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# PyQueue Documentation

*Release 0.5.1*

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**Sep 01, 2017**



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The *pyqueue* package makes it easy to view and control Postfix mails queue. It provide several classes to store, view and interact with mail queue using Postfix command line tools. This module is provided for automation and monitoring.

The *pyqueue* package defines the following attribute:

`pyqueue.DEBUG = False`

Boolean to control activation of the `debug()` decorator.

The *pyqueue* package defines the following decorators:

`pyqueue.debug(function)`

Decorator to print some call informations and timing debug on stderr.

Function's name, passed args and kwargs are printed to stderr. Elapsed time is also print at the end of call. This decorator is based on the value of `DEBUG`. If `True`, the debug informations will be displayed.

The *pyqueue* package provides the following submodules:



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## pyqueue.store – Mails queue storage objects

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The `store` module provide several objects to convert mails queue content into python structures.

### PostqueueStore Objects

**class** `pyqueue.store.PostqueueStore`

Postfix mails queue informations storage.

The `PostqueueStore` provides methods to load Postfix queued mails informations into Python structures. Thoses structures are based on `Mail` and `MailHeaders` classes which can be processed by a `MailSelector` instance.

The `PostqueueStore` class defines the following attributes:

**mails**

Loaded `Mail` objects `list()`.

**loaded\_at**

`datetime.datetime` instance to store load date and time informations, useful for datas deprecation tracking. Updated on `load()` call with `datetime.datetime.now()` method.

**postqueue\_cmd**

`list()` object to store Postfix command and arguments to view the mails queue content. Default is `["/usr/sbin/postqueue", "-p"]`.

**spool\_path**

Postfix spool path string. Default is `"/var/spool/postfix"`.

**postqueue\_mailstatus**

Postfix known queued mail status list. Default is `['active', 'deferred', 'hold']`.

**mail\_id\_re**

Python compiled regular expression object (`re.RegexObject`) provided by `re.compile()` method to match postfix IDs. Recognized IDs are hexadecimals, may

be 10 to 12 chars length and followed with \* or !. Default used regular expression is:  
`r"^[A-F0-9]{10,12}[*!]?$"`.

#### **mail\_addr\_re**

Python compiled regular expression object (`re.RegexObject`) provided by `re.compile()` method to match email addresses. Default used regular expression is:  
`r"^[A-Za-z0-9._%+-]+@[A-Za-z0-9.-]+\.[A-Za-z]+$"`

#### **See also:**

**Python modules:** `datetime` – Basic date and time types

`re` – Regular expression operations

**Postfix manual:** `postqueue` – Postfix queue control

**RFC 3696** – Checking and Transformation of Names

The `PostqueueStore` instance provides the following methods:

`PostqueueStore.load([method])`

Load content from postfix mails queue.

Mails are loaded using `postqueue` command line tool or reading directly from spool. The optionnal argument, if present, is a method string and specifies the method used to gather mails informations. By default, method is set to `"postqueue"` and the standard Postfix queue control tool: `postqueue` is used.

**Parameters** `method` (`str`) – Method used to load mails from Postfix queue

Provided method `str()` name is directly used with `getattr()` to find a `self.load_from_<method>` method.

`PostqueueStore._load_from_postqueue()`

Load content from postfix queue using `postqueue` command output.

Output lines from `_get_postqueue_output` are parsed to build `Mail` objects. Sample Postfix queue control tool (`postqueue`) output:

```
C0004979687      4769 Tue Apr 29 06:35:05 sender@domain.com
(error message from mx.remote1.org with parenthesis)
                first.rcpt@remote1.org
(error message from mx.remote2.org with parenthesis)
                second.rcpt@remote2.org
                third.rcpt@remote2.org
```

Parsing rules are pretty simple:

- Line starts with a valid `Mail.qid`: create new `Mail` object with `qid`, `size`, `date` and `sender` informations from line.

Queue ID	Size	Reception date and time				Sender
C0004979687	4769	Tue	Apr	29	06:35:05	user@domain.com

- Line starts with a parenthesis: store error messages to last created `Mail` object's `errors` attribute.
- Any other matches: add new recipient to the `recipients` attribute of the last created `Mail` object.

`PostqueueStore._load_from_spool()`

Load content from postfix queue using files from spool.

Mails are loaded using the command defined in `postqueue_cmd` attribute. Some informations may be missing using the `_load_from_spool()` method, including at least `Mail.status` field.



Loaded mails are stored as `Mail` objects in `mails` attribute.

**Warning:** Be aware that parsing mails on disk is slow and can lead to high load usage on system with large mails queue.

`PostqueueStore._get_postqueue_output()`

Get Postfix postqueue command output.

This method used the postfix command defined in `postqueue_cmd` attribute to view the mails queue content.

Command defined in `postqueue_cmd` attribute is runned using a `subprocess.Popen` instance. Output headers (1 line) and footers (2 lines) are excluded from result.

**Returns** Command's output lines without headers and footers.

**Return type** `list()`

**See also:**

**Python module:** `subprocess` – Subprocess management

`PostqueueStore._is_mail_id(mail_id)`

Check `mail_id` for a valid postfix queued mail ID.

Validation is made using a `re.RegexObject` stored in the `mail_id_re` attribute of the `PostqueueStore` instance.

**Parameters** `mail_id(str)` – Mail Postfix queue ID string

**Returns** True or false

**Return type** `bool()`

## Mail Objects

`class pyqueue.store.Mail(mail_id[, size[, date[, sender]]])`

Simple object to manipulate email messages.

This class provides the necessary methods to load and inspect mails content. This object functionalities are mainly based on `email` module's provided class and methods. However, `email.message.Message` instance's stored informations are extracted to extend `Mail` instances attributes.

Initialization of `Mail` instances are made the following way:

### Parameters

- **mail\_id** (`str`) – Mail's queue ID string
- **size** (`int`) – Mail size in Bytes (Default: 0)
- **date** (`datetime.datetime`) – Acceptance date and time in mails queue. (Default: `None`)
- **sender** (`str`) – Mail sender string as seen in mails queue. (Default: `empty str()`)

The `Mail` class defines the following attributes:

### `qid`

Mail Postfix queue ID string, validated by `_is_mail_id()` method.

**size**  
Mail size in bytes. Expected type is `int()`.

**parsed**  
`bool()` value to track if mail's content has been loaded from corresponding spool file.

**parse\_error**  
Last encountered parse error message `str()`.

**date**  
`datetime` object of acceptance date and time in mails queue.

**status**  
Mail's queue status `str()`.

**sender**  
Mail's sender `str()` as seen in mails queue.

**recipients**  
Recipients `list()` as seen in mails queue.

**errors**  
Mail deliver errors `list()` as seen in mails queue.

**head**  
Mail's headers *MailHeaders* structure.

**postcat\_cmd**  
Postfix command and arguments `list()` for mails content parsing. Default command and arguments list is build at initialization with: `["postcat", "-qv", self.qid]`

The Mail instance provides the following methods:

**Mail.parse()**  
Parse message content.

This method use Postfix mails content parsing command defined in *postcat\_cmd* attribute. This command is runned using *subprocess.Popen* instance.

Parsed headers become attributes and are retrieved with help of *message\_from\_string()* function provided by the *email* module.

**See also:**

**Postfix manual:** *postcat* – Show Postfix queue file contents

**Mail.dump()**  
Dump mail's gathered informations to a *dict* object.

Mails informations are splitted in two parts in dictionary. *postqueue* key regroups every informations directly gathered from Postfix queue, while *headers* regroups *MailHeaders* attributes converted from mail content with the *parse()* method.

If mail has not been parsed with the *parse()* method, informations under the *headers* key will be empty.

**Returns** Mail gathered informations

**Return type** *dict*

## MailHeaders Objects

**class** `store.MailHeaders`

Simple object to store mail headers.

Object's attributes are dynamically created while parent `Mail` object's method `parse()` is called. Those attributes are retrieved with help of `message_from_string()` method provided by the `email` module.

Standard RFC 822-style mail headers becomes attributes including but not limited to:

- Received*
- From*
- To*
- Cc*
- Bcc*
- Sender*
- Reply-To*
- Subject*

Case is kept while creating attribute and access will be made with `Mail.From` or `Mail.Received` for example. All those attributes will return *list* of values.

**See also:**

**Python modules:** `email` – An email and MIME handling package

`email.message.Message` – Representing an email message

**RFC 822** – Standard for ARPA Internet Text Messages



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## pyqueue.selector – Mails queue filtering

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The `selector` module mainly provide a selector class to interact with structures from the `store` module.

### MailSelector Objects

**class** `selector.MailSelector` (*store*)

Mail selector class to request mails from store matching criterias.

The *MailSelector* instance provides the following attributes:

**mails**

Currently selected Mail objects list ()

**store**

Linked PostqueueStore at the *MailSelector* instance initialization.

**filters**

Applied filters list () on current selection. Filters list entries are tuples containing (function.\_\_name\_\_, args, kwargs) for each applied filters. This list is filled by the *filter\_registration()* decorator while calling filtering methods. It is possible to replay registered filter using *replay\_filters()* method.

The *MailSelector* instance provides the following methods:

`MailSelector.filter_registration` (*function*)

Decorator to register applied filter.

This decorated is used to wrap selection methods `lookup_*`. It registers a (function.func\_name, args, kwargs) tuple () in the *filters* attribute.

`MailSelector.reset` ()

Reset mail selector with initial store mails list.

Selected Mail objects are deleted and the *mails* attribute is removed for memory releasing purpose (with help of `gc.collect()`). Attribute *mails* is then reinitialized a copy of *store's mails* attribute.

Registered *filters* are also emptied.

`MailSelector.replay_filters()`

Reset selection with store content and replay registered filters.

Like with the `reset()` method, selected Mail objects are deleted and reinitialized with a copy of *store*'s *mails* attribute.

However, registered *filters* are kept and replayed on resetted selection. Use this method to refresh your store content while keeping your filters.

`MailSelector.lookup_status(status)`

Lookup mails with specified postqueue status.

**Parameters** *status* (*list*) – List of matching status to filter on.

**Returns** List of newly selected Mail objects

**Return type** *list()*

`MailSelector.lookup_sender(sender[, partial])`

Lookup mails send from a specific sender.

Optionnal parameter *partial* allow lookup of partial sender like @domain.com or sender@. By default, *partial* is False and selection is made on exact sender.

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**Note:** Matches are made against *Mail.sender* attribute instead of real mail header *Sender*.

---

**Parameters**

- **sender** (*str*) – Sender address to lookup in Mail objects selection.

- **partial** (*bool*) – Allow lookup with partial match

**Returns** List of newly selected Mail objects

**Return type** *list()*

`MailSelector.lookup_error(error_msg)`

Lookup mails with specific error message (message may be partial).

**Parameters** *error\_msg* (*str*) – Error message to filter on

**Returns** List of newly selected Mail objects

**Return type** *list()*

`MailSelector.lookup_date([start[, stop]])`

Lookup mails send on specific date range.

Both arguments *start* and *stop* are optionnal and default is set to None. However, it is required to pass at least one of those arguments. This method will raise `TypeError` if both arguments *start* and *stop* are set to None.

**Parameters**

- **start** (*datetime.datetime*) – Start date (default: `datetime(1970, 1, 1)`)

- **stop** (*datetime.datetime*) – Stop date (default: `datetime.now()`)

**Returns** List of newly selected Mail objects

**Return type** *list()*

`MailSelector.lookup_size([smin[, smax]])`

Lookup mails send with specific size.

Both arguments *smin* and *smax* are optionnal and default is set to 0. Maximum size is ignored if setted to 0. If both *smin* and *smax* are setted to 0, no filtering is done and the entire Mail objects selection is returned.

**Parameters**

- **smin** (*int*) – Minimum size (Default: 0)
- **smax** (*int*) – Maximum size (Default: 0)

**Returns** List of newly selected Mail objects

**Return type** `list()`





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## pyqueue.control – Mails queue administrative operations

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The `control` module define a basic python class to simplify administrative operations against the mails queue. This module is mainly based on the `postsuper` administrative tool fonctionnalités.

### QueueControl Objects

**class** `control.QueueControl`

Postfix queue control using `postsuper` command.

The `QueueControl` instance defines the following attributes:

**postsuper\_cmd**

Postfix command and arguments `list()` for mails queue administrative operations.  
Default is `["postsuper"]`

**known\_operations**

Known Postfix administrative operations `dict` to associate operations to command arguments. Known associations are:

```
delete: -d
hold: -h
release: -H
requeue: -r
```

**Warning:** Default known associations are provided for the default mails queue administrative command `postsuper`.

**See also:**

**Postfix manual:** `postsuper` – Postfix superintendent

The `QueueControl` instance provides the following methods:

`QueueControl._operate(operation, messages)`

Generic method to lead operations messages from postfix mail queue.

Operations can be one of Postfix known operations stored in `known_operations` attribute. Operation argument is directly converted and passed to the `postsuper_cmd` command.

**Parameters**

- **operation** (*str*) – Known operation from `known_operations`.
- **messages** (*list*) – List of Mail objects targetted for operation.

**Returns** Command's `stderr` output lines

**Return type** `list()`

`QueueControl.delete_messages(messages)`

Delete several messages from postfix mail queue.

This method is a `partial()` wrapper on `_operate()`. Passed operation is delete

`QueueControl.hold_messages(messages)`

Hold several messages from postfix mail queue.

This method is a `partial()` wrapper on `_operate()`. Passed operation is hold

`QueueControl.release_messages(messages)`

Release several messages from postfix mail queue.

This method is a `partial()` wrapper on `_operate()`. Passed operation is release

`QueueControl.requeue_messages(messages)`

Requeue several messages from postfix mail queue.

This method is a `partial()` wrapper on `_operate()`. Passed operation is requeue

## CHAPTER 4

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### pyqueue.shell – Mails queue management shell

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The `pyqueue.shell` module provide a shell to view and control Postfix mails queue. More documentation will soon be available.



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# pqshell – A shell-like to interact with a Postfix mails queue

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## DESCRIPTION

pqshell is a shell-like to interact with Postfix mails queue. It provide simple means to view the queue content, filter mails on criterias like *Sender* or *delivery errors* and lead administrative operations.

## SYNOPSIS

```
pqshell [options]
```

## FEATURES

- Asynchronous interactions with Postfix mails queue.
- Mails filtering on various criterias.
- Administrative operations on mails queue
- History and autocomplete via readline, if installed.

## OPTIONS

No options supported.

## SHELL COMMANDS

An inside help is available with the help command. Each provided command takes subcommands and command's help can be obtained while running it without argument.

### store

Control of Postfix queue content storage

#### Subcommands:

**status** Show store status.

**load** Load Postfix queue content.

#### Example:

```
PyQueue (sel:0)> store status
store is not loaded
PyQueue (sel:0)> store load
590 mails loaded from queue
PyQueue (sel:590)> store status
store loaded with 590 mails at 2014-05-05 13:43:22.592767
```

### select

Select mails from Postfix queue content. Filters are cumulatives and designed to simply implement advanced filtering with simple syntax. The default prompt will show how many mails are currently selected by all applied filters. Order of filters application is also important.

#### Subcommands:

**date** Select mails by date.

Usage: select date X [Y]

**error** Select mails by error message. Specified error message can be partial and will be check against the whole error message.

Usage: select error <error\_msg>

**replay** Reset content of selector with store content and replay filters.

**reset** Reset content of selector with store content, remove filters.

**rmfilter** Remove filter previously applied. Filters ids are used to specify filter to remove.

Usage: select rmfilter <filterid>

**sender** Select mails from sender.

Usage: select sender <sender> [exact]

**size** Select mails by size in Bytes. Signs - and + are supported, if not specified, search for exact size. Size range is allowed by using - (lesser than) and + (greater than).

Usage: select size <-n|n|+n> [-n]

**status** Select mails with specific postfix status.

Usage: select status <status>

**Filtering Example:**

```
PyQueue (sel:608)> select size -5000
PyQueue (sel:437)> select sender MAILER-DAEMON
PyQueue (sel:316)> select status active
PyQueue (sel:0)>
```

**Filters management:**

```
PyQueue (sel:608)> select size -5000
PyQueue (sel:437)> select sender MAILER-DAEMON
PyQueue (sel:316)> show filters
0: select size:
    smax: 5000
    smin: 0
1: select sender:
    partial: True
    sender: MAILER-DAEMON
PyQueue (sel:316)> select rmfilter 1
PyQueue (sel:437)> select sender greedy-sender@domain.com
PyQueue (sel:25)> select reset
Selector resetted with store content (608 mails)
PyQueue (sel:608)>
```

**show**

Display the content of current mails selection or specific mail IDs. Modifiers have been implemented to allow quick output manipulation. These allow you to sort, limit or even output a ranking by specific field. By default, output is sorted by **date of acceptance** in queue.

**Optionnal modifiers can be provided to alter output:**

**limit** <n> Display the first n entries.

**sortby** <field> [**asc**|**desc**] Sort output by field asc or desc. Default sorting is made descending.

**rankby** <field> Produce mails ranking by field.

**Known fields:**

- **qid** – Postqueue mail ID.
- **date** – Mail date.
- **sender** – Mail sender.
- **recipients** – Mail recipients (list, no sort).
- **size** – Mail size.
- **errors** – Postqueue deferred error messages (list, no sort).

**Subcommands:**

**filters** Show filters applied on current mails selection.

Usage: show filters

**selected** Show selected mails.

Usage: show selected [modifiers]

**Example:**

```
PyQueue (sel:608)> show selected limit 5
2014-05-05 20:54:24 699C11831669 [active] jjj@dom1.com (14375B)
2014-05-05 20:43:39 8D60C13C14C6 [deferred] bbb@dom9.com (39549B)
2014-05-05 20:35:08 B0077198BC31 [deferred] rrr@dom2.com (4809B)
2014-05-05 20:30:09 014E21AB4B78 [deferred] aaa@dom7.com (2450B)
2014-05-05 20:25:04 CF1BE127A8D3 [deferred] xxx@dom2.com (4778B)
...Preview of first 5 (603 more)...
```

```
PyQueue (sel:608)> show selected sortby sender limit 5 asc
2014-05-02 11:36:16 40AA9149A9D7 [deferred] aaa@dom1.com (8262B)
2014-05-01 05:30:23 5E0B2162BE63 [deferred] bbb@dom4.com (3052B)
2014-05-02 05:30:20 653471AC5F76 [deferred] ccc@dom5.com (3052B)
2014-05-02 09:49:01 A00D3159AEE [deferred] ddd@dom1.com (3837B)
2014-05-05 18:18:59 98E9A790749 [deferred] ddd@dom2.com (1551B)
...Preview of first 5 (603 more)...
```

```
PyQueue (sel:608)> show selected rankby sender limit 5
sender                                     count
=====
jjj@dom8.com                             334
xxx@dom4.com                             43
nnn@dom1.com                             32
ccc@dom3.com                             14
sss@dom5.com                             13
...Preview of first 5 (64 more)...
```



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