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# **Pacifica Policy Documentation**

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**Mar 12, 2019**



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The Pacifica Policy service provides endpoints that define policy questions for institutions. This is separate from other services as certain operations required by other Pacifica Core services are more Policy base.

Practially speaking, when the question a Pacifica service wants to ask the Metadata service is sufficiently complex it should really be a Policy question. For example, when uploading data the ingest service needs to validate the metadata requesting to be added. This new metadata needs to be verified by some institutional requirements. So there is a Policy endpoint (several actually) that help ensure those requirements are met.



The Pacifica software is available through PyPi so creating a virtual environment to install is what is shown below. Please keep in mind compatibility with the Pacifica Core services.

### 1.1 Installation in Virtual Environment

These installation instructions are intended to work on both Windows, Linux, and Mac platforms. Please keep that in mind when following the instructions.

Please install the appropriate tested version of Python for maximum chance of success.

#### 1.1.1 Linux and Mac Installation

```
mkdir ~/.virtualenvs
python -m virtualenv ~/.virtualenvs/pacifica
. ~/.virtualenvs/pacifica/bin/activate
pip install pacifica-policy
```

#### 1.1.2 Windows Installation

This is done using PowerShell. Please do not use Batch Command.

```
mkdir "$Env:LOCALAPPDATA\virtualenvs"
python.exe -m virtualenv "$Env:LOCALAPPDATA\virtualenvs\pacifica"
& "$Env:LOCALAPPDATA\virtualenvs\pacifica\Scripts\activate.ps1"
pip install pacifica-policy
```





The Pacifica Core services require two configuration files. The REST API utilizes [CherryPy](#) and review of their [configuration documentation](#) is recommended. The service configuration file is a INI formatted file containing configuration for database connections.

### 2.1 CherryPy Configuration File

An example of Policy server CherryPy configuration:

```
[global]
log.screen: True
log.access_file: 'access.log'
log.error_file: 'error.log'
server.socket_host: '0.0.0.0'
server.socket_port: 8181

[/]
request.dispatch: cherrypy.dispatch.MethodDispatcher()
tools.response_headers.on: True
tools.response_headers.headers: [('Content-Type', 'application/json')]
```

### 2.2 Service Configuration File

The service configuration is an INI file and an example is as follows:

```
[policy]
; This section has policy service specific config options

; Internal URL format for transactions not released or have DOIs
internal_url_format = https://internal.example.com/{transaction}
```

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```
; Release URL format for transactions released but no DOI
release_url_format = https://release.example.com/{transaction}

; DOI URL format for transactions with a DOI
doi_url_format = https://dx.doi.org/{doi}

; In memory object cache size (used in data release)
cache_size = 10000

; This sets the admin group name
admin_group = admin

; This sets the admin group id (should match group name in metadata)
admin_group_id = 0

; This sets the admin user id (should match user name in metadata)
admin_user_id = 0

[metadata]
; This section contains configuration for metadata service

; The global metadata url
endpoint_url = http://localhost:8121

; The endpoint to check for status of metadata service
status_url = http://localhost:8121/groups

[elasticsearch]
; This section describes configuration to contact elasticsearch

; URL to the elasticsearch server
url = http://127.0.0.1:9200

; URL to the elasticsearch server
index = pacifica_search
```

## 2.3 Starting the Service

Starting the Policy service can be done by two methods. However, understanding the requirements and how they apply to REST services is important to address as well. Using the internal CherryPy server to start the service is recommended for Windows platforms. For Linux/Mac platforms it is recommended to deploy the service with uWSGI.

### 2.3.1 Deployment Considerations

The Policy server can have the same memory consumption issues as the Metadata service. Please consider those recommendations [here](#) similarly for the Policy service.

### 2.3.2 CherryPy Server

To make running the Policy service using the CherryPy's builtin server easier we have a command line entry point.

```
$ pacifica-policy --help
usage: pacifica-policy [-h] [-c CONFIG] [-p PORT] [-a ADDRESS]

Run the policy server.

optional arguments:
  -h, --help            show this help message and exit
  -c CONFIG, --config CONFIG
                        cherrypy config file
  -p PORT, --port PORT  port to listen on
  -a ADDRESS, --address ADDRESS
                        address to listen on

$ pacifica-policy
[09/Jan/2019:09:17:26] ENGINE Listening for SIGTERM.
[09/Jan/2019:09:17:26] ENGINE Bus STARTING
[09/Jan/2019:09:17:26] ENGINE Set handler for console events.
[09/Jan/2019:09:17:26] ENGINE Started monitor thread 'Autoreloader'.
[09/Jan/2019:09:17:26] ENGINE Serving on http://0.0.0.0:8181
[09/Jan/2019:09:17:26] ENGINE Bus STARTED
```

### 2.3.3 uWSGI Server

To make running the Policy service using uWSGI easier we have a module to be included as part of the uWSGI configuration. uWSGI is very configurable and can use this module many different ways. Please consult the [uWSGI Configuration](#) documentation for more complicated deployments.

```
$ pip install uwsgi
$ uwsgi --http-socket :8181 --master --module pacifica.policy.wsgi
```



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## Example Usage

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The usage of the Policy API is strictly a read-only interface. The command line usage of the system provides tools to update data in the metadata API and are mostly cronjob like processes.

### 3.1 The API

The policy server is split up into endpoints named for their Pacifica project that utilizes them. So the path `/uploader` is used by the Pacifica Uploader (<http://github.com/pacifica/pacifica-uploader>) to control its behavior. The idea is that workflow implemented by the various Pacifica projects has some element of site or instance specific policy that can be applied to the running service. The policy is driven by the metadata and thus this project should talk to the metadata service.

#### 3.1.1 Events API

The Events API is used by the [Notifications](#) service. The role of this query is to verify the event recieved by the Notifications services is allowed to be sent to the user on the URL path.

Request Example:

```
POST /events/dmlb2001
Content-Type: application/json
{
  "data": [
    ...
  ]
}
```

Good Response Example:

```
Http-Code: 200
{
```

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```
"status": "success"
}
```

Failed Response Example:

```
Http-Code: 401
{
  "error": "...
}
```

The underlying logic for this implementation is the same as the ingest endpoint discussed next.

### 3.1.2 Ingest API

The Ingest API is used by the [Ingest](#) service. This endpoint verifies the relationships between user, project and instrument before allowing an upload. The content of the body document is defined by the [uploader](#).

Request Example:

```
POST /ingest
Content-Type: application/json
[
  ...
]
```

Good Response Example:

```
Http-Code: 200
{
  "status": "success"
}
```

Failed Response Example:

```
Http-Code: 401
{
  "error": "...
}
```

### 3.1.3 Reporting and Status API

This document is not going into details about these APIs currently. These endpoints are supposed to be used by tools that provide status of current uploads to users of Pacifica as well as institutional reporting tools that aggregate metrics about uploads in Pacifica. Eventually, Pacifica should have a basic set of these websites to allow users to use these endpoints but not currently.

### 3.1.4 Uploader API

The Uploader API is a simple query interface to get complex metadata interactively while users are using the Uploader. This API has a JSON document that looks very SQL like but is not complete.

Request Example:

```

POST /uploader
Content-Type: application/json
{
  "user": 100,
  "from": "instruments",
  "columns": [
    "_id",
    "name"
  ],
  "where": {
    "_id": 54
  }
}

```

#### Good Response Example:

```

Http-Code: 200
[
  {
    "_id": 54,
    "name": "NMR PROBES: Nittany Liquid"
  }
]

```

#### Failed Response Example:

```

Http-Code: 500

```

## 3.2 Admin Command Line

There is a single admin command line tool (`pacifica-policy-cmd`) with two subcommands, `data_release` and `searchsync`. The `data_release` subcommand handles setting the `data_release` attributes of the Projects and Transactions. The `searchsync` subcommand handles formatting and synchronizing metadata to [ElasticSearch](#).

```

$ pacifica-policy-cmd --help
usage: pacifica-policy-cmd [-h] [--verbose] {data_release,searchsync} ...

positional arguments:
  {data_release,searchsync}
                        sub-command help
  data_release          data_release help
  searchsync           searchsync help

optional arguments:
  -h, --help            show this help message and exit
  --verbose             enable verbose debug output

```

### 3.2.1 Data Release

The data release process involves two phases, updating the suspense date and setting data release. The suspense date is a date that the metadata and data associated with that object in metadata will be released in the future. The data release phase checks the suspense date with now to determine if the object needs to have it released.

```
$ pacifica-policy-cmd data_release --help
usage: pacifica-policy-cmd data_release [-h]
                                     [--exclude [EXCLUDE [EXCLUDE ...]]]
                                     [--keyword KEYWORD]
                                     [--time-after TIME_AFTER]
                                     [--time-ago TIME_AGO]

data release by policy

optional arguments:
  -h, --help            show this help message and exit
  --exclude [EXCLUDE [EXCLUDE ...]]
                        id of keyword prefix to exclude.
  --keyword KEYWORD     keyword one of projects.actual_end_date,
                        projects.actual_start_date, projects.submitted_date,
                        projects.accepted_date, projects.closed_date,
                        transactions.created, transactions.updated.
  --time-after TIME_AFTER
                        set suspense date on data to X days after keyword.
  --time-ago TIME_AGO   only objects updated after X days ago.
```

### 3.2.2 Search Sync

The search synchronization to Elasticsearch is driven by the Policy service. The metadata in Elasticsearch is meant to be consumed by client applications and in order to be performant those clients should communicate directly with Elasticsearch. This does mean that the metadata in Elasticsearch is not as current as the Metadata API.

```
$ pacifica-policy-cmd searchsync
usage: pacifica-policy-cmd searchsync [-h] [--objects-per-page ITEMS_PER_PAGE]
                                     [--threads THREADS]
                                     [--time-ago TIME_AGO]

sync sql data to elastic for search

optional arguments:
  -h, --help            show this help message and exit
  --objects-per-page ITEMS_PER_PAGE
                        objects per bulk upload.
  --threads THREADS     number of threads to sync data
  --time-ago TIME_AGO   only objects newer than X days ago.
```



## 4.1 Events Python Module

Events module to drive policy for who can see events.

Events rest module for the cherrypy endpoint.

```
class pacifica.policy.events.rest.EventsPolicy
    CherryPy Events Policy.
```

This exposes whether a user can see an event from.

**POST** (*username*)

Pull the json content and validate the user can see the event.

## 4.2 Ingest Python Module

Ingest valication module.

The CherryPy rest object for the structure.

Below is an example post body:

```
[
  {"destinationTable": "Transactions._id", "value": 1234},
  {"destinationTable": "Transactions.submitter", "value": 34002},
  {"destinationTable": "Transactions.project", "value": "34002"},
  {"destinationTable": "Transactions.instrument", "value": 34002},
  {"destinationTable": "TransactionKeyValue", "key": "Tag", "value": "Blah"},
  {"destinationTable": "TransactionKeyValue", "key": "Taggy", "value": "Blah"},
  {"destinationTable": "TransactionKeyValue", "key": "Taggier", "value": "Blah"}
  {
    "destinationTable": "Files",
    "_id": 34, "name": "foo.txt", "subdir": "a/b/",
```

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```

    "ctime": "Tue Nov 29 14:09:05 PST 2016",
    "mtime": "Tue Nov 29 14:09:05 PST 2016",
    "size": 128, "mimetype": "text/plain"
  },
  {
    "destinationTable": "Files",
    "_id": 35, "name": "bar.txt", "subdir": "a/b/",
    "ctime": "Tue Nov 29 14:09:05 PST 2016",
    "mtime": "Tue Nov 29 14:09:05 PST 2016",
    "size": 47, "mimetype": "text/plain"
  },
]

```

**class** pacifica.policy.ingest.rest.**IngestPolicy**  
CherryPy Ingest Policy Class.

**POST** ()

Read in the json query and return results.

**static** **\_pull\_data\_by\_rec** (*query, table*)

Pull the value for the table.

**\_valid\_query** (*query*)

Validate the metadata format.

## 4.3 Reporting Python Module

CherryPy Uploader Policy object class.

CherryPy Uploader Policy object class.

CherryPy Status Metadata projectinfo base class.

**class** pacifica.policy.reporting.transaction.query\_base.**QueryBase**  
Formats summary data for other classes down the tree.

**\_\_weakref\_\_**

list of weak references to the object (if defined)

**static** **\_merge\_two\_dicts** (*dict\_a, dict\_b*)

Given two dicts, merge them into a new dict as a shallow copy.

**static** **get\_full\_user\_info** (*user\_id*)

Return user information for the given user\_id.

CherryPy Status Metadata object class.

**class** pacifica.policy.reporting.transaction.transaction\_details.**TransactionDetails**  
Retrieves a list of all transactions matching the search criteria.

**static** **POST** (*user\_id=None*)

CherryPy GET method.

CherryPy Status Metadata object class.

**class** pacifica.policy.reporting.transaction.transaction\_summary.**TransactionSummary**  
Retrieves a summary of all transactions matching the search criteria.

**static POST** (*time\_basis=None, object\_type=None, start\_date=None, end\_date=None, \*\*kwargs*)  
CherryPy GET method.

The CherryPy rest object for the structure.

**class** `pacifica.policy.reporting.rest.ReportingPolicy`  
CherryPy root object class.

not exposed by default the base objects are exposed.

**\_\_init\_\_** ()  
Create local objects to allow for import to work.

**\_\_weakref\_\_**  
list of weak references to the object (if defined)

## 4.4 Status Python Module

CherryPy Uploader Policy object class.

Base class module for standard queries for the upload status tool.

**class** `pacifica.policy.status.base.QueryBase`  
This pulls the common bits of instrument and project query into a single class.

CherryPy Status Policy object class.

**class** `pacifica.policy.status.instrument_query.InstrumentQuery`  
CherryPy root object class.

**\_\_init\_\_** ()  
Create local objects for sub tree items.

**\_\_weakref\_\_**  
list of weak references to the object (if defined)

CherryPy Status Policy object class.

**class** `pacifica.policy.status.project_query.ProjectQuery`  
CherryPy root object class.

**\_\_init\_\_** ()  
Create local objects for sub tree items.

**\_\_weakref\_\_**  
list of weak references to the object (if defined)

The CherryPy rest object for the structure.

**class** `pacifica.policy.status.rest.StatusPolicy`  
CherryPy root object class.

not exposed by default the base objects are exposed.

**\_\_init\_\_** ()  
Create local objects to allow for import to work.

**\_\_weakref\_\_**  
list of weak references to the object (if defined)

CherryPy Status Policy object class.

**class** `pacifica.policy.status.transaction_query.TransactionQuery`  
CherryPy root object class.

**\_\_init\_\_** ()  
Create local objects for sub tree items.

**\_\_weakref\_\_**  
list of weak references to the object (if defined)

CherryPy Status Policy object class.

**class** `pacifica.policy.status.user_query.UserQuery`  
CherryPy root object class.

**\_\_init\_\_** ()  
Create local objects for sub tree items.

**\_\_weakref\_\_**  
list of weak references to the object (if defined)

CherryPy Project Policy object classes.

CherryPy Status Policy object class.

**class** `pacifica.policy.status.instrument.by_project_id.InstrumentsByProject`  
Retrieves instrument list for a given project.

**static GET** (*project\_id=None*)  
CherryPy GET method.

**static \_get\_instruments\_for\_project** (*project\_id*)  
Return a list with all the instruments belonging to this project.

CherryPy Status Policy object class.

**class** `pacifica.policy.status.instrument.search.InstrumentKeywordSearch`  
Retrieves a set of projects for a given keyword set.

**GET** (*search\_terms=""*, *\*\*kwargs*)  
CherryPy GET method.

**\_clean\_up\_instrument\_list** (*inst\_response*, *user\_id*)  
Clear out entries that done belong to this user.

**\_get\_instruments\_for\_keywords** (*user\_id*, *search\_terms=""*)  
Return a list with all the instruments having this term.

**static \_squash\_output\_list** (*inst\_for\_user\_list*, *full\_inst\_list*)  
Filter entries in the full instrument list.

CherryPy Project Policy object classes.

CherryPy Status Policy object class.

**class** `pacifica.policy.status.project.by_user.ProjectUserSearch`  
Retrieves project list for a given user.

**static GET** (*user\_id=None*)  
CherryPy GET method.

**static \_get\_projects\_for\_user** (*user\_id=None*)  
Return a list with all the projects involving this user.

CherryPy Status Policy object class.

**class** pacifica.policy.status.project.lookup.**ProjectLookup**

Retrieves details of a given project.

**static GET** (*project\_id=None*)

CherryPy GET method.

**\_\_weakref\_\_**

list of weak references to the object (if defined)

**static \_get\_projects\_details** (*project\_id=None*)

Return a details about this project.

CherryPy Status Policy object class.

**class** pacifica.policy.status.project.search.**ProjectKeywordSearch**

Retrieves a set of projects for a given keyword set.

**GET** (*search\_terms=None, \*\*kwargs*)

CherryPy GET method.

**\_get\_projects\_for\_keywords** (*user\_id, search\_terms=None*)

Return a list with all the projects involving this user.

CherryPy Uploader Policy object class.

CherryPy Status Policy object class.

**class** pacifica.policy.status.transaction.files.**FileLookup**

Retrieves files for a given transaction\_id.

**static GET** (*transaction\_id=None*)

CherryPy GET method.

**\_\_weakref\_\_**

list of weak references to the object (if defined)

**static \_get\_file\_list** (*transaction\_id=None*)

Return files for the specified transaction entry.

CherryPy Status Policy object class.

**class** pacifica.policy.status.transaction.lookup.**TransactionLookup**

Retrieves details of a given project.

**static GET** (*transaction\_id=None*)

CherryPy GET method.

**\_\_weakref\_\_**

list of weak references to the object (if defined)

**static \_get\_transaction\_details** (*transaction\_id=None*)

Return details for the specified transaction entry.

CherryPy Status Policy object class.

**class** pacifica.policy.status.transaction.search.**TransactionSearch**

Retrieves a set of transactions for a given keyword set.

**static GET** (*option=None, \*\*kwargs*)

CherryPy GET method.

**\_\_weakref\_\_**

list of weak references to the object (if defined)

**static** `_get_transactions_for_keywords` (*kwargs*, *option=None*)  
Return a list with all the projects involving this user.

CherryPy Uploader Policy object class.

CherryPy Status Policy object class.

**class** `pacifica.policy.status.user.lookup.UserLookup`  
Retrieves info for the specified user.

**static** `GET` (*user\_id=None*)  
CherryPy GET method.

`__weakref__`  
list of weak references to the object (if defined)

**static** `_get_user_info` (*user\_id*)  
Return detailed info about a given user.

CherryPy Status Policy object class.

**class** `pacifica.policy.status.user.search.UserSearch`  
Retrieves a set of projects for a given keyword set.

`GET` (*search\_terms=None*, *option=None*, *\*\*kwargs*)  
CherryPy GET method.

**static** `_get_users_for_keywords` (*kwargs*, *search\_terms=None*, *option=None*)  
Return a list with all the projects involving this user.

## 4.5 Uploader Python Module

CherryPy Uploader Policy object class.

The CherryPy rest object for the structure.

**class** `pacifica.policy.uploader.rest.UploaderPolicy`  
CherryPy root object class.

not exposed by default the base objects are exposed

`POST` ()  
Read in the json query and return results.

**static** `_clean_user_query_id` (*query*)  
determine the *user\_id* for whatever is in the query.

## 4.6 Admin Python Module

The Admin module has logic about checking for admin group info.

**class** `pacifica.policy.admin.AdminPolicy`  
Enforces the admin policy.

Base class for checking for admin group membership or not.

`__init__` ()  
Constructor for Uploader Policy.

**`__weakref__`**

list of weak references to the object (if defined)

**`_format_url`** (*url*, *\*\*get\_args*)

Append the `recursion_depth` parameter to the url.

## 4.7 Admin Command Python Module

This is the admin main method.

`pacifica.policy.admin_cmd.create_subcommands` (*subparsers*)

Create the subcommands from the subparsers.

`pacifica.policy.admin_cmd.datarel_options` (*datarel\_parser*)

Add data release options to the parser.

`pacifica.policy.admin_cmd.main` (*\*argv*)

Main method for admin command line tool.

`pacifica.policy.admin_cmd.objstr_to_keyword` (*obj\_str*)

Verify the *obj\_str* is a valid keyword.

`pacifica.policy.admin_cmd.objstr_to_timedelta` (*obj\_str*)

Turn an object string of the format X unit ago into timedelta.

`pacifica.policy.admin_cmd.searchsync_options` (*searchsync\_parser*)

Add the searchsync command line options.

## 4.8 Config Python Module

Configuration reading and validation module.

`pacifica.policy.config.get_config` ()

Return the ConfigParser object with defaults set.

Currently metadata API doesn't work with SQLite the queries are too complex and it only is supported with MySQL and PostgreSQL.

## 4.9 Data Release Python Module

Data release policy for command line tools.

`pacifica.policy.data_release.collate_objs_from_key` (*resp*, *objs*, *date\_key*)

Deduplicate objs and make sure they have dates.

`pacifica.policy.data_release.data_release` (*args*)

Data release main subcommand.

The logic is to query updated objects between now and `args.time_ago`. If the objects `args.keyword` is set to something calculate the suspense date as `args.time_after` the keyword date. Then save the object back to the metadata server.

The follow on task is to use `orm_obj` to calculate the released data based on the set suspense dates and add that released data to the `transaction_release` table.

`pacifica.policy.data_release.relavent_data_release_objs` (*time\_ago*, *orm\_obj*, *exclude\_list*)

Query projects or transactions that has gone past their suspense date.

`pacifica.policy.data_release.relavent_suspense_date_objs` (*time\_ago*, *orm\_obj*, *date\_key*)

generate a list of relavent orm\_objs saving date\_key.

`pacifica.policy.data_release.update_data_release` (*objs*)

Add objs transactions to the released transactions table.

`pacifica.policy.data_release.update_suspense_date_objs` (*objs*, *time\_after*, *orm\_obj*)

update the list of objs given date\_key adding time\_after.

## 4.10 Globals Python Module

Global static variables.

## 4.11 Root Rest Python Module

CherryPy root object class.

**class** `pacifica.policy.root.Root`

CherryPy root object class.

not exposed by default the base objects are exposed

`__init__` ()

Create the local objects we need.

`__weakref__`

list of weak references to the object (if defined)

**classmethod** `try_meta_connect` (*attempts=0*)

Try to connect to the metadata service see if its there.

`pacifica.policy.root.error_page_default` (\*\**kwargs*)

The default error page should always enforce json.

## 4.12 Search Render Python Module

This is the render object for the search interface.

**class** `pacifica.policy.search_render.LimitedSizeDict` (*\*args*, \*\**kwds*)

Limited caching dictionary.

`__getitem__` (*key*)

Get the item and put it back so it's on top.

`__init__` (*\*args*, \*\**kwds*)

Constructor for caching dictionary.

`__setitem__` (*key*, *value*)

Set item foo[key] = value.



**`_check_size_limit()`**

Function to set the item and remove old ones.

**class** `pacifica.policy.search_render.SearchRender`

Search render class to contain methods.

**`__weakref__`**

list of weak references to the object (if defined)

**classmethod** `generate(obj_cls, objs, trans_ids=False, render_release=False)`

generate the institution object.

**classmethod** `get_groups_from_instrument(inst_id)`

Get the list of groups from an instrument.

**classmethod** `get_institutions_from_user(user_id)`

Get an institution list based on user id.

**classmethod** `get_obj_by_id(obj, obj_id)`

Get the user from metadata and put it in cache.

**classmethod** `get_proj_release(proj_id)`

Get the project release from transactions on that proj.

**classmethod** `get_trans_doi(trans_id)`

Get the transaction doi and return false or doi.

**classmethod** `get_trans_kvp(trans_id)`

Get the transaction key value pairs.

**classmethod** `get_trans_release(trans_id)`

Get the transaction release and return true/false.

**classmethod** `get_transactions_from_groups(group_id)`

Get a list of instruments for a group.

**classmethod** `get_transactions_from_institutions(inst_id)`

Get a list of transactions from an institution.

**classmethod** `get_transactions_from_instruments(inst_id)`

Get a list of transactions for a instrument.

**classmethod** `get_transactions_from_projects(proj_id)`

Get a list of transactions for a project.

**classmethod** `get_transactions_from_science_theme(science_theme)`

Get a list of transactions for a science theme.

**classmethod** `get_transactions_from_users(user_id)`

Get a list of transactions for a user.

**classmethod** `get_user_release(user_id)`

Get the user release from transactions on that proj.

**classmethod** `merge_get_args(get_args)`

Change a hash of get args and global get args into string for url.

**classmethod** `render(obj_cls, obj, trans_ids=False, render_release=False)`

Render the instrument object hash.

**classmethod** `render_science_theme(obj, trans_ids=False)`

Render the science theme as an object...

`pacifica.policy.search_render.proj_release (obj)`  
Render the transaction release attribute.

`pacifica.policy.search_render.trans_access_url (trans_obj)`  
Figure out the access url for the transaction.

`pacifica.policy.search_render.trans_has_doi (trans_obj)`  
Return true if the transaction has a doi otherwise false.

`pacifica.policy.search_render.trans_inst_groups (trans_obj)`  
Render the instrument groups for a transaction.

`pacifica.policy.search_render.trans_institutions (trans_obj)`  
Render the institutions for a transaction.

`pacifica.policy.search_render.trans_instruments (trans_obj)`  
Render the instruments for a transaction.

`pacifica.policy.search_render.trans_kvp (trans_obj)`  
Generate a list of key value pairs for transaction.

`pacifica.policy.search_render.trans_projects (trans_obj)`  
Render the projects for a transaction.

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Render the transaction release attribute.

`pacifica.policy.search_render.trans_science_themes (trans_obj)`  
Render the science theme from a project.

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Render the users list for transactions.

`pacifica.policy.search_render.transsip_transsap_render (trans_obj, render_func, obj_cls, trans_key)`  
Wrapper method to handle transaction relationships.

`pacifica.policy.search_render.user_release (obj)`  
Render the transaction release attribute.

## 4.13 Search Sync Python Module

Sync the database to elasticsearch index for use by Searching tools.

`pacifica.policy.search_sync.create_worker_threads (threads, work_queue)`  
Create the worker threads and return the list.

`pacifica.policy.search_sync.es_client ()`  
Get the elasticsearch client object.

`pacifica.policy.search_sync.generate_work (items_per_page, work_queue, time_ago)`  
Generate the work from the db and send it to the work queue.

`pacifica.policy.search_sync.search_sync (args)`  
Main search sync subcommand.

`pacifica.policy.search_sync.start_work (work_queue)`  
The main thread for the work.

`pacifica.policy.search_sync.try_doing_work (cli, job)`  
Try doing some work even if you fail.

`pacifica.policy.search_sync.try_es_connect` (*attempts=0*)  
Recursively try to connect to elasticsearch.

`pacifica.policy.search_sync.yield_data` (*obj, time\_field, page, items\_per\_page, time\_delta*)  
yield objects from obj for bulk ingest.

## 4.14 Validation Python Module

Validation methods for various objects.

`pacifica.policy.validation._get_check_id` (*index, \*args, \*\*kwargs*)  
Return the check ID in args or kwargs.

`pacifica.policy.validation.validate_project` (*index=0*)  
Validate the project id.

`pacifica.policy.validation.validate_transaction` (*index=0*)  
Validate the transaction id.

`pacifica.policy.validation.validate_universal` (*index, regex*)  
Decorator generator to validate project field.

`pacifica.policy.validation.validate_user` (*index=0*)  
Validate the user id.

## 4.15 WSGI Python Module

This is the main policy server script. This is the policy module.



## CHAPTER 5

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