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# **RAMLfications Documentation**

*Release 0.1.5*

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Release v0.1.5 ([What's new?](#)).

`ramlfications` is an Apache 2.0-licensed reference implementation of a [RAML](#) parser in Python intended to be used for parsing API definitions (e.g. for static documentation-generation).

If you've never heard of [RAML](#), you're missing out:

RESTful API Modeling Language (RAML) is a simple and succinct way of describing practically-RESTful APIs. It encourages reuse, enables discovery and pattern-sharing, and aims for merit-based emergence of best practices. The goal is to help our current API ecosystem by solving immediate problems and then encourage ever-better API patterns. RAML is built on broadly-used standards such as YAML and JSON and is a non-proprietary, vendor-neutral open spec.



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## Why `ramlfications` and not `pyraml-parser`?

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I chose to write a new library rather than wrestle with `pyraml-parser` as it was not developer-friendly to extend (in my PoV, others may have more success) and did not include required `RAML` features (e.g. `uriParameters`, parsing of security schemes, etc), as well as a lot of meta programming that is just simply over my head. However, I do encourage you to check out `pyraml-parser`! You may find it easier to work with than I did.





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### About

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`ramifications`'s documentation lives at [Read the Docs](#), the code on [GitHub](#). It's tested on Python 2.6, 2.7, 3.3+, and PyPy. Both Linux and OS X are supported.



## 3.1 Requirements and Installation

### 3.1.1 User Setup

The latest stable version can be found on [PyPI](#), and you can install via [pip](#):

```
$ pip install ramlfications
```

`ramlfications` runs on Python 2.6, 2.7, and 3.3+, and PyPy. Both Linux and OS X are supported.

Continue onto [usage](#) to get started on using `ramlfications`.

### 3.1.2 Developer Setup

If you'd like to contribute or develop upon `ramlfications`, be sure to read [How to Contribute](#) first.

#### System requirements:

- C Compiler (`gcc/clang/etc.`)
- If on Linux - you'll need to install Python headers (e.g. `apt-get install python-dev`)
- Python 2.6, 2.7, 3.3+, or PyPy
- [virtualenv](#)

Here's how to set your machine up:

```
$ git clone git@github.com:spotify/ramlfications
$ cd ramlfications
$ virtualenv env
$ source env/bin/activate
(env) $ pip install -r dev-requirements.txt
```

#### Run Tests

If you'd like to run tests for all supported Python versions, you must have all Python versions installed on your system. I suggest [pyenv](#) to help with that.

To run all tests:

```
(env) $ tox
```

To run a specific test setup (options include: `py26`, `py27`, `py33`, `py34`, `pypy`, `flake8`, `verbose`, `manifest`, `docs`, `setup`, `setupcov`):

```
(env) $ tox -e py26
```

To run tests without tox:

```
(env) $ py.test
(env) $ py.test --cov ramlfications --cov-report term-missing
```

### Build Docs

Documentation is build with [Sphinx](#), written in rST, uses the [Read the Docs](#) theme with a slightly customized CSS, and is hosted on [Read the Docs](#) site.

To rebuild docs locally, within the parent `ramlfications` directory:

```
(env) $ tox -e docs
```

or:

```
(env) $ sphinx-build -b docs/ docs/_build
```

Then within `ramlfications/docs/_build` you can open the `index.html` page in your browser.

### Still have issues?

Feel free to drop by [#ramlfications](#) on Freenode ([webchat](#)) or ping via [Twitter](#). “[roguelynn](#)” is the maintainer, a.k.a [econchick](#) on GitHub, and based in San Fran.

## 3.2 Usage

You can use `ramlfications` to parse and validate a RAML file with Python. With the command line, you can validate or visualize the RAML-defined API as a tree.

### 3.2.1 Parse

To parse a RAML file, include `ramlfications` in your project and call the `parse` function:

```
>>> import ramlfications
>>> RAML_FILE = "/path/to/my-api.raml"
>>> api = ramlfications.parse(RAML_FILE)
>>> api
RootNode(title='Example Web API')
>>> api.title
'My Foo API'
>>> api.version
'v1'
```

```
>>> api.security_schemes
[SecurityScheme(name='oauth_2_0')]
>>> oauth2 = api.security_schemes[0]
>>> oauth2.name
'oauth_2_0'
>>> oauth2.type
'OAuth 2.0'
>>> oauth2.settings.get("scopes")
['playlist-read-private', 'playlist-modify-public', ..., 'user-read-email']
>>> oauth2.settings.get("accessTokenUri")
'https://accounts.foo.com/api/token'
```

```
>>> api.resources
[ResourceNode(method='get', path='/foo'), ResourceNode(method='put', path='/foo'), ..., ResourceNode
>>> foo_bar = api.resources[-1]
>>> foo_bar.name
'/{id}'
>>> foo_bar.display_name
'fooBarID'
>>> foo_bar.absolute_uri
'https://api.foo.com/v1/foo/bar/{id}'
>>> foo_bar.uri_params
[URIParameter(name='id')]
```

```
>>> id_param = foo_bar.uri_params[0]
>>> id_param.required
True
>>> id_param.type
'string'
>>> id_param.example
'f00b@r1D'
```

You can pass in an optional config file to add additional values for certain parameters. Find out more within the [Extended Usage](#):

```
>>> CONFIG_FILE = "/path/to/config.ini"
>>> api = ramlfications.parse(RAML_FILE, CONFIG_FILE)
```

For more complete understanding of what's available when parsing a RAML file, check the [Extended Usage](#) or the [API Definition](#).

### 3.2.2 Validate

Validation is according to the [RAML Specification](#).

To validate a RAML file via the command line:

```
$ ramlfications validate /path/to/my-api.raml
Success! Valid RAML file: tests/data/examples/simple-tree.raml
```

```
$ ramlfications validate /path/to/invalid/no-title.raml
Error validating file /path/to/invalid/no-title.raml: RAML File does not define an API title.
```

To validate a RAML file with Python:

```
>>> from ramlfications import validate
>>> RAML_FILE = "/path/to/my-api.raml"
```

```
>>> validate(RAML_FILE)
>>>
```

```
>>> from ramlfications import validate
>>> RAML_FILE = "/path/to/invalid/no-title.raml"
>>> validate(RAML_FILE)
InvalidRootNodeError: RAML File does not define an API title.
```

**Note:** When using `validate` within Python (versus the command line utility), if the RAML file is valid, then nothing is returned. Only invalid files will return an exception.

If you have additionally supported items beyond the standard (e.g. protocols beyond HTTP/S), you can still validate your code by passing in your config file.

```
$ cat api.ini
[custom]
protocols = FTP
```

```
>>> from ramlfications import validate
>>> RAML_FILE = "/path/to/support-ftp-protocol.raml"
>>> CONFIG_FILE = "/path/to/api.ini"
>>> validate(RAML_FILE, CONFIG_FILE)
>>>
```

To learn more about ramlfications configuration including default/supported configuration, check out [Configuration](#).

### 3.2.3 Tree

To visualize a tree output of a RAML file:

```
$ ramlfications tree /path/to/my-api.raml [-c|--color light/dark] [-v|vv|vvv] [-o|--output]
```

The least verbose option would show something like this:

```
$ ramlfications tree /path/to/my-api.raml
=====
My Foo API
=====
Base URI: https://api.foo.com/v1
|- /foo
| - /bar
| - /bar/{id}
```

And the most verbose:

```
$ ramlfications tree /path/to/my-api.raml -vvv
=====
My Foo API
=====
Base URI: https://api.foo.com/v1
|- /foo
| GET
|   Query Params
|     q: Foo Query
|     type: Item Type
| - /bar
```

```

|   GET
|   Query Params
|     q: Bar Query
|     type: item type
| - /bar/{id}
|   GET
|   URI Params
|     id: ID of foo

```

### 3.2.4 Update

At the time of this release (Jun 5, 2015), the MIME media types that `ramlfications` supports can be found on [GitHub](#).

However, you do have the ability to update your own setup with the latest-supported MIME media types as defined by the [IANA](#). To do so:

```
$ ramlfications update
```

**Note:** If you are running Python version 2.7.8 or earlier, or Python version 3.4.2 or earlier, it is encouraged to have `requests[all]` installed in your environment. The command will still work without the package using the standard `lib's urllib2`, but does not perform SSL certificate verification. Please see [PEP 467](#) for more details.

### 3.2.5 Options and Arguments

The full usage is:

```
$ ramlfications [OPTIONS] COMMAND [ARGS]
```

The `RAMLFILE` is a file containing the RAML-defined API you'd like to work with.

Valid `COMMAND` s are the following:

**validate** `RAMLFILE`

Validate the RAML file according to the [RAML Specification](#).

**-c** `PATH`, **--config** `PATH`

Additionally supported items beyond RAML spec.

**update**

Update RAMLfications' supported MIME types from IANA.

**tree** `RAMLFILE`

Visualize the RAML file as a tree.

**-c** `PATH`, **--config** `PATH`

Additionally supported items beyond RAML spec.

**-C** `<light|dark>`, **--color** `<light|dark>`

Use a light color scheme for dark terminal backgrounds [DEFAULT], or dark color scheme for light backgrounds.

**-o** `FILENAME`, **--output** `FILENAME`

Save tree output to desired file

**-v**

Increase verbose output of the tree one level: adds the HTTP methods

- vv**  
Increase verbose output of the tree one level: adds the parameter names
- vvv**  
Increase verbose output of the tree one level: adds the parameter display name

## 3.3 Extended Usage

To parse a RAML file, include ramlfications in your project and call the parse function:

```
>>> import ramlfications
>>> RAML_FILE = "/path/to/my-api.raml"
>>> api = ramlfications.parse(RAML_FILE)
```

### 3.3.1 Configuration

Perhaps your API supports response codes beyond what IETF supports (default for this parser). Or maybe you implemented your own authentication scheme that your API uses <sup>I hope not!</sup>.

Example configuration file:

```
[main]
validate = True

[custom]
append = True
resp_codes = 420, 421, 422
auth_schemes = oauth_3_0, oauth_4_0
media_types = application/vnd.github.v3, foo/bar
protocols = FTP
raml_versions = 0.8
```

Feed the configuration into the parse function like so:

```
>>> import ramlfications
>>> RAML_FILE = "/path/to/my-api.raml"
>>> CONFIG_FILE = "/path/to/my-config.ini"
>>> api = ramlfications.parse(RAML_FILE, CONFIG_FILE)
```

### 3.3.2 RAML Root Section

In following the [RAML Spec's Root Section](#) definition, here is how you can access the following attributes:

#### The Basics

```
>>> api.title
'My Other Foo API'
>>>
>>> api.version
v2
>>> api.base_uri
'https://{domainName}.foo.com/v2'
>>> api.base_uri_parameters
```



```
[<URIParameter(name='domainName')>]
>>>
>>> api.protocols
['HTTPS']
```

## API Documentation

```
>>> api.documentation
[<Documentation(title='The Foo API Docs')>]
>>> doc = api.documentation[0]
>>> doc.title
'The Foo API Docs'
```

Docs written in the RAML file [should be written using Markdown](#). This also applies to any description parameter.

With ramlfications, documentation content and descriptions can either be viewed raw, or in parsed HTML.

```
>>> doc.content
'Welcome to the _Foo API_ specification. For more information about\nhow to use the API, check out [
>>>
>>> doc.content.html
u'<p>Welcome to the <em>Foo API</em> specification. For more information about\nhow to use the API, c
```

Check out [API Definition](#) for full definition of RootNode and its associated attributes and objects.

## Security Schemes

RAML supports OAuth 1, OAuth 2, Basic & Digest, and any authentication scheme self-defined with an x-`{other}` header.

To parse auth schemes:

```
>>> api.security_schemes
[<SecurityScheme(name='oauth_2_0')>]
>>> oauth2 = api.security_schemes[0]
>>> oauth2.name
'oauth_2_0'
>>> oauth2.type
'OAuth 2.0'
>>> oauth2.description
'Foo supports OAuth 2.0 for authenticating all API requests.\n'
>>> oauth2.description.html
u'<p>Foo supports OAuth 2.0 for authenticating all API requests.</p>\n'
```

And its related Headers and Responses:

```
>>> oauth2.described_by
{'headers': [<Header(name='Authorization')>], 'responses': [<Response(code='401')>, <Response(code='
>>> first_header = oauth2.described_by['headers'][0]
>>> first_header
<HeaderParameter(name='Authorization')>
>>> first_header.name
'Authorization'
>>> first_headers.description
'Used to send a valid OAuth 2 access token.\n'
>>> first_headers.description.html
u'<p>Used to send a valid OAuth 2 access token.</p>\n'
```

```
>>> resps = oauth2.described_by['responses']
>>> resps
[<Response (code='401')>, <Response (code='403')>]
>>> resp[0].code
401
>>> resp[0].description.raw
'Bad or expired token. This can happen if the user revoked a token or\nthe access token has expired.'
```

Authentication settings (available for OAuth1, OAuth2, and any x-header that includes “settings” in the RAML definition).

```
>>> oauth2.settings.scopes
['foo-read-private', 'foo-modify-public', ..., 'user-read-email-address']
>>> oauth2.settings.access_token_uri
'https://accounts.foo.com/api/token'
>>> oauth2.settings.authorization_grants
['code', 'token']
>>> oauth2.settings.authorization_uri
'https://accounts.foo.com/authorize'
```

Check out [API Definition](#) for full definition of SecuritySchemes, Header, Response and their associated attributes and objects.

### Traits & Resource Types

Traits & resource types help when API definitions get a bit repetitive. More information can be found in the RAML spec for [resource types and traits](#).

#### Resource Types

```
>>> api.resource_types
[<ResourceTypeNode (name='collection')>, <ResourceTypeNode (name='member')>]
>>> collection = api.resource_types[0]
>>> collection.name
'collection'
>>> collection.description
'The collection of <<resourcePathName>>'
>>> collection.usage
'This resourceType should be used for any collection of items'
>>> collection.method
'get'
>>> get.optional
False
```

#### Traits

```
>>> api.traits
[<TraitNode (name='filtered')>, <TraitNode (name='paged')>]
>>> paged = api.traits[1]
>>> paged.query_params
[<QueryParameter (name='offset')>, <QueryParameter (name='limit')>]
>>> paged.query_params[0].name
'offset'
```

```
>>> paged.query_params[0].description
'The index of the first track to return'
```

### Mapping of Properties and Elements from Traits & Resource Types to Resources

When a resource has a trait and/or type assigned to it, or a resource type has another resource type or a trait assigned to it, it inherits its properties.

Also, the [RAML Spec](#) allows for parameters within Traits and ResourceTypes, denoted by double brackets within the Trait/ResourceType definition, e.g. <<parameter>>. After the parsing of the API definition, the appropriate parameters are filled in for the respective resource.

For example, a simplified RAML file:

```

#%RAML 0.8
title: Example API - Mapped Traits
version: v1
resourceTypes:
  - searchableCollection:
    get:
      queryParameters:
        <<queryParamName>>:
          description: |
            Return <<resourcePathName>> that have their <<queryParamName>>
            matching the given value
        <<fallbackParamName>>:
          description: |
            If no values match the value given for <<queryParamName>>,
            use <<fallbackParamName>> instead
  - collection:
    usage: This resourceType should be used for any collection of items
    description: The collection of <<resourcePathName>>
    get:
      description: Get all <<resourcePathName>>, optionally filtered
    post:
      description: Create a new <<resourcePathName | !singularize>>
traits:
  - secured:
    description: A secured method
    queryParameters:
      <<tokenName>>:
        description: A valid <<tokenName>> is required
  - paged:
    queryParameters:
      numPages:
        description: The number of pages to return, not to exceed <<maxPages>>
/books:
  type: { searchableCollection: { queryParamName: title, fallbackParamName: digest_all_fields } }
  get:
    is: [ secured: { tokenName: access_token }, paged: { maxPages: 10 } ]

```

When parsed, the Python notation would look like this:

```
>>> RAML_FILE = "/path/to/foo-api.raml"
>>> api = parse(RAML_FILE)
```

```
# accessing API-supported resource types
>>> api.resource_types
[<ResourceTypeNode(method='GET', name='searchableCollection')>,
 <ResourceTypeNode(method='POST', name='collection')>,
 <ResourceTypeNode(method='GET', name='collection')>]
>>> api.resource_types[0].query_params
[<QueryParameter(name='<<queryParamName>>')>,
 <QueryParameter(name='<<fallbackParamName>>')>]
>>> api.resource_types[0].query_params[0].description
Return <<resourcePathName>> that have their <<queryParamName>> matching the given value
```

```
# accessing API-supported traits
>>> api.traits
[<TraitNode(name='secured')>, <TraitNode(name='paged')>]
>>> api.traits[0].query_params
[<QueryParameter(name='numPages')>]
>>> api.traits[0].query_params[0].description
The number of pages to return, not to exceed <<maxPages>>
```

```
# accessing a single resource
>>> books = api.resources[0]
>>> books
<ResourceNode(method='GET', path='/books')>
>>> books.type
{'searchableCollection': {'fallbackParamName': 'digest_all_fields', 'queryParamName': 'title'}}
>>> books.traits
[<TraitNode(name='secured')>, <TraitNode(name='paged')>]
>>> books.query_params
[<QueryParameter(name='title')>, <QueryParameter(name='digest_all_fields')>,
 <QueryParameter(name='access_token')>, <QueryParameter(name='numPages')>]
>>> books.query_params[0].description
Return books that have their title matching the given value
>>> books.query_params[3].description
The number of pages to return, not to exceed 10
```

Check out [API Definition](#) for full definition of traits and resources, and its associated attributes and objects.

### 3.3.3 Resources

“Resources” are defined in the [RAML Spec’s Resource Section](#) and is a relative URI (relative to the `base_uri` and, if nested, relative to its parent URI).

For example, *Foo API* defines `/foo/bar` as a resource (a “top-level resource” to be exact). It also defines `/id` under `/foo/bar`, making `/id` a nested resource, relative to `/foo/bar`. The relative path would be `/foo/bar/{id}`, and the absolute URI path would be `https://api.foo.com/v2/foo/bar/{id}`.

```
>>> api.resources
[<Resource(method='GET', path='/foo')>, ..., <Resource(method='DELETE', path='/foo/bar/{id}')>]
>>>
>>> foo_bar = resources[-1]
>>> foo_bar.name
'/{id}'
>>> foo_bar.description
'[Delete a foo bar](https://developer.foo.com/api/delete-foo-bar/)\n'
>>> foo_bar.description.html
u'<p><a href="https://developer.foo.com/api/delete-foo-bar/">Delete a foo bar</a></p>\n'
>>> foo_bar.display_name
```

```
'foo bar'
>>> foo_bar.method
'delete'
>>> foo_bar.path
'/foo/bar/{id}'
>>> foo_bar.absolute_uri
'https://api.foo.com/v2/foo/bar/{id}'
>>> foo_bar.uri_params
[<URIParameter(name='id')>]
>>>
>>> uri_param = foo_bar.uri_params[0]
>>> uri_param.required
True
>>> uri_param.type
'string'
>>> uri_param.example
'f0ob@r1D'
>>> foo_bar.parent
<Resource(method='GET', path='/foo/bar/')>
```

Check out [API Definition](#) for full definition of what is available for a `resource` object, and its associated attributes and objects.

## 3.4 Configuration

### 3.4.1 Supported

In support of the [RAML spec](#), ramlfications will automatically support the following:

#### RAML Versions

**Config variable:** `raml_versions`

**Config type:** list of strings

**Supported:** 0.8

#### HTTP Methods

**Config variable:** `http_methods`

**Config type:** list of strings

**Supported:** GET, POST, PUT, DELETE, PATCH, HEAD, OPTIONS, TRACE, CONNECT

#### Authentication Schemes

**Config variable:** `auth_schemes`

**Config type:** list of strings

**Supported:** OAuth 1.0, OAuth 2.0, Basic Authentication, Digest Authentication

## HTTP Response Codes

**Config variable:** `resp_codes`

**Config type:** list of integers

**Supported:** From Python `stdlib` `BaseHTTPServer`

100, 101,  
200, 201, 202, 203, 204, 205, 206,  
300, 301, 302, 303, 304, 305, 307,  
400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417,  
500, 501, 502, 503, 504, 505

## Protocols

**Config variable:** `protocols`

**Config type:** list of strings

**Supported:** HTTP, HTTPS

## MIME Media Types

**Config variable:** `media_types`

**Config type:** list of strings that fit the regex defined under `default media type`:  
`application\[A-Za-z.-0-1]*+?(json|xml)`

**Supported:** MIME media types that the package supports can be found on [GitHub](#) and is up to date as of the time of this release (Jun 5, 2015).

---

**Note:** If you would like to update your own setup with the latest [IANA](#) supported MIME media types, refer to [Usage](#).

---

### 3.4.2 User-specified

You may define additional values beyond what `ramlfications` already supports above.

To do so, create your own `ini` file with a `[custom]` section.

Then add the attributes defined *above* that you want to support. You can **only** add support to the configuration values explained above.

**Warning:** Additionally supported values defined in your configuration will only **add** to the values that `ramlfications` will validate against; it will **not** overwrite values that the `ramlfications` supports as defined in the [RAML spec](#).

An example `config.ini` file:

```
[custom]
raml_versions = 0.9, 1.0
http_methods = foo, bar
```

```
auth_schemes = oauth_3_0, my_auth
media_types = application/vnd.foobar.v2
protocols = FTP
resp_codes = 429, 440
```

## Usage

To use your configuration from within Python:

```
>>> from ramlfications import parse, validate
>>> RAML_FILE = "path/to/api.raml"
>>> CONFIG_FILE = "path/to/api.ini"
>>> api = parse(RAML_FILE, CONFIG_FILE)
>>> validate(RAML_FILE, CONFIG_FILE)
>>>
```

To use via the command line:

```
$ ramlfications validate --config path/to/api.ini path/to/api.raml
$ ramlfications tree --config path/to/api.ini path/to/api.raml
```

## 3.5 API Definition

### 3.5.1 Main functions

The following three functions are meant for you to use primarily when parsing a RAML file/string.

`ramlfications.parse(raml, config_file=None)`

Module helper function to parse a RAML File. First loads the RAML file with `loader.RAMLLoader` then parses with `parser.parse_raml()` to return a `raml.RAMLRoot` object.

#### Parameters

- **raml** – Either string path to the RAML file, a file object, or a string representation of RAML.
- **config\_file** (*str*) – String path to desired config file, if any.

**Returns** parsed API

**Return type** `RAMLRoot`

#### Raises

- **LoadRAMLError** – If error occurred trying to load the RAML file (see `loader.RAMLLoader`)
- **InvalidRootNodeError** – API metadata is invalid according to RAML specification.
- **InvalidResourceNodeError** – API resource endpoint is invalid according to RAML specification.
- **InvalidParameterError** – Named parameter is invalid according to RAML specification.

`ramlfications.load(raml_file)`

Module helper function to load a RAML File using `loader.RAMLLoader`.

**Parameters** **raml\_file** (*str*) – String path to RAML file

**Returns** loaded RAML

**Return type** dict

**Raises** **LoadRAMLError** If error occurred trying to load the RAML file

`ramlfications.loads(raml_string)`

Module helper function to load a RAML File using `loader.RAMLLoader`.

**Parameters** **raml\_string** (*str*) – String of RAML data

**Returns** loaded RAML

**Return type** dict

**Raises** **LoadRAMLError** If error occurred trying to load the RAML file

`ramlfications.validate(raml, config_file=None)`

Module helper function to validate a RAML File. First loads the RAML file with `loader.RAMLLoader` then validates with `validate.validate_raml()`.

**Parameters**

- **raml** (*str*) – Either string path to the RAML file, a file object, or a string representation of RAML.
- **config\_file** (*str*) – String path to desired config file, if any.

**Returns** No return value if successful

**Raises**

- **LoadRAMLError** – If error occurred trying to load the RAML file (see `loader.RAMLLoader`)
- **InvalidRootNodeError** – API metadata is invalid according to RAML [specification](#).
- **InvalidResourceNodeError** – API resource endpoint is invalid according to RAML [specification](#).
- **InvalidParameterError** – Named parameter is invalid according to RAML [specification](#).

### 3.5.2 Core

---

**Note:** The following documentation is meant for understanding the underlying `ramlfications` API. No need to interact directly with the modules, classes, & functions below.

---

#### parser

`ramlfications.parser.parse_raml(loaded_raml, config)`

Parse loaded RAML file into RAML/Python objects.

**Parameters** **loaded\_raml** (*RAMLDict*) – OrderedDict of loaded RAML file

**Returns** `raml.RootNode` object.

`ramlfications.parser.create_root(raml, config)`

Creates a Root Node based off of the RAML's root section.

**Parameters** **raml** (*RAMLDict*) – loaded RAML file



**Returns** `raml.RootNode` object with API root attributes set

`ramlfications.parser.create_traits(raml_data, root)`  
Parse traits into `Trait` objects.

**Parameters**

- **raml\_data** (*dict*) – Raw RAML data
- **root** (`RootNode`) – Root Node

**Returns** list of `raml.TraitNode` objects

`ramlfications.parser.create_resource_types(raml_data, root)`  
Parse resourceTypes into `ResourceTypeNode` objects.

**Parameters**

- **raml\_data** (*dict*) – Raw RAML data
- **root** (`RootNode`) – Root Node

**Returns** list of `raml.ResourceTypeNode` objects

`ramlfications.parser.create_resources(node, resources, root, parent)`  
Recursively traverses the RAML file via DFS to find each resource endpoint.

**Parameters**

- **node** (*dict*) – Dictionary of node to traverse
- **resources** (*list*) – List of collected `ResourceNode` s
- **root** (`RootNode`) – The `RootNode` of the API
- **parent** (`ResourceNode`) – Parent `ResourceNode` of current node

**Returns** List of `raml.ResourceNode` objects.

`ramlfications.parser.create_node(name, raw_data, method, parent, root)`  
Create a Resource Node object.

**Parameters**

- **name** (*str*) – Name of resource node
- **raw\_data** (*dict*) – Raw RAML data associated with resource node
- **method** (*str*) – HTTP method associated with resource node
- **parent** (`ResourceNode`) – Parent node object of resource node, if any
- **api** (`RootNode`) – API `RootNode` that the resource node is attached to

**Returns** `raml.ResourceNode` object

## raml

**class** `ramlfications.raml.RootNode`  
API Root Node

**raw**

Ordered dict of all raw data from the RAML file/string.

**version**

str of API version.

**base\_uri**  
str of API's base URI.

**base\_uri\_params**  
list of base *URIParameter* s for the base URI, or None.

**uri\_params**  
list of *URIParameter* s that can apply to all resources, or None.

**protocols**  
list of str s of API-supported protocols. If not defined, is inferred by protocol from *RootNode.base\_uri*.

**title**  
str of API's title.

**docs**  
list of *Documentation* objects, or None.

**schemas**  
list of dict s, or None.

**media\_type**  
str of default accepted request/response media type, or None.

**resource\_types**  
list of *ResourceTypeNode* objects, or None.

**traits**  
list of *TraitNode* objects, or None.

**security\_schemas**  
list of *SecurityScheme* objects, or None.

**resources**  
list of *ResourceNode* objects, or None.

**raml\_obj**  
The loader.*RAMLDict* object.

---

**Note:** *TraitNode*, *ResourceTypeNode*, and *ResourceNode* all inherit the following *BaseNode* attributes:

---

**class** ramlfications.raml.**BaseNode**

**name**  
str name of Node

**raw**  
dict of the raw data of the Node from the RAML file/string

**root**  
Back reference to the Node's API *RootNode* object.

**headers**  
list of Node's *Header* objects, or None

**body**  
list of Node's *Body* objects, or None

**responses**  
list of Node's *Response* objects, or None

**uri\_params**

list of Node's *URIParameter* objects, or None

**base\_uri\_params**

list of Node's base *URIParameter* objects, or None

**query\_params**

list of Node's *QueryParameter* objects, or None

**form\_params**

list of Node's *FormParameter* objects, or None.

**media\_type**

str of supported request MIME media type. Defaults to *RootNode*'s *media\_type*.

**description**

str description of Node.

**protocols**

list of str s of supported protocols. Defaults to *RootNode.protocols*.

**class** `ramlfications.raml.TraitNode`

Object representing a RAML Trait.

In addition to the *BaseNode*-defined attributes, *TraitNode* also has:

**usage**

Usage of trait

**class** `ramlfications.raml.ResourceTypeNode`

Object representing a RAML Resource Type.

In addition to the *BaseNode*-defined attributes, *ResourceTypeNode* also has:

**display\_name**

str of user-friendly name of resource type, defaults to *BaseNode.name*

**type**

str name of inherited *ResourceTypeNode* object, or None.

**method**

str of supported method.

Removes the ? if present (see *optional*).

**usage**

str usage of resource type, or None

**optional**

bool resource type attributes inherited if applied resource defines method (i.e. there is a ? in resource type method).

**is\_**

list of assigned trait names (str), or None

**traits**

list of assigned *TraitNode* objects, or None

**secured\_by**

list of str s or dict s of assigned security scheme, or None.

If str, then the name of the security scheme.

If dict, the key is the name of the scheme, the values are the parameters assigned (e.g. relevant OAuth 2 scopes).

**security\_schemes**

list of assigned parameters. *SecurityScheme* objects, or None.

**class** ramlfications.raml.**ResourceNode**

**parent**

parent *ResourceNode* object if any, or None.

**method**

str HTTP method for resource, or None.

**display\_name**

str of user-friendly name of resource. Defaults to name.

**path**

str of relative path of resource.

**absolute\_uri**

str concatenation of absolute URI of resource: *RootNode.base\_uri* + *path*.

**is\_**

list of str s or dict s of resource-assigned traits, or None.

**traits**

list of assigned *TraitNode* objects, or None.

**type**

str of the name of the assigned resource type, or None.

**resource\_type**

The assigned *ResourceTypeNode* object from *ResourceNode.type*, or None

**secured\_by**

list of str s or dict s of resource-assigned security schemes, or None.

If a str, the name of the security scheme.

If a dict, the key is the name of the scheme, the values are the parameters assigned (e.g. relevant OAuth 2 scopes).

**security\_schemes**

## Parameters

---

**Note:** The *URIParameter*, *QueryParameter*, *FormParameter*, and *Header* objects all share the same attributes.

---

**class** ramlfications.parameters.**URIParameter**

URI parameter with properties defined by the RAML specification’s “Named Parameters” section, e.g.: */foo/{id}* where *id* is the name of the URI parameter.

**class** ramlfications.parameters.**QueryParameter**

Query parameter with properties defined by the RAML specification’s “Named Parameters” section, e.g. */foo/bar?baz=123* where *baz* is the name of the query parameter.

**class** ramlfications.parameters.**FormParameter**

Form parameter with properties defined by the RAML specification’s “Named Parameters” section. Example:

```
curl -X POST https://api.com/foo/bar -d baz=123
```

where *baz* is the Form Parameter name.

**class** `ramlfications.parameters.Header`

Header with properties defined by the RAML spec's 'Named Parameters' section, e.g.:

```
curl -H 'X-Some-Header: foobar' ...
```

where X-Some-Header is the Header name.

**name**

str of the name of parameter.

**raw**

dict of all raw data associated with the parameter from the RAML file/string.

**description**

str parameter description, or None.

**display\_name**

str of a user-friendly name for display or documentation purposes.

If `displayName` is not specified in RAML data, defaults to `name`.

**min\_length**

int of the parameter's minimum number of characters, or None.

---

**Note:** Only applies when the parameter's primitive type is string.

---

**max\_length**

int of the parameter's maximum number of characters, or None.

---

**Note:** Only applies when the parameter's primitive type is string.

---

**minimum**

int of the parameter's minimum value, or None.

---

**Note:** Only applies when the parameter's primitive type is integer or number.

---

**maximum**

int of the parameter's maximum value, or None.

---

**Note:** Only applies when the parameter's primitive type is integer or number.

---

**example**

Example value for parameter, or None.

---

**Note:** Attribute type of `example` will match that of `type`.

---

**default**

Default value for parameter, or None.

---

**Note:** Attribute type of `default` will match that of `type`.

---

**repeat**

bool if parameter can be repeated. Defaults to False.

**pattern**

str of a regular expression that parameter of type `string` must match, or None if not set.

**enum**

list of valid parameter values, or `None`.

---

**Note:** Only applies when parameter's primitive type is `string`.

---

**type**

`str` representation of the primitive type of parameter. Defaults to `string` if not set.

**required**

`bool` if parameter is required.

---

**Note:** Defaults to `True` if *URIParameter*, else defaults to `False`.

---

**class** `ramlfications.parameters.Body`

Body of the request/response.

**mime\_type**

`str` of the accepted MIME media types for the body of the request/response.

**raw**

dict of all raw data associated with the `Body` from the RAML file/string

**schema**

dict of body schema definition, or `None` if not set.

---

**Note:** Can not be set if `mime_type` is `multipart/form-data` or `application/x-www-form-urlencoded`

---

**example**

dict of example of schema, or `None` if not set.

---

**Note:** Can not be set if `mime_type` is `multipart/form-data` or `application/x-www-form-urlencoded`

---

**form\_params**

list of *FormParameter* objects accepted in the request body.

---

**Note:** Must be set if `mime_type` is `multipart/form-data` or `application/x-www-form-urlencoded`. Can not be used when `schema` and/or `example` is defined.

---

**class** `ramlfications.parameters.Response`

Expected response parameters.

**code**

`int` of HTTP response code.

**raw**

dict of all raw data associated with the `Response` from the RAML file/string

**description**

`str` of the response description, or `None`.

**headers**

list of *Header* objects, or `None`.

**body**

list of *Body* objects, or `None`.

**method**

str of HTTP request method associated with response.

**class** ramlfications.parameters.**Documentation**

User documentation for the API.

**title**

str title of documentation

**content**

str content of documentation

**class** ramlfications.parameters.**SecurityScheme**

Security scheme definition.

**name**

str name of security scheme.

**raw**

dict of all raw data associated with the SecurityScheme from the RAML file/string

**type**

str of type of authentication

**described\_by**

*Header s, Response s, QueryParameter s*, etc. that is needed/can be expected when using security scheme.

**description**

str description of security scheme.

**settings**

dict of security schema-specific information

**class** ramlfications.parameters.**Content** (*data*)

Returns documentable content from the RAML file (e.g. Documentation content, description) in either raw or parsed form.

**Parameters** **data** (*str*) – The raw/marked up content data.

**raw**

Return raw Markdown/plain text written in the RAML file

**html**

Returns parsed Markdown into HTML

## Loader

**class** ramlfications.loader.**RAMLLoader**

Extends YAML loader to load RAML files with !include tags.

**load** (*raml*)

Loads the desired RAML file and returns data.

**Parameters** **raml** – Either a string/unicode path to RAML file, a file object, or string-representation of RAML.

**Returns** Data from RAML file

**Return type** dict

### Validate

Functions are used when instantiating the classes from `ramlfications.raml`.

`ramlfications.validate.root_version` (*inst, attr, value*)

Require an API Version (e.g. `api.foo.com/v1`).

`ramlfications.validate.root_base_uri` (*inst, attr, value*)

Require a Base URI.

`ramlfications.validate.root_base_uri_params` (*inst, attr, value*)

Require that Base URI parameters have a default parameter set.

`ramlfications.validate.root_uri_params` (*inst, attr, value*)

Assert that there is no `version` parameter in the regular URI parameters

`ramlfications.validate.root_protocols` (*inst, attr, value*)

Only support HTTP/S plus what is defined in user-config

`ramlfications.validate.root_title` (*inst, attr, value*)

Require a title for the defined API.

`ramlfications.validate.root_docs` (*inst, attr, value*)

Assert that if there is documentation defined in the root of the RAML file, that it contains a `title` and `content`.

`ramlfications.validate.root_media_type` (*inst, attr, value*)

Only support media types based on config and regex

`ramlfications.validate.assigned_traits` (*inst, attr, value*)

Assert assigned traits are defined in the RAML Root and correctly represented in the RAML.

`ramlfications.validate.assigned_res_type` (*inst, attr, value*)

Assert only one (or none) assigned resource type is defined in the RAML Root and correctly represented in the RAML.

`ramlfications.validate.header_type` (*inst, attr, value*)

Supported header type

`ramlfications.validate.body_mime_type` (*inst, attr, value*)

Supported MIME media type for request/response

`ramlfications.validate.body_schema` (*inst, attr, value*)

Assert no schema is defined if body as a form-related MIME media type

`ramlfications.validate.body_example` (*inst, attr, value*)

Assert no example is defined if body as a form-related MIME media type

`ramlfications.validate.body_form` (*inst, attr, value*)

Assert `formParameters` are defined if body has a form-related MIME type.

`ramlfications.validate.response_code` (*inst, attr, value*)

Assert a valid response code.

`ramlfications.validate.integer_number_type_parameter` (*inst, attr, value*)

Assert correct parameter attributes for `integer` or `number` primitive parameter types.

`ramlfications.validate.string_type_parameter` (*inst, attr, value*)

Assert correct parameter attributes for `string` primitive parameter types.

`ramlfications.validate.validate_mime_type` (*value*)

Assert a valid MIME media type for request/response body.



## Tree

`ramlfications.tree.tree` (*load\_obj*, *color*, *output*, *verbosity*, *validate*, *config*)  
Create a tree visualization of given RAML file.

### Parameters

- **load\_obj** (*dict*) – Loaded RAML File
- **color** (*str*) – `light`, `dark` or `None` (default) for the color output
- **output** (*str*) – Path to output file, if given
- **verbosity** (*str*) – Level of verbosity to print out

**Returns** ASCII Tree representation of API

**Return type** `stdout` to screen or given file name

### Raises

- **InvalidRootNodeError** – API metadata is invalid according to RAML [specification](#).
- **InvalidResourceNodeError** – API resource endpoint is invalid according to RAML [specification](#).
- **InvalidParameterError** – Named parameter is invalid according to RAML [specification](#).



---

## Project Information

---

### 4.1 Changelog

#### 4.1.1 0.1.5 (2015-06-05)

Fixed:

- Configuration parsing for validation/production. Thanks [vrajmohan](#)!
- Parsing of response bodies (fixes [Issue 12](#)). Thanks [Igor](#)!

#### 4.1.2 0.1.4 (2015-05-27)

Added:

- Support for recursive `!includes` in RAML files (0.1.3 would handle the error, now actually supports it. Thanks [Ben](#) for your [PR](#)!).

#### 4.1.3 0.1.3 (2015-05-14)

Added:

- New `#ramlfications` channel on [freenode](#) (web chat link)! Come chat, I'm lonely.
- Documentation for configuration and the `update` command.

Fixed:

- Handle recursive/cyclical `!includes` in RAML files for now ([PR](#))
- Encoding issues from upgrading to tox 2.0
- `tests/test_utils.py` would create `ramlfications/data/supported_mime_types.json`; now mocked out.

#### 4.1.4 0.1.2 (2015-04-21)

Fixed:

- `pypy 2.5.x` would fail a parser test because order of list was not expected

### 4.1.5 0.1.1 (2015-04-21)

New:

- Added ability to parse IANA-supported MIME media types
- Added `update` command for user to update IANA-supported MIME types if/when needed

### 4.1.6 0.1.0a1 (2015-04-18)

Initial alpha release of `ramlfications`!

## 4.2 License and Hall of Fame

`ramlfications` is licensed under the [Apache 2.0](#) license. The full license text can be also found in the [source code repository](#).

### 4.2.1 Credits

`ramlfications` is written and maintained by [Lynn Root](#) and thanks various contributors:

- [Hynek Schlawack](#)
- [Matt Montag](#)

## 4.3 How To Contribute

Every open source project lives from the generous help by contributors that sacrifice their time and `ramlfications` is no different.

To make participation as pleasant as possible, this project adheres to the [Code of Conduct](#) by the Python Software Foundation.

Here are a few hints and rules to get you started:

- Take a look at the `wishlist` for inspiration.
- Any GitHub issue that is not assigned is up for grabs.
- Add yourself to the `AUTHORS.rst` file in an alphabetical fashion. Every contribution is valuable and shall be credited.
- If your change is noteworthy, add an entry to the `changelog`.
- No contribution is too small; please submit as many fixes for typos and grammar bloopers as you can!
- *Always* add tests and docs for your code. This is a hard rule; patches with missing tests or documentation won't be merged – if a feature is not tested or documented, it doesn't exist.
- Obey [PEP 8](#) and [PEP 257](#).
- Write [good commit messages](#).

**Note:** If you have something great but aren't sure whether it adheres – or even can adhere – to the rules above: **please submit a pull request anyway!**

In the best case, we can mold it into something, in the worst case the pull request gets politely closed. There's absolutely nothing to fear.

---

Thank you for considering to contribute to `ramlfications`!



---

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-C <light|dark>, -color <light|dark>  
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-c PATH, -config PATH  
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-o FILENAME, -output FILENAME  
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