

---

# **Neo4j.rb Documentation**

*Release 6.1.x*

**Chris Grigg, Brian Underwood**

May 27, 2016



<b>1</b>	<b>Introduction</b>	<b>3</b>
1.1	Terminology . . . . .	3
1.1.1	Neo4j . . . . .	3
1.1.2	Neo4j.rb . . . . .	3
1.2	Code Examples . . . . .	4
1.2.1	ActiveNode . . . . .	4
1.3	Setup . . . . .	4
<b>2</b>	<b>Setup</b>	<b>5</b>
2.1	Ruby on Rails . . . . .	5
2.1.1	Generating a new app . . . . .	5
2.1.2	Adding the gem to an existing project . . . . .	6
2.1.3	Rails configuration . . . . .	6
2.1.4	Configuring Faraday . . . . .	7
2.2	Any Ruby Project . . . . .	7
2.2.1	Connection . . . . .	7
2.3	Heroku . . . . .	7
2.3.1	Rails configuration . . . . .	8
<b>3</b>	<b>Rake Tasks</b>	<b>9</b>
<b>4</b>	<b>ActiveNode</b>	<b>11</b>
4.1	Properties . . . . .	11
4.1.1	Labels . . . . .	12
4.1.2	Indexes . . . . .	12
4.1.3	Constraints . . . . .	12
4.1.4	Labels . . . . .	12
4.1.5	Serialization . . . . .	13
4.2	Wrapping . . . . .	13
4.3	Callbacks . . . . .	14
4.4	created_at, updated_at . . . . .	14
4.5	Validation . . . . .	14
4.6	id property (primary key) . . . . .	14
4.7	Associations . . . . .	14
4.7.1	Creating Unique Relationships . . . . .	15
4.7.2	Eager Loading . . . . .	16
<b>5</b>	<b>ActiveRel</b>	<b>17</b>

5.1	When to Use? . . . . .	17
5.2	Setup . . . . .	17
5.3	Relationship Creation . . . . .	18
5.3.1	From an ActiveRecord Model . . . . .	18
5.3.2	From a <i>has_many</i> or <i>has_one</i> association . . . . .	18
5.3.3	Creating Unique Relationships . . . . .	18
5.4	Query and Loading existing relationships . . . . .	19
5.4.1	:each_rel, :each_with_rel, or :pluck methods . . . . .	19
5.5	Accessing related nodes . . . . .	19
5.6	Advanced Usage . . . . .	19
5.6.1	Separation of Relationship Logic . . . . .	19
5.7	Additional methods . . . . .	20
5.8	Regarding: from and to . . . . .	20
<b>6</b>	<b>Properties</b> . . . . .	<b>21</b>
6.1	Undeclared Properties . . . . .	22
6.1.1	Types and Conversion . . . . .	22
6.1.2	Custom Converters . . . . .	23
<b>7</b>	<b>Querying</b> . . . . .	<b>25</b>
7.1	Simple Query Methods . . . . .	25
7.1.1	.find . . . . .	25
7.1.2	.find_by . . . . .	25
7.2	Scope Method Chaining . . . . .	25
7.2.1	Querying the scope . . . . .	26
7.2.2	Chaining associations . . . . .	26
7.2.3	Associations and Unpersisted Nodes . . . . .	26
7.2.4	Parameters . . . . .	27
7.2.5	Variable-length relationships . . . . .	27
7.3	The Query API . . . . .	28
7.4	#proxy_as . . . . .	29
7.5	match_to and first_rel_to . . . . .	29
7.6	Finding in Batches . . . . .	29
7.7	Orm_Adapter . . . . .	29
7.8	Find or Create By... . . . .	29
<b>8</b>	<b>QueryClauseMethods</b> . . . . .	<b>31</b>
8.1	Neo4j::Core::Query . . . . .	31
8.1.1	#match . . . . .	31
8.2	#optional_match . . . . .	33
8.3	#using . . . . .	34
8.4	#where . . . . .	34
8.5	#where_not . . . . .	38
8.6	#match_nodes . . . . .	39
8.6.1	one node object . . . . .	39
8.7	integer . . . . .	40
8.8	two node objects . . . . .	40
8.9	node object and integer . . . . .	40
8.10	#unwind . . . . .	40
8.11	#return . . . . .	41
8.12	#order . . . . .	42
8.13	#limit . . . . .	43
8.14	#skip . . . . .	44
8.15	#with . . . . .	45

8.16	#create	46
8.17	#create_unique	47
8.18	#merge	48
8.19	#delete	49
8.20	#set_props	49
8.21	#set	50
8.22	#on_create_set	51
8.23	#on_match_set	52
8.24	#remove	53
8.25	#start	54
8.26	clause combinations	55
<b>9</b>	<b>Configuration</b>	<b>59</b>
9.1	In Rails	59
9.2	Other Ruby apps	59
9.2.1	Variables	59
<b>10</b>	<b>Contributing</b>	<b>61</b>
10.1	The Neo4j.rb Project	61
10.2	Low Hanging Fruit	61
10.3	Communicating With the Neo4j.rb Team	61
10.4	Running Specs	61
10.5	Before you submit your pull request	62
10.5.1	Automated Tools	62
10.5.2	Documentation	62
<b>11</b>	<b>API</b>	<b>63</b>
11.1	Neo4j	63
11.1.1	Shared	63
11.1.2	Neo4jrbError	101
11.1.3	RecordNotFound	101
11.1.4	InvalidPropertyOptionsError	101
11.1.5	Config	101
11.1.6	ClassWrapper	104
11.1.7	Railtie	104
11.1.8	Migration	106
11.1.9	Paginated	108
11.1.10	Timestamps	109
11.1.11	ActiveRel	109
11.1.12	Core	137
11.1.13	ActiveNode	137
11.1.14	ClassArguments	218
11.1.15	TypeConverters	219
11.1.16	Schema	219
11.1.17	Relationship	224
11.1.18	Node	225
11.1.19	Generators	226
11.1.20	Constants	228
11.1.21	Files	228
11.1.22	Methods	230
11.2	Rails	230
11.2.1	Generators	230
11.2.2	Constants	230
11.2.3	Files	230

11.2.4 Methods . . . . .	231
<b>12 Additional features include</b>	<b>233</b>
<b>13 Requirements</b>	<b>235</b>
<b>14 Indices and tables</b>	<b>237</b>

Contents:





---

## Introduction

---

- *Terminology*
  - *Neo4j*
  - *Neo4j.rb*
- *Code Examples*
  - *ActiveNode*
- *Setup*

Neo4j.rb is an ActiveRecord-inspired OGM (Object Graph Mapping, like [ORM](#)) for Ruby supporting Neo4j 2.1+.

## 1.1 Terminology

### 1.1.1 Neo4j

**Node** An *Object* or *Entity* which has a distinct identity. Can store arbitrary properties with values

**Label** A means of identifying nodes. Nodes can have zero or more labels. While similar in concept to relational table names, nodes can have multiple labels (i.e. a node could have the labels `Person` and `Teacher`)

**Relationship** A link from one node to another. Can store arbitrary properties with values. A direction is required but relationships can be traversed bi-directionally without a performance impact.

**Type** Relationships always have exactly one **type** which describes how it is relating it's source and destination nodes (i.e. a relationship with a `FRIEND_OF` type might connect two `Person` nodes)

### 1.1.2 Neo4j.rb

Neo4j.rb consists of the `neo4j` and `neo4j-core` gems.

**neo4j** Provides `ActiveNode` and `ActiveRel` modules for object modeling. Introduces *Model* and *Association* concepts (see below). Depends on `neo4j-core` and thus both are available when `neo4j` is used

**neo4j-core** Provides low-level connectivity, transactions, and response object wrapping. Includes `Query` class for generating Cypher queries with Ruby method chaining.

**Model** A Ruby class including either the `Neo4j::ActiveNode` module (for modeling nodes) or the `Neo4j::ActiveRel` module (for modeling relationships) from the `neo4j` gem. These modules give classes the ability to define properties, associations, validations, and callbacks

**Association** Defined on an `ActiveNode` model. Defines either a `has_one` or `has_many` relationship to a model. A higher level abstraction of a **Relationship**

## 1.2 Code Examples

With Neo4j.rb, you can use either high-level abstractions for convenience or low level APIs for flexibility.

### 1.2.1 ActiveNode

ActiveNode provides an Object Graph Model (OGM) for abstracting Neo4j concepts with an ActiveRecord-like API:

```
# Models to create nodes
person = Person.create(name: 'James', age: 15)

# Get object by attributes
person = Person.find_by(name: 'James', age: 15)

# Associations to traverse relationships
person.houses.map(&:address)

# Method-chaining to build and execute queries
Person.where(name: 'James').order(age: :desc).first

# Query building methods can be chained with associations
# Here we get other owners for pre-2005 vehicles owned by the person in question
person.vehicles(:v).where('v.year < 2005').owners(:other).to_a
```

## 1.3 Setup

See the next section for instructions on [Setup](#)

---

## Setup

---

The `neo4j.rb` gems (`neo4j` and `neo4j-core`) support both Ruby and JRuby and can be used with many different frameworks and services. If you're just looking to get started you'll probably want to use the `neo4j` gem which includes `neo4j-core` as a dependency.

Below are some instructions on how to get started:

### 2.1 Ruby on Rails

The following contains instructions on how to setup Neo4j with Rails. If you prefer a video to follow along you can use [this YouTube video](#)

There are two ways to add neo4j to your Rails project. You can [LINK](#) generate a new project [LINK](#) with Neo4j as the default model mapper or you can [LINK](#) add it manually [LINK](#).

#### 2.1.1 Generating a new app

To create a new Rails app with Neo4j as the default model mapper use `-m` to run a script from the Neo4j project and `-O` to exclude ActiveRecord like so:

```
rails new myapp -m http://neo4jrb.io/neo4j/neo4j.rb -O
```

---

**Note:** Due to network issues sometimes you may need to run this command two or three times for the file to download correctly

---

An example series of setup commands:

```
rails new myapp -m http://neo4jrb.io/neo4j/neo4j.rb -O
cd myapp
rake neo4j:install[community-latest]
rake neo4j:start

rails generate scaffold User name:string email:string
rails s
open http://localhost:3000/users
```

**See also:**

## 2.1.2 Adding the gem to an existing project

Include in your Gemfile:

```
# for rubygems
gem 'neo4j', '~> 6.1.0'
```

In application.rb:

```
require 'neo4j/railtie'
```

---

**Note:** Neo4j does not interfere with ActiveRecord and both can be used in the same application

---

If you want the rails generate command to generate Neo4j models by default you can modify application.rb like so:

```
class Application < Rails::Application
  # ...

  config.generators { |g| g.orm :neo4j }
end
```

## 2.1.3 Rails configuration

For both new apps and existing apps the following configuration applies:

An example config/neo4j.yml file:

```
development:
  type: server_db
  url: http://localhost:7474

test:
  type: server_db
  url: http://localhost:7575

production:
  type: server_db
  url: http://neo4j:password@localhost:7000
```

You can also use your Rails configuration. The following example can be put into config/application.rb or any of your environment configurations (config/environments/(development|test|production).rb) file:

```
config.neo4j.session_type = :server_db
config.neo4j.session_path = 'http://localhost:7474'
```

Neo4j requires authentication by default but if you install using the built-in rake tasks) authentication is disabled. If you are using authentication you can configure it like this:

```
config.neo4j.session_path = 'http://neo4j:password@localhost:7474'
```

Of course it's often the case that you don't want to expose your username / password / URL in your repository. In these cases you can use the NEO4J\_TYPE (either server\_db or embedded\_db) and NEO4J\_URL/NEO4J\_PATH environment variables.

## 2.1.4 Configuring Faraday

Faraday is used under the covers to connect to Neo4j. You can use the `initialize` option to initialize the Faraday session. Example:

```
config.neo4j.session_options = {initialize: { ssl: { verify: true }}}}
```

## 2.2 Any Ruby Project

Include either `neo4j` or `neo4j-core` in your Gemfile (`neo4j` includes `neo4j-core` as a dependency):

```
gem 'neo4j', '~> 6.1.0'
# OR
gem 'neo4j-core', '~> 6.1.0'
```

If using only `neo4j-core` you can optionally include the rake tasks (`documentation`) manually in your Rakefile:

```
# Both are optional

# This provides tasks to install/start/stop/configure Neo4j
load 'neo4j/tasks/neo4j_server.rake'
# This provides tasks to have migrations
load 'neo4j/tasks/migration.rake'
```

If you don't already have a server you can install one with the rake tasks from `neo4j_server.rake`. See the ([rake tasks documentation](#)) for details on how to install, configure, and start/stop a Neo4j server in your project directory.

### 2.2.1 Connection

To open a session to the neo4j server database:

#### In Ruby

```
# In JRuby or MRI, using Neo4j Server mode. When the railtie is included, this happens automatically
Neo4j::Session.open(:server_db)
```

#### Embedded mode in JRuby

In jRuby you can access the data in server mode as above. If you want to run the database in “embedded” mode, however you can configure it like this:

```
session = Neo4j::Session.open(:embedded_db, '/folder/db')
session.start
```

Embedded mode means that Neo4j is running inside your jRuby process. This allows for direct access to the Neo4j Java APIs for faster and more direct querying.

## 2.3 Heroku

Add a Neo4j db to your application:

```
# To use GrapheneDB:
heroku addons:create graphenedb

# To use Graph Story:
heroku addons:create graphstory
```

### See also:

**GrapheneDB** <https://devcenter.heroku.com/articles/graphenedb> For plans: <https://addons.heroku.com/graphenedb>

**Graph Story** <https://devcenter.heroku.com/articles/graphstory> For plans: <https://addons.heroku.com/graphstory>

### 2.3.1 Rails configuration

config/application.rb

```
config.neo4j.session_type = :server_db
# GrapheneDB
config.neo4j.session_path = ENV["GRAPHENEDB_URL"] || 'http://localhost:7474'
# Graph Story
config.neo4j.session_path = ENV["GRAPHSTORY_URL"] || 'http://localhost:7474'
```

---

## Rake Tasks

---

The `neo4j-core` gem (automatically included with the `neo4j` gem) includes some rake tasks which make it easy to install and manage a Neo4j server in the same directory as your Ruby project.

---

**Note:** If you are using `zsh`, you need to prefix any rake tasks with arguments with the `noglob` command, e.g. `$ noglob bundle exec rake neo4j:install[community-latest]`.

---

**neo4j:install** Arguments: `version` and `environment` (environment default is *development*)

**Example:** `rake neo4j:install[community-latest,development]`

Downloads and installs Neo4j into `$PROJECT_DIR/db/neo4j/<environment>/`

For the `version` argument you can specify either `community-latest/enterprise-latest` to get the most up-to-date stable version or you can specify a specific version with the format `community-x.x.x/enterprise-x.x.x`

**neo4j:config** Arguments: `environment` and `port`

**Example:** `rake neo4j:config[development,7100]`

Configure the port which Neo4j runs on. This affects the HTTP REST interface and the web console address. This also sets the HTTPS port to the specified port minus one (so if you specify 7100 then the HTTP port will be 7099)

**neo4j:start** Arguments: `environment`

**Example:** `rake neo4j:start[development]`

Start the Neo4j server

Assuming everything is ok, point your browser to <http://localhost:7474> and the Neo4j web console should load up.

**neo4j:start** Arguments: `environment`

**Example:** `rake neo4j:shell[development]`

Open a Neo4j shell console (REPL shell).

If Neo4j isn't already started this task will first start the server and shut it down after the shell is exited.

**neo4j:start\_no\_wait** Arguments: `environment`

**Example:** `rake neo4j:start_no_wait[development]`

Start the Neo4j server with the `start-no-wait` command

**neo4j:stop** Arguments: environment

**Example:** rake neo4j:stop[development]

Stop the Neo4j server

**neo4j:restart** Arguments: environment

**Example:** rake neo4j:restart[development]

Restart the Neo4j server



---

## ActiveNode

---

ActiveNode is the ActiveRecord replacement module for Rails. Its syntax should be familiar for ActiveRecord users but has some unique qualities.

To use ActiveNode, include `Neo4j::ActiveNode` in a class.

```
class Post
  include Neo4j::ActiveNode
end
```

### 4.1 Properties

All properties for `Neo4j::ActiveNode` objects must be declared (unlike `neo4j-core` nodes). Properties are declared using the `property` method which is the same as `attribute` from the `active_attr` gem.

Example:

```
class Post
  include Neo4j::ActiveNode
  property :title, index: :exact
  property :text, default: 'bla bla bla'
  property :score, type: Integer, default: 0

  validates :title, :presence => true
  validates :score, numericality: { only_integer: true }

  before_save do
    self.score = score * 100
  end

  has_n :friends
end
```

Properties can be indexed using the `index` argument on the `property` method, see example above.

See the Properties section for additional information.

**See also:**

### 4.1.1 Labels

By default `ActiveNode` takes your model class' name and uses it directly as the Neo4j label for the nodes it represents. This even includes using the module namespace of the class. That is, the class `MyClass` in the `MyModule` module will have the label `MyModule::MyClass`. To change this behavior, see the *module\_handling* configuration variable.

Additionally you can change the name of a particular `ActiveNode` by using `mapped_label_name` like so:

```
class Post
  include Neo4j::ActiveNode

  self.mapped_label_name = 'BlogPost'
end
```

### 4.1.2 Indexes

To declare a index on a property

```
class Person
  include Neo4j::ActiveNode
  property :name, index: :exact
end
```

Only exact index is currently possible.

Indexes can also be declared like this:

```
class Person
  include Neo4j::ActiveNode
  property :name
  index :name
end
```

### 4.1.3 Constraints

You can declare that a property should have a unique value.

```
class Person
  property :id_number, constraint: :unique # will raise an exception if id_number is not unique
end
```

Notice an unique validation is not enough to be 100% sure that a property is unique (because of concurrency issues, just like `ActiveRecord`). Constraints can also be declared just like indexes separately, see above.

### 4.1.4 Labels

The class name maps directly to the label. In the following case both the class name and label are `Post`

```
class Post
  include Neo4j::ActiveNode
end
```

If you want to specify a different label for your class you can use `mapped_label_name`:

```
class Post
  include Neo4j::ActiveNode

  self.mapped_label_name = 'BlogPost'
end
```

If you would like to use multiple labels you can use class inheritance. In the following case object created with the *Article* model would have both *Post* and *Article* labels. When querying *Article* both labels are required on the nodes as well.

```
class Post
  include Neo4j::ActiveNode
end

class Article < Post
end
```

### 4.1.5 Serialization

Pass a property name as a symbol to the `serialize` method if you want to save a hash or an array with mixed object types\* to the database.

```
class Student
  include Neo4j::ActiveNode

  property :links

  serialize :links
end

s = Student.create(links: { neo4j: 'http://www.neo4j.org', neotech: 'http://www.neotechnology.com' })
s.links
# => {"neo4j"=>"http://www.neo4j.org", "neotech"=>"http://www.neotechnology.com"}
s.links.class
# => Hash
```

Neo4j.rb serializes as JSON by default but pass it the constant `Hash` as a second parameter to `serialize` as `YAML`. Those coming from `ActiveRecord` will recognize this behavior, though `Rails` serializes as `YAML` by default.

*Neo4j* allows you to save Ruby arrays to `undefined` or `String` types but their contents need to all be of the same type. You can do `user.stuff = [1, 2, 3]` or `user.stuff = ["beer", "pizza", "doritos"]` but not `user.stuff = [1, "beer", "pizza"]`. If you wanted to do that, you could call `serialize` on your property in the model.

## 4.2 Wrapping

When loading a node from the database there is a process to determine which `ActiveNode` model to choose for wrapping the node. If nothing is configured on your part then when a node is created labels will be saved representing all of the classes in the hierarchy.

That is, if you have a `Teacher` class inheriting from a `Person` model, then creating a `Person` object will create a node in the database with a `Person` label, but creating a `Teacher` object will create a node with both the `Teacher` and `Person` labels.

If there is a value for the property defined by `class_name_property` then the value of that property will be used directly to determine the class to wrap the node in.

## 4.3 Callbacks

Implements like Active Records the following callback hooks:

- initialize
- validation
- find
- save
- create
- update
- destroy

## 4.4 created\_at, updated\_at

```
class Blog
  include Neo4j::ActiveNode

  include Neo4j::Timestamps # will give model created_at and updated_at timestamps
  include Neo4j::Timestamps::Created # will give model created_at timestamp
  include Neo4j::Timestamps::Updated # will give model updated_at timestamp
end
```

## 4.5 Validation

Support the Active Model validation, such as:

validates :age, presence: true validates\_uniqueness\_of :name, :scope => :adult

## 4.6 id property (primary key)

Unique IDs are automatically created for all nodes using `SecureRandom::uuid`. See Unique IDs for details.

## 4.7 Associations

`has_many` and `has_one` associations can also be defined on `ActiveNode` models to make querying and creating relationships easier.

```
class Post
  include Neo4j::ActiveNode
  has_many :in, :comments, origin: :post
  has_one :out, :author, type: :author, model_class: :Person
end

class Comment
  include Neo4j::ActiveNode
  has_one :out, :post, type: :post
end
```

```

  has_one :out, :author, type: :author, model_class: :Person
end

class Person
  include Neo4j::ActiveNode
  has_many :in, :posts, origin: :author
  has_many :in, :comments, origin: :author

  # Match all incoming relationship types
  has_many :in, :written_things, type: false, model_class: [:Post, :Comment]

  # or if you want to match all model classes:
  # has_many :in, :written_things, type: false, model_class: false

  # or if you watch to match Posts and Comments on all relationships (in and out)
  # has_many :both, :written_things, type: false, model_class: [:Post, :Comment]
end

```

You can query associations:

```

post.comments.to_a      # Array of comments
comment.post           # Post object
comment.post.comments  # Original comment and all of it's siblings. Makes just one query
post.comments.authors.posts # All posts of people who have commented on the post. Still makes just one query

```

You can create associations

```

post.comments = [comment1, comment2] # Removes all existing relationships
post.comments << comment3            # Creates new relationship

comment.post = post1                 # Removes all existing relationships

```

See also:

See also:

`#has_many` and `#has_one`

### 4.7.1 Creating Unique Relationships

By including the `unique` option in a `has_many` or `has_one` association's method call, you can change the Cypher used to create from "CREATE" to "CREATE UNIQUE."

```

has_many :out, :friends, type: 'FRIENDS_WITH', model_class: :User, unique: true

```

Instead of `true`, you can give one of three different options:

- `:none`, also used `true` is given, will not include properties to determine whether or not to create a unique relationship. This means that no more than one relationship of the same pairing of nodes, rel type, and direction will ever be created.
- `:all`, which will include all set properties in rel creation. This means that if a new relationship will be created unless all nodes, type, direction, and rel properties are matched.
- `{on: [keys]}` will use the keys given to determine whether to create a new rel and the remaining properties will be set afterwards.

## 4.7.2 Eager Loading

ActiveNode supports eager loading of associations in two ways. The first way is transparent. When you do the following:

```
person.blog_posts.each do |post|
  puts post.title
  puts "Tags: #{post.tags.map(&:name).join(', ')}"
  post.comments.each do |comment|
    puts ' ' + comment.title
  end
end
```

Only three Cypher queries will be made:

- One to get the blog posts for the user
- One to get the tags for all of the blog posts
- One to get the comments for all of the blog posts

While three queries isn't ideal, it is better than the naive approach of one query for every call to an object's association (Thanks to [DataMapper](#) for the inspiration).

For those times when you need to load all of your data with one Cypher query, however, you can do the following to give *ActiveNode* a hint:

```
person.blog_posts.with_associations(:tags, :comments).each do |post|
  puts post.title
  puts "Tags: #{post.tags.map(&:name).join(', ')}"
  post.comments.each do |comment|
    puts ' ' + comment.title
  end
end
```

All that we did here was add `.with_associations(:tags, :comments)`. In addition to getting all of the blog posts, this will generate a Cypher query which uses the Cypher *COLLECT()* function to efficiently roll-up all of the associated objects. *ActiveNode* then automatically structures them into a nested set of *ActiveNode* objects for you.

---

## ActiveRel

---

ActiveRel is a module in the `neo4j` gem which wraps relationships. ActiveRel objects share most of their behavior with ActiveNode objects. ActiveRel is purely optional and offers advanced functionality for complex relationships.

### 5.1 When to Use?

It is not always necessary to use ActiveRel models but if you have the need for validation, callback, or working with properties on unpersisted relationships, it is the solution.

Note that in Neo4j it isn't possible to access relationships except by first accessing a node. Thus ActiveRel doesn't implement a `uuid` property like ActiveNode.

... Documentation notes

- Separation of relationship logic instead of shoehorning it into Node models

- Validations, callbacks, custom methods, etc.

- Centralize relationship type, no longer need to use `:type` or `:origin` options in models

### 5.2 Setup

ActiveRel model definitions have four requirements:

- include `Neo4j::ActiveRel`
- call `from_class` with a valid model constant or `:any`
- call `to_class` with a valid model constant or `:any`
- call `type` with a Symbol or String to define the Neo4j relationship type

See the note on `from/to` at the end of this page for additional information.

```
# app/models/enrolled_in.rb
class EnrolledIn
  include Neo4j::ActiveRel
  before_save :do_this

  from_class :Student
  to_class   :Lesson
  type 'enrolled_in'
```

```
property :since, type: Integer
property :grade, type: Integer
property :notes

validates_presence_of :since

def do_this
  #a callback
end
end
```

See also:

## 5.3 Relationship Creation

### 5.3.1 From an ActiveRecord Model

Once setup, ActiveRecord models follow the same rules as ActiveRecord in regard to properties. Declare them to create setter/getter methods. You can also set `created_at` or `updated_at` for automatic timestamps.

ActiveRecord instances require related nodes before they can be saved. Set these using the `from_node` and `to_node` methods.

```
rel = EnrolledIn.new
rel.from_node = student
rel.to_node = lesson
```

You can pass these as parameters when calling `new` or `create` if you so choose.

```
rel = EnrolledIn.new(from_node: student, to_node: lesson)
#or
rel = EnrolledIn.create(from_node: student, to_node: lesson)
```

### 5.3.2 From a *has\_many* or *has\_one* association

Add the `:rel_class` option to an association with the name of an ActiveRecord model. Association creation and querying will use this rel class, verifying classes, adding defaults, and performing callbacks.

```
class Student
  include Neo4j::ActiveNode
  has_many :out, :lessons, rel_class: :EnrolledIn
end
```

### 5.3.3 Creating Unique Relationships

The `creates_unique` class method will change the Cypher generated during rel creation from `CREATE` to `CREATE UNIQUE`. It may be called with one optional argument of the following:

- `:none`, also used when no argument is given, will not include properties to determine whether or not to create a unique relationship. This means that no more than one relationship of the same pairing of nodes, rel type, and direction will ever be created.
- `:all`, which will include all set properties in rel creation. This means that if a new relationship will be created unless all nodes, type, direction, and rel properties are matched.



- `{on: [keys]}` will use the keys given to determine whether to create a new rel and the remaining properties will be set afterwards.

## 5.4 Query and Loading existing relationships

Like nodes, you can load relationships a few different ways.

### 5.4.1 :each\_rel, :each\_with\_rel, or :pluck methods

Any of these methods can return relationship objects.

```
Student.first.lessons.each_rel { |r| }
Student.first.lessons.each_with_rel { |node, rel| }
Student.first.query_as(:s).match('s-[rel1:\`enrolled_in\`]->n2').pluck(:rel1)
```

These are available as both class or instance methods. Because both `each_rel` and `each_with_rel` return enumerables when a block is skipped, you can take advantage of the full suite of enumerable methods:

```
Lesson.first.students.each_with_rel.select{ |n, r| r.grade > 85 }
```

Be aware that `select` would be performed in Ruby after a Cypher query is performed. The example above performs a Cypher query that matches all students with relationships of type `enrolled_in` to `Lesson.first`, then it would call `select` on that.

## 5.5 Accessing related nodes

Once a relationship has been wrapped, you can access the related nodes using `from_node` and `to_node` instance methods. Note that these cannot be changed once a relationship has been created.

```
student = Student.first
lesson = Lesson.first
rel = EnrolledIn.create(from_node: student, to_node: lesson, since: 2014)
rel.from_node
=> #<Neo4j::ActiveRel::RelatedNode:0x00000104589d78 @node=#<Student property: 'value'>>
rel.to_node
=> #<Neo4j::ActiveRel::RelatedNode:0x00000104589d50 @node=#<Lesson property: 'value'>>
```

As you can see, this returns objects of type `RelatedNode` which delegate to the nodes. This allows for lazy loading when a relationship is returned in the future: the nodes are not loaded until you interact with them, which is beneficial with something like `each_with_rel` where you already have access to the nodes and do not want superfluous calls to the server.

## 5.6 Advanced Usage

### 5.6.1 Separation of Relationship Logic

`ActiveRel` really shines when you have multiple associations that share a relationship type. You can use an `ActiveRel` model to separate the relationship logic and just let the node models be concerned with the labels of related objects.

```
class User
  include Neo4j::ActiveNode
  property :managed_stats, type: Integer #store the number of managed objects to improve performance

  has_many :out, :managed_lessons, model_class: :Lesson, rel_class: :ManagedRel
  has_many :out, :managed_teachers, model_class: :Teacher, rel_class: :ManagedRel
  has_many :out, :managed_events, model_class: :Event, rel_class: :ManagedRel
  has_many :out, :managed_objects, model_class: false, rel_class: :ManagedRel

  def update_stats
    managed_stats += 1
    save
  end
end

class ManagedRel
  include Neo4j::ActiveRel
  after_create :update_user_stats
  validate :manageable_object
  from_class :User
  to_class :any
  type 'manages'

  def update_user_stats
    from_node.update_stats
  end

  def manageable_object
    errors.add(:to_node) unless to_node.respond_to?(:managed_by)
  end
end

# elsewhere
rel = ManagedRel.new(from_node: user, to_node: any_node)
if rel.save
  # validation passed, to_node is a manageable object
else
  # something is wrong
end
```

## 5.7 Additional methods

`:type` instance method, `:_` type class method: return the relationship type of the model

`:_from_class` and `:_to_class` class methods: return the expected classes declared in the model

## 5.8 Regarding: from and to

`:from_node`, `:to_node`, `:from_class`, and `:to_class` all have aliases using `start` and `end`: `:start_class`, `:end_class`, `:start_node`, `:end_node`, `:start_node=`, `:end_node=`. This maintains consistency with elements of the Neo4j::Core API while offering what may be more natural options for Rails users.

---

## Properties

---

In classes that mixin the `Neo4j::ActiveNode` or `Neo4j::ActiveRel` modules, properties must be declared using the `property` class method. It requires a single argument, a symbol that will correspond with the getter and setter as well as the property in the database.

```
class Post
  include Neo4j::ActiveNode

  property :title
end
```

Two options are also available to both node and relationship models. They are:

- `type`, to specify the expected class of the stored value in Ruby
- `default`, a default value to set when the property is `nil`

Node models have two more options:

- `index: :exact` to declare an exact index in the database
- `constraint: :unique` to declare a unique constraint

Note that a constraint is a type of index, so there is neither need nor ability to use both.

Finally, you can serialize properties as JSON with the `serialize` class method.

In practice, you can put it all together like this:

```
class Post
  include Neo4j::ActiveNode

  property :title, type: String, default: 'This ia new post', index: :exact
  property :links

  serialize :links
end
```

You will now be able to set the `title` property through mass-assignment (`Post.new(title: 'My Title')`) or by calling the `title=` method. You can also give a hash of links (`{ homepage: 'http://neo4jrb.io', twitter: 'https://twitter.com/neo4jrb' }`) to the `links` property and it will be saved as JSON to the db.

## 6.1 Undeclared Properties

Neo4j, being schemaless as far as the database is concerned, does not require that property keys be defined ahead of time. As a result, it's possible (and sometimes desirable) to set properties on the node that are not also defined on the database. For instance:

```
Neo4j::Node.create({ property: 'MyProp', secret_val: 123 }, :Post)
post = Post.first
post.secret_val
=> NoMethodError: undefined method `secret_val`...
```

In this case, simply adding the `secret_val` property to your model will make it available through the `secret_val` method. Alternatively, you can also access the properties of the “unwrapped node” through `post._persisted_obj.props`. See the `Neo4j::Core` API for more details about working with `CypherNode` objects.

### 6.1.1 Types and Conversion

The `type` option has some interesting qualities that are worth being aware of when developing. It defines the type of object that you expect when returning the value to Ruby, `_not_` the type that will be stored in the database. There are a few types available by default.

- String
- Integer
- Fixnum
- BigDecimal
- Date
- Time
- DateTime
- Boolean (`TrueClass` or `FalseClass`)

Declaring a type is not necessary and, in some cases, is better for performance. You should omit a type declaration if you are confident in the consistency of data going to/from the database.

```
class Post
  include Neo4j::ActiveNode

  property :score, type: Integer
  property :created_at, type: DateTime
end
```

In this model, the `score` property's type will ensure that String interpretations of numbers are always converted to Integer when you return the property in Ruby. As an added bonus, it will convert before saving to the database because Neo4j is capable of storing Ints natively, so you won't have to convert every time. DateTimes, however, are a different beast, because Neo4j cannot handle Ruby's native formats. To work around this, type converter knows to change the DateTime object into an Integer before saving and then, when loading the node, it will convert the Integer back into a DateTime.

This magic comes with a cost. DateTime conversion in particular is expensive and if you are obsessed with speed, you'll find that it slows you down. A tip for those users is to set your timestamps to `type: Integer` and you will end up with Unix timestamps that you can manipulate if/when you need them in friendlier formats.

## 6.1.2 Custom Converters

It is possible to define custom converters for types not handled natively by the gem.

```
class RangeConverter
  class << self
    def primitive_type
      String
    end

    def convert_type
      Range
    end

    def to_db(value)
      value.to_s
    end

    def to_ruby(value)
      ends = value.to_s.split('..').map { |d| Integer(d) }
      ends[0]..ends[1]
    end
    alias_method :call, :to_ruby
  end

  include Neo4j::Shared::Typecaster
end
```

This would allow you to use `property :my_prop, type: Range` in a model. Each method and the `alias_method` call is required. Make sure the module inclusion happens at the end of the file.

`primitive_type` is used to fool ActiveAttr's type converters, which only recognize a few basic Ruby classes.

`convert_type` must match the constant given to the `type` option.

`to_db` provides logic required to transform your value into the class defined by `primitive_type`. It will store the object in the database as this type.

`to_ruby` provides logic to transform the DB-provided value back into the class expected by code using the property. It should return an object of the type set in `convert_type`.

Note the `alias_method` to make `to_ruby` respond to `call`. This is to provide compatibility with the ActiveAttr dependency.

An optional method, `converted?(value)` can be defined. This should return a boolean indicating whether a value is already of the expected type for Neo4j.



## 7.1 Simple Query Methods

There are a number of ways to find and return nodes.

### 7.1.1 `.find`

Find an object by `id_property` (**TODO: LINK TO `id_property` documentation**)

### 7.1.2 `.find_by`

`find_by` and `find_by!` behave as they do in ActiveRecord, returning the first object matching the criteria or nil (or an error in the case of `find_by!`)

```
Post.find_by(title: 'Neo4j.rb is awesome')
```

## 7.2 Scope Method Chaining

Like in ActiveRecord you can build queries via method chaining. This can start in one of three ways:

- `Model.all`
- `Model.association`
- `model_object.association`

In the case of the association calls, the scope becomes a class-level representation of the association's model so far. So for example if I were to call `post.comments` I would end up with a representation of nodes from the `Comment` model, but only those which are related to the `post` object via the `comments` association.

At this point it should be mentioned that what associations return isn't an `Array` but in fact an `AssociationProxy`. `AssociationProxy` is `Enumerable` so you can still iterate over it as a collection. This allows for the method chaining to build queries, but it also enables *eager loading* of associations

From a scope you can filter, sort, and limit to modify the query that will be performed or call a further association.

## 7.2.1 Querying the scope

Similar to ActiveRecord you can perform various operations on a scope like so:

```
lesson.teachers.where(name: /. * smith/i, age: 34).order(:name).limit(2)
```

The arguments to these methods are translated into Cypher query statements. For example in the above statement the regular expression is translated into a Cypher `=~` operator. Additionally all values are translated into Neo4j [query parameters](#) for the best performance and to avoid query injection attacks.

## 7.2.2 Chaining associations

As you've seen, it's possible to chain methods to build a query on one model. In addition it's possible to also call associations at any point along the chain to transition to another associated model. The simplest example would be:

```
student.lessons.teachers
```

This would return all of the teachers for all of the lessons which the student is taking. Keep in mind that this builds only one Cypher query to be executed when the result is enumerated. Finally you can combine scoping and association chaining to create complex Cypher queries with simple Ruby method calls.

```
student.lessons(:l).where(level: 102).teachers(:t).where('t.age > 34').pluck(:l)
```

Here we get all of the lessons at the 102 level which have a teacher older than 34. The `pluck` method will actually perform the query and return an `Array` result with the lessons in question. There is also a `return` method which returns an `Array` of result objects which, in this case, would respond to a call to the `#l` method to return the lesson.

Note here that we're giving an argument to the association methods (`lessons(:l)` and `teachers(:t)`) in order to define Cypher variables which we can refer to. In the same way we can also pass in a second argument to define a variable for the relationship which the association follows:

```
student.lessons(:l, :r).where("r.start_date < {the_date} and r.end_date >= {the_date}")
```

Here we are limiting lessons by the `start_date` and `end_date` on the relationship between the student and the lessons. We can also use the `rel_where` method to filter based on this relationship:

```
student.lessons.where(subject: 'Math').rel_where(grade: 85)
```

**See also:**

## 7.2.3 Associations and Unpersisted Nodes

There is some special behavior around association creation when nodes are new and unsaved. Below are a few scenarios and their outcomes.

When both nodes are persisted, associations changes using `<<` or `=` take place immediately – no need to call `save`.

```
student = Student.first
Lesson = Lesson.first
student.lessons << lesson
```

In that case, the relationship would be created immediately.

When the node on which the association is called is unpersisted, no changes are made to the database until `save` is called. Once that happens, a cascading save event will occur.



```
student = Student.new
lesson = Lesson.first || Lesson.new
# This method will not save `student` or change relationships in the database:
student.lessons << lesson
```

Once we call `save` on `student`, two or three things will happen:

- Since `student` is unpersisted, it will be saved
- If `lesson` is unpersisted, it will be saved
- Once both nodes are saved, the relationship will be created

This process occurs within a transaction. If any part fails, an error will be raised, the transaction will fail, and no changes will be made to the database.

Finally, if you try to associate an unpersisted node with a persisted node, the unpersisted node will be saved and the relationship will be created immediately:

```
student = Student.first
lesson = Lesson.new
student.lessons << lesson
```

In the above example, `lesson` would be saved and the relationship would be created immediately. There is no need to call `save` on `student`.

## 7.2.4 Parameters

If you need to use a string in where, you should set the parameter manually.

```
Student.all.where("s.age < {age} AND s.name = {name} AND s.home_town = {home_town}")
  .params(age: params[:age], name: params[:name], home_town: params[:home_town])
  .pluck(:s)
```

## 7.2.5 Variable-length relationships

### Introduced in version 5.1.0

It is possible to specify a variable-length qualifier to apply to relationships when calling association methods.

```
student.friends(rel_length: 2)
```

This would find the friends of friends of a student. Note that you can still name matched nodes and relationships and use those names to build your query as seen above:

```
student.friends(:f, :r, rel_length: 2).where('f.gender = {gender} AND r.since >= {date}') .params(gender: 'M', date: '2013-01-01')
```

---

**Note:** You can either pass a single options Hash or provide **both** the node and relationship names along with the optional Hash.

---

There are many ways to provide the length information to generate all the various possibilities Cypher offers:

```
# As a Fixnum:
## Cypher: -[:`FRIENDS` *2]->
student.friends(rel_length: 2)

# As a Range:
```

```
## Cypher: -[:`FRIENDS`*1..3]->
student.friends(rel_length: 1..3) # Get up to 3rd degree friends

# As a Hash:
## Cypher: -[:`FRIENDS`*1..3]->
student.friends(rel_length: {min: 1, max: 3})

## Cypher: -[:`FRIENDS`*0..]->
student.friends(rel_length: {min: 0})

## Cypher: -[:`FRIENDS`*..3]->
student.friends(rel_length: {max: 3})

# As the :any Symbol:
## Cypher: -[:`FRIENDS`*]->
student.friends(rel_length: :any)
```

**Caution:** By default, “\*..3” is equivalent to “\*1..3” and “\*” is equivalent to “\*1..”, but this may change depending on your Node4j server configuration. Keep that in mind when using variable-length relationships queries without specifying a minimum value.

---

**Note:** When using variable-length relationships queries on *has\_one* associations, be aware that multiple nodes could be returned!

---

## 7.3 The Query API

The `neo4j-core` gem provides a `Query` class which can be used for building very specific queries with method chaining. This can be used either by getting a fresh `Query` object from a `Session` or by building a `Query` off of a scope such as above.

```
Neo4j::Session.current.query # Get a new Query object

# Get a Query object based on a scope
Student.query_as(:s)
student.lessons.query_as(:l)
```

The `Query` class has a set of methods which map directly to Cypher clauses and which return another `Query` object to allow chaining. For example:

```
student.lessons.query_as(:l) # This gives us our first Query object
  .match("1-[:has_category*]->(root_category:Category)") .where("NOT (root_category-[:has_category]->())")
  .pluck(:root_category)
```

Here we can make our own `MATCH` clauses unlike in model scoping. We have `where`, `pluck`, and `return` here as well in addition to all of the other clause-methods. See [this page](#) for more details.

**TODO Duplicate this page and link to it from here (or just duplicate it here):** <https://github.com/neo4jrb/neo4j-core/wiki/Queries>

See also:

## 7.4 #proxy\_as

Sometimes it makes sense to turn a `Query` object into (or back into) a proxy object like you would get from an association. In these cases you can use the `Query#proxy_as` method:

```
student.query_as(:s)
  .match("(s)-[rel:FRIENDS_WITH*1..3]->(s2:Student)")
  .proxy_as(Student, :s2).lessons
```

Here we pick up the `s2` variable with the scope of the `Student` model so that we can continue calling associations on it.

## 7.5 match\_to and first\_rel\_to

There are two methods, `match_to` and `first_rel_to` that both make simple patterns easier.

In the most recent release, `match_to` accepts nodes; in the master branch and in future releases, it will accept a node or an ID. It is essentially shorthand for `association.where(neo_id: node.neo_id)` and returns a `QueryProxy` object.

```
# starting from a student, match them to a lesson based off of submitted params, then return student
student.lessons.match_to(params[:id]).students
```

`first_rel_to` will return the first relationship found between two nodes in a `QueryProxy` chain.

```
student.lessons.first_rel_to(lesson)
# or in the master branch, future releases
student.lessons.first_rel_to(lesson.id)
```

This returns a relationship object.

## 7.6 Finding in Batches

Finding in batches will soon be supported in the `neo4j` gem, but for now is provided in the `neo4j-core` gem (documentation)

## 7.7 Orm\_Adapter

You can also use the `orm_adapter` API, by calling `#to_adapter` on your class. See the API, [https://github.com/ianwhite/orm\\_adapter](https://github.com/ianwhite/orm_adapter)

## 7.8 Find or Create By...

`QueryProxy` has a `find_or_create_by` method to make the node rel creation process easier. Its usage is simple:

```
a_node.an_association(params_hash)
```

The method has branching logic that attempts to match an existing node and relationship. If the pattern is not found, it tries to find a node of the expected class and create the relationship. If *that* doesn't work, it creates the node, then creates the relationship. The process is wrapped in a transaction to prevent a failure from leaving the database in an inconsistent state.

There are some mild caveats. First, it will not work on associations of class methods. Second, you should not use it across more than one associations or you will receive an error. For instance, if you did this:

```
student.friends.lessons.find_or_create_by(subject: 'Math')
```

Assuming the `lessons` association points to a `Lesson` model, you would effectively end up with this:

```
math = Lesson.find_or_create_by(subject: 'Math')
student.friends.lessons << math
```

...which is invalid and will result in an error.

---

## QueryClauseMethods

---

The `Neo4j::Core::Query` class from the `neo4j-core` gem defines a DSL which allows for easy creation of Neo4j Cypher queries. They can be started from a session like so:

```
# The current session can be retrieved with `Neo4j::Session.current`
a_session.query
```

Advantages of using the `Query` class include:

- Method chaining allows you to build a part of a query and then pass it somewhere else to be built further
- Automatic use of parameters when possible
- Ability to pass in data directly from other sources (like Hash to match keys/values)
- Ability to use native Ruby objects (such as translating `nil` values to `IS NULL`, regular expressions to Cypher-style regular expression matches, etc...)

Below is a series of Ruby code samples and the resulting Cypher that would be generated. These examples are all generated directly from the `spec` file and are thus all tested to work.

## 8.1 Neo4j::Core::Query

### 8.1.1 #match

#### Ruby

```
.match('n')
```

#### Cypher

```
MATCH n
```

#### Ruby

```
.match(:n)
```

#### Cypher

```
MATCH n
```

---

**Ruby**

```
.match(n: Person)
```

**Cypher**

```
MATCH (n:`Person`)
```

---

**Ruby**

```
.match(n: 'Person')
```

**Cypher**

```
MATCH (n:`Person`)
```

---

**Ruby**

```
.match(n: ':Person')
```

**Cypher**

```
MATCH (n:Person)
```

---

**Ruby**

```
.match(n: :Person)
```

**Cypher**

```
MATCH (n:`Person`)
```

---

**Ruby**

```
.match(n: [:Person, "Animal"])
```

**Cypher**

```
MATCH (n:`Person`:`Animal`)
```

---

**Ruby**

```
.match(n: ' :Person')
```

**Cypher**

```
MATCH (n:Person)
```

---

**Ruby**

```
.match(n: nil)
```

**Cypher**

---

```
MATCH (n)
```

---

**Ruby**

```
.match(n: 'Person {name: "Brian"}')
```

**Cypher**

```
MATCH (n:Person {name: "Brian"})
```

---

**Ruby**

```
.match(n: {name: 'Brian', age: 33})
```

**Cypher**

```
MATCH (n {name: {n_name}, age: {n_age}})
```

**Parameters:** {:n\_name=>"Brian", :n\_age=>33}

---

**Ruby**

```
.match(n: {Person: {name: 'Brian', age: 33}})
```

**Cypher**

```
MATCH (n:`Person` {name: {n_Person_name}, age: {n_Person_age}})
```

**Parameters:** {:n\_Person\_name=>"Brian", :n\_Person\_age=>33}

---

**Ruby**

```
.match('n--o')
```

**Cypher**

```
MATCH n--o
```

---

**Ruby**

```
.match('n--o').match('o--p')
```

**Cypher**

```
MATCH n--o, o--p
```

---

## 8.2 #optional\_match

**Ruby**

```
.optional_match(n: Person)
```

#### Cypher

```
OPTIONAL MATCH (n: `Person`)
```

---

#### Ruby

```
.match('m--n').optional_match('n--o').match('o--p')
```

#### Cypher

```
MATCH m--n, o--p OPTIONAL MATCH n--o
```

---

## 8.3 #using

#### Ruby

```
.using('INDEX m:German(surname)')
```

#### Cypher

```
USING INDEX m:German(surname)
```

---

#### Ruby

```
.using('SCAN m:German')
```

#### Cypher

```
USING SCAN m:German
```

---

#### Ruby

```
.using('INDEX m:German(surname)').using('SCAN m:German')
```

#### Cypher

```
USING INDEX m:German(surname) USING SCAN m:German
```

---

## 8.4 #where

#### Ruby

```
.where()
```

#### Cypher



**Ruby**

```
.where({})
```

**Cypher****Ruby**

```
.where('q.age > 30')
```

**Cypher**

```
WHERE (q.age > 30)
```

**Ruby**

```
.where('q.age' => 30)
```

**Cypher**

```
WHERE (q.age = {q_age})
```

**Parameters:** { :q\_age=>30 }

**Ruby**

```
.where('q.age' => [30, 32, 34])
```

**Cypher**

```
WHERE (q.age IN {q_age})
```

**Parameters:** { :q\_age=>[30, 32, 34] }

**Ruby**

```
.where('q.age IN {age}', age: [30, 32, 34])
```

**Cypher**

```
WHERE (q.age IN {age})
```

**Parameters:** { :age=>[30, 32, 34] }

**Ruby**

```
.where('q.name =~ ?', '.*test.*')
```

**Cypher**

```
WHERE (q.name =~ {question_mark_param1})
```

**Parameters:** {:question\_mark\_param1=>".\*test.\*"}

---

### Ruby

```
.where('q.age IN ?', [30, 32, 34])
```

### Cypher

```
WHERE (q.age IN {question_mark_param1})
```

**Parameters:** {:question\_mark\_param1=>[30, 32, 34]}

---

### Ruby

```
.where('q.age IN ?', [30, 32, 34]).where('q.age != ?', 60)
```

### Cypher

```
WHERE (q.age IN {question_mark_param1}) AND (q.age != {question_mark_param2})
```

**Parameters:** {:question\_mark\_param1=>[30, 32, 34], :question\_mark\_param2=>60}

---

### Ruby

```
.where(q: {age: [30, 32, 34]})
```

### Cypher

```
WHERE (q.age IN {q_age})
```

**Parameters:** {:q\_age=>[30, 32, 34]}

---

### Ruby

```
.where('q.age' => nil)
```

### Cypher

```
WHERE (q.age IS NULL)
```

### Ruby

```
.where(q: {age: nil})
```

### Cypher

```
WHERE (q.age IS NULL)
```

### Ruby

```
.where(q: {neo_id: 22})
```

**Cypher**

```
WHERE (ID(q) = {ID_q})
```

**Parameters:** { :ID\_q=>22 }

**Ruby**

```
.where(q: {age: 30, name: 'Brian'})
```

**Cypher**

```
WHERE (q.age = {q_age} AND q.name = {q_name})
```

**Parameters:** { :q\_age=>30, :q\_name=>"Brian" }

**Ruby**

```
.where(q: {age: 30, name: 'Brian'}).where('r.grade = 80')
```

**Cypher**

```
WHERE (q.age = {q_age} AND q.name = {q_name}) AND (r.grade = 80)
```

**Parameters:** { :q\_age=>30, :q\_name=>"Brian" }

**Ruby**

```
.where(q: {name: /Brian.*i})
```

**Cypher**

```
WHERE (q.name =~ {q_name})
```

**Parameters:** { :q\_name=>"(?i)Brian.\*" }

**Ruby**

```
.where(name: /Brian.*i)
```

**Cypher**

```
WHERE (name =~ {name})
```

**Parameters:** { :name=>"(?i)Brian.\*" }

**Ruby**

```
.where(q: {age: (30..40)})
```

**Cypher**

```
WHERE (q.age IN RANGE({q_age_range_min}, {q_age_range_max}))
```

Parameters: {:q\_age\_range\_min=>30, :q\_age\_range\_max=>40}

---

## 8.5 #where\_not

### Ruby

```
.where_not()
```

### Cypher

### Ruby

```
.where_not({})
```

### Cypher

### Ruby

```
.where_not('q.age > 30')
```

### Cypher

```
WHERE NOT(q.age > 30)
```

### Ruby

```
.where_not('q.age' => 30)
```

### Cypher

```
WHERE NOT(q.age = {q_age})
```

Parameters: {:q\_age=>30}

---

### Ruby

```
.where_not('q.age IN ?', [30, 32, 34])
```

### Cypher

```
WHERE NOT(q.age IN {question_mark_param1})
```

Parameters: {:question\_mark\_param1=>[30, 32, 34]}

---

### Ruby

```
.where_not(q: {age: 30, name: 'Brian'})
```

**Cypher**

```
WHERE NOT (q.age = {q_age} AND q.name = {q_name})
```

**Parameters:** { :q\_age=>30, :q\_name=>"Brian" }

**Ruby**

```
.where_not(q: {name: /Brian.*i})
```

**Cypher**

```
WHERE NOT (q.name =~ {q_name})
```

**Parameters:** { :q\_name=>"(?i)Brian.\*" }

**Ruby**

```
.where('q.age > 10').where_not('q.age > 30')
```

**Cypher**

```
WHERE (q.age > 10) AND NOT (q.age > 30)
```

**Ruby**

```
.where_not('q.age > 30').where('q.age > 10')
```

**Cypher**

```
WHERE NOT (q.age > 30) AND (q.age > 10)
```

## 8.6 #match\_nodes

### 8.6.1 one node object

**Ruby**

```
.match_nodes(var: node_object)
```

**Cypher**

```
MATCH var WHERE (ID(var) = {ID_var})
```

**Parameters:** { :ID\_var=>246 }

## 8.7 integer

### Ruby

```
.match_nodes(var: 924)
```

### Cypher

```
MATCH var WHERE (ID(var) = {ID_var})
```

**Parameters:** { :ID\_var=>924 }

---

## 8.8 two node objects

### Ruby

```
.match_nodes(user: user, post: post)
```

### Cypher

```
MATCH user, post WHERE (ID(user) = {ID_user}) AND (ID(post) = {ID_post})
```

**Parameters:** { :ID\_user=>246, :ID\_post=>123 }

---

## 8.9 node object and integer

### Ruby

```
.match_nodes(user: user, post: 652)
```

### Cypher

```
MATCH user, post WHERE (ID(user) = {ID_user}) AND (ID(post) = {ID_post})
```

**Parameters:** { :ID\_user=>246, :ID\_post=>652 }

---

## 8.10 #unwind

### Ruby

```
.unwind('val AS x')
```

### Cypher

```
UNWIND val AS x
```

### Ruby

---

```
.unwind(x: :val)
```

**Cypher**

```
UNWIND val AS x
```

**Ruby**

```
.unwind(x: 'val')
```

**Cypher**

```
UNWIND val AS x
```

**Ruby**

```
.unwind(x: [1,3,5])
```

**Cypher**

```
UNWIND [1, 3, 5] AS x
```

**Ruby**

```
.unwind(x: [1,3,5]).unwind('val as y')
```

**Cypher**

```
UNWIND [1, 3, 5] AS x UNWIND val as y
```

## 8.11 #return

**Ruby**

```
.return('q')
```

**Cypher**

```
RETURN q
```

**Ruby**

```
.return(:q)
```

**Cypher**

```
RETURN q
```

**Ruby**

```
.return('q.name, q.age')
```

#### Cypher

```
RETURN q.name, q.age
```

---

#### Ruby

```
.return(q: [:name, :age], r: :grade)
```

#### Cypher

```
RETURN q.name, q.age, r.grade
```

---

#### Ruby

```
.return(q: :neo_id)
```

#### Cypher

```
RETURN ID(q)
```

---

#### Ruby

```
.return(q: [:neo_id, :prop])
```

#### Cypher

```
RETURN ID(q), q.prop
```

---

## 8.12 #order

#### Ruby

```
.order('q.name')
```

#### Cypher

```
ORDER BY q.name
```

---

#### Ruby

```
.order_by('q.name')
```

#### Cypher

```
ORDER BY q.name
```

---

#### Ruby



```
.order('q.age', 'q.name DESC')
```

### Cypher

```
ORDER BY q.age, q.name DESC
```

### Ruby

```
.order(q: :age)
```

### Cypher

```
ORDER BY q.age
```

### Ruby

```
.order(q: [:age, {name: :desc}])
```

### Cypher

```
ORDER BY q.age, q.name DESC
```

### Ruby

```
.order(q: [:age, {name: :desc, grade: :asc}])
```

### Cypher

```
ORDER BY q.age, q.name DESC, q.grade ASC
```

### Ruby

```
.order(q: {age: :asc, name: :desc})
```

### Cypher

```
ORDER BY q.age ASC, q.name DESC
```

### Ruby

```
.order(q: [:age, 'name desc'])
```

### Cypher

```
ORDER BY q.age, q.name desc
```

## 8.13 #limit

### Ruby

```
.limit(3)
```

#### Cypher

```
LIMIT {limit_3}
```

**Parameters:** { :limit\_3=>3}

---

#### Ruby

```
.limit('3')
```

#### Cypher

```
LIMIT {limit_3}
```

**Parameters:** { :limit\_3=>3}

---

#### Ruby

```
.limit(3).limit(5)
```

#### Cypher

```
LIMIT {limit_5}
```

**Parameters:** { :limit\_5=>5}

---

#### Ruby

```
.limit(nil)
```

#### Cypher

---

## 8.14 #skip

#### Ruby

```
.skip(5)
```

#### Cypher

```
SKIP {skip_5}
```

**Parameters:** { :skip\_5=>5}

---

#### Ruby

```
.skip('5')
```

**Cypher**

```
SKIP {skip_5}
```

**Parameters:** {:skip\_5=>5}

**Ruby**

```
.skip(5).skip(10)
```

**Cypher**

```
SKIP {skip_10}
```

**Parameters:** {:skip\_10=>10}

**Ruby**

```
.offset(6)
```

**Cypher**

```
SKIP {skip_6}
```

**Parameters:** {:skip\_6=>6}

## 8.15 #with

**Ruby**

```
.with('n.age AS age')
```

**Cypher**

```
WITH n.age AS age
```

**Ruby**

```
.with('n.age AS age', 'count(n) as c')
```

**Cypher**

```
WITH n.age AS age, count(n) as c
```

**Ruby**

```
.with(['n.age AS age', 'count(n) as c'])
```

**Cypher**

```
WITH n.age AS age, count(n) as c
```

---

#### Ruby

```
.with(age: 'n.age')
```

#### Cypher

```
WITH n.age AS age
```

---

## 8.16 #create

#### Ruby

```
.create('(:Person)')
```

#### Cypher

```
CREATE (:Person)
```

---

#### Ruby

```
.create(:Person)
```

#### Cypher

```
CREATE (:Person)
```

---

#### Ruby

```
.create(age: 41, height: 70)
```

#### Cypher

```
CREATE ( {age: {age}, height: {height}})
```

Parameters: { :age=>41, :height=>70 }

---

#### Ruby

```
.create(Person: {age: 41, height: 70})
```

#### Cypher

```
CREATE (:Person {age: {Person_age}, height: {Person_height}})
```

Parameters: { :Person\_age=>41, :Person\_height=>70 }

---

#### Ruby

```
.create(q: {Person: {age: 41, height: 70}})
```

**Cypher**

```
CREATE (q:`Person` {age: {q_Person_age}, height: {q_Person_height}})
```

**Parameters:** { :q\_Person\_age=>41, :q\_Person\_height=>70 }

**Ruby**

```
.create(q: {Person: {age: nil, height: 70}})
```

**Cypher**

```
CREATE (q:`Person` {age: {q_Person_age}, height: {q_Person_height}})
```

**Parameters:** { :q\_Person\_age=>nil, :q\_Person\_height=>70 }

## 8.17 #create\_unique

**Ruby**

```
.create_unique('(:Person)')
```

**Cypher**

```
CREATE UNIQUE (:Person)
```

**Ruby**

```
.create_unique(:Person)
```

**Cypher**

```
CREATE UNIQUE (:Person)
```

**Ruby**

```
.create_unique(age: 41, height: 70)
```

**Cypher**

```
CREATE UNIQUE ( {age: {age}, height: {height}})
```

**Parameters:** { :age=>41, :height=>70 }

**Ruby**

```
.create_unique(Person: {age: 41, height: 70})
```

**Cypher**

```
CREATE UNIQUE (:`Person` {age: {Person_age}, height: {Person_height}})
```

Parameters: {:Person\_age=>41, :Person\_height=>70}

---

#### Ruby

```
.create_unique(q: {Person: {age: 41, height: 70}})
```

#### Cypher

```
CREATE UNIQUE (q:`Person` {age: {q_Person_age}, height: {q_Person_height}})
```

Parameters: {:q\_Person\_age=>41, :q\_Person\_height=>70}

---

## 8.18 #merge

#### Ruby

```
.merge('(:Person)')
```

#### Cypher

```
MERGE (:Person)
```

---

#### Ruby

```
.merge(:Person)
```

#### Cypher

```
MERGE (:Person)
```

---

#### Ruby

```
.merge(age: 41, height: 70)
```

#### Cypher

```
MERGE ( {age: {age}, height: {height}})
```

Parameters: {:age=>41, :height=>70}

---

#### Ruby

```
.merge(Person: {age: 41, height: 70})
```

#### Cypher

```
MERGE (:`Person` {age: {Person_age}, height: {Person_height}})
```

---

---

**Parameters:** {:Person\_age=>41, :Person\_height=>70}

---

**Ruby**

```
.merge(q: {Person: {age: 41, height: 70}})
```

**Cypher**

```
MERGE (q:`Person` {age: {q_Person_age}, height: {q_Person_height}})
```

**Parameters:** {:q\_Person\_age=>41, :q\_Person\_height=>70}

---

## 8.19 #delete

**Ruby**

```
.delete('n')
```

**Cypher**

```
DELETE n
```

**Ruby**

```
.delete(:n)
```

**Cypher**

```
DELETE n
```

**Ruby**

```
.delete('n', :o)
```

**Cypher**

```
DELETE n, o
```

**Ruby**

```
.delete(['n', :o])
```

**Cypher**

```
DELETE n, o
```

---

## 8.20 #set\_props

**Ruby**

```
.set_props('n = {name: "Brian"}')
```

#### Cypher

```
SET n = {name: "Brian"}
```

---

#### Ruby

```
.set_props(n: {name: 'Brian', age: 30})
```

#### Cypher

```
SET n = {n_set_props}
```

Parameters: {:n\_set\_props=>{:name=>"Brian", :age=>30}}

---

## 8.21 #set

#### Ruby

```
.set('n = {name: "Brian"}')
```

#### Cypher

```
SET n = {name: "Brian"}
```

---

#### Ruby

```
.set(n: {name: 'Brian', age: 30})
```

#### Cypher

```
SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}
```

Parameters: {:setter\_n\_name=>"Brian", :setter\_n\_age=>30}

---

#### Ruby

```
.set(n: {name: 'Brian', age: 30}, o: {age: 29})
```

#### Cypher

```
SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}, o.`age` = {setter_o_age}
```

Parameters: {:setter\_n\_name=>"Brian", :setter\_n\_age=>30, :setter\_o\_age=>29}

---

#### Ruby

```
.set(n: {name: 'Brian', age: 30}).set_props('o.age = 29')
```

#### Cypher



```
SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}, o.age = 29
```

Parameters: { :setter\_n\_name=>"Brian", :setter\_n\_age=>30 }

### Ruby

```
.set(n: :Label)
```

### Cypher

```
SET n:`Label`
```

### Ruby

```
.set(n: [:Label, 'Foo'])
```

### Cypher

```
SET n:`Label`, n:`Foo`
```

### Ruby

```
.set(n: nil)
```

### Cypher

## 8.22 #on\_create\_set

### Ruby

```
.on_create_set('n = {name: "Brian"}')
```

### Cypher

```
ON CREATE SET n = {name: "Brian"}
```

### Ruby

```
.on_create_set(n: {})
```

### Cypher

### Ruby

```
.on_create_set(n: {name: 'Brian', age: 30})
```

#### Cypher

```
ON CREATE SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}
```

Parameters: { :setter\_n\_name=>"Brian", :setter\_n\_age=>30 }

---

#### Ruby

```
.on_create_set(n: {name: 'Brian', age: 30}, o: {age: 29})
```

#### Cypher

```
ON CREATE SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}, o.`age` = {setter_o_age}
```

Parameters: { :setter\_n\_name=>"Brian", :setter\_n\_age=>30, :setter\_o\_age=>29 }

---

#### Ruby

```
.on_create_set(n: {name: 'Brian', age: 30}).on_create_set('o.age = 29')
```

#### Cypher

```
ON CREATE SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}, o.age = 29
```

Parameters: { :setter\_n\_name=>"Brian", :setter\_n\_age=>30 }

---

## 8.23 #on\_match\_set

#### Ruby

```
.on_match_set('n = {name: "Brian"}')
```

#### Cypher

```
ON MATCH SET n = {name: "Brian"}
```

---

#### Ruby

```
.on_match_set(n: {})
```

#### Cypher

---

#### Ruby

```
.on_match_set(n: {name: 'Brian', age: 30})
```

#### Cypher

```
ON MATCH SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}
```

**Parameters:** {:setter\_n\_name=>"Brian", :setter\_n\_age=>30}

### Ruby

```
.on_match_set(n: {name: 'Brian', age: 30}, o: {age: 29})
```

### Cypher

```
ON MATCH SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}, o.`age` = {setter_o_age}
```

**Parameters:** {:setter\_n\_name=>"Brian", :setter\_n\_age=>30, :setter\_o\_age=>29}

### Ruby

```
.on_match_set(n: {name: 'Brian', age: 30}).on_match_set('o.age = 29')
```

### Cypher

```
ON MATCH SET n.`name` = {setter_n_name}, n.`age` = {setter_n_age}, o.age = 29
```

**Parameters:** {:setter\_n\_name=>"Brian", :setter\_n\_age=>30}

## 8.24 #remove

### Ruby

```
.remove('n.prop')
```

### Cypher

```
REMOVE n.prop
```

### Ruby

```
.remove('n:American')
```

### Cypher

```
REMOVE n:American
```

### Ruby

```
.remove(n: 'prop')
```

### Cypher

```
REMOVE n.prop
```

### Ruby

```
.remove(n: :American)
```

### Cypher

```
REMOVE n:`American`
```

---

### Ruby

```
.remove(n: [:American, "prop"])
```

### Cypher

```
REMOVE n:`American`, n.prop
```

---

### Ruby

```
.remove(n: :American, o: 'prop')
```

### Cypher

```
REMOVE n:`American`, o.prop
```

---

### Ruby

```
.remove(n: ':prop')
```

### Cypher

```
REMOVE n:`prop`
```

---

## 8.25 #start

### Ruby

```
.start('r=node:nodes(name = "Brian")')
```

### Cypher

```
START r=node:nodes(name = "Brian")
```

---

### Ruby

```
.start(r: 'node:nodes(name = "Brian")')
```

### Cypher

```
START r = node:nodes(name = "Brian")
```

---

## 8.26 clause combinations

### Ruby

```
.match(q: Person).where('q.age > 30')
```

### Cypher

```
MATCH (q: `Person`) WHERE (q.age > 30)
```

### Ruby

```
.where('q.age > 30').match(q: Person)
```

### Cypher

```
MATCH (q: `Person`) WHERE (q.age > 30)
```

### Ruby

```
.where('q.age > 30').start('n').match(q: Person)
```

### Cypher

```
START n MATCH (q: `Person`) WHERE (q.age > 30)
```

### Ruby

```
.match(q: {age: 30}).set_props(q: {age: 31})
```

### Cypher

```
MATCH (q {age: {q_age}}) SET q = {q_set_props}
```

Parameters: { :q\_age=>30, :q\_set\_props=>{:age=>31} }

### Ruby

```
.match(q: Person).with('count(q) AS count')
```

### Cypher

```
MATCH (q: `Person`) WITH count(q) AS count
```

### Ruby

```
.match(q: Person).with('count(q) AS count').where('count > 2')
```

### Cypher

```
MATCH (q: `Person`) WITH count(q) AS count WHERE (count > 2)
```

### Ruby

```
.match(q: Person).with(count: 'count(q)').where('count > 2').with(new_count: 'count + 5')
```

### Cypher

```
MATCH (q:`Person`) WITH count(q) AS count WHERE (count > 2) WITH count + 5 AS new_count
```

---

### Ruby

```
.match(q: Person).match('r:Car').break.match('(p: Person)-->q')
```

### Cypher

```
MATCH (q:`Person`), r:Car MATCH (p: Person)-->q
```

---

### Ruby

```
.match(q: Person).break.match('r:Car').break.match('(p: Person)-->q')
```

### Cypher

```
MATCH (q:`Person`) MATCH r:Car MATCH (p: Person)-->q
```

---

### Ruby

```
.match(q: Person).match('r:Car').break.break.match('(p: Person)-->q')
```

### Cypher

```
MATCH (q:`Person`), r:Car MATCH (p: Person)-->q
```

---

### Ruby

```
.with(:a).order(a: {name: :desc}).where(a: {name: 'Foo'})
```

### Cypher

```
WITH a ORDER BY a.name DESC WHERE (a.name = {a_name})
```

Parameters: { :a\_name=>"Foo" }

---

### Ruby

```
.with(:a).limit(2).where(a: {name: 'Foo'})
```

### Cypher

```
WITH a LIMIT {limit_2} WHERE (a.name = {a_name})
```

Parameters: { :a\_name=>"Foo", :limit\_2=>2 }

---

### Ruby

```
.with(:a).order(a: {name: :desc}).limit(2).where(a: {name: 'Foo'})
```

**Cypher**

```
WITH a ORDER BY a.name DESC LIMIT {limit_2} WHERE (a.name = {a_name})
```

**Parameters:** {:a\_name=>"Foo", :limit\_2=>2}

**Ruby**

```
.order(a: {name: :desc}).with(:a).where(a: {name: 'Foo'})
```

**Cypher**

```
WITH a ORDER BY a.name DESC WHERE (a.name = {a_name})
```

**Parameters:** {:a\_name=>"Foo"}

**Ruby**

```
.limit(2).with(:a).where(a: {name: 'Foo'})
```

**Cypher**

```
WITH a LIMIT {limit_2} WHERE (a.name = {a_name})
```

**Parameters:** {:a\_name=>"Foo", :limit\_2=>2}

**Ruby**

```
.order(a: {name: :desc}).limit(2).with(:a).where(a: {name: 'Foo'})
```

**Cypher**

```
WITH a ORDER BY a.name DESC LIMIT {limit_2} WHERE (a.name = {a_name})
```

**Parameters:** {:a\_name=>"Foo", :limit\_2=>2}

**Ruby**

```
.match(q: Person).where('q.age = {age}').params(age: 15)
```

**Cypher**

```
MATCH (q: `Person`) WHERE (q.age = {age})
```

**Parameters:** {:age=>15}





---

## Configuration

---

To configure any of these variables you can do the following:

### 9.1 In Rails

In either `config/application.rb` or one of the environment configurations (e.g. `config/environments/development.rb`) you can set `config.neo4j.variable_name = value` where **variable\_name** and **value** are as described below.

### 9.2 Other Ruby apps

You can set configuration variables directly in the Neo4j configuration class like so: `Neo4j::Config[:variable_name] = value` where **variable\_name** and **value** are as described below.

#### 9.2.1 Variables

**class\_name\_property** **Default:** `:_classname`

Which property should be used to determine the *ActiveNode* class to wrap the node in

If there is no value for this property on a node the node's labels will be used to determine the *ActiveNode* class

**See also:**

*Wrapping*

**include\_root\_in\_json** **Default:** `true`

When serializing *ActiveNode* and *ActiveRel* objects, should there be a root in the JSON of the model name.

**See also:**

<http://api.rubyonrails.org/classes/ActiveModel/Serializers/JSON.html>

**transform\_rel\_type** **Default:** `:upcase`

**Available values:** `:upcase`, `:downcase`, `:legacy`, `:none`

Determines how relationship types as specified in associations are transformed when stored in the database. By default this is upper-case to match with Neo4j convention so if you specify an association of `has_many :in, :posts, type: :has_post` then the relationship type in the database will be `HAS_POST`

**:legacy** Causes the type to be downcased and preceded by a #

**:none** Uses the type as specified

**module\_handling** **Default:** :none

**Available values:** :demodulize, :none, proc

Determines what, if anything, should be done to module names when a model's class is set. By default, there is a direct mapping of model name to label, so *MyModule::MyClass* results in a label with the same name.

The *:demodulize* option uses ActiveSupport's method of the same name to strip off modules. If you use a *proc*, it will take the class name as an argument and you should return a string that modifies it as you see fit.

**association\_model\_namespace** **Default:** nil

Associations defined in node models will try to match association names to classes. For example, *has\_many :out, :student* will look for a *Student* class. To avoid having to use *model\_class: 'MyModule::Student'*, this config option lets you specify the module that should be used globally for class name discovery.

Of course, even with this option set, you can always override it by calling *model\_class: 'ClassName'*.

**logger** **Default:** nil (or *Rails.logger* in Rails)

A Ruby Logger object which is used to log Cypher queries (*info* level is used)

**pretty\_logged\_cypher\_queries** **Default:** nil

If true, format outputted queries with newlines and colors to be more easily readable by humans

**record\_timestamps** **Default:** false

A Rails-inspired configuration to manage inclusion of the Timestamps module. If set to true, all *ActiveNode* and *ActiveRel* models will include the Timestamps module and have *:created\_at* and *:updated\_at* properties.

**timestamp\_type** **Default:** DateTime

This method returns the specified default type for the *:created\_at* and *:updated\_at* timestamps. You can also specify another type (e.g. *Integer*).

**wait\_for\_connection** **Default:** false

This allows you to tell the gem to wait for up to 60 seconds for Neo4j to be available. This is useful in environments such as Docker Compose

---

## Contributing

---

We very much welcome contributions! Before contributing there are a few things that you should know about the neo4j.rb projects:

### 10.1 The Neo4j.rb Project

We have three main gems: `neo4j`, `neo4j-core`, `neo4j-rake_tasks`.

We try to follow semantic versioning based on *semver.org* <<http://semver.org/>>

### 10.2 Low Hanging Fruit

Just reporting issues is helpful, but if you want to help with some code we label our GitHub issues with `low-hanging-fruit` to make it easy for somebody to start helping out:

<https://github.com/neo4jrb/neo4j/labels/low-hanging-fruit>

<https://github.com/neo4jrb/neo4j-core/labels/low-hanging-fruit>

[https://github.com/neo4jrb/neo4j-rake\\_tasks/labels/low-hanging-fruit](https://github.com/neo4jrb/neo4j-rake_tasks/labels/low-hanging-fruit)

Help or discussion on other issues is welcome, just let us know!

### 10.3 Communicating With the Neo4j.rb Team

GitHub issues are a great way to submit new bugs / ideas. Of course pull requests are welcome (though please check with us first if it's going to be a large change). We like tracking our GitHub issues with [waffle.io](http://waffle.io) (`neo4j`, `neo4j-core`, `neo4j-rake_tasks`) but just through GitHub also works.

We hang out mostly in our [Gitter.im](http://Gitter.im) chat room and are happy to talk or answer questions. We also are often around on the [Neo4j-Users Slack group](#).

### 10.4 Running Specs

For running the specs, see our [spec/README.md](#)

## 10.5 Before you submit your pull request

### 10.5.1 Automated Tools

We use:

- [RSpec](#)
- [Rubocop](#)
- [Coveralls](#)

Please try to check at least the RSpec tests and Rubocop before making your pull request. `Guardfile` and `.overcommit.yml` files are available if you would like to use `guard` (for RSpec and rubocop) and/or `overcommit`.

We also use Travis CI to make sure all of these pass for each pull request. Travis runs the specs across multiple versions of Ruby and multiple Neo4j databases, so be aware of that for potential build failures.

### 10.5.2 Documentation

To aid our users, we try to keep a complete `CHANGELOG.md` file. We use [keepachangelog.com](http://keepachangelog.com) as a guide. We appreciate a line in the `CHANGELOG.md` as part of any changes.

We also use Sphinx / reStructuredText for our documentation which is published on [readthedocs.org](http://readthedocs.org). We also appreciate your help in documenting any user-facing changes.

Notes about our documentation setup:

- YARD documentation in code is also parsed and placed into the Sphinx site so that is also welcome. Note that reStructuredText inside of your YARD docs will render more appropriately.
- You can use `rake docs` to build the documentation locally and `rake docs:open` to open it in your web browser.
- Please make sure that you run `rake docs` before committing any documentation changes and checkin all changes to `docs/`.

## 11.1 Neo4j

### 11.1.1 Shared

#### ClassMethods

#### Constants

#### Files

- lib/neo4j/shared.rb:10

#### Methods

##### #neo4j\_session

```
def neo4j_session
  if @neo4j_session_name
    Neo4j::Session.named(@neo4j_session_name) ||
      fail("#{self.name} is configured to use a neo4j session named #{@neo4j_session_name}, but")
  else
    Neo4j::Session.current!
  end
end
```

##### #neo4j\_session\_name

```
def neo4j_session_name(name)
  ActiveSupport::Deprecation.warn 'neo4j_session_name is deprecated and may be removed from future versions'
  @neo4j_session_name = name
end
```

##### #neo4j\_session\_name= Sets the attribute neo4j\_session\_name

```
def neo4j_session_name=(value)
  @neo4j_session_name = value
end
```

## Cypher

### CreateMethod

#### Constants

#### Files

- lib/neo4j/shared/cypher.rb:3

#### Methods #create\_method

```
def create_method
  creates_unique? ? :create_unique : :create
end
```

#### #creates\_unique

```
def creates_unique(option = :none)
  option = :none if option == true
  @creates_unique = option
end
```

#### #creates\_unique?

```
def creates_unique?
  !!@creates_unique
end
```

#### #creates\_unique\_option

```
def creates_unique_option
  @creates_unique || :none
end
```

#### #unique?

```
def creates_unique?
  !!@creates_unique
end
```

## RelIdentifiers

#### Constants

#### Files

- lib/neo4j/shared/cypher.rb:23

#### Methods

## Constants

## Files

- lib/neo4j/shared/cypher.rb:2

## Methods

## Marshal

## Constants

## Files

- lib/neo4j/shared/marshal.rb:3

## Methods

### #marshal\_dump

```
def marshal_dump
  marshal_instance_variables.map(&method(:instance_variable_get))
end
```

### #marshal\_load

```
def marshal_load(array)
  marshal_instance_variables.zip(array).each do |var, value|
    instance_variable_set(var, value)
  end
end
```

## Property

### UndefinedPropertyError

## Constants

## Files

- lib/neo4j/shared/property.rb:12

## Methods

### MultiparameterAssignmentError

## Constants

## Files

- lib/neo4j/shared/property.rb:13

## Methods

### ClassMethods

### Constants

## Files

- lib/neo4j/shared/property.rb:130

## Methods #attribute!

```
def attribute!(name, options = {})
  super(name, options)
  define_method("#{name}=") do |value|
    typecast_value = typecast_attribute(_attribute_typecaster(name), value)
    send("#{name}_will_change!") unless typecast_value == read_attribute(name)
    super(value)
  end
end
```

**#attributes\_nil\_hash** an extra call to a slow dependency method.

```
def attributes_nil_hash
  declared_properties.attributes_nil_hash
end
```

## #build\_property

```
def build_property(name, options)
  prop = DeclaredProperty.new(name, options)
  prop.register
  declared_properties.register(prop)
  yield prop
  constraint_or_index(name, options)
end
```

## #declared\_properties

```
def declared_properties
  @_declared_properties ||= DeclaredProperties.new(self)
end
```

## #inherit\_property

```
def inherit_property(name, active_attr, options = {})
  build_property(name, options) do |prop|
    attributes[prop.name.to_s] = active_attr
  end
end
```

## #inherited



```

def inherited(other)
  self.declared_properties.registered_properties.each_pair do |prop_key, prop_def|
    other.property(prop_key, prop_def.options)
  end
  super
end

```

**#property** Defines a property on the class

See `active_attr` gem for allowed options, e.g which type Notice, in Neo4j you don't have to declare properties before using them, see the `neo4j-core` api.

```

def property(name, options = {})
  build_property(name, options) do |prop|
    attribute(name, prop.options)
  end
end

```

**#undef\_property**

```

def undef_property(name)
  declared_properties.unregister(name)
  attribute_methods(name).each { |method| undef_method(method) }
  undef_constraint_or_index(name)
end

```

## Constants

- `DATE_KEY_REGEX`

## Files

- `lib/neo4j/shared/property.rb:2`

## Methods

**#[]** Returning nil when we get `ActiveAttr::UnknownAttributeError` from `ActiveAttr`

```

def read_attribute(name)
  super(name)
  rescue ActiveAttr::UnknownAttributeError
    nil
  end

```

**#\_persisted\_obj** Returns the value of attribute `_persisted_obj`

```

def _persisted_obj
  @_persisted_obj
end

```

**#initialize** TODO: Remove the commented `:super` entirely once this code is part of a release. It calls an `init` method in `active_attr` that has a very negative impact on performance.

```

def initialize(attributes = nil)
  attributes = process_attributes(attributes)
  @relationship_props = self.class.extract_association_attributes!(attributes)

```

```
modded_attributes = inject_defaults!(attributes)
validate_attributes!(modded_attributes)
writer_method_props = extract_writer_methods!(modded_attributes)
send_props(writer_method_props)
@_persisted_obj = nil
end
```

### #inject\_defaults!

```
def inject_defaults!(starting_props)
  return starting_props if self.class.declared_properties.declared_property_defaults.empty?
  self.class.declared_properties.inject_defaults!(self, starting_props || {})
end
```

### #inspect

```
def inspect
  attribute_descriptions = inspect_attributes.map do |key, value|
    "#{Neo4j::ANSI::CYAN}#{key}: #{Neo4j::ANSI::CLEAR}#{value.inspect}"
  end.join(', ')

  separator = ' ' unless attribute_descriptions.empty?
  "#<#{Neo4j::ANSI::YELLOW}#{self.class.name}#{Neo4j::ANSI::CLEAR}#{separator}#{attribute_descriptions}"
end
```

### #read\_attribute

 Returning nil when we get ActiveSupport::UnknownAttributeError from ActiveSupport

```
def read_attribute(name)
  super(name)
rescue ActiveSupport::UnknownAttributeError
  nil
end
```

### #reload\_properties!

```
def reload_properties!(properties)
  @_attributes = nil
  convert_and_assign_attributes(properties)
end
```

### #send\_props

```
def send_props(hash)
  return hash if hash.blank?
  hash.each { |key, value| send("#{key}=", value) }
end
```

## Identity

### Constants

### Files

- lib/neo4j/shared/identity.rb:2

## Methods

### #==

```
def ==(other)
  other.class == self.class && other.id == id
end
```

### #eql?

```
def ==(other)
  other.class == self.class && other.id == id
end
```

### #hash

```
def hash
  id.hash
end
```

### #id

```
def id
  id = neo_id
  id.is_a?(Integer) ? id : nil
end
```

### #neo\_id

```
def neo_id
  _persisted_obj ? _persisted_obj.neo_id : nil
end
```

**#to\_key** Returns an Enumerable of all (primary) key attributes or nil if model.persisted? is false

```
def to_key
  _persisted_obj ? [id] : nil
end
```

## Callbacks

**nodoc**

## ClassMethods

## Constants

## Files

- lib/neo4j/shared/callbacks.rb:6

## Methods

### Constants

### Files

- lib/neo4j/shared/callbacks.rb:3

### Methods

**#conditional\_callback** Allows you to perform a callback if a condition is not satisfied.

```
def conditional_callback(kind, guard)
  return yield if guard
  run_callbacks(kind) { yield }
end
```

### #destroy

#### nodoc

```
def destroy #:nodoc:
  tx = Neo4j::Transaction.new
  run_callbacks(:destroy) { super }
rescue
  @_deleted = false
  @attributes = @attributes.dup
  tx.mark_failed
  raise
ensure
  tx.close if tx
end
```

### #initialize

```
def initialize(args = nil)
  run_callbacks(:initialize) { super }
end
```

### #touch

#### nodoc

```
def touch #:nodoc:
  run_callbacks(:touch) { super }
end
```

### Initialize

### Constants

### Files

- lib/neo4j/shared/initialize.rb:2

## Methods

**#wrapper** Implements the `Neo4j::Node#wrapper` and `Neo4j::Relationship#wrapper` method so that we don't have to care if the node is wrapped or not.

```
def wrapper
  self
end
```

## Typecaster

This module provides a convenient way of registering a custom Typecasting class. Custom Typecasters all follow a simple pattern.

EXAMPLE:

```
class RangeConverter
  class << self
    def primitive_type
      String
    end

    def convert_type
      Range
    end

    def to_db(value)
      value.to_s
    end

    def to_ruby(value)
      ends = value.to_s.split('..').map { |d| Integer(d) }
      ends[0]..ends[1]
    end
    alias_method :call, :to_ruby
  end

  include Neo4j::Shared::Typecaster
end
```

This would allow you to use *property :my\_prop, type: Range* in a model. Each method and the *alias\_method* call is required. Make sure the module inclusion happens at the end of the file.

*primitive\_type* is used to fool ActiveAttr's type converters, which only recognize a few basic Ruby classes.

*convert\_type* must match the constant given to the *type* option.

*to\_db* provides logic required to transform your value into the class defined by *primitive\_type*

*to\_ruby* provides logic to transform the DB-provided value back into the class expected by code using the property. In other words, it should match the *convert\_type*.

Note that *alias\_method* is used to make *to\_ruby* respond to *call*. This is to provide compatibility with ActiveAttr.

## Constants

## Files

- lib/neo4j/shared/typecaster.rb:47

## Methods

### .included

```
def self.included(other)
  Neo4j::Shared::TypeConverters.register_converter(other)
end
```

## Persistence

## Constants

## Files

- lib/neo4j/shared/persistence.rb:2

## Methods

### #apply\_default\_values

```
def apply_default_values
  return if self.class.declared_property_defaults.empty?
  self.class.declared_property_defaults.each_pair do |key, value|
    self.send("#{key}=", value) if self.send(key).nil?
  end
end
```

### #cache\_key

```
def cache_key
  if self.new_record?
    "#{model_cache_key}/new"
  elsif self.respond_to?(:updated_at) && !self.updated_at.blank?
    "#{model_cache_key}/#{neo_id}-#{self.updated_at.utc.to_s(:number)}"
  else
    "#{model_cache_key}/#{neo_id}"
  end
end
```

### #concurrent\_increment! Increments concurrently a numeric attribute by a certain amount

```
def concurrent_increment!(_attribute, _by = 1)
  fail 'not_implemented'
end
```

### #create\_or\_update

```

def create_or_update
  # since the same model can be created or updated twice from a relationship we have to have thi
  @_create_or_updating = true
  apply_default_values
  result = _persisted_obj ? update_model : create_model
  if result == false
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  else
    true
  end
rescue => e
  Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  raise e
ensure
  @_create_or_updating = nil
end

```

**#destroy**

```

def destroy
  freeze
  _persisted_obj && _persisted_obj.del
  @_deleted = true
end

```

**#destroyed?** Returns +true+ if the object was destroyed.

```

def destroyed?
  @_deleted
end

```

**#exist?**

```

def exist?
  _persisted_obj && _persisted_obj.exist?
end

```

**#freeze**

```

def freeze
  @attributes.freeze
  self
end

```

**#frozen?**

```

def frozen?
  @attributes.frozen?
end

```

**#increment** Increments a numeric attribute by a certain amount

```

def increment(attribute, by = 1)
  self[attribute] ||= 0
  self[attribute] += by
  self
end

```

**#increment!** Convenience method to increment numeric attribute and #save at the same time

```
def increment!(attribute, by = 1)
  increment(attribute, by).update_attribute(attribute, self[attribute])
end
```

**#new?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#new\_record?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#persisted?** Returns +true+ if the record is persisted, i.e. it's not a new record and it was not destroyed

```
def persisted?
  !new_record? && !destroyed?
end
```

**#props**

```
def props
  attributes.reject { |_, v| v.nil? }.symbolize_keys
end
```

**#props\_for\_create** Returns a hash containing: \* All properties and values for insertion in the database \* A *uuid* (or equivalent) key and value \* Timestamps, if the class is set to include them. Note that the UUID is added to the hash but is not set on the node. The timestamps, by comparison, are set on the node prior to addition in this hash.

```
def props_for_create
  inject_timestamps!
  props_with_defaults = inject_defaults!(props)
  converted_props = props_for_db(props_with_defaults)
  return converted_props unless self.class.respond_to?(:default_property_values)
  inject_primary_key!(converted_props)
end
```

**#props\_for\_persistence**

```
def props_for_persistence
  !_persisted_obj ? props_for_update : props_for_create
end
```

**#props\_for\_update**

```
def props_for_update
  update_magic_properties
  changed_props = attributes.select { |k, _| changed_attributes.include?(k) }
  changed_props.symbolize_keys!
  inject_defaults!(changed_props)
  props_for_db(changed_props)
end
```

**#reload**

```
def reload
  return self if new_record?
end
```



```

association_proxy_cache.clear if respond_to?(:association_proxy_cache)
changed_attributes && changed_attributes.clear
unless reload_from_database
  @_deleted = true
  freeze
end
self
end

```

**#reload\_from\_database**

```

def reload_from_database
  reloaded = self.class.load_entity(neo_id)
  reloaded ? init_on_reload(reloaded._persisted_obj) : nil
end

```

**#touch**

```

def touch
  fail 'Cannot touch on a new record object' unless persisted?
  update_attribute!(:updated_at, Time.now) if respond_to?(:updated_at=)
end

```

**#update** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```

def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end

```

**#update!** Same as {#update\_attributes}, but raises an exception if saving fails.

```

def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end

```

**#update\_attribute** Convenience method to set attribute and #save at the same time

```

def update_attribute(attribute, value)
  send("#{attribute}=", value)
  self.save
end

```

**#update\_attribute!** Convenience method to set attribute and #save! at the same time

```

def update_attribute!(attribute, value)
  send("#{attribute}=", value)
  self.save!
end

```

**#update\_attributes** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```

def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end

```

**#update\_attributes!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

### #update\_model

```
def update_model
  return if !changed_attributes || changed_attributes.empty?
  _persisted_obj.update_props(props_for_update)
  changed_attributes.clear
end
```

## Validations

### Constants

### Files

- lib/neo4j/shared/validations.rb:3

### Methods

**#read\_attribute\_for\_validation** Implements the ActiveRecord::Validation hook method.

```
def read_attribute_for_validation(key)
  respond_to?(key) ? send(key) : self[key]
end
```

**#save** The validation process on save can be skipped by passing false. The regular Model#save method is replaced with this when the validations module is mixed in, which it is by default.

```
def save(options = {})
  result = perform_validations(options) ? super : false
  if !result
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  end
  result
end
```

### #valid?

```
def valid?(context = nil)
  context ||= (new_record? ? :create : :update)
  super(context)
  errors.empty?
end
```

## QueryFactory

Acts as a bridge between the node and rel models and Neo4j::Core::Query. If the object is persisted, it returns a query matching; otherwise, it returns a query creating it. This class does not execute queries, so it keeps no record of what identifiers have been set or what has happened in previous factories.

## Constants

## Files

- lib/neo4j/shared/query\_factory.rb:5

## Methods

### #base\_query

```
def base_query
  @base_query || Neo4j::Session.current.query
end
```

### #base\_query=

```
def base_query=(query)
  return if query.blank?
  @base_query = query
end
```

### .create

```
def self.create(graph_object, identifier)
  factory = case graph_object
            when Neo4j::ActiveNode
              NodeQueryFactory
            when Neo4j::ActiveRel
              RelQueryFactory
            else
              fail "Unable to find factory for #{graph_object}"
            end
  factory.new(graph_object, identifier)
end
```

### #graph\_object Returns the value of attribute graph\_object

```
def graph_object
  @graph_object
end
```

### #identifier Returns the value of attribute identifier

```
def identifier
  @identifier
end
```

### #initialize

```
def initialize(graph_object, identifier)
  @graph_object = graph_object
  @identifier = identifier.to_sym
end
```

### #query

```
def query
  graph_object.persisted? ? match_query : create_query
end
```

## NodeQueryFactory

### Constants

### Files

- lib/neo4j/shared/query\_factory.rb:60

### Methods

#### #base\_query

```
def base_query
  @base_query || Neo4j::Session.current.query
end
```

#### #base\_query=

```
def base_query=(query)
  return if query.blank?
  @base_query = query
end
```

#### .create

```
def self.create(graph_object, identifier)
  factory = case graph_object
            when Neo4j::ActiveNode
              NodeQueryFactory
            when Neo4j::ActiveRel
              RelQueryFactory
            else
              fail "Unable to find factory for #{graph_object}"
            end
  factory.new(graph_object, identifier)
end
```

#### #graph\_object Returns the value of attribute graph\_object

```
def graph_object
  @graph_object
end
```

#### #identifier Returns the value of attribute identifier

```
def identifier
  @identifier
end
```

#### #initialize

```
def initialize(graph_object, identifier)
  @graph_object = graph_object
  @identifier = identifier.to_sym
end
```

#### #query

```
def query
  graph_object.persisted? ? match_query : create_query
end
```

## RelQueryFactory

### Constants

### Files

- lib/neo4j/shared/query\_factory.rb:73

### Methods

#### #base\_query

```
def base_query
  @base_query || Neo4j::Session.current.query
end
```

#### #base\_query=

```
def base_query=(query)
  return if query.blank?
  @base_query = query
end
```

#### .create

```
def self.create(graph_object, identifier)
  factory = case graph_object
            when Neo4j::ActiveNode
              NodeQueryFactory
            when Neo4j::ActiveRel
              RelQueryFactory
            else
              fail "Unable to find factory for #{graph_object}"
            end
  factory.new(graph_object, identifier)
end
```

#### #graph\_object Returns the value of attribute graph\_object

```
def graph_object
  @graph_object
end
```

#### #identifier Returns the value of attribute identifier

```
def identifier
  @identifier
end
```

#### #initialize

```
def initialize(graph_object, identifier)
  @graph_object = graph_object
  @identifier = identifier.to_sym
end
```

### #query

```
def query
  graph_object.persisted? ? match_query : create_query
end
```

## FilteredHash

### InvalidHashFilterType

### Constants

### Files

- lib/neo4j/shared/filtered\_hash.rb:3

### Methods

### Constants

- VALID\_SYMBOL\_INSTRUCTIONS
- VALID\_HASH\_INSTRUCTIONS
- VALID\_INSTRUCTIONS\_TYPES

### Files

- lib/neo4j/shared/filtered\_hash.rb:2

### Methods

**#base** Returns the value of attribute base

```
def base
  @base
end
```

### #filtered\_base

```
def filtered_base
  case instructions
  when Symbol
    filtered_base_by_symbol
  when Hash
    filtered_base_by_hash
  end
end
```

**#initialize**

```
def initialize(base, instructions)
  @base = base
  @instructions = instructions
  @instructions_type = instructions.class
  validate_instructions!(instructions)
end
```

**#instructions** Returns the value of attribute instructions

```
def instructions
  @instructions
end
```

**#instructions\_type** Returns the value of attribute instructions\_type

```
def instructions_type
  @instructions_type
end
```

**TypeConverters****BaseConverter****Constants****Files**

- lib/neo4j/shared/type\_converters.rb:8

**Methods .converted?**

```
def converted?(value)
  value.is_a?(db_type)
end
```

**IntegerConverter****Constants****Files**

- lib/neo4j/shared/type\_converters.rb:16

**Methods .convert\_type**

```
def convert_type
  Integer
end
```

**.converted?**

```
def converted?(value)
  value.is_a?(db_type)
end
```

#### **.db\_type**

```
def db_type
  Integer
end
```

#### **.to\_db**

```
def to_db(value)
  value.to_i
end
```

#### **.to\_ruby**

```
def to_db(value)
  value.to_i
end
```

### **FloatConverter**

#### **Constants**

#### **Files**

- lib/neo4j/shared/type\_converters.rb:34

#### **Methods .convert\_type**

```
def convert_type
  Float
end
```

#### **.converted?**

```
def converted?(value)
  value.is_a?(db_type)
end
```

#### **.db\_type**

```
def db_type
  Float
end
```

#### **.to\_db**

```
def to_db(value)
  value.to_f
end
```

#### **.to\_ruby**

```
def to_db(value)
  value.to_f
end
```



## BigDecimalConverter

### Constants

### Files

- lib/neo4j/shared/type\_converters.rb:51

### Methods .convert\_type

```
def convert_type
  BigDecimal
end
```

### .converted?

```
def converted?(value)
  value.is_a?(db_type)
end
```

### .db\_type

```
def db_type
  BigDecimal
end
```

### .to\_db

```
def to_db(value)
  case value
  when Rational
    value.to_f.to_d
  when respond_to?(:to_d)
    value.to_d
  else
    BigDecimal.new(value.to_s)
  end
end
```

### .to\_ruby

```
def to_db(value)
  case value
  when Rational
    value.to_f.to_d
  when respond_to?(:to_d)
    value.to_d
  else
    BigDecimal.new(value.to_s)
  end
end
```

## StringConverter

### Constants

## Files

- lib/neo4j/shared/type\_converters.rb:75

## Methods `.convert_type`

```
def convert_type
  String
end
```

## `.converted?`

```
def converted?(value)
  value.is_a?(db_type)
end
```

## `.db_type`

```
def db_type
  String
end
```

## `.to_db`

```
def to_db(value)
  value.to_s
end
```

## `.to_ruby`

```
def to_ruby(value)
  value.to_s
end
```

## BooleanConverter

### Constants

- FALSE\_VALUES

## Files

- lib/neo4j/shared/type\_converters.rb:92

## Methods `.convert_type`

```
def db_type
  ActiveSupport::Typecasting::Boolean
end
```

## `.converted?`

```
def converted?(value)
  converted_values.include?(value)
end
```

## `.converted_values`

```
def converted_values
  [true, false]
end
```

**.db\_type**

```
def db_type
  ActiveSupport::Typecasting::Boolean
end
```

**.to\_db**

```
def to_db(value)
  return false if FALSE_VALUES.include?(value)
  case value
  when TrueClass, FalseClass
    value
  when Numeric, /^-?[0-9]/
    !value.to_f.zero?
  else
    value.present?
  end
end
```

**.to\_ruby**

```
def to_db(value)
  return false if FALSE_VALUES.include?(value)
  case value
  when TrueClass, FalseClass
    value
  when Numeric, /^-?[0-9]/
    !value.to_f.zero?
  else
    value.present?
  end
end
```

**DateConverter**

Converts Date objects to Java long types. Must be timezone UTC.

**Constants****Files**

- lib/neo4j/shared/type\_converters.rb:127

**Methods .convert\_type**

```
def convert_type
  Date
end
```

**.converted?**

```
def converted?(value)
  value.is_a?(db_type)
end
```

### .db\_type

```
def db_type
  Integer
end
```

### .to\_db

```
def to_db(value)
  Time.utc(value.year, value.month, value.day).to_i
end
```

### .to\_ruby

```
def to_ruby(value)
  Time.at(value).utc.to_date
end
```

## DateTimeConverter

Converts DateTime objects to and from Java long types. Must be timezone UTC.

### Constants

- DATETIME\_FORMAT

### Files

- lib/neo4j/shared/type\_converters.rb:148

### Methods .convert\_type

```
def convert_type
  DateTime
end
```

### .converted?

```
def converted?(value)
  value.is_a?(db_type)
end
```

### .db\_type

```
def db_type
  Integer
end
```

**.to\_db** Converts the given DateTime (UTC) value to an Integer. DateTime values are automatically converted to UTC.

```
def to_db(value)
  value = value.new_offset(0) if value.respond_to?(:new_offset)
```

```

    args = [value.year, value.month, value.day]
    args += (value.class == Date ? [0, 0, 0] : [value.hour, value.min, value.sec])

    Time.utc(*args).to_i
  end

```

**.to\_ruby**

```

  def to_ruby(value)
    t = case value
        when Integer
          Time.at(value).utc
        when String
          DateTime.strptime(value, DATETIME_FORMAT)
        else
          fail ArgumentError, "Invalid value type for DateType property: #{value.inspect}"
        end

    DateTime.civil(t.year, t.month, t.day, t.hour, t.min, t.sec)
  end

```

**TimeConverter****Constants****Files**

- lib/neo4j/shared/type\_converters.rb:185

**Methods .call**

```

  def to_ruby(value)
    Time.at(value).utc
  end

```

**.convert\_type**

```

  def convert_type
    Time
  end

```

**.converted?**

```

  def converted?(value)
    value.is_a?(db_type)
  end

```

**.db\_type**

```

  def db_type
    Integer
  end

```

**.primitive\_type** ActiveAttr, which assists with property management, does not recognize Time as a valid type. We tell it to interpret it as Integer, as it will be when saved to the database.

```
def primitive_type
  Integer
end
```

**.to\_db** Converts the given DateTime (UTC) value to an Integer. Only utc times are supported !

```
def to_db(value)
  if value.class == Date
    Time.utc(value.year, value.month, value.day, 0, 0, 0).to_i
  else
    value.utc.to_i
  end
end
```

**.to\_ruby**

```
def to_ruby(value)
  Time.at(value).utc
end
```

## YAMLConverter

Converts hash to/from YAML

## Constants

## Files

- lib/neo4j/shared/type\_converters.rb:219

## Methods .convert\_type

```
def convert_type
  Hash
end
```

## .converted?

```
def converted?(value)
  value.is_a?(db_type)
end
```

## .db\_type

```
def db_type
  String
end
```

## .to\_db

```
def to_db(value)
  Psych.dump(value)
end
```

## .to\_ruby

```
def to_ruby(value)
  Psych.load(value)
end
```

## JSONConverter

Converts hash to/from JSON

### Constants

### Files

- lib/neo4j/shared/type\_converters.rb:240

### Methods .convert\_type

```
def convert_type
  JSON
end
```

### .converted?

```
def converted?(value)
  value.is_a?(db_type)
end
```

### .db\_type

```
def db_type
  String
end
```

### .to\_db

```
def to_db(value)
  value.to_json
end
```

### .to\_ruby

```
def to_ruby(value)
  JSON.parse(value, quirks_mode: true)
end
```

### Constants

### Files

- lib/neo4j/shared/type\_converters.rb:7

## Methods

**#convert\_properties\_to** Modifies a hash's values to be of types acceptable to Neo4j or matching what the user defined using *type* in property definitions.

```
def convert_properties_to(obj, medium, properties)
  direction = medium == :ruby ? :to_ruby : :to_db
  properties.each_pair do |key, value|
    next if skip_conversion?(obj, key, value)
    properties[key] = convert_property(key, value, direction)
  end
end
```

**#convert\_property** Converts a single property from its current format to its db- or Ruby-expected output type.

```
def convert_property(key, value, direction)
  converted_property(primitive_type(key.to_sym), value, direction)
end
```

**.converters** Returns the value of attribute converters

```
def converters
  @converters
end
```

**.formatted\_for\_db?** Attempts to determine whether conversion should be skipped because the object is already of the anticipated output type.

```
def formatted_for_db?(found_converter, value)
  return false unless found_converter.respond_to?(:db_type)
  if found_converter.respond_to?(:converted)
    found_converter.converted?(value)
  else
    value.is_a?(found_converter.db_type)
  end
end
```

**.included**

```
def included(_)
  return if @converters
  @converters = {}
  Neo4j::Shared::TypeConverters.constants.each do |constant_name|
    constant = Neo4j::Shared::TypeConverters.const_get(constant_name)
    register_converter(constant) if constant.respond_to?(:convert_type)
  end
end
```

**.register\_converter**

```
def register_converter(converter)
  converters[converter.convert_type] = converter
end
```

**.to\_other**

```
def to_other(direction, value, type)
  fail "Unknown direction given: #{direction}" unless direction == :to_ruby || direction == :to_db
  found_converter = converters[type]
  return value unless found_converter
  return value if direction == :to_db && formatted_for_db?(found_converter, value)
end
```



```

    found_converter.send(direction, value)
  end

```

**.typecaster\_for**

```

def typecaster_for(primitive_type)
  return nil if primitive_type.nil?
  converters.key?(primitive_type) ? converters[primitive_type] : nil
end

```

**DeclaredProperty**

Contains methods related to the management

**IllegalPropertyError****Constants****Files**

- lib/neo4j/shared/declared\_property.rb:4

**Methods****Index**

None of these methods interact with the database. They only keep track of property settings in models. It could (should?) handle the actual indexing/constraining, but that's TBD.

**Constants****Files**

- lib/neo4j/shared/declared\_property/index.rb:5

**Methods #constraint!**

```

def constraint!(type = :unique)
  fail Neo4j::InvalidPropertyOptionsError, "Unable to set constraint on indexed property #{name}"
  options[:constraint] = type
end

```

**#constraint?**

```

def constraint?(type = :unique)
  options.key?(:constraint) && options[:constraint] == type
end

```

**#index!**

```
def index!(type = :exact)
  fail Neo4j::InvalidPropertyOptionsError, "Unable to set index on constrained property #{name}"
  options[:index] = type
end
```

### #index?

```
def index?(type = :exact)
  options.key?(:index) && options[:index] == type
end
```

### #index\_or\_constraint?

```
def index_or_constraint?
  index?(:exact) || constraint?(:unique)
end
```

### #unconstraint!

```
def unconstraint!(type = :unique)
  options.delete(:constraint) if constraint?(type)
end
```

### #unindex!

```
def unindex!(type = :exact)
  options.delete(:index) if index?(type)
end
```

## Constants

- ILLEGAL\_PROPS

## Files

- lib/neo4j/shared/declared\_property.rb:3
- lib/neo4j/shared/declared\_property/index.rb:2

## Methods

### #constraint!

```
def constraint!(type = :unique)
  fail Neo4j::InvalidPropertyOptionsError, "Unable to set constraint on indexed property #{name}"
  options[:constraint] = type
end
```

### #constraint?

```
def constraint?(type = :unique)
  options.key?(:constraint) && options[:constraint] == type
end
```

### #default\_value

```

def default_value
  options[:default]
end

```

**#fail\_invalid\_options!**

```

def fail_invalid_options!
  case
  when index?(:exact) && constraint?(:unique)
    fail Neo4j::InvalidPropertyOptionsError,
        "#Uniqueness constraints also provide exact indexes, cannot set both options on property"
  end
end

```

**#index!**

```

def index!(type = :exact)
  fail Neo4j::InvalidPropertyOptionsError, "Unable to set index on constrained property #{name}"
  options[:index] = type
end

```

**#index?**

```

def index?(type = :exact)
  options.key?(:index) && options[:index] == type
end

```

**#index\_or\_constraint?**

```

def index_or_constraint?
  index?(:exact) || constraint?(:unique)
end

```

**#initialize**

```

def initialize(name, options = {})
  fail IllegalPropertyError, "#{name} is an illegal property" if ILLEGAL_PROPS.include?(name.to_s)
  @name = @name_sym = name
  @name_string = name.to_s
  @options = options
  fail_invalid_options!
end

```

**#magic\_typecaster** Returns the value of attribute magic\_typecaster

```

def magic_typecaster
  @magic_typecaster
end

```

**#name** Returns the value of attribute name

```

def name
  @name
end

```

**#name\_string** Returns the value of attribute name\_string

```

def name_string
  @name_string
end

```

**#name\_sym** Returns the value of attribute name\_sym

```
def name_sym
  @name_sym
end
```

**#options** Returns the value of attribute options

```
def options
  @options
end
```

**#register**

```
def register
  register_magic_properties
end
```

**#type**

```
def type
  options[:type]
end
```

**#typecaster**

```
def typecaster
  options[:typecaster]
end
```

**#unconstraint!**

```
def unconstraint!(type = :unique)
  options.delete(:constraint) if constraint?(type)
end
```

**#unindex!**

```
def unindex!(type = :exact)
  options.delete(:index) if index?(type)
end
```

## DeclaredProperties

The DeclaredPropertyManager holds details about objects created as a result of calling the #property class method on a class that includes Neo4j::ActiveNode or Neo4j::ActiveRel. There are many options that are referenced frequently, particularly during load and save, so this provides easy access and a way of separating behavior from the general Active{obj} modules.

See Neo4j::Shared::DeclaredProperty for definitions of the property objects themselves.

## Constants

- EXCLUDED\_TYPES

## Files

- lib/neo4j/shared/declared\_properties.rb:8

## Methods

#[]

```
def [] (key)
  registered_properties[key.to_sym]
end
```

**#attributes\_nil\_hash** During object wrap, a hash is needed that contains each declared property with a nil value. The `active_attr` dependency is capable of providing this but it is expensive and calculated on the fly each time it is called. Rather than rely on that, we build this progressively as properties are registered. When the node or rel is loaded, this is used as a template.

```
def attributes_nil_hash
  @attributes_nil_hash ||= {}.tap do |attr_hash|
    registered_properties.each_pair do |k, prop_obj|
      val = prop_obj.default_value
      attr_hash[k.to_s] = val
    end
  end.freeze
end
```

**#attributes\_string\_map** During object wrapping, a props hash is built with string keys but Neo4j-core provides symbols. Rather than a `to_s` or `symbolize_keys` during every load, we build a map of symbol-to-string to speed up the process. This increases memory used by the gem but reduces object allocation and GC, so it is faster in practice.

```
def attributes_string_map
  @attributes_string_map ||= {}.tap do |attr_hash|
    attributes_nil_hash.each_key { |k| attr_hash[k.to_sym] = k }
  end.freeze
end
```

**#constraint\_or\_fail!**

```
def constraint_or_fail!(key, id_property_name, type = :unique)
  return if key == id_property_name
  fail "Cannot constraint undeclared property #{property}" unless property?(key)
  registered_properties[key].constraint!(type)
end
```

**#convert\_properties\_to** Modifies a hash's values to be of types acceptable to Neo4j or matching what the user defined using `type` in property definitions.

```
def convert_properties_to(obj, medium, properties)
  direction = medium == :ruby ? :to_ruby : :to_db
  properties.each_pair do |key, value|
    next if skip_conversion?(obj, key, value)
    properties[key] = convert_property(key, value, direction)
  end
end
```

**#convert\_property** Converts a single property from its current format to its db- or Ruby-expected output type.

```
def convert_property(key, value, direction)
  converted_property(primitive_type(key.to_sym), value, direction)
end
```

**#declared\_property\_defaults** The `:default` option in `Neo4j::ActiveNode#property` class method allows for setting a default value instead of nil on declared properties. This holds those values.

```
def declared_property_defaults
  @default_property_values ||= {}
end
```

#### #index\_or\_fail!

```
def index_or_fail!(key, id_property_name, type = :exact)
  return if key == id_property_name
  fail "Cannot index undeclared property #{key}" unless property?(key)
  registered_properties[key].index!(type)
end
```

#### #indexed\_properties

```
def indexed_properties
  registered_properties.select { |_, p| p.index_or_constraint? }
end
```

**#initialize** Each class that includes Neo4j::ActiveNode or Neo4j::ActiveRel gets one instance of this class.

```
def initialize(klass)
  @klass = klass
end
```

#### #inject\_defaults!

```
def inject_defaults!(object, props)
  declared_property_defaults.each_pair do |k, v|
    props[k.to_sym] = v if object.send(k).nil? && props[k.to_sym].nil?
  end
  props
end
```

**#klass** Returns the value of attribute klass

```
def klass
  @klass
end
```

#### #magic\_typecast\_properties

```
def magic_typecast_properties
  @magic_typecast_properties ||= {}
end
```

#### #magic\_typecast\_properties\_keys

```
def magic_typecast_properties_keys
  @magic_typecast_properties_keys ||= magic_typecast_properties.keys
end
```

#### #property?

```
def property?(key)
  registered_properties.key?(key.to_sym)
end
```

**#register** #property on an ActiveNode or ActiveRel class. The DeclaredProperty has specifics about the property, but registration makes the management object aware of it. This is necessary for type conversion, defaults, and inclusion in the nil and string hashes.

```

def register(property)
  @_attributes_nil_hash = nil
  @_attributes_string_map = nil
  registered_properties[property.name] = property
  register_magic_typecaster(property) if property.magic_typecaster
  declared_property_defaults[property.name] = property.default_value if !property.default_value.
end

```

#### #registered\_properties

```

def registered_properties
  @_registered_properties ||= {}
end

```

#### #serialize

```

def serialize(name, coder = JSON)
  @serialize ||= {}
  @serialize[name] = coder
end

```

#### #serialized\_properties

```

def serialized_properties
  @serialize ||= {}
end

```

#### #serialized\_properties=

```

def serialized_properties=(serialize_hash)
  @serialized_property_keys = nil
  @serialize = serialize_hash.clone
end

```

#### #serialized\_properties\_keys

```

def serialized_properties_keys
  @serialized_property_keys ||= serialized_properties.keys
end

```

**#string\_key** but when this happens many times while loading many objects, it results in a surprisingly significant slowdown. The branching logic handles what happens if a property can't be found. The first option attempts to find it in the existing hash. The second option checks whether the key is the class's id property and, if it is, the string hash is rebuilt with it to prevent future lookups. The third calls *to\_s*. This would happen if undeclared properties are found on the object. We could add them to the string map but that would result in unchecked, un-GCed memory consumption. In the event that someone is adding properties dynamically, maybe through user input, this would be bad.

```

def string_key(k)
  attributes_string_map[k] || string_map_id_property(k) || k.to_s
end

```

#### #unregister

```

def unregister(name)
  # might need to be include?(name.to_s)
  fail ArgumentError, "Argument `#{name}` not an attribute" if not registered_properties[name]
  declared_prop = registered_properties[name]
  registered_properties.delete(declared_prop)
  unregister_magic_typecaster(name)
end

```

```
unregister_property_default (name)
end
```

**#upstream\_primitives** The known mappings of declared properties and their primitive types.

```
def upstream_primitives
  @upstream_primitives ||= {}
end
```

**#value\_for\_db**

```
def value_for_db(key, value)
  return value unless registered_properties[key]
  convert_property(key, value, :to_db)
end
```

**#value\_for\_ruby**

```
def value_for_ruby(key, value)
  return unless registered_properties[key]
  convert_property(key, value, :to_ruby)
end
```

**#value\_for\_where**

```
def value_for_where(key, value)
  return value unless prop = registered_properties[key]
  return value_for_db(key, value) if prop.typecaster && prop.typecaster.convert_type == value.class
  EXCLUDED_TYPES.include?(value.class) ? value : value_for_db(key, value)
end
```

## RelTypeConverters

This module controls changes to relationship type based on `Neo4j::Config.transform_rel_type`. It's used whenever a rel type is automatically determined based on ActiveRecord model name or association type.

### Constants

### Files

- lib/neo4j/shared/rel\_type\_converters.rb:5

### Methods

**#decorated\_rel\_type**

```
def decorated_rel_type(type)
  @decorated_rel_type ||= Neo4j::Shared::RelTypeConverters.decorated_rel_type(type)
end
```

**.decorated\_rel\_type**

```
def decorated_rel_type(type)
  type = type.to_s
  decorated_type = case rel_transformer
                  when :upcase
```



```

        type.underscore.upcase
      when :downcase
        type.underscore.downcase
      when :legacy
        "##{type.underscore.downcase}"
      when :none
        type
      else
        type.underscore.upcase
      end
    decorated_type.tap { |s| s.gsub!('/', '::') if type.include?('::') }
  end
end

```

**.rel\_transformer** Determines how relationship types should look when inferred based on association or ActiveRel model name. With the exception of *none*, all options will call *underscore*, so *ThisClass* becomes *this\_class*, with capitalization determined by the specific option passed. Valid options: \* :upcase - *this\_class*, *ThisClass*, *this\_cLaSs* (if you don't like yourself) becomes *THIS\_CLASS* \* :downcase - same as above, only... downcased. \* :legacy - downcases and prepends #, so *ThisClass* becomes *#this\_class* \* :none - uses the string version of whatever is passed with no modifications

```

def rel_transformer
  @rel_transformer ||= Neo4j::Config[:transform_rel_type].nil? ? :upcase : Neo4j::Config[:transform_rel_type]
end

```

## SerializedProperties

This module adds the *serialize* class method. It lets you store hashes and arrays in Neo4j properties. Be aware that you won't be able to search within serialized properties and stuff use indexes. If you do a regex search for portion of a string property, the search happens in Cypher and you may take a performance hit.

See `type_converters.rb` for the serialization process.

### ClassMethods

### Constants

### Files

- `lib/neo4j/shared/serialized_properties.rb:19`

### Methods #inherit\_serialized\_properties

```

def inherit_serialized_properties(other)
  other.serialized_properties = self.serialized_properties
end

```

### #inherited

```

def inherited(other)
  inherit_serialized_properties(other) if self.respond_to?(:serialized_properties)
  super
end

```

### Constants

#### Files

- lib/neo4j/shared/serialized\_properties.rb:7

#### Methods

##### #serializable\_hash

```
def serializable_hash(*args)
  super.merge(id: id)
end
```

##### #serialized\_properties

```
def serialized_properties
  self.class.serialized_properties
end
```

### Constants

#### Files

- lib/neo4j/shared.rb:2
- lib/neo4j/shared/cypher.rb:1
- lib/neo4j/shared/marshal.rb:2
- lib/neo4j/shared/property.rb:1
- lib/neo4j/shared/identity.rb:1
- lib/neo4j/shared/callbacks.rb:2
- lib/neo4j/shared/initialize.rb:1
- lib/neo4j/shared/typecaster.rb:2
- lib/neo4j/shared/persistence.rb:1
- lib/neo4j/shared/validations.rb:2
- lib/neo4j/shared/query\_factory.rb:1
- lib/neo4j/shared/filtered\_hash.rb:1
- lib/neo4j/shared/type\_converters.rb:6
- lib/neo4j/shared/declared\_property.rb:1
- lib/neo4j/shared/declared\_properties.rb:1
- lib/neo4j/shared/rel\_type\_converters.rb:1
- lib/neo4j/shared/serialized\_properties.rb:1
- lib/neo4j/shared/declared\_property/index.rb:1

## Methods

### #declared\_properties

```
def declared_properties
  self.class.declared_properties
end
```

## 11.1.2 Neo4jrbError

Neo4j.rb Errors Generic Neo4j.rb exception class.

### Constants

#### Files

- lib/neo4j/errors.rb:4

### Methods

## 11.1.3 RecordNotFound

Raised when Neo4j.rb cannot find record by given id.

### Constants

#### Files

- lib/neo4j/errors.rb:8

### Methods

## 11.1.4 InvalidPropertyOptionsError

### Constants

#### Files

- lib/neo4j/errors.rb:11

### Methods

## 11.1.5 Config

== Keeps configuration for neo4j

== Configurations keys

## Constants

- `DEFAULT_FILE`
- `CLASS_NAME_PROPERTY_KEY`

## Files

- `lib/neo4j/config.rb:5`

## Methods

`.[]`

```
def [](key)
  configuration[key.to_s]
end
```

`.[]=` Sets the value of a config entry.

```
def []=(key, val)
  configuration[key.to_s] = val
end
```

`.association_model_namespace`

```
def association_model_namespace
  Neo4j::Config[:association_model_namespace] || nil
end
```

`.association_model_namespace_string`

```
def association_model_namespace_string
  namespace = Neo4j::Config[:association_model_namespace]
  return nil if namespace.nil?
  "::#{namespace}"
end
```

`.configuration` Reads from the `default_file` if configuration is not set already

```
def configuration
  return @configuration if @configuration

  @configuration = ActiveSupport::HashWithIndifferentAccess.new
  @configuration.merge!(defaults)
  @configuration
end
```

`.default_file`

```
def default_file
  @default_file ||= DEFAULT_FILE
end
```

`.default_file=` Sets the location of the configuration YAML file and old deletes configurations.

```
def default_file=(file_path)
  delete_all
  @defaults = nil
end
```

```
@default_file = File.expand_path(file_path)
end
```

**.defaults**

```
def defaults
  require 'yaml'
  @defaults ||= ActiveSupport::HashWithIndifferentAccess.new(YAML.load_file(default_file))
end
```

**.delete** Remove the value of a config entry.

```
def delete(key)
  configuration.delete(key)
end
```

**.delete\_all** Remove all configuration. This can be useful for testing purpose.

```
def delete_all
  @configuration = nil
end
```

**.include\_root\_in\_json**

```
def include_root_in_json
  # we use ternary because a simple || will always evaluate true
  Neo4j::Config[:include_root_in_json].nil? ? true : Neo4j::Config[:include_root_in_json]
end
```

**.module\_handling**

```
def module_handling
  Neo4j::Config[:module_handling] || :none
end
```

**.timestamp\_type**

```
def timestamp_type
  Neo4j::Config[:timestamp_type] || DateTime
end
```

**.to\_hash**

```
def to_hash
  configuration.to_hash
end
```

**.to\_yaml**

```
def to_yaml
  configuration.to_yaml
end
```

**.use** Yields the configuration

```
def use
  @configuration ||= ActiveSupport::HashWithIndifferentAccess.new
  yield @configuration
  nil
end
```

## 11.1.6 ClassWrapper

### Constants

### Files

- lib/neo4j/wrapper.rb:2

### Methods

## 11.1.7 Railtie

### Constants

### Files

- lib/neo4j/railtie.rb:5

### Methods

#### **.config\_data**

```
def config_data
  @config_data ||= if yaml_path
                    HashWithIndifferentAccess.new(YAML.load(ERB.new(yaml_path.read).result) [Rai
                    else
                    {}
                    end
end
```

#### **.default\_session\_path**

```
def default_session_path
  ENV['NEO4J_URL'] || ENV['NEO4J_PATH'] ||
  config_data[:url] || config_data[:path] ||
  'http://localhost:7474'
end
```

#### **.default\_session\_type**

```
def default_session_type
  if ENV['NEO4J_TYPE']
    :embedded_db
  else
    config_data[:type] || :server_db
  end.to_sym
end
```

#### **.java\_platform?**

```
def java_platform?
  RUBY_PLATFORM =~ /java/
end
```

#### **.open\_neo4j\_session**

```

def open_neo4j_session(options)
  type, name, default, path = options.values_at(:type, :name, :default, :path)

  if !java_platform? && type == :embedded_db
    fail "Tried to start embedded Neo4j db without using JRuby (got #{RUBY_PLATFORM}), please run
  end

  session = if options.key?(:name)
    Neo4j::Session.open_named(type, name, default, path)
  else
    Neo4j::Session.open(type, path, options[:options])
  end

  start_embedded_session(session) if type == :embedded_db
end

```

### #register\_neo4j\_cypher\_logging

```

def register_neo4j_cypher_logging
  return if @neo4j_cypher_logging_registered

  Neo4j::Core::Query.pretty_cypher = Neo4j::Config[:pretty_logged_cypher_queries]

  Neo4j::Server::CypherSession.log_with do |message|
    (Neo4j::Config[:logger] || Rails.logger).debug message
  end

  @neo4j_cypher_logging_registered = true
end

```

### .setup\_config\_defaults!

```

def setup_config_defaults!(cfg)
  cfg.session_type ||= default_session_type
  cfg.session_path ||= default_session_path
  cfg.session_options ||= {}
  cfg.sessions ||= []
end

```

### .setup\_default\_session

```

def setup_default_session(cfg)
  setup_config_defaults!(cfg)

  return if !cfg.sessions.empty?

  cfg.sessions << {type: cfg.session_type, path: cfg.session_path, options: cfg.session_options.
end

```

### .start\_embedded\_session

```

def start_embedded_session(session)
  # See https://github.com/jruby/jruby/wiki/UnlimitedStrengthCrypto
  security_class = java.lang.Class.for_name('javax.crypto.JceSecurity')
  restricted_field = security_class.get_declared_field('isRestricted')
  restricted_field.accessible = true
  restricted_field.set nil, false
  session.start
end

```

## .yaml\_path

```
def yaml_path
  @yaml_path ||= %w(config/neo4j.yml config/neo4j.yaml).map do |path|
    Rails.root.join(path)
  end.detect(&:exist?)
end
```

## 11.1.8 Migration

### AddIdProperty

#### Constants

#### Files

- lib/neo4j/migration.rb:25

#### Methods

##### #default\_path

```
def default_path
  Rails.root if defined? Rails
end
```

##### #initialize

```
def initialize(path = default_path)
  @models_filename = File.join(joined_path(path), 'add_id_property.yml')
end
```

##### #joined\_path

```
def joined_path(path)
  File.join(path.to_s, 'db', 'neo4j-migrate')
end
```

##### #migrate

```
def migrate
  models = ActiveSupport::HashWithIndifferentAccess.new(YAML.load_file(models_filename)[:models])
  output 'This task will add an ID Property every node in the given file.'
  output 'It may take a significant amount of time, please be patient.'
  models.each do |model|
    output
    output
    output "Adding IDs to #{model}"
    add_ids_to model.constantize
  end
end
```

##### #models\_filename Returns the value of attribute models\_filename

```
def models_filename
  @models_filename
end
```



**#output**

```
def output(string = '')
  puts string unless !!ENV['silenced']
end
```

**#print\_output**

```
def print_output(string)
  print string unless !!ENV['silenced']
end
```

**#setup**

```
def setup
  FileUtils.mkdir_p('db/neo4j-migrate')

  return if File.file?(models_filename)

  File.open(models_filename, 'w') do |file|
    message = <<MESSAGE
# Provide models to which IDs should be added.
# # It will only modify nodes that do not have IDs. There is no danger of overwriting data.
# # models: [Student,Lesson,Teacher,Exam]\nmodels: []
MESSAGE
    file.write(message)
  end
end
```

**Constants****Files**

- lib/neo4j/migration.rb:4

**Methods****#default\_path**

```
def default_path
  Rails.root if defined? Rails
end
```

**#joined\_path**

```
def joined_path(path)
  File.join(path.to_s, 'db', 'neo4j-migrate')
end
```

**#migrate**

```
def migrate
  fail 'not implemented'
end
```

**#output**

```
def output(string = '')
  puts string unless !!ENV['silenced']
end
```

### #print\_output

```
def print_output(string)
  print string unless !!ENV['silenced']
end
```

## 11.1.9 Paginated

### Constants

### Files

- lib/neo4j/paginated.rb:2

### Methods

#### .create\_from

```
def self.create_from(source, page, per_page, order = nil)
  target = source.node_var || source.identity
  partial = source.skip((page - 1) * per_page).limit(per_page)
  ordered_partial, ordered_source = if order
    [partial.order_by(order), source.query.with("#{target} as
    else
    [partial, source.count]
  end
  Paginated.new(ordered_partial, ordered_source, page)
end
```

**#current\_page** Returns the value of attribute current\_page

```
def current_page
  @current_page
end
```

#### #initialize

```
def initialize(items, total, current_page)
  @items = items
  @total = total
  @current_page = current_page
end
```

**#items** Returns the value of attribute items

```
def items
  @items
end
```

**#total** Returns the value of attribute total

```
def total
  @total
end
```

### 11.1.10 Timestamps

This mixin includes timestamps in the included class

#### Updated

This mixin includes a `updated_at` timestamp property

#### Constants

#### Files

- `lib/neo4j/timestamps/updated.rb:4`

#### Methods

#### Created

This mixin includes a `created_at` timestamp property

#### Constants

#### Files

- `lib/neo4j/timestamps/created.rb:4`

#### Methods

#### Constants

#### Files

- `lib/neo4j/timestamps.rb:6`
- `lib/neo4j/timestamps/updated.rb:2`
- `lib/neo4j/timestamps/created.rb:2`

#### Methods

### 11.1.11 ActiveRel

Makes Neo4j Relationships more or less act like ActiveRecord objects. See documentation at <https://github.com/neo4jrb/neo4j/wiki/Neo4j%3A%3AActiveRel>

## FrozenRelError

### Constants

### Files

- lib/neo4j/active\_rel.rb:21

### Methods

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_rel.rb:62

### Methods

### Query

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_rel/query.rb:5

### Methods

**#all** Performs a basic match on the relationship, returning all results. This is not executed lazily, it will immediately return matching objects.

```
def all
  all_query.pluck(:r1)
end
```

**#find** Returns the object with the specified neo4j id.

```
def find(id, session = self.neo4j_session)
  fail "Unknown argument #{id.class} in find method (expected String or Integer)" if !(id.is_a?(String || Integer))
  find_by_id(id, session)
end
```

**#find\_by\_id** Loads the relationship using its neo\_id.

```
def find_by_id(key, session = Neo4j::Session.current!)
  session.query.match('( )-[r]- ( )').where('ID(r)' => key.to_i).limit(1).return(:r).first.r
end
```

### #first

```
def first
  all_query.limit(1).order('ID(r1)').pluck(:r1).first
end
```

**#last**

```
def last
  all_query.limit(1).order('ID(r1) DESC').pluck(:r1).first
end
```

**#where** Performs a very basic match on the relationship. This is not executed lazily, it will immediately return matching objects. To use a string, prefix the property with “r1”

```
def where(args = {})
  where_query.where(where_string(args)).pluck(:r1)
end
```

**Constants****Files**

- lib/neo4j/active\_rel/query.rb:2

**Methods****Types**

provides mapping of type to model name

**ClassMethods****Constants****Files**

- lib/neo4j/active\_rel/types.rb:24

**Methods**

**#\_type** When called without arguments, it will return the current setting or supply a default. When called with arguments, it will change the current setting. should be deprecated

```
def type(given_type = nil, auto = false)
  case
  when !given_type && rel_type?
    @rel_type
  when given_type
    assign_type!(given_type, auto)
  else
    assign_type!(namespaced_model_name, true)
  end
end
```

**#\_wrapped\_classes**

```
def _wrapped_classes
  WRAPPED_CLASSES
end
```

**#add\_wrapped\_class**

```
def add_wrapped_class(type)
  # WRAPPED_CLASSES[type.to_sym.downcase] = self.name
  _wrapped_classes[type.to_sym] = self.name
end
```

**#decorated\_rel\_type**

```
def decorated_rel_type(type)
  @decorated_rel_type ||= Neo4j::Shared::RelTypeConverters.decorated_rel_type(type)
end
```

**#inherited**

```
def inherited(subclass)
  subclass.type subclass.namespaced_model_name, true
end
```

**#namespaced\_model\_name**

```
def namespaced_model_name
  case Neo4j::Config[:module_handling]
  when :demodulize
    self.name.demodulize
  when Proc
    Neo4j::Config[:module_handling].call(self.name)
  else
    self.name
  end
end
```

**#rel\_type** When called without arguments, it will return the current setting or supply a default. When called with arguments, it will change the current setting.

```
def type(given_type = nil, auto = false)
  case
  when !given_type && rel_type?
    @rel_type
  when given_type
    assign_type!(given_type, auto)
  else
    assign_type!(namespaced_model_name, true)
  end
end
```

**#rel\_type?**

```
def rel_type?
  !!@rel_type
end
```

**#type** When called without arguments, it will return the current setting or supply a default. When called with arguments, it will change the current setting.

```

def type(given_type = nil, auto = false)
  case
  when !given_type && rel_type?
    @rel_type
  when given_type
    assign_type!(given_type, auto)
  else
    assign_type!(namespaced_model_name, true)
  end
end
end

```

## Constants

- WRAPPED\_CLASSES

## Files

- lib/neo4j/active\_rel/types.rb:4

## Methods

## Property

## ClassMethods

## Constants

## Files

- lib/neo4j/active\_rel/property.rb:40

## Methods #create\_method

```

def create_method
  creates_unique? ? :create_unique : :create
end

```

## #creates\_unique

```

def creates_unique(option = :none)
  option = :none if option == true
  @creates_unique = option
end

```

## #creates\_unique?

```

def creates_unique?
  !!@creates_unique
end

```

## #creates\_unique\_option

```
def creates_unique_option
  @creates_unique || :none
end
```

### #end\_class

```
alias_method :end_class, :to_class
```

**#extract\_association\_attributes!** Extracts keys from attributes hash which are relationships of the model TODO: Validate separately that relationships are getting the right values? Perhaps also store the values and persist relationships on save?

```
def extract_association_attributes!(attributes)
  return if attributes.blank?
  {}.tap do |relationship_props|
    attributes.each_key do |key|
      relationship_props[key] = attributes.delete(key) if [[:from_node, :to_node]].include?(key)
    end
  end
end
```

### #id\_property\_name

```
def id_property_name
  false
end
```

### #load\_entity

```
def load_entity(id)
  Neo4j::Node.load(id)
end
```

### #start\_class

```
alias_method :start_class, :from_class
```

### #unique?

```
def creates_unique?
  !!@creates_unique
end
```

### #valid\_class\_argument?

```
def valid_class_argument?(class_argument)
  [String, Symbol, FalseClass].include?(class_argument.class) ||
  (class_argument.is_a?(Array) && class_argument.all? { |c| [String, Symbol].include?(c.class) }
end
```

## Constants

- DATE\_KEY\_REGEX

## Files

- lib/neo4j/active\_rel/property.rb:4



## Methods

#[] Returning nil when we get ActiveAttr::UnknownAttributeError from ActiveAttr

```
def read_attribute(name)
  super(name)
  rescue ActiveAttr::UnknownAttributeError
    nil
  end
```

#\_persisted\_obj Returns the value of attribute \_persisted\_obj

```
def _persisted_obj
  @_persisted_obj
end
```

#creates\_unique\_option

```
def creates_unique_option
  self.class.create_unique_option
end
```

#end\_node

```
alias_method :end_node, :to_node
```

#from\_node\_neo\_id

```
alias_method :from_node_neo_id, :start_node_neo_id
```

#initialize

```
def initialize(attributes = nil)
  super(attributes)
  send_props(@relationship_props) unless @relationship_props.nil?
end
```

#inject\_defaults!

```
def inject_defaults!(starting_props)
  return starting_props if self.class.declared_properties.declared_property_defaults.empty?
  self.class.declared_properties.inject_defaults!(self, starting_props || {})
end
```

#inspect

```
def inspect
  attribute_descriptions = inspect_attributes.map do |key, value|
    "#{Neo4j::ANSI::CYAN}#{key}: #{Neo4j::ANSI::CLEAR}#{value.inspect}"
  end.join(', ')

  separator = ' ' unless attribute_descriptions.empty?
  "#<#{Neo4j::ANSI::YELLOW}#{self.class.name}#{Neo4j::ANSI::CLEAR}#{separator}#{attribute_descriptions}"
end
```

#read\_attribute Returning nil when we get ActiveAttr::UnknownAttributeError from ActiveAttr

```
def read_attribute(name)
  super(name)
  rescue ActiveAttr::UnknownAttributeError
    nil
  end
```

### #rel\_type

```
def type
  self.class.type
end
```

### #reload\_properties!

```
def reload_properties!(properties)
  @attributes = nil
  convert_and_assign_attributes(properties)
end
```

### #send\_props

```
def send_props(hash)
  return hash if hash.blank?
  hash.each { |key, value| send("#{key}=", value) }
end
```

### #start\_node

```
alias_method :start_node, :from_node
```

### #to\_node\_neo\_id

```
alias_method :to_node_neo_id, :end_node_neo_id
```

### #type

```
def type
  self.class.type
end
```

## Callbacks

**nodoc**

## Constants

## Files

- lib/neo4j/active\_rel/callbacks.rb:3

## Methods

**#conditional\_callback** Allows you to perform a callback if a condition is not satisfied.

```
def conditional_callback(kind, guard)
  return yield if guard
  run_callbacks(kind) { yield }
end
```

### #destroy

**nodoc**

```

def destroy #:nodoc:
  tx = Neo4j::Transaction.new
  run_callbacks(:destroy) { super }
rescue
  @_deleted = false
  @attributes = @attributes.dup
  tx.mark_failed
  raise
ensure
  tx.close if tx
end

```

**#initialize**

```

def initialize(args = nil)
  run_callbacks(:initialize) { super }
end

```

**#save**

```

def save(*args)
  unless _persisted_obj || (from_node.respond_to?(:neo_id) && to_node.respond_to?(:neo_id))
    fail Neo4j::ActiveRel::Persistence::RelInvalidError, 'from_node and to_node must be node obj'
  end
  super(*args)
end

```

**#touch****nodoc**

```

def touch #:nodoc:
  run_callbacks(:touch) { super }
end

```

**Initialize****Constants****Files**

- lib/neo4j/active\_rel/initialize.rb:2

**Methods**

**#init\_on\_load** called when loading the rel from the database

```

def init_on_load(persisted_rel, from_node_id, to_node_id, type)
  @rel_type = type
  @_persisted_obj = persisted_rel
  changed_attributes && changed_attributes.clear
  @attributes = convert_and_assign_attributes(persisted_rel.props)
  load_nodes(from_node_id, to_node_id)
end

```

**#init\_on\_reload**

```
def init_on_reload(unwrapped_reloaded)
  @attributes = nil
  init_on_load(unwrapped_reloaded,
              unwrapped_reloaded._start_node_id,
              unwrapped_reloaded._end_node_id,
              unwrapped_reloaded.rel_type)

  self
end
```

**#wrapper** Implements the `Neo4j::Node#wrapper` and `Neo4j::Relationship#wrapper` method so that we don't have to care if the node is wrapped or not.

```
def wrapper
  self
end
```

### Persistence

#### RelInvalidError

#### Constants

#### Files

- `lib/neo4j/active_rel/persistence.rb:7`

#### Methods

#### ModelClassInvalidError

#### Constants

#### Files

- `lib/neo4j/active_rel/persistence.rb:8`

#### Methods

#### RelCreateFailedError

#### Constants

#### Files

- `lib/neo4j/active_rel/persistence.rb:9`

#### Methods

## ClassMethods

## Constants

## Files

- lib/neo4j/active\_rel/persistence.rb:55

## Methods

**#create** Creates a new relationship between objects

```
def create(props = {})
  relationship_props = extract_association_attributes!(props) || {}
  new(props).tap do |obj|
    relationship_props.each do |prop, value|
      obj.send("#{prop}=", value)
    end
    obj.save
  end
end
```

**#create!** Same as #create, but raises an error if there is a problem during save.

```
def create!(*args)
  props = args[0] || {}
  relationship_props = extract_association_attributes!(props) || {}
  new(props).tap do |obj|
    relationship_props.each do |prop, value|
      obj.send("#{prop}=", value)
    end
    obj.save!
  end
end
```

**#create\_method**

```
def create_method
  creates_unique? ? :create_unique : :create
end
```

**#load\_entity**

```
def load_entity(id)
  Neo4j::Relationship.load(id)
end
```

## QueryFactory

**This class builds and executes a Cypher query, using information from the graph objects to determine whether they need to be created simultaneously.** It keeps the rel instance from being responsible for inspecting the nodes or talking with Shared::QueryFactory.

## Constants

- NODE\_SYMBOLS

### Files

- lib/neo4j/active\_rel/persistence/query\_factory.rb:5

### Methods

**#build!** TODO: This feels like it should also wrap the rel, but that is handled in Neo4j::ActiveRel::Persistence at the moment. Builds and executes the query using the objects giving during init. It holds the process:

- Execute node callbacks if needed
- Create and execute the query
- Mix the query response into the unpersisted objects given during init

```
def build!
  node_before_callbacks! do
    res = query_factory(rel, rel_id, iterative_query).query.unwrapped.return(*unpersisted_return
    node_symbols.each { |n| wrap!(send(n), res, n) }
    @unwrapped_rel = res.send(rel_id)
  end
end
```

**#from\_node** Returns the value of attribute from\_node

```
def from_node
  @from_node
end
```

**#initialize**

```
def initialize(from_node, to_node, rel)
  @from_node = from_node
  @to_node = to_node
  @rel = rel
end
```

**#rel** Returns the value of attribute rel

```
def rel
  @rel
end
```

**#to\_node** Returns the value of attribute to\_node

```
def to_node
  @to_node
end
```

**#unwrapped\_rel** Returns the value of attribute unwrapped\_rel

```
def unwrapped_rel
  @unwrapped_rel
end
```

### Constants

### Files

- lib/neo4j/active\_rel/persistence.rb:2

- lib/neo4j/active\_rel/persistence/query\_factory.rb:1

## Methods

### #apply\_default\_values

```
def apply_default_values
  return if self.class.declared_property_defaults.empty?
  self.class.declared_property_defaults.each_pair do |key, value|
    self.send("#{key}=", value) if self.send(key).nil?
  end
end
```

### #cache\_key

```
def cache_key
  if self.new_record?
    "#{model_cache_key}/new"
  elsif self.respond_to?(:updated_at) && !self.updated_at.blank?
    "#{model_cache_key}/#{neo_id}-#{self.updated_at.utc.to_s(:number)}"
  else
    "#{model_cache_key}/#{neo_id}"
  end
end
```

### #concurrent\_increment! Increments concurrently a numeric attribute by a certain amount

```
def concurrent_increment!(attribute, by = 1)
  query_rel = Neo4j::Session.query.match('()-[n]-()').where(n: {neo_id: neo_id})
  increment_by_query! query_rel, attribute, by
end
```

### #create\_method

```
def create_method
  self.class.create_method
end
```

### #create\_model

```
def create_model
  validate_node_classes!
  rel = _create_rel
  return self unless rel.respond_to?(:props)
  init_on_load(rel, from_node, to_node, @rel_type)
  true
end
```

### #create\_or\_update

```
def create_or_update
  # since the same model can be created or updated twice from a relationship we have to have thi
  @create_or_updating = true
  apply_default_values
  result = _persisted_obj ? update_model : create_model
  if result == false
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  else
    true
  end
end
```

```
    end
  rescue => e
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
    raise e
  ensure
    @_create_or_updating = nil
  end
```

#### #cypher\_identifier

```
def cypher_identifier
  @cypher_identifier || :rel
end
```

#### #destroy

```
def destroy
  freeze
  _persisted_obj && _persisted_obj.del
  @_deleted = true
end
```

**#destroyed?** Returns +true+ if the object was destroyed.

```
def destroyed?
  @_deleted
end
```

#### #exist?

```
def exist?
  _persisted_obj && _persisted_obj.exist?
end
```

#### #freeze

```
def freeze
  @attributes.freeze
  self
end
```

#### #from\_node\_identifier

```
def from_node_identifier
  @from_node_identifier || :from_node
end
```

#### #from\_node\_identifier=

```
def from_node_identifier=(id)
  @from_node_identifier = id.to_sym
end
```

#### #frozen?

```
def frozen?
  @attributes.frozen?
end
```

**#increment** Increments a numeric attribute by a certain amount



```
def increment(attribute, by = 1)
  self[attribute] ||= 0
  self[attribute] += by
  self
end
```

**#increment!** Convenience method to increment numeric attribute and **#save** at the same time

```
def increment!(attribute, by = 1)
  increment(attribute, by).update_attribute(attribute, self[attribute])
end
```

**#new?** Returns **+true+** if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#new\_record?** Returns **+true+** if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#persisted?** Returns **+true+** if the record is persisted, i.e. it's not a new record and it was not destroyed

```
def persisted?
  !new_record? && !destroyed?
end
```

**#props**

```
def props
  attributes.reject { |_, v| v.nil? }.symbolize_keys
end
```

**#props\_for\_create** Returns a hash containing: \* All properties and values for insertion in the database \* A *uuid* (or equivalent) key and value \* Timestamps, if the class is set to include them. Note that the UUID is added to the hash but is not set on the node. The timestamps, by comparison, are set on the node prior to addition in this hash.

```
def props_for_create
  inject_timestamps!
  props_with_defaults = inject_defaults!(props)
  converted_props = props_for_db(props_with_defaults)
  return converted_props unless self.class.respond_to?(:default_property_values)
  inject_primary_key!(converted_props)
end
```

**#props\_for\_persistence**

```
def props_for_persistence
  _persisted_obj ? props_for_update : props_for_create
end
```

**#props\_for\_update**

```
def props_for_update
  update_magic_properties
  changed_props = attributes.select { |k, _| changed_attributes.include?(k) }
  changed_props.symbolize_keys!
end
```

```
inject_defaults!(changed_props)
props_for_db(changed_props)
end
```

### #reload

```
def reload
  return self if new_record?
  association_proxy_cache.clear if respond_to?(:association_proxy_cache)
  changed_attributes && changed_attributes.clear
  unless reload_from_database
    @_deleted = true
    freeze
  end
  self
end
```

### #reload\_from\_database

```
def reload_from_database
  reloaded = self.class.load_entity(neo_id)
  reloaded ? init_on_reload(reloaded._persisted_obj) : nil
end
```

### #save

```
def save(*)
  create_or_update
end
```

### #save!

```
def save!(*args)
  save(*args) or fail(RelInvalidError, inspect) # rubocop:disable Style/AndOr
end
```

### #to\_node\_identifier

```
def to_node_identifier
  @to_node_identifier || :to_node
end
```

### #to\_node\_identifier=

```
def to_node_identifier=(id)
  @to_node_identifier = id.to_sym
end
```

### #touch

```
def touch
  fail 'Cannot touch on a new record object' unless persisted?
  update_attribute!(:updated_at, Time.now) if respond_to?(:updated_at=)
end
```

**#update** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#update\_attribute** Convenience method to set attribute and #save at the same time

```
def update_attribute(attribute, value)
  send("#{attribute}=", value)
  self.save
end
```

**#update\_attribute!** Convenience method to set attribute and #save! at the same time

```
def update_attribute!(attribute, value)
  send("#{attribute}=", value)
  self.save!
end
```

**#update\_attributes** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update\_attributes!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#update\_model**

```
def update_model
  return if !changed_attributes || changed_attributes.empty?
  _persisted_obj.update_props(props_for_update)
  changed_attributes.clear
end
```

## Validations

### Constants

### Files

- lib/neo4j/active\_rel/validations.rb:3

### Methods

**#read\_attribute\_for\_validation** Implements the ActiveRecord::Validation hook method.

```
def read_attribute_for_validation(key)
  respond_to?(key) ? send(key) : self[key]
end
```

**#save** The validation process on save can be skipped by passing false. The regular `Model#save` method is replaced with this when the validations module is mixed in, which it is by default.

```
def save(options = {})
  result = perform_validations(options) ? super : false
  if !result
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  end
  result
end
```

**#valid?**

```
def valid?(context = nil)
  context ||= (new_record? ? :create : :update)
  super(context)
  errors.empty?
end
```

### RelatedNode

A container for ActiveRecord's `:inbound` and `:outbound` methods. It provides lazy loading of nodes. It's important (or maybe not really IMPORTANT, but at least worth mentioning) that calling `method_missing` will result in a query to load the node if the node is not already loaded.

### InvalidParameterError

#### Constants

#### Files

- `lib/neo4j/active_rel/related_node.rb:6`

#### Methods

### UnsetRelatedNodeError

#### Constants

#### Files

- `lib/neo4j/active_rel/related_node.rb:7`

#### Methods

## Constants

## Files

- lib/neo4j/active\_rel/related\_node.rb:5

## Methods

**#==** Loads the node if needed, then conducts comparison.

```
def ==(other)
  loaded if @node.is_a?(Integer)
  @node == other
end
```

## #class

```
def class
  loaded.send(:class)
end
```

## #cypher\_representation

```
def cypher_representation(clazz)
  case
  when !set?
    "(#{formatted_label_list(clazz)})"
  when set? && !loaded?
    "(Node with neo_id #{@node})"
  else
    node_class = self.class
    id_name = node_class.id_property_name
    labels = ':' + node_class.mapped_label_names.join(':')

    "(#{labels} {#{id_name}: #{@node.id.inspect}})"
  end
end
```

**#initialize** ActiveRel's related nodes can be initialized with nothing, an integer, or a fully wrapped node.

Initialization with nothing happens when a new, non-persisted ActiveRel object is first initialized.

Initialization with an integer happens when a relationship is loaded from the database. It loads using the ID because that is provided by the Cypher response and does not require an extra query.

```
def initialize(node = nil)
  @node = valid_node_param?(node) ? node : (fail InvalidParameterError, 'RelatedNode must be ini
end
```

**#loaded** Loads a node from the database or returns the node if already loaded

```
def loaded
  fail UnsetRelatedNodeError, 'Node not set, cannot load' if @node.nil?
  @node = @node.respond_to?(:neo_id) ? @node : Neo4j::Node.load(@node)
end
```

## #loaded?

```
def loaded?  
  @node.respond_to?(:neo_id)  
end
```

### #method\_missing

```
def method_missing(*args, &block)  
  loaded.send(*args, &block)  
end
```

#neo\_id Returns the neo\_id of a given node without loading.

```
def neo_id  
  loaded? ? @node.neo_id : @node  
end
```

### #respond\_to\_missing?

```
def respond_to_missing?(method_name, include_private = false)  
  loaded if @node.is_a?(Numeric)  
  @node.respond_to?(method_name) ? true : super  
end
```

### #set?

```
def set?  
  !@node.nil?  
end
```

## Constants

- MARSHAL\_INSTANCE\_VARIABLES
- WRAPPED\_CLASSES
- DATE\_KEY\_REGEX

## Files

- lib/neo4j/active\_rel.rb:4
- lib/neo4j/active\_rel/query.rb:1
- lib/neo4j/active\_rel/types.rb:2
- lib/neo4j/active\_rel/property.rb:3
- lib/neo4j/active\_rel/callbacks.rb:2
- lib/neo4j/active\_rel/initialize.rb:1
- lib/neo4j/active\_rel/persistence.rb:1
- lib/neo4j/active\_rel/validations.rb:2
- lib/neo4j/active\_rel/related\_node.rb:1

## Methods

**#==**

```
def ==(other)
  other.class == self.class && other.id == id
end
```

**#[]** Returning nil when we get ActiveAttr::UnknownAttributeError from ActiveAttr

```
def read_attribute(name)
  super(name)
  rescue ActiveAttr::UnknownAttributeError
    nil
end
```

**#\_persisted\_obj** Returns the value of attribute \_persisted\_obj

```
def _persisted_obj
  @_persisted_obj
end
```

**#apply\_default\_values**

```
def apply_default_values
  return if self.class.declared_property_defaults.empty?
  self.class.declared_property_defaults.each_pair do |key, value|
    self.send("#{key}=", value) if self.send(key).nil?
  end
end
```

**#cache\_key**

```
def cache_key
  if self.new_record?
    "#{model_cache_key}/new"
  elsif self.respond_to?(:updated_at) && !self.updated_at.blank?
    "#{model_cache_key}/#{neo_id}-#{self.updated_at.utc.to_s(:number)}"
  else
    "#{model_cache_key}/#{neo_id}"
  end
end
```

**#concurrent\_increment!** Increments concurrently a numeric attribute by a certain amount

```
def concurrent_increment!(attribute, by = 1)
  query_rel = Neo4j::Session.query.match('()-[n]-()').where(n: {neo_id: neo_id})
  increment_by_query! query_rel, attribute, by
end
```

**#conditional\_callback** Allows you to perform a callback if a condition is not satisfied.

```
def conditional_callback(kind, guard)
  return yield if guard
  run_callbacks(kind) { yield }
end
```

**#create\_method**

```
def create_method
  self.class.create_method
end
```

**#creates\_unique\_option**

```
def creates_unique_option
  self.class.create_unique_option
end
```

**#cypher\_identifier**

```
def cypher_identifier
  @cypher_identifier || :rel
end
```

**#declared\_properties**

```
def declared_properties
  self.class.declared_properties
end
```

**#destroy****nodoc**

```
def destroy #:nodoc:
  tx = Neo4j::Transaction.new
  run_callbacks(:destroy) { super }
rescue
  @_deleted = false
  @attributes = @attributes.dup
  tx.mark_failed
  raise
ensure
  tx.close if tx
end
```

**#destroyed?** Returns +true+ if the object was destroyed.

```
def destroyed?
  @_deleted
end
```

**#end\_node**

```
alias_method :end_node, :to_node
```

**#eq?**

```
def ==(other)
  other.class == self.class && other.id == id
end
```

**#exist?**

```
def exist?
  _persisted_obj && _persisted_obj.exist?
end
```

**#freeze**

```
def freeze
  @attributes.freeze
  self
end
```



**#from\_node\_identifier**

```
def from_node_identifier
  @from_node_identifier ||= :from_node
end
```

**#from\_node\_identifier=**

```
def from_node_identifier=(id)
  @from_node_identifier = id.to_sym
end
```

**#from\_node\_neo\_id**

```
alias_method :from_node_neo_id, :start_node_neo_id
```

**#frozen?**

```
def frozen?
  @attributes.frozen?
end
```

**#hash**

```
def hash
  id.hash
end
```

**#id**

```
def id
  id = neo_id
  id.is_a?(Integer) ? id : nil
end
```

**#increment** Increments a numeric attribute by a certain amount

```
def increment(attribute, by = 1)
  self[attribute] ||= 0
  self[attribute] += by
  self
end
```

**#increment!** Convenience method to increment numeric attribute and #save at the same time

```
def increment!(attribute, by = 1)
  increment(attribute, by).update_attribute(attribute, self[attribute])
end
```

**#init\_on\_load** called when loading the rel from the database

```
def init_on_load(persisted_rel, from_node_id, to_node_id, type)
  @rel_type = type
  @_persisted_obj = persisted_rel
  changed_attributes && changed_attributes.clear
  @attributes = convert_and_assign_attributes(persisted_rel.props)
  load_nodes(from_node_id, to_node_id)
end
```

**#init\_on\_reload**

```

def init_on_reload(unwrapped_reloaded)
  @attributes = nil
  init_on_load(unwrapped_reloaded,
              unwrapped_reloaded._start_node_id,
              unwrapped_reloaded._end_node_id,
              unwrapped_reloaded.rel_type)

  self
end

```

**#initialize**

```

def initialize(from_node = nil, to_node = nil, args = nil)
  load_nodes(node_or_nil(from_node), node_or_nil(to_node))
  resolved_args = hash_or_nil(from_node, args)
  symbol_args = resolved_args.is_a?(Hash) ? resolved_args.symbolize_keys : resolved_args
  super(symbol_args)
end

```

**#inject\_defaults!**

```

def inject_defaults!(starting_props)
  return starting_props if self.class.declared_properties.declared_property_defaults.empty?
  self.class.declared_properties.inject_defaults!(self, starting_props || {})
end

```

**#inspect**

```

def inspect
  attribute_descriptions = inspect_attributes.map do |key, value|
    "#{Neo4j::ANSI::CYAN}#{key}: #{Neo4j::ANSI::CLEAR}#{value.inspect}"
  end.join(', ')

  separator = ' ' unless attribute_descriptions.empty?
  "#<#{Neo4j::ANSI::YELLOW}#{self.class.name}#{Neo4j::ANSI::CLEAR}#{separator}#{attribute_descriptions}"
end

```

**#marshal\_dump**

```

def marshal_dump
  marshal_instance_variables.map(&method(:instance_variable_get))
end

```

**#marshal\_load**

```

def marshal_load(array)
  marshal_instance_variables.zip(array).each do |var, value|
    instance_variable_set(var, value)
  end
end

```

**#neo4j\_obj**

```

def neo4j_obj
  _persisted_obj || fail('Tried to access native neo4j object on a non persisted object')
end

```

**#neo\_id**

```

def neo_id
  _persisted_obj ? _persisted_obj.neo_id : nil
end

```

**#new?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#new\_record?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#node\_cypher\_representation**

```
def node_cypher_representation(node)
  node_class = node.class
  id_name = node_class.id_property_name
  labels = ':' + node_class.mapped_label_names.join(':')

  "(#{labels} {#{id_name}: #{node.id.inspect}})"
end
```

**#persisted?** Returns +true+ if the record is persisted, i.e. it's not a new record and it was not destroyed

```
def persisted?
  !new_record? && !destroyed?
end
```

**#props**

```
def props
  attributes.reject { |_, v| v.nil? }.symbolize_keys
end
```

**#props\_for\_create** Returns a hash containing: \* All properties and values for insertion in the database \* A *uuid* (or equivalent) key and value \* Timestamps, if the class is set to include them. Note that the UUID is added to the hash but is not set on the node. The timestamps, by comparison, are set on the node prior to addition in this hash.

```
def props_for_create
  inject_timestamps!
  props_with_defaults = inject_defaults!(props)
  converted_props = props_for_db(props_with_defaults)
  return converted_props unless self.class.respond_to?(:default_property_values)
  inject_primary_key!(converted_props)
end
```

**#props\_for\_persistence**

```
def props_for_persistence
  _persisted_obj ? props_for_update : props_for_create
end
```

**#props\_for\_update**

```
def props_for_update
  update_magic_properties
  changed_props = attributes.select { |k, _| changed_attributes.include?(k) }
  changed_props.symbolize_keys!
  inject_defaults!(changed_props)
  props_for_db(changed_props)
end
```

**#read\_attribute** Returning nil when we get ActiveSupport::UnknownAttributeError from ActiveSupport

```
def read_attribute(name)
  super(name)
  rescue ActiveSupport::UnknownAttributeError
    nil
  end
end
```

**#read\_attribute\_for\_validation** Implements the ActiveRecord::Validation hook method.

```
def read_attribute_for_validation(key)
  respond_to?(key) ? send(key) : self[key]
end
```

**#rel\_type**

```
def type
  self.class.type
end
```

**#reload**

```
def reload
  return self if new_record?
  association_proxy_cache.clear if respond_to?(:association_proxy_cache)
  changed_attributes && changed_attributes.clear
  unless reload_from_database
    @_deleted = true
    freeze
  end
  self
end
```

**#reload\_from\_database**

```
def reload_from_database
  reloaded = self.class.load_entity(neo_id)
  reloaded ? init_on_reload(reloaded._persisted_obj) : nil
end
```

**#reload\_properties!**

```
def reload_properties!(properties)
  @attributes = nil
  convert_and_assign_attributes(properties)
end
```

**#save**

```
def save(*args)
  unless _persisted_obj || (from_node.respond_to?(:neo_id) && to_node.respond_to?(:neo_id))
    fail Neo4j::ActiveRel::Persistence::RelInvalidError, 'from_node and to_node must be node obj'
  end
  super(*args)
end
```

**#save!**

```
def save!(*args)
  save(*args) or fail(RelInvalidError, inspect) # rubocop:disable Style/AndOr
end
```

**#send\_props**

```
def send_props(hash)
  return hash if hash.blank?
  hash.each { |key, value| send("#(key)=", value) }
end
```

**#serializable\_hash**

```
def serializable_hash(*args)
  super.merge(id: id)
end
```

**#serialized\_properties**

```
def serialized_properties
  self.class.serialized_properties
end
```

**#start\_node**

```
alias_method :start_node, :from_node
```

**#to\_key** Returns an Enumerable of all (primary) key attributes or nil if model.persisted? is false

```
def to_key
  _persisted_obj ? [id] : nil
end
```

**#to\_node\_identifier**

```
def to_node_identifier
  @to_node_identifier || :to_node
end
```

**#to\_node\_identifier=**

```
def to_node_identifier=(id)
  @to_node_identifier = id.to_sym
end
```

**#to\_node\_neo\_id**

```
alias_method :to_node_neo_id, :end_node_neo_id
```

**#touch****nodoc**

```
def touch #:nodoc:
  run_callbacks(:touch) { super }
end
```

**#type**

```
def type
  self.class.type
end
```

**#update** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#update\_attribute** Convenience method to set attribute and #save at the same time

```
def update_attribute(attribute, value)
  send("#{attribute}=", value)
  self.save
end
```

**#update\_attribute!** Convenience method to set attribute and #save! at the same time

```
def update_attribute!(attribute, value)
  send("#{attribute}=", value)
  self.save!
end
```

**#update\_attributes** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update\_attributes!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#valid?**

```
def valid?(context = nil)
  context ||= (new_record? ? :create : :update)
  super(context)
  errors.empty?
end
```

**#wrapper** Implements the Neo4j::Node#wrapper and Neo4j::Relationship#wrapper method so that we don't have to care if the node is wrapped or not.

```
def wrapper
  self
end
```

## 11.1.12 Core

### Query

#### Constants

#### Files

- lib/neo4j/core/query.rb:2

#### Methods

**#proxy\_as** Creates a Neo4j::ActiveNode::Query::QueryProxy object that builds off of a Core::Query object.

```
def proxy_as(model, var, optional = false)
  # TODO: Discuss whether it's necessary to call `break` on the query or if this should be left
  Neo4j::ActiveNode::Query::QueryProxy.new(model, nil, node: var, optional: optional, starting_q
end
```

**#proxy\_as\_optional** Calls proxy\_as with *optional* set true. This doesn't offer anything different from calling *proxy\_as* directly but it may be more readable.

```
def proxy_as_optional(model, var)
  proxy_as(model, var, true)
end
```

**#proxy\_chain\_level** For instances where you turn a QueryProxy into a Query and then back to a QueryProxy with *#proxy\_as*

```
def proxy_chain_level
  @proxy_chain_level
end
```

**#proxy\_chain\_level=** For instances where you turn a QueryProxy into a Query and then back to a QueryProxy with *#proxy\_as*

```
def proxy_chain_level=(value)
  @proxy_chain_level = value
end
```

#### Constants

#### Files

- lib/neo4j/core/query.rb:1

#### Methods

## 11.1.13 ActiveNode

Makes Neo4j nodes and relationships behave like ActiveRecord objects. By including this module in your class it will create a mapping for the node to your ruby class by using a Neo4j Label with the same name as the class. When the node is loaded from the database it will check if there is a ruby class for the labels it has. If there Ruby class with the same name as the label then the Neo4j node will be wrapped in a new object of that class.

= ClassMethods \* {Neo4j::ActiveNode::Labels::ClassMethods} defines methods like: `index` and `find` \* {Neo4j::ActiveNode::Persistence::ClassMethods} defines methods like: `create` and `create!` \* {Neo4j::ActiveNode::Property::ClassMethods} defines methods like: `property`.

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_node.rb:56
- lib/neo4j/active\_node/orm\_adapter.rb:5

### Methods

#### #nodeify

```
def nodeify(object)
  if object.is_a?(:Neo4j::ActiveNode) || object.nil?
    object
  else
    self.find(object)
  end
end
```

### Rels

### Constants

### Files

- lib/neo4j/active\_node/rels.rb:2

### Methods

#### #\_rels\_delegator

```
def _rels_delegator
  fail "Can't access relationship on a non persisted node" unless _persisted_obj
  _persisted_obj
end
```

### Query

Helper methods to return Neo4j::Core::Query objects. A query object can be used to successively build a cypher query

```
person.query_as(:n).match('n-[:friend]-o').return(o: :name) # Return the names of all the person's friends
```



## ClassMethods

## Constants

## Files

- lib/neo4j/active\_node/query.rb:35

## Methods

**#as** Start a new QueryProxy with the starting identifier set to the given argument. This method does not exist within QueryProxy, it can only be called at the class level to create a new QP object. To set an identifier within a QueryProxy chain, give it as the first argument to a chained association.

```
def as(node_var)
  query_proxy(node: node_var, context: self.name)
end
```

**#query\_as** Returns a Query object with all nodes for the model matched as the specified variable name (an early Cypher match has already filtered results) where including labels will degrade performance.

```
def query_as(var, with_labels = true)
  query_proxy.query_as(var, with_labels)
end
```

## #query\_proxy

```
def query_proxy(options = {})
  Neo4j::ActiveNode::Query::QueryProxy.new(self, nil, options)
end
```

## QueryProxy

## Link

## Constants

## Files

- lib/neo4j/active\_node/query/query\_proxy\_link.rb:5

## Methods #args

```
def args(var, rel_var)
  @arg.respond_to?(:call) ? @arg.call(var, rel_var) : [@arg, @args].flatten
end
```

**#clause** Returns the value of attribute clause

```
def clause
  @clause
end
```

## .converted\_value

```

def converted_value(model, key, value)
  model.declared_properties.value_for_where(key, value)
end

```

**.for\_arg**

```

def for_arg(model, clause, arg, *args)
  default = [Link.new(clause, arg, *args)]

  Link.for_clause(clause, arg, model, *args) || default
rescue NoMethodError
  default
end

```

**.for\_args**

```

def for_args(model, clause, args, association = nil)
  if [:where, :where_not].include?(clause) && args[0].is_a?(String) # Better way?
    [for_arg(model, clause, args[0], *args[1..-1])]
  elsif clause == :rel_where
    args.map { |arg| for_arg(model, clause, arg, association) }
  else
    args.map { |arg| for_arg(model, clause, arg) }
  end
end

```

**.for\_association**

```

def for_association(name, value, n_string, model)
  neo_id = value.try(:neo_id) || value
  fail ArgumentError, "Invalid value for '#{name}' condition" if not neo_id.is_a?(Integer)

  [
    new(:match, ->(v, _) { "#{v}#{model.associations[name].arrow_cypher}({n_string})" }),
    new(:where, ->(_, _) { {"ID({n_string})" => neo_id.to_i} })
  ]
end

```

**.for\_clause**

```

def for_clause(clause, arg, model, *args)
  method_to_call = "for_#{clause}_clause"

  send(method_to_call, arg, model, *args)
end

```

**.for\_node\_where\_clause**

```

def for_where_clause(arg, model, *args)
  node_num = 1
  result = []
  if arg.is_a?(Hash)
    arg.each do |key, value|
      if model && model.association?(key)
        result += for_association(key, value, "n#{node_num}", model)
        node_num += 1
      else
        result << new_for_key_and_value(model, key, value)
      end
    end
  end
end

```

```

    elsif arg.is_a?(String)
      result << new(:where, arg, args)
    end
    result
  end
end

```

**.for\_order\_clause**

```

def for_order_clause(arg, _)
  [new(:order, ->(v, _) { arg.is_a?(String) ? arg : {v => arg} })]
end

```

**.for\_rel\_order\_clause**

```

def for_rel_order_clause(arg, _)
  [new(:order, ->(_, v) { arg.is_a?(String) ? arg : {v => arg} })]
end

```

**.for\_rel\_where\_clause** We don't accept strings here. If you want to use a string, just use where.

```

def for_rel_where_clause(arg, _, association)
  arg.each_with_object([]) do |(key, value), result|
    rel_class = association.relationship_class if association.relationship_class
    val = rel_class ? converted_value(rel_class, key, value) : value
    result << new(:where, ->(_, rel_var) { {rel_var => {key => val}} })
  end
end

```

**.for\_where\_clause**

```

def for_where_clause(arg, model, *args)
  node_num = 1
  result = []
  if arg.is_a?(Hash)
    arg.each do |key, value|
      if model && model.association?(key)
        result += for_association(key, value, "n#{node_num}", model)
        node_num += 1
      else
        result << new_for_key_and_value(model, key, value)
      end
    end
  elsif arg.is_a?(String)
    result << new(:where, arg, args)
  end
  result
end

```

**.for\_where\_not\_clause**

```

def for_where_not_clause(*args)
  for_where_clause(*args).each do |link|
    link.instance_variable_set('@clause', :where_not)
  end
end

```

**#initialize**

```

def initialize(clause, arg, args = [])
  @clause = clause
  @arg = arg
end

```

```
@args = args
end
```

### .new\_for\_key\_and\_value

```
def new_for_key_and_value(model, key, value)
  key = (key.to_sym == :id ? model.id_property_name : key)

  val = if !model
    value
  elsif key == model.id_property_name && value.is_a?(Neo4j::ActiveNode)
    value.id
  else
    converted_value(model, key, value)
  end

  new(:where, ->(v, _) { {v => {key => val}} })
end
```

### Constants

- METHODS
- FIRST
- LAST

### Files

- lib/neo4j/active\_node/query/query\_proxy.rb:4
- lib/neo4j/active\_node/query/query\_proxy\_link.rb:4

### Methods

#<< To add a relationship for the node for the association on this QueryProxy

```
def <<(other_node)
  if @start_object._persisted_obj
    create(other_node, {})
  elsif @association
    @start_object.defer_create(@association.name, other_node)
  else
    fail 'Another crazy error!'
  end
  self
end
```

#== Does exactly what you would hope. Without it, comparing *bobby.lessons* == *sandy.lessons* would evaluate to false because it would be comparing the QueryProxy objects, not the lessons themselves.

```
def ==(other)
  self.to_a == other
end
```

#[]

```

def [](index)
  # TODO: Maybe for this and other methods, use array if already loaded, otherwise
  # use OFFSET and LIMIT 1?
  self.to_a[index]
end

```

**#\_create\_relationship**

```

def _create_relationship(other_node_or_nodes, properties)
  association._create_relationship(@start_object, other_node_or_nodes, properties)
end

```

**#\_model\_label\_string** param [TrueClass, FalseClass] with\_labels This param is used by certain QueryProxy methods that already have the neo\_id and therefore do not need labels. The @association\_labels instance var is set during init and used during association chaining to keep labels out of Cypher queries.

```

def _model_label_string(with_labels = true)
  return if !@model || (!with_labels || @association_labels == false)
  @model.mapped_label_names.map { |label_name| ":\#{label_name}`" }.join
end

```

**#\_nodeify!**

```

def _nodeify!(*args)
  other_nodes = [args].flatten!.map! do |arg|
    (arg.is_a?(Integer) || arg.is_a?(String)) ? @model.find_by(id: arg) : arg
  end.compact

  if @model && other_nodes.any? { |other_node| !other_node.class.mapped_label_names.include?(@model.mapped_label_names) }
    fail ArgumentError, "Node must be of the association's class when model is specified"
  end

  other_nodes
end

```

**#all\_rels\_to** Returns all relationships across a QueryProxy chain between a given node or array of nodes and the preceding link.

```

def rels_to(node)
  self.match_to(node).pluck(rel_var)
end

```

**#as\_models** Takes an Array of ActiveNode models and applies the appropriate WHERE clause So for a *Teacher* model inheriting from a *Person* model and an *Article* model if you called `.as_models([Teacher, Article])` The where clause would look something like:

```

WHERE (node_var:Teacher:Person OR node_var:Article)

```

```

def as_models(models)
  where_clause = models.map do |model|
    "\#{identity}`:" + model.mapped_label_names.map do |mapped_label_name|
      "\#{mapped_label_name}`"
    end.join(':')
  end.join(' OR ')

  where("\#{where_clause}")
end

```

**#association** The most recent node to start a QueryProxy chain. Will be nil when using QueryProxy chains on class methods.

```
def association
  @association
end
```

**#base\_query**

```
def base_query(var, with_labels = true)
  if @association
    chain_var = _association_chain_var
    (_association_query_start(chain_var) & _query).break.send(@match_type,
                                                              "#{chain_var}#{@association_arrow}")
  else
    starting_query ? starting_query : _query_model_as(var, with_labels)
  end
end
```

**#blank?**

```
def empty?(target = nil)
  query_with_target(target) { |var| !self.exists?(nil, var) }
end
```

**#context** Returns the value of attribute context

```
def context
  @context
end
```

**#count**

```
def count(distinct = nil, target = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct
  query_with_target(target) do |var|
    q = distinct.nil? ? var : "DISTINCT #{var}"
    limited_query = self.query.clause?(:limit) ? self.query.break.with(var) : self.query.reorder
    limited_query.pluck("count(#{q}) AS #{var}").first
  end
end
```

**#create**

```
def create(other_nodes, properties)
  fail 'Can only create relationships on associations' if !@association
  other_nodes = _nodeify!(other_nodes)

  Neo4j::Transaction.run do
    other_nodes.each do |other_node|
      other_node.save unless other_node.neo_id

      return false if @association.perform_callback(@start_object, other_node, :before) == false

      @start_object.association_proxy_cache.clear

      _create_relationship(other_node, properties)

      @association.perform_callback(@start_object, other_node, :after)
    end
  end
end
```

**#delete** Deletes the relationship between a node and its last link in the QueryProxy chain. Executed in the database, callbacks will not run.

```
def delete(node)
  self.match_to(node).query.delete(rel_var).exec
  clear_source_object_cache
end
```

**#delete\_all** Deletes a group of nodes and relationships within a QP chain. When identifier is omitted, it will remove the last link in the chain. The optional argument must be a node identifier. A relationship identifier will result in a Cypher Error

```
def delete_all(identifier = nil)
  query_with_target(identifier) do |target|
    begin
      self.query.with(target).optional_match("#{target}-[#{target}_rel]-()").delete("#{target}")
    rescue Neo4j::Session::CypherError
      self.query.delete(target).exec
    end
    clear_source_object_cache
  end
end
```

**#delete\_all\_rels** Deletes the relationships between all nodes for the last step in the QueryProxy chain. Executed in the database, callbacks will not be run.

```
def delete_all_rels
  return unless start_object && start_object._persisted_obj
  self.query.delete(rel_var).exec
end
```

**#destroy** Returns all relationships between a node and its last link in the QueryProxy chain, destroys them in Ruby. Callbacks will be run.

```
def destroy(node)
  self.rels_to(node).map!(&:destroy)
  clear_source_object_cache
end
```

**#each**

```
def each(node = true, rel = nil, &block)
  return super if with_associations_spec.size.zero?

  query_from_association_spec.pluck(identity, with_associations_return_clause).map do |record, eager_data|
    eager_data.each_with_index do |eager_records, index|
      record.association_proxy(with_associations_spec[index]).cache_result(eager_records)
    end

    block.call(record)
  end
end
```

**#each\_for\_destruction** Used as part of *dependent*: *:destroy* and may not have any utility otherwise. It keeps track of the node responsible for a cascading *destroy* process. but this is not always available, so we require it explicitly.

```
def each_for_destruction(owning_node)
  target = owning_node.called_by || owning_node
  objects = pluck(identity).compact.reject do |obj|
    target.dependent_children.include?(obj)
  end
end
```

```

    end

    objects.each do |obj|
      obj.called_by = target
      target.dependent_children << obj
      yield obj
    end
  end
end

```

**#each\_rel** When called at the end of a QueryProxy chain, it will return the resultant relationship objects instead of nodes. For example, to return the relationship between a given student and their lessons:

```
student.lessons.each_rel do |rel|
```

```

def each_rel(&block)
  block_given? ? each(false, true, &block) : to_enum(:each, false, true)
end

```

**#each\_with\_rel** When called at the end of a QueryProxy chain, it will return the nodes and relationships of the last link. For example, to return a lesson and each relationship to a given student:

```
student.lessons.each_with_rel do |lesson, rel|
```

```

def each_with_rel(&block)
  block_given? ? each(true, true, &block) : to_enum(:each, true, true)
end

```

**#empty?**

```

def empty?(target = nil)
  query_with_target(target) { |var| !self.exists?(nil, var) }
end

```

**#exists?**

```

def exists?(node_condition = nil, target = nil)
  fail(InvalidParameterError, ':exists? only accepts neo_ids') unless node_condition.is_a?(Integer)
  query_with_target(target) do |var|
    start_q = exists_query_start(node_condition, var)
    start_q.query.reorder.return("COUNT(#{var}) AS count").first.count > 0
  end
end

```

**#fetch\_result\_cache**

```

def fetch_result_cache
  @result_cache ||= yield
end

```

**#find** Give ability to call *#find* on associations to get a scoped find Doesn't pass through via *method\_missing* because Enumerable has a *#find* method

```

def find(*args)
  scoping { @model.find(*args) }
end

```

**#find\_each**

```

def find_each(options = {})
  query.return(identity).find_each(identity, @model.primary_key, options) do |result|

```



```

    yield result.send(identity)
  end
end

```

**#find\_in\_batches**

```

def find_in_batches(options = {})
  query.return(identity).find_in_batches(identity, @model.primary_key, options) do |batch|
    yield batch.map(&:identity)
  end
end

```

**#find\_or\_create\_by** When called, this method returns a single node that satisfies the match specified in the params hash. If no existing node is found to satisfy the match, one is created or associated as expected.

```

def find_or_create_by(params)
  fail 'Method invalid when called on Class objects' unless source_object
  result = self.where(params).first
  return result unless result.nil?
  Neo4j::Transaction.run do
    node = model.find_or_create_by(params)
    self << node
  end
  return node
end

```

**#first**

```

def first(target = nil)
  first_and_last(FIRST, target)
end

```

**#first\_rel\_to** Gives you the first relationship between the last link of a QueryProxy chain and a given node Shorthand for *MATCH (start)-[r]-(other\_node) WHERE ID(other\_node) = #{other\_node.neo\_id} RETURN r*

```

def first_rel_to(node)
  self.match_to(node).limit(1).pluck(rel_var).first
end

```

**#identity**

```

def identity
  @node_var || _result_string
end

```

**#include?**

```

def include?(other, target = nil)
  query_with_target(target) do |var|
    where_filter = if other.respond_to?(:neo_id)
      "ID(#{var}) = {other_node_id}"
    else
      "#{var}.#{association_id_key} = {other_node_id}"
    end

    node_id = other.respond_to?(:neo_id) ? other.neo_id : other
    self.where(where_filter).params(other_node_id: node_id).query.return("count(#{var}) as count")
  end
end

```

**#initialize** QueryProxy is ActiveRecord's Cypher DSL. While the name might imply that it creates queries in a general sense, it is actually referring to `Neo4j::Core::Query`, which is a pure Ruby Cypher pro-

vided by the `neo4j-core` gem. QueryProxy provides ActiveRecord-like methods for common patterns. When it's not handling CRUD for relationships and queries, it provides ActiveNode's association chaining (`student.lessons.teachers.where(age: 30).hobbies`) and enjoys long walks on the beach.

It should not ever be necessary to instantiate a new QueryProxy object directly, it always happens as a result of calling a method that makes use of it.

originated. `has_many` that created this object. QueryProxy objects are evaluated lazily.

```
def initialize(model, association = nil, options = {})
  @model = model
  @association = association
  @context = options.delete(:context)
  @options = options
  @associations_spec = []

  instance_vars_from_options!(options)

  @match_type = @optional ? :optional_match : :match

  @rel_var = options[:rel] || _rel_chain_var

  @chain = []
  @params = @query_proxy ? @query_proxy.instance_variable_get('@params') : {}
end
```

### #inspect

```
def inspect
  "#<QueryProxy #{@context} CYPHER: #{@self.to_cypher.inspect}>"
end
```

### #last

```
def last(target = nil)
  first_and_last(LAST, target)
end
```

**#limit\_value** TODO: update this with public API methods if/when they are exposed

```
def limit_value
  return unless self.query.clause?(:limit)
  limit_clause = self.query.send(:clauses).find { |clause| clause.is_a?(Neo4j::Core::QueryClause) }
  limit_clause.instance_variable_get(:@arg)
end
```

**#match\_to** Shorthand for `MATCH (start)-[r]-(other_node) WHERE ID(other_node) = #{other_node.neo_id}` The `node` param can be a persisted ActiveNode instance, any string or integer, or nil. When it's a node, it'll use the object's `neo_id`, which is fastest. When not nil, it'll figure out the primary key of that model. When nil, it uses `1 = 2` to prevent matching all records, which is the default behavior when nil is passed to `where` in QueryProxy.

```
def match_to(node)
  first_node = node.is_a?(Array) ? node.first : node
  where_arg = if first_node.respond_to?(:neo_id)
    {neo_id: node.is_a?(Array) ? node.map(&:neo_id) : node}
  elsif !node.nil?
    {association_id_key => node.is_a?(Array) ? ids_array(node) : node}
  else
    # support for null object pattern
    '1 = 2'
  end
end
```

```

    self.where(where_arg)
  end

```

**#method\_missing** QueryProxy objects act as a representation of a model at the class level so we pass through calls. This allows us to define class functions for reusable query chaining or for end-of-query aggregation/summarizing.

```

def method_missing(method_name, *args, &block)
  if @model && @model.respond_to?(method_name)
    scoping { @model.public_send(method_name, *args, &block) }
  else
    super
  end
end

```

**#model** The most recent node to start a QueryProxy chain. Will be nil when using QueryProxy chains on class methods.

```

def model
  @model
end

```

**#new\_link**

```

def new_link(node_var = nil)
  self.clone.tap do |new_query_proxy|
    new_query_proxy.instance_variable_set('@result_cache', nil)
    new_query_proxy.instance_variable_set('@node_var', node_var) if node_var
  end
end

```

**#node\_identity**

```

def identity
  @node_var || _result_string
end

```

**#node\_order**

```

alias_method :node_order, :order

```

**#node\_var** The current node identifier on deck, so to speak. It is the object that will be returned by calling *each* and the last node link in the QueryProxy chain.

```

def node_var
  @node_var
end

```

**#node\_where** Since there are *rel\_where* and *rel\_order* methods, it seems only natural for there to be *node\_where* and *node\_order*.

```

alias_method :node_where, :where

```

**#offset**

```

alias_method :offset, :skip

```

**#optional** A shortcut for attaching a new, optional match to the end of a QueryProxy chain.

```

def optional(association, node_var = nil, rel_var = nil)
  self.send(association, node_var, rel_var, optional: true)
end

```

**#optional?**

```
def optional?  
  @optional == true  
end
```

**#order\_by**

```
alias_method :order_by, :order
```

**#order\_property**

```
def order_property  
  # This should maybe be based on a setting in the association  
  # rather than a hardcoded `nil`  
  model ? model.id_property_name : nil  
end
```

**#params**

```
def params(params)  
  new_link.tap { |new_query| new_query._add_params(params) }  
end
```

**#pluck** For getting variables which have been defined as part of the association chain

```
def pluck(*args)  
  transformable_attributes = (model ? model.attribute_names : []) + %w(uuid neo_id)  
  arg_list = args.map do |arg|  
    if transformable_attributes.include?(arg.to_s)  
      {identity => arg}  
    else  
      arg  
    end  
  end  
end  
  
self.query.pluck(*arg_list)  
end
```

**#query** Like calling #query\_as, but for when you don't care about the variable name

```
def query  
  query_as(identity)  
end
```

**#query\_as** Build a Neo4j::Core::Query object for the QueryProxy. This is necessary when you want to take an existing QueryProxy chain and work with it from the more powerful (but less friendly) Neo4j::Core::Query. ...  
code-block:: ruby

```
student.lessons.query_as(:l).with('your cypher here...')
```

```
def query_as(var, with_labels = true)  
  result_query = @chain.inject(base_query(var, with_labels).params(@params)) do |query, link|  
    args = link.args(var, rel_var)  
  
    args.is_a?(Array) ? query.send(link.clause, *args) : query.send(link.clause, args)  
  end  
  
  result_query.tap { |query| query.proxy_chain_level = _chain_level }  
end
```

**#query\_proxy** Returns the value of attribute query\_proxy

```
def query_proxy
  @query_proxy
end
```

**#read\_attribute\_for\_serialization**

```
def read_attribute_for_serialization(*args)
  to_a.map { |o| o.read_attribute_for_serialization(*args) }
end
```

**#rel**

```
def rel
  rels.first
end
```

**#rel\_identity**

```
def rel_identity
  ActiveSupport::Deprecation.warn 'rel_identity is deprecated and may be removed from future rel

  @rel_var
end
```

**#rel\_var** The relationship identifier most recently used by the QueryProxy chain.

```
def rel_var
  @rel_var
end
```

**#rels**

```
def rels
  fail 'Cannot get rels without a relationship variable.' if !@rel_var

  pluck(@rel_var)
end
```

**#rels\_to** Returns all relationships across a QueryProxy chain between a given node or array of nodes and the preceding link.

```
def rels_to(node)
  self.match_to(node).pluck(rel_var)
end
```

**#replace\_with** Deletes the relationships between all nodes for the last step in the QueryProxy chain and replaces them with relationships to the given nodes. Executed in the database, callbacks will not be run.

```
def replace_with(node_or_nodes)
  nodes = Array(node_or_nodes)

  self.delete_all_rels
  nodes.each { |node| self << node }
end
```

**#respond\_to\_missing?**

```
def respond_to_missing?(method_name, include_all = false)
  (@model && @model.respond_to?(method_name, include_all)) || super
end
```

**#result**

```
def result(node = true, rel = nil)
  @result_cache ||= {}
  return result_cache_for(node, rel) if result_cache?(node, rel)

  pluck_vars = []
  pluck_vars << identity if node
  pluck_vars << @rel_var if rel

  result = pluck(*pluck_vars)

  result.each do |object|
    object.instance_variable_set('@source_query_proxy', self)
    object.instance_variable_set('@source_proxy_result_cache', result)
  end

  @result_cache[[node, rel]] ||= result
end
```

#### #result\_cache?

```
def result_cache?(node = true, rel = nil)
  !!result_cache_for(node, rel)
end
```

#### #result\_cache\_for

```
def result_cache_for(node = true, rel = nil)
  (@result_cache || {})[[node, rel]]
end
```

#### #scoping Scope all queries to the current scope.

```
Comment.where(post_id: 1).scoping do
  Comment.first
end
```

TODO: unscoped Please check unscoped if you want to remove all previous scopes (including the default\_scope) during the execution of a block.

```
def scoping
  previous = @model.current_scope
  @model.current_scope = self
  yield
ensure
  @model.current_scope = previous
end
```

#### #size

```
def size
  result_cache? ? result_cache_for.length : count
end
```

**#source\_object** The most recent node to start a QueryProxy chain. Will be nil when using QueryProxy chains on class methods.

```
def source_object
  @source_object
end
```

**#start\_object** Returns the value of attribute start\_object

```
def start_object
  @start_object
end
```

**#starting\_query** The most recent node to start a QueryProxy chain. Will be nil when using QueryProxy chains on class methods.

```
def starting_query
  @starting_query
end
```

**#to\_cypher\_with\_params** Returns a string of the cypher query with return objects and params

```
def to_cypher_with_params(columns = [self.identity])
  final_query = query.return_query(columns)
  "#{final_query.to_cypher} | params: #{final_query.send(:merge_params)}"
end
```

**#unique\_nodes** This will match nodes who only have a single relationship of a given type. It's used by *dependent: :delete\_orphans* and *dependent: :destroy\_orphans* and may not have much utility otherwise.

```
def unique_nodes(association, self_idenfier, other_node, other_rel)
  fail 'Only supported by in QueryProxy chains started by an instance' unless source_object
  return false if send(association.name).empty?
  unique_nodes_query(association, self_idenfier, other_node, other_rel)
  .proxy_as(association.target_class, other_node)
end
```

**#with\_associations**

```
def with_associations(*spec)
  invalid_association_names = spec.reject do |association_name|
    model.associations[association_name]
  end

  if invalid_association_names.size > 0
    fail "Invalid associations: #{invalid_association_names.join(', ')}"
  end

  new_link.tap do |new_query_proxy|
    new_spec = new_query_proxy.with_associations_spec + spec
    new_query_proxy.with_associations_spec.replace(new_spec)
  end
end
```

**#with\_associations\_return\_clause**

```
def with_associations_return_clause
  '[' + with_associations_spec.map { |n| "collect(#{n})" }.join(',') + ']'
end
```

**#with\_associations\_spec**

```
def with_associations_spec
  @with_associations_spec ||= []
end
```

## QueryProxyMethods

### InvalidParameterError

## Constants

### Files

- lib/neo4j/active\_node/query/query\_proxy\_methods.rb:5

### Methods

#### Constants

- FIRST
- LAST

### Files

- lib/neo4j/active\_node/query/query\_proxy\_methods.rb:4

### Methods

**#all\_rels\_to** Returns all relationships across a QueryProxy chain between a given node or array of nodes and the preceding link.

```
def rels_to(node)
  self.match_to(node).pluck(rel_var)
end
```

**#as\_models** Takes an Array of ActiveNode models and applies the appropriate WHERE clause So for a *Teacher* model inheriting from a *Person* model and an *Article* model if you called `.as_models([Teacher, Article])` The where clause would look something like:

```
WHERE (node_var:Teacher:Person OR node_var:Article)
```

```
def as_models(models)
  where_clause = models.map do |model|
    "`#{identity}`:" + model.mapped_label_names.map do |mapped_label_name|
      "`#{mapped_label_name}`"
    end.join(':')
  end.join(' OR ')

  where("#{where_clause}")
end
```

### #blank?

```
def empty?(target = nil)
  query_with_target(target) { |var| !self.exists?(nil, var) }
end
```

### #count

```
def count(distinct = nil, target = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct
  query_with_target(target) do |var|
    q = distinct.nil? ? var : "DISTINCT #{var}"
    limited_query = self.query.clause?(:limit) ? self.query.break.with(var) : self.query.reorder
    limited_query.pluck("count(#{q}) AS #{var}").first
  end
end
```



```

end
end

```

**#delete** Deletes the relationship between a node and its last link in the QueryProxy chain. Executed in the database, callbacks will not run.

```

def delete(node)
  self.match_to(node).query.delete(rel_var).exec
  clear_source_object_cache
end

```

**#delete\_all** Deletes a group of nodes and relationships within a QP chain. When identifier is omitted, it will remove the last link in the chain. The optional argument must be a node identifier. A relationship identifier will result in a Cypher Error

```

def delete_all(identifier = nil)
  query_with_target(identifier) do |target|
    begin
      self.query.with(target).optional_match("#{target}-[#{target}_rel]-()").delete("#{target}")
    rescue Neo4j::Session::CypherError
      self.query.delete(target).exec
    end
    clear_source_object_cache
  end
end

```

**#delete\_all\_rels** Deletes the relationships between all nodes for the last step in the QueryProxy chain. Executed in the database, callbacks will not be run.

```

def delete_all_rels
  return unless start_object && start_object._persisted_obj
  self.query.delete(rel_var).exec
end

```

**#destroy** Returns all relationships between a node and its last link in the QueryProxy chain, destroys them in Ruby. Callbacks will be run.

```

def destroy(node)
  self.rels_to(node).map!(&:destroy)
  clear_source_object_cache
end

```

**#empty?**

```

def empty?(target = nil)
  query_with_target(target) { |var| !self.exists?(nil, var) }
end

```

**#exists?**

```

def exists?(node_condition = nil, target = nil)
  fail(InvalidParameterError, ':exists? only accepts neo_ids') unless node_condition.is_a?(Integer)
  query_with_target(target) do |var|
    start_q = exists_query_start(node_condition, var)
    start_q.query.reorder.return("COUNT(#{var}) AS count").first.count > 0
  end
end

```

**#find** Give ability to call *#find* on associations to get a scoped find Doesn't pass through via *method\_missing* because Enumerable has a *#find* method

```
def find(*args)
  scoping { @model.find(*args) }
end
```

**#find\_or\_create\_by** When called, this method returns a single node that satisfies the match specified in the params hash. If no existing node is found to satisfy the match, one is created or associated as expected.

```
def find_or_create_by(params)
  fail 'Method invalid when called on Class objects' unless source_object
  result = self.where(params).first
  return result unless result.nil?
  Neo4j::Transaction.run do
    node = model.find_or_create_by(params)
    self << node
    return node
  end
end
```

**#first**

```
def first(target = nil)
  first_and_last(FIRST, target)
end
```

**#first\_rel\_to** Gives you the first relationship between the last link of a QueryProxy chain and a given node Shorthand for *MATCH (start)-[r]-(other\_node) WHERE ID(other\_node) = #{other\_node.neo\_id} RETURN r*

```
def first_rel_to(node)
  self.match_to(node).limit(1).pluck(rel_var).first
end
```

**#include?**

```
def include?(other, target = nil)
  query_with_target(target) do |var|
    where_filter = if other.respond_to?(:neo_id)
      "ID(#{var}) = {other_node_id}"
    else
      "#{var}.#{association_id_key} = {other_node_id}"
    end
    node_id = other.respond_to?(:neo_id) ? other.neo_id : other
    self.where(where_filter).params(other_node_id: node_id).query.return("count(#{var}) as count")
  end
end
```

**#last**

```
def last(target = nil)
  first_and_last(LAST, target)
end
```

**#limit\_value** TODO: update this with public API methods if/when they are exposed

```
def limit_value
  return unless self.query.clause?(:limit)
  limit_clause = self.query.send(:clauses).find { |clause| clause.is_a?(Neo4j::Core::QueryClause) }
  limit_clause.instance_variable_get(:@arg)
end
```

**#match\_to** Shorthand for *MATCH (start)-[r]-(other\_node) WHERE ID(other\_node) = #{other\_node.neo\_id} The node param can be a persisted ActiveNode instance, any string or integer, or nil. When it's a node, it'll use the*

object's `neo_id`, which is fastest. When not nil, it'll figure out the primary key of that model. When nil, it uses `l = 2` to prevent matching all records, which is the default behavior when nil is passed to `where` in QueryProxy.

```
def match_to(node)
  first_node = node.is_a?(Array) ? node.first : node
  where_arg = if first_node.respond_to?(:neo_id)
               {neo_id: node.is_a?(Array) ? node.map(&:neo_id) : node}
             elsif !node.nil?
               {association_id_key => node.is_a?(Array) ? ids_array(node) : node}
             else
               # support for null object pattern
               '1 = 2'
             end

  self.where(where_arg)
end
```

**#optional** A shortcut for attaching a new, optional match to the end of a QueryProxy chain.

```
def optional(association, node_var = nil, rel_var = nil)
  self.send(association, node_var, rel_var, optional: true)
end
```

**#order\_property**

```
def order_property
  # This should maybe be based on a setting in the association
  # rather than a hardcoded `nil`
  model ? model.id_property_name : nil
end
```

**#rel**

```
def rel
  rels.first
end
```

**#rels**

```
def rels
  fail 'Cannot get rels without a relationship variable.' if !@rel_var

  pluck(@rel_var)
end
```

**#rels\_to** Returns all relationships across a QueryProxy chain between a given node or array of nodes and the preceding link.

```
def rels_to(node)
  self.match_to(node).pluck(rel_var)
end
```

**#replace\_with** Deletes the relationships between all nodes for the last step in the QueryProxy chain and replaces them with relationships to the given nodes. Executed in the database, callbacks will not be run.

```
def replace_with(node_or_nodes)
  nodes = Array(node_or_nodes)

  self.delete_all_rels
  nodes.each { |node| self << node }
end
```

**#size**

```
def size
  result_cache? ? result_cache_for.length : count
end
```

**QueryProxyEnumerable**

Methods related to returning nodes and rels from QueryProxy

**Constants****Files**

- lib/neo4j/active\_node/query/query\_proxy\_enumerable.rb:5

**Methods**

**==** Does exactly what you would hope. Without it, comparing *bobby.lessons == sandy.lessons* would evaluate to false because it would be comparing the QueryProxy objects, not the lessons themselves.

```
def ==(other)
  self.to_a == other
end
```

**#each** Just like every other `each` but it allows for optional params to support the versions that also return relationships. The `node` and `rel` params are typically used by those other methods but there's nothing stopping you from using *your\_node.each(true, true)* instead of *your\_node.each\_with\_rel*.

```
def each(node = true, rel = nil, &block)
  result(node, rel).each(&block)
end
```

**#each\_rel** When called at the end of a QueryProxy chain, it will return the resultant relationship objects instead of nodes. For example, to return the relationship between a given student and their lessons:

```
student.lessons.each_rel do |rel|
```

```
def each_rel(&block)
  block_given? ? each(false, true, &block) : to_enum(:each, false, true)
end
```

**#each\_with\_rel** When called at the end of a QueryProxy chain, it will return the nodes and relationships of the last link. For example, to return a lesson and each relationship to a given student:

```
student.lessons.each_with_rel do |lesson, rel|
```

```
def each_with_rel(&block)
  block_given? ? each(true, true, &block) : to_enum(:each, true, true)
end
```

**#fetch\_result\_cache**

```
def fetch_result_cache
  @result_cache ||= yield
end
```

**#pluck** For getting variables which have been defined as part of the association chain

```
def pluck(*args)
  transformable_attributes = (model ? model.attribute_names : []) + %w(uuid neo_id)
  arg_list = args.map do |arg|
    if transformable_attributes.include?(arg.to_s)
      {identity => arg}
    else
      arg
    end
  end

  self.query.pluck(*arg_list)
end
```

**#result**

```
def result(node = true, rel = nil)
  @result_cache ||= {}
  return result_cache_for(node, rel) if result_cache?(node, rel)

  pluck_vars = []
  pluck_vars << identity if node
  pluck_vars << @rel_var if rel

  result = pluck(*pluck_vars)

  result.each do |object|
    object.instance_variable_set('@source_query_proxy', self)
    object.instance_variable_set('@source_proxy_result_cache', result)
  end

  @result_cache[[node, rel]] ||= result
end
```

**#result\_cache?**

```
def result_cache?(node = true, rel = nil)
  !!result_cache_for(node, rel)
end
```

**#result\_cache\_for**

```
def result_cache_for(node = true, rel = nil)
  (@result_cache || {})[[node, rel]]
end
```

## QueryProxyEagerLoading

### Constants

### Files

- lib/neo4j/active\_node/query/query\_proxy\_eager\_loading.rb:4

### Methods #each

```
def each(node = true, rel = nil, &block)
  return super if with_associations_spec.size.zero?

  query_from_association_spec.pluck(identity, with_associations_return_clause).map do |record, eager_data|
    eager_data.each_with_index do |eager_records, index|
      record.association_proxy(with_associations_spec[index]).cache_result(eager_records)
    end

    block.call(record)
  end
end
```

#### #with\_associations

```
def with_associations(*spec)
  invalid_association_names = spec.reject do |association_name|
    model.associations[association_name]
  end

  if invalid_association_names.size > 0
    fail "Invalid associations: #{invalid_association_names.join(', ')}"
  end

  new_link.tap do |new_query_proxy|
    new_spec = new_query_proxy.with_associations_spec + spec
    new_query_proxy.with_associations_spec.replace(new_spec)
  end
end
```

#### #with\_associations\_return\_clause

```
def with_associations_return_clause
  '[' + with_associations_spec.map { |n| "collect(#{n})" }.join(',') + ']'
end
```

#### #with\_associations\_spec

```
def with_associations_spec
  @with_associations_spec ||= []
end
```

### QueryProxyFindInBatches

#### Constants

#### Files

- lib/neo4j/active\_node/query/query\_proxy\_find\_in\_batches.rb:4

#### Methods #find\_each

```
def find_each(options = {})
  query.return(identity).find_each(identity, @model.primary_key, options) do |result|
    yield result.send(identity)
  end
end
```

## #find\_in\_batches

```
def find_in_batches(options = {})
  query.return(identity).find_in_batches(identity, @model.primary_key, options) do |batch|
    yield batch.map(&:identity)
  end
end
```

## Constants

## Files

- lib/neo4j/active\_node/query.rb:7
- lib/neo4j/active\_node/query/query\_proxy.rb:3
- lib/neo4j/active\_node/query/query\_proxy\_link.rb:3
- lib/neo4j/active\_node/query/query\_proxy\_methods.rb:3
- lib/neo4j/active\_node/query/query\_proxy\_enumerable.rb:3
- lib/neo4j/active\_node/query/query\_proxy\_eager\_loading.rb:3
- lib/neo4j/active\_node/query/query\_proxy\_find\_in\_batches.rb:3

## Methods

**#as** Starts a new QueryProxy with the starting identifier set to the given argument and QueryProxy source\_object set to the node instance. This method does not exist within QueryProxy and can only be used to start a new chain.

```
def as(node_var)
  self.class.query_proxy(node: node_var, source_object: self).match_to(self)
end
```

**#query\_as** Returns a Query object with the current node matched the specified variable name

```
def query_as(node_var)
  self.class.query_as(node_var, false).where("ID(#{node_var})" => self.neo_id)
end
```

## HasN

### NonPersistedNodeError

## Constants

## Files

- lib/neo4j/active\_node/has\_n.rb:5

## Methods

### AssociationProxy

Return this object from associations It uses a QueryProxy to get results But also caches results and can have results cached on it

### Constants

- QUERY\_PROXY\_METHODS
- CACHED\_RESULT\_METHODS

### Files

- lib/neo4j/active\_node/has\_n.rb:10

### Methods #+

```
def +(other)
  self.to_a + other
end
```

### #==

```
def ==(other)
  self.to_a == other.to_a
end
```

### #add\_to\_cache

```
def add_to_cache(object)
  @cached_result ||= []
  @cached_result << object
end
```

### #cache\_query\_proxy\_result

```
def cache_query_proxy_result
  @query_proxy.to_a.tap { |result| cache_result(result) }
end
```

### #cache\_result

```
def cache_result(result)
  @cached_result = result
  @enumerable = (@cached_result || @query_proxy)
end
```

### #cached?

```
def cached?
  !!@cached_result
end
```

### #clear\_cache\_result

```
def clear_cache_result
  cache_result(nil)
end
```



**#each**

```
def each(&block)
  result_nodes.each(&block)
end
```

**#initialize**

```
def initialize(query_proxy, deferred_objects = [], cached_result = nil)
  @query_proxy = query_proxy
  @deferred_objects = deferred_objects

  cache_result(cached_result)

  # Represents the thing which can be enumerated
  # default to @query_proxy, but will be set to
  # @cached_result if that is set
  @enumerable = @query_proxy
end
```

**#inspect** States: Default

```
def inspect
  if @cached_result
    result_nodes.inspect
  else
    "<AssociationProxy @query_proxy=#{@query_proxy.inspect}>"
  end
end
```

**#method\_missing**

```
def method_missing(method_name, *args, &block)
  target = target_for_missing_method(method_name)
  super if target.nil?

  cache_query_proxy_result if !cached? && !target.is_a?(Neo4j::ActiveNode::Query::QueryProxy)
  clear_cache_result if !QUERY_PROXY_METHODS.include?(method_name) && target.is_a?(Neo4j::ActiveNode::Query::QueryProxy)

  target.public_send(method_name, *args, &block)
end
```

**#replace\_with**

```
def replace_with(*args)
  @cached_result = nil

  @query_proxy.public_send(:replace_with, *args)
end
```

**#result**

```
def result
  (@deferred_objects || []) + result_without_deferred
end
```

**#result\_ids**

```
def result_ids
  result.map do |object|
    object.is_a?(Neo4j::ActiveNode) ? object.id : object
  end
end
```

```
end
end
```

#### #result\_nodes

```
def result_nodes
  return result_objects if !@query_proxy.model

  result_objects.map do |object|
    object.is_a?(Neo4j::ActiveNode) ? object : @query_proxy.model.find(object)
  end
end
```

#### #result\_objects

```
def result_objects
  @deferred_objects + result_without_deferred
end
```

#### #result\_without\_deferred

```
def result_without_deferred
  cache_query_proxy_result if !@cached_result

  @cached_result
end
```

#### #serializable\_hash

```
def serializable_hash(options = {})
  to_a.map { |record| record.serializable_hash(options) }
end
```

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_node/has\_n.rb:206

### Methods

#### #association? rubocop:disable Style/PredicateName

```
def association?(name)
  !!associations[name.to_sym]
end
```

#### #associations

```
def associations
  @associations ||= {}
end
```

#### #associations\_keys

```
def associations_keys
  @associations_keys ||= associations.keys
end
```

**#has\_association?****nocov**

```
def has_association?(name)
  ActiveSupport::Deprecation.warn 'has_association? is deprecated and may be removed from future
  association?(name)
end
```

**#has\_many** For defining a “has many” association on a model. This defines a set of methods on your model instances. For instance, if you define the association on a Person model:

```
has_many :out, :vehicles, type: :has_vehicle
```

This would define the following methods:

**#vehicles** Returns a QueryProxy object. This is an Enumerable object and thus can be iterated over. It also has the ability to accept class-level methods from the Vehicle model (including calls to association methods)

**#vehicles=** Takes an array of Vehicle objects and replaces all current :HAS\_VEHICLE relationships with new relationships referring to the specified objects

**.vehicles** Returns a QueryProxy object. This would represent all Vehicle objects associated with either all Person nodes (if Person.vehicles is called), or all Vehicle objects associated with the Person nodes thus far represented in the QueryProxy chain. For example:

```
company.people.where(age: 40).vehicles
```

**Arguments:**

**direction:** Available values: :in, :out, or :both.

Refers to the relative to the model on which the association is being defined.

Example:

```
Person.has_many :out, :posts, type: :wrote
```

means that a *WROTE* relationship goes from a *Person* node to a *Post* node

**name:** The name of the association. The affects the methods which are created (see above). The name is also used to form default assumptions about the model which is being referred to

Example:

```
Person.has_many :out, :posts, type: :wrote
```

will assume a *model\_class* option of 'Post' unless otherwise specified

**options:** A Hash of options. Allowed keys are:

**type:** The Neo4j relationship type. This option is required unless either the *origin* or *rel\_class* options are specified

**origin:** The name of the association from another model which the *type* and *model\_class* can be gathered.

Example:

```
# `model_class` of `Post` is assumed here
Person.has_many :out, :posts, origin: :author

Post.has_one :in, :author, type: :has_author, model_class: :Person
```

**model\_class:** The model class to which the association is referring. Can be a Symbol/String (or an Array of same) with the name of the *ActiveNode* class, *false* to specify any model, or nil to specify that it should be guessed.

**rel\_class:** The *ActiveRel* class to use for this association. Can be either a model object including *ActiveRel* or a Symbol/String (or an Array of same). A **Symbol or String is recommended** to avoid load-time issues

**dependent:** Enables deletion cascading. Available values: `:delete`, `:delete_orphans`, `:destroy`, `:destroy_orphans` (note that the `:destroy_orphans` option is known to be “very metal”. Caution advised)

```
def has_many(direction, name, options = {}) # rubocop:disable Style/PredicateName
  name = name.to_sym
  build_association(:has_many, direction, name, options)

  define_has_many_methods(name)
end
```

**#has\_one** For defining an “has one” association on a model. This defines a set of methods on your model instances. For instance, if you define the association on a *Person* model:

```
has_one :out, :vehicle, type: :has_vehicle
```

This would define the methods: `#vehicle`, `#vehicle=`, and `.vehicle`.

See *#has\_many* for anything not specified here

```
def has_one(direction, name, options = {}) # rubocop:disable Style/PredicateName
  name = name.to_sym
  build_association(:has_one, direction, name, options)

  define_has_one_methods(name)
end
```

**#inherited** make sure the inherited classes inherit the `<tt>_decl_rels</tt>` hash

```
def inherited(klass)
  klass.instance_variable_set(:@associations, associations.clone)
  @associations_keys = klass.associations_keys.clone
  super
end
```

## Association

**RelWrapper** Provides the interface needed to interact with the *ActiveRel* query factory.

## Constants

## Files

- `lib/neo4j/active_node/has_n/association/rel_wrapper.rb:3`

**Methods #create\_method**

```
def create_method
  creates_unique? ? :create_unique : :create
end
```

**#creates\_unique**

```
def creates_unique(option = :none)
  option = :none if option == true
  @creates_unique = option
end
```

**#creates\_unique?**

```
def creates_unique?
  !!@creates_unique
end
```

**#creates\_unique\_option**

```
def creates_unique_option
  @creates_unique || :none
end
```

**#initialize**

```
def initialize(association, properties = {})
  @association = association
  @properties = properties
  @type = association.relationship_type(true)
  creates_unique(association.creates_unique_option) if association.unique?
end
```

**#persisted?**

```
def persisted?
  false
end
```

**#properties** Returns the value of attribute properties

```
def properties
  @properties
end
```

**#properties=** Sets the attribute properties

```
def properties=(value)
  @properties = value
end
```

**#props\_for\_create** Returns the value of attribute properties

```
def properties
  @properties
end
```

**#type** Returns the value of attribute type

```
def type
  @type
end
```

## #unique?

```
def creates_unique?  
  !!@creates_unique  
end
```

## RelFactory

### Constants

### Files

- lib/neo4j/active\_node/has\_n/association/rel\_factory.rb:3

### Methods #\_create\_relationship

```
def _create_relationship  
  creator = association.relationship_class ? :rel_class : :factory  
  send(:"_create_relationship_with_#{creator}")  
end
```

### .create

```
def self.create(start_object, other_node_or_nodes, properties, association)  
  factory = new(start_object, other_node_or_nodes, properties, association)  
  factory._create_relationship  
end
```

### Constants

- VALID\_ASSOCIATION\_OPTION\_KEYS
- VALID\_REL\_LENGTH\_SYMBOLS

### Files

- lib/neo4j/active\_node/has\_n/association.rb:7
- lib/neo4j/active\_node/has\_n/association/rel\_wrapper.rb:1
- lib/neo4j/active\_node/has\_n/association/rel\_factory.rb:2

### Methods #\_create\_relationship

```
def _create_relationship(start_object, node_or_nodes, properties)  
  RelFactory.create(start_object, node_or_nodes, properties, self)  
end
```

### #add\_destroy\_callbacks

```
def add_destroy_callbacks(model)  
  return if dependent.nil?  
  
  model.before_destroy(&method("dependent_#{dependent}_callback"))  
  rescue NameError
```

```

    raise "Unknown dependent option #{dependent}"
  end

```

**#arrow\_cypher** Return cypher partial query string for the relationship part of a MATCH (arrow / relationship definition)

```

def arrow_cypher(var = nil, properties = {}, create = false, reverse = false, length = nil)
  validate_origin!

  if create && length.present?
    fail(ArgumentError, 'rel_length option cannot be specified when creating a relationship')
  end

  direction_cypher(get_relationship_cypher(var, properties, create, length), create, reverse)
end

```

**#callback**

```

def callback(type)
  @callbacks[type]
end

```

**#create\_method**

```

def create_method
  unique? ? :create_unique : :create
end

```

**#creates\_unique\_option**

```

def creates_unique_option
  @unique || :none
end

```

**#decorated\_rel\_type**

```

def decorated_rel_type(type)
  @decorated_rel_type ||= Neo4j::Shared::RelTypeConverters.decorated_rel_type(type)
end

```

**#dependent** Returns the value of attribute dependent

```

def dependent
  @dependent
end

```

**#derive\_model\_class**

```

def derive_model_class
  refresh_model_class! if pending_model_refresh?
  return @model_class unless @model_class.nil?
  return nil if relationship_class.nil?
  dir_class = direction == :in ? :from_class : :to_class
  return false if relationship_class.send(dir_class).to_s.to_sym == :any
  relationship_class.send(dir_class)
end

```

**#direction** Returns the value of attribute direction

```

def direction
  @direction
end

```

**#discovered\_model**

```
def discovered_model
  target_classes.select do |constant|
    constant.ancestors.include?(:Neo4j::ActiveNode)
  end
end
```

**#initialize**

```
def initialize(type, direction, name, options = {type: nil})
  validate_init_arguments(type, direction, name, options)
  @type = type.to_sym
  @name = name
  @direction = direction.to_sym
  @target_class_name_from_name = name.to_s.classify
  apply_vars_from_options(options)
end
```

**#model\_class** Returns the value of attribute model\_class

```
def model_class
  @model_class
end
```

**#name** Returns the value of attribute name

```
def name
  @name
end
```

**#pending\_model\_refresh?**

```
def pending_model_refresh?
  !!@pending_model_refresh
end
```

**#perform\_callback**

```
def perform_callback(caller, other_node, type)
  return if callback(type).nil?
  caller.send(callback(type), other_node)
end
```

**#queue\_model\_refresh!**

```
def queue_model_refresh!
  @pending_model_refresh = true
end
```

**#refresh\_model\_class!**

```
def refresh_model_class!
  @pending_model_refresh = @target_classes_or_nil = nil

  # Using #to_s on purpose here to take care of classes/strings/symbols
  @model_class = ClassArguments.constantize_argument(@model_class.to_s) if @model_class
end
```

**#rel\_class?**



```
def relationship_class?
  !!relationship_class
end
```

**#relationship** Returns the value of attribute relationship

```
def relationship
  @relationship
end
```

**#relationship\_class**

```
def relationship_class
  @relationship_class ||= @relationship_class_name && @relationship_class_name.constantize
end
```

**#relationship\_class?**

```
def relationship_class?
  !!relationship_class
end
```

**#relationship\_class\_name** Returns the value of attribute relationship\_class\_name

```
def relationship_class_name
  @relationship_class_name
end
```

**#relationship\_class\_type**

```
def relationship_class_type
  relationship_class._type.to_sym
end
```

**#relationship\_type**

```
def relationship_type(create = false)
  case
  when relationship_class
    relationship_class_type
  when !@relationship_type.nil?
    @relationship_type
  when @origin
    origin_type
  else
    (create || exceptional_target_class?) && decorated_rel_type(@name)
  end
end
```

**#target\_class**

```
def target_class
  return @target_class if @target_class

  return if !(target_class_names && target_class_names.size == 1)

  class_const = ClassArguments.constantize_argument(target_class_names[0])

  @target_class = class_const
end
```

**#target\_class\_names**

```

def target_class_names
  option = target_class_option(derive_model_class)

  @target_class_names ||= if option.is_a?(Array)
    option.map(&:to_s)
  elsif option
    [option.to_s]
  end
end

```

**#target\_class\_option**

```

def target_class_option(model_class)
  case model_class
  when nil
    @target_class_name_from_name ? "#{association_model_namespace}::#{@target_class_name_from_name}"
  when Array
    model_class.map { |sub_model_class| target_class_option(sub_model_class) }
  when false
    false
  else
    model_class.to_s[0, 2] == '::' ? model_class.to_s : "::#{@model_class}"
  end
end

```

**#target\_classes**

```

def target_classes
  ClassArguments.constantize_argument(target_class_names)
end

```

**#target\_classes\_or\_nil**

```

def target_classes_or_nil
  @target_classes_or_nil ||= discovered_model if target_class_names
end

```

**#target\_where\_clause**

```

def target_where_clause
  return if model_class == false

  Array.new(target_classes).map do |target_class|
    "#{name}:#(target_class.mapped_label_name)"
  end.join(' OR ')
end

```

**#type** Returns the value of attribute type

```

def type
  @type
end

```

**#unique?**

```

def unique?
  return relationship_class.unique? if rel_class?
  @origin ? origin_association.unique? : !!@unique
end

```

**#validate\_dependent**

```

def validate_dependent(value)
  fail ArgumentError, "Invalid dependent value: #{value.inspect}" if not valid_dependent_value?(value)
end

```

## AssociationCypherMethods

### Constants

- VALID\_REL\_LENGTH\_SYMBOLS

### Files

- lib/neo4j/active\_node/has\_n/association\_cypher\_methods.rb:4

### Methods

**#arrow\_cypher** Return cypher partial query string for the relationship part of a MATCH (arrow / relationship definition)

```

def arrow_cypher(var = nil, properties = {}, create = false, reverse = false, length = nil)
  validate_origin!

  if create && length.present?
    fail(ArgumentError, 'rel_length option cannot be specified when creating a relationship')
  end

  direction_cypher(get_relationship_cypher(var, properties, create, length), create, reverse)
end

```

### Constants

### Files

- lib/neo4j/active\_node/has\_n.rb:2
- lib/neo4j/active\_node/has\_n/association.rb:6
- lib/neo4j/active\_node/has\_n/association/rel\_factory.rb:1
- lib/neo4j/active\_node/has\_n/association\_cypher\_methods.rb:3

### Methods

#### #association\_proxy

```

def association_proxy(name, options = {})
  name = name.to_sym
  hash = association_proxy_hash(name, options)
  association_proxy_cache_fetch(hash) do
    if result_cache = self.instance_variable_get('@source_proxy_result_cache')
      result_by_previous_id = previous_proxy_results_by_previous_id(result_cache, name)

      result_cache.inject(nil) do |proxy_to_return, object|
        proxy = fresh_association_proxy(name, options.merge(start_object: object), result_by_pre

```

```
        object.association_proxy_cache[hash] = proxy

        (self == object ? proxy : proxy_to_return)
      end
    else
      fresh_association_proxy(name, options)
    end
  end
end
```

**#association\_proxy\_cache** Returns the current AssociationProxy cache for the association cache. It is in the format { :association\_name => AssociationProxy} This is so that we \* don't need to re-build the QueryProxy objects \* also because the QueryProxy object caches it's results \* so we don't need to query again \* so that we can cache results from association calls or eager loading

```
def association_proxy_cache
  @association_proxy_cache ||= {}
end
```

**#association\_proxy\_cache\_fetch**

```
def association_proxy_cache_fetch(key)
  association_proxy_cache.fetch(key) do
    value = yield
    association_proxy_cache[key] = value
  end
end
```

**#association\_proxy\_hash**

```
def association_proxy_hash(name, options = {})
  [name.to_sym, options.values_at(:node, :rel, :labels, :rel_length)].hash
end
```

**#association\_query\_proxy**

```
def association_query_proxy(name, options = {})
  self.class.send(:association_query_proxy, name, {start_object: self}.merge!(options))
end
```

## Scope

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_node/scope.rb:7

### Methods #\_call\_scope\_context

```
def _call_scope_context(eval_context, query_params, proc)
  if proc.arity == 1
    eval_context.instance_exec(query_params, &proc)
  else
  end
end
```

```

    eval_context.instance_exec(&proc)
  end
end

```

**#\_scope**

```

def _scope
  @_scope ||= {}
end

```

**#all**

```

def all(new_var = nil)
  var = new_var || (current_scope ? current_scope.node_identity : :n)
  if current_scope
    current_scope.new_link(var)
  else
    self.as(var)
  end
end
end

```

**#current\_scope****nodoc**

```

def current_scope #:nodoc:
  ScopeRegistry.value_for(:current_scope, base_class.to_s)
end

```

**#current\_scope=****nodoc**

```

def current_scope=(scope) #:nodoc:
  ScopeRegistry.set_value_for(:current_scope, base_class.to_s, scope)
end

```

**#has\_scope?** rubocop:disable Style/PredicateName

```

def has_scope?(name)
  ActiveSupport::Deprecation.warn 'has_scope? is deprecated and may be removed from future releases'

  scope?(name)
end

```

**#scope** Similar to ActiveRecord scope

```

def scope(name, proc)
  _scope[name.to_sym] = proc

  klass = class << self; self; end
  klass.instance_eval do
    define_method(name) do |query_params = nil, _ = nil|
      eval_context = ScopeEvalContext.new(self, current_scope || self.query_proxy)
      proc = _scope[name.to_sym]
      _call_scope_context(eval_context, query_params, proc)
    end
  end
end
end

```

**#scope?** rubocop:enable Style/PredicateName

```
def scope?(name)
  _scope.key?(name.to_sym)
end
```

## ScopeEvalContext

### Constants

### Files

- lib/neo4j/active\_node/scope.rb:93

### Methods #initialize

```
def initialize(target, query_proxy)
  @query_proxy = query_proxy
  @target = target
end
```

## ScopeRegistry

Stolen from ActiveRecord [https://github.com/rails/rails/blob/08754f12e65a9ec79633a605e986d0f1ffa4b251/activerecord/lib/active\\_reco](https://github.com/rails/rails/blob/08754f12e65a9ec79633a605e986d0f1ffa4b251/activerecord/lib/active_reco)

### Constants

- VALID\_SCOPE\_TYPES

### Files

- lib/neo4j/active\_node/scope.rb:112

### Methods #initialize

```
def initialize
  @registry = Hash.new { |hash, key| hash[key] = {} }
end
```

**#set\_value\_for** Sets the +value+ for a given +scope\_type+ and +variable\_name+.

```
def set_value_for(scope_type, variable_name, value)
  raise_invalid_scope_type!(scope_type)
  @registry[scope_type][variable_name] = value
end
```

**#value\_for** Obtains the value for a given +scope\_name+ and +variable\_name+.

```
def value_for(scope_type, variable_name)
  raise_invalid_scope_type!(scope_type)
  @registry[scope_type][variable_name]
end
```

## Constants

## Files

- lib/neo4j/active\_node/scope.rb:4

## Methods

## Labels

Provides a mapping between neo4j labels and Ruby classes

## InvalidQueryError

## Constants

## Files

- lib/neo4j/active\_node/labels.rb:23

## Methods

## RecordNotFound

## Constants

## Files

- lib/neo4j/active\_node/labels.rb:24

## Methods

## ClassMethods

## Constants

## Files

- lib/neo4j/active\_node/labels.rb:78

## Methods #base\_class

```
def base_class
  unless self < Neo4j::ActiveNode
    fail "#{name} doesn't belong in a hierarchy descending from ActiveNode"
  end

  if superclass == Object
```

```

    self
  else
    superclass.base_class
  end
end

```

**#blank?**

```

def empty?
  !self.all.exists?
end

```

**#count**

```

def count(distinct = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct
  q = distinct.nil? ? 'n' : 'DISTINCT n'
  self.query_as(:n).return("count(#{q}) AS count").first.count
end

```

**#delete\_all** Deletes all nodes and connected relationships from Cypher.

```

def delete_all
  self.neo4j_session._query("MATCH (n:#{mapped_label_name}) OPTIONAL MATCH n-[r]-() DELETE n,r")
  self.neo4j_session._query("MATCH (n:#{mapped_label_name}) DELETE n")
end

```

**#destroy\_all** Returns each node to Ruby and calls *destroy*. Be careful, as this can be a very slow operation if you have many nodes. It will generate at least one database query per node in the database, more if callbacks require them.

```

def destroy_all
  all.each(&:destroy)
end

```

**#empty?**

```

def empty?
  !self.all.exists?
end

```

**#exists?**

```

def exists?(node_condition = nil)
  unless node_condition.is_a?(Integer) || node_condition.is_a?(Hash) || node_condition.nil?
    fail(InvalidParameterError, ':exists? only accepts ids or conditions')
  end
  query_start = exists_query_start(node_condition)
  start_q = query_start.respond_to?(:query_as) ? query_start.query_as(:n) : query_start
  start_q.return('COUNT(n) AS count').first.count > 0
end

```

**#find** Returns the object with the specified neo4j id.

```

def find(id)
  map_id = proc { |object| object.respond_to?(:id) ? object.send(:id) : object }

  result = if id.is_a?(Array)
    find_by_ids(id.map { |o| map_id.call(o) })
  else
    find_by_id(map_id.call(id))
  end
end

```



```

    end
    fail Neo4j::RecordNotFound if result.blank?
    result.tap { |r| find_callbacks!(r) }
  end
end

```

**#find\_by** Finds the first record matching the specified conditions. There is no implied ordering so if order matters, you should specify it yourself.

```

def find_by(values)
  all.where(values).limit(1).query_as(:n).pluck(:n).first
end

```

**#find\_by!** Like `find_by`, except that if no record is found, raises a `RecordNotFound` error.

```

def find_by!(values)
  find_by(values) || fail(RecordNotFound, "#{self.query_as(:n).where(n: values).limit(1).to_cyph
end

```

**#find\_each**

```

def find_each(options = {})
  self.query_as(:n).return(:n).find_each(:n, primary_key, options) do |batch|
    yield batch.n
  end
end

```

**#find\_in\_batches**

```

def find_in_batches(options = {})
  self.query_as(:n).return(:n).find_in_batches(:n, primary_key, options) do |batch|
    yield batch.map(&:n)
  end
end

```

**#first** Returns the first node of this class, sorted by ID. Note that this may not be the first node created since Neo4j recycles IDs.

```

def first
  self.query_as(:n).limit(1).order(n: primary_key).pluck(:n).first
end

```

**#last** Returns the last node of this class, sorted by ID. Note that this may not be the first node created since Neo4j recycles IDs.

```

def last
  self.query_as(:n).limit(1).order(n: {primary_key => :desc}).pluck(:n).first
end

```

**#length**

```

def count(distinct = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct
  q = distinct.nil? ? 'n' : 'DISTINCT n'
  self.query_as(:n).return("count(#{q}) AS count").first.count
end

```

**#mapped\_label**

```

def mapped_label
  Neo4j::Label.create(mapped_label_name)
end

```

**#mapped\_label\_name**

```
def mapped_label_name
  @mapped_label_name || label_for_model
end
```

**#mapped\_label\_names**

```
def mapped_label_names
  self.ancestors.find_all { |a| a.respond_to?(:mapped_label_name) }.map { |a| a.mapped_label_name }
end
```

**#size**

```
def count(distinct = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct
  q = distinct.nil? ? 'n' : 'DISTINCT n'
  self.query_as(:n).return("count(#{q}) AS count").first.count
end
```

**Index****ClassMethods****Constants****Files**

- lib/neo4j/active\_node/labels/index.rb:5

**Methods**

**#constraint** Creates a neo4j constraint on this class for given property

```
def constraint(property, constraints = {type: :unique})
  Neo4j::Session.on_next_session_available do
    declared_properties.constraint_or_fail!(property, id_property_name)
    schema_create_operation(:constraint, property, constraints)
  end
end
```

**#constraint?**

```
def constraint?(property)
  mapped_label.unique_constraints[:property_keys].include?([property])
end
```

**#drop\_constraint**

```
def drop_constraint(property, constraint = {type: :unique})
  Neo4j::Session.on_next_session_available do
    declared_properties[property].unconstraint! if declared_properties[property]
    schema_drop_operation(:constraint, property, constraint)
  end
end
```

**#drop\_index**

```

def drop_index(property, options = {})
  Neo4j::Session.on_next_session_available do
    declared_properties[property].unindex! if declared_properties[property]
    schema_drop_operation(:index, property, options)
  end
end
end

```

**#index** Creates a Neo4j index on given property

This can also be done on the property directly, see `Neo4j::ActiveNode::Property::ClassMethods#property`.

```

def index(property)
  Neo4j::Session.on_next_session_available do |_|
    declared_properties.index_or_fail!(property, id_property_name)
    schema_create_operation(:index, property)
  end
end
end

```

**#index?**

```

def index?(property)
  mapped_label.indexes[:property_keys].include?([property])
end
end

```

## Constants

## Files

- `lib/neo4j/active_node/labels/index.rb:2`

## Methods

## Reloading

## ClassMethods

## Constants

## Files

- `lib/neo4j/active_node/labels/reloading.rb:12`

## Methods #before\_remove\_const

```

def before_remove_const
  associations.each_value(&:queue_model_refresh!)
  MODELS_FOR_LABELS_CACHE.clear
  WRAPPED_CLASSES.each { |c| MODELS_TO_RELOAD << c.name }
  WRAPPED_CLASSES.clear
end
end

```

### Constants

- `MODELS_TO_RELOAD`

### Files

- `lib/neo4j/active_node/labels/reloading.rb:2`

### Methods `.reload_models!`

```
def self.reload_models!  
  MODELS_TO_RELOAD.each(&:constantize)  
  MODELS_TO_RELOAD.clear  
end
```

### Constants

- `WRAPPED_CLASSES`
- `MODELS_FOR_LABELS_CACHE`
- `MODELS_TO_RELOAD`

### Files

- `lib/neo4j/active_node/labels.rb:4`
- `lib/neo4j/active_node/labels/index.rb:1`
- `lib/neo4j/active_node/labels/reloading.rb:1`

### Methods

#### `._wrapped_classes`

```
def self._wrapped_classes  
  WRAPPED_CLASSES  
end
```

`#add_label` adds one or more labels

```
def add_label(*label)  
  @_persisted_obj.add_label(*label)  
end
```

#### `.add_wrapped_class`

```
def self.add_wrapped_class(model)  
  _wrapped_classes << model  
end
```

#### `.clear_wrapped_models`

```

def self.clear_wrapped_models
  WRAPPED_CLASSES.clear
  MODELS_FOR_LABELS_CACHE.clear
  Neo4j::Node::Wrapper::CONSTANTS_FOR_LABELS_CACHE.clear
end

```

**#labels**

```

def labels
  @_persisted_obj.labels
end

```

**.model\_for\_labels** Finds an appropriate matching model given a set of labels which are assigned to a node

```

def self.model_for_labels(labels)
  return MODELS_FOR_LABELS_CACHE[labels] if MODELS_FOR_LABELS_CACHE[labels]

  models = WRAPPED_CLASSES.select do |model|
    (model.mapped_label_names - labels).size == 0
  end

  MODELS_FOR_LABELS_CACHE[labels] = models.max do |model|
    (model.mapped_label_names & labels).size
  end
end

```

**#remove\_label** Removes one or more labels Be careful, don't remove the label representing the Ruby class.

```

def remove_label(*label)
  @_persisted_obj.remove_label(*label)
end

```

**Property****ClassMethods****Constants****Files**

- lib/neo4j/active\_node/property.rb:12

**Methods #association\_key?**

```

def association_key?(key)
  association_method_keys.include?(key.to_sym)
end

```

**#extract\_association\_attributes!** Extracts keys from attributes hash which are associations of the model TODO: Validate separately that relationships are getting the right values? Perhaps also store the values and persist relationships on save?

```

def extract_association_attributes!(attributes)
  return unless contains_association?(attributes)
  attributes.each_with_object({}) do |(key, _), result|
    result[key] = attributes.delete(key) if self.association_key?(key)
  end
end

```

```
end
end
```

## Constants

- DATE\_KEY\_REGEX

## Files

- lib/neo4j/active\_node/property.rb:2

## Methods

#[] Returning nil when we get ActiveSupport::UnknownAttributeError from ActiveSupport

```
def read_attribute(name)
  super(name)
  rescue ActiveSupport::UnknownAttributeError
    nil
  end
end
```

#\_persisted\_obj Returns the value of attribute \_persisted\_obj

```
def _persisted_obj
  @_persisted_obj
end
```

## #initialize

```
def initialize(attributes = nil)
  super(attributes)
  @attributes ||= Hash[self.class.attributes_nil_hash]
  send_props(@relationship_props) if !@relationship_props.nil?
end
```

## #inject\_defaults!

```
def inject_defaults!(starting_props)
  return starting_props if self.class.declared_properties.declared_property_defaults.empty?
  self.class.declared_properties.inject_defaults!(self, starting_props || {})
end
```

## #inspect

```
def inspect
  attribute_descriptions = inspect_attributes.map do |key, value|
    "#{Neo4j::ANSI::CYAN}#{key}: #{Neo4j::ANSI::CLEAR}#{value.inspect}"
  end.join(', ')

  separator = ' ' unless attribute_descriptions.empty?
  "#<#{Neo4j::ANSI::YELLOW}#{self.class.name}#{Neo4j::ANSI::CLEAR}#{separator}#{attribute_descriptions}"
end
```

#read\_attribute Returning nil when we get ActiveSupport::UnknownAttributeError from ActiveSupport

```

def read_attribute(name)
  super(name)
rescue ActiveSupport::UnknownAttributeError
  nil
end

```

**#reload\_properties!**

```

def reload_properties!(properties)
  @attributes = nil
  convert_and_assign_attributes(properties)
end

```

**#send\_props**

```

def send_props(hash)
  return hash if hash.blank?
  hash.each { |key, value| send("#{key}=", value) }
end

```

**Callbacks****nodoc****Constants****Files**

- lib/neo4j/active\_node/callbacks.rb:3

**Methods****#conditional\_callback** Allows you to perform a callback if a condition is not satisfied.

```

def conditional_callback(kind, guard)
  return yield if guard
  run_callbacks(kind) { yield }
end

```

**#destroy****nodoc**

```

def destroy #:nodoc:
  tx = Neo4j::Transaction.new
  run_callbacks(:destroy) { super }
rescue
  @_deleted = false
  @attributes = @attributes.dup
  tx.mark_failed
  raise
ensure
  tx.close if tx
end

```

**#initialize**

```
def initialize(args = nil)
  run_callbacks(:initialize) { super }
end
```

#### #touch

##### nodoc

```
def touch #:nodoc:
  run_callbacks(:touch) { super }
end
```

## Dependent

### AssociationMethods

### Constants

### Files

- lib/neo4j/active\_node/dependent/association\_methods.rb:4

### Methods #add\_destroy\_callbacks

```
def add_destroy_callbacks(model)
  return if dependent.nil?

  model.before_destroy(&method("dependent_#{dependent}_callback"))
rescue NameError
  raise "Unknown dependent option #{dependent}"
end
```

### #validate\_dependent

```
def validate_dependent(value)
  fail ArgumentError, "Invalid dependent value: #{value.inspect}" if not valid_dependent_value?(value)
end
```

### QueryProxyMethods

methods used to resolve association dependencies

### Constants

### Files

- lib/neo4j/active\_node/dependent/query\_proxy\_methods.rb:5



## Methods

**#each\_for\_destruction** Used as part of *dependent: :destroy* and may not have any utility otherwise. It keeps track of the node responsible for a cascading *destroy* process. but this is not always available, so we require it explicitly.

```
def each_for_destruction(owning_node)
  target = owning_node.called_by || owning_node
  objects = pluck(identity).compact.reject do |obj|
    target.dependent_children.include?(obj)
  end

  objects.each do |obj|
    obj.called_by = target
    target.dependent_children << obj
    yield obj
  end
end
```

**#unique\_nodes** This will match nodes who only have a single relationship of a given type. It's used by *dependent: :delete\_orphans* and *dependent: :destroy\_orphans* and may not have much utility otherwise.

```
def unique_nodes(association, self_idenfifer, other_node, other_rel)
  fail 'Only supported by in QueryProxy chains started by an instance' unless source_object
  return false if send(association.name).empty?
  unique_nodes_query(association, self_idenfifer, other_node, other_rel)
  .proxy_as(association.target_class, other_node)
end
```

## Constants

## Files

- lib/neo4j/active\_node/dependent.rb:3
- lib/neo4j/active\_node/dependent/association\_methods.rb:3
- lib/neo4j/active\_node/dependent/query\_proxy\_methods.rb:3

## Methods

**#called\_by=** Sets the attribute `called_by`

```
def called_by=(value)
  @called_by = value
end
```

**#dependent\_children**

```
def dependent_children
  @dependent_children ||= []
end
```

## Initialize

### Constants

### Files

- lib/neo4j/active\_node/initialize.rb:1

### Methods

**#called\_by** Returns the value of attribute called\_by

```
def called_by
  @called_by
end
```

**#init\_on\_load** called when loading the node from the database

```
def init_on_load(persisted_node, properties)
  self.class.extract_association_attributes!(properties)
  @_persisted_obj = persisted_node
  changed_attributes && changed_attributes.clear
  @attributes = convert_and_assign_attributes(properties)
end
```

**#init\_on\_reload**

```
def init_on_reload(reloaded)
  @attributes = nil
  init_on_load(reloaded, reloaded.props)
end
```

**#wrapper** Implements the Neo4j::Node#wrapper and Neo4j::Relationship#wrapper method so that we don't have to care if the node is wrapped or not.

```
def wrapper
  self
end
```

## Reflection

A reflection contains information about an association. They are often used in connection with form builders to determine associated classes. This module contains methods related to the creation and retrieval of reflections.

### ClassMethods

Adds methods to the class related to creating and retrieving reflections.

### Constants

### Files

- lib/neo4j/active\_node/reflection.rb:14

## Methods

**#reflect\_on\_all\_associations** Returns an array containing one reflection for each association declared in the model.

```
def reflect_on_all_associations(macro = nil)
  association_reflections = reflections.values
  macro ? association_reflections.select { |reflection| reflection.macro == macro } : association_reflections
end
```

**#reflect\_on\_association**

```
def reflect_on_association(association)
  reflections[association.to_sym]
end
```

## AssociationReflection

The actual reflection object that contains information about the given association. These should never need to be created manually, they will always be created by declaring a `:has_many` or `:has_one` association on a model.

## Constants

## Files

- `lib/neo4j/active_node/reflection.rb:39`

## Methods

**#association** The association object referenced by this reflection

```
def association
  @association
end
```

**#class\_name** Returns the name of the target model

```
def class_name
  @class_name ||= association.target_class.name
end
```

**#collection?**

```
def collection?
  macro == :has_many
end
```

**#initialize**

```
def initialize(macro, name, association)
  @macro = macro
  @name = name
  @association = association
end
```

**#klass** Returns the target model

```
def klass
  @klass ||= class_name.constantize
end
```

**#macro** The type of association

```
def macro
  @macro
end
```

**#name** The name of the association

```
def name
  @name
end
```

**#rel\_class\_name**

```
def rel_class_name
  @rel_class_name ||= association.relationship_class.name.to_s
end
```

**#rel\_class**

```
def rel_class
  @rel_class ||= rel_class_name.constantize
end
```

**#type**

```
def type
  @type ||= association.relationship_type
end
```

**#validate?**

```
def validate?
  true
end
```

## Constants

## Files

- lib/neo4j/active\_node/reflection.rb:5

## Methods

### IdProperty

This module makes it possible to use other IDs than the build it neo4j id (neo\_id)

### TypeMethods

## Constants

**Files**

- lib/neo4j/active\_node/id\_property.rb:39

**Methods #define\_id\_methods**

```
def define_id_methods(clazz, name, conf)
  validate_conf!(conf)

  if conf[:on]
    define_custom_method(clazz, name, conf[:on])
  elsif conf[:auto]
    define_uuid_method(clazz, name)
  elsif conf.empty?
    define_property_method(clazz, name)
  end
end
```

**.define\_id\_methods**

```
def define_id_methods(clazz, name, conf)
  validate_conf!(conf)

  if conf[:on]
    define_custom_method(clazz, name, conf[:on])
  elsif conf[:auto]
    define_uuid_method(clazz, name)
  elsif conf.empty?
    define_property_method(clazz, name)
  end
end
```

**ClassMethods****Constants****Files**

- lib/neo4j/active\_node/id\_property.rb:124

**Methods #find\_by\_id**

```
def find_by_id(id)
  self.where(id_property_name => id).first
end
```

**#find\_by\_ids**

```
def find_by_ids(ids)
  self.where(id_property_name => ids).to_a
end
```

**#find\_by\_neo\_id**

```
def find_by_neo_id(id)
  Neo4j::Node.load(id)
end
```

**#has\_id\_property?** rubocop:disable Style/PredicateName

```
def has_id_property?  
  ActiveSupport::Deprecation.warn 'has_id_property? is deprecated and may be removed from future  
  
  id_property?  
end
```

**#id\_property**

```
def id_property(name, conf = {})  
  self.manual_id_property = true  
  Neo4j::Session.on_next_session_available do |_|  
    @id_property_info = {name: name, type: conf}  
    TypeMethods.define_id_methods(self, name, conf)  
    constraint(name, type: :unique) unless conf[:constraint] == false  
  
    self.define_singleton_method(:find_by_id) { |key| self.where(name => key).first }  
  end  
end
```

**#id\_property?** rubocop:enable Style/PredicateName

```
def id_property?  
  id_property_info && !id_property_info.empty?  
end
```

**#id\_property\_info**

```
def id_property_info  
  @id_property_info ||= {}  
end
```

**#id\_property\_name**

```
def id_property_name  
  id_property_info[:name]  
end
```

**#manual\_id\_property** Returns the value of attribute manual\_id\_property

```
def manual_id_property  
  @manual_id_property  
end
```

**#manual\_id\_property=** Sets the attribute manual\_id\_property

```
def manual_id_property=(value)  
  @manual_id_property = value  
end
```

**#manual\_id\_property?**

```
def manual_id_property?  
  !!manual_id_property  
end
```

**#primary\_key**

```
def id_property_name  
  id_property_info[:name]  
end
```

## Accessor

Provides get/set of the Id Property values. Some methods

## ClassMethods

## Constants

## Files

- lib/neo4j/active\_node/id\_property/accessor.rb:26

## Methods #default\_properties

```
def default_properties
  @default_property ||= {}
end
```

## #default\_properties\_keys

```
def default_properties_keys
  @default_properties_keys ||= default_properties.keys
end
```

## #default\_property TODO: Move this to the DeclaredProperties

```
def default_property(name, &block)
  reset_default_properties(name) if default_properties.respond_to?(:size)
  default_properties[name] = block
end
```

## #default\_property\_key

```
def default_property_key
  @default_property_key ||= default_properties_keys.first
end
```

## #default\_property\_values

```
def default_property_values(instance)
  default_properties.each_with_object({}) do |(key, block), result|
    result[key] = block.call(instance)
  end
end
```

## #reset\_default\_properties

```
def reset_default_properties(name_to_keep)
  default_properties.each_key do |property|
    @default_properties_keys = nil
    undef_method(property) unless property == name_to_keep
  end
  @default_properties_keys = nil
  @default_property = {}
end
```

## Constants

### Files

- lib/neo4j/active\_node/id\_property/accessor.rb:4

### Methods #default\_properties

```
def default_properties
  @default_properties ||= Hash.new(nil)
end
```

### #default\_properties=

```
def default_properties=(properties)
  @default_property_value = properties[default_property_key]
end
```

### #default\_property

```
def default_property(key)
  return nil unless key == default_property_key
  default_property_value
end
```

### #default\_property\_key

```
def default_property_key
  self.class.default_property_key
end
```

### #default\_property\_value Returns the value of attribute default\_property\_value

```
def default_property_value
  @default_property_value
end
```

### Constants

### Files

- lib/neo4j/active\_node/id\_property.rb:35
- lib/neo4j/active\_node/id\_property/accessor.rb:1

### Methods

### #default\_properties

```
def default_properties
  @default_properties ||= Hash.new(nil)
end
```

### #default\_properties=

```
def default_properties=(properties)
  @default_property_value = properties[default_property_key]
end
```

### #default\_property



```
def default_property(key)
  return nil unless key == default_property_key
  default_property_value
end
```

**#default\_property\_key**

```
def default_property_key
  self.class.default_property_key
end
```

**#default\_property\_value** Returns the value of attribute default\_property\_value

```
def default_property_value
  @default_property_value
end
```

**Unpersisted****Constants****Files**

- lib/neo4j/active\_node/unpersisted.rb:3

**Methods****#clear\_deferred\_nodes\_for\_association**

```
def clear_deferred_nodes_for_association(association_name)
  deferred_nodes_for_association(association_name.to_sym).clear
end
```

**#defer\_create**

```
def defer_create(association_name, object, options = {})
  clear_deferred_nodes_for_association(association_name) if options[:clear]

  deferred_nodes_for_association(association_name) << object
end
```

**#deferred\_create\_cache** The values in this Hash are returned and used outside by reference so any modifications to the Array should be in-place

```
def deferred_create_cache
  @deferred_create_cache ||= {}
end
```

**#deferred\_nodes\_for\_association**

```
def deferred_nodes_for_association(association_name)
  deferred_create_cache[association_name.to_sym] ||= []
end
```

**#pending\_deferred\_creations?**

```
def pending_deferred_creations?  
  !deferred_create_cache.values.all?(&:empty?)  
end
```

## OrmAdapter

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_node/orm\_adapter.rb:10

### Methods

### Constants

### Files

- lib/neo4j/active\_node/orm\_adapter.rb:9

### Methods

#### #column\_names

```
def column_names  
  klass._decl_props.keys  
end
```

#### #create! Create a model using attributes

```
def create!(attributes = {})  
  klass.create!(attributes)  
end
```

#### #destroy

```
def destroy(object)  
  object.destroy && true if valid_object?(object)  
end
```

#### #find\_all Find all models matching conditions

```
def find_all(options = {})  
  conditions, order, limit, offset = extract_conditions!(options)  
  extract_id!(conditions)  
  order = hasherize_order(order)  
  
  result = klass.where(conditions)  
  result = result.order(order) unless order.empty?  
  result = result.skip(offset) if offset  
  result = result.limit(limit) if limit
```

```

    result.to_a
  end

```

**#find\_first** Find the first instance matching conditions

```

def find_first(options = {})
  conditions, order = extract_conditions!(options)
  extract_id!(conditions)
  order = hasherize_order(order)

  result = klass.where(conditions)
  result = result.order(order) unless order.empty?
  result.first
end

```

**#get** Get an instance by id of the model

```

def get(id)
  klass.find_by(klass.id_property_name => wrap_key(id))
end

```

**#get!** Get an instance by id of the model

```

def get!(id)
  klass.find(wrap_key(id)).tap do |node|
    fail 'No record found' if node.nil?
  end
end

```

**#i18n\_scope**

```

def i18n_scope
  :neo4j
end

```

## Persistence

### RecordInvalidError

### Constants

### Files

- lib/neo4j/active\_node/persistence.rb:3

### Methods #initialize

```

def initialize(record)
  @record = record
  super(@record.errors.full_messages.join(', '))
end

```

**#record** Returns the value of attribute record

```

def record
  @record
end

```

## ClassMethods

## Constants

## Files

- lib/neo4j/active\_node/persistence.rb:103

## Methods

**#create** Creates and saves a new node

```
def create(props = {})
  association_props = extract_association_attributes!(props) || {}
  new(props).tap do |obj|
    yield obj if block_given?
    obj.save
    association_props.each do |prop, value|
      obj.send("#{prop}=", value)
    end
  end
end
```

**#create!** Same as #create, but raises an error if there is a problem during save.

```
def create!(*args)
  props = args[0] || {}
  association_props = extract_association_attributes!(props) || {}

  new(*args).tap do |o|
    yield o if block_given?
    o.save!
    association_props.each do |prop, value|
      o.send("#{prop}=", value)
    end
  end
end
```

**#find\_or\_create**

```
def find_or_create(find_attributes, set_attributes = {})
  on_create_attributes = set_attributes.reverse_merge(on_create_props(find_attributes))
  neo4j_session.query.merge(n: {self.mapped_label_names => find_attributes})
    .on_create_set(n: on_create_attributes)
    .pluck(:n).first
end
```

**#find\_or\_create\_by** Finds the first node with the given attributes, or calls create if none found

```
def find_or_create_by(attributes, &block)
  find_by(attributes) || create(attributes, &block)
end
```

**#find\_or\_create\_by!** Same as #find\_or\_create\_by, but calls #create! so it raises an error if there is a problem during save.

```
def find_or_create_by!(attributes, &block)
  find_by(attributes) || create!(attributes, &block)
end
```

**#load\_entity**

```
def load_entity(id)
  Neo4j::Node.load(id)
end
```

**#merge**

```
def merge(attributes)
  neo4j_session.query.merge(n: {self.mapped_label_names => attributes})
  .on_create_set(n: on_create_props(attributes))
  .on_match_set(n: on_match_props)
  .pluck(:n).first
end
```

**Constants****Files**

- lib/neo4j/active\_node/persistence.rb:2

**Methods**

**#\_create\_node** TODO: This does not seem like it should be the responsibility of the node. Creates an unwrapped node in the database.

```
def _create_node(node_props, labels = labels_for_create)
  self.class.neo4j_session.create_node(node_props, labels)
end
```

**#apply\_default\_values**

```
def apply_default_values
  return if self.class.declared_property_defaults.empty?
  self.class.declared_property_defaults.each_pair do |key, value|
    self.send("#{key}=", value) if self.send(key).nil?
  end
end
```

**#cache\_key**

```
def cache_key
  if self.new_record?
    "#{model_cache_key}/new"
  elsif self.respond_to?(:updated_at) && !self.updated_at.blank?
    "#{model_cache_key}/#{neo_id}-#{self.updated_at.utc.to_s(:number)}"
  else
    "#{model_cache_key}/#{neo_id}"
  end
end
```

**#concurrent\_increment!** Increments concurrently a numeric attribute by a certain amount

```
def concurrent_increment!(attribute, by = 1)
  query_node = Neo4j::Session.query.match_nodes(n: neo_id)
  increment_by_query! query_node, attribute, by
end
```

**#create\_model** Creates a model with values matching those of the instance attributes and returns its id.

```
def create_model
  node = _create_node(props_for_create)
  init_on_load(node, node.props)
  send_props(@relationship_props) if @relationship_props
  @relationship_props = @deferred_nodes = nil
  true
end
```

**#create\_or\_update**

```
def create_or_update
  # since the same model can be created or updated twice from a relationship we have to have thi
  @_create_or_updating = true
  apply_default_values
  result = _persisted_obj ? update_model : create_model
  if result == false
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
    false
  else
    true
  end
rescue => e
  Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  raise e
ensure
  @_create_or_updating = nil
end
```

**#destroy**

```
def destroy
  freeze
  _persisted_obj && _persisted_obj.del
  @_deleted = true
end
```

**#destroyed?** Returns +true+ if the object was destroyed.

```
def destroyed?
  @_deleted
end
```

**#exist?**

```
def exist?
  _persisted_obj && _persisted_obj.exist?
end
```

**#freeze**

```
def freeze
  @attributes.freeze
  self
end
```

**#frozen?**

```
def frozen?
  @attributes.frozen?
end
```

**#increment** Increments a numeric attribute by a certain amount

```
def increment(attribute, by = 1)
  self[attribute] ||= 0
  self[attribute] += by
  self
end
```

**#increment!** Convenience method to increment numeric attribute and #save at the same time

```
def increment!(attribute, by = 1)
  increment(attribute, by).update_attribute(attribute, self[attribute])
end
```

**#inject\_primary\_key!** As the name suggests, this inserts the primary key (id property) into the properties hash. The method called here, *default\_property\_values*, is a holdover from an earlier version of the gem. It does NOT contain the default values of properties, it contains the Default Property, which we now refer to as the ID Property. It will be deprecated and renamed in a coming refactor.

```
def inject_primary_key!(converted_props)
  self.class.default_property_values(self).tap do |destination_props|
    destination_props.merge!(converted_props) if converted_props.is_a?(Hash)
  end
end
```

**#labels\_for\_create**

```
def labels_for_create
  self.class.mapped_label_names
end
```

**#new?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#new\_record?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#persisted?** Returns +true+ if the record is persisted, i.e. it's not a new record and it was not destroyed

```
def persisted?
  !new_record? && !destroyed?
end
```

**#props**

```
def props
  attributes.reject { |_, v| v.nil? }.symbolize_keys
end
```

**#props\_for\_create** Returns a hash containing: \* All properties and values for insertion in the database \* A *uuid* (or equivalent) key and value \* Timestamps, if the class is set to include them. Note that the UUID is added to the hash but is not set on the node. The timestamps, by comparison, are set on the node prior to addition in this hash.

```
def props_for_create
  inject_timestamps!
  props_with_defaults = inject_defaults!(props)
  converted_props = props_for_db(props_with_defaults)
  return converted_props unless self.class.respond_to?(:default_property_values)
  inject_primary_key!(converted_props)
end
```

#### #props\_for\_persistence

```
def props_for_persistence
  _persisted_obj ? props_for_update : props_for_create
end
```

#### #props\_for\_update

```
def props_for_update
  update_magic_properties
  changed_props = attributes.select { |k, _| changed_attributes.include?(k) }
  changed_props.symbolize_keys!
  inject_defaults!(changed_props)
  props_for_db(changed_props)
end
```

#### #reload

```
def reload
  return self if new_record?
  association_proxy_cache.clear if respond_to?(:association_proxy_cache)
  changed_attributes && changed_attributes.clear
  unless reload_from_database
    @_deleted = true
    freeze
  end
  self
end
```

#### #reload\_from\_database

```
def reload_from_database
  reloaded = self.class.load_entity(neo_id)
  reloaded ? init_on_reload(reloaded._persisted_obj) : nil
end
```

#### #save Saves the model.

If the model is new a record gets created in the database, otherwise the existing record gets updated. If `perform_validation` is true validations run. If any of them fail the action is cancelled and save returns false. If the flag is false validations are bypassed altogether. See `ActiveRecord::Validations` for more information. There's a series of callbacks associated with save. If any of the `before_*` callbacks return false the action is cancelled and save returns false.

```
def save(*)
  cascade_save do
    association_proxy_cache.clear
    create_or_update
  end
end
```

**#save!** Persist the object to the database. Validations and Callbacks are included by default but validation can be disabled by passing `:validate => false` to `#save!` Creates a new transaction.



```
def save!(*args)
  save(*args) or fail(RecordInvalidError, self) # rubocop:disable Style/AndOr
end
```

**#touch**

```
def touch
  fail 'Cannot touch on a new record object' unless persisted?
  update_attribute!(:updated_at, Time.now) if respond_to?(:updated_at=)
end
```

**#update** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#update\_attribute** Convenience method to set attribute and #save at the same time

```
def update_attribute(attribute, value)
  send("#{attribute}=", value)
  self.save
end
```

**#update\_attribute!** Convenience method to set attribute and #save! at the same time

```
def update_attribute!(attribute, value)
  send("#{attribute}=", value)
  self.save!
end
```

**#update\_attributes** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update\_attributes!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#update\_model**

```
def update_model
  return if !changed_attributes || changed_attributes.empty?
  _persisted_obj.update_props(props_for_update)
  changed_attributes.clear
end
```

## Validations

This mixin replace the original save method and performs validation before the save.

### ClassMethods

### Constants

### Files

- lib/neo4j/active\_node/validations.rb:16

### Methods #validates\_uniqueness\_of

```
def validates_uniqueness_of(*attr_names)
  validates_with UniquenessValidator, _merge_attributes(attr_names)
end
```

## UniquenessValidator

### Constants

### Files

- lib/neo4j/active\_node/validations.rb:23

### Methods #found

```
def found(record, attribute, value)
  conditions = scope_conditions(record)

  # TODO: Added as find(:name => nil) throws error
  value = '' if value.nil?

  conditions[attribute] = options[:case_sensitive] ? value : /(#{Regexp.escape(value.to_s)})/i

  found = record.class.as(:result).where(conditions)
  found = found.where_not(neo_id: record.neo_id) if record._persisted_obj
  found
end
```

### #initialize

```
def initialize(options)
  super(options.reverse_merge(case_sensitive: true))
end
```

### #message

```
def message(instance)
  super || 'has already been taken'
end
```

### #scope\_conditions

```

def scope_conditions(instance)
  Array(options[:scope] || []).inject({}) do |conditions, key|
    conditions.merge(key => instance[key])
  end
end

```

### #validate\_each

```

def validate_each(record, attribute, value)
  return unless found(record, attribute, value).exists?

  record.errors.add(attribute, :taken, options.except(:case_sensitive, :scope).merge(value: value))
end

```

## Constants

## Files

- lib/neo4j/active\_node/validations.rb:4

## Methods

**#read\_attribute\_for\_validation** Implements the ActiveRecord::Validation hook method.

```

def read_attribute_for_validation(key)
  respond_to?(key) ? send(key) : self[key]
end

```

**#save** The validation process on save can be skipped by passing false. The regular Model#save method is replaced with this when the validations module is mixed in, which it is by default.

```

def save(options = {})
  result = perform_validations(options) ? super : false
  if !result
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  end
  result
end

```

### #valid?

```

def valid?(context = nil)
  context ||= (new_record? ? :create : :update)
  super(context)
  errors.empty?
end

```

## QueryMethods

### InvalidParameterError

## Constants

## Files

- lib/neo4j/active\_node/query\_methods.rb:4

## Methods

## Constants

## Files

- lib/neo4j/active\_node/query\_methods.rb:3

## Methods

### #blank?

```
def empty?  
  !self.all.exists?  
end
```

### #count

```
def count(distinct = nil)  
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct  
  q = distinct.nil? ? 'n' : 'DISTINCT n'  
  self.query_as(:n).return("count(#{q}) AS count").first.count  
end
```

### #empty?

```
def empty?  
  !self.all.exists?  
end
```

### #exists?

```
def exists?(node_condition = nil)  
  unless node_condition.is_a?(Integer) || node_condition.is_a?(Hash) || node_condition.nil?  
    fail(InvalidParameterError, ':exists? only accepts ids or conditions')  
  end  
  query_start = exists_query_start(node_condition)  
  start_q = query_start.respond_to?(:query_as) ? query_start.query_as(:n) : query_start  
  start_q.return('COUNT(n) AS count').first.count > 0  
end
```

### #find\_each

```
def find_each(options = {})  
  self.query_as(:n).return(:n).find_each(:n, primary_key, options) do |batch|  
    yield batch.n  
  end  
end
```

### #find\_in\_batches

```

def find_in_batches(options = {})
  self.query_as(:n).return(:n).find_in_batches(:n, primary_key, options) do |batch|
    yield batch.map(&:n)
  end
end

```

**#first** Returns the first node of this class, sorted by ID. Note that this may not be the first node created since Neo4j recycles IDs.

```

def first
  self.query_as(:n).limit(1).order(n: primary_key).pluck(:n).first
end

```

**#last** Returns the last node of this class, sorted by ID. Note that this may not be the first node created since Neo4j recycles IDs.

```

def last
  self.query_as(:n).limit(1).order(n: {primary_key => :desc}).pluck(:n).first
end

```

### #length

```

def count(distinct = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct.nil?
  q = distinct.nil? ? 'n' : 'DISTINCT n'
  self.query_as(:n).return("count(#{q}) AS count").first.count
end

```

### #size

```

def count(distinct = nil)
  fail(InvalidParameterError, ':count accepts `distinct` or nil as a parameter') unless distinct.nil?
  q = distinct.nil? ? 'n' : 'DISTINCT n'
  self.query_as(:n).return("count(#{q}) AS count").first.count
end

```

## Constants

- MARSHAL\_INSTANCE\_VARIABLES
- WRAPPED\_CLASSES
- MODELS\_FOR\_LABELS\_CACHE
- MODELS\_TO\_RELOAD
- DATE\_KEY\_REGEX

## Files

- lib/neo4j/active\_node.rb:23
- lib/neo4j/active\_node/rels.rb:1
- lib/neo4j/active\_node/query.rb:2
- lib/neo4j/active\_node/has\_n.rb:1
- lib/neo4j/active\_node/scope.rb:3
- lib/neo4j/active\_node/labels.rb:2

- lib/neo4j/active\_node/property.rb:1
- lib/neo4j/active\_node/callbacks.rb:2
- lib/neo4j/active\_node/dependent.rb:2
- lib/neo4j/active\_node/reflection.rb:1
- lib/neo4j/active\_node/id\_property.rb:1
- lib/neo4j/active\_node/unpersisted.rb:2
- lib/neo4j/active\_node/orm\_adapter.rb:4
- lib/neo4j/active\_node/persistence.rb:1
- lib/neo4j/active\_node/validations.rb:2
- lib/neo4j/active\_node/query\_methods.rb:2
- lib/neo4j/active\_node/has\_n/association.rb:5
- lib/neo4j/active\_node/query/query\_proxy.rb:2
- lib/neo4j/active\_node/query/query\_proxy\_link.rb:2
- lib/neo4j/active\_node/query/query\_proxy\_methods.rb:2
- lib/neo4j/active\_node/query/query\_proxy\_enumerable.rb:2
- lib/neo4j/active\_node/dependent/association\_methods.rb:2
- lib/neo4j/active\_node/dependent/query\_proxy\_methods.rb:2
- lib/neo4j/active\_node/query/query\_proxy\_eager\_loading.rb:2
- lib/neo4j/active\_node/has\_n/association\_cypher\_methods.rb:2
- lib/neo4j/active\_node/query/query\_proxy\_find\_in\_batches.rb:2

## Methods

**#==**

```
def == (other)
  other.class == self.class && other.id == id
end
```

**#[]** Returning nil when we get `ActiveAttr::UnknownAttributeError` from `ActiveAttr`

```
def read_attribute (name)
  super (name)
rescue ActiveAttr::UnknownAttributeError
  nil
end
```

**#\_create\_node** TODO: This does not seem like it should be the responsibility of the node. Creates an unwrapped node in the database.

```
def _create_node (node_props, labels = labels_for_create)
  self.class.neo4j_session.create_node (node_props, labels)
end
```

**#\_persisted\_obj** Returns the value of attribute `_persisted_obj`

```
def _persisted_obj
  @_persisted_obj
end
```

**#\_rels\_delegator**

```
def _rels_delegator
  fail "Can't access relationship on a non persisted node" unless _persisted_obj
  _persisted_obj
end
```

**#add\_label** adds one or more labels

```
def add_label(*label)
  @_persisted_obj.add_label(*label)
end
```

**#apply\_default\_values**

```
def apply_default_values
  return if self.class.declared_property_defaults.empty?
  self.class.declared_property_defaults.each_pair do |key, value|
    self.send("#{key}=", value) if self.send(key).nil?
  end
end
```

**#as** Starts a new QueryProxy with the starting identifier set to the given argument and QueryProxy source\_object set to the node instance. This method does not exist within QueryProxy and can only be used to start a new chain.

```
def as(node_var)
  self.class.query_proxy(node: node_var, source_object: self).match_to(self)
end
```

**#association\_proxy**

```
def association_proxy(name, options = {})
  name = name.to_sym
  hash = association_proxy_hash(name, options)
  association_proxy_cache_fetch(hash) do
    if result_cache = self.instance_variable_get('@source_proxy_result_cache')
      result_by_previous_id = previous_proxy_results_by_previous_id(result_cache, name)

      result_cache.inject(nil) do |proxy_to_return, object|
        proxy = fresh_association_proxy(name, options.merge(start_object: object), result_by_pre

        object.association_proxy_cache[hash] = proxy

        (self == object ? proxy : proxy_to_return)
      end
    else
      fresh_association_proxy(name, options)
    end
  end
end
```

**#association\_proxy\_cache** Returns the current AssociationProxy cache for the association cache. It is in the format { :association\_name => AssociationProxy} This is so that we \* don't need to re-build the QueryProxy objects \* also because the QueryProxy object caches it's results \* so we don't need to query again \* so that we can cache results from association calls or eager loading

```
def association_proxy_cache
  @association_proxy_cache ||= {}
end
```

#### #association\_proxy\_cache\_fetch

```
def association_proxy_cache_fetch(key)
  association_proxy_cache.fetch(key) do
    value = yield
    association_proxy_cache[key] = value
  end
end
```

#### #association\_proxy\_hash

```
def association_proxy_hash(name, options = {})
  [name.to_sym, options.values_at(:node, :rel, :labels, :rel_length)].hash
end
```

#### #association\_query\_proxy

```
def association_query_proxy(name, options = {})
  self.class.send(:association_query_proxy, name, {start_object: self}.merge!(options))
end
```

#### #cache\_key

```
def cache_key
  if self.new_record?
    "#{model_cache_key}/new"
  elsif self.respond_to?(:updated_at) && !self.updated_at.blank?
    "#{model_cache_key}/#{neo_id}-#{self.updated_at.utc.to_s(:number)}"
  else
    "#{model_cache_key}/#{neo_id}"
  end
end
```

#### #called\_by Returns the value of attribute called\_by

```
def called_by
  @called_by
end
```

#### #called\_by= Sets the attribute called\_by

```
def called_by=(value)
  @called_by = value
end
```

#### #clear\_deferred\_nodes\_for\_association

```
def clear_deferred_nodes_for_association(association_name)
  deferred_nodes_for_association(association_name.to_sym).clear
end
```

#### #concurrent\_increment! Increments concurrently a numeric attribute by a certain amount

```
def concurrent_increment!(attribute, by = 1)
  query_node = Neo4j::Session.query.match_nodes(n: neo_id)
  increment_by_query! query_node, attribute, by
end
```



**#conditional\_callback** Allows you to perform a callback if a condition is not satisfied.

```
def conditional_callback(kind, guard)
  return yield if guard
  run_callbacks(kind) { yield }
end
```

**#declared\_properties**

```
def declared_properties
  self.class.declared_properties
end
```

**#default\_properties**

```
def default_properties
  @default_properties ||= Hash.new(nil)
end
```

**#default\_properties=**

```
def default_properties=(properties)
  @default_property_value = properties[default_property_key]
end
```

**#default\_property**

```
def default_property(key)
  return nil unless key == default_property_key
  default_property_value
end
```

**#default\_property\_key**

```
def default_property_key
  self.class.default_property_key
end
```

**#default\_property\_value** Returns the value of attribute default\_property\_value

```
def default_property_value
  @default_property_value
end
```

**#defer\_create**

```
def defer_create(association_name, object, options = {})
  clear_deferred_nodes_for_association(association_name) if options[:clear]

  deferred_nodes_for_association(association_name) << object
end
```

**#deferred\_create\_cache** The values in this Hash are returned and used outside by reference so any modifications to the Array should be in-place

```
def deferred_create_cache
  @deferred_create_cache ||= {}
end
```

**#deferred\_nodes\_for\_association**

```
def deferred_nodes_for_association(association_name)
  deferred_create_cache[association_name.to_sym] ||= []
end
```

### #dependent\_children

```
def dependent_children
  @dependent_children ||= []
end
```

### #destroy

#### nodoc

```
def destroy #:nodoc:
  tx = Neo4j::Transaction.new
  run_callbacks(:destroy) { super }
rescue
  @_deleted = false
  @attributes = @attributes.dup
  tx.mark_failed
  raise
ensure
  tx.close if tx
end
```

**#destroyed?** Returns +true+ if the object was destroyed.

```
def destroyed?
  @_deleted
end
```

### #eq?

```
def ==(other)
  other.class == self.class && other.id == id
end
```

### #exist?

```
def exist?
  _persisted_obj && _persisted_obj.exist?
end
```

### #freeze

```
def freeze
  @attributes.freeze
  self
end
```

### #frozen?

```
def frozen?
  @attributes.frozen?
end
```

### #hash

```
def hash
  id.hash
end
```

**#id**

```
def id
  id = neo_id
  id.is_a?(Integer) ? id : nil
end
```

**#increment** Increments a numeric attribute by a certain amount

```
def increment(attribute, by = 1)
  self[attribute] ||= 0
  self[attribute] += by
  self
end
```

**#increment!** Convenience method to increment numeric attribute and #save at the same time

```
def increment!(attribute, by = 1)
  increment(attribute, by).update_attribute(attribute, self[attribute])
end
```

**#init\_on\_load** called when loading the node from the database

```
def init_on_load(persisted_node, properties)
  self.class.extract_association_attributes!(properties)
  @_persisted_obj = persisted_node
  changed_attributes && changed_attributes.clear
  @attributes = convert_and_assign_attributes(properties)
end
```

**#init\_on\_reload**

```
def init_on_reload(reloaded)
  @attributes = nil
  init_on_load(reloaded, reloaded.props)
end
```

**#initialize**

```
def initialize(args = nil)
  symbol_args = args.is_a?(Hash) ? args.symbolize_keys : args
  super(symbol_args)
end
```

**#inject\_defaults!**

```
def inject_defaults!(starting_props)
  return starting_props if self.class.declared_properties.declared_property_defaults.empty?
  self.class.declared_properties.inject_defaults!(self, starting_props || {})
end
```

**#inject\_primary\_key!** As the name suggests, this inserts the primary key (id property) into the properties hash. The method called here, *default\_property\_values*, is a holdover from an earlier version of the gem. It does NOT contain the default values of properties, it contains the Default Property, which we now refer to as the ID Property. It will be deprecated and renamed in a coming refactor.

```
def inject_primary_key!(converted_props)
  self.class.default_property_values(self).tap do |destination_props|
    destination_props.merge!(converted_props) if converted_props.is_a?(Hash)
  end
end
```

**#inspect**

```
def inspect
  attribute_descriptions = inspect_attributes.map do |key, value|
    "#{Neo4j::ANSI::CYAN}#{key}: #{Neo4j::ANSI::CLEAR}#{value.inspect}"
  end.join(', ')

  separator = ' ' unless attribute_descriptions.empty?
  "#<#{Neo4j::ANSI::YELLOW}#{self.class.name}#{Neo4j::ANSI::CLEAR}#{separator}#{attribute_descri
end
```

**#labels**

```
def labels
  @_persisted_obj.labels
end
```

**#labels\_for\_create**

```
def labels_for_create
  self.class.mapped_label_names
end
```

**#marshal\_dump**

```
def marshal_dump
  marshal_instance_variables.map(&method(:instance_variable_get))
end
```

**#marshal\_load**

```
def marshal_load(array)
  marshal_instance_variables.zip(array).each do |var, value|
    instance_variable_set(var, value)
  end
end
```

**#neo4j\_obj**

```
def neo4j_obj
  !_persisted_obj || fail('Tried to access native neo4j object on a non persisted object')
end
```

**#neo\_id**

```
def neo_id
  !_persisted_obj ? !_persisted_obj.neo_id : nil
end
```

**#new?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#new\_record?** Returns +true+ if the record hasn't been saved to Neo4j yet.

```
def new_record?
  !_persisted_obj
end
```

**#pending\_deferred\_creations?**

```
def pending_deferred_creations?
  !deferred_create_cache.values.all?(&:empty?)
end
```

**#persisted?** Returns +true+ if the record is persisted, i.e. it's not a new record and it was not destroyed

```
def persisted?
  !new_record? && !destroyed?
end
```

**#props**

```
def props
  attributes.reject { |_, v| v.nil? }.symbolize_keys
end
```

**#props\_for\_create** Returns a hash containing: \* All properties and values for insertion in the database \* A *uuid* (or equivalent) key and value \* Timestamps, if the class is set to include them. Note that the UUID is added to the hash but is not set on the node. The timestamps, by comparison, are set on the node prior to addition in this hash.

```
def props_for_create
  inject_timestamps!
  props_with_defaults = inject_defaults!(props)
  converted_props = props_for_db(props_with_defaults)
  return converted_props unless self.class.respond_to?(:default_property_values)
  inject_primary_key!(converted_props)
end
```

**#props\_for\_persistence**

```
def props_for_persistence
  _persisted_obj ? props_for_update : props_for_create
end
```

**#props\_for\_update**

```
def props_for_update
  update_magic_properties
  changed_props = attributes.select { |k, _| changed_attributes.include?(k) }
  changed_props.symbolize_keys!
  inject_defaults!(changed_props)
  props_for_db(changed_props)
end
```

**#query\_as** Returns a Query object with the current node matched the specified variable name

```
def query_as(node_var)
  self.class.query_as(node_var, false).where("ID(#{node_var})" => self.neo_id)
end
```

**#read\_attribute** Returning nil when we get ActiveSupport::UnknownAttributeError from ActiveSupport

```
def read_attribute(name)
  super(name)
  rescue ActiveSupport::UnknownAttributeError
    nil
end
```

**#read\_attribute\_for\_validation** Implements the ActiveRecord::Validation hook method.

```
def read_attribute_for_validation(key)
  respond_to?(key) ? send(key) : self[key]
end
```

#### #reload

```
def reload
  return self if new_record?
  association_proxy_cache.clear if respond_to?(:association_proxy_cache)
  changed_attributes && changed_attributes.clear
  unless reload_from_database
    @_deleted = true
    freeze
  end
  self
end
```

#### #reload\_from\_database

```
def reload_from_database
  reloaded = self.class.load_entity(neo_id)
  reloaded ? init_on_reload(reloaded._persisted_obj) : nil
end
```

#### #reload\_properties!

```
def reload_properties!(properties)
  @attributes = nil
  convert_and_assign_attributes(properties)
end
```

**#remove\_label** Removes one or more labels Be careful, don't remove the label representing the Ruby class.

```
def remove_label(*label)
  @_persisted_obj.remove_label(*label)
end
```

**#save** The validation process on save can be skipped by passing false. The regular Model#save method is replaced with this when the validations module is mixed in, which it is by default.

```
def save(options = {})
  result = perform_validations(options) ? super : false
  if !result
    Neo4j::Transaction.current.failure if Neo4j::Transaction.current
  end
  result
end
```

**#save!** Persist the object to the database. Validations and Callbacks are included by default but validation can be disabled by passing :validate => false to #save! Creates a new transaction.

```
def save!(*args)
  save(*args) or fail(RecordInvalidError, self) # rubocop:disable Style/AndOr
end
```

#### #send\_props

```
def send_props(hash)
  return hash if hash.blank?
  hash.each { |key, value| send("#{key}=", value) }
end
```

**#serializable\_hash**

```
def serializable_hash(*args)
  super.merge(id: id)
end
```

**#serialized\_properties**

```
def serialized_properties
  self.class.serialized_properties
end
```

**#to\_key** Returns an Enumerable of all (primary) key attributes or nil if model.persisted? is false

```
def to_key
  _persisted_obj ? [id] : nil
end
```

**#touch****nodoc**

```
def touch #:nodoc:
  run_callbacks(:touch) { super }
end
```

**#update** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#update\_attribute** Convenience method to set attribute and #save at the same time

```
def update_attribute(attribute, value)
  send("#{attribute}=", value)
  self.save
end
```

**#update\_attribute!** Convenience method to set attribute and #save! at the same time

```
def update_attribute!(attribute, value)
  send("#{attribute}=", value)
  self.save!
end
```

**#update\_attributes** Updates this resource with all the attributes from the passed-in Hash and requests that the record be saved. If saving fails because the resource is invalid then false will be returned.

```
def update(attributes)
  self.attributes = process_attributes(attributes)
  save
end
```

**#update\_attributes!** Same as {#update\_attributes}, but raises an exception if saving fails.

```
def update!(attributes)
  self.attributes = process_attributes(attributes)
  save!
end
```

**#valid?**

```
def valid?(context = nil)
  context ||= (new_record? ? :create : :update)
  super(context)
  errors.empty?
end
```

**#wrapper** Implements the Neo4j::Node#wrapper and Neo4j::Relationship#wrapper method so that we don't have to care if the node is wrapped or not.

```
def wrapper
  self
end
```

## 11.1.14 ClassArguments

### Constants

- INVALID\_CLASS\_ARGUMENT\_ERROR

### Files

- lib/neo4j/class\_arguments.rb:2

### Methods

**.active\_node\_model?**

```
def active_node_model?(class_constant)
  class_constant.included_modules.include?(Neo4j::ActiveNode)
end
```

**.constantize\_argument**

```
def constantize_argument(class_argument)
  case class_argument
  when 'any', :any, false, nil
    nil
  when Array
    class_argument.map(&method(:constantize_argument))
  else
    class_argument.to_s.constantize.tap do |class_constant|
      if !active_node_model?(class_constant)
        fail ArgumentError, "#{class_constant} is not an ActiveNode model"
      end
    end
  end
end
rescue NameError
```



```

    raise ArgumentError, "Could not find class: #{class_argument}"
  end

```

**.valid\_argument?**

```

def valid_argument?(class_argument)
  [NilClass, String, Symbol, FalseClass].include?(class_argument.class) ||
  (class_argument.is_a?(Array) && class_argument.all? { |c| [Symbol, String].include?(c.class) }
end

```

**.validate\_argument!**

```

def validate_argument!(class_argument, context)
  return if valid_argument?(class_argument)

  fail ArgumentError, "#{context} #{INVALID_CLASS_ARGUMENT_ERROR} (was #{class_argument.inspect})"
end

```

## 11.1.15 TypeConverters

### Constants

### Files

- lib/neo4j/type\_converters.rb:2

### Methods

**#convert\_properties\_to** Modifies a hash's values to be of types acceptable to Neo4j or matching what the user defined using *type* in property definitions.

```

def convert_properties_to(obj, medium, properties)
  direction = medium == :ruby ? :to_ruby : :to_db
  properties.each_pair do |key, value|
    next if skip_conversion?(obj, key, value)
    properties[key] = convert_property(key, value, direction)
  end
end

```

**#convert\_property** Converts a single property from its current format to its db- or Ruby-expected output type.

```

def convert_property(key, value, direction)
  converted_property(primitive_type(key.to_sym), value, direction)
end

```

## 11.1.16 Schema

### Operation

### Constants

### Files

- lib/neo4j/schema/operation.rb:3

## Methods

### #create!

```
def create!  
  drop_incompatible!  
  return if exist?  
  label_object.send(:"create_#{type}", property, options)  
end
```

### #default\_options

```
def default_options  
  {}  
end
```

### #drop!

```
def drop!  
  label_object.send(:"drop_#{type}", property, options)  
end
```

### #drop\_incompatible!

```
def drop_incompatible!  
  incompatible_operation_classes.each do |clazz|  
    operation = clazz.new(label_name, property)  
    operation.drop! if operation.exist?  
  end  
end
```

### #exist?

```
def exist?  
  fail 'Abstract class, not implemented'  
end
```

### #incompatible\_operation\_classes

```
def incompatible_operation_classes  
  self.class.incompatible_operation_classes  
end
```

### .incompatible\_operation\_classes

```
def self.incompatible_operation_classes  
  []  
end
```

### #initialize

```
def initialize(label_name, property, options = default_options)  
  @label_name = label_name.to_sym  
  @property = property.to_sym  
  @options = options  
end
```

### #label\_name Returns the value of attribute label\_name

```
def label_name  
  @label_name  
end
```

**#label\_object**

```
def label_object
  @label_object ||= Neo4j::Label.create(label_name)
end
```

**#options** Returns the value of attribute options

```
def options
  @options
end
```

**#property** Returns the value of attribute property

```
def property
  @property
end
```

**#type**

```
def type
  fail 'Abstract class, not implemented'
end
```

**ExactIndexOperation****Constants****Files**

- lib/neo4j/schema/operation.rb:54

**Methods****#create!**

```
def create!
  drop_incompatible!
  return if exist?
  label_object.send(:"create_#{type}", property, options)
end
```

**#default\_options**

```
def default_options
  {}
end
```

**#drop!**

```
def drop!
  label_object.send(:"drop_#{type}", property, options)
end
```

**#drop\_incompatible!**

```
def drop_incompatible!
  incompatible_operation_classes.each do |clazz|
    operation = clazz.new(label_name, property)
    operation.drop! if operation.exist?
  end
end
```

#### #exist?

```
def exist?
  label_object.indexes[:property_keys].include?([property])
end
```

#### #incompatible\_operation\_classes

```
def incompatible_operation_classes
  self.class.incompatible_operation_classes
end
```

#### .incompatible\_operation\_classes

```
def self.incompatible_operation_classes
  [UniqueConstraintOperation]
end
```

#### #initialize

```
def initialize(label_name, property, options = default_options)
  @label_name = label_name.to_sym
  @property = property.to_sym
  @options = options
end
```

#### #label\_name Returns the value of attribute label\_name

```
def label_name
  @label_name
end
```

#### #label\_object

```
def label_object
  @label_object ||= Neo4j::Label.create(label_name)
end
```

#### #options Returns the value of attribute options

```
def options
  @options
end
```

#### #property Returns the value of attribute property

```
def property
  @property
end
```

#### #type

```
def type
  'index'
end
```

## UniqueConstraintOperation

### Constants

### Files

- lib/neo4j/schema/operation.rb:68

### Methods

#### #create!

```
def create!
  return if exist?
  super
end
```

#### #default\_options

```
def default_options
  {type: :unique}
end
```

#### #drop!

```
def drop!
  label_object.send("drop_#{type}", property, options)
end
```

#### #drop\_incompatible!

```
def drop_incompatible!
  incompatible_operation_classes.each do |clazz|
    operation = clazz.new(label_name, property)
    operation.drop! if operation.exist?
  end
end
```

#### #exist?

```
def exist?
  Neo4j::Label.constraint?(label_name, property)
end
```

#### #incompatible\_operation\_classes

```
def incompatible_operation_classes
  self.class.incompatible_operation_classes
end
```

#### .incompatible\_operation\_classes

```
def self.incompatible_operation_classes
  [ExactIndexOperation]
end
```

#### #initialize

```
def initialize(label_name, property, options = default_options)
  @label_name = label_name.to_sym
  @property = property.to_sym
  @options = options
end
```

**#label\_name** Returns the value of attribute label\_name

```
def label_name
  @label_name
end
```

**#label\_object**

```
def label_object
  @label_object ||= Neo4j::Label.create(label_name)
end
```

**#options** Returns the value of attribute options

```
def options
  @options
end
```

**#property** Returns the value of attribute property

```
def property
  @property
end
```

**#type**

```
def type
  'constraint'
end
```

## Constants

## Files

- lib/neo4j/schema/operation.rb:2

## Methods

### 11.1.17 Relationship

## Wrapper

## Constants

## Files

- lib/neo4j/active\_rel/rel\_wrapper.rb:2

## Methods

### #wrapper

```

def wrapper
  props.symbolize_keys!
  begin
    most_concrete_class = class_from_type
    wrapped_rel = most_concrete_class.constantize.new
  rescue NameError
    return self
  end

  wrapped_rel.init_on_load(self, self._start_node_id, self._end_node_id, self.rel_type)
  wrapped_rel
end

```

## Constants

### Files

- lib/neo4j/active\_rel/rel\_wrapper.rb:1

## Methods

### 11.1.18 Node

#### Wrapper

The wrapping process is what transforms a raw CypherNode or EmbeddedNode from Neo4j::Core into a healthy ActiveNode (or ActiveRel) object.

#### Constants

- CONSTANTS\_FOR\_LABELS\_CACHE

#### Files

- lib/neo4j/active\_node/node\_wrapper.rb:5

## Methods

### #class\_to\_wrap

```

def class_to_wrap
  load_classes_from_labels
  Neo4j::ActiveNode::Labels.model_for_labels(labels).tap do |model_class|
    Neo4j::Node::Wrapper.populate_constants_for_labels_cache(model_class, labels)
  end
end

```

**#wrapper** this is a plugin in the neo4j-core so that the Ruby wrapper will be wrapped around the Neo4j::Node objects

```
def wrapper
  found_class = class_to_wrap
  return self if not found_class

  found_class.new.tap do |wrapped_node|
    wrapped_node.init_on_load(self, self.props)
  end
end
```

### Constants

### Files

- lib/neo4j/active\_node/node\_wrapper.rb:3

### Methods

#### 11.1.19 Generators

**nodoc**

### Base

**nodoc**

### Constants

### Files

- lib/rails/generators/neo4j\_generator.rb:10

### Methods

#### .source\_root

```
def self.source_root
  @_neo4j_source_root ||= File.expand_path(File.join(File.dirname(__FILE__),
                                                    'neo4j', generator_name, 'templates'))
end
```

### ActiveModel

**nodoc**



## Constants

## Files

- lib/rails/generators/neo4j\_generator.rb:17

## Methods

### .all

```
def self.all(klass)
  "#{klass}.all"
end
```

### .build

```
def self.build(klass, params = nil)
  if params
    "#{klass}.new({params})"
  else
    "#{klass}.new"
  end
end
```

### #destroy

```
def destroy
  "#{name}.destroy"
end
```

### #errors

```
def errors
  "#{name}.errors"
end
```

### .find

```
def self.find(klass, params = nil)
  "#{klass}.find({params})"
end
```

### #save

```
def save
  "#{name}.save"
end
```

### #update\_attributes

```
def update_attributes(params = nil)
  "#{name}.update_attributes({params})"
end
```

## ModelGenerator

nodoc

## Constants

### Files

- lib/rails/generators/neo4j/model/model\_generator.rb:3

### Methods

#### #create\_model\_file

```
def create_model_file
  template 'model.erb', File.join('app/models', "#{singular_name}.rb")
end
```

#### .source\_root

```
def self.source_root
  @_neo4j_source_root ||= File.expand_path(File.join(File.dirname(__FILE__),
                                                    'neo4j', generator_name, 'templates'))
end
```

## Constants

### Files

- lib/rails/generators/neo4j\_generator.rb:6

### Methods

## 11.1.20 Constants

- VERSION

## 11.1.21 Files

- lib/neo4j/shared.rb:1
- lib/neo4j/errors.rb:1
- lib/neo4j/config.rb:1
- lib/neo4j/version.rb:1
- lib/neo4j/wrapper.rb:1
- lib/neo4j/railtie.rb:4
- lib/neo4j/migration.rb:3
- lib/neo4j/paginated.rb:1
- lib/neo4j/timestamps.rb:4
- lib/neo4j/active\_rel.rb:1
- lib/neo4j/active\_node.rb:1

- lib/neo4j/shared/marshal.rb:1
- lib/neo4j/class\_arguments.rb:1
- lib/neo4j/type\_converters.rb:1
- lib/neo4j/active\_rel/types.rb:1
- lib/neo4j/schema/operation.rb:1
- lib/neo4j/shared/callbacks.rb:1
- lib/neo4j/active\_node/query.rb:1
- lib/neo4j/shared/typecaster.rb:1
- lib/neo4j/timestamps/updated.rb:1
- lib/neo4j/active\_node/labels.rb:1
- lib/neo4j/shared/validations.rb:1
- lib/neo4j/timestamps/created.rb:1
- lib/neo4j/active\_rel/callbacks.rb:1
- lib/neo4j/active\_node/callbacks.rb:1
- lib/neo4j/active\_node/dependent.rb:1
- lib/neo4j/active\_rel/validations.rb:1
- lib/neo4j/active\_node/unpersisted.rb:1
- lib/neo4j/active\_node/orm\_adapter.rb:3
- lib/neo4j/active\_node/validations.rb:1
- lib/neo4j/active\_node/query\_methods.rb:1
- lib/rails/generators/neo4j\_generator.rb:5
- lib/neo4j/active\_node/has\_n/association.rb:4
- lib/neo4j/active\_node/query/query\_proxy.rb:1
- lib/neo4j/active\_node/query/query\_proxy\_link.rb:1
- lib/neo4j/active\_node/query/query\_proxy\_methods.rb:1
- lib/neo4j/active\_node/query/query\_proxy\_enumerable.rb:1
- lib/neo4j/active\_node/dependent/association\_methods.rb:1
- lib/neo4j/active\_node/dependent/query\_proxy\_methods.rb:1
- lib/neo4j/active\_node/query/query\_proxy\_eager\_loading.rb:1
- lib/neo4j/active\_node/has\_n/association\_cypher\_methods.rb:1
- lib/neo4j/active\_node/query/query\_proxy\_find\_in\_batches.rb:1

## 11.1.22 Methods

# 11.2 Rails

## 11.2.1 Generators

### GeneratedAttribute

**nodoc**

### Constants

### Files

- lib/rails/generators/neo4j\_generator.rb:53

### Methods

#### #type\_class

```
def type_class
  case type.to_s.downcase
  when 'any' then 'any'
  when 'datetime' then 'DateTime'
  when 'date' then 'Date'
  when 'integer', 'number', 'fixnum' then 'Integer'
  when 'float' then 'Float'
  else
    'String'
  end
end
```

### Constants

### Files

- lib/rails/generators/neo4j\_generator.rb:52

### Methods

## 11.2.2 Constants

## 11.2.3 Files

- lib/rails/generators/neo4j\_generator.rb:51

## 11.2.4 Methods

Neo4j.rb (the `neo4j` and `neo4j-core` gems) is a Ruby Object-Graph-Mapper (OGM) for the Neo4j graph database. It tries to follow API conventions established by `ActiveRecord` and familiar to most Ruby developers but with a Neo4j flavor.

**Ruby** (software) A dynamic, open source programming language with a focus on simplicity and productivity. It has an elegant syntax that is natural to read and easy to write.

**Graph Database** (computer science) A graph database stores data in a graph, the most generic of data structures, capable of elegantly representing any kind of data in a highly accessible way.

**Neo4j** (databases) The world's leading graph database

If you're already familiar with `ActiveRecord`, `DataMapper`, or `Mongoid`, you'll find the Object Model features you've come to expect from an O\*M:

- Properties
- Indexes / Constraints
- Callbacks
- Validation
- Associations

Because relationships are first-class citizens in Neo4j, models can be created for both nodes and relationships.



---

**Additional features include**

---

- A chainable `arel`-inspired query builder
- Transactions
- Migration framework





---

## Requirements

---

- Ruby 1.9.3+ (tested in MRI and JRuby)
- Neo4j 2.1.0 + (version 4.0+ of the gem is required to use neo4j 2.2+)



---

**Indices and tables**

---

- `genindex`
- `modindex`
- `search`



## A

association\_model\_namespace, [60](#)

## C

class\_name\_property, [59](#)

## I

include\_root\_in\_json, [59](#)

## L

logger, [60](#)

## M

module\_handling, [60](#)

## N

neo4j:config, [9](#)

neo4j:install, [9](#)

neo4j:restart, [10](#)

neo4j:start, [9](#)

neo4j:start\_no\_wait, [9](#)

neo4j:stop, [10](#)

## P

pretty\_logged\_cypher\_queries, [60](#)

## R

record\_timestamps, [60](#)

## T

timestamp\_type, [60](#)

transform\_rel\_type, [59](#)

## W

wait\_for\_connection, [60](#)