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# Wagtail Documentation

*Release 2.7.1*

**Torchbox**

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Wagtail is an open source CMS written in [Python](#) and built on the [Django web framework](#).

Below are some useful links to help you get started with Wagtail.

If you'd like to get a quick feel for Wagtail, [explore the Wagtail Bakery](#), a fully-functional interactive demo (hosted at Divio Cloud).

- **First steps**

- *[Getting started](#)*
- *[Your first Wagtail site](#)*
- *[Demo site](#)*

- **Using Wagtail**

- *[Page models](#)*
- *[Writing templates](#)*
- *[Using images in templates](#)*
- *[Search](#)*
- *[Third-party tutorials](#)*

- **For editors**

- *[Editors guide](#)*



## 1.1 Getting started

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**Note:** These instructions assume familiarity with virtual environments and the [Django web framework](#). For more detailed instructions, see [Your first Wagtail site](#). To add Wagtail to an existing Django project, see [Integrating Wagtail into a Django project](#).

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### 1.1.1 Dependencies needed for installation

- [Python 3](#)
- **libjpeg** and **zlib**, libraries required for Django’s **Pillow** library. See Pillow’s [platform-specific installation instructions](#).

### 1.1.2 Quick install

Run the following in a virtual environment of your choice:

```
$ pip install wagtail
```

(Installing outside a virtual environment may require `sudo`.)

Once installed, Wagtail provides a command similar to Django’s `django-admin startproject` to generate a new site/project:

```
$ wagtail start mysite
```

This will create a new folder `mysite`, based on a template containing everything you need to get started. More information on that template is available in [the project template reference](#).

Inside your `mysite` folder, run the setup steps necessary for any Django project:

```
$ pip install -r requirements.txt
$ ./manage.py migrate
$ ./manage.py createsuperuser
$ ./manage.py runserver
```

Your site is now accessible at `http://localhost:8000`, with the admin backend available at `http://localhost:8000/admin/`.

This will set you up with a new stand-alone Wagtail project. If you'd like to add Wagtail to an existing Django project instead, see [Integrating Wagtail into a Django project](#).

There are a few optional packages which are not installed by default but are recommended to improve performance or add features to Wagtail, including:

- [Elasticsearch](#).
- [Feature Detection](#).

### Your first Wagtail site

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**Note:** This tutorial covers setting up a brand new Wagtail project. If you'd like to add Wagtail to an existing Django project instead, see [Integrating Wagtail into a Django project](#).

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## Install and run Wagtail

### Install dependencies

Wagtail supports Python 3.5, 3.6, 3.7 and 3.8.

To check whether you have an appropriate version of Python 3:

```
$ python3 --version
```

If this does not return a version number or returns a version lower than 3.5, you will need to [install Python 3](#).

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**Important:** Before installing Wagtail, it is necessary to install the **libjpeg** and **zlib** libraries, which provide support for working with JPEG, PNG and GIF images (via the Python **Pillow** library). The way to do this varies by platform—see Pillow's [platform-specific installation instructions](#).

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### Create and activate a virtual environment

We recommend using a virtual environment, which provides an isolated Python environment. This tutorial uses [venv](#), which is packaged with Python 3.

**On Windows** (cmd.exe):

```
$ python3 -m venv mysite\env
$ mysite\env\Scripts\activate.bat
```

**On Unix or MacOS** (bash):

```
$ python3 -m venv mysite/env
$ source mysite/env/bin/activate
```

For other shells see the [venv documentation](#).

---

**Note:** If you’re using version control (e.g. `git`), `mysite` will be the directory for your project. The `env` directory inside of it should be excluded from any version control.

---

## Install Wagtail

Use `pip`, which is packaged with Python, to install Wagtail and its dependencies:

```
$ pip install wagtail
```

## Generate your site

Wagtail provides a `start` command similar to `django-admin startproject`. Running `wagtail start mysite` in your project will generate a new `mysite` folder with a few Wagtail-specific extras, including the required project settings, a “home” app with a blank `HomePage` model and basic templates, and a sample “search” app.

Because the folder `mysite` was already created by `venv`, run `wagtail start` with an additional argument to specify the destination directory:

```
$ wagtail start mysite mysite
```

## Install project dependencies

```
$ cd mysite
$ pip install -r requirements.txt
```

This ensures that you have the relevant versions of Wagtail, Django, and any other dependencies for the project you have just created.

## Create the database

If you haven’t updated the project settings, this will be a SQLite database file in the project directory.

```
$ python manage.py migrate
```

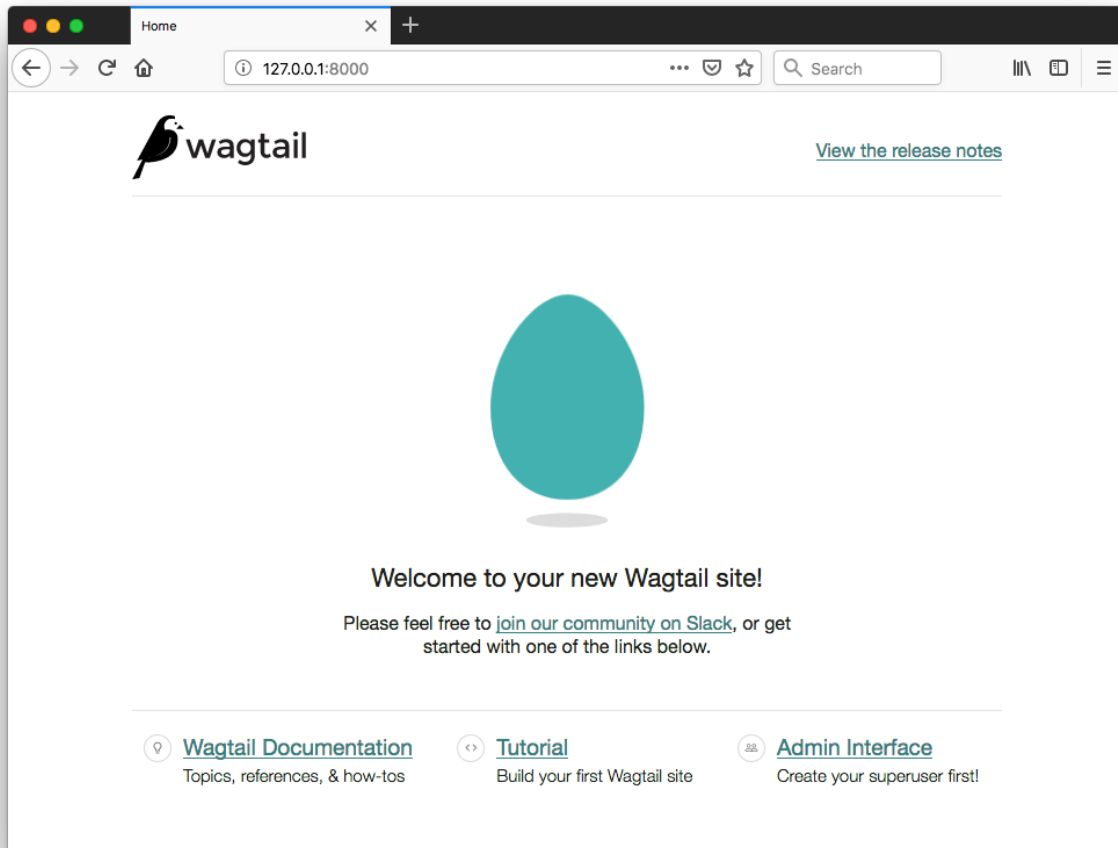
## Create an admin user

```
$ python manage.py createsuperuser
```

### Start the server

```
$ python manage.py runserver
```

If everything worked, <http://127.0.0.1:8000> will show you a welcome page:



You can now access the administrative area at <http://127.0.0.1:8000/admin>

### Extend the HomePage model

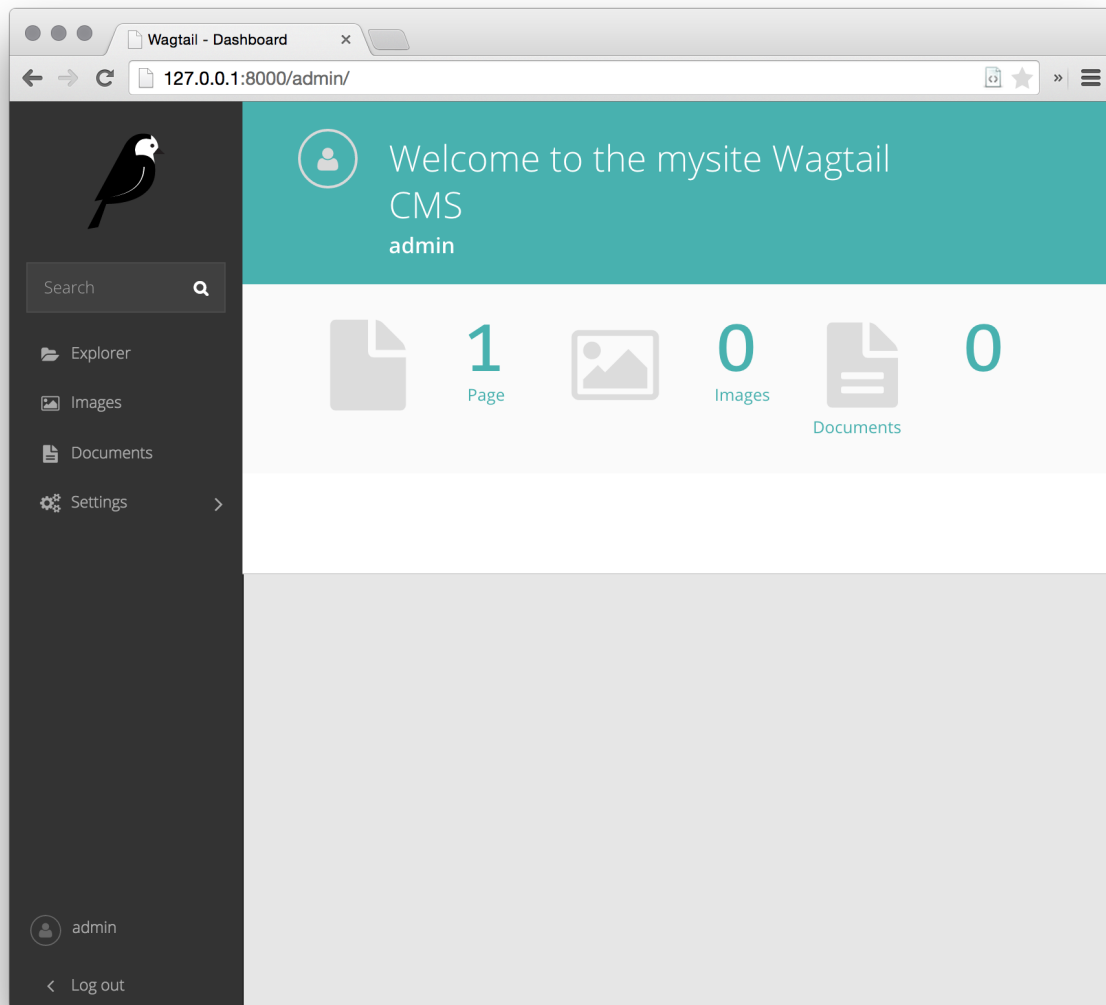
Out of the box, the “home” app defines a blank `HomePage` model in `models.py`, along with a migration that creates a homepage and configures Wagtail to use it.

Edit `home/models.py` as follows, to add a `body` field to the model:

```
from django.db import models

from wagtail.core.models import Page
from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel
```

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```
class HomePage(Page):
    body = RichTextField(blank=True)

    content_panels = Page.content_panels + [
        FieldPanel('body', classname="full"),
    ]
```

body is defined as `RichTextField`, a special Wagtail field. You can use any of the [Django core fields](#). `content_panels` define the capabilities and the layout of the editing interface. [More on creating Page models](#).

Run `python manage.py makemigrations`, then `python manage.py migrate` to update the database with your model changes. You must run the above commands each time you make changes to the model definition.

You can now edit the homepage within the Wagtail admin area (go to Pages, Homepage, then Edit) to see the new body field. Enter some text into the body field, and publish the page.

The page template now needs to be updated to reflect the changes made to the model. Wagtail uses normal Django templates to render each page type. By default, it will look for a template filename formed from the app and model name, separating capital letters with underscores (e.g. `HomePage` within the 'home' app becomes `home/home_page.html`). This template file can exist in any location recognised by [Django's template rules](#); conventionally it is placed under a `templates` folder within the app.

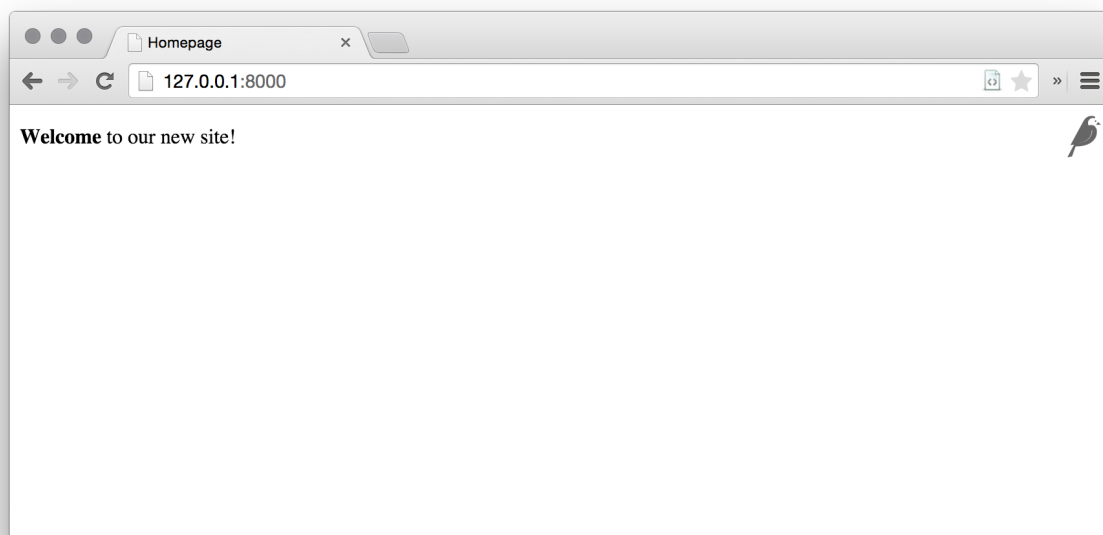
Edit `home/templates/home/home_page.html` to contain the following:

```
{% extends "base.html" %}

{% load wagtailcore_tags %}

{% block body_class %}template-homepage{% endblock %}

{% block content %}
    {{ page.body|richtext }}
{% endblock %}
```





## Wagtail template tags

Wagtail provides a number of *template tags & filters* which can be loaded by including `{% load wagtailcore_tags %}` at the top of your template file.

In this tutorial, we use the *richtext* filter to escape and print the contents of a `RichTextField`:

```
{% load wagtailcore_tags %}
{{ page.body|richtext }}
```

Produces:

```
<div class="rich-text">
  <p>
    <b>Welcome</b> to our new site!
  </p>
</div>
```

**Note:** You'll need to include `{% load wagtailcore_tags %}` in each template that uses Wagtail's tags. Django will throw a `TemplateSyntaxError` if the tags aren't loaded.

## A basic blog

We are now ready to create a blog. To do so, run `python manage.py startapp blog` to create a new app in your Wagtail site.

Add the new `blog` app to `INSTALLED_APPS` in `mysite/settings/base.py`.

## Blog Index and Posts

Lets start with a simple index page for our blog. In `blog/models.py`:

```
from wagtail.core.models import Page
from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel

class BlogIndexPage(Page):
    intro = RichTextField(blank=True)

    content_panels = Page.content_panels + [
        FieldPanel('intro', classname="full")
    ]
```

Run `python manage.py makemigrations` and `python manage.py migrate`.

Since the model is called `BlogIndexPage`, the default template name (unless we override it) will be `blog/templates/blog/blog_index_page.html`. Create this file with the following content:

```
{% extends "base.html" %}

{% load wagtailcore_tags %}

{% block body_class %}template-blogindexpage{% endblock %}
```

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```
{% block content %}
    <h1>{{ page.title }}</h1>

    <div class="intro">{{ page.intro|richtext }}</div>

    {% for post in page.get_children %}
        <h2><a href="{% pageurl post %}">{{ post.title }}</a></h2>
        {{ post.specific.intro }}
        {{ post.specific.body|richtext }}
    {% endfor %}

{% endblock %}
```

Most of this should be familiar, but we'll explain `get_children` a bit later. Note the `pageurl` tag, which is similar to Django's `url` tag but takes a Wagtail Page object as an argument.

In the Wagtail admin, create a `BlogIndexPage` as a child of the Homepage, make sure it has the slug "blog" on the Promote tab, and publish it. You should now be able to access the url `/blog` on your site (note how the slug from the Promote tab defines the page URL).

Now we need a model and template for our blog posts. In `blog/models.py`:

```
from django.db import models

from wagtail.core.models import Page
from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel
from wagtail.search import index

# Keep the definition of BlogIndexPage, and add:

class BlogPage(Page):
    date = models.DateField("Post date")
    intro = models.CharField(max_length=250)
    body = RichTextField(blank=True)

    search_fields = Page.search_fields + [
        index.SearchField('intro'),
        index.SearchField('body'),
    ]

    content_panels = Page.content_panels + [
        FieldPanel('date'),
        FieldPanel('intro'),
        FieldPanel('body', classname="full"),
    ]
```

Run `python manage.py makemigrations` and `python manage.py migrate`.

Create a template at `blog/templates/blog/blog_page.html`:

```
{% extends "base.html" %}

{% load wagtailcore_tags %}
```

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```
{% block body_class %}template-blogpage{% endblock %}

{% block content %}
<h1>{{ page.title }}</h1>
<p class="meta">{{ page.date }}</p>

<div class="intro">{{ page.intro }}</div>

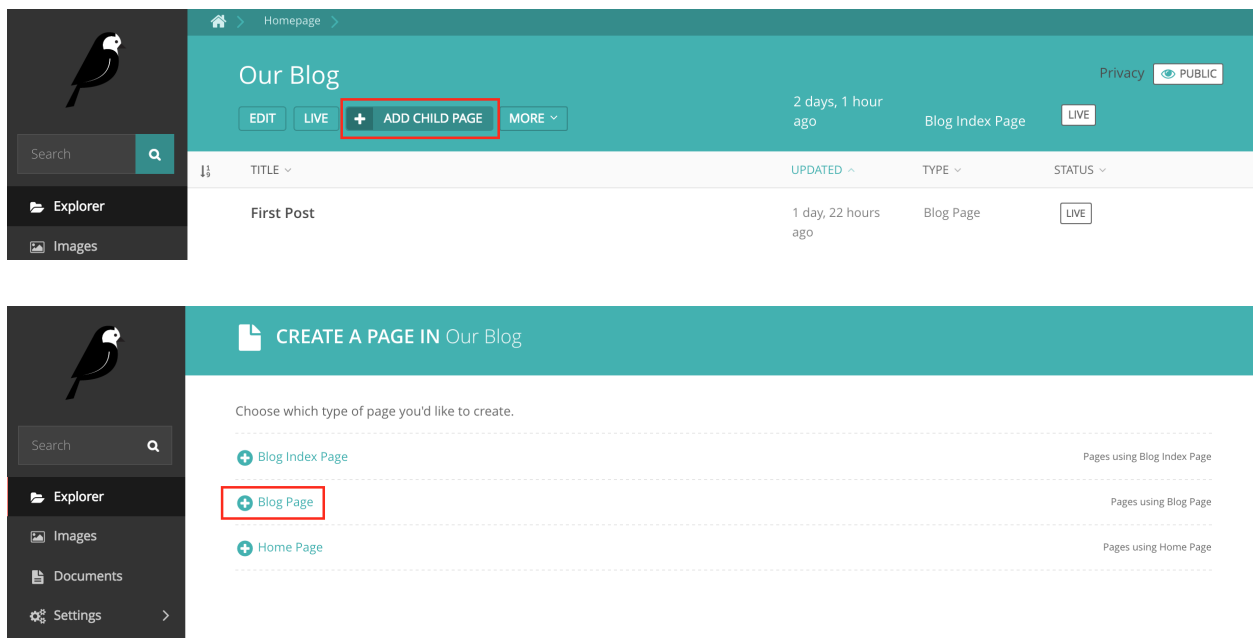
{{ page.body|richtext }}

<p><a href="{{ page.get_parent.url }}">Return to blog</a></p>

{% endblock %}
```

Note the use of Wagtail’s built-in `get_parent()` method to obtain the URL of the blog this post is a part of.

Now create a few blog posts as children of `BlogIndexPage`. Be sure to select type “Blog Page” when creating your posts.



Wagtail gives you full control over what kinds of content can be created under various parent content types. By default, any page type can be a child of any other page type.

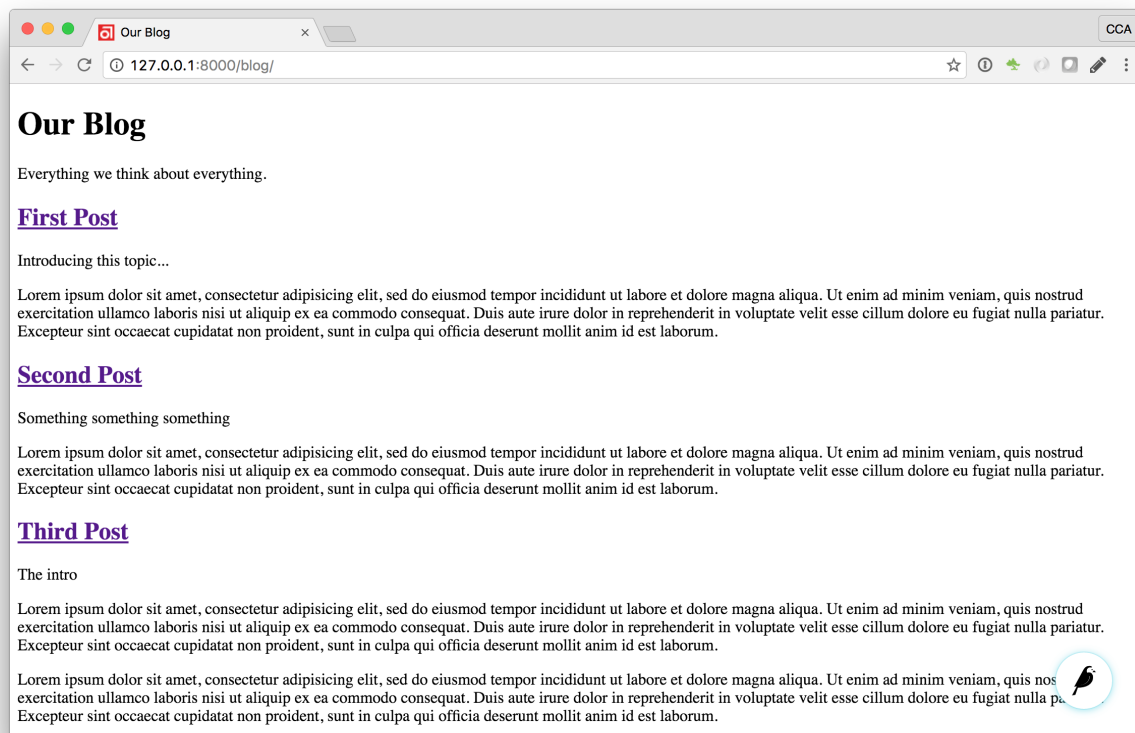
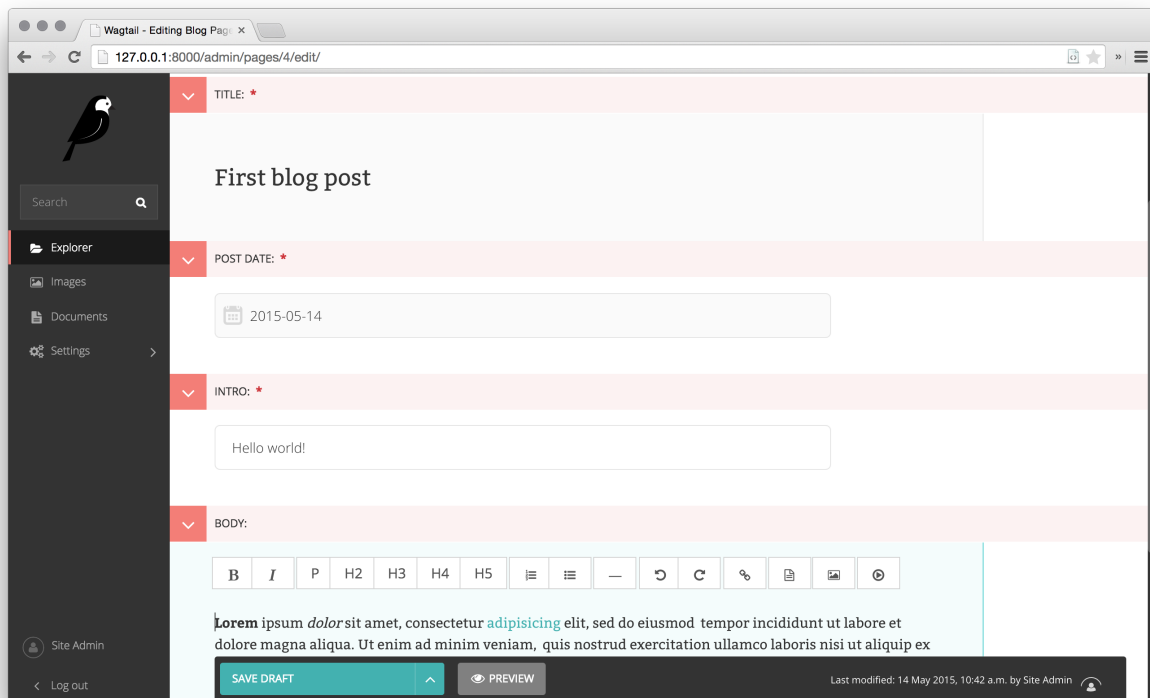
You should now have the very beginnings of a working blog. Access the `/blog` URL and you should see something like this:

Titles should link to post pages, and a link back to the blog’s homepage should appear in the footer of each post page.

## Parents and Children

Much of the work you’ll be doing in Wagtail revolves around the concept of hierarchical “tree” structures consisting of nodes and leaves (see *Theory*). In this case, the `BlogIndexPage` is a “node” and individual `BlogPage` instances are the “leaves”.

Take another look at the guts of `blog_index_page.html`:



```
{% for post in page.get_children %}
    <h2><a href="{% pageurl post %}">{{ post.title }}</a></h2>
    {{ post.specific.intro }}
    {{ post.specific.body|richtext }}
{% endfor %}
```

Every “page” in Wagtail can call out to its parent or children from its own position in the hierarchy. But why do we have to specify `post.specific.intro` rather than `post.intro`? This has to do with the way we defined our model:

```
class BlogPage(Page):
```

The `get_children()` method gets us a list of instances of the `Page` base class. When we want to reference properties of the instances that inherit from the base class, Wagtail provides the `specific` method that retrieves the actual `BlogPage` record. While the “title” field is present on the base `Page` model, “intro” is only present on the `BlogPage` model, so we need `.specific` to access it.

To tighten up template code like this, we could use Django’s `with` tag:

```
{% for post in page.get_children %}
    {% with post=post.specific %}
        <h2><a href="{% pageurl post %}">{{ post.title }}</a></h2>
        <p>{{ post.intro }}</p>
        {{ post.body|richtext }}
    {% endwith %}
{% endfor %}
```

When you start writing more customized Wagtail code, you’ll find a whole set of `QuerySet` modifiers to help you navigate the hierarchy.

```
# Given a page object 'somepage':
MyModel.objects.descendant_of(somepage)
child_of(page) / not_child_of(somepage)
ancestor_of(somepage) / not_ancestor_of(somepage)
parent_of(somepage) / not_parent_of(somepage)
sibling_of(somepage) / not_sibling_of(somepage)
# ... and ...
somepage.get_children()
somepage.get_ancestors()
somepage.get_descendants()
somepage.get_siblings()
```

For more information, see: [Page QuerySet reference](#)

## Overriding Context

There are a couple of problems with our blog index view:

- 1) Blogs generally display content in *reverse* chronological order
- 2) We want to make sure we’re only displaying *published* content.

To accomplish these things, we need to do more than just grab the index page’s children in the template. Instead, we’ll want to modify the `QuerySet` in the model definition. Wagtail makes this possible via the overridable `get_context()` method. Modify your `BlogIndexPage` model like this:

```
class BlogIndexPage(Page):
    intro = RichTextField(blank=True)

    def get_context(self, request):
        # Update context to include only published posts, ordered by reverse-chron
        context = super().get_context(request)
        blogpages = self.get_children().live().order_by('-first_published_at')
        context['blogpages'] = blogpages
        return context
```

All we've done here is retrieve the original context, create a custom QuerySet, add it to the retrieved context, and return the modified context back to the view. You'll also need to modify your `blog_index_page.html` template slightly. Change:

```
{% for post in page.get_children %} to {% for post in blogpages %}
```

Now try unpublishing one of your posts - it should disappear from the blog index page. The remaining posts should now be sorted with the most recently published posts first.

## Images

Let's add the ability to attach an image gallery to our blog posts. While it's possible to simply insert images into the body rich text field, there are several advantages to setting up our gallery images as a new dedicated object type within the database - this way, you have full control of the layout and styling of the images on the template, rather than having to lay them out in a particular way within the rich text field. It also makes it possible for the images to be used elsewhere, independently of the blog text - for example, displaying a thumbnail on the blog index page.

Add a new `BlogPageGalleryImage` model to `models.py`:

```
from django.db import models

# New imports added for ParentalKey, Orderable, InlinePanel, ImageChooserPanel

from modelcluster.fields import ParentalKey

from wagtail.core.models import Page, Orderable
from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel, InlinePanel
from wagtail.images.edit_handlers import ImageChooserPanel
from wagtail.search import index

# ... (Keep the definition of BlogIndexPage, and update BlogPage:)

class BlogPage(Page):
    date = models.DateField("Post date")
    intro = models.CharField(max_length=250)
    body = RichTextField(blank=True)

    search_fields = Page.search_fields + [
        index.SearchField('intro'),
        index.SearchField('body'),
    ]

    content_panels = Page.content_panels + [
```

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```

        FieldPanel('date'),
        FieldPanel('intro'),
        FieldPanel('body', classname="full"),
        InlinePanel('gallery_images', label="Gallery images"),
    ]

class BlogPageGalleryImage(Orderable):
    page = ParentalKey(BlogPage, on_delete=models.CASCADE, related_name='gallery_
↪images')
    image = models.ForeignKey(
        'wagtailimages.Image', on_delete=models.CASCADE, related_name='+'
    )
    caption = models.CharField(blank=True, max_length=250)

    panels = [
        ImageChooserPanel('image'),
        FieldPanel('caption'),
    ]

```

Run `python manage.py makemigrations` and `python manage.py migrate`.

There are a few new concepts here, so let's take them one at a time:

Inheriting from `Orderable` adds a `sort_order` field to the model, to keep track of the ordering of images in the gallery.

The `ParentalKey` to `BlogPage` is what attaches the gallery images to a specific page. A `ParentalKey` works similarly to a `ForeignKey`, but also defines `BlogPageGalleryImage` as a “child” of the `BlogPage` model, so that it's treated as a fundamental part of the page in operations like submitting for moderation, and tracking revision history.

`image` is a `ForeignKey` to Wagtail's built-in `Image` model, where the images themselves are stored. This comes with a dedicated panel type, `ImageChooserPanel`, which provides a pop-up interface for choosing an existing image or uploading a new one. This way, we allow an image to exist in multiple galleries - effectively, we've created a many-to-many relationship between pages and images.

Specifying `on_delete=models.CASCADE` on the foreign key means that if the image is deleted from the system, the gallery entry is deleted as well. (In other situations, it might be appropriate to leave the entry in place - for example, if an “our staff” page included a list of people with headshots, and one of those photos was deleted, we'd rather leave the person in place on the page without a photo. In this case, we'd set the foreign key to `blank=True, null=True, on_delete=models.SET_NULL`.)

Finally, adding the `InlinePanel` to `BlogPage.content_panels` makes the gallery images available on the editing interface for `BlogPage`.

Adjust your blog page template to include the images:

```

{% extends "base.html" %}

{% load wagtailcore_tags wagtailimages_tags %}

{% block body_class %}template-blogpage{% endblock %}

{% block content %}
    <h1>{{ page.title }}</h1>
    <p class="meta">{{ page.date }}</p>

```

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```

<div class="intro">{{ page.intro }}</div>

{{ page.body|richtext }}

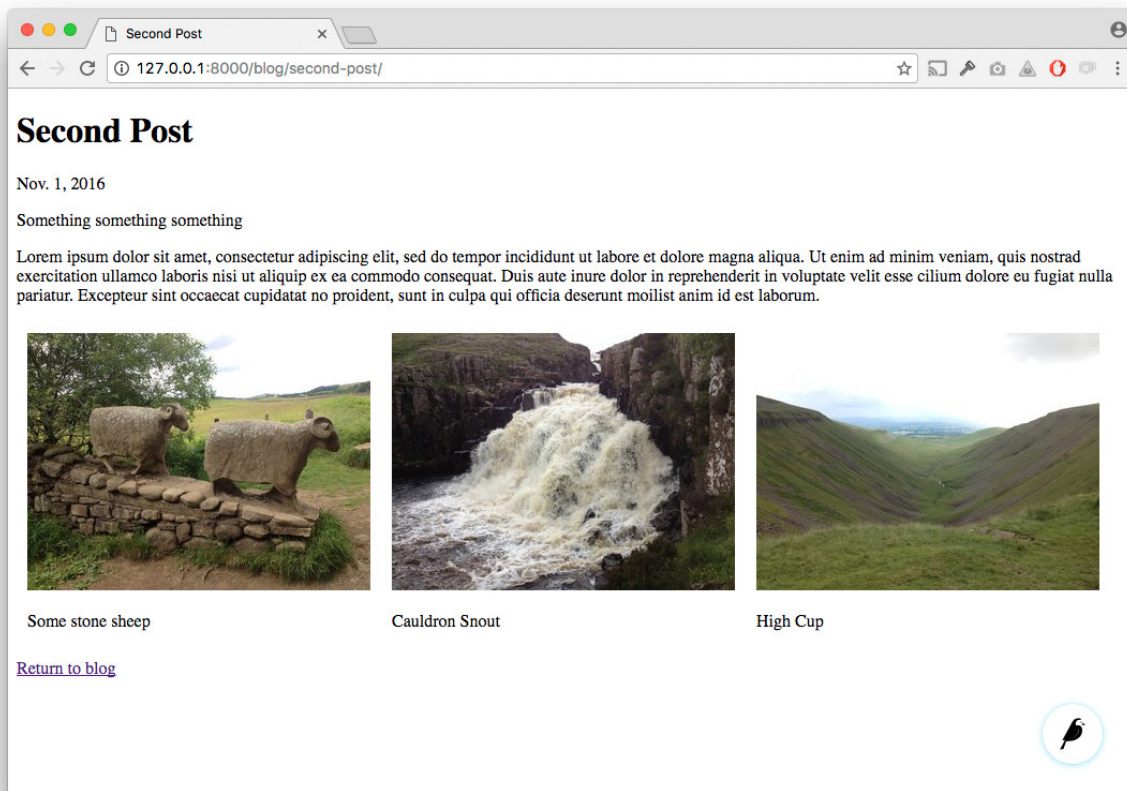
{% for item in page.gallery_images.all %}
    <div style="float: left; margin: 10px">
        {% image item.image fill-320x240 %}
        <p>{{ item.caption }}</p>
    </div>
{% endfor %}

<p><a href="{{ page.get_parent.url }}">Return to blog</a></p>

{% endblock %}

```

Here we use the `{% image %}` tag (which exists in the `wagtailimages_tags` library, imported at the top of the template) to insert an `<img>` element, with a `fill-320x240` parameter to indicate that the image should be resized and cropped to fill a 320x240 rectangle. You can read more about using images in templates in the [docs](#).



Since our gallery images are database objects in their own right, we can now query and re-use them independently of the blog post body. Let's define a `main_image` method, which returns the image from the first gallery item (or `None` if no gallery items exist):

```
class BlogPage(Page):
```

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```

date = models.DateField("Post date")
intro = models.CharField(max_length=250)
body = RichTextField(blank=True)

def main_image(self):
    gallery_item = self.gallery_images.first()
    if gallery_item:
        return gallery_item.image
    else:
        return None

search_fields = Page.search_fields + [
    index.SearchField('intro'),
    index.SearchField('body'),
]

content_panels = Page.content_panels + [
    FieldPanel('date'),
    FieldPanel('intro'),
    FieldPanel('body', classname="full"),
    InlinePanel('gallery_images', label="Gallery images"),
]

```

This method is now available from our templates. Update `blog_index_page.html` to include the main image as a thumbnail alongside each post:

```

{% load wagtailcore_tags wagtailimages_tags %}

...

{% for post in blogpages %}
    {% with post=post.specific %}
        <h2><a href="{% pageurl post %}">{{ post.title }}</a></h2>

        {% with post.main_image as main_image %}
            {% if main_image %}{% image main_image fill-160x100 %}{% endif %}
        {% endwith %}

        <p>{{ post.intro }}</p>
        {{ post.body|richtext }}
    {% endwith %}
{% endfor %}

```

## Tagging Posts

Let's say we want to let editors "tag" their posts, so that readers can, e.g., view all bicycle-related content together. For this, we'll need to invoke the tagging system bundled with Wagtail, attach it to the `BlogPage` model and content panels, and render linked tags on the blog post template. Of course, we'll need a working tag-specific URL view as well.

First, alter `models.py` once more:

```

from django.db import models

# New imports added for ClusterTaggableManager, TaggedItemBase, MultiFieldPanel

```

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```

from modelcluster.fields import ParentalKey
from modelcluster.contrib.taggit import ClusterTaggableManager
from taggit.models import TaggedItemBase

from wagtail.core.models import Page, Orderable
from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel, InlinePanel, MultiFieldPanel
from wagtail.images.edit_handlers import ImageChooserPanel
from wagtail.search import index

# ... (Keep the definition of BlogIndexPage)

class BlogPageTag(TaggedItemBase):
    content_object = ParentalKey(
        'BlogPage',
        related_name='tagged_items',
        on_delete=models.CASCADE
    )

class BlogPage(Page):
    date = models.DateField("Post date")
    intro = models.CharField(max_length=250)
    body = RichTextField(blank=True)
    tags = ClusterTaggableManager(through=BlogPageTag, blank=True)

    # ... (Keep the main_image method and search_fields definition)

    content_panels = Page.content_panels + [
        MultiFieldPanel([
            FieldPanel('date'),
            FieldPanel('tags'),
        ], heading="Blog information"),
        FieldPanel('intro'),
        FieldPanel('body'),
        InlinePanel('gallery_images', label="Gallery images"),
    ]

```

Run `python manage.py makemigrations` and `python manage.py migrate`.

Note the new `modelcluster` and `taggit` imports, the addition of a new `BlogPageTag` model, and the addition of a `tags` field on `BlogPage`. We've also taken the opportunity to use a `MultiFieldPanel` in `content_panels` to group the date and tags fields together for readability.

Edit one of your `BlogPage` instances, and you should now be able to tag posts:

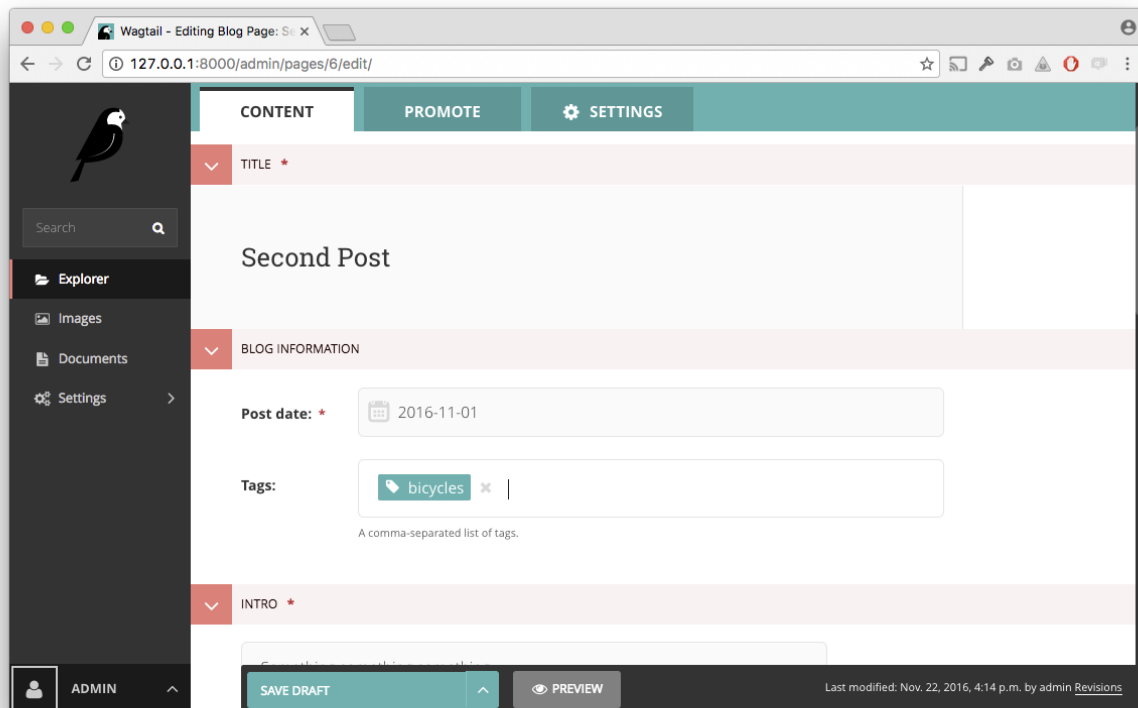
To render tags on a `BlogPage`, add this to `blog_page.html`:

```

{% if page.tags.all.count %}
    <div class="tags">
        <h3>Tags</h3>
        {% for tag in page.tags.all %}
            <a href="{% slugurl 'tags' %}?tag={{ tag }}"><button type="button">{{ tag_
↵ }}</button></a>

```

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```

    {% endfor %}
</div>
{% endif %}

```

Notice that we’re linking to pages here with the builtin `slugurl` tag rather than `pageurl`, which we used earlier. The difference is that `slugurl` takes a Page slug (from the Promote tab) as an argument. `pageurl` is more commonly used because it is unambiguous and avoids extra database lookups. But in the case of this loop, the Page object isn’t readily available, so we fall back on the less-preferred `slugurl` tag.

Visiting a blog post with tags should now show a set of linked buttons at the bottom - one for each tag. However, clicking a button will get you a 404, since we haven’t yet defined a “tags” view. Add to `models.py`:

```

class BlogTagIndexPage(Page):

    def get_context(self, request):

        # Filter by tag
        tag = request.GET.get('tag')
        blogpages = BlogPage.objects.filter(tags__name=tag)

        # Update template context
        context = super().get_context(request)
        context['blogpages'] = blogpages
        return context

```

Note that this Page-based model defines no fields of its own. Even without fields, subclassing `Page` makes it a part of the Wagtail ecosystem, so that you can give it a title and URL in the admin, and so that you can manipulate its contents

by returning a `QuerySet` from its `get_context()` method.

Migrate this in, then create a new `BlogTagIndexPage` in the admin. You'll probably want to create the new page/view as a child of `Homepage`, parallel to your `Blog` index. Give it the slug "tags" on the Promote tab.

Access `/tags` and Django will tell you what you probably already knew: you need to create a template `blog/blog_tag_index_page.html`:

```
{% extends "base.html" %}
{% load wagtailcore_tags %}

{% block content %}

    {% if request.GET.tag|length %}
        <h4>Showing pages tagged "{{ request.GET.tag }}"</h4>
    {% endif %}

    {% for blogpage in blogpages %}

        <p>
            <strong><a href="{% pageurl blogpage %}">{{ blogpage.title }}</a></
→strong><br />
            <small>Revised: {{ blogpage.latest_revision_created_at }}</small><br />
            {% if blogpage.author %}
                <p>By {{ blogpage.author.profile }}</p>
            {% endif %}
        </p>

    {% empty %}
        No pages found with that tag.
    {% endfor %}

{% endblock %}
```

We're calling the built-in `latest_revision_created_at` field on the `Page` model - handy to know this is always available.

We haven't yet added an "author" field to our `BlogPage` model, nor do we have a `Profile` model for authors - we'll leave those as an exercise for the reader.

Clicking the tag button at the bottom of a `BlogPost` should now render a page something like this:

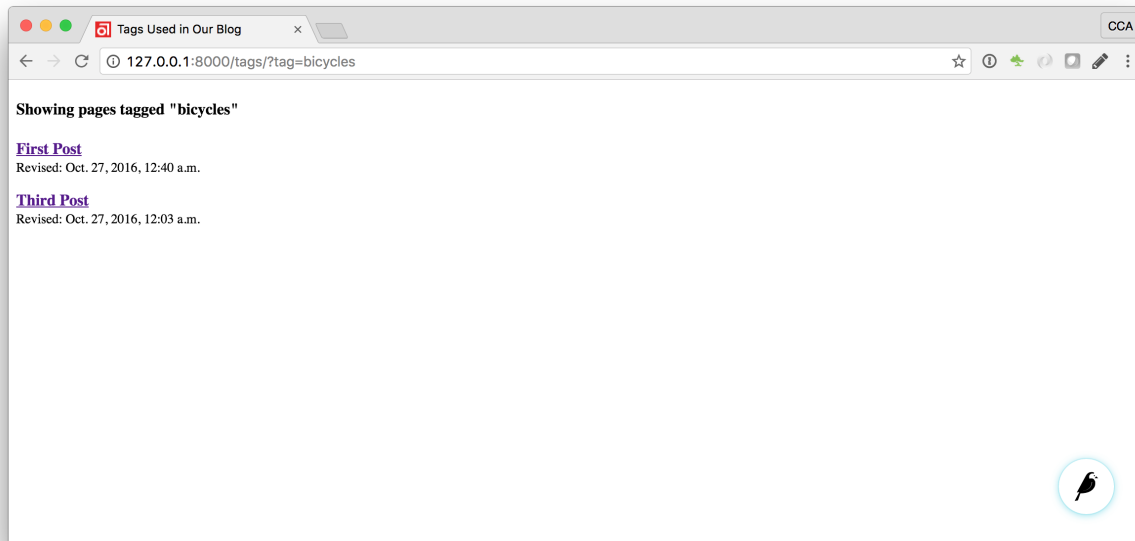
## Categories

Let's add a category system to our blog. Unlike tags, where a page author can bring a tag into existence simply by using it on a page, our categories will be a fixed list, managed by the site owner through a separate area of the admin interface.

First, we define a `BlogCategory` model. A category is not a page in its own right, and so we define it as a standard Django `models.Model` rather than inheriting from `Page`. Wagtail introduces the concept of "snippets" for reusable pieces of content that need to be managed through the admin interface, but do not exist as part of the page tree themselves; a model can be registered as a snippet by adding the `@register_snippet` decorator. All the field types we've used so far on pages can be used on snippets too - here we'll give each category an icon image as well as a name. Add to `blog/models.py`:

```
from wagtail.snippets.models import register_snippet
```

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```
@register_snippet
class BlogCategory(models.Model):
    name = models.CharField(max_length=255)
    icon = models.ForeignKey(
        'wagtailimages.Image', null=True, blank=True,
        on_delete=models.SET_NULL, related_name='+'
    )

    panels = [
        FieldPanel('name'),
        ImageChooserPanel('icon'),
    ]

    def __str__(self):
        return self.name

    class Meta:
        verbose_name_plural = 'blog categories'
```

**Note:** Note that we are using `panels` rather than `content_panels` here - since snippets generally have no need for fields such as slug or publish date, the editing interface for them is not split into separate ‘content’ / ‘promote’ / ‘settings’ tabs as standard, and so there is no need to distinguish between ‘content panels’ and ‘promote panels’.

Migrate this change in, and create a few categories through the Snippets area which now appears in the admin menu.

We can now add categories to the `BlogPage` model, as a many-to-many field. The field type we use for this is `ParentalManyToManyField` - this is a variant of the standard Django `ManyToManyField` which ensures that the chosen objects are correctly stored against the page record in the revision history, in much the same way that `ParentalKey` replaces `ForeignKey` for one-to-many relations.

```
# New imports added for forms and ParentalManyToManyField
from django import forms
from django.db import models

from modelcluster.fields import ParentalKey, ParentalManyToManyField
from modelcluster.contrib.taggit import ClusterTaggableManager
from taggit.models import TaggedItemBase

# ...

class BlogPage(Page):
    date = models.DateField("Post date")
    intro = models.CharField(max_length=250)
    body = RichTextField(blank=True)
    tags = ClusterTaggableManager(through=BlogPageTag, blank=True)
    categories = ParentalManyToManyField('blog.BlogCategory', blank=True)

    # ... (Keep the main_image method and search_fields definition)

    content_panels = Page.content_panels + [
        MultiFieldPanel([
            FieldPanel('date'),
            FieldPanel('tags'),
            FieldPanel('categories', widget=forms.CheckboxSelectMultiple),
        ], heading="Blog information"),
        FieldPanel('intro'),
        FieldPanel('body'),
        InlinePanel('gallery_images', label="Gallery images"),
    ]
```

Here we're making use of the `widget` keyword argument on the `FieldPanel` definition to specify a checkbox-based widget instead of the default multiple select box, as this is often considered more user-friendly.

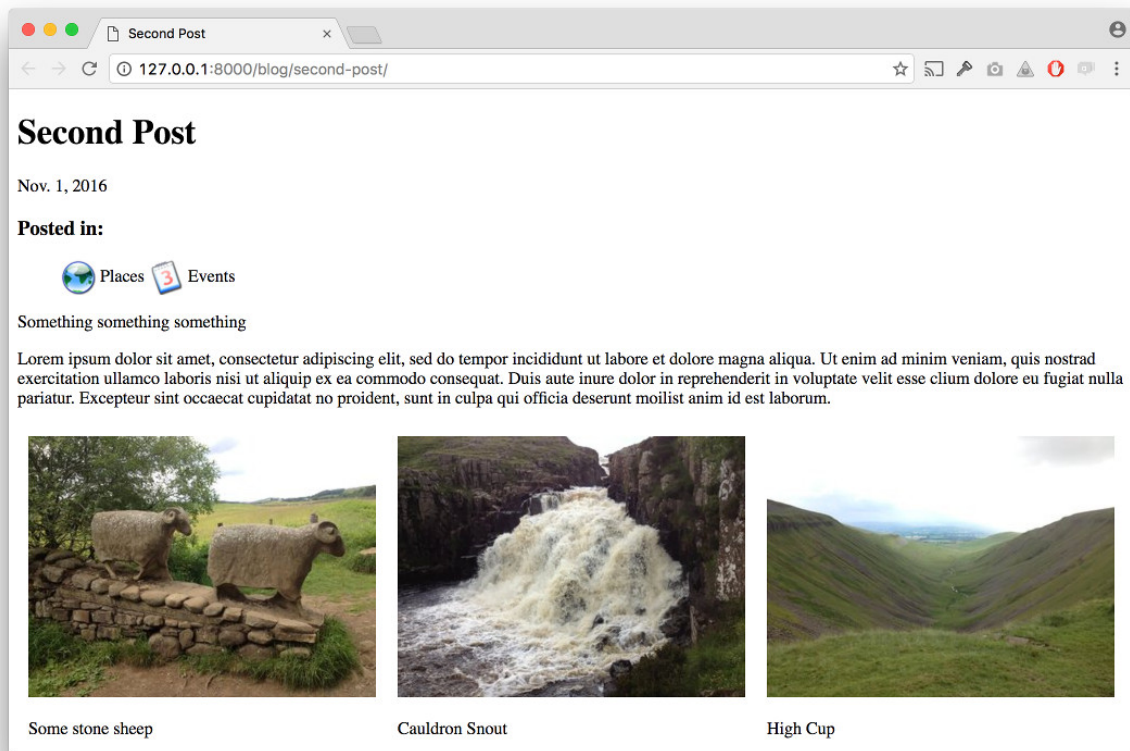
Finally, we can update the `blog_page.html` template to display the categories:

```
<h1>{{ page.title }}</h1>
<p class="meta">{{ page.date }}</p>

{% with categories=page.categories.all %}
    {% if categories %}
        <h3>Posted in:</h3>
        <ul>
            {% for category in categories %}
                <li style="display: inline">
                    {% image category.icon fill-32x32 style="vertical-align: middle"
↪ %}
                    {{ category.name }}
                </li>
            {% endfor %}
        </ul>
    {% endif %}
{% endwith %}
```

## Where next

- Read the Wagtail [topics](#) and [reference](#) documentation



- Learn how to implement *StreamField* for freeform page content
- Browse through the *advanced topics* section and read *third-party tutorials*

### Demo site

To create a new site on Wagtail we recommend the `wagtail start` command in *Getting started*; however, a demo site, The Wagtail Bakery, exists containing example page types and models. We also recommend you use the demo site for testing during development of Wagtail itself.

The repo and installation instructions can be found here: <https://github.com/wagtail/bakerydemo>

### Integrating Wagtail into a Django project

Wagtail provides the `wagtail start` command and project template to get you started with a new Wagtail project as quickly as possible, but it's easy to integrate Wagtail into an existing Django project too.

Wagtail is currently compatible with Django 2.0, 2.1 and 2.2. First, install the `wagtail` package from PyPI:

```
$ pip install wagtail
```

or add the package to your existing requirements file. This will also install the **Pillow** library as a dependency, which requires libjpeg and zlib - see Pillow's [platform-specific installation instructions](#).

### Settings

In your settings file, add the following apps to `INSTALLED_APPS`:

```
'wagtail.contrib.forms',
'wagtail.contrib.redirects',
'wagtail.embeds',
'wagtail.sites',
'wagtail.users',
'wagtail.snippets',
'wagtail.documents',
'wagtail.images',
'wagtail.search',
'wagtail.admin',
'wagtail.core',

'modelcluster',
'taggit',
```

Add the following entries to `MIDDLEWARE`:

```
'wagtail.core.middleware.SiteMiddleware',
'wagtail.contrib.redirects.middleware.RedirectMiddleware',
```

---

**Note:** Wagtail is currently incompatible with projects using `django.contrib.sites.middleware.CurrentSiteMiddleware`, as both this and `wagtail.core.middleware.SiteMiddleware` set the attribute `request.site`.

---

Add a `STATIC_ROOT` setting, if your project does not have one already:



```
STATIC_ROOT = os.path.join(BASE_DIR, 'static')
```

Add `MEDIA_ROOT` and `MEDIA_URL` settings, if your project does not have these already:

```
MEDIA_ROOT = os.path.join(BASE_DIR, 'media')
MEDIA_URL = '/media/'
```

Add a `WAGTAIL_SITE_NAME` - this will be displayed on the main dashboard of the Wagtail admin backend:

```
WAGTAIL_SITE_NAME = 'My Example Site'
```

Various other settings are available to configure Wagtail's behaviour - see *Configuring Django for Wagtail*.

## URL configuration

Now make the following additions to your `urls.py` file:

```
from django.urls import path, re_path, include

from wagtail.admin import urls as wagtailadmin_urls
from wagtail.core import urls as wagtail_urls
from wagtail.documents import urls as wagtaildocs_urls

urlpatterns = [
    ...
    re_path(r'^cms/', include(wagtailadmin_urls)),
    re_path(r'^documents/', include(wagtaildocs_urls)),
    re_path(r'^pages/', include(wagtail_urls)),
    ...
]
```

The URL paths here can be altered as necessary to fit your project's URL scheme.

`wagtailadmin_urls` provides the admin interface for Wagtail. This is separate from the Django admin interface (`django.contrib.admin`); Wagtail-only projects typically host the Wagtail admin at `/admin/`, but if this would clash with your project's existing admin backend then an alternative path can be used, such as `/cms/` here.

`wagtaildocs_urls` is the location from where document files will be served. This can be omitted if you do not intend to use Wagtail's document management features.

`wagtail_urls` is the base location from where the pages of your Wagtail site will be served. In the above example, Wagtail will handle URLs under `/pages/`, leaving the root URL and other paths to be handled as normal by your Django project. If you want Wagtail to handle the entire URL space including the root URL, this can be replaced with:

```
re_path(r'', include(wagtail_urls)),
```

In this case, this should be placed at the end of the `urlpatterns` list, so that it does not override more specific URL patterns.

Finally, your project needs to be set up to serve user-uploaded files from `MEDIA_ROOT`. Your Django project may already have this in place, but if not, add the following snippet to `urls.py`:

```
from django.conf import settings
from django.conf.urls.static import static

urlpatterns = [
```

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```
# ... the rest of your URLconf goes here ...  
] + static(settings.MEDIA_URL, document_root=settings.MEDIA_ROOT)
```

Note that this only works in development mode (`DEBUG = True`); in production, you will need to configure your web server to serve files from `MEDIA_ROOT`. For further details, see the Django documentation: [Serving files uploaded by a user during development](#) and [Deploying static files](#).

With this configuration in place, you are ready to run `./manage.py migrate` to create the database tables used by Wagtail.

## User accounts

Superuser accounts receive automatic access to the Wagtail admin interface; use `./manage.py createsuperuser` if you don't already have one. Custom user models are supported, with some restrictions; Wagtail uses an extension of Django's permissions framework, so your user model must at minimum inherit from `AbstractBaseUser` and `PermissionsMixin`.

## Start developing

You're now ready to add a new app to your Django project (via `./manage.py startapp` - remember to add it to `INSTALLED_APPS`) and set up page models, as described in [Your first Wagtail site](#).

Note that there's one small difference when not using the Wagtail project template: Wagtail creates an initial homepage of the basic type `Page`, which does not include any content fields beyond the title. You'll probably want to replace this with your own `HomePage` class - when you do so, ensure that you set up a site record (under Settings / Sites in the Wagtail admin) to point to the new homepage.

## The Zen of Wagtail

Wagtail has been born out of many years of experience building websites, learning approaches that work and ones that don't, and striking a balance between power and simplicity, structure and flexibility. We hope you'll find that Wagtail is in that sweet spot. However, as a piece of software, Wagtail can only take that mission so far - it's now up to you to create a site that's beautiful and a joy to work with. So, while it's tempting to rush ahead and start building, it's worth taking a moment to understand the design principles that Wagtail is built on.

In the spirit of “[The Zen of Python](#)”, The Zen of Wagtail is a set of guiding principles, both for building websites in Wagtail, and for the ongoing development of Wagtail itself.

## Wagtail is not an instant website in a box.

You can't make a beautiful website by plugging off-the-shelf modules together - expect to write code.

## Always wear the right hat.

The key to using Wagtail effectively is to recognise that there are multiple roles involved in creating a website: the content author, site administrator, developer and designer. These may well be different people, but they don't have to be - if you're using Wagtail to build your personal blog, you'll probably find yourself hopping between those different roles. Either way, it's important to be aware of which of those hats you're wearing at any moment, and to use the right tools for that job. A content author or site administrator will do the bulk of their work through the Wagtail admin interface; a developer or designer will spend most of their time writing Python, HTML or CSS code. This is a good

thing: Wagtail isn't designed to replace the job of programming. Maybe one day someone will come up with a drag-and-drop UI for building websites that's as powerful as writing code, but Wagtail is not that tool, and does not try to be.

A common mistake is to push too much power and responsibility into the hands of the content author and site administrator - indeed, if those people are your clients, they'll probably be loudly clamouring for exactly that. The success of your site depends on your ability to say no. The real power of content management comes not from handing control over to CMS users, but from setting clear boundaries between the different roles. Amongst other things, this means not having editors doing design and layout within the content editing interface, and not having site administrators building complex interaction workflows that would be better achieved in code.

### **A CMS should get information out of an editor's head and into a database, as efficiently and directly as possible.**

Whether your site is about cars, cats, cakes or conveyancing, your content authors will be arriving at the Wagtail admin interface with some domain-specific information they want to put up on the website. Your aim as a site builder is to extract and store this information in its raw form - not one particular author's idea of how that information should look.

Keeping design concerns out of page content has numerous advantages. It ensures that the design remains consistent across the whole site, not subject to the whims of editors from one day to the next. It allows you to make full use of the informational content of the pages - for example, if your pages are about events, then having a dedicated "Event" page type with data fields for the event date and location will let you present the events in a calendar view or filtered listing, which wouldn't be possible if those were just implemented as different styles of heading on a generic page. Finally, if you redesign the site at some point in the future, or move it to a different platform entirely, you can be confident that the site content will work in its new setting, and not be reliant on being formatted a particular way.

Suppose a content author comes to you with a request: "We need this text to be in bright pink Comic Sans". Your question to them should be "Why? What's special about this particular bit of text?" If the reply is "I just like the look of it", then you'll have to gently persuade them that it's not up to them to make design choices. (Sorry.) But if the answer is "it's for our Children's section", then that gives you a way to divide the editorial and design concerns: give your editors the ability to designate certain pages as being "the Children's section" (through tagging, different page models, or the site hierarchy) and let designers decide how to apply styles based on that.


### **The best user interface for a programmer is usually a programming language.**

A common sight in content management systems is a point-and-click interface to let you define the data model that makes up a page:










It looks nice in the sales pitch, but in reality, no CMS end-user can realistically make that kind of fundamental change - on a live site, no less - unless they have a programmer's insight into how the site is built, and what impact the change will have. As such, it will always be the programmer's job to negotiate that point-and-click interface - all you've done is taken them away from the comfortable world of writing code, where they have a whole ecosystem of tools, from text editors to version control systems, to help them develop, test and deploy their code changes.

Wagtail recognises that most programming tasks are best done by writing code, and does not try to turn them into box-filling exercises when there's no good reason to. Likewise, when building functionality for your site, you should keep in mind that some features are destined to be maintained by the programmer rather than a content editor, and consider whether making them configurable through the Wagtail admin is going to be more of a hindrance than a convenience. For example, Wagtail provides a form builder to allow content authors to create general-purpose data collection forms. You might be tempted to use this as the basis for more complex forms that integrate with (for example) a CRM system or payment processor - however, in this case there's no way to edit the form fields without rewriting the backend logic, so making them editable through Wagtail has limited value. More likely, you'd be better off building these using Django's form framework, where the form fields are defined entirely in code.

Home » Administration » Structure » Content types » Content types » News item

News item  **EDIT** **ACCESS CONTROL** **MANAGE FIELDS** **MANAGE DISPLAY** **COMMENT FIELDS** **COMMENT DISPLAY**

[Show row weights](#)

| LABEL  | MACHINE NAME               | FIELD TYPE   | WIDGET  | OPERATIONS  |                        |
|--|----------------------------|--|---|---|------------------------|
|  Content          | group_content              | Vertical tab  | tab closed<br>classes group-content<br>field-group-tab<br>required_fields yes |  | <a href="#">delete</a> |
|  Title            | title                      | Node module element  |   |   |                        |
|  Publication date | field_media_date_published | Date (ISO format)  | Pop-up calendar   | <a href="#">edit</a>  | <a href="#">delete</a> |
|  News section     | field_news_section         | List (text)  | Check boxes/radio buttons   | <a href="#">edit</a>  | <a href="#">delete</a> |
|  News type        | field_news_type            | Term reference   | Select list   | <a href="#">edit</a>  | <a href="#">delete</a> |
|  Introduction     | field_intro                | Long text  | Text area (multiple rows)   | <a href="#">edit</a>  | <a href="#">delete</a> |
|  Body             | field_body                 | Long text and summary  | Text area with a summary  | <a href="#">edit</a>  | <a href="#">delete</a> |

## 1.2 Usage guide

### 1.2.1 Page models

Each page type (a.k.a. content type) in Wagtail is represented by a Django model. All page models must inherit from the `wagtail.core.models.Page` class.

As all page types are Django models, you can use any field type that Django provides. See [Model field reference](#) for a complete list of field types you can use. Wagtail also provides `RichTextField` which provides a WYSIWYG editor for editing rich-text content.

#### Django models

If you're not yet familiar with Django models, have a quick look at the following links to get you started:

- [Creating models](#)
- [Model syntax](#)

#### An example Wagtail page model

This example represents a typical blog post:

```
from django.db import models

from modelcluster.fields import ParentalKey

from wagtail.core.models import Page, Orderable
from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel, MultiFieldPanel, InlinePanel
from wagtail.images.edit_handlers import ImageChooserPanel
```

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```

from wagtail.search import index

class BlogPage(Page):

    # Database fields

    body = RichTextField()
    date = models.DateField("Post date")
    feed_image = models.ForeignKey(
        'wagtailimages.Image',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+'
    )

    # Search index configuration

    search_fields = Page.search_fields + [
        index.SearchField('body'),
        index.FilterField('date'),
    ]

    # Editor panels configuration

    content_panels = Page.content_panels + [
        FieldPanel('date'),
        FieldPanel('body', classname="full"),
        InlinePanel('related_links', label="Related links"),
    ]

    promote_panels = [
        MultiFieldPanel(Page.promote_panels, "Common page configuration"),
        ImageChooserPanel('feed_image'),
    ]

    # Parent page / subpage type rules

    parent_page_types = ['blog.BlogIndex']
    subpage_types = []

class BlogPageRelatedLink(Orderable):
    page = ParentalKey(BlogPage, on_delete=models.CASCADE, related_name='related_links
↪')
    name = models.CharField(max_length=255)
    url = models.URLField()

    panels = [
        FieldPanel('name'),
        FieldPanel('url'),
    ]

```

---

**Important:** Ensure that none of your field names are the same as your class names. This will cause errors due to the way Django handles relations ([read more](#)). In our examples we have avoided this by appending “Page” to each model name.

---

## Writing page models

Here we’ll describe each section of the above example to help you create your own page models.

### Database fields

Each Wagtail page type is a Django model, represented in the database as a separate table.

Each page type can have its own set of fields. For example, a news article may have body text and a published date, whereas an event page may need separate fields for venue and start/finish times.

In Wagtail, you can use any Django field class. Most field classes provided by third party apps should work as well.

Wagtail also provides a couple of field classes of its own:

- `RichTextField` - For rich text content
- `StreamField` - A block-based content field (see: [Freeform page content using StreamField](#))

For tagging, Wagtail fully supports [django-taggit](#) so we recommend using that.

### Search

The `search_fields` attribute defines which fields are added to the search index and how they are indexed.

This should be a list of `SearchField` and `FilterField` objects. `SearchField` adds a field for full-text search. `FilterField` adds a field for filtering the results. A field can be indexed with both `SearchField` and `FilterField` at the same time (but only one instance of each).

In the above example, we’ve indexed `body` for full-text search and `date` for filtering.

The arguments that these field types accept are documented in [Indexing extra fields](#).

### Editor panels

There are a few attributes for defining how the page’s fields will be arranged in the page editor interface:

- `content_panels` - For content, such as main body text
- `promote_panels` - For metadata, such as tags, thumbnail image and SEO title
- `settings_panels` - For settings, such as publish date

Each of these attributes is set to a list of `EditHandler` objects, which defines which fields appear on which tabs and how they are structured on each tab.

Here’s a summary of the `EditHandler` classes that Wagtail provides out of the box. See [Available panel types](#) for full descriptions.

#### Basic

These allow editing of model fields. The `FieldPanel` class will choose the correct widget based on the type of the field, though `StreamField` fields need to use a specialised panel class.

- `FieldPanel`
- `StreamFieldPanel`

### Structural

These are used for structuring fields in the interface.

- `MultiFieldPanel` - For grouping similar fields together
- `InlinePanel` - For inlining child models
- `FieldRowPanel` - For organising multiple fields into a single row

### Chooser

ForeignKey fields to certain models can use one of the below `ChooserPanel` classes. These add a nice modal chooser interface, and the image/document choosers also allow uploading new files without leaving the page editor.

- `PageChooserPanel`
- `ImageChooserPanel`
- `DocumentChooserPanel`
- `SnippetChooserPanel`

---

**Note:** In order to use one of these choosers, the model being linked to must either be a page, image, document or snippet.

To link to any other model type, you should use `FieldPanel`, which will create a dropdown box.

---

## Customising the page editor interface

The page editor can be customised further. See [Customising the editing interface](#).

### Parent page / subpage type rules

These two attributes allow you to control where page types may be used in your site. It allows you to define rules like “blog entries may only be created under a blog index”.

Both take a list of model classes or model names. Model names are of the format `app_label.ModelName`. If the `app_label` is omitted, the same app is assumed.

- `parent_page_types` limits which page types this type can be created under
- `subpage_types` limits which page types can be created under this type

By default, any page type can be created under any page type and it is not necessary to set these attributes if that’s the desired behaviour.

Setting `parent_page_types` to an empty list is a good way of preventing a particular page type from being created in the editor interface.

## Page URLs

The most common method of retrieving page URLs is by using the `{% pageurl %}` template tag. Since it's called from a template, `pageurl` automatically includes the optimizations mentioned below. For more information, see [pageurl](#).

Page models also include several low-level methods for overriding or accessing page URLs.

### Customising URL patterns for a page model

The `Page.get_url_parts(request)` method will not typically be called directly, but may be overridden to define custom URL routing for a given page model. It should return a tuple of `(site_id, root_url, page_path)`, which are used by `get_url` and `get_full_url` (see below) to construct the given type of page URL.

When overriding `get_url_parts()`, you should accept `*args`, `**kwargs`:

```
def get_url_parts(self, *args, **kwargs):
```

and pass those through at the point where you are calling `get_url_parts` on `super` (if applicable), e.g.:

```
super().get_url_parts(*args, **kwargs)
```

While you could pass only the `request` keyword argument, passing all arguments as-is ensures compatibility with any future changes to these method signatures.

For more information, please see `wagtail.core.models.Page.get_url_parts()`.

### Obtaining URLs for page instances

The `Page.get_url(request)` method can be called whenever a page URL is needed. It defaults to returning local URLs (not including the protocol or domain) if it can detect that the page is on the current site (via `request.site`); otherwise, a full URL including the protocol and domain is returned. Whenever possible, the optional `request` argument should be included to enable per-request caching of site-level URL information and facilitate the generation of local URLs.

A common use case for `get_url(request)` is in any custom template tag your project may include for generating navigation menus. When writing such a custom template tag, ensure that it includes `takes_context=True` and use `context.get('request')` to safely pass the request or `None` if no request exists in the context.

For more information, please see `wagtail.core.models.Page.get_url()`.

In the event a full URL (including the protocol and domain) is needed, `Page.get_full_url(request)` can be used instead. Whenever possible, the optional `request` argument should be included to enable per-request caching of site-level URL information. For more information, please see `wagtail.core.models.Page.get_full_url()`.

## Template rendering

Each page model can be given an HTML template which is rendered when a user browses to a page on the site frontend. This is the simplest and most common way to get Wagtail content to end users (but not the only way).



## Adding a template for a page model

Wagtail automatically chooses a name for the template based on the app label and model class name.

Format: <app\_label>/<model\_name (snake cased)>.html

For example, the template for the above blog page will be: `blog/blog_page.html`

You just need to create a template in a location where it can be accessed with this name.

## Template context

Wagtail renders templates with the `page` variable bound to the page instance being rendered. Use this to access the content of the page. For example, to get the title of the current page, use `{{ page.title }}`. All variables provided by [context processors](#) are also available.

## Customising template context

All pages have a `get_context` method that is called whenever the template is rendered and returns a dictionary of variables to bind into the template.

To add more variables to the template context, you can override this method:

```
class BlogIndexPage(Page):
    ...

    def get_context(self, request):
        context = super().get_context(request)

        # Add extra variables and return the updated context
        context['blog_entries'] = BlogPage.objects.child_of(self).live()
        return context
```

The variables can then be used in the template:

```
{{ page.title }}

{% for entry in blog_entries %}
    {{ entry.title }}
{% endfor %}
```

## Changing the template

Set the `template` attribute on the class to use a different template file:

```
class BlogPage(Page):
    ...

    template = 'other_template.html'
```

## Dynamically choosing the template

The template can be changed on a per-instance basis by defining a `get_template` method on the page class. This method is called every time the page is rendered:

```
class BlogPage(Page):
    ...

    use_other_template = models.BooleanField()

    def get_template(self, request):
        if self.use_other_template:
            return 'blog/other_blog_page.html'

        return 'blog/blog_page.html'
```

In this example, pages that have the `use_other_template` boolean field set will use the `blog/other_blog_page.html` template. All other pages will use the default `blog/blog_page.html`.

## Ajax Templates

If you want to add AJAX functionality to a page, such as a paginated listing that updates in-place on the page rather than triggering a full page reload, you can set the `ajax_template` attribute to specify an alternative template to be used when the page is requested via an AJAX call (as indicated by the `X-Requested-With: XMLHttpRequest` header):

```
class BlogPage(Page):
    ...

    ajax_template = 'other_template_fragment.html'
    template = 'other_template.html'
```

## More control over page rendering

All page classes have a `serve()` method that internally calls the `get_context` and `get_template` methods and renders the template. This method is similar to a Django view function, taking a Django Request object and returning a Django Response object.

This method can also be overridden for complete control over page rendering.

For example, here's a way to make a page respond with a JSON representation of itself:

```
from django.http import JsonResponse

class BlogPage(Page):
    ...

    def serve(self, request):
        return JsonResponse({
            'title': self.title,
            'body': self.body,
            'date': self.date,
```

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```
# Resizes the image to 300px width and gets a URL to it
'feed_image': self.feed_image.get_rendition('width-300').url,
})
```

## Inline models

Wagtail can nest the content of other models within the page. This is useful for creating repeated fields, such as related links or items to display in a carousel. Inline model content is also versioned with the rest of the page content.

Each inline model requires the following:

- It must inherit from `wagtail.core.models.Orderable`
- It must have a `ParentalKey` to the parent model

**Note:** `django-modelcluster` and `ParentalKey`

The model inlining feature is provided by `django-modelcluster` and the `ParentalKey` field type must be imported from there:

```
from modelcluster.fields import ParentalKey
```

`ParentalKey` is a subclass of Django's `ForeignKey`, and takes the same arguments.

For example, the following inline model can be used to add related links (a list of name, url pairs) to the `BlogPage` model:

```
from django.db import models
from modelcluster.fields import ParentalKey
from wagtail.core.models import Orderable

class BlogPageRelatedLink(Orderable):
    page = ParentalKey(BlogPage, on_delete=models.CASCADE, related_name='related_links')
    name = models.CharField(max_length=255)
    url = models.URLField()

    panels = [
        FieldPanel('name'),
        FieldPanel('url'),
    ]
```

To add this to the admin interface, use the `InlinePanel` edit panel class:

```
content_panels = [
    ...

    InlinePanel('related_links', label="Related links"),
]
```

The first argument must match the value of the `related_name` attribute of the `ParentalKey`.

### Working with pages

Wagtail uses Django’s [multi-table inheritance](#) feature to allow multiple page models to be used in the same tree.

Each page is added to both Wagtail’s builtin `Page` model as well as its user-defined model (such as the `BlogPage` model created earlier).

Pages can exist in Python code in two forms, an instance of `Page` or an instance of the page model.

When working with multiple page types together, you will typically use instances of Wagtail’s `Page` model, which don’t give you access to any fields specific to their type.

```
# Get all pages in the database
>>> from wagtail.core.models import Page
>>> Page.objects.all()
[<Page: Homepage>, <Page: About us>, <Page: Blog>, <Page: A Blog post>, <Page:
↳Another Blog post>]
```

When working with a single page type, you can work with instances of the user-defined model. These give access to all the fields available in `Page`, along with any user-defined fields for that type.

```
# Get all blog entries in the database
>>> BlogPage.objects.all()
[<BlogPage: A Blog post>, <BlogPage: Another Blog post>]
```

You can convert a `Page` object to its more specific user-defined equivalent using the `.specific` property. This may cause an additional database lookup.

```
>>> page = Page.objects.get(title="A Blog post")
>>> page
<Page: A Blog post>

# Note: the blog post is an instance of Page so we cannot access body, date or feed_
↳image

>>> page.specific
<BlogPage: A Blog post>
```

### Tips

#### Friendly model names

You can make your model names more friendly to users of Wagtail by using Django’s internal `Meta` class with a `verbose_name`, e.g.:

```
class HomePage(Page):
    ...

    class Meta:
        verbose_name = "homepage"
```

When users are given a choice of pages to create, the list of page types is generated by splitting your model names on each of their capital letters. Thus a `HomePage` model would be named “Home Page” which is a little clumsy. Defining `verbose_name` as in the example above would change this to read “Homepage”, which is slightly more conventional.

## Page QuerySet ordering

Page-derived models *cannot* be given a default ordering by using the standard Django approach of adding an ordering attribute to the internal Meta class.

```
class NewsItemPage(Page):
    publication_date = models.DateField()
    ...

    class Meta:
        ordering = ('-publication_date', ) # will not work
```

This is because Page enforces ordering QuerySets by path. Instead, you must apply the ordering explicitly when constructing a QuerySet:

```
news_items = NewsItemPage.objects.live().order_by('-publication_date')
```

## Custom Page managers

You can add a custom Manager to your Page class. Any custom Managers should inherit from `wagtail.core.models.PageManager`:

```
from django.db import models
from wagtail.core.models import Page, PageManager

class EventPageManager(PageManager):
    """ Custom manager for Event pages """

class EventPage(Page):
    start_date = models.DateField()

    objects = EventPageManager()
```

Alternately, if you only need to add extra QuerySet methods, you can inherit from `wagtail.core.models.PageQuerySet`, and call `from_queryset()` to build a custom Manager:

```
from django.db import models
from django.utils import timezone
from wagtail.core.models import Page, PageManager, PageQuerySet

class EventPageQuerySet(PageQuerySet):
    def future(self):
        today = timezone.localtime(timezone.now()).date()
        return self.filter(start_date__gte=today)

EventPageManager = PageManager.from_queryset(EventPageQuerySet)

class EventPage(Page):
    start_date = models.DateField()

    objects = EventPageManager()
```

## 1.2.2 Writing templates

Wagtail uses Django’s templating language. For developers new to Django, start with Django’s own template documentation: [Templates](#)

Python programmers new to Django/Wagtail may prefer more technical documentation: [The Django template language: for Python programmers](#)

You should be familiar with Django templating basics before continuing with this documentation.

### Templates

Every type of page or “content type” in Wagtail is defined as a “model” in a file called `models.py`. If your site has a blog, you might have a `BlogPage` model and another called `BlogPageListing`. The names of the models are up to the Django developer.

For each page model in `models.py`, Wagtail assumes an HTML template file exists of (almost) the same name. The Front End developer may need to create these templates themselves by referring to `models.py` to infer template names from the models defined therein.

To find a suitable template, Wagtail converts CamelCase names to snake\_case. So for a `BlogPage`, a template `blog_page.html` will be expected. The name of the template file can be overridden per model if necessary.

Template files are assumed to exist here:

```
name_of_project/  
  name_of_app/  
    templates/  
      name_of_app/  
        blog_page.html  
models.py
```

For more information, see the Django documentation for the [application directories template loader](#).

### Page content

The data/content entered into each page is accessed/output through Django’s `{{ double-brace }}` notation. Each field from the model must be accessed by prefixing `page.` e.g the page title `{{ page.title }}` or another field `{{ page.author }}`.

Additionally `request` is available and contains Django’s request object.

### Static assets

Static files e.g CSS, JS and images are typically stored here:

```
name_of_project/  
  name_of_app/  
    static/  
      name_of_app/  
        css/  
        js/  
        images/  
models.py
```

(The names “css”, “js” etc aren’t important, only their position within the tree.)

Any file within the static folder should be inserted into your HTML using the `{% static %}` tag. More about it: [Static files \(tag\)](#).

## User images

Images uploaded to a Wagtail site by its users (as opposed to a developer’s static files, mentioned above) go into the image library and from there are added to pages via the [page editor interface](#).

Unlike other CMSs, adding images to a page does not involve choosing a “version” of the image to use. Wagtail has no predefined image “formats” or “sizes”. Instead the template developer defines image manipulation to occur *on the fly* when the image is requested, via a special syntax within the template.

Images from the library must be requested using this syntax, but a developer’s static images can be added via conventional means e.g `img` tags. Only images from the library can be manipulated on the fly.

Read more about the image manipulation syntax here [Using images in templates](#).

## Template tags & filters

In addition to Django’s standard tags and filters, Wagtail provides some of its own, which can be load-ed [just like](#) any other.

### Images (tag)

The `image` tag inserts an XHTML-compatible `img` element into the page, setting its `src`, `width`, `height` and `alt`. See also [More control over the `img` tag](#).

The syntax for the `image` tag is thus:

```
{% image [image] [resize-rule] %}
```

For example:

```
{% load wagtailimages_tags %}
...

{% image page.photo width-400 %}

<!-- or a square thumbnail: -->
{% image page.photo fill-80x80 %}
```

See [Using images in templates](#) for full documentation.

### Rich text (filter)

This filter takes a chunk of HTML content and renders it as safe HTML in the page. Importantly, it also expands internal shorthand references to embedded images, and links made in the Wagtail editor, into fully-baked HTML ready for display.

Only fields using `RichTextField` need this applied in the template.

```
{% load wagtailcore_tags %}
...
{{ page.body|richtext }}
```

## Responsive Embeds

Wagtail includes embeds and images at their full width, which may overflow the bounds of the content container you've defined in your templates. To make images and embeds responsive – meaning they'll resize to fit their container – include the following CSS.

```
.rich-text img {
    max-width: 100%;
    height: auto;
}

.responsive-object {
    position: relative;
}

.responsive-object iframe,
.responsive-object object,
.responsive-object embed {
    position: absolute;
    top: 0;
    left: 0;
    width: 100%;
    height: 100%;
}
```

## Internal links (tag)

### pageurl

Takes a Page object and returns a relative URL (/foo/bar/) if within the same Site as the current page, or absolute (http://example.com/foo/bar/) if not.

```
{% load wagtailcore_tags %}
...
<a href="{% pageurl page.get_parent %}">Back to index</a>
```

A fallback keyword argument can be provided - this should be a URL route name that takes no parameters, and will be used as a substitute URL when the passed page is None.

```
{% load wagtailcore_tags %}

{% for publication in page.related_publications.all %}
    <li>
        <a href="{% pageurl publication.detail_page fallback='coming_soon' %}">
            {{ publication.title }}
        </a>
    </li>
{% endfor %}
```



## slugurl

Takes any `slug` as defined in a page’s “Promote” tab and returns the URL for the matching Page. If multiple pages exist with the same slug, the page chosen is undetermined.

Like `pageurl`, this will try to provide a relative link if possible, but will default to an absolute link if the Page is on a different Site. This is most useful when creating shared page furniture, e.g. top level navigation or site-wide links.

```
{% load wagtailcore_tags %}
...
<a href="{% slugurl 'news' %}">News index</a>
```

## Static files (tag)

Used to load anything from your static files directory. Use of this tag avoids rewriting all static paths if hosting arrangements change, as they might between development and live environments.

```
{% load static %}
...

```

Notice that the full path name is not required and the path snippet you enter only need begin with the parent app’s directory name.

## Wagtail User Bar

This tag provides a contextual flyout menu for logged-in users. The menu gives editors the ability to edit the current page or add a child page, besides the options to show the page in the Wagtail page explorer or jump to the Wagtail admin dashboard. Moderators are also given the ability to accept or reject a page being previewed as part of content moderation.

```
{% load wagtailuserbar %}
...
{% wagtailuserbar %}
```

By default the User Bar appears in the bottom right of the browser window, inset from the edge. If this conflicts with your design it can be moved by passing a parameter to the template tag. These examples show you how to position the userbar in each corner of the screen:

```
...
{% wagtailuserbar 'top-left' %}
{% wagtailuserbar 'top-right' %}
{% wagtailuserbar 'bottom-left' %}
{% wagtailuserbar 'bottom-right' %}
...
```

The userbar can be positioned where it works best with your design. Alternatively, you can position it with a CSS rule in your own CSS files, for example:

```
.wagtail-userbar {
    top: 200px !important;
    left: 10px !important;
}
```

## Varying output between preview and live

Sometimes you may wish to vary the template output depending on whether the page is being previewed or viewed live. For example, if you have visitor tracking code such as Google Analytics in place on your site, it's a good idea to leave this out when previewing, so that editor activity doesn't appear in your analytics reports. Wagtail provides a `request.is_preview` variable to distinguish between preview and live:

```
{% if not request.is_preview %}
  <script>
    (function(i,s,o,g,r,a,m){i['GoogleAnalyticsObject']=r;i[r]=i[r]||function(){
      ...
    })
  </script>
{% endif %}
```

### 1.2.3 Using images in templates

The `image` tag inserts an XHTML-compatible `img` element into the page, setting its `src`, `width`, `height` and `alt`. See also *More control over the `img` tag*.

The syntax for the tag is thus:

```
{% image [image] [resize-rule] %}
```

**Both the image and resize rule must be passed to the template tag.**

For example:

```
{% load wagtailimages_tags %}
...

<!-- Display the image scaled to a width of 400 pixels: -->
{% image page.photo width=400 %}

<!-- Display it again, but this time as a square thumbnail: -->
{% image page.photo fill=80x80 %}
```

In the above syntax example `[image]` is the Django object referring to the image. If your page model defined a field called “photo” then `[image]` would probably be `page.photo`. The `[resize-rule]` defines how the image is to be resized when inserted into the page. Various resizing methods are supported, to cater to different use cases (e.g. lead images that span the whole width of the page, or thumbnails to be cropped to a fixed size).

Note that a space separates `[image]` and `[resize-rule]`, but the resize rule must not contain spaces. The width is always specified before the height. Resized images will maintain their original aspect ratio unless the `fill` rule is used, which may result in some pixels being cropped.

The available resizing methods are as follows:

**max** (takes two dimensions)

```
{% image page.photo max=1000x500 %}
```

Fit **within** the given dimensions.

The longest edge will be reduced to the matching dimension specified. For example, a portrait image of width 1000 and height 2000, treated with the `max=1000x500` rule (a landscape layout) would result in the image being shrunk so the *height* was 500 pixels and the width was 250.

**min** (takes two dimensions)

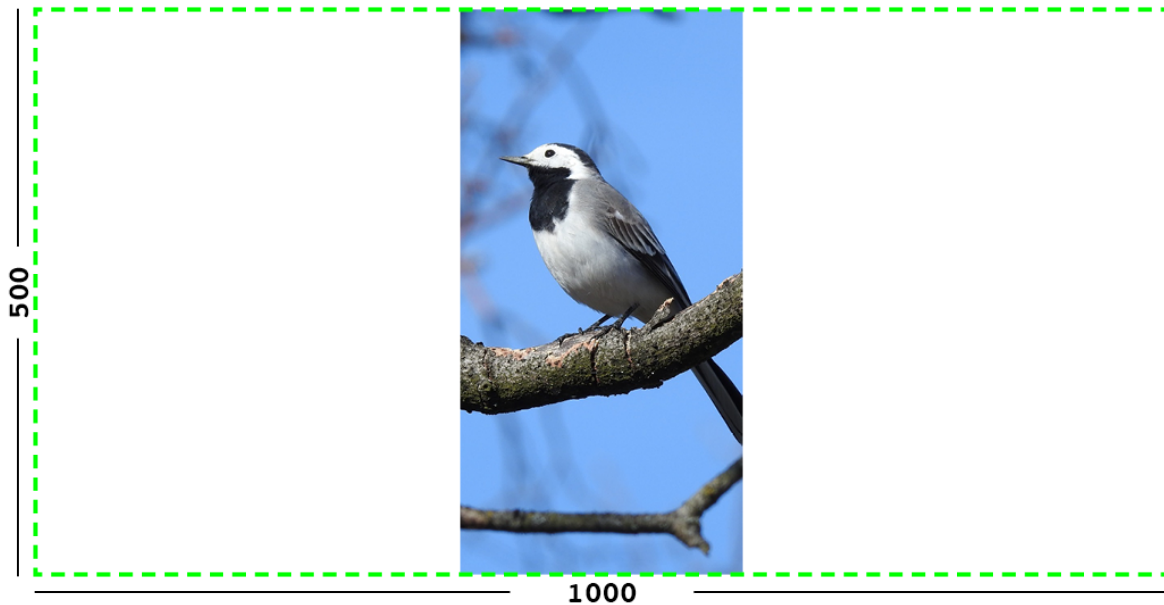


Fig. 1: Example: The image will keep its proportions but fit within the max (green line) dimensions provided.

```
{% image page.photo min-500x200 %}
```

**Cover** the given dimensions.

This may result in an image slightly **larger** than the dimensions you specify. A square image of width 2000 and height 2000, treated with the `min-500x200` rule would have its height and width changed to 500, i.e matching the *width* of the resize-rule, but greater than the height.

**width** (takes one dimension)

```
{% image page.photo width-640 %}
```

Reduces the width of the image to the dimension specified.

**height** (takes one dimension)

```
{% image page.photo height-480 %}
```

Reduces the height of the image to the dimension specified.

**scale** (takes percentage)

```
{% image page.photo scale-50 %}
```

Resize the image to the percentage specified.

**fill** (takes two dimensions and an optional `-c` parameter)

```
{% image page.photo fill-200x200 %}
```

Resize and **crop** to fill the **exact** dimensions specified.

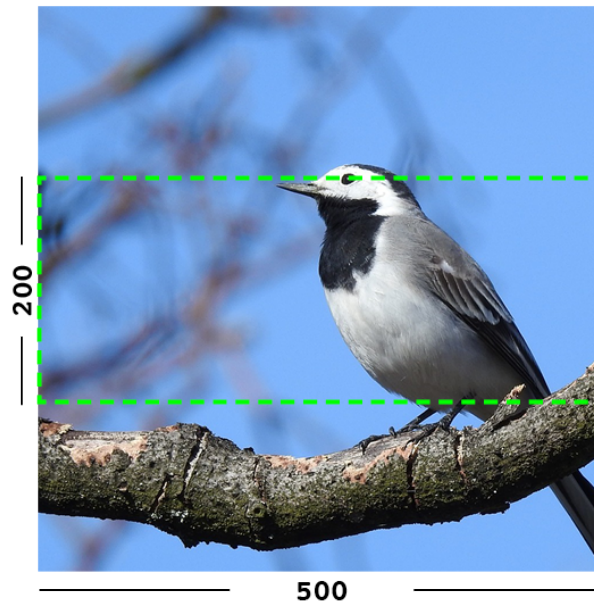


Fig. 2: Example: The image will keep its proportions while filling at least the min (green line) dimensions provided.

This can be particularly useful for websites requiring square thumbnails of arbitrary images. For example, a landscape image of width 2000 and height 1000 treated with the `fill-200x200` rule would have its height reduced to 200, then its width (ordinarily 400) cropped to 200.

This resize-rule will crop to the image’s focal point if it has been set. If not, it will crop to the centre of the image.

#### On images that won’t upscale

It’s possible to request an image with `fill` dimensions that the image can’t support without upscaling. e.g. an image of width 400 and height 200 requested with `fill-400x400`. In this situation the *ratio of the requested fill* will be matched, but the dimension will not. So that example 400x200 image (a 2:1 ratio) could become 200x200 (a 1:1 ratio, matching the resize-rule).

#### Cropping closer to the focal point

By default, Wagtail will only crop enough to change the aspect ratio of the image to match the ratio in the resize-rule.

In some cases (e.g. thumbnails), it may be preferable to crop closer to the focal point, so that the subject of the image is more prominent.

You can do this by appending `-c<percentage>` at the end of the resize-rule. For example, if you would like the image to be cropped as closely as possible to its focal point, add `-c100`:

```
{% image page.photo fill-200x200-c100 %}
```

This will crop the image as much as it can, without cropping into the focal point.

If you find that `-c100` is too close, you can try `-c75` or `-c50`. Any whole number from 0 to 100 is accepted.

**original** (takes no dimensions)

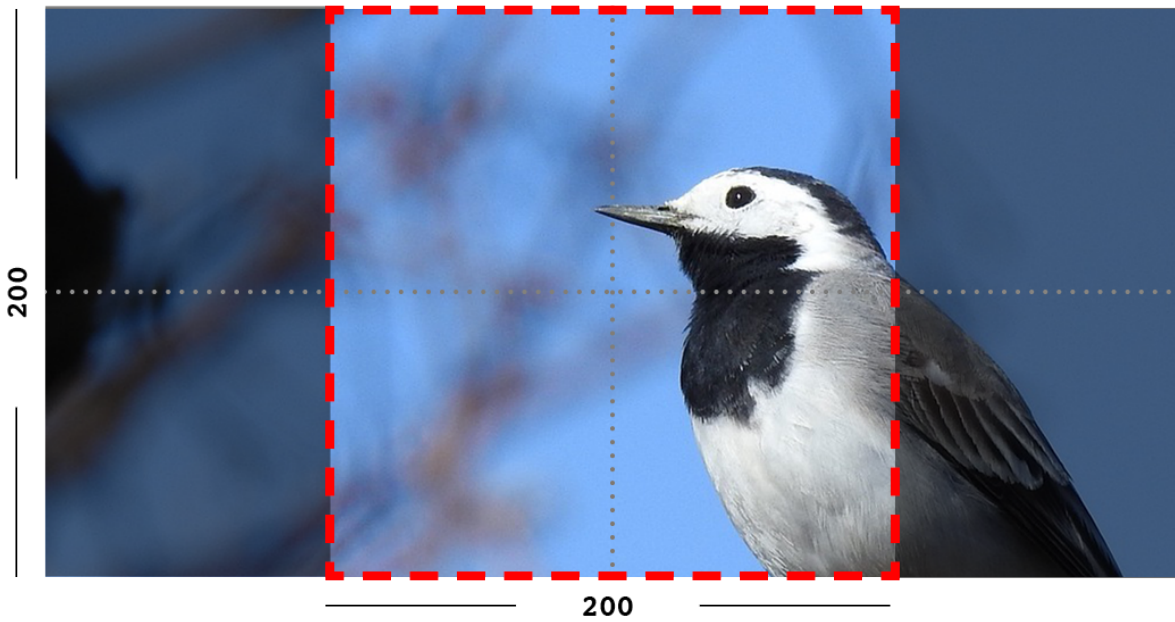


Fig. 3: Example: The image is scaled and also cropped (red line) to fit as much of the image as possible within the provided dimensions.

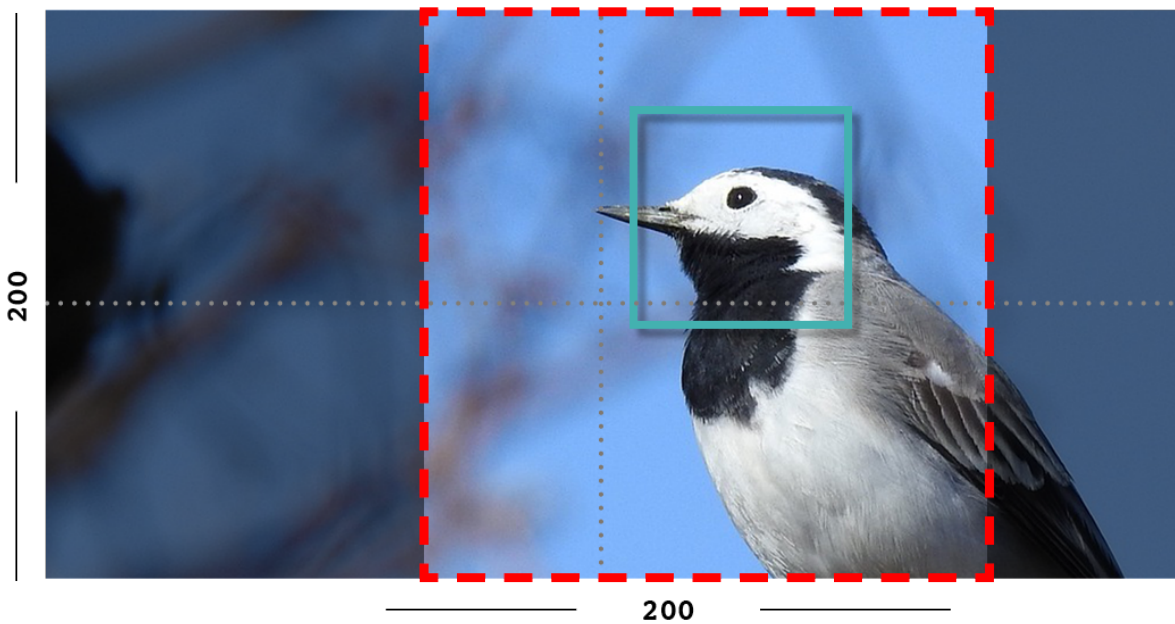


Fig. 4: Example: The focal point is set off centre so the image is scaled and also cropped like fill, however the center point of the crop is positioned closer the focal point.

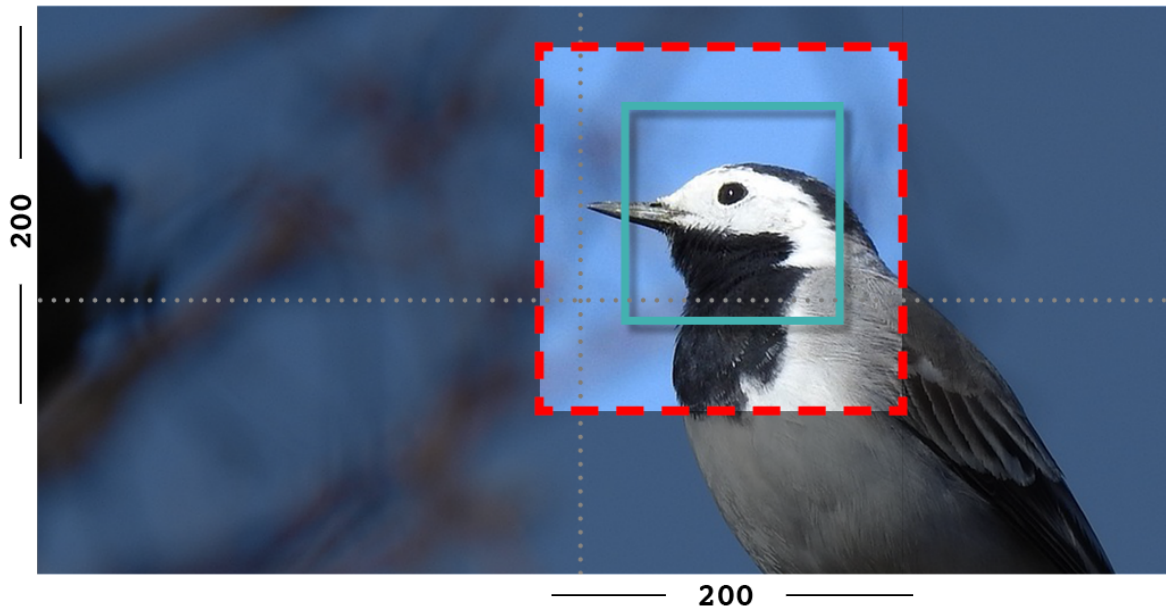


Fig. 5: Example: With `-c75` set, the final crop will be closer to the focal point.

```
{% image page.photo original %}
```

Renders the image at its original size.

---

**Note:** Wagtail does not allow deforming or stretching images. Image dimension ratios will always be kept. Wagtail also *does not support upscaling*. Small images forced to appear at larger sizes will “max out” at their native dimensions.

---

## More control over the `img` tag

Wagtail provides two shortcuts to give greater control over the `img` element:

### 1. Adding attributes to the `{% image %}` tag

Extra attributes can be specified with the syntax `attribute="value"`:

```
{% image page.photo width=400 class="foo" id="bar" %}
```

You can set a more relevant `alt` attribute this way, overriding the one automatically generated from the title of the image. The `src`, `width`, and `height` attributes can also be overridden, if necessary.

### 2. Generating the image “as foo” to access individual properties

Wagtail can assign the image data to another variable using Django’s `as` syntax:

```
{% image page.photo width=400 as tmp_photo %}
```

(continues on next page)



(continued from previous page)

```

```

This syntax exposes the underlying image Rendition (`tmp_photo`) to the developer. A “Rendition” contains the information specific to the way you’ve requested to format the image using the `resize-rule`, i.e. dimensions and source URL.

If your site defines a custom image model using `AbstractImage`, any additional fields you add to an image (e.g. a copyright holder) are **not** included in the rendition.

Therefore, if you’d added the field `author` to your `AbstractImage` in the above example, you’d access it using `{{ page.photo.author }}` rather than `{{ tmp_photo.author }}`.

(Due to the links in the database between renditions and their parent image, you *could* access it as `{{ tmp_photo.image.author }}`, but that has reduced readability.)

---

**Note:** The image property used for the `src` attribute is actually `image.url`, not `image.src`.

---

## The `attrs` shortcut

You can also use the `attrs` property as a shorthand to output the attributes `src`, `width`, `height` and `alt` in one go:

```
<img {{ tmp_photo.attrs }} class="my-custom-class" />
```

## Alternative HTML tags

The `as` keyword allows alternative HTML image tags (such as `<picture>` or `<amp-img>`) to be used. For example, to use the `<picture>` tag:

```
<picture>
  {% image page.photo width=800 as wide_photo %}
  <source srcset="{{ wide_photo.url }}" media="(min-width: 800px)">
  {% image page.photo width=400 %}
</picture>
```

And to use the `<amp-img>` tag (based on the [Mountains example](#) from the AMP docs):

```
{% image image width=550 format=webp as webp_image %}
{% image image width=550 format=jpeg as jpeg_image %}

<amp-img alt="{{ image.alt }}"
  width="{{ webp_image.width }}"
  height="{{ webp_image.height }}"
  src="{{ webp_image.url }}">
  <amp-img alt="{{ image.alt }}"
    fallback
    width="{{ jpeg_image.width }}"
    height="{{ jpeg_image.height }}"
    src="{{ jpeg_image.url }}"></amp-img>
</amp-img>
```

## Images embedded in rich text

The information above relates to images defined via image-specific fields in your model. However, images can also be embedded arbitrarily in Rich Text fields by the page editor (see [Rich Text \(HTML\)](#)).

Images embedded in Rich Text fields can't be controlled by the template developer as easily. There are no image objects to work with, so the `{% image %}` template tag can't be used. Instead, editors can choose from one of a number of image "Formats" at the point of inserting images into their text.

Wagtail comes with three pre-defined image formats, but more can be defined in Python by the developer. These formats are:

**Full width** Creates an image rendition using `width-800`, giving the `<img>` tag the CSS class `full-width`.

**Left-aligned** Creates an image rendition using `width-500`, giving the `<img>` tag the CSS class `left`.

**Right-aligned** Creates an image rendition using `width-500`, giving the `<img>` tag the CSS class `right`.

---

**Note:** The CSS classes added to images do **not** come with any accompanying stylesheets, or inline styles. e.g. the `left` class will do nothing, by default. The developer is expected to add these classes to their front end CSS files, to define exactly what they want `left`, `right` or `full-width` to mean.

---

For more information about image formats, including creating your own, see [Image Formats in the Rich Text Editor](#)

## Output image format

Wagtail may automatically change the format of some images when they are resized:

- PNG and JPEG images don't change format
- GIF images without animation are converted to PNGs
- BMP images are converted to PNGs

It is also possible to override the output format on a per-tag basis by using the `format` filter after the `resize` rule.

For example, to make the tag always convert the image to a JPEG, use `format-jpeg`:

```
{% image page.photo width-400 format-jpeg %}
```

You may also use `format-png` or `format-gif`.

## Background color

The PNG and GIF image formats both support transparency, but if you want to convert images to JPEG format, the transparency will need to be replaced with a solid background color.

By default, Wagtail will set the background to white. But if a white background doesn't fit your design, you can specify a color using the `bgcolor` filter.

This filter takes a single argument, which is a CSS 3 or 6 digit hex code representing the color you would like to use:

```
{# Sets the image background to black #}  
{% image page.photo width-400 bgcolor-000 format-jpeg %}
```



## JPEG image quality

Wagtail’s JPEG image quality setting defaults to 85 (which is quite high). This can be changed either globally or on a per-tag basis.

### Changing globally

Use the `WAGTAILIMAGES_JPEG_QUALITY` setting to change the global default JPEG quality:

```
# settings.py

# Make low-quality but small images
WAGTAILIMAGES_JPEG_QUALITY = 40
```

Note that this won’t affect any previously generated images so you may want to delete all renditions so they can regenerate with the new setting. This can be done from the Django shell:

```
# Replace this with your custom rendition model if you use one
>>> from wagtail.images.models import Rendition
>>> Rendition.objects.all().delete()
```

### Changing per-tag

It’s also possible to have different JPEG qualities on individual tags by using the `jpegquality` filter. This will always override the default setting:

```
{% image page.photo width=400 jpegquality=40 %}
```

Note that this will have no effect on PNG or GIF files. If you want all images to be low quality, you can use this filter with `format-jpeg` (which forces all images to output in JPEG format):

```
{% image page.photo width=400 format-jpeg jpegquality=40 %}
```

## Generating image renditions in Python

All of the image transformations mentioned above can also be used directly in Python code. See [Generating renditions in Python](#).

## 1.2.4 Search

Wagtail provides a comprehensive and extensible search interface. In addition, it provides ways to promote search results through “Editor’s Picks”. Wagtail also collects simple statistics on queries made through the search interface.

### Indexing

To make a model searchable, you’ll need to add it into the search index. All pages, images and documents are indexed for you, so you can start searching them right away.

If you have created some extra fields in a subclass of `Page` or `Image`, you may want to add these new fields to the search index too so that a user’s search query will match on their content. See [Indexing extra fields](#) for info on how to do this.

If you have a custom model that you would like to make searchable, see [Indexing custom models](#).

### Updating the index

If the search index is kept separate from the database (when using Elasticsearch for example), you need to keep them both in sync. There are two ways to do this: using the search signal handlers, or calling the `update_index` command periodically. For best speed and reliability, it's best to use both if possible.

### Signal handlers

`wagtailsearch` provides some signal handlers which bind to the save/delete signals of all indexed models. This would automatically add and delete them from all backends you have registered in `WAGTAILSEARCH_BACKENDS`. These signal handlers are automatically registered when the `wagtail.search` app is loaded.

In some cases, you may not want your content to be automatically reindexed and instead rely on the `update_index` command for indexing. If you need to disable these signal handlers, use one of the following methods:

### Disabling auto update signal handlers for a model

You can disable the signal handlers for an individual model by adding `search_auto_update = False` as an attribute on the model class.

### Disabling auto update signal handlers for a search backend/whole site

You can disable the signal handlers for a whole search backend by setting the `AUTO_UPDATE` setting on the backend to `False`.

If all search backends have `AUTO_UPDATE` set to `False`, the signal handlers will be completely disabled for the whole site.

For documentation on the `AUTO_UPDATE` setting, see [AUTO\\_UPDATE](#).

### The `update_index` command

Wagtail also provides a command for rebuilding the index from scratch.

```
./manage.py update_index
```

It is recommended to run this command once a week and at the following times:

- whenever any pages have been created through a script (after an import, for example)
- whenever any changes have been made to models or search configuration

The search may not return any results while this command is running, so avoid running it at peak times.

---

**Note:** The `update_index` command is also aliased as `wagtail_update_index`, for use when another installed package (such as [Haystack](#)) provides a conflicting `update_index` command. In this case, the other package's entry in `INSTALLED_APPS` should appear above `wagtail.search` so that its `update_index` command takes precedence over Wagtail's.

---

## Indexing extra fields

**Warning:** Indexing extra fields is only supported by the *Elasticsearch Backend* and *PostgreSQL Backend*. Indexing extra fields is not supported by the *Database Backend (default)*. If you're using the database backend, any other fields you define via `search_fields` will be ignored.

Fields must be explicitly added to the `search_fields` property of your Page-derived model, in order for you to be able to search/filter on them. This is done by overriding `search_fields` to append a list of extra `SearchField`/`FilterField` objects to it.

### Example

This creates an `EventPage` model with two fields: `description` and `date`. `description` is indexed as a `SearchField` and `date` is indexed as a `FilterField`

```
from wagtail.search import index
from django.utils import timezone

class EventPage(Page):
    description = models.TextField()
    date = models.DateField()

    search_fields = Page.search_fields + [ # Inherit search_fields from Page
        index.SearchField('description'),
        index.FilterField('date'),
    ]

# Get future events which contain the string "Christmas" in the title or description
>>> EventPage.objects.filter(date__gt=timezone.now()).search("Christmas")
```

### `index.SearchField`

These are used for performing full-text searches on your models, usually for text fields.

### Options

- **partial\_match** (boolean) - Setting this to true allows results to be matched on parts of words. For example, this is set on the title field by default, so a page titled `Hello World!` will be found if the user only types `Hel` into the search box.
- **boost** (int/float) - This allows you to set fields as being more important than others. Setting this to a high number on a field will cause pages with matches in that field to be ranked higher. By default, this is set to 2 on the Page title field and 1 on all other fields.
- **es\_extra** (dict) - This field is to allow the developer to set or override any setting on the field in the ElasticSearch mapping. Use this if you want to make use of any ElasticSearch features that are not yet supported in Wagtail.

### `index.FilterField`

These are added to the search index but are not used for full-text searches. Instead, they allow you to run filters on your search results.

### `index.RelatedFields`

This allows you to index fields from related objects. It works on all types of related fields, including their reverse accessors.

For example, if we have a book that has a `ForeignKey` to its author, we can nest the author's name and `date_of_birth` fields inside the book:

```
from wagtail.search import index

class Book(models.Model, index.Indexed):
    ...

    search_fields = [
        index.SearchField('title'),
        index.FilterField('published_date'),

        index.RelatedFields('author', [
            index.SearchField('name'),
            index.FilterField('date_of_birth'),
        ]),
    ]
```

This will allow you to search for books by their author's name.

It works the other way around as well. You can index an author's books, allowing an author to be searched for by the titles of books they've published:

```
from wagtail.search import index

class Author(models.Model, index.Indexed):
    ...

    search_fields = [
        index.SearchField('name'),
        index.FilterField('date_of_birth'),

        index.RelatedFields('books', [
            index.SearchField('title'),
            index.FilterField('published_date'),
        ]),
    ]
```

#### Filtering on `index.RelatedFields`

It's not possible to filter on any `index.FilterFields` within `index.RelatedFields` using the `QuerySet` API. However, the fields are indexed, so it should be possible to use them by querying Elasticsearch manually.

Filtering on `index.RelatedFields` with the `QuerySet` API is planned for a future release of Wagtail.

## Indexing callables and other attributes

---

**Note:** This is not supported in the *Database Backend (default)*

---

Search/filter fields do not need to be Django model fields. They can also be any method or attribute on your model class.

One use for this is indexing the `get_*_display` methods Django creates automatically for fields with choices.

```
from wagtail.search import index

class EventPage(Page):
    IS_PRIVATE_CHOICES = (
        (False, "Public"),
        (True, "Private"),
    )

    is_private = models.BooleanField(choices=IS_PRIVATE_CHOICES)

    search_fields = Page.search_fields + [
        # Index the human-readable string for searching.
        index.SearchField('get_is_private_display'),

        # Index the boolean value for filtering.
        index.FilterField('is_private'),
    ]
```

Callables also provide a way to index fields from related models. In the example from *Inline Panels and Model Clusters*, to index each `BookPage` by the titles of its related `links`:

```
class BookPage(Page):
    # ...
    def get_related_link_titles(self):
        # Get list of titles and concatenate them
        return '\n'.join(self.related_links.all().values_list('name', flat=True))

    search_fields = Page.search_fields + [
        # ...
        index.SearchField('get_related_link_titles'),
    ]
```

## Indexing custom models

Any Django model can be indexed and searched.

To do this, inherit from `index.Indexed` and add some `search_fields` to the model.

```
from wagtail.search import index

class Book(index.Indexed, models.Model):
    title = models.CharField(max_length=255)
    genre = models.CharField(max_length=255, choices=GENRE_CHOICES)
    author = models.ForeignKey(Author, on_delete=models.CASCADE)
    published_date = models.DateTimeField()
```

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```
search_fields = [
    index.SearchField('title', partial_match=True, boost=10),
    index.SearchField('get_genre_display'),

    index.FilterField('genre'),
    index.FilterField('author'),
    index.FilterField('published_date'),
]

# As this model doesn't have a search method in its QuerySet, we have to call search_
↳ directly on the backend
>>> from wagtail.search.backends import get_search_backend
>>> s = get_search_backend()

# Run a search for a book by Roald Dahl
>>> roald_dahl = Author.objects.get(name="Roald Dahl")
>>> s.search("chocolate factory", Book.objects.filter(author=roald_dahl))
[<Book: Charlie and the chocolate factory>]
```

## Searching

### Searching QuerySets

Wagtail search is built on Django's [QuerySet API](#). You should be able to search any Django QuerySet provided the model and the fields being filtered on have been added to the search index.

### Searching Pages

Wagtail provides a shortcut for searching pages: the `.search()` QuerySet method. You can call this on any PageQuerySet. For example:

```
# Search future EventPages
>>> from wagtail.core.models import EventPage
>>> EventPage.objects.filter(date__gt=timezone.now()).search("Hello world!")
```

All other methods of PageQuerySet can be used with `search()`. For example:

```
# Search all live EventPages that are under the events index
>>> EventPage.objects.live().descendant_of(events_index).search("Event")
[<EventPage: Event 1>, <EventPage: Event 2>]
```

---

**Note:** The `search()` method will convert your QuerySet into an instance of one of Wagtail's SearchResults classes (depending on backend). This means that you must perform filtering before calling `search()`.

---

### Searching Images, Documents and custom models

Wagtail's document and image models provide a search method on their QuerySets, just as pages do:

```
>>> from wagtail.images.models import Image

>>> Image.objects.filter(uploaded_by_user=user).search("Hello")
[<Image: Hello>, <Image: Hello world!>]
```

*Custom models* can be searched by using the `search` method on the search backend directly:

```
>>> from myapp.models import Book
>>> from wagtail.search.backends import get_search_backend

# Search books
>>> s = get_search_backend()
>>> s.search("Great", Book)
[<Book: Great Expectations>, <Book: The Great Gatsby>]
```

You can also pass a `QuerySet` into the `search` method which allows you to add filters to your search results:

```
>>> from myapp.models import Book
>>> from wagtail.search.backends import get_search_backend

# Search books
>>> s = get_search_backend()
>>> s.search("Great", Book.objects.filter(published_date__year__lt=1900))
[<Book: Great Expectations>]
```

## Specifying the fields to search

By default, Wagtail will search all fields that have been indexed using `index.SearchField`.

This can be limited to a certain set of fields by using the `fields` keyword argument:

```
# Search just the title field
>>> EventPage.objects.search("Event", fields=["title"])
[<EventPage: Event 1>, <EventPage: Event 2>]
```

## Faceted search

Wagtail supports faceted search which is a kind of filtering based on a taxonomy field (such as category or page type).

The `.facet(field_name)` method returns an `OrderedDict`. The keys are the IDs of the related objects that have been referenced by the specified field, and the values are the number of references found for each ID. The results are ordered by number of references descending.

For example, to find the most common page types in the search results:

```
>>> Page.objects.search("Test").facet("content_type_id")

# Note: The keys correspond to the ID of a ContentType object; the values are the
# number of pages returned for that type
OrderedDict([
    ('2', 4), # 4 pages have content_type_id == 2
    ('1', 2), # 2 pages have content_type_id == 1
])
```

## Changing search behaviour

### Search operator

The search operator specifies how search should behave when the user has typed in multiple search terms. There are two possible values:

- “or” - The results must match at least one term (default for Elasticsearch)
- “and” - The results must match all terms (default for database search)

Both operators have benefits and drawbacks. The “or” operator will return many more results but will likely contain a lot of results that aren’t relevant. The “and” operator only returns results that contain all search terms, but require the user to be more precise with their query.

We recommend using the “or” operator when ordering by relevance and the “and” operator when ordering by anything else (note: the database backend doesn’t currently support ordering by relevance).

Here’s an example of using the `operator` keyword argument:

```
# The database contains a "Thing" model with the following items:
# - Hello world
# - Hello
# - World

# Search with the "or" operator
>>> s = get_search_backend()
>>> s.search("Hello world", Things, operator="or")

# All records returned as they all contain either "hello" or "world"
[<Thing: Hello World>, <Thing: Hello>, <Thing: World>]

# Search with the "and" operator
>>> s = get_search_backend()
>>> s.search("Hello world", Things, operator="and")

# Only "hello world" returned as that's the only item that contains both terms
[<Thing: Hello world>]
```

For page, image and document models, the `operator` keyword argument is also supported on the `QuerySet`’s `search` method:

```
>>> Page.objects.search("Hello world", operator="or")

# All pages containing either "hello" or "world" are returned
[<Page: Hello World>, <Page: Hello>, <Page: World>]
```

### Custom ordering

By default, search results are ordered by relevance, if the backend supports it. To preserve the `QuerySet`’s existing ordering, the `order_by_relevance` keyword argument needs to be set to `False` on the `search()` method.

For example:



```
# Get a list of events ordered by date
>>> EventPage.objects.order_by('date').search("Event", order_by_relevance=False)

# Events ordered by date
[<EventPage: Easter>, <EventPage: Halloween>, <EventPage: Christmas>]
```

## Annotating results with score

For each matched result, Elasticsearch calculates a “score”, which is a number that represents how relevant the result is based on the user’s query. The results are usually ordered based on the score.

There are some cases where having access to the score is useful (such as programmatically combining two queries for different models). You can add the score to each result by calling the `.annotate_score(field)` method on the `SearchQuerySet`.

For example:

```
>>> events = EventPage.objects.search("Event").annotate_score("_score")
>>> for event in events:
...     print(event.title, event._score)
...
("Easter", 2.5),
("Halloween", 1.7),
("Christmas", 1.5),
```

Note that the score itself is arbitrary and it is only useful for comparison of results for the same query.

## An example page search view

Here’s an example Django view that could be used to add a “search” page to your site:

```
# views.py

from django.shortcuts import render

from wagtail.core.models import Page
from wagtail.search.models import Query

def search(request):
    # Search
    search_query = request.GET.get('query', None)
    if search_query:
        search_results = Page.objects.live().search(search_query)

        # Log the query so Wagtail can suggest promoted results
        Query.get(search_query).add_hit()
    else:
        search_results = Page.objects.none()

    # Render template
    return render(request, 'search_results.html', {
        'search_query': search_query,
        'search_results': search_results,
    })
```

And here's a template to go with it:

```
{% extends "base.html" %}
{% load wagtailcore_tags %}

{% block title %}Search{% endblock %}

{% block content %}
    <form action="{% url 'search' %}" method="get">
        <input type="text" name="query" value="{{ search_query }}">
        <input type="submit" value="Search">
    </form>

    {% if search_results %}
        <ul>
            {% for result in search_results %}
                <li>
                    <h4><a href="{% pageurl result %}">{{ result }}</a></h4>
                    {% if result.search_description %}
                        {{ result.search_description|safe }}
                    {% endif %}
                </li>
            {% endfor %}
        </ul>
    {% elif search_query %}
        No results found
    {% else %}
        Please type something into the search box
    {% endif %}
{% endblock %}
```

## Promoted search results

“Promoted search results” allow editors to explicitly link relevant content to search terms, so results pages can contain curated content in addition to results from the search engine.

This functionality is provided by the `search_promotions` contrib module.

## Backends

Wagtailsearch has support for multiple backends, giving you the choice between using the database for search or an external service such as Elasticsearch. The database backend is enabled by default.

You can configure which backend to use with the `WAGTAILSEARCH_BACKENDS` setting:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.search.backends.db',
    }
}
```

## AUTO\_UPDATE

By default, Wagtail will automatically keep all indexes up to date. This could impact performance when editing content, especially if your index is hosted on an external service.

The `AUTO_UPDATE` setting allows you to disable this on a per-index basis:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': ...,
        'AUTO_UPDATE': False,
    }
}
```

If you have disabled auto update, you must run the `update_index` command on a regular basis to keep the index in sync with the database.

## ATOMIC\_REBUILD

**Warning:** This option may not work on Elasticsearch version 5.4 and above, due to a [bug in the handling of aliases](#) affecting these releases.

By default (when using the Elasticsearch backend), when the `update_index` command is run, Wagtail deletes the index and rebuilds it from scratch. This causes the search engine to not return results until the rebuild is complete and is also risky as you can't rollback if an error occurs.

Setting the `ATOMIC_REBUILD` setting to `True` makes Wagtail rebuild into a separate index while keep the old index active until the new one is fully built. When the rebuild is finished, the indexes are swapped atomically and the old index is deleted.

## BACKEND

Here's a list of backends that Wagtail supports out of the box.

### Database Backend (default)

```
wagtail.search.backends.db
```

The database backend is very basic and is intended only to be used in development and on small sites. It cannot order results by relevance, severely hampering its usefulness when searching a large collection of pages.

It also doesn't support:

- Searching on fields in subclasses of `Page` (unless the class is being searched directly)
- *Indexing callables and other attributes*
- Converting accented characters to ASCII

If any of these features are important to you, we recommend using Elasticsearch instead.

### PostgreSQL Backend

```
wagtail.contrib.postgres_search.backend
```

If you use PostgreSQL for your database and your site has less than a million pages, you probably want to use this backend.

See *PostgreSQL search engine* for more detail.

### Elasticsearch Backend

Elasticsearch versions 2, 5, 6 and 7 are supported. Use the appropriate backend for your version:

`wagtail.search.backends.elasticsearch2` (Elasticsearch 2.x)

`wagtail.search.backends.elasticsearch5` (Elasticsearch 5.x)

`wagtail.search.backends.elasticsearch6` (Elasticsearch 6.x)

`wagtail.search.backends.elasticsearch7` (Elasticsearch 7.x)

Prerequisites are the [Elasticsearch](#) service itself and, via pip, the `elasticsearch-py` package. The major version of the package must match the installed version of Elasticsearch:

```
$ pip install "elasticsearch>=2.0.0,<3.0.0" # for Elasticsearch 2.x
```

```
pip install "elasticsearch>=5.0.0,<6.0.0" # for Elasticsearch 5.x
```

```
pip install "elasticsearch>=6.4.0,<7.0.0" # for Elasticsearch 6.x
```

```
pip install "elasticsearch>=7.0.0,<8.0.0" # for Elasticsearch 7.x
```

#### Warning:

Version 6.3.1 of the Elasticsearch client library is incompatible with Wagtail. Use 6.4.0 or above.

The backend is configured in settings:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.search.backends.elasticsearch2',
        'URLS': ['http://localhost:9200'],
        'INDEX': 'wagtail',
        'TIMEOUT': 5,
        'OPTIONS': {},
        'INDEX_SETTINGS': {},
    }
}
```

Other than `BACKEND`, the keys are optional and default to the values shown. Any defined key in `OPTIONS` is passed directly to the Elasticsearch constructor as case-sensitive keyword argument (e.g. `'max_retries': 1`).

`INDEX_SETTINGS` is a dictionary used to override the default settings to create the index. The default settings are defined inside the `ElasticsearchSearchBackend` class in the module `wagtail/wagtail/wagtailsearch/backends/elasticsearch.py`. Any new key is added, any existing key, if not a dictionary, is replaced with the new value. Here's a sample on how to configure the number of shards and setting the Italian LanguageAnalyzer as the default analyzer:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        ...,
        'INDEX_SETTINGS': {
            'settings': {
                'index': {
                    'number_of_shards': 1,
```

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```

        },
        'analysis': {
            'analyzer': {
                'default': {
                    'type': 'italian'
                }
            }
        }
    }
}

```

If you prefer not to run an Elasticsearch server in development or production, there are many hosted services available, including [Bonsai](#), who offer a free account suitable for testing and development. To use Bonsai:

- Sign up for an account at [Bonsai](#)
- Use your Bonsai dashboard to create a Cluster.
- Configure URLs in the Elasticsearch entry in `WAGTAILSEARCH_BACKENDS` using the Cluster URL from your Bonsai dashboard
- Run `./manage.py update_index`

## Amazon AWS Elasticsearch

The Elasticsearch backend is compatible with [Amazon Elasticsearch Service](#), but requires additional configuration to handle IAM based authentication. This can be done with the `requests-aws4auth` package along with the following configuration:

```

from elasticsearch import RequestsHttpConnection
from requests_aws4auth import AWS4Auth

WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.search.backends.elasticsearch2',
        'INDEX': 'wagtail',
        'TIMEOUT': 5,
        'HOSTS': [{
            'host': 'YOURCLUSTER.REGION.es.amazonaws.com',
            'port': 443,
            'use_ssl': True,
            'verify_certs': True,
            'http_auth': AWS4Auth('ACCESS_KEY', 'SECRET_KEY', 'REGION', 'es'),
        }],
        'OPTIONS': {
            'connection_class': RequestsHttpConnection,
        },
    }
}

```

## Rolling Your Own

Wagtail search backends implement the interface defined in `wagtail/wagtail/wagtailsearch/backends/base.py`. At a minimum, the backend's `search()` method must return a collection of objects

or `model.objects.none()`. For a fully-featured search backend, examine the Elasticsearch backend code in `elasticsearch.py`.

### Indexing

To make objects searchable, they must first be added to the search index. This involves configuring the models and fields that you would like to index (which is done for you for Pages, Images and Documents), and then actually inserting them into the index.

See *Updating the index* for information on how to keep the objects in your search index in sync with the objects in your database.

If you have created some extra fields in a subclass of `Page` or `Image`, you may want to add these new fields to the search index, so a user's search query can match the Page or Image's extra content. See *Indexing extra fields*.

If you have a custom model which doesn't derive from `Page` or `Image` that you would like to make searchable, see *Indexing custom models*.

### Searching

Wagtail provides an API for performing search queries on your models. You can also perform search queries on Django QuerySets.

See *Searching*.

### Backends

Wagtail provides three backends for storing the search index and performing search queries: Elasticsearch, the database, and PostgreSQL (Django  $\geq 1.10$  required). It's also possible to roll your own search backend.

See *Backends*.

## 1.2.5 Snippets

Snippets are pieces of content which do not necessitate a full webpage to render. They could be used for making secondary content, such as headers, footers, and sidebars, editable in the Wagtail admin. Snippets are Django models which do not inherit the `Page` class and are thus not organized into the Wagtail tree. However, they can still be made editable by assigning panels and identifying the model as a snippet with the `register_snippet` class decorator.

Snippets lack many of the features of pages, such as being orderable in the Wagtail admin or having a defined URL. Decide carefully if the content type you would want to build into a snippet might be more suited to a page.

### Snippet Models

Here's an example snippet model:

```
from django.db import models

from wagtail.admin.edit_handlers import FieldPanel
from wagtail.snippets.models import register_snippet

...
```

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```
@register_snippet
class Advert(models.Model):
    url = models.URLField(null=True, blank=True)
    text = models.CharField(max_length=255)

    panels = [
        FieldPanel('url'),
        FieldPanel('text'),
    ]

    def __str__(self):
        return self.text
```

The `Advert` model uses the basic Django model class and defines two properties: `text` and `URL`. The editing interface is very close to that provided for Page-derived models, with fields assigned in the `panels` property. Snippets do not use multiple tabs of fields, nor do they provide the “save as draft” or “submit for moderation” features.

`@register_snippet` tells Wagtail to treat the model as a snippet. The `panels` list defines the fields to show on the snippet editing page. It’s also important to provide a string representation of the class through `def __str__(self)`: so that the snippet objects make sense when listed in the Wagtail admin.

## Including Snippets in Template Tags

The simplest way to make your snippets available to templates is with a template tag. This is mostly done with vanilla Django, so perhaps reviewing Django’s documentation for [django custom template tags](#) will be more helpful. We’ll go over the basics, though, and point out any considerations to make for Wagtail.

First, add a new python file to a `templatetags` folder within your app - for example, `myproject/demo/templatetags/demo_tags.py`. We’ll need to load some Django modules and our app’s models, and ready the `register` decorator:

```
from django import template
from demo.models import Advert

register = template.Library()

...

# Advert snippets
@register.inclusion_tag('demo/tags/adverts.html', takes_context=True)
def adverts(context):
    return {
        'adverts': Advert.objects.all(),
        'request': context['request'],
    }
```

`@register.inclusion_tag()` takes two variables: a template and a boolean on whether that template should be passed a request context. It’s a good idea to include request contexts in your custom template tags, since some Wagtail-specific template tags like `pageurl` need the context to work properly. The template tag function could take arguments and filter the adverts to return a specific instance of the model, but for brevity we’ll just use `Advert.objects.all()`.

Here’s what’s in the template used by this template tag:

```
{% for advert in adverts %}
    <p>
        <a href="{ { advert.url } }">
            { { advert.text } }
        </a>
    </p>
{% endfor %}
```

Then, in your own page templates, you can include your snippet template tag with:

```
{% load wagtailcore_tags demo_tags %}

...

{% block content %}

    ...

    {% adverts %}

{% endblock %}
```

## Binding Pages to Snippets

In the above example, the list of adverts is a fixed list that is displayed via the custom template tag independent of any other content on the page. This might be what you want for a common panel in a sidebar, but, in another scenario, you might wish to display just one specific instance of a snippet on a particular page. This can be accomplished by defining a foreign key to the snippet model within your page model and adding a `SnippetChooserPanel` to the page's `content_panels` list. For example, if you wanted to display a specific advert on a `BookPage` instance:

```
from wagtail.snippets.edit_handlers import SnippetChooserPanel
# ...
class BookPage(Page):
    advert = models.ForeignKey(
        'demo.Advert',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+'
    )

    content_panels = Page.content_panels + [
        SnippetChooserPanel('advert'),
        # ...
    ]
```

The snippet could then be accessed within your template as `page.advert`.

To attach multiple adverts to a page, the `SnippetChooserPanel` can be placed on an inline child object of `BookPage` rather than on `BookPage` itself. Here, this child model is named `BookPageAdvertPlacement` (so called because there is one such object for each time that an advert is placed on a `BookPage`):

```
from django.db import models

from wagtail.core.models import Page, Orderable
from wagtail.snippets.edit_handlers import SnippetChooserPanel
```

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```

from modelcluster.fields import ParentalKey

...

class BookPageAdvertPlacement(Orderable, models.Model):
    page = ParentalKey('demo.BookPage', on_delete=models.CASCADE, related_name=
↳ 'advert_placements')
    advert = models.ForeignKey('demo.Advert', on_delete=models.CASCADE, related_name=
↳ '+')

    class Meta:
        verbose_name = "advert placement"
        verbose_name_plural = "advert placements"

    panels = [
        SnippetChooserPanel('advert'),
    ]

    def __str__(self):
        return self.page.title + " -> " + self.advert.text

class BookPage(Page):
    ...

    content_panels = Page.content_panels + [
        InlinePanel('advert_placements', label="Adverts"),
        # ...
    ]

```

These child objects are now accessible through the page's `advert_placements` property, and from there we can access the linked Advert snippet as `advert`. In the template for `BookPage`, we could include the following:

```

{% for advert_placement in page.advert_placements.all %}
    <p>
        <a href="{{ advert_placement.advert.url }}">
            {{ advert_placement.advert.text }}
        </a>
    </p>
{% endfor %}

```

## Making Snippets Searchable

If a snippet model inherits from `wagtail.search.index.Indexed`, as described in *Indexing custom models*, Wagtail will automatically add a search box to the chooser interface for that snippet type. For example, the Advert snippet could be made searchable as follows:

```

...

from wagtail.search import index

...

@register_snippet

```

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```
class Advert(index.Indexed, models.Model):
    url = models.URLField(null=True, blank=True)
    text = models.CharField(max_length=255)

    panels = [
        FieldPanel('url'),
        FieldPanel('text'),
    ]

    search_fields = [
        index.SearchField('text', partial_match=True),
    ]
```

## Tagging snippets

Adding tags to snippets is very similar to adding tags to pages. The only difference is that `taggit.manager.TaggableManager` should be used in the place of `ClusterTaggableManager`.

```
from modelcluster.fields import ParentalKey
from modelcluster.models import ClusterableModel
from taggit.models import TaggedItemBase
from taggit.managers import TaggableManager

class AdvertTag(TaggedItemBase):
    content_object = ParentalKey('demo.Advert', on_delete=models.CASCADE, related_
    ↪name='tagged_items')

@register_snippet
class Advert(ClusterableModel):
    ...
    tags = TaggableManager(through=AdvertTag, blank=True)

    panels = [
        ...
        FieldPanel('tags'),
    ]
```

The *documentation on tagging pages* has more information on how to use tags in views.

## 1.2.6 Freeform page content using StreamField

StreamField provides a content editing model suitable for pages that do not follow a fixed structure – such as blog posts or news stories – where the text may be interspersed with subheadings, images, pull quotes and video. It’s also suitable for more specialised content types, such as maps and charts (or, for a programming blog, code snippets). In this model, these different content types are represented as a sequence of ‘blocks’, which can be repeated and arranged in any order.

For further background on StreamField, and why you would use it instead of a rich text field for the article body, see the blog post [Rich text fields and faster horses](#).

StreamField also offers a rich API to define your own block types, ranging from simple collections of sub-blocks (such as a ‘person’ block consisting of first name, surname and photograph) to completely custom components with their own editing interface. Within the database, the StreamField content is stored as JSON, ensuring that the full informational content of the field is preserved, rather than just an HTML representation of it.

## Using StreamField

StreamField is a model field that can be defined within your page model like any other field:

```
from django.db import models

from wagtail.core.models import Page
from wagtail.core.fields import StreamField
from wagtail.core import blocks
from wagtail.admin.edit_handlers import FieldPanel, StreamFieldPanel
from wagtail.images.blocks import ImageChooserBlock

class BlogPage(Page):
    author = models.CharField(max_length=255)
    date = models.DateField("Post date")
    body = StreamField([
        ('heading', blocks.CharBlock(classname="full title")),
        ('paragraph', blocks.RichTextBlock()),
        ('image', ImageChooserBlock()),
    ])

    content_panels = Page.content_panels + [
        FieldPanel('author'),
        FieldPanel('date'),
        StreamFieldPanel('body'),
    ]
```

Note: StreamField is not backwards compatible with other field types such as RichTextField. If you need to migrate an existing field to StreamField, refer to [Migrating RichTextFields to StreamField](#).

The parameter to StreamField is a list of (name, block\_type) tuples. ‘name’ is used to identify the block type within templates and the internal JSON representation (and should follow standard Python conventions for variable names: lower-case and underscores, no spaces) and ‘block\_type’ should be a block definition object as described below. (Alternatively, StreamField can be passed a single StreamBlock instance - see [Structural block types](#).)

This defines the set of available block types that can be used within this field. The author of the page is free to use these blocks as many times as desired, in any order.

StreamField also accepts an optional keyword argument `blank`, defaulting to `false`; when this is `false`, at least one block must be provided for the field to be considered valid.

## Basic block types

All block types accept the following optional keyword arguments:

**default** The default value that a new ‘empty’ block should receive.

**label** The label to display in the editor interface when referring to this block - defaults to a prettified version of the block name (or, in a context where no name is assigned - such as within a ListBlock - the empty string).

**icon** The name of the icon to display for this block type in the menu of available block types. For a list of icon names, see the Wagtail style guide, which can be enabled by adding `wagtail.contrib.styleguide` to your project’s `INSTALLED_APPS`.

**template** The path to a Django template that will be used to render this block on the front end. See [Template rendering](#).

**group** The group used to categorize this block, i.e. any blocks with the same group name will be shown together in the editor interface with the group name as a heading.

The basic block types provided by Wagtail are as follows:

### CharBlock

```
wagtail.core.blocks.CharBlock
```

A single-line text input. The following keyword arguments are accepted:

**required (default: True)** If true, the field cannot be left blank.

**max\_length, min\_length** Ensures that the string is at most or at least the given length.

**help\_text** Help text to display alongside the field.

**validators** A list of validation functions for the field (see [Django Validators](#)).

### TextBlock

```
wagtail.core.blocks.TextBlock
```

A multi-line text input. As with CharBlock, the keyword arguments `required` (default: True), `max_length`, `min_length`, `help_text` and `validators` are accepted.

### EmailBlock

```
wagtail.core.blocks.EmailBlock
```

A single-line email input that validates that the email is a valid Email Address. The keyword arguments `required` (default: True), `help_text` and `validators` are accepted.

For an example of EmailBlock in use, see [Example: PersonBlock](#)

### IntegerBlock

```
wagtail.core.blocks.IntegerBlock
```

A single-line integer input that validates that the integer is a valid whole number. The keyword arguments `required` (default: True), `max_value`, `min_value`, `help_text` and `validators` are accepted.

For an example of IntegerBlock in use, see [Example: PersonBlock](#)

### FloatBlock

```
wagtail.core.blocks.FloatBlock
```

A single-line Float input that validates that the value is a valid floating point number. The keyword arguments `required` (default: True), `max_value`, `min_value` and `validators` are accepted.

### DecimalBlock

```
wagtail.core.blocks.DecimalBlock
```

A single-line decimal input that validates that the value is a valid decimal number. The keyword arguments required (default: `True`), `help_text`, `max_value`, `min_value`, `max_digits`, `decimal_places` and `validators` are accepted.

For an example of `DecimalBlock` in use, see [Example: \*PersonBlock\*](#)

## RegexBlock

`wagtail.core.blocks.RegexBlock`

A single-line text input that validates a string against a regex expression. The regular expression used for validation must be supplied as the first argument, or as the keyword argument `regex`. To customise the message text used to indicate a validation error, pass a dictionary as the keyword argument `error_messages` containing either or both of the keys `required` (for the message shown on an empty value) or `invalid` (for the message shown on a non-matching value):

```
blocks.RegexBlock(regex=r'^[0-9]{3}$', error_messages={
    'invalid': "Not a valid library card number."
})
```

The keyword arguments `regex`, `help_text`, `required` (default: `True`), `max_length`, `min_length`, `error_messages` and `validators` are accepted.

## URLBlock

`wagtail.core.blocks.URLBlock`

A single-line text input that validates that the string is a valid URL. The keyword arguments required (default: `True`), `max_length`, `min_length`, `help_text` and `validators` are accepted.

## BooleanBlock

`wagtail.core.blocks.BooleanBlock`

A checkbox. The keyword arguments `required` and `help_text` are accepted. As with Django's `BooleanField`, a value of `required=True` (the default) indicates that the checkbox must be ticked in order to proceed. For a checkbox that can be ticked or unticked, you must explicitly pass in `required=False`.

## DateBlock

`wagtail.core.blocks.DateBlock`

A date picker. The keyword arguments `required` (default: `True`), `help_text`, `format` and `validators` are accepted.

**format** (default: `None`) Date format. This must be one of the recognised formats listed in the `DATE_INPUT_FORMATS` setting. If not specified Wagtail will use `WAGTAIL_DATE_FORMAT` setting with fallback to `'%Y-%m-%d'`.

## TimeBlock

`wagtail.core.blocks.TimeBlock`

A time picker. The keyword arguments required (default: `True`), `help_text` and `validators` are accepted.

## DateTimeBlock

`wagtail.core.blocks.DateTimeField`

A combined date / time picker. The keyword arguments required (default: `True`), `help_text`, `format` and `validators` are accepted.

**format** (default: `None`) Date format. This must be one of the recognised formats listed in the `DATE-TIME_INPUT_FORMATS` setting. If not specified Wagtail will use `WAGTAIL_DATETIME_FORMAT` setting with fallback to `'%Y-%m-%d %H:%M'`.

## RichTextBlock

`wagtail.core.blocks.RichTextBlock`

A WYSIWYG editor for creating formatted text including links, bold / italics etc. The keyword arguments required (default: `True`), `help_text`, `validators`, `editor` and `features` are accepted.

**editor** (default: `default`) The rich text editor to be used (see *Rich text*).

**features** (default: `None`) Specify the set of features allowed (see *Limiting features in a rich text field*).

## RawHTMLBlock

`wagtail.core.blocks.RawHTMLBlock`

A text area for entering raw HTML which will be rendered unescaped in the page output. The keyword arguments required (default: `True`), `max_length`, `min_length`, `help_text` and `validators` are accepted.

**Warning:** When this block is in use, there is nothing to prevent editors from inserting malicious scripts into the page, including scripts that would allow the editor to acquire administrator privileges when another administrator views the page. Do not use this block unless your editors are fully trusted.

## BlockQuoteBlock

`wagtail.core.blocks.BlockQuoteBlock`

A text field, the contents of which will be wrapped in an HTML `<blockquote>` tag pair. The keyword arguments required (default: `True`), `max_length`, `min_length`, `help_text` and `validators` are accepted.

## ChoiceBlock

`wagtail.core.blocks.ChoiceBlock`

A dropdown select box for choosing from a list of choices. The following keyword arguments are accepted:

**choices** A list of choices, in any format accepted by Django’s `choices` parameter for model fields, or a callable returning such a list.

**required (default: True)** If true, the field cannot be left blank.

**help\_text** Help text to display alongside the field.

**validators** A list of validation functions for the field (see [Django Validators](#)).

ChoiceBlock can also be subclassed to produce a reusable block with the same list of choices everywhere it is used. For example, a block definition such as:

```
blocks.ChoiceBlock(choices=[
    ('tea', 'Tea'),
    ('coffee', 'Coffee'),
], icon='cup')
```

could be rewritten as a subclass of ChoiceBlock:

```
class DrinksChoiceBlock(blocks.ChoiceBlock):
    choices = [
        ('tea', 'Tea'),
        ('coffee', 'Coffee'),
    ]

    class Meta:
        icon = 'cup'
```

StreamField definitions can then refer to `DrinksChoiceBlock()` in place of the full `ChoiceBlock` definition. Note that this only works when `choices` is a fixed list, not a callable.

## PageChooserBlock

`wagtail.core.blocks.PageChooserBlock`

A control for selecting a page object, using Wagtail’s page browser. The following keyword arguments are accepted:

**required (default: True)** If true, the field cannot be left blank.

**page\_type (default: Page)** Restrict choices to one or more specific page types. Accepts a page model class, model name (as a string), or a list or tuple of these.

**can\_choose\_root (default: False)** If true, the editor can choose the tree root as a page. Normally this would be undesirable, since the tree root is never a usable page, but in some specialised cases it may be appropriate. For example, a block providing a feed of related articles could use a `PageChooserBlock` to select which subsection of the site articles will be taken from, with the root corresponding to ‘everywhere’.

## DocumentChooserBlock

`wagtail.documents.blocks.DocumentChooserBlock`

A control to allow the editor to select an existing document object, or upload a new one. The keyword argument `required (default: True)` is accepted.

## ImageChooserBlock

`wagtail.images.blocks.ImageChooserBlock`

A control to allow the editor to select an existing image, or upload a new one. The keyword argument `required` (default: `True`) is accepted.

### SnippetChooserBlock

`wagtail.snippets.blocks.SnippetChooserBlock`

A control to allow the editor to select a snippet object. Requires one positional argument: the snippet class to choose from. The keyword argument `required` (default: `True`) is accepted.

### EmbedBlock

`wagtail.embeds.blocks.EmbedBlock`

A field for the editor to enter a URL to a media item (such as a YouTube video) to appear as embedded media on the page. The keyword arguments `required` (default: `True`), `max_length`, `min_length` and `help_text` are accepted.

### StaticBlock

`wagtail.core.blocks.StaticBlock`

A block which doesn't have any fields, thus passes no particular values to its template during rendering. This can be useful if you need the editor to be able to insert some content which is always the same or doesn't need to be configured within the page editor, such as an address, embed code from third-party services, or more complex pieces of code if the template uses template tags.

By default, some default text (which contains the `label` keyword argument if you pass it) will be displayed in the editor interface, so that the block doesn't look empty. But you can also customise it entirely by passing a text string as the `admin_text` keyword argument instead:

```
blocks.StaticBlock(
    admin_text='Latest posts: no configuration needed.',
    # or admin_text=mark_safe('<b>Latest posts</b>: no configuration needed.'),
    template='latest_posts.html')
```

`StaticBlock` can also be subclassed to produce a reusable block with the same configuration everywhere it is used:

```
class LatestPostsStaticBlock(blocks.StaticBlock):
    class Meta:
        icon = 'user'
        label = 'Latest posts'
        admin_text = '{label}: configured elsewhere'.format(label=label)
        template = 'latest_posts.html'
```

### Structural block types

In addition to the basic block types above, it is possible to define new block types made up of sub-blocks: for example, a 'person' block consisting of sub-blocks for first name, surname and image, or a 'carousel' block consisting of an unlimited number of image blocks. These structures can be nested to any depth, making it possible to have a structure containing a list, or a list of structures.



## StructBlock

wagtail.core.blocks.StructBlock

A block consisting of a fixed group of sub-blocks to be displayed together. Takes a list of (name, block\_definition) tuples as its first argument:

```
(('person', blocks.StructBlock([
    ('first_name', blocks.CharBlock()),
    ('surname', blocks.CharBlock()),
    ('photo', ImageChooserBlock(required=False)),
    ('biography', blocks.RichTextBlock()),
]), icon='user'))
```

Alternatively, the list of sub-blocks can be provided in a subclass of StructBlock:

```
class PersonBlock(blocks.StructBlock):
    first_name = blocks.CharBlock()
    surname = blocks.CharBlock()
    photo = ImageChooserBlock(required=False)
    biography = blocks.RichTextBlock()

    class Meta:
        icon = 'user'
```

The Meta class supports the properties default, label, icon and template, which have the same meanings as when they are passed to the block's constructor.

This defines PersonBlock() as a block type that can be re-used as many times as you like within your model definitions:

```
body = StreamField([
    ('heading', blocks.CharBlock(classname="full title")),
    ('paragraph', blocks.RichTextBlock()),
    ('image', ImageChooserBlock()),
    ('person', PersonBlock()),
])
```

Further options are available for customising the display of a StructBlock within the page editor - see [Custom editing interfaces for StructBlock](#).

You can also customise how the value of a StructBlock is prepared for using in templates - see [Custom value class for StructBlock](#).

## ListBlock

wagtail.core.blocks.ListBlock

A block consisting of many sub-blocks, all of the same type. The editor can add an unlimited number of sub-blocks, and re-order and delete them. Takes the definition of the sub-block as its first argument:

```
('ingredients_list', blocks.ListBlock(blocks.CharBlock(label="Ingredient")))
```

Any block type is valid as the sub-block type, including structural types:

```
('ingredients_list', blocks.ListBlock(blocks.StructBlock([
    ('ingredient', blocks.CharBlock()),
    ('amount', blocks.CharBlock(required=False)),
])))
```

## StreamBlock

wagtail.core.blocks.StreamBlock

A block consisting of a sequence of sub-blocks of different types, which can be mixed and reordered at will. Used as the overall mechanism of the StreamField itself, but can also be nested or used within other structural block types. Takes a list of (name, block\_definition) tuples as its first argument:

```
('carousel', blocks.StreamBlock(
    [
        ('image', ImageChooserBlock()),
        ('quotation', blocks.StructBlock([
            ('text', blocks.TextBlock()),
            ('author', blocks.CharBlock()),
        ])),
        ('video', EmbedBlock()),
    ],
    icon='cogs'
))
```

As with StructBlock, the list of sub-blocks can also be provided as a subclass of StreamBlock:

```
class CarouselBlock(blocks.StreamBlock):
    image = ImageChooserBlock()
    quotation = blocks.StructBlock([
        ('text', blocks.TextBlock()),
        ('author', blocks.CharBlock()),
    ])
    video = EmbedBlock()

    class Meta:
        icon='cogs'
```

Since StreamField accepts an instance of StreamBlock as a parameter, in place of a list of block types, this makes it possible to re-use a common set of block types without repeating definitions:

```
class HomePage(Page):
    carousel = StreamField(CarouselBlock(max_num=10, block_counts={'video': {'max_num': 2}}))
```

StreamBlock accepts the following options as either keyword arguments or Meta properties:

**required (default: True)** If true, at least one sub-block must be supplied. This is ignored when using the StreamBlock as the top-level block of a StreamField; in this case the StreamField's blank property is respected instead.

**min\_num** Minimum number of sub-blocks that the stream must have.

**max\_num** Maximum number of sub-blocks that the stream may have.

**block\_counts** Specifies the minimum and maximum number of each block type, as a dictionary mapping block names to dicts with (optional) min\_num and max\_num fields.

### Example: PersonBlock

This example demonstrates how the basic block types introduced above can be combined into a more complex block type based on StructBlock:

```

from wagtail.core import blocks

class PersonBlock(blocks.StructBlock):
    name = blocks.CharBlock()
    height = blocks.DecimalBlock()
    age = blocks.IntegerBlock()
    email = blocks.EmailBlock()

    class Meta:
        template = 'blocks/person_block.html'

```

### Template rendering

StreamField provides an HTML representation for the stream content as a whole, as well as for each individual block. To include this HTML into your page, use the `{% include_block %}` tag:

```

{% load wagtailcore_tags %}

...

{% include_block page.body %}

```

In the default rendering, each block of the stream is wrapped in a `<div class="block-my_block_name">` element (where `my_block_name` is the block name given in the StreamField definition). If you wish to provide your own HTML markup, you can instead iterate over the field's value, and invoke `{% include_block %}` on each block in turn:

```

{% load wagtailcore_tags %}

...

<article>
    {% for block in page.body %}
        <section>{% include_block block %}</section>
    {% endfor %}
</article>

```

For more control over the rendering of specific block types, each block object provides `block_type` and `value` properties:

```

{% load wagtailcore_tags %}

...

<article>
    {% for block in page.body %}
        {% if block.block_type == 'heading' %}
            <h1>{{ block.value }}</h1>
        {% else %}
            <section class="block-{{ block.block_type }}">
                {% include_block block %}
            </section>
        {% endif %}
    {% endfor %}
</article>

```

(continues on next page)

(continued from previous page)

```

        </section>
    {% endif %}
{% endfor %}
</article>

```

By default, each block is rendered using simple, minimal HTML markup, or no markup at all. For example, a CharBlock value is rendered as plain text, while a ListBlock outputs its child blocks in a `<ul>` wrapper. To override this with your own custom HTML rendering, you can pass a `template` argument to the block, giving the filename of a template file to be rendered. This is particularly useful for custom block types derived from StructBlock:

```

('person', blocks.StructBlock(
    [
        ('first_name', blocks.CharBlock()),
        ('surname', blocks.CharBlock()),
        ('photo', ImageChooserBlock(required=False)),
        ('biography', blocks.RichTextBlock()),
    ],
    template='myapp/blocks/person.html',
    icon='user'
))

```

Or, when defined as a subclass of StructBlock:

```

class PersonBlock(blocks.StructBlock):
    first_name = blocks.CharBlock()
    surname = blocks.CharBlock()
    photo = ImageChooserBlock(required=False)
    biography = blocks.RichTextBlock()

    class Meta:
        template = 'myapp/blocks/person.html'
        icon = 'user'

```

Within the template, the block value is accessible as the variable value:

```

{% load wagtailimages_tags %}

<div class="person">
    {% image value.photo width=400 %}
    <h2>{{ value.first_name }} {{ value.surname }}</h2>
    {{ value.biography }}
</div>

```

Since `first_name`, `surname`, `photo` and `biography` are defined as blocks in their own right, this could also be written as:

```

{% load wagtailcore_tags wagtailimages_tags %}

<div class="person">
    {% image value.photo width=400 %}
    <h2>{% include_block value.first_name %} {% include_block value.surname %}</h2>
    {% include_block value.biography %}
</div>

```

Writing `{{ my_block }}` is roughly equivalent to `{% include_block my_block %}`, but the short form is more restrictive, as it does not pass variables from the calling template such as `request` or `page`; for this reason,

it is recommended that you only use it for simple values that do not render HTML of their own. For example, if our `PersonBlock` used the template:

```
{% load wagtailimages_tags %}

<div class="person">
    {% image value.photo width=400 %}
    <h2>{{ value.first_name }} {{ value.surname }}</h2>

    {% if request.user.is_authenticated %}
        <a href="#">Contact this person</a>
    {% endif %}

    {{ value.biography }}
</div>
```

then the `request.user.is_authenticated` test would not work correctly when rendering the block through a `{{ ... }}` tag:

```
{# Incorrect: #}

{% for block in page.body %}
    {% if block.block_type == 'person' %}
        <div>
            {{ block }}
        </div>
    {% endif %}
{% endfor %}

{# Correct: #}

{% for block in page.body %}
    {% if block.block_type == 'person' %}
        <div>
            {% include_block block %}
        </div>
    {% endif %}
{% endfor %}
```

Like Django's `{% include %}` tag, `{% include_block %}` also allows passing additional variables to the included template, through the syntax `{% include_block my_block with foo="bar" %}`:

```
{# In page template: #}

{% for block in page.body %}
    {% if block.block_type == 'person' %}
        {% include_block block with classname="important" %}
    {% endif %}
{% endfor %}

{# In PersonBlock template: #}

<div class="{{ classname }}">
    ...
</div>
```

The syntax `{% include_block my_block with foo="bar" only %}` is also supported, to specify that no variables from the parent template other than `foo` will be passed to the child template.

As well as passing variables from the parent template, block subclasses can pass additional template variables of their own by overriding the `get_context` method:

```
import datetime

class EventBlock(blocks.StructBlock):
    title = blocks.CharBlock()
    date = blocks.DateBlock()

    def get_context(self, value, parent_context=None):
        context = super().get_context(value, parent_context=parent_context)
        context['is_happening_today'] = (value['date'] == datetime.date.today())
        return context

    class Meta:
        template = 'myapp/blocks/event.html'
```

In this example, the variable `is_happening_today` will be made available within the block template. The `parent_context` keyword argument is available when the block is rendered through an `{% include_block %}` tag, and is a dict of variables passed from the calling template.

## BoundBlocks and values

All block types, not just `StructBlock`, accept a `template` parameter to determine how they will be rendered on a page. However, for blocks that handle basic Python data types, such as `CharBlock` and `IntegerBlock`, there are some limitations on where the template will take effect, since those built-in types (`str`, `int` and so on) cannot be ‘taught’ about their template rendering. As an example of this, consider the following block definition:

```
class HeadingBlock(blocks.CharBlock):
    class Meta:
        template = 'blocks/heading.html'
```

where `blocks/heading.html` consists of:

```
<h1>{{ value }}</h1>
```

This gives us a block that behaves as an ordinary text field, but wraps its output in `<h1>` tags whenever it is rendered:

```
class BlogPage(Page):
    body = StreamField([
        # ...
        ('heading', HeadingBlock()),
        # ...
    ])
```

```
{% load wagtailcore_tags %}

{% for block in page.body %}
    {% if block.block_type == 'heading' %}
        {% include_block block %}  {# This block will output its own <h1>...</h1> ->tags. #}
    {% endif %}
{% endfor %}
```

This kind of arrangement - a value that supposedly represents a plain text string, but has its own custom HTML representation when output on a template - would normally be a very messy thing to achieve in Python, but it works

here because the items you get when iterating over a `StreamField` are not actually the ‘native’ values of the blocks. Instead, each item is returned as an instance of `BoundBlock` - an object that represents the pairing of a value and its block definition. By keeping track of the block definition, a `BoundBlock` always knows which template to render. To get to the underlying value - in this case, the text content of the heading - you would need to access `block.value`. Indeed, if you were to output `{% include_block block.value %}` on the page, you would find that it renders as plain text, without the `<h1>` tags.

(More precisely, the items returned when iterating over a `StreamField` are instances of a class `StreamChild`, which provides the `block_type` property as well as `value`.)

Experienced Django developers may find it helpful to compare this to the `BoundField` class in Django’s forms framework, which represents the pairing of a form field value with its corresponding form field definition, and therefore knows how to render the value as an HTML form field.

Most of the time, you won’t need to worry about these internal details; Wagtail will use the template rendering wherever you would expect it to. However, there are certain cases where the illusion isn’t quite complete - namely, when accessing children of a `ListBlock` or `StructBlock`. In these cases, there is no `BoundBlock` wrapper, and so the item cannot be relied upon to know its own template rendering. For example, consider the following setup, where our `HeadingBlock` is a child of a `StructBlock`:

```
class EventBlock(blocks.StructBlock):
    heading = HeadingBlock()
    description = blocks.TextBlock()
    # ...

    class Meta:
        template = 'blocks/event.html'
```

In `blocks/event.html`:

```
{% load wagtailcore_tags %}

<div class="event {% if value.heading == 'Party!' %}lots-of-balloons{% endif %}">
    {% include_block value.heading %}
    - {% include_block value.description %}
</div>
```

In this case, `value.heading` returns the plain string value rather than a `BoundBlock`; this is necessary because otherwise the comparison in `{% if value.heading == 'Party!' %}` would never succeed. This in turn means that `{% include_block value.heading %}` renders as the plain string, without the `<h1>` tags. To get the HTML rendering, you need to explicitly access the `BoundBlock` instance through `value.bound_blocks.heading`:

```
{% load wagtailcore_tags %}

<div class="event {% if value.heading == 'Party!' %}lots-of-balloons{% endif %}">
    {% include_block value.bound_blocks.heading %}
    - {% include_block value.description %}
</div>
```

In practice, it would probably be more natural and readable to make the `<h1>` tag explicit in the `EventBlock`’s template:

```
{% load wagtailcore_tags %}

<div class="event {% if value.heading == 'Party!' %}lots-of-balloons{% endif %}">
    <h1>{{ value.heading }}</h1>
    - {% include_block value.description %}
</div>
```

This limitation does not apply to `StructBlock` and `StreamBlock` values as children of a `StructBlock`, because Wagtail implements these as complex objects that know their own template rendering, even when not wrapped in a `BoundBlock`. For example, if a `StructBlock` is nested in another `StructBlock`, as in:

```
class EventBlock(blocks.StructBlock):
    heading = HeadingBlock()
    description = blocks.TextBlock()
    guest_speaker = blocks.StructBlock([
        ('first_name', blocks.CharBlock()),
        ('surname', blocks.CharBlock()),
        ('photo', ImageChooserBlock()),
    ], template='blocks/speaker.html')
```

then `{% include_block value.guest_speaker %}` within the `EventBlock`'s template will pick up the template rendering from `blocks/speaker.html` as intended.

In summary, interactions between `BoundBlocks` and plain values work according to the following rules:

1. When iterating over the value of a `StreamField` or `StreamBlock` (as in `{% for block in page.body %}`), you will get back a sequence of `BoundBlocks`.
2. If you have a `BoundBlock` instance, you can access the plain value as `block.value`.
3. Accessing a child of a `StructBlock` (as in `value.heading`) will return a plain value; to retrieve the `BoundBlock` instead, use `value.bound_blocks.heading`.
4. The value of a `ListBlock` is a plain Python list; iterating over it returns plain child values.
5. `StructBlock` and `StreamBlock` values always know how to render their own templates, even if you only have the plain value rather than the `BoundBlock`.

## Custom editing interfaces for `StructBlock`

To customise the styling of a `StructBlock` as it appears in the page editor, you can specify a `form_classname` attribute (either as a keyword argument to the `StructBlock` constructor, or in a subclass's `Meta`) to override the default value of `struct-block`:

```
class PersonBlock(blocks.StructBlock):
    first_name = blocks.CharBlock()
    surname = blocks.CharBlock()
    photo = ImageChooserBlock(required=False)
    biography = blocks.RichTextBlock()

    class Meta:
        icon = 'user'
        form_classname = 'person-block struct-block'
```

You can then provide custom CSS for this block, targeted at the specified classname, by using the [insert\\_editor\\_css](#) hook.

---

**Note:** Wagtail's editor styling has some built in styling for the `struct-block` class and other related elements. If you specify a value for `form_classname`, it will overwrite the classes that are already applied to `StructBlock`, so you must remember to specify the `struct-block` as well.

---

For more extensive customisations that require changes to the HTML markup as well, you can override the `form_template` attribute in `Meta` to specify your own template path. The following variables are available on this template:



**children** An `OrderedDict` of `BoundBlocks` for all of the child blocks making up this `StructBlock`; typically your template will call `render_form` on each of these.

**help\_text** The help text for this block, if specified.

**classname** The class name passed as `form_classname` (defaults to `struct-block`).

**block\_definition** The `StructBlock` instance that defines this block.

**prefix** The prefix used on form fields for this block instance, guaranteed to be unique across the form.

To add additional variables, you can override the block's `get_form_context` method:

```
class PersonBlock(blocks.StructBlock):
    first_name = blocks.CharBlock()
    surname = blocks.CharBlock()
    photo = ImageChooserBlock(required=False)
    biography = blocks.RichTextBlock()

    def get_form_context(self, value, prefix='', errors=None):
        context = super().get_form_context(value, prefix=prefix, errors=errors)
        context['suggested_first_names'] = ['John', 'Paul', 'George', 'Ringo']
        return context

    class Meta:
        icon = 'user'
        form_template = 'myapp/block_forms/person.html'
```

## Custom value class for `StructBlock`

To customise the methods available for a `StructBlock` value, you can specify a `value_class` attribute (either as a keyword argument to the `StructBlock` constructor, or in a subclass's `Meta`) to override how the value is prepared.

This `value_class` must be a subclass of `StructValue`, any additional methods can access the value from sub-blocks via the block key on `self` (e.g. `self.get('my_block')`).

Example:

```
from wagtail.core.models import Page
from wagtail.core.blocks import (
    CharBlock, PageChooserBlock, StructValue, StructBlock, TextBlock, URLBlock)

class LinkStructValue(StructValue):
    def url(self):
        external_url = self.get('external_url')
        page = self.get('page')
        if external_url:
            return external_url
        elif page:
            return page.url

class QuickLinkBlock(StructBlock):
    text = CharBlock(label="link text", required=True)
    page = PageChooserBlock(label="page", required=False)
    external_url = URLBlock(label="external URL", required=False)
```

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```

class Meta:
    icon = 'site'
    value_class = LinkStructValue

class MyPage(Page):
    quick_links = StreamField([('links', QuickLinkBlock())], blank=True)
    quotations = StreamField([('quote', StructBlock([
        ('quote', TextBlock(required=True)),
        ('page', PageChooserBlock(required=False)),
        ('external_url', URLBlock(required=False)),
    ]), icon='openquote', value_class=LinkStructValue)], blank=True)

    content_panels = Page.content_panels + [
        StreamFieldPanel('quick_links'),
        StreamFieldPanel('quotations'),
    ]

```

Your extended value class methods will be available in your template:

```

{% load wagtailcore_tags %}

<ul>
    {% for link in page.quick_links %}
        <li><a href="{{ link.value.url }}">{{ link.value.text }}</a></li>
    {% endfor %}
</ul>

<div>
    {% for quotation in page.quotations %}
        <blockquote cite="{{ quotation.value.url }}">
            {{ quotation.value.quote }}
        </blockquote>
    {% endfor %}
</div>

```

## Custom block types

If you need to implement a custom UI, or handle a datatype that is not provided by Wagtail’s built-in block types (and cannot be built up as a structure of existing fields), it is possible to define your own custom block types. For further guidance, refer to the source code of Wagtail’s built-in block classes.

For block types that simply wrap an existing Django form field, Wagtail provides an abstract class `wagtail.core.blocks.FieldBlock` as a helper. Subclasses just need to set a `field` property that returns the form field object:

```

class IPAddressBlock(FieldBlock):
    def __init__(self, required=True, help_text=None, **kwargs):
        self.field = forms.GenericIPAddressField(required=required, help_text=help_
→text)
        super().__init__(**kwargs)

```

## Migrations

## StreamField definitions within migrations

As with any model field in Django, any changes to a model definition that affect a StreamField will result in a migration file that contains a ‘frozen’ copy of that field definition. Since a StreamField definition is more complex than a typical model field, there is an increased likelihood of definitions from your project being imported into the migration – which would cause problems later on if those definitions are moved or deleted.

To mitigate this, StructBlock, StreamBlock and ChoiceBlock implement additional logic to ensure that any subclasses of these blocks are deconstructed to plain instances of StructBlock, StreamBlock and ChoiceBlock – in this way, the migrations avoid having any references to your custom class definitions. This is possible because these block types provide a standard pattern for inheritance, and know how to reconstruct the block definition for any subclass that follows that pattern.

If you subclass any other block class, such as FieldBlock, you will need to either keep that class definition in place for the lifetime of your project, or implement a [custom deconstruct method](#) that expresses your block entirely in terms of classes that are guaranteed to remain in place. Similarly, if you customise a StructBlock, StreamBlock or ChoiceBlock subclass to the point where it can no longer be expressed as an instance of the basic block type – for example, if you add extra arguments to the constructor – you will need to provide your own deconstruct method.

## Migrating RichTextFields to StreamField

If you change an existing RichTextField to a StreamField, the database migration will complete with no errors, since both fields use a text column within the database. However, StreamField uses a JSON representation for its data, so the existing text requires an extra conversion step in order to become accessible again. For this to work, the StreamField needs to include a RichTextBlock as one of the available block types. (When updating the model, don’t forget to change FieldPanel to StreamFieldPanel too.) Create the migration as normal using `./manage.py makemigrations`, then edit it as follows (in this example, the ‘body’ field of the `demo.BlogPage` model is being converted to a StreamField with a RichTextBlock named `rich_text`):

```
# -*- coding: utf-8 -*-
from django.db import models, migrations
from wagtail.core.rich_text import RichText

def convert_to_streamfield(apps, schema_editor):
    BlogPage = apps.get_model("demo", "BlogPage")
    for page in BlogPage.objects.all():
        if page.body.raw_text and not page.body:
            page.body = [ ('rich_text', RichText(page.body.raw_text))]
            page.save()

def convert_to_richtext(apps, schema_editor):
    BlogPage = apps.get_model("demo", "BlogPage")
    for page in BlogPage.objects.all():
        if page.body.raw_text is None:
            raw_text = ''.join([
                child.value.source for child in page.body
                if child.block_type == 'rich_text'
            ])
            page.body = raw_text
            page.save()

class Migration(migrations.Migration):
```

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```

dependencies = [
    # leave the dependency line from the generated migration intact!
    ('demo', '0001_initial'),
]

operations = [
    # leave the generated AlterField intact!
    migrations.AlterField(
        model_name='BlogPage',
        name='body',
        field=wagtail.core.fields.StreamField([('rich_text', wagtail.core.blocks.
↪RichTextBlock())]),
    ),

    migrations.RunPython(
        convert_to_streamfield,
        convert_to_richtext,
    ),
]

```

Note that the above migration will work on published Page objects only. If you also need to migrate draft pages and page revisions, then edit the migration as in the following example instead:

```

# -*- coding: utf-8 -*-
import json

from django.core.serializers.json import DjangoJSONEncoder
from django.db import migrations, models

from wagtail.core.rich_text import RichText

def page_to_streamfield(page):
    changed = False
    if page.body.raw_text and not page.body:
        page.body = [
            ('rich_text', {'rich_text': RichText(page.body.raw_text)})]
        changed = True
    return page, changed

def pagerevision_to_streamfield(revision_data):
    changed = False
    body = revision_data.get('body')
    if body:
        try:
            json.loads(body)
        except ValueError:
            revision_data['body'] = json.dumps(
                [{
                    "value": {"rich_text": body},
                    "type": "rich_text"
                }],
                cls=DjangoJSONEncoder)
            changed = True
    else:

```

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```

        # It's already valid JSON. Leave it.
        pass
    return revision_data, changed

def page_to_richtext(page):
    changed = False
    if page.body.raw_text is None:
        raw_text = ''.join([
            child.value['rich_text'].source for child in page.body
            if child.block_type == 'rich_text'
        ])
        page.body = raw_text
        changed = True
    return page, changed

def pagerevision_to_richtext(revision_data):
    changed = False
    body = revision_data.get('body', 'definitely non-JSON string')
    if body:
        try:
            body_data = json.loads(body)
        except ValueError:
            # It's not apparently a StreamField. Leave it.
            pass
        else:
            raw_text = ''.join([
                child['value']['rich_text'] for child in body_data
                if child['type'] == 'rich_text'
            ])
            revision_data['body'] = raw_text
            changed = True
    return revision_data, changed

def convert(apps, schema_editor, page_converter, pagerevision_converter):
    BlogPage = apps.get_model("demo", "BlogPage")
    for page in BlogPage.objects.all():

        page, changed = page_converter(page)
        if changed:
            page.save()

        for revision in page.revisions.all():
            revision_data = json.loads(revision.content_json)
            revision_data, changed = pagerevision_converter(revision_data)
            if changed:
                revision.content_json = json.dumps(revision_data,
↪cls=DjangoJSONEncoder)
                revision.save()

def convert_to_streamfield(apps, schema_editor):
    return convert(apps, schema_editor, page_to_streamfield, pagerevision_to_
↪streamfield)

```

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```
def convert_to_richtext(apps, schema_editor):
    return convert(apps, schema_editor, page_to_richtext, pagerevision_to_richtext)

class Migration(migrations.Migration):

    dependencies = [
        # leave the dependency line from the generated migration intact!
        ('demo', '0001_initial'),
    ]

    operations = [
        # leave the generated AlterField intact!
        migrations.AlterField(
            model_name='BlogPage',
            name='body',
            field=wagtail.core.fields.StreamField([('richtext', wagtail.core.blocks.
↪RichTextBlock())]),
        ),

        migrations.RunPython(
            convert_to_streamfield,
            convert_to_richtext,
        ),
    ]
```

## 1.2.7 Permissions

Wagtail adapts and extends the [Django permission system](#) to cater for the needs of website content creation, such as moderation workflows, and multiple teams working on different areas of a site (or multiple sites within the same Wagtail installation). Permissions can be configured through the ‘Groups’ area of the Wagtail admin interface, under ‘Settings’.

### Page permissions

Permissions can be attached at any point in the page tree, and propagate down the tree. For example, if a site had the page tree:

```
MegaCorp/
  About us
  Offices/
    UK
    France
    Germany
```

then a group with ‘edit’ permissions on the ‘Offices’ page would automatically receive the ability to edit the ‘UK’, ‘France’ and ‘Germany’ pages. Permissions can be set globally for the entire tree by assigning them on the ‘root’ page - since all pages must exist underneath the root node, and the root cannot be deleted, this permission will cover all pages that exist now and in future.

Whenever a user creates a page through the Wagtail admin, that user is designated as the owner of that page. Any user with ‘add’ permission has the ability to edit pages they own, as well as adding new ones. This is in recognition of the fact that creating pages is typically an iterative process involving creating a number of draft versions - giving a user the

ability to create a draft but not letting them subsequently edit it would not be very useful. Ability to edit a page also implies the ability to delete it; unlike Django's standard permission model, there is no distinct 'delete' permission.

The full set of available permission types is as follows:

- **Add** - grants the ability to create new subpages underneath this page (provided the page model permits this - see *Parent page / subpage type rules*), and to edit and delete pages owned by the current user. Published pages cannot be deleted unless the user also has 'publish' permission.
- **Edit** - grants the ability to edit and delete this page, and any pages underneath it, regardless of ownership. A user with only 'edit' permission may not create new pages, only edit existing ones. Published pages cannot be deleted unless the user also has 'publish' permission.
- **Publish** - grants the ability to publish and unpublish this page and/or its children. A user without publish permission cannot directly make changes that are visible to visitors of the website; instead, they must submit their changes for moderation (which will send a notification to users with publish permission). Publish permission is independent of edit permission; a user with only publish permission will not be able to make any edits of their own.
- **Bulk delete** - allows a user to delete pages that have descendants, in a single operation. Without this permission, a user has to delete the descendant pages individually before deleting the parent. This is a safeguard against accidental deletion. This permission must be used in conjunction with 'add' / 'edit' permission, as it does not provide any deletion rights of its own; it only provides a 'shortcut' for the permissions the user has already. For example, a user with just 'add' and 'bulk delete' permissions will only be able to bulk-delete if all the affected pages are owned by that user, and are unpublished.
- **Lock** - grants the ability to lock or unlock this page (and any pages underneath it) for editing, preventing users from making any further edits to it.

Drafts can be viewed only if the user has either Edit or Publish permission.

## Image / document permissions

The permission rules for images and documents work on a similar basis to pages. Images and documents are considered to be 'owned' by the user who uploaded them; a user with 'add' permission also has the ability to edit items they own; and deletion is considered equivalent to editing rather than having a specific permission type.

Access to specific sets of images and documents can be controlled by setting up *collections*. By default all images and documents belong to the 'root' collection, but new collections can be created through the Settings -> Collections area of the admin interface. Permissions set on 'root' apply to all collections, so a user with 'edit' permission for images on root can edit all images; permissions set on other collections apply to that collection only.

## 1.3 Advanced topics

### 1.3.1 Images

#### Generating renditions in Python

Rendered versions of original images generated by the Wagtail `{% image %}` template tag are called "renditions", and are stored as new image files in the site's `[media]/images` directory on the first invocation.

Image renditions can also be generated dynamically from Python via the native `get_rendition()` method, for example:

```
newimage = myimage.get_rendition('fill-300x150|jpegquality-60')
```

If `myimage` had a filename of `foo.jpg`, a new rendition of the image file called `foo.fill-300x150.jpegquality-60.jpg` would be generated and saved into the site's `[media]/images` directory. Argument options are identical to the `{% image %}` template tag's filter spec, and should be separated with `|`.

The generated `Rendition` object will have properties specific to that version of the image, such as `url`, `width` and `height`, so something like this could be used in an API generator, for example:

```
url = myimage.get_rendition('fill-300x186|jpegquality-60').url
```

Properties belonging to the original image from which the generated `Rendition` was created, such as `title`, can be accessed through the `Rendition`'s `image` property:

```
>>> newimage.image.title
'Blue Sky'
>>> newimage.image.is_landscape()
True
```

See also: *Using images in templates*

### Animated GIF support

Pillow, Wagtail's default image library, doesn't support animated GIFs.

To get animated GIF support, you will have to [install Wand](#). Wand is a binding to ImageMagick so make sure that has been installed as well.

When installed, Wagtail will automatically use Wand for resizing GIF files but continue to resize other images with Pillow.

### Image file formats

#### Using the picture element

The [picture element](#) can be used with the `format-<type>` image operation to specify different image formats and let the browser choose the one it prefers. For example:

```
{% load wagtailimages_tags %}

<picture>
  {% image myimage width-1000 format-webp as image_webp %}
  <source srcset="{ { image_webp.url } }" type="image/webp">

  {% image myimage width-1000 format-png as image_png %}
  <source srcset="{ { image_png.url } }" type="image/png">

  {{ image_png }}
</picture>
```

### Customizing output formats

By default all `bmp` and `webp` images are converted to the `png` format when no image output format is given.

The default conversion mapping can be changed by setting the `WAGTAILIMAGES_FORMAT_CONVERSIONS` to a dictionary which maps the input type to an output type.



For example:

```
WAGTAILIMAGES_FORMAT_CONVERSIONS = {
    'bmp': 'jpeg',
    'webp': 'webp',
}
```

will convert bmp images to jpeg and disable the default webp to png conversion.

## Custom image models

The Image model can be customised, allowing additional fields to be added to images.

To do this, you need to add two models to your project:

- The image model itself that inherits from `wagtail.images.models.AbstractImage`. This is where you would add your additional fields
- The renditions model that inherits from `wagtail.images.models.AbstractRendition`. This is used to store renditions for the new model.

Here's an example:

```
# models.py
from django.db import models

from wagtail.images.models import Image, AbstractImage, AbstractRendition

class CustomImage(AbstractImage):
    # Add any extra fields to image here

    # eg. To add a caption field:
    # caption = models.CharField(max_length=255, blank=True)

    admin_form_fields = Image.admin_form_fields + (
        # Then add the field names here to make them appear in the form:
        # 'caption',
    )

class CustomRendition(AbstractRendition):
    image = models.ForeignKey(CustomImage, on_delete=models.CASCADE, related_name=
        ↪ 'renditions')

    class Meta:
        unique_together = (
            ('image', 'filter_spec', 'focal_point_key'),
        )
```

**Note:** Fields defined on a custom image model must either be set as non-required (`blank=True`), or specify a default value - this is because uploading the image and entering custom data happen as two separate actions, and Wagtail needs to be able to create an image record immediately on upload.

Then set the `WAGTAILIMAGES_IMAGE_MODEL` setting to point to it:

```
WAGTAILIMAGES_IMAGE_MODEL = 'images.CustomImage'
```

### Migrating from the builtin image model

When changing an existing site to use a custom image model, no images will be copied to the new model automatically. Copying old images to the new model would need to be done manually with a [data migration](#).

Any templates that reference the builtin image model will still continue to work as before but would need to be updated in order to see any new images.

### Referring to the image model

`wagtail.images.get_image_model()`

Get the image model from the `WAGTAILIMAGES_IMAGE_MODEL` setting. Useful for developers making Wagtail plugins that need the image model. Defaults to the standard `Image` model if no custom model is defined.

`wagtail.images.get_image_model_string()`

Get the dotted `app.Model` name for the image model as a string. Useful for developers making Wagtail plugins that need to refer to the image model, such as in foreign keys, but the model itself is not required.

### Changing rich text representation

The HTML representation of an image in rich text can be customised - for example, to display captions or custom fields.

To do this requires subclassing `Format` (see *Image Formats in the Rich Text Editor*), and overriding its `image_to_html` method.

You may then register formats of your subclass using `register_image_format` as usual.

```
# image_formats.py
from wagtail.images.formats import Format, register_image_format

class SubclassedImageFormat(Format):

    def image_to_html(self, image, alt_text, extra_attributes=None):

        custom_html = # the custom HTML representation of your image here
                      # in Format, the image's rendition.img_tag(extra_attributes) is
↳used to generate the HTML
                      # representation

        return custom_html

register_image_format(
    SubclassedImageFormat('subclassed_format', 'Subclassed Format', classnames,
↳filter_spec)
)
```

As an example, let's say you want the alt text to be displayed as a caption for the image as well:

```
# image_formats.py
from django.utils.html import format_html
from wagtail.images.formats import Format, register_image_format

class CaptionedImageFormat(Format):

    def image_to_html(self, image, alt_text, extra_attributes=None):

        default_html = super().image_to_html(image, alt_text, extra_attributes)

        return format_html("{}<figcaption>{}</figcaption>", default_html, alt_text)

register_image_format(
    CaptionedImageFormat('captioned_fullwidth', 'Full width captioned', 'bodytext-
↪image', 'width-750')
)
```

---

**Note:** Any custom HTML image features will not be displayed in the Draftail editor, only on the published page.

---

## Feature Detection

Wagtail has the ability to automatically detect faces and features inside your images and crop the images to those features.

Feature detection uses [OpenCV](#), the Open Source Computer Vision Library, to detect faces/features in an image when the image is uploaded. The detected features are stored internally as a focal point in the `focal_point_{x, y, width, height}` fields on the `Image` model. These fields are used by the `fill` image filter when an image is rendered in a template to crop the image.

## Installation

Three components are required to get this working with Wagtail:

- OpenCV itself
- various system-level components that OpenCV relies on
- a Python interface to OpenCV, exposed as `cv2`

## Installation options

There is more than one way to install these components, but in each case you will need to test that both OpenCV itself *and* the Python interface have been correctly installed.

### Install `opencv-python`

`opencv-python` is available on PyPI. It includes a Python interface to OpenCV, as well as the statically-built OpenCV binaries themselves.

To install:

```
$ pip install opencv-python
```

Depending on what else is installed on your system, this may be all that is required. On lighter-weight Linux systems, you may need to identify and install missing system libraries (for example, a slim version of Debian Stretch requires `libsm6 libxrender1 libxext6` to be installed with `apt`).

### Install a system-level package

A system-level package can take care of all of the required components. Check what is available for your operating system. For example, `python-opencv` is available for Debian; it installs OpenCV itself, and sets up Python bindings.

However, it may make incorrect assumptions about how you're using Python (for example, which version you're using) - test as described below.

### Testing the installation

Test the installation:

```
python3
>>> import cv2
```

An error such as:

```
ImportError: libSM.so.6: cannot open shared object file: No such file or directory
```

indicates that a required system library (in this case `libsm6`) has not been installed.

On the other hand,

```
ModuleNotFoundError: No module named 'cv2'
```

means that the Python components have not been set up correctly in your Python environment.

If you don't get an import error, installation has probably been successful.

### Switching on feature detection in Wagtail

Once OpenCV is installed, you need to set the `WAGTAILIMAGES_FEATURE_DETECTION_ENABLED` setting to `True`:

```
# settings.py

WAGTAILIMAGES_FEATURE_DETECTION_ENABLED = True
```

### Manually running feature detection

Feature detection runs when new images are uploaded in to Wagtail. If you already have images in your Wagtail site and would like to run feature detection on them, you will have to run it manually.

You can manually run feature detection on all images by running the following code in the Python shell:

```
from wagtail.images.models import Image

for image in Image.objects.all():
    if not image.has_focal_point():
        image.set_focal_point(image.get_suggested_focal_point())
        image.save()
```

## Dynamic image serve view

In most cases, developers wanting to generate image renditions in Python should use the `get_rendition()` method. See *Generating renditions in Python*.

If you need to be able to generate image versions for an *external* system such as a blog or mobile app, Wagtail provides a view for dynamically generating renditions of images by calling a unique URL.

The view takes an image id, filter spec and security signature in the URL. If these parameters are valid, it serves an image file matching that criteria.

Like the `{% image %}` tag, the rendition is generated on the first call and subsequent calls are served from a cache.

## Setup

Add an entry for the view into your URLs configuration:

```
from wagtail.images.views.serve import ServeView

urlpatterns = [
    ...

    url(r'^images/([^\/]*)/(\d+)/([^\/]*)/[^/]*$', ServeView.as_view(), name=
    ↳ 'wagtailimages_serve'),

    ...

    # Ensure that the wagtailimages_serve line appears above the default_
    ↳ Wagtail page serving route
    url(r'', include(wagtail_urls)),
]
```

## Usage

### Image URL generator UI

When the dynamic serve view is enabled, an image URL generator in the admin interface becomes available automatically. This can be accessed through the edit page of any image by clicking the “URL generator” button on the right hand side.

This interface allows editors to generate URLs to cropped versions of the image.

## Generating dynamic image URLs in Python

Dynamic image URLs can also be generated using Python code and served to a client over an API or used directly in the template.

One advantage of using dynamic image URLs in the template is that they do not block the initial response while rendering like the `{% image %}` tag does.

The `generate_image_url` function in `wagtail.images.views.serve` is a convenience method to generate a dynamic image URL.

Here's an example of this being used in a view:

```
def display_image(request, image_id):
    image = get_object_or_404(Image, id=image_id)

    return render(request, 'display_image.html', {
        'image_url': generate_image_url(image, 'fill-100x100')
    })
```

Image operations can be chained by joining them with a `|` character:

```
return render(request, 'display_image.html', {
    'image_url': generate_image_url(image, 'fill-100x100|jpegquality-40')
})
```

In your templates:

```
{% load wagtailimages_tags %}
...

<!-- Get the url for the image scaled to a width of 400 pixels: -->
{% image_url page.photo "width-400" %}

<!-- Again, but this time as a square thumbnail: -->
{% image_url page.photo "fill-100x100|jpegquality-40" %}

<!-- This time using our custom image serve view: -->
{% image_url page.photo "width-400" "mycustomview_serve" %}
```

You can pass an optional view name that will be used to serve the image through. The default is `wagtailimages_serve`

## Advanced configuration

### Making the view redirect instead of serve

By default, the view will serve the image file directly. This behaviour can be changed to a 301 redirect instead which may be useful if you host your images externally.

To enable this, pass `action='redirect'` into the `ServeView.as_view()` method in your urls configuration:

```
from wagtail.images.views.serve import ServeView

urlpatterns = [
    ...
```

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```
url(r'^images/([^/]*)/(\d+)/([^/]*)/[^/]*$', ServeView.as_view(action='redirect'),
→ name='wagtailimages_serve'),
]
```

## Integration with django-sendfile

`django-sendfile` offloads the job of transferring the image data to the web server instead of serving it directly from the Django application. This could greatly reduce server load in situations where your site has many images being downloaded but you're unable to use a *Caching proxy* or a CDN.

You firstly need to install and configure `django-sendfile` and configure your web server to use it. If you haven't done this already, please refer to the [installation docs](#).

To serve images with `django-sendfile`, you can use the `SendFileView` class. This view can be used out of the box:

```
from wagtail.images.views.serve import SendFileView

urlpatterns = [
    ...

    url(r'^images/([^/]*)/(\d+)/([^/]*)/[^/]*$', SendFileView.as_view(), name=
→ 'wagtailimages_serve'),
]
```

You can customise it to override the backend defined in the `SENDFILE_BACKEND` setting:

```
from wagtail.images.views.serve import SendFileView
from project.sendfile_backends import MyCustomBackend

class MySendFileView(SendFileView):
    backend = MyCustomBackend
```

You can also customise it to serve private files. For example, if the only need is to be authenticated (e.g. for Django >= 1.9):

```
from django.contrib.auth.mixins import LoginRequiredMixin
from wagtail.images.views.serve import SendFileView

class PrivateSendFileView(LoginRequiredMixin, SendFileView):
    raise_exception = True
```

## 1.3.2 Documents

### Custom document model

An alternate `Document` model can be used to add custom behaviour and additional fields.

You need to complete the following steps in your project to do this:

- Create a new document model that inherits from `wagtail.documents.models.AbstractDocument`. This is where you would add additional fields.
- Point `WAGTAILDOCS_DOCUMENT_MODEL` to the new model.

Here's an example:

```
# models.py
from wagtail.documents.models import Document, AbstractDocument

class CustomDocument(AbstractDocument):
    # Custom field example:
    source = models.CharField(
        max_length=255,
        # This must be set to allow Wagtail to create a document instance
        # on upload.
        blank=True,
        null=True
    )

    admin_form_fields = Document.admin_form_fields + (
        # Add all custom fields names to make them appear in the form:
        'source',
    )
```

---

**Note:** Fields defined on a custom document model must either be set as non-required (`blank=True`), or specify a default value. This is because uploading the document and entering custom data happens as two separate actions. Wagtail needs to be able to create a document record immediately on upload.

---

Then in your settings module:

```
# Ensure that you replace app_label with the app you placed your custom
# model in.
WAGTAILDOCS_DOCUMENT_MODEL = 'app_label.CustomDocument'
```

### Migrating from the builtin document model

When changing an existing site to use a custom document model, no documents will be copied to the new model automatically. Copying old documents to the new model would need to be done manually with a [data migration](#).

Any templates that reference the builtin document model will still continue to work as before.

### Referring to the document model

```
wagtail.documents.models.get_document_model()
```

Get the document model from the `WAGTAILDOCS_DOCUMENT_MODEL` setting. Defaults to the standard Document model if no custom model is defined.

### 1.3.3 Embedded content

Wagtail supports generating embed code from URLs to content on external providers such as Youtube or Twitter. By default, Wagtail will fetch the embed code directly from the relevant provider's site using the oEmbed protocol.

Wagtail has a built-in list of the most common providers and this list can be changed *with a setting*. Wagtail also supports fetching embed code using *Embedly* and *custom embed finders*.



## Embedding content on your site

Wagtail’s embeds module should work straight out of the box for most providers. You can use any of the following methods to call the module:

### Rich text

Wagtail’s default rich text editor has a “media” icon that allows embeds to be placed into rich text. You don’t have to do anything to enable this; just make sure the rich text field’s content is being passed through the `|richtext` filter in the template as this is what calls the embeds module to fetch and nest the embed code.

### EmbedBlock StreamField block type

The EmbedBlock block type allows embeds to be placed into a StreamField.

For example:

```
from wagtail.embeds.blocks import EmbedBlock

class MyStreamField(blocks.StreamBlock):
    ...

    embed = EmbedBlock()
```

### {% embed %} tag

Syntax: `{% embed <url> [max_width=<max width>] %}`

You can nest embeds into a template by passing the URL and an optional `max_width` argument to the `{% embed %}` tag.

The `max_width` argument is sent to the provider when fetching the embed code.

```
{% load wagtailembeds_tags %}

{# Embed a YouTube video #}
{% embed 'https://www.youtube.com/watch?v=SJXMTtvCxRo' %}

{# This tag can also take the URL from a variable #}
{% embed page.video_url %}
```

## From Python

You can also call the internal `get_embed` function that takes a URL string and returns an Embed object (see model documentation below). This also takes a `max_width` keyword argument that is sent to the provider when fetching the embed code.

```
from wagtail.embeds.embeds import get_embed
from wagtail.embeds.exceptions import EmbedException

try:
    embed = get_embed('https://www.youtube.com/watch?v=SJXMTtvCxRo')
```

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```
print(embed.html)
except EmbedException:
    # Cannot find embed
    pass
```

## Configuring embed “finders”

Embed finders are the modules within Wagtail that are responsible for producing embed code from a URL.

Embed finders are configured using the `WAGTAILEMBEDS_FINDERS` setting. This is a list of finder configurations that are each run in order until one of them successfully returns an embed:

The default configuration is:

```
WAGTAILEMBEDS_FINDERS = [
    {
        'class': 'wagtail.embeds.finders.oembed'
    }
]
```

## oEmbed (default)

The default embed finder fetches the embed code directly from the content provider using the oEmbed protocol. Wagtail has a built-in list of providers which are all enabled by default. You can find that provider list at the following link:

[https://github.com/wagtail/wagtail/blob/master/wagtail/embeds/oembed\\_providers.py](https://github.com/wagtail/wagtail/blob/master/wagtail/embeds/oembed_providers.py)

## Customising the provider list

You can limit which providers may be used by specifying the list of providers in the finder configuration.

For example, this configuration will only allow content to be nested from Vimeo and Youtube. It also adds a custom provider:

```
from wagtail.embeds.oembed_providers import youtube, vimeo

# Add a custom provider
# Your custom provider must support oEmbed for this to work. You should be
# able to find these details in the provider's documentation.
# - 'endpoint' is the URL of the oEmbed endpoint that Wagtail will call
# - 'urls' specifies which patterns
my_custom_provider = {
    'endpoint': 'https://customvideosite.com/oembed',
    'urls': [
        '^http(?:s)?://(?:www\\.)?customvideosite\\.com/[^#?/]+/videos/.+$',
    ]
}

WAGTAILEMBEDS_FINDERS = [
    {
        'class': 'wagtail.embeds.finders.oembed',
```

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```

        'providers': [youtube, vimeo, my_custom_provider],
    }
]

```

## Customising an individual provider

Multiple finders can be chained together. This can be used for customising the configuration for one provider without affecting the others.

For example, this is how you can instruct Youtube to return videos in HTTPS (which must be done explicitly for YouTube):

```

from wagtail.embeds.oembed_providers import youtube

WAGTAILEMBEDS_FINDERS = [
    # Fetches YouTube videos but puts ``?scheme=https`` in the GET parameters
    # when calling YouTube's oEmbed endpoint
    {
        'class': 'wagtail.embeds.finders.oembed',
        'providers': [youtube],
        'options': {'scheme': 'https'}
    },

    # Handles all other oEmbed providers the default way
    {
        'class': 'wagtail.embeds.finders.oembed',
    }
]

```

### How Wagtail uses multiple finders

If multiple providers can handle a URL (for example, a YouTube video was requested using the configuration above), the topmost finder is chosen to perform the request.

Wagtail will not try to run any other finder, even if the chosen one didn't return an embed.

## Embed.ly

[Embed.ly](#) is a paid-for service that can also provide embeds for sites that do not implement the oEmbed protocol.

They also provide some helpful features such as giving embeds a consistent look and a common video playback API which is useful if your site allows videos to be hosted on different providers and you need to implement custom controls for them.

Wagtail has built in support for fetching embeds from Embed.ly. To use it, add an embed finder to your WAGTAILEMBEDS\_FINDERS setting that uses the `wagtail.embeds.finders.embedly` class and pass it your API key:

```

WAGTAILEMBEDS_FINDERS = [
    {
        'class': 'wagtail.embeds.finders.embedly',

```

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```
        'key': 'YOUR EMBED.LY KEY HERE'
    }
]
```

## Custom embed finder classes

For complete control, you can create a custom finder class.

Here's a stub finder class that could be used as a skeleton; please read the docstrings for details of what each method does:

```
from wagtail.embeds.finders.base import EmbedFinder

class ExampleFinder(EmbedFinder):
    def __init__(self, **options):
        pass

    def accept(self, url):
        """
        Returns True if this finder knows how to fetch an embed for the URL.

        This should not have any side effects (no requests to external servers)
        """
        pass

    def find_embed(self, url, max_width=None):
        """
        Takes a URL and max width and returns a dictionary of information about the
        content to be used for embedding it on the site.

        This is the part that may make requests to external APIs.
        """
        # TODO: Perform the request

        return {
            'title': "Title of the content",
            'author_name': "Author name",
            'provider_name': "Provider name (eg. YouTube, Vimeo, etc)",
            'type': "Either 'photo', 'video', 'link' or 'rich'",
            'thumbnail_url': "URL to thumbnail image",
            'width': width_in_pixels,
            'height': height_in_pixels,
            'html': "<h2>The Embed HTML</h2>",
        }
}
```

Once you've implemented all of those methods, you just need to add it to your `WAGTAILEMBEDS_FINDERS` setting:

```
WAGTAILEMBEDS_FINDERS = [
    {
        'class': 'path.to.your.finder.class.here',
        # Any other options will be passed as kwargs to the __init__ method
    }
]
```

## The Embed model

**class** wagtail.embeds.models.**Embed**

Embeds are fetched only once and stored in the database so subsequent requests for an individual embed do not hit the embed finders again.

**url**

(text)

The URL of the original content of this embed.

**max\_width**

(integer, nullable)

The max width that was requested.

**type**

(text)

The type of the embed. This can be either 'video', 'photo', 'link' or 'rich'.

**html**

(text)

The HTML content of the embed that should be placed on the page

**title**

(text)

The title of the content that is being embedded.

**author\_name**

(text)

The author name of the content that is being embedded.

**provider\_name**

(text)

The provider name of the content that is being embedded.

For example: YouTube, Vimeo

**thumbnail\_url**

(text)

a URL to a thumbnail image of the content that is being embedded.

**width**

(integer, nullable)

The width of the embed (images and videos only).

**height**

(integer, nullable)

The height of the embed (images and videos only).

**last\_updated**

(datetime)

The Date/time when this embed was last fetched.

### Deleting embeds

As long as your embeds configuration is not broken, deleting items in the `Embed` model should be perfectly safe to do. Wagtail will automatically repopulate the records that are being used on the site.

You may want to do this if you've changed from `oEmbed` to `Embedly` or vice-versa as the embed code they generate may be slightly different and lead to inconsistency on your site.

### 1.3.4 Configuring Django for Wagtail

To install Wagtail completely from scratch, create a new Django project and an app within that project. For instructions on these tasks, see [Writing your first Django app](#). Your project directory will look like the following:

```
myproject/
  myproject/
    __init__.py
    settings.py
    urls.py
    wsgi.py
  myapp/
    __init__.py
    models.py
    tests.py
    admin.py
    views.py
  manage.py
```

From your app directory, you can safely remove `admin.py` and `views.py`, since Wagtail will provide this functionality for your models. Configuring Django to load Wagtail involves adding modules and variables to `settings.py` and URL configuration to `urls.py`. For a more complete view of what's defined in these files, see [Django Settings](#) and [Django URL Dispatcher](#).

What follows is a settings reference which skips many boilerplate Django settings. If you just want to get your Wagtail install up quickly without fussing with settings at the moment, see [Ready to Use Example Configuration Files](#).

#### Middleware (`settings.py`)

```
MIDDLEWARE = [
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.middleware.common.CommonMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',
    'django.middleware.security.SecurityMiddleware',

    'wagtail.core.middleware.SiteMiddleware',

    'wagtail.contrib.redirects.middleware.RedirectMiddleware',
]
```

Wagtail requires several common Django middleware modules to work and cover basic security. Wagtail provides its own middleware to cover these tasks:

**SiteMiddleware** Wagtail routes pre-defined hosts to pages within the Wagtail tree using this middleware.

**RedirectMiddleware** Wagtail provides a simple interface for adding arbitrary redirects to your site and this module makes it happen.

### Apps (`settings.py`)

```
INSTALLED_APPS = [

    'myapp',  # your own app

    'wagtail.contrib.forms',
    'wagtail.contrib.redirects',
    'wagtail.embeds',
    'wagtail.sites',
    'wagtail.users',
    'wagtail.snippets',
    'wagtail.documents',
    'wagtail.images',
    'wagtail.search',
    'wagtail.admin',
    'wagtail.core',

    'taggit',
    'modelcluster',

    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',

]
```

Wagtail requires several Django app modules, third-party apps, and defines several apps of its own. Wagtail was built to be modular, so many Wagtail apps can be omitted to suit your needs. Your own app (here `myapp`) is where you define your models, templates, static assets, template tags, and other custom functionality for your site.

### Wagtail Apps

**wagtailcore** The core functionality of Wagtail, such as the `Page` class, the Wagtail tree, and model fields.

**wagtailadmin** The administration interface for Wagtail, including page edit handlers.

**wagtaildocs** The Wagtail document content type.

**wagtailsnippets** Editing interface for non-Page models and objects. See [Snippets](#).

**wagtailusers** User editing interface.

**wagtailimages** The Wagtail image content type.

**wagtailembeds** Module governing oEmbed and Embedly content in Wagtail rich text fields. See [Inserting videos into body content](#).

**wagtailsearch** Search framework for Page content. See [Search](#).

**wagtailredirects** Admin interface for creating arbitrary redirects on your site.

**wagtailforms** Models for creating forms on your pages and viewing submissions. See [Form builder](#).

### Third-Party Apps

**taggit** Tagging framework for Django. This is used internally within Wagtail for image and document tagging and is available for your own models as well. See [Tagging](#) for a Wagtail model recipe or the [Taggit Documentation](#).

**modelcluster** Extension of Django ForeignKey relation functionality, which is used in Wagtail pages for on-the-fly related object creation. For more information, see [Inline Panels and Model Clusters](#) or the [django-modelcluster github project page](#).

### Settings Variables (`settings.py`)

Wagtail makes use of the following settings, in addition to Django's core settings:

#### Site Name

```
WAGTAIL_SITE_NAME = 'Stark Industries Skunkworks'
```

This is the human-readable name of your Wagtail install which welcomes users upon login to the Wagtail admin.

#### Append Slash

```
# Don't add a trailing slash to Wagtail-served URLs
WAGTAIL_APPEND_SLASH = False
```

Similar to Django's `APPEND_SLASH`, this setting controls how Wagtail will handle requests that don't end in a trailing slash.

When `WAGTAIL_APPEND_SLASH` is `True` (default), requests to Wagtail pages which omit a trailing slash will be redirected by Django's `CommonMiddleware` to a URL with a trailing slash.

When `WAGTAIL_APPEND_SLASH` is `False`, requests to Wagtail pages will be served both with and without trailing slashes. Page links generated by Wagtail, however, will not include trailing slashes.

---

**Note:** If you use the `False` setting, keep in mind that serving your pages both with and without slashes may affect search engines' ability to index your site. See [this Google Webmaster Blog post](#) for more details.

---

#### Search

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.search.backends.elasticsearch2',
        'INDEX': 'myapp'
    }
}
```

Define a search backend. For a full explanation, see [Backends](#).

```
WAGTAILSEARCH_RESULTS_TEMPLATE = 'myapp/search_results.html'
WAGTAILSEARCH_RESULTS_TEMPLATE AJAX = 'myapp/includes/search_listing.html'
```



Override the templates used by the search front-end views.

```
WAGTAILSEARCH_HITS_MAX_AGE = 14
```

Set the number of days (default 7) that search query logs are kept for; these are used to identify popular search terms for *promoted search results*. Queries older than this will be removed by the *search\_garbage\_collect* command.

## Embeds

Wagtail supports generating embed code from URLs to content on an external providers such as Youtube or Twitter. By default, Wagtail will fetch the embed code directly from the relevant provider's site using the oEmbed protocol. Wagtail has a builtin list of the most common providers.

The embeds fetching can be fully configured using the `WAGTAILEMBEDS_FINDERS` setting. This is fully documented in *Configuring embed "finders"*.

## Dashboard

```
WAGTAILADMIN_RECENT_EDITS_LIMIT = 5
```

This setting lets you change the number of items shown at 'Your most recent edits' on the dashboard.

```
WAGTAILADMIN_USER_LOGIN_FORM = 'users.forms.LoginForm'
```

Allows the default `LoginForm` to be extended with extra fields.

```
WAGTAIL_GRAVATAR_PROVIDER_URL = '://www.gravatar.com/avatar'
```

If a user has not uploaded a profile picture, Wagtail will look for an avatar linked to their email address on `gravatar.com`. This setting allows you to specify an alternative provider such as `like robohash.org`, or can be set to `None` to disable the use of remote avatars completely.

```
WAGTAIL_MODERATION_ENABLED = True
```

Changes whether the Submit for Moderation button is displayed in the action menu.

## Images

```
WAGTAILIMAGES_IMAGE_MODEL = 'myapp.MyImage'
```

This setting lets you provide your own image model for use in Wagtail, which might extend the built-in `AbstractImage` class or replace it entirely.

```
WAGTAILIMAGES_MAX_UPLOAD_SIZE = 20 * 1024 * 1024 # i.e. 20MB
```

This setting lets you override the maximum upload size for images (in bytes). If omitted, Wagtail will fall back to using its 10MB default value.

```
WAGTAILIMAGES_MAX_IMAGE_PIXELS = 128000000 # i.e. 128 megapixels
```

This setting lets you override the maximum number of pixels an image can have. If omitted, Wagtail will fall back to using its 128 megapixels default value. The pixel count takes animation frames into account - for example, a 25-frame animation of size 100x100 is considered to have  $100 * 100 * 25 = 250000$  pixels.

```
WAGTAILIMAGES_FEATURE_DETECTION_ENABLED = True
```

This setting enables feature detection once OpenCV is installed, see all details on the [Feature Detection](#) documentation.

```
WAGTAILIMAGES_INDEX_PAGE_SIZE = 20
```

Specifies the number of images per page shown on the main Images listing in the Wagtail admin.

```
WAGTAILIMAGES_USAGE_PAGE_SIZE = 20
```

Specifies the number of items per page shown when viewing an image's usage (see [WAGTAIL\\_USAGE\\_COUNT\\_ENABLED](#)).

```
WAGTAILIMAGES_CHOOSER_PAGE_SIZE = 12
```

Specifies the number of images shown per page in the image chooser modal.

## Documents

```
WAGTAILDOCS_SERVE_METHOD = 'redirect'
```

Determines how document downloads will be linked to and served. Normally, requests for documents are sent through a Django view, to perform permission checks (see [Image / document permissions](#)) and potentially other housekeeping tasks such as hit counting. To fully protect against users bypassing this check, it needs to happen in the same request where the document is served; however, this incurs a performance hit as the document then needs to be served by the Django server. In particular, this cancels out much of the benefit of hosting documents on external storage, such as S3 or a CDN.

For this reason, Wagtail provides a number of serving methods which trade some of the strictness of the permission check for performance:

- `'direct'` - links to documents point directly to the URL provided by the underlying storage, bypassing the Django view that provides the permission check. This is most useful when deploying sites as fully static HTML (e.g. using [wagtail-bakery](#) or [Gatsby](#)).
- `'redirect'` - links to documents point to a Django view which will check the user's permission; if successful, it will redirect to the URL provided by the underlying storage to allow the document to be downloaded. This is most suitable for remote storage backends such as S3, as it allows the document to be served independently of the Django server. Note that if a user is able to guess the latter URL, they will be able to bypass the permission check; some storage backends may provide configuration options to generate a random or short-lived URL to mitigate this.
- `'serve_view'` - links to documents point to a Django view which both checks the user's permission, and serves the document. Serving will be handled by [django-sendfile](#), if this is installed and supported by your server configuration, or as a streaming response from Django if not. When using this method, it is recommended that you configure your webserver to *disallow* serving documents directly from their location under `MEDIA_ROOT`, as this would provide a way to bypass the permission check.

If `WAGTAILDOCS_SERVE_METHOD` is unspecified or set to `None`, the default method is `'redirect'` when a remote storage backend is in use (i.e. one that exposes a URL but not a local filesystem path), and `'serve_view'` otherwise. Finally, some storage backends may not expose a URL at all; in this case, serving will proceed as for `'serve_view'`.

## Password Management

```
WAGTAIL_PASSWORD_MANAGEMENT_ENABLED = True
```

This specifies whether users are allowed to change their passwords (enabled by default).

```
WAGTAIL_PASSWORD_RESET_ENABLED = True
```

This specifies whether users are allowed to reset their passwords. Defaults to the same as `WAGTAIL_PASSWORD_MANAGEMENT_ENABLED`.

```
WAGTAILUSERS_PASSWORD_ENABLED = True
```

This specifies whether password fields are shown when creating or editing users through Settings -> Users (enabled by default). Set this to `False` (along with `WAGTAIL_PASSWORD_MANAGEMENT_ENABLED` and `WAGTAIL_PASSWORD_RESET_ENABLED`) if your users are authenticated through an external system such as LDAP.

```
WAGTAILUSERS_PASSWORD_REQUIRED = True
```

This specifies whether password is a required field when creating a new user. `True` by default; ignored if `WAGTAILUSERS_PASSWORD_ENABLED` is `false`. If this is set to `False`, and the password field is left blank when creating a user, then that user will have no usable password; in order to log in, they will have to reset their password (if `WAGTAIL_PASSWORD_RESET_ENABLED` is `True`) or use an alternative authentication system such as LDAP (if one is set up).

```
WAGTAIL_EMAIL_MANAGEMENT_ENABLED = True
```

This specifies whether users are allowed to change their email (enabled by default).

## Email Notifications

```
WAGTAILADMIN_NOTIFICATION_FROM_EMAIL = 'wagtail@myhost.io'
```

Wagtail sends email notifications when content is submitted for moderation, and when the content is accepted or rejected. This setting lets you pick which email address these automatic notifications will come from. If omitted, Django will fall back to using the `DEFAULT_FROM_EMAIL` variable if set, and `webmaster@localhost` if not.

```
WAGTAILADMIN_NOTIFICATION_USE_HTML = True
```

Notification emails are sent in *text/plain* by default, change this to use HTML formatting.

```
WAGTAILADMIN_NOTIFICATION_INCLUDE_SUPERUSERS = False
```

Notification emails are sent to moderators and superusers by default. You can change this to exclude superusers and only notify moderators.

## Wagtail update notifications

```
WAGTAIL_ENABLE_UPDATE_CHECK = True
```

For admins only, Wagtail performs a check on the dashboard to see if newer releases are available. This also provides the Wagtail team with the hostname of your Wagtail site. If you'd rather not receive update notifications, or if you'd like your site to remain unknown, you can disable it with this setting.

### Private pages / documents

```
PASSWORD_REQUIRED_TEMPLATE = 'myapp/password_required.html'
```

This is the path to the Django template which will be used to display the “password required” form when a user accesses a private page. For more details, see the *Private pages* documentation.

```
DOCUMENT_PASSWORD_REQUIRED_TEMPLATE = 'myapp/document_password_required.html'
```

As above, but for password restrictions on documents. For more details, see the *Private pages* documentation.

### Login page

The basic login page can be customised with a custom template.

```
WAGTAIL_FRONTEND_LOGIN_TEMPLATE = 'myapp/login.html'
```

Or the login page can be a redirect to an external or internal URL.

```
WAGTAIL_FRONTEND_LOGIN_URL = '/accounts/login/'
```

For more details, see the *Setting up a login page* documentation.

### Case-Insensitive Tags

```
TAGGIT_CASE_INSENSITIVE = True
```

Tags are case-sensitive by default (‘music’ and ‘Music’ are treated as distinct tags). In many cases the reverse behaviour is preferable.

### Multi-word tags

```
TAG_SPACES_ALLOWED = False
```

Tags can only consist of a single word, no spaces allowed. The default setting is `True` (spaces in tags are allowed).

### Tag limit

```
TAG_LIMIT = 5
```

Limit the number of tags that can be added to (django-taggit) Tag model. Default setting is `None`, meaning no limit on tags.

## Unicode Page Slugs

```
WAGTAIL_ALLOW_UNICODE_SLUGS = True
```

By default, page slugs can contain any alphanumeric characters, including non-Latin alphabets. Set this to False to limit slugs to ASCII characters.

## Auto update preview

```
WAGTAIL_AUTO_UPDATE_PREVIEW = False
```

When enabled, data from an edited page is automatically sent to the server on each change, even without saving. That way, users don't have to click on "Preview" to update the content of the preview page. However, the preview page tab is not refreshed automatically, users have to do it manually. This behaviour is disabled by default.

## Custom User Edit Forms

See *Custom user models*.

```
WAGTAIL_USER_EDIT_FORM = 'users.forms.CustomUserEditForm'
```

Allows the default `UserEditForm` class to be overridden with a custom form when a custom user model is being used and extra fields are required in the user edit form.

```
WAGTAIL_USER_CREATION_FORM = 'users.forms.CustomUserCreationForm'
```

Allows the default `UserCreationForm` class to be overridden with a custom form when a custom user model is being used and extra fields are required in the user creation form.

```
WAGTAIL_USER_CUSTOM_FIELDS = ['country']
```

A list of the extra custom fields to be appended to the default list.

## Usage for images, documents and snippets

```
WAGTAIL_USAGE_COUNT_ENABLED = True
```

When enabled Wagtail shows where a particular image, document or snippet is being used on your site. This is disabled by default because it generates a query which may run slowly on sites with large numbers of pages.

A link will appear on the edit page (in the rightmost column) showing you how many times the item is used. Clicking this link takes you to the "Usage" page, which shows you where the snippet, document or image is used.

The link is also shown on the delete page, above the "Delete" button.

---

**Note:** The usage count only applies to direct (database) references. Using documents, images and snippets within `StreamFields` or rich text fields will not be taken into account.

---

## Date and DateTime inputs

```
WAGTAIL_DATE_FORMAT = '%d.%m.%Y.'
WAGTAIL_DATETIME_FORMAT = '%d.%m.%Y. %H:%M'
```

Specifies the date and datetime format to be used in input fields in the Wagtail admin. The format is specified in [Python datetime module syntax](#), and must be one of the recognised formats listed in the `DATE_INPUT_FORMATS` or `DATETIME_INPUT_FORMATS` setting respectively (see [DATE\\_INPUT\\_FORMATS](#)).

## Time zones

Logged-in users can choose their current time zone for the admin interface in the account settings. If is no time zone selected by the user, then `TIME_ZONE` will be used. (Note that time zones are only applied to datetime fields, not to plain time or date fields. This is a Django design decision.)

The list of time zones is by default the common\_timezones list from pytz. It is possible to override this list via the `WAGTAIL_USER_TIME_ZONES` setting. If there is zero or one time zone permitted, the account settings form will be hidden.

```
WAGTAIL_USER_TIME_ZONES = ['America/Chicago', 'Australia/Sydney', 'Europe/Rome']
```

## Admin languages

Users can choose between several languages for the admin interface in the account settings. The list of languages is by default all the available languages in Wagtail with at least 90% coverage. To change it, set `WAGTAILADMIN_PERMITTED_LANGUAGES`:

```
WAGTAILADMIN_PERMITTED_LANGUAGES = [('en', 'English'),
                                     ('pt', 'Portuguese')]
```

Since the syntax is the same as Django `LANGUAGES`, you can do this so users can only choose between front office languages:

```
LANGUAGES = WAGTAILADMIN_PERMITTED_LANGUAGES = [('en', 'English'),
                                                  ('pt', 'Portuguese')]
```

## Static files

```
WAGTAILADMIN_STATIC_FILE_VERSION_STRINGS = False
```

Static file URLs within the Wagtail admin are given a version-specific query string of the form `?v=1a2b3c4d`, to prevent outdated cached copies of Javascript and CSS files from persisting after a Wagtail upgrade. To disable these, set `WAGTAILADMIN_STATIC_FILE_VERSION_STRINGS` to `False`.

## API Settings

For full documentation on API configuration, including these settings, see [Wagtail API v2 Configuration Guide](#) documentation.

```
WAGTAILAPI_BASE_URL = 'http://api.example.com/'
```

Required when using frontend cache invalidation, used to generate absolute URLs to document files and invalidating the cache.

```
WAGTAILAPI_LIMIT_MAX = 500
```

Default is 20, used to change the maximum number of results a user can request at a time, set to None for no limit.

```
WAGTAILAPI_SEARCH_ENABLED = False
```

Default is true, setting this to false will disable full text search on all endpoints.

```
WAGTAILAPI_USE_FRONTENDCACHE = True
```

Requires `wagtailfrontendcache` app to be installed, indicates the API should use the frontend cache.

## Frontend cache

For full documentation on frontend cache invalidation, including these settings, see *Frontend cache invalidator*.

```
WAGTAILFRONTENDCACHE = {
    'varnish': {
        'BACKEND': 'wagtail.contrib.frontend_cache.backends.HTTPBackend',
        'LOCATION': 'http://localhost:8000',
    },
}
```

See documentation linked above for full options available.

**Note:** `WAGTAILFRONTENDCACHE_LOCATION` is no longer the preferred way to set the cache location, instead set the `LOCATION` within the `WAGTAILFRONTENDCACHE` item.

```
WAGTAILFRONTENDCACHE_LANGUAGES = [l[0] for l in settings.LANGUAGES]
```

Default is an empty list, must be a list of languages to also purge the urls for each language of a purging url. This setting needs `settings.USE_I18N` to be True to work.

## Rich text

```
WAGTAILADMIN_RICH_TEXT_EDITORS = {
    'default': {
        'WIDGET': 'wagtail.admin.rich_text.DraftailRichTextArea',
        'OPTIONS': {
            'features': ['h2', 'bold', 'italic', 'link', 'document-link']
        }
    },
    'legacy': {
        'WIDGET': 'wagtail.admin.rich_text.HalloRichTextArea',
    }
}
```

Customise the behaviour of rich text fields. By default, `RichTextField` and `RichTextBlock` use the configuration given under the `'default'` key, but this can be overridden on a per-field basis through the `editor` keyword argument, e.g. `body = RichTextField(editor='legacy')`. Within each configuration block, the following fields are recognised:

- **WIDGET:** The rich text widget implementation to use. Wagtail provides two implementations: `wagtail.admin.rich_text.DraftailRichTextArea` (a modern extensible editor which enforces well-structured markup) and `wagtail.admin.rich_text.HalloRichTextArea` (deprecated; works directly at the HTML level). Other widgets may be provided by third-party packages.
- **OPTIONS:** Configuration options to pass to the widget. Recognised options are widget-specific, but both `DraftailRichTextArea` and `HalloRichTextArea` accept a `features` list indicating the active rich text features (see [Limiting features in a rich text field](#)).

## URL Patterns

```
from django.contrib import admin

from wagtail.core import urls as wagtail_urls
from wagtail.admin import urls as wagtailadmin_urls
from wagtail.documents import urls as wagtaildocs_urls

urlpatterns = [
    re_path(r'^django-admin/', include(admin.site.urls)),

    re_path(r'^admin/', include(wagtailadmin_urls)),
    re_path(r'^documents/', include(wagtaildocs_urls)),

    # Optional URL for including your own vanilla Django urls/views
    re_path(r'', include('myapp.urls')),

    # For anything not caught by a more specific rule above, hand over to
    # Wagtail's serving mechanism
    re_path(r'', include(wagtail_urls)),
]
```

This block of code for your project's `urls.py` does a few things:

- Load the vanilla Django admin interface to `/django-admin/`
- Load the Wagtail admin and its various apps
- Dispatch any vanilla Django apps you're using other than Wagtail which require their own URL configuration (this is optional, since Wagtail might be all you need)
- Lets Wagtail handle any further URL dispatching.

That's not everything you might want to include in your project's URL configuration, but it's what's necessary for Wagtail to flourish.

## Ready to Use Example Configuration Files

These two files should reside in your project directory (`myproject/myproject/`).



**settings.py**

```

import os

PROJECT_DIR = os.path.dirname(os.path.dirname(os.path.abspath(__file__)))
BASE_DIR = os.path.dirname(PROJECT_DIR)

DEBUG = True

# Application definition

INSTALLED_APPS = [
    'myapp',

    'wagtail.contrib.forms',
    'wagtail.contrib.redirects',
    'wagtail.embeds',
    'wagtail.sites',
    'wagtail.users',
    'wagtail.snippets',
    'wagtail.documents',
    'wagtail.images',
    'wagtail.search',
    'wagtail.admin',
    'wagtail.core',

    'taggit',
    'modelcluster',

    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
]

MIDDLEWARE = [
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.middleware.common.CommonMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',
    'django.middleware.security.SecurityMiddleware',

    'wagtail.core.middleware.SiteMiddleware',
    'wagtail.contrib.redirects.middleware.RedirectMiddleware',
]

ROOT_URLCONF = 'myproject.urls'

TEMPLATES = [
    {
        'BACKEND': 'django.template.backends.django.DjangoTemplates',
        'DIRS': [
            os.path.join(PROJECT_DIR, 'templates'),

```

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```

    ],
    'APP_DIRS': True,
    'OPTIONS': {
        'context_processors': [
            'django.template.context_processors.debug',
            'django.template.context_processors.request',
            'django.contrib.auth.context_processors.auth',
            'django.contrib.messages.context_processors.messages',
        ],
    },
],

WSGI_APPLICATION = 'myproject.wsgi.application'

# Database

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.postgresql',
        'NAME': 'myprojectdb',
        'USER': 'postgres',
        'PASSWORD': '',
        'HOST': '', # Set to empty string for localhost.
        'PORT': '', # Set to empty string for default.
        'CONN_MAX_AGE': 600, # number of seconds database connections should persist,
    }
}

# Internationalization

LANGUAGE_CODE = 'en-us'
TIME_ZONE = 'UTC'
USE_I18N = True
USE_L10N = True
USE_TZ = True

# Static files (CSS, JavaScript, Images)

STATICFILES_FINDERS = [
    'django.contrib.staticfiles.finders.FileSystemFinder',
    'django.contrib.staticfiles.finders.AppDirectoriesFinder',
]

STATICFILES_DIRS = [
    os.path.join(PROJECT_DIR, 'static'),
]

STATIC_ROOT = os.path.join(BASE_DIR, 'static')
STATIC_URL = '/static/'

MEDIA_ROOT = os.path.join(BASE_DIR, 'media')
MEDIA_URL = '/media/'

```

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```

ADMINS = [
    # ('Your Name', 'your_email@example.com'),
]
MANAGERS = ADMINS

# Default to dummy email backend. Configure dev/production/local backend
# as per https://docs.djangoproject.com/en/dev/topics/email/#email-backends
EMAIL_BACKEND = 'django.core.mail.backends.dummy.EmailBackend'

# Hosts/domain names that are valid for this site; required if DEBUG is False
ALLOWED_HOSTS = []

# Make this unique, and don't share it with anybody.
SECRET_KEY = 'change-me'

EMAIL_SUBJECT_PREFIX = '[Wagtail] '

INTERNAL_IPS = ('127.0.0.1', '10.0.2.2')

# A sample logging configuration. The only tangible logging
# performed by this configuration is to send an email to
# the site admins on every HTTP 500 error when DEBUG=False.
# See http://docs.djangoproject.com/en/dev/topics/logging for
# more details on how to customize your logging configuration.
LOGGING = {
    'version': 1,
    'disable_existing_loggers': False,
    'filters': {
        'require_debug_false': {
            '()': 'django.utils.log.RequireDebugFalse'
        }
    },
    'handlers': {
        'mail_admins': {
            'level': 'ERROR',
            'filters': ['require_debug_false'],
            'class': 'django.utils.log.AdminEmailHandler'
        }
    },
    'loggers': {
        'django.request': {
            'handlers': ['mail_admins'],
            'level': 'ERROR',
            'propagate': True,
        },
    }
}

# WAGTAIL SETTINGS

# This is the human-readable name of your Wagtail install
# which welcomes users upon login to the Wagtail admin.
WAGTAIL_SITE_NAME = 'My Project'

# Override the search results template for wagtailsearch
# WAGTAILSEARCH_RESULTS_TEMPLATE = 'myapp/search_results.html'

```

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```
# WAGTAILSEARCH_RESULTS_TEMPLATE AJAX = 'myapp/includes/search_listing.html'

# Replace the search backend
#WAGTAILSEARCH_BACKENDS = {
#    'default': {
#        'BACKEND': 'wagtail.search.backends.elasticsearch2',
#        'INDEX': 'myapp'
#    }
#}

# Wagtail email notifications from address
# WAGTAILADMIN_NOTIFICATION_FROM_EMAIL = 'wagtail@myhost.io'

# Wagtail email notification format
# WAGTAILADMIN_NOTIFICATION_USE_HTML = True

# Reverse the default case-sensitive handling of tags
TAGGIT_CASE_INSENSITIVE = True
```

**urls.py**

```
from django.conf.urls import include, re_path
from django.conf.urls.static import static
from django.views.generic.base import RedirectView
from django.contrib import admin
from django.conf import settings
import os.path

from wagtail.core import urls as wagtail_urls
from wagtail.admin import urls as wagtailadmin_urls
from wagtail.documents import urls as wagtaildocs_urls

urlpatterns = [
    re_path(r'^django-admin/', include(admin.site.urls)),

    re_path(r'^admin/', include(wagtailadmin_urls)),
    re_path(r'^documents/', include(wagtaildocs_urls)),

    # For anything not caught by a more specific rule above, hand over to
    # Wagtail's serving mechanism
    re_path(r'', include(wagtail_urls)),
]

if settings.DEBUG:
    from django.contrib.staticfiles.urls import staticfiles_urlpatterns

    urlpatterns += staticfiles_urlpatterns() # tell gunicorn where static files are_
    ↳ in dev mode
    urlpatterns += static(settings.MEDIA_URL + 'images/', document_root=os.path.
    ↳ join(settings.MEDIA_ROOT, 'images'))
    urlpatterns += [
        re_path(r'^favicon\.ico$', RedirectView.as_view(url=settings.STATIC_URL +
    ↳ 'myapp/images/favicon.ico'))
```

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### 1.3.5 Deploying Wagtail

#### On your server

Wagtail is straightforward to deploy on modern Linux-based distributions, but see the section on [performance](#) for the non-Python services we recommend.

Our current preferences are for Nginx, Gunicorn and supervisor on Debian, but Wagtail should run with any of the combinations detailed in Django's [deployment documentation](#).

#### On Divio Cloud

[Divio Cloud](#) is a Dockerised cloud hosting platform for Python/Django that allows you to launch and deploy Wagtail projects in minutes. With a free account, you can create a Wagtail project. Choose from a:

- [site based on the Wagtail Bakery project](#), or
- [brand new Wagtail project](#) (see the [how to get started notes](#)).

Divio Cloud also hosts a [live Wagtail Bakery demo](#) (no account required).

#### On PythonAnywhere

[PythonAnywhere](#) is a Platform-as-a-Service (PaaS) focused on Python hosting and development. It allows developers to quickly develop, host, and scale applications in a cloud environment. Starting with a free plan they also provide MySQL and PostgreSQL databases as well as very flexible and affordable paid plans, so there's all you need to host a Wagtail site. To get quickly up and running you may use the [wagtail-pythonanywhere-quickstart](#).

#### On other PAASs and IAASs

We know of Wagtail sites running on [Heroku](#), Digital Ocean and elsewhere. If you have successfully installed Wagtail on your platform or infrastructure, please [contribute](#) your notes to this documentation!

### Deployment tips

#### Static files

As with all Django projects, static files are not served by the Django application server in production (i.e. outside of the `manage.py runserver` command); these need to be handled separately at the web server level. See [Django's documentation on deploying static files](#).

The JavaScript and CSS files used by the Wagtail admin frequently change between releases of Wagtail - it's important to avoid serving outdated versions of these files due to browser or server-side caching, as this can cause hard-to-diagnose issues. We recommend enabling `ManifestStaticFilesStorage` in the `STATICFILES_STORAGE` setting - this ensures that different versions of files are assigned distinct URLs.

## Cloud storage

Wagtail follows [Django's conventions for managing uploaded files](#), and can be configured to store uploaded images and documents on a cloud storage service such as Amazon S3; this is done through the `DEFAULT_FILE_STORAGE` setting in conjunction with an add-on package such as [django-storages](#). Be aware that setting up remote storage will not entirely offload file handling tasks from the application server - some Wagtail functionality requires files to be read back by the application server. In particular, documents are served through a Django view in order to enforce permission checks, and original image files need to be read back whenever a new resized rendition is created.

Note that the `django-storages` Amazon S3 backends (`storages.backends.s3boto.S3BotoStorage` and `storages.backends.s3boto3.S3Boto3Storage`) **do not correctly handle duplicate filenames** in their default configuration. When using these backends, `AWS_S3_FILE_OVERWRITE` must be set to `False`.

If you are also serving Wagtail's static files from remote storage (using Django's `STATICFILES_STORAGE` setting), you'll need to ensure that it is configured to serve [CORS HTTP headers](#), as current browsers will reject remotely-hosted font files that lack a valid header. For Amazon S3, refer to the documentation [Setting Bucket and Object Access Permissions](#), or (for the `storages.backends.s3boto.S3BotoStorage` backend only) add the following to your Django settings:

```
AWS_HEADERS = {
    'Access-Control-Allow-Origin': '*'
}
```

For other storage services, refer to your provider's documentation, or the documentation for the Django storage backend library you're using.

## 1.3.6 Performance

Wagtail is designed for speed, both in the editor interface and on the front-end, but if you want even better performance or you need to handle very high volumes of traffic, here are some tips on eking out the most from your installation.

### Editor interface

We have tried to minimise external dependencies for a working installation of Wagtail, in order to make it as simple as possible to get going. However, a number of default settings can be configured for better performance:

### Cache

We recommend [Redis](#) as a fast, persistent cache. Install Redis through your package manager (on Debian or Ubuntu: `sudo apt-get install redis-server`), add `django-redis` to your `requirements.txt`, and enable it as a cache backend:

```
CACHES = {
    'default': {
        'BACKEND': 'django_redis.cache.RedisCache',
        'LOCATION': 'redis://127.0.0.1:6379/dbname',
        # for django-redis < 3.8.0, use:
        # 'LOCATION': '127.0.0.1:6379',
        'OPTIONS': {
            'CLIENT_CLASS': 'django_redis.client.DefaultClient',
        }
    }
}
```

## Search

Wagtail has strong support for [Elasticsearch](#) - both in the editor interface and for users of your site - but can fall back to a database search if Elasticsearch isn't present. Elasticsearch is faster and more powerful than the Django ORM for text search, so we recommend installing it or using a hosted service like [Searchly](#).

For details on configuring Wagtail for Elasticsearch, see [Elasticsearch Backend](#).

## Database

Wagtail is tested on PostgreSQL, SQLite and MySQL. It should work on some third-party database backends as well (Microsoft SQL Server is known to work but currently untested). We recommend PostgreSQL for production use.

## Templates

The overhead from reading and compiling templates can add up. In some cases a significant performance improvement can be gained by using Django's `cached template loader`:

```
TEMPLATES = [{
    'BACKEND': 'django.template.backends.django.DjangoTemplates',
    'DIRS': [os.path.join(BASE_DIR, 'templates')],
    'OPTIONS': {
        'loaders': [
            ('django.template.loaders.cached.Loader', [
                'django.template.loaders.filesystem.Loader',
                'django.template.loaders.app_directories.Loader',
            ]),
        ],
    },
}]
```

There is a caveat associated with this loader though. Changes to a template file will not be picked up once it is cached. This means that this loader should *not* be enabled during development.

## Public users

### Caching proxy

To support high volumes of traffic with excellent response times, we recommend a caching proxy. Both [Varnish](#) and [Squid](#) have been tested in production. Hosted proxies like [Cloudflare](#) should also work well.

Wagtail supports automatic cache invalidation for Varnish/Squid. See [Frontend cache invalidator](#) for more information.

## 1.3.7 Internationalisation

This document describes the internationalisation features of Wagtail and how to create multi-lingual sites.

Wagtail uses Django's [Internationalisation framework](#) so most of the steps are the same as other Django projects.

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## Wagtail admin translations

The Wagtail admin backend has been translated into many different languages. You can find a list of currently available translations on Wagtail’s [Transifex](#) page. (Note: if you’re using an old version of Wagtail, this page may not accurately reflect what languages you have available).

If your language isn’t listed on that page, you can easily contribute new languages or correct mistakes. Sign up and submit changes to [Transifex](#). Translation updates are typically merged into an official release within one month of being submitted.

## Change Wagtail admin language on a per user basis

Logged-in users can set their preferred language from `/admin/account/`. By default, Wagtail provides a list of languages that have a  $\geq 90\%$  translation coverage. It is possible to override this list via the `WAGTAILADMIN_PERMITTED_LANGUAGES` setting.

In case there is zero or one language permitted, the form will be hidden.

If there is no language selected by the user, the `LANGUAGE_CODE` will be used.

## Changing the primary language of your Wagtail installation

The default language of Wagtail is `en-us` (American English). You can change this by tweaking a couple of Django settings:

- Make sure `USE_I18N` is set to `True`
- Set `LANGUAGE_CODE` to your websites’ primary language

If there is a translation available for your language, the Wagtail admin backend should now be in the language you’ve chosen.

## Creating sites with multiple languages

You can create sites with multiple language support by leveraging Django’s [translation features](#).



This section of the documentation will show you how to use Django’s translation features with Wagtail and also describe a couple of methods for storing/retrieving translated content using Wagtail pages.

## Enabling multiple language support

Firstly, make sure the `USE_I18N` Django setting is set to `True`.

To enable multi-language support, add `django.middleware.locale.LocaleMiddleware` to your `MIDDLEWARE`:

```
MIDDLEWARE = (
    ...

    'django.middleware.locale.LocaleMiddleware',
)
```

This middleware class looks at the user’s browser language and sets the [language of the site accordingly](#).

## Serving different languages from different URLs

Just enabling the multi-language support in Django sometimes may not be enough. By default, Django will serve different languages of the same page with the same URL. This has a couple of drawbacks:

- Users cannot change language without changing their browser settings
- It may not work well with various caching setups (as content varies based on browser settings)

Django’s `i18n_patterns` feature, when enabled, prefixes the URLs with the language code (eg `/en/about-us`). Users are forwarded to their preferred version, based on browser language, when they first visit the site.

This feature is enabled through the project’s root URL configuration. Just put the views you would like to have this enabled for in an `i18n_patterns` list and append that to the other URL patterns:

```
# mysite/urls.py

from django.conf.urls import include, re_path
from django.conf.urls.i18n import i18n_patterns
from django.conf import settings
from django.contrib import admin

from wagtail.admin import urls as wagtailadmin_urls
from wagtail.documents import urls as wagtaildocs_urls
from wagtail.core import urls as wagtail_urls
from search import views as search_views

urlpatterns = [
    re_path(r'^django-admin/', include(admin.site.urls)),

    re_path(r'^admin/', include(wagtailadmin_urls)),
    re_path(r'^documents/', include(wagtaildocs_urls)),
]

urlpatterns += i18n_patterns(
    # These URLs will have <language_code> appended to the beginning
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```
re_path(r'^search/$', search_views.search, name='search'),

re_path(r'', include(wagtail_urls)),

)
```

You can implement switching between languages by changing the part at the beginning of the URL. As each language has its own URL, it also works well with just about any caching setup.

## Translating templates

Static text in templates needs to be marked up in a way that allows Django’s `makemessages` command to find and export the strings for translators and also allow them to switch to translated versions on the when the template is being served.

As Wagtail uses Django’s templates, inserting this markup and the workflow for exporting and translating the strings is the same as any other Django project.

See: <https://docs.djangoproject.com/en/stable/topics/i18n/translation/#internationalization-in-template-code>

## Translating content

The most common approach for translating content in Wagtail is to duplicate each translatable text field, providing a separate field for each language.

This section will describe how to implement this method manually but there is a third party module you can use, [wagtail modeltranslation](#), which may be quicker if it meets your needs.

### Duplicating the fields in your model

For each field you would like to be translatable, duplicate it for every language you support and suffix it with the language code:

```
class BlogPage(Page):

    title_fr = models.CharField(max_length=255)

    body_en = StreamField(...)
    body_fr = StreamField(...)

    # Language-independent fields don't need to be duplicated
    thumbnail_image = models.ForeignKey('wagtailimages.Image', on_delete=models.SET_
↪NULL, null=True, ...)
```

---

**Note:** We only define the French version of the `title` field as Wagtail already provides the English version for us.

---

### Organising the fields in the admin interface

You can either put all the fields with their translations next to each other on the “content” tab or put the translations for other languages on different tabs.

See [Customising the tabbed interface](#) for information on how to add more tabs to the admin interface.

### Accessing the fields from the template

In order for the translations to be shown on the site frontend, the correct field needs to be used in the template based on what language the client has selected.

Having to add language checks every time you display a field in a template, could make your templates very messy. Here's a little trick that will allow you to implement this while keeping your templates and model code clean.

You can use a snippet like the following to add accessor fields on to your page model. These accessor fields will point at the field that contains the language the user has selected.

Copy this into your project and make sure it's imported in any `models.py` files that contain a `Page` with translated fields. It will require some modification to support different languages.

```
from django.utils import translation

class TranslatedField:
    def __init__(self, en_field, fr_field):
        self.en_field = en_field
        self.fr_field = fr_field

    def __get__(self, instance, owner):
        if translation.get_language() == 'fr':
            return getattr(instance, self.fr_field)
        else:
            return getattr(instance, self.en_field)
```

Then, for each translated field, create an instance of `TranslatedField` with a nice name (as this is the name your templates will reference).

For example, here's how we would apply this to the above `BlogPage` model:

```
class BlogPage(Page):
    ...

    translated_title = TranslatedField(
        'title',
        'title_fr',
    )
    body = TranslatedField(
        'body_en',
        'body_fr',
    )
```

Finally, in the template, reference the accessors instead of the underlying database fields:

```
{{ page.translated_title }}

{{ page.body }}
```

## Other approaches

### Creating a multilingual site (by duplicating the page tree)

This tutorial will show you a method of creating multilingual sites in Wagtail by duplicating the page tree.

For example:

```
/
    en/
        about/
        contact/
    fr/
        about/
        contact/
```

## The root page

The root page (/) should detect the browsers language and forward them to the correct language homepage (/en/, /fr/). This page should sit at the site root (where the homepage would normally be).

We must set Django's LANGUAGES setting so we don't redirect non English/French users to pages that don't exist.

```
# settings.py
LANGUAGES = (
    ('en', _("English")),
    ('fr', _("French")),
)

# models.py
from django.utils import translation
from django.http import HttpResponseRedirect

from wagtail.core.models import Page

class LanguageRedirectionPage(Page):

    def serve(self, request):
        # This will only return a language that is in the LANGUAGES Django setting
        language = translation.get_language_from_request(request)

        return HttpResponseRedirect(self.url + language + '/')
```

## Linking pages together

It may be useful to link different versions of the same page together to allow the user to easily switch between languages. But we don't want to increase the burden on the editor too much so ideally, editors should only need to link one of the pages to the other versions and the links between the other versions should be created implicitly.

As this behaviour needs to be added to all page types that would be translated, its best to put this behaviour in a mixin.

Here's an example of how this could be implemented (with English as the main language and French/Spanish as alternative languages):

```
from wagtail.core.models import Page
from wagtail.admin.edit_handlers import MultiFieldPanel, PageChooserPanel

class TranslatablePageMixin(models.Model):
    # One link for each alternative language
    # These should only be used on the main language page (english)
```

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```

french_link = models.ForeignKey(Page, null=True, on_delete=models.SET_NULL,
↳blank=True, related_name='+')
spanish_link = models.ForeignKey(Page, null=True, on_delete=models.SET_NULL,
↳blank=True, related_name='+')

panels = [
    PageChooserPanel('french_link'),
    PageChooserPanel('spanish_link'),
]

def get_language(self):
    """
    This returns the language code for this page.
    """
    # Look through ancestors of this page for its language homepage
    # The language homepage is located at depth 3
    language_homepage = self.get_ancestors(inclusive=True).get(depth=3)

    # The slug of language homepages should always be set to the language code
    return language_homepage.slug

# Method to find the main language version of this page
# This works by reversing the above links

def english_page(self):
    """
    This finds the english version of this page
    """
    language = self.get_language()

    if language == 'en':
        return self
    elif language == 'fr':
        return type(self).objects.filter(french_link=self).first().specific
    elif language == 'es':
        return type(self).objects.filter(spanish_link=self).first().specific

# We need a method to find a version of this page for each alternative language.
# These all work the same way. They firstly find the main version of the page
# (english), then from there they can just follow the link to the correct page.

def french_page(self):
    """
    This finds the french version of this page
    """
    english_page = self.english_page()

    if english_page and english_page.french_link:
        return english_page.french_link.specific

def spanish_page(self):
    """
    This finds the spanish version of this page
    """
    english_page = self.english_page()

```

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```

        if english_page and english_page.spanish_link:
            return english_page.spanish_link.specific

class Meta:
    abstract = True

class AboutPage(Page, TranslatablePageMixin):
    ...
    content_panels = [
        ...
        MultiFieldPanel(TranslatablePageMixin.panels, 'Language links')
    ]

class ContactPage(Page, TranslatablePageMixin):
    ...
    content_panels = [
        ...
        MultiFieldPanel(TranslatablePageMixin.panels, 'Language links')
    ]

```

You can make use of these methods in your template by doing:

```

{% if page.english_page and page.get_language != 'en' %}
    <a href="{{ page.english_page.url }}">{% trans "View in English" %}</a>
{% endif %}

{% if page.french_page and page.get_language != 'fr' %}
    <a href="{{ page.french_page.url }}">{% trans "View in French" %}</a>
{% endif %}

{% if page.spanish_page and page.get_language != 'es' %}
    <a href="{{ page.spanish_page.url }}">{% trans "View in Spanish" %}</a>
{% endif %}

```

### 1.3.8 Private pages

Users with publish permission on a page can set it to be private by clicking the ‘Privacy’ control in the top right corner of the page explorer or editing interface. This sets a restriction on who is allowed to view the page and its sub-pages. Several different kinds of restriction are available:

- **Accessible to logged-in users:** The user must log in to view the page. All user accounts are granted access, regardless of permission level.
- **Accessible with the following password:** The user must enter the given password to view the page. This is appropriate for situations where you want to share a page with a trusted group of people, but giving them individual user accounts would be overkill. The same password is shared between all users, and this works independently of any user accounts that exist on the site.
- **Accessible to users in specific groups:** The user must be logged in, and a member of one or more of the specified groups, in order to view the page.

Similarly, documents can be made private by placing them in a collection with appropriate privacy settings (see [Image / document permissions](#)).

Private pages and documents work on Wagtail out of the box - the site implementer does not need to do anything to set them up. However, the default “log in” and “password required” forms are only bare-bones HTML pages, and site implementers may wish to replace them with a page customised to their site design.

## Setting up a login page

The basic login page can be customised by setting `WAGTAIL_FRONTEND_LOGIN_TEMPLATE` to the path of a template you wish to use:

```
WAGTAIL_FRONTEND_LOGIN_TEMPLATE = 'myapp/login.html'
```

Wagtail uses Django’s standard `django.contrib.auth.views.LoginView` view here, and so the context variables available on the template are as detailed in [Django's login view documentation](#).

If the stock Django login view is not suitable - for example, you wish to use an external authentication system, or you are integrating Wagtail into an existing Django site that already has a working login view - you can specify the URL of the login view via the `WAGTAIL_FRONTEND_LOGIN_URL` setting:

```
WAGTAIL_FRONTEND_LOGIN_URL = '/accounts/login/'
```

To integrate Wagtail into a Django site with an existing login mechanism, setting `WAGTAIL_FRONTEND_LOGIN_URL = LOGIN_URL` will usually be sufficient.

## Setting up a global “password required” page

By setting `PASSWORD_REQUIRED_TEMPLATE` in your Django settings file, you can specify the path of a template which will be used for all “password required” forms on the site (except for page types that specifically override it - see below):

```
PASSWORD_REQUIRED_TEMPLATE = 'myapp/password_required.html'
```

This template will receive the same set of context variables that the blocked page would pass to its own template via `get_context()` - including `page` to refer to the page object itself - plus the following additional variables (which override any of the page’s own context variables of the same name):

- **form** - A Django form object for the password prompt; this will contain a field named `password` as its only visible field. A number of hidden fields may also be present, so the page must loop over `form.hidden_fields` if not using one of Django’s rendering helpers such as `form.as_p`.
- **action\_url** - The URL that the password form should be submitted to, as a POST request.

A basic template suitable for use as `PASSWORD_REQUIRED_TEMPLATE` might look like this:

```
<!DOCTYPE HTML>
<html>
  <head>
    <title>Password required</title>
  </head>
  <body>
    <h1>Password required</h1>
    <p>You need a password to access this page.</p>
    <form action="{{ action_url }}" method="POST">
      {% csrf_token %}

      {{ form.non_field_errors }}
    </form>
  </body>
</html>
```

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```

        <div>
            {{ form.password.errors }}
            {{ form.password.label_tag }}
            {{ form.password }}
        </div>

        {% for field in form.hidden_fields %}
            {{ field }}
        {% endfor %}
        <input type="submit" value="Continue" />
    </form>
</body>
</html>

```

Password restrictions on documents use a separate template, specified through the setting `DOCUMENT_PASSWORD_REQUIRED_TEMPLATE`; this template also receives the context variables `form` and `action_url` as described above.

### Setting a “password required” page for a specific page type

The attribute `password_required_template` can be defined on a page model to use a custom template for the “password required” view, for that page type only. For example, if a site had a page type for displaying embedded videos along with a description, it might choose to use a custom “password required” template that displays the video description as usual, but shows the password form in place of the video embed.

```

class VideoPage(Page):
    ...

    password_required_template = 'video/password_required.html'

```

## 1.3.9 Customising Wagtail

### Customising the editing interface

#### Customising the tabbed interface

As standard, Wagtail organises panels for pages into three tabs: ‘Content’, ‘Promote’ and ‘Settings’. For snippets Wagtail puts all panels into one page. Depending on the requirements of your site, you may wish to customise this for specific page types or snippets - for example, adding an additional tab for sidebar content. This can be done by specifying an `edit_handler` attribute on the page or snippet model. For example:

```

from wagtail.admin.edit_handlers import TabbedInterface, ObjectList

class BlogPage(Page):
    # field definitions omitted

    content_panels = [
        FieldPanel('title', classname="full title"),
        FieldPanel('date'),
        FieldPanel('body', classname="full"),
    ]
    sidebar_content_panels = [

```

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```

        SnippetChooserPanel('advert'),
        InlinePanel('related_links', label="Related links"),
    ]

    edit_handler = TabbedInterface([
        ObjectList(content_panels, heading='Content'),
        ObjectList(sidebar_content_panels, heading='Sidebar content'),
        ObjectList(Page.promote_panels, heading='Promote'),
        ObjectList(Page.settings_panels, heading='Settings', classname="settings"),
    ])

```

## Rich Text (HTML)

Wagtail provides a general-purpose WYSIWYG editor for creating rich text content (HTML) and embedding media such as images, video, and documents. To include this in your models, use the `RichTextField` function when defining a model field:

```

from wagtail.core.fields import RichTextField
from wagtail.admin.edit_handlers import FieldPanel

class BookPage(Page):
    book_text = RichTextField()

    content_panels = Page.content_panels + [
        FieldPanel('body', classname="full"),
    ]

```

`RichTextField` inherits from Django's basic `TextField` field, so you can pass any field parameters into `RichTextField` as if using a normal Django field. This field does not need a special panel and can be defined with `FieldPanel`.

However, template output from `RichTextField` is special and needs to be filtered in order to preserve embedded content. See [Rich text \(filter\)](#).

## Limiting features in a rich text field

By default, the rich text editor provides users with a wide variety of options for text formatting and inserting embedded content such as images. However, we may wish to restrict a rich text field to a more limited set of features - for example:

- The field might be intended for a short text snippet, such as a summary to be pulled out on index pages, where embedded images or videos would be inappropriate;
- When page content is defined using [StreamField](#), elements such as headings, images and videos are usually given their own block types, alongside a rich text block type used for ordinary paragraph text; in this case, allowing headings and images to also exist within the rich text content is redundant (and liable to result in inconsistent designs).

This can be achieved by passing a `features` keyword argument to `RichTextField`, with a list of identifiers for the features you wish to allow:

```
body = RichTextField(features=['h2', 'h3', 'bold', 'italic', 'link'])
```

The feature identifiers provided on a default Wagtail installation are as follows:

- `h1`, `h2`, `h3`, `h4`, `h5`, `h6` - heading elements
- `bold`, `italic` - bold / italic text
- `ol`, `ul` - ordered / unordered lists
- `hr` - horizontal rules
- `link` - page, external and email links
- `document-link` - links to documents
- `image` - embedded images
- `embed` - embedded media (see *Embedded content*)

We have few additional feature identifiers as well. They are not enabled by default, but you can use them in your list of identifiers. These are as follows:

- `code` - inline code
- `superscript`, `subscript`, `strikethrough` - text formatting
- `blockquote` - blockquote

The process for creating new features is described in the following pages:

- *Rich text internals*
- *Extending the Draftail Editor*
- *Extending the Hallo Editor*

## Image Formats in the Rich Text Editor

On loading, Wagtail will search for any app with the file `image_formats.py` and execute the contents. This provides a way to customise the formatting options shown to the editor when inserting images in the `RichTextField` editor.

As an example, add a “thumbnail” format:

```
# image_formats.py
from wagtail.images.formats import Format, register_image_format

register_image_format(Format('thumbnail', 'Thumbnail', 'richtext-image thumbnail',
↪ 'max-120x120'))
```

To begin, import the `Format` class, `register_image_format` function, and optionally `unregister_image_format` function. To register a new `Format`, call the `register_image_format` with the `Format` object as the argument. The `Format` class takes the following constructor arguments:

**name** The unique key used to identify the format. To unregister this format, call `unregister_image_format` with this string as the only argument.

**label** The label used in the chooser form when inserting the image into the `RichTextField`.

**classnames** The string to assign to the `class` attribute of the generated `<img>` tag.

---

**Note:** Any class names you provide must have CSS rules matching them written separately, as part of the front end CSS code. Specifying a `classnames` value of `left` will only ensure that class is output in the generated markup, it won't cause the image to align itself left.

---

**filter\_spec** The string specification to create the image rendition. For more, see the *Using images in templates*. To unregister, call `unregister_image_format` with the string of the name of the `Format` as the only argument.

**Warning:** Unregistering `Format` objects will cause errors viewing or editing pages that reference them.

## Customising generated forms

```
class wagtail.admin.forms.WagtailAdminModelForm
```

```
class wagtail.admin.forms.WagtailAdminPageForm
```

Wagtail automatically generates forms using the panels configured on the model. By default, this form subclasses *WagtailAdminModelForm*, or *WagtailAdminPageForm* for pages. A custom base form class can be configured by setting the `base_form_class` attribute on any model. Custom forms for snippets must subclass *WagtailAdminModelForm*, and custom forms for pages must subclass *WagtailAdminPageForm*.

This can be used to add non-model fields to the form, to automatically generate field content, or to add custom validation logic for your models:

```
from django import forms
from django.db import models
import geocoder # not in Wagtail, for example only - http://geocoder.readthedocs.io/
from wagtail.admin.edit_handlers import FieldPanel
from wagtail.admin.forms import WagtailAdminPageForm
from wagtail.core.models import Page

class EventPageForm(WagtailAdminPageForm):
    address = forms.CharField()

    def clean(self):
        cleaned_data = super().clean()

        # Make sure that the event starts before it ends
        start_date = cleaned_data['start_date']
        end_date = cleaned_data['end_date']
        if start_date and end_date and start_date > end_date:
            self.add_error('end_date', 'The end date must be after the start date')

        return cleaned_data

    def save(self, commit=True):
        page = super().save(commit=False)

        # Update the duration field from the submitted dates
        page.duration = (page.end_date - page.start_date).days

        # Fetch the location by geocoding the address
        page.location = geocoder.arcgis(self.cleaned_data['address'])

        if commit:
            page.save()
        return page
```

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```
class EventPage(Page):
    start_date = models.DateField()
    end_date = models.DateField()
    duration = models.IntegerField()
    location = models.CharField(max_length=255)

    content_panels = [
        FieldPanel('title'),
        FieldPanel('start_date'),
        FieldPanel('end_date'),
        FieldPanel('address'),
    ]
    base_form_class = EventPageForm
```

Wagtail will generate a new subclass of this form for the model, adding any fields defined in `panels` or `content_panels`. Any fields already defined on the model will not be overridden by these automatically added fields, so the form field for a model field can be overridden by adding it to the custom form.

## Rich text internals

At first glance, Wagtail’s rich text capabilities appear to give editors direct control over a block of HTML content. In reality, it’s necessary to give editors a representation of rich text content that is several steps removed from the final HTML output, for several reasons:

- The editor interface needs to filter out certain kinds of unwanted markup; this includes malicious scripting, font styles pasted from an external word processor, and elements which would break the validity or consistency of the site design (for example, pages will generally reserve the `<h1>` element for the page title, and so it would be inappropriate to allow users to insert their own additional `<h1>` elements through rich text).
- Rich text fields can specify a `features` argument to further restrict the elements permitted in the field - see *Limiting features in a rich text field*.
- Enforcing a subset of HTML helps to keep presentational markup out of the database, making the site more maintainable, and making it easier to repurpose site content (including, potentially, producing non-HTML output such as [LaTeX](#)).
- Elements such as page links and images need to preserve metadata such as the page or image ID, which is not present in the final HTML representation.

This requires the rich text content to go through a number of validation and conversion steps; both between the editor interface and the version stored in the database, and from the database representation to the final rendered HTML.

For this reason, extending Wagtail’s rich text handling to support a new element is more involved than simply saying (for example) “enable the `<blockquote>` element”, since various components of Wagtail - both client and server-side - need to agree on how to handle that feature, including how it should be exposed in the editor interface, how it should be represented within the database, and (if appropriate) how it should be translated when rendered on the front-end.

The components involved in Wagtail’s rich text handling are described below.

## Data format

Rich text data (as handled by *RichTextField*, and *RichTextBlock* within *StreamField*) is stored in the database in a format that is similar, but not identical, to HTML. For example, a link to a page might be stored as:

```
<p><a linktype="page" id="3">Contact us</a> for more information.</p>
```

Here, the `linktype` attribute identifies a rule that shall be used to rewrite the tag. When rendered on a template through the `|richtext` filter (see *Rich text (filter)*), this is converted into valid HTML:

```
<p><a href="/contact-us/">Contact us</a> for more information.</p>
```

In the case of `RichTextBlock`, the block's value is a `RichText` object which performs this conversion automatically when rendered as a string, so the `|richtext` filter is not necessary.

Likewise, an image inside rich text content might be stored as:

```
<embed embedtype="image" id="10" alt="A pied wagtail" format="left" />
```

which is converted into an `img` element when rendered:

```

```

Again, the `embedtype` attribute identifies a rule that shall be used to rewrite the tag. All tags other than `<a linktype="...">` and `<embed embedtype="..." />` are left unchanged in the converted HTML.

A number of additional constraints apply to `<a linktype="...">` and `<embed embedtype="..." />` tags, to allow the conversion to be performed efficiently via string replacement:

- The tag name and attributes must be lower-case
- Attribute values must be quoted with double-quotes
- `embed` elements must use XML self-closing tag syntax (i.e. end in `/>` instead of a closing `</embed>` tag)
- The only HTML entities permitted in attribute values are `&lt;`, `&gt;`, `&amp;` and `&quot;`;

## The feature registry

Any app within your project can define extensions to Wagtail's rich text handling, such as new `linktype` and `embedtype` rules. An object known as the *feature registry* serves as a central source of truth about how rich text should behave. This object can be accessed through the *register\_rich\_text\_features* hook, which is called on startup to gather all definitions relating to rich text:

```
# my_app/wagtail_hooks.py

from wagtail.core import hooks

@hooks.register('register_rich_text_features')
def register_my_feature(features):
    # add new definitions to 'features' here
```

## Rewrite handlers

Rewrite handlers are classes that know how to translate the content of rich text tags like `<a linktype="...">` and `<embed embedtype="..." />` into front-end HTML. For example, the `PageLinkHandler` class knows how to convert the rich text tag `<a linktype="page" id="123">` into the HTML tag `<a href="/path/to/page/123">`.

Rewrite handlers can also provide other useful information about rich text tags. For example, given an appropriate tag, `PageLinkHandler` can be used to extract which page is being referred to. This can be useful for downstream code that may want information about objects being referenced in rich text.

You can create custom rewrite handlers to support your own new `linktype` and `embedtype` tags. New handlers must be Python classes that inherit from either `wagtail.core.richtext.LinkHandler` or `wagtail.core.richtext.EmbedHandler`. Your new classes should override at least some of the following methods (listed here for `LinkHandler`, although `EmbedHandler` has an identical signature):

#### **class LinkHandler**

##### **identifier**

Required. The `identifier` attribute is a string that indicates which rich text tags should be handled by this handler.

For example, `PageLinkHandler.identifier` is set to the string `"page"`, indicating that any rich text tags with `<a linktype="page">` should be handled by it.

##### **expand\_db\_attributes (attrs)**

Required. The `expand_db_attributes` method is expected to take a dictionary of attributes from a database rich text `<a>` tag (`<embed>` for `EmbedHandler`) and use it to generate valid frontend HTML.

For example, `PageLinkHandler.expand_db_attributes` might receive `{'id': 123}`, use it to retrieve the Wagtail page with ID 123, and render a link to its URL like `<a href="/path/to/page/123">`.

##### **get\_model ()**

Optional. The static `get_model` method only applies to those handlers that are used to render content related to Django models. This method allows handlers to expose the type of content that they know how to handle.

For example, `PageLinkHandler.get_model` returns the Wagtail class `Page`.

Handlers that aren't related to Django models can leave this method undefined, and calling it will raise `NotImplementedError`.

##### **get\_instance (attrs)**

Optional. The static or classmethod `get_instance` method also only applies to those handlers that are used to render content related to Django models. This method is expected to take a dictionary of attributes from a database rich text `<a>` tag (`<embed>` for `EmbedHandler`) and use it to return the specific Django model instance being referred to.

For example, `PageLinkHandler.get_instance` might receive `{'id': 123}` and return the instance of the Wagtail `Page` class with ID 123.

If left undefined, a default implementation of this method will query the `id` model field on the class returned by `get_model` using the provided `id` attribute; this can be overridden in your own handlers should you want to use some other model field.

Below is an example custom rewrite handler that implements these methods to add support for rich text linking to user email addresses. It supports the conversion of rich text tags like `<a linktype="user" username="wagtail">` to valid HTML like `<a href="mailto:hello@wagtail.io">`. This example assumes that equivalent front-end functionality has been added to allow users to insert these kinds of links into their rich text editor.

```
from django.contrib.auth import get_user_model
from wagtail.core.richtext import LinkHandler

class UserLinkHandler(LinkHandler):
```

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```

identifier = 'user'

@staticmethod
def get_model():
    return get_user_model()

@classmethod
def get_instance(cls, attrs):
    model = cls.get_model()
    return model.objects.get(username=attrs['username'])

@classmethod
def expand_db_attributes(cls, attrs):
    user = cls.get_instance(attrs)
    return '<a href="mailto:%s">' % user.email

```

## Registering rewrite handlers

Rewrite handlers must also be registered with the feature registry via the `register_rich_text_features` hook. Independent methods for registering both link handlers and embed handlers are provided.

FeatureRegistry.**register\_link\_type** (*handler*)

This method allows you to register a custom handler deriving from `wagtail.core.rich_text.LinkHandler`, and adds it to the list of link handlers available during rich text conversion.

```

# my_app/wagtail_hooks.py

from wagtail.core import hooks
from my_app.handlers import MyCustomLinkHandler

@hooks.register('register_rich_text_features')
def register_link_handler(features):
    features.register_link_type(MyCustomLinkHandler)

```

It is also possible to define link rewrite handlers for Wagtail's built-in external and email links, even though they do not have a predefined `linktype`. For example, if you want external links to have a `rel="nofollow"` attribute for SEO purposes:

```

from django.utils.html import escape
from wagtail.core import hooks
from wagtail.core.rich_text import LinkHandler

class NoFollowExternalLinkHandler(LinkHandler):
    identifier = 'external'

    @classmethod
    def expand_db_attributes(cls, attrs):
        href = attrs["href"]
        return '<a href="%s" rel="nofollow">' % escape(href)

@hooks.register('register_rich_text_features')
def register_external_link(features):
    features.register_link_type(NoFollowExternalLinkHandler)

```

Similarly you can use `email linktype` to add a custom rewrite handler for email links (e.g. to obfuscate emails in rich text).

`FeatureRegistry.register_embed_type(handler)`

This method allows you to register a custom handler deriving from `wagtail.core.rich_text.EmbedHandler`, and adds it to the list of embed handlers available during rich text conversion.

```
# my_app/wagtail_hooks.py

from wagtail.core import hooks
from my_app.handlers import MyCustomEmbedHandler

@hooks.register('register_rich_text_features')
def register_embed_handler(features):
    features.register_embed_type(MyCustomEmbedHandler)
```

New in version 2.5: In previous releases, `register_link_type` and `register_embed_type` accepted two arguments: the identifier for the link or embed type, and a function for performing the rewriting (equivalent to the `expand_db_attributes` method).

## Editor widgets

The editor interface used on rich text fields can be configured with the `WAGTAILADMIN_RICH_TEXT_EDITORS` setting. Wagtail provides two editor implementations: `wagtail.admin.rich_text.DraftailRichTextArea` (the **Draftail** editor based on **Draft.js**) and `wagtail.admin.rich_text.HalloRichTextArea` (deprecated, based on **Hallo.js**).

It is possible to create your own rich text editor implementation. At minimum, a rich text editor is a Django `Widget` subclass whose constructor accepts an `options` keyword argument (a dictionary of editor-specific configuration options sourced from the `OPTIONS` field in `WAGTAILADMIN_RICH_TEXT_EDITORS`), and which consumes and produces string data in the HTML-like format described above.

Typically, a rich text widget also receives a `features` list, passed from either `RichTextField` / `RichTextBlock` or the `features` option in `WAGTAILADMIN_RICH_TEXT_EDITORS`, which defines the features available in that instance of the editor (see *Limiting features in a rich text field*). To opt in to supporting features, set the attribute `accepts_features = True` on your widget class; the widget constructor will then receive the feature list as a keyword argument `features`.

There is a standard set of recognised feature identifiers as listed under *Limiting features in a rich text field*, but this is not a definitive list; feature identifiers are only defined by convention, and it is up to each editor widget to determine which features it will recognise, and adapt its behaviour accordingly. Individual editor widgets might implement fewer or more features than the default set, either as built-in functionality or through a plugin mechanism if the editor widget has one.

For example, a third-party Wagtail extension might introduce `table` as a new rich text feature, and provide implementations for the Draftail and Hallo editors (which both provide a plugin mechanism). In this case, the third-party extension will not be aware of your custom editor widget, and so the widget will not know how to handle the `table` feature identifier. Editor widgets should silently ignore any feature identifiers that they do not recognise.

The `default_features` attribute of the feature registry is a list of feature identifiers to be used whenever an explicit feature list has not been given in `RichTextField` / `RichTextBlock` or `WAGTAILADMIN_RICH_TEXT_EDITORS`. This list can be modified within the `register_rich_text_features` hook to make new features enabled by default, and retrieved by calling `get_default_features()`.



```
@hooks.register('register_rich_text_features')
def make_h1_default(features):
    features.default_features.append('h1')
```

Outside of the `register_rich_text_features` hook - for example, inside a widget class - the feature registry can be imported as the object `wagtail.core.rich_text.features`. A possible starting point for a rich text editor with feature support would be:

```
from django.forms import widgets
from wagtail.core.rich_text import features

class CustomRichTextArea(widgets.TextArea):
    accepts_features = True

    def __init__(self, *args, **kwargs):
        self.options = kwargs.pop('options', None)

        self.features = kwargs.pop('features', None)
        if self.features is None:
            self.features = features.get_default_features()

        super().__init__(*args, **kwargs)
```

## Editor plugins

`FeatureRegistry.register_editor_plugin(editor_name, feature_name, plugin_definition)`

Rich text editors often provide a plugin mechanism to allow extending the editor with new functionality. The `register_editor_plugin` method provides a standardised way for `register_rich_text_features` hooks to define plugins to be pulled in to the editor when a given rich text feature is enabled.

`register_editor_plugin` is passed an editor name (a string uniquely identifying the editor widget - Wagtail uses the identifiers `draftail` and `hallo` for its built-in editors), a feature identifier, and a plugin definition object. This object is specific to the editor widget and can be any arbitrary value, but will typically include a [Django form media](#) definition referencing the plugin's JavaScript code - which will then be merged into the editor widget's own media definition - along with any relevant configuration options to be passed when instantiating the editor.

`FeatureRegistry.get_editor_plugin(editor_name, feature_name)`

Within the editor widget, the plugin definition for a given feature can be retrieved via the `get_editor_plugin` method, passing the editor's own identifier string and the feature identifier. This will return `None` if no matching plugin has been registered.

For details of the plugin formats for Wagtail's built-in editors, see [Extending the Draftail Editor](#) and [Extending the Hallo Editor](#).

## Format converters

Editor widgets will often be unable to work directly with Wagtail's rich text format, and require conversion to their own native format. For Draftail, this is a JSON-based format known as `ContentState` (see [How Draft.js Represents Rich Text Data](#)). Hallo.js and other editors based on HTML's `contentEditable` mechanism require valid HTML, and so Wagtail uses a convention referred to as “editor HTML”, where the additional data required on link and embed elements is stored in `data-` attributes, for example: `<a href="/contact-us/" data-linktype="page" data-id="3">Contact us</a>`.

Wagtail provides two utility classes, `wagtail.admin.rich_text.converters.contentstate.ContentstateConverter` and `wagtail.admin.rich_text.converters.editor_html.EditorHTMLConverter`, to perform conversions between rich text format and the native editor formats. These classes are independent of any editor widget, and distinct from the rewriting process that happens when rendering rich text onto a template.

Both classes accept a `features` list as an argument to their constructor, and implement two methods, `from_database_format(data)` which converts Wagtail rich text data to the editor's format, and `to_database_format(data)` which converts editor data to Wagtail rich text format.

As with editor plugins, the behaviour of a converter class can vary according to the feature list passed to it. In particular, it can apply whitelisting rules to ensure that the output only contains HTML elements corresponding to the currently active feature set. The feature registry provides a `register_converter_rule` method to allow `register_rich_text_features` hooks to define conversion rules that will be activated when a given feature is enabled.

`FeatureRegistry.register_converter_rule(converter_name, feature_name, rule_definition)`

`register_editor_plugin` is passed a converter name (a string uniquely identifying the converter class - Wagtail uses the identifiers `contentstate` and `editorhtml`), a feature identifier, and a rule definition object. This object is specific to the converter and can be any arbitrary value.

For details of the rule definition format for the `contentstate` and `editorhtml` converters, see [Extending the Draftail Editor](#) and [Extending the Hallo Editor](#) respectively.

`FeatureRegistry.get_converter_rule(converter_name, feature_name)`

Within a converter class, the rule definition for a given feature can be retrieved via the `get_converter_rule` method, passing the converter's own identifier string and the feature identifier. This will return `None` if no matching rule has been registered.

## Extending the Draftail Editor

Wagtail's rich text editor is built with [Draftail](#), and its functionality can be extended through plugins.

Plugins come in three types:

- Inline styles – To format a portion of a line, eg. `bold`, `italic`, `monospace`.
- Blocks – To indicate the structure of the content, eg. `blockquote`, `ol`.
- Entities – To enter additional data/metadata, eg. `link` (with a URL), `image` (with a file).

All of these plugins are created with a similar baseline, which we can demonstrate with one of the simplest examples – a custom feature for an inline style of mark. Place the following in a `wagtail_hooks.py` file in any installed app:

```
import wagtail.admin.rich_text.editors.draftail.features as draftail_features
from wagtail.admin.rich_text.converters.html_to_contentstate import _
↳ InlineStyleElementHandler
from wagtail.core import hooks

# 1. Use the register_rich_text_features hook.
@hooks.register('register_rich_text_features')
def register_mark_feature(features):
    """
    Registering the `mark` feature, which uses the `MARK` Draft.js inline style type,
    and is stored as HTML with a `` tag.
    """
    feature_name = 'mark'
```

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```

type_ = 'MARK'
tag = 'mark'

# 2. Configure how Drafttail handles the feature in its toolbar.
control = {
    'type': type_,
    'label': '',
    'description': 'Mark',
    # This isn't even required - Drafttail has predefined styles for MARK.
    # 'style': {'textDecoration': 'line-through'},
}

# 3. Call register_editor_plugin to register the configuration for Drafttail.
features.register_editor_plugin(
    'drafttail', feature_name, drafttail_features.InlineStyleFeature(control)
)

# 4. configure the content transform from the DB to the editor and back.
db_conversion = {
    'from_database_format': {tag: InlineStyleElementHandler(type_)},
    'to_database_format': {'style_map': {type_: tag}},
}

# 5. Call register_converter_rule to register the content transformation.
↪conversion.
features.register_converter_rule('contentstate', feature_name, db_conversion)

# 6. (optional) Add the feature to the default features list to make it available
# on rich text fields that do not specify an explicit 'features' list
features.default_features.append('mark')

```

These steps will always be the same for all Drafttail plugins. The important parts are to:

- Consistently use the feature's Draft.js type or Wagtail feature names where appropriate.
- Give enough information to Drafttail so it knows how to make a button for the feature, and how to render it (more on this later).
- Configure the conversion to use the right HTML element (as they are stored in the DB).

For detailed configuration options, head over to the [Drafttail documentation](#) to see all of the details. Here are some parts worth highlighting about controls:

- The `type` is the only mandatory piece of information.
- To display the control in the toolbar, combine `icon`, `label` and `description`.
- The controls' `icon` can be a string to use an icon font with CSS classes, say `'icon': 'fas fa-user',`. It can also be an array of strings, to use SVG paths, or SVG symbol references eg. `'icon': ['M100 100 H 900 V 900 H 100 Z'],`. The paths need to be set for a 1024x1024 viewBox.

## Creating new inline styles

In addition to the initial example, inline styles take a `style` property to define what CSS rules will be applied to text in the editor. Be sure to read the [Drafttail documentation](#) on inline styles.

Finally, the DB to/from conversion uses an `InlineStyleElementHandler` to map from a given tag (`<mark>` in the example above) to a Drafttail type, and the inverse mapping is done with [Draft.js exporter configuration](#) of the

style\_map.

## Creating new blocks

Blocks are nearly as simple as inline styles:

```
from wagtail.admin.rich_text.converters.html_to_contentstate import BlockElementHandler

@hooks.register('register_rich_text_features')
def register_help_text_feature(features):
    """
    Registering the `help-text` feature, which uses the `help-text` Draft.js block,
    and is stored as HTML with a `

['help-text.css']})
    )

    features.register_converter_rule('contentstate', feature_name, {
        'from_database_format': {'div[class=help-text]': BlockElementHandler(type_)},
        'to_database_format': {'block_map': {type_: {'element': 'div', 'props': {
            'class': 'help-text'}}}},
    })


```

Here are the main differences:

- We can configure an element to tell Draftail how to render those blocks in the editor.
- We register the plugin with BlockFeature.
- We set up the conversion with BlockElementHandler and block\_map.

Optionally, we can also define styles for the blocks with the Draftail-block--help-text (Draftail-block--<block type>) CSS class.

That's it! The extra complexity is that you may need to write CSS to style the blocks in the editor.

## Creating new entities

**Warning:** This is an advanced feature. Please carefully consider whether you really need this.

Entities aren't simply formatting buttons in the toolbar. They usually need to be much more versatile, communicating to APIs or requesting further user input. As such,

- You will most likely need to write a **hefty dose of JavaScript**, some of it with React.
- The API is very **low-level**. You will most likely need some **Draft.js knowledge**.
- Custom UIs in rich text can be brittle. Be ready to spend time **testing in multiple browsers**.

The good news is that having such a low-level API will enable third-party Wagtail plugins to innovate on rich text features, proposing new kinds of experiences. But in the meantime, consider implementing your UI through *StreamField* instead, which has a battle-tested API meant for Django developers.

Here are the main requirements to create a new entity feature:

- Like for inline styles and blocks, register an editor plugin.
- The editor plugin must define a `source`: a React component responsible for creating new entity instances in the editor, using the Draft.js API.
- The editor plugin also needs a `decorator` (for inline entities) or `block` (for block entities): a React component responsible for displaying entity instances within the editor.
- Like for inline styles and blocks, set up the to/from DB conversion.
- The conversion usually is more involved, since entities contain data that needs to be serialised to HTML.

To write the React components, Wagtail exposes its own React, Draft.js and Draftail dependencies as global variables. Read more about this in *Extending client-side components*. To go further, please look at the *Draftail documentation* as well as the *Draft.js exporter documentation*.

Here is a detailed example to showcase how those tools are used in the context of Wagtail. For the sake of our example, we can imagine a news team working at a financial newspaper. They want to write articles about the stock market, refer to specific stocks anywhere inside of their content (eg. “\$TSLA” tokens in a sentence), and then have their article automatically enriched with the stock's information (a link, a number, a sparkline).

The editor toolbar could contain a “stock chooser” that displays a list of available stocks, then inserts the user's selection as a textual token. For our example, we will just pick a stock at random:

Those tokens are then saved in the rich text on publish. When the news article is displayed on the site, we then insert live market data coming from an API next to each token:

Anyone following Elon Musk's **\$TSLA**  should also look into **\$BTC** .

In order to achieve this, we start with registering the rich text feature like for inline styles and blocks:

```
@hooks.register('register_rich_text_features')
def register_stock_feature(features):
    features.default_features.append('stock')
```

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```

Registering the `stock` feature, which uses the `STOCK` Draft.js entity type,
and is stored as HTML with a `` tag.
"""
feature_name = 'stock'
type_ = 'STOCK'

control = {
    'type': type_,
    'label': '$',
    'description': 'Stock',
}

features.register_editor_plugin(
    'draftail', feature_name, draftail_features.EntityFeature(
        control,
        js=['stock.js'],
        css={'all': ['stock.css']}
    )
)

features.register_converter_rule('contentstate', feature_name, {
    # Note here that the conversion is more complicated than for blocks and
↪ inline styles.
    'from_database_format': {'span[data-stock]': StockEntityElementHandler(type_)
↪ ,
    'to_database_format': {'entity_decorators': {type_: stock_entity_decorator}},
})

```

The `js` and `css` keyword arguments on `EntityFeature` can be used to specify additional JS and CSS files to load when this feature is active. Both are optional. Their values are added to a `Media` object, more documentation on these objects is available in the [Django Form Assets documentation](#).

Since entities hold data, the conversion to/from database format is more complicated. We have to create the two handlers:

```

from draftjs_exporter.dom import DOM
from wagtail.admin.rich_text.converters.html_to_contentstate import ↪
↪ InlineEntityElementHandler

def stock_entity_decorator(props):
    """
    Draft.js ContentState to database HTML.
    Converts the STOCK entities into a span tag.
    """
    return DOM.create_element('span', {
        'data-stock': props['stock'],
    }, props['children'])

class StockEntityElementHandler(InlineEntityElementHandler):
    """
    Database HTML to Draft.js ContentState.
    Converts the span tag into a STOCK entity, with the right data.
    """
    mutability = 'IMMUTABLE'

    def get_attribute_data(self, attrs):

```

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```

"""
Take the ``stock`` value from the ``data-stock`` HTML attribute.
"""
return {
    'stock': attrs['data-stock'],
}

```

Note how they both do similar conversions, but use different APIs. `to_database_format` is built with the [Draft.js exporter](#) components API, whereas `from_database_format` uses a Wagtail API.

The next step is to add JavaScript to define how the entities are created (the source), and how they are displayed (the decorator). Within `stock.js`, we define the source component:

```

const React = window.React;
const Modifier = window.DraftJS.Modifier;
const EditorState = window.DraftJS.EditorState;

const DEMO_STOCKS = ['AMD', 'AAPL', 'TWTR', 'TSLA', 'BTC'];

// Not a real React component - just creates the entities as soon as it is rendered.
class StockSource extends React.Component {
  componentDidMount() {
    const { editorState, entityType, onComplete } = this.props;

    const content = editorState.getCurrentContent();
    const selection = editorState.getSelection();

    const randomStock = DEMO_STOCKS[Math.floor(Math.random() * DEMO_STOCKS.
↵length)];

    // Uses the Draft.js API to create a new entity with the right data.
    const contentWithEntity = content.createEntity(entityType.type, 'IMMUTABLE', {
      stock: randomStock,
    });
    const entityKey = contentWithEntity.getLastCreatedEntityKey();

    // We also add some text for the entity to be activated on.
    const text = `$$${randomStock}`;

    const newContent = Modifier.replaceText(content, selection, text, null, ↵
↵entityKey);
    const nextState = EditorState.push(editorState, newContent, 'insert-characters
↵');

    onComplete(nextState);
  }

  render() {
    return null;
  }
}

```

This source component uses data and callbacks provided by [Draftail](#). It also uses dependencies from global variables – see [Extending client-side components](#).

We then create the decorator component:

```
const Stock = (props) => {
  const { entityKey, contentState } = props;
  const data = contentState.getEntity(entityKey).getData();

  return React.createElement('a', {
    role: 'button',
    onMouseUp: () => {
      window.open(`https://finance.yahoo.com/quote/${data.stock}`);
    },
  }, props.children);
};
```

This is a straightforward React component. It does not use JSX since we do not want to have to use a build step for our JavaScript. It uses ES6 syntax – this would not work in IE11 unless it was converted back to ES5 with a build step.

Finally, we register the JS components of our plugin:

```
window.drafttail.registerPlugin({
  type: 'STOCK',
  source: StockSource,
  decorator: Stock,
});
```

And that's it! All of this setup will finally produce the following HTML on the site's front-end:

```
<p>
  Anyone following Elon Musk's <span data-stock="TSLA">$TSLA</span> should also
  ↳ look into <span data-stock="BTC">$BTC</span>.
</p>
```

To fully complete the demo, we can add a bit of JavaScript to the front-end in order to decorate those tokens with links and a little sparkline.

```
[].slice.call(document.querySelectorAll('[data-stock]')).forEach((elt) => {
  const link = document.createElement('a');
  link.href = `https://finance.yahoo.com/quote/${elt.dataset.stock}`;
  link.innerHTML = `${elt.innerHTML}<svg width="50" height="20" stroke-width="2"
  ↳ stroke="blue" fill="rgba(0, 0, 255, .2)"><path d="M4 14.19 L 4 14.19 L 13.2 14.21 L
  ↳ 22.4 13.77 L 31.59 13.99 L 40.8 13.46 L 50 11.68 L 59.19 11.35 L 68.39 10.68 L 77.6
  ↳ 7.11 L 86.8 7.85 L 96 4" fill="none"></path><path d="M4 14.19 L 4 14.19 L 13.2 14.
  ↳ 21 L 22.4 13.77 L 31.59 13.99 L 40.8 13.46 L 50 11.68 L 59.19 11.35 L 68.39 10.68 L
  ↳ 77.6 7.11 L 86.8 7.85 L 96 4 V 20 L 4 20 Z" stroke="none"></path></svg>`;

  elt.innerHTML = '';
  elt.appendChild(link);
});
```

---

Custom block entities can also be created (have a look at the separate [Drafttail documentation](#)), but these are not detailed here since *StreamField* is the go-to way to create block-level rich text in Wagtail.

## Integration of the Drafttail widgets

To further customise how the Drafttail widgets are integrated into the UI, there are additional extension points for CSS and JS:



- In JavaScript, use the `[data-draftail-input]` attribute selector to target the input which contains the data, and `[data-draftail-editor-wrapper]` for the element which wraps the editor.
- The editor instance is bound on the input field for imperative access. Use `document.querySelector('[data-draftail-input]').draftailEditor`.
- In CSS, use the classes prefixed with `Draftail-`.

## Extending the Hallo Editor

**Warning:** As of Wagtail 2.0, the `hallo.js` editor is deprecated. We have no intentions to remove it from Wagtail as of yet, but it will no longer receive bug fixes. Please be aware of the [known hallo.js issues](#) should you want to keep using it.

To use `hallo.js` on Wagtail 2.x, add the following to your settings:

```
WAGTAILADMIN_RICH_TEXT_EDITORS = {
    'default': {
        'WIDGET': 'wagtail.admin.rich_text.HalloRichTextArea'
    }
}
```

The legacy `hallo.js` editor's functionality can be extended through plugins. For information on developing custom `hallo.js` plugins, see the project's page: <https://github.com/bergie/hallo>

Once the plugin has been created, it should be registered through the feature registry's `register_editor_plugin(editor, feature_name, plugin)` method. For a `hallo.js` plugin, the editor parameter should always be `'hallo'`.

A plugin `halloblockquote`, implemented in `myapp/js/hallo-blockquote.js`, that adds support for the `<blockquote>` tag, would be registered under the feature name `block-quote` as follows:

```
from wagtail.admin.rich_text import HalloPlugin
from wagtail.core import hooks

@hooks.register('register_rich_text_features')
def register_embed_feature(features):
    features.register_editor_plugin(
        'hallo', 'block-quote',
        HalloPlugin(
            name='halloblockquote',
            js=['myapp/js/hallo-blockquote.js'],
        )
    )
```

The constructor for `HalloPlugin` accepts the following keyword arguments:

- `name` - the plugin name as defined in the JavaScript code. `hallo.js` plugin names are prefixed with the `"IKS."` namespace, but the name passed here should be without the prefix.
- `options` - a dictionary (or other JSON-serialisable object) of options to be passed to the JavaScript plugin code on initialisation
- `js` - a list of JavaScript files to be imported for this plugin, defined in the same way as a [Django form media](#) definition
- `css` - a dictionary of CSS files to be imported for this plugin, defined in the same way as a [Django form media](#) definition

- `order` - an index number (default 100) specifying the order in which plugins should be listed, which in turn determines the order buttons will appear in the toolbar

When writing the front-end code for the plugin, Wagtail's Hallo implementation offers two extension points:

- In JavaScript, use the `[data-hallo-editor]` attribute selector to target the editor, eg. `var $editor = $('[data-hallo-editor]');`
- In CSS, use the `.halloeditor` class selector.

### Whitelisting rich text elements

After extending the editor to support a new HTML element, you'll need to add it to the whitelist of permitted elements - Wagtail's standard behaviour is to strip out unrecognised elements, to prevent editors from inserting styles and scripts (either deliberately, or inadvertently through copy-and-paste) that the developer didn't account for.

Elements can be added to the whitelist through the feature registry's `register_converter_rule(converter, feature_name, ruleset)` method. When the `hallo.js` editor is in use, the `converter` parameter should always be `'editorhtml'`.

The following code will add the `<blockquote>` element to the whitelist whenever the `block-quote` feature is active:

```
from wagtail.admin.rich_text.converters.editor_html import WhitelistRule
from wagtail.core.whitelist import allow_without_attributes

@hooks.register('register_rich_text_features')
def register_blockquote_feature(features):
    features.register_converter_rule('editorhtml', 'block-quote', [
        WhitelistRule('blockquote', allow_without_attributes),
    ])
```

`WhitelistRule` is passed the element name, and a callable which will perform some kind of manipulation of the element whenever it is encountered. This callable receives the element as a `BeautifulSoup` Tag object.

The `wagtail.core.whitelist` module provides a few helper functions to assist in defining these handlers: `allow_without_attributes`, a handler which preserves the element but strips out all of its attributes, and `attribute_rule` which accepts a dict specifying how to handle each attribute, and returns a handler function. This dict will map attribute names to either `True` (indicating that the attribute should be kept), `False` (indicating that it should be dropped), or a callable (which takes the initial attribute value and returns either a final value for the attribute, or `None` to drop the attribute).

### Customising admin templates

In your projects with Wagtail, you may wish to replace elements such as the Wagtail logo within the admin interface with your own branding. This can be done through Django's template inheritance mechanism.

You need to create a `templates/wagtailadmin/` folder within one of your apps - this may be an existing one, or a new one created for this purpose, for example, `dashboard`. This app must be registered in `INSTALLED_APPS` before `wagtail.admin`:

```
INSTALLED_APPS = (
    # ...

    'dashboard',
```

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```
'wagtail.core',
'wagtail.admin',

# ...
)
```

## Custom branding

The template blocks that are available to customise the branding in the admin interface are as follows:

### branding\_logo

To replace the default logo, create a template file `dashboard/templates/wagtailadmin/base.html` that overrides the block `branding_logo`:

```
{% extends "wagtailadmin/base.html" %}
{% load static %}

{% block branding_logo %}
    
{% endblock %}
```

The logo also appears on the admin 404 error page; to replace it there too, create a template file `dashboard/templates/wagtailadmin/404.html` that overrides the `branding_logo` block.

### branding\_favicon

To replace the favicon displayed when viewing admin pages, create a template file `dashboard/templates/wagtailadmin/admin_base.html` that overrides the block `branding_favicon`:

```
{% extends "wagtailadmin/admin_base.html" %}
{% load static %}

{% block branding_favicon %}
    <link rel="shortcut icon" href="{% static 'images/favicon.ico' %}" />
{% endblock %}
```

### branding\_title

To replace the title prefix (which is ‘Wagtail’ by default), create a template file `dashboard/templates/wagtailadmin/admin_base.html` that overrides the block `branding_title`:

```
{% extends "wagtailadmin/admin_base.html" %}

{% block branding_title %}Frank's CMS{% endblock %}
```

### branding\_login

To replace the login message, create a template file `dashboard/templates/wagtailadmin/login.html` that overrides the block `branding_login`:

```
{% extends "wagtailadmin/login.html" %}

{% block branding_login %}Sign in to Frank's Site{% endblock %}
```

### branding\_welcome

To replace the welcome message on the dashboard, create a template file `dashboard/templates/wagtailadmin/home.html` that overrides the block `branding_welcome`:

```
{% extends "wagtailadmin/home.html" %}

{% block branding_welcome %}Welcome to Frank's Site{% endblock %}
```

## Specifying a site or page in the branding

The admin interface has a number of variables available to the renderer context that can be used to customize the branding in the admin page. These can be useful for customizing the dashboard on a multitenanted Wagtail installation:

### root\_page

Returns the highest explorable page object for the currently logged in user. If the user has no explore rights, this will default to `None`.

### root\_site

Returns the name on the site record for the above root page.

### site\_name

Returns the value of `root_site`, unless it evaluates to `None`. In that case, it will return the value of `settings.WAGTAIL_SITE_NAME`.

To use these variables, create a template file `dashboard/templates/wagtailadmin/home.html`, just as if you were overriding one of the template blocks in the dashboard, and use them as you would any other Django template variable:

```
{% extends "wagtailadmin/home.html" %}

{% block branding_welcome %}Welcome to the Admin Homepage for {{ root_site }}{%
↪endblock %}
```

## Extending the login form

To add extra controls to the login form, create a template file `dashboard/templates/wagtailadmin/login.html`.

### above\_login and below\_login

To add content above or below the login form, override these blocks:

```
{% extends "wagtailadmin/login.html" %}

{% block above_login %} If you are not Frank you should not be here! {% endblock %}
```

### fields

To add extra fields to the login form, override the `fields` block. You will need to add `{{ block.super }}` somewhere in your block to include the username and password fields:

```
{% extends "wagtailadmin/login.html" %}

{% block fields %}
    {{ block.super }}
    <li class="full">
        <div class="field iconfield">
            Two factor auth token
            <div class="input icon-key">
                <input type="text" name="two-factor-auth">
            </div>
        </div>
    </li>
{% endblock %}
```

### submit\_buttons

To add extra buttons to the login form, override the `submit_buttons` block. You will need to add `{{ block.super }}` somewhere in your block to include the sign in button:

```
{% extends "wagtailadmin/login.html" %}

{% block submit_buttons %}
    {{ block.super }}
    <a href="{% url 'signup' %}"><button type="button" class="button">{% trans 'Sign_
    ↪up' %}</button></a>
{% endblock %}
```

### login\_form

To completely customise the login form, override the `login_form` block. This block wraps the whole contents of the `<form>` element:

```
{% extends "wagtailadmin/login.html" %}

{% block login_form %}
    <p>Some extra form content</p>
    {{ block.super }}
{% endblock %}
```

### Extending client-side components

Some of Wagtail’s admin interface is written as client-side JavaScript with [React](#). In order to customise or extend those components, you may need to use React too, as well as other related libraries. To make this easier, Wagtail exposes its React-related dependencies as global variables within the admin. Here are the available packages:

```
// 'focus-trap-react'
window.FocusTrapReact;
// 'react'
window.React;
// 'react-dom'
window.ReactDOM;
// 'react-transition-group/CSSTransitionGroup'
window.CSSTransitionGroup;
```

Wagtail also exposes some of its own React components. You can reuse:

```
window.wagtail.components.Icon;
window.wagtail.components.Portal;
```

Pages containing rich text editors also have access to:

```
// 'draft-js'
window.DraftJS;
// 'draftail'
window.Draftail;

// Wagtail’s Draftail-related APIs and components.
window.draftail;
window.draftail.ModalWorkflowSource;
window.draftail.Tooltip;
window.draftail.TooltipEntity;
```

### Custom user models

#### Custom user forms example

This example shows how to add a text field and foreign key field to a custom user model and configure Wagtail user forms to allow the fields values to be updated.

Create a custom user model. In this case we extend the `AbstractUser` class and add two fields. The foreign key references another model (not shown).

```
from django.contrib.auth.models import AbstractUser

class User(AbstractUser):
```

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```
country = models.CharField(verbose_name='country', max_length=255)
status = models.ForeignKey(MembershipStatus, on_delete=models.SET_NULL, null=True,
↪ default=1)
```

Add the app containing your user model to `INSTALLED_APPS` and set `AUTH_USER_MODEL` to reference your model. In this example the app is called `users` and the model is `User`

```
AUTH_USER_MODEL = 'users.User'
```

Create your custom user ‘create’ and ‘edit’ forms in your app:

```
from django import forms
from django.utils.translation import gettext_lazy as _

from wagtail.users.forms import UserEditForm, UserCreationForm

from users.models import MembershipStatus

class CustomUserEditForm(UserEditForm):
    country = forms.CharField(required=True, label=_("Country"))
    status = forms.ModelChoiceField(queryset=MembershipStatus.objects, required=True,
↪ label=_("Status"))

class CustomUserCreationForm(UserCreationForm):
    country = forms.CharField(required=True, label=_("Country"))
    status = forms.ModelChoiceField(queryset=MembershipStatus.objects, required=True,
↪ label=_("Status"))
```

Extend the Wagtail user ‘create’ and ‘edit’ templates. These extended templates should be placed in a template directory `wagtailusers/users`.

Template `create.html`:

```
{% extends "wagtailusers/users/create.html" %}

{% block extra_fields %}
    {% include "wagtailadmin/shared/field_as_li.html" with field=form.country %}
    {% include "wagtailadmin/shared/field_as_li.html" with field=form.status %}
{% endblock extra_fields %}
```

Template `edit.html`:

```
{% extends "wagtailusers/users/edit.html" %}

{% block extra_fields %}
    {% include "wagtailadmin/shared/field_as_li.html" with field=form.country %}
    {% include "wagtailadmin/shared/field_as_li.html" with field=form.status %}
{% endblock extra_fields %}
```

The `extra_fields` block allows fields to be inserted below the `last_name` field in the default templates. Other block overriding options exist to allow appending fields to the end or beginning of the existing fields, or to allow all the fields to be redefined.

Add the wagtail settings to your project to reference the user form additions:

```
WAGTAIL_USER_EDIT_FORM = 'users.forms.CustomUserEditForm'
WAGTAIL_USER_CREATION_FORM = 'users.forms.CustomUserCreationForm'
WAGTAIL_USER_CUSTOM_FIELDS = ['country', 'status']
```

### 1.3.10 Third-party tutorials

**Warning:** The following list is a collection of tutorials and development notes from third-party developers. Some of the older links may not apply to the latest Wagtail versions.

- [How do I Wagtail - An Editor's Guide for Mozilla's usage of Wagtail](#) (25 April 2019)
- [Learn Wagtail - Regular video tutorials about all aspects of Wagtail](#) (1 March 2019)
- [How to add buttons to ModelAdmin Index View in Wagtail CMS](#) (23 January 2019)
- [Wagtail Tutorial Series](#) (20 January 2019)
- [How to Deploy Wagtail to Google App Engine PaaS \(Video\)](#) (18 December 2018)
- [How To Prevent Users From Creating Pages by Page Type](#) (25 October 2018)
- [How to Deploy Wagtail to Jelastic PaaS](#) (11 October 2018)
- [Basic Introduction to Setting Up Wagtail](#) (15 August 2018)
- [E-Commerce for Django developers \(with Wagtail shop tutorial\)](#) (5 July 2018)
- [Supporting StreamFields, Snippets and Images in a Wagtail GraphQL API](#) (14 June 2018)
- [Wagtail and GraphQL](#) (19 April 2018)
- [Wagtail and Azure storage blob containers](#) (29 November 2017)
- [Building TwilioQuest with Twilio Sync, Django \[incl. Wagtail\], and Vue.js](#) (6 November 2017)
- [Image upload in wagtail forms](#) (3 September 2017)
- [Upgrading from Wagtail 1.0 to Wagtail 1.11](#) (19 July 2017)
- [Wagtail-Multilingual: a simple project to demonstrate how multilingual is implemented](#) (31 January 2017)
- [Wagtail: 2 Steps for Adding Pages Outside of the CMS](#) (15 February 2016)
- [Adding a Twitter Widget for Wagtail's new StreamField](#) (2 April 2015)
- [Working With Wagtail: Menus](#) (22 January 2015)
- [Upgrading Wagtail to use Django 1.7 locally using vagrant](#) (10 December 2014)
- [Wagtail redirect page. Can link to page, URL and document](#) (24 September 2014)
- [Outputting JSON for a model with properties and db fields in Wagtail/Django](#) (24 September 2014)
- [Bi-lingual website using Wagtail CMS](#) (17 September 2014)
- [Wagtail CMS – Lesser known features](#) (12 September 2014)
- [Wagtail notes: stateful on/off hallo.js plugins](#) (9 August 2014)
- [Add some blockquote buttons to Wagtail CMS' WYSIWYG Editor](#) (24 July 2014)
- [Adding Bread Crumbs to the front end in Wagtail CMS](#) (1 July 2014)
- [Extending hallo.js using Wagtail hooks](#) (9 July 2014)



- [Wagtail notes: custom tabs per page type](#) (10 May 2014)
- [Wagtail notes: managing redirects as pages](#) (10 May 2014)
- [Wagtail notes: dynamic templates per page](#) (10 May 2014)
- [Wagtail notes: type-constrained PageChooserPanel](#) (9 May 2014)

You can also find more resources from the community on [Awesome Wagtail](#).

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**Tip:** We are working on a collection of Wagtail tutorials and best practices. Please tweet [@WagtailCMS](#) or [contact us directly](#) to share your Wagtail HOWTOs, development notes or site launches.

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### 1.3.11 Jinja2 template support

Wagtail supports Jinja2 templating for all front end features. More information on each of the template tags below can be found in the [Writing templates](#) documentation.

#### Configuring Django

Django needs to be configured to support Jinja2 templates. As the Wagtail admin is written using regular Django templates, Django has to be configured to use both templating engines. Add the following configuration to the `TEMPLATES` setting for your app:

```
TEMPLATES = [
    # ...
    {
        'BACKEND': 'django.template.backends.jinja2.Jinja2',
        'APP_DIRS': True,
        'OPTIONS': {
            'extensions': [
                'wagtail.core.jinja2tags.core',
                'wagtail.admin.jinja2tags.userbar',
                'wagtail.images.jinja2tags.images',
            ],
        },
    },
]
```

Jinja templates must be placed in a `jinja2/` directory in your app. The template for an `EventPage` model in an `events` app should be created at `events/jinja2/events/event_page.html`.

By default, the Jinja environment does not have any Django functions or filters. The Django documentation has more information on [configuring Jinja for Django](#).

#### self in templates

In Django templates, `self` can be used to refer to the current page, stream block, or field panel. In Jinja, `self` is reserved for internal use. When writing Jinja templates, use `page` to refer to pages, `value` for stream blocks, and `field_panel` for field panels.

## Template tags, functions & filters

### `pageurl()`

Generate a URL for a Page instance:

```
<a href="{{ pageurl(page.more_information) }}">More information</a>
```

See *pageurl* for more information

### `slugurl()`

Generate a URL for a Page with a slug:

```
<a href="{{ slugurl("about") }}">About us</a>
```

See *slugurl* for more information

### `image()`

Resize an image, and print an `<img>` tag:

```
{# Print an image tag #}  
{{ image(page.header_image, "fill-1024x200", class="header-image") }}  
  
{# Resize an image #}  
{% set background=image(page.background_image, "max-1024x1024") %}  
<div class="wrapper" style="background-image: url('{{ background.url }}');">
```

See *Using images in templates* for more information

### `|richtext`

Transform Wagtail's internal HTML representation, expanding internal references to pages and images.

```
{{ page.body|richtext }}
```

See *Rich text (filter)* for more information

### `wagtailuserbar()`

Output the Wagtail contextual flyout menu for editing pages from the front end

```
{{ wagtailuserbar() }}
```

See *Wagtail User Bar* for more information

```
{% include_block %}
```

Output the HTML representation for the stream content as a whole, as well as for each individual block.

Allows to pass template context (by default) to the StreamField template.

```
{% include_block page.body %}
{% include_block page.body with context %} {# The same as the previous #}
{% include_block page.body without context %}
```

See *StreamField template rendering* for more information.

**Note:** The `{% include_block %}` tag is designed to closely follow the syntax and behaviour of Jinja’s `{% include %}`, so it does not implement the Django version’s feature of only passing specified variables into the context.

### 1.3.12 Testing your Wagtail site

Wagtail comes with some utilities that simplify writing tests for your site.

#### WagtailPageTests

**class** wagtail.tests.utils.WagtailPageTests

WagtailPageTests extends `django.test.TestCase`, adding a few new assert methods. You should extend this class to make use of its methods:

```
from wagtail.tests.utils import WagtailPageTests
from myapp.models import MyPage

class MyPageTests(WagtailPageTests):
    def test_can_create_a_page(self):
        ...
```

**assertCanCreateAt** (*parent\_model*, *child\_model*, *msg=None*)

Assert a particular child Page type can be created under a parent Page type. *parent\_model* and *child\_model* should be the Page classes being tested.

```
def test_can_create_under_home_page(self):
    # You can create a ContentPage under a HomePage
    self.assertCanCreateAt(HomePage, ContentPage)
```

**assertCannotCreateAt** (*parent\_model*, *child\_model*, *msg=None*)

Assert a particular child Page type can not be created under a parent Page type. *parent\_model* and *child\_model* should be the Page classes being tested.

```
def test_cant_create_under_event_page(self):
    # You can not create a ContentPage under an EventPage
    self.assertCannotCreateAt(EventPage, ContentPage)
```

**assertCanCreate** (*parent*, *child\_model*, *data*, *msg=None*)

Assert that a child of the given Page type can be created under the parent, using the supplied POST data.

*parent* should be a Page instance, and *child\_model* should be a Page subclass. *data* should be a dict that will be POSTed at the Wagtail admin Page creation method.

```
from wagtail.tests.utils.form_data import nested_form_data, streamfield

def test_can_create_content_page(self):
    # Get the HomePage
    root_page = HomePage.objects.get(pk=2)

    # Assert that a ContentPage can be made here, with this POST data
    self.assertCanCreate(root_page, ContentPage, nested_form_data({
        'title': 'About us',
        'body': streamfield([
            ('text', 'Lorem ipsum dolor sit amet'),
        ])
    })))
```

See *Form data helpers* for a set of functions useful for constructing POST data.

**assertAllowedParentPageTypes** (*child\_model*, *parent\_models*, *msg=None*)

Test that the only page types that *child\_model* can be created under are *parent\_models*.

The list of allowed parent models may differ from those set in `Page.parent_page_types`, if the parent models have set `Page.subpage_types`.

```
def test_content_page_parent_pages(self):
    # A ContentPage can only be created under a HomePage
    # or another ContentPage
    self.assertAllowedParentPageTypes(
        ContentPage, {HomePage, ContentPage})

    # An EventPage can only be created under an EventIndex
    self.assertAllowedParentPageTypes(
        EventPage, {EventIndex})
```

**assertAllowedSubpageTypes** (*parent\_model*, *child\_models*, *msg=None*)

Test that the only page types that can be created under *parent\_model* are *child\_models*.

The list of allowed child models may differ from those set in `Page.subpage_types`, if the child models have set `Page.parent_page_types`.

```
def test_content_page_subpages(self):
    # A ContentPage can only have other ContentPage children
    self.assertAllowedSubpageTypes(
        ContentPage, {ContentPage})

    # A HomePage can have ContentPage and EventIndex children
    self.assertAllowedParentPageTypes(
        HomePage, {ContentPage, EventIndex})
```

## Form data helpers

The `assertCanCreate` method requires page data to be passed in the same format that the page edit form would submit. For complex page types, it can be difficult to construct this data structure by hand; the `wagtail.tests.utils.form_data` module provides a set of helper functions to assist with this.

`wagtail.tests.utils.form_data.nested_form_data` (*data*)

Translates a nested dict structure into a flat form data dict with hyphen-separated keys.

```
nested_form_data({
    'foo': 'bar',
    'parent': {
        'child': 'field',
    },
})
# Returns: {'foo': 'bar', 'parent-child': 'field'}
```

wagtail.tests.utils.form\_data.**rich\_text**(value, editor='default', features=None)

Converts an HTML-like rich text string to the data format required by the currently active rich text editor.

#### Parameters

- **editor** – An alternative editor name as defined in WAGTAILADMIN\_RICH\_TEXT\_EDITORS
- **features** – A list of features allowed in the rich text content (see [Limiting features in a rich text field](#))

```
self.assertCanCreate(root_page, ContentPage, nested_form_data({
    'title': 'About us',
    'body': rich_text('<p>Lorem ipsum dolor sit amet</p>'),
}))
```

wagtail.tests.utils.form\_data.**streamfield**(items)

Takes a list of (block\_type, value) tuples and turns it in to StreamField form data. Use this within a `nested_form_data()` call, with the field name as the key.

```
nested_form_data({'content': streamfield([
    ('text', 'Hello, world'),
])})
# Returns:
# {
#     'content-count': '1',
#     'content-0-type': 'text',
#     'content-0-value': 'Hello, world',
#     'content-0-order': '0',
#     'content-0-deleted': '',
# }
```

wagtail.tests.utils.form\_data.**inline\_formset**(items, initial=0, min=0, max=1000)

Takes a list of form data for an InlineFormset and translates it in to valid POST data. Use this within a `nested_form_data()` call, with the formset relation name as the key.

```
nested_form_data({'lines': inline_formset([
    {'text': 'Hello'},
    {'text': 'World'},
])})
# Returns:
# {
#     'lines-TOTAL_FORMS': '2',
#     'lines-INITIAL_FORMS': '0',
#     'lines-MIN_NUM_FORMS': '0',
#     'lines-MAX_NUM_FORMS': '1000',
#     'lines-0-text': 'Hello',
#     'lines-0-ORDER': '0',
#     'lines-0-DELETE': '',
#     'lines-1-text': 'World',
```

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```
#      'lines-1-ORDER': '1',
#      'lines-1-DELETE': '',
#  }
```

## Fixtures

### Using `dumpdata`

Creating [fixtures](#) for tests is best done by creating content in a development environment, and using Django's `dumpdata` command.

Note that by default `dumpdata` will represent `content_type` by the primary key; this may cause consistency issues when adding / removing models, as content types are populated separately from fixtures. To prevent this, use the `--natural-foreign` switch, which represents content types by `["app", "model"]` instead.

### Manual modification

You could modify the dumped fixtures manually, or even write them all by hand. Here are a few things to be wary of.

### Custom Page models

When creating customised Page models in fixtures, you will need to add both a `wagtailcore.page` entry, and one for your custom Page model.

Let's say you have a `website` module which defines a `Homepage (Page)` class. You could create such a homepage in a fixture with:

```
[
  {
    "model": "wagtailcore.page",
    "pk": 3,
    "fields": {
      "title": "My Customer's Homepage",
      "content_type": ["website", "homepage"],
      "depth": 2
    }
  },
  {
    "model": "website.homepage",
    "pk": 3,
    "fields": {}
  }
]
```

### Treebeard fields

Filling in the `path` / `numchild` / `depth` fields is necessary in order for tree operations like `get_parent()` to work correctly. `url_path` is another field that can cause errors in some uncommon cases if it isn't filled in.

The [Treebeard docs](#) might help in understanding how this works.

### 1.3.13 Wagtail API

The API module provides a public-facing, JSON-formatted API to allow retrieving content as raw field data. This is useful for cases like serving content to non-web clients (such as a mobile phone app) or pulling content out of Wagtail for use in another site.

See [RFC 8: Wagtail API](#) for full details on our stabilisation policy.

#### Wagtail API v2 Configuration Guide

This section of the docs will show you how to set up a public API for your Wagtail site.

Even though the API is built on Django REST Framework, you do not need to install this manually as it is already a dependency of Wagtail.

#### Basic configuration

##### Enable the app

Firstly, you need to enable Wagtail's API app so Django can see it. Add `wagtail.api.v2` to `INSTALLED_APPS` in your Django project settings:

```
# settings.py

INSTALLED_APPS = [
    ...

    'wagtail.api.v2',

    ...
]
```

Optionally, you may also want to add `rest_framework` to `INSTALLED_APPS`. This would make the API browsable when viewed from a web browser but is not required for basic JSON-formatted output.

#### Configure endpoints

Next, it's time to configure which content will be exposed on the API. Each content type (such as pages, images and documents) has its own endpoint. Endpoints are combined by a router, which provides the url configuration you can hook into the rest of your project.

Wagtail provides three endpoint classes you can use:

- Pages `wagtail.api.v2.endpoints.PagesAPIEndpoint`
- Images `wagtail.images.api.v2.endpoints.ImagesAPIEndpoint`
- Documents `wagtail.documents.api.v2.endpoints.DocumentsAPIEndpoint`

You can subclass any of these endpoint classes to customise their functionality. Additionally, there is a base endpoint class you can use for adding different content types to the API: `wagtail.api.v2.endpoints.BaseAPIEndpoint`

For this example, we will create an API that includes all three builtin content types in their default configuration:

```
# api.py

from wagtail.api.v2.endpoints import PagesAPIEndpoint
from wagtail.api.v2.router import WagtailAPIRouter
from wagtail.images.api.v2.endpoints import ImagesAPIEndpoint
from wagtail.documents.api.v2.endpoints import DocumentsAPIEndpoint

# Create the router. "wagtailapi" is the URL namespace
api_router = WagtailAPIRouter('wagtailapi')

# Add the three endpoints using the "register_endpoint" method.
# The first parameter is the name of the endpoint (eg. pages, images). This
# is used in the URL of the endpoint
# The second parameter is the endpoint class that handles the requests
api_router.register_endpoint('pages', PagesAPIEndpoint)
api_router.register_endpoint('images', ImagesAPIEndpoint)
api_router.register_endpoint('documents', DocumentsAPIEndpoint)
```

Next, register the URLs so Django can route requests into the API:

```
# urls.py

from .api import api_router

urlpatterns = [
    ...

    url(r'^api/v2/', api_router.urls),

    ...

    # Ensure that the api_router line appears above the default Wagtail page serving_
    ↪ route
    url(r'', include(wagtail_urls)),
]
```

With this configuration, pages will be available at `/api/v2/pages/`, images at `/api/v2/images/` and documents at `/api/v2/documents/`

### Adding custom page fields

It's likely that you would need to export some custom fields over the API. This can be done by adding a list of fields to be exported into the `api_fields` attribute for each page model.

For example:

```
# blog/models.py

from wagtail.api import APIField

class BlogPageAuthor(Orderable):
    page = models.ForeignKey('blog.BlogPage', on_delete=models.CASCADE, related_name=
    ↪ 'authors')
    name = models.CharField(max_length=255)

    api_fields = [
```

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```

        APIField('name'),
    ]

class BlogPage(Page):
    published_date = models.DateTimeField()
    body = RichTextField()
    feed_image = models.ForeignKey('wagtailimages.Image', on_delete=models.SET_NULL,
    ↪null=True, ...)
    private_field = models.CharField(max_length=255)

    # Export fields over the API
    api_fields = [
        APIField('published_date'),
        APIField('body'),
        APIField('feed_image'),
        APIField('authors'), # This will nest the relevant BlogPageAuthor objects in
    ↪the API response
    ]

```

This will make `published_date`, `body`, `feed_image` and a list of authors with the `name` field available in the API. But to access these fields, you must select the `blog.BlogPage` type using the `?type` *parameter in the API itself*.

## Custom serialisers

Serialisers are used to convert the database representation of a model into JSON format. You can override the serialiser for any field using the `serializer` keyword argument:

```

from rest_framework.fields import DateField

class BlogPage(Page):
    ...

    api_fields = [
        # Change the format of the published_date field to "Thursday 06 April 2017"
        APIField('published_date', serializer=DateField(format='%A %d %B %Y')),
        ...
    ]

```

Django REST framework's serializers can all take a `source` argument allowing you to add API fields that have a different field name or no underlying field at all:

```

from rest_framework.fields import DateField

class BlogPage(Page):
    ...

    api_fields = [
        # Date in ISO8601 format (the default)
        APIField('published_date'),

        # A separate published_date_display field with a different format
        APIField('published_date_display', serializer=DateField(format='%A %d %B %Y',
    ↪source='published_date')),
    ]

```

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```
    ...  
]
```

This adds two fields to the API (other fields omitted for brevity):

```
{  
    "published_date": "2017-04-06",  
    "published_date_display": "Thursday 06 April 2017"  
}
```

## Images in the API

The `ImageRenditionField` serializer allows you to add renditions of images into your API. It requires an image filter string specifying the resize operations to perform on the image. It can also take the `source` keyword argument described above.

For example:

```
from wagtail.images.api.fields import ImageRenditionField  
  
class BlogPage(Page):  
    ...  
  
    api_fields = [  
        # Adds information about the source image (eg, title) into the API  
        APIField('feed_image'),  
  
        # Adds a URL to a rendered thumbnail of the image to the API  
        APIField('feed_image_thumbnail', serializer=ImageRenditionField('fill-100x100  
→', source='feed_image')),  
        ...  
    ]
```

This would add the following to the JSON:

```
{  
    "feed_image": {  
        "id": 45529,  
        "meta": {  
            "type": "wagtailimages.Image",  
            "detail_url": "http://www.example.com/api/v2/images/12/",  
            "download_url": "/media/images/a_test_image.jpg",  
            "tags": []  
        },  
        "title": "A test image",  
        "width": 2000,  
        "height": 1125  
    },  
    "feed_image_thumbnail": {  
        "url": "/media/images/a_test_image.fill-100x100.jpg",  
        "width": 100,  
        "height": 100  
    }  
}
```

Note: `download_url` is the original uploaded file path, whereas `feed_image_thumbnail['url']` is the url of the rendered image. When you are using another storage backend, such as S3, `download_url` will return a URL to the image if your media files are properly configured.

## Additional settings

### `WAGTAILAPI_BASE_URL`

(required when using frontend cache invalidation)

This is used in two places, when generating absolute URLs to document files and invalidating the cache.

Generating URLs to documents will fall back the the current request's hostname if this is not set. Cache invalidation cannot do this, however, so this setting must be set when using this module alongside the `wagtailfrontendcache` module.

### `WAGTAILAPI_SEARCH_ENABLED`

(default: True)

Setting this to false will disable full text search. This applies to all endpoints.

### `WAGTAILAPI_LIMIT_MAX`

(default: 20)

This allows you to change the maximum number of results a user can request at a time. This applies to all endpoints. Set to `None` for no limit.

## Wagtail API v2 Usage Guide

The Wagtail API module exposes a public, read only, JSON-formatted API which can be used by external clients (such as a mobile app) or the site's frontend.

This document is intended for developers using the API exposed by Wagtail. For documentation on how to enable the API module in your Wagtail site, see [Wagtail API v2 Configuration Guide](#)

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- *Wagtail API v2 Usage Guide*
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## Fetching content

To fetch content over the API, perform a GET request against one of the following endpoints:

- Pages `/api/v2/pages/`
- Images `/api/v2/images/`
- Documents `/api/v2/documents/`

---

**Note:** The available endpoints and their URLs may vary from site to site, depending on how the API has been configured.

---

## Example response

Each response contains the list of items (`items`) and the total count (`meta.total_count`). The total count is irrespective of pagination.

```
GET /api/v2/endpoint_name/

HTTP 200 OK
Content-Type: application/json
```

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```
{
  "meta": {
    "total_count": "total number of results"
  },
  "items": [
    {
      "id": 1,
      "meta": {
        "type": "app_name.ModelName",
        "detail_url": "http://api.example.com/api/v2/endpoint_name/1/"
      },
      "field": "value"
    },
    {
      "id": 2,
      "meta": {
        "type": "app_name.ModelName",
        "detail_url": "http://api.example.com/api/v2/endpoint_name/2/"
      },
      "field": "different value"
    }
  ]
}
```

## Custom page fields in the API

Wagtail sites contain many page types, each with their own set of fields. The `pages` endpoint will only expose the common fields by default (such as `title` and `slug`).

To access custom page fields with the API, select the page type with the `?type` parameter. This will filter the results to only include pages of that type but will also make all the exported custom fields for that type available in the API.

For example, to access the `published_date`, `body` and `authors` fields on the `blog.BlogPage` model in the *configuration docs*:

```
GET /api/v2/pages/?type=blog.BlogPage&fields=published_date,body,authors(name)
```

```
HTTP 200 OK
```

```
Content-Type: application/json
```

```
{
  "meta": {
    "total_count": 10
  },
  "items": [
    {
      "id": 1,
      "meta": {
        "type": "blog.BlogPage",
        "detail_url": "http://api.example.com/api/v2/pages/1/",
        "html_url": "http://www.example.com/blog/my-blog-post/",
        "slug": "my-blog-post",
        "first_published_at": "2016-08-30T16:52:00Z"
      }
    }
  ]
}
```

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```
        "title": "Test blog post",
        "published_date": "2016-08-30",
        "authors": [
            {
                "id": 1,
                "meta": {
                    "type": "blog.BlogPageAuthor",
                },
                "name": "Karl Hobley"
            }
        ],
        ...
    ]
}
```

---

**Note:** Only fields that have been explicitly exported by the developer may be used in the API. This is done by adding a `api_fields` attribute to the page model. You can read about configuration [here](#).

---

This doesn't apply to images/documents as there is only one model exposed in those endpoints. But for projects that have customised image/document models, the `api_fields` attribute can be used to export any custom fields into the API.

## Pagination

The number of items in the response can be changed by using the `?limit` parameter (default: 20) and the number of items to skip can be changed by using the `?offset` parameter.

For example:

```
GET /api/v2/pages/?offset=20&limit=20

HTTP 200 OK
Content-Type: application/json

{
    "meta": {
        "total_count": 50
    },
    "items": [
        pages 20 - 40 will be listed here.
    ]
}
```

---

**Note:** There may be a maximum value for the `?limit` parameter. This can be modified in your project settings by setting `WAGTAILAPI_LIMIT_MAX` to either a number (the new maximum value) or `None` (which disables maximum value check).

---

## Ordering

The results can be ordered by any field by setting the `?order` parameter to the name of the field to order by.

```
GET /api/v2/pages/?order=title

HTTP 200 OK
Content-Type: application/json

{
  "meta": {
    "total_count": 50
  },
  "items": [
    pages will be listed here in ascending title order (a-z)
  ]
}
```

The results will be ordered in ascending order by default. This can be changed to descending order by prefixing the field name with a `-` sign.

```
GET /api/v2/pages/?order=-title

HTTP 200 OK
Content-Type: application/json

{
  "meta": {
    "total_count": 50
  },
  "items": [
    pages will be listed here in descending title order (z-a)
  ]
}
```

---

**Note:** Ordering is case-sensitive so lowercase letters are always ordered after uppercase letters when in ascending order.

---

## Random ordering

Passing `random` into the `?order` parameter will make results return in a random order. If there is no caching, each request will return results in a different order.

```
GET /api/v2/pages/?order=random

HTTP 200 OK
Content-Type: application/json

{
  "meta": {
    "total_count": 50
  },
  "items": [
```

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```
    pages will be listed here in random order
  ]
}
```

---

**Note:** It's not possible to use `?offset` while ordering randomly because consistent random ordering cannot be guaranteed over multiple requests (so requests for subsequent pages may return results that also appeared in previous pages).

---

## Filtering

Any field may be used in an exact match filter. Use the filter name as the parameter and the value to match against.

For example, to find a page with the slug “about”:

```
GET /api/v2/pages/?slug=about

HTTP 200 OK
Content-Type: application/json

{
  "meta": {
    "total_count": 1
  },
  "items": [
    {
      "id": 10,
      "meta": {
        "type": "standard.StandardPage",
        "detail_url": "http://api.example.com/api/v2/pages/10/",
        "html_url": "http://www.example.com/about/",
        "slug": "about",
        "first_published_at": "2016-08-30T16:52:00Z"
      },
      "title": "About"
    },
  ],
}
```

## Filtering by tree position (pages only)

Pages can additionally be filtered by their position of the tree. For this, there are two parameters you can use: `?child_of` and `?descendant_of`.

The `?child_of` filter takes the id of a page and filters the list of results to contain only direct children of that page.

For example, this can be useful for constructing the main menu, by passing the id of the homepage to the filter:

```
GET /api/v2/pages/?child_of=2&show_in_menus=true

HTTP 200 OK
Content-Type: application/json
```

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```
{
  "meta": {
    "total_count": 5
  },
  "items": [
    {
      "id": 3,
      "meta": {
        "type": "blog.BlogIndexPage",
        "detail_url": "http://api.example.com/api/v2/pages/3/",
        "html_url": "http://www.example.com/blog/",
        "slug": "blog",
        "first_published_at": "2016-09-21T13:54:00Z"
      },
      "title": "About"
    },
    {
      "id": 10,
      "meta": {
        "type": "standard.StandardPage",
        "detail_url": "http://api.example.com/api/v2/pages/10/",
        "html_url": "http://www.example.com/about/",
        "slug": "about",
        "first_published_at": "2016-08-30T16:52:00Z"
      },
      "title": "About"
    },
    ...
  ]
}
```

The `?descendant_of` filter also takes the id of a page but includes all descendants (children of children) instead of just directly children.

## Search

Passing a query to the `?search` parameter will perform a full-text search on the results.

The query is split into “terms” (by word boundary), then each term is normalised (lowercased and unaccented).

For example: `?search=James+Joyce`

## Search operator

The `search_operator` specifies how multiple terms in the query should be handled. There are two possible values:

- `and` - All terms in the search query (excluding stop words) must exist in each result
- `or` - At least one term in the search query must exist in each result

The `or` operator is generally better than `and` as it allows the user to be inexact with their query and the ranking algorithm will make sure that irrelevant results are not returned at the top of the page.

The default search operator depends on whether the search engine being used by the site supports ranking. If it does (Elasticsearch), the operator will default to `or`. Otherwise (database), it will default to `and`.

For the same reason, it's also recommended to use the `and` operator when using `?search` in conjunction with `?order` (as this disables ranking).

For example: `?search=James+Joyce&order=-first_published_at&search_operator=and`

### Fields

By default, only a subset of the available fields are returned in the response. The `?fields` parameter can be used to both add additional fields to the response and remove default fields that you know you won't need.

### Additional fields

Additional fields can be added to the response by setting `?fields` to a comma-separated list of field names you want to add.

For example, `?fields=body,feed_image` will add the `body` and `feed_image` fields to the response.

This can also be used across relationships. For example, `?fields=body,feed_image(width,height)` will nest the `width` and `height` of the image in the response.

### All fields

Setting `?fields` to an asterisk (\*) will add all available fields to the response. This is useful for discovering what fields have been exported.

For example: `?fields=*`

### Removing fields

Fields you know that you do not need can be removed by prefixing the name with a `-` and adding it to `?fields`.

For example, `?fields=-title,body` will remove `title` and add `body`.

This can also be used with the asterisk. For example, `?fields=*,-body` adds all fields except for `body`.

### Removing all default fields

To specify exactly the fields you need, you can set the first item in fields to an underscore (`_`) which removes all default fields.

For example, `?fields=_,title` will only return the `title` field.

### Detail views

You can retrieve a single object from the API by appending its id to the end of the URL. For example:

- Pages `/api/v2/pages/1/`
- Images `/api/v2/images/1/`
- Documents `/api/v2/documents/1/`

All exported fields will be returned in the response by default. You can use the `?fields` parameter to customise which fields are shown.

For example: `/api/v2/pages/1/?fields=__,title,body` will return just the `title` and `body` of the page with the id of 1.

### Finding pages by HTML path

You can find an individual page by its HTML path using the `/api/v2/pages/find/?html_path=<path>` view.

This will return either a 302 redirect response to that page's detail view, or a 404 not found response.

For example: `/api/v2/pages/find/?html_path=/` always redirects to the homepage of the site

### Default endpoint fields

#### Common fields

These fields are returned by every endpoint.

**id (number)** The unique ID of the object

---

**Note:** Except for page types, every other content type has its own id space so you must combine this with the `type` field in order to get a unique identifier for an object.

---

**type (string)** The type of the object in `app_label.ModelName` format

**detail\_url (string)** The URL of the detail view for the object

### Pages

**title (string)**

**meta.slug (string)**

**meta.show\_in\_menus (boolean)**

**meta.seo\_title (string)**

**meta.search\_description (string)**

**meta.first\_published\_at (date/time)** These values are taken from their corresponding fields on the page

**meta.html\_url (string)** If the site has an HTML frontend that's generated by Wagtail, this field will be set to the URL of this page

**meta.parent** Nests some information about the parent page (only available on detail views)

### Images

**title (string)** The value of the image's title field. Within Wagtail, this is used in the image's `alt` HTML attribute.

**width (number)**

**height (number)** The size of the original image file

**meta.tags (list of strings)** A list of tags associated with the image

## Documents

**title (string)** The value of the document's title field

**meta.tags (list of strings)** A list of tags associated with the document

**meta.download\_url (string)** A URL to the document file

## Changes since v1

### Breaking changes

- The results list in listing responses has been renamed to `items` (was previously either `pages`, `images` or `documents`)

### Major features

- The `fields` parameter has been improved to allow removing fields, adding all fields and customising nested fields

### Minor features

- `html_url`, `slug`, `first_published_at`, `expires_at` and `show_in_menus` fields have been added to the pages endpoint
- `download_url` field has been added to the documents endpoint
- Multiple page types can be specified in `type` parameter on pages endpoint
- `true` and `false` may now be used when filtering boolean fields
- `order` can now be used in conjunction with `search`
- `search_operator` parameter was added

## 1.4 Reference

### 1.4.1 Pages

Wagtail requires a little careful setup to define the types of content that you want to present through your website. The basic unit of content in Wagtail is the *Page*, and all of your page-level content will inherit basic webpage-related properties from it. But for the most part, you will be defining content yourself, through the construction of Django models using Wagtail's *Page* as a base.

Wagtail organizes content created from your models in a tree, which can have any structure and combination of model objects in it. Wagtail doesn't prescribe ways to organize and interrelate your content, but here we've sketched out some strategies for organizing your models.

The presentation of your content, the actual webpages, includes the normal use of the Django template system. We'll cover additional functionality that Wagtail provides at the template level later on.

## Theory

### Introduction to Trees

If you're unfamiliar with trees as an abstract data type, you might want to [review the concepts involved](#).

As a web developer, though, you probably already have a good understanding of trees as filesystem directories or paths. Wagtail pages can create the same structure, as each page in the tree has its own URL path, like so:

```

/
  people/
    nien-nunb/
    laura-roslin/
  events/
    captain-picard-day/
    winter-wrap-up/

```

The Wagtail admin interface uses the tree to organize content for editing, letting you navigate up and down levels in the tree through its Explorer menu. This method of organization is a good place to start in thinking about your own Wagtail models.

### Nodes and Leaves

It might be handy to think of the `Page`-derived models you want to create as being one of two node types: parents and leaves. Wagtail isn't prescriptive in this approach, but it's a good place to start if you're not experienced in structuring your own content types.

### Nodes

Parent nodes on the Wagtail tree probably want to organize and display a browse-able index of their descendants. A blog, for instance, needs a way to show a list of individual posts.

A Parent node could provide its own function returning its descendant objects.

```

class EventPageIndex(Page):
    # ...
    def events(self):
        # Get list of live event pages that are descendants of this page
        events = EventPage.objects.live().descendant_of(self)

        # Filter events list to get ones that are either
        # running now or start in the future
        events = events.filter(date_from__gte=date.today())

        # Order by date
        events = events.order_by('date_from')

    return events

```

This example makes sure to limit the returned objects to pieces of content which make sense, specifically ones which have been published through Wagtail's admin interface (`live()`) and are children of this node (`descendant_of(self)`). By setting a `subpage_types` class property in your model, you can specify which models are allowed to be set as children, and by setting a `parent_page_types` class property, you can specify which models are allowed to be parents of this page model. Wagtail will allow any `Page`-derived model by default. Regardless, it's smart for a parent model to provide an index filtered to make sense.

## Leaves

Leaves are the pieces of content itself, a page which is consumable, and might just consist of a bunch of properties. A blog page leaf might have some body text and an image. A person page leaf might have a photo, a name, and an address.

It might be helpful for a leaf to provide a way to back up along the tree to a parent, such as in the case of breadcrumbs navigation. The tree might also be deep enough that a leaf's parent won't be included in general site navigation.

The model for the leaf could provide a function that traverses the tree in the opposite direction and returns an appropriate ancestor:

```
class EventPage(Page):
    # ...
    def event_index(self):
        # Find closest ancestor which is an event index
        return self.get_ancestors().type(EventIndexPage).last()
```

If defined, `subpage_types` and `parent_page_types` will also limit the parent models allowed to contain a leaf. If not, Wagtail will allow any combination of parents and leafs to be associated in the Wagtail tree. Like with index pages, it's a good idea to make sure that the index is actually of the expected model to contain the leaf.

## Other Relationships

Your `Page`-derived models might have other interrelationships which extend the basic Wagtail tree or depart from it entirely. You could provide functions to navigate between siblings, such as a “Next Post” link on a blog page (`post->post->post`). It might make sense for subtrees to interrelate, such as in a discussion forum (`forum->post->replies`). Skipping across the hierarchy might make sense, too, as all objects of a certain model class might interrelate regardless of their ancestors (`events = EventPage.objects.all()`). It's largely up to the models to define their interrelations, the possibilities are really endless.

## Anatomy of a Wagtail Request

For going beyond the basics of model definition and interrelation, it might help to know how Wagtail handles requests and constructs responses. In short, it goes something like:

1. Django gets a request and routes through Wagtail's URL dispatcher definitions
2. Wagtail checks the hostname of the request to determine which `Site` record will handle this request.
3. Starting from the root page of that site, Wagtail traverses the page tree, calling the `route()` method and letting each page model decide whether it will handle the request itself or pass it on to a child page.
4. The page responsible for handling the request returns a `RouteResult` object from `route()`, which identifies the page along with any additional `args/kwargs` to be passed to `serve()`.
5. Wagtail calls `serve()`, which constructs a context using `get_context()`
6. `serve()` finds a template to pass it to using `get_template()`
7. A response object is returned by `serve()` and Django responds to the requester.

You can apply custom behaviour to this process by overriding `Page` class methods such as `route()` and `serve()` in your own models. For examples, see [Recipes](#).

## Scheduled Publishing

Page publishing can be scheduled through the *Go live date/time* feature in the *Settings* tab of the *Edit* page. This allows you to set up initial page publishing or a page update in advance. In order for pages to be published at the scheduled time you should set up the *publish\_scheduled\_pages* management command.

The basic workflow is as follows:

- Scheduling a revision for a page that is not currently live means that page will go live when the scheduled time comes.
- Scheduling a revision for a page that is already live means that revision will be published when the time comes.
- If page has a scheduled revision and you set another revision to publish immediately, the scheduled revision will be unscheduled.

The *Revisions* view for a given page will show which revision is scheduled and when it is scheduled for. A scheduled revision in the list will also provide an *Unschedule* button to cancel it.

## Recipes

### Overriding the `serve()` Method

Wagtail defaults to serving *Page*-derived models by passing a reference to the page object to a Django HTML template matching the model's name, but suppose you wanted to serve something other than HTML? You can override the *serve()* method provided by the *Page* class and handle the Django request and response more directly.

Consider this example from the Wagtail demo site's `models.py`, which serves an *EventPage* object as an iCal file if the `format` variable is set in the request:

```
class EventPage(Page):
    ...

    def serve(self, request):
        if "format" in request.GET:
            if request.GET['format'] == 'ical':
                # Export to ical format
                response = HttpResponse(
                    export_event(self, 'ical'),
                    content_type='text/calendar',
                )
                response['Content-Disposition'] = 'attachment; filename=' + self.slug_
                return response
            else:
                # Unrecognised format error
                message = 'Could not export event\n\nUnrecognised format: ' + request.
                return HttpResponse(message, content_type='text/plain')
        else:
            # Display event page as usual
            return super().serve(request)
```

*serve()* takes a Django request object and returns a Django response object. Wagtail returns a *TemplateResponse* object with the template and context which it generates, which allows middleware to function as intended, so keep in mind that a simpler response object like a *HttpResponse* will not receive these benefits.

With this strategy, you could use Django or Python utilities to render your model in JSON or XML or any other format you'd like.

## Adding Endpoints with Custom `route()` Methods

---

**Note:** A much simpler way of adding more endpoints to pages is provided by the `routable_page` module.

---

Wagtail routes requests by iterating over the path components (separated with a forward slash /), finding matching objects based on their slug, and delegating further routing to that object's model class. The Wagtail source is very instructive in figuring out what's happening. This is the default `route()` method of the `Page` class:

```
class Page(...):
    ...

    def route(self, request, path_components):
        if path_components:
            # request is for a child of this page
            child_slug = path_components[0]
            remaining_components = path_components[1:]

            # find a matching child or 404
            try:
                subpage = self.get_children().get(slug=child_slug)
            except Page.DoesNotExist:
                raise Http404

            # delegate further routing
            return subpage.specific.route(request, remaining_components)

        else:
            # request is for this very page
            if self.live:
                # Return a RouteResult that will tell Wagtail to call
                # this page's serve() method
                return RouteResult(self)
            else:
                # the page matches the request, but isn't published, so 404
                raise Http404
```

`route()` takes the current object (`self`), the request object, and a list of the remaining `path_components` from the request URL. It either continues delegating routing by calling `route()` again on one of its children in the Wagtail tree, or ends the routing process by returning a `RouteResult` object or raising a 404 error.

The `RouteResult` object (defined in `wagtail.core.url_routing`) encapsulates all the information Wagtail needs to call a page's `serve()` method and return a final response: this information consists of the page object, and any additional `args/kwargs` to be passed to `serve()`.

By overriding the `route()` method, we could create custom endpoints for each object in the Wagtail tree. One use case might be using an alternate template when encountering the `print/` endpoint in the path. Another might be a REST API which interacts with the current object. Just to see what's involved, let's make a simple model which prints out all of its child path components.

First, `models.py`:



```

from django.shortcuts import render
from wagtail.core.url_routing import RouteResult
from django.http.response import Http404
from wagtail.core.models import Page

...

class Echoer(Page):

    def route(self, request, path_components):
        if path_components:
            # tell Wagtail to call self.serve() with an additional 'path_components'
            ↪kwarg
            return RouteResult(self, kwargs={'path_components': path_components})
        else:
            if self.live:
                # tell Wagtail to call self.serve() with no further args
                return RouteResult(self)
            else:
                raise Http404

    def serve(self, path_components=[]):
        return render(request, self.template, {
            'page': self,
            'echo': ' '.join(path_components),
        })

```

This model, `Echoer`, doesn't define any properties, but does subclass `Page` so objects will be able to have a custom title and slug. The template just has to display our `{{ echo }}` property.

Now, once creating a new `Echoer` page in the Wagtail admin titled “Echo Base,” requests such as:

```
http://127.0.0.1:8000/echo-base/tauntaun/kennel/bed/and/breakfast/
```

Will return:

```
tauntaun kennel bed and breakfast
```

Be careful if you're introducing new required arguments to the `serve()` method - Wagtail still needs to be able to display a default view of the page for previewing and moderation, and by default will attempt to do this by calling `serve()` with a request object and no further arguments. If your `serve()` method does not accept that as a method signature, you will need to override the page's `serve_preview()` method to call `serve()` with suitable arguments:

```

def serve_preview(self, request, mode_name):
    return self.serve(request, color='purple')

```

## Tagging

Wagtail provides tagging capability through the combination of two django modules, `taggit` and `modelcluster`. `taggit` provides a model for tags which is extended by `modelcluster`, which in turn provides some magical database abstraction which makes drafts and revisions possible in Wagtail. It's a tricky recipe, but the net effect is a many-to-many relationship between your model and a tag class reserved for your model.

Using an example from the Wagtail demo site, here's what the tag model and the relationship field looks like in `models.py`:

```
from modelcluster.fields import ParentalKey
from modelcluster.contrib.taggit import ClusterTaggableManager
from taggit.models import TaggedItemBase

class BlogPageTag(TaggedItemBase):
    content_object = ParentalKey('demo.BlogPage', on_delete=models.CASCADE, related_
    ↪name='tagged_items')

class BlogPage(Page):
    ...
    tags = ClusterTaggableManager(through=BlogPageTag, blank=True)

    promote_panels = Page.promote_panels + [
        ...
        FieldPanel('tags'),
    ]
```

Wagtail’s admin provides a nice interface for inputting tags into your content, with typeahead tag completion and friendly tag icons.

Now that we have the many-to-many tag relationship in place, we can fit in a way to render both sides of the relation. Here’s more of the Wagtail demo site `models.py`, where the index model for `BlogPage` is extended with logic for filtering the index by tag:

```
from django.shortcuts import render

class BlogIndexPage(Page):
    ...
    def serve(self, request):
        # Get blogs
        blogs = BlogPage.objects.child_of(self).live()

        # Filter by tag
        tag = request.GET.get('tag')
        if tag:
            blogs = blogs.filter(tags__name=tag)

        return render(request, self.template, {
            'page': self,
            'blogs': blogs,
        })
```

Here, `blogs.filter(tags__name=tag)` invokes a reverse Django QuerySet filter on the `BlogPageTag` model to optionally limit the `BlogPage` objects sent to the template for rendering. Now, let’s render both sides of the relation by showing the tags associated with an object and a way of showing all of the objects associated with each tag. This could be added to the `blog_page.html` template:

```
{% for tag in page.tags.all %}
    <a href="{% pageurl page.blog_index %}?tag={{ tag }}">{{ tag }}</a>
{% endfor %}
```

Iterating through `page.tags.all` will display each tag associated with `page`, while the link(s) back to the index make use of the filter option added to the `BlogIndexPage` model. A Django query could also use the `tagged_items` related name field to get `BlogPage` objects associated with a tag.

This is just one possible way of creating a taxonomy for Wagtail objects. With all of the components for a taxonomy available through Wagtail, you should be able to fulfil even the most exotic taxonomic schemes.

## Have redirects created automatically when changing page slug

You may want redirects created automatically when a url gets changed in the admin so as to avoid broken links. You can add something like the following block to a `wagtail_hooks.py` file within one of your project's apps.

```
from wagtail.core import hooks
from wagtail.contrib.redirects.models import Redirect

# Create redirect when editing slugs
@hooks.register('before_edit_page')
def create_redirect_on_slug_change(request, page):
    if request.method == 'POST':
        if page.slug != request.POST['slug']:
            Redirect.objects.create(
                old_path=page.url[:-1],
                site=page.get_site(),
                redirect_page=page
            )
```

Note: This does not work in some cases e.g. when you redirect a page, create a new page in that url and then move the new one. It should be helpful in most cases however.

## Available panel types

### FieldPanel

**class** wagtail.admin.edit\_handlers.**FieldPanel** (*field\_name*, *classname=None*, *width=None*)

This is the panel used for basic Django field types.

#### **field\_name**

This is the name of the class property used in your model definition.

#### **classname**

This is a string of optional CSS classes given to the panel which are used in formatting and scripted interactivity. By default, panels are formatted as inset fields.

The CSS class `full` can be used to format the panel so it covers the full width of the Wagtail page editor.

The CSS class `title` can be used to give the field a larger text size, suitable for representing page titles and section headings.

#### **widget** (*optional*)

This parameter allows you to specify a Django form widget to use instead of the default widget for this field type.

### MultiFieldPanel

**class** wagtail.admin.edit\_handlers.**MultiFieldPanel** (*children*, *heading=""*, *classname=None*)

This panel condenses several *FieldPanel*s or choosers, from a list or tuple, under a single heading string.

#### **children**

A list or tuple of child panels

**heading**

A heading for the fields

**Collapsing MultiFieldPanels to save space**

By default, `MultiFieldPanel`s are expanded and not collapsible. Adding `collapsible` to `classname` will enable the collapse control. Adding both `collapsible` and `collapsed` to the `classname` parameter will load the editor page with the `MultiFieldPanel` collapsed under its heading.

```
content_panels = [
    MultiFieldPanel(
        [
            ImageChooserPanel('cover'),
            DocumentChooserPanel('book_file'),
            PageChooserPanel('publisher'),
        ],
        heading="Collection of Book Fields",
        classname="collapsible collapsed"
    ),
]
```

**InlinePanel**

```
class wagtail.admin.edit_handlers.InlinePanel(relation_name, panels=None, class-
                                             name="", heading="", label="",
                                             help_text="", min_num=None,
                                             max_num=None)
```

This panel allows for the creation of a “cluster” of related objects over a join to a separate model, such as a list of related links or slides to an image carousel.

This is a powerful but complex feature which will take some space to cover, so we’ll skip over it for now. For a full explanation on the usage of `InlinePanel`, see [Inline Panels and Model Clusters](#).

**FieldRowPanel**

```
class wagtail.admin.edit_handlers.FieldRowPanel(children, classname=None)
```

This panel creates a columnar layout in the editing interface, where each of the child `Panels` appears alongside each other rather than below.

Use of `FieldRowPanel` particularly helps reduce the “snow-blindness” effect of seeing so many fields on the page, for complex models. It also improves the perceived association between fields of a similar nature. For example if you created a model representing an “Event” which had a starting date and ending date, it may be intuitive to find the start and end date on the same “row”.

By default, the panel is divided into equal-width columns, but this can be overridden by adding `col*` class names to each of the child `Panels` of the `FieldRowPanel`. The Wagtail editing interface is laid out using a grid system, in which the maximum width of the editor is 12 columns. Classes `col1-col12` can be applied to each child of a `FieldRowPanel`. The class `col3` will ensure that field appears 3 columns wide or a quarter the width. `col4` would cause the field to be 4 columns wide, or a third the width.

**children**

A list or tuple of child panels to display on the row

**classname**

A class to apply to the FieldRowPanel as a whole

**HelpPanel**

```
class wagtail.admin.edit_handlers.HelpPanel (content=",tem-  
                                           plate='wagtailadmin/edit_handlers/help_panel.html',  
                                           heading=", classname=")
```

**content**

HTML string that gets displayed in the panel.

**template**

Path to a template rendering the full panel HTML.

**heading**

A heading for the help content.

**classname**

String of CSS classes given to the panel which are used in formatting and scripted interactivity.

**PageChooserPanel**

```
class wagtail.admin.edit_handlers.PageChooserPanel (field_name,page_type=None,  
                                                    can_choose_root=False)
```

You can explicitly link [Page](#)-derived models together using the [Page](#) model and PageChooserPanel.

```
from wagtail.core.models import Page
from wagtail.admin.edit_handlers import PageChooserPanel

class BookPage(Page):
    related_page = models.ForeignKey(
        'wagtailcore.Page',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+',
    )

    content_panels = Page.content_panels + [
        PageChooserPanel('related_page', 'demo.PublisherPage'),
    ]
```

PageChooserPanel takes one required argument, the field name. Optionally, specifying a page type (in the form of an "appname.modelname" string) will filter the chooser to display only pages of that type. A list or tuple of page types can also be passed in, to allow choosing a page that matches any of those page types:

```
PageChooserPanel('related_page', ['demo.PublisherPage', 'demo.AuthorPage'])
```

Passing `can_choose_root=True` will allow the editor to choose the tree root as a page. Normally this would be undesirable, since the tree root is never a usable page, but in some specialised cases it may be appropriate; for example, a page with an automatic “related articles” feed could use a PageChooserPanel to select which subsection articles will be taken from, with the root corresponding to ‘everywhere’.

## ImageChooserPanel

**class** wagtail.images.edit\_handlers.**ImageChooserPanel** (*field\_name*)

Wagtail includes a unified image library, which you can access in your models through the `Image` model and the `ImageChooserPanel` chooser. Here's how:

```
from wagtail.images.models import Image
from wagtail.images.edit_handlers import ImageChooserPanel

class BookPage(Page):
    cover = models.ForeignKey(
        'wagtailimages.Image',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+'
    )

    content_panels = Page.content_panels + [
        ImageChooserPanel('cover'),
    ]
```

Django's default behaviour is to “cascade” deletions through a `ForeignKey` relationship, which may not be what you want. This is why the `null`, `blank`, and `on_delete` parameters should be set to allow for an empty field. `ImageChooserPanel` takes only one argument: the name of the field.

Displaying `Image` objects in a template requires the use of a template tag. See [Using images in templates](#).

## FormSubmissionsPanel

**class** wagtail.contrib.forms.edit\_handlers.**FormSubmissionsPanel**

This panel adds a single, read-only section in the edit interface for pages implementing the `AbstractForm` model. It includes the number of total submissions for the given form and also a link to the listing of submissions.

```
from wagtail.contrib.forms.models import AbstractForm
from wagtail.contrib.forms.edit_handlers import FormSubmissionsPanel

class ContactFormPage(AbstractForm):
    content_panels = [
        FormSubmissionsPanel(),
    ]
```

## DocumentChooserPanel

**class** wagtail.documents.edit\_handlers.**DocumentChooserPanel** (*field\_name*)

For files in other formats, Wagtail provides a generic file store through the `Document` model:

```
from wagtail.documents.models import Document
from wagtail.documents.edit_handlers import DocumentChooserPanel

class BookPage(Page):
    book_file = models.ForeignKey(
```

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```

        'wagtaildocs.Document',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+'
    )

    content_panels = Page.content_panels + [
        DocumentChooserPanel('book_file'),
    ]

```

As with images, Wagtail documents should also have the appropriate extra parameters to prevent cascade deletions across a `ForeignKey` relationship. `DocumentChooserPanel` takes only one argument: the name of the field.

## SnippetChooserPanel

**class** wagtail.snippets.edit\_handlers.**SnippetChooserPanel** (*field\_name*, *snip-  
pet\_type=None*)

Snippets are vanilla Django models you create yourself without a Wagtail-provided base class. A chooser, `SnippetChooserPanel`, is provided which takes the field name as an argument.

```

from wagtail.snippets.edit_handlers import SnippetChooserPanel

class BookPage(Page):
    advert = models.ForeignKey(
        'demo.Advert',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+'
    )

    content_panels = Page.content_panels + [
        SnippetChooserPanel('advert'),
    ]

```

See [Snippets](#) for more information.

## Built-in Fields and Choosers

Django's field types are automatically recognised and provided with an appropriate widget for input. Just define that field the normal Django way and pass the field name into `FieldPanel` when defining your panels. Wagtail will take care of the rest.

Here are some Wagtail-specific types that you might include as fields in your models.

## Field Customisation

By adding CSS classes to your panel definitions or adding extra parameters to your field definitions, you can control much of how your fields will display in the Wagtail page editing interface. Wagtail's page editing interface takes much of its behaviour from Django's admin, so you may find many options for customisation covered there. (See [Django model field reference](#)).

## Full-Width Input

Use `classname="full"` to make a field (input element) stretch the full width of the Wagtail page editor. This will not work if the field is encapsulated in a *MultiFieldPanel*, which places its child fields into a formset.

## Titles

Use `classname="title"` to make Page’s built-in title field stand out with more vertical padding.

## Required Fields

To make input or chooser selection mandatory for a field, add `blank=False` to its model definition.

## Hiding Fields

Without a panel definition, a default form field (without label) will be used to represent your fields. If you intend to hide a field on the Wagtail page editor, define the field with `editable=False`.

## Inline Panels and Model Clusters

The `django-modelcluster` module allows for streamlined relation of extra models to a Wagtail page via a ForeignKey-like relationship called `ParentalKey`. Normally, your related objects “cluster” would need to be created beforehand (or asynchronously) before being linked to a Page; however, objects related to a Wagtail page via `ParentalKey` can be created on-the-fly and saved to a draft revision of a Page object.

Let’s look at the example of adding related links to a *Page*-derived model. We want to be able to add as many as we like, assign an order, and do all of this without leaving the page editing screen.

```
from wagtail.core.models import Orderable, Page
from modelcluster.fields import ParentalKey

# The abstract model for related links, complete with panels
class RelatedLink(models.Model):
    title = models.CharField(max_length=255)
    link_external = models.URLField("External link", blank=True)

    panels = [
        FieldPanel('title'),
        FieldPanel('link_external'),
    ]

    class Meta:
        abstract = True

# The real model which combines the abstract model, an
# Orderable helper class, and what amounts to a ForeignKey link
# to the model we want to add related links to (BookPage)
class BookPageRelatedLinks(Orderable, RelatedLink):
    page = ParentalKey('demo.BookPage', on_delete=models.CASCADE, related_name=
    ↪ 'related_links')
```

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```
class BookPage(Page):
    # ...

    content_panels = Page.content_panels + [
        InlinePanel('related_links', label="Related Links"),
    ]
```

The `RelatedLink` class is a vanilla Django abstract model. The `BookPageRelatedLinks` model extends it with capability for being ordered in the Wagtail interface via the `Orderable` class as well as adding a page property which links the model to the `BookPage` model we're adding the related links objects to. Finally, in the panel definitions for `BookPage`, we'll add an `InlinePanel` to provide an interface for it all. Let's look again at the parameters that `InlinePanel` accepts:

```
InlinePanel( relation_name, panels=None, heading='', label='', help_text='', min_
    num=None, max_num=None )
```

The `relation_name` is the `related_name` label given to the cluster's `ParentalKey` relation. You can add the panels manually or make them part of the cluster model. `heading` and `help_text` provide a heading and caption, respectively, for the Wagtail editor. `label` sets the text on the add button, and is used as the heading when `heading` is not present. Finally, `min_num` and `max_num` allow you to set the minimum/maximum number of forms that the user must submit.

For another example of using model clusters, see [Tagging](#)

For more on `django-modelcluster`, visit [the django-modelcluster github project page](#).

## Model Reference

This document contains reference information for the model classes inside the `wagtailcore` module.

### Page

#### Database fields

```
class wagtail.core.models.Page
```

##### **title**

(text)

Human-readable title of the page.

##### **draft\_title**

(text)

Human-readable title of the page, incorporating any changes that have been made in a draft edit (in contrast to the `title` field, which for published pages will be the title as it exists in the current published version).

##### **slug**

(text)

This is used for constructing the page's URL.

For example: `http://domain.com/blog/[my-slug]/`

**content\_type**

(foreign key to `django.contrib.contenttypes.models.ContentType`)

A foreign key to the `ContentType` object that represents the specific model of this page.

**live**

(boolean)

A boolean that is set to `True` if the page is published.

Note: this field defaults to `True` meaning that any pages that are created programmatically will be published by default.

**has\_unpublished\_changes**

(boolean)

A boolean that is set to `True` when the page is either in draft or published with draft changes.

**owner**

(foreign key to user model)

A foreign key to the user that created the page.

**first\_published\_at**

(date/time)

The date/time when the page was first published.

**last\_published\_at**

(date/time)

The date/time when the page was last published.

**seo\_title**

(text)

Alternate SEO-crafted title, for use in the page's `<title>` HTML tag.

**search\_description**

(text)

SEO-crafted description of the content, used for search indexing. This is also suitable for the page's `<meta name="description">` HTML tag.

**show\_in\_menus**

(boolean)

Toggles whether the page should be included in site-wide menus.

This is used by the `in_menu()` QuerySet filter.

Defaults to `False` and can be overridden on the model with `show_in_menus_default = True`.

---

**Note:** To set the global default for all pages, set `Page.show_in_menus_default = True` once where you first import the `Page` model.

---

## Methods and properties

In addition to the model fields provided, `Page` has many properties and methods that you may wish to reference, use, or override in creating your own models.

---

**Note:** See also [django-treebeard's node API](#). Page is a subclass of [materialized path tree](#) nodes.

---

**class** wagtail.core.models.**Page**

**specific**

Return this page in its most specific subclassed form.

**specific\_class**

Return the class that this page would be if instantiated in its most specific form

**get\_url** (*request=None, current\_site=None*)

Return the ‘most appropriate’ URL for referring to this page from the pages we serve, within the Wagtail backend and actual website templates; this is the local URL (starting with ‘/’) if we’re only running a single site (i.e. we know that whatever the current page is being served from, this link will be on the same domain), and the full URL (with domain) if not. Return None if the page is not routable.

Accepts an optional but recommended `request` keyword argument that, if provided, will be used to cache site-level URL information (thereby avoiding repeated database / cache lookups) and, via the `request.site` attribute, determine whether a relative or full URL is most appropriate.

**full\_url**

Return the full URL (including protocol / domain) to this page, or None if it is not routable

**relative\_url** (*current\_site, request=None*)

Return the ‘most appropriate’ URL for this page taking into account the site we’re currently on; a local URL if the site matches, or a fully qualified one otherwise. Return None if the page is not routable.

Accepts an optional but recommended `request` keyword argument that, if provided, will be used to cache site-level URL information (thereby avoiding repeated database / cache lookups).

**get\_site** ()

Return the Site object that this page belongs to.

**get\_url\_parts** (*request=None*)

Determine the URL for this page and return it as a tuple of (`site_id`, `site_root_url`, `page_url_relative_to_site_root`). Return None if the page is not routable.

This is used internally by the `full_url`, `url`, `relative_url` and `get_site` properties and methods; pages with custom URL routing should override this method in order to have those operations return the custom URLs.

Accepts an optional keyword argument `request`, which may be used to avoid repeated database / cache lookups. Typically, a page model that overrides `get_url_parts` should not need to deal with `request` directly, and should just pass it to the original method when calling `super`.

**route** (*request, path\_components*)

**serve** (*request, \*args, \*\*kwargs*)

**get\_context** (*request, \*args, \*\*kwargs*)

**get\_template** (*request, \*args, \*\*kwargs*)

**get\_admin\_display\_title** ()

Return the title for this page as it should appear in the admin backend; override this if you wish to display extra contextual information about the page, such as language. By default, returns `draft_title`.

**preview\_modes**

A list of (`internal_name`, `display_name`) tuples for the modes in which this page can be displayed for preview/moderation purposes. Ordinarily a page will only have one display mode, but subclasses of Page

can override this - for example, a page containing a form might have a default view of the form, and a post-submission ‘thankyou’ page

**serve\_preview** (*request, mode\_name*)

Return an HTTP response for use in page previews. Normally this would be equivalent to `self.serve(request)`, since we obviously want the preview to be indicative of how it looks on the live site. However, there are a couple of cases where this is not appropriate, and custom behaviour is required:

1) The page has custom routing logic that derives some additional required args/kwargs to be passed to `serve()`. The routing mechanism is bypassed when previewing, so there’s no way to know what args we should pass. In such a case, the page model needs to implement its own version of `serve_preview`.

2) The page has several different renderings that we would like to be able to see when previewing - for example, a form page might have one rendering that displays the form, and another rendering to display a landing page when the form is posted. This can be done by setting a custom `preview_modes` list on the page model - Wagtail will allow the user to specify one of those modes when previewing, and pass the chosen `mode_name` to `serve_preview` so that the page model can decide how to render it appropriately. (Page models that do not specify their own `preview_modes` list will always receive an empty string as `mode_name`.)

Any templates rendered during this process should use the ‘request’ object passed here - this ensures that `request.user` and other properties are set appropriately for the wagtail user bar to be displayed. This request will always be a GET.

**get\_parent** (*update=False*)

**Returns** the parent node of the current node object. Caches the result in the object itself to help in loops.

**get\_ancestors** (*inclusive=False*)

Returns a queryset of the current page’s ancestors, starting at the root page and descending to the parent, or to the current page itself if `inclusive` is true.

**get\_descendants** (*inclusive=False*)

Returns a queryset of all pages underneath the current page, any number of levels deep. If `inclusive` is true, the current page itself is included in the queryset.

**get\_siblings** (*inclusive=True*)

Returns a queryset of all other pages with the same parent as the current page. If `inclusive` is true, the current page itself is included in the queryset.

**search\_fields**

A list of fields to be indexed by the search engine. See Search docs [Indexing extra fields](#)

**subpage\_types**

A whitelist of page models which can be created as children of this page type. For example, a `BlogIndex` page might allow a `BlogPage` as a child, but not a `JobPage`:

```
class BlogIndex(Page):
    subpage_types = ['mysite.BlogPage', 'mysite.BlogArchivePage']
```

The creation of child pages can be blocked altogether for a given page by setting its `subpage_types` attribute to an empty array:

```
class BlogPage(Page):
    subpage_types = []
```

**parent\_page\_types**

A whitelist of page models which are allowed as parent page types. For example, a `BlogPage` may only allow itself to be created below the `BlogIndex` page:

```
class BlogPage(Page):
    parent_page_types = ['mysite.BlogIndexPage']
```

Pages can block themselves from being created at all by setting `parent_page_types` to an empty array (this is useful for creating unique pages that should only be created once):

```
class HiddenPage(Page):
    parent_page_types = []
```

**classmethod `can_exist_under` (*parent*)**

Checks if this page type can exist as a subpage under a parent page instance.

See also: `Page.can_create_at()` and `Page.can_move_to()`

**classmethod `can_create_at` (*parent*)**

Checks if this page type can be created as a subpage under a parent page instance.

**`can_move_to` (*parent*)**

Checks if this page instance can be moved to be a subpage of a parent page instance.

**`password_required_template`**

Defines which template file should be used to render the login form for Protected pages using this model. This overrides the default, defined using `PASSWORD_REQUIRED_TEMPLATE` in your settings. See [Private pages](#)

**`is_creatable`**

Controls if this page can be created through the Wagtail administration. Defaults to `True`, and is not inherited by subclasses. This is useful when using [multi-table inheritance](#), to stop the base model from being created as an actual page.

**`max_count`**

Controls the maximum number of pages of this type that can be created through the Wagtail administration interface. This is useful when needing “allow at most 3 of these pages to exist”, or for singleton pages.

**`max_count_per_parent`**

Controls the maximum number of pages of this type that can be created under any one parent page.

**`exclude_fields_in_copy`**

An array of field names that will not be included when a Page is copied. Useful when you have relations that do not use *ClusterableModel* or should not be copied.

```
class BlogPage(Page):
    exclude_fields_in_copy = ['special_relation', 'custom_uuid']
```

The following fields will always be excluded in a copy - [`'id'`, `'path'`, `'depth'`, `'numchild'`, `'url_path'`, `'path'`].

**`base_form_class`**

The form class used as a base for editing Pages of this type in the Wagtail page editor. This attribute can be set on a model to customise the Page editor form. Forms must be a subclass of *WagtailAdminPageForm*. See [Customising generated forms](#) for more information.

**`with_content_json` (*content\_json*)**

Returns a new version of the page with field values updated to reflect changes in the provided `content_json` (which usually comes from a previously-saved page revision).

Certain field values are preserved in order to prevent errors if the returned page is saved, such as `id`, `content_type` and some tree-related values. The following field values are also preserved, as they are considered to be meaningful to the page as a whole, rather than to a specific revision:

- `draft_title`
- `live`
- `has_unpublished_changes`
- `owner`
- `locked`
- `latest_revision_created_at`
- `first_published_at`

### Site

The `Site` model is useful for multi-site installations as it allows an administrator to configure which part of the tree to use for each hostname that the server responds on.

This configuration is used by the `SiteMiddleware` middleware class which checks each request against this configuration and appends the `Site` object to the Django request object.

### Database fields

```
class wagtail.core.models.Site
```

#### **hostname**

(text)

This is the hostname of the site, excluding the scheme, port and path.

For example: `www.mysite.com`

---

**Note:** If you're looking for how to get the root url of a site, use the `root_url` attribute.

---

#### **port**

(number)

This is the port number that the site responds on.

#### **site\_name**

(text - optional)

A human-readable name for the site. This is not used by Wagtail itself, but is suitable for use on the site front-end, such as in `<title>` elements.

For example: `Rod's World of Birds`

#### **root\_page**

(foreign key to [Page](#))

This is a link to the root page of the site. This page will be what appears at the `/` URL on the site and would usually be a homepage.

#### **is\_default\_site**

(boolean)

This is set to `True` if the site is the default. Only one site can be the default.

The default site is used as a fallback in situations where a site with the required hostname/port couldn't be found.

## Methods and properties

**class** wagtail.core.models.Site

**static** find\_for\_request(*request*)

Find the site object responsible for responding to this HTTP request object. Try:

- unique hostname first
- then hostname and port
- if there is no matching hostname at all, or no matching hostname:port combination, fall back to the unique default site, or raise an exception

NB this means that high-numbered ports on an extant hostname may still be routed to a different hostname which is set as the default

**root\_url**

This returns the URL of the site. It is calculated from the *hostname* and the *port* fields.

The scheme part of the URL is calculated based on value of the *port* field:

- 80 = http://
- 443 = https://
- Everything else will use the http:// scheme and the port will be appended to the end of the hostname (eg. http://mysite.com:8000/)

**static** get\_site\_root\_paths()

Return a list of (id, root\_path, root\_url) tuples, most specific path first - used to translate url\_paths into actual URLs with hostnames

## PageRevision

Every time a page is edited a new PageRevision is created and saved to the database. It can be used to find the full history of all changes that have been made to a page and it also provides a place for new changes to be kept before going live.

- Revisions can be created from any *Page* object by calling its `save_revision()` method
- The content of the page is JSON-serialised and stored in the *content\_json* field
- You can retrieve a PageRevision as a *Page* object by calling the `as_page_object()` method

## Database fields

**class** wagtail.core.models.PageRevision

**page**

(foreign key to *Page*)

**submitted\_for\_moderation**

(boolean)

True if this revision is in moderation

**created\_at**

(date/time)

This is the time the revision was created

**user**

(foreign key to user model)

This links to the user that created the revision

**content\_json**

(text)

This field contains the JSON content for the page at the time the revision was created

## Managers

**class** wagtail.core.models.PageRevision

**objects**

This manager is used to retrieve all of the PageRevision objects in the database

Example:

```
PageRevision.objects.all()
```

**submitted\_revisions**

This manager is used to retrieve all of the PageRevision objects that are awaiting moderator approval

Example:

```
PageRevision.submitted_revisions.all()
```

## Methods and properties

**class** wagtail.core.models.PageRevision

**as\_page\_object()**

This method retrieves this revision as an instance of its *Page* subclass.

**approve\_moderation()**

Calling this on a revision that's in moderation will mark it as approved and publish it

**reject\_moderation()**

Calling this on a revision that's in moderation will mark it as rejected

**is\_latest\_revision()**

Returns True if this revision is its page's latest revision

**publish()**

Calling this will copy the content of this revision into the live page object. If the page is in draft, it will be published.



## GroupPagePermission

### Database fields

```
class wagtail.core.models.GroupPagePermission

    group
        (foreign key to django.contrib.auth.models.Group)

    page
        (foreign key to Page)

    permission_type
        (choice list)
```

## PageViewRestriction

### Database fields

```
class wagtail.core.models.PageViewRestriction

    page
        (foreign key to Page)

    password
        (text)
```

## Orderable (abstract)

### Database fields

```
class wagtail.core.models.Orderable

    sort_order
        (number)
```

## Page QuerySet reference

All models that inherit from *Page* are given some extra QuerySet methods accessible from their `.objects` attribute.

## Examples

- Selecting only live pages

```
live_pages = Page.objects.live()
```

- Selecting published EventPages that are descendants of `events_index`

```
events = EventPage.objects.live().descendant_of(events_index)
```

- Getting a list of menu items

```
# This gets a QuerySet of live children of the homepage with ``show_in_
↪ menus`` set
menu_items = homepage.get_children().live().in_menu()
```

## Reference

**class** wagtail.core.query.**PageQuerySet** (*model=None, query=None, using=None, hints=None*)

### **live()**

This filters the QuerySet to only contain published pages.

Example:

```
published_pages = Page.objects.live()
```

### **not\_live()**

This filters the QuerySet to only contain unpublished pages.

Example:

```
unpublished_pages = Page.objects.not_live()
```

### **in\_menu()**

This filters the QuerySet to only contain pages that are in the menus.

Example:

```
# Build a menu from live pages that are children of the homepage
menu_items = homepage.get_children().live().in_menu()
```

---

**Note:** To put your page in menus, set the `show_in_menus` flag to `true`:

```
# Add 'my_page' to the menu
my_page.show_in_menus = True
```

---

### **not\_in\_menu()**

This filters the QuerySet to only contain pages that are not in the menus.

### **in\_site(site)**

This filters the QuerySet to only contain pages within the specified site.

Example:

```
# Get all the EventPages in the current site
site_events = EventPage.objects.in_site(request.site)
```

### **page(other)**

This filters the QuerySet so it only contains the specified page.

Example:

```
# Append an extra page to a QuerySet
new_queryset = old_queryset | Page.objects.page(page_to_add)
```

**not\_page** (*other*)

This filters the QuerySet so it doesn't contain the specified page.

Example:

```
# Remove a page from a QuerySet
new_queryset = old_queryset & Page.objects.not_page(page_to_remove)
```

**descendant\_of** (*other*, *inclusive=False*)

This filters the QuerySet to only contain pages that descend from the specified page.

If inclusive is set to True, it will also contain the page itself (instead of just its descendants).

Example:

```
# Get EventPages that are under the special_events Page
special_events = EventPage.objects.descendant_of(special_events_index)

# Alternative way
special_events = special_events_index.get_descendants()
```

**not\_descendant\_of** (*other*, *inclusive=False*)

This filters the QuerySet to not contain any pages that descend from the specified page.

If inclusive is set to True, it will also exclude the specified page.

Example:

```
# Get EventPages that are not under the archived_events Page
non_archived_events = EventPage.objects.not_descendant_of(archived_events_
↳ index)
```

**child\_of** (*other*)

This filters the QuerySet to only contain pages that are direct children of the specified page.

Example:

```
# Get a list of sections
sections = Page.objects.child_of(homepage)

# Alternative way
sections = homepage.get_children()
```

**not\_child\_of** (*other*)

This filters the QuerySet to not contain any pages that are direct children of the specified page.

**ancestor\_of** (*other*, *inclusive=False*)

This filters the QuerySet to only contain pages that are ancestors of the specified page.

If inclusive is set to True, it will also include the specified page.

Example:

```
# Get the current section
current_section = Page.objects.ancestor_of(current_page).child_of(homepage).
↳ first()
```

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```
# Alternative way
current_section = current_page.get_ancestors().child_of(homepage).first()
```

**not\_ancestor\_of** (*other*, *inclusive=False*)

This filters the QuerySet to not contain any pages that are ancestors of the specified page.

If inclusive is set to True, it will also exclude the specified page.

Example:

```
# Get the other sections
other_sections = Page.objects.not_ancestor_of(current_page).child_of(homepage)
```

**parent\_of** (*other*)

This filters the QuerySet to only contain the parent of the specified page.

**not\_parent\_of** (*other*)

This filters the QuerySet to exclude the parent of the specified page.

**sibling\_of** (*other*, *inclusive=True*)

This filters the QuerySet to only contain pages that are siblings of the specified page.

By default, inclusive is set to True so it will include the specified page in the results.

If inclusive is set to False, the page will be excluded from the results.

Example:

```
# Get list of siblings
siblings = Page.objects.sibling_of(current_page)

# Alternative way
siblings = current_page.get_siblings()
```

**not\_sibling\_of** (*other*, *inclusive=True*)

This filters the QuerySet to not contain any pages that are siblings of the specified page.

By default, inclusive is set to True so it will include the specified page from the results.

If inclusive is set to False, the page will be included in the results.

**public** ()

This filters the QuerySet to only contain pages that are not in a private section

See: [Private pages](#)

---

**Note:** This doesn't filter out unpublished pages. If you want to only have published public pages, use `.live().public()`

---

Example:

```
# Find all the pages that are viewable by the public
all_pages = Page.objects.live().public()
```

**not\_public** ()

This filters the QuerySet to only contain pages that are in a private section

**search** (*query*, *fields=None*, *operator=None*, *order\_by\_relevance=True*, *partial\_match=True*, *backend='default'*)

This runs a search query on all the items in the QuerySet

See: [Searching QuerySets](#)

Example:

```
# Search future events
results = EventPage.objects.live().filter(date__gt=datetime.now()).search(
    ↪ "Hello")
```

**type** (*model*)

This filters the QuerySet to only contain pages that are an instance of the specified model (including subclasses).

Example:

```
# Find all pages that are of type AbstractEmailForm, or a descendant of it
form_pages = Page.objects.type(AbstractEmailForm)
```

**not\_type** (*model*)

This filters the QuerySet to not contain any pages which are an instance of the specified model.

**exact\_type** (*model*)

This filters the QuerySet to only contain pages that are an instance of the specified model (matching the model exactly, not subclasses).

Example:

```
# Find all pages that are of the exact type EventPage
event_pages = Page.objects.exact_type(EventPage)
```

**not\_exact\_type** (*model*)

This filters the QuerySet to not contain any pages which are an instance of the specified model (matching the model exactly, not subclasses).

Example:

```
# Find all pages that are not of the exact type EventPage (but may be a_
↪ subclass)
non_event_pages = Page.objects.not_exact_type(EventPage)
```

**unpublish** ()

This unpublishes all live pages in the QuerySet.

Example:

```
# Unpublish current_page and all of its children
Page.objects.descendant_of(current_page, inclusive=True).unpublish()
```

**specific** (*defer=False*)

This efficiently gets all the specific pages for the queryset, using the minimum number of queries.

When the “defer” keyword argument is set to True, only the basic page fields will be loaded and all specific fields will be deferred. It will still generate a query for each page type though (this may be improved to generate only a single query in a future release).

Example:

```
# Get the specific instance of all children of the homepage,
# in a minimum number of database queries.
homepage.get_children().specific()
```

See also: `Page.specific`

**first\_common\_ancestor** (*include\_self=False, strict=False*)

Find the first ancestor that all pages in this queryset have in common. For example, consider a page hierarchy like:

```
- Home/
  - Foo Event Index/
    - Foo Event Page 1/
    - Foo Event Page 2/
  - Bar Event Index/
    - Bar Event Page 1/
    - Bar Event Page 2/
```

The common ancestors for some queries would be:

```
>>> Page.objects\
...     .type(EventPage)\
...     .first_common_ancestor()
<Page: Home>
>>> Page.objects\
...     .type(EventPage)\
...     .filter(title__contains='Foo')\
...     .first_common_ancestor()
<Page: Foo Event Index>
```

This method tries to be efficient, but if you have millions of pages scattered across your page tree, it will be slow.

If *include\_self* is True, the ancestor can be one of the pages in the queryset:

```
>>> Page.objects\
...     .filter(title__contains='Foo')\
...     .first_common_ancestor()
<Page: Foo Event Index>
>>> Page.objects\
...     .filter(title__exact='Bar Event Index')\
...     .first_common_ancestor()
<Page: Bar Event Index>
```

A few invalid cases exist: when the queryset is empty, when the root Page is in the queryset and *include\_self* is False, and when there are multiple page trees with no common root (a case Wagtail does not support). If *strict* is False (the default), then the first root node is returned in these cases. If *strict* is True, then a `ObjectDoesNotExist` is raised.

## 1.4.2 Contrib modules

Wagtail ships with a variety of extra optional modules.

## Site settings

You can define settings for your site that are editable by administrators in the Wagtail admin. These settings can be accessed in code, as well as in templates.

To use these settings, you must add `wagtail.contrib.settings` to your `INSTALLED_APPS`:

```
INSTALLED_APPS += [
    'wagtail.contrib.settings',
]
```

## Defining settings

Create a model that inherits from `BaseSetting`, and register it using the `register_setting` decorator:

```
from django.db import models
from wagtail.contrib.settings.models import BaseSetting, register_setting

@register_setting
class SocialMediaSettings(BaseSetting):
    facebook = models.URLField(
        help_text='Your Facebook page URL')
    instagram = models.CharField(
        max_length=255, help_text='Your Instagram username, without the @')
    trip_advisor = models.URLField(
        help_text='Your Trip Advisor page URL')
    youtube = models.URLField(
        help_text='Your YouTube channel or user account URL')
```

A ‘Social media settings’ link will appear in the Wagtail admin ‘Settings’ menu.

## Edit handlers

Settings use edit handlers much like the rest of Wagtail. Add a `panels` setting to your model defining all the edit handlers required:

```
@register_setting
class ImportantPages(BaseSetting):
    donate_page = models.ForeignKey(
        'wagtailcore.Page', null=True, on_delete=models.SET_NULL, related_name='+')
    sign_up_page = models.ForeignKey(
        'wagtailcore.Page', null=True, on_delete=models.SET_NULL, related_name='+')

    panels = [
        PageChooserPanel('donate_page'),
        PageChooserPanel('sign_up_page'),
    ]
```

You can also customize the editor handlers *like you would do for Page model* with a custom `edit_handler` attribute:

```
from wagtail.admin.edit_handlers import TabbedInterface, ObjectList

@register_setting
class MySettings(BaseSetting):
    # ...
```

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```
first_tab_panels = [
    FieldPanel('field_1'),
]
second_tab_panels = [
    FieldPanel('field_2'),
]

edit_handler = TabbedInterface([
    ObjectList(first_tab_panels, heading='First tab'),
    ObjectList(second_tab_panels, heading='Second tab'),
])
```

## Appearance

You can change the label used in the menu by changing the `verbose_name` of your model.

You can add an icon to the menu by passing an ‘icon’ argument to the `register_setting` decorator:

```
@register_setting(icon='placeholder')
class SocialMediaSettings(BaseSetting):
    class Meta:
        verbose_name = 'social media accounts'
    ...
```

For a list of all available icons, please see the [UI Styleguide](#).

## Using the settings

Settings are designed to be used both in Python code, and in templates.

### Using in Python

If access to a setting is required in the code, the `for_site()` method will retrieve the setting for the supplied site:

```
def view(request):
    social_media_settings = SocialMediaSettings.for_site(request.site)
    ...
```

### Using in Django templates

Add the settings context processor to your settings:

```
TEMPLATES = [
    {
        ...

        'OPTIONS': {
            'context_processors': [
                ...
```

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```

        'wagtail.contrib.settings.context_processors.settings',
    ]
}
}
]

```

Then access the settings through `{{ settings }}`:

```
{{ settings.app_label.SocialMediaSettings.instagram }}
```

**Note:** Replace `app_label` with the label of the app containing your settings model.

If you are not in a `RequestContext`, then context processors will not have run, and the `settings` variable will not be available. To get the settings, use the provided `{% get_settings %}` template tag. If a request is in the template context, but for some reason it is not a `RequestContext`, just use `{% get_settings %}`:

```

{% load wagtailsettings_tags %}
{% get_settings %}
{{ settings.app_label.SocialMediaSettings.instagram }}

```

If there is no request available in the template at all, you can use the settings for the default Wagtail site instead:

```

{% load wagtailsettings_tags %}
{% get_settings use_default_site=True %}
{{ settings.app_label.SocialMediaSettings.instagram }}

```

**Note:** You can not reliably get the correct settings instance for the current site from this template tag if the request object is not available. This is only relevant for multisite instances of Wagtail.

## Using in Jinja2 templates

Add `wagtail.contrib.settings.jinja2tags.settings` extension to your Jinja2 settings:

```

TEMPLATES = [
    # ...
    {
        'BACKEND': 'django.template.backends.jinja2.Jinja2',
        'APP_DIRS': True,
        'OPTIONS': {
            'extensions': [
                # ...
                'wagtail.contrib.settings.jinja2tags.settings',
            ],
        },
    },
]

```

Then access the settings through the `settings()` template function:

```
{{ settings("app_label.SocialMediaSettings").twitter }}
```

---

**Note:** Replace `app_label` with the label of the app containing your settings model.

---

This will look for a `request` variable in the template context, and find the correct site to use from that. If for some reason you do not have a `request` available, you can instead use the settings defined for the default site:

```
{{ settings("app_label.SocialMediaSettings", use_default_site=True).instagram }}
```

You can store the settings instance in a variable to save some typing, if you have to use multiple values from one model:

```
{% with social_settings=settings("app_label.SocialMediaSettings") %}
    Follow us on Twitter at @{{ social_settings.twitter }},
    or Instagram at @{{ social_settings.instagram }}.
{% endwith %}
```

Or, alternately, using the `set` tag:

```
{% set social_settings=settings("app_label.SocialMediaSettings") %}
```

## Form builder

The `wagtailforms` module allows you to set up single-page forms, such as a ‘Contact us’ form, as pages of a Wagtail site. It provides a set of base models that site implementers can extend to create their own `FormPage` type with their own site-specific templates. Once a page type has been set up in this way, editors can build forms within the usual page editor, consisting of any number of fields. Form submissions are stored for later retrieval through a new ‘Forms’ section within the Wagtail admin interface; in addition, they can be optionally e-mailed to an address specified by the editor.

---

**Note:** `wagtailforms` is not a replacement for Django’s form support. It is designed as a way for page authors to build general-purpose data collection forms without having to write code. If you intend to build a form that assigns specific behaviour to individual fields (such as creating user accounts), or needs a custom HTML layout, you will almost certainly be better served by a standard Django form, where the fields are fixed in code rather than defined on-the-fly by a page author. See the [wagtail-form-example](#) project for an example of integrating a Django form into a Wagtail page.

---

## Usage

Add `wagtail.contrib.forms` to your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...
    'wagtail.contrib.forms',
]
```

Within the `models.py` of one of your apps, create a model that extends `wagtail.contrib.forms.models.AbstractEmailForm`:

```
from modelcluster.fields import ParentalKey
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
```

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```

    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='form_fields
    ↪')

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname="full"),
        InlinePanel('form_fields', label="Form fields"),
        FieldPanel('thank_you_text', classname="full"),
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('from_address', classname="col6"),
                FieldPanel('to_address', classname="col6"),
            ]),
            FieldPanel('subject'),
        ], "Email"),
    ]

```

`AbstractEmailForm` defines the fields `to_address`, `from_address` and `subject`, and expects `form_fields` to be defined. Any additional fields are treated as ordinary page content - note that `FormPage` is responsible for serving both the form page itself and the landing page after submission, so the model definition should include all necessary content fields for both of those views.

If you do not want your form page type to offer form-to-email functionality, you can inherit from `AbstractForm` instead of `AbstractEmailForm`, and omit the `to_address`, `from_address` and `subject` fields from the `content_panels` definition.

You now need to create two templates named `form_page.html` and `form_page_landing.html` (where `form_page` is the underscore-formatted version of the class name). `form_page.html` differs from a standard Wagtail template in that it is passed a variable `form`, containing a Django Form object, in addition to the usual page variable. A very basic template for the form would thus be:

```

{% load wagtailcore_tags %}
<html>
  <head>
    <title>{{ page.title }}</title>
  </head>
  <body>
    <h1>{{ page.title }}</h1>
    {{ page.intro|richtext }}
    <form action="{% pageurl page %}" method="POST">
      {% csrf_token %}
      {{ form.as_p }}
      <input type="submit">
    </form>
  </body>
</html>

```

`form_page_landing.html` is a regular Wagtail template, displayed after the user makes a successful form submission, `form_submission` will be available in this template. If you want to dynamically override the landing page template, you can do so with the `get_landing_page_template` method (in the same way that you would with `get_template`).

## Displaying form submission information

`FormSubmissionsPanel` can be added to your page's panel definitions to display the number of form submissions and the time of the most recent submission, along with a quick link to access the full submission data:

```
from wagtail.contrib.forms.edit_handlers import FormSubmissionsPanel

class FormPage(AbstractEmailForm):
    # ...

    content_panels = AbstractEmailForm.content_panels + [
        FormSubmissionsPanel(),
        FieldPanel('intro', classname="full"),
        # ...
    ]
```

## Index

### Form builder customisation

For a basic usage example see *Usage*.

### Custom `related_name` for form fields

If you want to change `related_name` for form fields (by default `AbstractForm` and `AbstractEmailForm` expect `form_fields` to be defined), you will need to override the `get_form_fields` method. You can do this as shown below.

```
from modelcluster.fields import ParentalKey
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='custom_
    ↪form_fields')

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
```

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```

    FieldPanel('intro', classname="full"),
    InlinePanel('custom_form_fields', label="Form fields"),
    FieldPanel('thank_you_text', classname="full"),
    MultiFieldPanel([
        FieldRowPanel([
            FieldPanel('from_address', classname="col6"),
            FieldPanel('to_address', classname="col6"),
        ]),
        FieldPanel('subject'),
    ], "Email"),
]

def get_form_fields(self):
    return self.custom_form_fields.all()

```

### Custom form submission model

If you need to save additional data, you can use a custom form submission model. To do this, you need to:

- Define a model that extends `wagtail.contrib.forms.models.AbstractFormSubmission`.
- Override the `get_submission_class` and `process_form_submission` methods in your page model.

Example:

```

import json

from django.conf import settings
from django.core.serializers.json import DjangoJSONEncoder
from django.db import models
from modelcluster.fields import ParentalKey
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField,
↳ AbstractFormSubmission

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='form_fields'
↳)

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname="full"),
        InlinePanel('form_fields', label="Form fields"),
        FieldPanel('thank_you_text', classname="full"),
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('from_address', classname="col6"),

```

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```

        FieldPanel('to_address', classname="col6"),
    ]),
    FieldPanel('subject'),
], "Email"),
]

def get_submission_class(self):
    return CustomFormSubmission

def process_form_submission(self, form):
    self.get_submission_class().objects.create(
        form_data=json.dumps(form.cleaned_data, cls=DjangoJSONEncoder),
        page=self, user=form.user
    )

class CustomFormSubmission(AbstractFormSubmission):
    user = models.ForeignKey(settings.AUTH_USER_MODEL, on_delete=models.CASCADE)

```

## Add custom data to CSV export

If you want to add custom data to the CSV export, you will need to:

- Override the `get_data_fields` method in page model.
- Override `get_data` in the submission model.

The following example shows how to add a username to the CSV export:

```

import json

from django.conf import settings
from django.core.serializers.json import DjangoJSONEncoder
from django.db import models
from modelcluster.fields import ParentalKey
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField,
↳ AbstractFormSubmission

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='form_fields'
↳)

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname="full"),
        InlinePanel('form_fields', label="Form fields"),

```

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```

        FieldPanel('thank_you_text', classname="full"),
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('from_address', classname="col6"),
                FieldPanel('to_address', classname="col6"),
            ]),
            FieldPanel('subject'),
        ], "Email"),
    ]

    def get_data_fields(self):
        data_fields = [
            ('username', 'Username'),
        ]
        data_fields += super().get_data_fields()

        return data_fields

    def get_submission_class(self):
        return CustomFormSubmission

    def process_form_submission(self, form):
        self.get_submission_class().objects.create(
            form_data=json.dumps(form.cleaned_data, cls=DjangoJSONEncoder),
            page=self, user=form.user
        )

class CustomFormSubmission(AbstractFormSubmission):
    user = models.ForeignKey(settings.AUTH_USER_MODEL, on_delete=models.CASCADE)

    def get_data(self):
        form_data = super().get_data()
        form_data.update({
            'username': self.user.username,
        })

        return form_data

```

Note that this code also changes the submissions list view.

### Check that a submission already exists for a user

If you want to prevent users from filling in a form more than once, you need to override the `serve` method in your page model.

Example:

```

import json

from django.conf import settings
from django.core.serializers.json import DjangoJSONEncoder
from django.db import models
from django.shortcuts import render
from modelcluster.fields import ParentalKey

```

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```

from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField,
↳ AbstractFormSubmission

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='form_fields'
↳)

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname="full"),
        InlinePanel('form_fields', label="Form fields"),
        FieldPanel('thank_you_text', classname="full"),
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('from_address', classname="col6"),
                FieldPanel('to_address', classname="col6"),
            ]),
            FieldPanel('subject'),
        ], "Email"),
    ]

    def serve(self, request, *args, **kwargs):
        if self.get_submission_class().objects.filter(page=self, user__pk=request.
↳user.pk).exists():
            return render(
                request,
                self.template,
                self.get_context(request)
            )

        return super().serve(request, *args, **kwargs)

    def get_submission_class(self):
        return CustomFormSubmission

    def process_form_submission(self, form):
        self.get_submission_class().objects.create(
            form_data=json.dumps(form.cleaned_data, cls=DjangoJSONEncoder),
            page=self, user=form.user
        )

class CustomFormSubmission(AbstractFormSubmission):
    user = models.ForeignKey(settings.AUTH_USER_MODEL, on_delete=models.CASCADE)

    class Meta:
        unique_together = ('page', 'user')

```



Your template should look like this:

```
{% load wagtailcore_tags %}
<html>
  <head>
    <title>{{ page.title }}</title>
  </head>
  <body>
    <h1>{{ page.title }}</h1>

    {% if user.is_authenticated and user.is_active or request.is_preview %}
      {% if form %}
        <div>{{ page.intro|richtext }}</div>
        <form action="{% pageurl page %}" method="POST">
          {% csrf_token %}
          {{ form.as_p }}
          <input type="submit">
        </form>
      {% else %}
        <div>You can fill in the form only one time.</div>
      {% endif %}
    {% else %}
      <div>To fill in the form, you must to log in.</div>
    {% endif %}
  </body>
</html>
```

## Multi-step form

The following example shows how to create a multi-step form.

```
from django.core.paginator import Paginator, PageNotAnInteger, EmptyPage
from django.shortcuts import render
from modelcluster.fields import ParentalKey
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='form_fields
→')

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname="full"),
        InlinePanel('form_fields', label="Form fields"),
        FieldPanel('thank_you_text', classname="full"),
        MultiFieldPanel([
```

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```

        FieldRowPanel([
            FieldPanel('from_address', classname="col6"),
            FieldPanel('to_address', classname="col6"),
        ]),
        FieldPanel('subject'),
    ], "Email"),
]

def get_form_class_for_step(self, step):
    return self.form_builder(step.object_list).get_form_class()

def serve(self, request, *args, **kwargs):
    """
    Implements a simple multi-step form.

    Stores each step into a session.
    When the last step was submitted correctly, saves whole form into a DB.
    """

    session_key_data = 'form_data-%s' % self.pk
    is_last_step = False
    step_number = request.GET.get('p', 1)

    paginator = Paginator(self.get_form_fields(), per_page=1)
    try:
        step = paginator.page(step_number)
    except PageNotAnInteger:
        step = paginator.page(1)
    except EmptyPage:
        step = paginator.page(paginator.num_pages)
        is_last_step = True

    if request.method == 'POST':
        # The first step will be submitted with step_number == 2,
        # so we need to get a form from previous step
        # Edge case - submission of the last step
        prev_step = step if is_last_step else paginator.page(step.previous_page_
↪number())

        # Create a form only for submitted step
        prev_form_class = self.get_form_class_for_step(prev_step)
        prev_form = prev_form_class(request.POST, page=self, user=request.user)
        if prev_form.is_valid():
            # If data for step is valid, update the session
            form_data = request.session.get(session_key_data, {})
            form_data.update(prev_form.cleaned_data)
            request.session[session_key_data] = form_data

        if prev_step.has_next():
            # Create a new form for a following step, if the following step_
↪is present

            form_class = self.get_form_class_for_step(step)
            form = form_class(page=self, user=request.user)
        else:
            # If there is no next step, create form for all fields
            form = self.get_form(
                request.session[session_key_data],

```

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```

        page=self, user=request.user
    )

    if form.is_valid():
        # Perform validation again for whole form.
        # After successful validation, save data into DB,
        # and remove from the session.
        form_submission = self.process_form_submission(form)
        del request.session[session_key_data]
        # render the landing page
        return self.render_landing_page(request, form_submission, _
→*args, **kwargs)
    else:
        # If data for step is invalid
        # we will need to display form again with errors,
        # so restore previous state.
        form = prev_form
        step = prev_step

    else:
        # Create empty form for non-POST requests
        form_class = self.get_form_class_for_step(step)
        form = form_class(page=self, user=request.user)

    context = self.get_context(request)
    context['form'] = form
    context['fields_step'] = step
    return render(
        request,
        self.template,
        context
    )

```

Your template for this form page should look like this:

```

{% load wagtailcore_tags %}
<html>
  <head>
    <title>{{ page.title }}</title>
  </head>
  <body>
    <h1>{{ page.title }}</h1>

    <div>{{ page.intro|richtext }}</div>
    <form action="{% pageurl page %}?p={{ fields_step.number|add:"1" }}" method=
→"POST">
      {% csrf_token %}
      {{ form.as_p }}
      <input type="submit">
    </form>
  </body>
</html>

```

Note that the example shown before allows the user to return to a previous step, or to open a second step without submitting the first step. Depending on your requirements, you may need to add extra checks.

## Show results

If you are implementing polls or surveys, you may want to show results after submission. The following example demonstrates how to do this.

First, you need to collect results as shown below:

```
from modelcluster.fields import ParentalKey
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel,
    InlinePanel, MultiFieldPanel
)
from wagtail.core.fields import RichTextField
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', on_delete=models.CASCADE, related_name='form_fields
    ↪')

class FormPage(AbstractEmailForm):
    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname="full"),
        InlinePanel('form_fields', label="Form fields"),
        FieldPanel('thank_you_text', classname="full"),
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('from_address', classname="col6"),
                FieldPanel('to_address', classname="col6"),
            ]),
            FieldPanel('subject'),
        ], "Email"),
    ]

    def get_context(self, request, *args, **kwargs):
        context = super().get_context(request, *args, **kwargs)

        # If you need to show results only on landing page,
        # you may need check request.method

        results = dict()
        # Get information about form fields
        data_fields = [
            (field.clean_name, field.label)
            for field in self.get_form_fields()
        ]

        # Get all submissions for current page
        submissions = self.get_submission_class().objects.filter(page=self)
        for submission in submissions:
            data = submission.get_data()

            # Count results for each question
            for name, label in data_fields:
```

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```

        answer = data.get(name)
        if answer is None:
            # Something wrong with data.
            # Probably you have changed questions
            # and now we are receiving answers for old questions.
            # Just skip them.
            continue

        if type(answer) is list:
            # Answer is a list if the field type is 'Checkboxes'
            answer = u', '.join(answer)

        question_stats = results.get(label, {})
        question_stats[answer] = question_stats.get(answer, 0) + 1
        results[label] = question_stats

    context.update({
        'results': results,
    })
    return context

```

Next, you need to transform your template to display the results:

```

{% load wagtailcore_tags %}
<html>
  <head>
    <title>{{ page.title }}</title>
  </head>
  <body>
    <h1>{{ page.title }}</h1>

    <h2>Results</h2>
    {% for question, answers in results.items %}
      <h3>{{ question }}</h3>
      {% for answer, count in answers.items %}
        <div>{{ answer }}: {{ count }}</div>
      {% endfor %}
    {% endfor %}

    <div>{{ page.intro|richtext }}</div>
    <form action="{% pageurl page %}" method="POST">
      {% csrf_token %}
      {{ form.as_p }}
      <input type="submit">
    </form>
  </body>
</html>

```

You can also show the results on the landing page.

## Custom landing page redirect

You can override the `render_landing_page` method on your *FormPage* to change what is rendered when a form submits.

In this example below we have added a *thank\_you\_page* field that enables custom redirects after a form submits to the

selected page.

When overriding the `render_landing_page` method, we check if there is a linked `thank_you_page` and then redirect to it if it exists.

Finally, we add a URL param of `id` based on the `form_submission` if it exists.

```
from django.shortcuts import redirect
from wagtail.admin.edit_handlers import (
    FieldPanel, FieldRowPanel, InlinePanel, MultiFieldPanel, PageChooserPanel)
from wagtail.contrib.forms.models import AbstractEmailForm

class FormPage(AbstractEmailForm):

    # intro, thank_you_text, ...

    thank_you_page = models.ForeignKey(
        'wagtailcore.Page',
        null=True,
        blank=True,
        on_delete=models.SET_NULL,
        related_name='+',
    )

    def render_landing_page(self, request, form_submission=None, *args, **kwargs):
        if self.thank_you_page:
            url = self.thank_you_page.url
            # if a form_submission instance is available, append the id to URL
            # when previewing landing page, there will not be a form_submission_
            ↪instance
            if form_submission:
                url += '?id=%s' % form_submission.id
            return redirect(url, permanent=False)
        # if no thank_you_page is set, render default landing page
        return super().render_landing_page(request, form_submission, *args, **kwargs)

    content_panels = AbstractEmailForm.content_panels + [
        FieldPanel('intro', classname='full'),
        InlinePanel('form_fields'),
        FieldPanel('thank_you_text', classname='full'),
        PageChooserPanel('thank_you_page'),
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('from_address', classname='col6'),
                FieldPanel('to_address', classname='col6'),
            ]),
            FieldPanel('subject'),
        ], 'Email'),
    ]
```

## Customise form submissions listing in Wagtail Admin

The Admin listing of form submissions can be customised by setting the attribute `submissions_list_view_class` on your `FormPage` model.

The list view class must be a subclass of `SubmissionsListView` from `wagtail.contrib.forms.views`, which is a child class of Django's class based `ListView`.

Example:

```
from wagtail.contrib.forms.models import AbstractEmailForm, AbstractFormField
from wagtail.contrib.forms.views import SubmissionsListView

class CustomSubmissionsListView(SubmissionsListView):
    paginate_by = 50 # show more submissions per page, default is 20
    ordering = ('submit_time',) # order submissions by oldest first, normally newest_
    ↪first
    ordering_csv = ('-submit_time',) # order csv export by newest first, normally_
    ↪oldest first

    # override the method to generate csv filename
    def get_csv_filename(self):
        """ Returns the filename for CSV file with page slug at start """
        filename = super().get_csv_filename()
        return self.form_page.slug + '-' + filename

class FormField(AbstractFormField):
    page = ParentalKey('FormPage', related_name='form_fields')

class FormPage(AbstractEmailForm):
    """Form Page with customised submissions listing view"""

    # set custom view class as class attribute
    submissions_list_view_class = CustomSubmissionsListView

    intro = RichTextField(blank=True)
    thank_you_text = RichTextField(blank=True)

    # content_panels = ...
```

## Adding a custom field type

First, make the new field type available in the page editor by changing your FormField model.

- Create a new set of choices which includes the original `FORM_FIELD_CHOICES` along with new field types you want to make available.
- Each choice must contain a unique key and a human readable name of the field, e.g. `('slug', 'URL Slug')`
- Override the `field_type` field in your FormField model with choices attribute using these choices.
- You will need to run `./manage.py makemigrations` and `./manage.py migrate` after this step.

Then, create and use a new form builder class.

- Define a new form builder class that extends the FormBuilder class.
- Add a method that will return a created Django form field for the new field type.
- Its name must be in the format: `create_<field_type_key>_field`, e.g. `create_slug_field`
- Override the `form_builder` attribute in your form page model to use your new form builder class.

Example:

```
from django import forms
from django.db import models
from modelcluster.fields import ParentalKey
from wagtail.contrib.forms.forms import FormBuilder
from wagtail.contrib.forms.models import (
    AbstractEmailForm, AbstractFormField, FORM_FIELD_CHOICES)

class FormField(AbstractFormField):
    # extend the built in field type choices
    # our field type key will be 'ipaddress'
    CHOICES = FORM_FIELD_CHOICES + (('ipaddress', 'IP Address'),)

    page = ParentalKey('FormPage', related_name='form_fields')
    # override the field_type field with extended choices
    field_type = models.CharField(
        verbose_name='field type',
        max_length=16,
        # use the choices tuple defined above
        choices=CHOICES
    )

class CustomFormBuilder(FormBuilder):
    # create a function that returns an instanced Django form field
    # function name must match create_<field_type_key>_field
    def create_ipaddress_field(self, field, options):
        # return `forms.GenericIPAddressField(**options)` not `forms.SlugField`
        # returns created a form field with the options passed in
        return forms.GenericIPAddressField(**options)

class FormPage(AbstractEmailForm):
    # intro, thank_you_text, edit_handlers, etc...

    # use custom form builder defined above
    form_builder = CustomFormBuilder
```

## Custom send\_mail method

If you want to change the content of the email that is sent when a form submits you can override the `send_mail` method.

To do this, you need to:

- Ensure you have your form model defined that extends `wagtail.contrib.forms.models.AbstractEmailForm`.
- In your `models.py` file, import the `wagtail.admin.mail.send_mail` function.
- Override the `send_mail` method in your page model.

Example:

```
from datetime import date
# ... additional wagtail imports
from wagtail.admin.mail import send_mail
```

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```

from wagtail.contrib.forms.models import AbstractEmailForm

class FormPage(AbstractEmailForm):
    # ... fields, content_panels, etc

    def send_mail(self, form):
        # `self` is the FormPage, `form` is the form's POST data on submit

        # Email addresses are parsed from the FormPage's addresses field
        addresses = [x.strip() for x in self.to_address.split(',')]

        # Subject can be adjusted, be sure to include the form's defined subject field
        submitted_date_str = date.today().strftime('%x')
        subject = self.subject + " - " + submitted_date_str # add date to email_
        subject

        content = []

        # Add a title (not part of original method)
        content.append('{}: {}'.format('Form', self.title))

        for field in form:
            # add the value of each field as a new line
            value = field.value()
            if isinstance(value, list):
                value = ', '.join(value)
            content.append('{}: {}'.format(field.label, value))

        # Add a link to the form page
        content.append('{}: {}'.format('Submitted Via', self.full_url))

        # Add the date the form was submitted
        content.append('{}: {}'.format('Submitted on', submitted_date_str))

        # Content is joined with a new line to separate each text line
        content = '\n'.join(content)

        # wagtail.admin.mail - send_mail function is called
        # This function extends the Django default send_mail function
        send_mail(subject, content, addresses, self.from_address)

```

## Sitemap generator

This document describes how to create XML sitemaps for your Wagtail website using the `wagtail.contrib.sitemaps` module.

**Note:** As of Wagtail 1.10 the Django contrib sitemap app is used to generate sitemaps. However since Wagtail requires the Site instance to be available during the sitemap generation you will have to use the views from the `wagtail.contrib.sitemaps.views` module instead of the views provided by Django (`django.contrib.sitemaps.views`).

The usage of these views is otherwise identical, which means that customisation and caching of the sitemaps are done using the default Django patterns. See the Django documentation for in-depth information.

### Basic configuration

You firstly need to add `"django.contrib.sitemaps"` to `INSTALLED_APPS` in your Django settings file:

```
INSTALLED_APPS = [  
    ...  
    "django.contrib.sitemaps",  
]
```

Then, in `urls.py`, you need to add a link to the `wagtail.contrib.sitemaps.views.sitemap` view which generates the sitemap:

```
from wagtail.contrib.sitemaps.views import sitemap  
  
urlpatterns = [  
    ...  
    url('^sitemap\.xml$', sitemap),  
    ...  
    # Ensure that the 'sitemap' line appears above the default Wagtail page serving_  
↪ route  
    url(r'', include(wagtail_urls)),  
]
```

You should now be able to browse to `/sitemap.xml` and see the sitemap working. By default, all published pages in your website will be added to the site map.

### Setting the hostname

By default, the sitemap uses the hostname defined in the Wagtail Admin's Sites area. If your default site is called `localhost`, then URLs in the sitemap will look like:

```
<url>  
  <loc>http://localhost/about/</loc>  
  <lastmod>2015-09-26</lastmod>  
</url>
```

For tools like Google Search Tools to properly index your site, you need to set a valid, crawlable hostname. If you change the site's hostname from `localhost` to `mysite.com`, `sitemap.xml` will contain the correct URLs:

```
<url>  
  <loc>http://mysite.com/about/</loc>  
  <lastmod>2015-09-26</lastmod>  
</url>
```

Find out more about *working with Sites*.

### Customising

## URLs

The `Page` class defines a `get_sitemap_urls` method which you can override to customise sitemaps per `Page` instance. This method must accept a request object and return a list of dictionaries, one dictionary per URL entry in the sitemap. You can exclude pages from the sitemap by returning an empty list.

Each dictionary can contain the following:

- **location** (required) - This is the full URL path to add into the sitemap.
- **lastmod** - A python date or datetime set to when the page was last modified.
- **changefreq**
- **priority**

You can add more but you will need to override the `sitemap.xml` template in order for them to be displayed in the sitemap.

## Serving multiple sitemaps

If you want to support the sitemap indexes from Django then you will need to use the index view from `wagtail.contrib.sitemaps.views` instead of the index view from `django.contrib.sitemaps.views`. Please see the Django documentation for further details.

## Frontend cache invalidator

Many websites use a frontend cache such as Varnish, Squid, Cloudflare or CloudFront to gain extra performance. The downside of using a frontend cache though is that they don't respond well to updating content and will often keep an old version of a page cached after it has been updated.

This document describes how to configure Wagtail to purge old versions of pages from a frontend cache whenever a page gets updated.

## Setting it up

Firstly, add `"wagtail.contrib.frontend_cache"` to your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...

    "wagtail.contrib.frontend_cache"
]
```

The `wagtailfrontendcache` module provides a set of signal handlers which will automatically purge the cache whenever a page is published or deleted. These signal handlers are automatically registered when the `wagtail.contrib.frontend_cache` app is loaded.

## Varnish/Squid

Add a new item into the `WAGTAILFRONTENDCACHE` setting and set the `BACKEND` parameter to `wagtail.contrib.frontend_cache.backends.HTTPBackend`. This backend requires an extra parameter `LOCATION` which points to where the cache is running (this must be a direct connection to the server and cannot go through another proxy).

```
# settings.py

WAGTAILFRONTENDCACHE = {
    'varnish': {
        'BACKEND': 'wagtail.contrib.frontend_cache.backends.HTTPBackend',
        'LOCATION': 'http://localhost:8000',
    },
}

WAGTAILFRONTENDCACHE_LANGUAGES = []
```

Set `WAGTAILFRONTENDCACHE_LANGUAGES` to a list of languages (typically equal to `[l[0] for l in settings.LANGUAGES]`) to also purge the urls for each language of a purging url. This setting needs `settings.USE_I18N` to be `True` to work. Its default is an empty list.

Finally, make sure you have configured your frontend cache to accept PURGE requests:

- [Varnish](#)
- [Squid](#)

### Cloudflare

Firstly, you need to register an account with Cloudflare if you haven't already got one. You can do this here: [Cloudflare Sign up](#)

Add an item into the `WAGTAILFRONTENDCACHE` and set the `BACKEND` parameter to `wagtail.contrib.frontend_cache.backends.CloudflareBackend`. This backend requires three extra parameters, `EMAIL` (your Cloudflare account email), `TOKEN` (your API token from Cloudflare), and `ZONEID` (for zone id for your domain, see below).

To find the `ZONEID` for your domain, read the [Cloudflare API Documentation](#)

```
# settings.py

WAGTAILFRONTENDCACHE = {
    'cloudflare': {
        'BACKEND': 'wagtail.contrib.frontend_cache.backends.CloudflareBackend',
        'EMAIL': 'your-cloudflare-email-address@example.com',
        'TOKEN': 'your cloudflare api token',
        'ZONEID': 'your cloudflare domain zone id',
    },
}
```

### Amazon CloudFront

Within Amazon Web Services you will need at least one CloudFront web distribution. If you don't have one, you can get one here: [CloudFront getting started](#)

Add an item into the `WAGTAILFRONTENDCACHE` and set the `BACKEND` parameter to `wagtail.contrib.frontend_cache.backends.CloudfrontBackend`. This backend requires one extra parameter, `DISTRIBUTION_ID` (your CloudFront generated distribution id).

```
WAGTAILFRONTENDCACHE = {
    'cloudfront': {
        'BACKEND': 'wagtail.contrib.frontend_cache.backends.CloudfrontBackend',
```

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```

        'DISTRIBUTION_ID': 'your-distribution-id',
    },
}

```

Configuration of credentials can be done in multiple ways. You won't need to store them in your Django settings file. You can read more about this here: [Boto 3 Docs](#)

In case you run multiple sites with Wagtail and each site has its CloudFront distribution, provide a mapping instead of a single distribution. Make sure the mapping matches with the hostnames provided in your site settings.

```

WAGTAILFRONTENDCACHE = {
    'cloudfront': {
        'BACKEND': 'wagtail.contrib.frontend_cache.backends.CloudfrontBackend',
        'DISTRIBUTION_ID': {
            'www.wagtail.io': 'your-distribution-id',
            'www.madewithwagtail.org': 'your-distribution-id',
        },
    },
}

```

**Note:** In most cases, absolute URLs with `www` prefixed domain names should be used in your mapping. Only drop the `www` prefix if you're absolutely sure you're not using it (e.g. a subdomain).

## Advanced usage

### Invalidating more than one URL per page

By default, Wagtail will only purge one URL per page. If your page has more than one URL to be purged, you will need to override the `get_cached_paths` method on your page type.

```

class BlogIndexPage(Page):
    def get_blog_items(self):
        # This returns a Django paginator of blog items in this section
        return Paginator(self.get_children().live().type(BlogPage), 10)

    def get_cached_paths(self):
        # Yield the main URL
        yield '/'

        # Yield one URL per page in the paginator to make sure all pages are purged
        for page_number in range(1, self.get_blog_items().num_pages + 1):
            yield '/?page=' + str(page_number)

```

### Invalidating index pages

Pages that list other pages (such as a blog index) may need to be purged as well so any changes to a blog page are also reflected on the index (for example, a blog post was added, deleted or its title/thumbnail was changed).

To purge these pages, we need to write a signal handler that listens for Wagtail's `page_published` and `page_unpublished` signals for blog pages (note, `page_published` is called both when a page is created and

updated). This signal handler would trigger the invalidation of the index page using the `PurgeBatch` class which is used to construct and dispatch invalidation requests.

```
# models.py
from django.dispatch import receiver
from django.db.models.signals import pre_delete

from wagtail.core.signals import page_published
from wagtail.contrib.frontend_cache.utils import PurgeBatch

...

def blog_page_changed(blog_page):
    # Find all the live BlogIndexPages that contain this blog_page
    batch = PurgeBatch()
    for blog_index in BlogIndexPage.objects.live():
        if blog_page in blog_index.get_blog_items().object_list:
            batch.add_page(blog_index)

    # Purge all the blog indexes we found in a single request
    batch.purge()

@receiver(page_published, sender=BlogPage)
def blog_published_handler(instance):
    blog_page_changed(instance)

@receiver(pre_delete, sender=BlogPage)
def blog_deleted_handler(instance):
    blog_page_changed(instance)
```

## Invalidating URLs

The `PurgeBatch` class provides a `.add_url(url)` and a `.add_urls(urls)` for adding individual URLs to the purge batch.

For example, this could be useful for purging a single page on a blog index:

```
from wagtail.contrib.frontend_cache.utils import PurgeBatch

# Purge the first page of the blog index
batch = PurgeBatch()
batch.add_url(blog_index.url + '?page=1')
batch.purge()
```

## The `PurgeBatch` class

All of the methods available on `PurgeBatch` are listed below:

```
class wagtail.contrib.frontend_cache.utils.PurgeBatch (urls=None)
    Represents a list of URLs to be purged in a single request

    add_url (url)
        Adds a single URL
```

**add\_urls** (*urls*)

Adds multiple URLs from an iterable

This is equivalent to running `.add_url(url)` on each URL individually

**add\_page** (*page*)

Adds all URLs for the specified page

This combines the page's full URL with each path that is returned by the page's `.get_cached_paths` method

**add\_pages** (*pages*)

Adds multiple pages from a `QuerySet` or an iterable

This is equivalent to running `.add_page(page)` on each page individually

**purge** (*backend\_settings=None, backends=None*)

Performs the purge of all the URLs in this batch

This method takes two optional keyword arguments: `backend_settings` and `backends`

- `backend_settings` can be used to override the `WAGTAILFRONTENDCACHE` setting for just this call
- `backends` can be set to a list of backend names. When set, the invalidation request will only be sent to these backends

**RoutablePageMixin**

The `RoutablePageMixin` mixin provides a convenient way for a page to respond on multiple sub-URLs with different views. For example, a blog section on a site might provide several different types of index page at URLs like `/blog/2013/06/`, `/blog/authors/bob/`, `/blog/tagged/python/`, all served by the same page instance.

A Page using `RoutablePageMixin` exists within the page tree like any other page, but URL paths underneath it are checked against a list of patterns. If none of the patterns match, control is passed to subpages as usual (or failing that, a 404 error is thrown).

By default a route for `r'^$',` exists, which serves the content exactly like a regular `Page` would. It can be overridden by using `@route(r'^$',)` on any other method of the inheriting class.

**Installation**

Add `"wagtail.contrib.routable_page"` to your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...
    "wagtail.contrib.routable_page",
]
```

**The basics**

To use `RoutablePageMixin`, you need to make your class inherit from both `wagtail.contrib.routable_page.models.RoutablePageMixin` and `wagtail.core.models.Page`, then define some view methods and decorate them with `wagtail.contrib.routable_page.models.route`.

Here's an example of an `EventPage` with three views:

```
from wagtail.core.models import Page
from wagtail.contrib.routable_page.models import RoutablePageMixin, route

class EventPage(RoutablePageMixin, Page):
    ...

    @route(r'^$',) # will override the default Page serving mechanism
    def current_events(self, request):
        """
        View function for the current events page
        """
        ...

    @route(r'^past/$')
    def past_events(self, request):
        """
        View function for the past events page
        """
        ...

    # Multiple routes!
    @route(r'^year/(\d+)/$')
    @route(r'^year/current/$')
    def events_for_year(self, request, year=None):
        """
        View function for the events for year page
        """
        ...
```

## Reversing URLs

`RoutablePageMixin` adds a `reverse_subpage()` method to your page model which you can use for reversing URLs. For example:

```
# The URL name defaults to the view method name.
>>> event_page.reverse_subpage('events_for_year', args=(2015, ))
'year/2015/'
```

This method only returns the part of the URL within the page. To get the full URL, you must append it to the values of either the `url` or the `full_url` attribute on your page:

```
>>> event_page.url + event_page.reverse_subpage('events_for_year', args=(2015, ))
'/events/year/2015/'

>>> event_page.full_url + event_page.reverse_subpage('events_for_year', args=(2015, ))
'http://example.com/events/year/2015/'
```

## Changing route names

The route name defaults to the name of the view. You can override this name with the `name` keyword argument on `@route`:



```

from wagtail.core.models import Page
from wagtail.contrib.routable_page.models import RoutablePageMixin, route

class EventPage(RoutablePageMixin, Page):
    ...

    @route(r'^year/(\d+)/$', name='year')
    def events_for_year(self, request, year):
        """
        View function for the events for year page
        """
        ...

```

```

>>> event_page.reverse_subpage('year', args=(2015, ))
'/events/year/2015/'

```

## The RoutablePageMixin class

**class** wagtail.contrib.routable\_page.models.RoutablePageMixin

This class can be mixed in to a Page model, allowing extra routes to be added to it.

**classmethod** get\_subpage\_urls()

**resolve\_subpage**(path)

This method takes a URL path and finds the view to call.

Example:

```

view, args, kwargs = page.resolve_subpage('/past/')
response = view(request, *args, **kwargs)

```

**reverse\_subpage**(name, args=None, kwargs=None)

This method takes a route name/arguments and returns a URL path.

Example:

```

url = page.url + page.reverse_subpage('events_for_year', kwargs={'year
↪ ': '2014'})

```

## The routablepageurl template tag

wagtail.contrib.routable\_page.templatetags.wagtailroutablepage\_tags.**routablepageurl**(context, page, url\_name, \*args, \*\*kwargs)

routablepageurl is similar to pageurl, but works with pages using RoutablePageMixin. It behaves like a hybrid between the built-in reverse, and pageurl from Wagtail.

page is the RoutablePage that URLs will be generated from.

url\_name is a URL name defined in page.subpage\_urls.

Positional arguments and keyword arguments should be passed as normal positional arguments and keyword arguments.

Example:

```
{% load wagtailroutablepage_tags %}

{% routablepageurl page "feed" %}
{% routablepageurl page "archive" 2014 08 14 %}
{% routablepageurl page "food" foo="bar" baz="quux" %}
```

### ModelAdmin

The `modeladmin` module allows you to add any model in your project to the Wagtail admin. You can create customisable listing pages for a model, including plain Django models, and add navigation elements so that a model can be accessed directly from the Wagtail admin. Simply extend the `ModelAdmin` class, override a few attributes to suit your needs, register it with Wagtail using an easy one-line `modeladmin_register` method (you can copy and paste from the examples below), and you're good to go. Your model doesn't need to extend `Page` or be registered as a `Snippet`, and it won't interfere with any of the existing admin functionality that Wagtail provides.

### Summary of features

- A customisable list view, allowing you to control what values are displayed for each row, available options for result filtering, default ordering, and more.
- Access your list views from the Wagtail admin menu easily with automatically generated menu items, with automatic 'active item' highlighting. Control the label text and icons used with easy-to-change attributes on your class.
- An additional `ModelAdminGroup` class, that allows you to group your related models, and list them together in their own submenu, for a more logical user experience.
- Simple, robust **add** and **edit** views for your non-`Page` models that use the panel configurations defined on your model using Wagtail's edit panels.
- For `Page` models, the system directs to Wagtail's existing add and edit views, and returns you back to the correct list page, for a seamless experience.
- Full respect for permissions assigned to your Wagtail users and groups. Users will only be able to do what you want them to!
- All you need to easily hook your `ModelAdmin` classes into Wagtail, taking care of URL registration, menu changes, and registering any missing model permissions, so that you can assign them to Groups.
- **Built to be customisable** - While `modeladmin` provides a solid experience out of the box, you can easily use your own templates, and the `ModelAdmin` class has a large number of methods that you can override or extend, allowing you to customise the behaviour to a greater degree.

### Want to know more about customising ModelAdmin?

#### modeladmin customisation primer

The `modeladmin` app is designed to offer you as much flexibility as possible in how your model and its objects are represented in Wagtail's CMS. This page aims to provide you with some background information to help you gain a better understanding of what the app can do, and to point you in the right direction, depending on the kind of customisations you're looking to make.

- *Wagtail's `ModelAdmin` class isn't the same as Django's*
- *Changing what appears in the listing*
- *Adding additional stylesheets and/or JavaScript*
- *Overriding templates*
- *Overriding views*
- *Overriding helper classes*

## Wagtail's `ModelAdmin` class isn't the same as Django's

Wagtail's `ModelAdmin` class is designed to be used in a similar way to Django's class of the same name, and it often uses the same attribute and method names to achieve similar things. However, there are a few key differences:

### Add & edit forms are still defined by `panels` and `edit_handlers`

In Wagtail, controlling which fields appear in add/edit forms for your `Model`, and defining how they are grouped and ordered, is achieved by adding a `panels` attribute, or `edit_handler` to your `Model` class. This remains the same whether your model is a `Page` type, a snippet, or just a standard Django `Model`. Because of this, Wagtail's `ModelAdmin` class is mostly concerned with 'listing' configuration. For example, `list_display`, `list_filter` and `search_fields` attributes are present and support largely the same values as Django's `ModelAdmin` class, while `fields`, `fieldsets`, `exclude` and other attributes you may be used to using to configure Django's add/edit views, simply aren't supported by Wagtail's version.

### 'Page type' models need to be treated differently from other models

While `modeladmin`'s listing view and its supported customisation options work in exactly the same way for all types of `Model`, when it comes to the other management views, the treatment differs depending on whether your `ModelAdmin` class is representing a page type model (that extends `wagtailcore.models.Page`) or not.

Pages in Wagtail have some unique properties, and require additional views, interface elements and general treatment in order to be managed effectively. For example, they have a tree structure that must be preserved properly as pages are added, deleted and moved around. They also have a revisions system, their own permission considerations, and the facility to preview changes before saving changes. Because of this added complexity, Wagtail provides its own specific views for managing any custom page types you might add to your project (whether you create a `ModelAdmin` class for them or not).

In order to deliver a consistent user experience, `modeladmin` simply redirects users to Wagtail's existing page management views wherever possible. You should bear this in mind if you ever find yourself wanting to change what happens when pages of a certain type are added, deleted, published, or have some other action applied to them. Customising the `CreateView` or `EditView` for your page type `Model` (even if just to add an additional stylesheet or JavaScript), simply won't have any effect, as those views are not used.

If you do find yourself needing to customise the add, edit or other behaviour for a page type model, you should take a look at the following part of the documentation: [Hooks](#).

### Wagtail's `ModelAdmin` class is 'modular'

Unlike Django's class of the same name, wagtailadmin's `ModelAdmin` acts primarily as a 'controller' class. While it does have a set of attributes and methods to enable you to configure how various components should treat your model, it has been deliberately designed to do as little work as possible by itself; it designates all of the real work to a set of separate, swappable components.

The theory is: If you want to do something differently, or add some functionality that `modeladmin` doesn't already have, you can create new classes (or extend the ones provided by `modeladmin`) and easily configure your `ModelAdmin` class to use them instead of the defaults.

- Learn more about [Overriding views](#)
- Learn more about [Overriding helper classes](#)

### Changing what appears in the listing

You should familiarise yourself with the attributes and methods supported by the `ModelAdmin` class, that allow you to change what is displayed in the `IndexView`. The following page should give you everything you need to get going: [Customising `IndexView` - the listing view](#)

### Adding additional stylesheets and/or JavaScript

The `ModelAdmin` class provides several attributes to enable you to easily add additional stylesheets and JavaScript to the admin interface for your model. Each attribute simply needs to be a list of paths to the files you want to include. If the path is for a file in your project's static directory, then Wagtail will automatically prepend the path with `STATIC_URL` so that you don't need to repeat it each time in your list of paths.

If you'd like to add styles or scripts to the `IndexView`, you should set the following attributes:

- `index_view_extra_css` - Where each item is the path name of a pre-compiled stylesheet that you'd like to include.
- `index_view_extra_js` - Where each item is the path name of a JavaScript file that you'd like to include.

If you'd like to do the same for `CreateView` and `EditView`, you should set the following attributes:

- `form_view_extra_css` - Where each item is the path name of a pre-compiled stylesheet that you'd like to include.
- `form_view_extra_js` - Where each item is the path name of a JavaScript file that you'd like to include.

And if you're using the `InspectView` for your model, and want to do the same for that view, you should set the following attributes:

- `inspect_view_extra_css` - Where each item is the path name of a pre-compiled stylesheet that you'd like to include.
- `inspect_view_extra_js` - Where each item is the path name of a JavaScript file that you'd like to include.

### Overriding templates

For all `modeladmin` views, Wagtail looks for templates in the following folders within your project, before resorting to the defaults:

1. `/modeladmin/app-name/model-name/`
2. `/modeladmin/app-name/`

### 3. /modeladmin/

So, to override the template used by `IndexView` for example, you'd create a new `index.html` template and put it in one of those locations. For example, if you wanted to do this for an `ArticlePage` model in a news app, you'd add your custom template as `modeladmin/news/articlepage/index.html`.

For reference, `modeladmin` looks for templates with the following names for each view:

- `'index.html'` for `IndexView`
- `'inspect.html'` for `InspectView`
- `'create.html'` for `CreateView`
- `'edit.html'` for `EditView`
- `'delete.html'` for `DeleteView`
- `'choose_parent.html'` for `ChooseParentView`

If for any reason you'd rather bypass this behaviour and explicitly specify a template for a specific view, you can set either of the following attributes on your `ModelAdmin` class:

- `index_template_name` to specify a template for `IndexView`
- `inspect_template_name` to specify a template for `InspectView`
- `create_template_name` to specify a template for `CreateView`
- `edit_template_name` to specify a template for `EditView`
- `delete_template_name` to specify a template for `DeleteView`
- `choose_parent_template_name` to specify a template for `ChooseParentView`

## Overriding views

For all of the views offered by `ModelAdmin`, the class provides an attribute that you can override in order to tell it which class you'd like to use:

- `index_view_class`
- `inspect_view_class`
- `create_view_class` (not used for 'page type' models)
- `edit_view_class` (not used for 'page type' models)
- `delete_view_class` (not used for 'page type' models)
- `choose_parent_view_class` (only used for 'page type' models)

For example, if you'd like to create your own view class and use it for the `IndexView`, you would do the following:

```
from wagtail.contrib.modeladmin.views import IndexView
from wagtail.contrib.modeladmin.options import ModelAdmin
from .models import MyModel

class MyCustomIndexView(IndexView):
    # New functionality and existing method overrides added here
    ...

class MyModelAdmin(ModelAdmin):
```

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```
model = MyModel
index_view_class = MyCustomIndexView
```

Or, if you have no need for any of `IndexView`'s existing functionality in your view and would rather create your own view from scratch, `modeladmin` will support that too. However, it's highly recommended that you use `modeladmin.views.WMABaseView` as a base for your view. It'll make integrating with your `ModelAdmin` class much easier and will provide a bunch of useful attributes and methods to get you started.

You can also use the `url_helper` to easily reverse URLs for any `ModelAdmin` see [Reversing ModelAdmin URLs](#).

## Overriding helper classes

While 'view classes' are responsible for a lot of the work, there are also a number of other tasks that `modeladmin` must do regularly, that need to be handled in a consistent way, and in a number of different places. These tasks are designated to a set of simple classes (in `modeladmin`, these are termed 'helper' classes) and can be found in `wagtail.contrib.modeladmin.helpers`.

If you ever intend to write and use your own custom views with `modeladmin`, you should familiarise yourself with these helpers, as they are made available to views via the `modeladmin.views.WMABaseView` view.

There are three types of 'helper class':

- **URL helpers** - That help with the consistent generation, naming and referencing of urls.
- **Permission helpers** - That help with ensuring only users with sufficient permissions can perform certain actions, or see options to perform those actions.
- **Button helpers** - That, with the help of the other two, helps with the generation of buttons for use in a number of places.

The `ModelAdmin` class allows you to define and use your own helper classes by setting values on the following attributes:

### `ModelAdmin.url_helper_class`

By default, the `modeladmin.helpers.url.PageAdminURLHelper` class is used when your model extends `wagtailcore.models.Page`, otherwise `modeladmin.helpers.url.AdminURLHelper` is used.

If you find that the above helper classes don't work for your needs, you can easily create your own helper class by sub-classing `AdminURLHelper` or `PageAdminURLHelper` (if your model extends Wagtail's `Page` model), and making any necessary additions/overrides.

Once your class is defined, set the `url_helper_class` attribute on your `ModelAdmin` class to use your custom `URLHelper`, like so:

```
from wagtail.contrib.modeladmin.helpers import AdminURLHelper
from wagtail.contrib.modeladmin.options import ModelAdmin, modeladmin_register
from .models import MyModel

class MyURLHelper(AdminURLHelper):
    ...

class MyModelAdmin(ModelAdmin):
    model = MyModel
```

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```
url_helper_class = MyURLHelper

modeladmin_register(MyModelAdmin)
```

Or, if you have a more complicated use case, where simply setting that attribute isn't possible (due to circular imports, for example) or doesn't meet your needs, you can override the `get_url_helper_class` method, like so:

```
class MyModelAdmin(ModelAdmin):
    model = MyModel

    def get_url_helper_class(self):
        if self.some_attribute is True:
            return MyURLHelper
        return AdminURLHelper
```

### `ModelAdmin.permission_helper_class`

By default, the `modeladmin.helpers.permission.PagePermissionHelper` class is used when your model extends `wagtailcore.models.Page`, otherwise `modeladmin.helpers.permission.PermissionHelper` is used.

If you find that the above helper classes don't work for your needs, you can easily create your own helper class, by sub-classing `PermissionHelper` (or `PagePermissionHelper` if your model extends Wagtail's `Page` model), and making any necessary additions/overrides. Once defined, you set the `permission_helper_class` attribute on your `ModelAdmin` class to use your custom class instead of the default, like so:

```
from wagtail.contrib.modeladmin.helpers import PermissionHelper
from wagtail.contrib.modeladmin.options import ModelAdmin, modeladmin_register
from .models import MyModel

class MyPermissionHelper(PermissionHelper):
    ...

class MyModelAdmin(ModelAdmin):
    model = MyModel
    permission_helper_class = MyPermissionHelper

modeladmin_register(MyModelAdmin)
```

Or, if you have a more complicated use case, where simply setting an attribute isn't possible or doesn't meet your needs, you can override the `get_permission_helper_class` method, like so:

```
class MyModelAdmin(ModelAdmin):
    model = MyModel

    def get_permission_helper_class(self):
        if self.some_attribute is True:
            return MyPermissionHelper
        return PermissionHelper
```

### ModelAdmin.button\_helper\_class

By default, the `modeladmin.helpers.button.PageButtonHelper` class is used when your model extends `wagtailcore.models.Page`, otherwise `modeladmin.helpers.button.ButtonHelper` is used.

If you wish to add or change buttons for your model's `IndexView`, you'll need to create your own button helper class by sub-classing `ButtonHelper` or `PageButtonHelper` (if your model extends Wagtail's `Page` model), and make any necessary additions/overrides. Once defined, you set the `button_helper_class` attribute on your `ModelAdmin` class to use your custom class instead of the default, like so:

```
from wagtail.contrib.modeladmin.helpers import ButtonHelper
from wagtail.contrib.modeladmin.options import ModelAdmin, modeladmin_register
from .models import MyModel

class MyButtonHelper(ButtonHelper):
    def add_button(self, classnames_add=None, classnames_exclude=None):
        if classnames_add is None:
            classnames_add = []
        if classnames_exclude is None:
            classnames_exclude = []
        classnames = self.add_button_classnames + classnames_add
        cn = self.finalise_classname(classnames, classnames_exclude)
        return {
            'url': self.url_helper.create_url,
            'label': _('Add %s') % self.verbose_name,
            'classname': cn,
            'title': _('Add a new %s') % self.verbose_name,
        }

    def inspect_button(self, pk, classnames_add=None, classnames_exclude=None):
        ...

    def edit_button(self, pk, classnames_add=None, classnames_exclude=None):
        ...

    def delete_button(self, pk, classnames_add=None, classnames_exclude=None):
        ...

class MyModelAdmin(ModelAdmin):
    model = MyModel
    button_helper_class = MyButtonHelper

modeladmin_register(MyModelAdmin)
```

To customise the buttons found in the `ModelAdmin` List View you can change the returned dictionary in the `add_button`, `delete_button`, `edit_button` or `inspect_button` methods. For example if you wanted to change the Delete button you could modify the `delete_button` method in your `ButtonHelper` like so:

```
class MyButtonHelper(ButtonHelper):
    ...
    def delete_button(self, pk, classnames_add=None, classnames_exclude=None):
        ...
        return {
            'url': reverse("your_custom_url"),
            'label': _('Delete'),
```

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```
'classname': "custom-css-class",
'title': _('Delete this item')
}
```

Or, if you have a more complicated use case, where simply setting an attribute isn't possible or doesn't meet your needs, you can override the `get_button_helper_class` method, like so:

```
class MyModelAdmin(ModelAdmin):
    model = MyModel

    def get_button_helper_class(self):
        if self.some_attribute is True:
            return MyButtonHelper
        return ButtonHelper
```

## Using helpers in your custom views

As long as you sub-class `modeladmin.views.WMABaseView` (or one of the more 'specific' view classes) to create your custom view, instances of each helper should be available on instances of your class as:

- `self.url_helper`
- `self.permission_helper`
- `self.button_helper`

Unlike the other two, `self.button_helper` isn't populated right away when the view is instantiated. In order to show the right buttons for the right users, `ButtonHelper` instances need to be 'request aware', so `self.button_helper` is only set once the view's `dispatch()` method has run, which takes a `HttpRequest` object as an argument, from which the current user can be identified.

## Customising the menu item

You can use the following attributes and methods on the `ModelAdmin` class to alter the menu item used to represent your model in Wagtail's admin area.

- `ModelAdmin.menu_label`
- `ModelAdmin.menu_icon`
- `ModelAdmin.menu_order`
- `ModelAdmin.add_to_settings_menu`

### `ModelAdmin.menu_label`

**Expected value:** A string.

Set this attribute to a string value to override the label used for the menu item that appears in Wagtail's sidebar. If not set, the menu item will use `verbose_name_plural` from your model's `Meta` data.

### `ModelAdmin.menu_icon`

**Expected value:** A string matching one of Wagtail’s icon class names.

If you want to change the icon used to represent your model, you can set the `menu_icon` attribute on your class to use one of the other icons available in Wagtail’s CMS. The same icon will be used for the menu item in Wagtail’s sidebar, and will also appear in the header on the list page and other views for your model. If not set, `'doc-full-inverse'` will be used for page-type models, and `'snippet'` for others.

If you’re using a `ModelAdminGroup` class to group together several `ModelAdmin` classes in their own sub-menu, and want to change the menu item used to represent the group, you should override the `menu_icon` attribute on your `ModelAdminGroup` class (`'icon-folder-open-inverse'` is the default).

### `ModelAdmin.menu_order`

**Expected value:** An integer between 1 and 999.

If you want to change the position of the menu item for your model (or group of models) in Wagtail’s sidebar, you do that by setting `menu_order`. The value should be an integer between 1 and 999. The lower the value, the higher up the menu item will appear.

Wagtail’s ‘Explorer’ menu item has an order value of 100, so supply a value greater than that if you wish to keep the explorer menu item at the top.

### `ModelAdmin.add_to_settings_menu`

**Expected value:** True or False

If you’d like the menu item for your model to appear in Wagtail’s ‘Settings’ sub-menu instead of at the top level, add `add_to_settings_menu = True` to your `ModelAdmin` class.

This will only work for individual `ModelAdmin` classes registered with their own `modeladmin_register` call. It won’t work for members of a `ModelAdminGroup`.

## Customising `IndexView` - the listing view

For the sake of consistency, this section of the docs will refer to the listing view as `IndexView`, because that is the view class that does all the heavy lifting.

You can use the following attributes and methods on the `ModelAdmin` class to alter how your model data is treated and represented by the `IndexView`.

- `ModelAdmin.list_display`
- `ModelAdmin.list_filter`
- `ModelAdmin.search_fields`
- `ModelAdmin.search_handler_class`
- `ModelAdmin.extra_search_kwargs`
- `ModelAdmin.ordering`
- `ModelAdmin.list_per_page`

- `ModelAdmin.get_queryset()`
- `ModelAdmin.get_extra_attrs_for_row()`
- `ModelAdmin.get_extra_class_names_for_field_col()`
- `ModelAdmin.get_extra_attrs_for_field_col()`
- `wagtail.contrib.modeladmin.mixins.ThumbnailMixin`
- `ModelAdmin.list_display_add_buttons`
- `ModelAdmin.index_view_extra_css`
- `ModelAdmin.index_view_extra_js`
- `ModelAdmin.index_template_name`
- `ModelAdmin.index_view_class`

### `ModelAdmin.list_display`

**Expected value:** A list or tuple, where each item is the name of a field or single-argument callable on your model, or a similarly simple method defined on the `ModelAdmin` class itself.

Default value: `( '__str__', )`

Set `list_display` to control which fields are displayed in the `IndexView` for your model.

You have three possible values that can be used in `list_display`:

- A field of the model. For example:

```
from wagtail.contrib.modeladmin.options import ModelAdmin
from .models import Person

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('first_name', 'last_name')
```

- The name of a custom method on your `ModelAdmin` class, that accepts a single parameter for the model instance. For example:

```
from wagtail.contrib.modeladmin.options import ModelAdmin
from .models import Person

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('upper_case_name',)

    def upper_case_name(self, obj):
        return ("%s %s" % (obj.first_name, obj.last_name)).upper()
    upper_case_name.short_description = 'Name'
```

- The name of a method on your `Model` class that accepts only `self` as an argument. For example:

```
from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin
```

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```
class Person(models.Model):
    name = models.CharField(max_length=50)
    birthday = models.DateField()

    def decade_born_in(self):
        return self.birthday.strftime('%Y')[3:] + "0's"
    decade_born_in.short_description = 'Birth decade'

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('name', 'decade_born_in')
```

A few special cases to note about `list_display`:

- If the field is a `ForeignKey`, Django will display the output of `__str__()` of the related object.
- If the string provided is a method of the model or `ModelAdmin` class, Django will HTML-escape the output by default. To escape user input and allow your own unescaped tags, use `format_html()`. For example:

```
from django.db import models
from django.utils.html import format_html
from wagtail.contrib.modeladmin.options import ModelAdmin

class Person(models.Model):
    first_name = models.CharField(max_length=50)
    last_name = models.CharField(max_length=50)
    color_code = models.CharField(max_length=6)

    def colored_name(self):
        return format_html(
            '<span style="color: #{};">{} {}</span>',
            self.color_code,
            self.first_name,
            self.last_name,
        )

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('first_name', 'last_name', 'colored_name')
```

- If the value of a field is `None`, an empty string, or an iterable without elements, Wagtail will display a dash (-) for that column. You can override this by setting `empty_value_display` on your `ModelAdmin` class. For example:

```
from wagtail.contrib.modeladmin.options import ModelAdmin

class PersonAdmin(ModelAdmin):
    empty_value_display = 'N/A'
    ...
```

Or, if you'd like to change the value used depending on the field, you can override `ModelAdmin`'s `get_empty_value_display()` method, like so:

```
from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin
```

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```

class Person(models.Model):
    name = models.CharField(max_length=100)
    nickname = models.CharField(blank=True, max_length=100)
    likes_cat_gifs = models.NullBooleanField()

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('name', 'nickname', 'likes_cat_gifs')

    def get_empty_value_display(self, field_name=None):
        if field_name == 'nickname':
            return 'None given'
        if field_name == 'likes_cat_gifs':
            return 'Unanswered'
        return super().get_empty_value_display(field_name)

```

The `__str__()` method is just as valid in `list_display` as any other model method, so it's perfectly OK to do this:

```
list_display = ('__str__', 'some_other_field')
```

By default, the ability to sort results by an item in `list_display` is only offered when it's a field that has an actual database value (because sorting is done at the database level). However, if the output of the method is representative of a database field, you can indicate this fact by setting the `admin_order_field` attribute on that method, like so:

```

from django.db import models
from django.utils.html import format_html
from wagtail.contrib.modeladmin.options import ModelAdmin

class Person(models.Model):
    first_name = models.CharField(max_length=50)
    last_name = models.CharField(max_length=50)
    color_code = models.CharField(max_length=6)

    def colored_first_name(self):
        return format_html(
            '<span style="color: #{};">{}</span>',
            self.color_code,
            self.first_name,
        )
    colored_first_name.admin_order_field = 'first_name'

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('colored_first_name', 'last_name')

```

The above will tell Wagtail to order by the `first_name` field when trying to sort by `colored_first_name` in the index view.

To indicate descending order with `admin_order_field` you can use a hyphen prefix on the field name. Using the above example, this would look like:

```
colored_first_name.admin_order_field = '-first_name'
```

`admin_order_field` supports query lookups to sort by values on related models, too. This example includes an “author first name” column in the list display and allows sorting it by first name:

```
from django.db import models

class Blog(models.Model):
    title = models.CharField(max_length=255)
    author = models.ForeignKey(Person, on_delete=models.CASCADE)

    def author_first_name(self, obj):
        return obj.author.first_name

    author_first_name.admin_order_field = 'author__first_name'
```

- Elements of `list_display` can also be properties. Please note however, that due to the way properties work in Python, setting `short_description` on a property is only possible when using the `property()` function and **not** with the `@property` decorator.

For example:

```
from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin

class Person(models.Model):
    first_name = models.CharField(max_length=50)
    last_name = models.CharField(max_length=50)

    def full_name_property(self):
        return self.first_name + ' ' + self.last_name
    full_name_property.short_description = "Full name of the person"

    full_name = property(full_name_property)

class PersonAdmin(ModelAdmin):
    list_display = ('full_name',)
```

### `ModelAdmin.list_filter`

**Expected value:** A list or tuple, where each item is the name of model field of type `BooleanField`, `CharField`, `DateField`, `DateTimeField`, `IntegerField` or `ForeignKey`.

Set `list_filter` to activate filters in the right sidebar of the list page for your model. For example:

```
class PersonAdmin(ModelAdmin):
    list_filter = ('is_staff', 'company')
```

### `ModelAdmin.search_fields`

**Expected value:** A list or tuple, where each item is the name of a model field of type `CharField`, `TextField`, `RichTextField` or `StreamField`.

Set `search_fields` to enable a search box at the top of the index page for your model. You should add names of any fields on the model that should be searched whenever somebody submits a search query using the search box.

Searching is handled via Django's QuerySet API by default, see [ModelAdmin.search\\_handler\\_class](#) about changing this behaviour. This means by default it will work for all models, whatever search backend your project is using, and without any additional setup or configuration.

#### `ModelAdmin.search_handler_class`

**Expected value:** A subclass of `wagtail.contrib.modeladmin.helpers.search.BaseSearchHandler`

The default value is `DjangoORMSearchHandler`, which uses the Django ORM to perform lookups on the fields specified by `search_fields`.

If you would prefer to use the built-in Wagtail search backend to search your models, you can use the `WagtailBackendSearchHandler` class instead. For example:

```
from wagtail.contrib.modeladmin.helpers import WagtailBackendSearchHandler

from .models import Person

class PersonAdmin(ModelAdmin):
    model = Person
    search_handler_class = WagtailBackendSearchHandler
```

#### Extra considerations when using `WagtailBackendSearchHandler`

##### `ModelAdmin.search_fields` is used differently

The value of `search_fields` is passed to the underlying search backend to limit the fields used when matching. Each item in the list must be indexed on your model using [index.SearchField](#).

To allow matching on **any** indexed field, set the `search_fields` attribute on your `ModelAdmin` class to `None`, or remove it completely.

##### Indexing extra fields using `index.FilterField`

The underlying search backend must be able to interpret all of the fields and relationships used in the queryset created by `IndexView`, including those used in `prefetch()` or `select_related()` queryset methods, or used in `list_display`, `list_filter` or `ordering`.

Be sure to test things thoroughly in a development environment (ideally using the same search backend as you use in production). Wagtail will raise an `IndexError` if the backend encounters something it does not understand, and will tell you what you need to change.

#### `ModelAdmin.extra_search_kwargs`

**Expected value:** A dictionary of keyword arguments that will be passed on to the `search()` method of `search_handler_class`.

For example, to override the `WagtailBackendSearchHandler` default operator you could do the following:

```
from wagtail.contrib.modeladmin.helpers import WagtailBackendSearchHandler
from wagtail.search.utils import OR

from .models import IndexedModel

class DemoAdmin(ModelAdmin):
    model = IndexedModel
    search_handler_class = WagtailBackendSearchHandler
    extra_search_kwargs = {'operator': OR}
```

### ModelAdmin.ordering

**Expected value:** A list or tuple in the same format as a model's `ordering` parameter.

Set `ordering` to specify the default ordering of objects when listed by `IndexView`. If not provided, the model's default ordering will be respected.

If you need to specify a dynamic order (for example, depending on user or language) you can override the `get_ordering()` method instead.

### ModelAdmin.list\_per\_page

**Expected value:** A positive integer

Set `list_per_page` to control how many items appear on each paginated page of the index view. By default, this is set to 100.

### ModelAdmin.get\_queryset()

**Must return:** A `QuerySet`

The `get_queryset` method returns the 'base' `QuerySet` for your model, to which any filters and search queries are applied. By default, the `all()` method of your model's default manager is used. But, if for any reason you only want a certain sub-set of objects to appear in the `IndexView` listing, overriding the `get_queryset` method on your `ModelAdmin` class can help you with that. The method takes an `HttpRequest` object as a parameter, so limiting objects by the current logged-in user is possible.

For example:

```
from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin

class Person(models.Model):
    first_name = models.CharField(max_length=50)
    last_name = models.CharField(max_length=50)
    managed_by = models.ForeignKey('auth.User', on_delete=models.CASCADE)

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('first_name', 'last_name')

    def get_queryset(self, request):
        qs = super().get_queryset(request)
```

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```
# Only show people managed by the current user
return qs.filter(managed_by=request.user)
```

**ModelAdmin.get\_extra\_attrs\_for\_row()****Must return:** A dictionary

The `get_extra_attrs_for_row` method allows you to add html attributes to the opening `<tr>` tag for each result, in addition to the `data-object_pk` and `class` attributes already added by the `result_row_display` template tag.

If you want to add additional CSS classes, simply provide those class names as a string value using the `'class'` key, and the `odd/even` will be appended to your custom class names when rendering.

For example, if you wanted to add some additional class names based on field values, you could do something like:

```
from decimal import Decimal
from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin

class BankAccount(models.Model):
    name = models.CharField(max_length=50)
    account_number = models.CharField(max_length=50)
    balance = models.DecimalField(max_digits=5, num_places=2)

class BankAccountAdmin(ModelAdmin):
    list_display = ('name', 'account_number', 'balance')

    def get_extra_attrs_for_row(self, obj, context):
        if obj.balance < Decimal('0.00'):
            classname = 'balance-negative'
        else:
            classname = 'balance-positive'
        return {
            'class': classname,
        }
```

**ModelAdmin.get\_extra\_class\_names\_for\_field\_col()****Must return:** A list

The `get_extra_class_names_for_field_col` method allows you to add additional CSS class names to any of the columns defined by `list_display` for your model. The method takes two parameters:

- `obj`: the object being represented by the current row
- `field_name`: the item from `list_display` being represented by the current column

For example, if you'd like to apply some conditional formatting to a cell depending on the row's value, you could do something like:

```
from decimal import Decimal
from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin
```

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```

class BankAccount(models.Model):
    name = models.CharField(max_length=50)
    account_number = models.CharField(max_length=50)
    balance = models.DecimalField(max_digits=5, num_places=2)

class BankAccountAdmin(ModelAdmin):
    list_display = ('name', 'account_number', 'balance')

    def get_extra_class_names_for_field_col(self, obj, field_name):
        field_name == 'balance':
            if balance <= Decimal('-100.00'):
                return ['brand-danger']
            if balance <= Decimal('-0.00'):
                return ['brand-warning']
            if balance <= Decimal('-50.00'):
                return ['brand-info']
            else:
                return ['brand-success']
        return []

```

`ModelAdmin.get_extra_attrs_for_field_col()`

**Must return:** A dictionary

The `get_extra_attrs_for_field_col` method allows you to add additional HTML attributes to any of the columns defined in `list_display`. Like the `get_extra_class_names_for_field_col` method above, this method takes two parameters:

- `obj`: the object being represented by the current row
- `field_name`: the item from `list_display` being represented by the current column

For example, you might like to add some tooltip text to a certain column, to help give the value more context:

```

from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin

class Person(models.Model):
    name = models.CharField(max_length=100)
    likes_cat_gifs = models.NullBooleanField()

class PersonAdmin(ModelAdmin):
    model = Person
    list_display = ('name', 'likes_cat_gifs')

    def get_extra_attrs_for_field_col(self, obj, field_name=None):
        attrs = super().get_extra_attrs_for_field_col(obj, field_name)
        if field_name == 'likes_cat_gifs' and obj.likes_cat_gifs is None:
            attrs.update({
                'title': (
                    'The person was shown several cat gifs, but failed to '
                    'indicate a preference.'
                )
            })

```

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```

        ),
    })
    return attrs

```

Or you might like to add one or more data attributes to help implement some kind of interactivity using JavaScript:

```

from django.db import models
from wagtail.contrib.modeladmin.options import ModelAdmin

class Event(models.Model):
    title = models.CharField(max_length=255)
    start_date = models.DateField()
    end_date = models.DateField()
    start_time = models.TimeField()
    end_time = models.TimeField()

class EventAdmin(ModelAdmin):
    model = Event
    list_display = ('title', 'start_date', 'end_date')

    def get_extra_attrs_for_field_col(self, obj, field_name=None):
        attrs = super().get_extra_attrs_for_field_col(obj, field_name)
        if field_name == 'start_date':
            # Add the start time as data to the 'start_date' cell
            attrs.update({ 'data-time': obj.start_time.strftime('%H:%M') })
        elif field_name == 'end_date':
            # Add the end time as data to the 'end_date' cell
            attrs.update({ 'data-time': obj.end_time.strftime('%H:%M') })
        return attrs

```

### wagtail.contrib.modeladmin.mixins.ThumbnailMixin

If you're using `wagtailimages.Image` to define an image for each item in your model, `ThumbnailMixin` can help you add thumbnail versions of that image to each row in `IndexView`. To use it, simply extend `ThumbnailMixin` as well as `ModelAdmin` when defining your `ModelAdmin` class, and change a few attributes to change the thumbnail to your liking, like so:

```

from django.db import models
from wagtail.contrib.modeladmin.mixins import ThumbnailMixin
from wagtail.contrib.modeladmin.options import ModelAdmin

class Person(models.Model):
    name = models.CharField(max_length=255)
    avatar = models.ForeignKey('wagtailimages.Image', on_delete=models.SET_NULL,
    ↪ null=True)
    likes_cat_gifs = models.NullBooleanField()

class PersonAdmin(ThumbnailMixin, ModelAdmin):

    # Add 'admin_thumb' to list_display, where you want the thumbnail to appear
    list_display = ('admin_thumb', 'name', 'likes_cat_gifs')

```

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```
# Optionally tell IndexView to add buttons to a different column (if the
# first column contains the thumbnail, the buttons are likely better off
# displayed elsewhere)
list_display_add_buttons = 'name'

"""
Set 'thumb_image_field_name' to the name of the ForeignKey field that
links to 'wagtailimages.Image'
"""
thumb_image_field_name = 'avatar'

# Optionally override the filter spec used to create each thumb
thumb_image_filter_spec = 'fill-100x100' # this is the default

# Optionally override the 'width' attribute value added to each img tag
thumb_image_width = 50 # this is the default

# Optionally override the class name added to each img tag
thumb_classname = 'admin-thumb' # this is the default

# Optionally override the text that appears in the column header
thumb_col_header_text = 'image' # this is the default

# Optionally specify a fallback image to be used when the object doesn't
# have an image set, or the image has been deleted. It can be an image from
# your static files folder, or an external URL.
thumb_default = 'http://lorempixel.com/100/100'
```

#### **`ModelAdmin.list_display_add_buttons`**

**Expected value:** A string matching one of the items in `list_display`.

If for any reason you'd like to change which column the action buttons appear in for each row, you can specify a different column using `list_display_add_buttons` on your `ModelAdmin` class. The value must match one of the items your class's `list_display` attribute. By default, buttons are added to the first column of each row.

See the `ThumbnailMixin` example above to see how `list_display_add_buttons` can be used.

#### **`ModelAdmin.index_view_extra_css`**

**Expected value:** A list of path names of additional stylesheets to be added to the `IndexView`

See the following part of the docs to find out more: [\*Adding additional stylesheets and/or JavaScript\*](#)

#### **`ModelAdmin.index_view_extra_js`**

**Expected value:** A list of path names of additional js files to be added to the `IndexView`

See the following part of the docs to find out more: [\*Adding additional stylesheets and/or JavaScript\*](#)

#### **`ModelAdmin.index_template_name`**

**Expected value:** The path to a custom template to use for `IndexView`

See the following part of the docs to find out more: [Overriding templates](#)

### `ModelAdmin.index_view_class`

**Expected value:** A custom view class to replace `modeladmin.views.IndexView`

See the following part of the docs to find out more: [Overriding views](#)

## Customising `CreateView`, `EditView` and `DeleteView`

**NOTE:** `modeladmin` only provides ‘create’, ‘edit’ and ‘delete’ functionality for non page type models (i.e. models that do not extend `wagtailcore.models.Page`). If your model is a ‘page type’ model, customising any of the following will not have any effect:

## Changing which fields appear in `CreateView` & `EditView`

`edit_handler` can be used on any Django `models.Model` class, just like it can be used for `Page` models or other models registered as `Snippets` in Wagtail.

To change the way your `MyPageModel` is displayed in the `CreateView` and the `EditView`, simply define an `edit_handler` or `panels` attribute on your model class.

```
class MyPageModel(models.Model):
    first_name = models.CharField(max_length=100)
    last_name = models.CharField(max_length=100)
    address = models.TextField()

    panels = [
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('first_name', classname='fn'),
                FieldPanel('last_name', classname='ln'),
            ]),
            FieldPanel('address', classname='custom1',)
        ])
    ]
```

Or alternatively:

```
class MyPageModel(models.Model):
    first_name = models.CharField(max_length=100)
    last_name = models.CharField(max_length=100)
    address = models.TextField()

    custom_panels = [
        MultiFieldPanel([
            FieldRowPanel([
                FieldPanel('first_name', classname='fn'),
                FieldPanel('last_name', classname='ln'),
            ]),
            FieldPanel('address', classname='custom1',)
        ])
    ]
    edit_handler = ObjectList(custom_panels)
    # or
    edit_handler = TabbedInterface([
```

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```
ObjectList(custom_panels, heading='First Tab'),
ObjectList(...))
```

New in version 2.5: `edit_handler` and `panels` can alternatively be defined on a `ModelAdmin` definition. This feature is especially useful for use cases where you have to work with models that are ‘out of reach’ (due to being part of a third-party package, for example).

```
class BookAdmin(ModelAdmin):
    model = Book

    panels = [
        FieldPanel('title'),
        FieldPanel('author'),
    ]
```

Or alternatively:

```
class BookAdmin(ModelAdmin):
    model = Book

    custom_panels = [
        FieldPanel('title'),
        FieldPanel('author'),
    ]
    edit_handler = ObjectList(custom_panels)
```

#### **`ModelAdmin.form_view_extra_css`**

**Expected value:** A list of path names of additional stylesheets to be added to `CreateView` and `EditView`

See the following part of the docs to find out more: [Adding additional stylesheets and/or JavaScript](#)

#### **`ModelAdmin.form_view_extra_js`**

**Expected value:** A list of path names of additional js files to be added to `CreateView` and `EditView`

See the following part of the docs to find out more: [Adding additional stylesheets and/or JavaScript](#)

#### **`ModelAdmin.create_template_name`**

**Expected value:** The path to a custom template to use for `CreateView`

See the following part of the docs to find out more: [Overriding templates](#)

#### **`ModelAdmin.create_view_class`**

**Expected value:** A custom view class to replace `modeladmin.views.CreateView`

See the following part of the docs to find out more: [Overriding views](#)

**`ModelAdmin.edit_template_name`**

**Expected value:** The path to a custom template to use for `EditView`

See the following part of the docs to find out more: [Overriding templates](#)

**`ModelAdmin.edit_view_class`**

**Expected value:** A custom `view` class to replace `modeladmin.views.EditView`

See the following part of the docs to find out more: [Overriding views](#)

**`ModelAdmin.delete_template_name`**

**Expected value:** The path to a custom template to use for `DeleteView`

See the following part of the docs to find out more: [Overriding templates](#)

**`ModelAdmin.delete_view_class`**

**Expected value:** A custom `view` class to replace `modeladmin.views.DeleteView`

See the following part of the docs to find out more: [Overriding views](#)

**`ModelAdmin.form_fields_exclude`**

**Expected value:** A list or tuple of fields names

When using `CreateView` or `EditView` to create or update model instances, this value will be passed to the edit form, so that any named fields will be excluded from the form. This is particularly useful when registering `ModelAdmin` classes for models from third-party apps, where defining panel configurations on the `Model` itself is more complicated.

**`ModelAdmin.get_edit_handler()`**

New in version 2.5.

**Must return:** An instance of `wagtail.admin.edit_handlers.ObjectList`

Returns the appropriate `edit_handler` for the `modeladmin` class. `edit_handlers` can be defined either on the model itself or on the `modeladmin` (as property `edit_handler` or `panels`). Falls back to extracting panel / edit handler definitions from the model class.

**Enabling & customising `InspectView`**

The `InspectView` is disabled by default, as it's not often useful for most models. However, if you need a view that enables users to view more detailed information about an instance without the option to edit it, you can easily enable the inspect view by setting `inspect_view_enabled=True` on your `ModelAdmin` class.

When `InspectView` is enabled, an 'Inspect' button will automatically appear for each row in your index / listing view, linking to a new page that shows a list of field values for that particular object.

By default, all ‘concrete’ fields (where the field value is stored as a column in the database table for your model) will be shown. You can customise what values are displayed by adding the following attributes to your `ModelAdmin` class:

- `ModelAdmin.inspect_view_fields`
- `ModelAdmin.inspect_view_fields_exclude`
- `ModelAdmin.inspect_view_extra_css`
- `ModelAdmin.inspect_view_extra_js`
- `ModelAdmin.inspect_template_name`
- `ModelAdmin.inspect_view_class`

### `ModelAdmin.inspect_view_fields`

**Expected value:** A list or tuple, where each item is the name of a field or attribute on the instance that you’d like `InspectView` to render.

A sensible value will be rendered for most field types.

If you have `wagtail.images` installed, and the value happens to be an instance of `wagtailimages.models.Image` (or a custom model that subclasses `wagtailimages.models.AbstractImage`), a thumbnail of that image will be rendered.

If you have `wagtail.documents` installed, and the value happens to be an instance of `wagtaildocs.models.Document` (or a custom model that subclasses `wagtaildocs.models.AbstractDocument`), a link to that document will be rendered, along with the document title, file extension and size.

### `ModelAdmin.inspect_view_fields_exclude`

**Expected value:** A list or tuple, where each item is the name of a field that you’d like to exclude from `InspectView`

**Note:** If both `inspect_view_fields` and `inspect_view_fields_exclude` are set, `inspect_view_fields_exclude` will be ignored.

### `ModelAdmin.inspect_view_extra_css`

**Expected value:** A list of path names of additional stylesheets to be added to the `InspectView`

See the following part of the docs to find out more: [Adding additional stylesheets and/or JavaScript](#)

### `ModelAdmin.inspect_view_extra_js`

**Expected value:** A list of path names of additional js files to be added to the `InspectView`

See the following part of the docs to find out more: [Adding additional stylesheets and/or JavaScript](#)



**ModelAdmin.inspect\_template\_name**

**Expected value:** The path to a custom template to use for `InspectView`

See the following part of the docs to find out more: [Overriding templates](#)

**ModelAdmin.inspect\_view\_class**

**Expected value:** A custom `view` class to replace `modeladmin.views.InspectView`

See the following part of the docs to find out more: [Overriding views](#)

**Customising ChooseParentView**

When adding a new page via Wagtail’s explorer view, you essentially choose where you want to add a new page by navigating the relevant part of the page tree and choosing to ‘add a child page’ to your chosen parent page. Wagtail then asks you to select what type of page you’d like to add.

When adding a page from a `ModelAdmin` list page, we know what type of page needs to be added, but we might not automatically know where in the page tree it should be added. If there’s only one possible choice of parent for a new page (as defined by setting `parent_page_types` and `subpage_types` attributes on your models), then we skip a step and use that as the parent. Otherwise, the user must specify a parent page using `modeladmin`’s `ChooseParentView`.

It should be very rare that you need to customise this view, but in case you do, `modeladmin` offers the following attributes that you can override:

- `ModelAdmin.choose_parent_template_name`
- `ModelAdmin.choose_parent_view_class`

**ModelAdmin.choose\_parent\_template\_name**

**Expected value:** The path to a custom template to use for `ChooseParentView`

See the following part of the docs to find out more: [Overriding templates](#)

**ModelAdmin.choose\_parent\_view\_class**

**Expected value:** A custom `view` class to replace `modeladmin.views.ChooseParentView`

See the following part of the docs to find out more: [Overriding views](#)

**Additional tips and tricks**

This section explores some of `modeladmin`’s lesser-known features, and provides examples to help with `modeladmin` customisation. More pages will be added in future.

## Reversing ModelAdmin URLs

It's sometimes useful to be able to derive the index (listing) or create URLs for a model along with the edit, delete or inspect URL for a specific object in a model you have registered via the `modeladmin` app.

Wagtail itself does this by instantiating each `ModelAdmin` class you have registered, and using the `url_helper` attribute of each instance to determine what these URLs are.

You can take a similar approach in your own code too, by creating a `ModelAdmin` instance yourself, and using its `url_helper` to determine URLs.

See below for some examples:

- *Getting the edit or delete or inspect URL for an object*
- *Getting the index or create URL for a model*

### Getting the edit or delete or inspect URL for an object

In this example, we will provide a quick way to edit the `Author` that is linked to a blog post from the admin page listing menu. We have defined an `AuthorModelAdmin` class and registered it with Wagtail to allow `Author` objects to be administered via the admin area. The `BlogPage` model has an `author` field (a `ForeignKey` to the `Author` model) to allow a single author to be specified for each post.

```
# file: wagtail_hooks.py

from wagtail.admin.widgets import PageListingButton
from wagtail.contrib.modeladmin.options import ModelAdmin, modeladmin_register
from wagtail.core import hooks

# Author & BlogPage model not shown in this example
from models import Author

# ensure our modeladmin is created
class AuthorModelAdmin(ModelAdmin):
    model = Author
    menu_order = 200

# Creating an instance of `AuthorModelAdmin`
author_modeladmin = AuthorModelAdmin()

@hooks.register('register_page_listing_buttons')
def add_author_edit_buttons(page, page_perms, is_parent=False):
    """
    For pages that have an author, add an additional button to the page listing,
    linking to the 'edit' page for that author.
    """
    author_id = getattr(page, 'author_id', None)
    if author_id:
        # the url helper will return something like: /admin/my-app/author/edit/2/
        author_edit_url = author_modeladmin.url_helper.get_action_url('edit', author_
→id)
        yield PageListingButton('Edit Author', author_edit_url, priority=10)

modeladmin_register(AuthorModelAdmin)
```

As you can see from the example above, when using `get_action_url()` to generate object-specific URLs, the target object's primary key value must be supplied so that it can be included in the resulting URL (e.g. `"/admin/my-app/author/edit/2/"`). The following object-specific action names are supported by `get_action_url()`:

**'edit'** Returns a URL for updating a specific object.

**'delete'** Returns a URL for deleting a specific object.

**'inspect'** Returns a URL for viewing details of a specific object. **NOTE:** This will only work if `inspect_view_enabled` is set to `True` on your `ModelAdmin` class.

---

**Note:** If you are using string values as primary keys for your model, you may need to handle cases where the key contains characters that are not URL safe. Only alphanumerics (`[0-9a-zA-Z]`), or the following special characters are safe: `$, -, _, ., +, !, *, ', (, )`.

`django.contrib.admin.utils.quote()` can be used to safely encode these primary key values before passing them to `get_action_url()`. Failure to do this may result in Wagtail not being able to recognise the primary key when the URL is visited, resulting in 404 errors.

---

## Getting the index or create URL for a model

There are URLs available for the model listing view (action is `'index'`) and the create model view (action is `'create'`). Each of these has an equivalent shortcut available; `url_helper.index_url` and `url_helper.create_url`.

For example:

```
from .wagtail_hooks import AuthorModelAdmin

url_helper = AuthorModelAdmin().url_helper

index_url = url_helper.get_action_url('index')
# OR we can use the 'index_url' shortcut
also_index_url = url_helper.index_url # note: do not call this property as a function
# both will output /admin/my-app/author

create_url = url_helper.get_action_url('create')
# OR we can use the 'create_url' shortcut
also_create_url = url_helper.create_url # note: do not call this property as a
→function
# both will output /admin/my-app/author/create
```

---

**Note:** If you have registered a page type with `modeladmin` (e.g. `BlogPage`), and pages of that type can be added to more than one place in the page tree, when a user visits the `create` URL, they'll be automatically redirected to another view to choose a parent for the new page. So, this isn't something you need to check or cater for in your own code.

---

To customise `url_helper` behaviour, see [ModelAdmin.url\\_helper\\_class](#).

## Installation

Add `wagtail.contrib.modeladmin` to your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...
    'wagtail.contrib.modeladmin',
]
```

### How to use

#### A simple example

Let's say your website is for a local library. They have a model called `Book` that appears across the site in many places. You can define a normal Django model for it, then use `ModelAdmin` to create a menu in Wagtail's admin to create, view, and edit `Book` entries.

`models.py` looks like this:

```
from django.db import models
from wagtail.admin.edit_handlers import FieldPanel
from wagtail.images.edit_handlers import ImageChooserPanel

class Book(models.Model):
    title = models.CharField(max_length=255)
    author = models.CharField(max_length=255)
    cover_photo = models.ForeignKey(
        'wagtailimages.Image',
        null=True, blank=True,
        on_delete=models.SET_NULL,
        related_name='+'
    )

    panels = [
        FieldPanel('title'),
        FieldPanel('author'),
        ImageChooserPanel('cover_photo')
    ]
```

---

**Tip:** You can specify `FieldPanels` like `ImageChooserPanel`, `PageChooserPanel`, and `DocumentChooserPanel` within the `panels` attribute of the model. This lets you use Wagtail-specific features in an otherwise traditional Django model.

---

`wagtail_hooks.py` in your app directory would look something like this:

```
from wagtail.contrib.modeladmin.options import (
    ModelAdmin, modeladmin_register)
from .models import Book

class BookAdmin(ModelAdmin):
    model = Book
    menu_label = 'Book' # ditch this to use verbose_name_plural from model
    menu_icon = 'pencil' # change as required
    menu_order = 200 # will put in 3rd place (000 being 1st, 100 2nd)
    add_to_settings_menu = False # or True to add your model to the Settings sub-menu
    exclude_from_explorer = False # or True to exclude pages of this type from Wagtail
    # 's explorer view
```

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```
list_display = ('title', 'author')
list_filter = ('author',)
search_fields = ('title', 'author')

# Now you just need to register your customised ModelAdmin class with Wagtail
modeladmin_register(BookAdmin)
```

## A more complicated example

In addition to `Book`, perhaps we also want to add `Author` and `Genre` models to our app and display a menu item for each of them, too. Creating lots of menus can add up quickly, so it might be a good idea to group related menus together. This section shows you how to create one menu called *Library* which expands to show submenus for *Book*, *Author*, and *Genre*.

Assume we've defined `Book`, `Author`, and `Genre` models in `models.py`.

`wagtail_hooks.py` in your app directory would look something like this:

```
from wagtail.contrib.modeladmin.options import (
    ModelAdmin, ModelAdminGroup, modeladmin_register)
from .models import (
    Book, Author, Genre)

class BookAdmin(ModelAdmin):
    model = Book
    menu_label = 'Book' # ditch this to use verbose_name_plural from model
    menu_icon = 'pencil' # change as required
    list_display = ('title', 'author')
    list_filter = ('genre', 'author')
    search_fields = ('title', 'author')

class AuthorAdmin(ModelAdmin):
    model = Author
    menu_label = 'Author' # ditch this to use verbose_name_plural from model
    menu_icon = 'user' # change as required
    list_display = ('first_name', 'last_name')
    list_filter = ('first_name', 'last_name')
    search_fields = ('first_name', 'last_name')

class GenreAdmin(ModelAdmin):
    model = Genre
    menu_label = 'Genre' # ditch this to use verbose_name_plural from model
    menu_icon = 'group' # change as required
    list_display = ('name',)
    list_filter = ('name',)
    search_fields = ('name',)

class LibraryGroup(ModelAdminGroup):
    menu_label = 'Library'
    menu_icon = 'folder-open-inverse' # change as required
    menu_order = 200 # will put in 3rd place (000 being 1st, 100 2nd)
```

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```
items = (BookAdmin, AuthorAdmin, GenreAdmin)

# When using a ModelAdminGroup class to group several ModelAdmin classes together,
# you only need to register the ModelAdminGroup class with Wagtail:
modeladmin_register(LibraryGroup)
```

### Registering multiple classes in one `wagtail_hooks.py` file

Each time you call `modeladmin_register(MyAdmin)` it creates a new top-level menu item in Wagtail's left sidebar. You can call this multiple times within the same `wagtail_hooks.py` file if you want. The example below will create 3 top-level menus.

```
class BookAdmin(ModelAdmin):
    model = Book
    ...

class MovieAdmin(ModelAdmin):
    model = MovieModel
    ...

class MusicAdminGroup(ModelAdminGroup):
    label = _("Music")
    items = (AlbumAdmin, ArtistAdmin)
    ...

modeladmin_register(BookAdmin)
modeladmin_register(MovieAdmin)
modeladmin_register(MusicAdminGroup)
```

### PostgreSQL search engine

This contrib module provides a search engine backend for Wagtail using [PostgreSQL full-text search capabilities](#).

#### Warning:

You can only use this module to index data from a PostgreSQL database.

#### Features:

- Supports all the search features available in Wagtail.
- Easy to install and adds no external dependency or service.
- Excellent performance for sites with up to 200 000 pages. Stays decent for sites up to a million pages.
- Faster to reindex than Elasticsearch if you use PostgreSQL 9.5 or more.

The only known **downsides** concern :

#### Downsides:

- `SearchField(partial_match=True)` is not handled.
- Due to a PostgreSQL limitation, `SearchField(boost=...)` is only partially respected. It is changed so that there can only be 4 different boosts. If you define 4 or less different boosts, everything will be perfectly

accurate. However, your search will be a little less accurate if you define more than 4 different boosts. That being said, it will work and be roughly the same.

- When *Specifying the fields to search*, the index is not used, so it will be slow on huge sites.
- Still when *Specifying the fields to search*, you cannot search on a specific method.

## Installation

Add `'wagtail.contrib.postgres_search'`, anywhere in your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...
    'wagtail.contrib.postgres_search',
    ...
]
```

Then configure Wagtail to use it as a search backend. Give it the alias `'default'` if you want it to be the default search backend:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.contrib.postgres_search.backend',
    },
}
```

After installing the module, run `python manage.py migrate` to create the necessary `postgres_search_indexentry` table.

You then need to index data inside this backend using the *update\_index* command. You can reuse this command whenever you want. However, it should not be needed after a first usage since the search engine is automatically updated when data is modified. To disable this behaviour, see *AUTO\_UPDATE*.

## Configuration

### Language / PostgreSQL search configuration

Use the additional `'SEARCH_CONFIG'` key to define which PostgreSQL search configuration should be used. For example:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.contrib.postgres_search.backend',
        'SEARCH_CONFIG': 'english',
    },
}
```

As you can deduce, a PostgreSQL search configuration is mostly used to define rules for a language, English in this case. A search configuration consists in a compilation of algorithms (parsers & analysers) and language specifications (stop words, stems, dictionaries, synonyms, thesauruses, etc.).

A few search configurations are already defined by default in PostgreSQL. You can list them using `sudo -u postgres psql -c "\dF"` in a Unix shell or by using this SQL query: `SELECT cfgname FROM pg_catalog.pg_ts_config`.

These already-defined search configurations are decent, but they’re basic compared to commercial search engines. If you want a nicer support of your language, you will have to create your own PostgreSQL search configuration. See the PostgreSQL documentation for [an example](#), [the list of parsers](#), and [a guide to use dictionaries](#).

### Atomic rebuild

Like the Elasticsearch backend, this backend supports *ATOMIC\_REBUILD*:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.contrib.postgres_search.backend',
        'ATOMIC_REBUILD': True,
    }
}
```

This is nearly useless with this backend. In Elasticsearch, all data is removed before rebuilding the index. But in this PostgreSQL backend, only objects no longer in the database are removed. Then the index is progressively updated, with no moment where the index is empty.

However, if you want to be extra sure that nothing wrong happens while updating the index, you can use atomic rebuild. The index will be rebuilt, but nobody will have access to it until reindexing is complete. If any error occurs during the operation, all changes to the index are reverted as if reindexing never happened.

### Promoted search results

The `searchpromotions` module provides the models and user interface for managing “Promoted search results” and displaying them in a search results page.

“Promoted search results” allow editors to explicitly link relevant content to search terms, so results pages can contain curated content in addition to results from the search engine.

### Installation

The `searchpromotions` module is not enabled by default. To install it, add `wagtail.contrib.search_promotions` to `INSTALLED_APPS` in your project’s Django settings file.

```
INSTALLED_APPS = [
    ...

    'wagtail.contrib.search_promotions',
]
```

This app contains migrations so make sure you run the `migrate django-admin` command after installing.

### Usage

Once installed, a new menu item called “Promoted search results” should appear in the “Settings” menu. This is where you can assign pages to popular search terms.



## Displaying on a search results page

To retrieve a list of promoted search results for a particular search query, you can use the `{% get_search_promotions search_query as search_promotions %}` template tag from the `wagtailsearchpromotions_tags` templatetag library:

```
{% load wagtailcore_tags wagtailsearchpromotions_tags %}

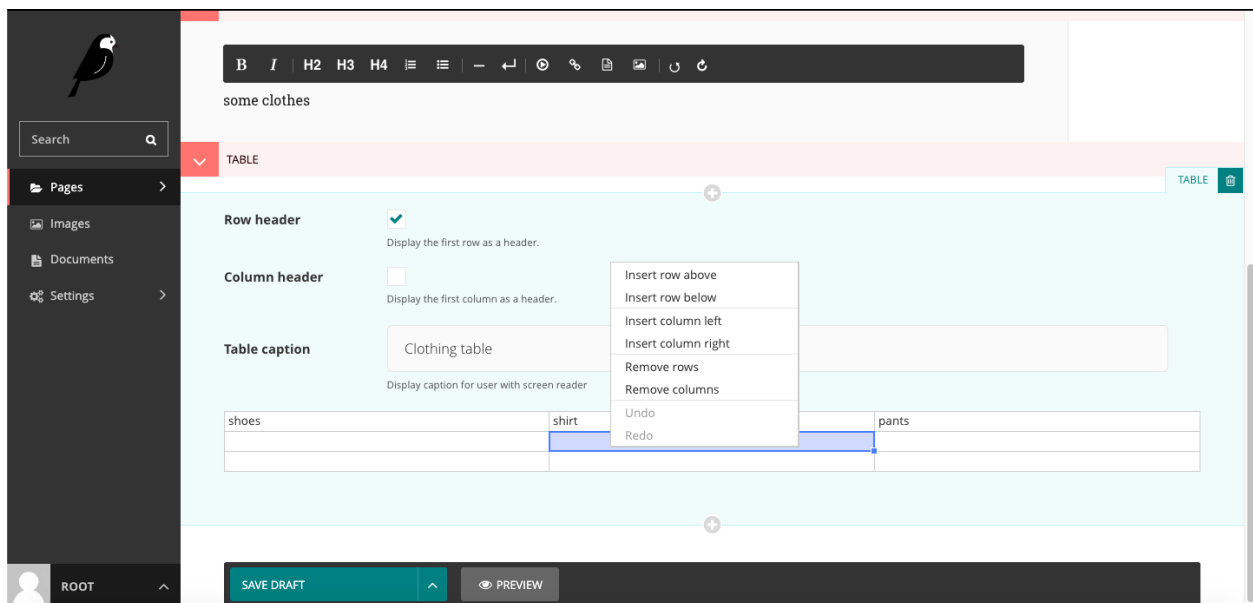
...

{% get_search_promotions search_query as search_promotions %}

<ul>
  {% for search_promotion in search_promotions %}
    <li>
      <a href="{% pageurl search_promotion.page %}">
        <h2>{{ search_promotion.page.title }}</h2>
        <p>{{ search_promotion.description }}</p>
      </a>
    </li>
  {% endfor %}
</ul>
```

## TableBlock

The TableBlock module provides an HTML table block type for StreamField. This module uses [handsontable 6.2.2](#) to provide users with the ability to create and edit HTML tables in Wagtail. Table blocks provides a caption field for accessibility.



## Installation

Add `"wagtail.contrib.table_block"` to your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...

    "wagtail.contrib.table_block",
]
```

## Basic Usage

After installation, the `TableBlock` module can be used in a similar fashion to other `StreamField` blocks in the Wagtail core.

Import the `TableBlock` from `wagtail.contrib.table_block.blocks` `import TableBlock` and add it to your `StreamField` declaration.

```
class DemoStreamBlock(StreamBlock):
    ...
    table = TableBlock()
```

Then, on your page template, the `{% include_block %}` tag (called on either the individual block, or the `StreamField` value as a whole) will render any table blocks it encounters as an HTML `<table>` element:

```
{% load wagtailcore_tags %}

{% include_block page.body %}
```

Or:

```
{% load wagtailcore_tags %}

{% for block in page.body %}
    {% if block.block_type == 'table' %}
        {% include_block block %}
    {% else %}
        {# rendering for other block types #}
    {% endif %}
{% endfor %}
```

## Advanced Usage

### Default Configuration

When defining a `TableBlock`, Wagtail provides the ability to pass an optional `table_options` dictionary. The default `TableBlock` dictionary looks like this:

```
default_table_options = {
    'minSpareRows': 0,
    'startRows': 3,
    'startCols': 3,
    'colHeaders': False,
    'rowHeaders': False,
    'contextMenu': [
        'row_above',
        'row_below',
    ],
}
```

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```

        '-----',
        'col_left',
        'col_right',
        '-----',
        'remove_row',
        'remove_col',
        '-----',
        'undo',
        'redo'
    ],
    'editor': 'text',
    'stretchH': 'all',
    'height': 108,
    'language': language,
    'renderer': 'text',
    'autoColumnSize': False,
}

```

## Configuration Options

Every key in the `table_options` dictionary maps to a `handsontable` option. These settings can be changed to alter the behaviour of tables in Wagtail. The following options are available:

- `minSpareRows` - The number of rows to append to the end of an empty grid. The default setting is 0.
- `startRows` - The default number of rows for a new table.
- `startCols` - The default number of columns for new tables.
- `colHeaders` - Can be set to `True` or `False`. This setting designates if new tables should be created with column headers. **Note:** this only sets the behaviour for newly created tables. Page editors can override this by checking the the “Column header” checkbox in the table editor in the Wagtail admin.
- `rowHeaders` - Operates the same as `colHeaders` to designate if new tables should be created with the first column as a row header. Just like `colHeaders` this option can be overridden by the page editor in the Wagtail admin.
- `contextMenu` - Enables or disables the Handsontable right-click menu. By default this is set to `True`. Alternatively you can provide a list or a dictionary with [specific options](<https://handsontable.com/docs/6.2.2/demo-context-menu.html#page-specific>).
- `editor` - Defines the editor used for table cells. The default setting is `text`.
- `stretchH` - Sets the default horizontal resizing of tables. Options include, ‘none’, ‘last’, and ‘all’. By default TableBlock uses ‘all’ for the even resizing of columns.
- `height` - The default height of the grid. By default TableBlock sets the height to 108 for the optimal appearance of new tables in the editor. This is optimized for tables with `startRows` set to 3. If you change the number of `startRows` in the configuration, you might need to change the `height` setting to improve the default appearance in the editor.
- `language` - The default language setting. By default TableBlock tries to get the language from `django.utils.translation.get_language`. If needed, this setting can be overridden here.
- `renderer` - The default setting Handsontable uses to render the content of table cells.
- `autoColumnSize` - Enables or disables the `autoColumnSize` plugin. The TableBlock default setting is `False`.

A complete list of [handsontable options](#) can be found on the Handsontable website.

## Changing the default table\_options

To change the default table options just pass a new `table_options` dictionary when a new `TableBlock` is declared.

```
new_table_options = {
    'minSpareRows': 0,
    'startRows': 6,
    'startCols': 4,
    'colHeaders': False,
    'rowHeaders': False,
    'contextMenu': True,
    'editor': 'text',
    'stretchH': 'all',
    'height': 216,
    'language': 'en',
    'renderer': 'text',
    'autoColumnSize': False,
}

class DemoStreamBlock(StreamBlock):
    ...
    table = TableBlock(table_options=new_table_options)
```

## Supporting cell alignment

You can activate the *alignment* option by setting a custom *contextMenu* which allows you to set the alignment on a cell selection. HTML classes set by handsontable will be kept on the rendered block. You'll be then able to apply your own custom CSS rules to preserve the style. Those class names are:

- Horizontal: `htLeft`, `htCenter`, `htRight`, `htJustify`
- Vertical: `htTop`, `htMiddle`, `htBottom`

```
new_table_options = {
    'contextMenu': [
        'row_above',
        'row_below',
        '-----',
        'col_left',
        'col_right',
        '-----',
        'remove_row',
        'remove_col',
        '-----',
        'undo',
        'redo',
        '-----',
        'copy',
        'cut',
        '-----',
        'alignment',
    ],
}
```

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```
class DemoStreamBlock(StreamBlock):  
    ...  
    table = TableBlock(table_options=new_table_options)
```

## Site settings

Site-wide settings that are editable by administrators in the Wagtail admin.

## Form builder

Allows forms to be created by admins and provides an interface for browsing form submissions.

## Sitemap generator

Provides a view that generates a Google XML sitemap of your public Wagtail content.

## Frontend cache invalidator

A module for automatically purging pages from a cache (Varnish, Squid, Cloudflare or Cloudfront) when their content is changed.

## RoutablePageMixin

Provides a way of embedding Django URLconfs into pages.

## ModelAdmin

A module allowing for more customisable representation and management of custom models in Wagtail's admin area.

## Promoted search results

A module for managing “Promoted Search Results”

## TableBlock

Provides a TableBlock for adding HTML tables to pages.

## 1.4.3 Management commands

### publish\_scheduled\_pages

```
$ ./manage.py publish_scheduled_pages
```

This command publishes, updates or unpublishes pages that have had these actions scheduled by an editor. We recommend running this command once an hour.

### fixtree

```
$ ./manage.py fixtree
```

This command scans for errors in your database and attempts to fix any issues it finds.

### move\_pages

```
$ manage.py move_pages from to
```

This command moves a selection of pages from one section of the tree to another.

Options:

- **from** This is the **id** of the page to move pages from. All descendants of this page will be moved to the destination. After the operation is complete, this page will have no children.
- **to** This is the **id** of the page to move pages to.

### update\_index

```
$ ./manage.py update_index [--backend <backend name>]
```

This command rebuilds the search index from scratch. It is not required when using the database search backend (`wagtail.search.backends.db`).

It is recommended to run this command once a week and at the following times:

- whenever any pages have been created through a script (after an import, for example)
- whenever any changes have been made to models or search configuration

The search may not return any results while this command is running, so avoid running it at peak times.

### Specifying which backend to update

By default, `update_index` will rebuild all the search indexes listed in `WAGTAILSEARCH_BACKENDS`.

If you have multiple backends and would only like to update one of them, you can use the `--backend` option.

For example, to update just the default backend:

```
$ python manage.py update_index --backend default
```

The `--chunk_size` option can be used to set the size of chunks that are indexed at a time. This defaults to 1000 but may need to be reduced for larger document sizes.

### Indexing the schema only

You can prevent the `update_index` command from indexing any data by using the `--schema-only` option:

```
$ python manage.py update_index --schema-only
```

## wagtail\_update\_index

An alias for the `update_index` command that can be used when another installed package (such as [Haystack](#)) provides a command named `update_index`. In this case, the other package's entry in `INSTALLED_APPS` should appear above `wagtail.search` so that its `update_index` command takes precedence over Wagtail's.

## search\_garbage\_collect

```
$ ./manage.py search_garbage_collect
```

Wagtail keeps a log of search queries that are popular on your website. On high traffic websites, this log may get big and you may want to clean out old search queries. This command cleans out all search query logs that are more than one week old (or a number of days configurable through the `WAGTAILSEARCH_HITS_MAX_AGE` setting).

## 1.4.4 Hooks

On loading, Wagtail will search for any app with the file `wagtail_hooks.py` and execute the contents. This provides a way to register your own functions to execute at certain points in Wagtail's execution, such as when a page is saved or when the main menu is constructed.

**Note:** Hooks are typically used to customise the view-level behaviour of the Wagtail admin and front-end. For customisations that only deal with model-level behaviour - such as calling an external service when a page or document is added - it is often better to use Django's [signal mechanism](#) (see also: [Wagtail signals](#)), as these are not dependent on a user taking a particular path through the admin interface.

Registering functions with a Wagtail hook is done through the `@hooks.register` decorator:

```
from wagtail.core import hooks

@hooks.register('name_of_hook')
def my_hook_function(arg1, arg2...)
    # your code here
```

Alternatively, `hooks.register` can be called as an ordinary function, passing in the name of the hook and a handler function defined elsewhere:

```
hooks.register('name_of_hook', my_hook_function)
```

If you need your hooks to run in a particular order, you can pass the `order` parameter:

```
@hooks.register('name_of_hook', order=1)  # This will run after every hook in the_
↳wagtail core
def my_hook_function(arg1, arg2...)
    # your code here

@hooks.register('name_of_hook', order=-1)  # This will run before every hook in the_
↳wagtail core
def my_other_hook_function(arg1, arg2...)
    # your code here

@hooks.register('name_of_hook', order=2)  # This will run after `my_hook_function`
def yet_another_hook_function(arg1, arg2...)
    # your code here
```

The available hooks are listed below.

- *Admin modules*
- *Editor interface*
- *Editor workflow*
- *Admin workflow*
- *Choosers*
- *Page explorer*
- *Page serving*
- *Document serving*

### Admin modules

Hooks for building new areas of the admin interface (alongside pages, images, documents and so on).

#### `construct_homepage_panels`

Add or remove panels from the Wagtail admin homepage. The callable passed into this hook should take a `request` object and a list of panels, objects which have a `render()` method returning a string. The objects also have an `order` property, an integer used for ordering the panels. The default panels use integers between 100 and 300. Hook functions should modify the `panels` list in-place as required.

```
from django.utils.safestring import mark_safe

from wagtail.core import hooks

class WelcomePanel:
    order = 50

    def render(self):
        return mark_safe("""
        <section class="panel summary nice-padding">
            <h3>No, but seriously -- welcome to the admin homepage.</h3>
        </section>
        """)

@hooks.register('construct_homepage_panels')
def add_another_welcome_panel(request, panels):
    panels.append(WelcomePanel())
```

#### `construct_homepage_summary_items`

Add or remove items from the ‘site summary’ bar on the admin homepage (which shows the number of pages and other object that exist on the site). The callable passed into this hook should take a `request` object and a list of `SummaryItem` objects to be modified as required. These objects have a `render()` method, which returns an HTML string, and an `order` property, which is an integer that specifies the order in which the items will appear.



### `construct_main_menu`

Called just before the Wagtail admin menu is output, to allow the list of menu items to be modified. The callable passed to this hook will receive a `request` object and a list of `menu_items`, and should modify `menu_items` in-place as required. Adding menu items should generally be done through the `register_admin_menu_item` hook instead - items added through `construct_main_menu` will be missing any associated JavaScript includes, and their `is_shown` check will not be applied.

```
from wagtail.core import hooks

@hooks.register('construct_main_menu')
def hide_explorer_menu_item_from_frank(request, menu_items):
    if request.user.username == 'frank':
        menu_items[:] = [item for item in menu_items if item.name != 'explorer']
```

### `describe_collection_contents`

Called when Wagtail needs to find out what objects exist in a collection, if any. Currently this happens on the confirmation before deleting a collection, to ensure that non-empty collections cannot be deleted. The callable passed to this hook will receive a `collection` object, and should return either `None` (to indicate no objects in this collection), or a dict containing the following keys:

**count** A numeric count of items in this collection

**count\_text** A human-readable string describing the number of items in this collection, such as “3 documents”. (Sites with multi-language support should return a translatable string here, most likely using the `django.utils.translation.ungettext` function.)

**url (optional)** A URL to an index page that lists the objects being described.

### `register_account_menu_item`

Add an item to the “Account settings” page within the Wagtail admin. The callable for this hook should return a dict with the keys `url`, `label` and `help_text`. For example:

```
from django.urls import reverse
from wagtail.core import hooks

@hooks.register('register_account_menu_item')
def register_account_delete_account(request):
    return {
        'url': reverse('delete-account'),
        'label': 'Delete account',
        'help_text': 'This permanently deletes your account.'
    }
```

### `register_admin_menu_item`

Add an item to the Wagtail admin menu. The callable passed to this hook must return an instance of `wagtail.admin.menu.MenuItem`. New items can be constructed from the `MenuItem` class by passing in a `label` which will be the text in the menu item, and the URL of the admin page you want the menu item to link to (usually by calling `reverse()` on the admin view you’ve set up). Additionally, the following keyword arguments are accepted:

**name** an internal name used to identify the menu item; defaults to the slugified form of the label.

**classnames** additional classnames applied to the link, used to give it an icon

**attrs** additional HTML attributes to apply to the link

**order** an integer which determines the item's position in the menu

MenuItem can be subclassed to customise the HTML output, specify JavaScript files required by the menu item, or conditionally show or hide the item for specific requests (for example, to apply permission checks); see the source code (`wagtail/admin/menu.py`) for details.

```
from django.urls import reverse

from wagtail.core import hooks
from wagtail.admin.menu import MenuItem

@hooks.register('register_admin_menu_item')
def register_frank_menu_item():
    return MenuItem('Frank', reverse('frank'), classnames='icon icon-folder-
    ↪inverse', order=10000)
```

### register\_admin\_urls

Register additional admin page URLs. The callable fed into this hook should return a list of Django URL patterns which define the structure of the pages and endpoints of your extension to the Wagtail admin. For more about vanilla Django URLconfs and views, see [url dispatcher](#).

```
from django.http import HttpResponse
from django.conf.urls import url

from wagtail.core import hooks

def admin_view(request):
    return HttpResponse(
        "I have approximate knowledge of many things!",
        content_type="text/plain")

@hooks.register('register_admin_urls')
def urlconf_time():
    return [
        url(r'^how_did_you_almost_know_my_name/$', admin_view, name='frank'),
    ]
```

### register\_group\_permission\_panel

Add a new panel to the Groups form in the 'settings' area. The callable passed to this hook must return a `ModelForm` / `ModelFormSet`-like class, with a constructor that accepts a group object as its instance keyword argument, and which implements the methods `save`, `is_valid`, and `as_admin_panel` (which returns the HTML to be included on the group edit page).

### `register_settings_menu_item`

As `register_admin_menu_item`, but registers menu items into the ‘Settings’ sub-menu rather than the top-level menu.

### `construct_settings_menu`

As `construct_main_menu`, but modifies the ‘Settings’ sub-menu rather than the top-level menu.

### `register_admin_search_area`

Add an item to the Wagtail admin search “Other Searches”. Behaviour of this hook is similar to `register_admin_menu_item`. The callable passed to this hook must return an instance of `wagtail.admin.search.SearchArea`. New items can be constructed from the `SearchArea` class by passing the following parameters:

**label** text displayed in the “Other Searches” option box.

**name** an internal name used to identify the search option; defaults to the slugified form of the label.

**url** the URL of the target search page.

**classnames** additional CSS classnames applied to the link, used to give it an icon.

**attrs** additional HTML attributes to apply to the link.

**order** an integer which determines the item’s position in the list of options.

Setting the URL can be achieved using `reverse()` on the target search page. The GET parameter ‘q’ will be appended to the given URL.

A template tag, `search_other` is provided by the `wagtailadmin_tags` template module. This tag takes a single, optional parameter, `current`, which allows you to specify the name of the search option currently active. If the parameter is not given, the hook defaults to a reverse lookup of the page’s URL for comparison against the `url` parameter.

`SearchArea` can be subclassed to customise the HTML output, specify JavaScript files required by the option, or conditionally show or hide the item for specific requests (for example, to apply permission checks); see the source code (`wagtail/admin/search.py`) for details.

```

from django.urls import reverse
from wagtail.core import hooks
from wagtail.admin.search import SearchArea

@hooks.register('register_admin_search_area')
def register_frank_search_area():
    return SearchArea('Frank', reverse('frank'), classnames='icon icon-
    ↪folder-inverse', order=10000)

```

### `register_permissions`

Return a QuerySet of `Permission` objects to be shown in the Groups administration area.

### `filter_form_submissions_for_user`

Allows access to form submissions to be customised on a per-user, per-form basis.

**This hook takes two parameters:**

- The user attempting to access form submissions
- A `QuerySet` of form pages

The hook must return a `QuerySet` containing a subset of these form pages which the user is allowed to access the submissions for.

For example, to prevent non-superusers from accessing form submissions:

```
from wagtail.core import hooks

@hooks.register('filter_form_submissions_for_user')
def construct_forms_for_user(user, queryset):
    if not user.is_superuser:
        queryset = queryset.none()

    return queryset
```

## Editor interface

Hooks for customising the editing interface for pages and snippets.

### `register_rich_text_features`

Rich text fields in Wagtail work with a list of ‘feature’ identifiers that determine which editing controls are available in the editor, and which elements are allowed in the output; for example, a rich text field defined as `RichTextField(features=['h2', 'h3', 'bold', 'italic', 'link'])` would allow headings, bold / italic formatting and links, but not (for example) bullet lists or images. The `register_rich_text_features` hook allows new feature identifiers to be defined - see [Limiting features in a rich text field](#) for details.

### `insert_editor_css`

Add additional CSS files or snippets to the page editor.

```
from django.template.tags.static import static
from django.utils.html import format_html

from wagtail.core import hooks

@hooks.register('insert_editor_css')
def editor_css():
    return format_html(
        '<link rel="stylesheet" href="{}">',
        static('demo/css/vendor/font-awesome/css/font-awesome.min.css')
    )
```

### insert\_global\_admin\_css

Add additional CSS files or snippets to all admin pages.

```

from django.utils.html import format_html
from django.template.tags.static import static

from wagtail.core import hooks

@hooks.register('insert_global_admin_css')
def global_admin_css():
    return format_html('<link rel="stylesheet" href="{0}">', static('my/
    ↪wagtail/theme.css'))

```

### insert\_editor\_js

Add additional JavaScript files or code snippets to the page editor.

```

from django.utils.html import format_html, format_html_join
from django.template.tags.static import static

from wagtail.core import hooks

@hooks.register('insert_editor_js')
def editor_js():
    js_files = [
        'demo/js/jquery.raptorize.1.0.js',
    ]
    js_includes = format_html_join('\n', '<script src="{0}"></script>',
        ((static(filename),) for filename in js_files)
    )
    return js_includes + format_html(
        """
        <script>
            $(function() {
                $('button').raptorize();
            });
        </script>
        """
    )

```

### insert\_global\_admin\_js

Add additional JavaScript files or code snippets to all admin pages.

```

from django.utils.html import format_html

from wagtail.core import hooks

@hooks.register('insert_global_admin_js')
def global_admin_js():
    return format_html(

```

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```
'<script src="https://cdnjs.cloudflare.com/ajax/libs/three.js/r74/
↪three.js"></script>',
)
```

## Editor workflow

Hooks for customising the way users are directed through the process of creating page content.

### after\_create\_page

Do something with a `Page` object after it has been saved to the database (as a published page or a revision). The callable passed to this hook should take a `request` object and a `page` object. The function does not have to return anything, but if an object with a `status_code` property is returned, Wagtail will use it as a response object. By default, Wagtail will instead redirect to the Explorer page for the new page's parent.

```
from django.http import HttpResponseRedirect

from wagtail.core import hooks

@hooks.register('after_create_page')
def do_after_page_create(request, page):
    return HttpResponseRedirect("Congrats on making content!", content_type="text/
↪plain")
```

### before\_create\_page

Called at the beginning of the “create page” view passing in the request, the parent page and page model class.

The function does not have to return anything, but if an object with a `status_code` property is returned, Wagtail will use it as a response object and skip the rest of the view.

Unlike, `after_create_page`, this is run both for both GET and POST requests.

This can be used to completely override the editor on a per-view basis:

```
from wagtail.core import hooks

from .models import AwesomePage
from .admin_views import edit_awesome_page

@hooks.register('before_create_page')
def before_create_page(request, parent_page, page_class):
    # Use a custom create view for the AwesomePage model
    if page_class == AwesomePage:
        return create_awesome_page(request, parent_page)
```

### after\_delete\_page

Do something after a `Page` object is deleted. Uses the same behaviour as `after_create_page`.

**before\_delete\_page**

Called at the beginning of the “delete page” view passing in the request and the page object.

Uses the same behaviour as `before_create_page`.

**after\_edit\_page**

Do something with a `Page` object after it has been updated. Uses the same behaviour as `after_create_page`.

**before\_edit\_page**

Called at the beginning of the “edit page” view passing in the request and the page object.

Uses the same behaviour as `before_create_page`.

**after\_copy\_page**

Do something with a `Page` object after it has been copied passing in the request, page object and the new copied page. Uses the same behaviour as `after_create_page`.

**before\_copy\_page**

Called at the beginning of the “copy page” view passing in the request and the page object.

Uses the same behaviour as `before_create_page`.

**after\_move\_page**

Do something with a `Page` object after it has been moved passing in the request and page object. Uses the same behaviour as `after_create_page`.

**before\_move\_page**

Called at the beginning of the “move page” view passing in the request, the page object and the destination page object.

Uses the same behaviour as `before_create_page`.

**register\_page\_action\_menu\_item**

Add an item to the popup menu of actions on the page creation and edit views. The callable passed to this hook must return an instance of `wagtail.admin.action_menu.ActionMenuItem`. The following attributes and methods are available to be overridden on subclasses of `ActionMenuItem`:

**order** an integer (default 100) which determines the item's position in the menu. Can also be passed as a keyword argument to the object constructor. The lowest-numbered item in this sequence will be selected as the default menu item; as standard, this is "Save draft" (which has an `order` of 0).

**label** the displayed text of the menu item

**get\_url** a method which returns a URL for the menu item to link to; by default, returns `None` which causes the menu item to behave as a form submit button instead

**name** value of the `name` attribute of the submit button, if no URL is specified

**is\_shown** a method which returns a boolean indicating whether the menu item should be shown; by default, true except when editing a locked page

**template** path to a template to render to produce the menu item HTML

**get\_context** a method that returns a context dictionary to pass to the template

**render\_html** a method that returns the menu item HTML; by default, renders `template` with the context returned from `get_context`

**Media** an inner class defining Javascript and CSS to import when this menu item is shown - see [Django form media](#)

The `get_url`, `is_shown`, `get_context` and `render_html` methods all accept a request object and a context dictionary containing the following fields:

**view** name of the current view: 'create', 'edit' or 'revisions\_revert'

**page** For view = 'edit' or 'revisions\_revert', the page being edited

**parent\_page** For view = 'create', the parent page of the page being created

**user\_page\_permissions** a `UserPagePermissionsProxy` object for the current user, to test permissions against

```
from wagtail.core import hooks
from wagtail.admin.action_menu import ActionMenuItem

class GuacamoleMenuItem(ActionMenuItem):
    name = 'action-guacamole'
    label = "Guacamole"

    def get_url(self, request, context):
        return "https://www.youtube.com/watch?v=dNJdJIwCF_Y"

@hooks.register('register_page_action_menu_item')
def register_guacamole_menu_item():
    return GuacamoleMenuItem(order=10)
```

### `construct_page_action_menu`

Modify the final list of action menu items on the page creation and edit views. The callable passed to this hook receives a list of `ActionMenuItem` objects, a request object and a context dictionary as per `register_page_action_menu_item`, and should modify the list of menu items in-place.



```
@hooks.register('construct_page_action_menu')
def remove_submit_to_moderator_option(menu_items, request, context):
    menu_items[:] = [item for item in menu_items if item.name != 'action-
↳submit']
```

The `construct_page_action_menu` hook is called after the menu items have been sorted by their order attributes, and so setting a menu item's order will have no effect at this point. Instead, items can be reordered by changing their position in the list, with the first item being selected as the default action. For example, to change the default action to Publish:

```
@hooks.register('construct_page_action_menu')
def make_publish_default_action(menu_items, request, context):
    for (index, item) in enumerate(menu_items):
        if item.name == 'action-publish':
            # move to top of list
            menu_items.pop(index)
            menu_items.insert(0, item)
            break
```

### construct\_page\_listing\_buttons

Modify the final list of page listing buttons in the page explorer. The callable passed to this hook receives a list of Button objects, a request object and a context dictionary as per `register_page_action_menu_item`, and should modify the list of menu items in-place.

```
@hooks.register('construct_page_listing_buttons')
def remove_page_listing_button_item(buttons, page, page_perms, is_
↳parent=False, context=None):
    if is_parent:
        buttons.pop() # removes the last 'more' dropdown button on the_
↳parent page listing buttons
```

### construct\_wagtail\_userbar

Add or remove items from the wagtail userbar. Add, edit, and moderation tools are provided by default. The callable passed into the hook must take the request object and a list of menu objects, `items`. The menu item objects must have a `render` method which can take a request object and return the HTML string representing the menu item. See the userbar templates and menu item classes for more information.

```
from wagtail.core import hooks

class UserbarPuppyLinkItem:
    def render(self, request):
        return '<li><a href="http://cuteoverload.com/tag/puppehs/" ' ' \
            + 'target="_parent" class="action icon icon-wagtail">Puppies!</a>
↳</li>'

@hooks.register('construct_wagtail_userbar')
def add_puppy_link_item(request, items):
    return items.append( UserbarPuppyLinkItem() )
```

## Admin workflow

Hooks for customising the way admins are directed through the process of editing users.

### `after_create_user`

Do something with a `User` object after it has been saved to the database. The callable passed to this hook should take a `request` object and a `user` object. The function does not have to return anything, but if an object with a `status_code` property is returned, Wagtail will use it as a response object. By default, Wagtail will instead redirect to the User index page.

```
from django.http import HttpResponseRedirect

from wagtail.core import hooks

@hooks.register('after_create_user')
def do_after_page_create(request, user):
    return HttpResponseRedirect("Congrats on creating a new user!", content_type=
↪ "text/plain")
```

### `before_create_user`

Called at the beginning of the “create user” view passing in the request.

The function does not have to return anything, but if an object with a `status_code` property is returned, Wagtail will use it as a response object and skip the rest of the view.

Unlike, `after_create_user`, this is run both for both GET and POST requests.

This can be used to completely override the user editor on a per-view basis:

```
from django.http import HttpResponseRedirect

from wagtail.core import hooks

from .models import AwesomePage
from .admin_views import edit_awesome_page

@hooks.register('before_create_user')
def before_create_page(request):
    return HttpResponseRedirect("A user creation form", content_type="text/plain")
```

### `after_delete_user`

Do something after a `User` object is deleted. Uses the same behaviour as `after_create_user`.

### `before_delete_user`

Called at the beginning of the “delete user” view passing in the request and the user object.

Uses the same behaviour as `before_create_user`.

### after\_edit\_user

Do something with a `User` object after it has been updated. Uses the same behaviour as `after_create_user`.

### before\_edit\_user

Called at the beginning of the “edit user” view passing in the request and the user object.

Uses the same behaviour as `before_create_user`.

## Choosers

### construct\_page\_chooser\_queryset

Called when rendering the page chooser view, to allow the page listing `QuerySet` to be customised. The callable passed into the hook will receive the current page `QuerySet` and the request object, and must return a `Page QuerySet` (either the original one, or a new one).

```
from wagtail.core import hooks

@hooks.register('construct_page_chooser_queryset')
def show_my_pages_only(pages, request):
    # Only show own pages
    pages = pages.filter(owner=request.user)

    return pages
```

### construct\_document\_chooser\_queryset

Called when rendering the document chooser view, to allow the document listing `QuerySet` to be customised. The callable passed into the hook will receive the current document `QuerySet` and the request object, and must return a `Document QuerySet` (either the original one, or a new one).

```
from wagtail.core import hooks

@hooks.register('construct_document_chooser_queryset')
def show_my_uploaded_documents_only(documents, request):
    # Only show uploaded documents
    documents = documents.filter(uploaded_by_user=request.user)

    return documents
```

### construct\_image\_chooser\_queryset

Called when rendering the image chooser view, to allow the image listing `QuerySet` to be customised. The callable passed into the hook will receive the current image `QuerySet` and the request object, and must return an `Image QuerySet` (either the original one, or a new one).

```
from wagtail.core import hooks

@hooks.register('construct_image_chooser_queryset')
def show_my_uploaded_images_only(images, request):
    # Only show uploaded images
    images = images.filter(uploaded_by_user=request.user)

    return images
```

## Page explorer

### construct\_explorer\_page\_queryset

Called when rendering the page explorer view, to allow the page listing QuerySet to be customised. The callable passed into the hook will receive the parent page object, the current page QuerySet, and the request object, and must return a Page QuerySet (either the original one, or a new one).

```
from wagtail.core import hooks

@hooks.register('construct_explorer_page_queryset')
def show_my_profile_only(parent_page, pages, request):
    # If we're in the 'user-profiles' section, only show the user's own
    # profile
    if parent_page.slug == 'user-profiles':
        pages = pages.filter(owner=request.user)

    return pages
```

### register\_page\_listing\_buttons

Add buttons to the actions list for a page in the page explorer. This is useful when adding custom actions to the listing, such as translations or a complex workflow.

This example will add a simple button to the listing:

```
from wagtail.admin import widgets as wagtailadmin_widgets

@hooks.register('register_page_listing_buttons')
def page_listing_buttons(page, page_perms, is_parent=False):
    yield wagtailadmin_widgets.PageListingButton(
        'A page listing button',
        '/goes/to/a/url/',
        priority=10
    )
```

The `priority` argument controls the order the buttons are displayed in. Buttons are ordered from low to high priority, so a button with `priority=10` will be displayed before a button with `priority=20`.

### register\_page\_listing\_more\_buttons

Add buttons to the “More” dropdown menu for a page in the page explorer. This works similarly to the `register_page_listing_buttons` hook but is useful for lesser-used custom actions that are better suited for the dropdown.

This example will add a simple button to the dropdown menu:

```
from wagtail.admin import widgets as wagtailadmin_widgets

@hooks.register('register_page_listing_more_buttons')
def page_listing_more_buttons(page, page_perms, is_parent=False):
    yield wagtailadmin_widgets.Button(
        'A dropdown button',
        '/goes/to/a/url/',
        priority=60
    )
```

The `priority` argument controls the order the buttons are displayed in the dropdown. Buttons are ordered from low to high priority, so a button with `priority=10` will be displayed before a button with `priority=60`.

## Buttons with dropdown lists

The admin widgets also provide `ButtonWithDropdownFromHook`, which allows you to define a custom hook for generating a dropdown menu that gets attached to your button.

Creating a button with a dropdown menu involves two steps. Firstly, you add your button to the `register_page_listing_buttons` hook, just like the example above. Secondly, you register a new hook that yields the contents of the dropdown menu.

This example shows how Wagtail's default admin dropdown is implemented. You can also see how to register buttons conditionally, in this case by evaluating the `page_perms`:

```
from wagtail.admin import widgets as wagtailadmin_widgets

@hooks.register('register_page_listing_buttons')
def page_custom_listing_buttons(page, page_perms, is_parent=False):
    yield wagtailadmin_widgets.ButtonWithDropdownFromHook(
        'More actions',
        hook_name='my_button_dropdown_hook',
        page=page,
        page_perms=page_perms,
        is_parent=is_parent,
        priority=50
    )

@hooks.register('my_button_dropdown_hook')
def page_custom_listing_more_buttons(page, page_perms, is_parent=False):
    if page_perms.can_move():
        yield wagtailadmin_widgets.Button('Move', reverse('wagtailadmin_
↪pages:move', args=[page.id]), priority=10)
    if page_perms.can_delete():
        yield wagtailadmin_widgets.Button('Delete', reverse('wagtailadmin_
↪pages:delete', args=[page.id]), priority=30)
    if page_perms.can_unpublish():
        yield wagtailadmin_widgets.Button('Unpublish', reverse('wagtailadmin_
↪pages:unpublish', args=[page.id]), priority=40)
```

The template for the dropdown button can be customised by overriding `wagtailadmin/pages/listing/_button_with_dropdown.html`. The JavaScript that runs the dropdowns makes use of custom data attributes, so you should leave `data-dropdown` and `data-dropdown-toggle` in the markup if you customise it.

## Page serving

### `before_serve_page`

Called when Wagtail is about to serve a page. The callable passed into the hook will receive the page object, the request object, and the `args` and `kwargs` that will be passed to the page's `serve()` method. If the callable returns an `HttpResponse`, that response will be returned immediately to the user, and Wagtail will not proceed to call `serve()` on the page.

```
from django.http import HttpResponse

from wagtail.core import hooks

@hooks.register('before_serve_page')
def block_googlebot(page, request, serve_args, serve_kwargs):
    if request.META.get('HTTP_USER_AGENT') == 'GoogleBot':
        return HttpResponse("<h1>bad googlebot no cookie</h1>")
```

## Document serving

### `before_serve_document`

Called when Wagtail is about to serve a document. The callable passed into the hook will receive the document object and the request object. If the callable returns an `HttpResponse`, that response will be returned immediately to the user, instead of serving the document. Note that this hook will be skipped if the `WAGTAILDOCS_SERVE_METHOD` setting is set to `direct`.

## 1.4.5 Signals

Wagtail's `PageRevision` and `Page` implement [Signals](#) from `django.dispatch`. Signals are useful for creating side-effects from page publish/unpublish events.

For example, you could use signals to send publish notifications to a messaging service, or POST messages to another app that's consuming the API, such as a static site generator.

### `page_published`

This signal is emitted from a `PageRevision` when a revision is set to *published*.

**sender** The page class

**instance** The specific `Page` instance.

**revision** The `PageRevision` that was published

**kwargs** Any other arguments passed to `page_published.send()`.

To listen to a signal, implement `page_published.connect(receiver, sender, **kwargs)`. Here's a simple example showing how you might notify your team when something is published:

```
from wagtail.core.signals import page_published
import urllib
import urllib2
```

(continues on next page)

(continued from previous page)

```

# Let everyone know when a new page is published
def send_to_slack(sender, **kwargs):
    instance = kwargs['instance']
    url = 'https://hooks.slack.com/services/T00000000/B00000000/
↪XXXXXXXXXXXXXXXXXXXXX'
    values = {
        "text" : "%s was published by %s " % (instance.title, instance.owner.
↪username),
        "channel": "#publish-notifications",
        "username": "the squid of content",
        "icon_emoji": ":octopus:"
    }

    data = urllib.urlencode(values)
    req = urllib2.Request(url, data)
    response = urllib2.urlopen(req)

# Register a receiver
page_published.connect(send_to_slack)

```

## Receiving specific model events

Sometimes you're not interested in receiving signals for every model, or you want to handle signals for specific models in different ways. For instance, you may wish to do something when a new blog post is published:

```

from wagtail.core.signals import page_published
from mysite.models import BlogPostPage

# Do something clever for each model type
def receiver(sender, **kwargs):
    # Do something with blog posts
    pass

# Register listeners for each page model class
page_published.connect(receiver, sender=BlogPostPage)

```

Wagtail provides access to a list of registered page types through the `get_page_models()` function in `wagtail.core.models`.

Read the [Django documentation](#) for more information about specifying senders.

## page\_unpublished

This signal is emitted from a `Page` when the page is unpublished.

**sender** The page class

**instance** The specific `Page` instance.

**kwargs** Any other arguments passed to `page_unpublished.send()`

## 1.4.6 The project template

```
mysite/
  home/
    migrations/
      __init__.py
      0001_initial.py
      0002_create_homepage.py
    templates/
      home/
        home_page.html
      __init__.py
      models.py
  search/
    templates/
      search/
        search.html
      __init__.py
      views.py
  mysite/
    settings/
      __init__.py
      base.py
      dev.py
      production.py
    static/
      css/
        mysite.css
      js/
        mysite.js
    templates/
      404.html
      500.html
      base.html
      __init__.py
      urls.py
      wsgi.py
  Dockerfile
  manage.py
  requirements.txt
```

### The “home” app

Location: `/mysite/home/`

This app is here to help get you started quicker by providing a `HomePage` model with migrations to create one when you first set up your app.

### Default templates and static files

Location: `/mysite/mysite/templates/` and `/mysite/mysite/static/`

The templates directory contains `base.html`, `404.html` and `500.html`. These files are very commonly needed on Wagtail sites so they have been added into the template.

The static directory contains an empty JavaScript and CSS file.



## Django settings

Location: `/mysite/mysite/settings/`

The Django settings files are split up into `base.py`, `dev.py`, `production.py` and `local.py`.

**base.py** This file is for global settings that will be used in both development and production. Aim to keep most of your configuration in this file.

**dev.py** This file is for settings that will only be used by developers. For example: `DEBUG = True`

**production.py** This file is for settings that will only run on a production server. For example: `DEBUG = False`

**local.py** This file is used for settings local to a particular machine. This file should never be tracked by a version control system.

---

**Tip:** On production servers, we recommend that you only store secrets in `local.py` (such as API keys and passwords). This can save you headaches in the future if you are ever trying to debug why a server is behaving badly. If you are using multiple servers which need different settings then we recommend that you create a different `production.py` file for each one.

---

## Dockerfile

Location: `/mysite/Dockerfile`

Contains configuration for building and deploying the site as a [Docker](#) container. To build and use the Docker image for your project, run:

```
docker build -t mysite .
docker run -p 8000:8000 mysite
```

## 1.5 Support

If you have any problems or questions about working with Wagtail, you are invited to visit any of the following support channels, where volunteer members of the Wagtail community will be happy to assist.

**Please respect the time and effort of volunteers, by not asking the same question in multiple places.** At best, you'll be spamming the same set of people each time; at worst, you'll waste the effort of volunteers who spend time answering a question unaware that it has already been answered elsewhere. If you absolutely must ask a question on multiple forums, post it on Stack Overflow first and include the Stack Overflow link in your subsequent posts.

### 1.5.1 Stack Overflow

[Stack Overflow](#) is the best place to find answers to your questions about working with Wagtail - there is an active community of Wagtail users and developers responding to questions there. When posting questions, please read Stack Overflow's advice on [how to ask questions](#) and remember to tag your question with "wagtail".

### 1.5.2 Mailing list

For topics and discussions that do not fit Stack Overflow's question-and-answer format, there is a Wagtail Support mailing list at [groups.google.com/d/forum/wagtail](https://groups.google.com/d/forum/wagtail).

### 1.5.3 Slack

The Wagtail Slack workspace is open to all users and developers of Wagtail. To join, head to: <https://wagtail.io/slack/>

Please use the **#support** channel for support questions. Support is provided by members of the Wagtail community on a voluntary basis, and we cannot guarantee that questions will be answered quickly (or at all). If you want to see this resource succeed, please consider sticking around to help out! Also, please keep in mind that many of Wagtail's core and expert developers prefer to handle support queries on a non-realtime basis through Stack Overflow, and questions asked there may well get a better response.

### 1.5.4 Issues

If you think you've found a bug in Wagtail, or you'd like to suggest a new feature, please check the current list at [github.com/wagtail/wagtail/issues](https://github.com/wagtail/wagtail/issues). If your bug or suggestion isn't there, raise a new issue, providing as much relevant context as possible.

### 1.5.5 Torchbox

Finally, if you have a query which isn't relevant for any of the above forums, feel free to contact the Wagtail team at Torchbox directly, on [hello@wagtail.io](mailto:hello@wagtail.io) or [@wagtailcms](https://twitter.com/wagtailcms).

## 1.6 Using Wagtail: an Editor's guide

This section of the documentation is written for the users of a Wagtail-powered site. That is, the content editors, moderators and administrators who will be running things on a day-to-day basis.

### 1.6.1 Introduction

**Wagtail** is a new open source content management system (CMS) developed by **Torchbox**. It is built on the Django framework and designed to be super easy to use for both developers and editors.

This documentation will explain how to:

- navigate the main user interface of Wagtail
- create pages of all different types
- modify, save, publish and unpublish pages
- how to set up users, and provide them with specific roles to create a publishing workflow
- upload, edit and include images and documents
- ... and more!

### 1.6.2 Getting started

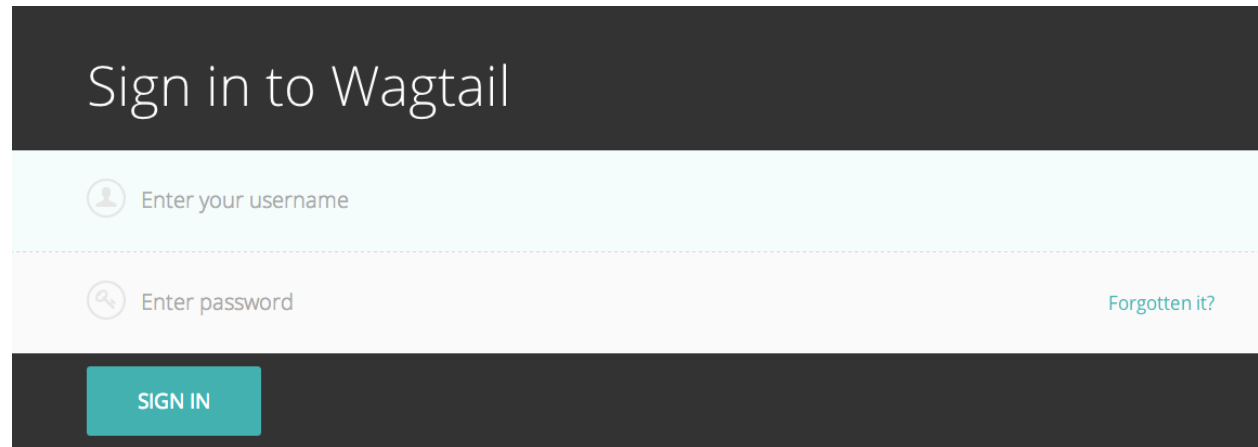
#### The Wagtail demo site

The examples in this document are based on [Torchbox.com](https://demo.wagtail.io). However, the instructions are general enough as to be applicable to any Wagtail site.

For the purposes of this documentation we will be using the URL, **www.example.com**, to represent the root (home-page) of your website.

## Logging in

- The first port of call for an editor is the login page for the administrator interface.
- Access this by adding **/admin** onto the end of your root URL (e.g. `www.example.com/admin`).
- Enter your username and password and click **Sign in**.

The image shows the Wagtail sign-in page. It has a dark grey header with the text "Sign in to Wagtail" in white. Below the header is a light blue box containing a username input field with a person icon and the placeholder text "Enter your username". Below that is a password input field with a key icon and the placeholder text "Enter password". To the right of the password field is a link that says "Forgotten it?". At the bottom of the form is a teal button with the text "SIGN IN" in white.

### 1.6.3 Finding your way around

This section describes the different pages that you will see as you navigate around the CMS, and how you can find the content that you are looking for.

#### The Dashboard

The Dashboard provides information on:

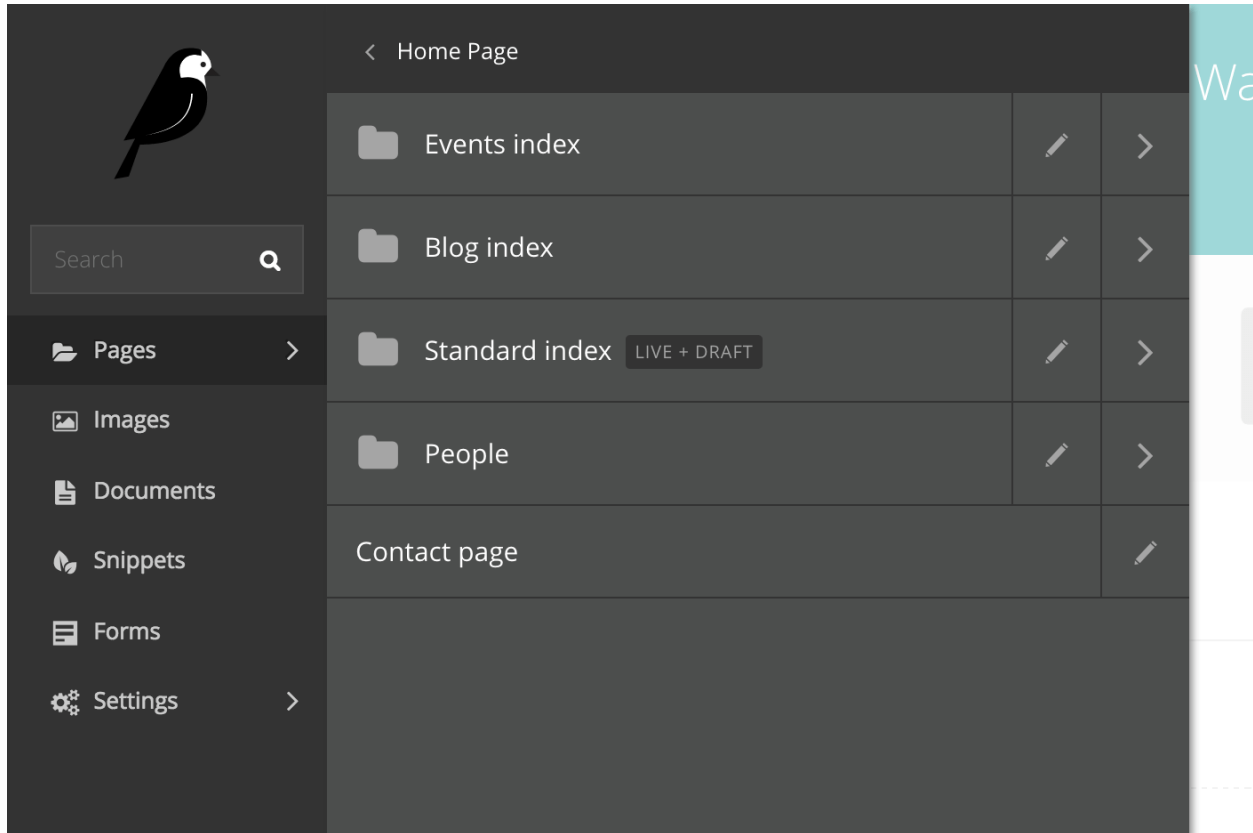
- The number of pages, images, and documents currently held in the Wagtail CMS
- Any pages currently awaiting moderation (if you have these privileges)
- Your most recently edited pages

You can return to the Dashboard at any time by clicking the Wagtail logo in the top-left of the screen.

The screenshot shows the Wagtail CMS dashboard for user 'admin'. The interface includes a dark sidebar on the left with navigation links: Pages, Images, Documents, Snippets, Forms, and Settings. The main content area has a teal header with a welcome message and a summary of content: 54 Pages, 12 Images, and 0 Documents. Below this, there are two tables. The first table, 'PAGES AWAITING MODERATION', lists a page titled 'It's a blog page' with parent 'Blog' and type 'Blog Page', edited 0 minutes ago by Chris Rogers. The second table, 'YOUR MOST RECENT EDITS', lists three pages: 'Standard index' (1 month, 3 weeks ago, LIVE + DRAFT), 'Test to add child pages to' (1 month, 3 weeks ago, LIVE), and a long title test (2 months, 1 week ago, LIVE + DRAFT). The bottom of the sidebar shows the user's profile as 'ADMIN'.


- Clicking the logo returns you to your Dashboard.
- The stats at the top of the page describe the total amount of content on the CMS (just for fun!).
- The *Pages awaiting moderation* table will only be displayed if you have moderator or administrator privileges
  - Clicking the name of a page will take you to the ‘Edit page’ interface for this page.
  - Clicking approve or reject will either change the page status to live or return the page to draft status. An email will be sent to the creator of the page giving the result of moderation either way.
  - The *Parent* column tells you what the parent page of the page awaiting moderation is called. Clicking the parent page name will take you to its Edit page.
- The *Your most recent edits* table displays the five pages that you most recently edited.
- The date column displays the date that you edited the page. Hover your mouse over the date for a more exact time/date.
- The status column displays the current status of the page. A page will have one of three statuses:
  - Live: Published and accessible to website visitors
  - Draft: Not live on the website.
  - Live + Draft: A version of the page is live, but a newer version is in draft mode.

## The Explorer menu






- Click the Pages button in the sidebar to open the explorer. This allows you to navigate through the sections of the site.
- Clicking the name of a page will take you to the Explorer page for that section.
- Clicking the edit icon for a page will take you to its edit screen.
- Clicking the arrow takes you to the sub-section.
- Clicking the section title takes you back to where you were.

### Using search

 **SEARCH**

THERE ARE 8 MATCHING PAGES

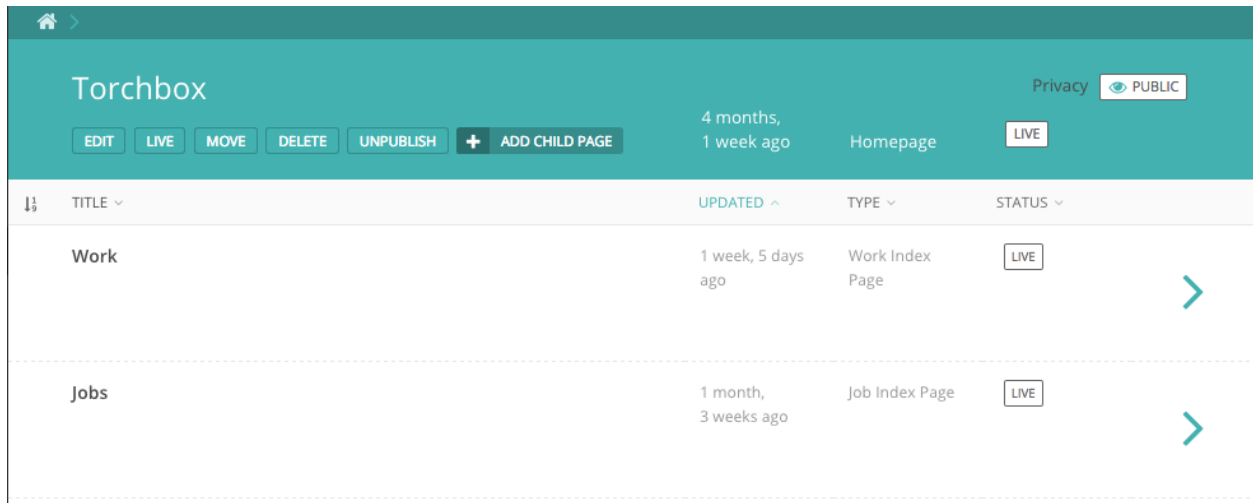
OTHER SEARCHES  Images  Documents  Users

| TITLE                     | PARENT               | UPDATED                 | TYPE      | STATUS            |
|---------------------------|----------------------|-------------------------|-----------|-------------------|
| Wagtail                   | <a href="#">Work</a> | 6 months,<br>1 week ago | Work Page | <span>LIVE</span> |
| Wagtail in one line       | <a href="#">Blog</a> | 6 months,<br>1 week ago | Blog Page | <span>LIVE</span> |
| Meet Wagtail, our new CMS | <a href="#">Blog</a> | 6 months,<br>1 week ago | Blog Page | <span>LIVE</span> |

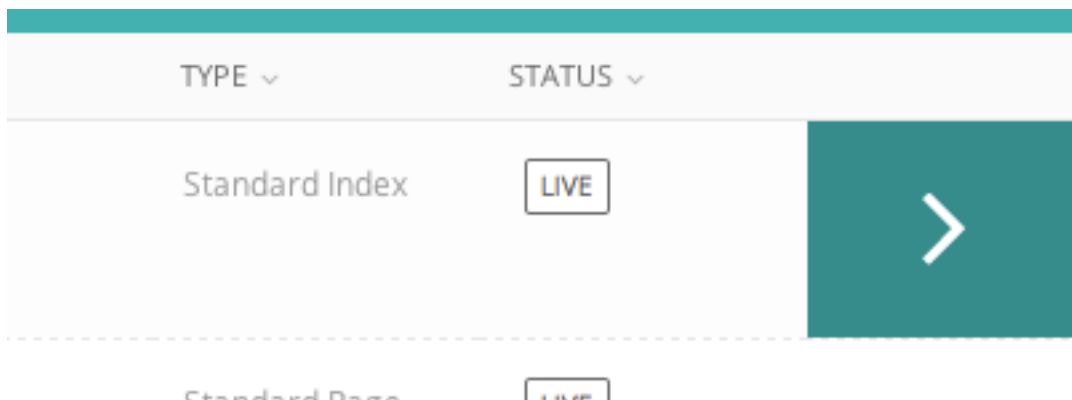
- A very easy way to find the page that you want is to use the main search feature, accessible from the left-hand menu.
- Simply type in part or all of the name of the page you are looking for, and the results below will automatically update as you type.
- Clicking the page title in the results will take you to the Edit page for that result. You can differentiate between similar named pages using the Parent column, which tells you what the parent page of that page is.

### The Explorer page

The Explorer page allows you to view a page's children and perform actions on them. From here you can publish/unpublish pages, move pages to other sections, drill down further into the content tree, or reorder pages under the parent for the purposes of display in menus.



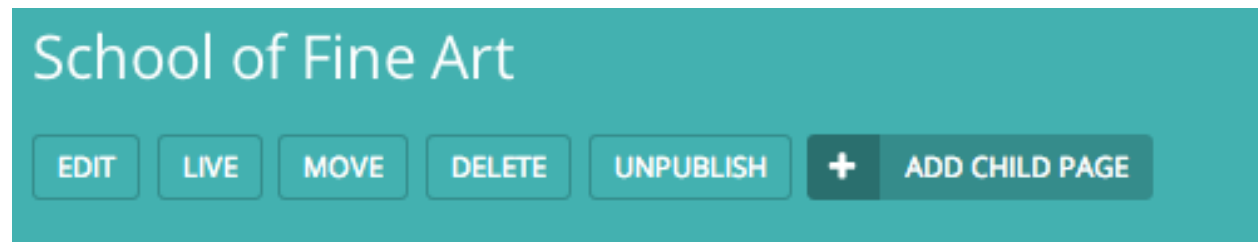
- The name of the section you are looking at is displayed below the breadcrumb (the row of page names beginning with the home icon). Each section is also itself a page (in this case the homepage). Clicking the title of the section takes you to the Edit screen for the section page.
- As the heading suggests, below are the child pages of the section. Clicking the titles of each child page will take you to its Edit screen.



- Clicking the arrows will display a further level of child pages.

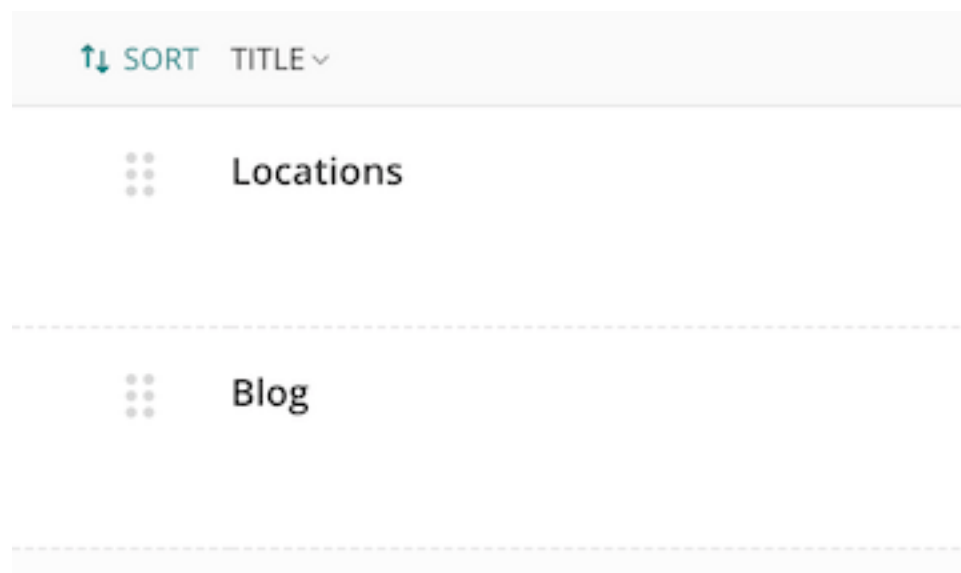


- As you drill down through the site the breadcrumb (the row of pages beginning with the home icon) will display the path you have taken. Clicking on the page titles in the breadcrumb will take you to the Explorer screen for that page.



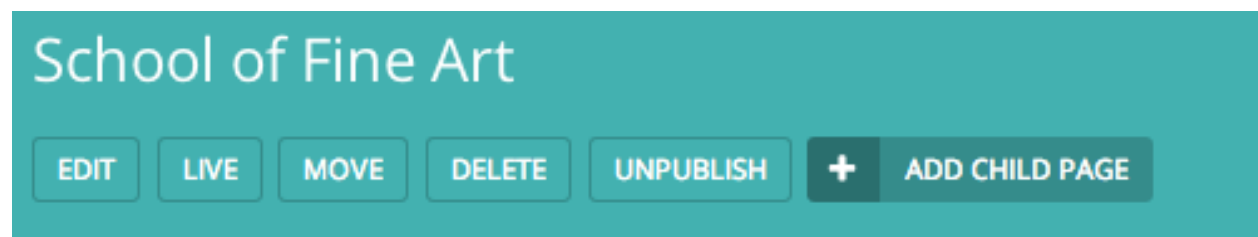
- To add further child pages press the Add child page button below the parent page title. You can view the parent page on the live site by pressing the View live button. The Move button will take you to the Move page screen where you can reposition the page and all its child pages in the site structure.
- Similar buttons are available for each child page. These are made visible on hover.

### Reordering pages



- Clicking the “Sort” control in the header row will enable the reordering handles. This allows you to reorder the way that content displays in the main menu of your website.
- Reorder by dragging the pages by the handles on the far left (the icon made up of 6 dots).
- Your new order will be automatically saved each time you drag and drop an item.

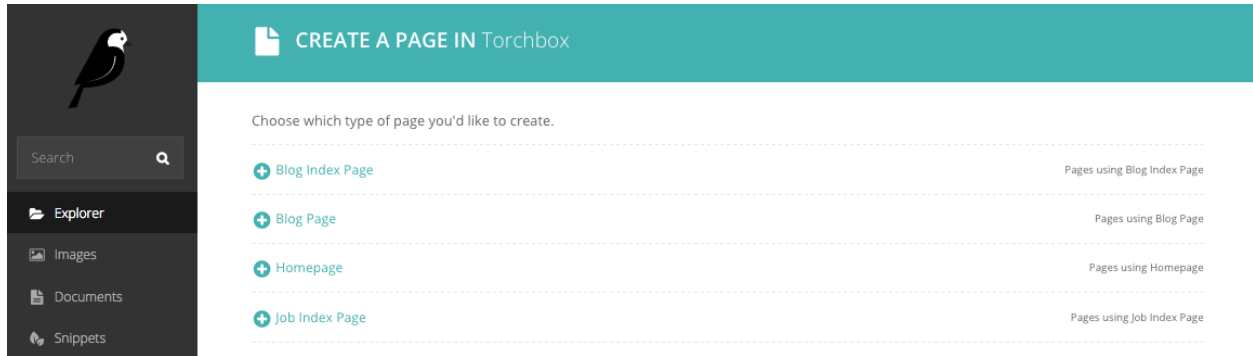
#### 1.6.4 Creating new pages



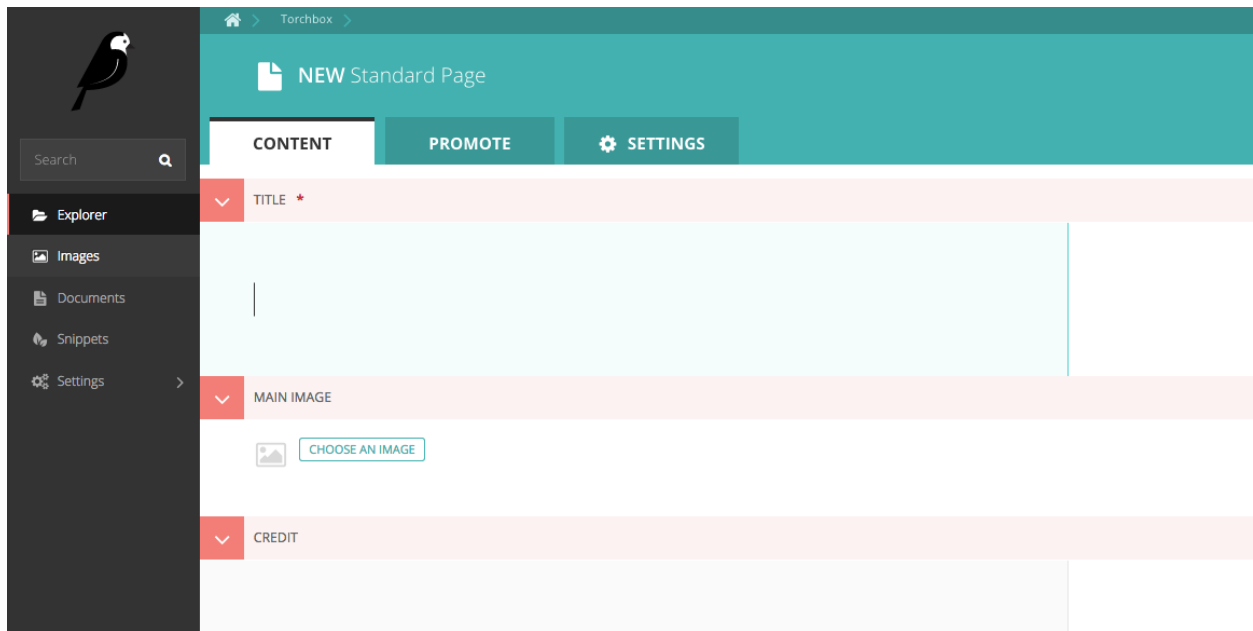
Create new pages by clicking the **Add child page** button. This creates a child page of the section you are currently in. In this case a child page of the ‘School of Fine Art’ page.



## Selecting a page type



- On the left of the page chooser screen are listed all the types of pages that you can create. Clicking the page type name will take you to the Create new page screen for that page type (see below).
- Clicking the *Pages using ... Page* links on the right will display all the pages that exist on the website of this type. This is to help you judge what type of page you will need to complete your task.



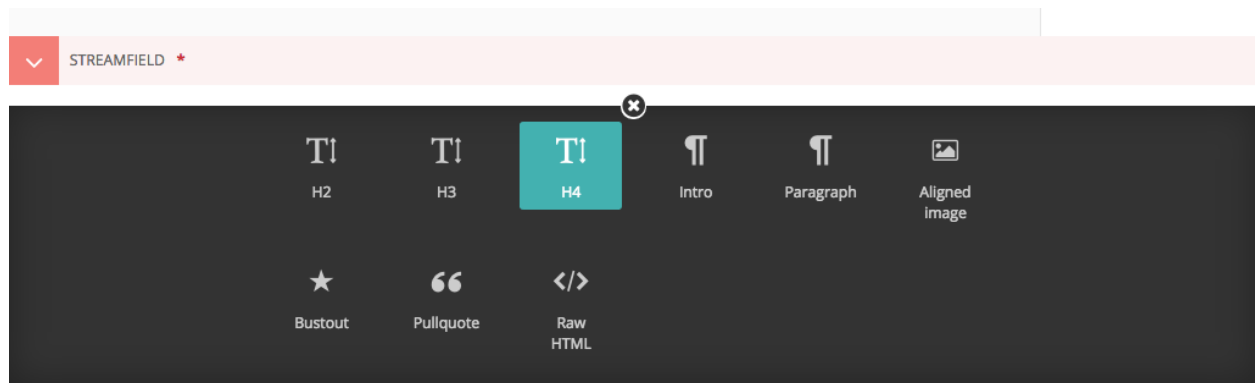
- Once you've selected a page type you will be presented with a blank New page screen.
- Click into the areas below each field's heading to start entering content.

## Creating page body content

Wagtail supports a number of basic fields for creating content, as well as our unique StreamField feature which allows you to construct complex layouts by combining these basic fields in any order.

### StreamField

StreamField allows you to create complex layouts of content on a page by combining a number of different arrangements of content, 'blocks', in any order.



When you first edit a page, you will be presented with the empty StreamField area, with the option to choose one of several block types. The block types on your website may be different from the screenshot here, but the principles are the same.

Click the block type, and the options will disappear, revealing the entry field for that block.

Depending on the block you chose, the field will display differently, and there might even be more than one field! There are a few common field types though that we will talk about here.

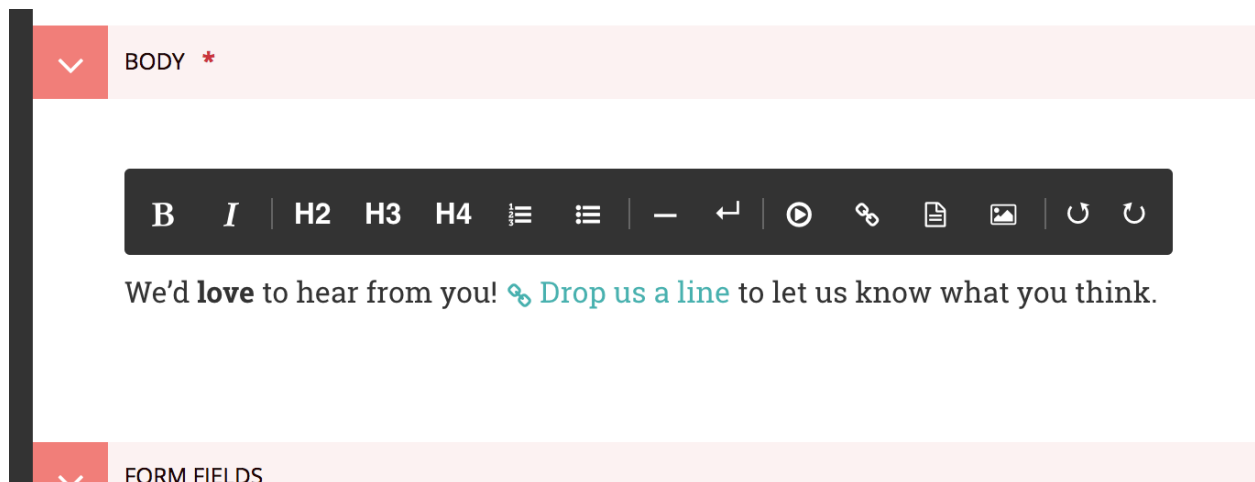
- Basic text field
- Rich text field
- Image field

## Basic text field

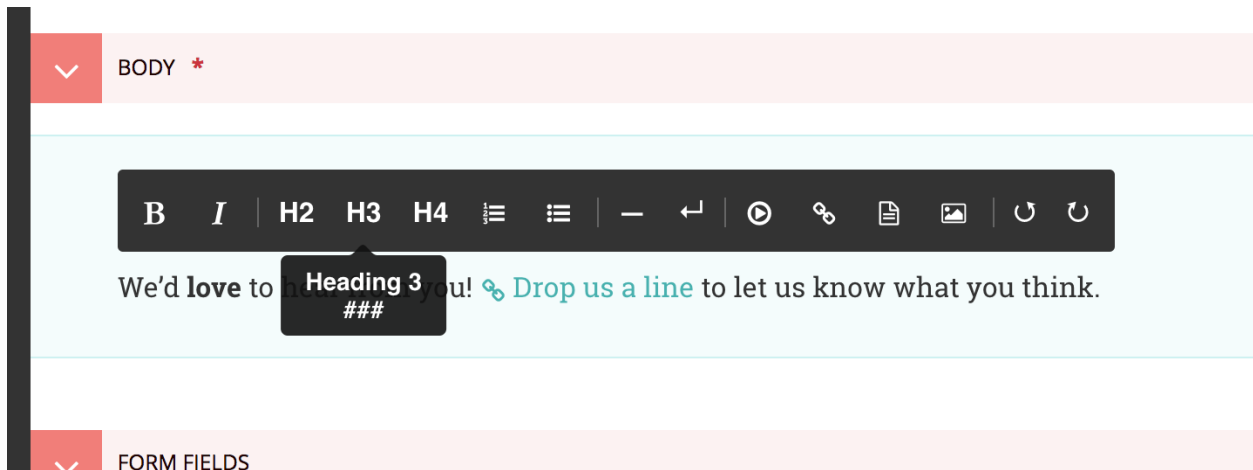
Basic text fields have no formatting options. How these display will be determined by the style of the page in which they are being inserted. Just click into the field and type!

## Rich text fields

Most of the time though, you need formatting options to create beautiful looking pages. Wagtail provides “rich text” fields, which have formatting options similar to those of word processors.



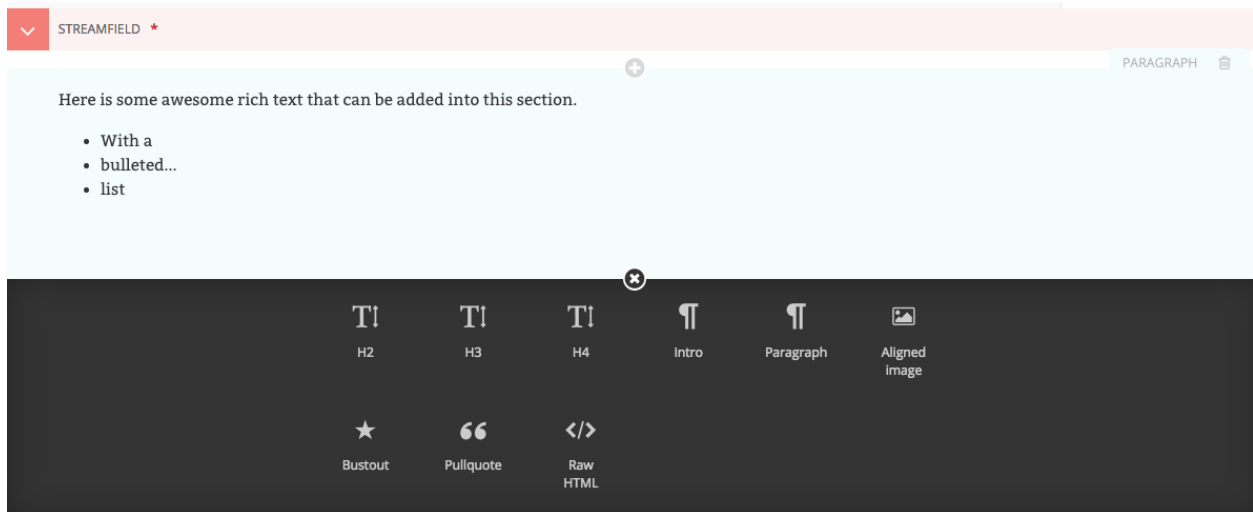
Those fields present a set of tools which allow you to format and style your text. These tools also allow you to insert links, images, videos clips and links to documents. If you want to know more about a specific tool, hover your mouse on the corresponding button so the tooltip appears:



This tooltip shows a longer description of the tool, and displays its keyboard shortcut if there is one. If the keyboard shortcut does not start with CTRL or , it's a [Markdown](#) shortcut to type directly in the editor:

That's the gist of it! If you want more information about the editor, please have a look at its dedicated [user guide](#). It also contains a list of all of the available keyboard shortcuts, and some tricks and gotchas.

## Adding further blocks in StreamField



- To add new blocks, click the '+' icons above or below the existing blocks.
- You'll then be presented once again with the different blocks from which you may choose.
- You can cancel the addition of a new block by clicking the cross at the top of the block selection interface.

## Reordering and deleting content in StreamField



- Click the arrows on the right-hand side of each block to move blocks up and down in the StreamField order of content.
- The blocks will be displayed in the front-end in the order that they are placed in this interface.
- Click the rubbish bin on the far right to delete a field

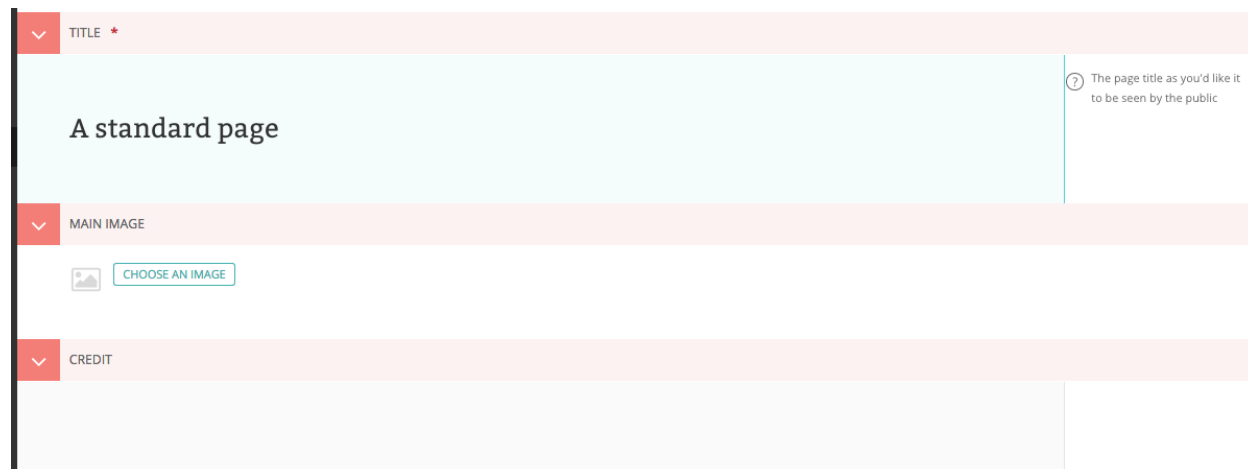
**Warning:** Once a StreamField field is deleted it cannot be retrieved if the page has not been saved. Save your pages regularly so that if you accidentally delete a field you can reload the page to undo your latest edit.

## Inserting images and videos in a page

There will obviously be many instances in which you will want to add images to a page. There are two main ways to add images to pages, either via a specific image chooser field, or via the rich text field image button. Which of these you use will be dependent on the individual setup of your site.

### Inserting images using the image chooser field

Often a specific image field will be used for a main image on a page, or for an image to be used when sharing the page on social media. For the standard page on Torchbox.com, the former is used.



- You insert an image by clicking the *Choose an image* button.

## Choosing an image to insert

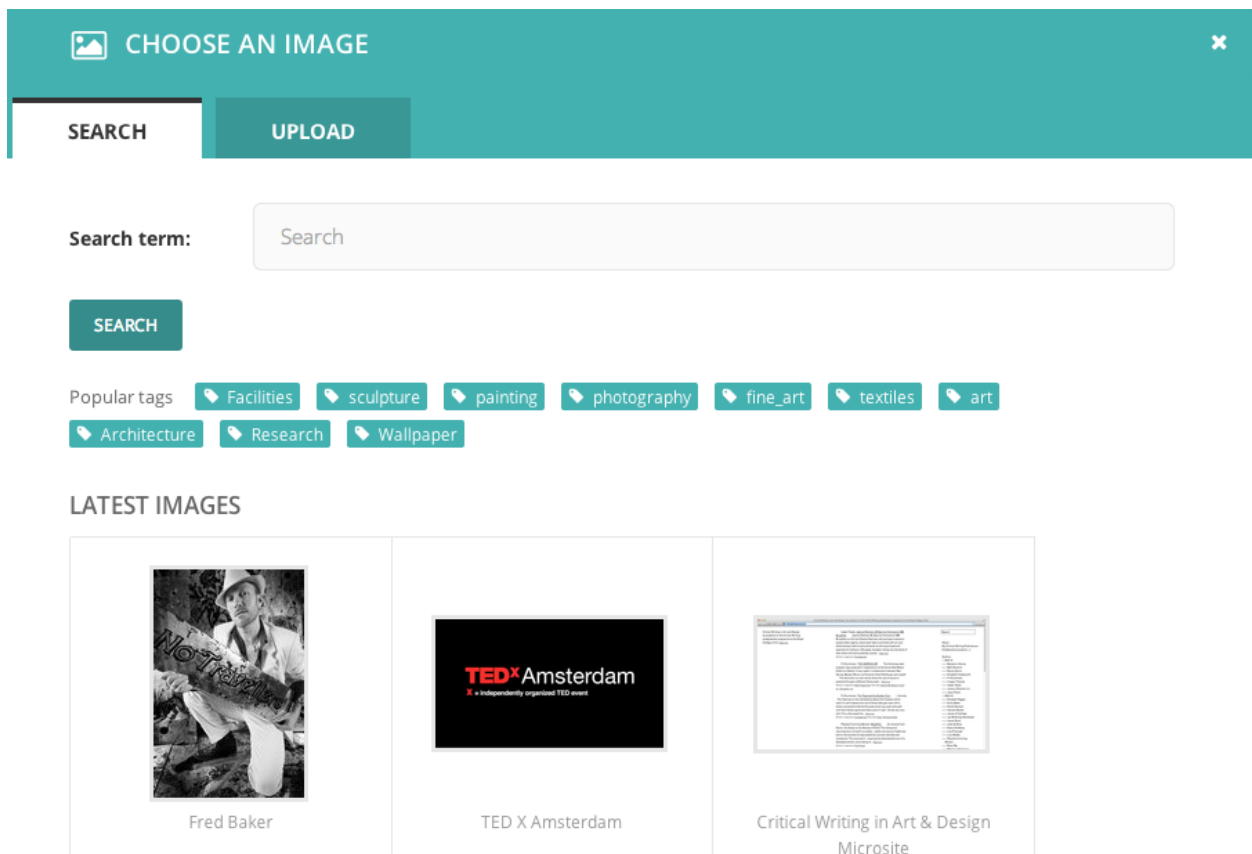
You have two options when selecting an image to insert:

1. Selecting an image from the existing image library, or...
2. Uploading a new image to the CMS

When you click the *Choose an image* button you will be presented with a pop-up with two tabs at the top. The first, *Search*, allows you to search and select from the library. The second, *Upload*, allows you to upload a new image.

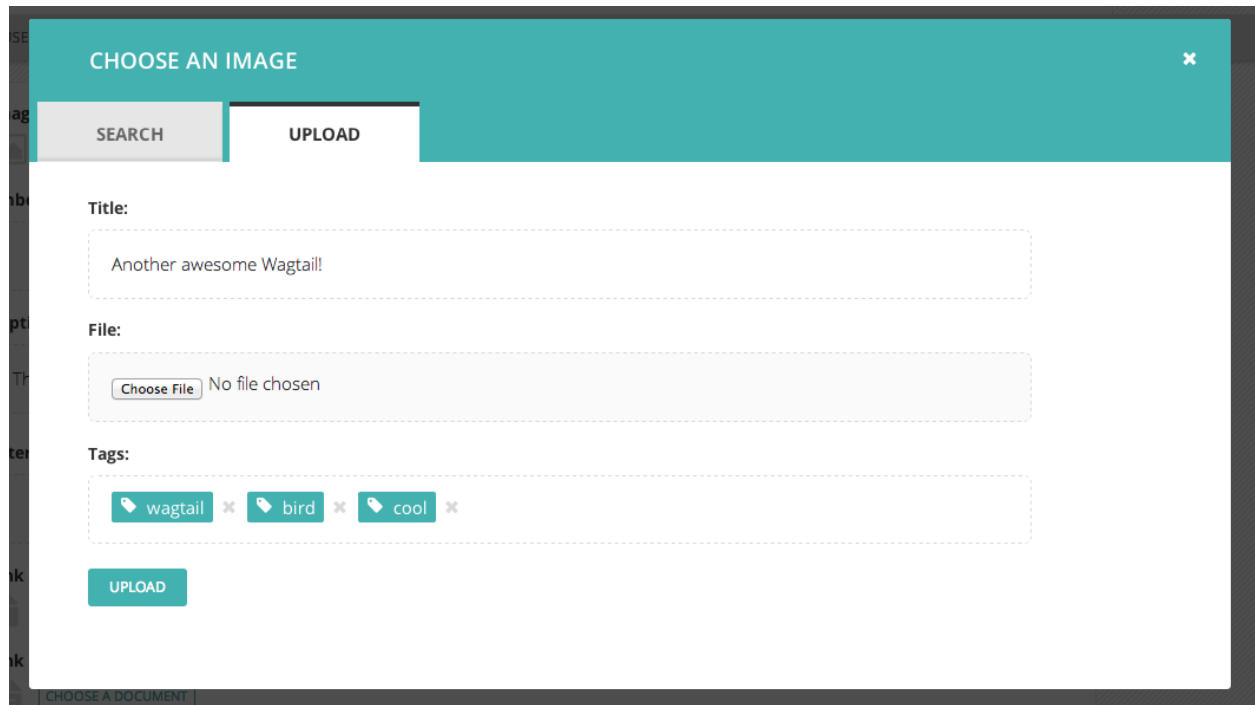
### Choosing an image from the image library

The image below demonstrates finding and inserting an image that is already present in the CMS image library.



1. Typing into the search box will automatically display the results below.
2. Clicking one of the Popular tags will filter the search results by that tag.
3. Clicking an image will take you to the Choose a format window (see image below).

### Uploading a new image to the CMS



CHOOSE AN IMAGE

SEARCH UPLOAD

Title:

Another awesome Wagtail!

File:

Choose File No file chosen

Tags:

wagtail x bird x cool x

UPLOAD


1. You must include an image title for your uploaded image
2. Click the *Choose file* button to choose an image from your computer.
3. *Tags* allows you to associate tags with the image you are uploading. This allows them to be more easily found when searching. Each tag should be separated by a space. Good practice for creating multiple word tags is to use an underscore between each word (e.g. `western_yellow_wagtail`).
4. Click *Upload* to insert the uploaded image into the carousel. The image will also be added to the main CMS image library for reuse in other content.

### Inserting images using the rich text field

Images can also be inserted into the body text of a page via the rich text editor. When working in a rich text field, click the Image control. You will then be presented with the same options as for inserting images into the main carousel.

In addition, Wagtail allows you to choose the format of your image.

CHOOSE A FORMAT



Format:

☒ Full width
 ☐ Left-aligned
 ☐ Right-aligned

Alt text:

INSERT IMAGE

1. You can select how the image is displayed by selecting one of the format options.
2. You must provide specific `alt text` for your image.

The format options available are described below:

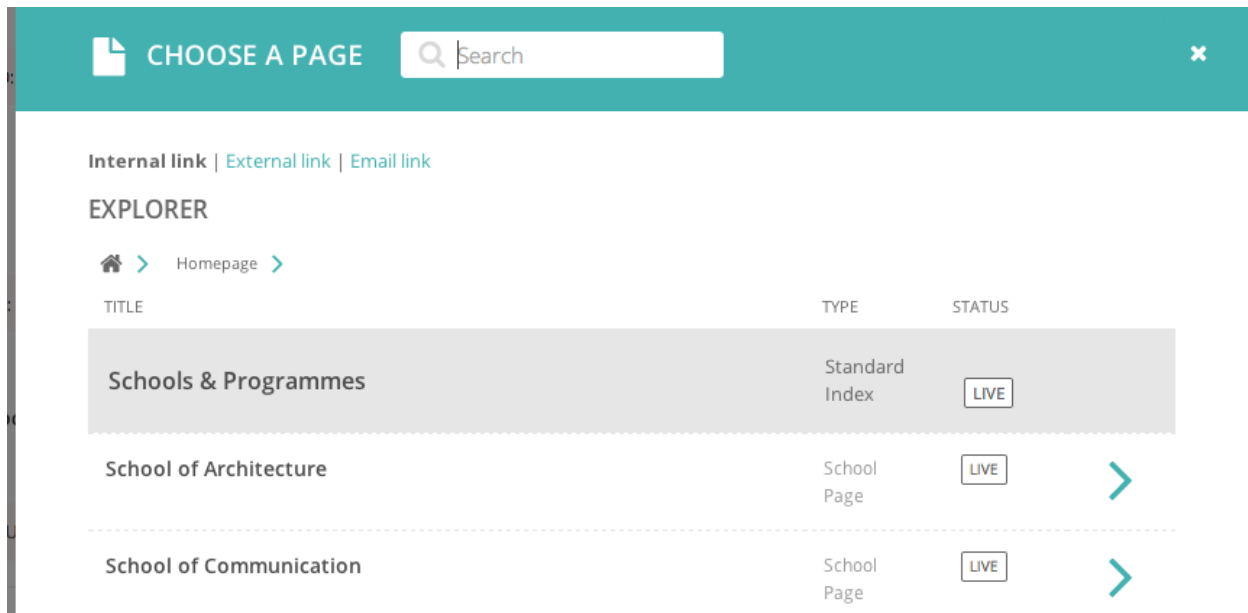
- **Full width:** Image will be inserted using the full width of the text area.
- **Half-width left/right aligned:** Inserts the image at half the width of the text area. If inserted in a block of text, the text will wrap around the image. If two half-width images are inserted together, they will display next to each other.

**Note:** The display of images formatted in this way is dependent on your implementation of Wagtail, so you may get slightly different results.

## Inserting links in a page

Similar to images, there are a variety of points at which you will want to add links. The most common place to insert a link will be in the body text of a page. You can insert a link into the body text by clicking the **Insert link** button in the rich text toolbar.

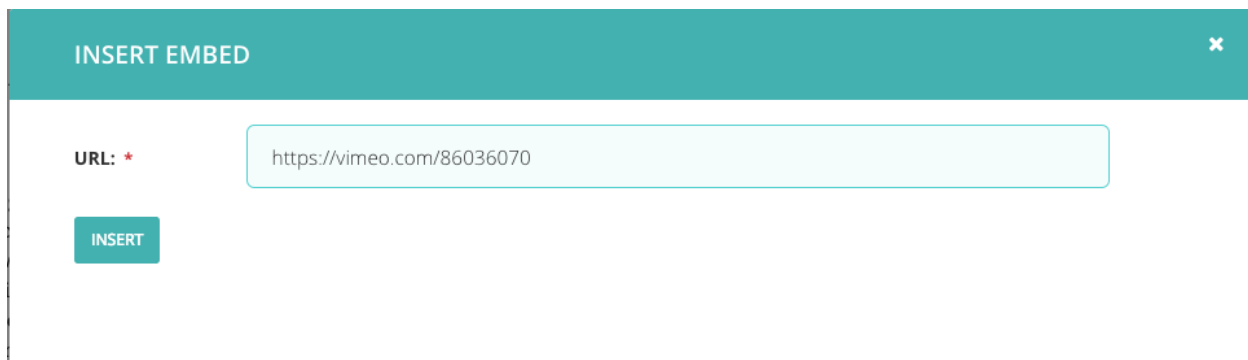
Whichever way you insert a link, you will be presented with the form displayed below.



- Search for an existing page to link to using the search bar at the top of the pop-up.
- Below the search bar you can select the type of link you want to insert. The following types are available:
  - Internal link: A link to an existing page within your website.
  - External link: A link to a page on another website.
  - Email link: A link that will open the user’s default email client with the email address prepopulated.
  - Phone link: A link that will open the user’s default client for initiating audio calls, with the phone number prepopulated.
- You can also navigate through the website to find an internal link via the explorer.

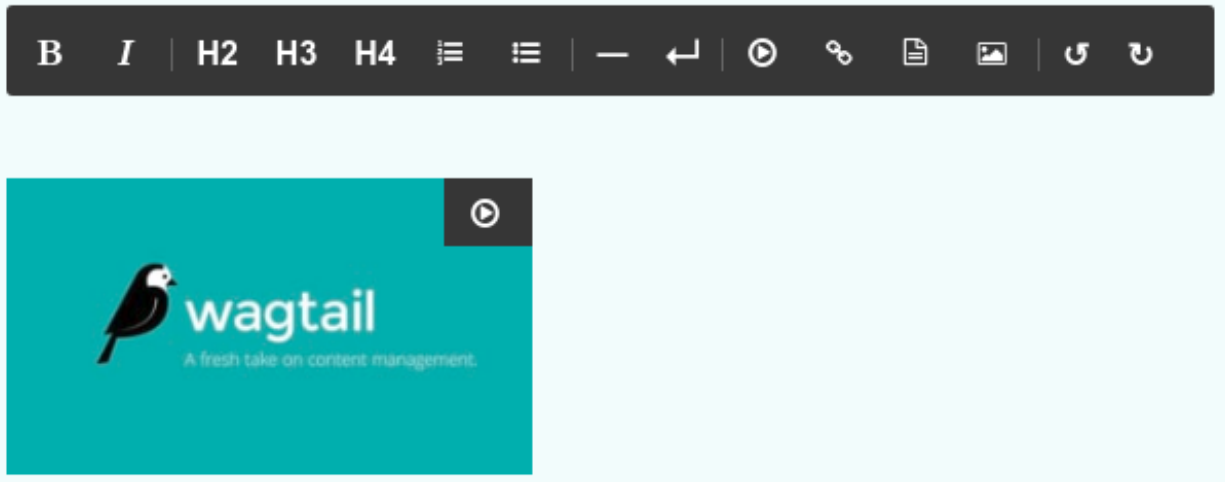
## Inserting videos into body content

It is possible to embed media into the body text of a web page by clicking the *Embed* button in rich text toolbar.



- Copy and paste the web address for the media into the URL field and click Insert.





- A placeholder of the media will be inserted into the text area.

The embed button can be used to import media from a number of supported providers, you can see the [full list of supported providers](#) in Wagtail's source code.

### Inserting links to documents into body text



It is possible to insert links to documents held in the CMS into the body text of a web page by clicking the button above in the rich text field.

The process for doing this is the same as when inserting an image. You are given the choice of either choosing a document from the CMS, or uploading a new document.

CHOOSE A DOCUMENT

×

SEARCH

UPLOAD

Search term:

Search

Collection:

All collections

▼

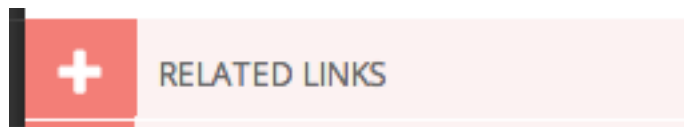
LATEST DOCUMENTS

| TITLE ▼                                       | FILE  | UPLOADED ▼    |
|---|---|---------------|
| THE-SEPARATION-OF-WHITE-AND-PIED-WAGTAILS.pdf | THE-SEPARATION-OF-WHITE-AND-PIED-WAGTAILS.pdf | 0 minutes ago |

Page 1 of 1.

## Adding multiple items

A common feature of Wagtail is the ability to add more than one of a particular type of field or item. For example, you can add as many carousel items or related links as you wish.



- Whenever you see the white cross in the green circle illustrated here, it means you can add multiple objects or items to a page. Clicking the icon will display the fields required for that piece of content. The image below demonstrates this with a *Related link* item.

▼

RELATED LINKS

Link:

CHOOSE A PAGE

External link:

http://www.thelink.com

Link text:

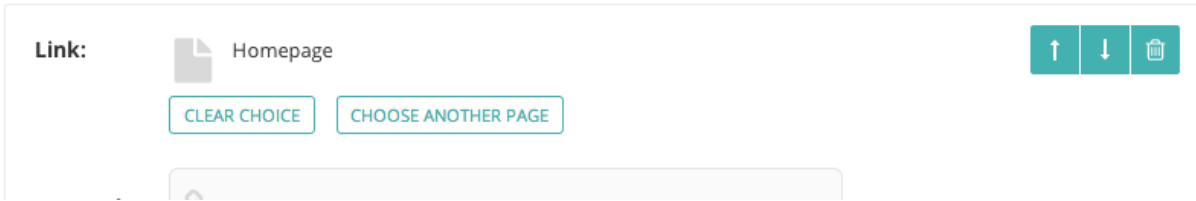
The first link

Link title (or leave blank to use page title)

+

ADD RELATED LINKS

- You can delete an individual item by pressing the trash can in the top-right.
- You can add more items by clicking the link with the white cross again.



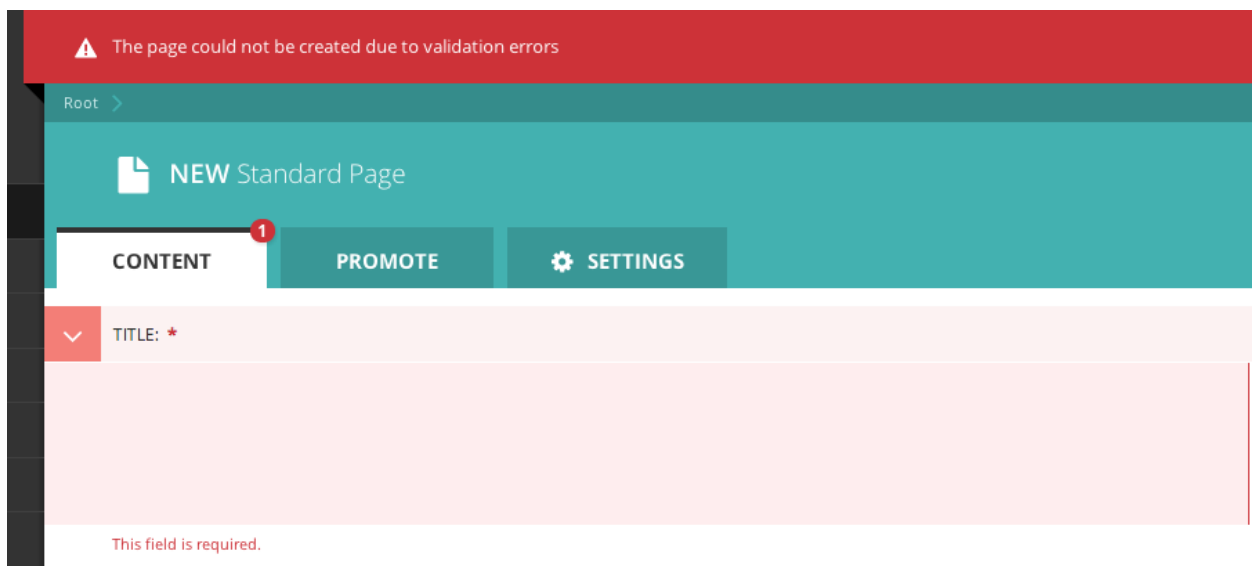
- You can reorder your multiple items using the up and down arrows. Doing this will affect the order in which they are displayed on the live page.

### Required fields

- Fields marked with an asterisk are required. You will not be able to save a draft or submit the page for moderation without these fields being completed.



- If you try to save/submit the page with some required fields not filled out, you will see the error displayed here.
- The number of validation errors for each of the *Promote* and *Content* tabs will appear in a red circle, and the text, ‘This field is required’, will appear below each field that must be completed.



### Edit Page tabs

A common feature of the *Edit* pages for all page types is the three tabs at the top of the screen. The first, *Content*, is where you build the content of the page itself.

### The Promote tab

The second, *Promote*, is where you can set all the ‘metadata’ (data about data!) for the page. Below is a description of all default fields in the promote tab and what they do.

- **Slug:** The last part of the web address for the page. E.g. the slug for a blog page called ‘The best things on the web’ would be `the-best-things-on-the-web` (`www.example.com/blog/the-best-things-on-the-web`). This is automatically generated from the main page title set in the Content tab. This can be overridden by adding a new slug into the field. Slugs should be entirely lowercase, with words separated by hyphens (-).
- **Page title:** An optional, search-engine friendly page title. This is the title that appears in the tab of your browser window. It is also the title that would appear in a search engine if the page was returned as part of a set of search results.
- **Show in menus:** Ticking this box will ensure that the page is included in automatically generated menus on your site. Note: A page will only display in menus if all of its parent pages also have *Show in menus* ticked.
- **Search description:** This field allows you to add text that will be displayed if the page appears in search results. This is especially useful to distinguish between similarly named pages.

---

**Note:** You may see more fields than this in your promote tab. These are just the default fields, but you are free to add other fields to this section as necessary.

---

### The Settings Tab

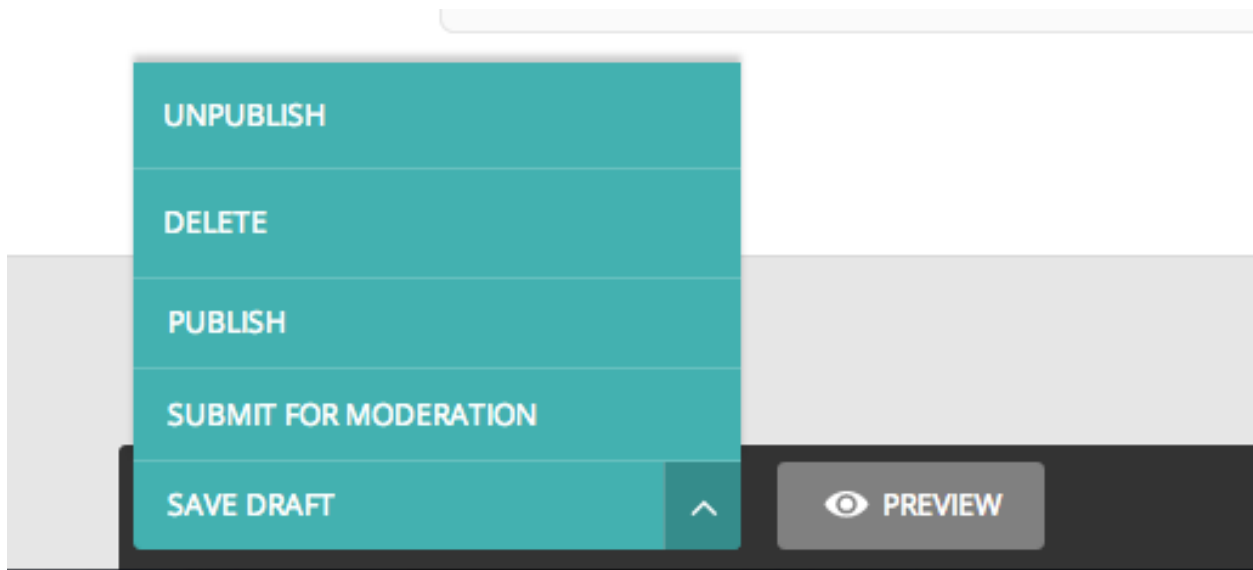
The *Settings* tab has two fields by default.

- **Go Live date/time:** Sets the time at which the changes should go live when published. See [Scheduled Publishing](#) for more details.
- **Expiry date/time:** Sets the time at which this page should be unpublished.

## Previewing and submitting pages for moderation

The Save/Preview/Submit for moderation menu is always present at the bottom of the page edit/creation screen. The menu allows you to perform the following actions, dependent on whether you are an editor, moderator or administrator:

- **Save draft:** Saves your current changes but doesn't submit the page for moderation and so won't be published. (all roles)
- **Submit for moderation:** Saves your current changes and submits the page for moderation. A moderator will be notified and they will then either publish or reject the page. This button may be missing if the site administrator has *disabled moderation*. (all roles)
- **Preview:** Opens a new window displaying the page as it would look if published, but does not save your changes or submit the page for moderation. (all roles)
- **Publish/Unpublish:** Clicking the *Publish* button will publish this page. Clicking the *Unpublish* button will take you to a confirmation screen asking you to confirm that you wish to unpublish this page. If a page is published it will be accessible from its specific URL and will also be displayed in site search results. (moderators and administrators only)
- **Delete:** Clicking this button will take you to a confirmation screen asking you to confirm that you wish to delete the current page. Be sure that this is actually what you want to do, as deleted pages are not recoverable. In many situations simply unpublishing the page will be enough. (moderators and administrators only)



### 1.6.5 Editing existing pages

Here is how you can access the edit screen of an existing page:

- Clicking the title of the page in an *Explorer page* or in *search results*.
- Clicking the *Edit* link below the title in either of the situations above.
- Clicking the *Edit* icon for a page in the explorer menu.

The screenshot displays the Wagtail CMS interface for editing a blog page. At the top, a teal header bar contains the page title "Django: A guide to upgrading your application" and its status "LIVE". Below the header, a sidebar with tabs for "CONTENT", "PROMOTE", and "SETTINGS" is visible. The main content area shows the title "Django: A guide to upgrading your application" and the author "Neal Todd". A bottom bar contains a "SAVE DRAFT" button, a "PREVIEW" button, and a last modified timestamp: "Last modified: June 4, 2015, 12:10 p.m. by Rob Carter".

- When editing an existing page the title of the page being edited is displayed at the top of the page.
- The current status of the page is displayed in the top-right.
- You can change the title of the page by clicking into the title field.
- When you are typing into a field, help text is often displayed on the right-hand side of the screen.

### 1.6.6 Managing documents, images, snippets and collections

Wagtail allows you to manage all of your documents and images through their own dedicated interfaces. See below for information on each of these elements.

#### Documents


Documents such as PDFs can be managed from the Documents interface, available in the left-hand menu. This interface allows you to add documents to and remove documents from the CMS.

 DOCUMENTS
 

 ADD A DOCUMENT

| TITLE ▾   | FILE   | UPLOADED ▾            |
|---|--|-----------------------|
| Special Project Coordinator Info Pack             | Special_Projects_Coordinator_Information_Pack_0514_1.pdf   | 2 months, 2 weeks ago |
| Senior Tutor in Mixed Media Information Pack      | Senior_Tutor_in_Mixed_Media_Information_Pack_0514_1.pdf    | 2 months, 3 weeks ago |
| Senior Tutor in Mixed Media Information Pack      | Senior_Tutor_in_Mixed_Media_Information_Pack_0514.pdf      | 2 months, 3 weeks ago |
| Senior Tutor in Printed Textiles Information Pack | Senior_Tutor_in_Printed_Textiles_Information_Pack_0514.pdf | 2 months, 3 weeks ago |

- Add documents by clicking the *Add document* button in the top-right.
- Search for documents in the CMS by entering your search term in the search bar. The results will be automatically updated as you type.
- You can also filter the results by *Popular tags*. Click on a tag to update the search results listing.
- Edit the details of a document by clicking the document title.

 EDITING Tutor in Performance Info Pack

**Title:** \*

**File:** \*

**Tags:**

- When editing a document you can replace the file associated with that document record. This means you can update documents without having to update the pages on which they are placed. Changing the file will change it on all pages that use the document.
- Add or remove tags using the Tags field.
- Save or delete documents using the buttons at the bottom of the interface.













**Warning:** Deleted documents cannot be recovered.

## Images

If you want to edit, add or remove images from the CMS outside of the individual pages you can do so from the Images interface. This is accessed from the left-hand menu.


IMAGES
+ ADD AN IMAGE

LATEST IMAGES


|  |  |   |  |
|--|--|---|--|
|  <p>The best Wagtail!</p>             |  <p>Grey wagtail by Lip Kee</p>                           |  <p>Wagtail collects insects by Margrit</p> |  <p>Hopalong wagtail by Ruth Flickr</p> |
|  <p>Wagtail Sproing by Jim Bendon</p> |  <p>Wagtail at Borovoye, Kazakhstan by Ken and Nyetta</p> |  <p>Pied wagtail by Marie Hale</p>          |  <p>White wagtail by Koshy Koshy</p>    |
|                                       |   |   |   |

- Clicking an image will allow you to edit the data associated with it. This includes the Alt text, the photographers credit, the medium of the subject matter and much more.

**Warning:** Changing the alt text here will alter it for all occurrences of the image in carousels, but not in inline images, where the alt text can be set separately.

 EDITING django\_upgraded.jpg
Used 1 time

**Title:** \* django\_upgraded.jpg

**File:** \*  django\_upgraded.jpg (1548x908)

Change image file:

No file chosen


Supported formats: GIF, JPEG, PNG. Maximum filesize: 10.0 MB.

**Credit:** Gordon Tarpley <https://www.flickr.com/photos/>

**Tags:**

**Focal point (optional)**

To define this image's most important region, drag a box over the image below.



**MAX DIMENSIONS**  
1548x908

**FILESIZE**  
650.4 KB



## Changing the image

- When editing an image you can replace the file associated with that image record. This means you can update images without having to update the pages on which they are placed.

**Warning:** Changing the file will change it on all pages that use the image.

## Focal area

- This interface allows you to select a focal area which can effect how your image displays to visitors on the front-end.
- If your images are cropped in some way to make them fit to a specific shape, then the focal area will define the centre point from which the image is cropped.
- To set the focal area, drag a marquee around the most important element of the image.
- To remove the focal area, hit the button below the image.
- If the feature is set up in your website, then on the front-end you will see the crop of this image focusing on your selection.

## Snippets

Snippets allow you to create elements on a website once and reuse them in multiple places. Then, if you want to change something on the snippet, you only need to change it once, and it will change across all the occurrences of the snippet.

How snippets are used can vary widely between websites. Here are a few examples of things Torchbox have used snippets for on our clients' websites:

- For staff contact details, so that they can be added to many pages but managed in one place
- For Adverts, either to be applied sitewide or on individual pages
- To manage links in a global area of the site, for example in the footer
- For Calls to Action, such as Newsletter sign up blocks, that may be consistent across many different pages

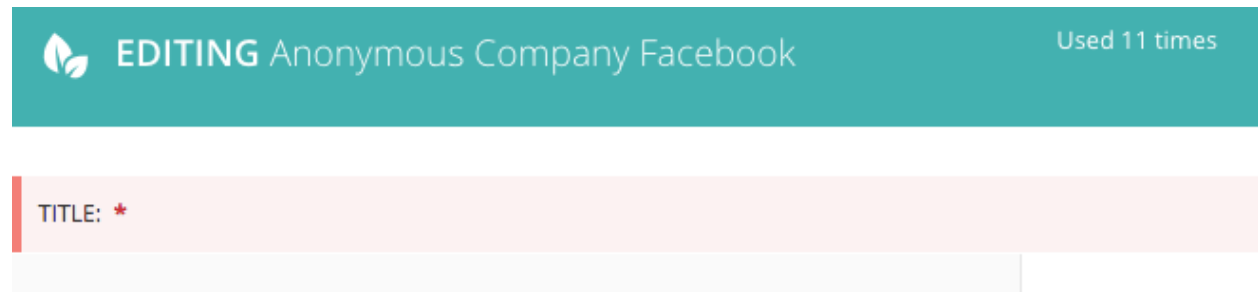
## The Snippets menu

|  SNIPPETS |   |
|--|---|
| Adverts  | Boxed text links displayed in the sidebar. Applied globally or on individual pages. Usable on all pages.  |
| Contact snippets   | Displayed in main body. Usable on standard index page only.   |
| Custom content modules   | Navigational content for index pages. A series of images in rows of three with titles and links, displayed in main body. Usable only on standard index page |
| Reusable text snippets   | Rich text field with title. Displayed in main body. Usable only on standard page and job page.  |

- You can access the Snippets menu by clicking on the 'Snippets' link in the left-hand menu bar.

- To add or edit a snippet, click on the snippet type you are interested in (often help text will be included to help you in selecting the right type)
- Click on an individual snippet to edit, or click ‘Add ...’ in the top right to add a new snippet
- To delete snippets, select one or more snippets with the tickbox on the left and then click the delete button near the top right

**Warning:** Editing a snippet will change it on all of the pages on which it has been used. In the top-right of the Snippet edit screen you will see a label saying how many times the snippet has been used. Clicking this label will display a listing of all of these pages.



### Adding snippets whilst editing a page

If you are editing a page, and you find yourself in need of a new snippet, do not fear! You can create a new one without leaving the page you are editing:

- Whilst editing the page, open the snippets interface in a new tab, either by Ctrl+click (cmd+click on Mac) or by right clicking it and selecting ‘Open in new tab’ from the resulting menu.
- Add the snippet in this new tab as you normally would.
- Return to your existing tab and reopen the Snippet chooser window.
- You should now see your new snippet, even though you didn’t leave the edit page.

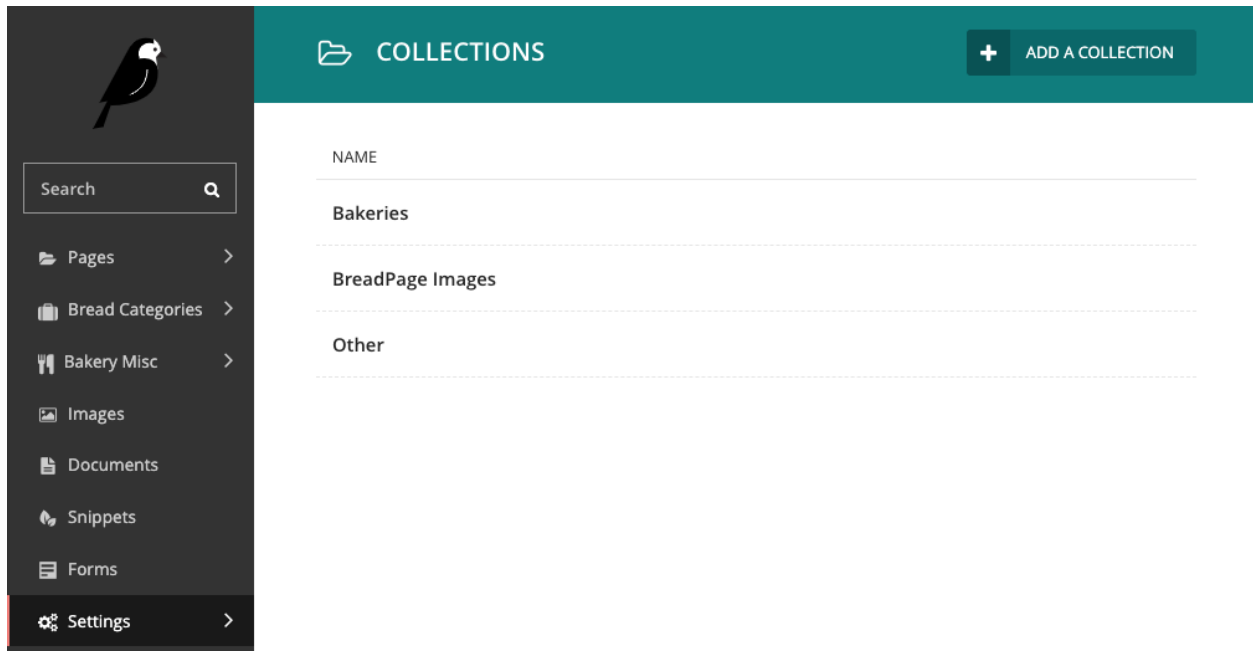
---

**Note:** Even though this is possible, it is worth saving your page as a draft as often as possible, to avoid your changes being lost by navigating away from the edit page accidentally.

---

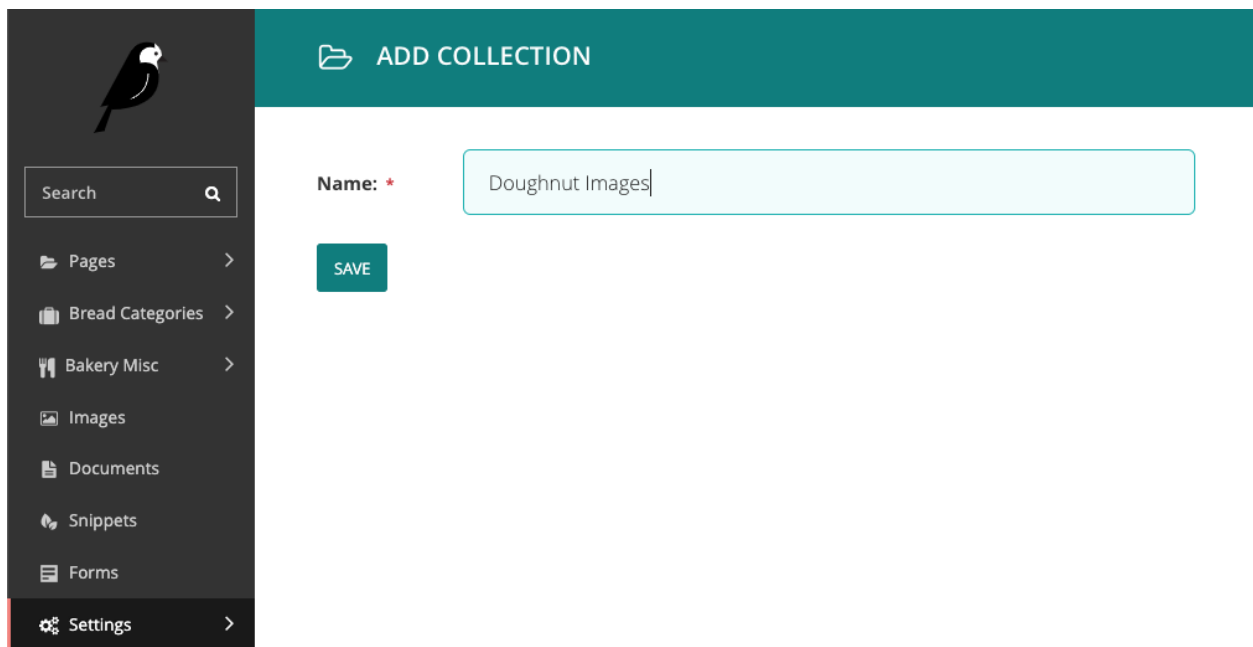
### Collections

Access to specific sets of images and documents can be controlled by setting up ‘collections’. By default all images and documents belong to the ‘root’ collection, but new collections can be created through the **Settings -> Collections** area of the admin interface.



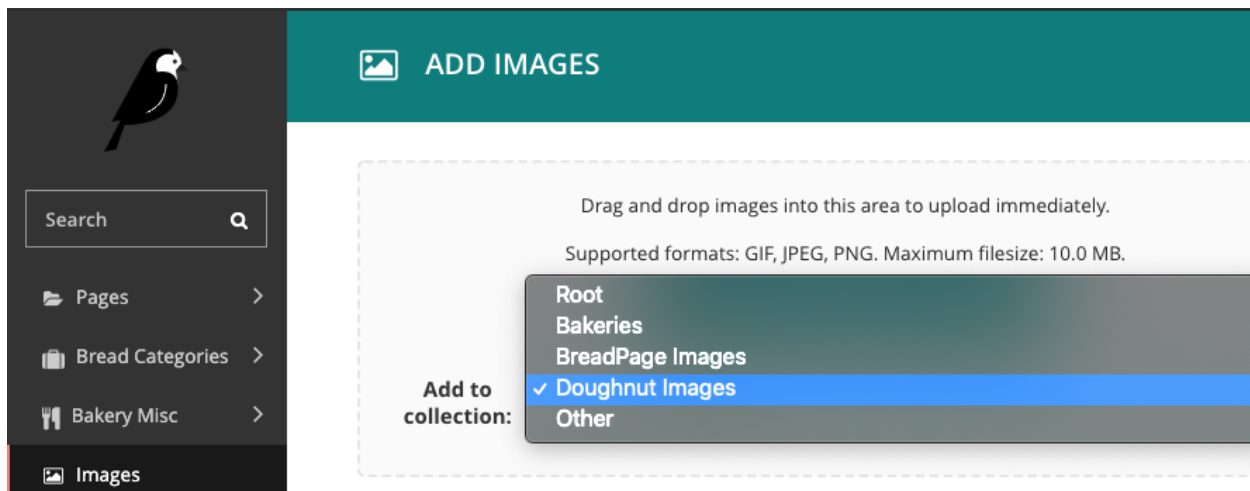
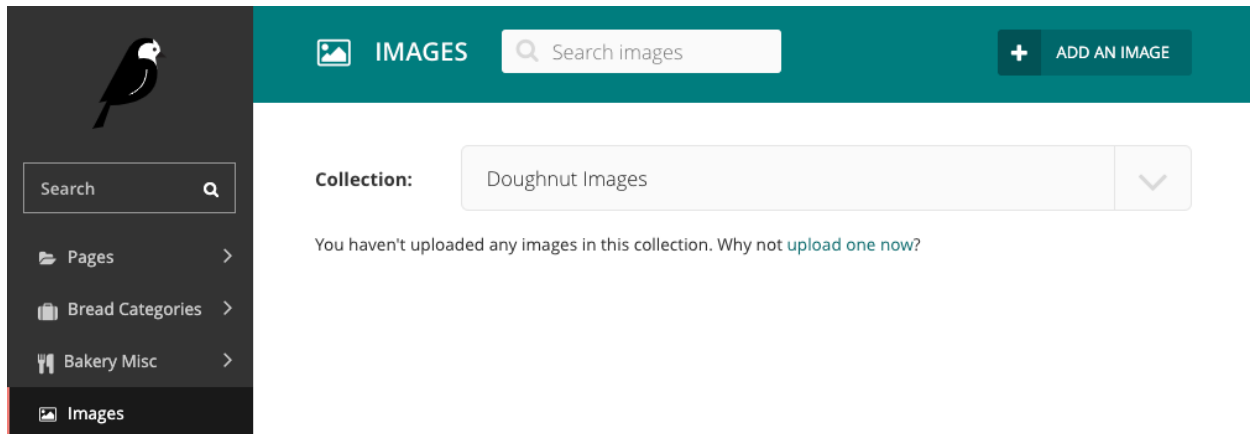
## Add a collection

- Clicking the **add a collection** button will allow you to create a collection. Name your collection and click **save**.

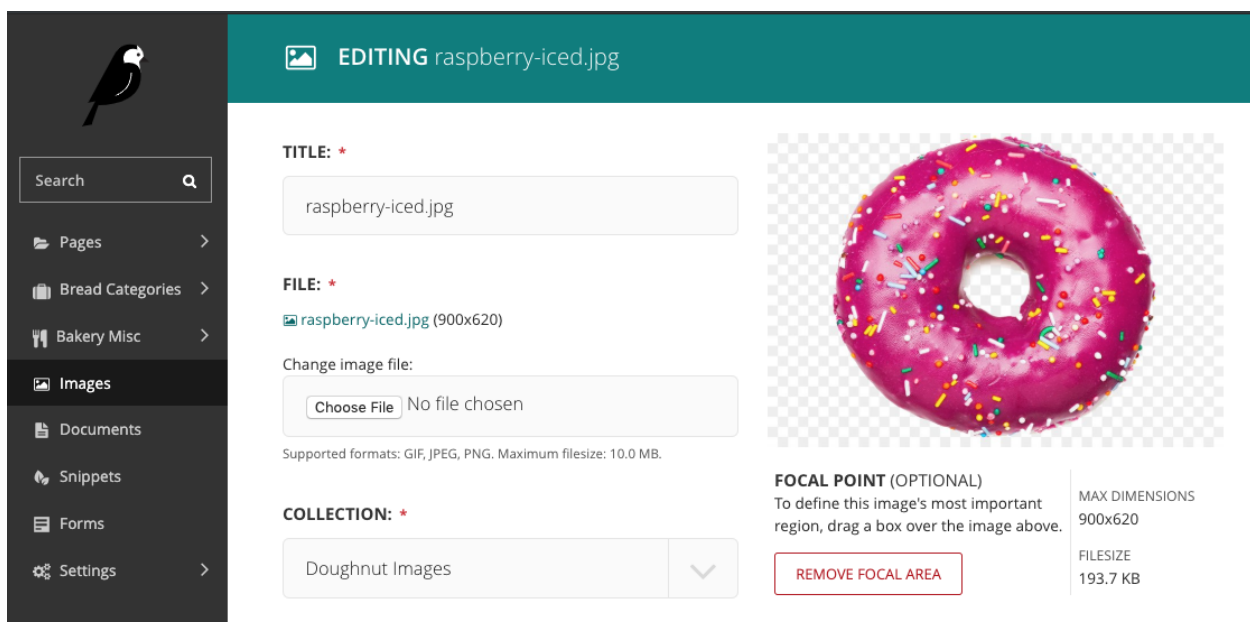


## Add images / documents to a collection

- Navigate to the **Images** or **Documents** section and select a collection from the dropdown menu.



- You can also edit an image or document directly by clicking on it to assign it to a collection.

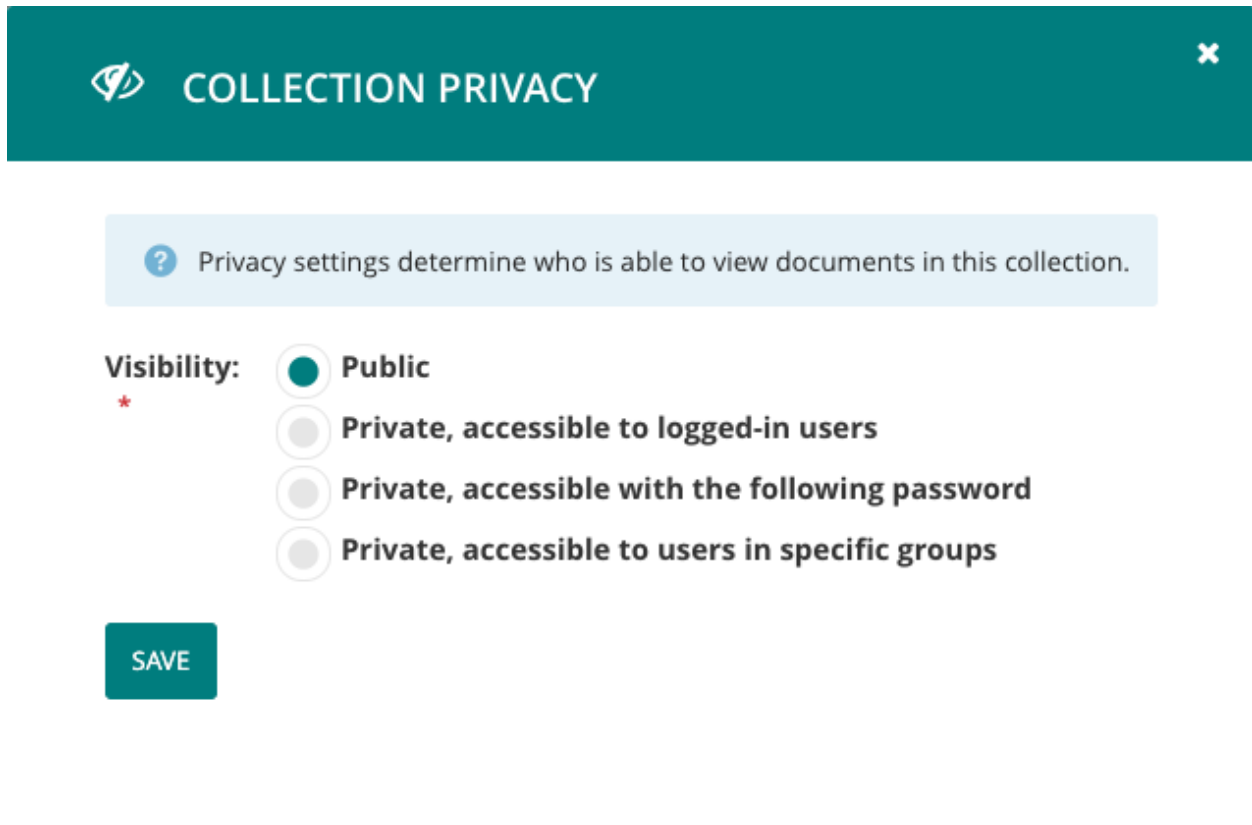


## Privacy settings

- To set permissions determining who is able to view documents within a collection, navigate to **Settings > Collections** and select a collection. Then click the privacy button above the collection name.

Privacy  PUBLIC

- Within the privacy settings overlay, select the level of privacy for the collection.



**Note:** Permissions set on ‘root’ apply to all collections, so a user with ‘edit’ permission for images on root can edit all images; permissions set on other collections apply to that collection only.

## 1.6.7 Managing Redirects

### About redirects

When dealing with publishing and unpublishing pages you will eventually need to make redirects. A redirect ensures that when a page is no longer available (404), the visitor and search engines are sent to a new page. Therefore the visitor won’t end up in a breaking journey which would result in a page not found.

Wagtail considers two types of configurable redirects depending on whether *Permanent* is checked or not:

- Permanent redirect (checked by default)

- Temporary redirect

For both redirects the visitor won't experience a difference when visiting a page, but the search engine will react to these two type of redirects differently.

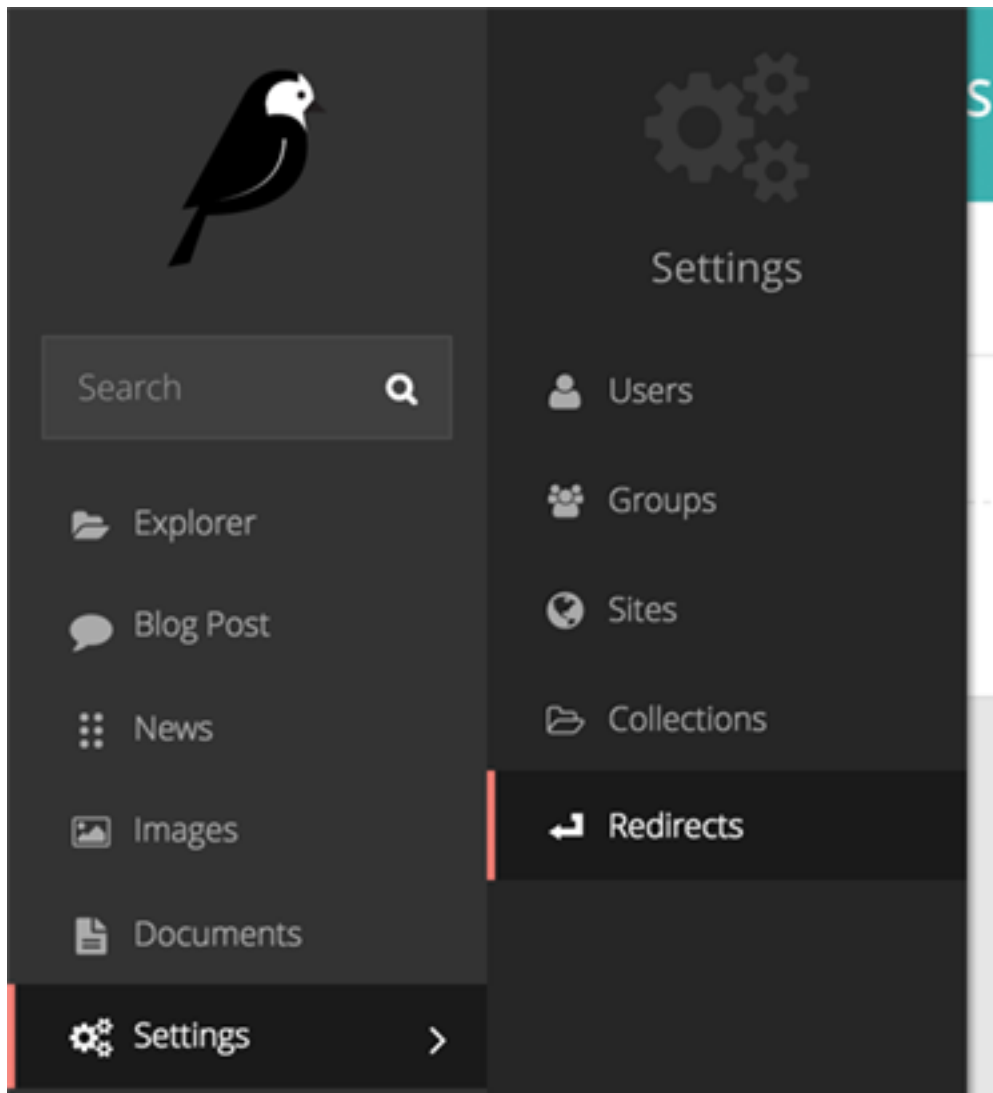
- In the case of a temporary redirect a search engine will keep track of your old page and will index the redirected page as well.
- With a permanent redirect, the search engine will mark the old page as obsolete and considers the new page as a replacement.

---



**Note:** As a best practice Wagtail will check redirects as permanent by default, in order to prevent the undermining of your search engine ranking.

---

### Configuring redirects




To configure redirects head over to 'Redirects', which can be found in the Settings menu, accessible via the left-hand menu bar.

| <div>  REDIRECTS           <input type="text" value="Search redirects"/> <div>  ADD REDIRECT         </div> </div> |                     |                        |                      |
|--|---------------------|------------------------|----------------------|
| FROM ▾   | SITE                | TO                     | TYPE                 |
| /new   | Your Site [default] | News                   | <div>PERMANENT</div> |
| /news/a-new-item-which-is-no-longer-available  | Your Site [default] | http://www.example.com | <div>PERMANENT</div> |

Page 1 of 1.

- Add a redirect by clicking the *Add redirect* button in the top-right.
- Search for redirects already configured by entering your search term in the search bar. The results will be automatically updated as you type.
- Edit the details of a redirect by clicking the URL path in the listing.

 EDITING /new

Redirect from: \*

From site:

Your Site [default]


▾

Permanent:

☒

Recommended. Permanent redirects ensure search engines forget the old page (the 'Redirect from') and index the new page instead.

Redirect to a page:

 News

CLEAR CHOICE

CHOOSE ANOTHER PAGE

EDIT THIS PAGE

Redirect to any URL:

SAVE

DELETE REDIRECT

- Set *Redirect from* to the URL pattern which is no longer available on your site.
- Set the *From site* if applicable (for eg: a multisite environment).
- Check whether the redirect is *Permanent* or temporary (unchecked).

As a last step you can either redirect to a new page within Wagtail **or** you can redirect the page to a different domain outside of Wagtail.

- Select your page from the explorer for *Redirect to a page*.
- Set a full-domain and path for *Redirect to any URL*.

---

**Note:** Keep in mind a redirect will only be initiated if the page is not found. It will not be applied to existing pages (200) which will resolve on your site.

---

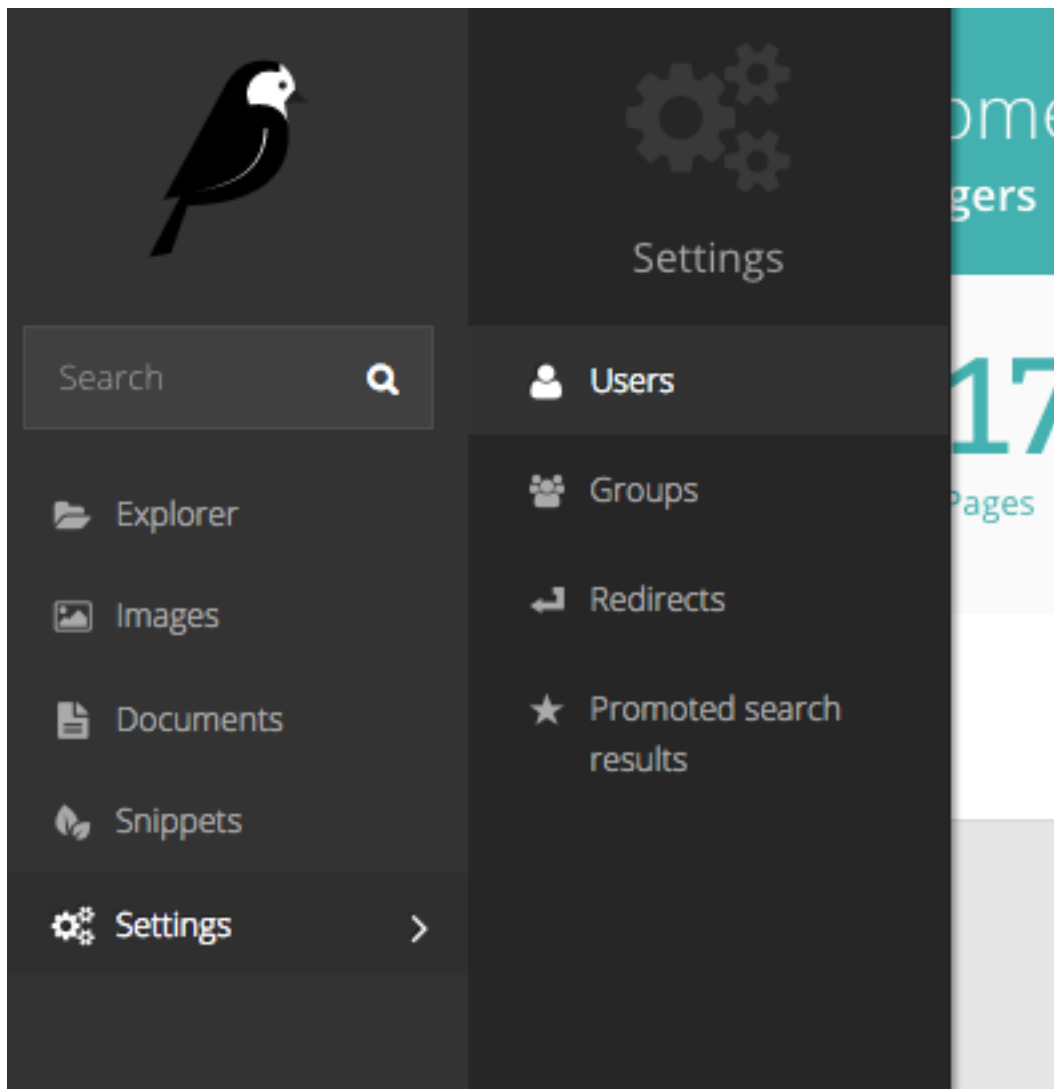
## 1.6.8 Administrator tasks

This section of the guide documents how to perform common tasks as an administrator of a Wagtail site.

### Managing users and roles

As an administrator, a common task will be adding, modifying or removing user profiles.


This is done via the ‘Users’ interface, which can be found in the Settings menu, accessible via the left-hand menu bar.








In this interface you can see all of your users, their usernames, their ‘level’ of access (otherwise known as their ‘role’), and their status, either active or inactive.

You can sort this listing either via Name or Username.




**USERS**

+ **ADD A USER**

| NAME ▾   | USERNAME ▾ | LEVEL | STATUS        |
|--|------------|-------|---------------|
|  <b>jamesg</b>        | jamesg     | Admin | <b>ACTIVE</b> |
|  <b>felicity</b>      | felicity   | Admin | <b>ACTIVE</b> |
|  <b>Edward Baldry</b> | eddbaldry  |       | <b>ACTIVE</b> |
|  <b>Ged Barker</b>    | ged.barker | Admin | <b>ACTIVE</b> |
|  <b>Glenn Barr</b>    | glenn.barr | Admin | <b>ACTIVE</b> |

Clicking on a user's name will open their profile details. From here you can then edit that users details.

**Note:** It is possible to change user's passwords in this interface, but it is worth encouraging your users to use the 'Forgotten password' link on the login screen instead. This should save you some time!

Click the 'Roles' tab to edit the level of access your users have. By default there are three roles:

| Role          | Create/view drafts | Publish content | Access Settings |
|---------------|--------------------|-----------------|-----------------|
| Editor        | Yes                | No              | No              |
| Moderator     | Yes                | Yes             | No              |
| Administrator | Yes                | Yes             | Yes             |

## Promoted search results

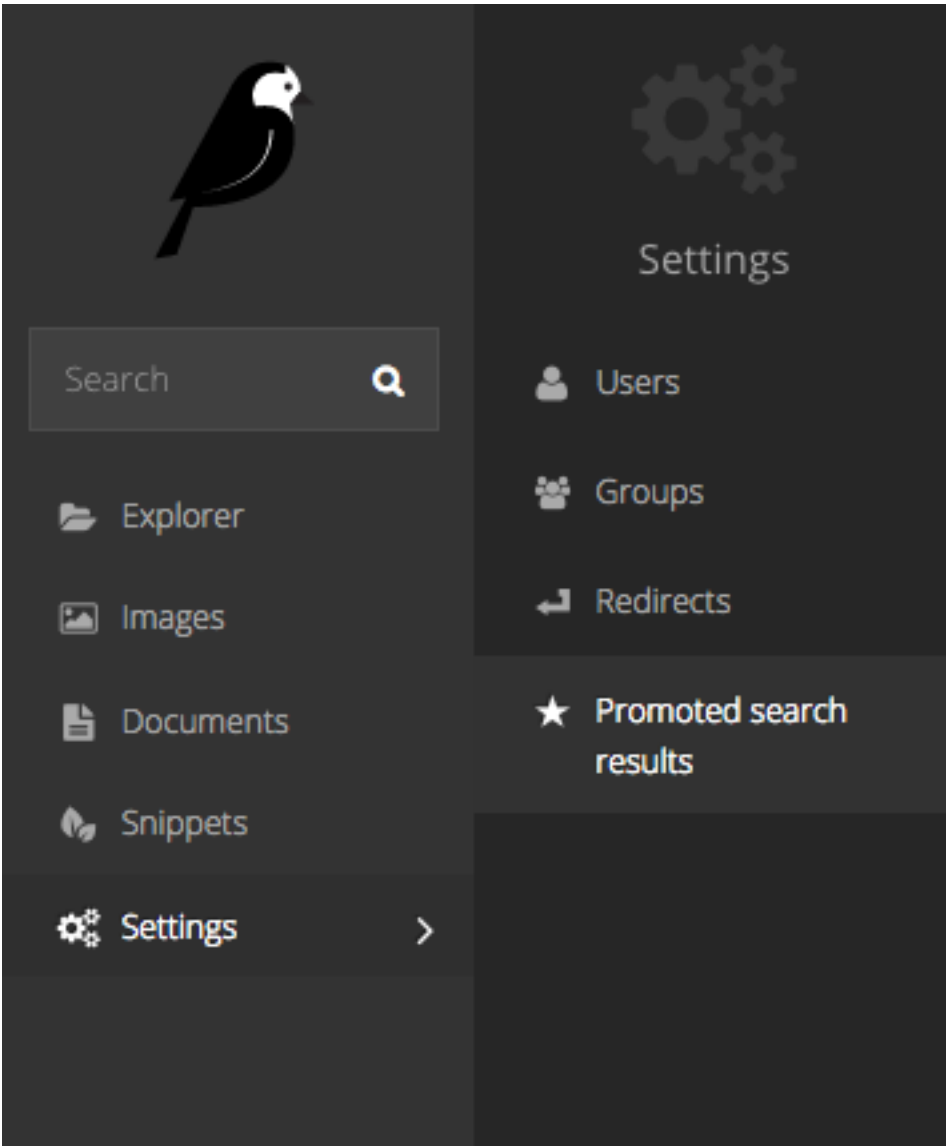
**Note:** Promoted search results are an optional Wagtail feature. For details of how to enable them on a Wagtail installation, see [search\\_promotions](#)

Wagtail allows you to promote certain search results dependant on the keyword or phrase entered by the user when searching. This can be particularly useful when users commonly refer to parts of your organisation via an acronym that isn't in official use, or if you want to direct users to a page when they enter a certain term related to the page but not included in the text of the page itself.

As a concrete example, one of our clients wanted to direct people who searched for 'finances' to their 'Annual budget review' page. The word 'finances' is not mentioned in either the title or the body of the target page, so they created a promoted search result for the word 'finances' that pushed the budget page to the very top of the results.

**Note:** The promoted result will only work if the user types *exactly* the phrase that you have set it up for. If you have variations of a phrase that you want to take into account, then you must create additional promoted results.

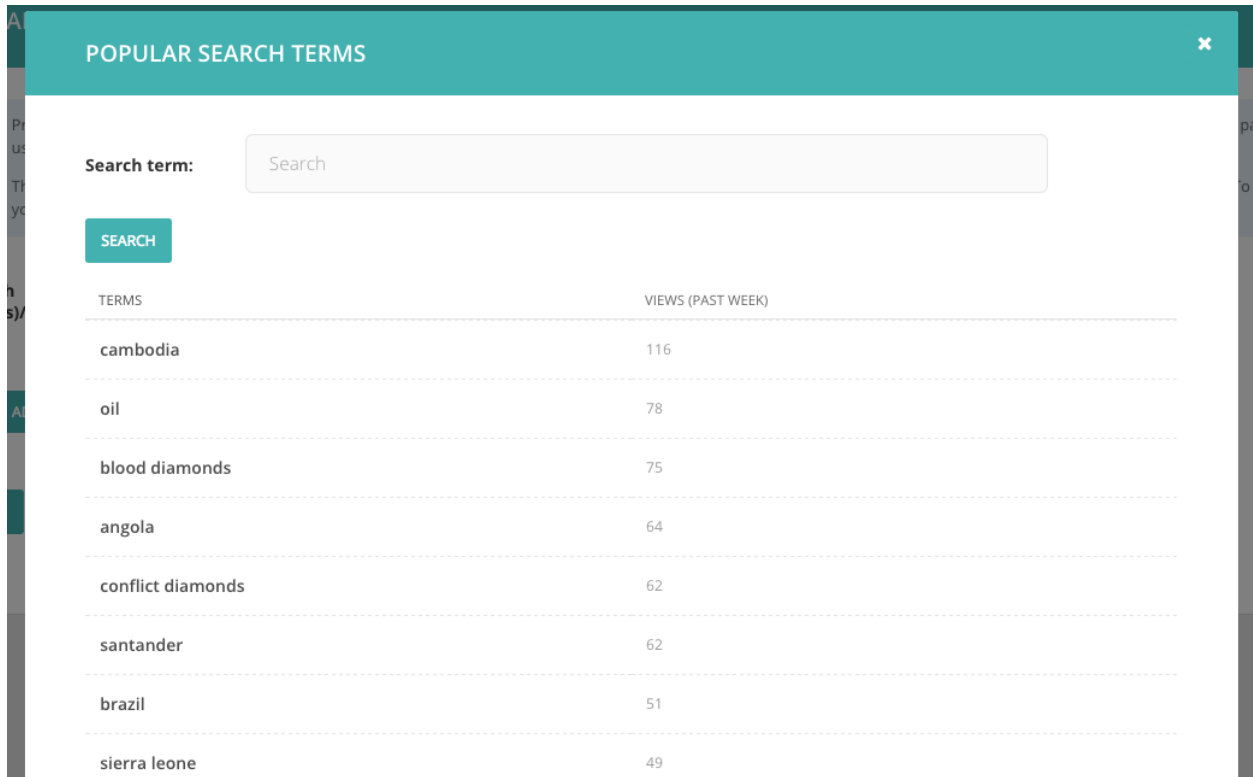
To set up the promoted search results, click on the 'Promoted search results' menu item in the 'Settings' menu.



Add a new promoted result from the button in the top right of the resulting screen, or edit an existing promoted result by clicking on it.

| ★ PROMOTED SEARCH RESULTS   |  |                   |
|---|--|-------------------|
| <div><div>🔍 Search editor's picks</div><div><div>+</div>ADD NEW PROMOTED RESULT</div></div> |  |                   |
| SEARCH TERM(S)  | PROMOTED RESULTS   | VIEWS (PAST WEEK) |
| turkmenistan gas  | Turkmenistan, It's A Gas, All That Gas?  | 0                 |
| south sudan oil   | Will Star Shine for South Sudan? , Blueprint for Prosperity , Three years in, is South Sudan's oil driving its crisis?   | 2                 |
| south sudan   | South Sudan, Will Star Shine for South Sudan? , Blueprint for Prosperity , Fuelling Mistrust   | 13                |
| cambodia oil  | Country For Sale   | 3                 |
| blood red carpet  | Surrey Mansion Used To Hide Suspect Funds, Former Kyrgyz president's son lives in £3.5m Surrey mansion despite convictions for attempted murder of UK citizen and grand corruption at home | 28                |

When adding a new promoted result, Wagtail provides you with a ‘Choose from popular search terms’ option. This will show you the most popular terms entered by users into your internal search. You can match this list against your existing promoted results to ensure that users are able to find what they are looking for.



**POPULAR SEARCH TERMS** ×

Search term:

**SEARCH**

| TERMS             | VIEWS (PAST WEEK) |
|-------------------|-------------------|
| cambodia          | 116               |
| oil               | 78                |
| blood diamonds    | 75                |
| angola            | 64                |
| conflict diamonds | 62                |
| santander         | 62                |
| brazil            | 51                |
| sierra leone      | 49                |

You then add the result itself by clicking ‘Add recommended page’. You can add multiple results, but be careful about adding too many, as you may end up hiding all of your organic results with promoted results, which may not be helpful for users who aren’t really sure what they are looking for.

★ ADD EDITOR'S PICK

❓ Promoted search results are a means of recommending specific pages that might not organically come high up in search results. E.g recommending your primary donation page to a user searching with the less common term "giving".

The "Search term(s)/phrase" field below must contain the full and exact search for which you wish to provide recommended results, *including* any misspellings/user error. To help, you can choose from search terms that have been popular with users of your site.

Search  
term(s)/phrase:

CHOOSE FROM POPULAR SEARCH TERMS

Enter the full search string to match. An exact match is required for your Editors Picks to be displayed, wildcards are NOT allowed.

Page:



CHOOSE A PAGE



Description:



ADD RECOMMENDED PAGE

SAVE

## 1.6.9 Browser issues

Some issues with Wagtail may come from the browser. Try [clearing the browser cache and cookies](#), or you can also try using Wagtail with [another browser](#) to see if the problem persists.

JavaScript is required to use Wagtail – make sure it is [enabled in your browser](#).

### Supported browsers

For the best experience and security, we recommend that you keep your browser up to date. Go to [Browse Happy](#) for more information.

## 1.7 Contributing to Wagtail

### 1.7.1 Issues

The easiest way to contribute to Wagtail is to tell us how to improve it! First, check to see if your bug or feature request has already been submitted at [github.com/wagtail/wagtail/issues](https://github.com/wagtail/wagtail/issues). If it has, and you have some supporting information which may help us deal with it, comment on the existing issue. If not, please [create a new one](#), providing as much relevant context as possible. For example, if you're experiencing problems with installation, detail your environment and the steps you've already taken. If something isn't displaying correctly, tell us what browser you're using, and include a screenshot if possible.

### Issue tracking

We welcome bug reports, feature requests and pull requests through Wagtail's [Github issue tracker](#).

## Issues

An issue must always correspond to a specific action with a well-defined completion state: fixing a bug, adding a new feature, updating documentation, cleaning up code. Open-ended issues where the end result is not immediately clear (“come up with a way of doing translations”) are fine, as long as there’s a clear way to progress the issue and identify when it has been completed (not e.g. “make rich text fields suck less”).

Do not use issues for support queries or other questions (“How do I do X?” - although “Implement a way of doing X” or “Document how to do X” could well be valid issues). These should be asked on [Stack Overflow](#), or for discussions that do not fit Stack Overflow’s question-and-answer format, the [Wagtail Support Google group](#).

As soon as a ticket is opened - ideally within one day - a member of the core team will give it an initial classification, by either closing it as invalid or assigning it to a milestone. Don’t be discouraged if you feel that your ticket has been given a lower priority than it deserves - this decision isn’t permanent. We will consider all feedback, and reassign or reopen tickets where appropriate.

(From the other side, this means that the core team member doing the classification should feel free to make bold unilateral decisions - there’s no need to seek consensus first. If they make the wrong judgment call, that can always be reversed later.)

The possible milestones that it might be assigned to are as follows:

- **invalid** (closed): this issue doesn’t identify a specific action to be taken, or the action is not one that we want to take. For example - a bug report for something that’s working as designed, or a feature request for something that’s actively harmful.
- **some-day**: the issue is accepted as valid (i.e. it’s a bug report for a legitimate bug, or a useful feature request) but not deemed a priority to work on (in the opinion of the core team). For example - a bug that’s only cosmetic, or a feature that would be kind of neat but not really essential. There are no resources allocated to it - feel free to take it on!
- **real-soon-now**: no-one on the core team has resources allocated to work on this right now, but we know it’s a pain point, and it will be prioritised whenever we next get a chance to choose something new to work on. In practice, that kind of free choice doesn’t happen very often - there are lots of pressures determining what we work on from day to day - so if this is a feature or fix you need, we encourage you to work on it and contribute a pull request, rather than waiting for the core team to get round to it!
- A specific version number (eg. **1.6**): the issue is important enough that it needs to be fixed in this version. There are resources allocated and/or plans to work on the issue in the given version.

On some occasions it may take longer for the core team to classify an issue into a milestone. For example:

- It may require a non-trivial amount of work to confirm the presence of a bug. In this case, feedback and further details from other contributors, whether or not they can replicate the bug, would be particularly welcomed.
- It may require further discussion to decide whether the proposal is a good idea or not - if so, it will be tagged “design decision needed”.

We will endeavour to make sure that issues don’t remain in this state for prolonged periods. Issues and PRs tagged “design decision needed” will be revisited regularly and discussed with at least two core contributors - we aim to review each ticket at least once per release cycle (= 6 weeks) as part of weekly core team meetings.

## Pull requests

As with issues, the core team will classify pull requests as soon as they are opened, usually within one day. Unless the change is invalid or particularly contentious (in which case it will be closed or marked as “design decision needed”), it will generally be classified under the next applicable version - the next minor release for new features, or the next patch release for bugfixes - and marked as ‘Needs review’.

- All contributors, core and non-core, are invited to offer feedback on the pull request.
- Core team members are invited to assign themselves to the pull request for review.

Subsequently (ideally within a week or two, but possibly longer for larger submissions) a core team member will merge it if it is ready to be merged, or tag it as requiring further work ('needs work' / 'needs tests' / 'needs docs'). In the latter case, they may also reassign it to a later milestone ('real-soon-now' or 'some-day'). Pull requests that require further work are handled and prioritised in the same way as issues - anyone is welcome to pick one up from the backlog, whether or not they were the original committer.

Rebasing / squashing of pull requests is welcome, but not essential. When doing so, do not squash commits that need reviewing into previous ones and make sure to preserve the sequence of changes. To fix mistakes in earlier commits, use `git commit --fixup` so that the final merge can be done with `git rebase -i --autosquash`.

Core team members working on Wagtail are expected to go through the same process with their own fork of the project.

### Release schedule

We aim to release a new version every 2 months. To keep to this schedule, we will tend to 'bump' issues and PRs to a future release where necessary, rather than let them delay the present one. For this reason, an issue being tagged under a particular release milestone should not be taken as any kind of guarantee that the feature will actually be shipped in that release.

### 1.7.2 Pull requests

If you're a Python or Django developer, [fork it](#) and read the [developing docs](#) to get stuck in! We welcome all contributions, whether they solve problems which are specific to you or they address existing issues. If you're stuck for ideas, pick something from the [issue list](#), or email us directly on [hello@wagtail.io](mailto:hello@wagtail.io) if you'd like us to suggest something!

For large-scale changes, we'd generally recommend breaking them down into smaller pull requests that achieve a single well-defined task and can be reviewed individually. If this isn't possible, we recommend opening a pull request on the [Wagtail RFCs](#) repository, so that there's a chance for the community to discuss the change before it gets implemented.

### Development

Setting up a local copy of the [Wagtail git repository](#) is slightly more involved than running a release package of Wagtail, as it requires [Node.js](#) and NPM for building Javascript and CSS assets. (This is not required when running a release version, as the compiled assets are included in the release package.)

If you're happy to develop on a virtual machine, the [vagrant-wagtail-develop](#) setup script is the fastest way to get up and running. This will provide you with a running instance of the [Wagtail Bakery demo site](#), with the Wagtail and bakerydemo codebases available as shared folders for editing on your host machine.

(Build scripts for other platforms would be very much welcomed - if you create one, please let us know via the [Wagtail Developers group](#)!)

If you'd prefer to set up all the components manually, read on. These instructions assume that you're familiar with using pip and virtualenv to manage Python packages.

### Setting up the Wagtail codebase

Install Node.js, version 8. Instructions for installing Node.js can be found on the [Node.js download page](#). You can also use Node version manager (nvm) since Wagtail supplies a `.nvmrc` file in the root of the project with the minimum required Node version - see nvm's [installation instructions](#).

You will also need to install the **libjpeg** and **zlib** libraries, if you haven't done so already - see Pillow's [platform-specific installation instructions](#).

Clone a copy of the Wagtail codebase:

```
$ git clone https://github.com/wagtail/wagtail.git
$ cd wagtail
```

With your preferred virtualenv activated, install the Wagtail package in development mode with the included testing and documentation dependencies:

```
$ pip install -e '.[testing,docs]' -U
```

Install Node through nvm (optional):

```
$ nvm install
```

Install the tool chain for building static assets:

```
$ npm install --no-save
```

Compile the assets:

```
$ npm run build
```

Any Wagtail sites you start up in this virtualenv will now run against this development instance of Wagtail. We recommend using the [Wagtail Bakery demo site](#) as a basis for developing Wagtail. Keep in mind that the setup steps for a Wagtail site may include installing a release version of Wagtail, which will override the development version you've just set up. In this case, you should install the site before running the `pip install -e` step, or re-run that step after the site is installed.

## Testing

From the root of the Wagtail codebase, run the following command to run all the tests:

```
$ python runtests.py
```

## Running only some of the tests

At the time of writing, Wagtail has well over 2500 tests, which takes a while to run. You can run tests for only one part of Wagtail by passing in the path as an argument to `runtests.py` or `tox`:

```
$ # Running in the current environment
$ python runtests.py wagtail.core

$ # Running in a specified Tox environment
$ tox -e py36-dj20-sqlite-noelasticsearch wagtail.core

$ # See a list of available Tox environments
$ tox -l
```

You can also run tests for individual TestCases by passing in the path as an argument to `runtests.py`

```
$ # Running in the current environment
$ python runtests.py wagtail.core.tests.test_blocks.TestIntegerBlock

$ # Running in a specified Tox environment
$ tox -e py36-dj20-sqlite-noelasticsearch wagtail.core.tests.test_blocks.
↪TestIntegerBlock
```

### Running migrations for the test app models

You can create migrations for the test app by running the following from the Wagtail root.

```
$ django-admin.py makemigrations --settings=wagtail.tests.settings
```

### Testing against PostgreSQL

By default, Wagtail tests against SQLite. You can switch to using PostgreSQL by using the `--postgres` argument:

```
$ python runtests.py --postgres
```

If you need to use a different user, password or host. Use the `PGUSER`, `PGPASSWORD` and `PGHOST` environment variables.

### Testing against a different database

If you need to test against a different database, set the `DATABASE_ENGINE` environment variable to the name of the Django database backend to test against:

```
$ DATABASE_ENGINE=django.db.backends.mysql python runtests.py
```

This will create a new database called `test_wagtail` in MySQL and run the tests against it.

### Testing Elasticsearch

You can test Wagtail against Elasticsearch by passing the `--elasticsearch` argument to `runtests.py`:

```
$ python runtests.py --elasticsearch
```

Wagtail will attempt to connect to a local instance of Elasticsearch (`http://localhost:9200`) and use the index `test_wagtail`.

If your Elasticsearch instance is located somewhere else, you can set the `ELASTICSEARCH_URL` environment variable to point to its location:

```
$ ELASTICSEARCH_URL=http://my-elasticsearch-instance:9200 python runtests.py --
↪elasticsearch
```

### Browser and device support

Wagtail is meant to be used on a wide variety of devices and browsers. Supported browser / device versions include:



| Browser       | Device/OS  | Version(s) |
|---------------|------------|------------|
| Mobile Safari | iOS Phone  | Last 2     |
| Mobile Safari | iOS Tablet | Last 2     |
| Chrome        | Android    | Last 2     |
| IE            | Desktop    | 11         |
| Chrome        | Desktop    | Last 2     |
| MS Edge       | Desktop    | Last 2     |
| Firefox       | Desktop    | Latest     |
| Firefox ESR   | Desktop    | Latest     |
| Safari        | macOS      | Last 2     |

We aim for Wagtail to work in those environments. Our development standards ensure that the site is usable on other browsers **and will work on future browsers**. To test on IE, install virtual machines [made available by Microsoft](#).

IE 11 is gradually falling out of use, and specific features are unsupported in this browser:

- Rich text copy-paste in the rich text editor.
- Sticky toolbar in the rich text editor.
- Focus outline styles in the main menu & explorer menu.

**Unsupported browsers / devices include:**

| Browser       | Device/OS | Version(s)   |
|---------------|-----------|--------------|
| Stock browser | Android   | All          |
| IE            | Desktop   | 10 and below |
| Safari        | Windows   | All          |

## Accessibility targets

We want to make Wagtail accessible for users of a wide variety of assistive technologies. The specific standard we aim for is [WCAG2.1](#), AA level. Wagtail’s administration user interface isn’t accessible at the moment (see [issue #4199](#)), but here are specific assistive technologies we aim to test for, and ultimately support:

| Type          | Assistive technology  |
|---------------|---|
| Screen reader | <a href="#">NVDA</a> on Windows with Firefox ESR                                |
| Screen reader | <a href="#">VoiceOver</a> on macOS with Safari                                  |
| Magnification | <a href="#">Windows Magnifier</a>   |
| Magnification | macOS Zoom  |
| Voice control | Windows Speech Recognition  |
| Voice control | macOS Dictation   |
| Screen reader | Mobile <a href="#">VoiceOver</a> on iOS, or <a href="#">TalkBack</a> on Android |

We aim for Wagtail to work in those environments. Our development standards ensure that the site is usable with other assistive technologies. In practice, testing with assistive technology can be a daunting task that requires specialised training – here are tools we rely on to help identify accessibility issues, to use during development and code reviews:

- [react-axe](#) integrated directly in our build tools, to identify actionable issues. Logs its results in the browser console.
- [Axe](#) Chrome extension for more comprehensive automated tests of a given page.
- [Accessibility Insights for Web](#) Chrome extension for semi-automated tests, and manual audits.

### Compiling static assets

All static assets such as JavaScript, CSS, images, and fonts for the Wagtail admin are compiled from their respective sources by `gulp`. The compiled assets are not committed to the repository, and are compiled before packaging each new release. Compiled assets should not be submitted as part of a pull request.

To compile the assets, run:

```
$ npm run build
```

This must be done after every change to the source files. To watch the source files for changes and then automatically recompile the assets, run:

```
$ npm start
```

### Compiling the documentation

The Wagtail documentation is built by Sphinx. To install Sphinx and compile the documentation, run:

```
$ cd /path/to/wagtail
$ # Install the documentation dependencies
$ pip install -e .[docs]
$ # Compile the docs
$ cd docs/
$ make html
```

The compiled documentation will now be in `docs/_build/html`. Open this directory in a web browser to see it. Python comes with a module that makes it very easy to preview static files in a web browser. To start this simple server, run the following commands:

```
$ cd docs/_build/html/
$ python -mhttp.server 8080
```

Now you can open `<http://localhost:8080/>` in your web browser to see the compiled documentation.

Sphinx caches the built documentation to speed up subsequent compilations. Unfortunately, this cache also hides any warnings thrown by unmodified documentation source files. To clear the built HTML and start fresh, so you can see all warnings thrown when building the documentation, run:

```
$ cd docs/
$ make clean
$ make html
```

Wagtail also provides a way for documentation to be compiled automatically on each change. To do this, you can run the following command to see the changes automatically at `localhost:4000`:

```
$ cd docs/
$ make livehtml
```

### Committing code

**This section is for the core team of Wagtail, or for anyone interested in the process of getting code committed to Wagtail.**

Code should only be committed after it has been reviewed by at least one other reviewer or committer, unless the change is a small documentation change or fixing a typo. If additional code changes are made after the review, it is OK to commit them without further review if they are uncontroversial and small enough that there is minimal chance of introducing new bugs.

Most code contributions will be in the form of pull requests from Github. Pull requests should not be merged from Github, apart from small documentation fixes, which can be merged with the ‘Squash and merge’ option. Instead, the code should be checked out by a committer locally, the changes examined and rebased, the `CHANGELOG.txt` and release notes updated, and finally the code should be pushed to the master branch. This process is covered in more detail below.

### Check out the code locally

If the code has been submitted as a pull request, you should fetch the changes and check them out in your Wagtail repository. A simple way to do this is by adding the following `git` alias to your `~/.gitconfig` (assuming upstream is `wagtail/wagtail`):

```
[alias]
pr = !sh -c \"git fetch upstream pull/${1}/head:pr/${1} && git checkout pr/${1}\"
```

Now you can check out pull request number `xxxx` by running `git pr xxxx`.

### Rebase on to master

Now that you have the code, you should rebase the commits on to the `master` branch. Rebasing is preferred over merging, as merge commits make the commit history harder to read for small changes.

You can fix up any small mistakes in the commits, such as typos and formatting, as part of the rebase. `git rebase --interactive` is an excellent tool for this job.

Ideally, use this as an opportunity to squash the changes to a few commits, so each commit is making a single meaningful change (and not breaking anything). If this is not possible because of the nature of the changes, it’s acceptable to either squash into a commit or leave all commits unsquashed, depending on which will be more readable in the commit history.

```
$ # Get the latest commits from Wagtail
$ git fetch upstream
$ git checkout master
$ git merge --ff-only upstream/master
$ # Rebase this pull request on to master
$ git checkout pr/xxxx
$ git rebase master
$ # Update master to this commit
$ git checkout master
$ git merge --ff-only pr/xxxx
```

### Update `CHANGELOG.txt` and release notes

---

**Note:** This should only be done by core committers, once the changes have been reviewed and accepted.

---

Every significant change to Wagtail should get an entry in the `CHANGELOG.txt`, and the release notes for the current version.

The `CHANGELOG.txt` contains a short summary of each new feature, refactoring, or bug fix in each release. Each summary should be a single line. Bug fixes should be grouped together at the end of the list for each release, and be prefixed with “Fix:”. The name of the contributor should be added at the end of the summary, in brackets, if they are not a core committer. For example:

```
* Fix: Tags added on the multiple image uploader are now saved correctly (Alex Smith)
```

The release notes for each version contain a more detailed description of each change. Backwards compatibility notes should also be included. Large new features or changes should get their own section, while smaller changes and bug fixes should be grouped together in their own section. See previous release notes for examples. The release notes for each version are found in `docs/releases/x.x.x.rst`.

If the contributor is a new person, and this is their first contribution to Wagtail, they should be added to the `CONTRIBUTORS.rst` list. Contributors are added in chronological order, with new contributors added to the bottom of the list. Use their preferred name. You can usually find the name of a contributor on their Github profile. If in doubt, or if their name is not on their profile, ask them how they want to be named.

If the changes to be merged are small enough to be a single commit, amend this single commit with the additions to the `CHANGELOG.txt`, release notes, and contributors:

```
$ git add CHANGELOG.txt docs/releases/x.x.x.rst CONTRIBUTORS.rst
$ git commit --amend --no-edit
```

If the changes do not fit in a single commit, make a new commit with the updates to the `CHANGELOG.txt`, release notes, and contributors. The commit message should say Release notes for #xxxx:

```
$ git add CHANGELOG.txt docs/releases/x.x.x.rst CONTRIBUTORS.rst
$ git commit -m 'Release notes for #xxxx'
```

### Push to master

The changes are ready to be pushed to master now.

```
$ # Check that everything looks OK
$ git log upstream/master..master --oneline
$ git push --dry-run upstream master
$ # Push the commits!
$ git push upstream master
$ git branch -d pr/xxxx
```

### When you have made a mistake

It's ok! Everyone makes mistakes. If you realise that recent merged changes have a negative impact, create a new pull request with a revert of the changes and merge it without waiting for a review. The PR will serve as additional documentation for the changes, and will run through the CI tests.

## 1.7.3 Translations

Wagtail has internationalisation support so if you are fluent in a non-English language you can contribute by localising the interface.

Translation work should be submitted through [Transifex](#).

### 1.7.4 Other contributions

We welcome contributions to all aspects of Wagtail. If you would like to improve the design of the user interface, or extend the documentation, please submit a pull request as above. If you’re not familiar with Github or pull requests, [contact us directly](#) and we’ll work something out.

### 1.7.5 Developing packages for Wagtail

If you are developing packages for Wagtail, you can add the following [PyPI](#) classifiers:

- `Framework :: Wagtail`
- `Framework :: Wagtail :: 1`
- `Framework :: Wagtail :: 2`

You can also find a curated list of awesome packages, articles, and other cool resources from the Wagtail community at [Awesome Wagtail](#).

### 1.7.6 More information

#### UI Styleguide

Developers working on the Wagtail UI or creating new UI components may wish to test their work against our Styleguide, which is provided as the contrib module “`wagtailstyleguide`”.

To install the styleguide module on your site, add it to the list of `INSTALLED_APPS` in your settings:

```
INSTALLED_APPS = (
    ...
    'wagtail.contrib.styleguide',
    ...
)
```

This will add a ‘Styleguide’ item to the Settings menu in the admin.

At present the styleguide is static: new UI components must be added to it manually, and there are no hooks into it for other modules to use. We hope to support hooks in the future.

The styleguide doesn’t currently provide examples of all the core interface components; notably the Page, Document, Image and Snippet chooser interfaces are not currently represented.

### General coding guidelines

#### Language

British English is preferred for user-facing text; this text should also be marked for translation (using the `django.utils.translation.gettext` function and `{% trans %}` template tag, for example). However, identifiers within code should use American English if the British or international spelling would conflict with built-in language keywords; for example, CSS code should consistently use the spelling `color` to avoid inconsistencies like `background-colour: $colour-red`.

## Python coding guidelines

### PEP8

We ask that all Python contributions adhere to the [PEP8](#) style guide, apart from the restriction on line length (E501) and some minor docstring-related issues. The list of PEP8 violations to ignore is in the `tox.ini` file, under the `[flake8]` header. You might want to configure the flake8 linter in your editor/IDE to use the configuration in this file.

In addition, import lines should be sorted according to [isort](#) 4.2.5 rules. If you have installed Wagtail's testing dependencies (`pip install -e .[testing]`), you can check your code by running `make lint`.

### Django compatibility

Wagtail is written to be compatible with multiple versions of Django. Sometimes, this requires running one piece of code for recent version of Django, and another piece of code for older versions of Django. In these cases, always check which version of Django is being used by inspecting `django.VERSION`:

```
import django

if django.VERSION >= (1, 9):
    # Use new attribute
    related_field = field.rel
else:
    # Use old, deprecated attribute
    related_field = field.related
```

Always compare against the version using greater-or-equals (`>=`), so that code for newer versions of Django is first.

Do not use a `try ... except` when seeing if an object has an attribute or method introduced in a newer versions of Django, as it does not clearly express why the `try ... except` is used. An explicit check against the Django version makes the intention of the code very clear.

```
# Do not do this
try:
    related_field = field.rel
except AttributeError:
    related_field = field.related
```

If the code needs to use something that changed in a version of Django many times, consider making a function that encapsulates the check:

```
import django

def related_field(field):
    if django.VERSION >= (1, 9):
        return field.rel
    else:
        return field.related
```

If a new function has been introduced by Django that you think would be very useful for Wagtail, but is not available in older versions of Django that Wagtail supports, that function can be copied over in to Wagtail. If the user is running a new version of Django that has the function, the function should be imported from Django. Otherwise, the version bundled with Wagtail should be used. A link to the Django source code where this function was taken from should be included:

```
import django

if django.VERSION >= (1, 9):
    from django.core.validators import validate_unicode_slug
else:
    # Taken from https://github.com/django/django/blob/1.9/django/core/validators.py
    ↪ #L230
    def validate_unicode_slug(value):
        # Code left as an exercise to the reader
        pass
```

## Tests

Wagtail has a suite of tests, which we are committed to improving and expanding. See [Testing](#).

We run continuous integration at [travis-ci.org/wagtail/wagtail](https://travis-ci.org/wagtail/wagtail) to ensure that no commits or pull requests introduce test failures. If your contributions add functionality to Wagtail, please include the additional tests to cover it; if your contributions alter existing functionality, please update the relevant tests accordingly.

## HTML coding guidelines

We use [Django templates](#) to author HTML.

### Linting HTML

We use [jinja-lint](#) to lint templates. If you have installed Wagtail's testing dependencies (`pip install -e . [testing]`), you can check your code by running `make lint`.

## Principles

- Write [valid HTML](#). We target the HTML5 doctype.
- Write [semantic HTML](#).
- Attach JavaScript behavior with `data-` attributes, rather than classes or IDs.
- For comments, use Django templates syntax instead of HTML.

## CSS coding guidelines

Our CSS is written in [Sass](#), using the SCSS syntax.

## Compiling

The SCSS source files are compiled to CSS using the [gulp](#) build system. This requires [Node.js](#) to run. To install the libraries required for compiling the SCSS, run the following from the Wagtail repository root:

```
$ npm install --no-save
```

To compile the assets, run:

```
$ npm run build
```

Alternatively, the SCSS files can be monitored, automatically recompiling when any changes are observed, by running:

```
$ npm start
```

### Linting and formatting SCSS

Wagtail uses the [stylelint](#) linter. You'll need Node.js and npm on your development machine. Ensure project dependencies are installed by running `npm install --no-save`

#### Linting code

Run the linter from the wagtail project root:

```
$ npm run lint:css
```

The linter is configured to check your code for adherence to the guidelines below, plus a little more.

#### Formatting code

If you want to autofix errors, you can run that command directly with:

```
$ npm run lint:css -- --fix
```

### Changing the linter configuration

The configuration for the linting rules is managed in an external repository so that it can be easily shared across other Wagtail projects or plugins. This configuration can be found at [stylelint-config-wagtail](#).

## Styleguide Reference

### Spacing

- Use soft-tabs with a four space indent. Spaces are the only way to guarantee code renders the same in any person's environment.
- Put spaces after `:` in property declarations.
- Put spaces before `{` in rule declarations.
- Put line breaks between rulesets.
- When grouping selectors, put each selector on its own line.
- Place closing braces of declaration blocks on a new line.
- Each declaration should appear on its own line for more accurate error reporting.
- Add a newline at the end of your `.scss` files.
- Strip trailing whitespace from your rules.



- Add a space after the comma, in comma-delimited property values e.g `rgba()`

## Formatting

- Use hex color codes `#000` unless using `rgba()` in raw CSS (SCSS' `rgba()` function is overloaded to accept hex colors as a param, e.g., `rgba(#000, .5)`).
- Use `//` for comment blocks (instead of `/* */`).
- Use single quotes for string values `background: url('my/image.png')`
- Avoid specifying units for zero values, e.g., `margin: 0;` instead of `margin: 0px;`.
- Strive to limit use of shorthand declarations to instances where you must explicitly set all the available values.

## Sass imports

Leave off underscores and file extensions in includes:

```
// Bad
@import 'components/_widget.scss'

// Better
@import 'components/widget'
```

## Pixels vs. ems

Use `rems` for `font-size`, because they offer absolute control over text. Additionally, unit-less `line-height` is preferred because it does not inherit a percentage value of its parent element, but instead is based on a multiplier of the `font-size`.

## Specificity (classes vs. ids)

Always use classes instead of IDs in CSS code. IDs are overly specific and lead to duplication of CSS.

When styling a component, start with an element + class namespace, prefer direct descendant selectors by default, and use as little specificity as possible. Here is a good example:

```
<ul class="category-list">
  <li class="item">Category 1</li>
  <li class="item">Category 2</li>
  <li class="item">Category 3</li>
</ul>
```

```
.category-list { // element + class namespace

  // Direct descendant selector > for list items
  > li {
    list-style-type: disc;
  }

  // Minimal specificity for all links
  a {
```

(continues on next page)

(continued from previous page)

```
        color: #f00;
    }
}
```

## Class naming conventions

Never reference `js-` prefixed class names from CSS files. `js-` are used exclusively from JS files.

Use the SMACSS `is-prefix` for state rules that are shared between CSS and JS.

## Misc

As a rule of thumb, avoid unnecessary nesting in SCSS. At most, aim for three levels. If you cannot help it, step back and rethink your overall strategy (either the specificity needed, or the layout of the nesting).

## Examples

Here are some good examples that apply the above guidelines:

```
// Example of good basic formatting practices
.styleguide-format {
    color: #000;
    background-color: rgba(0, 0, 0, .5);
    border: 1px solid #0f0;
}

// Example of individual selectors getting their own lines (for error reporting)
.styleguide-multiple,
.styleguide-classes,
.styleguide-get-new-lines {
    display: block;
}

// Avoid unnecessary shorthand declarations
.styleguide-not-so-good {
    margin: 0 0 20px;
}
.styleguide-good {
    margin-bottom: 20px;
}
```

## JavaScript coding guidelines

Write JavaScript according to the [Airbnb Styleguide](#), with some exceptions:

- Use soft-tabs with a four space indent. Spaces are the only way to guarantee code renders the same in any person's environment.
- We accept `snake_case` in object properties, such as `ajaxResponse.page_title`, however `camelCase` or `UPPER_CASE` should be used everywhere else.

## Linting and formatting code

Wagtail uses the [ESLint](#) linter to help check your code meets the styleguide. You'll need node.js and npm on your development machine. Ensure project dependencies are installed by running `npm install --no-save`

### Linting code

```
$ npm run lint:js
```

This will lint all the JS in the wagtail project, excluding vendor files and compiled libraries.

Some of the modals are generated via server-side scripts. These include template tags that upset the linter, so modal workflow JavaScript is excluded from the linter.

### Formatting code

```
$ npm run lint:js -- --fix
```

This will perform safe edits to conform your JS code to the styleguide. It won't touch the line-length, or convert quotemarks from double to single.

Run the linter after you've formatted the code to see what manual fixes you need to make to the codebase.

## Changing the linter configuration

The configuration for the linting rules is managed in an external repository so that it can be easily shared across other Wagtail projects or plugins. This configuration can be found at [eslint-config-wagtail](#).

## Wagtail's release process

### Official releases

Release numbering works as follows:

- Versions are numbered in the form `A.B` or `A.B.C`.
- `A.B` is the *feature release* version number. Each version will be mostly backwards compatible with the previous release. Exceptions to this rule will be listed in the release notes.
- `C` is the *patch release* version number, which is incremented for bugfix and security releases. These releases will be 100% backwards-compatible with the previous patch release. The only exception is when a security or data loss issue can't be fixed without breaking backwards-compatibility. If this happens, the release notes will provide detailed upgrade instructions.
- Before a new feature release, we'll make at least one release candidate release. These are of the form `A.BrCn`, which means the `Nth` release candidate of version `A.B`.

In git, each Wagtail release will have a tag indicating its version number. Additionally, each release series has its own branch, called `stable/A.B.x`, and bugfix/security releases will be issued from those branches.

**Feature release** Feature releases (`A.B`, `A.B+1`, etc.) happen every three months – see [release process](#) for details. These releases will contain new features and improvements to existing features.

**Patch release** Patch releases (A.B.C, A.B.C+1, etc.) will be issued as needed, to fix bugs and/or security issues.

These releases will be 100% compatible with the associated feature release, unless this is impossible for security reasons or to prevent data loss. So the answer to “should I upgrade to the latest patch release?” will always be “yes.”

**Long-term support release** Certain feature releases will be designated as long-term support (LTS) releases. These releases will get security and data loss fixes applied for a guaranteed period of time, typically six months.

### Release cadence

Wagtail uses a loose form of [semantic versioning](#). SemVer makes it easier to see at a glance how compatible releases are with each other. It also helps to anticipate when compatibility shims will be removed. It’s not a pure form of SemVer as each feature release will continue to have a few documented backwards incompatibilities where a deprecation path isn’t possible or not worth the cost.

### Deprecation policy

A feature release may deprecate certain features from previous releases. If a feature is deprecated in feature release A.B, it will continue to work in the following version but raise warnings. Features deprecated in release A.B will be removed in the A.B+2 release to ensure deprecations are done over at least 2 feature releases.

So, for example, if we decided to start the deprecation of a function in Wagtail 1.4:

- Wagtail 1.4 will contain a backwards-compatible replica of the function which will raise a `RemovedInWagtail16Warning`.
- Wagtail 1.5 will still contain the backwards-compatible replica.
- Wagtail 1.6 will remove the feature outright.

The warnings are silent by default. You can turn on display of these warnings with the `python -Wd` option.

### Supported versions

At any moment in time, Wagtail’s developer team will support a set of releases to varying levels.

- The current development master will get new features and bug fixes requiring non-trivial refactoring.
- Patches applied to the master branch must also be applied to the last feature release branch, to be released in the next patch release of that feature series, when they fix critical problems:
  - Security issues.
  - Data loss bugs.
  - Crashing bugs.
  - Major functionality bugs in newly-introduced features.
  - Regressions from older versions of Wagtail.

The rule of thumb is that fixes will be backported to the last feature release for bugs that would have prevented a release in the first place (release blockers).

- Security fixes and data loss bugs will be applied to the current master, the last feature release branch, and any other supported long-term support release branches.

- Documentation fixes generally will be more freely backported to the last release branch. That’s because it’s highly advantageous to have the docs for the last release be up-to-date and correct, and the risk of introducing regressions is much less of a concern.

As a concrete example, consider a moment in time halfway between the release of Wagtail 1.6 and 1.7. At this point in time:

- Features will be added to `master`, to be released as Wagtail 1.7.
- Critical bug fixes will be applied to the `stable/1.6.x` branch, and released as 1.6.1, 1.6.2, etc.
- Security fixes and bug fixes for data loss issues will be applied to `master` and to the `stable/1.6.x` and `stable/1.4.x` (LTS) branches. They will trigger the release of 1.6.1, 1.4.8, etc.
- Documentation fixes will be applied to `master`, and, if easily backported, to the latest stable branch, 1.6.x.

## Supported versions of Django

Each release of Wagtail declares which versions of Django it supports.

Typically, a new Wagtail feature release supports the last long-term support version and all following versions of Django.

For example, consider a moment in time before release of Wagtail 1.5 and after the following releases:

- Django 1.8 (LTS)
- Django 1.9
- Wagtail 1.4 (LTS) - Released before Django 1.10 and supports Django 1.8 and 1.9
- Django 1.10

Wagtail 1.5 will support Django 1.8 (LTS), 1.9, 1.10. Wagtail 1.4 will still support only Django 1.8 (LTS) and 1.9.

## Release process

Wagtail uses a [time-based release schedule](#), with feature releases every three months.

After each feature release, the release manager will announce a timeline for the next feature release.

## Release cycle

Each release cycle consists of three parts:

### Phase one: feature proposal

The first phase of the release process will include figuring out what major features to include in the next version. This should include a good deal of preliminary work on those features – working code trumps grand design.

### Phase two: development

The second part of the release schedule is the “heads-down” working period. Using the roadmap produced at the end of phase one, we’ll all work very hard to get everything on it done.

At the end of phase two, any unfinished features will be postponed until the next release.

At this point, the `stable/A.B.x` branch will be forked from `master`.

### Phase three: bugfixes

The last part of a release cycle is spent fixing bugs – no new features will be accepted during this time.

Once all known blocking bugs have been addressed, a release candidate will be made available for testing. The final release will usually follow two weeks later, although this period may be extended if the further release blockers are found.

During this phase, committers will be more and more conservative with backports, to avoid introducing regressions. After the release candidate, only release blockers and documentation fixes should be backported.

Developers should avoid adding any new translatable strings after the release candidate - this ensures that translators have the full period between the release candidate and the final release to bring translations up to date. Translations will be re-imported immediately before the final release.

In parallel to this phase, `master` can receive new features, to be released in the `A.B+1` cycle.

### Bug-fix releases

After a feature release (e.g. `A.B`), the previous release will go into bugfix mode.

The branch for the previous feature release (e.g. `stable/A.B-1.x`) will include bugfixes. Critical bugs fixed on `master` must *also* be fixed on the bugfix branch; this means that commits need to cleanly separate bug fixes from feature additions. The developer who commits a fix to `master` will be responsible for also applying the fix to the current bugfix branch.

## 1.8 Release notes

### 1.8.1 Upgrading Wagtail

#### Version numbers

New feature releases of Wagtail are released every three months. These releases provide new features, improvements and bugfixes, and are marked by incrementing the second part of the version number (for example, 2.6 to 2.7).

Additionally, patch releases will be issued as needed, to fix bugs and security issues. These are marked by incrementing the third part of the version number (for example, 2.6 to 2.6.1). Wherever possible, these releases will remain fully backwards compatible with the corresponding feature and not introduce any breaking changes.

A feature release will usually stop receiving patch release updates when the next feature release comes out. However, selected feature releases are designated as Long Term Support (LTS) releases, and will continue to receive maintenance updates to address any security and data-loss related issues that arise. Typically, a Long Term Support release will happen once every four feature releases and receive updates for five feature releases, giving a support period of fifteen months with a three month overlap.

Also, Long Term Support releases will ensure compatibility with at least one [Django Long Term Support release](#).

For dates of past and upcoming releases and support periods, see [Release Schedule](#).

## Deprecation policy

Sometimes it is necessary for a feature release to deprecate features from previous releases. This will be noted in the “Upgrade considerations” section of the release notes.

When a feature is deprecated, it will continue to work in that feature release and the one after it, but will raise a warning. The feature will then be removed in the subsequent feature release. For example, a feature marked as deprecated in version 1.8 will continue to work in versions 1.8 and 1.9, and be dropped in version 1.10.

## Upgrade process

We recommend upgrading one feature release at a time, even if your project is several versions behind the current one. This has a number of advantages over skipping directly to the newest release:

- If anything breaks as a result of the upgrade, you will know which version caused it, and will be able to troubleshoot accordingly;
- Deprecation warnings shown in the console output will notify you of any code changes you need to make before upgrading to the following version;
- Some releases make database schema changes that need to be reflected on your project by running `./manage.py makemigrations` - this is liable to fail if too many schema changes happen in one go.

Before upgrading to a new feature release:

- Check your project’s console output for any deprecation warnings, and fix them where necessary;
- Check the new version’s release notes, and the *Compatible Django / Python versions* table below, for any dependencies that need upgrading first;
- Make a backup of your database.

To upgrade:

- Update the `wagtail` line in your project’s `requirements.txt` file to specify the latest patch release of the version you wish to install. For example, to upgrade to version 1.8.x, the line should read:

```
wagtail>=1.8,<1.9
```

- Run:

```
pip install -r requirements.txt
./manage.py makemigrations
./manage.py migrate
```

- Make any necessary code changes as directed in the “Upgrade considerations” section of the release notes.
- Test that your project is working as expected.

Remember that the JavaScript and CSS files used in the Wagtail admin may have changed between releases - if you encounter erratic behaviour on upgrading, ensure that you have cleared your browser cache. When deploying the upgrade to a production server, be sure to run `./manage.py collectstatic` to make the updated static files available to the web server. In production, we recommend enabling `ManifestStaticFilesStorage` in the `STATICFILES_STORAGE` setting - this ensures that different versions of files are assigned distinct URLs.

## Compatible Django / Python versions

New feature releases frequently add support for newer versions of Django and Python, and drop support for older ones. We recommend always carrying out upgrades to Django and Python as a separate step from upgrading Wagtail.

The compatible versions of Django and Python for each Wagtail release are:

| Wagtail release | Compatible Django versions | Compatible Python versions |
|-----------------|----------------------------|----------------------------|
| 0.1             | 1.6                        | 2.7                        |
| 0.2             | 1.6                        | 2.7                        |
| 0.3             | 1.6                        | 2.6, 2.7                   |
| 0.4             | 1.6                        | 2.6, 2.7, 3.2, 3.3, 3.4    |
| 0.5             | 1.6                        | 2.6, 2.7, 3.2, 3.3, 3.4    |
| 0.6             | 1.6, 1.7                   | 2.6, 2.7, 3.2, 3.3, 3.4    |
| 0.7             | 1.6, 1.7                   | 2.6, 2.7, 3.2, 3.3, 3.4    |
| 0.8 LTS         | 1.6, 1.7                   | 2.6, 2.7, 3.2, 3.3, 3.4    |
| 1.0             | 1.7, 1.8                   | 2.7, 3.3, 3.4              |
| 1.1             | 1.7, 1.8                   | 2.7, 3.3, 3.4              |
| 1.2             | 1.7, 1.8                   | 2.7, 3.3, 3.4, 3.5         |
| 1.3             | 1.7, 1.8, 1.9              | 2.7, 3.3, 3.4, 3.5         |
| 1.4 LTS         | 1.8, 1.9                   | 2.7, 3.3, 3.4, 3.5         |
| 1.5             | 1.8, 1.9                   | 2.7, 3.3, 3.4, 3.5         |
| 1.6             | 1.8, 1.9, 1.10             | 2.7, 3.3, 3.4, 3.5         |
| 1.7             | 1.8, 1.9, 1.10             | 2.7, 3.3, 3.4, 3.5         |
| 1.8 LTS         | 1.8, 1.9, 1.10             | 2.7, 3.3, 3.4, 3.5         |
| 1.9             | 1.8, 1.9, 1.10             | 2.7, 3.3, 3.4, 3.5         |
| 1.10            | 1.8, 1.10, 1.11            | 2.7, 3.4, 3.5, 3.6         |
| 1.11            | 1.8, 1.10, 1.11            | 2.7, 3.4, 3.5, 3.6         |
| 1.12 LTS        | 1.8, 1.10, 1.11            | 2.7, 3.4, 3.5, 3.6         |
| 1.13 LTS        | 1.8, 1.10, 1.11            | 2.7, 3.4, 3.5, 3.6         |
| 2.0             | 1.11, 2.0                  | 3.4, 3.5, 3.6              |
| 2.1             | 1.11, 2.0                  | 3.4, 3.5, 3.6              |
| 2.2             | 1.11, 2.0                  | 3.4, 3.5, 3.6              |
| 2.3 LTS         | 1.11, 2.0, 2.1             | 3.4, 3.5, 3.6              |
| 2.4             | 2.0, 2.1                   | 3.4, 3.5, 3.6, 3.7         |
| 2.5             | 2.0, 2.1, 2.2              | 3.4, 3.5, 3.6, 3.7         |
| 2.6             | 2.0, 2.1, 2.2              | 3.5, 3.6, 3.7              |
| 2.7 LTS         | 2.0, 2.1, 2.2              | 3.5, 3.6, 3.7, 3.8         |

## 1.8.2 Wagtail 2.7.1 release notes

- *What's new*

### What's new

### Bug fixes

- Management command startup checks under `ManifestStaticFilesStorage` no longer fail if `collectstatic` has not been run first (Alex Tomkins)



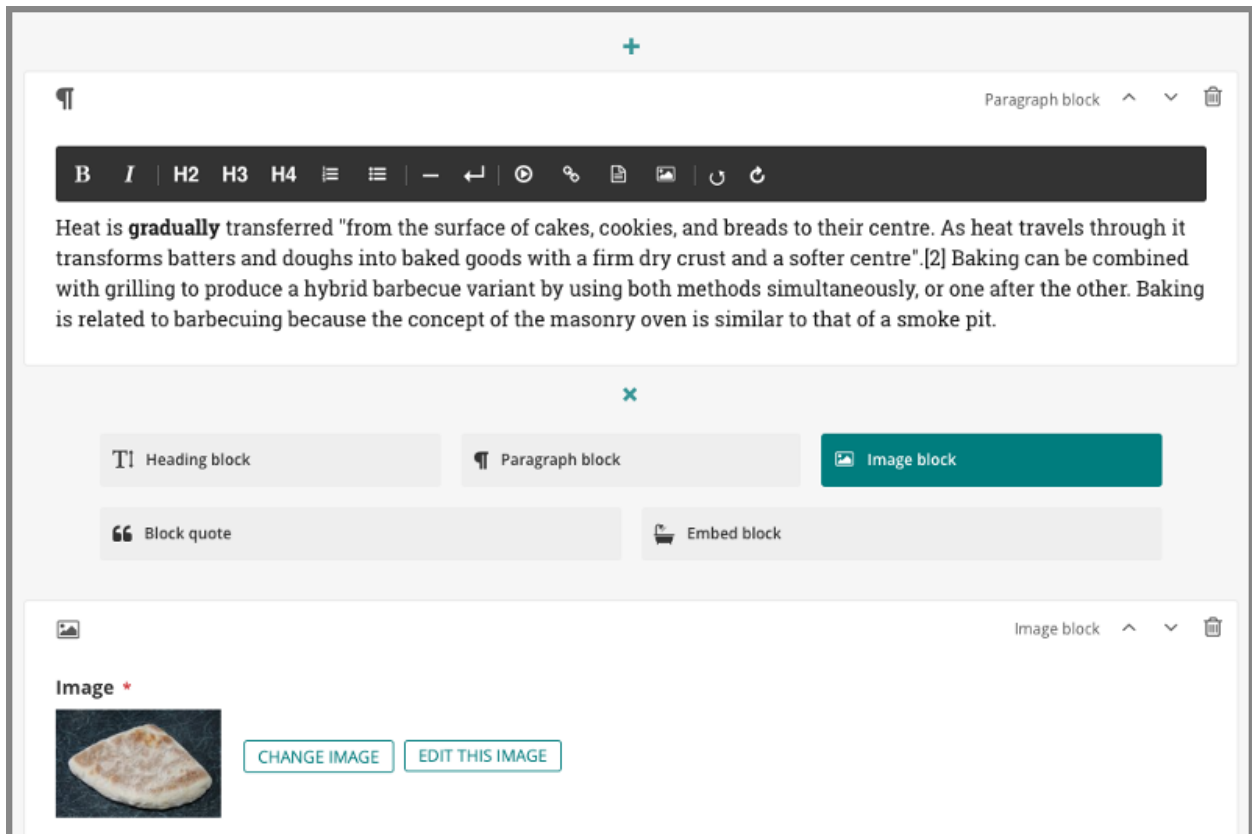
### 1.8.3 Wagtail 2.7 release notes

- *What's new*
- *Upgrade considerations*

Wagtail 2.7 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 12 months).

#### What's new

#### Improved StreamField design



The design of the StreamField user interface has been updated to improve clarity and usability, including better handling of nested blocks. This work was completed by Bertrand Bordage as part of the [Wagtail's First Hatch](#) crowdfunding campaign. We would like to thank all [supporters of the campaign](#).

#### WebP image support

Images can now be uploaded and rendered in [WebP](#) format; see [Image file formats](#) for details. This feature was developed by frmdstryr, Karl Hobley and Matt Westcott.

### Other features

- Added Elasticsearch 7 support (pySilver)
- Added Python 3.8 support (John Carter, Matt Westcott)
- Added `construct_page_listing_buttons` hook (Michael van Tellingen)
- Added more detailed documentation and troubleshooting for installing OpenCV for feature detection (Daniele Procida)
- Move and refactor upgrade notification JS (Jonny Scholes)
- Remove need for Elasticsearch `update_all_types` workaround, upgrade minimum release to 6.4.0 or above (Jonathan Liuti)
- Add ability to insert internal anchor links/links with fragment identifiers in Draftail (rich text) fields (Iman Syed)
- Added Table Block caption for accessibility (Rahmi Pruitt)
- Add ability for users to change their own name via the account settings page (Kevin Howbrook)
- Add ability to insert telephone numbers as links in Draftail (rich text) fields (Mikael Engström and Liam Brenner)
- Increase delay before search in the snippet chooser, to prevent redundant search request round trips (Robert Rollins)
- Add `WAGTAIL_EMAIL_MANAGEMENT_ENABLED` setting to determine whether users can change their email address (Janne Alatalo)
- Recognise Soundcloud artist URLs as embeddable (Kiril Staikov)
- Add `WAGTAILDOCS_SERVE_METHOD` setting to determine how document downloads will be linked to and served (Tobias McNulty, Matt Westcott)
- Add `WAGTAIL_MODERATION_ENABLED` setting to enable / disable the ‘Submit for Moderation’ option (Jacob Topp-Mugglestone) - thanks to [The Motley Fool](#) for sponsoring this feature
- Added settings to customise pagination page size for the Images admin area (Brian Whitton)
- Added ARIA role to TableBlock output (Matt Westcott)
- Added cache-busting query parameters to static files within the Wagtail admin (Matt Westcott)
- Allow `register_page_action_menu_item` and `construct_page_action_menu` hooks to override the default menu action (Rahmi Pruitt, Matt Westcott) - thanks to [The Motley Fool](#) for sponsoring review of this feature
- `WAGTAILIMAGES_MAX_IMAGE_PIXELS` limit now takes the number of animation frames into account (Karl Hobley)

### Bug fixes

- Added line breaks to long filenames on multiple image / document uploader (Kevin Howbrook)
- Added https support for Scribd oEmbed provider (Rodrigo)
- Changed StreamField group label color so labels are visible (Catherine Farman)
- Prevented images with a very wide aspect ratio from being displayed distorted in the rich text editor (Iman Syed)
- Prevent exception when deleting a model with a protected One-to-one relationship (Neal Todd)
- Added labels to snippet bulk edit checkboxes for screen reader users (Martey Dodoo)

- Middleware responses during page preview are now properly returned to the user (Matt Westcott)
- Default text of page links in rich text uses the public page title rather than the admin display title (Andy Chosak)
- Specific page permission checks are now enforced when viewing a page revision (Andy Chosak)
- `pageurl` and `slugurl` tags no longer fail when `request.site` is `None` (Samir Shah)
- Output form media on add/edit image forms with custom models (Matt Westcott)
- Output form media on add/edit document forms with custom models (Sergey Fedoseev)
- Fixes layout for the clear checkbox in default `FileField` widget (Mikalai Radchuk)
- Remove ASCII conversion from Postgres search backend, to support stemming in non-Latin alphabets (Pavel Denisov)
- Prevent tab labels on page edit view from being cut off on very narrow screens (Kevin Howbrook)
- Very long words in page listings are now broken where necessary (Kevin Howbrook)
- Language chosen in user preferences no longer persists on subsequent requests (Bojan Mihelac)
- Prevent new block IDs from being assigned on repeated calls to `StreamBlock.get_prep_value` (Colin Klein)
- Prevent broken images in notification emails when static files are hosted on a remote domain (Eduard Luca)
- Replace styleguide example avatar with default image to avoid issues when custom user model is used (Matt Westcott)
- `DrafttailRichTextArea` is no longer treated as a hidden field by Django's form logic (Sergey Fedoseev)
- Replace `format()` placeholders in translatable strings with `%` formatting (Matt Westcott)
- Altering Django REST Framework's `DEFAULT_AUTHENTICATION_CLASSES` setting no longer breaks the page explorer menu and admin API (Matt Westcott)
- Regression - missing label for external link URL field in link chooser (Stefani Castellanos)

## Upgrade considerations

### Query strings added to static file URLs within the admin

To avoid problems caused by outdated cached JavaScript / CSS files following a Wagtail upgrade, URLs to static files within the Wagtail admin now include a version-specific query parameter of the form `?v=1a2b3c4d`. Under certain front-end cache configurations (such as Cloudflare's 'No Query String' caching level), the presence of this parameter may prevent the file from being cached at all. If you are using such a setup, and have some other method in place to expire outdated files (e.g. clearing the cache on deployment), you can disable the query parameter by setting `WAGTAILADMIN_STATIC_FILE_VERSION_STRINGS` to `False` in your project settings. (Note that this is automatically disabled when `ManifestStaticFilesStorage` is in use.)

### `Page.dummy_request` is deprecated

The internal `Page.dummy_request` method (which generates an HTTP request object simulating a real page request, for use in previews) has been deprecated, as it did not correctly handle errors generated during middleware processing. Any code that calls this method to render page previews should be updated to use the new method `Page.make_preview_request(original_request=None, preview_mode=None)`, which builds the request and calls `Page.serve_preview` as a single operation.

## Changes to document serving on remote storage backends (Amazon S3 etc)

This release introduces a new setting `WAGTAILDOCS_SERVE_METHOD` to control how document downloads are served. On previous versions of Wagtail, document files would always be served through a Django view, to allow permission checks to be applied. When using a remote storage backend such as Amazon S3, this meant that the document would be downloaded to the Django server on every download request.

In Wagtail 2.7, the default behaviour on remote storage backends is to redirect to the storage's underlying URL after performing the permission check. If this is unsuitable for your project (for example, your storage provider is configured to block public access, or revealing its URL would be a security risk) you can revert to the previous behaviour by setting `WAGTAILDOCS_SERVE_METHOD` to `'serve_view'`.

## Template change for page action menu hooks

When customising the action menu on the page edit view through the `register_page_action_menu_item` or `construct_page_action_menu` hook, the `ActionMenuItem` object's `template` attribute or `render_html` method can be overridden to customise the menu item's HTML. As of Wagtail 2.7, the HTML returned from these should *not* include the enclosing `<li>` element.

Any add-on library that uses this feature and needs to preserve backward compatibility with previous Wagtail versions can conditionally reinsert the `<li>` wrapper through its `render_html` method - for example:

```
from django.utils.html import format_html
from wagtail import VERSION as WAGTAIL_VERSION
from wagtail.admin.action_menu import ActionMenuItem

class CustomMenuItem(ActionMenuItem):
    template = 'myapp/my_menu_item.html'

    def render_html(self, request, parent_context):
        html = super().render_html(request, parent_context)
        if WAGTAIL_VERSION < (2, 7):
            html = format_html('<li>{}</li>', html)
        return html
```

## `wagtail.admin.utils` and `wagtail.admin.decorators` modules deprecated

The modules `wagtail.admin.utils` and `wagtail.admin.decorators` have been deprecated. The helper functions defined here exist primarily for Wagtail's internal use; however, some of them (particularly `send_mail` and `permission_required`) may be found in user code, and import lines will need to be updated. The new locations for these definitions are as follows:

| Definition                                   | Old location                          | New location                            |
|--|---------------------------------------|---|
| <code>any_permission_required</code>         | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>permission_denied</code>               | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>permission_required</code>             | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>PermissionPolicyChecker</code>         | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>user_has_any_page_permission</code>    | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>user_passes_test</code>                | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>users_with_page_permission</code>      | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.auth</code>         |
| <code>reject_request</code>                  | <code>wagtail.admin.decorators</code> | <code>wagtail.admin.auth</code>         |
| <code>require_admin_access</code>            | <code>wagtail.admin.decorators</code> | <code>wagtail.admin.auth</code>         |
| <code>get_available_admin_languages</code>   | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.localization</code> |
| <code>get_available_admin_time_zones</code>  | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.localization</code> |
| <code>get_js_translation_strings</code>      | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.localization</code> |
| <code>WAGTAILADMIN_PROVIDED_LANGUAGES</code> | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.localization</code> |
| <code>send_mail</code>                       | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.mail</code>         |
| <code>send_notification</code>               | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.mail</code>         |
| <code>get_object_usage</code>                | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.models</code>       |
| <code>popular_tags_for_model</code>          | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.models</code>       |
| <code>get_site_for_user</code>               | <code>wagtail.admin.utils</code>      | <code>wagtail.admin.navigation</code>   |

## 1.8.4 Wagtail 2.6.3 release notes

- *What's new*

### What's new

### Bug fixes

- Altering Django REST Framework's `DEFAULT_AUTHENTICATION_CLASSES` setting no longer breaks the page explorer menu and admin API (Matt Westcott)

## 1.8.5 Wagtail 2.6.2 release notes

- *What's new*

### What's new

### Bug fixes

- Prevent search indexing failures on Postgres 9.4 and Django `>= 2.2.1` (Matt Westcott)

## 1.8.6 Wagtail 2.6.1 release notes

- *What's new*

### What's new

#### Bug fixes

- Prevent Javascript errors caused by unescaped quote characters in translation strings (Matt Westcott)

## 1.8.7 Wagtail 2.6 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### Accessibility targets and improvements

Wagtail now has official accessibility support targets: we are aiming for compliance with [WCAG2.1](#), AA level. WCAG 2.1 is the international standard which underpins many national accessibility laws.

Wagtail isn't fully compliant just yet, but we have made many changes to the admin interface to get there. We thank the UK Government (in particular the CMS team at the Department for International Trade), who commissioned many of these improvements.

Here are changes which should make Wagtail more usable for all users regardless of abilities:

- Increase font-size across the whole admin (Beth Menzies, Katie Locke)
- Improved text color contrast across the whole admin (Beth Menzies, Katie Locke)
- Added consistent focus outline styles across the whole admin (Thibaud Colas)
- Ensured the 'add child page' button displays when focused (Helen Chapman, Katie Locke)

This release also contains many big improvements for screen reader users:

- Added more ARIA landmarks across the admin interface and welcome page for screen reader users to navigate the CMS more easily (Beth Menzies)
- Improved heading structure for screen reader users navigating the CMS admin (Beth Menzies, Helen Chapman)
- Make icon font implementation more screen-reader-friendly (Thibaud Colas)
- Removed buggy tab order customisations in the CMS admin (Jordan Bauer)
- Screen readers now treat page-level action dropdowns as navigation instead of menus (Helen Chapman)
- Fixed occurrences of invalid HTML across the CMS admin (Thibaud Colas)
- Add empty alt attributes to all images in the CMS admin (Andreas Bernacca)

- Fixed focus not moving to the pages explorer menu when open (Helen Chapman)

We’ve also had a look at how controls are labeled across the UI for screen reader users:

- Add image dimensions in image gallery and image choosers for screen reader users (Helen Chapman)
- Add more contextual information for screen readers in the explorer menu’s links (Helen Chapman)
- Make URL generator preview image alt translatable (Thibaud Colas)
- Screen readers now announce “Dashboard” for the main nav’s logo link instead of Wagtail’s version number (Thibaud Colas)
- Remove duplicate labels in image gallery and image choosers for screen reader users (Helen Chapman)
- Added a label to the modals’ “close” button for screen reader users (Helen Chapman, Katie Locke)
- Added labels to permission checkboxes for screen reader users (Helen Chapman, Katie Locke)
- Improve screen-reader labels for action links in page listing (Helen Chapman, Katie Locke)
- Add screen-reader labels for table headings in page listing (Helen Chapman, Katie Locke)
- Add screen reader labels for page privacy toggle, edit lock, status tag in page explorer & edit views (Helen Chapman, Katie Locke)
- Add screen-reader labels for dashboard summary cards (Helen Chapman, Katie Locke)
- Add screen-reader labels for privacy toggle of collections (Helen Chapman, Katie Locke)

Again, this is still a work in progress – if you are aware of other existing accessibility issues, please do [open an issue](#) if there isn’t one already.

## Other features

- Added support for `short_description` for field labels in `modeladmin`’s `InspectView` (Wesley van Lee)
- Rearranged SCSS folder structure to the `client` folder and split them approximately according to ITCSS. (Naomi Morduch Toubman, Jonny Scholes, Janneke Janssen, Hugo van den Berg)
- Added support for specifying cell alignment on `TableBlock` (Samuel Mendes)
- Added more informative error when a non-image object is passed to the `image` template tag (Deniz Dogan)
- Added `ButtonHelper` examples in the `modelAdmin` primer page within documentation (Kalob Taulien)
- Multiple clarifications, grammar and typo fixes throughout documentation (Dan Swain)
- Use correct URL in API example in documentation (Michael Bunsen)
- Move `datetime` widget initialiser JS into the widget’s form media instead of page editor media (Matt Westcott)
- Add form field prefixes for input forms in chooser modals (Matt Westcott)
- Removed version number from the logo link’s title. The version can now be found under the Settings menu (Thibaud Colas)
- Added “don’t delete” option to confirmation screen when deleting images, documents and `modeladmin` models (Kevin Howbrook)
- Added `branding_title` template block for the admin title prefix (Dillen Meijboom)
- Added support for custom search handler classes to `modeladmin`’s `IndexView`, and added a class that uses the default Wagtail search backend for searching (Seb Brown, Andy Babic)
- Update group edit view to expose the `Permission` object for each checkbox (George Hickman)

- Improve performance of Pages for Moderation panel (Fidel Ramos)
- Added `process_child_object` and `exclude_fields` arguments to `Page.copy()` to make it easier for third-party apps to customise copy behavior (Karl Hobley)
- Added `Page.with_content_json()`, allowing revision content loading behaviour to be customised on a per-model basis (Karl Hobley)
- Added `construct_settings_menu` hook (Jordan Bauer, Quadric)
- Fixed compatibility of date / time choosers with wagtail-react-streamfield (Mike Hearn)
- Performance optimization of several admin functions, including breadcrumbs, home and index pages (Fidel Ramos)

### Bug fixes

- ModelAdmin no longer fails when filtering over a foreign key relation (Jason Dilworth, Matt Westcott)
- The Wagtail version number is now visible within the Settings menu (Kevin Howbrook)
- Scaling images now rounds values to an integer so that images render without errors (Adrian Brunyate)
- Revised test decorator to ensure `TestPageEditHandlers` test cases run correctly (Alex Tomkins)
- Wagtail bird animation in admin now ends correctly on all browsers (Deniz Dogan)
- Explorer menu no longer shows sibling pages for which the user does not have access (Mike Hearn)
- Admin HTML now includes the correct `dir` attribute for the active language (Andreas Bernacca)
- Fix type error when using `--chunk_size` argument on `./manage.py update_index` (Seb Brown)
- Avoid rendering entire form in `EditHandler`'s `repr` method (Alex Tomkins)
- Add empty alt attributes to HTML output of `Embedly` and `oEmbed` embed finders (Andreas Bernacca)
- Clear pending AJAX request if error occurs on page chooser (Matt Westcott)
- Prevent text from overlapping in focal point editing UI (Beth Menzies)
- Restore custom “Date” icon for scheduled publishing panel in Edit page’s Settings tab (Helen Chapman)
- Added missing form media to user edit form template (Matt Westcott)
- `Page.copy()` no longer copies child objects when the accessor name is included in `exclude_fields_in_copy` (Karl Hobley)
- Clicking the privacy toggle while the page is still loading no longer loads the wrong data in the page (Helen Chapman)
- Added missing `is_stored_locally` method to `AbstractDocument` (jonny5532)
- Query model no longer removes punctuation as part of string normalisation (William Blackie)
- Make login test helper work with user models with non-default username fields (Andrew Miller)
- Delay dirty form check to prevent “unsaved changes” warning from being wrongly triggered (Thibaud Colas)

### Upgrade considerations

#### Removed support for Python 3.4

Python 3.4 is no longer supported as of this release; please upgrade to Python 3.5 or above before upgrading Wagtail.



## Icon font implementation changes

The icon font implementation has been changed to be invisible for screen-reader users, by switching to using [Private Use Areas](#) Unicode code points. All of the icon classes (`icon-user`, `icon-search`, etc) should still work the same, except for two which have been removed because they were duplicates:

- `icon-picture` is removed. Use `icon-image` instead (same visual).
- `icon-file-text-alt` is removed. Use `icon-doc-full` instead (same visual).

For a list of all available icons, please see the [UI Styleguide](#).

## 1.8.8 Wagtail 2.5.2 release notes

- *What's new*

### What's new

### Bug fixes

- Delay dirty form check to prevent “unsaved changes” warning from being wrongly triggered (Thibaud Colas)

## 1.8.9 Wagtail 2.5.1 release notes

- *What's new*

### What's new

### Bug fixes

- Prevent crash when comparing StructBlocks in revision history (Adrian Turjak, Matt Westcott)

## 1.8.10 Wagtail 2.5 release notes

- *What's new*
- *Upgrade considerations*

### What's new

### Django 2.2 support

This release is compatible with Django 2.2. Compatibility fixes were contributed by Matt Westcott and Andy Babic.

### New Markdown shortcuts in rich text

Wagtail’s rich text editor now supports using Markdown shortcuts for inline formatting:

- `**` for bold
- `_` for italic
- `~` for strikethrough (if enabled)
- ``` for code (if enabled)

To learn other shortcuts, have a look at the [keyboard shortcuts](#) reference.

### Other features

- Added support for customising EditHandler-based forms on a per-request basis (Bertrand Bordage)
- Added more informative error message when `|richtext` filter is applied to a non-string value (mukesh5)
- Automatic search indexing can now be disabled on a per-model basis via the `search_auto_update` attribute (Karl Hobley)
- Improved diffing of StreamFields when comparing page revisions (Karl Hobley)
- Highlight broken links to pages and missing documents in rich text (Brady Moe)
- Preserve links when copy-pasting rich text content from Wagtail to other tools (Thibaud Colas)
- Rich text to contentstate conversion now prioritises more specific rules, to accommodate `<p>` and `<br>` elements with attributes (Matt Westcott)
- Added limit image upload size by number of pixels (Thomas Elliott)
- Added `manage.py wagtail_update_index` alias to avoid clashes with `update_index` commands from other packages (Matt Westcott)
- Renamed `target_model` argument on PageChooserBlock to `page_type` (Loic Teixeira)
- `edit_handler` and `panels` can now be defined on a ModelAdmin definition (Thomas Kremmel)
- Add Learn Wagtail to third-party tutorials in documentation (Matt Westcott)
- Add a Django setting `TAG_LIMIT` to limit number of tags that can be added to any taggit model (Mani)
- Added instructions on how to generate urls for ModelAdmin to documentation (LB (Ben Johnston), Andy Babic)
- Added option to specify a fallback URL on `{% pageurl %}` (Arthur Holzner)
- Add support for more rich text formats, disabled by default: `blockquote`, `superscript`, `subscript`, `strikethrough`, `code` (Md Arifin Ibne Matin)
- Added `max_count_per_parent` option on page models to limit the number of pages of a given type that can be created under one parent page (Wesley van Lee)
- StreamField field blocks now accept a `validators` argument (Tom Usher)
- Added edit / delete buttons to snippet index and “don’t delete” option to confirmation screen, for consistency with pages (Kevin Howbrook)
- Added name attributes to all built-in page action menu items (LB (Ben Johnston))
- Added validation on the filter string to the Jinja2 image template tag (Jonny Scholes)
- Changed the pages reordering UI toggle to make it easier to find (Katie Locke, Thibaud Colas)

- Added support for rich text link rewrite handlers for `external` and `email` links (Md Arifin Ibne Matin)
- Clarify installation instructions in documentation, especially regarding virtual environments. (Naomi Morduch Toubman)

## Bug fixes

- Set `SERVER_PORT` to 443 in `Page.dummy_request()` for HTTPS sites (Sergey Fedoseev)
- Include port number in `Host` header of `Page.dummy_request()` (Sergey Fedoseev)
- Validation error messages in `InlinePanel` no longer count towards `max_num` when disabling the ‘add’ button (Todd Dembrey, Thibaud Colas)
- Rich text to contentstate conversion now ignores stray closing tags (frmdstryr)
- Escape backslashes in `postgres_search` queries (Hammy Goonan)
- Parent page link in page chooser search results no longer navigates away (Asanka Lihiniyagoda, Sævar Öfjörð Magnússon)
- `routablepageurl` tag now correctly omits domain part when multiple sites exist at the same root (Gassan Gousseinov)
- Added missing collection column specifier on document listing template (Sergey Fedoseev)
- Page Copy will now also copy `ParentalManyToMany` field relations (LB (Ben Johnston))
- Admin HTML header now includes correct language code (Matt Westcott)
- Unclear error message when saving image after focal point edit (Hugo van den Berg)
- Increase max length on `Embed.thumbnail_url` to 255 characters (Kevin Howbrook)
- `send_mail` now correctly uses the `html_message` kwarg for HTML messages (Tiago Requeijo)
- Page copying no longer allowed if page model has reached its `max_count` (Andy Babic)
- Don’t show page type on page chooser button when multiple types are allowed (Thijs Kramer)
- Make sure page chooser search results correspond to the latest search by canceling previous requests (Esper Kuijs)
- Inform user when moving a page from one parent to another where there is an already existing page with the same slug (Casper Timmers)
- User add/edit forms now support form widgets with JS/CSS media (Damian Grinwis)
- Rich text processing now preserves non-breaking spaces instead of converting them to normal spaces (Wesley van Lee)
- Prevent autocomplete dropdowns from appearing over date choosers on Chrome (Kevin Howbrook)
- Prevent crash when logging HTTP errors on Cloudflare cache purging (Kevin Howbrook)
- Prevent rich text editor crash when filtering copy-pasted content and the last block is to be removed, e.g. unsupported image (Thibaud Colas)
- Removing rich text links / documents now also works when the text selection is backwards (Thibaud Colas)
- Prevent the rich text editor from crashing when copy-paste filtering removes all of its content (Thibaud Colas)
- Page chooser now respects custom `get_admin_display_title` methods on parent page and breadcrumb (Haydn Greatnews)
- Added consistent whitespace around sortable table headings (Matt Westcott)

- Moved locale names for Chinese (Simplified) and Chinese (Traditional) to zh\_Hans and zh\_Hant (Matt Westcott)

### Upgrade considerations

#### `EditHandler.bind_to_model` and `EditHandler.bind_to_instance` deprecated

The internal `EditHandler` methods `bind_to_model` and `bind_to_instance` have been deprecated, in favour of a new combined `bind_to` method which accepts `model`, `instance`, `request` and `form` as optional keyword arguments. Any user code which calls `EditHandler.bind_to_model(model)` should be updated to use `EditHandler.bind_to(model=model)` instead; any user code which calls `EditHandler.bind_to_instance(instance, request, form)` should be updated to use `EditHandler.bind_to(instance=instance, request=request, form=form)`.

### Changes to admin pagination helpers

A number of changes have been made to pagination handling within the Wagtail admin; these are internal API changes, but may affect applications and third-party packages that add new paginated object listings, including chooser modals, to the admin. The `paginate` function in `wagtail.utils.pagination` has been deprecated in favour of the `django.core.paginator.Paginator.get_page` method introduced in Django 2.0 - a call such as:

```
from wagtail.utils.pagination import paginate

paginator, page = paginate(request, object_list, per_page=25)
```

should be replaced with:

```
from django.core.paginator import Paginator

paginator = Paginator(object_list, per_page=25)
page = paginator.get_page(request.GET.get('p'))
```

Additionally, the `is_ajax` flag on the template `wagtailadmin/shared/pagination_nav.html` has been deprecated in favour of a new template `wagtailadmin/shared/ajax_pagination_nav.html`:

```
{% include "wagtailadmin/shared/pagination_nav.html" with items=page_obj is_
↪ajax=1 %}
```

should become:

```
{% include "wagtailadmin/shared/ajax_pagination_nav.html" with items=page_
↪obj %}
```

### New rich text formats

Wagtail now has built-in support for new rich text formats, disabled by default:

- blockquote, using the `blockquote` Draft.js block type, saved as a `<blockquote>` tag.
- superscript, using the `SUPERSCRIPT` Draft.js inline style, saved as a `<sup>` tag.
- subscript, using the `SUBSCRIPT` Draft.js inline style, saved as a `<sub>` tag.
- strikethrough, using the `STRIKETHROUGH` Draft.js inline style, saved as a `<s>` tag.

- `code`, using the `Draft.js` inline style, saved as a `<code>` tag.

Projects already using those exact `Draft.js` type and HTML tag combinations can safely replace their feature definitions with the new built-ins. Projects that use the same feature identifier can keep their existing feature definitions as overrides. Finally, if the `Draft.js` types / HTML tags are used but with a different combination, do not enable the new feature definitions to avoid conflicts in storage or editor behavior.

### `register_link_type` and `register_embed_type` methods for rich text tag rewriting have changed

The `FeatureRegistry.register_link_type` and `FeatureRegistry.register_embed_type` methods, which define how links and embedded media in rich text are converted to HTML, now accept a handler class. Previously, they were passed an identifier string and a rewrite function. For details of updating your code to the new convention, see [Rewrite handlers](#).

### Chinese language locales changed to `zh_Hans` and `zh_Hant`

The translations for Chinese (Simplified) and Chinese (Traditional) are now available under the locale names `zh_Hans` and `zh_Hant` respectively, rather than `zh_CN` and `zh_TW`. Projects that currently use the old names for the `LANGUAGE_CODE` setting may need to update the settings file to use the new names.

## 1.8.11 Wagtail 2.4 release notes

- [What's new](#)
- [Upgrade considerations](#)

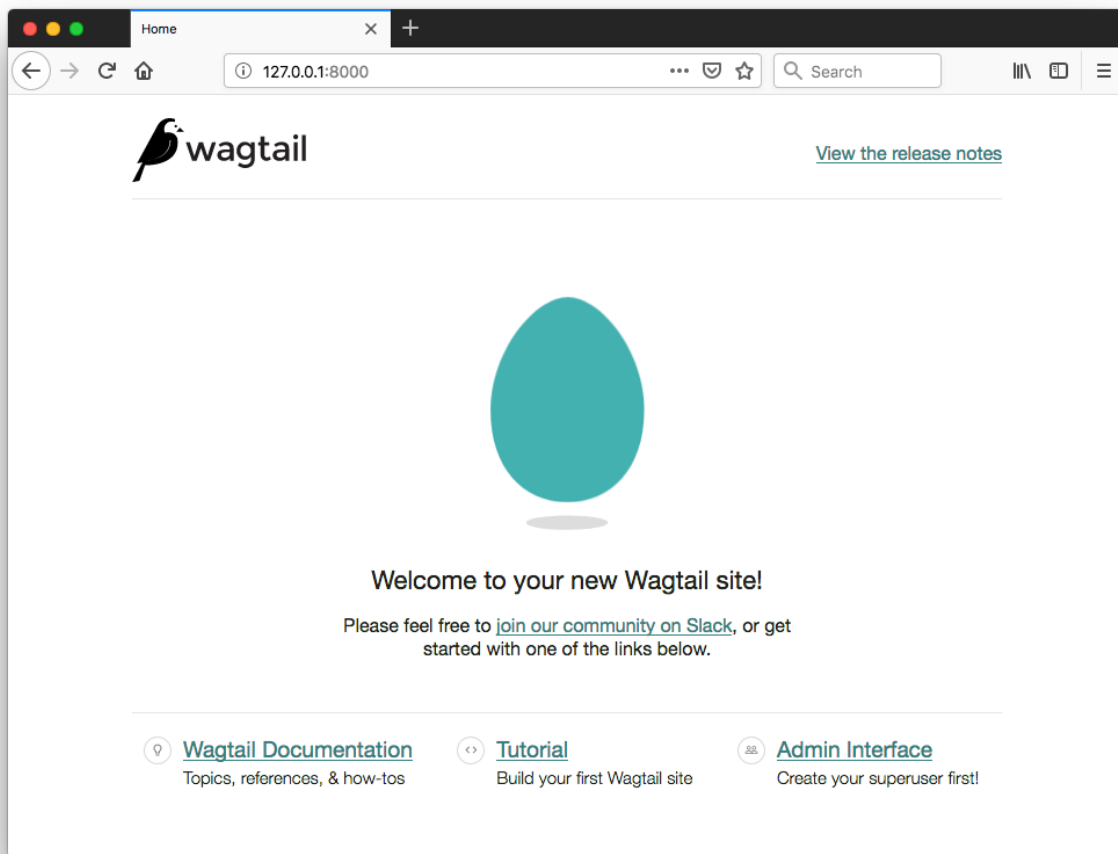
### What's new

#### New “Welcome to your Wagtail site” Starter Page

When using the `wagtail start` command to make a new site, users will now be greeted with a proper starter page. Thanks to Timothy Allen and Scott Cranfill for pulling this off!

### Other features

- Added support for Python 3.7 (Matt Westcott)
- Added `max_count` option on page models to limit the number of pages of a particular type that can be created (Dan Braghis)
- Document and image choosers now show the document / image's collection (Alejandro Garza, Janneke Janssen)
- New `image_url` template tag allows to generate dynamic image URLs, so image renditions are being created outside the main request which improves performance. Requires extra configuration, see [Dynamic image serve view](#) (Yannick Chabbert, Dan Braghis).
- Added ability to run individual tests through `tox` (Benjamin Bach)



- Collection listings are now ordered by name (Seb Brown)
- Added `file_hash` field to documents (Karl Hobley, Dan Braghis)
- Added last login to the user overview (Noah B Johnson)
- Changed design of image editing page (Janneke Janssen, Ben Enright)
- Added Slovak character map for JavaScript slug generation (Andy Chosak)
- Make documentation links on welcome page work for prereleases (Matt Westcott)
- Allow overridden `copy()` methods in `Page` subclasses to be called from the page copy view (Robert Rollins)
- Users without a preferred language set on their profile now use language selected by Django's `LocaleMiddleware` (Benjamin Bach)
- Added hooks to customise the actions menu on the page create/edit views (Matt Westcott)
- Cleanup: Use `functools.partial()` instead of `django.utils.functional.curry()` (Sergey Fedoseev)
- Added `before_move_page` and `after_move_page` hooks (Maylon Pedroso)
- Bulk deletion button for snippets is now hidden until items are selected (Karl Hobley)

## Bug fixes

- Query objects returned from `PageQuerySet.type_q` can now be merged with `|` (Brady Moe)
- Add `rel="noopener noreferrer"` to target blank links (Anselm Bradford)
- Additional fields on custom document models now show on the multiple document upload view (Robert Rollins, Sergey Fedoseev)
- Help text does not overflow when using a combination of `BooleanField` and `FieldPanel` in page model (Dzianis Sheka)
- Document chooser now displays more useful help message when there are no documents in Wagtail document library (gmmoraes, Stas Rudakou)
- Allow custom logos of any height in the admin menu (Meteor0id)
- Allow nav menu to take up all available space instead of scrolling (Meteor0id)
- Users without the edit permission no longer see “Edit” links in list of pages waiting for moderation (Justin Focus, Fedor Selitsky)
- Redirects now return 404 when destination is unspecified or a page with no site (Hillary Jeffrey)
- Refactor all breakpoint definitions, removing style overlaps (Janneke Janssen)
- Updated `draftjs_exporter` to 2.1.5 to fix bug in handling adjacent entities (Thibaud Colas)
- Page titles consisting only of stopwords now generate a non-empty default slug (Andy Chosak, Janneke Janssen)
- Sitemap generator now allows passing a sitemap instance in the URL configuration (Mitchel Cabuloy, Dan Braghis)

## Upgrade considerations

### Removed support for Django 1.11

Django 1.11 is no longer supported in this release; please upgrade your project to Django 2.0 or 2.1 before upgrading to Wagtail 2.4.

### Custom image model migrations created on Wagtail <1.8 may fail

Projects with a custom image model (see *Custom image models*) created on Wagtail 1.7 or earlier are likely to have one or more migrations that refer to the (now-deleted) `wagtailimages.Filter` model. In Wagtail 2.4, the migrations that defined this model have been squashed, which may result in the error `ValueError: Related model 'wagtailimages.Filter' cannot be resolved when bringing up a new instance of the database`. To rectify this, check your project's migrations for `ForeignKey` references to `wagtailimages.Filter`, and change them to `IntegerField` definitions. For example, the line:

```
('filter', models.ForeignKey(blank=True, null=True, on_delete=django.db.  
↪models.deletion.CASCADE, related_name='+', to='wagtailimages.Filter')),
```

should become:

```
('filter', models.IntegerField(blank=True, null=True)),
```

## 1.8.12 Wagtail 2.3 release notes

- *What's new*
- *Upgrade considerations*

Wagtail 2.3 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 8 months).

Note that Wagtail 2.3 will be the last release branch to support Django 1.11.

### What's new

#### Added Django 2.1 support

Wagtail is now compatible with Django 2.1. Compatibility fixes were contributed by Ryan Verner and Matt Westcott.

#### Improved colour contrast

Colour contrast within the admin interface has been improved, and now complies with WCAG 2 level AA. This was completed by Coen van der Kamp and Naomi Morduch Toubman based on earlier work from Edd Baldry, Naa Marteki Reed and Ben Enright.



## Other features

- Added ‘scale’ image filter (Oliver Wilkerson)
- Added meta tag to prevent search engines from indexing admin pages (Karl Hobley)
- EmbedBlock now validates against recognised embed providers on save (Bertrand Bordage)
- Made cache control headers on Wagtail admin consistent with Django admin (Tomasz Knapik)
- Notification emails now include an “Auto-Submitted: auto-generated” header (Dan Braghis)
- Image chooser panels now show alt text as title (Samir Shah)
- Added `download_url` field to images in the API (Michael Harrison)
- Dummy requests for preview now preserve the HTTP Authorization header (Ben Dickinson)

## Bug fixes

- Respect next param on login (Loic Teixeira)
- InlinePanel now handles relations that specify a `related_query_name` (Aram Dulyan)
- `before_delete_page` / `after_delete_page` hooks now run within the same database transaction as the page deletion (Tomasz Knapik)
- Seek to the beginning of image files when uploading, to restore compatibility with django-storages Google Cloud and Azure backends (Mikalai Radchuk)
- Snippet chooser modal no longer fails on snippet models with UUID primary keys (Sævar Öfjörð Magnússon)
- Restored localisation in date/time pickers (David Moore, Thibaud Colas)
- Tag input field no longer treats ‘,’ on Russian keyboards as a comma (Michael Borisov)
- Disabled autocomplete dropdowns on date/time chooser fields (Janneke Janssen)
- Split up `wagtail.admin.forms` to make it less prone to circular imports (Matt Westcott)
- Disable linking to root page in rich text, making the page non-functional (Matt Westcott)
- Pages should be editable and save-able even if there are broken page or document links in rich text (Matt Westcott)
- Avoid redundant round-trips of JSON StreamField data on save, improving performance and preventing consistency issues on fixture loading (Andy Chosak, Matt Westcott)
- Users are not logged out when changing their own password through the Users area (Matt Westcott)

## Upgrade considerations

### `wagtail.admin.forms` reorganised

The `wagtail.admin.forms` module has been split up into submodules to make it less prone to producing circular imports, particularly when a custom user model is in use. The following (undocumented) definitions have now been moved to new locations:

| Definition                                   | New location                          |
|--|---------------------------------------|
| LoginForm                                    | wagtail.admin.forms.auth              |
| PasswordResetForm                            | wagtail.admin.forms.auth              |
| URLOrAbsolutePathValidator                   | wagtail.admin.forms.choosers          |
| URLOrAbsolutePathField                       | wagtail.admin.forms.choosers          |
| ExternalLinkChooserForm                      | wagtail.admin.forms.choosers          |
| EmailLinkChooserForm                         | wagtail.admin.forms.choosers          |
| CollectionViewRestrictionForm                | wagtail.admin.forms.collections       |
| CollectionForm                               | wagtail.admin.forms.collections       |
| BaseCollectionMemberForm                     | wagtail.admin.forms.collections       |
| BaseGroupCollectionMemberPermissionFormSet   | wagtail.admin.forms.collections       |
| collection_member_permission_formset_factory | wagtail.admin.forms.collections       |
| CopyForm                                     | wagtail.admin.forms.pages             |
| PageViewRestrictionForm                      | wagtail.admin.forms.pages             |
| SearchForm                                   | wagtail.admin.forms.search            |
| BaseViewRestrictionForm                      | wagtail.admin.forms.view_restrictions |

The following definitions remain in `wagtail.admin.forms`: `FORM_FIELD_OVERRIDES`, `DIRECT_FORM_FIELD_OVERRIDES`, `formfield_for_dbfield`, `WagtailAdminModelFormMetaclass`, `WagtailAdminModelForm` and `WagtailAdminPageForm`.

### 1.8.13 Wagtail 2.2.2 release notes

- *What's new*

#### What's new

#### Bug fixes

- Seek to the beginning of image files when uploading, to restore compatibility with django-storages Google Cloud and Azure backends (Mikalai Radchuk)
- Respect next param on login (Loic Teixeira)

### 1.8.14 Wagtail 2.2.1 release notes

- *What's new*

#### What's new

#### Bug fixes

- Pin Beautiful Soup to 4.6.0 due to further regressions in formatting empty elements (Matt Westcott)
- Prevent AppRegistryNotReady error when wagtail.contrib.sitemaps is in INSTALLED\_APPS (Matt Westcott)

## 1.8.15 Wagtail 2.2 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### Faceted search

Wagtail search now includes support for facets, allowing you to display search result counts broken down by a particular field value. For further details, see [Faceted search](#). This feature was developed by Karl Hobley.

#### Improved admin page search

The page search in the Wagtail admin now supports filtering by page type and ordering search results by title, creation date and status. This feature was developed by Karl Hobley.

### Other features

- Added another valid AudioBoom oEmbed pattern (Bertrand Bordage)
- Added `annotate_score` support to PostgreSQL search backend (Bertrand Bordage)
- Pillow's image optimisation is now applied when saving PNG images (Dmitry Vasilev)
- JS / CSS media files can now be associated with Draftail feature definitions (Matt Westcott)
- The `{% slugurl %}` template tag is now site-aware (Samir Shah)
- Added `file_size` field to documents (Karl Hobley)
- Added `file_hash` field to images (Karl Hobley)
- Update documentation (configuring Django for Wagtail) to contain all current settings options (Matt Westcott, LB (Ben Johnston))
- Added `defer` flag to `PageQuerySet.specific` (Karl Hobley)
- Snippets can now be deleted from the listing view (LB (Ben Johnston))
- Increased max length of redirect URL field to 255 (Michael Harrison)
- Added documentation for new JS/CSS media files association with Draftail feature definitions (Ed Henderson)
- Added accessible colour contrast guidelines to the style guide (Catherine Farman)
- Admin modal views no longer rely on Javascript `eval()`, for better CSP compliance (Matt Westcott)
- Update editor guide for embeds and documents in rich text (Kevin Howbrook)
- Improved performance of sitemap generation (Michael van Tellingen, Bertrand Bordage)
- Added an internal API for autocomplete (Karl Hobley)

## Bug fixes

- Handle all exceptions from `Image.get_file_size` (Andrew Plummer)
- Fix display of breadcrumbs in `ModelAdmin` (LB (Ben Johnston))
- Remove duplicate border radius of avatars (Benjamin Thurm)
- `Site.get_site_root_paths()` preferring other sites over the default when some sites share the same `root_page` (Andy Babic)
- Pages with missing model definitions no longer crash the API (Abdulmalik Abdulwahab)
- Rich text image chooser no longer skips format selection after a validation error (Matt Westcott)
- Null characters in URLs no longer crash the redirect middleware on PostgreSQL (Andrew Crewdson, Matt Westcott)
- Permission checks no longer prevent a non-live page from being unscheduled (Abdulmalik Abdulwahab)
- Copy-paste between Draftail editors now preserves all formatting/content (Thibaud Colas)
- Fix alignment of checkboxes and radio buttons on Firefox (Matt Westcott)

## Upgrade considerations

### JavaScript templates in modal workflows are deprecated

The `wagtail.admin.modal_workflow` module (used internally by Wagtail to handle modal popup interfaces such as the page chooser) has been updated to avoid returning JavaScript code as part of HTTP responses. User code that relies on this functionality can be updated as follows:

- Eliminate template tags from the `.js` template. Any dynamic data needed by the template can instead be passed in a dict to `render_modal_workflow`, as a keyword argument `json_data`; this data will then be available as the second parameter of the JavaScript function.
- At the point where you call the `ModalWorkflow` constructor, add an `onload` option - a dictionary of functions to be called on loading each step of the workflow. Move the code from the `.js` template into this dictionary. Then, on the call to `render_modal_workflow`, rather than passing the `.js` template name (which should now be replaced by `None`), pass a `step` item in the `json_data` dictionary to indicate the `onload` function to be called.

Additionally, if your code calls `loadResponseText` as part of a jQuery AJAX callback, this should now be passed all three arguments from the callback (the response data, status string and XMLHttpRequest object).

### `Page.get_sitemap_urls()` now accepts an optional `request` keyword argument

The `Page.get_sitemap_urls()` method used by the `wagtail.contrib.sitemaps` module has been updated to receive an optional `request` keyword argument. If you have overridden this method in your page models, you will need to update the method signature to accept this argument (and pass it on when calling `super`, if applicable).

## 1.8.16 Wagtail 2.1.3 release notes

- *What's new*

## What's new

### Bug fixes

- Pin Beautiful Soup to 4.6.0 due to further regressions in formatting empty elements (Matt Westcott)

## 1.8.17 Wagtail 2.1.2 release notes

- *What's new*

## What's new

### Bug fixes

- Bundle the l18n package to avoid installation issues on systems with a non-Unicode locale (Matt Westcott)
- Mark Beautiful Soup 4.6.1 as incompatible due to bug in formatting empty elements (Matt Westcott)

## 1.8.18 Wagtail 2.1.1 release notes

- *What's new*

## What's new

### Bug fixes

- Fix `Site.get_site_root_paths()` preferring other sites over the default when some sites share the same root\_page (Andy Babic)
- Rich text image chooser no longer skips format selection after a validation error (Matt Westcott)
- Null characters in URLs no longer crash the redirect middleware on PostgreSQL (Matt Westcott)

## 1.8.19 Wagtail 2.1 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### New `HelpPanel`

A new panel type `HelpPanel` allows to easily add HTML within an edit form. This new feature was developed by Kevin Chung.

#### Profile picture upload

Users can now upload profile pictures directly through the Account Settings menu, rather than using Gravatar. Gravatar is still used as a fallback if no profile picture has been uploaded directly; a new setting `WAGTAIL_GRAVATAR_PROVIDER_URL` has been added to specify an alternative provider, or disable the use of external avatars completely. This feature was developed by Daniel Chimeno, Pierre Geier and Matt Westcott.

#### API lookup by page path

The API now includes an endpoint for finding pages by path; see *Finding pages by HTML path*. This feature was developed by Karl Hobley.

#### User time zone setting

Users can now set their current time zone through the Account Settings menu, which will then be reflected in date / time fields throughout the admin (such as go-live / expiry dates). The list of available time zones can be configured via the `WAGTAIL_USER_TIME_ZONES` setting. This feature was developed by David Moore.

#### Elasticsearch 6 support

Wagtail now supports Elasticsearch 6. See *Elasticsearch Backend* for configuration details. This feature was developed by Karl Hobley.

#### Other features

- Persist tab hash in URL to allow direct navigation to tabs in the admin interface (Ben Weatherman)
- Animate the chevron icon when opening sub-menus in the admin (Carlo Ascani)
- Look through the target link and target page slug (in addition to the old slug) when searching for redirects in the admin (Michael Harrison)
- Remove support for IE6 to IE9 from project template (Samir Shah)
- Remove outdated X-UA-Compatible meta from admin template (Thibaud Colas)
- Add JavaScript source maps in production build for packaged Wagtail (Thibaud Colas)
- Removed `assert` statements from Wagtail API (Kim Chee Leong)
- Update `jquery-datetimepicker` dependency to make Wagtail more CSP-friendly (*unsafe-eval*) (Pomax)
- Added error notification when running the `wagtail` command on Python <3.4 (Matt Westcott)
- `update_index` management command now accepts a `--chunk_size` option to determine the number of items to load at once (Dave Bell)

- Added hook `register_account_menu_item` to add new account preference items (Michael van Tellingen)
- Added change email functionality from the account settings (Alejandro Garza, Alexs Mathilda)
- Add request parameter to edit handlers (Rajeev J Sebastian)
- ImageChooser now sets a default title based on filename (Coen van der Kamp)
- Added error handling to the Draftail editor (Thibaud Colas)
- Add new `wagtail_icon` template tag to facilitate making admin icons accessible (Sander Tuit)
- Set `ALLOWED_HOSTS` in the project template to allow any host in development (Tom Dyson)
- Expose reusable client-side code to build Draftail extensions (Thibaud Colas)
- Added `WAGTAILFRONTENDCACHE_LANGUAGES` setting to specify the languages whose URLs are to be purged when using `il8n_patterns` (PyMan Claudio Marinozzi)
- Added `extra_footer_actions` template blocks for customising the add/edit page views (Arthur Holzner)

## Bug fixes

- Status button on ‘edit page’ now links to the correct URL when live and draft slug differ (LB (Ben Johnston))
- Image title text in the gallery and in the chooser now wraps for long filenames (LB (Ben Johnston), Luiz Boaretto)
- Move image editor action buttons to the bottom of the form on mobile (Julian Gallo)
- StreamField icons are now correctly sorted into groups on the ‘append’ menu (Tim Heap)
- Draftail now supports features specified via the `WAGTAILADMIN_RICH_TEXT_EDITORS` setting (Todd Dembrey)
- Password reset form no longer indicates whether the email is recognised, as per standard Django behaviour (Bertrand Bordage)
- `UserAttributeSimilarityValidator` is now correctly enforced on user creation / editing forms (Tim Heap)
- Focal area removal not working in IE11 and MS Edge (Thibaud Colas)
- Rewrite password change feedback message to be more user-friendly (Casper Timmers)
- Correct dropdown arrow styling in Firefox, IE11 (Janneke Janssen, Alexs Mathilda)
- Password reset no indicates specific validation errors on certain password restrictions (Lucas Moeskops)
- Confirmation page on page deletion now respects custom `get_admin_display_title` methods (Kim Chee Leong)
- Adding external link with selected text now includes text in link chooser (Tony Yates, Thibaud Colas, Alexs Mathilda)
- Editing setting object with no site configured no longer crashes (Harm Zeinstra)
- Creating a new object with inlines while mandatory fields are empty no longer crashes (Bertrand Bordage)
- Localization of image and apps verbose names
- Draftail editor no longer crashes after deleting image/embed using DEL key (Thibaud Colas)
- Breadcrumb navigation now respects custom `get_admin_display_title` methods (Arthur Holzner, Witze Helmantel, Matt Westcott)

- Inconsistent order of heading features when adding h1, h5 or h6 as default feature for Hallo RichText editor (Loic Teixeira)
- Add invalid password reset link error message (Coen van der Kamp)
- Bypass select/prefetch related optimisation on `update_index` for `ParentalManyToManyField` to fix crash (Tim Kamanin)
- ‘Add user’ is now rendered as a button due to the use of quotes within translations (Benoît Vogel)
- Menu icon no longer overlaps with title in Modeladmin on mobile (Coen van der Kamp)
- Background color overflow within the Wagtail documentation (Sergey Fedoseev)
- Page count on homepage summary panel now takes account of user permissions (Andy Chosak)
- Explorer view now prevents navigating outside of the common ancestor of the user’s permissions (Andy Chosak)
- Generate URL for the current site when multiple sites share the same root page (Codie Roelf)
- Restored ability to use non-model fields with FieldPanel (Matt Westcott, LB (Ben Johnston))
- Stop revision comparison view from crashing when non-model FieldPanels are in use (LB (Ben Johnston))
- Ordering in the page explorer now respects custom `get_admin_display_title` methods when sorting <100 pages (Matt Westcott)
- Use index-specific Elasticsearch endpoints for bulk insertion, for compatibility with providers that lock down the root endpoint (Karl Hobley)
- Fix usage URL on the document edit page (Jérôme Lebleu)

## Upgrade considerations

### Image format `image_to_html` method has been updated

The internal API for rich text image format objects (see *Image Formats in the Rich Text Editor*) has been updated; the `Format.image_to_html` method now receives the `extra_attributes` keyword argument as a dictionary of attributes, rather than a string. If you have defined any custom format objects that override this method, these will need to be updated.

## 1.8.20 Wagtail 2.0.2 release notes

- *What’s new*

## What’s new

### Bug fixes

- Restored ability to use non-model fields with FieldPanel (Matt Westcott, LB (Ben Johnston))
- Fix usage URL on the document edit page (Jérôme Lebleu)
- Pin Beautiful Soup to 4.6.0 due to further regressions in formatting empty elements (Matt Westcott)



### 1.8.21 Wagtail 2.0.1 release notes

- *What's new*

#### What's new

- Added error notification when running the `wagtail` command on Python <3.4 (Matt Westcott)
- Added error handling to the Draftail editor (Thibaud Colas)

#### Bug fixes

- Draftail now supports features specified via the `WAGTAILADMIN_RICH_TEXT_EDITORS` setting (Todd Dembrey)
- Password reset form no longer indicates whether the email is recognised, as per standard Django behaviour (Bertrand Bordage)
- `UserAttributeSimilarityValidator` is now correctly enforced on user creation / editing forms (Tim Heap)
- Editing setting object with no site configured no longer crashes (Harm Zeinstra)
- Creating a new object with inlines while mandatory fields are empty no longer crashes (Bertrand Bordage)

### 1.8.22 Wagtail 2.0 release notes

- *What's new*
- *Upgrade considerations*

#### What's new

##### Added Django 2.0 support

Wagtail is now compatible with Django 2.0. Compatibility fixes were contributed by Matt Westcott, Karl Hobley, LB (Ben Johnston) and Mads Jensen.

##### New rich text editor

Wagtail's rich text editor has now been replaced with [Draftail](#), a new editor based on [Draft.js](#), fixing numerous bugs and providing an improved editing experience, better support for current browsers, and more consistent HTML output. This feature was developed by Thibaud Colas, Loïc Teixeira and Matt Westcott.

### Reorganised modules

The modules that make up Wagtail have been renamed and reorganised, to avoid the repetition in names like `wagtail.wagtailcore.models` (originally an artefact of app naming limitations in Django 1.6) and to improve consistency. While this will require some up-front work to upgrade existing Wagtail sites, we believe that this will be a long-term improvement to the developer experience, improving readability of code and reducing errors. This change was implemented by Karl Hobley and Matt Westcott.

### Scheduled page revisions

The behaviour of scheduled publishing has been revised so that pages are no longer unpublished at the point of setting a future go-live date, making it possible to schedule updates to an existing published page. This feature was developed by Patrick Woods.

### Other features

- Moved Wagtail API v1 implementation (`wagtail.contrib.api`) to an [external app](#) (Karl Hobley)
- The page chooser now searches all fields of a page, instead of just the title (Bertrand Bordage)
- Implement ordering by date in form submission view (LB (Ben Johnston))
- Elasticsearch scroll API is now used when fetching more than 100 search results (Karl Hobley)
- Added hidden field to the form builder (Ross Crawford-d’Heureuse)
- Usage count now shows on delete confirmation page when `WAGTAIL_USAGE_COUNT_ENABLED` is active (Kees Hink)
- Added usage count to snippets (Kees Hink)
- Moved usage count to the sidebar on the edit page (Kees Hink)
- Explorer menu now reflects customisations to the page listing made via the `construct_explorer_page_queryset` hook and `ModelAdmin.exclude_from_explorer` property (Tim Heap)
- “Choose another image” button changed to “Change image” to avoid ambiguity (Edd Baldry)
- Added hooks `before_create_user`, `after_create_user`, `before_delete_user`, `after_delete_user`, `before_edit_user`, `after_edit_user` (Jon Carmack)
- Added `exclude_fields_in_copy` property to `Page` to define fields that should not be included on page copy (LB (Ben Johnston))
- Improved error message on incorrect `{% image %}` tag syntax (LB (Ben Johnston))
- Optimized preview data storage (Bertrand Bordage)
- Added `render_landing_page` method to `AbstractForm` to be easily overridden and pass `form_submission` to landing page context (Stein Strindhaug)
- Added heading kwarg to `InlinePanel` to allow heading to be set independently of button label (Adrian Turjak)
- The value type returned from a `StructBlock` can now be customised. See [Custom value class for StructBlock](#) (LB (Ben Johnston))
- Added `bgcolor` image operation (Karl Hobley)
- Added `WAGTAILADMIN_USER_LOGIN_FORM` setting for overriding the admin login form (Mike Dingjan)

- Snippets now support custom primary keys (Sævar Öfjörð Magnússon)
- Upgraded jQuery to version 3.2.1 (Janneke Janssen)
- Update autoprefixer configuration to better match browser support targets (Janneke Janssen)
- Update React and related dependencies to latest versions (Janneke Janssen, Hugo van den Berg)
- Remove Hallo editor `.richtext` CSS class in favour of more explicit extension points (Thibaud Colas)
- Updated documentation styling (LB (Ben Johnston))
- Rich text fields now take feature lists into account when whitelisting HTML elements (Matt Westcott)
- FormPage lists and Form submission lists in admin now use class based views for easy overriding (Johan Arensman)
- Form submission csv exports now have the export date in the filename and can be customized (Johan Arensman)
- FormBuilder class now uses bound methods for field generation, adding custom fields is now easier and documented (LB (Ben Johnston))
- Added `WAGTAILADMIN_NOTIFICATION_INCLUDE_SUPERUSERS` setting to determine whether superusers are included in moderation email notifications (Bruno Alla)
- Added a basic Dockerfile to the project template (Tom Dyson)
- StreamField blocks now allow custom `get_template` methods for overriding templates in instances (Christopher Bledsoe)
- Simplified edit handler API (Florent Osmont, Bertrand Bordage)
- Made ‘add/change/delete collection’ permissions configurable from the group edit page (Matt Westcott)
- Expose React-related dependencies as global variables for extension in the admin interface (Thibaud Colas)
- Added helper functions for constructing form data for use with `assertCanCreate`. See *Form data helpers* (Tim Heap, Matt Westcott)

## Bug fixes

- Do not remove stopwords when generating slugs from non-ASCII titles, to avoid issues with incorrect word boundaries (Sævar Öfjörð Magnússon)
- The PostgreSQL search backend now preserves ordering of the `QuerySet` when searching with `order_by_relevance=False` (Bertrand Bordage)
- Using `modeladmin_register` as a decorator no longer replaces the decorated class with `None` (Tim Heap)
- Fixed crash in XML sitemap generator when all pages on the site are private (Stein Strindhaug)
- The `{% routablepageurl %}` template tag no longer generates invalid URLs when the `WAGTAIL_APPEND_SLASH` setting was set to `False` (Venelin Stoykov)
- The “View live” button is no longer shown if the page doesn’t have a routable URL (Tim Heap)
- API listing views no longer fail when no site records are defined (Karl Hobley)
- Fixed rendering of border on dropdown arrow buttons on Chrome (Bertrand Bordage)
- Fixed incorrect z-index on userbar causing it to appear behind page content (Stein Strindhaug)
- Form submissions pagination no longer loses date filter when changing page (Bertrand Bordage)
- PostgreSQL search backend now removes duplicate page instances from the database (Bertrand Bordage)

- `FormSubmissionsPanel` now recognises custom form submission classes (LB (Ben Johnston))
- Prevent the footer and revisions link from unnecessarily collapsing on mobile (Jack Paine)
- Empty searches were activated when paginating through images and documents (LB (Ben Johnston))
- Summary numbers of pages, images and documents were not responsive when greater than 4 digits (Michael Palmer)
- Project template now has password validators enabled by default (Matt Westcott)
- Alignment options correctly removed from `TableBlock` context menu (LB (Ben Johnston))
- Fix support of `ATOMIC_REBUILD` for projects with Elasticsearch client  $\geq 1.7.0$  (Mikalai Radchuk)
- Fixed error on Elasticsearch backend when passing a `QuerySet` as an `__in` filter (Karl Hobley, Matt Westcott)
- `__isnull` filters no longer fail on Elasticsearch 5 (Karl Hobley)
- Prevented intermittent failures on Postgres search backend when a field is defined as both a `SearchField` and a `FilterField` (Matt Westcott)
- Alt text of images in rich text is no longer truncated on double-quote characters (Matt Westcott)
- Ampersands in embed URLs within rich text are no longer double-escaped (Matt Westcott)
- Using RGBA images no longer crashes with Pillow  $\geq 4.2.0$  (Karl Hobley)
- Copying a page with PostgreSQL search enabled no longer crashes (Bertrand Bordage)
- Style of the page unlock button was broken (Bertrand Bordage)
- Admin search no longer floods browser history (Bertrand Bordage)
- Version comparison now handles custom primary keys on inline models correctly (LB (Ben Johnston))
- Fixed error when inserting chooser panels into `FieldRowPanel` (Florent Osmont, Bertrand Bordage)
- Reinstated missing error reporting on image upload (Matt Westcott)
- Only load Hallo CSS if Hallo is in use (Thibaud Colas)
- Prevent style leak of Wagtail panel icons in widgets using `h2` elements (Thibaud Colas)

## Upgrade considerations

### Removed support for Python 2.7, Django 1.8 and Django 1.10

Python 2.7, Django 1.8 and Django 1.10 are no longer supported in this release. You are advised to upgrade your project to Python 3 and Django 1.11 before upgrading to Wagtail 2.0.

### Added support for Django 2.0

Before upgrading to Django 2.0, you are advised to review the [release notes](#), especially the [backwards incompatible changes](#) and [removed features](#).

## Wagtail module path updates

Many of the module paths within Wagtail have been reorganised to reduce duplication - for example, `wagtail.wagtailcore.models` is now `wagtail.core.models`. As a result, `import` lines and other references to

Wagtail modules will need to be updated when you upgrade to Wagtail 2.0. A new command has been added to assist with this - from the root of your project's code base:

```
$ wagtail updatemodulepaths --list # list the files to be changed without
→ updating them
$ wagtail updatemodulepaths --diff # show the changes to be made, without
→ updating files
$ wagtail updatemodulepaths # actually update the files
```

Or, to run from a different location:

```
$ wagtail updatemodulepaths /path/to/project --list
$ wagtail updatemodulepaths /path/to/project --diff
$ wagtail updatemodulepaths /path/to/project
```

For the full list of command line options, enter `wagtail help updatemodulepaths`.

You are advised to take a backup of your project codebase before running this command. The command will perform a search-and-replace over all \*.py files for the affected module paths; while this should catch the vast majority of module references, it will not be able to fix instances that do not use the dotted path directly, such as `from wagtail import wagtailcore`.

The full list of modules to be renamed is as follows:

| Old name                                | New name                          | Notes                             |
|---|-----------------------------------|-----------------------------------|
| wagtail.wagtailcore                     | wagtail.core                      |                                   |
| wagtail.wagtailadmin                    | wagtail.admin                     |                                   |
| wagtail.wagtaildocs                     | wagtail.documents                 | 'documents' no longer abbreviated |
| wagtail.wagtailembeds                   | wagtail.embeds                    |                                   |
| wagtail.wagtailimages                   | wagtail.images                    |                                   |
| wagtail.wagtailsearch                   | wagtail.search                    |                                   |
| wagtail.wagtailsites                    | wagtail.sites                     |                                   |
| wagtail.wagtailsnippets                 | wagtail.snippets                  |                                   |
| wagtail.wagtailusers                    | wagtail.users                     |                                   |
| wagtail.wagtailforms                    | wagtail.contrib.forms             | Moved into 'contrib'              |
| wagtail.wagtailredirects                | wagtail.contrib.redirects         | Moved into 'contrib'              |
| wagtail.contrib.wagtailapi              | <i>removed</i>                    | API v1, removed in this release   |
| wagtail.contrib.wagtailfrontendcache    | wagtail.contrib.frontend_cache    | Underscore added                  |
| wagtail.contrib.wagtailroutablepage     | wagtail.contrib.routable_page     | Underscore added                  |
| wagtail.contrib.wagtailsearchpromotions | wagtail.contrib.search_promotions | Underscore added                  |
| wagtail.contrib.wagtailsitemaps         | wagtail.contrib.sitemaps          |                                   |
| wagtail.contrib.wagtailstyleguide       | wagtail.contrib.styleguide        |                                   |

Places these should be updated include:

- `import` lines
- Paths specified in settings, such as `INSTALLED_APPS`, `MIDDLEWARE` and `WAGTAILSEARCH_BACKENDS`
- Fields and blocks referenced within migrations, such as `wagtail.wagtailcore.fields.StreamField` and `wagtail.wagtailcore.blocks.RichTextBlock`

However, note that this only applies to dotted module paths beginning with `wagtail..` App names that are *not* part of a dotted module path should be left unchanged - in this case, the `wagtail` prefix is still required to avoid clashing

with other apps that might exist in the project with names such as `admin` or `images`. The following should be left unchanged:

- Foreign keys specifying a model as `'app_name.ModelName'`, e.g. `models.ForeignKey('wagtailimages.Image', ...)`
- App labels used in database table names, content types or permissions
- Paths to templates and static files, e.g. when *overriding admin templates with custom branding*
- Template tag library names, e.g. `{% load wagtailcore_tags %}`

### Hallo.js customisations are unavailable on the Draftail rich text editor

The Draftail rich text editor has a substantially different API from Hallo.js, including the use of a non-HTML format for its internal data representation; as a result, functionality added through Hallo.js plugins will be unavailable. If your project is dependent on Hallo.js-specific behaviour, you can revert to the original Hallo-based editor by adding the following to your settings:

```
WAGTAILADMIN_RICH_TEXT_EDITORS = {
    'default': {
        'WIDGET': 'wagtail.admin.rich_text.HalloRichTextArea'
    }
}
```

### Data format for rich text fields in `assertCanCreate` tests has been updated

The `assertCanCreate` test method (see *Testing your Wagtail site*) requires data to be passed in the same format that the page edit form would submit. The Draftail rich text editor posts this data in a non-HTML format, and so any existing `assertCanCreate` tests involving rich text fields will fail when Draftail is in use:

```
self.assertCanCreate(root_page, ContentPage, {
    'title': 'About us',
    'body': '<p>Lorem ipsum dolor sit amet</p>', # will not work
})
```

Wagtail now provides a set of helper functions for constructing form data: see *Form data helpers*. The above assertion can now be rewritten as:

```
from wagtail.tests.utils.form_data import rich_text

self.assertCanCreate(root_page, ContentPage, {
    'title': 'About us',
    'body': rich_text('<p>Lorem ipsum dolor sit amet</p>'),
})
```

### Removed support for Elasticsearch 1.x

Elasticsearch 1.x is no longer supported in this release. Please upgrade to a 2.x or 5.x release of Elasticsearch before upgrading to Wagtail 2.0.

## Removed version 1 of the Wagtail API

Version 1 of the Wagtail API (`wagtail.contrib.wagtailapi`) has been removed from Wagtail.

If you're using version 1, you will need to migrate to version 2. Please see [Wagtail API v2 Configuration Guide](#) and [Wagtail API v2 Usage Guide](#).

If migrating to version 2 is not an option right now (if you have API clients that you don't have direct control over, such as a mobile app), you can find the implementation of the version 1 API in the new `wagtailapi_legacy` repository.

This repository has been created to provide a place for the community to collaborate on supporting legacy versions of the API until everyone has migrated to an officially supported version.

## `construct_whitelister_element_rules` hook is deprecated

The `construct_whitelister_element_rules` hook, used to specify additional HTML elements to be permitted in rich text, is deprecated. The recommended way of whitelisting elements is now to use rich text features - see [Whitelisting rich text elements](#). For example, a whitelist rule that was previously defined as:

```
from wagtail.core import hooks
from wagtail.core.whitelist import allow_without_attributes

@hooks.register('construct_whitelister_element_rules')
def whitelist_blockquote():
    return {
        'blockquote': allow_without_attributes,
    }
```

can be rewritten as:

```
from wagtail.admin.rich_text.converters.editor_html import WhitelistRule
from wagtail.core import hooks
from wagtail.core.whitelist import allow_without_attributes

@hooks.register('register_rich_text_features')
def blockquote_feature(features):
    # register a feature 'blockquote' which whitelists the <blockquote>_
    ↪element
    features.register_converter_rule('editorhtml', 'blockquote', [
        WhitelistRule('blockquote', allow_without_attributes),
    ])

    # add 'blockquote' to the default feature set
    features.default_features.append('blockquote')
```

Please note that the new Draftail rich text editor uses a different mechanism to process rich text content, and does not apply whitelist rules; they only take effect when the Hallo.js editor is in use.

## `wagtail.images.views.serve.generate_signature` now returns a string

The `generate_signature` function in `wagtail.images.views.serve`, used to build URLs for the [dynamic image serve view](#), now returns a string rather than a byte string. This ensures that any existing user code that builds up the final image URL with `reverse` will continue to work on Django 2.0 (which no longer allows byte strings to be passed to `reverse`). Any code that expects a byte string as the return value of `generate_string`

- for example, calling `decode()` on the result - will need to be updated. (Apps that need to preserve compatibility with earlier versions of Wagtail can call `django.utils.encoding.force_text` instead of `decode`.)

### Deprecated search view

Wagtail has always included a bundled view for frontend search. However, this view isn't easy to customise so defining this view per project is usually preferred. If you have used this bundled view (check for an import from `wagtail.wagtailsearch.urls` in your project's `urls.py`), you will need to replace this with your own implementation.

See the search view in Wagtail demo for a guide: <https://github.com/wagtail/wagtaildemo/blob/master/demo/views.py>

### New Hallo editor extension points

With the introduction of a new editor, we want to make sure existing editor plugins meant for Hallo only target Hallo editors for extension.

- The existing `.richtext` CSS class is no longer applied to the Hallo editor's DOM element.
- In JavaScript, use the `[data-hallo-editor]` attribute selector to target the editor, eg. `var $editor = $('[data-hallo-editor]');`
- In CSS, use the `.halloeditor` class selector.

For example,

```
/* JS */
- var widget = $(elem).parent('.richtext').data('IKS-hallo');
+ var widget = $(elem).parent('[data-hallo-editor]').data('IKS-hallo');

[...]

/* Styles */
- .richtext {
+ .halloeditor {
    font-family: monospace;
}
```

## 1.8.23 Wagtail 1.13.4 release notes

- *What's new*

### What's new

#### Bug fixes

- Pin Beautiful Soup to 4.6.0 due to further regressions in formatting empty elements (Matt Westcott)



### 1.8.24 Wagtail 1.13.3 release notes

- *What's new*

#### What's new

#### Bug fixes

- Pin django-taggit to <0.23 to restore Django 1.8 compatibility (Matt Westcott)
- Mark BeautifulSoup 4.6.1 as incompatible due to bug in formatting empty elements (Matt Westcott)

### 1.8.25 Wagtail 1.13.2 release notes

- *What's new*

#### What's new

#### Bug fixes

- Fix support of ATOMIC\_REBUILD for projects with Elasticsearch client  $\geq 1.7.0$  (Mikalai Radchuk)
- Logging an indexing failure on an object with a non-ASCII representation no longer crashes on Python 2 (Aram Dulyan)
- Rich text image chooser no longer skips format selection after a validation error (Matt Westcott)
- Null characters in URLs no longer crash the redirect middleware on PostgreSQL (Matt Westcott)

### 1.8.26 Wagtail 1.13.1 release notes

- *What's new*

#### What's new

#### Bug fixes

- API listing views no longer fail when no site records are defined (Karl Hobley)
- Fixed crash in XML sitemap generator when all pages on the site are private (Stein Strindhaug)
- Fixed incorrect z-index on userbar causing it to appear behind page content (Stein Strindhaug)
- Fixed error in Postgres search backend when searching specific fields of a `specific()` Page QuerySet (Bertrand Bordage, Matt Westcott)

- Fixed error on Elasticsearch backend when passing a QuerySet as an `__in` filter (Karl Hobley, Matt Westcott)
- `__isnull` filters no longer fail on Elasticsearch 5 (Karl Hobley)
- Prevented intermittent failures on Postgres search backend when a field is defined as both a `SearchField` and a `FilterField` (Matt Westcott)

### 1.8.27 Wagtail 1.13 release notes

- *What's new*

Wagtail 1.13 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 8 months). Please note that Wagtail 1.13 will be the last LTS release to support Python 2.

#### What's new

##### New features

- Front-end cache invalidator now supports purging URLs as a batch - see *Invalidating URLs* (Karl Hobley)
- *Custom document model* is now documented (Emily Horsman)
- Use minified versions of CSS in the admin by adding minification to the front-end tooling (Vincent Audebert, Thibaud Colas)
- Wagtailforms serve view now passes `request.FILES`, for use in custom form handlers (LB (Ben Johnston))
- Documents and images are now given new filenames on re-uploading, to avoid old versions being kept in cache (Bertrand Bordage)
- Added custom 404 page for admin interface (Jack Paine)
- Breadcrumb navigation now uses globe icon to indicate tree root, rather than home icon (Matt Westcott)
- Wagtail now uses React 15.6.2 and above, released under the MIT license (Janneke Janssen)
- User search in the Wagtail admin UI now works across multiple fields (Will Giddens)
- `Page.last_published_at` is now a filterable field for search (Mikalai Radchuk)
- Page search results and usage listings now include navigation links (Matt Westcott)

##### Bug fixes

- “Open Link in New Tab” on a right arrow in page explorer should open page list (Emily Horsman)
- Using `order_by_relevance=False` when searching with PostgreSQL now works (Mitchel Cabuloy)
- Inline panel first and last sorting arrows correctly hidden in non-default tabs (Matt Westcott)
- `WAGTAILAPI_LIMIT_MAX` now accepts `None` to disable limiting (jcronyn)
- In PostgreSQL, new default ordering when ranking of objects is the same (Bertrand Bordage)
- Fixed overlapping header elements on form submissions view on mobile (Jack Paine)
- Fixed avatar position in footer on mobile (Jack Paine)

- Custom document models no longer require their own post-delete signal handler (Gordon Pendleton)
- Deletion of image / document files now only happens when database transaction has completed (Gordon Pendleton)
- Fixed Node build scripts to work on Windows (Mikalai Radchuk)
- Stop breadcrumb home icon from showing as ellipsis in Chrome 60 (Matt Westcott)
- Prevent `USE_THOUSAND_SEPARATOR = True` from breaking the image focal point chooser (Sævar Öfjörð Magnússon)
- Removed deprecated `SessionAuthenticationMiddleware` from project template (Samir Shah)
- Custom display page titles defined with `get_admin_display_title` are now shown in search results (Ben Sturmfels, Matt Westcott)
- Custom PageManagers now return the correct PageQuerySet subclass (Matt Westcott)

### 1.8.28 Wagtail 1.12.6 release notes

- *What's new*

#### What's new

#### Bug fixes

- Pin Beautiful Soup to 4.6.0 due to further regressions in formatting empty elements (Matt Westcott)

### 1.8.29 Wagtail 1.12.5 release notes

- *What's new*

#### What's new

#### Bug fixes

- Pin django-taggit to <0.23 to restore Django 1.8 compatibility (Matt Westcott)
- Mark Beautiful Soup 4.6.1 as incompatible due to bug in formatting empty elements (Matt Westcott)

### 1.8.30 Wagtail 1.12.4 release notes

- *What's new*

## What's new

### Bug fixes

- Fix support of `ATOMIC_REBUILD` for projects with Elasticsearch client `>=1.7.0` (Mikalai Radchuk)
- Logging an indexing failure on an object with a non-ASCII representation no longer crashes on Python 2 (Aram Dulyan)
- Rich text image chooser no longer skips format selection after a validation error (Matt Westcott)
- Null characters in URLs no longer crash the redirect middleware on PostgreSQL (Andrew Crewdson, Matt Westcott)

## 1.8.31 Wagtail 1.12.3 release notes

- *What's new*

## What's new

### Bug fixes

- API listing views no longer fail when no site records are defined (Karl Hobley)
- Pinned Django REST Framework to `<3.7` to restore Django 1.8 compatibility (Matt Westcott)
- Fixed crash in XML sitemap generator when all pages on the site are private (Stein Strindhaug)
- Fixed error in Postgres search backend when searching specific fields of a `specific()` Page QuerySet (Bertrand Bordage, Matt Westcott)
- Fixed error on Elasticsearch backend when passing a QuerySet as an `__in` filter (Karl Hobley, Matt Westcott)
- `__isnull` filters no longer fail on Elasticsearch 5 (Karl Hobley)
- Prevented intermittent failures on Postgres search backend when a field is defined as both a `SearchField` and a `FilterField` (Matt Westcott)

## 1.8.32 Wagtail 1.12.2 release notes

- *What's new*

## What's new

### Bug fixes

- Migration for addition of `Page.draft_title` field is now reversible (Venelin Stoykov)
- Fixed failure on application startup when `ManifestStaticFilesStorage` is in use and `collectstatic` has not yet been run (Matt Westcott)

- Fixed handling of Vimeo and other oEmbed providers with a format parameter in the endpoint URL (Mitchel Cabuloy)
- Fixed regression in rendering save button in wagtail.contrib.settings edit view (Matt Westcott)

### 1.8.33 Wagtail 1.12.1 release notes

- *What's new*

#### What's new

#### Bug fixes

- Prevent home page draft title from displaying as blank (Mikalai Radchuk, Matt Westcott)
- Fix regression on styling of preview button with more than one preview mode (Jack Paine)
- Enabled translations within date-time chooser widget (Lucas Moeskops)

### 1.8.34 Wagtail 1.12 release notes

- *What's new*
- *Upgrade considerations*

Wagtail 1.12 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 8 months).

#### What's new

#### Configurable rich text features

The feature set provided by the rich text editor can now be configured on a per-field basis, by passing a `features` keyword argument; for example, a field can be configured to allow bold / italic formatting and links, but not headings or embedded images or media. For further information, see [Limiting features in a rich text field](#). This feature was developed by Matt Westcott.

#### Improved embed configuration

New configuration options for embedded media have been added, to give greater control over how media URLs are converted to embeds, and to make it possible to specify additional media providers beyond the ones built in to Wagtail. For further information, see [Embedded content](#). This feature was developed by Karl Hobley.

### Other features

- The admin interface now displays a title of the latest draft (Mikalai Radchuk)
- `RoutablePageMixin` now has a default “index” route (Andreas Nüßlein, Matt Westcott)
- Added multi-select form field to the form builder (dwasyl)
- Improved performance of sitemap generation (Levi Adler)
- `StreamField` now respects the `blank` setting; `StreamBlock` accepts a `required` setting (Loic Teixeira)
- `StreamBlock` now accepts `min_num`, `max_num` and `block_counts` settings to control the minimum and maximum numbers of blocks (Edwar Baron, Matt Westcott)
- Users can no longer remove their own active / superuser flags through Settings -> Users (Stein Strindhaug, Huub Bouma)
- The `process_form_submission` method of form pages now return the created form submission object (Christine Ho)
- Added `WAGTAILUSERS_PASSWORD_ENABLED` and `WAGTAILUSERS_PASSWORD_REQUIRED` settings to permit creating users with no Django-side passwords, to support external authentication setups (Matt Westcott)
- Added help text parameter to `DecimalBlock` and `RegexBlock` (Tomasz Knapik)
- Optimised caudal oscillation parameters on logo (Jack Paine)

### Bug fixes

- `FieldBlocks` in `StreamField` now call the field’s `prepare_value` method (Tim Heap)
- Initial disabled state of `InlinePanel` add button is now set correctly on non-default tabs (Matthew Downey)
- Redirects with unicode characters now work (Rich Brennan)
- Prevent explorer view from crashing when page model definitions are missing, allowing the offending pages to be deleted (Matt Westcott)
- Hide the userbar from printed page representation (Eugene Morozov)
- Prevent the page editor footer content from collapsing into two lines unnecessarily (Jack Paine)
- `StructBlock` values no longer render HTML templates as their `str` representation, to prevent infinite loops in debugging / logging tools (Matt Westcott)
- Removed deprecated `jQuery load` call from `TableBlock` initialisation (Jack Paine)
- Position of options in mobile nav-menu (Jack Paine)
- Center page editor footer regardless of screen width (Jack Paine)
- Change the design of the navbar toggle icon so that it no longer obstructs page headers (Jack Paine)
- Document add/edit forms no longer render container elements for hidden fields (Jeffrey Chau)

### Upgrade considerations

### StreamField now defaults to `blank=False`

StreamField now respects the `blank` field setting; when this is false, at least one block must be supplied for the field to pass validation. To match the behaviour of other model fields, `blank` defaults to `False`; if you wish to allow a StreamField to be left empty, you must now add `blank=True` to the field.

When passing an explicit `StreamBlock` as the top-level block of a StreamField definition, note that the StreamField's `blank` keyword argument always takes precedence over the block's `required` property, including when it is left as the default value of `blank=False`. Consequently, setting `required=False` on a top-level `StreamBlock` has no effect.

### Old configuration settings for embeds are deprecated

The configuration settings `WAGTAILEMBEDS_EMBED_FINDER` and `WAGTAILEMBEDS_EMBEDLY_KEY` have been deprecated in favour of the new `WAGTAILEMBEDS_FINDERS` setting. Please see [Configuring embed “finders”](#) for the new configuration to use.

### Registering custom `hallo.js` plugins directly is deprecated

The ability to enable / disable `hallo.js` plugins by calling `registerHalloPlugin` or modifying the `halloPlugins` list has been deprecated, and will be removed in Wagtail 1.14. The recommended way of customising the `hallo.js` editor is now through [rich text features](#). For details of how to define a `hallo.js` plugin as a rich text feature, see [Extending the Hallo Editor](#).

### Custom `get_admin_display_title` methods should use `draft_title`

This release introduces a new `draft_title` field on page models, so that page titles as used across the admin interface will correctly reflect any changes that exist in draft. If any of your page models override the `get_admin_display_title` method, to customise the display of page titles in the admin, it is recommended that you now update these to base their output on `draft_title` rather than `title`. Alternatively, to preserve backwards compatibility, you can invoke `super` on the method, for example:

```
def get_admin_display_title(self):
    return "%(title)s (%(lang)s)" % {
        'title': super(TranslatablePage, self).get_admin_display_title(),
        'lang': self.language_code,
    }
```

### Fixtures for loading pages should include `draft_title`

In most situations, the new `draft_title` field on page models will automatically be populated from the page title. However, this is not the case for pages that are created from fixtures. Projects that use fixtures to load initial data should therefore ensure that a `draft_title` field is specified.

### `RoutablePageMixin` now has a default index route

If you've used `RoutablePageMixin` on a Page model, you may have had to manually define an index route to serve the page at its main URL (`r'^$',`) so it behaves like a normal page. Wagtail now defines a default index route so this is no longer required.

## 1.8.35 Wagtail 1.11.1 release notes

- *What's new*

### What's new

#### Bug fixes

- Custom display page titles defined with `get_admin_display_title` are now shown within the page explorer menu (Matt Westcott, Janneke Janssen)

## 1.8.36 Wagtail 1.11 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### Explorer menu built with the admin API and React

After more than a year of work, the new explorer menu has finally landed! It comes with the following improvements:

- View all pages - not just the ones with child pages.
- Better performance, no matter the number of pages or levels in the hierarchy.
- Navigate the menu via keyboard.
- View Draft pages, and go to page editing, directly from the menu.

Beyond features, the explorer is built with the new admin API and React components. This will facilitate further evolutions to make it even faster and user-friendly. This work is the product of 4 Wagtail sprints, and the efforts of 16 people, listed here by order of first involvement:

- Karl Hobley (Cape town sprint, admin API)
- Josh Barr (Cape town sprint, prototype UI)
- Thibaud Colas (Ede sprint, Reykjavík sprint)
- Janneke Janssen (Ede sprint, Reykjavík sprint, Wagtail Space sprint)
- Rob Moorman (Ede sprint, eslint-config-wagtail, ES6+React+Redux styleguide)
- Maurice Bartnig (Ede sprint, i18n and bug fixes)
- Jonny Scholes (code review)
- Matt Westcott (Reykjavík sprint, refactorings)
- Sævar Öfjörð Magnússon (Reykjavík sprint)
- Eiríkur Ingi Magnusson (Reykjavík sprint)



- Harris Lapiroff (Reykjavík sprint, tab-accessible navigation)
- Hugo van den Berg (testing, Wagtail Space sprint)
- Olly Willans (UI, UX, Wagtail Space sprint)
- Andy Babic (UI, UX)
- Ben Enright (UI, UX)
- Bertrand Bordage (testing, documentation)

## Privacy settings on documents

Privacy settings can now be configured on collections, to restrict access to documents either by shared password or by user account. See: [Private pages](#).

This feature was developed by Ulrich Wagner and Matt Westcott. Thank you to [Wharton Research Data Services of The Wharton School](#) for sponsoring this feature.

## Other features

- Optimised page URL generation by caching site paths in the request scope (Tobias McNulty, Matt Westcott)
- The current live version of a page is now tracked on the revision listing view (Matheus Bratfisch)
- Each block created in a `StreamField` is now assigned a globally unique identifier (Matt Westcott)
- Mixcloud oEmbed pattern has been updated (Alice Rose)
- Added `last_published_at` field to the Page model (Matt Westcott)
- Added `show_in_menus_default` flag on page models, to allow “show in menus” to be checked by default (LB (Ben Johnston))
- “Copy page” form now validates against copying to a destination where the user does not have permission (Henk-Jan van Hasselaar)
- Allows reverse relations in `RelatedFields` for elasticsearch & PostgreSQL search backends (Lucas Moeskops, Bertrand Bordage)
- Added oEmbed support for Facebook (Mikalai Radchuk)
- Added oEmbed support for Tumblr (Mikalai Radchuk)

## Bug fixes

- Unauthenticated AJAX requests to admin views now return 403 rather than redirecting to the login page (Karl Hobley)
- `TableBlock` options `afterChange`, `afterCreateCol`, `afterCreateRow`, `afterRemoveCol`, `afterRemoveRow` and `contextMenu` can now be overridden (Loic Teixeira)
- The `lastmod` field returned by `wagtailsitemaps` now shows the last published date rather than the date of the last draft edit (Matt Westcott)
- Document chooser upload form no longer renders container elements for hidden fields (Jeffrey Chau)
- Prevented exception when visiting a preview URL without initiating the preview (Paul Kamp)

## Upgrade considerations

### Browser requirements for the new explorer menu

The new explorer menu does not support IE8, IE9, and IE10. The fallback experience is a link pointing to the explorer pages.

### Caching of site-level URL information throughout the request cycle

The `get_url_parts` and `relative_url` methods on `Page` now accept an optional `request` keyword argument. Additionally, two new methods have been added, `get_url` (analogous to the `url` property) and `get_full_url` (analogous to the `full_url` property). Whenever possible, these methods should be used instead of the property versions, and the request passed to each method. For example:

```
page_url = my_page.url
```

would become:

```
page_url = my_page.get_url(request=request)
```

This enables caching of underlying site-level URL information throughout the request cycle, thereby significantly reducing the number of cache or SQL queries your site will generate for a given page load. A common use case for these methods is any custom template tag your project may include for generating navigation menus. For more information, please refer to [Page URLs](#).

Furthermore, if you have overridden `get_url_parts` or `relative_url` on any of your page models, you will need to update the method signature to support this keyword argument; most likely, this will involve changing the line:

```
def get_url_parts(self):
```

to:

```
def get_url_parts(self, *args, **kwargs):
```

and passing those through at the point where you are calling `get_url_parts` on `super` (if applicable).

See also: `wagtail.core.models.Page.get_url_parts()`, `wagtail.core.models.Page.get_url()`, `wagtail.core.models.Page.get_full_url()`, and `wagtail.core.models.Page.relative_url()`

### “Password required” template for documents

This release adds the ability to password-protect documents as well as pages. The template used for the “password required” form is distinct from the one used for pages; if you have previously overridden the default template through the `PASSWORD_REQUIRED_TEMPLATE` setting, you may wish to provide a corresponding template for documents through the setting `DOCUMENT_PASSWORD_REQUIRED_TEMPLATE`. See: [Private pages](#)

### Elasticsearch 5.4 is incompatible with `ATOMIC_REBUILD`

While not specific to Wagtail 1.11, users of Elasticsearch should be aware that the `ATOMIC_REBUILD` option is not compatible with Elasticsearch 5.4.x due to [a bug in the handling of aliases](#). If you wish to use this feature, please use Elasticsearch 5.3.x or 5.5.x (when available).

### 1.8.37 Wagtail 1.10.1 release notes

- *What's changed*

#### What's changed

##### Bug fixes

- Fix admin page preview that was broken 24 hours after previewing a page (Martin Hill)
- Removed territory-specific translations for Spanish, Polish, Swedish, Russian and Chinese (Taiwan) that block more complete translations from being used (Matt Westcott)

### 1.8.38 Wagtail 1.10 release notes

- *What's new*
- *Upgrade considerations*

#### What's new

##### PostgreSQL search engine

A new search engine has been added to Wagtail which uses PostgreSQL's built-in full-text search functionality. This means that if you use PostgreSQL to manage your database, you can now get a good quality search engine without needing to install Elasticsearch.

To get started, see *PostgreSQL search engine*.

This feature was developed at the Arnhem sprint by Bertrand Bordage, Jaap Roes, Arne de Laat and Ramon de Jezus.

##### Django 1.11 and Python 3.6 support

Wagtail is now compatible with Django 1.11 and Python 3.6. Compatibility fixes were contributed by Tim Graham, Matt Westcott, Mikalai Radchuk and Bertrand Bordage.

##### User language preference

Users can now set their preferred language for the Wagtail admin interface under Account Settings → Language Preferences. The list of available languages can be configured via the `WAGTAILADMIN_PERMITTED_LANGUAGES` setting. This feature was developed by Daniel Chimeno.

### New admin preview

Previewing pages in Wagtail admin interface was rewritten to make it more robust. In previous versions, preview was broken in several scenarios so users often ended up on a blank page with an infinite spinner.

An additional setting was created: `WAGTAIL_AUTO_UPDATE_PREVIEW`. It allows users to see changes done in the editor by refreshing the preview tab without having to click again on the preview button.

This was developed by Bertrand Bordage.

### Other features

- Use minified versions of jQuery and jQuery UI in the admin. Total savings without compression 371 KB (Tom Dyson)
- Hooks can now specify the order in which they are run (Gagaro)
- Added a `submit_buttons` block to login template (Gagaro)
- Added `construct_image_chooser_queryset`, `construct_document_chooser_queryset` and `construct_page_chooser_queryset` hooks (Gagaro)
- The homepage created in the project template is now titled “Home” rather than “Homepage” (Karl Hobley)
- Signal receivers for custom `Image` and `Rendition` models are connected automatically (Mike Dingjan)
- `PageChooserBlock` can now accept a list/tuple of page models as `target_model` (Mikalai Radchuk)
- Styling tweaks for the `ModelAdmin`’s `IndexView` to be more inline with the Wagtail styleguide (Andy Babic)
- Added `.nvmrc` to the project root for Node versioning support (Janneke Janssen)
- Added `form_fields_exclude` property to `ModelAdmin` views (Matheus Bratfisch)
- User creation / edit form now enforces password validators set in `AUTH_PASSWORD_VALIDATORS` (Bertrand Bordage)
- Added support for displaying `non_field_errors` when validation fails in the page editor (Matt Westcott)
- Added `WAGTAILADMIN_RECENT_EDITS_LIMIT` setting to define the number of your most recent edits on the dashboard (Maarten Kling)
- Added link to the full Elasticsearch setup documentation from the Performance page (Matt Westcott)
- Tag input fields now accept spaces in tags by default, and can be overridden with the `TAG_SPACES_ALLOWED` setting (Kees Hink, Alex Gleason)
- Page chooser widgets now display the required page type where relevant (Christine Ho)
- Site root pages are now indicated with a globe icon in the explorer listing (Nick Smith, Huub Bouma)
- Draft page view is now restricted to users with edit / publish permission over the page (Kees Hink)
- Added the option to delete a previously saved focal point on a image (Maarten Kling)
- Page explorer menu item, search and summary panel are now hidden for users with no page permissions (Tim Heap)
- Added support for custom date and datetime formats in input fields (Bojan Mihelac)
- Added support for custom Django REST framework serializer fields in `Page.api_fields` using a new `APIField` class (Karl Hobley)
- Added `classname` argument to `StreamFieldPanel` (Christine Ho)

- Added `group` keyword argument to `StreamField` blocks for grouping related blocks together in the block menu (Andreas Nüßlein)
- Update the sitemap generator to use the Django sitemap module (Michael van Tellingen, Mike Dingjan)

## Bug fixes

- Marked ‘Date from’ / ‘Date to’ strings in `wagtailforms` for translation (Vorlif)
- “File” field label on image edit form is now translated (Stein Strindhaug)
- Unreliable preview is now reliable by always opening in a new window (Kjartan Sverrisson)
- Fixed placement of `{{ block.super }}` in `snippets/type_index.html` (LB (Ben Johnston))
- Optimised database queries on group edit page (Ashia Zawaduk)
- Choosing a popular search term for promoted search results now works correctly after pagination (Janneke Janssen)
- IDs used in tabbed interfaces are now namespaced to avoid collisions with other page elements (Janneke Janssen)
- Page title not displaying page name when moving a page (Trent Holliday)
- The `ModelAdmin` module can now work without the `wagtailimages` and `wagtaildocs` apps installed (Andy Babic)
- Cloudflare error handling now handles non-string error responses correctly (hdnpl)
- Search indexing now uses a defined query ordering to prevent objects from being skipped (Christian Peters)
- Ensure that number localisation is not applied to object IDs within admin templates (Tom Hendrikx)
- Paginating with a search present was always returning the 1st page in Internet Explorer 10 & 11 (Ralph Jacobs)
- `RoutablePageMixin` and `wagtailforms` previews now set the `request.is_preview` flag (Wietze Helmantel)
- The save and preview buttons in the page editor are now mobile-friendly (Maarten Kling)
- Page links within rich text now respect custom URLs defined on specific page models (Gary Krige, Huub Bouma)
- Default avatar no longer visible when using a transparent gravatar image (Thijs Kramer)
- Scrolling within the datetime picker is now usable again for touchpads (Ralph Jacobs)
- List-based fields within form builder form submissions are now displayed as comma-separated strings rather than as Python lists (Christine Ho, Matt Westcott)
- The page type usage listing now have a translatable page title (Ramon de Jezus)
- Styles for submission filtering form now have a consistent height. (Thijs Kramer)
- Slicing a search result set no longer loses the annotation added by `annotate_score` (Karl Hobley)
- String-based primary keys are now escaped correctly in `ModelAdmin` URLs (Andreas Nüßlein)
- Empty search in the API now works (Morgan Aubert)
- `RichTextBlock` toolbar now correctly positioned within `StructBlock` (Janneke Janssen)
- Fixed display of `ManyToMany` fields and `False` values on the `ModelAdmin` inspect view (Andy Babic)
- Prevent pages from being recursively copied into themselves (Matheus Bratfish)
- Specifying the full file name in documents URL is mandatory (Morgan Aubert)
- Reordering inline forms now works correctly when moving past a deleted form (Janneke Janssen)

- Removed erroneous *lsafe* filter from search results template in project template (Karl Hobley)

### Upgrade considerations

#### Django 1.9 and Python 3.3 support dropped

Support for Django 1.9 and Python 3.3 has been dropped in this release; please upgrade from these before upgrading Wagtail. Note that the Django 1.8 release series is still supported, as a Long Term Support release.

#### Dropped support for generating static sites using `django-medusa`

Django-medusa is no longer maintained, and is incompatible with Django 1.8 and above. An alternative module based on the *django-bakery* package is available as a third-party contribution: <https://github.com/moorinteractive/wagtail-bakery>.

#### Signals on custom `Image` and `Rendition` models connected automatically

Projects using *custom image models* no longer need to set up signal receivers to handle deletion of image files and image feature detection, as these are now handled automatically by Wagtail. The following lines of code should be removed:

```
# Delete the source image file when an image is deleted
@receiver(post_delete, sender=CustomImage)
def image_delete(sender, instance, **kwargs):
    instance.file.delete(False)

# Delete the rendition image file when a rendition is deleted
@receiver(post_delete, sender=CustomRendition)
def rendition_delete(sender, instance, **kwargs):
    instance.file.delete(False)

# Perform image feature detection (if enabled)
@receiver(pre_save, sender=CustomImage)
def image_feature_detection(sender, instance, **kwargs):
    if not instance.has_focal_point():
        instance.set_focal_point(instance.get_suggested_focal_point())
```

#### Adding / editing users through Wagtail admin no longer sets `is_staff` flag

Previously, the `is_staff` flag (which grants access to the Django admin interface) was automatically set for superusers, and reset for other users, when creating and updating users through the Wagtail admin. This behaviour has now been removed, since Wagtail is designed to work independently of the Django admin. If you need to reinstate the old behaviour, you can set up a `pre_save` signal handler on the User model to set the flag appropriately.

#### Specifying the full file name in documents URL is mandatory

In previous releases, it was possible to download a document using the primary key and a fraction of its file name, or even without file name. You could get the same document at the addresses `/documents/1/your-file-name`.

pdf, /documents/1/you & /documents/1/.

This feature was supposed to allow shorter URLs but was not used in Wagtail. For security reasons, we removed it, so only the full URL works: /documents/1/your-file-name.pdf

If any of your applications relied on the previous behaviour, you will have to rewrite it to take this into account.

### 1.8.39 Wagtail 1.9.1 release notes

- *What's changed*

#### What's changed

##### Bug fixes

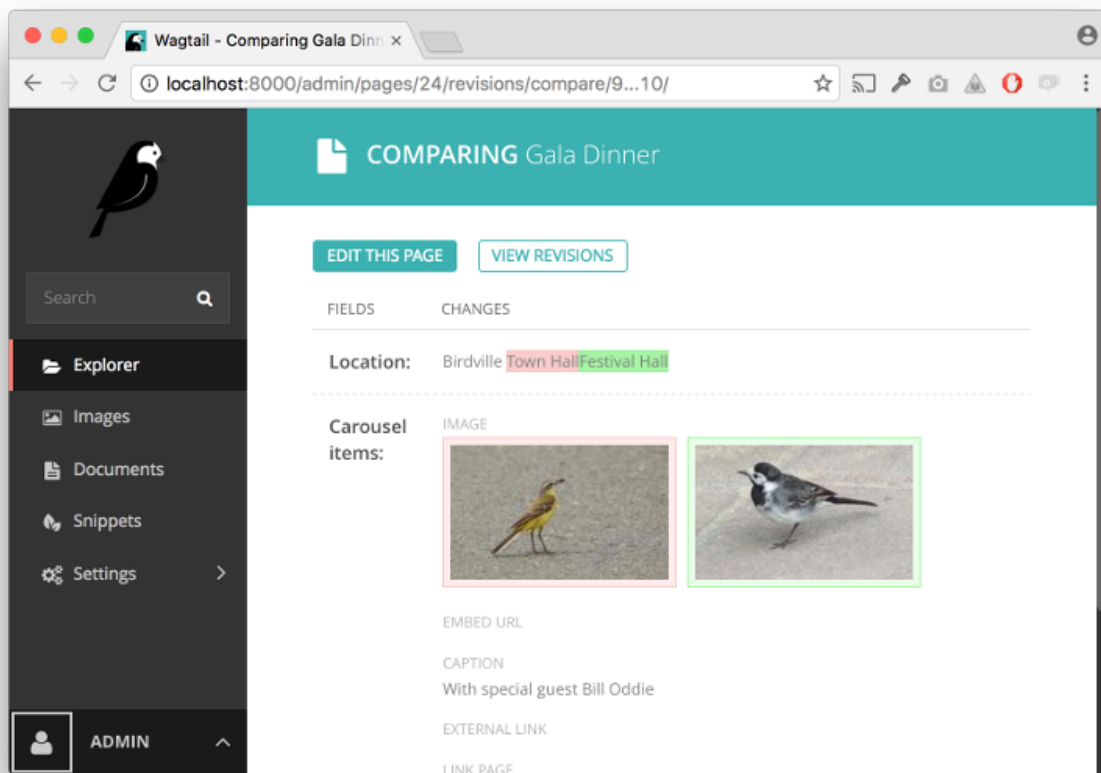
- Removed erroneous |safe filter from search results template in project template (Karl Hobley)
- Prevent pages from being recursively copied into themselves (Matheus Bratfisch)

### 1.8.40 Wagtail 1.9 release notes

- *What's new*
- *Upgrade considerations*

#### What's new

## Revision comparisons



Wagtail now provides the ability to view differences between revisions of a page, from the revisions listing page and when reviewing a page in moderation. This feature was developed by Karl Hobley, Janneke Janssen and Matt Westcott. Thank you to Blackstone Chambers for sponsoring this feature.

## Many-to-many relations on page models



Wagtail now supports a new field type `ParentalManyToManyField` that can be used to set up many-to-many relations on pages. For details, see the [Categories](#) section of the tutorial. This feature was developed by Thejaswi Puthraya and Matt Westcott.



## Bulk-deletion of form submissions

Form builder form submissions can now be deleted in bulk from the form submissions index page. This feature was sponsored by St John’s College, Oxford and developed by Karl Hobley.

## Accessing parent context from StreamField block `get_context` methods

The `get_context` method on StreamField blocks now receives a `parent_context` keyword argument, consisting of the dict of variables passed in from the calling template. For example, this makes it possible to perform pagination logic within `get_context`, retrieving the current page number from `parent_context['request'].GET`. See [get\\_context on StreamField blocks](#). This feature was developed by Mikael Svensson and Peter Baumgartner.

## Welcome message customisation for multi-tenanted installations

The welcome message on the admin dashboard has been updated to be more suitable for multi-tenanted installations. Users whose page permissions lie within a single site will now see that site name in the welcome message, rather than the installation-wide `WAGTAIL_SITE_NAME`. As before, this message can be customised, and additional template variables have been provided for this purpose - see [Custom branding](#). This feature was developed by Jeffrey Chau.

## Other features

- Changed text of “Draft” and “Live” buttons to “View draft” and “View live” (Dan Braghis)
- Added `get_api_representation` method to streamfield blocks allowing the JSON representation in the API to be customised (Marco Fucci)
- Added *before\_copy\_page* and *after\_copy\_page* hooks (Matheus Bratfisch)
- View live / draft links in the admin now consistently open in a new window (Marco Fucci)
- `ChoiceBlock` now omits the blank option if the block is required and has a default value (Andreas Nüßlein)
- The `add_subpage` view now maintains a `next` URL parameter to specify where to redirect to after completing page creation (Robert Rollins)
- The `wagtailforms` module now allows to define custom form submission model, add custom data to CSV export and some other customisations. See [Form builder customisation](#) (Mikalai Radchuk)
- The Webpack configuration is now in a subfolder to declutter the project root, and uses environment-specific configurations for smaller bundles in production and easier debugging in development (Janneke Janssen, Thibaud Colas)
- Added page titles to title text on action buttons in the explorer, for improved accessibility (Matt Westcott)

## Bug fixes

- Help text for StreamField is now visible and does not cover block controls (Stein Strindhaug)
- “X minutes ago” timestamps are now marked for translation (Janneke Janssen, Matt Westcott)
- Avoid indexing unsaved field content on *save(update\_fields=[...])* operations (Matt Westcott)
- Corrected ordering of arguments passed to ModelAdmin `get_extra_class_names_for_field_col / get_extra_attrs_for_field_col` methods (Andy Babic)
- `pageurl / slugurl` tags now function when `request.site` is not available (Tobias McNulty, Matt Westcott)

## Upgrade considerations

### django-modelcluster and django-taggit dependencies updated

Wagtail now requires version 3.0 or later of `django-modelcluster` and version 0.20 or later of `django-taggit`; earlier versions are unsupported. In normal circumstances these packages will be upgraded automatically when upgrading Wagtail; however, if your Wagtail project has a requirements file that explicitly specifies an older version, this will need to be updated.

### get\_context methods on StreamField blocks need updating

Previously, `get_context` methods on `StreamField` blocks returned a dict of variables which would be merged into the calling template's context before rendering the block template. `get_context` methods now receive a `parent_context` dict, and are responsible for returning the final context dictionary with any new variables merged into it. The old calling convention is now deprecated, and will be phased out in Wagtail 1.11.

In most cases, the method will be calling `get_context` on the superclass, and can be updated by passing the new `parent_context` keyword argument to it:

```
class MyBlock(Block):

    def get_context(self, value):
        context = super(MyBlock, self).get_context(value)
        ...
        return context
```

becomes:

```
class MyBlock(Block):

    def get_context(self, value, parent_context=None):
        context = super(MyBlock, self).get_context(value, parent_context=parent_
↪context)
        ...
        return context
```

Note that `get_context` methods on page models are unaffected by this change.

## 1.8.41 Wagtail 1.8.2 release notes

- *What's changed*

### What's changed

#### Bug fixes

- Removed erroneous `|safe` filter from search results template in project template (Karl Hobley)
- Avoid indexing unsaved field content on `save(update_fields=[...])` operations (Matt Westcott)
- Prevent pages from being recursively copied into themselves (Matheus Bratfisch)

## 1.8.42 Wagtail 1.8.1 release notes

- *What's changed*

### What's changed

#### Bug fixes

- Reduced `Rendition.focal_point_key` field length to prevent migration failure when upgrading to Wagtail 1.8 on MySQL with `utf8` character encoding (Andy Chosak, Matt Westcott)

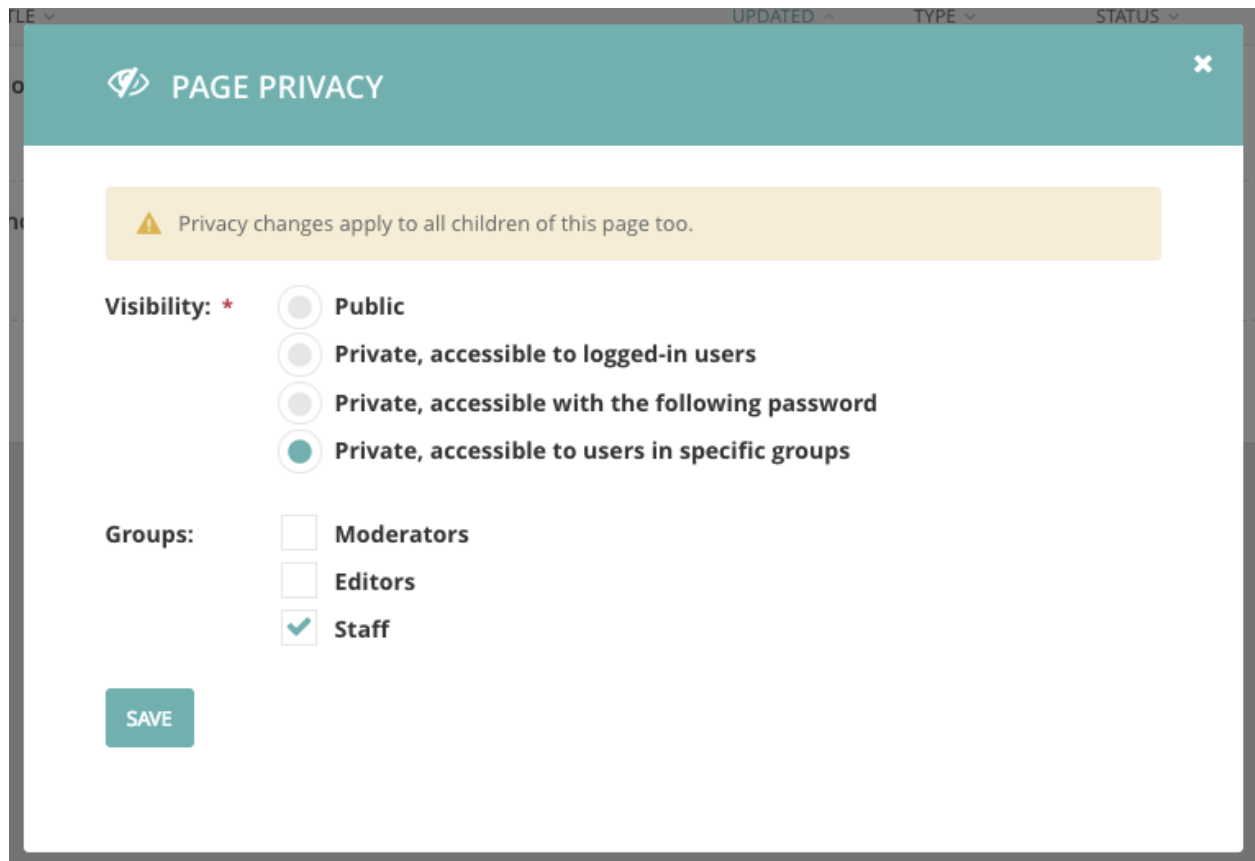
## 1.8.43 Wagtail 1.8 release notes

- *What's new*
- *Upgrade considerations*

Wagtail 1.8 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 8 months).

### What's new

## New page privacy options



FILE UPDATED TYPE STATUS

**PAGE PRIVACY**

⚠ Privacy changes apply to all children of this page too.

**Visibility:** \*

- ☐ Public
- ☐ Private, accessible to logged-in users
- ☐ Private, accessible with the following password
- ☒ Private, accessible to users in specific groups

**Groups:**

- ☐ Moderators
- ☐ Editors
- ☒ Staff

SAVE

Access to pages can now be restricted based on user accounts and group membership, rather than just through a shared password. This makes it possible to set up intranet-style sites via the admin, with no additional coding. This feature was developed by Shawn Makinson, Tom Miller, Luca Perico and Matt Westcott.

See: *Private pages*

## Restrictions on bulk-deletion of pages

Previously, any user with edit permission over a page and its descendants was able to delete them all as a single action, which led to the risk of accidental deletions. To guard against this, the permission rules have been revised so that a user with basic permissions can only delete pages that have no children; in order to delete a whole subtree, they must individually delete each child page first. A new “bulk delete” permission type has been added which allows a user to delete pages with children, as before; superusers receive this permission implicitly, and so there is no change of behaviour for them.

See: *Permissions*

This feature was developed by Matt Westcott.

## Elasticsearch 5 support

Wagtail now supports Elasticsearch 5. See *Elasticsearch Backend* for configuration details. This feature was developed by Karl Hobley.

## Permission-limited admin breadcrumb

Breadcrumb links within the admin are now limited to the portion of the page tree that covers all pages the user has permission over. As with the changes to the explorer sidebar menu in Wagtail 1.6, this is a step towards supporting full multi-tenancy (where multiple sites on the same Wagtail installation can be fully isolated from each other through permission configuration). This feature was developed by Jeffrey Chau, Robert Rollins and Matt Westcott.

## Updated tutorial

The “*Your first Wagtail site*” tutorial has been extensively updated to cover concepts such as dynamic page listings, template context variables, and tagging. This update was contributed by Scot Hacker, with additions from Matt Westcott.

## Other features

- Added support of a custom `edit_handler` for site settings. See *docs for the site settings module*. (Axel Haustant)
- Added `get_landing_page_template` getter method to `AbstractForm` (Gagaro)
- Added `Page.get_admin_display_title` method to override how the title is displayed in the admin (Henk-Jan van Hasselaar)
- Added support for specifying custom HTML attributes for table rows on `ModelAdmin` index pages. See *ModelAdmin.get\_extra\_attrs\_for\_row()* (Andy Babic)
- Added `first_common_ancestor` method to `PageQuerySet` (Tim Heap)
- Page chooser now opens at the deepest ancestor page that covers all the pages of the required page type (Tim Heap)
- `PageChooserBlock` now accepts a `target_model` option to specify the required page type (Tim Heap)
- `Modeladmin` forms now respect `fields / exclude` options passed on custom model forms (Thejaswi Puthraya)
- Added new `StreamField` block type `StaticBlock` for blocks that occupy a position in a stream but otherwise have no configuration; see *StaticBlock* (Benoît Vogel)
- Added new `StreamField` block type `BlockQuoteBlock` (Scot Hacker)
- Updated Cloudflare cache module to use the v4 API (Albert O’Connor)
- Added `exclude_from_explorer` attribute to the `ModelAdmin` class to allow hiding instances of a page type from Wagtail’s explorer views (Andy Babic)
- Added `above_login`, `below_login`, `fields` and `login_form` customisation blocks to the login page template - see *Customising admin templates* (Tim Heap)
- `ChoiceBlock` now accepts a callable as the choices list (Mikalai Radchuk)
- Redundant action buttons are now omitted from the root page in the explorer (Nick Smith)
- Locked pages are now disabled from editing at the browser level (Edd Baldry)
- Added `wagtail.core.query.PageQuerySet.in_site()` method for filtering page `QuerySets` to pages within the specified site (Chris Rogers)
- Added the ability to override the default index settings for Elasticsearch. See *Elasticsearch Backend* (PyMan Claudio Marinozzi)

- Extra options for the Elasticsearch constructor should be now defined with the new key `OPTIONS` of the `WAGTAILSEARCH_BACKENDS` setting (PyMan Claudio Marinozzi)

### Bug fixes

- `AbstractForm` now respects custom `get_template` methods on the page model (Gagaro)
- Use specific page model for the parent page in the explore index (Gagaro)
- Remove responsive styles in embed when there is no ratio available (Gagaro)
- Parent page link in page search modal no longer disappears on hover (Dan Braghis)
- `ModelAdmin` views now consistently call `get_context_data` (Andy Babic)
- Header for search results on the redirects index page now shows the correct count when the listing is paginated (Nick Smith)
- `set_url_paths` management command is now compatible with Django 1.10 (Benjamin Bach)
- Form builder email notifications now output multiple values correctly (Sævar Öfjörð Magnússon)
- Closing ‘more’ dropdown on explorer no longer jumps to the top of the page (Ducky)
- Users with only publish permission are no longer given implicit permission to delete pages (Matt Westcott)
- `search_garbage_collect` management command now works when `wagtailsearchpromotions` is not installed (Morgan Aubert)
- `wagtail.contrib.settings` context processor no longer fails when `request.site` is unavailable (Diederik van der Boor)
- `TableBlock` content is now indexed for search (Morgan Aubert)
- `Page.copy()` is now marked as `alters_data`, to prevent template code from triggering it (Diederik van der Boor)

### Upgrade considerations

#### unique\_together constraint on custom image rendition models needs updating

If your project is using a custom image model (see [Custom image models](#)), you will need to update the `unique_together` option on the corresponding Rendition model when upgrading to Wagtail 1.8. Change the line:

```
unique_together = (
    ('image', 'filter', 'focal_point_key'),
)
```

to:

```
unique_together = (
    ('image', 'filter_spec', 'focal_point_key'),
)
```

You will then be able to run `manage.py makemigrations` and `manage.py migrate` as normal.

Additionally, third-party code that accesses the `Filter` and `Rendition` models directly should note the following and make updates where applicable:

- Filter will no longer be a Django model as of Wagtail 1.9, and as such, ORM operations on it (such as `save()` and `Filter.objects`) are deprecated. It should be instantiated and used as an in-memory object instead - for example, `flt, created = Filter.objects.get_or_create(spec='fill-100x100')` should become `flt = Filter(spec='fill-100x100')`.
- The `filter` field of Rendition models is no longer in use; lookups should instead be performed on the `filter_spec` field, which contains a filter spec string such as `'fill-100x100'`.

### `wagtail.wagtailimages.models.get_image_model` has moved

The `get_image_model` function should now be imported from `wagtail.wagtailimages` rather than `wagtail.wagtailimages.models`. See [Referring to the image model](#).

### Non-administrators now need ‘bulk delete’ permission to delete pages with children

As a precaution against accidental data loss, this release introduces a new “bulk delete” permission on pages, which can be set through the Settings -> Groups area. Non-administrator users must have this permission in order to delete pages that have children; a user without this permission would have to delete each child individually before deleting the parent. By default, no groups are assigned this new permission. If you wish to restore the previous behaviour, and don’t want to configure permissions manually through the admin interface, you can do so with a data migration. Create an empty migration using `./manage.py makemigrations myapp --empty --name assign_bulk_delete_permission` (replacing `myapp` with the name of one of your project’s apps) and edit the migration file to contain the following:

```
from __future__ import unicode_literals

from django.db import migrations

def add_bulk_delete_permission(apps, schema_editor):
    """Find all groups with add/edit page permissions, and assign them bulk_delete_
    ↪permission"""
    GroupPagePermission = apps.get_model('wagtailcore', 'GroupPagePermission')
    for group_id, page_id in GroupPagePermission.objects.filter(
        permission_type__in=['add', 'edit']
    ).values_list('group', 'page').distinct():
        GroupPagePermission.objects.create(
            group_id=group_id, page_id=page_id, permission_type='bulk_delete'
        )

def remove_bulk_delete_permission(apps, schema_editor):
    GroupPagePermission = apps.get_model('wagtailcore', 'GroupPagePermission')
    GroupPagePermission.objects.filter(permission_type='bulk_delete').delete()

class Migration(migrations.Migration):

    dependencies = [
        # keep the original dependencies line
    ]

    operations = [
```

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```
migrations.RunPython(add_bulk_delete_permission, remove_bulk_delete_
↪permission),
]
```

### Cloudflare cache module now requires a ZONEID setting

The `wagtail.contrib.wagtailfrontendcache.backends.CloudflareBackend` module has been updated to use Cloudflare's v4 API, replacing the previous v1 implementation (which is [unsupported as of November 9th, 2016](#)). The new API requires users to supply a *zone identifier*, which should be passed as the `ZONEID` field of the `WAGTAILFRONTENDCACHE` setting:

```
WAGTAILFRONTENDCACHE = {
    'cloudflare': {
        'BACKEND': 'wagtail.contrib.wagtailfrontendcache.backends.CloudflareBackend',
        'EMAIL': 'your-cloudflare-email-address@example.com',
        'TOKEN': 'your cloudflare api token',
        'ZONEID': 'your cloudflare domain zone id',
    },
}
```

For details of how to obtain the zone identifier, see [the Cloudflare API documentation](#).

### Extra options for the Elasticsearch constructor should be now defined with the new key `OPTIONS` of the `WAGTAILSEARCH_BACKENDS` setting

For the Elasticsearch backend, all extra keys defined in `WAGTAILSEARCH_BACKENDS` are passed directly to the Elasticsearch constructor. All these keys now should be moved inside the new `OPTIONS` dictionary. The old behaviour is still supported, but deprecated.

For example, the following configuration changes the connection class that the Elasticsearch [connector](#) uses:

```
from elasticsearch import RequestsHttpConnection

WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.wagtailsearch.backends.elasticsearch',
        'connection_class': RequestsHttpConnection,
    }
}
```

As `connection_class` needs to be passed through to the Elasticsearch [connector](#), it should be moved to the new `OPTIONS` dictionary:

```
from elasticsearch import RequestsHttpConnection

WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.wagtailsearch.backends.elasticsearch',
        'OPTIONS': {
            'connection_class': RequestsHttpConnection,
        }
    }
}
```



## 1.8.44 Wagtail 1.7 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### Elasticsearch 2 support

Wagtail now supports Elasticsearch 2. Note that you need to change backend in `WAGTAILSEARCH_BACKENDS`, if you wish to switch to Elasticsearch 2. This feature was developed by Karl Hobley.

See: *Elasticsearch Backend*

#### New image tag options for file type and JPEG compression level

The `{% image %}` tag now supports extra parameters for specifying the image file type and JPEG compression level on a per-tag basis. See *Output image format* and *JPEG image quality*. This feature was developed by Karl Hobley.

#### AWS CloudFront support added to cache invalidation module

Wagtail's cache invalidation module can now invalidate pages cached in AWS CloudFront when they are updated or unpublished. This feature was developed by Rob Moorman.

See: *Amazon CloudFront*

#### Unpublishing subpages

Unpublishing a page now gives the option to unpublish its subpages at the same time. This feature was developed by Jordi Joan.

#### Minor features

- The `|embed` filter has been converted into a templatetag `{% embed %}` (Janneke Janssen)
- The `wagtailforms` module now provides a `FormSubmissionPanel` for displaying details of form submissions; see *Displaying form submission information* for documentation. (João Luiz Lorencetti)
- The Wagtail version number can now be obtained as a tuple using `from wagtail import VERSION` (Tim Heap)
- `send_mail` logic has been moved from `AbstractEmailForm.process_form_submission` into `AbstractEmailForm.send_mail`. Now it's easier to override this logic (Tim Leguijt)
- Added `before_create_page`, `before_edit_page`, `before_delete_page` hooks (Karl Hobley)
- Updated font sizes and colours to improve legibility of admin menu and buttons (Stein Strindhaug)
- Added pagination to "choose destination" view when moving pages (Nick Smith, Žan Anderle)

- Added ability to annotate search results with score - see *Annotating results with score* (Karl Hobley)
- Added ability to limit access to form submissions - see *filter\_form\_submissions\_for\_user* (Mikalai Radchuk)
- Added the ability to configure the number of days search logs are kept for, through the *WAGTAILSEARCH\_HITS\_MAX\_AGE* setting (Stephen Rice)
- `SnippetChooserBlock` now supports passing the model name as a string (Nick Smith)
- Redesigned account settings / logout area in the sidebar for better clarity (Janneke Janssen)
- Pillow's image optimisation is now applied when saving JPEG images (Karl Hobley)

### Bug fixes

- Migrations for wagtailcore and project template are now reversible (Benjamin Bach)
- Migrations no longer depend on wagtailcore and taggit's `__latest__` migration, logically preventing those apps from receiving new migrations (Matt Westcott)
- The default image format label text ('Full width', 'Left-aligned', 'Right-aligned') is now localised (Mikalai Radchuk)
- Text on the front-end 'password required' form is now marked for translation (Janneke Janssen)
- Text on the page view restriction form is now marked for translation (Luiz Boaretto)
- Fixed toggle behaviour of userbar on mobile (Robert Rollins)
- Image rendition / document file deletion now happens on a `post_delete` signal, so that files are not lost if the deletion does not proceed (Janneke Janssen)
- "Your recent edits" list on dashboard no longer leaves out pages that another user has subsequently edited (Michael Cordover, Kees Hink, João Luiz Lorencetti)
- `InlinePanel` now accepts a `classname` parameter as per the documentation (emg36, Matt Westcott)
- Disabled use of escape key to revert content of rich text fields, which could cause accidental data loss (Matt Westcott)
- Setting `USE_THOUSAND_SEPARATOR = True` no longer breaks the rendering of numbers in JS code for `InlinePanel` (Mattias Loverot, Matt Westcott)
- Images / documents pagination now preserves GET parameters (Bojan Mihelac)
- Wagtail's `UserProfile` model now sets a `related_name` of `wagtail_userprofile` to avoid naming collisions with other user profile models (Matt Westcott)
- Non-text content is now preserved when adding or editing a link within rich text (Matt Westcott)
- Fixed preview when `SECURE_SSL_REDIRECT = True` (Aymeric Augustin)
- Prevent hang when truncating an image filename without an extension (Ricky Robinett)

### Upgrade considerations

#### Project template's initial migration should not depend on `wagtailcore.__latest__`

On projects created under previous releases of Wagtail, the `home/migrations/0001_initial.py` migration created by the `wagtail start` command contains the following dependency line:

```
dependencies = [
    ('wagtailcore', '__latest__'),
]
```

This may produce `InconsistentMigrationHistory` errors under Django 1.10 when upgrading Wagtail, since Django interprets this to mean that no new migrations can legally be added to `wagtailcore` after this migration is applied. This line should be changed to:

```
dependencies = [
    ('wagtailcore', '0029_unicode_slugfield_dj19'),
]
```

### Custom image models require a data migration for the new `filter_spec` field

The data model for image renditions will be changed in Wagtail 1.8 to eliminate `Filter` as a model. Wagtail sites using a custom image model (see *Custom image models*) need to have a schema and data migration in place prior to upgrading to Wagtail 1.8. To create these migrations:

- Run `manage.py makemigrations` to create the schema migration
- Run `manage.py makemigrations --empty myapp` (replacing `myapp` with the name of the app containing the custom image model) to create an empty migration
- Edit the created migration to contain:

```
from wagtail.wagtailimages.utils import get_fill_filter_spec_migrations
```

and, for the operations list:

```
forward, reverse = get_fill_filter_spec_migrations('myapp', 'CustomRendition')
operations = [
    migrations.RunPython(forward, reverse),
]
```

replacing `myapp` and `CustomRendition` with the app and model name for the custom rendition model.

### embed template filter is now a template tag

The `embed` template filter, used to translate the URL of a media resource (such as a YouTube video) into a corresponding embeddable HTML fragment, has now been converted to a template tag. Any template code such as:

```
{% load wagtailembeds_tags %}
...
{{ my_media_url|embed }}
```

should now be rewritten as:

```
{% load wagtailembeds_tags %}
...
{% embed my_media_url %}
```

## 1.8.45 Wagtail 1.6.3 release notes

- *What's changed*

## What's changed

### Bug fixes

- Restore compatibility with django-debug-toolbar 1.5 (Matt Westcott)
- Edits to StreamFields are no longer ignored in page edits on Django  $\geq 1.10.1$  when a default value exists (Matt Westcott)

## 1.8.46 Wagtail 1.6.2 release notes

- *What's changed*

## What's changed

### Bug fixes

- Initial values of checkboxes on group permission edit form now are visible on Django 1.10 (Matt Westcott)

## 1.8.47 Wagtail 1.6.1 release notes

- *What's new*
- *Upgrade considerations*

## What's new

### Minor features

- Added `WAGTAIL_ALLOW_UNICODE_SLUGS` setting to make Unicode support optional in page slugs (Matt Westcott)

### Bug fixes

- Wagtail's middleware classes are now compatible with Django 1.10's [new-style middleware](#) (Karl Hobley)
- The `can_create_at()` method is now checked in the create page view (Mikalai Radchuk)
- Fixed regression on Django 1.10.1 causing Page subclasses to fail to use PageManager (Matt Westcott)
- ChoiceBlocks with lazy translations as option labels no longer break Elasticsearch indexing (Matt Westcott)

- The page editor no longer fails to load JavaScript files with `ManifestStaticFilesStorage` (Matt Westcott)
- Django 1.10 enables client-side validation for all forms by default, but it fails to handle all the nuances of how forms are used in Wagtail. The client-side validation has been disabled for the Wagtail UI (Matt Westcott)

## Upgrade considerations

### Multi-level inheritance and custom managers

The inheritance rules for *Custom Page managers* have been updated to match Django's standard behaviour. In the vast majority of scenarios there will be no change. However, in the specific case where a page model with a custom `objects` manager is subclassed further, the subclass will be assigned a plain `Manager` instead of a `PageManager`, and will now need to explicitly override this with a `PageManager` to function correctly:

```
class EventPage(Page):
    objects = EventManager()

class SpecialEventPage(EventPage):
    # Previously SpecialEventPage.objects would be set to a PageManager automatically;
    # this now needs to be set explicitly
    objects = PageManager()
```

## 1.8.48 Wagtail 1.6 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### Django 1.10 support

Wagtail is now compatible with Django 1.10. Thanks to Mikalai Radchuk and Paul J Stevens for developing this, and to Tim Graham for reviewing and additional Django core assistance.

#### `{% include_block %}` tag for improved StreamField template inclusion

In previous releases, the standard way of rendering the HTML content of a StreamField was through a simple variable template tag, such as `{{ page.body }}`. This had the drawback that any templates used in the StreamField rendering would not inherit variables from the parent template's context, such as `page` and `request`. To address this, a new template tag `{% include_block page.body %}` has been introduced as the new recommended way of outputting Streamfield content - this replicates the behaviour of Django's `{% include %}` tag, passing on the full template context by default. For full documentation, see *Template rendering*. This feature was developed by Matt Westcott, and additionally ported to Jinja2 (see: *Jinja2 template support*) by Mikalai Radchuk.

### Unicode page slugs

Page URL slugs can now contain Unicode characters, when using Django 1.9 or above. This feature was developed by Behzad Nategh.

### Permission-limited explorer menu

The explorer sidebar menu now limits the displayed pages to the ones the logged-in user has permission for. For example, if a user has permission over the pages MegaCorp / Departments / Finance and MegaCorp / Departments / HR, then their menu will begin at “Departments”. This reduces the amount of “drilling-down” the user has to do, and is an initial step towards supporting fully independent sites on the same Wagtail installation. This feature was developed by Matt Westcott and Robert Rollins, California Institute of Technology.

### Minor features

- Image upload form in image chooser now performs client side validation so that the selected file is not lost in the submission (Jack Paine)
- oEmbed URL for audioBoom was updated (Janneke Janssen)
- Remember tree location in page chooser when switching between Internal / External / Email link (Matt Westcott)
- `FieldRowPanel` now creates equal-width columns automatically if `col*` classnames are not specified (Chris Rogers)
- Form builder now validates against multiple fields with the same name (Richard McMillan)
- The ‘choices’ field on the form builder no longer has a maximum length (Johannes Spielmann)
- Multiple ChooserBlocks inside a StreamField are now prefetched in bulk, for improved performance (Michael van Tellingen, Roel Bruggink, Matt Westcott)
- Added new EmailBlock and IntegerBlock (Oktay Altay)
- Added a new FloatBlock, DecimalBlock and a RegexBlock (Oktay Altay, Andy Babic)
- Wagtail version number is now shown on the settings menu (Chris Rogers)
- Added a system check to validate that fields listed in `search_fields` are defined on the model (Josh Schneier)
- Added formal APIs for customising the display of StructBlock forms within the page editor - see [Custom editing interfaces for StructBlock](#) (Matt Westcott)
- `wagtailforms.models.AbstractEmailForm` now supports multiple email recipients (Serafeim Papastefanos)
- Added ability to delete users through Settings -> Users (Vincent Audebert; thanks also to Ludolf Takens and Tobias Schmidt for alternative implementations)
- Page previews now pass additional HTTP headers, to simulate the page being viewed by the logged-in user and avoid clashes with middleware (Robert Rollins)
- Added back buttons to page delete and unpublish confirmation screens (Matt Westcott)
- Recognise Flickr embed URLs using HTTPS (Danielle Madeley)
- Success message when publishing a page now correctly respects custom URLs defined on the specific page class (Chris Darko)
- Required blocks inside StreamField are now indicated with asterisks (Stephen Rice)

## Bug fixes

- Email templates and document uploader now support custom `STATICFILES_STORAGE` (Jonny Scholes)
- Removed alignment options (deprecated in HTML and not rendered by Wagtail) from `TableBlock` context menu (Moritz Pfeiffer)
- Fixed incorrect CSS path on `ModelAdmin`’s “choose a parent page” view
- Prevent empty redirect by overnormalisation
- “Remove link” button in rich text editor didn’t trigger “edit” event, leading to the change to sometimes not be persisted (Matt Westcott)
- `RichText` values can now be correctly evaluated as booleans (Mike Dingjan, Bertrand Bordage)
- `wagtailforms` no longer assumes an `.html` extension when determining the landing page template filename (kaku-lukia)
- Fixed styling glitch on bi-colour icon + text buttons in Chrome (Janneke Janssen)
- `StreamField` can now be used in an `InlinePanel` (Gagaro)
- `StreamField` block renderings using templates no longer undergo double escaping when using Jinja2 (Aymeric Augustin)
- `RichText` objects no longer undergo double escaping when using Jinja2 (Aymeric Augustin, Matt Westcott)
- Saving a page by pressing enter key no longer triggers a “Changes may not be saved message” (Sean Muck, Matt Westcott)
- `RoutablePageMixin` no longer breaks in the presence of instance-only attributes such as those generated by `FileFields` (Fábio Macêdo Mendes)
- The `--schema-only` flag on `update_index` no longer expects an argument (Karl Hobley)
- Added file handling to support custom user add/edit forms with images/files (Eraldo Energy)
- Placeholder text in `modeladmin` search now uses the correct template variable (Adriaan Tijsseling)
- Fixed bad SQL syntax for updating URL paths on Microsoft SQL Server (Jesse Legg)
- Added workaround for Django 1.10 bug <https://code.djangoproject.com/ticket/27037> causing forms with file upload fields to fail validation (Matt Westcott)

## Upgrade considerations

### Form builder `FormField` models require a migration

There are some changes in the `wagtailforms.models.AbstractFormField` model:

- The `choices` field has been changed from a `CharField` to a `TextField`, to allow it to be of unlimited length;
- The help text for the `to_address` field has been changed: it now gives more information on how to specify multiple addresses.

These changes require migration. If you are using the `wagtailforms` module in your project, you will need to run `python manage.py makemigrations` and `python manage.py migrate` after upgrading, in order to apply changes to your form page models.

### TagSearchable needs removing from custom image / document model migrations

The mixin class `wagtail.wagtailadmin.taggable.TagSearchable`, used internally by image and document models, has been deprecated. If you are using custom image or document models in your project, the migration(s) which created them will contain frozen references to `wagtail.wagtailadmin.taggable.TagSearchable`, which must now be removed. The line:

```
import wagtail.wagtailadmin.taggable
```

should be replaced by:

```
import wagtail.wagtailsearch.index
```

and the line:

```
bases=(models.Model, wagtail.wagtailadmin.taggable.TagSearchable),
```

should be updated to:

```
bases=(models.Model, wagtail.wagtailsearch.index.Indexed),
```

### render and render\_basic methods on StreamField blocks now accept a context keyword argument

The `render` and `render_basic` methods on `wagtail.wagtailcore.blocks.Block` have been updated to accept an optional `context` keyword argument, a template context to use when rendering the block. If you have defined any custom StreamField blocks that override either of these methods, the method signature now needs to be updated to include this keyword argument:

```
class MyBlock(Block):

    def render(self, value):
        ...

    def render_basic(self, value):
        ...
```

should now become:

```
class MyBlock(Block):

    def render(self, value, context=None):
        ...

    def render_basic(self, value, context=None):
        ...
```

## 1.8.49 Wagtail 1.5.3 release notes

- *What's changed*



## What's changed

### Bug fixes

- Pin html5lib to version 0.999999 to prevent breakage caused by internal API changes (Liam Brenner)

## 1.8.50 Wagtail 1.5.2 release notes

- *What's new*

## What's new

### Bug fixes

- Fixed regression in 1.5.1 on editing external links (Stephen Rice)

## 1.8.51 Wagtail 1.5.1 release notes

- *What's new*

## What's new

### Bug fixes

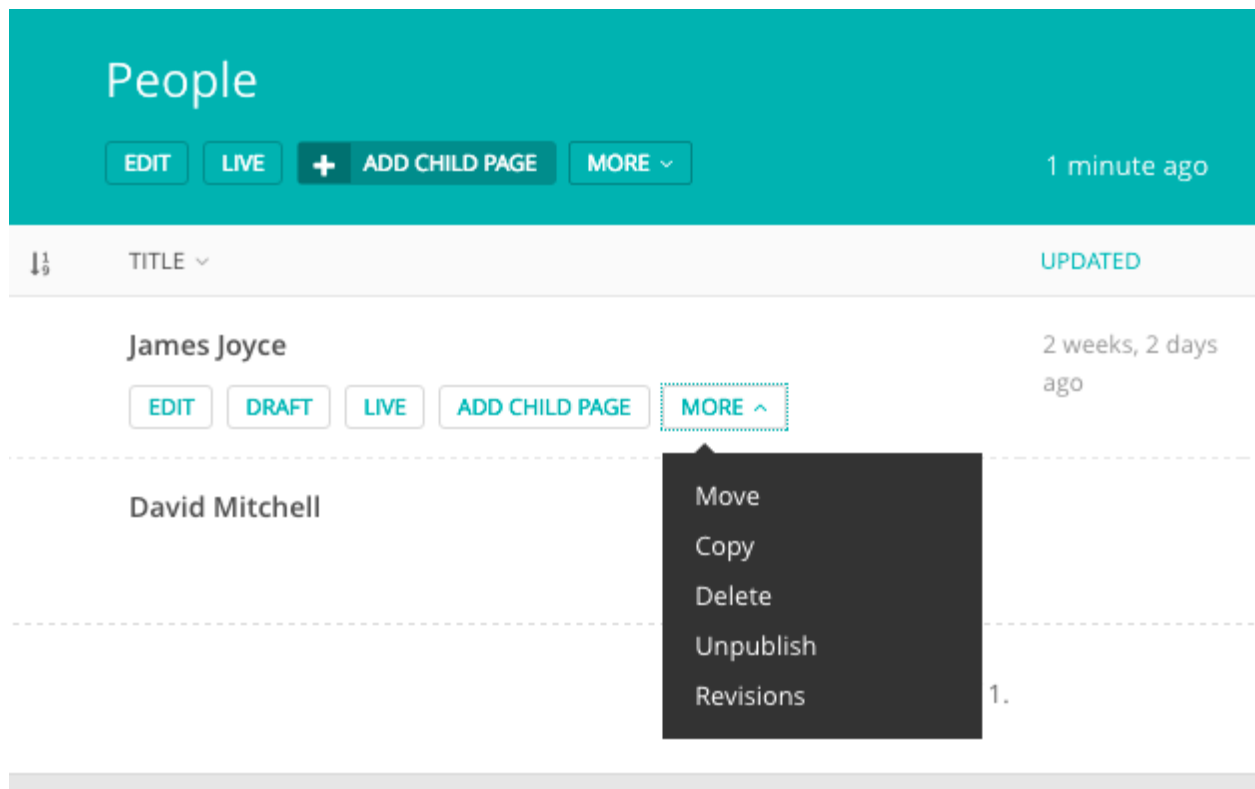
- When editing a document link in rich text, the document ID is no longer erroneously interpreted as a page ID (Stephen Rice)
- Removing embedded media from rich text by mouse click action now gets correctly registered as a change to the field (Loic Teixeira)
- Rich text editor is no longer broken in InlinePanels (Matt Westcott, Gagaro)
- Rich text editor is no longer broken in settings (Matt Westcott)
- Link tooltip now shows correct urls for newly inserted document links (Matt Westcott)
- Now page chooser (in a rich text editor) opens up at the link's parent page, rather than at the page itself (Matt Westcott)
- Reverted fix for explorer menu scrolling with page content, as it blocked access to menus that exceed screen height
- Image listing in the image chooser no longer becomes unpaginated after an invalid upload form submission (Stephen Rice)
- Confirmation message on the ModelAdmin delete view no longer errors if the model's string representation depends on the primary key (Yannick Chabbert)
- Applied correct translation tags for 'permanent' / 'temporary' labels on redirects (Matt Westcott)

## 1.8.52 Wagtail 1.5 release notes

- *What's new*
- *Upgrade considerations*

### What's new

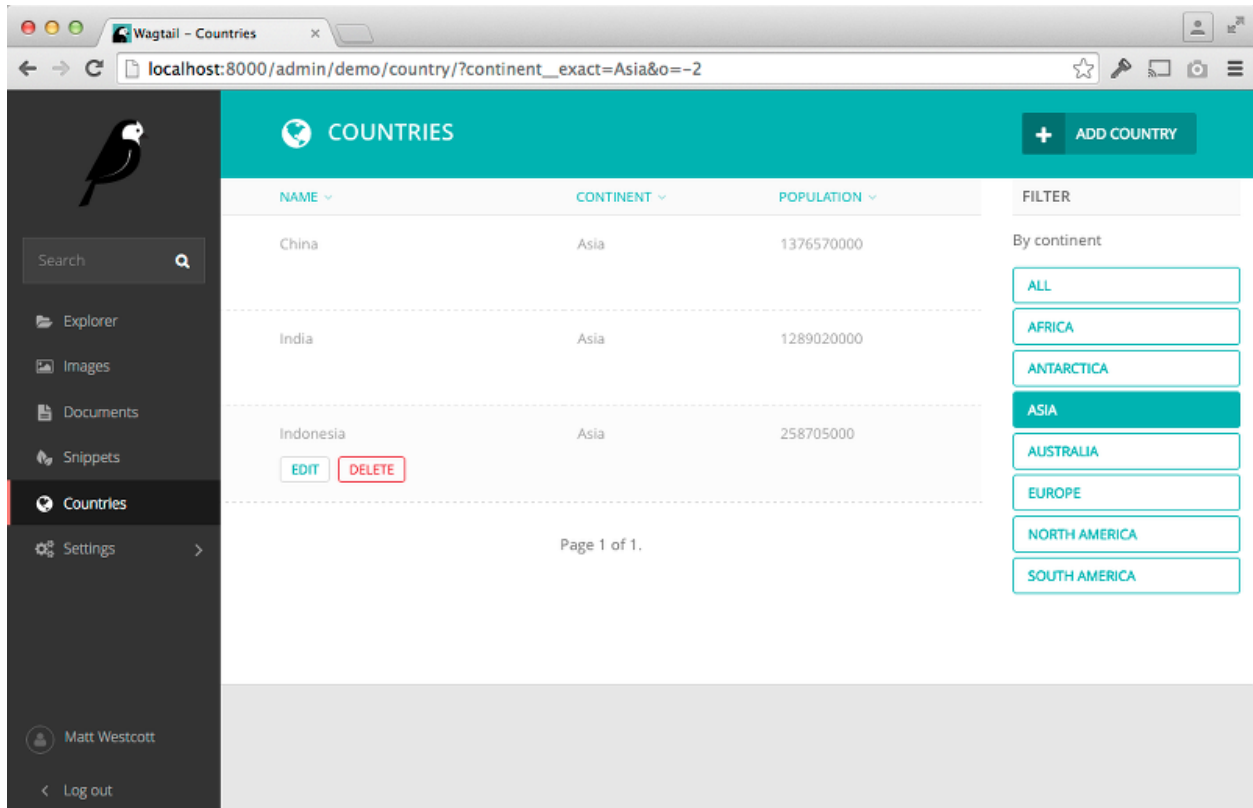
#### Reorganised page explorer actions



The action buttons on the page explorer have been reorganised to reduce clutter, and lesser-used actions have been moved to a “More” dropdown. A new hook `register_page_listing_buttons` has been added for adding custom action buttons to the page explorer.

### ModelAdmin

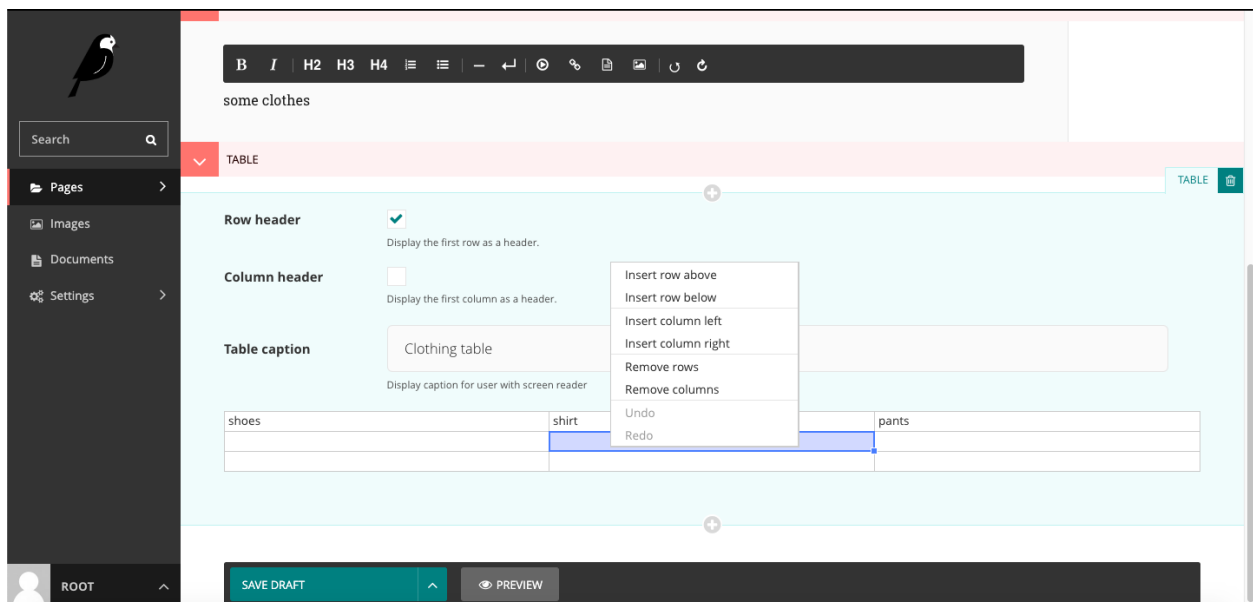
Wagtail now includes an app `wagtail.contrib.modeladmin` (previously available separately as the `wagtailmodeladmin` package) which allows you to configure arbitrary Django models to be listed, added and edited through the Wagtail admin.



See [ModelAdmin](#) for full documentation. This feature was developed by Andy Babic.

## TableBlock

TableBlock, a new StreamField block type for editing table-based content, is now available through the `wagtail.contrib.table_block` module.



See [TableBlock](#) for documentation. This feature was developed by Moritz Pfeiffer, David Seddon and Brad Busenius.

### Improved link handling in rich text

The user experience around inserting, editing and removing links inside rich text areas has been greatly improved: link destinations are shown as tooltips, and existing links can be edited as well as unlinked. This feature was developed by Loic Teixeira.

### Improvements to the “Image serve view”

#### *Dynamic image serve view*

This view, which is used for requesting image thumbnails from an external app, has had some improvements made to it in this release.

- A “*redirect*” *action* has been added which will redirect the user to where the resized image is hosted rather than serving it from the app. This may be beneficial for performance if the images are hosted externally (eg, S3)
- It now takes an optional extra path component which can be used for appending a filename to the end of the URL
- The key is now configurable on the view so you don’t have to use your project’s `SECRET_KEY`
- It’s been refactored into a class based view and you can now create multiple serve views with different image models and/or keys
- It now supports *serving image files using django-sendfile* (Thanks to Yannick Chabbert for implementing this)

### Minor features

- Password reset email now reminds the user of their username (Matt Westcott)
- Added *jinja2 support* for the `settings` template tag (Tim Heap)
- Added ‘revisions’ action to pages list (Roel Bruggink)
- Added a hook *insert\_global\_admin\_js* for inserting custom JavaScript throughout the admin backend (Tom Dyson)
- Recognise instagram embed URLs with `www` prefix (Matt Westcott)
- The type of the `search_fields` attribute on Page models (and other searchable models) has changed from a tuple to a list (see upgrade consideration below) (Tim Heap)
- Use *PasswordChangeForm* when user changes their password, requiring the user to enter their current password (Matthijs Melissen)
- Highlight current day in date picker (Jonas Lergell)
- Eliminated the deprecated `register.assignment_tag` on Django 1.9 (Josh Schneier)
- Increased size of Save button on site settings (Liam Brenner)
- Optimised `Site.find_for_request` to only perform one database query (Matthew Downey)
- Notification messages on creating / editing sites now include the site name if specified (Chris Rogers)
- Added `--schema-only` option to `update_index` management command
- Added meaningful default icons to `StreamField` blocks (Benjamin Bach)
- Added title text to action buttons in the page explorer (Liam Brenner)

- Changed project template to explicitly import development settings via `settings.dev` (Tomas Olander)
- Improved L10N and I18N for revisions list (Roel Bruggink)
- The multiple image uploader now displays details of server errors (Nigel Fletton)
- Added `WAGTAIL_APPEND_SLASH` setting to determine whether page URLs end in a trailing slash - see [Append Slash](#) (Andrew Tork Baker)
- Added auto resizing text field, richtext field, and snippet chooser to styleguide (Liam Brenner)
- Support field widget media inside `StreamBlock` blocks (Karl Hobley)
- Spinner was added to Save button on site settings (Liam Brenner)
- Added success message after logout from Admin (Liam Brenner)
- Added `get_upload_to` method to `AbstractRendition` which, when overridden, allows control over where image renditions are stored (Rob Moggach and Matt Westcott)
- Added a mechanism to customise the add / edit user forms for custom user models - see [Custom user models](#) (Nigel Fletton)
- Added internal provision for swapping in alternative rich text editors (Karl Hobley)

## Bug fixes

- The currently selected day is now highlighted only in the correct month in date pickers (Jonas Lergell)
- Fixed crash when an image without a source file was resized with the “dynamic serve view”
- Registered settings admin menu items now show active correctly (Matthew Downey)
- Direct usage of `Document` model replaced with `get_document_model` function in `wagtail.contrib.wagtailmedusa` and in `wagtail.contrib.wagtailapi`
- Failures on sending moderation notification emails now produce a warning, rather than crashing the admin page outright (Matt Fozard)
- All admin forms that could potentially include file upload fields now specify `multipart/form-data` where appropriate (Tim Heap)
- REM units in `Wagtailuserbar` caused incorrect spacing (Vincent Audebert)
- Explorer menu no longer scrolls with page content (Vincent Audebert)
- `decorate_urlpatterns` now uses `functools.update_wrapper` to keep view names and docstrings (Mario César)
- `StreamField` block controls are no longer hidden by the `StreamField` menu when prepending a new block (Vincent Audebert)
- Removed invalid use of `__` alias that prevented strings getting picked up for translation (Juha Yrjölä)
- [Routable pages](#) without a main view no longer raise a `TypeError` (Bojan Mihelac)
- Fixed `UnicodeEncodeError` in `wagtailforms` when downloading a CSV for a form containing non-ASCII field labels on Python 2 (Mikalai Radchuk)
- Server errors during search indexing on creating / updating / deleting a model are now logged, rather than causing the overall operation to fail (Karl Hobley)
- Objects are now correctly removed from search indexes on deletion (Karl Hobley)

### Upgrade considerations

#### Buttons in admin now require `class="button"`

The Wagtail admin CSS has been refactored for maintainability, and buttons now require an explicit `button` class. (Previously, the styles were applied on all inputs of type `"submit"`, `"reset"` or `"button"`.) If you have created any apps that extend the Wagtail admin with new views / templates, you will need to add this class to all buttons.

#### The `search_fields` attribute on models should now be set to a list

On searchable models (eg, `Page` or custom `Image` models) the `search_fields` attribute should now be a list instead of a tuple.

For example, the following `Page` model:

```
class MyPage(Page):
    ...

    search_fields = Page.search_fields + (
        indexed.SearchField('body'),
    )
```

Should be changed to:

```
class MyPage(Page):
    ...

    search_fields = Page.search_fields + [
        indexed.SearchField('body'),
    ]
```

To ease the burden on third-party modules, adding tuples to `Page.search_fields` will still work. But this backwards-compatibility fix will be removed in Wagtail 1.7.

#### Elasticsearch backend now defaults to verifying SSL certs

Previously, if you used the Elasticsearch backend, configured with the `URLS` property like:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.wagtailsearch.backends.elasticsearch',
        'URLS': ['https://example.com/'],
    }
}
```

Elasticsearch would not be configured to verify SSL certificates for HTTPS URLs. This has been changed so that SSL certificates are verified for HTTPS connections by default.

If you need the old behaviour back, where SSL certificates are not verified for your HTTPS connection, you can configure the Elasticsearch backend with the `HOSTS` option, like so:

```
WAGTAILSEARCH_BACKENDS = {
    'default': {
        'BACKEND': 'wagtail.wagtailsearch.backends.elasticsearch',
```

(continues on next page)

(continued from previous page)

```

    'HOSTS': [{
        'host': 'example.com'
        'use_ssl': True,
        'verify_certs': False,
    }],
}

```

See the [Elasticsearch-py documentation](#) for more configuration options.

### Project template now imports `settings.dev` explicitly

In previous releases, the project template's `settings/__init__.py` file was set up to import the development settings (`settings/dev.py`), so that these would be picked up as the default (i.e. whenever a settings module was not specified explicitly). However, in some setups this meant that the development settings were being inadvertently imported in production mode.

For this reason, the import in `settings/__init__.py` has now been removed, and commands must now specify `myproject.settings.dev` or `myproject.settings.production` as appropriate; the supporting scripts (such as `manage.py`) have been updated accordingly. As this is a change to the project template, existing projects are not affected; however, if you have any common scripts or configuration files that rely on importing `myproject.settings` as the settings module, these will need to be updated in order to work on projects created under Wagtail 1.5.

## 1.8.53 Wagtail 1.4.6 release notes

- *What's changed*

### What's changed

#### Bug fixes

- Pin `html5lib` to version 0.999999 to prevent breakage caused by internal API changes (Liam Brenner)

## 1.8.54 Wagtail 1.4.5 release notes

- *What's changed*

### What's changed

#### Bug fixes

- Paste / drag operations done entirely with the mouse are now correctly picked up as edits within the rich text editor (Matt Fozard)

- Logic for cancelling the “unsaved changes” check on form submission has been fixed to work cross-browser (Stephen Rice)
- The “unsaved changes” confirmation was erroneously shown on IE / Firefox when previewing a page with validation errors (Matt Westcott)
- The up / down / delete controls on the “Promoted search results” form no longer trigger a form submission (Matt Westcott)
- Opening preview window no longer performs user-agent sniffing, and now works correctly on IE11 (Matt Westcott)
- Tree paths are now correctly assigned when previewing a newly-created page underneath a parent with deleted children (Matt Westcott)
- Added `BASE_URL` setting back to project template
- Clearing the search box in the page chooser now returns the user to the browse view (Matt Westcott)
- The above fix also fixed an issue where Internet Explorer got stuck in the search view upon opening the page chooser (Matt Westcott)

### 1.8.55 Wagtail 1.4.4 release notes

- *What's changed*

#### What's changed

##### Translations

- New translation for Slovenian (Mitja Pagon)

##### Bug fixes

- The `wagtailuserbar` template tag now gracefully handles situations where the `request` object is not in the template context (Matt Westcott)
- Meta classes on `StreamField` blocks now handle multiple inheritance correctly (Tim Heap)
- Now user can upload images / documents only into permitted collection from choosers
- Keyboard shortcuts for save / preview on the page editor no longer incorrectly trigger the “unsaved changes” message (Jack Paine / Matt Westcott)
- Redirects no longer fail when both a site-specific and generic redirect exist for the same URL path (Nick Smith, João Luiz Lorencetti)
- Wagtail now checks that `Group` is registered with the Django admin before unregistering it (Jason Morrison)
- Previewing inaccessible pages no longer fails with `ALLOWED_HOSTS = [ '*' ]` (Robert Rollins)
- The submit button ‘spinner’ no longer activates if the form has client-side validation errors (Jack Paine, Matt Westcott)
- Overriding `MESSAGE_TAGS` in project settings no longer causes messages in the Wagtail admin to lose their styling (Tim Heap)



- Border added around explorer menu to stop it blending in with StreamField block listing; also fixes invisible explorer menu in Firefox 46 (Alex Gleason)

### 1.8.56 Wagtail 1.4.3 release notes

- *What's changed*

#### What's changed

#### Bug fixes

- Fixed regression introduced in 1.4.2 which caused Wagtail to query the database during a system check (Tim Heap)

### 1.8.57 Wagtail 1.4.2 release notes

- *What's changed*

#### What's changed

#### Bug fixes

- Streamfields no longer break on validation error
- Number of validation errors in each tab in the editor is now correctly reported again
- Userbar now opens on devices with both touch and mouse (Josh Barr)
- `wagtail.wagtailadmin.wagtail_hooks` no longer calls `static` during app load, so you can use `ManifestStaticFilesStorage` without calling the `collectstatic` command
- Fixed crash on page save when a custom Page edit handler has been specified using the `edit_handler` attribute (Tim Heap)

### 1.8.58 Wagtail 1.4.1 release notes

- *What's changed*

#### What's changed

#### Bug fixes

- Fixed erroneous rendering of up arrow icons (Rob Moorman)

## 1.8.59 Wagtail 1.4 release notes

- *What's new*
- *Upgrade considerations*

Wagtail 1.4 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 8 months).

### What's new

#### Page revision management



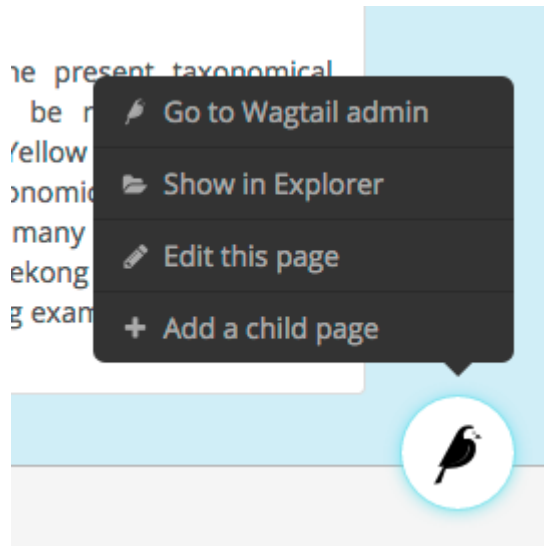
From the page editing interface, editors can now access a list of previous revisions of the page, and preview or roll back to any earlier revision.

#### Collections for image / document organisation

Images and documents can now be organised into collections, set up by administrators through the Settings -> Collections menu item. User permissions can be set either globally (on the 'Root' collection) or on individual collections, allowing different user groups to keep their media items separated. Thank you to the University of South Wales for sponsoring this feature.

#### Redesigned userbar

The Wagtail userbar (which gives editors quick access to the admin from the site frontend) has been redesigned, and no longer depends on an iframe. The new design allows more flexibility in label text, more configurable positioning to avoid overlapping with site navigation, and adds a new "Show in Explorer" option. This feature was developed by Thomas Winter and Gareth Price.



### Protection against unsaved changes

The page editor interface now produces a warning if the user attempts to navigate away while there are unsaved changes.

### Multiple document uploader

The “Add a document” interface now supports uploading multiple documents at once, in the same way as uploading images.

### Custom document models

The `Document` model can now be overridden using the new `WAGTAILDOCS_DOCUMENT_MODEL` setting. This works in the same way that `WAGTAILIMAGES_IMAGE_MODEL` works for `Image`.

### Removed django-compressor dependency

Wagtail no longer depends on the [django-compressor](#) library. While we highly recommend compressing and bundling the CSS and Javascript on your sites, using `django-compressor` places additional installation and configuration demands on the developer, so this has now been made optional.

### Minor features

- The page search interface now searches all fields instead of just the title (Kait Crawford)
- Snippets now support a custom `edit_handler` property; this can be used to implement a tabbed interface, for example. See [Customising the tabbed interface](#) (Mikalai Radchuk)
- Date/time pickers now respect the locale’s ‘first day of week’ setting (Peter Quade)
- Refactored the way forms are constructed for the page editor, to allow custom forms to be used

- Notification message on publish now indicates whether the page is being published now or scheduled for publication in future (Chris Rogers)
- Server errors when uploading images / documents through the chooser modal are now reported back to the user (Nigel Fletton)
- Added a hook `insert_global_admin_css` for inserting custom CSS throughout the admin backend (Tom Dyson)
- Added a hook `construct_explorer_page_queryset` for customising the set of pages displayed in the page explorer
- Page models now perform field validation, including testing slugs for uniqueness within a parent page, at the model level on saving
- Page slugs are now auto-generated at the model level on page creation if one has not been specified explicitly
- The `Page` model now has two new methods `get_site()` and `get_url_parts()` to aid with customising the page URL generation logic
- Upgraded jQuery to 2.2.1 (Charlie Choiniere)
- Multiple homepage summary items (`construct_homepage_summary_items` hook) now better vertically spaced (Nicolas Kuttler)
- Email notifications can now be sent in HTML format. See [Email Notifications](#) (Mike Dingjan)
- `StreamBlock` now has provision for throwing non-field-specific validation errors
- Wagtail now works with Willow 0.3, which supports auto-correcting the orientation of images based on EXIF data
- New translations for Hungarian, Swedish (Sweden) and Turkish

### Bug fixes

- Custom page managers no longer raise an error when used on an abstract model
- Wagtail's migrations are now all reversible (Benjamin Bach)
- Deleting a page content type now preserves existing pages as basic `Page` instances, to prevent tree corruption
- The `Page.path` field is now explicitly given the "C" collation on PostgreSQL to prevent tree ordering issues when using a database created with the Slovak locale
- Wagtail's compiled static assets are now put into the correct directory on Windows (Aarni Koskela)
- `ChooserBlock` now correctly handles models with primary keys other than `id` (alexpilot11)
- Fixed typo in Wistia oEmbed pattern (Josh Hurd)
- Added more accurate help text for the Administrator flag on user accounts (Matt Fozard)
- Tags added on the multiple image uploader are now saved correctly
- Documents created by a user are no longer deleted when the user is deleted
- Fixed a crash in `RedirectMiddleware` when a middleware class before `SiteMiddleware` returns a response (Josh Schneier)
- Fixed error retrieving the moderator list on pages that are covered by multiple moderator permission records (Matt Fozard)
- Ordering pages in the explorer by reverse 'last updated' time now puts pages with no revisions at the top
- `WagtailTestUtils` now works correctly on custom user models without a `username` field (Adam Bolfik)

- Logging in to the admin as a user with valid credentials but no admin access permission now displays an error message, rather than rejecting the user silently
- StreamBlock HTML rendering now handles non-ASCII characters correctly on Python 2 (Mikalai Radchuk)
- Fixed a bug preventing pages with a `OneToOneField` from being copied (Liam Brenner)
- SASS compilation errors during Wagtail development no longer cause exit of Gulp process, instead throws error to console and continues (Thomas Winter)
- Explorer page listing now uses specific page models, so that custom URL schemes defined on Page subclasses are respected
- Made settings menu clickable again in Firefox 46.0a2 (Juha Kujala)
- User management index view no longer assumes the presence of `username`, `first_name`, `last_name` and `email` fields on the user model (Eirik Krogstad)

## Upgrade considerations

### Removal of django-compressor

As Wagtail no longer installs django-compressor automatically as a dependency, you may need to make changes to your site's configuration when upgrading. If your project is actively using django-compressor (that is, your site templates contain `{% compress %}` tags), you should ensure that your project's requirements explicitly include django-compressor, rather than indirectly relying on Wagtail to install it. If you are not actively using django-compressor on your site, you should update your settings file to remove the line `'compressor' from INSTALLED_APPS`, and remove `'compressor.finders.CompressorFinder' from STATICFILES_FINDERS`.

### Page models now enforce field validation

In previous releases, field validation on Page models was only applied at the form level, meaning that creating pages directly at the model level would bypass validation. For example, if `NewsPage` is a Page model with a required `body` field, then code such as:

```
news_page = NewsPage(title="Hello", slug='hello')
parent_page = NewsIndex.objects.get()
parent_page.add_child(instance=news_page)
```

would create a page that does not comply with the validation rules. This is no longer possible, as validation is now enforced at the model level on `save()` and `save_revision()`; as a result, code that creates pages programmatically (such as unit tests, and import scripts) may need to be updated to ensure that it creates valid pages.

## 1.8.60 Wagtail 1.3.1 release notes

- *What's changed*

### What's changed

## Bug fixes

- Applied workaround for failing `wagtailimages` migration on Django 1.8.8 / 1.9.1 with Postgres (see [Django issue #26034](#))

## 1.8.61 Wagtail 1.3 release notes

- *What's new*
- *Upgrade considerations*

## What's new

### Django 1.9 support

Wagtail is now compatible with Django 1.9.

### Indexing fields across relations in Elasticsearch

Fields on related objects can now be indexed in Elasticsearch using the new `indexed.RelatedFields` declaration type:

```
class Book(models.Model, index.Indexed):
    ...

    search_fields = [
        index.SearchField('title'),
        index.FilterField('published_date'),

        index.RelatedFields('author', [
            index.SearchField('name'),
            index.FilterField('date_of_birth'),
        ]),
    ]

# Search books where their author was born after 1950
# Both the book title and the authors name will be searched
>>> Book.objects.filter(author__date_of_birth__gt=date(1950, 1, 1)).search("Hello")
```

See: *index.RelatedFields*

### Cross-linked admin search UI

The search interface in the Wagtail admin now includes a toolbar to quickly switch between different search types - pages, images, documents and users. A new *register\_admin\_search\_area* hook is provided for adding new search types to this toolbar.

## Minor features

- Added `WagtailPageTests`, a helper module to simplify writing tests for Wagtail sites. See [Testing your Wagtail site](#)
- Added system checks to check the `subpage_types` and `parent_page_types` attributes of page models
- Added `WAGTAIL_PASSWORD_RESET_ENABLED` setting to allow password resets to be disabled independently of the password management interface (John Draper)
- Submit for moderation notification emails now include the editor name (Denis Voskvitsov)
- Updated fonts for more comprehensive Unicode support
- Added `.alt` attribute to image renditions
- The default `src`, `width`, `height` and `alt` attributes can now be overridden by attributes passed to the `{% image %}` tag
- Added keyboard shortcuts for preview and save in the page editor
- Added Page methods `can_exist_under`, `can_create_at`, `can_move_to` for customising page type business rules
- `wagtailadmin.utils.send_mail` now passes extra keyword arguments to Django's `send_mail` function (Matthew Downey)
- `page_unpublish` signal is now fired for each page that was unpublished by a call to `PageQuerySet.unpublish()`
- Add `get_upload_to` method to `AbstractImage`, to allow overriding the default image upload path (Ben Emery)
- Notification emails are now sent per user (Matthew Downey)
- Added the ability to override the default manager on Page models
- Added an optional human-friendly `site_name` field to sites (Timo Rieber)
- Added a system check to warn developers who use a custom Wagtail build but forgot to build the admin css
- Added success message after updating image from the image upload view (Christian Peters)
- Added a `request.is_preview` variable for templates to distinguish between previewing and live (Denis Voskvitsov)
- 'Pages' link on site stats dashboard now links to the site homepage when only one site exists, rather than the root level
- Added support for chaining multiple image operations on the `{% image %}` tag (Christian Peters)
- New translations for Arabic, Latvian and Slovak

## Bug fixes

- Images and page revisions created by a user are no longer deleted when the user is deleted (Rich Atkinson)
- HTTP cache purge now works again on Python 2 (Mitchel Cabuloy)
- Locked pages can no longer be unpublished (Alex Bridge)
- Site records now implement `get_by_natural_key`
- Creating pages at the root level (and any other instances of the base Page model) now properly respects the `parent_page_types` setting

- Settings menu now opens correctly from the page editor and styleguide views
- `subpage_types / parent_page_types` business rules are now enforced when moving pages
- Multi-word tags on images and documents are now correctly preserved as a single tag (LKozlowski)
- Changed verbose names to start with lower case where necessary (Maris Serzans)
- Invalid images no longer crash the image listing (Maris Serzans)
- `MenuItem.url` parameter can now take a lazy URL (Adon Metcalfe, rayrayndwiga)
- Added missing translation tag to InlinePanel 'Add' button (jnns)
- Added missing translation tag to 'Signing in...' button text (Eugene MechanisM)
- Restored correct highlighting behaviour of rich text toolbar buttons
- Rendering a missing image through ImageChooserBlock no longer breaks the whole page (Christian Peters)
- Filtering by popular tag in the image chooser now works when using the database search backend

## Upgrade considerations

### Jinja2 template tag modules have changed location

Due to a change in the way template tags are imported in Django 1.9, it has been necessary to move the Jinja2 template tag modules from “templatetags” to a new location, “jinja2tags”. The correct configuration settings to enable Jinja2 templates are now as follows:

```
TEMPLATES = [  
    # ...  
    {  
        'BACKEND': 'django.template.backends.jinja2.Jinja2',  
        'APP_DIRS': True,  
        'OPTIONS': {  
            'extensions': [  
                'wagtail.core.jinja2tags.core',  
                'wagtail.wagtailadmin.jinja2tags.userbar',  
                'wagtail.wagtailimages.jinja2tags.images',  
            ],  
        },  
    },  
]
```

See: *Jinja2 template support*

### ContentType-returning methods in wagtailcore are deprecated

The following internal functions and methods in `wagtail.wagtailcore.models`, which return a list of `ContentType` objects, have been deprecated. Any uses of these in your code should be replaced by the corresponding new function which returns a list of model classes instead:

- `get_page_types()` - replaced by `get_page_models()`
- `Page.clean_subpage_types()` - replaced by `Page.clean_subpage_models()`
- `Page.clean_parent_page_types()` - replaced by `Page.clean_parent_page_models()`
- `Page.allowed_parent_page_types()` - replaced by `Page.allowed_parent_page_models()`



- `Page.allowed_subpage_types()` - replaced by `Page.allowed_subpage_models()`

In addition, note that these methods now return page types that are marked as `is_creatable = False`, including the base `Page` class. (Abstract models are not included, as before.)

## 1.8.62 Wagtail 1.2 release notes

- *What's new*
- *Upgrade considerations*

### What's new

#### Site settings module

Wagtail now includes a contrib module (previously available as the `wagtailsettings` package) to allow administrators to edit site-specific settings.

See: *Site settings*

#### Jinja2 support

The core `templatetags` (`pageurl`, `slugurl`, `image`, `richtext` and `wagtailuserbar`) are now compatible with Jinja2 so it's now possible to use Jinja2 as the template engine for your Wagtail site.

Note that the variable name `self` is reserved in Jinja2, and so Wagtail now provides alternative variable names where `self` was previously used: `page` to refer to page objects, and `value` to refer to `StreamField` blocks. All code examples in this documentation have now been updated to use the new variable names, for compatibility with Jinja2; however, users of the default Django template engine can continue to use `self`.

See: *Jinja2 template support*

#### Site-specific redirects

You can now create redirects for a particular site using the admin interface.

#### Search API improvements

Wagtail's image and document models now provide a `search` method on their `QuerySets`, making it easy to perform searches on filtered data sets. In addition, search methods now accept two new keyword arguments:

- `operator`, to determine whether multiple search terms will be treated as 'or' (any term may match) or 'and' (all terms must match);
- `order_by_relevance`, set to `True` (the default) to order by relevance or `False` to preserve the `QuerySet`'s original ordering.

See: *Searching*

### max\_num and min\_num parameters on inline panels

Inline panels now accept the optional parameters `max_num` and `min_num`, to specify the maximum / minimum number of child items that must exist in order for the page to be valid.

See: *Inline Panels and Model Clusters*

### get\_context on StreamField blocks

StreamField blocks now *provide a `get_context` method* that can be overridden to pass additional variables to the block's template.

### Browsable API

The Wagtail API now incorporates the browsable front-end provided by Django REST Framework. Note that this must be enabled by adding `'rest_framework'` to your project's `INSTALLED_APPS` setting.

### Python 3.5 support

Wagtail now supports Python 3.5 when run in conjunction with Django 1.8.6 or later.

### Minor features

- WagtailRedirectMiddleware can now ignore the query string if there is no redirect that exactly matches it
- Order of URL parameters now ignored by redirect middleware
- Added SQL Server compatibility to image migration
- Added `class` attributes to Wagtail rich text editor buttons to aid custom styling
- Simplified `body_class` in default homepage template
- `page_published` signal now called with the revision object that was published
- Added a favicon to the admin interface, customisable by overriding the `branding_favicon` block (see *Custom branding*).
- Added spinner animations to long-running form submissions
- The `EMBEDLY_KEY` setting has been renamed to `WAGTAILEMBEDS_EMBEDLY_KEY`
- StreamField blocks are now added automatically, without showing the block types menu, if only one block type exists (Alex Gleason)
- The `first_published_at` and `latest_revision_created_at` fields on page models are now available as filter fields on search queries
- Wagtail admin now standardises on a single thumbnail image size, to reduce the overhead of creating multiple renditions
- Rich text fields now strip out HTML comments
- Page editor form now sets `enctype="multipart/form-data"` as appropriate, allowing FileField to be used on page models (Petr Vacha)

- Explorer navigation menu on a completely empty page tree now takes you to the root level, rather than doing nothing
- Added animation and fixed display issues when focusing a rich text field (Alex Gleason)
- Added a system check to warn if Pillow is compiled without JPEG / PNG support
- Page chooser now prevents users from selecting the root node where this would be invalid
- New translations for Dutch (Netherlands), Georgian, Swedish and Turkish (Turkey)

## Bug fixes

- Page slugs are no longer auto-updated from the page title if the page is already published
- Deleting a page permission from the groups admin UI does not immediately submit the form
- Wagtail userbar is shown on pages that do not pass a `page` variable to the template (e.g. because they override the `serve` method)
- `request.site` now set correctly on page preview when the page is not in the default site
- Project template no longer raises a deprecation warning (Maximilian Stauss)
- `PageManager.sibling_of(page)` and `PageManager.not_sibling_of(page)` now default to inclusive (i.e. page is considered a sibling of itself), for consistency with other sibling methods
- The “view live” button displayed after publishing a page now correctly reflects any changes made to the page slug (Ryan Pineo)
- API endpoints now accept and ignore the `_` query parameter used by jQuery for cache-busting
- Page slugs are no longer cut off when Unicode characters are expanded into multiple characters (Sævar Öfjörð Magnússon)
- Searching a specific page model while filtering it by either ID or tree position no longer raises an error (Ashia Zawaduk)
- Scrolling an over-long explorer menu no longer causes white background to show through (Alex Gleason)
- Removed jitter when hovering over StreamField blocks (Alex Gleason)
- Non-ASCII email addresses no longer throw errors when generating Gravatar URLs (Denis Voskvitsov, Kyle Stratis)
- Dropdown for `ForeignKey`s are now styled consistently (Ashia Zawaduk)
- Date choosers now appear on top of StreamField menus (Sergey Nikitin)
- Fixed a migration error that was raised when block-updating from 0.8 to 1.1+
- `Page.copy()` no longer breaks on models with a `ClusterTaggableManager` or `ManyToManyField`
- Validation errors when inserting an embed into a rich text area are now reported back to the editor

## Upgrade considerations

**`PageManager.sibling_of(page)` and `PageManager.not_sibling_of(page)` have changed behaviour**

In previous versions of Wagtail, the `sibling_of` and `not_sibling_of` methods behaved inconsistently depending on whether they were called on a manager (e.g. `Page.objects.sibling_of(some_page)`

or `EventPage.objects.sibling_of(some_page))` or a `QuerySet` (e.g. `Page.objects.all().sibling_of(some_page)` or `EventPage.objects.live().sibling_of(some_page)`).

Previously, the manager methods behaved as *exclusive* by default; that is, they did not count the passed-in page object as a sibling of itself:

```
>>> event_1 = EventPage.objects.get(title='Event 1')
>>> EventPage.objects.sibling_of(event_1)
[<EventPage: Event 2>] # OLD behaviour: Event 1 is not considered a sibling of itself
```

This has now been changed to be *inclusive* by default; that is, the page is counted as a sibling of itself:

```
>>> event_1 = EventPage.objects.get(title='Event 1')
>>> EventPage.objects.sibling_of(event_1)
[<EventPage: Event 1>, <EventPage: Event 2>] # NEW behaviour: Event 1 is considered
↳ a sibling of itself
```

If the call to `sibling_of` or `not_sibling_of` is chained after another `QuerySet` method - such as `all()`, `filter()` or `live()` - behaviour is unchanged; this behaves as *inclusive*, as it did in previous versions:

```
>>> event_1 = EventPage.objects.get(title='Event 1')
>>> EventPage.objects.all().sibling_of(event_1)
[<EventPage: Event 1>, <EventPage: Event 2>] # OLD and NEW behaviour
```

If your project includes queries that rely on the old (exclusive) behaviour, this behaviour can be restored by adding the keyword argument `inclusive=False`:

```
>>> event_1 = EventPage.objects.get(title='Event 1')
>>> EventPage.objects.sibling_of(event_1, inclusive=False)
[<EventPage: Event 2>] # passing inclusive=False restores the OLD behaviour
```

### Image.search and Document.search methods are deprecated

The `Image.search` and `Document.search` methods have been deprecated in favour of the new `QuerySet`-based search mechanism - see [Searching Images, Documents and custom models](#). Code using the old search methods should be updated to search on `QuerySets` instead; for example:

```
Image.search("Hello", filters={'uploaded_by_user': user})
```

can be rewritten as:

```
Image.objects.filter(uploaded_by_user=user).search("Hello")
```

### Wagtail API requires adding `rest_framework` to `INSTALLED_APPS`

If you have the Wagtail API (`wagtail.contrib.wagtailapi`) enabled, you must now add `'rest_framework'` to your project's `INSTALLED_APPS` setting. In the current version the API will continue to function without this app, but the browsable front-end will not be available; this ability will be dropped in a future release.

**Page.get\_latest\_revision\_as\_page() now returns live page object when there are no draft changes**

If you have any application code that makes direct updates to page data, at the model or database level, be aware that the way these edits are reflected in the page editor has changed.

Previously, the `get_latest_revision_as_page` method - used by the page editor to return the current page revision for editing - always retrieved data from the page's revision history. Now, it will only do so if the page has unpublished changes (i.e. the page is in `live + draft` state) - pages which have received no draft edits since being published will return the page's live data instead.

As a result, any changes made directly to a live page object will be immediately reflected in the editor without needing to update the latest revision record (but note, the old behaviour is still used for pages in `live + draft` state).

**1.8.63 Wagtail 1.1 release notes**

- *What's new*
- *Upgrade considerations*

**What's new****specific() method on PageQuerySet**

Usually, an operation that retrieves a `QuerySet` of pages (such as `homepage.get_children()`) will return them as basic `Page` instances, which only include the core page data such as title. The `specific()` method (e.g. `homepage.get_children().specific()`) now allows them to be retrieved as their most specific type, using the minimum number of queries.

**“Promoted search results” has moved into its own module**

Previously, this was implemented in `wagtailsearch` but now has been moved into a separate module: `wagtail.contrib.wagtailsearchpromotions`

**Atomic rebuilding of Elasticsearch indexes**

The Elasticsearch search backend now accepts an experimental `ATOMIC_REBUILD` flag which ensures that the existing search index continues to be available while the `update_index` task is running. See [ATOMIC\\_REBUILD](#).

**The wagtailapi module now uses Django REST Framework**

The `wagtailapi` module is now built on Django REST Framework and it now also has a [library of serialisers](#) that you can use in your own REST Framework based APIs. No user-facing changes have been made.

We hope to support more REST framework features, such as a browsable API, in future releases.

### Permissions fixes in the admin interface

A number of inconsistencies around permissions in the admin interface were fixed in this release:

- Removed all permissions for “User profile” (not used)
- Removed “delete” permission for Images and documents (not used)
- Users can now access images and documents when they only have the “change” permission (previously required “add” permission as well)
- Permissions for Users now taken from custom user model, if set (previously always used permissions on Django’s builtin User model)
- Groups and Users now respond consistently to their respective “add”, “change” and “delete” permissions

### Searchable snippets

Snippets that inherit from `wagtail.wagtailsearch.index.Indexed` are now given a search box on the snippet chooser and listing pages. See [Making Snippets Searchable](#).

### Minor features

- Implemented deletion of form submissions
- Implemented pagination in the page chooser modal
- Changed `INSTALLED_APPS` in project template to list apps in precedence order
- The `{% image %}` tag now supports filters on the image variable, e.g. `{% image primary_img|default:secondary_img width=500 %}`
- Moved the style guide menu item into the Settings sub-menu
- Search backends can now be specified by module (e.g. `wagtail.wagtailsearch.backends.elasticsearch`), rather than a specific class (`wagtail.wagtailsearch.backends.elasticsearch.ElasticSearch`)
- Added `descendant_of` filter to the API
- Added optional `directory` argument to “wagtail start” command
- Non-superusers can now view/edit/delete sites if they have the correct permissions
- Image file size is now stored in the database, to avoid unnecessary filesystem lookups
- Page URL lookups hit the cache/database less often
- Updated URLs within the admin backend to use namespaces
- The `update_index` task now indexes objects in batches of 1000, to indicate progress and avoid excessive memory use
- Added database indexes on `PageRevision` and `Image` to improve performance on large sites
- Search in page chooser now uses Wagtail’s search framework, to order results by relevance
- `PageChooserPanel` now supports passing a list (or tuple) of accepted page types
- The `snippet_type` parameter of `SnippetChooserPanel` can now be omitted, or passed as a model name string rather than a model class

- Added aliases for the `self` template variable to accommodate Jinja as a templating engine: `page` for pages, `field_panel` for field panels / edit handlers, and `value` for blocks
- Added signposting text to the explorer to steer editors away from creating pages at the root level unless they are setting up new sites
- “Clear choice” and “Edit this page” buttons are no longer shown on the page field of the group page permissions form
- Altered styling of stream controls to be more like all other buttons
- Added ability to mark page models as not available for creation using the flag `is_creatable`; pages that are abstract Django models are automatically made non-creatable
- New translations for Norwegian Bokmål and Icelandic

## Bug fixes

- Text areas in the non-default tab of the page editor now resize to the correct height
- Tabs in “insert link” modal in the rich text editor no longer disappear (Tim Heap)
- H2 elements in rich text fields were accidentally given a `click()` binding when put inside a collapsible multi field panel
- The `wagtailimages` module is now compatible with remote storage backends that do not allow reopening closed files
- Search no longer crashes when auto-indexing a model that doesn’t have an `id` field
- The `wagtailfrontendcache` module’s HTTP backend has been rewritten to reliably direct requests to the configured cache hostname
- Resizing single pixel images with the “fill” filter no longer raises “ZeroDivisionError” or “tile cannot extend outside image”
- The QuerySet returned from `search` operations when using the database search backend now correctly preserves additional properties of the original query, such as `prefetch_related` / `select_related`
- Responses from the external image URL generator are correctly marked as streaming and will no longer fail when used with Django’s cache middleware
- Page copy now works with pages that use multiple inheritance
- Form builder pages now pick up template variables defined in the `get_context` method
- When copying a page, IDs of child objects within page revision records were not remapped to the new objects; this would cause those objects to be lost from the original page when editing the new one
- Newly added redirects now take effect on all sites, rather than just the site that the Wagtail admin backend was accessed through
- Add user form no longer throws a hard error on validation failure

## Upgrade considerations

### “Promoted search results” no longer in `wagtailsearch`

This feature has moved into a contrib module so is no longer enabled by default.

To re-enable it, add `wagtail.contrib.wagtailsearchpromotions` to your `INSTALLED_APPS`:

```
INSTALLED_APPS = [
    ...

    'wagtail.contrib.wagtailsearchpromotions',
    ...
]
```

If you have references to the `wagtail.wagtailsearch.models.EditorPick` model in your project, you will need to update these to point to the `wagtail.contrib.wagtailsearchpromotions.models.SearchPromotion` model instead.

If you created your project using the `wagtail start` command with Wagtail 1.0, you will probably have references to this model in the `search/views.py` file.

### **`is_abstract` flag on page models has been replaced by `is_creatable`**

Previous versions of Wagtail provided an undocumented `is_abstract` flag on page models - not to be confused with Django's abstract Meta flag - to indicate that it should not be included in the list of available page types for creation. (Typically this would be used on model classes that were designed to be subclassed to create new page types, rather than used directly.) To avoid confusion with Django's distinct concept of abstract models, this has now been replaced by a new flag, `is_creatable`.

If you have used `is_abstract = True` on any of your models, you should now change this to `is_creatable = False`.

It is not necessary to include this flag if the model is abstract in the Django sense (i.e. it has `abstract = True` in the model's Meta class), since it would never be valid to create pages of that type.

## 1.8.64 Wagtail 1.0 release notes

- *What's changed*
- *Upgrade considerations*

### **What's changed**

#### **StreamField - a field type for freeform content**

StreamField provides an editing model for freeform content such as blog posts and news stories, allowing diverse content types such as text, images, headings, video and more specialised types such as maps and charts to be mixed in any order. See *Freeform page content using StreamField*.

#### **Wagtail API - A RESTful API for your Wagtail site**

When installed, the new Wagtail API module provides a RESTful web API to your Wagtail site. You can use this for accessing your raw field content for your sites pages, images and documents in JSON format.



## MySQL support

Wagtail now officially supports MySQL as a database backend.

## Django 1.8 support

Wagtail now officially supports running under Django 1.8.

## Vanilla project template

The built-in project template is more like the Django built-in one with several Wagtail-specific additions. It includes bare minimum settings and two apps (home and search).

## Minor changes

- Dropped Django 1.6 support
- Dropped Python 2.6 and 3.2 support
- Dropped Elasticsearch 0.90.x support
- Removed dependency on `libsass`
- Users without usernames can now be created and edited in the admin interface
- Added new translations for Croatian and Finnish

## Core

- The Page model now records the date/time that a page was first published, as the field `first_published_at`
- Increased the maximum length of a page slug from 50 to 255 characters
- Added hooks `register_rich_text_embed_handler` and `register_rich_text_link_handler` for customising link / embed handling within rich text fields
- Page URL paths can now be longer than 255 characters

## Admin

### UI

- Improvements to the layout of the left-hand menu footer
- Menu items of custom apps are now highlighted when being used
- Added thousands separator for counters on dashboard
- Added contextual links to admin notification messages
- When copying pages, it is now possible to specify a place to copy to
- Added pagination to the snippets listing and chooser
- Page / document / image / snippet choosers now include a link to edit the chosen item
- Plain text fields in the page editor now use auto-expanding text areas

- Added “Add child page” button to admin userbar
- Added update notifications (See: [Wagtail update notifications](#))

### Page editor

- JavaScript includes in the admin backend have been moved to the HTML header, to accommodate form widgets that render inline scripts that depend on libraries such as jQuery
- The external link chooser in rich text areas now accepts URLs of the form ‘/some/local/path’, to allow linking to non-Wagtail-controlled URLs within the local site
- Bare text entered in rich text areas is now automatically wrapped in a paragraph element

### Edit handlers API

- `FieldPanel` now accepts an optional `widget` parameter to override the field’s default form widget
- Page model fields without a `FieldPanel` are no longer displayed in the form
- No longer need to specify the base model on `InlinePanel` definitions
- Page classes can specify an `edit_handler` property to override the default Content / Promote / Settings tabbed interface. See [Customising the tabbed interface](#).

### Other admin changes

- SCSS files in `wagtailadmin` now use absolute imports, to permit overriding by user stylesheets
- Removed the dependency on `LOGIN_URL` and `LOGIN_REDIRECT_URL` settings
- Password reset view names namespaced to `wagtailadmin`
- Removed the need to add permission check on admin views (now automated)
- Reversing `django.contrib.auth.admin.login` will no longer lead to Wagtails login view (making it easier to have frontend login views)
- Added cache-control headers to all admin views. This allows Varnish/Squid/CDN to run on vanilla settings in front of a Wagtail site
- Date / time pickers now consistently use times without seconds, to prevent JavaScript behaviour glitches when focusing / unfocusing fields
- Added hook `construct_homepage_summary_items` for customising the site summary panel on the admin homepage
- Renamed the `construct_wagtail_edit_bird` hook to `construct_wagtail_userbar`
- ‘static’ template tags are now used throughout the admin templates, in place of `STATIC_URL`

### Docs

- Support for `django-sendfile` added
- Documents now served with correct mime-type
- Support for `If-Modified-Since` HTTP header

### Search

- Search view accepts “page” GET parameter in line with pagination

- Added `AUTO_UPDATE` flag to search backend settings to enable/disable automatically updating the search index on model changes

## Routable pages

- Added a new decorator-based syntax for `RoutablePage`, compatible with Django 1.8

## Bug fixes

- The `document_served` signal now correctly passes the `Document` class as `sender` and the document as `instance`
- Image edit page no longer throws `OSError` when the original image is missing
- Collapsible blocks stay open on any form error
- Document upload modal no longer switches tabs on form errors
- `with_metaclass` is now imported from Django's bundled copy of the `six` library, to avoid errors on Mac OS X from an outdated system copy of the library being imported

## Upgrade considerations

### Support for older Django/Python/Elasticsearch versions dropped

This release drops support for Django 1.6, Python 2.6/3.2 and Elasticsearch 0.90.x. Please make sure these are updated before upgrading.

If you are upgrading from Elasticsearch 0.90.x, you may also need to update the `elasticsearch` pip package to a version greater than 1.0 as well.

### Wagtail version upgrade notifications are enabled by default

Starting from Wagtail 1.0, the admin dashboard will (for admin users only) perform a check to see if newer releases are available. This also provides the Wagtail team with the hostname of your Wagtail site. If you'd rather not receive update notifications, or if you'd like your site to remain unknown, you can disable it by adding this line to your settings file:

```
WAGTAIL_ENABLE_UPDATE_CHECK = False
```

### InlinePanel definitions no longer need to specify the base model

In previous versions of Wagtail, inline child blocks on a page or snippet were defined using a declaration like:

```
InlinePanel(HomePage, 'carousel_items', label="Carousel items")
```

It is no longer necessary to pass the base model as a parameter, so this declaration should be changed to:

```
InlinePanel('carousel_items', label="Carousel items")
```

The old format is now deprecated; all existing `InlinePanel` declarations should be updated to the new format.

### Custom image models should now set the `admin_form_fields` attribute

Django 1.8 now requires that all the fields in a `ModelForm` must be defined in its `Meta.fields` attribute.

As Wagtail uses Django's `ModelForm` for creating image model forms, we've added a new attribute called `admin_form_fields` that should be set to a tuple of field names on the image model.

See *Custom image models* for an example.

### You no longer need `LOGIN_URL` and `LOGIN_REDIRECT_URL` to point to Wagtail admin.

If you are upgrading from an older version of Wagtail, you probably want to remove these from your project settings.

Previously, these two settings needed to be set to `wagtailadmin_login` and `wagtailadmin_dashboard` respectively or Wagtail would become very tricky to log in to. This is no longer the case and Wagtail should work fine without them.

### `RoutablePage` now uses decorator syntax for defining views

In previous versions of Wagtail, page types that used the `RoutablePageMixin` had endpoints configured by setting their `subpage_urls` attribute to a list of urls with view names. This will not work on Django 1.8 as view names can no longer be passed into a url (see: <https://docs.djangoproject.com/en/stable/releases/1.8/#django-conf-urls-patterns>).

Wagtail 1.0 introduces a new syntax where each view function is annotated with a `@route` decorator - see *RoutablePageMixin*.

The old `subpage_urls` convention will continue to work on Django versions prior to 1.8, but this is now deprecated; all existing `RoutablePage` definitions should be updated to the decorator-based convention.

### Upgrading from the external `wagtailapi` module.

If you were previously using the external `wagtailapi` module (which has now become `wagtail.contrib.wagtailapi`). Please be aware of the following backwards-incompatible changes:

#### 1. Representation of foreign keys has changed

Foreign keys were previously represented by just the value of their primary key. For example:

```
"feed_image": 1
```

This has now been changed to add some meta information:

```
"feed_image": {
    "id": 1,
    "meta": {
        "type": "wagtailimages.Image",
        "detail_url": "http://api.example.com/api/v1/images/1/"
    }
}
```

#### 2. On the page detail view, the “parent” field has been moved out of meta

Previously, there was a “parent” field in the “meta” section on the page detail view:

```
{
  "id": 10,
  "meta": {
    "type": "demo.BlogPage",
    "parent": 2
  },
  ...
}
```

This has now been moved to the top level. Also, the above change to how foreign keys are represented applies to this field too:

```
{
  "id": 10,
  "meta": {
    "type": "demo.BlogPage"
  },
  "parent": {
    "id": 2,
    "meta": {
      "type": "demo.BlogIndexPage"
    }
  },
  ...
}
```

### Celery no longer automatically used for sending notification emails

Previously, Wagtail would try to use Celery whenever the `django-celery` module was installed, even if Celery wasn't actually set up. This could cause a very hard to track down problem where notification emails would not be sent so this functionality has now been removed.

If you would like to keep using Celery for sending notification emails, have a look at: [django-celery-email](#)

### Login/Password reset views renamed

It was previously possible to reverse the Wagtail login view using `django.contrib.auth.views.login`. This is no longer possible. Update any references to `wagtailadmin_login`.

Password reset view name has changed from `password_reset` to `wagtailadmin_password_reset`.

### JavaScript includes in admin backend have been moved

To improve compatibility with third-party form widgets, pages within the Wagtail admin backend now output their JavaScript includes in the HTML header, rather than at the end of the page. If your project extends the admin backend (through the `register_admin_menu_item` hook, for example) you will need to ensure that all associated JavaScript code runs correctly from the new location. In particular, any code that accesses HTML elements will need to be contained in an 'onload' handler (e.g. jQuery's `$(document).ready()`).

### EditHandler internal API has changed

While it is not an official Wagtail API, it has been possible for Wagtail site implementers to define their own `EditHandler` subclasses for use in panel definitions, to customise the behaviour of the page / snippet editing forms. If you have made use of this facility, you will need to update your custom `EditHandlers`, as this mechanism has been refactored (to allow `EditHandler` classes to keep a persistent reference to their corresponding model). If you have only used Wagtail's built-in panel types (`FieldPanel`, `InlinePanel`, `PageChooserPanel` and so on), you are unaffected by this change.

Previously, functions like `FieldPanel` acted as 'factory' functions, where a call such as `FieldPanel('title')` constructed and returned an `EditHandler` subclass tailored to work on a 'title' field. These functions now return an object with a `bind_to_model` method instead; the `EditHandler` subclass can be obtained by calling this with the model class as a parameter. As a guide to updating your custom `EditHandler` code, you may wish to refer to [the relevant change to the Wagtail codebase](#).

### chooser\_panel templates are obsolete

If you have added your own custom admin views to the Wagtail admin (e.g. through the `register_admin_urls` hook), you may have used one of the following template includes to incorporate a chooser element for pages, documents, images or snippets into your forms:

- `wagtailadmin/edit_handlers/chooser_panel.html`
- `wagtailadmin/edit_handlers/page_chooser_panel.html`
- `wagtaildocs/edit_handlers/document_chooser_panel.html`
- `wagtailimages/edit_handlers/image_chooser_panel.html`
- `wagtailsnippets/edit_handlers/snippet_chooser_panel.html`

All of these templates are now deprecated. Wagtail now provides a set of Django form widgets for this purpose - `AdminPageChooser`, `AdminDocumentChooser`, `AdminImageChooser` and `AdminSnippetChooser` - which can be used in place of the `HiddenInput` widget that these form fields were previously using. The field can then be rendered using the regular `wagtailadmin/shared/field.html` or `wagtailadmin/shared/field_as_li.html` template.

### document\_served signal arguments have changed

Previously, the `document_served` signal (which is fired whenever a user downloads a document) passed the document instance as the sender. This has now been changed to correspond the behaviour of Django's built-in signals; sender is now the `Document` class, and the document instance is passed as the argument instance. Any existing signal listeners that expect to receive the document instance in sender must now be updated to check the instance argument instead.

### Custom image models must specify an admin\_form\_fields list

Previously, the forms for creating and editing images followed Django's default behaviour of showing all fields defined on the model; this would include any custom fields specific to your project that you defined by subclassing `AbstractImage` and setting `WAGTAILIMAGES_IMAGE_MODEL`. This behaviour is risky as it may lead to fields being unintentionally exposed to the user, and so Django has deprecated this, for removal in Django 1.8. Accordingly, if you create your own custom subclass of `AbstractImage`, you must now provide an `admin_form_fields` list property, listing the fields that should appear on the image creation / editing form - for example:

```
from wagtail.wagtailimages.models import AbstractImage, Image

class MyImage(AbstractImage):
    photographer = models.CharField(max_length=255)
    has_legal_approval = models.BooleanField()

    admin_form_fields = Image.admin_form_fields + ['photographer']
```

### **construct\_wagtail\_edit\_bird hook has been renamed**

Previously you could customize the Wagtail userbar using the `construct_wagtail_edit_bird` hook. The hook has been renamed to `construct_wagtail_userbar`.

The old hook is now deprecated; all existing `construct_wagtail_edit_bird` declarations should be updated to the new hook.

### **IMAGE\_COMPRESSION\_QUALITY setting has been renamed**

The `IMAGE_COMPRESSION_QUALITY` setting, which determines the quality of saved JPEG images as a value from 1 to 100, has been renamed to `WAGTAILIMAGES_JPEG_QUALITY`. If you have used this setting, please update your settings file accordingly.

## **1.8.65 Wagtail 0.8.10 release notes**

- *What's changed*

### **What's changed**

#### **Bug fixes**

- When copying a page, IDs of child objects within page revision records were not remapped to the new objects; this would cause those objects to be lost from the original page when editing the new one
- Search no longer crashes when auto-indexing a model that doesn't have an id field (Scot Hacker)
- Resizing single pixel images with the "fill" filter no longer raises "ZeroDivisionError" or "tile cannot extend outside image"

## **1.8.66 Wagtail 0.8.8 release notes**

- *What's changed*

## What's changed

### Bug fixes

- Form builder no longer raises a `TypeError` when submitting unchecked boolean field
- Image upload form no longer breaks when using 10 thousand separators
- Multiple image uploader now escapes HTML in filenames
- Retrieving an individual item from a sliced `BaseSearchResults` object now properly takes the slice offset into account
- Removed dependency on `unicodcsv` which fixes a crash on Python 3
- Submitting unicode text in form builder form no longer crashes with `UnicodeEncodeError` on Python 2
- Creating a proxy model from a `Page` class no longer crashes in the system check
- Unrecognised embed URLs passed to the `|embed` filter no longer cause the whole page to crash with an `EmbedNotFoundException`
- Underscores no longer get stripped from page slugs

### 1.8.67 Wagtail 0.8.7 release notes

- *What's changed*

## What's changed

### Bug fixes

- `wagtailfrontendcodecache` no longer tries to purge pages that are not in a site
- The contents of `<div>` elements in the rich text editor were not being whitelisted
- Due to the above issue, embeds/images in a rich text field would sometimes be saved into the database in their editor representation
- `RoutablePage` now prevents `subpage_urls` from being defined as a property, which would cause a memory leak
- Added validation to prevent pages being created with only whitespace characters in their title fields
- Users are no longer logged out on changing password when `SessionAuthenticationMiddleware` (added in Django 1.7) is in use
- Added a workaround for a Python / Django issue that prevented documents with certain non-ASCII filenames from being served

### 1.8.68 Wagtail 0.8.6 release notes



- *What's new*
- *Upgrade considerations*

## What's new

### Minor features

- Translations updated, including new translations for Czech, Italian and Japanese
- The “fixtree” command can now delete orphaned pages

### Bug fixes

- django-taggit library updated to 0.12.3, to fix a bug with migrations on SQLite on Django 1.7.2 and above (<https://github.com/alex/django-taggit/issues/285>)
- Fixed a bug that caused children of a deleted page to not be deleted if they had a different type

## Upgrade considerations

### Orphaned pages may need deleting

This release fixes a bug with page deletion introduced in 0.8, where deleting a page with child pages will result in those child pages being left behind in the database (unless the child pages are of the same type as the parent). This may cause errors later on when creating new pages in the same position. To identify and delete these orphaned pages, it is recommended that you run the following command (from the project root) after upgrading to 0.8.6:

```
$ ./manage.py fixtree
```

This will output a list of any orphaned pages found, and request confirmation before deleting them.

Since this now makes `fixtree` an interactive command, a `./manage.py fixtree --noinput` option has been added to restore the previous non-interactive behaviour. With this option enabled, deleting orphaned pages is always skipped.

## 1.8.69 Wagtail 0.8.5 release notes

- *What's new*

## What's new

### Bug fixes

- On adding a new page, the available page types are ordered by the displayed verbose name
- Active admin submenus were not properly closed when activating another

- `get_sitemap_urls` is now called on the specific page class so it can now be overridden
- (Firefox and IE) Fixed preview window hanging and not refocusing when “Preview” button is clicked again
- Storage backends that return raw `ContentFile` objects are now handled correctly when resizing images
- Punctuation characters are no longer stripped when performing search queries
- When adding tags where there were none before, it is now possible to save a single tag with multiple words in it
- `richtext` template tag no longer raises `TypeError` if `None` is passed into it
- Serving documents now uses a streaming HTTP response and will no longer break Django’s cache middleware
- User admin area no longer fails in the presence of negative user IDs (as used by `django-guardian`’s default settings)
- Password reset emails now use the `BASE_URL` setting for the reset URL
- `BASE_URL` is now included in the project template’s default settings file

### 1.8.70 Wagtail 0.8.4 release notes

- *What’s new*

#### What’s new

#### Bug fixes

- It is no longer possible to have the explorer and settings menu open at the same time
- Page IDs in page revisions were not updated on page copy, causing subsequent edits to be committed to the original page instead
- Copying a page now creates a new page revision, ensuring that changes to the title/slug are correctly reflected in the editor (and also ensuring that the user performing the copy is logged)
- Prevent a race condition when creating `Filter` objects
- On adding a new page, the available page types are ordered by the displayed verbose name

### 1.8.71 Wagtail 0.8.3 release notes

- *What’s new*
- *Upgrade considerations*

#### What’s new

#### Bug fixes

- Added missing jQuery UI sprite files, causing `collectstatic` to throw errors (most reported on Heroku)

- Page system check for on\_delete actions of ForeignKeys was throwing false positives when page class descends from an abstract class (Alejandro Giacometti)
- Page system check for on\_delete actions of ForeignKeys now only raises warnings, not errors
- Fixed a regression where form builder submissions containing a number field would fail with a JSON serialisation error
- Resizing an image with a focal point equal to the image size would result in a divide-by-zero error
- Focal point indicator would sometimes be positioned incorrectly for small or thin images
- Fix: Focal point chooser background colour changed to grey to make working with transparent images easier
- Elasticsearch configuration now supports specifying HTTP authentication parameters as part of the URL, and defaults to ports 80 (HTTP) and 443 (HTTPS) if port number not specified
- Fixed a TypeError when previewing pages that use RoutablePageMixin
- Rendering image with missing file in rich text no longer crashes the entire page
- IOErrors thrown by underlying image libraries that are not reporting a missing image file are no longer caught
- Fix: Minimum Pillow version bumped to 2.6.1 to work around a crash when using images with transparency
- Fix: Images with transparency are now handled better when being used in feature detection

## Upgrade considerations

### Port number must be specified when running Elasticsearch on port 9200

In previous versions, an Elasticsearch connection URL in `WAGTAILSEARCH_BACKENDS` without an explicit port number (e.g. `http://localhost/`) would be treated as port 9200 (the Elasticsearch default) whereas the correct behaviour would be to use the default http/https port of 80/443. This behaviour has now been fixed, so sites running Elasticsearch on port 9200 must now specify this explicitly - e.g. `http://localhost:9200`. (Projects using the default settings, or the settings given in the Wagtail documentation, are unaffected.)

## 1.8.72 Wagtail 0.8.1 release notes

- *What's new*

### What's new

### Bug fixes

- Fixed a regression where images would fail to save when feature detection is active

## 1.8.73 Wagtail 0.8 release notes

- *What's new*
- *Upgrade considerations*

Wagtail 0.8 is designated a Long Term Support (LTS) release. Long Term Support releases will continue to receive maintenance updates as necessary to address security and data-loss related issues, up until the next LTS release (typically a period of 8 months).

### What's new

#### Minor features

- Page operations (creation, publishing, copying etc) are now logged via Python's logging framework; to configure this, add a logger entry for 'wagtail' or 'wagtail.core' to the LOGGING setup in your settings file.
- The save button on the page edit page now redirects the user back to the edit page instead of the explorer
- Signal handlers for `wagtail.wagtailsearch` and `wagtail.contrib.wagtailfrontendcache` are now automatically registered when using Django 1.7 or above.
- Added a Django 1.7 system check to ensure that foreign keys from Page models are set to `on_delete=SET_NULL`, to prevent inadvertent (and tree-breaking) page deletions
- Improved error reporting on image upload, including ability to set a maximum file size via a new setting `WAGTAILIMAGES_MAX_UPLOAD_SIZE`
- The external image URL generator now keeps persistent image renditions, rather than regenerating them on each request, so it no longer requires a front-end cache.
- Added Dutch translation

#### Bug fixes

- Replaced references of `.username` with `.get_username()` on users for better custom user model support
- Unpinned dependency versions for six and requests to help prevent dependency conflicts
- Fixed `TypeError` when getting embed HTML with oembed on Python 3
- Made HTML whitelisting in rich text fields more robust at catching disallowed URL schemes such as `jav\tascript:`
- `created_at` timestamps on page revisions were not being preserved on page copy, causing revisions to get out of sequence
- When copying pages recursively, revisions of sub-pages were being copied regardless of the `copy_revisions` flag
- Updated the migration dependencies within the project template to ensure that Wagtail's own migrations consistently apply first
- The cache of site root paths is now cleared when a site is deleted
- Search indexing now prevents pages from being indexed multiple times, as both the base Page model and the specific subclass
- Search indexing now avoids trying to index abstract models
- Fixed references to "username" in login form help text for better custom user model support
- Later items in a model's `search_field` list now consistently override earlier items, allowing subclasses to redefine rules from the parent
- Image uploader now accepts JPEG images that PIL reports as being in MPO format

- Multiple checkbox fields on form-builder forms did not correctly save multiple values
- Editing a page’s slug and saving it without publishing could sometimes cause the URL paths of child pages to be corrupted
- `latest_revision_created_at` was being cleared on page publish, causing the page to drop to the bottom of explorer listings
- Searches on `partial_match` fields were wrongly applying prefix analysis to the search query as well as the document (causing e.g. a query for “water” to match against “wagtail”)

## Upgrade considerations

### Corrupted URL paths may need fixing

This release fixes a bug in Wagtail 0.7 where editing a parent page’s slug could cause the URL paths of child pages to become corrupted. To ensure that your database does not contain any corrupted URL paths, it is recommended that you run `./manage.py set_url_paths` after upgrading.

### Automatic registration of signal handlers (Django 1.7+)

Signal handlers for the `wagtailsearch` core app and `wagtailfrontendcache` contrib app are automatically registered when using Django 1.7. Calls to `register_signal_handlers` from your `urls.py` can be removed.

### Change to search API when using database backend

When using the database backend, calling `search` (either through `Page.objects.search()` or on the backend directly) will now return a `SearchResults` object rather than a Django `QuerySet` to make the database backend work more like the Elasticsearch backend.

This change shouldn’t affect most people as `SearchResults` behaves very similarly to `QuerySet`. But it may cause issues if you are calling `QuerySet` specific methods after calling `.search()`. Eg: `Page.objects.search("Hello").filter(foo="Bar")` (in this case, `.filter()` should be moved before `.search()` and it would work as before).

### Removal of `validate_image_format` from custom image model migrations (Django 1.7+)

If your project is running on Django 1.7, and you have defined a custom image model (by extending the `wagtailimages.AbstractImage` class), the migration that creates this model will probably have a reference to `wagtail.wagtailimages.utils.validators.validate_image_format`. This module has now been removed, which will cause `manage.py migrate` to fail with an `ImportError` (even if the migration has already been applied). You will need to edit the migration file to remove the line:

```
import wagtail.wagtailimages.utils.validators
```

and the `validators` attribute of the ‘file’ field - that is, the line:

```
('file', models.ImageField(upload_to=wagtail.wagtailimages.models.get_upload_to,
    width_field='width', height_field='height',
    validators=[wagtail.wagtailimages.utils.validators.validate_image_format],
    verbose_name='File')),
```

should become:

```
(‘file’, models.ImageField(upload_to=wagtail.wagtailimages.models.get_upload_to,
width_field=‘width’, height_field=‘height’, verbose_name=‘File’)),
```

## 1.8.74 Wagtail 0.7 release notes

- *What’s new*
- *Upgrade considerations*

### What’s new

#### New interface for choosing image focal point

##### Focal point (optional)


To define this image's most important region, drag a box over the image below. (Current focal point shown)




When editing images, users can now specify a ‘focal point’ region that cropped versions of the image will be centred on. Previously the focal point could only be set automatically, through image feature detection.

#### Groups and Sites administration interfaces

The main navigation menu has been reorganised, placing site configuration options in a ‘Settings’ submenu. This includes two new items, which were previously only available through the Django admin backend: ‘Groups’, for setting up user groups with a specific set of permissions, and ‘Sites’, for managing the list of sites served by this Wagtail instance.




Search 

Explorer


Images

Documents

Settings >



Log out

 **EDITING** Editors

**Name:** \*

**OBJECT PERMISSIONS**

| NAME         | ADD                                 | CHANGE                              | DELETE                              |
|--------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Document     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Image        | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Group        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| User         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| User profile | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |

**OTHER PERMISSIONS**

| NAME                     |                                     |
|--------------------------|-------------------------------------|
| Can access Wagtail admin | <input checked="" type="checkbox"/> |

## Page locking



Moderators and administrators now have the ability to lock a page, preventing further edits from being made to that page until it is unlocked again.

## Minor features

- The `content_type` template filter has been removed from the project template, as the same thing can be accomplished with `self.get_verbose_name|slugify`.
- Page copy operations now also copy the page revision history.
- Page models now support a `parent_page_types` property in addition to `subpage_types`, to restrict the types of page they can be created under.
- `register_snippet` can now be invoked as a decorator.
- The project template (used when running `wagtail start`) has been updated to Django 1.7.
- The ‘boost’ applied to the title field on searches has been reduced from 100 to 2.
- The `type` method of `PageQuerySet` (used to filter the `QuerySet` to a specific page type) now includes subclasses of the given page type.
- The `update_index` management command now updates all backends listed in `WAGTAILSEARCH_BACKENDS`, or a specific one passed on the command line, rather than just the default backend.
- The ‘fill’ image resize method now supports an additional parameter defining the closeness of the crop. See [Using images in templates](#)
- Added support for invalidating Cloudflare caches. See [Frontend cache invalidator](#)
- Pages in the explorer can now be ordered by last updated time.

## Bug fixes

- The ‘wagtail start’ command now works on Windows and other environments where the `django-admin.py` executable is not readily accessible.
- The external image URL generator no longer stores generated images in Django’s cache; this was an unintentional side-effect of setting cache control headers.
- The Elasticsearch backend can now search `QuerySets` that have been filtered with an ‘in’ clause of a non-list type (such as a `ValuesListQuerySet`).



- Logic around the `has_unpublished_changes` flag has been fixed, to prevent issues with the ‘View draft’ button failing to show in some cases.
- It is now easier to move pages to the beginning and end of their section
- Image rendering no longer creates erroneous duplicate Rendition records when the focal point is blank.

## Upgrade considerations

### Addition of `wagtailsites` app

The Sites administration interface is contained within a new app, `wagtailsites`. To enable this on an existing Wagtail project, add the line:

```
'wagtail.wagtailsites',
```

to the `INSTALLED_APPS` list in your project’s settings file.

### Title boost on search reduced to 2

Wagtail’s search interface applies a ‘boost’ value to give extra weighting to matches on the title field. The original boost value of 100 was found to be excessive, and in Wagtail 0.7 this has been reduced to 2. If you have used comparable boost values on other fields, to give them similar weighting to title, you may now wish to reduce these accordingly. See [Indexing](#).

### Addition of `locked` field to Page model

The page locking mechanism adds a `locked` field to `wagtailcore.Page`, defaulting to `False`. Any application code working with Page objects should be unaffected, but any code that creates page records using direct SQL, or within existing South migrations using South’s frozen ORM, will fail as this code will be unaware of the new database column. To fix a South migration that fails in this way, add the following line to the `'wagtailcore.page'` entry at the bottom of the migration file:

```
'locked': ('django.db.models.fields.BooleanField', [], {'default': 'False'}),
```

### Update to `focal_point_key` field on custom Rendition models

The `focal_point_key` field on `wagtailimages.Rendition` has been changed to `null=False`, to fix an issue with duplicate renditions being created. If you have defined a custom Rendition model in your project (by extending the `wagtailimages.AbstractRendition` class), you will need to apply a migration to make the corresponding change on your custom model. Unfortunately neither South nor Django 1.7’s migration system are able to generate this automatically - you will need to customise the migration produced by `./manage.py schemamigration / ./manage.py makemigrations`, using the `wagtailimages` migration as a guide:

- [https://github.com/wagtail/wagtail/blob/master/wagtail/wagtailimages/south\\_migrations/0004\\_auto\\_chg\\_field\\_rendition\\_focal\\_point\\_key.py](https://github.com/wagtail/wagtail/blob/master/wagtail/wagtailimages/south_migrations/0004_auto_chg_field_rendition_focal_point_key.py) (for South / Django 1.6)
- [https://github.com/wagtail/wagtail/blob/master/wagtail/wagtailimages/migrations/0004\\_make\\_focal\\_point\\_key\\_not\\_nullable.py](https://github.com/wagtail/wagtail/blob/master/wagtail/wagtailimages/migrations/0004_make_focal_point_key_not_nullable.py) (for Django 1.7)

## 1.8.75 Wagtail 0.6 release notes

- *What's new*
- *Upgrade considerations*
- *Deprecated features*

### What's new

#### Project template and start project command

Wagtail now has a basic project template built in to make starting new projects much easier.

To use it, install `wagtail` onto your machine and run `wagtail start project_name`.

#### Django 1.7 support

Wagtail can now be used with Django 1.7.

#### Minor features

- A new template tag has been added for reversing URLs inside routable pages. See [The routablepageurl template tag](#).
- `RoutablePage` can now be used as a mixin. See `wagtail.contrib.wagtailroutablepage.models.RoutablePageMixin`.
- `MenuItem`s can now have bundled JavaScript
- Added the `register_admin_menu_item` hook for registering menu items at startup. See [Hooks](#)
- Added a version indicator into the admin interface (hover over the wagtail to see it)
- Added Russian translation

#### Bug fixes

- Page URL generation now returns correct URLs for sites that have the main 'serve' view rooted somewhere other than '/'.
- Search results in the page chooser now respect the `page_type` parameter on `PageChooserPanel`.
- Rendition filenames are now prevented from going over 60 chars, even with a large `focal_point_key`.
- Child relations that are defined on a model's superclass (such as the base `Page` model) are now picked up correctly by the page editing form, page copy operations and the `replace_text` management command.
- Tags on images and documents are now committed to the search index immediately on saving.

## Upgrade considerations

### All features deprecated in 0.4 have been removed

See: *Deprecated features*

### Search signal handlers have been moved

If you have an import in your `urls.py` file like `from wagtail.wagtailsearch import register_signal_handlers`, this must now be changed to `from wagtail.wagtailsearch.signal_handlers import register_signal_handlers`

## Deprecated features

- The `wagtail.wagtailsearch.indexed` module has been renamed to `wagtail.wagtailsearch.index`

## 1.8.76 Wagtail 0.5 release notes

- *What's new*
- *Upgrade considerations*

## What's new

### Multiple image uploader

The image uploader UI has been improved to allow multiple images to be uploaded at once.

### Image feature detection

Wagtail can now apply face and feature detection on images using [OpenCV](#), and use this to intelligently crop images.

*Feature Detection*

### Using images outside Wagtail

In normal use, Wagtail will generate resized versions of images at the point that they are referenced on a template, which means that those images are not easily accessible for use outside of Wagtail, such as displaying them on external sites. Wagtail now provides a way to obtain URLs to your images, at any size.

*Dynamic image serve view*

### RoutablePage

A `RoutablePage` model has been added to allow embedding Django-style URL routing within a page.

*RoutablePageMixin*

### Usage stats for images, documents and snippets

It's now easier to find where a particular image, document or snippet is being used on your site.

Set the `WAGTAIL_USAGE_COUNT_ENABLED` setting to `True` and an icon will appear on the edit page showing you which pages they have been used on.

### Copy Page action

The explorer interface now offers the ability to copy pages, with or without subpages.

### Minor features

#### Core

- Hooks can now be defined using decorator syntax:

```
@hooks.register('construct_main_menu')
def construct_main_menu(request, menu_items):
    menu_items.append(
        MenuItem('Kittens!', '/kittens/', classnames='icon icon-
↪folder-inverse', order=1000)
    )
```

- The `lxml` library (used for whitelisting and rewriting of rich text fields) has been replaced with the pure-python `html5lib` library, to simplify installation.
- A `page_unpublished` signal has been added.

#### Admin

- Explorer nav now rendered separately and fetched with AJAX when needed.

This improves the general performance of the admin interface for large sites.

### Bug fixes

- Updates to tag fields are now properly committed to the database when publishing directly from the page edit interface.

## Upgrade considerations

### Urlconf entries for `/admin/images/`, `/admin/embeds/` etc need to be removed

If you created a Wagtail project prior to the release of Wagtail 0.3, it is likely to contain the following entries in its `urls.py`:

```
# TODO: some way of getting wagtailimages to register itself within_
↳wagtailadmin so that we
# don't have to define it separately here
url(r'^admin/images/', include(wagtailimages_urls)),
url(r'^admin/embeds/', include(wagtailembeds_urls)),
url(r'^admin/documents/', include(wagtaildocs_admin_urls)),
url(r'^admin/snippets/', include(wagtailsnippets_urls)),
url(r'^admin/search/', include(wagtailsearch_admin_urls)),
url(r'^admin/users/', include(wagtailusers_urls)),
url(r'^admin/redirects/', include(wagtailredirects_urls)),
```

These entries (and the corresponding from `wagtail.wagtail* import ...` lines) need to be removed from `urls.py`. (The entry for `/admin/` should be left in, however.)

Since Wagtail 0.3, the `wagtailadmin` module automatically takes care of registering these URL subpaths, so these entries are redundant, and these urlconf modules are not guaranteed to remain stable and backwards-compatible in future. Leaving these entries in place will now cause an `ImproperlyConfigured` exception to be thrown.

### New fields on Image and Rendition models

Several new fields have been added to the Image and Rendition models to support *Feature Detection*. These will be added to the database when you run `./manage.py migrate`. If you have defined a custom image model (by extending the `wagtailimages.AbstractImage` and `wagtailimages.AbstractRendition` classes and specifying `WAGTAILIMAGES_IMAGE_MODEL` in settings), the change needs to be applied to that model's database table too. Running the command:

```
$ ./manage.py schemamigration myapp --auto add_image_focal_point_fields
```

(with 'myapp' replaced with your app name) will generate the necessary migration file.

### South upgraded to 1.0

In preparation for Django 1.7 support in a future release, Wagtail now depends on South 1.0, and its migration files have been moved from `migrations` to `south_migrations`. Older versions of South will fail to find the migrations in the new location.

If your project's requirements file (most commonly `requirements.txt` or `requirements/base.txt`) references a specific older version of South, this must be updated to South 1.0.

## 1.8.77 Wagtail 0.4.1 release notes

### Bug fixes

- ElasticSearch backend now respects the backward-compatible URLs configuration setting, in addition to HOSTS
- Documentation fixes

## 1.8.78 Wagtail 0.4 release notes

- *What's new*
- *Backwards-incompatible changes*
- *Deprecated features*

### What's new

#### Private Pages

Wagtail now supports password protecting pages on the frontend, allowing sections of your website to be made private.

*Private pages*

#### Python 3 support

Wagtail now supports Python 3.2, 3.3 and 3.4.

#### Scheduled publishing

Editors can now schedule pages to be published or unpublished at specified times.

A new management command has been added (*publish\_scheduled\_pages*) to publish pages that have been scheduled by an editor.

#### Search on QuerySet with Elasticsearch

It's now possible to perform searches with Elasticsearch on PageQuerySet objects:

```
>>> from wagtail.core.models import Page
>>> Page.objects.live().descendant_of(events_index).search("Hello")
[<Page: Event 1>, <Page: Event 2>]
```

#### Sitemap generation

A new module has been added (`wagtail.contrib.wagtailsitemaps`) which produces XML sitemaps for Wagtail sites.

*Sitemap generator*

#### Front-end cache invalidation

A new module has been added (`wagtail.contrib.wagtailfrontendcache`) which invalidates pages in a frontend cache when they are updated or deleted in Wagtail.

*Frontend cache invalidator*

## Notification preferences

Users can now decide which notifications they receive from Wagtail using a new “Notification preferences” section located in the account settings.

## Minor features

### Core

- Any extra arguments given to `Page.serve` are now passed through to `get_context` and `get_template`
- Added `in_menu` and `not_in_menu` methods to `PageQuerySet`
- Added `search` method to `PageQuerySet`
- Added `get_next_siblings` and `get_prev_siblings` to `Page`
- Added `page_published` signal
- Added `copy` method to `Page` to allow copying of pages
- Added `construct_whitelister_element_rules` hook for customising the HTML whitelist used when saving `RichText` fields
- Support for setting a `subpage_types` property on `Page` models, to define which page types are allowed as subpages

### Admin

- Removed the “More” section from the menu
- Added pagination to page listings
- Added a new datetime picker widget
- Updated `hallo.js` to version 1.0.4
- Aesthetic improvements to preview experience
- Login screen redirects to dashboard if user is already logged in
- Snippets are now ordered alphabetically
- Added `init_new_page` signal

### Search

- Added a new way to configure searchable/filterable fields on models
- Added `get_indexed_objects` allowing developers to customise which objects get added to the search index
- Major refactor of Elasticsearch backend
- Use `match` instead of `query_string` queries
- Fields are now indexed in Elasticsearch with their correct type
- Filter fields are no longer included in `_all`

- Fields with partial matching are now indexed together into `_partials`

### Images

- Added `original` as a resizing rule supported by the `{% image %}` tag
- `image` tag now accepts extra keyword arguments to be output as attributes on the `img` tag
- Added an `attrs` property to image rendition objects to output `src`, `width`, `height` and `alt` attributes all in one go

### Other

- Added styleguide, for Wagtail developers

### Bug fixes

- Animated GIFs are now coalesced before resizing
- The Wand backend clones images before modifying them
- The admin breadcrumb is now positioned correctly on mobile
- The page chooser breadcrumb now updates the chooser modal instead of linking to Explorer
- Embeds - fixed crash when no HTML field is sent back from the embed provider
- Multiple sites with same hostname but different ports are now allowed
- It is no longer possible to create multiple sites with `is_default_site = True`

### Backwards-incompatible changes

#### ElasticUtils replaced with elasticsearch-py

If you are using the Elasticsearch backend, you must install the `elasticsearch` module into your environment.

---

**Note:** If you are using an older version of Elasticsearch (< 1.0) you must install `elasticsearch` version 0.4.x.

---

#### Addition of `expired` column may break old data migrations involving pages

The scheduled publishing mechanism adds an `expired` field to `wagtailcore.Page`, defaulting to `False`. Any application code working with Page objects should be unaffected, but any code that creates page records using direct SQL, or within existing South migrations using South's frozen ORM, will fail as this code will be unaware of the `expired` database column. To fix a South migration that fails in this way, add the following line to the `'wagtailcore.page'` entry at the bottom of the migration file:

```
'expired': ('django.db.models.fields.BooleanField', [], {'default': 'False'}),
```



## Deprecated features

### Template tag libraries renamed

The following template tag libraries have been renamed:

- `pageurl => wagtailcore_tags`
- `rich_text => wagtailcore_tags`
- `embed_filters => wagtailembeds_tags`
- `image_tags => wagtailimages_tags`

The old names will continue to work, but output a `DeprecationWarning` - you are advised to update any `{% load %}` tags in your templates to refer to the new names.

### New search field configuration format

`indexed_fields` is now deprecated and has been replaced by a new search field configuration format called `search_fields`. See [Indexing](#) for how to define a `search_fields` property on your models.

### `Page.route` method should now return a `RouteResult`

Previously, the `route` method called `serve` and returned an `HttpResponse` object. This has now been split up so `serve` is called separately and `route` must now return a `RouteResult` object.

If you are overriding `Page.route` on any of your page models, you will need to update the method to return a `RouteResult` object. The old method of returning an `HttpResponse` will continue to work, but this will throw a `DeprecationWarning` and bypass the `before_serve_page` hook, which means in particular that *Private pages* will not work on those page types. See [Adding Endpoints with Custom route\(\) Methods](#).

### Wagtailadmin's hooks module has moved to wagtailcore

If you use any `wagtail_hooks.py` files in your project, you may have an import like: `from wagtail.wagtailadmin import hooks`

Change this to: `from wagtail.core import hooks`

### Miscellaneous

- `Page.show_as_mode` replaced with `Page.serve_preview`
- `Page.get_page_modes` method replaced with `Page.preview_modes` property
- `Page.get_other_siblings` replaced with `Page.get_siblings(inclusive=False)`



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