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Tastypie is a web service API framework for Django. It provides a convenient, yet powerful and highly customizable, abstraction for creating REST-style interfaces.
Getting Started with Tastypie

Tastypie is a reusable app (that is, it relies only on its own code and focuses on providing just a REST-style API) and is suitable for providing an API to any application without having to modify the sources of that app.

Not everyone’s needs are the same, so Tastypie goes out of its way to provide plenty of hooks for overriding or extending how it works.

**Note:** If you hit a stumbling block, you can join #tastypie on irc.freenode.net to get help.

This tutorial assumes that you have a basic understanding of Django as well as how proper REST-style APIs ought to work. We will only explain the portions of the code that are Tastypie-specific in any kind of depth.

For example purposes, we’ll be adding an API to a simple blog application. Here is `myapp/models.py`:

```python
import datetime
from django.contrib.auth.models import User
from django.db import models
from django.template.defaultfilters import slugify

class Entry(models.Model):
    user = models.ForeignKey(User)
    pub_date = models.DateTimeField(default=datetime.datetime.now)
    title = models.CharField(max_length=200)
    slug = models.SlugField()
    body = models.TextField()

    def __unicode__(self):
        return self.title

    def save(self, *args, **kwargs):
        # For automatic slug generation.
        if not self.slug:
            self.slug = slugify(self.title)[:50]

        return super(Entry, self).save(*args, **kwargs)
```

With that, we’ll move on to installing and configuring Tastypie.

### 1.1 Installation

Installing Tastypie is as simple as checking out the source and adding it to your project or `PYTHONPATH`. 
1. Download the dependencies:
   • Python 2.4+
   • Django 1.0+ (tested on Django 1.1+)
   • mimeparse 0.1.3+ (http://code.google.com/p/mimeparse/)
     – Older versions will work, but their behavior on JSON/JSONP is a touch wonky.
   • dateutil (http://labix.org/python-dateutil)
   • OPTIONAL - lxml (http://codespeak.net/lxml/) if using the XML serializer
   • OPTIONAL - pyyaml (http://pyyaml.org/) if using the YAML serializer
   • OPTIONAL - uuid (present in 2.5+, downloadable from http://pypi.python.org/pypi/uuid/) if using the ApiKey authentication

2. Either check out tastypie from GitHub or to pull a release off PyPI. Doing `sudo pip install django-tastypie` or `sudo easy_install django-tastypie` is all that should be required.

3. Either symlink the `tastypie` directory into your project or copy the directory in. What ever works best for you.

1.2 Configuration

The only mandatory configuration is adding ‘tastypie’ to your INSTALLED_APPS. This isn’t strictly necessary, as Tastypie has only one non-required model, but may ease usage.

You have the option to set up a number of settings (see Tastypie Settings) but they all have sane defaults and are not required unless you need to tweak their values.

1.3 Creating Resources

REST-style architecture talks about resources, so unsurprisingly integrating with Tastypie involves creating Resource classes. For our simple application, we’ll create a file for these in `myapp/api.py`, though they can live anywhere in your application:

```python
# myapp/api.py
from tastypie.resources import ModelResource
from myapp.models import Entry

class EntryResource(ModelResource):
    class Meta:
        queryset = Entry.objects.all()
        resource_name = 'entry'
```

This class, by virtue of being a ModelResource subclass, will introspect all non-relational fields on the Entry model and create it’s own ApiFields that map to those fields, much like the way Django’s ModelForm class introspects.

Note: The resource_name within the Meta class is optional. If not provided, it is automatically generated off the classname, removing any instances of Resource and lowercasing the string. So EntryResource would become just entry.
We’ve included the `resource_name` attribute in this example for clarity, especially when looking at the URLs, but you should feel free to omit it if you’re comfortable with the automatic behavior.

### 1.4 Hooking Up The Resource(s)

Now that we have our `EntryResource`, we can hook it up in our `URLconf`. To do this, we simply instantiate the resource in our `URLconf` and hook up its `urls`:

```python
# urls.py
from django.conf.urls.defaults import *
from myapp.api import EntryResource

entry_resource = EntryResource()

urlpatterns = patterns('',
    # The normal jazz here...
    (r'^blog/', include('myapp.urls')),
    (r'^api/', include(entry_resource.urls)),
)
```

Now it’s just a matter of firing up server (`./manage.py runserver`) and going to `http://127.0.0.1:8000/api/entry/?format=json`. You should get back a list of `Entry`-like objects.

**Note:** The `?format=json` is an override required to make things look decent in the browser (accept headers vary between browsers). Tastypie properly handles the `Accept` header. So the following will work properly:

```bash
curl -H "Accept: application/json" http://127.0.0.1:8000/api/entry/
```

But if you’re sure you want something else (or want to test in a browser), Tastypie lets you specify `?format=...` when you really want to force a certain type.

At this point, a bunch of other URLs are also available. Try out any/all of the following (assuming you have at least three records in the database):

- `http://127.0.0.1:8000/api/entry/?format=json`
- `http://127.0.0.1:8000/api/entry/1/?format=json`
- `http://127.0.0.1:8000/api/entry/schema/?format=json`
- `http://127.0.0.1:8000/api/entry/set/1;3/?format=json`

With just seven lines of code, we have a full working REST interface to our `Entry` model. In addition, full `GET/POST/PUT/DELETE` support is already there, so it’s possible to really work with all of the data. Well, *almost*.

You see, you’ll note that not quite all of our data is there. Markedly absent is the `user` field, which is a `ForeignKey` to Django’s `User` model. Tastypie does NOT introspect related data because it has no way to know how you want to represent that data.

And since that relation isn’t there, any attempt to `POST/PUT` new data will fail, because no `user` is present, which is a required field on the model.

This is easy to fix, but we’ll need to flesh out our API a little more.
1.5 Creating More Resources

In order to handle our user relation, we’ll need to create a UserResource and tell the EntryResource to use it. So we’ll modify myapp/api.py to match the following code:

```python
# myapp/api.py
from django.contrib.auth.models import User
from tastypie import fields
from tastypie.resources import ModelResource
from myapp.models import Entry

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'user'

class EntryResource(ModelResource):
    user = fields.ForeignKey(UserResource, 'user')
    class Meta:
        queryset = Entry.objects.all()
        resource_name = 'entry'
```

We simply created a new ModelResource subclass called UserResource. Then we added a field to EntryResource that specified that the user field points to a UserResource for that data.

Now we should be able to get all of the fields back in our response. But since we have another full, working resource on our hands, we should hook that up to our API as well. And there’s a better way to do it.

1.6 Adding To The Api

Tastypie ships with an Api class, which lets you bind multiple Resources together to form a coherent API. Adding it to the mix is simple.

We’ll go back to our URLconf (urls.py) and change it to match the following:

```python
# urls.py
from django.conf.urls.defaults import *
from tastypie.api import Api
from myapp.api import EntryResource, UserResource

v1_api = Api(api_name='v1')
v1_api.register(UserResource())
v1_api.register(EntryResource())

urlpatterns = patterns('',
    # The normal jazz here...
    (r'^blog/', include('myapp.urls')),
    (r'^api/', include(v1_api.urls)),
)
```

Note that we’re now creating an Api instance, registering our EntryResource and UserResource instances with it and that we’ve modified the urls to now point to v1_api.urls.

This makes even more data accessible, so if we start up the runserver again, the following URLs should work:
Additionally, the representations out of `EntryResource` will now include the `user` field and point to an endpoint like `/api/v1/users/1/` to access that user’s data. And full POST/PUT delete support should now work.

But there’s several new problems. One is that our new `UserResource` leaks too much data, including fields like `email`, `password`, `is_active` and `is_staff`. Another is that we may not want to allow end users to alter `User` data. Both of these problems are easily fixed as well.

### 1.7 Limiting Data And Access

Cutting out the `email`, `password`, `is_active` and `is_staff` fields is easy to do. We simply modify our `UserResource` code to match the following:

```python
class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'user'
        excludes = ['email', 'password', 'is_active', 'is_staff', 'is_superuser']
```

The `excludes` directive tells `UserResource` which fields not to include in the output. If you’d rather whitelist fields, you could do:

```python
class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'user'
        fields = ['username', 'first_name', 'last_name', 'last_login']
```

Now that the undesirable fields are no longer included, we can look at limiting access. This is also easy and involves making our `UserResource` look like:

```python
class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'user'
        excludes = ['email', 'password', 'is_active', 'is_staff', 'is_superuser']
        allowed_methods = ['get']
```

Now only HTTP GET requests will be allowed on `/api/v1/user/` endpoints. If you require more granular control, both `list_allowed_methods` and `detail_allowed_methods` options are supported.
1.8 Beyond The Basics

We now have a full working API for our application. But Tastypie supports many more features, like:

- Authentication / Authorization
- Caching
- Throttling
- Resources (filtering & sorting)
- Serialization

Tastypie is also very easy to override and extend. For some common patterns and approaches, you should refer to the Tastypie Cookbook documentation.
Now that you’ve got a shiny new REST-style API in place, let’s demonstrate how to interact with it. We’ll assume that you have cURL installed on your system (generally available on most modern Mac & Linux machines), but any tool that allows you to control headers & bodies on requests will do.

We’ll assume that we’re interacting with the following Tastypie code:

```python
# myapp/api/resources.py
from django.contrib.auth.models import User
from tastypie.authorization import Authorization
from tastypie import fields
from tastypie.resources import ModelResource, ALL, ALL_WITH_RELATIONS
from myapp.models import Entry

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'user'
        excludes = ['email', 'password', 'is_active', 'is_staff', 'is_superuser']
        filtering = {
            'username': ALL,
        }

class EntryResource(ModelResource):
    user = fields.ForeignKey(UserResource, 'user')
    class Meta:
        queryset = Entry.objects.all()
        resource_name = 'entry'
        authorization = Authorization()
        filtering = {
            'user': ALL_WITH_RELATIONS,
            'pub_date': ['exact', 'lt', 'lte', 'gte', 'gt'],
        }

# urls.py
from django.conf.urls.defaults import *
from tastypie.api import Api
from myapp.api.resources import EntryResource, UserResource

v1_api = Api(api_name='v1')
```

Interacting With The API
Let's fire up a shell & start exploring the API!

2.1 Front Matter

Tastypie tries to treat all clients & all serialization types as equally as possible. It also tries to be a good ‘Net citizen & respects the HTTP method used as well as the Accepts headers sent. Between these two, you control all interactions with Tastypie through relatively few endpoints.

**Warning:** Should you try these URLs in your browser, be warned you **WILL** need to append `?format=json` (or `xml` or `yaml`) to the URL. Your browser requests `application/xml` before `application/json`, so you’ll always get back XML if you don’t specify it. That’s also why it’s recommended that you explore via curl, because you avoid your browser’s opinionated requests & get something closer to what any programmatic clients will get.

2.2 Fetching Data

Since reading data out of an API is a very common activity (and the easiest type of request to make), we’ll start there. Tastypie tries to expose various parts of the API & interlink things within the API (HATEOAS).

2.2.1 Api-Wide

We’ll start at the highest level:

```
curl http://localhost:8000/api/v1/
```

You’ll get back something like:

```
{
    "entry": {
        "list_endpoint": "/api/v1/entry/",
        "schema": "/api/v1/entry/schema/"
    },
    "user": {
        "list_endpoint": "/api/v1/user/",
        "schema": "/api/v1/user/schema/"
    }
}
```

This lists out all the different Resource classes you registered in your URLconf with the API. Each one is listed by the resource_name you gave it and provides the list_endpoint & the schema for the resource.

Note that these links try to direct you to other parts of the API, to make exploration/discovery easier. We’ll use these URLs in the next several sections.
To demonstrate another format, you could run the following to get the XML variant of the same information:

```
```

To which you’d receive:

```xml
<?xml version="1.0" encoding="utf-8"?>
<response>
  <entry type="hash">
    <list_endpoint>/api/v1/entry/</list_endpoint>
    <schema>/api/v1/entry/schema/</schema>
  </entry>
  <user type="hash">
    <list_endpoint>/api/v1/user/</list_endpoint>
    <schema>/api/v1/user/schema/</schema>
  </user>
</response>
```

We’ll stick to JSON for the rest of this document, but using XML should be OK to do at any time.

### 2.2.2 Inspecting The Resource’s Schema

Since the api-wide view gave us a `schema` URL, let’s inspect that next. We’ll use the `entry` resource. Again, a simple GET request by curl:

```
curl http://localhost:8000/api/v1/entry/schema/
```

This time, we get back a lot more data:

```
{
    "default_format": "application/json",
    "fields": {
        "body": {
            "help_text": "Unicode string data. Ex: "Hello World",
            "nullable": false,
            "readonly": false,
            "type": "string"
        },
        "id": {
            "help_text": "Unicode string data. Ex: "Hello World",
            "nullable": false,
            "readonly": false,
            "type": "string"
        },
        "pub_date": {
            "help_text": "A date & time as a string. Ex: "2010-11-10T03:07:43",
            "nullable": false,
            "readonly": false,
            "type": "datetime"
        },
        "resource_uri": {
            "help_text": "Unicode string data. Ex: "Hello World",
            "nullable": false,
            "readonly": true,
            "type": "string"
        },
        "slug": {
            "help_text": "Unicode string data. Ex: "Hello World"
        }
```

### 2.2. Fetching Data
This lists out the default_format this resource responds with, the fields on the resource & the filtering options available. This information can be used to prepare the other aspects of the code for the data it can obtain & ways to filter the resources.

2.2.3 Getting A Collection Of Resources

Let’s get down to fetching live data. From the api-wide view, we’ll hit the list_endpoint for entry:

```
curl http://localhost:8000/api/v1/entry/
```

We get back data that looks like:

```
{
   "meta": {
      "limit": 20,
      "next": null,
      "offset": 0,
      "previous": null,
      "total_count": 3
   },
   "objects": [{
      "body": "Welcome to my blog!",
      "id": "1",
      "pub_date": "2011-05-20T00:46:38",
      "resource_uri": "/api/v1/entry/1/",
      "slug": "first-post",
      "title": "First Post",
      "user": "/api/v1/user/1/"
   },
   {
      "body": "Well, it's been awhile and I still haven't updated. ",
      "id": "2",
      "pub_date": "2011-05-21T00:46:58",
      "resource_uri": "/api/v1/entry/2/",
      "title": "Second Post",
      "user": "/api/v1/user/1/"
   }
}
```
Some things to note:

- By default, you get a paginated set of objects (20 per page is the default).
- In the meta, you get a previous & next. If available, these are URIs to the previous & next pages.
- You get a list of resources/objects under the objects key.
- Each resources/object has a resource_uri field that points to the detail view for that object.
- The foreign key to User is represented as a URI by default. If you’re looking for the full UserResource to be embedded in this view, you’ll need to add full=True to the fields.ToOneField.

If you want to skip paginating, simply run:

```
curl http://localhost:8000/api/v1/entry/?limit=0
```

Be warned this will return all objects, so it may be a CPU/IO-heavy operation on large datasets.

Let’s try filtering on the resource. Since we know we can filter on the user, we’ll fetch all posts by the daniel user with:

```
curl http://localhost:8000/api/v1/entry/?user__username=daniel
```

We get back what we asked for:

```json
{
    "meta": {
        "limit": 20,
        "next": null,
        "offset": 0,
        "previous": null,
        "total_count": 2
    },
    "objects": [{
        "body": "Welcome to my blog!",
        "id": "1",
        "pub_date": "2011-05-20T00:46:38",
        "resource_uri": "/api/v1/entry/1/",
        "slug": "first-post",
        "title": "First Post",
        "user": "/api/v1/user/1/"
    },
    {
        "body": "Well, it's been awhile and I still haven't updated. ",
        "id": "2",
```
Where there were three posts before, now there are only two.

### 2.2.4 Getting A Detail Resource

Since each resource/object in the list view had a resource_uri, let's explore what's there:

```bash
curl http://localhost:8000/api/v1/entry/1/
```

We get back a similar set of data that we received from the list view:

```json
{
    "body": "Welcome to my blog!",
    "id": "1",
    "pub_date": "2011-05-20T00:46:38",
    "resource_uri": "http://localhost:8000/api/v1/entry/1/",
    "slug": "first-post",
    "title": "First Post",
    "user": "http://localhost:8000/api/v1/user/1/
```

Where this proves useful (for example) is present in the data we got back. We know the URI of the User associated with this blog entry. Let’s run:

```bash
curl http://localhost:8000/api/v1/user/1/
```

Without ever seeing any aspect of the UserResource & just following the URI given, we get back:

```json
{
    "date_joined": "2011-05-20T00:42:14.990617",
    "first_name": "",
    "id": "1",
    "last_login": "2011-05-20T00:44:57.510066",
    "last_name": "",
    "resource_uri": "http://localhost:8000/api/v1/user/1/",
    "username": "daniel"
```

### 2.2.5 Selecting A Subset Of Resources

Sometimes you may want back more than one record, but not an entire list view nor do you want to do multiple requests. Tastypie includes a “set” view, which lets you cherry-pick the objects you want. For example, if we just want the first & third Entry resources, we’d run:

```bash
curl "http://localhost:8000/api/v1/entry/set/1;3/"
```

**Note:** Quotes are needed in this case because of the semicolon delimiter between primary keys. Without the quotes, bash tries to split it into two statements. No extraordinary quoting will be necessary in your application (unless your API client is written in bash :D).
And we get back just those two objects:

```
{
   "objects": [{
      "body": "Welcome to my blog!",
      "id": "1",
      "pub_date": "2011-05-20T00:46:38",
      "resource_uri": "/api/v1/entry/1/",
      "slug": "first-post",
      "title": "First Post",
      "user": "/api/v1/user/1/"
   },
   {
      "body": "I'm really excited to get started with this new blog. It's gonna be great!",
      "id": "3",
      "pub_date": "2011-05-20T00:47:30",
      "resource_uri": "/api/v1/entry/3/",
      "slug": "my-blog",
      "title": "My Blog",
      "user": "/api/v1/user/2/"
   }
  ]
}
```

Note that, like the list view, you get back a list of objects. Unlike the list view, there is NO pagination applied to these objects. You asked for them, you’re going to get them all.

### 2.3 Sending Data

Tastypie also gives you full write capabilities in the API. Since the EntryResource has the no-limits Authentication & Authorization on it, we can freely write data.

**Warning:** Note that this is a huge security hole as well. Don’t put unauthorized write-enabled resources on the Internet, because someone will trash your data. This is why ReadOnlyAuthorization is the default in Tastypie & why you must override to provide more access.

The good news is that there are no new URLs to learn. The “list” & “detail” URLs we’ve been using to fetch data ALSO support the POST/PUT/DELETE HTTP methods.

#### 2.3.1 Creating A New Resource (POST)

Let’s add a new entry. To create new data, we’ll switch from GET requests to the familiar POST request.

To create new resources/objects, you will POST to the list endpoint of a resource. Trying to POST to a detail endpoint has a different meaning in the REST mindset (meaning to add a resource as a child of a resource of the same type).

As with all Tastypie requests, the headers we request are important. Since we’ve been using primarily JSON throughout, let’s send a new entry in JSON format:

```bash
curl --dump-header - -H "Content-Type: application/json" -X POST --data '{"body": "This will probbly be my lst post.
```
You’ll also note that we get a correct HTTP status code back (201) & a Location header, which gives us the URI to our newly created resource.

Passing --dump-header - is important, because it gives you all the headers as well as the status code. When things go wrong, this will be useful information to help with debugging. For instance, if we send a request without a user:

```bash
curl --dump-header - -H "Content-Type: application/json" -X POST --data '{"body": "This will probably be my last post.", "pub_date": "2011-05-22T00:46:38", "slug": "another-post", "title": "Another Post", "user": "/api/v1/user/1/"'}' http://localhost:8000/api/v1/entry/
```

We get back:

```
HTTP/1.0 400 BAD REQUEST
Date: Fri, 20 May 2011 06:53:02 GMT
Server: WSGIServer/0.1 Python/2.7
Content-Type: text/html; charset=utf-8

The 'user' field has no data and doesn't allow a default or null value.
```

### 2.3.2 Updating An Existing Resource (PUT)

You might have noticed that we made some typos when we submitted the POST request. We can fix this using a PUT request to the detail endpoint (modify this instance of a resource).

```bash
curl --dump-header - -H "Content-Type: application/json" -X PUT --data '{"body": "This will probably be my last post.", "pub_date": "2011-05-22T00:46:38", "slug": "another-post", "title": "Another Post", "user": "/api/v1/user/1/"'}' http://localhost:8000/api/v1/entry/4/
```

After fixing up the body, we get back:

```
HTTP/1.0 204 NO CONTENT
Date: Fri, 20 May 2011 07:13:21 GMT
Server: WSGIServer/0.1 Python/2.7
Content-Length: 0
Content-Type: text/html; charset=utf-8

We get a 204 status code, meaning our update was successful. We don’t get a Location header back because we did the PUT on a detail URL, which presumably did not change.

### 2.3.3 Updating A Whole Collection Of Resources (PUT)

You can also, in rare circumstances, update an entire collection of objects. By sending a PUT request to the list view of a resource, you can replace the entire collection.

**Warning:** This deletes all of the objects first, then creates the objects afresh. This is done because determining which objects are the same is actually difficult to get correct in the general case for all people.

Send a request like:

```bash
```
2.4 Deleting Data

No CRUD setup would be complete without the ability to delete resources/objects. Deleting also requires significantly less complicated requests than POST/PUT.

2.4.1 Deleting A Single Resource

We’ve decided that we don’t like the entry we added & edited earlier. Let’s delete it (but leave the other objects alone):

```
```

Once again, we get back the “Accepted” response of a 204:

```
HTTP/1.0 204 NO CONTENT
Date: Fri, 20 May 2011 07:28:01 GMT
Server: WSGIServer/0.1 Python/2.7
Content-Length: 0
Content-Type: text/html; charset=utf-8
```

If we request that resource, we get a 410 to show it’s no longer there:

```
```

HTTP/1.0 410 GONE
Date: Fri, 20 May 2011 07:29:02 GMT
Server: WSGIServer/0.1 Python/2.7
Content-Type: text/html; charset=utf-8

Additionally, if we try to run the DELETE again (using the same original command), we get the “Gone” response again:

```
HTTP/1.0 410 GONE
Date: Fri, 20 May 2011 07:30:00 GMT
Server: WSGIServer/0.1 Python/2.7
Content-Type: text/html; charset=utf-8
```

2.4.2 Deleting A Whole Collection Of Resources

Finally, it’s possible to remove an entire collection of resources. This is as destructive as it sounds. Once again, we use the DELETE method, this time on the entire list endpoint:

```
```

As a response, we get:
Hitting the list view:

```
```

Gives us a 200 but no objects:

```json
{
    "meta": {
        "limit": 20,
        "next": null,
        "offset": 0,
        "previous": null,
        "total_count": 0
    },
    "objects": []
}
```

## 2.5 You Did It!

That's a whirlwind tour of interacting with a Tastypie API. There’s additional functionality present, such as:

- **POST/PUT** the other supported content-types
- **More filtering/order_by/limit/offset** tricks
- Using overridden URLconfs to support complex or non-PK lookups
- Authentication

But this grounds you in the basics & hopefully clarifies usage/debugging better.
This is a comprehensive list of the settings Tastypie recognizes.

### 3.1 API_LIMIT_PER_PAGE

Optional

This setting controls the default number of records Tastypie will show in a list view. This is only used when a user does not specify a limit GET parameter and the Resource subclass has not overridden the number to be shown.

An example:

```
API_LIMIT_PER_PAGE = 50
```

Defaults to 20.

### 3.2 TASTYPIE_FULL_DEBUG

Optional

This setting controls what the behavior is when an unhandled exception occurs. If set to True and settings.DEBUG = True, the standard Django technical 500 is displayed.

If not set or set to False, Tastypie will return a serialized response. If settings.DEBUG is True, you’ll get the actual exception message plus a traceback. If settings.DEBUG is False, Tastypie will call mail_admins() and provide a canned error message (which you can override with TASTYPIE_CANNED_ERROR) in the response.

An example:

```
TASTYPIE_FULL_DEBUG = True
```

Defaults to False.

### 3.3 TASTYPIE_CANNED_ERROR

Optional
This setting allows you to override the canned error response when an unhandled exception is raised and `settings.DEBUG` is `False`.

An example:

```
TASTYPIE_CANNED_ERROR = "Oops, we broke it!"
```

Defaults to "Sorry, this request could not be processed. Please try again later.".

### 3.4 TASTYPIE_ALLOW_MISSING_SLASH

**Optional**

This setting allows your URLs to be missing the final slash. Useful for integrating with other systems.

You must also have `settings.APPEND_SLASH = False` so that Django does not emit HTTP 302 redirects.

**Warning:** This setting causes the `Resource.get_multiple()` method to fail. If you need this method, you will have to override the URLconf to meet your needs.

An example:

```
TASTYPIE_ALLOW_MISSING_SLASH = True
```

Defaults to `False`.

### 3.5 TASTYPIE_DATETIME_FORMATTING

**Optional**

This setting allows you to globally choose what format your datetime/date/time data will be formatted in. Valid options are `iso-8601` & `rfc-2822`.

An example:

```
TASTYPIE_DATETIME_FORMATTING = 'rfc-2822'
```

Defaults to `iso-8601`. 
Using Tastypie With Non-ORM Data Sources

Much of this documentation demonstrates the use of Tastypie with Django’s ORM. You might think that Tastypie depended on the ORM, when in fact, it was purpose-built to handle non-ORM data. This documentation should help you get started providing APIs using other data sources.

Virtually all of the code that makes Tastypie actually process requests & return data is within the Resource class. ModelResource is actually a light wrapper around Resource that provides ORM-specific access. The methods that ModelResource overrides are the same ones you’ll need to override when hooking up your data source.

4.1 Approach

When working with Resource, many things are handled for you. All the authentication/authorization/caching/serialization/throttling bits should work as normal and Tastypie can support all the REST-style methods. Schemas & discovery views all work the same as well.

What you don’t get out of the box are the fields you’re choosing to expose & the lowest level data access methods. If you want a full read-write API, there are nine methods you need to implement. They are:

- get_resource_uri
- get_object_list
- obj_get_list
- obj_get
- obj_create
- obj_update
- obj_delete_list
- obj_delete
- rollback

If read-only is all you’re exposing, you can cut that down to four methods to override.

4.2 Using Riak for MessageResource

As an example, we’ll take integrating with Riak (a Dynamo-like NoSQL store) since it has both a simple API and demonstrate what hooking up to a non-relational datastore looks like:
# We need a generic object to shove data in/get data from.
# Riak generally just tosses around dictionaries, so we'll lightly
# wrap that.

class RiakObject(object):
    def __init__(self, initial=None):
        self.__dict__['_data'] = {}

        if hasattr(initial, 'items'):
            self.__dict__['_data'] = initial

    def __getattr__(self, name):
        return self._data.get(name, None)

    def __setattr__(self, name, value):
        self.__dict__['_data'][name] = value

    def to_dict(self):
        return self._data

class MessageResource(Resource):
    # Just like a Django `Form` or `Model`, we're defining all the
    # fields we're going to handle with the API here.
    uuid = fields.CharField(attribute='uuid')
    user_uuid = fields.CharField(attribute='user_uuid')
    message = fields.CharField(attribute='message')
    created = fields.IntegerField(attribute='created')

    class Meta:
        resource_name = 'riak'
        object_class = RiakObject
        authorization = Authorization()

        # Specific to this resource, just to get the needed Riak bits.
        def _client(self):
            return riak.RiakClient()

        def _bucket(self):
            client = self._client()
            # Note that we're hard-coding the bucket to use. Fine for
            # example purposes, but you'll want to abstract this.
            return client.bucket('messages')

        # The following methods will need overriding regardless of your
        # data source.
        def get_resource_uri(self, bundle_or_obj):
            kwargs = {
                'resource_name': self._meta.resource_name,
            }

            if isinstance(bundle_or_obj, Bundle):
                kwargs['pk'] = bundle_or_obj.obj.uuid
            else:
                kwargs['pk'] = bundle_or_obj.uuid

            if self._meta.api_name is not None:
                kwargs['api_name'] = self._meta.api_name
```
return self._build_reverse_url("api_dispatch_detail", kwargs=kwargs)

def get_object_list(self, request):
    query = self._client().add('messages')
    query.map("function(v) { var data = JSON.parse(v.values[0].data); return [[v.key, data]]; }")
    results = []
    for result in query.run():
        new_obj = RiakObject(initial=result[1])
        new_obj.uuid = result[0]
        results.append(new_obj)
    return results

def obj_get_list(self, request=None, **kwargs):
    # Filtering disabled for brevity...
    return self.get_object_list(request)

def obj_get(self, request=None, **kwargs):
    bucket = self._bucket()
    message = bucket.get(kwargs['pk'])
    return RiakObject(initial=message.get_data())

def obj_create(self, bundle, request=None, **kwargs):
    bundle.obj = RiakObject(initial=kwargs)
    bundle = self.full_hydrate(bundle)
    bucket = self._bucket()
    new_message = bucket.new(bundle.obj.uuid, data=bundle.obj.to_dict())
    new_message.store()
    return bundle

def obj_update(self, bundle, request=None, **kwargs):
    return self.obj_create(bundle, request, **kwargs)

def obj_delete_list(self, request=None, **kwargs):
    bucket = self._bucket()
    for key in bucket.get_keys():
        obj = bucket.get(key)
        obj.delete()

def obj_delete(self, request=None, **kwargs):
    bucket = self._bucket()
    obj = bucket.get(kwargs['pk'])
    obj.delete()

def rollback(self, bundles):
    pass
```

This represents a full, working, Riak-powered API endpoint. All REST-style actions (GET/POST/PUT/DELETE) all work correctly. The only shortcut taken in this example was skipping filter-ability, as adding in the MapReduce bits would have decreased readability.

All said and done, just nine methods needed overriding, eight of which were highly specific to how data access is done.

4.2. Using Riak for MessageResource
In terms of a REST-style architecture, a “resource” is a collection of similar data. This data could be a table of a database, a collection of other resources or a similar form of data storage. In Tastypie, these resources are generally intermediaries between the end user & objects, usually Django models. As such, Resource (and its model-specific twin ModelResource) form the heart of Tastypie’s functionality.

### 5.1 Quick Start

A sample resource definition might look something like:

```python
from django.contrib.auth.models import User
from tastypie import fields
from tastypie.authorization import DjangoAuthorization
from tastypie.resources import ModelResource, ALL, ALL_WITH_RELATIONS
from myapp.models import Entry

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'auth/user'
        excludes = ['email', 'password', 'is_superuser']

class EntryResource(ModelResource):
    user = fields.ForeignKey(UserResource, 'user')
    class Meta:
        queryset = Entry.objects.all()
        list_allowed_methods = ['get', 'post']
        detail_allowed_methods = ['get', 'post', 'put', 'delete']
        resource_name = 'myapp/entry'
        authorization = DjangoAuthorization()
        filtering = {
            'slug': ALL,
            'user': ALL_WITH_RELATIONS,
            'created': ['exact', 'range', 'gt', 'gte', 'lt', 'lte'],
        }
```

5.2 Why Class-Based?

Using class-based resources make it easier to extend/modify the code to meet your needs. APIs are rarely a one-size-fits-all problem space, so Tastypie tries to get the fundamentals right and provide you with enough hooks to customize things to work your way.

As is standard, this raises potential problems for thread-safety. Tastypie has been designed to minimize the possibility of data “leaking” between threads. This does however sometimes introduce some small complexities & you should be careful not to store state on the instances if you’re going to be using the code in a threaded environment.

5.3 Why Resource VS. ModelResource?

Make no mistake that Django models are far and away the most popular source of data. However, in practice, there are many times where the ORM isn’t the data source. Hooking up things like a NoSQL store (see Using Tastypie With Non-ORM Data Sources), a search solution like Haystack or even managed filesystem data are all good use cases for Resource knowing nothing about the ORM.

5.4 Flow Through The Request/Response Cycle

Tastypie can be thought of as a set of class-based views that provide the API functionality. As such, many part of the request/response cycle are standard Django behaviors. For instance, all routing/middleware/response-handling aspects are the same as a typical Django app. Where it differs is in the view itself.

As an example, we’ll walk through what a GET request to a list endpoint (say /api/v1/user/?format=json) looks like:

- The Resource.urls are checked by Django’s url resolvers.
- On a match for the list view, Resource.wrap_view('dispatch_list') is called. wrap_view provides basic error handling & allows for returning serialized errors.
- Because dispatch_list was passed to wrap_view, Resource.dispatch_list is called next. This is a thin wrapper around Resource.dispatch.
- dispatch does a bunch of heavy lifting. It ensures:
  - the requested HTTP method is in allowed_methods (method_check),
  - the class has a method that can handle the request (get_list),
  - the user is authenticated (is_authenticated),
  - the user is authorized (is_authorized),
  - & the user has not exceeded their throttle (throttle_check).

At this point, dispatch actually calls the requested method (get_list).

- get_list does the actual work of the API. It does:
  - A fetch of the available objects via Resource.obj_get_list. In the case of ModelResource, this builds the ORM filters to apply (ModelResource.build_filters). It then gets the QuerySet via ModelResource.get_object_list (which performs Resource.apply_authorization_limits to possibly limit the set the user can work with) and applies the built filters to it.
  - It then sorts the objects based on user input (ModelResource.apply_sorting).
– Then it paginates the results using the supplied Paginator & pulls out the data to be serialized.
– The objects in the page have full_dehydrate applied to each of them, causing Tastypie to translate the raw object data into the fields the endpoint supports.
– Finally, it calls Resource.create_response.

• create_response is a shortcut method that:
  – Determines the desired response format (Resource.determine_format).
  – Serializes the data given to it in the proper format,
  – And returns a Django HttpResponse (200 OK) with the serialized data.

• We bubble back up the call stack to dispatch. The last thing dispatch does is potentially store that a request occurred for future throttling (Resource.log_throttled_access) then either returns the HttpResponse or wraps whatever data came back in a response (so Django doesn’t freak out).

Processing on other endpoints or using the other HTTP methods results in a similar cycle, usually differing only in what “actual work” method gets called (which follows the format of “<http_method>_<list_or_detail>”). In the case of POST/PUT, the ‘hydrate cycle additionally takes place and is used to take the user data & convert it to raw data for storage.

5.5 What Are Bundles?

Bundles are a small abstraction that allow Tastypie to pass data between resources. This allows us not to depend on passing request to every single method (especially in places where this would be overkill). It also allows resources to work with data coming into the application paired together with an unsaved instance of the object in question.

Think of it as package of user data & an object instance (either of which are optionally present).

5.6 Why Resource URIs?

Resource URIs play a heavy role in how Tastypie delivers data. This can seem very different from other solutions which simply inline related data. Though Tastypie can inline data like that (using full=True on the field with the relation), the default is to provide URIs.

URIs are useful because it results in smaller payloads, letting you fetch only the data that is important to you. You can imagine an instance where an object has thousands of related items that you may not be interested in.

URIs are also very cache-able, because the data at each endpoint is less likely to frequently change.

And URIs encourage proper use of each endpoint to display the data that endpoint covers.

Ideology aside, you should use whatever suits you. If you prefer fewer requests & fewer endpoints, use of full=True is available, but be aware of the consequences of each approach.

5.7 Advanced Data Preparation

Tastypie uses a “dehydrate” cycle to prepare data for serialization & a “hydrate” cycle to take data sent to it & turn that back into useful Python objects.

Within these cycles, there are several points of customization if you need them.
5.7.1 dehydrate

5.7.2 dehydrate_FOO

5.7.3 hydrate

5.7.4 hydrate_FOO

5.8 Reverse “Relationships”

Unlike Django’s ORM, Tastypie does not automatically create reverse relations. This is because there is substantial technical complexity involved, as well as perhaps unintentionally exposing related data in an incorrect way to the end user of the API.

However, it is still possible to create reverse relations. Instead of handing the `ToOneField` or `ToManyField` a class, pass them a string that represents the full path to the desired class. Implementing a reverse relationship looks like so:

```python
# myapp/api/resources.py
from tastypie import fields
from tastypie.resources import ModelResource
from myapp.models import Note, Comment

class NoteResource(ModelResource):
    comments = fields.ToManyField('myapp.api.resources.CommentResource', 'comments')

    class Meta:
        queryset = Note.objects.all()

class CommentResource(ModelResource):
    note = fields.ToOneField(NoteResource, 'notes')

    class Meta:
        queryset = Comment.objects.all()
```

**Warning:** Unlike Django, you can’t use just the class name (i.e. ‘CommentResource’), even if it’s in the same module. Tastypie (intentionally) lacks a construct like the AppCache which makes that sort of thing work in Django. Sorry.

Tastypie also supports self-referential relations. If you assume we added the appropriate self-referential `ForeignKey` to the `Note` model, implementing a similar relation in Tastypie would look like:

```python
# myapp/api/resources.py
from tastypie import fields
from tastypie.resources import ModelResource
from myapp.models import Note

class NoteResource(ModelResource):
    sub_notes = fields.ToManyField('self', 'notes')

    class Meta:
        queryset = Note.objects.all()
```
5.9 Resource Options (AKA Meta)

The inner Meta class allows for class-level configuration of how the Resource should behave. The following options are available:

5.9.1 serializer

Controls which serializer class the Resource should use. Default is tastypie.serializers.Serializer().

5.9.2 authentication

Controls which authentication class the Resource should use. Default is tastypie.authentication.Authentication().

5.9.3 authorization

Controls which authorization class the Resource should use. Default is tastypie.authorization.ReadOnlyAuthorization().

5.9.4 validation

Controls which validation class the Resource should use. Default is tastypie.validation.Validation().

5.9.5 paginator_class

Controls which paginator class the Resource should use. Default is tastypie.paginator.Paginator().

Note: This is different than the other options in that you supply a class rather than an instance. This is done because the Paginator has some per-request initialization options.

5.9.6 cache

Controls which cache class the Resource should use. Default is tastypie.cache.NoCache().

5.9.7 throttle

Controls which throttle class the Resource should use. Default is tastypie.throttle.BaseThrottle().
5.9.8 allowed_methods

Controls what list & detail REST methods the Resource should respond to. Default is None, which means delegate to the more specific list_allowed_methods & detail_allowed_methods options.

You may specify a list like ['get', 'post', 'put', 'delete'] as a shortcut to prevent having to specify the other options.

5.9.9 list_allowed_methods

Controls what list REST methods the Resource should respond to. Default is ['get', 'post', 'put', 'delete'].

5.9.10 detail_allowed_methods

Controls what detail REST methods the Resource should respond to. Default is ['get', 'post', 'put', 'delete'].

5.9.11 limit

Controls what how many results the Resource will show at a time. Default is either the API_LIMIT_PER_PAGE setting (if provided) or 20 if not specified.

5.9.12 api_name

An override for the Resource to use when generating resource URLs. Default is None.

5.9.13 resource_name

An override for the Resource to use when generating resource URLs. Default is None.

If not provided, the Resource or ModelResource will attempt to name itself. This means a lowercase version of the classname preceding the word Resource if present (i.e. SampleContentResource would become samplecontent).

5.9.14 default_format

Specifies the default serialization format the Resource should use if one is not requested (usually by the Accept header or format GET parameter). Default is application/json.

5.9.15 filtering

Provides a list of fields that the Resource will accept client filtering on. Default is {}.

Keys should be the fieldnames as strings while values should be a list of accepted filter types.
5.9.16 ordering

Specifies the what fields the Resource should allow ordering on. Default is `[]`. Values should be the fieldnames as strings. When provided to the Resource by the order_by GET parameter, you can specify either the `fieldname` (ascending order) or `-fieldname` (descending order).

5.9.17 object_class

Provides the Resource with the object that serves as the data source. Default is `None`. In the case of ModelResource, this is automatically populated by the queryset option and is the model class.

5.9.18 queryset

Provides the Resource with the set of Django models to respond with. Default is `None`. Unused by Resource but present for consistency.

5.9.19 fields

Controls what introspected fields the Resource should include. A whitelist of fields. Default is `[]`.

5.9.20 excludes

Controls what introspected fields the Resource should NOT include. A blacklist of fields. Default is `[]`.

5.9.21 include_resource_uri

Specifies if the Resource should include an extra field that displays the detail URL (within the api) for that resource. Default is `True`.

5.9.22 include_absolute_url

Specifies if the Resource should include an extra field that displays the get_absolute_url for that object (on the site proper). Default is `False`.

5.10 Basic Filtering

ModelResource provides a basic Django ORM filter interface. Simply list the resource fields which you’d like to filter on and the allowed expression in a filtering property of your resource’s Meta class:
from tastypie.constants import ALL, ALL_WITH_RELATIONS

class MyResource(ModelResource):
    class Meta:
        filtering = {
            "slug": ('exact', 'startswith',),
            "title": ALL,
        }

Valid filtering values are: Django ORM filters (e.g. `startswith`, `exact`, `lte`, etc.) or the `ALL` or `ALL_WITH_RELATIONS` constants defined in `tastypie.constants`.

These filters will be extracted from URL query strings using the same double-underscore syntax as the Django ORM:

/api/v1/myresource/?slug=myslug
/api/v1/myresource/?slug__startswith=test

5.11 Advanced Filtering

If you need to filter things other than ORM resources or wish to apply additional constraints (e.g. text filtering using `django-haystack <http://haystacksearch.org>` rather than simple database queries) your `Resource` may define a custom `build_filters()` method which allows you to filter the queryset before processing a request:

```python
from haystack.query import SearchQuerySet

class MyResource(Resource):
    def build_filters(self, filters=None):
        if filters is None:
            filters = {}

        orm_filters = super(MyResource, self).build_filters(filters)

        if "q" in filters:
            sqs = SearchQuerySet().auto_query(filters['q'])

            orm_filters = {"pk__in": [ i.pk for i in sqs ]}

        return orm_filters
```

5.12 Resource Methods

Handles the data, request dispatch and responding to requests.

Serialization/deserialization is handled “at the edges” (i.e. at the beginning/end of the request/response cycle) so that everything internally is Python data structures.

This class tries to be non-model specific, so it can be hooked up to other data sources, such as search results, files, other data, etc.

5.12.1 `wrap_view`

Resource:`wrap_view(self, view)`
Wraps methods so they can be called in a more functional way as well as handling exceptions better.

Note that if BadRequest or an exception with a response attr are seen, there is special handling to either present a message back to the user or return the response traveling with the exception.

5.12.2 base_urls

Resource.base_urls(self)

The standard URLs this Resource should respond to. These include the list, detail, schema & multiple endpoints by default.

Should return a list of individual URLconf lines (NOT wrapped in patterns).

5.12.3 override_urls

Resource.override_urls(self)

A hook for adding your own URLs or overriding the default URLs. Useful for adding custom endpoints or overriding the built-in ones (from base_urls).

Should return a list of individual URLconf lines (NOT wrapped in patterns).

5.12.4 urls

Resource.urls(self)

Property

The endpoints this Resource responds to. A combination of base_urls & override_urls.

Mostly a standard URLconf, this is suitable for either automatic use when registered with an Api class or for including directly in a URLconf should you choose to.

5.12.5 determine_format

Resource.determine_format(self, request)

Used to determine the desired format.

Largely relies on tastypie.utils.mime.determine_format but here as a point of extension.

5.12.6 serialize

Resource.serialize(self, request, data, format, options=None)

Given a request, data and a desired format, produces a serialized version suitable for transfer over the wire.

Mostly a hook, this uses the Serializer from Resource._meta.
5.12.7 deserialize

Resource.deserialize(self, request, data, format='application/json')

Given a request, data and a format, deserializes the given data.

It relies on the request properly sending a CONTENT_TYPE header, falling back to application/json if not provided.

Mostly a hook, this uses the Serializer from Resource._meta.

5.12.8 alter_list_data_to_serialize

Resource.alter_list_data_to_serialize(self, request, data)

A hook to alter list data just before it gets serialized & sent to the user.

Useful for restructuring/renaming aspects of the what’s going to be sent.

Should accommodate for a list of objects, generally also including meta data.

5.12.9 alter_detail_data_to_serialize

Resource.alter_detail_data_to_serialize(self, request, data)

A hook to alter detail data just before it gets serialized & sent to the user.

Useful for restructuring/renaming aspects of the what’s going to be sent.

Should accommodate for receiving a single bundle of data.

5.12.10 alter_deserialized_list_data

Resource.alter_deserialized_list_data(self, request, data)

A hook to alter list data just after it has been received from the user & gets deserialized.

Useful for altering the user data before any hydration is applied.

5.12.11 alter_deserialized_detail_data

Resource.alter_deserialized_detail_data(self, request, data)

A hook to alter detail data just after it has been received from the user & gets deserialized.

Useful for altering the user data before any hydration is applied.

5.12.12 dispatch_list

Resource.dispatch_list(self, request, **kwargs)

A view for handling the various HTTP methods (GET/POST/PUT/DELETE) over the entire list of resources.

Relies on Resource.dispatch for the heavy-lifting.
5.12.13 dispatch_detail

Resource: \texttt{dispatch\_detail}(\texttt{self, request, **kwargs})

A view for handling the various HTTP methods (GET/POST/PUT/DELETE) on a single resource.
Relies on Resource: \texttt{dispatch} for the heavy-lifting.

5.12.14 dispatch

Resource: \texttt{dispatch}(\texttt{self, request\_type, request, **kwargs})

Handles the common operations (allowed HTTP method, authentication, throttling, method lookup) surrounding most CRUD interactions.

5.12.15 remove_api_resource_names

Resource: \texttt{remove\_api\_resource\_names}(\texttt{self, url\_dict})

Given a dictionary of regex matches from a URLconf, removes \texttt{api\_name} and/or \texttt{resource\_name} if found.
This is useful for converting URLconf matches into something suitable for data lookup. For example:

\begin{verbatim}
Model.objects.filter(**self.remove_api_resource_names(matches))
\end{verbatim}

5.12.16 method_check

Resource: \texttt{method\_check}(\texttt{self, request, allowed=None})

Ensures that the HTTP method used on the request is allowed to be handled by the resource.

Takes an \texttt{allowed} parameter, which should be a list of lowercase HTTP methods to check against. Usually, this looks like:

\begin{verbatim}
# The most generic lookup.
self.method_check(request, self._meta.allowed_methods)

# A lookup against what's allowed for list-type methods.
self.method_check(request, self._meta.list_allowed_methods)

# A useful check when creating a new endpoint that only handles
# GET.
self.method_check(request, ['get'])
\end{verbatim}

5.12.17 is_authorized

Resource: \texttt{is\_authorized}(\texttt{self, request, object=None})

Handles checking of permissions to see if the user has authorization to GET, POST, PUT, or DELETE this resource.
If \texttt{object} is provided, the authorization backend can apply additional row-level permissions checking.
5.12.18 is_authenticated

Resource.is_authenticated(self, request)
Handles checking if the user is authenticated and dealing with unauthenticated users.
Mostly a hook, this uses class assigned to authentication from Resource._meta.

5.12.19 throttle_check

Resource.throttle_check(self, request)
Handles checking if the user should be throttled.
Mostly a hook, this uses class assigned to throttle from Resource._meta.

5.12.20 log_throttled_access

Resource.log_throttled_access(self, request)
Handles the recording of the user’s access for throttling purposes.
Mostly a hook, this uses class assigned to throttle from Resource._meta.

5.12.21 build_bundle

Resource.build_bundle(self, obj=None, data=None)
Given either an object, a data dictionary or both, builds a Bundle for use throughout the dehydrate/hydrate cycle.
If no object is provided, an empty object from Resource._meta.object_class is created so that attempts to access bundle.obj do not fail.

5.12.22 build_filters

Resource.build_filters(self, filters=None)
Allows for the filtering of applicable objects.
This needs to be implemented at the user level.
ModelResource includes a full working version specific to Django’s Models.

5.12.23 apply_sorting

Resource.apply_sorting(self, obj_list, options=None)
Allows for the sorting of objects being returned.
This needs to be implemented at the user level.
ModelResource includes a full working version specific to Django’s Models.
5.12.24 get_resource_uri

Resource.get_resource_uri(self, bundle_or_obj)

This needs to be implemented at the user level.

A return reverse("api_dispatch_detail", kwargs={‘resource_name’: self.resource_name, ‘pk’: object.id}) should be all that would be needed.

ModelResource includes a full working version specific to Django’s Models.

5.12.25 get_resource_list_uri

Resource.get_resource_list_uri(self)

Returns a URL specific to this resource’s list endpoint.

5.12.26 get_via_uri

Resource.get_via_uri(self, uri)

This pulls apart the salient bits of the URI and populates the resource via a obj_get.

If you need custom behavior based on other portions of the URI, simply override this method.

5.12.27 full_dehydrate

Resource.full_dehydrate(self, obj)

Given an object instance, extract the information from it to populate the resource.

5.12.28 dehydrate

Resource.dehydrate(self, bundle)

A hook to allow a final manipulation of data once all fields/methods have built out the dehydrated data.

Useful if you need to access more than one dehydrated field or want to annotate on additional data.

Must return the modified bundle.

5.12.29 full_hydrate

Resource.full_hydrate(self, bundle)

Given a populated bundle, distill it and turn it back into a full-fledged object instance.

5.12.30 hydrate

Resource.hydrate(self, bundle)

A hook to allow a final manipulation of data once all fields/methods have built out the hydrated data.

Useful if you need to access more than one hydrated field or want to annotate on additional data.

Must return the modified bundle.
5.12.31 hydrate_m2m

Resource.\texttt{hydrate} \texttt{m}2\texttt{m}(self, bundle)

Populate the ManyToMany data on the instance.

5.12.32 build_schema

Resource.\texttt{build} \texttt{schema}(self)

Returns a dictionary of all the fields on the resource and some properties about those fields.

Used by the \texttt{schema/} endpoint to describe what will be available.

5.12.33 dehydrate_resource_uri

Resource.\texttt{dehydrate} \texttt{resource} \texttt{uri}(self, bundle)

For the automatically included \texttt{resource_uri} field, dehydrate the URI for the given bundle.

Returns empty string if no URI can be generated.

5.12.34 generate_cache_key

Resource.\texttt{generate} \texttt{cache} \texttt{key}(self, *args, **kwargs)

Creates a unique-enough cache key.

This is based off the current api\_name/resource\_name/args/kwargs.

5.12.35 get_object_list

Resource.\texttt{get} \texttt{object} \texttt{list}(self, request)

A hook to allow making returning the list of available objects.

\textit{This needs to be implemented at the user level.}

ModelResource includes a full working version specific to Django’s Models.

5.12.36 apply_authorization_limits

Resource.\texttt{apply} \texttt{authorization} \texttt{limits}(self, request, object_list)

Allows the Authorization class to further limit the object list. Also a hook to customize per Resource.

Calls Authorization.\texttt{apply} \texttt{limits} if available.

5.12.37 can_create

Resource.\texttt{can} \texttt{create}(self)

Checks to ensure post is within allowed_methods.
5.12.38 **can_update**

Resource.**can_update**(self)
Checks to ensure put is within allowed_methods.
Used when hydrating related data.

5.12.39 **can_delete**

Resource.**can_delete**(self)
Checks to ensure delete is within allowed_methods.

5.12.40 **obj_get_list**

Resource.**obj_get_list**(self, request=None, **kwargs)
Fetches the list of objects available on the resource.
*This needs to be implemented at the user level.*
ModelResource includes a full working version specific to Django’s Models.

5.12.41 **cached_obj_get_list**

Resource.**cached_obj_get_list**(self, request=None, **kwargs)
A version of **obj_get_list** that uses the cache as a means to get commonly-accessed data faster.

5.12.42 **obj_get**

Resource.**obj_get**(self, request=None, **kwargs)
Fetches an individual object on the resource.
*This needs to be implemented at the user level.* If the object can not be found, this should raise a NotFound exception.
ModelResource includes a full working version specific to Django’s Models.

5.12.43 **cached_obj_get**

Resource.**cached_obj_get**(self, request=None, **kwargs)
A version of **obj_get** that uses the cache as a means to get commonly-accessed data faster.

5.12.44 **obj_create**

Resource.**obj_create**(self, bundle, request=None, **kwargs)
Creates a new object based on the provided data.
*This needs to be implemented at the user level.*
ModelResource includes a full working version specific to Django’s Models.
5.12.45 obj_update

Resource.obj_update(self, bundle, request=None, **kwargs)

Updates an existing object (or creates a new object) based on the provided data.
This needs to be implemented at the user level.
ModelResource includes a full working version specific to Django’s Models.

5.12.46 obj_delete_list

Resource.obj_delete_list(self, request=None, **kwargs)

Deletes an entire list of objects.
This needs to be implemented at the user level.
ModelResource includes a full working version specific to Django’s Models.

5.12.47 obj_delete

Resource.obj_delete(self, request=None, **kwargs)

Deletes a single object.
This needs to be implemented at the user level.
ModelResource includes a full working version specific to Django’s Models.

5.12.48 create_response

Resource.create_response(self, request, data)

Extracts the common “which-format/serialize/return-response” cycle.
Mostly a useful shortcut/hook.

5.12.49 is_valid

Resource.is_valid(self, bundle, request=None)

Handles checking if the data provided by the user is valid.
Mostly a hook, this uses class assigned to validation from Resource._meta.
If validation fails, an error is raised with the error messages serialized inside it.

5.12.50 rollback

Resource.rollback(self, bundles)

Given the list of bundles, delete all objects pertaining to those bundles.
This needs to be implemented at the user level. No exceptions should be raised if possible.
ModelResource includes a full working version specific to Django’s Models.
5.12.51 get_list

Resource.get_list(self, request, **kwargs)
Returns a serialized list of resources.
Calls obj_get_list to provide the data, then handles that result set and serializes it.
Should return a HttpResponse (200 OK).

5.12.52 get_detail

Resource.get_detail(self, request, **kwargs)
Returns a single serialized resource.
Calls cached_obj_get/obj_get to provide the data, then handles that result set and serializes it.
Should return a HttpResponse (200 OK).

5.12.53 put_list

Resource.put_list(self, request, **kwargs)
Replaces a collection of resources with another collection.
Calls delete_list to clear out the collection then obj_create with the provided the data to create the new collection.
Return HttpAccepted (204 No Content).

5.12.54 put_detail

Resource.put_detail(self, request, **kwargs)
Either updates an existing resource or creates a new one with the provided data.
Calls obj_update with the provided data first, but falls back to obj_create if the object does not already exist.
If a new resource is created, return HttpCreated (201 Created). If an existing resource is modified, return HttpAccepted (204 No Content).

5.12.55 post_list

Resource.post_list(self, request, **kwargs)
Creates a new resource/object with the provided data.
Calls obj_create with the provided data and returns a response with the new resource’s location.
If a new resource is created, return HttpCreated (201 Created).
5.12.56 post_detail

Resource.post_detail (self, request, **kwargs)

Creates a new subcollection of the resource under a resource.
This is not implemented by default because most people’s data models aren’t self-referential.
If a new resource is created, return HttpCreated (201 Created).

5.12.57 delete_list

Resource.delete_list (self, request, **kwargs)

Destroys a collection of resources/objects.
Calls obj_delete_list.
If the resources are deleted, return HttpAccepted (204 No Content).

5.12.58 delete_detail

Resource.delete_detail (self, request, **kwargs)

Destroys a single resource/object.
Calls obj_delete.
If the resource is deleted, return HttpAccepted (204 No Content). If the resource did not exist, return HttpGone (410 Gone).

5.12.59 get_schema

Resource.get_schema (self, request, **kwargs)

Returns a serialized form of the schema of the resource.
Calls build_schema to generate the data. This method only responds to HTTP GET.
Should return a HttpResponse (200 OK).

5.12.60 get_multiple

Resource.get_multiple (self, request, **kwargs)

Returns a serialized list of resources based on the identifiers from the URL.
Calls obj_get to fetch only the objects requested. This method only responds to HTTP GET.
Should return a HttpResponse (200 OK).
5.13 ModelResource Methods

A subclass of Resource designed to work with Django's Models.
This class will introspect a given Model and build a field list based on the fields found on the model (excluding relational fields).
Given that it is aware of Django’s ORM, it also handles the CRUD data operations of the resource.

5.13.1 should_skip_field

ModelResource.should_skip_field(cls, field)

Class method
Given a Django model field, return if it should be included in the contributed ApiFields.

5.13.2 api_field_from_django_field

ModelResource.api_field_from_django_field(cls, f, default=CharField)

Class method
Returns the field type that would likely be associated with each Django type.

5.13.3 get_fields

ModelResource.get_fields(cls, fields=None, excludes=None)

Class method
Given any explicit fields to include and fields to exclude, add additional fields based on the associated model.

5.13.4 check_filtering

ModelResource.check_filtering(self, field_name, filter_type='exact', filter_bits=None)

Given a field name, a optional filter type and an optional list of additional relations, determine if a field can be filtered on.
If a filter does not meet the needed conditions, it should raise an InvalidFilterError.
If the filter meets the conditions, a list of attribute names (not field names) will be returned.

5.13.5 build_filters

ModelResource.build_filters(self, filters=None)

Given a dictionary of filters, create the necessary ORM-level filters.
Keys should be resource fields, NOT model fields.
Valid values are either a list of Django filter types (i.e. ['startswith', 'exact', 'lte']), the ALL constant or the ALL_WITH_RELATIONS constant.
At the declarative level:
filtering = {
    'resource_field_name': ['exact', 'startswith', 'endswith', 'contains'],
    'resource_field_name_2': ['exact', 'gt', 'gte', 'lt', 'lte', 'range'],
    'resource_field_name_3': ALL,
    'resource_field_name_4': ALL_WITH_RELATIONS,
    ...
}

Accepts the filters as a dict. None by default, meaning no filters.

5.13.6 **apply_sorting**

ModelResource.**apply_sorting**(self, obj_list, options=None)

Given a dictionary of options, apply some ORM-level sorting to the provided QuerySet.

Looks for the order_by key and handles either ascending (just the field name) or descending (the field name with a - in front).

The field name should be the resource field, NOT model field.

5.13.7 **get_object_list**

ModelResource.**get_object_list**(self, request)

A ORM-specific implementation of get_object_list.

Returns a QuerySet that may have been limited by other overrides.

5.13.8 **obj_get_list**

ModelResource.**obj_get_list**(self, filters=None, **kwargs)

A ORM-specific implementation of obj_get_list.

Takes an optional filters dictionary, which can be used to narrow the query.

5.13.9 **obj_get**

ModelResource.**obj_get**(self, **kwargs)

A ORM-specific implementation of obj_get.

Takes optional kwargs, which are used to narrow the query to find the instance.

5.13.10 **obj_create**

ModelResource.**obj_create**(self, bundle, **kwargs)

A ORM-specific implementation of obj_create.
5.13.11 obj_update

ModelResource.obj_update(self, bundle, **kwargs)
A ORM-specific implementation of obj_update.

5.13.12 obj_delete_list

ModelResource.obj_delete_list(self, **kwargs)
A ORM-specific implementation of obj_delete_list.
Takes optional kwargs, which can be used to narrow the query.

5.13.13 obj_delete

ModelResource.obj_delete(self, **kwargs)
A ORM-specific implementation of obj_delete.
Takes optional kwargs, which are used to narrow the query to find the instance.

5.13.14 rollback

ModelResource.rollback(self, bundles)
A ORM-specific implementation of rollback.
Given the list of bundles, delete all models pertaining to those bundles.

5.13.15 save_m2m

ModelResource.save_m2m(self, bundle)
Handles the saving of related M2M data.
Due to the way Django works, the M2M data must be handled after the main instance, which is why this isn’t a part of the main save bits.
Currently slightly inefficient in that it will clear out the whole relation and recreate the related data as needed.

5.13.16 get_resource_uri

ModelResource.get_resource_uri(self, bundle_or_obj)
Handles generating a resource URI for a single resource.
Uses the model’s pk in order to create the URI.
In terms of a REST-style architecture, the “api” is a collection of resources. In Tastypie, the Api gathers together the Resources & provides a nice way to use them as a set. It handles many of the URLconf details for you, provides a helpful “top-level” view to show what endpoints are available & some extra URL resolution juice.

6.1 Quick Start

A sample api definition might look something like (usually located in a URLconf):

```python
from tastypie.api import Api
from myapp.api.resources import UserResource, EntryResource

v1_api = Api(api_name='v1')
v1_api.register(UserResource())
v1_api.register(EntryResource())

# Standard bits...
urlpatterns = patterns('',
    (r'^api/', include(v1_api.urls)),
)
```

6.2 Api Methods

Implements a registry to tie together the various resources that make up an API.
Especially useful for navigation, HATEOAS and for providing multiple versions of your API.
Optionally supplying api_name allows you to name the API. Generally, this is done with version numbers (i.e. v1, v2, etc.) but can be named any string.

6.2.1 register

```python
Api.register(self, resource, canonical=True):
```

Registers an instance of a Resource subclass with the API.
Optionally accept a canonical argument, which indicates that the resource being registered is the canonical variant. Defaults to True.
6.2.2 unregister

Api.unregister(self, resource_name):
If present, unregisters a resource from the API.

6.2.3 canonical_resource_for

Api.canonical_resource_for(self, resource_name):
Returns the canonical resource for a given resource_name.

override_urls

Api.override_urls(self):
A hook for adding your own URLs or overriding the default URLs. Useful for adding custom endpoints or overriding
the built-in ones.
Should return a list of individual URLconf lines (NOT wrapped in patterns).

6.2.4 urls

Api.urls(self):
Property
Provides URLconf details for the Api and all registered Resources beneath it.

6.2.5 top_level

Api.top_level(self, request, api_name=None):
A view that returns a serialized list of all resources registers to the Api. Useful for discovery.
When designing an API, an important component is defining the representation of the data you’re presenting. Like Django models, you can control the representation of a Resource using fields. There are a variety of fields for various types of data.

### 7.1 Quick Start

For the impatient:

```python
import datetime
from tastypie import fields
from tastypie.resources import Resource
from myapp.api.resources import ProfileResource, NoteResource

class PersonResource(Resource):
    name = fields.CharField(attribute='name')
    age = fields.IntegerField(attribute='years_old', null=True)
    created = fields.DateTimeField(readonly=True, help_text='When the person was created', default=datetime.datetime.now)
    is_active = fields.BooleanField(default=True)
    profile = fields.ToOneField(ProfileResource, 'profile')
    notes = fields.ToManyField(NoteResource, 'notes', full=True)
```

### 7.2 Standard Data Fields

All standard data fields have a common base class ApiField which handles the basic implementation details.

**Note:** You should not use the ApiField class directly. Please use one of the subclasses that is more correct for your data.

#### 7.2.1 Common Field Options

All ApiField objects accept the following options.
attribute

ApiField.attribute
A string naming an instance attribute of the object wrapped by the Resource. The attribute will be accessed during the 
dehydrate or or written during the hydrate.
Defaults to None, meaning data will be manually accessed.

default

ApiField.default
Provides default data when the object being dehydrated/hydrated has no data on the field.
Defaults to tastypie.fields.NOT_PROVIDED.

null

ApiField.null
Indicates whether or not a None is allowable data on the field. Defaults to False.

readonly

ApiField.readonly
Indicates whether the field is used during the hydrate or not. Defaults to False.

unique

ApiField.unique
Indicates whether the field is a unique identifier for the object.

help_text

ApiField.help_text
A human-readable description of the field exposed at the schema level. Defaults to the per-Field definition.

7.2.2 Field Types

7.2.3 BooleanField

A boolean field.
Covers both models.BooleanField and models.NullBooleanField.

7.2.4 CharField

A text field of arbitrary length.
Covers both models.CharField and models.TextField.
7.2.5 DateField
A date field.

7.2.6 DateTimeField
A datetime field.

7.2.7 DecimalField
A decimal field.

7.2.8 DictField
A dictionary field.

7.2.9 FileField
A file-related field.
Covers both models.FileField and models.ImageField.

7.2.10 FloatField
A floating point field.

7.2.11 IntegerField
An integer field.

7.2.12 ListField
A list field.

7.3 Relationship Fields
Provides access to data that is related within the database.
The RelatedField base class is not intended for direct use but provides functionality that ToOneField andToManyField build upon.
The contents of this field actually point to another Resource, rather than the related object. This allows the field to represent its data in different ways.
The abstractions based around this are “leaky” in that, unlike the other fields provided by tastypie, these fields don’t handle arbitrary objects very well. The subclasses use Django’s ORM layer to make things go, though there is no ORM-specific code at this level.

### 7.3.1 Common Field Options

In addition to the common attributes for all ApiField, relationship fields accept the following.

**to**

```
RelatedField.to
```

The to argument should point to a Resource class, NOT to a Model. Required.

**full**

```
RelatedField.full
```

Indicates how the related Resource will appear post-dehydrate. If False, the related Resource will appear as a URL to the endpoint of that resource. If True, the result of the sub-resource’s dehydrate will be included in full.

**related_name**

```
RelatedField.related_name
```

Currently unused, as unlike Django’s ORM layer, reverse relations between Resource classes are not automatically created. Defaults to None.

### 7.3.2 Field Types

**ToOneField**

Provides access to related data via foreign key.

This subclass requires Django’s ORM layer to work properly.

**OneToOneField**

An alias to ToOneField for those who prefer to mirror django.db.models.

**ForeignKey**

An alias to ToOneField for those who prefer to mirror django.db.models.
ToManyField

Provides access to related data via a join table. This subclass requires Django’s ORM layer to work properly. This field also has special behavior when dealing with attribute in that it can take a callable. For instance, if you need to filter the reverse relation, you can do something like:

```python
subjects = fields.ToManyField(SubjectResource, ToManyField(SubjectResource, attribute=lambda bundle: Subject.objects.filter(notes=bundle.obj, name__startswith='Personal'))
```

Note that the hydrate portions of this field are quite different than any other field. hydrate_m2m actually handles the data and relations. This is due to the way Django implements M2M relationships.

ManyToManyField

An alias to ToManyField for those who prefer to mirror django.db.models.

OneToManyField

An alias to ToManyField for those who prefer to mirror django.db.models.
When adding an API to your site, it’s important to understand that most consumers of the API will not be people, but instead machines. This means that the traditional “fetch-read-click” cycle is no longer measured in minutes but in seconds or milliseconds.

As such, caching is a very important part of the deployment of your API. Tastypie ships with two classes to make working with caching easier. These caches store at the object level, reducing access time on the database.

However, it’s worth noting that these do NOT cache serialized representations. For heavy traffic, we’d encourage the use of a caching proxy, especially Varnish, as it shines under this kind of usage. It’s far faster than Django views and already neatly handles most situations.

### 8.1 Usage

Using these classes is simple. Simply provide them (or your own class) as a Meta option to the Resource in question. For example:

```python
from django.contrib.auth.models import User
from tastypie.cache import SimpleCache
from tastypie.resources import ModelResource

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'auth/user'
        excludes = ['email', 'password', 'is_superuser']
        # Add it here.
        cache = SimpleCache()
```

### 8.2 Caching Options

Tastypie ships with the following Cache classes:

#### 8.2.1 NoCache

The no-op cache option, this does no caching but serves as an api-compatible plug. Very useful for development.
### 8.2.2 SimpleCache

This option does basic object caching, attempting to find the object in the cache & writing the object to the cache. It uses Django’s current `CACHE_BACKEND` to store cached data.

### 8.3 Implementing Your Own Cache

Implementing your own Cache class is as simple as subclassing `NoCache` and overriding the `get` & `set` methods. For example, a json-backed cache might look like:

```python
import json
from django.conf import settings
from tastypie.cache import NoCache

class JSONCache(NoCache):
    def _load(self):
        data_file = open(settings.TASTYPIE_JSON_CACHE, 'r')
        return json.load(data_file)

    def _save(self, data):
        data_file = open(settings.TASTYPIE_JSON_CACHE, 'w')
        return json.dump(data, data_file)

    def get(self, key):
        data = self._load()
        return data.get(key, None)

    def set(self, key, value, timeout=60):
        data = self._load()
        data[key] = value
        self._save(data)
```

Note that this is *NOT* necessarily an optimal solution, but is simply demonstrating how one might go about implementing your own Cache.
Validation allows you to ensure that the data being submitted by the user is appropriate for storage. This can range from simple type checking on up to complex validation that compares different fields together.

If the data is valid, an empty dictionary is returned and processing continues as normal. If the data is invalid, a dictionary of error messages (keys being the field names, values being a list of error messages). This will be immediately returned to the user, serialized in the format they requested.

### 9.1 Usage

Using these classes is simple. Simply provide them (or your own class) as a `Meta` option to the `Resource` in question. For example:

```python
from django.contrib.auth.models import User
from tastypie.validation import Validation
from tastypie.resources import ModelResource

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'auth/user'
        excludes = ['email', 'password', 'is_superuser']
        # Add it here.
        validation = Validation()
```

### 9.2 Validation Options

Tastypie ships with the following `Validation` classes:

#### 9.2.1 Validation

The no-op validation option, the data submitted is always considered to be valid.

This is the default class hooked up to `Resource/ModelResource`. 
9.2.2 FormValidation

A more complex form of validation, this class accepts a `form_class` argument to its constructor. You supply a Django `Form` (or `ModelForm`, though `save` will never get called) and Tastypie will verify the data in the Bundle against the form.

**Warning:** Data in the bundle must line up with the fieldnames in the `Form`. If they do not, you’ll need to either munge the data or change your form.

Usage looks like:

```python
definition
from django import forms
class NoteForm(forms.Form):
    title = forms.CharField(max_length=100)
    slug = forms.CharField(max_length=50)
    content = forms.CharField(required=False, widget=forms.Textarea)
    is_active = forms.BooleanField()

form = FormValidation(form_class=NoteForm)
```

9.3 Implementing Your Own Validation

Implementing your own Validation classes is a simple process. The constructor can take whatever **kwargs it needs (if any). The only other method to implement is the `is_valid` method:

```python
from tastypie.validation import Validation
class AwesomeValidation(Validation):
    def is_valid(self, bundle, request=None):
        if not bundle.data:
            return {'__all__': 'Not quite what I had in mind.'}

        errors = {}

        for key, value in bundle.data.items():
            if not isinstance(value, basestring):
                continue

            if not 'awesome' in value:
                errors[key] = ['NOT ENOUGH AWESOME. NEEDS MORE. ']

        return errors
```

Under this validation, every field that’s a string is checked for the word ‘awesome’. If it’s not in the string, it’s an error.
CHAPTER 10

Authentication / Authorization

Authentication & authorization make up the components needed to verify that a certain user has access to the API and what they can do with it.

Authentication answers the question “can they see this data?” This usually involves requiring credentials, such as an API key or username/password.

Authorization answers the question “what objects can they modify?” This usually involves checking permissions, but is open to other implementations.

10.1 Usage

Using these classes is simple. Simply provide them (or your own class) as a Meta option to the Resource in question. For example:

```python
from django.contrib.auth.models import User
from tastypie.authentication import BasicAuthentication
from tastypie.authorization import DjangoAuthorization
from tastypie.resources import ModelResource

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'auth/user'
        excludes = ['email', 'password', 'is_superuser']
        # Add it here.
        authentication = BasicAuthentication()
        authorization = DjangoAuthorization()
```

10.2 Authentication Options

Tastypie ships with the following Authentication classes:

10.2.1 Authentication

The no-op authentication option, the client is always allowed through. Very useful for development and read-only APIs.
10.2.2 BasicAuthentication

This authentication scheme uses HTTP Basic Auth to check a user’s credentials. The username is their django.contrib.auth.models.User username (assuming it is present) and their password should also correspond to that entry.

**Warning:** If you’re using Apache & mod_wsgi, you will need to enable WSGIPassAuthorization On. See [this post](#) for details.

10.2.3 ApiKeyAuthentication

As an alternative to requiring sensitive data like a password, the ApiKeyAuthentication allows you to collect just username & a machine-generated api key. Tastypie ships with a special Model just for this purpose, so you’ll need to ensure tastypie is in INSTALLED_APPS.

10.2.4 DigestAuthentication

This authentication scheme uses HTTP Digest Auth to check a user’s credentials. The username is their django.contrib.auth.models.User username (assuming it is present) and their password should be their machine-generated api key. As with ApiKeyAuthentication, tastypie should be included in INSTALLED_APPS.

**Warning:** If you’re using Apache & mod_wsgi, you will need to enable WSGIPassAuthorization On. See [this post](#) for details (even though it only mentions Basic auth).

10.3 Authorization Options

Tastypie ships with the following Authorization classes:

10.3.1 Authorization

The no-op authorization option, no permissions checks are performed.

**Warning:** This is a potentially dangerous option, as it means ANY recognized user can modify ANY data they encounter in the API. Be careful who you trust.

10.3.2 ReadOnlyAuthorization

This authorization class only permits reading data, regardless of what the Resource might think is allowed. This is the default Authorization class and the safe option.

10.3.3 DjangoAuthorization

The most advanced form of authorization, this checks the permission a user has granted to them (via django.contrib.auth.models.Permission). In conjunction with the admin, this is a very effective means of control.
10.4 Implementing Your Own Authentication/Authorization

Implementing your own Authentication/Authorization classes is a simple process. Authentication has two methods to override (one of which is optional but recommended to be customized) and Authorization has just one required method and one optional method:

```python
from tastypie.authentication import Authentication
from tastypie.authorization import Authorization

class SillyAuthentication(Authentication):
    def is_authenticated(self, request, **kwargs):
        if 'daniel' in request.user.username:
            return True
        return False

    # Optional but recommended
    def get_identifier(self, request):
        return request.user.username

class SillyAuthorization(Authorization):
    def is_authorized(self, request, object=None):
        if request.user.date_joined.year == 2010:
            return True
        else:
            return False

    # Optional but useful for advanced limiting, such as per user.
    def apply_limits(self, request, object_list):
        if request and hasattr(request, 'user'):
            return object_list.filter(author__username=request.user.username)
        return object_list.none()
```

Under this scheme, only users with ‘daniel’ in their username will be allowed in, and only those who joined the site in 2010 will be allowed to affect data.

If the optional apply_limits method is included, each user that fits the above criteria will only be able to access their own records.
Serialization can be one of the most contentious areas of an API. Everyone has their own requirements, their own preferred output format & the desire to have control over what is returned.

As a result, Tastypie ships with a serializer that tries to meet the basic needs of most use cases, and the flexibility to go outside of that when you need to.

The default Serializer supports the following formats:

- json
- jsonp
- xml
- yaml
- html

11.1 Usage

Using this class is simple. It is the default option on all Resource classes unless otherwise specified. The following code is a no-op, but demonstrate how you could use your own serializer:

```python
from django.contrib.auth.models import User
from tastypie.resources import ModelResource
from tastypie.serializers import Serializer

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'auth/user'
        excludes = ['email', 'password', 'is_superuser']
        # Add it here.
        serializer = Serializer()
```

11.2 Implementing Your Own Serializer

There are several different use cases here. We’ll cover simple examples of wanting a tweaked format & adding a different format.
To tweak a format, simply override its `to_<format>` & `from_<format>` methods. So adding the server time to all output might look like so:

```python
import time
from tastypie.serializers import Serializer

class CustomJSONSerializer(Serializer):
    def to_json(self, data, options=None):
        options = options or {}
        data = self.to_simple(data, options)
        # Add in the current time.
        data['requested_time'] = time.time()
        return simplejson.dumps(data, cls=json.DjangoJSONEncoder, sort_keys=True)

def from_json(self, content):
    data = simplejson.loads(content)
    if 'requested_time' in data:
        # Log the request here...
        pass
    return data
```

In the case of adding a different format, let’s say you want to add a CSV output option to the existing set. Your `Serializer` subclass might look like:

```python
import csv
import StringIO
from tastypie.serializers import Serializer

class CSVSerializer(Serializer):
    formats = ['json', 'jsonp', 'xml', 'yaml', 'html', 'csv']
    content_types = {
        'json': 'application/json',
        'jsonp': 'text/javascript',
        'xml': 'application/xml',
        'yaml': 'text/yaml',
        'html': 'text/html',
        'csv': 'text/csv',
    }

    def to_csv(self, data, options=None):
        options = options or {}
        data = self.to_simple(data, options)
        raw_data = StringIO.StringIO()
        # Untested, so this might not work exactly right.
        for item in data:
            writer = csv.DictWriter(raw_data, item.keys(), extrasaction='ignore')
            writer.write(item)
        return raw_data

    def from_csv(self, content):
        raw_data = StringIO.StringIO(content)
        data = []
        return data
```

In the case of adding a different format, let’s say you want to add a CSV output option to the existing set. Your `Serializer` subclass might look like:
# Untested, so this might not work exactly right.

```python
for item in csv.DictReader(raw_data):
    data.append(item)
return data
```

## 11.3 Serializer Methods

A swappable class for serialization.

This handles most types of data as well as the following output formats:

* json
* jsonp
* xml
* yaml
* html

It was designed to make changing behavior easy, either by overriding the various format methods (i.e. `to_json`), by changing the `formats/content_types` options or by altering the other hook methods.

### 11.3.1 get_mime_for_format

`Serializer.get_mime_for_format(self, format):`

Given a format, attempts to determine the correct MIME type.

If not available on the current `Serializer`, returns `application/json` by default.

### 11.3.2 format_datetime

`Serializer.format_datetime(data):`

A hook to control how datetimes are formatted.

Can be overridden at the `Serializer` level (`datetime_formatting`) or globally (via `settings.TASTYPIE_DATETIME_FORMATTING`).

Default is `iso-8601`, which looks like “2010-12-16T03:02:14”.

### 11.3.3 format_date

`Serializer.format_date(data):`

A hook to control how dates are formatted.

Can be overridden at the `Serializer` level (`datetime_formatting`) or globally (via `settings.TASTYPIE_DATETIME_FORMATTING`).

Default is `iso-8601`, which looks like “2010-12-16”.
11.3.4 format_time

Serializer.format_time(data):
A hook to control how times are formatted.
Can be overridden at the Serializer level (datetime_formatting) or globally (via settings.TASTYPIE_DATETIME_FORMATTING).
Default is iso-8601, which looks like “03:02:14”.

11.3.5 serialize

Serializer.serialize(self, bundle, format='application/json', options={}):
Given some data and a format, calls the correct method to serialize the data and returns the result.

11.3.6 deserialize

Serializer.deserialize(self, content, format='application/json'):
Given some data and a format, calls the correct method to deserialize the data and returns the result.

11.3.7 to_simple

Serializer.to_simple(self, data, options):
For a piece of data, attempts to recognize it and provide a simplified form of something complex.
This brings complex Python data structures down to native types of the serialization format(s).

11.3.8 to_etree

Serializer.to_etree(self, data, options=None, name=None, depth=0):
Given some data, converts that data to an etree.Element suitable for use in the XML output.

11.3.9 from_etree

Serializer.from_etree(self, data):
Not the smartest deserializer on the planet. At the request level, it first tries to output the deserialized subelement called “object” or “objects” and falls back to deserializing based on hinted types in the XML element attribute “type”.

11.3.10 to_json

Serializer.to_json(self, data, options=None):
Given some Python data, produces JSON output.
11.3.11 from_json

Serializer.from_json(self, content):
Given some JSON data, returns a Python dictionary of the decoded data.

11.3.12 to_jsonp

Serializer.to_jsonp(self, data, options=None):
Given some Python data, produces JSON output wrapped in the provided callback.

11.3.13 to_xml

Serializer.to_xml(self, data, options=None):
Given some Python data, produces XML output.

11.3.14 from_xml

Serializer.from_xml(self, content):
Given some XML data, returns a Python dictionary of the decoded data.

11.3.15 to_yaml

Serializer.to_yaml(self, data, options=None):
Given some Python data, produces YAML output.

11.3.16 from_yaml

Serializer.from_yaml(self, content):
Given some YAML data, returns a Python dictionary of the decoded data.

11.3.17 to_html

Serializer.to_html(self, data, options=None):
Reserved for future usage.
The desire is to provide HTML output of a resource, making an API available to a browser. This is on the TODO list but not currently implemented.

11.3.18 from_html

Serializer.from_html(self, content):
Reserved for future usage.
The desire is to handle form-based (maybe Javascript?) input, making an API available to a browser. This is on the TODO list but not currently implemented.
Sometimes, the client on the other end may request data too frequently or you have a business use case that dictates that the client should be limited to a certain number of requests per hour.

For this, Tastypie includes throttling as a way to limit the number of requests in a timeframe.

### 12.1 Usage

To specify a throttle, add the `Throttle` class to the `Meta` class on the `Resource`:

```python
from django.contrib.auth.models import User
from tastypie.resources import ModelResource
from tastypie.throttle import BaseThrottle

class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()
        resource_name = 'auth/user'
        excludes = ['email', 'password', 'is_superuser']
        # Add it here.
        throttle = BaseThrottle(throttle_at=100)
```

### 12.2 Throttle Options

Each of the `Throttle` classes accepts the following initialization arguments:

- `throttle_at` - the number of requests at which the user should be throttled. Default is 150 requests.
- `timeframe` - the length of time (in seconds) in which the user make up to the `throttle_at` requests. Default is 3600 seconds ( 1 hour).
- `expiration` - the length of time to retain the times the user has accessed the api in the cache. Default is 604800 ( 1 week).

Tastypie ships with the following `Throttle` classes:
12.2.1 BaseThrottle

The no-op throttle option, this does no throttling but implements much of the common logic and serves as an api-compatible plug. Very useful for development.

12.2.2 CacheThrottle

This uses just the cache to manage throttling. Fast but prone to cache misses and/or cache restarts.

12.2.3 CacheDBThrottle

A write-through option that uses the cache first & foremost, but also writes through to the database to persist access times. Useful for logging client accesses & with RAM-only caches.

12.3 Implementing Your Own Throttle

Writing a Throttle class is not quite as simple as the other components. There are two important methods, should_be_throttled & accessed. The should_be_throttled method dictates whether or not the client should be throttled. The accessed method allows for the recording of the hit to the API.

An example of a subclass might be:

```python
import random
from tastypie.throttle import BaseThrottle

class RandomThrottle(BaseThrottle):
    def should_be_throttled(self, identifier, **kwargs):
        if random.randint(0, 10) % 2 == 0:
            return True
        return False

def accessed(self, identifier, **kwargs):
    pass
```

This throttle class would pick a random number between 0 & 10. If the number is even, their request is allowed through; otherwise, their request is throttled & rejected.
13.1 Adding Custom Values

You might encounter cases where you wish to include additional data in a response which is not obtained from a field or method on your model. You can easily extend the `dehydrate()` method to provide additional values:

```python
class MyModelResource(Resource):
    class Meta:
        qs = MyModel.objects.all()

    def dehydrate(self, bundle):
        bundle.data['custom_field'] = "Whatever you want"
        return bundle
```

13.2 Using Your Resource In Regular Views

In addition to using your resource classes to power the API, you can also use them to write other parts of your application, such as your views. For instance, if you wanted to encode user information in the page for some Javascript's use, you could do the following:

```python
from myapp.api.resources import UserResource

def user_detail(request, username):
    ur = UserResource()
    user = ur.obj_get_detail(username=username)

    # Other things get prepped to go into the context then...

    return render_to_response('myapp/user_detail.html', {
        # Other things here.
        "user_json": ur.serialize(None, ur.full_dehydrate(obj=user), 'application/json'),
    })
```
13.3 Using Non-PK Data For Your URLs

By convention, ModelResource's usually expose the detail endpoints utilizing the primary key of the Model they represent. However, this is not a strict requirement. Each URL can take other named URLconf parameters that can be used for the lookup.

For example, if you want to expose User resources by username, you can do something like the following:

```python
# myapp/api/resources.py
class UserResource(ModelResource):
    class Meta:
        queryset = User.objects.all()

    def override_urls(self):
        return [
            url(r'^{%s}$/\w\d_.-+/\s' % self._meta.resource_name, self.wrap_view('dispatch_detail'), name='api_dispatch_detail'),
        ]
```

The added URLconf matches before the standard URLconf included by default & matches on the username provided in the URL.

13.4 Nested Resources

You can also do “nested resources” (resources within another related resource) by lightly overriding the override_urls method & adding on a new method to handle the children:

```python
class ParentResource(ModelResource):
    children = fields.ToManyField(ChildResource, 'children')

    def override_urls(self):
        return [
            url(r'^{%s}\w\[-/\s' % (self._meta.resource_name, trailing_slash()), self.wrap_view('get_children'), name='api_get_children'),
        ]

    def get_children(self, request, **kwargs):
        try:
            obj = self.cached_obj_get(request=request, **self.remove_api_resource_names(kwargs))
        except ObjectDoesNotExist:
            return
        except MultipleObjectsReturned:
            return HttpMultipleChoices("More than one resource is found at this URI.")
        child_resource = ChildResource()
        return child_resource.get_detail(request, parent_id=obj.pk)
```

Another alternative approach is to override the dispatch method:

```python
# myapp/api/resources.py
class EntryResource(ModelResource):
    user = fields.ForeignKey(UserResource, 'user')

    class Meta:
        queryset = Entry.objects.all()
        resource_name = 'entry'

    def dispatch(self, self, request_type, request, **kwargs):
```

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username = kwargs.pop('username')
kwargs['user'] = get_object_or_404(User, username=username)
return super(EntryResource, self).dispatch(request_type, request, **kwargs)

# urls.py
from django.conf.urls.defaults import *
from myapp.api import EntryResource

entry_resource = EntryResource()

urlpatterns = patterns('',
    # The normal jazz here, then...
    (r'^api/[^?]+', include(entry_resource.urls)),
)

13.5 Adding Search Functionality

Another common request is being able to integrate search functionality. This approach uses Haystack, though you could hook it up to any search technology. We leave the CRUD methods of the resource alone, choosing to add a new endpoint at /api/v1/notes/search/:

```python
from django.conf.urls.defaults import *
from django.core.paginator import Paginator, InvalidPage
from django.http import Http404
from haystack.query import SearchQuerySet
from tastypie.resources import ModelResource
from tastypie.utils import trailing_slash
from notes.models import Note
class NoteResource(ModelResource):
    class Meta:
        queryset = Note.objects.all()
        resource_name = 'notes'
def override_urls(self):
    return [
        url(r'^%(resource_name)s/search%s$' % (self._meta.resource_name, trailing_slash()), self.wrap_view('get_search'), name="api_get_search"),
    ]
def get_search(self, request, **kwargs):
    self.method_check(request, allowed=['get'])
    self.is_authenticated(request)
    self.throttle_check(request)
    # Do the query.
    sqs = SearchQuerySet().models(Note).load_all().auto_query(request.GET.get('q', ''))
    paginator = Paginator(sqs, 20)
    try:
        page = paginator.page(int(request.GET.get('page', 1)))
    except InvalidPage:
        raise Http404("Sorry, no results on that page.")
    objects = []
```

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for result in page.object_list:
    bundle = self.full_dehydrate(result.object)
    objects.append(bundle)

object_list = {
    'objects': objects,
}

self.log_throttled_access(request)
return self.create_response(request, object_list)

### 13.6 Creating per-user resources

One might want to create an API which will require every user to authenticate and every user will be working only with objects associated with him. Let’s see how to implement it for two basic operations: listing and creation of an object.

For listing we want to list only objects for which ‘user’ field matches ‘request.user’. This could be done my applying filter in `apply_authorization_limits` method of your resource.

For creating we’d have to wrap `obj_create` method of `ModelResource`. Then the resulting code will look something like:

```python
# myapp/api/resources.py
class EnvironmentResource(ModelResource):
    class Meta:
        queryset = Environment.objects.all()
        resource_name = 'environment'
        list_allowed_methods = ['get', 'post']
        authentication = ApiKeyAuthentication()
        authorization = Authorization()

    def obj_create(self, bundle, request=None, **kwargs):
        return super(EnvironmentResource, self).obj_create(bundle, request, user=request.user)

    def apply_authorization_limits(self, request, object_list):
        return object_list.filter(user=request.user)
```
There are some common problems people run into when using Tastypie for the first time. Some of the common problems and things to try appear below.

14.1 “I’m getting XML output in my browser but I want JSON output!”

This is actually not a bug and JSON support is present in your Resource. This issue is that Tastypie respects the Accept header your browser sends. Most browsers send something like:

```
Accept: application/xml, application/xhtml+xml, text/html; q=0.9, text/plain; q=0.8, image/png,*/*; q=0.5
```

Note that application/xml comes first, which is a format that Tastypie handles by default, hence why you receive XML.

If you use curl from the command line, you should receive JSON by default:

```
curl http://localhost:8000/api/v1/
```

If you want JSON in the browser, simply append ?format=json to your URL. Tastypie always respects this override first, before it falls back to the Accept header.
The following sites are a partial list of people using Tastypie. I’m always interested in adding more sites, so please find me (daniellindsley) via IRC or start a mailing list thread.

### 15.1 LJWorld Marketplace

- http://www2.ljworld.com/marketplace/api/v1/?format=json

### 15.2 Forkinit

Read-only API access to recipes.

- http://forkinit.com/
- http://forkinit.com/api/v1/?format=json

### 15.3 Read The Docs

A hosted documentation site, primarily for Python docs. General purpose read-write access.

- http://readthedocs.org/
- http://readthedocs.org/api/v1/?format=json

### 15.4 Luzme

An e-book search site that lets you fetch pricing information.

- http://luzme.com/
There are two primary ways of getting help. We have a mailing list hosted at Google (http://groups.google.com/group/django-tastypie/) and an IRC channel (#tastypie on irc.freenode.net) to get help, want to bounce idea or generally shoot the breeze.
Quick Start

1. Add `tastypie` to `INSTALLED_APPS`.
2. Create an `api` directory in your app with a bare `__init__.py`.
3. Create an `<my_app>/api/resources.py` file and place the following in it:

   ```python
   from tastypie.resources import ModelResource
   from my_app.models import MyModel

   class MyModelResource(ModelResource):
     class Meta:
       queryset = MyModel.objects.all()
       allowed_methods = ['get']
   ```

4. In your root URLconf, add the following code (around where the admin code might be):

   ```python
   from tastypie.api import Api
   from my_app.api.resources import MyModelResource

   v1_api = Api(api_name='v1')
   v1_api.register(MyModelResource())

   urlpatterns = patterns('',
   # ...more URLconf bits here...
   # Then add:
   (r'^api/', include(v1_api.urls)),
   )
   ```

5. Hit `http://localhost:8000/api/v1/?format=json` in your browser!
Requirements

Tastypie requires the following modules. If you use Pip, you can install the necessary bits via the included requirements.txt:

- Python 2.4+
- Django 1.0+
- mimeparse 0.1.3+ (http://code.google.com/p/mimeparse/)
  - Older versions will work, but their behavior on JSON/JSONP is a touch wonky.
- dateutil (http://labix.org/python-dateutil)
- lxml (http://codespeak.net/lxml/) if using the XML serializer
- pyyaml (http://pyyaml.org/) if using the YAML serializer

If you choose to use Python 2.4, be warned that you will also need to grab the following modules:

- uuid (present in 2.5+, downloadable from http://pypi.python.org/pypi/uuid/) if using the ApiKey authentication
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