# Celery Documentation

***Release 2.1.4***

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CHAPTER 1

# Getting Started

**Release** 2.1

**Date** February 04, 2014

## 1.1 Introduction

**Version** 2.1.4

**Web** http://celeryproject.org/

**Download** http://pypi.python.org/pypi/celery/

**Source** http://github.com/ask/celery/

**Keywords** task queue, job queue, asynchronous, rabbitmq, amqp, redis, python, webhooks, queue, distributed

– Celery is an open source asynchronous task queue/job queue based on distributed message passing. It is focused on real-time operation, but supports scheduling as well.

The execution units, called tasks, are executed concurrently on one or more worker nodes. Tasks can execute asynchronously (in the background) or synchronously (wait until ready).

Celery is already used in production to process millions of tasks a day.

Celery is written in Python, but the protocol can be implemented in any language. It can also operate with other languages using webhooks.

The recommended message broker is RabbitMQ, but support for Redis and databases (SQLAlchemy) is also available.

Celery is easy to integrate with Django, Pylons and Flask, using the django-celery, celery-pylons and Flask-Celery add-on packages.

### 1.1.1 Overview

This is a high level overview of the architecture.

The broker delivers tasks to the worker servers. A worker server is a networked machine running `celeryd`. This can be one or more machines depending on the workload.

The result of the task can be stored for later retrieval (called its “tombstone”).

### 1.1.2 Example

You probably want to see some code by now, so here’s an example task adding two numbers:

```
from celery.decorators import task

@task
def add(x, y):
    return x + y
```

You can execute the task in the background, or wait for it to finish:

```
>>> result = add.delay(4, 4)
>>> result.wait() # wait for and return the result
8
```

Simple!

### 1.1.3 Features

| | |
|---|---|
| Messaging | Supported brokers include RabbitMQ, Stomp, Redis, and most common SQL databases. |
| Robust | Using *RabbitMQ*, celery survives most error scenarios, and your tasks will never be lost. |
| Distributed | Runs on one or more machines. Supports clustering when used in combination with RabbitMQ. You can set up new workers without central configuration (e.g. use your dads laptop while the queue is temporarily overloaded). |
| Concurrency | Tasks are executed in parallel using the `multiprocessing` module. |
| Scheduling | Supports recurring tasks like cron, or specifying an exact date or countdown for when after the task should be executed. |
| Performance | Able to execute tasks while the user waits. |
| Return Values | Task return values can be saved to the selected result store backend. You can wait for the result, retrieve it later, or ignore it. |
| Result Stores | Database, MongoDB, Redis, *Tokyo Tyrant*, AMQP (high performance). |
| Webhooks | Your tasks can also be HTTP callbacks, enabling cross-language communication. |
| Rate limiting | Supports rate limiting by using the token bucket algorithm, which accounts for bursts of traffic. Rate limits can be set for each task type, or globally for all. |
| Routing | Using AMQP you can route tasks arbitrarily to different workers. |
| Remote-control | You can rate limit and delete (revoke) tasks remotely. |
| Monitoring | You can capture everything happening with the workers in real-time by subscribing to events. A real-time web monitor is in development. |
| Serialization | Supports Pickle, JSON, YAML, or easily defined custom schemes. One task invocation can have a different scheme than another. |
| Tracebacks | Errors and tracebacks are stored and can be investigated after the fact. |
| UUID | Every task has an UUID (Universally Unique Identifier), which is the task id used to query task status and return value. |
| Retries | Tasks can be retried if they fail, with configurable maximum number of retries, and delays between each retry. |
| Task Sets | A Task set is a task consisting of several sub-tasks. You can find out how many, or if all of the sub-tasks has been executed, and even retrieve the results in order. Progress bars, anyone? |
| Made for Web | You can query status and results via URLs, enabling the ability to poll task status using Ajax. |
| Error e-mails | Can be configured to send e-mails to the administrators when tasks fails. |
| Supervised | Pool workers are supervised and automatically replaced if they crash. |

### 1.1.4 Documentation

The latest documentation with user guides, tutorials and API reference is hosted at Github.

### 1.1.5 Installation

You can install `celery` either via the Python Package Index (PyPI) or from source.

To install using `pip`,:

```
$ pip install celery
```

To install using `easy_install`,:

```
$ easy_install celery
```

#### Downloading and installing from source

Download the latest version of `celery` from http://pypi.python.org/pypi/celery/

You can install it by doing the following,:

```
$ tar xvfz celery-0.0.0.tar.gz
$ cd celery-0.0.0
$ python setup.py build
# python setup.py install # as root
```

#### Using the development version

You can clone the repository by doing the following:

```
$ git clone git://github.com/ask/celery.git
```

## 1.2 Broker Installation

### 1.2.1 Installing RabbitMQ

See Installing RabbitMQ over at RabbitMQ's website. For Mac OS X see Installing RabbitMQ on OS X.

**Note:** If you're getting `nodedown` errors after installing and using **rabbitmqctl** then this blog post can help you identify the source of the problem:

http://somic.org/2009/02/19/on-rabbitmqctl-and-badrpcnodedown/

### 1.2.2 Setting up RabbitMQ

To use celery we need to create a RabbitMQ user, a virtual host and allow that user access to that virtual host:

```
$ rabbitmqctl add_user myuser mypassword
```

```
$ rabbitmqctl add_vhost myvhost
```

```
$ rabbitmqctl set_permissions -p myvhost myuser ".*" ".*" ".*"
```

See the RabbitMQ Admin Guide for more information about access control.

### 1.2.3 Installing RabbitMQ on OS X

The easiest way to install RabbitMQ on Snow Leopard is using Homebrew; the new and shiny package management system for OS X.

In this example we'll install Homebrew into `/lol`, but you can choose whichever destination, even in your home directory if you want, as one of the strengths of Homebrew is that it's relocatable.

Homebrew is actually a git repository, so to install Homebrew, you first need to install git. Download and install from the disk image at http://code.google.com/p/git-osx-installer/downloads/list?can=3

When git is installed you can finally clone the repository, storing it at the `/lol` location:

```
$ git clone git://github.com/mxcl/homebrew /lol
```

Brew comes with a simple utility called **brew**, used to install, remove and query packages. To use it you first have to add it to `PATH`, by adding the following line to the end of your `~/.profile`:

```
export PATH="/lol/bin:/lol/sbin:$PATH"
```

Save your profile and reload it:

```
$ source ~/.profile
```

Finally, we can install rabbitmq using **brew**:

```
$ brew install rabbitmq
```

#### Configuring the system host name

If you're using a DHCP server that is giving you a random host name, you need to permanently configure the host name. This is because RabbitMQ uses the host name to communicate with nodes.

Use the **scutil** command to permanently set your host name:

```
sudo scutil --set HostName myhost.local
```

Then add that host name to `/etc/hosts` so it's possible to resolve it back into an IP address:

```
127.0.0.1       localhost myhost myhost.local
```

If you start the rabbitmq server, your rabbit node should now be `rabbit@myhost`, as verified by **rabbitmqctl**:

```
$ sudo rabbitmqctl status
Status of node rabbit@myhost ...
[{running_applications,[{rabbit,"RabbitMQ","1.7.1"},
                        {mnesia,"MNESIA  CXC 138 12","4.4.12"},
                        {os_mon,"CPO  CXC 138 46","2.2.4"},
                        {sasl,"SASL  CXC 138 11","2.1.8"},
                        {stdlib,"ERTS  CXC 138 10","1.16.4"},
                    {kernel,"ERTS  CXC 138 10","2.13.4"}]},
{nodes,[rabbit@myhost]},
{running_nodes,[rabbit@myhost]}]
...done.
```

This is especially important if your DHCP server gives you a host name starting with an IP address, (e.g. *23.10.112.31.comcast.net*), because then RabbitMQ will try to use *rabbit@23*, which is an illegal host name.

#### Starting/Stopping the RabbitMQ server

To start the server:

```
$ sudo rabbitmq-server
```

you can also run it in the background by adding the *-detached* option (note: only one dash):

```
$ sudo rabbitmq-server -detached
```

Never use **kill** to stop the RabbitMQ server, but rather use the **rabbitmqctl** command:

```
$ sudo rabbitmqctl stop
```

When the server is running, you can continue reading Setting up RabbitMQ.

## 1.3 First steps with Celery

### 1.3.1 Creating a simple task

In this tutorial we are creating a simple task that adds two numbers. Tasks are defined in normal Python modules.

By convention we will call our module `tasks.py`, and it looks like this:

**file** *tasks.py*

```
from celery.decorators import task

@task
def add(x, y):
    return x + y
```

All Celery tasks are classes that inherits from the `Task` class. In this example we’re using a decorator that wraps the add function in an appropriate class for us automatically.

**See also:**

The full documentation on how to create tasks and task classes is in the *Tasks* part of the user guide.

### 1.3.2 Configuration

Celery is configured by using a configuration module. By default this module is called `celeryconfig.py`.

The configuration module must either be in the current directory or on the Python path, so that it can be imported.

You can also set a custom name for the configuration module by using the `CELERY_CONFIG_MODULE` environment variable.

Let's create our `celeryconfig.py`.

1. Configure how we communicate with the broker (RabbitMQ in this example):

   ```
   BROKER_HOST = "localhost"
   BROKER_PORT = 5672
   BROKER_USER = "myuser"
   BROKER_PASSWORD = "mypassword"
   BROKER_VHOST = "myvhost"
   ```

2. Define the backend used to store task metadata and return values:

   ```
   CELERY_RESULT_BACKEND = "amqp"
   ```

   The AMQP backend is non-persistent by default, and you can only fetch the result of a task once (as it's sent as a message).

   For list of backends available and related options see *Task result backend settings*.

3. Finally we list the modules the worker should import. This includes the modules containing your tasks.

   We only have a single task module, `tasks.py`, which we added earlier:

   ```
   CELERY_IMPORTS = ("tasks", )
   ```

That's it.

There are more options available, like how many processes you want to use to process work in parallel (the `CELERY_CONCURRENCY` setting), and we could use a persistent result store backend, but for now, this should do. For all of the options available, see *Configuration and defaults*.

**Note:** You can also specify modules to import using the *-I* option to `celeryd`:

```
$ celeryd -l info -I tasks,handlers
```

This can be a single, or a comma separated list of task modules to import when **celeryd** starts.

### 1.3.3 Running the celery worker server

To test we will run the worker server in the foreground, so we can see what's going on in the terminal:

```
$ celeryd --loglevel=INFO
```

In production you will probably want to run the worker in the background as a daemon. To do this you need to use the tools provided by your platform, or something like supervisord (see *Running celeryd as a daemon* for more information).

For a complete listing of the command line options available, do:

```
$  celeryd --help
```

### 1.3.4 Executing the task

Whenever we want to execute our task, we use the `delay()` method of the task class.

This is a handy shortcut to the `apply_async()` method which gives greater control of the task execution (see *Executing Tasks*).

```
>>> from tasks import add
>>> add.delay(4, 4)
<AsyncResult: 889143a6-39a2-4e52-837b-d80d33efb22d>
```

At this point, the task has been sent to the message broker. The message broker will hold on to the task until a worker server has consumed and executed it.

Right now we have to check the worker log files to know what happened with the task. This is because we didn't keep the `AsyncResult` object returned.

The `AsyncResult` lets us check the state of the task, wait for the task to finish, get its return value or exception/traceback if the task failed, and more.

Let's execute the task again – but this time we'll keep track of the task by holding on to the `AsyncResult`:

```
>>> result = add.delay(4, 4)

>>> result.ready() # returns True if the task has finished processing.
False

>>> result.result # task is not ready, so no return value yet.
None

>>> result.get()   # Waits until the task is done and returns the retval.
8

>>> result.result # direct access to result, doesn't re-raise errors.
8

>>> result.successful() # returns True if the task didn't end in failure.
True
```

If the task raises an exception, the return value of `result.successful()` will be `False`, and `result.result` will contain the exception instance raised by the task.

### 1.3.5 Where to go from here

After this you should read the *User Guide*. Specifically *Tasks* and *Executing Tasks*.

## 1.4 Resources

### 1.4.1 Getting Help

#### Mailing list

For discussions about the usage, development, and future of celery, please join the celery-users mailing list.

#### IRC

Come chat with us on IRC. The #celery channel is located at the Freenode network.

### 1.4.2 Bug tracker

If you have any suggestions, bug reports or annoyances please report them to our issue tracker at http://github.com/ask/celery/issues/

### 1.4.3 Wiki

http://wiki.github.com/ask/celery/

### 1.4.4 Contributing

Development of `celery` happens at Github: http://github.com/ask/celery

You are highly encouraged to participate in the development of `celery`. If you don't like Github (for some reason) you're welcome to send regular patches.

See also the Contributing section in the Documentation.

### 1.4.5 License

This software is licensed under the `New BSD License`. See the `LICENSE` file in the top distribution directory for the full license text.

CHAPTER 2

# User Guide

**Release** 2.1

**Date** February 04, 2014

## 2.1 Overview

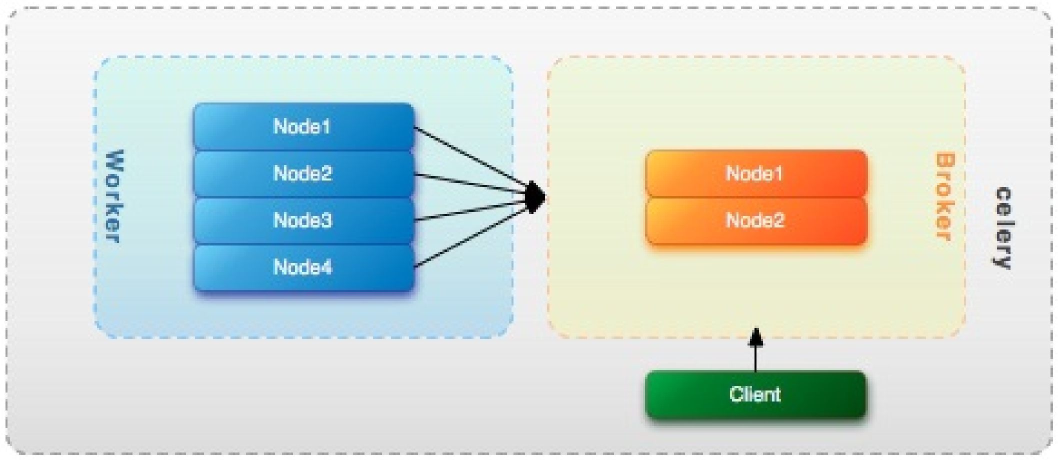


Figure 2.1: *Figure 1:* Worker and broker nodes.

To use Celery you need at least two main components; a message broker and a worker.

The message broker enables clients and workers to communicate through messaging. There are several broker implementations available, the most popular being RabbitMQ.

The worker processes messages, and consists of one or more physical (or virtual) nodes.

### 2.1.1 Tasks

The action to take whenever a message of a certain type is received is called a "task".

- Go to *Tasks*.
- Go to *Executing Tasks*.
- Go to *Sets of tasks, Subtasks and Callbacks*
- Go to *Periodic Tasks*.
- Go to *HTTP Callback Tasks (Webhooks)*.

### 2.1.2 Workers

Go to *Workers Guide*.

### 2.1.3 Monitoring

Go to *Monitoring Guide*.

### 2.1.4 Routing

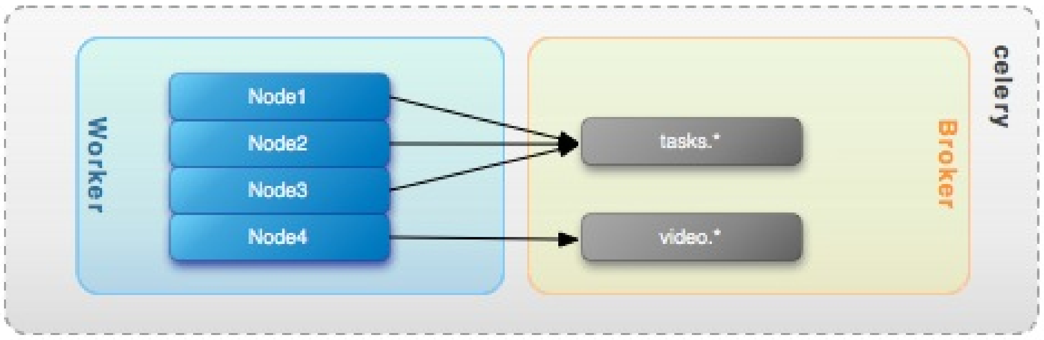


Figure 2.2: *Figure 2:* Worker bindings.

Go to *Routing Tasks*.

Celery takes advantage of AMQPs flexible routing model. Tasks can be routed to specific servers, or a cluster of servers by binding workers to different queues. A single worker node can be bound to one or more queues. Multiple messaging scenarios are supported: round robin, point-to-point, broadcast (one-to-many), and more.

Celery aims to hide the complexity of AMQP through features like *Automatic routing*, while still preserving the ability to go low level if that should be necessary.

## 2.2 Tasks

This guide gives an overview of how tasks are defined. For a complete listing of task attributes and methods, please see the `API reference`.

### 2.2.1 Basics

A task is a class that encapsulates a function and its execution options. Given a function `create_user`, that takes two arguments: `username` and `password`, you can create a task like this:

```
from celery.task import Task
from django.contrib.auth import User

class CreateUserTask(Task):
    def run(self, username, password):
        User.objects.create(username=username, password=password)
```

For convenience there is a shortcut decorator that turns any function into a task:

```
from celery.decorators import task
from django.contrib.auth import User

@task
def create_user(username, password):
    User.objects.create(username=username, password=password)
```

The task decorator takes the same execution options as the `Task` class does:

```
@task(serializer="json")
def create_user(username, password):
    User.objects.create(username=username, password=password)
```

## 2.2.2 Default keyword arguments

Celery supports a set of default arguments that can be forwarded to any task. Tasks can choose not to take these, or list the ones they want. The worker will do the right thing.

The current default keyword arguments are:

**task_id** The unique id of the executing task.

**task_name** Name of the currently executing task.

**task_retries** How many times the current task has been retried. An integer starting at `0`.

**is_eager** Set to `True` if the task is executed locally in the client, and not by a worker.

**logfile** The log file, can be passed on to `get_logger()` to gain access to the workers log file. See Logging.

**loglevel** The current log level used.

**delivery_info**

**Additional message delivery information. This is a mapping** containing the exchange and routing key used to deliver this task. It's used by e.g. `retry()` to resend the task to the same destination queue.

**NOTE** As some messaging backends doesn't have advanced routing capabilities, you can't trust the availability of keys in this mapping.

## 2.2.3 Logging

You can use the workers logger to add diagnostic output to the worker log:

```
class AddTask(Task):

    def run(self, x, y, **kwargs):
        logger = self.get_logger(**kwargs)
        logger.info("Adding %s + %s" % (x, y))
        return x + y
```

or using the decorator syntax:

```
@task()
def add(x, y, **kwargs):
    logger = add.get_logger(**kwargs)
    logger.info("Adding %s + %s" % (x, y))
    return x + y
```

There are several logging levels available, and the workers `loglevel` setting decides whether or not they will be written to the log file.

Of course, you can also simply use *print* as anything written to standard out/-err will be written to the log file as well.

### 2.2.4 Retrying a task if something fails

Simply use `retry()` to re-send the task. It will do the right thing, and respect the `max_retries` attribute:

```
@task()
def send_twitter_status(oauth, tweet, **kwargs):
    try:
        twitter = Twitter(oauth)
        twitter.update_status(tweet)
    except (Twitter.FailWhaleError, Twitter.LoginError), exc:
        send_twitter_status.retry(args=[oauth, tweet], kwargs=kwargs, exc=exc)
```

Here we used the `exc` argument to pass the current exception to `retry()`. At each step of the retry this exception is available as the tombstone (result) of the task. When `max_retries` has been exceeded this is the exception raised. However, if an `exc` argument is not provided the `RetryTaskError` exception is raised instead.

**Important note:** The task has to take the magic keyword arguments in order for max retries to work properly, this is because it keeps track of the current number of retries using the `task_retries` keyword argument passed on to the task. In addition, it also uses the `task_id` keyword argument to use the same task id, and `delivery_info` to route the retried task to the same destination.

#### Using a custom retry delay

When a task is to be retried, it will wait for a given amount of time before doing so. The default delay is in the `default_retry_delay` attribute on the task. By default this is set to 3 minutes. Note that the unit for setting the delay is in seconds (int or float).

You can also provide the `countdown` argument to `retry()` to override this default.

```
class MyTask(Task):
    default_retry_delay = 30 * 60 # retry in 30 minutes

    def run(self, x, y, **kwargs):
        try:
            ...
        except Exception, exc:
            self.retry([x, y], kwargs, exc=exc,
                       countdown=60) # override the default and
                                     # - retry in 1 minute
```

## 2.2.5 Task options

### General

`Task.`**`name`**
The name the task is registered as.

You can set this name manually, or just use the default which is automatically generated using the module and class name. See *Task names*.

`Task.`**`abstract`**
Abstract classes are not registered, but are used as the base class for new task types.

`Task.`**`max_retries`**
The maximum number of attempted retries before giving up. If this exceeds the `MaxRetriesExceeded` an exception will be raised. *NOTE:* You have to `retry()` manually, it's not something that happens automatically.

`Task.`**`default_retry_delay`**
Default time in seconds before a retry of the task should be executed. Can be either `int` or `float`. Default is a 3 minute delay.

`Task.`**`rate_limit`**
Set the rate limit for this task type, i.e. how many times in a given period of time is the task allowed to run.

If this is `None` no rate limit is in effect. If it is an integer, it is interpreted as "tasks per second".

The rate limits can be specified in seconds, minutes or hours by appending `"/s"`, `"/m"` or `"/h"` to the value. Example: `"100/m"` (hundred tasks a minute). Default is the `CELERY_DEFAULT_RATE_LIMIT` setting, which if not specified means rate limiting for tasks is disabled by default.

`Task.`**`ignore_result`**
Don't store task state. Note that this means you can't use `AsyncResult` to check if the task is ready, or get its return value.

`Task.`**`store_errors_even_if_ignored`**
If `True`, errors will be stored even if the task is configured to ignore results.

`Task.`**`send_error_emails`**
Send an e-mail whenever a task of this type fails. Defaults to the `CELERY_SEND_TASK_ERROR_EMAILS` setting. See *Error E-Mails* for more information.

`Task.`**`error_whitelist`**
If the sending of error e-mails is enabled for this task, then this is a white list of exceptions to actually send e-mails about.

`Task.`**`serializer`**
A string identifying the default serialization method to use. Defaults to the `CELERY_TASK_SERIALIZER` setting. Can be `pickle` `json`, `yaml`, or any custom serialization methods that have been registered with `carrot.serialization.registry`.

Please see *Serializers* for more information.

`Task.`**`backend`**
The result store backend to use for this task. Defaults to the `CELERY_RESULT_BACKEND` setting.

`Task.`**`acks_late`**
If set to `True` messages for this task will be acknowledged **after** the task has been executed, not *just before*, which is the default behavior.

Note that this means the task may be executed twice if the worker crashes in the middle of execution, which may be acceptable for some applications.

The global default can be overridden by the `CELERY_ACKS_LATE` setting.

`Task.`**`track_started`**

If `True` the task will report its status as "started" when the task is executed by a worker. The default value is `False` as the normal behaviour is to not report that level of granularity. Tasks are either pending, finished, or waiting to be retried. Having a "started" status can be useful for when there are long running tasks and there is a need to report which task is currently running.

The host name and process id of the worker executing the task will be available in the state metadata (e.g. *result.info["pid"]*)

The global default can be overridden by the `CELERY_TRACK_STARTED` setting.

**See also:**

The API reference for `Task`.

### Message and routing options

`Task.`**`queue`**

Use the routing settings from a queue defined in `CELERY_QUEUES`. If defined the `exchange` and `routing_key` options will be ignored.

`Task.`**`exchange`**

Override the global default `exchange` for this task.

`Task.`**`routing_key`**

Override the global default `routing_key` for this task.

`Task.`**`mandatory`**

If set, the task message has mandatory routing. By default the task is silently dropped by the broker if it can't be routed to a queue. However – If the task is mandatory, an exception will be raised instead.

Not supported by amqplib.

`Task.`**`immediate`**

Request immediate delivery. If the task cannot be routed to a task worker immediately, an exception will be raised. This is instead of the default behavior, where the broker will accept and queue the task, but with no guarantee that the task will ever be executed.

Not supported by amqplib.

`Task.`**`priority`**

The message priority. A number from 0 to 9, where 0 is the highest priority.

Not supported by RabbitMQ.

**See also:**

*Routing options* for more information about message options, and *Routing Tasks*.

## 2.2.6 Task names

The task type is identified by the *task name*.

If not provided a name will be automatically generated using the module and class name.

For example:

```
>>> @task(name="sum-of-two-numbers")
>>> def add(x, y):
...     return x + y

>>> add.name
'sum-of-two-numbers'
```

The best practice is to use the module name as a prefix to classify the tasks using namespaces. This way the name won't collide with the name from another module:

```
>>> @task(name="tasks.add")
>>> def add(x, y):
...     return x + y

>>> add.name
'tasks.add'
```

Which is exactly the name that is automatically generated for this task if the module name is "tasks.py":

```
>>> @task()
>>> def add(x, y):
...     return x + y

>>> add.name
'tasks.add'
```

#### Automatic naming and relative imports

Relative imports and automatic name generation does not go well together, so if you're using relative imports you should set the name explicitly.

For example if the client imports the module "myapp.tasks" as ".tasks", and the worker imports the module as "myapp.tasks", the generated names won't match and an `NotRegistered` error will be raised by the worker.

This is also the case if using Django and using `project.myapp`:

```
INSTALLED_APPS = ("project.myapp", )
```

The worker will have the tasks registered as "project.myapp.tasks.*", while this is what happens in the client if the module is imported as "myapp.tasks":

```
>>> from myapp.tasks import add
>>> add.name
'myapp.tasks.add'
```

For this reason you should never use "project.app", but rather add the project directory to the Python path:

```
import os
import sys
sys.path.append(os.getcwd())

INSTALLED_APPS = ("myapp", )
```

This makes more sense from the reusable app perspective anyway.

### 2.2.7 Decorating tasks

Using decorators with tasks requires extra steps because of the magic keyword arguments.

If you have the following task and decorator:

```
from celery.utils.functional import wraps

def decorator(task):

    @wraps(task)
    def _decorated(*args, **kwargs):
        print("inside decorator")
        return task(*args, **kwargs)


@decorator
@task
def add(x, y):
    return x + y
```

Then the worker will see that the task is accepting keyword arguments, while it really doesn't, resulting in an error.

The workaround is to either have your task accept arbitrary keyword arguments:

```
@decorator
@task
def add(x, y, **kwargs):
    return x + y
```

or patch the decorator to preserve the original signature:

```
from inspect import getargspec
from celery.utils.functional import wraps

def decorator(task):

    @wraps(task)
    def _decorated(*args, **kwargs):
        print("in decorator")
        return task(*args, **kwargs)
    _decorated.argspec = inspect.getargspec(task)
```

Also note the use of `wraps()` here, this is necessary to keep the original function name and docstring.

**Note:** The magic keyword arguments will be deprecated in the future, replaced by the `task.request` attribute in 2.2, and the keyword arguments will be removed in 3.0.

### 2.2.8 Task States

During its lifetime a task will transition through several possible states, and each state may have arbitrary metadata attached to it. When a task moves into a new state the previous state is forgotten about, but some transitions can be deducted, (e.g. a task now in the `FAILED` state, is implied to have been in the `STARTED` state at some point).

There are also sets of states, like the set of `failure states`, and the set of `ready states`.

The client uses the membership of these sets to decide whether the exception should be re-raised (`PROPAGATE_STATES`), or whether the result can be cached (it can if the task is ready).

You can also define *custom-states*.

### Built-in States

#### PENDING

Task is waiting for execution or unknown. Any task id that is not know is implied to be in the pending state.

#### STARTED

Task has been started. Not reported by default, to enable please see :attr‘Task.track_started‘.

**metadata** `pid` and `hostname` of the worker process executing the task.

#### SUCCESS

Task has been successfully executed.

**metadata** `result` contains the return value of the task.

**propagates** Yes

**ready** Yes

#### FAILURE

Task execution resulted in failure.

**metadata** *result* contains the exception occurred, and *traceback* contains the backtrace of the stack at the point when the exception was raised.

**propagates** Yes

#### RETRY

Task is being retried.

**metadata** `result` contains the exception that caused the retry, and `traceback` contains the backtrace of the stack at the point when the exceptions was raised.

**propagates** No

#### REVOKED

Task has been revoked.

**propagates** Yes

### Custom states

You can easily define your own states, all you need is a unique name. The name of the state is usually an uppercase string. As an example you could have a look at `abortable tasks` which defines its own custom `ABORTED` state.

Use `Task.update_state` to update a tasks state:

```
@task
def upload_files(filenames, **kwargs):

    for i, file in enumerate(filenames):
        upload_files.update_state(kwargs["task_id"], "PROGRESS",
            {"current": i, "total": len(filenames)})
```

Here we created the state "PROGRESS", which tells any application aware of this state that the task is currently in progress, and also where it is in the process by having `current` and `total` counts as part of the state metadata. This can then be used to create e.g. progress bars.

### 2.2.9 How it works

Here comes the technical details, this part isn't something you need to know, but you may be interested.

All defined tasks are listed in a registry. The registry contains a list of task names and their task classes. You can investigate this registry yourself:

```
>>> from celery import registry
>>> from celery import task
>>> registry.tasks
{'celery.delete_expired_task_meta':
    <PeriodicTask: celery.delete_expired_task_meta (periodic)>,
 'celery.task.http.HttpDispatchTask':
    <Task: celery.task.http.HttpDispatchTask (regular)>,
 'celery.execute_remote':
    <Task: celery.execute_remote (regular)>,
 'celery.map_async':
    <Task: celery.map_async (regular)>,
 'celery.ping':
    <Task: celery.ping (regular)>}
```

This is the list of tasks built-in to celery. Note that we had to import `celery.task` first for these to show up. This is because the tasks will only be registered when the module they are defined in is imported.

The default loader imports any modules listed in the `CELERY_IMPORTS` setting.

The entity responsible for registering your task in the registry is a meta class, `TaskType`. This is the default meta class for `Task`.

If you want to register your task manually you can set mark the task as `abstract`:

```
class MyTask(Task):
    abstract = True
```

This way the task won't be registered, but any task inheriting from it will be.

When tasks are sent, we don't send any actual function code, just the name of the task to execute. When the worker then receives the message it can look up the name in its task registry to find the execution code.

This means that your workers should always be updated with the same software as the client. This is a drawback, but the alternative is a technical challenge that has yet to be solved.

## 2.2.10 Tips and Best Practices

### Ignore results you don't want

If you don't care about the results of a task, be sure to set the `ignore_result` option, as storing results wastes time and resources.

```
@task(ignore_result=True)
def mytask(...)
    something()
```

Results can even be disabled globally using the `CELERY_IGNORE_RESULT` setting.

### Disable rate limits if they're not used

Disabling rate limits altogether is recommended if you don't have any tasks using them. This is because the rate limit subsystem introduces quite a lot of complexity.

Set the `CELERY_DISABLE_RATE_LIMITS` setting to globally disable rate limits:

```
CELERY_DISABLE_RATE_LIMITS = True
```

### Avoid launching synchronous subtasks

Having a task wait for the result of another task is really inefficient, and may even cause a deadlock if the worker pool is exhausted.

Make your design asynchronous instead, for example by using *callbacks*.

**Bad**:

```
@task()
def update_page_info(url):
    page = fetch_page.delay(url).get()
    info = parse_page.delay(url, page).get()
    store_page_info.delay(url, info)

@task()
def fetch_page(url):
    return myhttplib.get(url)

@task()
def parse_page(url, page):
    return myparser.parse_document(page)

@task()
def store_page_info(url, info):
    return PageInfo.objects.create(url, info)
```

**Good**:

```
@task(ignore_result=True)
def update_page_info(url):
    # fetch_page -> parse_page -> store_page
    fetch_page.delay(url, callback=subtask(parse_page,
                                callback=subtask(store_page_info)))
```

```
@task(ignore_result=True)
def fetch_page(url, callback=None):
    page = myhttplib.get(url)
    if callback:
        # The callback may have been serialized with JSON,
        # so best practice is to convert the subtask dict back
        # into a subtask object.
        subtask(callback).delay(url, page)

@task(ignore_result=True)
def parse_page(url, page, callback=None):
    info = myparser.parse_document(page)
    if callback:
        subtask(callback).delay(url, info)

@task(ignore_result=True)
def store_page_info(url, info):
    PageInfo.objects.create(url, info)
```

We use `subtask` here to safely pass around the callback task. `subtask` is a subclass of dict used to wrap the arguments and execution options for a single task invocation.

**See also:**

*Subtasks* for more information about subtasks.

## 2.2.11 Performance and Strategies

### Granularity

The task granularity is the amount of computation needed by each subtask. In general it is better to split the problem up into many small tasks, than have a few long running tasks.

With smaller tasks you can process more tasks in parallel and the tasks won't run long enough to block the worker from processing other waiting tasks.

However, executing a task does have overhead. A message needs to be sent, data may not be local, etc. So if the tasks are too fine-grained the additional overhead may not be worth it in the end.

**See also:**

The book Art of Concurrency has a whole section dedicated to the topic of task granularity.

### Data locality

The worker processing the task should be as close to the data as possible. The best would be to have a copy in memory, the worst would be a full transfer from another continent.

If the data is far away, you could try to run another worker at location, or if that's not possible - cache often used data, or preload data you know is going to be used.

The easiest way to share data between workers is to use a distributed cache system, like memcached.

**See also:**

The paper Distributed Computing Economics by Jim Gray is an excellent introduction to the topic of data locality.

### State

Since celery is a distributed system, you can't know in which process, or on what machine the task will be executed. You can't even know if the task will run in a timely manner.

The ancient async sayings tells us that "asserting the world is the responsibility of the task". What this means is that the world view may have changed since the task was requested, so the task is responsible for making sure the world is how it should be; If you have a task that re-indexes a search engine, and the search engine should only be re-indexed at maximum every 5 minutes, then it must be the tasks responsibility to assert that, not the callers.

Another gotcha is Django model objects. They shouldn't be passed on as arguments to tasks. It's almost always better to re-fetch the object from the database when the task is running instead, as using old data may lead to race conditions.

Imagine the following scenario where you have an article and a task that automatically expands some abbreviations in it:

```
class Article(models.Model):
    title = models.CharField()
    body = models.TextField()

@task
def expand_abbreviations(article):
    article.body.replace("MyCorp", "My Corporation")
    article.save()
```

First, an author creates an article and saves it, then the author clicks on a button that initiates the abbreviation task.

```
>>> article = Article.objects.get(id=102)
>>> expand_abbreviations.delay(model_object)
```

Now, the queue is very busy, so the task won't be run for another 2 minutes. In the meantime another author makes changes to the article, so when the task is finally run, the body of the article is reverted to the old version because the task had the old body in its argument.

Fixing the race condition is easy, just use the article id instead, and re-fetch the article in the task body:

```
@task
def expand_abbreviations(article_id):
    article = Article.objects.get(id=article_id)
    article.body.replace("MyCorp", "My Corporation")
    article.save()

>>> expand_abbreviations(article_id)
```

There might even be performance benefits to this approach, as sending large messages may be expensive.

### Database transactions

Let's have a look at another example:

```
from django.db import transaction

@transaction.commit_on_success
def create_article(request):
    article = Article.objects.create(....)
    expand_abbreviations.delay(article.pk)
```

This is a Django view creating an article object in the database, then passing the primary key to a task. It uses the *commit_on_success* decorator, which will commit the transaction when the view returns, or roll back if the view raises an exception.

There is a race condition if the task starts executing before the transaction has been committed; The database object does not exist yet!

The solution is to *always commit transactions before sending tasks depending on state from the current transaction*:

```
@transaction.commit_manually
def create_article(request):
    try:
        article = Article.objects.create(...)
    except:
        transaction.rollback()
        raise
    else:
        transaction.commit()
        expand_abbreviations.delay(article.pk)
```

## 2.2.12 Example

Let's take a real wold example; A blog where comments posted needs to be filtered for spam. When the comment is created, the spam filter runs in the background, so the user doesn't have to wait for it to finish.

We have a Django blog application allowing comments on blog posts. We'll describe parts of the models/views and tasks for this application.

### blog/models.py

The comment model looks like this:

```
from django.db import models
from django.utils.translation import ugettext_lazy as _


class Comment(models.Model):
    name = models.CharField(_("name"), max_length=64)
    email_address = models.EmailField(_("e-mail address"))
    homepage = models.URLField(_("home page"),
                               blank=True, verify_exists=False)
    comment = models.TextField(_("comment"))
    pub_date = models.DateTimeField(_("Published date"),
                                    editable=False, auto_add_now=True)
    is_spam = models.BooleanField(_("spam?"),
                                  default=False, editable=False)

    class Meta:
        verbose_name = _("comment")
        verbose_name_plural = _("comments")
```

In the view where the comment is posted, we first write the comment to the database, then we launch the spam filter task in the background.

### blog/views.py

```
from django import forms
from django.http import HttpResponseRedirect
from django.template.context import RequestContext
from django.shortcuts import get_object_or_404, render_to_response

from blog import tasks
from blog.models import Comment


class CommentForm(forms.ModelForm):

    class Meta:
        model = Comment


def add_comment(request, slug, template_name="comments/create.html"):
    post = get_object_or_404(Entry, slug=slug)
    remote_addr = request.META.get("REMOTE_ADDR")

    if request.method == "post":
        form = CommentForm(request.POST, request.FILES)
        if form.is_valid():
            comment = form.save()
            # Check spam asynchronously.
            tasks.spam_filter.delay(comment_id=comment.id,
                                    remote_addr=remote_addr)
            return HttpResponseRedirect(post.get_absolute_url())
    else:
        form = CommentForm()

    context = RequestContext(request, {"form": form})
    return render_to_response(template_name, context_instance=context)
```

To filter spam in comments we use Akismet, the service used to filter spam in comments posted to the free weblog platform *Wordpress*. Akismet is free for personal use, but for commercial use you need to pay. You have to sign up to their service to get an API key.

To make API calls to Akismet we use the akismet.py library written by Michael Foord.

### blog/tasks.py

```
from akismet import Akismet
from celery.decorators import task

from django.core.exceptions import ImproperlyConfigured
from django.contrib.sites.models import Site

from blog.models import Comment


@task
def spam_filter(comment_id, remote_addr=None, **kwargs):
        logger = spam_filter.get_logger(**kwargs)
        logger.info("Running spam filter for comment %s" % comment_id)
        comment = Comment.objects.get(pk=comment_id)
        current_domain = Site.objects.get_current().domain
        akismet = Akismet(settings.AKISMET_KEY, "http://%s" % domain)
        if not akismet.verify_key():
            raise ImproperlyConfigured("Invalid AKISMET_KEY")


        is_spam = akismet.comment_check(user_ip=remote_addr,
                            comment_content=comment.comment,
                            comment_author=comment.name,
                            comment_author_email=comment.email_address)
        if is_spam:
            comment.is_spam = True
            comment.save()

        return is_spam
```

## 2.3 Executing Tasks

### 2.3.1 Basics

Executing tasks is done with `apply_async()`, and the shortcut: `delay()`.

`delay` is simple and convenient, as it looks like calling a regular function:

```
Task.delay(arg1, arg2, kwarg1="x", kwarg2="y")
```

The same using `apply_async` is written like this:

```
Task.apply_async(args=[arg1, arg2], kwargs={"kwarg1": "x", "kwarg2": "y"})
```

While `delay` is convenient, it doesn't give you as much control as using `apply_async`. With `apply_async` you can override the execution options available as attributes on the `Task` class (see *Task options*). In addition you can set countdown/eta, task expiry, provide a custom broker connection and more.

Let's go over these in more detail. All the examples uses a simple task, called `add`, taking two positional arguments and returning the sum:

```
@task
def add(x, y):
    return x + y
```

**Note:** You can also execute a task by name using `send_task()`, if you don't have access to the task class:

```
>>> from celery.execute import send_task
>>> result = send_task("tasks.add", [2, 2])
>>> result.get()
4
```

### 2.3.2 ETA and countdown

The ETA (estimated time of arrival) lets you set a specific date and time that is the earliest time at which your task will be executed. `countdown` is a shortcut to set eta by seconds into the future.

```
>>> result = add.apply_async(args=[10, 10], countdown=3)
>>> result.get()    # this takes at least 3 seconds to return
20
```

The task is guaranteed to be executed at some time *after* the specified date and time, but not necessarily at that exact time. Possible reasons for broken deadlines may include many items waiting in the queue, or heavy network latency. To make sure your tasks are executed in a timely manner you should monitor queue lengths. Use Munin, or similar tools, to receive alerts, so appropriate action can be taken to ease the workload. See *Munin*.

While `countdown` is an integer, `eta` must be a `datetime` object, specifying an exact date and time (including millisecond precision, and timezone information):

```
>>> from datetime import datetime, timedelta

>>> tomorrow = datetime.now() + timedelta(days=1)
>>> add.apply_async(args=[10, 10], eta=tomorrow)
```

### 2.3.3 Expiration

The `expires` argument defines an optional expiry time, either as seconds after task publish, or a specific date and time using :class:~datetime.datetime‘:

```
>>> # Task expires after one minute from now.
>>> add.apply_async(args=[10, 10], expires=60)

>>> # Also supports datetime
>>> from datetime import datetime, timedelta
>>> add.apply_async(args=[10, 10], kwargs,
...                 expires=datetime.now() + timedelta(days=1)
```

When a worker receives an expired task it will mark the task as `REVOKED` (`TaskRevokedError`).

### 2.3.4 Serializers

Data transferred between clients and workers needs to be serialized. The default serializer is `pickle`, but you can change this globally or for each individual task. There is built-in support for `pickle`, `JSON`, `YAML` and `msgpack`, and you can also add your own custom serializers by registering them into the Carrot serializer registry (see Carrot: Serialization of Data).

Each option has its advantages and disadvantages.

**json – JSON is supported in many programming languages, is now** a standard part of Python (since 2.6), and is fairly fast to decode using the modern Python libraries such as `cjson` or `simplejson`.

The primary disadvantage to JSON is that it limits you to the following data types: strings, Unicode, floats, boolean, dictionaries, and lists. Decimals and dates are notably missing.

Also, binary data will be transferred using Base64 encoding, which will cause the transferred data to be around 34% larger than an encoding which supports native binary types.

However, if your data fits inside the above constraints and you need cross-language support, the default setting of JSON is probably your best choice.

See http://json.org for more information.

**pickle – If you have no desire to support any language other than** Python, then using the pickle encoding will gain you the support of all built-in Python data types (except class instances), smaller messages when sending binary files, and a slight speedup over JSON processing.

See http://docs.python.org/library/pickle.html for more information.

**yaml – YAML has many of the same characteristics as json,** except that it natively supports more data types (including dates, recursive references, etc.)

However, the Python libraries for YAML are a good bit slower than the libraries for JSON.

If you need a more expressive set of data types and need to maintain cross-language compatibility, then YAML may be a better fit than the above.

See http://yaml.org/ for more information.

**msgpack – msgpack is a binary serialization format that is closer to JSON** in features. It is very young however, and support should be considered experimental at this point.

See http://msgpack.org/ for more information.

The encoding used is available as a message header, so the worker knows how to deserialize any task. If you use a custom serializer, this serializer must be available for the worker.

The client uses the following order to decide which serializer to use when sending a task:

1. The `serializer` argument to `apply_async`
2. The tasks `serializer` attribute
3. The default `CELERY_TASK_SERIALIZER` setting.

*Using the ``serializer`` argument to ``apply_async``*:

```
>>> add.apply_async(args=[10, 10], serializer="json")
```

## 2.3.5 Connections and connection timeouts.

Currently there is no support for broker connection pools, so `apply_async` establishes and closes a new connection every time it is called. This is something you need to be aware of when sending more than one task at a time.

You handle the connection manually by creating a publisher:

```
numbers = [(2, 2), (4, 4), (8, 8), (16, 16)]

results = []
publisher = add.get_publisher()
try:
    for args in numbers:
        res = add.apply_async(args=args, publisher=publisher)
        results.append(res)
finally:
    publisher.close()
    publisher.connection.close()

print([res.get() for res in results])
```

**Note:** This particularly example is better expressed as a task set. See *Task Sets*. Tasksets already reuses connections.

The connection timeout is the number of seconds to wait before giving up on establishing the connection. You can set this by using the `connect_timeout` argument to `apply_async`:

```
add.apply_async([10, 10], connect_timeout=3)
```

Or if you handle the connection manually:

```
publisher = add.get_publisher(connect_timeout=3)
```

## 2.3.6 Routing options

Celery uses the AMQP routing mechanisms to route tasks to different workers.

Messages (tasks) are sent to exchanges, a queue binds to an exchange with a routing key. Let's look at an example:

Let's pretend we have an application with lot of different tasks: some process video, others process images, and some gather collective intelligence about its users. Some of these tasks are more important, so we want to make sure the high priority tasks get sent to dedicated nodes.

For the sake of this example we have a single exchange called `tasks`. There are different types of exchanges, each type interpreting the routing key in different ways, implementing different messaging scenarios.

The most common types used with Celery are `direct` and `topic`.

- direct

  Matches the routing key exactly.

- topic

  In the topic exchange the routing key is made up of words separated by dots (`.`). Words can be matched by the wild cards `*` and `#`, where `*` matches one exact word, and `#` matches one or many words.

  For example, `*.stock.#` matches the routing keys `usd.stock` and `euro.stock.db` but not `stock.nasdaq`.

We create three queues, `video`, `image` and `lowpri` that binds to the `tasks` exchange. For the queues we use the following binding keys:

```
video: video.#
image: image.#
lowpri: misc.#
```

Now we can send our tasks to different worker machines, by making the workers listen to different queues:

```
>>> add.apply_async(args=[filename],
...                               routing_key="video.compress")

>>> add.apply_async(args=[filename, 360],
...                             routing_key="image.rotate")

>>> add.apply_async(args=[filename, selection],
...                                routing_key="image.crop")
>>> add.apply_async(routing_key="misc.recommend")
```

Later, if the crop task is consuming a lot of resources, we can bind new workers to handle just the "image.crop" task, by creating a new queue that binds to "image.crop".

**See also:**

To find out more about routing, please see *Routing Tasks*.

### 2.3.7 AMQP options

- mandatory

This sets the delivery to be mandatory. An exception will be raised if there are no running workers able to take on the task.

Not supported by `amqplib`.

- immediate

Request immediate delivery. Will raise an exception if the task cannot be routed to a worker immediately.

Not supported by `amqplib`.

- priority

A number between `0` and `9`, where `0` is the highest priority.

**Note:** RabbitMQ does not yet support AMQP priorities.

## 2.4 Workers Guide

### 2.4.1 Starting the worker

You can start celeryd to run in the foreground by executing the command:

```
$ celeryd --loglevel=INFO
```

You probably want to use a daemonization tool to start `celeryd` in the background. See *Running celeryd as a daemon* for help using `celeryd` with popular daemonization tools.

For a full list of available command line options see `celeryd`, or simply do:

```
$ celeryd --help
```

You can also start multiple workers on the same machine. If you do so be sure to give a unique name to each individual worker by specifying a host name with the *–hostname|-n* argument:

```
$ celeryd --loglevel=INFO --concurrency=10 -n worker1.example.com
$ celeryd --loglevel=INFO --concurrency=10 -n worker2.example.com
$ celeryd --loglevel=INFO --concurrency=10 -n worker3.example.com
```

### 2.4.2 Stopping the worker

Shutdown should be accomplished using the `TERM` signal.

When shutdown is initiated the worker will finish all currently executing tasks before it actually terminates, so if these tasks are important you should wait for it to finish before doing anything drastic (like sending the `KILL` signal).

If the worker won’t shutdown after considerate time, for example because of tasks stuck in an infinite-loop, you can use the `KILL` signal to force terminate the worker, but be aware that currently executing tasks will be lost (unless the tasks have the `acks_late` option set).

Also as processes can’t override the `KILL` signal, the worker will not be able to reap its children, so make sure to do so manually. This command usually does the trick:

```
$ ps auxww | grep celeryd | awk '{print $2}' | xargs kill -9
```

### 2.4.3 Restarting the worker

Other than stopping then starting the worker to restart, you can also restart the worker using the `HUP` signal:

```
$ kill -HUP $pid
```

The worker will then replace itself with a new instance using the same arguments as it was started with.

### 2.4.4 Concurrency

Multiprocessing is used to perform concurrent execution of tasks. The number of worker processes can be changed using the `--concurrency` argument and defaults to the number of CPUs available on the machine.

More worker processes are usually better, but there’s a cut-off point where adding more processes affects performance in negative ways. There is even some evidence to support that having multiple celeryd’s running, may perform better than having a single worker. For example 3 celeryd’s with 10 worker processes each. You need to experiment to find the numbers that works best for you, as this varies based on application, work load, task run times and other factors.

### 2.4.5 Persistent revokes

Revoking tasks works by sending a broadcast message to all the workers, the workers then keep a list of revoked tasks in memory.

If you want tasks to remain revoked after worker restart you need to specify a file for these to be stored in, either by using the `--statedb` argument to `celeryd` or the `CELERYD_STATE_DB` setting. See `CELERYD_STATE_DB` for more information.

### 2.4.6 Time limits

New in version 2.0.

A single task can potentially run forever, if you have lots of tasks waiting for some event that will never happen you will block the worker from processing new tasks indefinitely. The best way to defend against this scenario happening is enabling time limits.

The time limit (`--time-limit`) is the maximum number of seconds a task may run before the process executing it is terminated and replaced by a new process. You can also enable a soft time limit (`--soft-time-limit`), this raises an exception the task can catch to clean up before the hard time limit kills it:

```
from celery.decorators import task
from celery.exceptions import SoftTimeLimitExceeded

@task()
def mytask():
    try:
        do_work()
    except SoftTimeLimitExceeded:
        clean_up_in_a_hurry()
```

Time limits can also be set using the `CELERYD_TASK_TIME_LIMIT` / `CELERYD_SOFT_TASK_TIME_LIMIT` settings.

**Note:** Time limits does not currently work on Windows.

### 2.4.7 Max tasks per child setting

With this option you can configure the maximum number of tasks a worker can execute before it's replaced by a new process.

This is useful if you have memory leaks you have no control over for example from closed source C extensions.

The option can be set using the `--maxtasksperchild` argument to `celeryd` or using the `CELERYD_MAX_TASKS_PER_CHILD` setting.

### 2.4.8 Remote control

New in version 2.0.

Workers have the ability to be remote controlled using a high-priority broadcast message queue. The commands can be directed to all, or a specific list of workers.

Commands can also have replies. The client can then wait for and collect those replies. Since there's no central authority to know how many workers are available in the cluster, there is also no way to estimate how many workers may send a reply, so the client has a configurable timeout — the deadline in seconds for replies to arrive in. This timeout defaults to one second. If the worker doesn't reply within the deadline it doesn't necessarily mean the worker didn't reply, or worse is dead, but may simply be caused by network latency or the worker being slow at processing commands, so adjust the timeout accordingly.

In addition to timeouts, the client can specify the maximum number of replies to wait for. If a destination is specified, this limit is set to the number of destination hosts.

**See also:**

The **celeryctl** program is used to execute remote control commands from the command line. It supports all of the commands listed below. See *celeryctl: Management Utility* for more information.

### The `broadcast()` function.

This is the client function used to send commands to the workers. Some remote control commands also have higher-level interfaces using `broadcast()` in the background, like `rate_limit()` and `ping()`.

Sending the `rate_limit` command and keyword arguments:

```
>>> from celery.task.control import broadcast
>>> broadcast("rate_limit", arguments={"task_name": "myapp.mytask",
...                                    "rate_limit": "200/m"})
```

This will send the command asynchronously, without waiting for a reply. To request a reply you have to use the `reply` argument:

```
>>> broadcast("rate_limit", {"task_name": "myapp.mytask",
...                          "rate_limit": "200/m"}, reply=True)
[{'worker1.example.com': 'New rate limit set successfully'},
 {'worker2.example.com': 'New rate limit set successfully'},
 {'worker3.example.com': 'New rate limit set successfully'}]
```

Using the `destination` argument you can specify a list of workers to receive the command:

```
>>> broadcast
>>> broadcast("rate_limit", {"task_name": "myapp.mytask",
...                          "rate_limit": "200/m"}, reply=True,
...            destination=["worker1.example.com"])
[{'worker1.example.com': 'New rate limit set successfully'}]
```

Of course, using the higher-level interface to set rate limits is much more convenient, but there are commands that can only be requested using `broadcast()`.

### Rate limits

Example changing the rate limit for the `myapp.mytask` task to accept 200 tasks a minute on all servers:

```
>>> from celery.task.control import rate_limit
>>> rate_limit("myapp.mytask", "200/m")
```

Example changing the rate limit on a single host by specifying the destination hostname:

```
>>> rate_limit("myapp.mytask", "200/m",
...             destination=["worker1.example.com"])
```

**Warning:** This won't affect workers with the `CELERY_DISABLE_RATE_LIMITS` setting on. To re-enable rate limits then you have to restart the worker.

### Remote shutdown

This command will gracefully shut down the worker remotely:

```
>>> broadcast("shutdown") # shutdown all workers
>>> broadcast("shutdown, destination="worker1.example.com")
```

### Ping

This command requests a ping from alive workers. The workers reply with the string 'pong', and that's just about it. It will use the default one second timeout for replies unless you specify a custom timeout:

```
>>> from celery.task.control import ping
>>> ping(timeout=0.5)
[{'worker1.example.com': 'pong'},
 {'worker2.example.com': 'pong'},
 {'worker3.example.com': 'pong'}]
```

`ping()` also supports the `destination` argument, so you can specify which workers to ping:

```
>>> ping(['worker2.example.com', 'worker3.example.com'])
[{'worker2.example.com': 'pong'},
 {'worker3.example.com': 'pong'}]
```

### Enable/disable events

You can enable/disable events by using the `enable_events`, `disable_events` commands. This is useful to temporarily monitor a worker using **celeryev/celerymon**.

```
>>> broadcast("enable_events")
>>> broadcast("disable_events")
```

### Writing your own remote control commands

Remote control commands are registered in the control panel and they take a single argument: the current `ControlDispatch` instance. From there you have access to the active `celery.worker.listener.CarrotListener` if needed.

Here's an example control command that restarts the broker connection:

```
from celery.worker.control import Panel

@Panel.register
def reset_connection(panel):
    panel.logger.critical("Connection reset by remote control.")
    panel.listener.reset_connection()
    return {"ok": "connection reset"}
```

These can be added to task modules, or you can keep them in their own module then import them using the `CELERY_IMPORTS` setting:

```
CELERY_IMPORTS = ("myapp.worker.control", )
```

## 2.4.9 Inspecting workers

celery.task.control.inspect lets you inspect running workers. It uses remote control commands under the hood.

```
>>> from celery.task.control import inspect

# Inspect all nodes.
>>> i = inspect()

# Specify multiple nodes to inspect.
>>> i = inspect(["worker1.example.com", "worker2.example.com"])

# Specify a single node to inspect.
>>> i = inspect("worker1.example.com")
```

### Dump of registered tasks

You can get a list of tasks registered in the worker using the registered_tasks():

```
>>> i.registered_tasks()
[{'worker1.example.com': ['celery.delete_expired_task_meta',
                          'celery.execute_remote',
                          'celery.map_async',
                          'celery.ping',
                          'celery.task.http.HttpDispatchTask',
                          'tasks.add',
                          'tasks.sleeptask']}]
```

### Dump of currently executing tasks

You can get a list of active tasks using active():

```
>>> i.active()
[{'worker1.example.com':
    [{"name": "tasks.sleeptask",
      "id": "32666e9b-809c-41fa-8e93-5ae0c80afbbf",
      "args": "(8,)",
      "kwargs": "{}"}]}]
```

### Dump of scheduled (ETA) tasks

You can get a list of tasks waiting to be scheduled by using scheduled():

```
>>> i.scheduled()
[{'worker1.example.com':
    [{"eta": "2010-06-07 09:07:52", "priority": 0,
      "request": {
        "name": "tasks.sleeptask",
        "id": "1a7980ea-8b19-413e-91d2-0b74f3844c4d",
        "args": "[1]",
        "kwargs": "{}"}},
     {"eta": "2010-06-07 09:07:53", "priority": 0,
      "request": {
        "name": "tasks.sleeptask",
        "id": "49661b9a-aa22-4120-94b7-9ee8031d219d",
        "args": "[2]",
        "kwargs": "{}"}]}]
```

Note that these are tasks with an eta/countdown argument, not periodic tasks.

#### Dump of reserved tasks

Reserved tasks are tasks that has been received, but is still waiting to be executed.

You can get a list of these using `reserved()`:

```
>>> i.reserved()
[{'worker1.example.com':
    [{"name": "tasks.sleeptask",
      "id": "32666e9b-809c-41fa-8e93-5ae0c80afbbf",
      "args": "(8,)",
      "kwargs": "{}"}]}]
```

## 2.5 Periodic Tasks

### 2.5.1 Introduction

**celerybeat** is a scheduler. It kicks off tasks at regular intervals, which are then executed by the worker nodes available in the cluster.

By default the entries are taken from the `CELERYBEAT_SCHEDULE` setting, but custom stores can also be used, like storing the entries in an SQL database.

You have to ensure only a single scheduler is running for a schedule at a time, otherwise you would end up with duplicate tasks. Using a centralized approach means the schedule does not have to be synchronized, and the service can operate without using locks.

### 2.5.2 Entries

To schedule a task periodically you have to add an entry to the `CELERYBEAT_SCHEDULE` setting.

Example: Run the `tasks.add` task every 30 seconds.

```
from datetime import timedelta

CELERYBEAT_SCHEDULE = {
    "runs-every-30-seconds": {
        "task": "tasks.add",
        "schedule": timedelta(seconds=30),
        "args": (16, 16)
    },
}
```

Using a `timedelta` for the schedule means the task will be executed 30 seconds after `celerybeat` starts, and then every 30 seconds after the last run. A crontab like schedule also exists, see the section on Crontab schedules.

### Available Fields

- `task`

  The name of the task to execute.

- `schedule`

  The frequency of execution.

  This can be the number of seconds as an integer, a `timedelta`, or a `crontab`. You can also define your own custom schedule types, by extending the interface of `schedule`.

- `args`

  Positional arguments (`list` or `tuple`).

- `kwargs`

  Keyword arguments (`dict`).

- `options`

  Execution options (`dict`).

  This can be any argument supported by `apply_async()`, e.g. `exchange`, `routing_key`, `expires`, and so on.

- `relative`

  By default `timedelta` schedules are scheduled "by the clock". This means the frequency is rounded to the nearest second, minute, hour or day depending on the period of the timedelta.

  If `relative` is true the frequency is not rounded and will be relative to the time when **celerybeat** was started.

## 2.5.3 Crontab schedules

If you want more control over when the task is executed, for example, a particular time of day or day of the week, you can use the `crontab` schedule type:

```
from celery.schedules import crontab

CELERYBEAT_SCHEDULE = {
    # Executes every Monday morning at 7:30 A.M
    "every-monday-morning": {
        "task": "tasks.add",
        "schedule": crontab(hour=7, minute=30, day_of_week=1),
        "args": (16, 16),
    },
}
```

The syntax of these crontab expressions are very flexible. Some examples:

| Example | Meaning |
|---|---|
| crontab() | Execute every minute. |
| crontab(minute=0, hour=0) | Execute daily at midnight. |
| crontab(minute=0, hour="*/3") | Execute every three hours: 3am, 6am, 9am, noon, 3pm, 6pm, 9pm. |
| **crontab(minute=0,** hour=[0,3,6,9,12,15,18,21]) | Same as previous. |
| crontab(minute="*/15") | Execute every 15 minutes. |
| crontab(day_of_week="sunday") | Execute every minute (!) at Sundays. |
| **crontab(minute="*",** hour="*", day_of_week="sun") | Same as previous. |
| **crontab(minute="*/10",** hour="3,17,22", day_of_week="thu,fri") | Execute every ten minutes, but only between 3-4 am, 5-6 pm and 10-11 pm on Thursdays or Fridays. |
| crontab(minute=0, hour="*/2,*/3") | Execute every even hour, and every hour divisible by three. This means: at every hour *except*: 1am, 5am, 7am, 11am, 1pm, 5pm, 7pm, 11pm |
| crontab(minute=0, hour="*/5") | Execute hour divisible by 5. This means that it is triggered at 3pm, not 5pm (since 3pm equals the 24-hour clock value of "15", which is divisible by 5). |
| crontab(minute=0, hour="*/3,8-17") | Execute every hour divisible by 3, and every hour during office hours (8am-5pm). |

### 2.5.4 Starting celerybeat

To start the **celerybeat** service:

```
$ celerybeat
```

You can also start `celerybeat` with `celeryd` by using the `-B` option, this is convenient if you only intend to use one worker node:

```
$ celeryd -B
```

Celerybeat needs to store the last run times of the tasks in a local database file (named `celerybeat-schedule` by default), so it needs access to write in the current directory, or alternatively you can specify a custom location for this file:

```
$ celerybeat -s /home/celery/var/run/celerybeat-schedule
```

**Note:** To daemonize celerybeat see *Running celeryd as a daemon*.

#### Using custom scheduler classes

Custom scheduler classes can be specified on the command line (the `-S` argument). The default scheduler is `celery.beat.PersistentScheduler`, which is simply keeping track of the last run times in a local database file (a `shelve`).

`django-celery` also ships with a scheduler that stores the schedule in the Django database:

```
$ celerybeat -S djcelery.schedulers.DatabaseScheduler
```

Using `django-celery`'s scheduler you can add, modify and remove periodic tasks from the Django Admin.

## 2.6 Sets of tasks, Subtasks and Callbacks

### 2.6.1 Subtasks

New in version 2.0.

The `subtask` type is used to wrap the arguments and execution options for a single task invocation:

`subtask(task_name_or_cls, args, kwargs, options)`

For convenience every task also has a shortcut to create subtasks:

`task.subtask(args, kwargs, options)`

`subtask` is actually a `dict` subclass, which means it can be serialized with JSON or other encodings that doesn't support complex Python objects.

Also it can be regarded as a type, as the following usage works:

```
>>> s = subtask("tasks.add", args=(2, 2), kwargs={})

>>> subtask(dict(s))  # coerce dict into subtask
```

This makes it excellent as a means to pass callbacks around to tasks.

#### Callbacks

Let's improve our `add` task so it can accept a callback that takes the result as an argument:

```
from celery.decorators import task
from celery.task.sets import subtask

@task
def add(x, y, callback=None):
    result = x + y
    if callback is not None:
        subtask(callback).delay(result)
    return result
```

`subtask` also knows how it should be applied, asynchronously by `delay()`, and eagerly by `apply()`.

The best thing is that any arguments you add to `subtask.delay`, will be prepended to the arguments specified by the subtask itself!

If you have the subtask:

```
>>> add.subtask(args=(10, ))
```

`subtask.delay(result)` becomes:

```
>>> add.apply_async(args=(result, 10))
```

...

Now let's execute our new `add` task with a callback:

```
>>> add.delay(2, 2, callback=add.subtask((8, )))
```

As expected this will first launch one task calculating `2 + 2`, then another task calculating `4 + 8`.

## 2.6.2 Task Sets

The `TaskSet` enables easy invocation of several tasks at once, and is then able to join the results in the same order as the tasks were invoked.

A task set takes a list of `subtask`'s:

```
>>> from celery.task.sets import TaskSet
>>> from tasks import add

>>> job = TaskSet(tasks=[
...             add.subtask((4, 4)),
...             add.subtask((8, 8)),
...             add.subtask((16, 16)),
...             add.subtask((32, 32)),
... ])

>>> result = job.apply_async()

>>> result.ready()  # has all subtasks completed?
True
>>> result.successful() # was all subtasks successful?

>>> result.join()
[4, 8, 16, 32, 64]
```

### Results

When a `TaskSet` is applied it returns a `TaskSetResult` object.

`TaskSetResult` takes a list of `AsyncResult` instances and operates on them as if it was a single task.

It supports the following operations:

- `successful()`

  Returns `True` if all of the subtasks finished successfully (e.g. did not raise an exception).

- `failed()`

  Returns `True` if any of the subtasks failed.

- `waiting()`

  Returns `True` if any of the subtasks is not ready yet.

- `ready()`

  Return `True` if all of the subtasks are ready.

- `completed_count()`

  Returns the number of completed subtasks.

- `revoke()`

  Revokes all of the subtasks.

- `iterate()`

  Iterates over the return values of the subtasks as they finish, one by one.

- `join()`

  Gather the results for all of the subtasks and return a list with them ordered by the order of which they were called.

## 2.7 HTTP Callback Tasks (Webhooks)

### 2.7.1 Basics

If you need to call into another language, framework or similar, you can do so by using HTTP callback tasks.

The HTTP callback tasks uses GET/POST data to pass arguments and returns result as a JSON response. The scheme to call a task is:

```
GET http://example.com/mytask/?arg1=a&arg2=b&arg3=c
```

or using POST:

```
POST http://example.com/mytask
```

**Note:** POST data needs to be form encoded.

Whether to use GET or POST is up to you and your requirements.

The web page should then return a response in the following format if the execution was successful:

```
{"status": "success", "retval": ....}
```

or if there was an error:

```
{"status": "failure": "reason": "Invalid moon alignment."}
```

### 2.7.2 Django webhook example

With this information you could define a simple task in Django:

```
from django.http import HttpResponse
from anyjson import serialize


def multiply(request):
    x = int(request.GET["x"])
    y = int(request.GET["y"])
    result = x * y
    response = {"status": "success", "retval": result}
    return HttpResponse(serialize(response), mimetype="application/json")
```

### 2.7.3 Ruby on Rails webhook example

or in Ruby on Rails:

```
def multiply
    @x = params[:x].to_i
    @y = params[:y].to_i

    @status = {:status => "success", :retval => @x * @y}

    render :json => @status
end
```

You can easily port this scheme to any language/framework; new examples and libraries are very welcome.

### 2.7.4 Executing webhook tasks

To execute the task you use the `URL` class:

```
>>> from celery.task.http import URL
>>> res = URL("http://example.com/multiply").get_async(x=10, y=10)
```

`URL` is a shortcut to the `HttpDispatchTask`. You can subclass this to extend the functionality.

```
>>> from celery.task.http import HttpDispatchTask
>>> res = HttpDispatchTask.delay(url="http://example.com/multiply", method="GET", x=10, y=10)
>>> res.get()
100
```

The output of **celeryd** (or the log file if enabled) should show the task being executed:

```
[INFO/MainProcess] Task celery.task.http.HttpDispatchTask
        [f2cc8efc-2a14-40cd-85ad-f1c77c94beeb] processed: 100
```

Since applying tasks can be done via HTTP using the `djcelery.views.apply` view, executing tasks from other languages is easy. For an example service exposing tasks via HTTP you should have a look at `examples/celery_http_gateway` in the Celery distribution: http://github.com/ask/celery/tree/master/examples/celery_http_gateway/

## 2.8 Routing Tasks

**Warning:** This document refers to functionality only available in brokers using AMQP. Other brokers may implement some functionality, see their respective documentation for more information, or contact the *Mailing list*.

### 2.8.1 Basics

#### Automatic routing

The simplest way to do routing is to use the `CELERY_CREATE_MISSING_QUEUES` setting (on by default).

With this setting on, a named queue that is not already defined in `CELERY_QUEUES` will be created automatically. This makes it easy to perform simple routing tasks.

Say you have two servers, `x`, and `y` that handles regular tasks, and one server `z`, that only handles feed related tasks. You can use this configuration:

```
CELERY_ROUTES = {"feed.tasks.import_feed": {"queue": "feeds"}}
```

With this route enabled import feed tasks will be routed to the `"feeds"` queue, while all other tasks will be routed to the default queue (named `"celery"` for historic reasons).

Now you can start server `z` to only process the feeds queue like this:

```
(z)$ celeryd -Q feeds
```

You can specify as many queues as you want, so you can make this server process the default queue as well:

```
(z)$ celeryd -Q feeds,celery
```

#### Changing the name of the default queue

You can change the name of the default queue by using the following configuration:

```
CELERY_QUEUES = {"default": {"exchange": "default",
                             "binding_key": "default"}}
CELERY_DEFAULT_QUEUE = "default"
```

#### How the queues are defined

The point with this feature is to hide the complex AMQP protocol for users with only basic needs. However – you may still be interested in how these queues are declared.

A queue named "video" will be created with the following settings:

```
{"exchange": "video",
 "exchange_type": "direct",
 "routing_key": "video"}
```

The non-AMQP backends like ghettoq does not support exchanges, so they require the exchange to have the same name as the queue. Using this design ensures it will work for them as well.

### Manual routing

Say you have two servers, x, and y that handles regular tasks, and one server z, that only handles feed related tasks, you can use this configuration:

```
CELERY_DEFAULT_QUEUE = "default"
CELERY_QUEUES = {
    "default": {
        "binding_key": "task.#",
    },
    "feed_tasks": {
        "binding_key": "feed.#",
    },
}
CELERY_DEFAULT_EXCHANGE = "tasks"
CELERY_DEFAULT_EXCHANGE_TYPE = "topic"
CELERY_DEFAULT_ROUTING_KEY = "task.default"
```

CELERY_QUEUES is a map of queue names and their exchange/type/binding_key, if you don't set exchange or exchange type, they will be taken from the CELERY_DEFAULT_EXCHANGE and CELERY_DEFAULT_EXCHANGE_TYPE settings.

To route a task to the feed_tasks queue, you can add an entry in the CELERY_ROUTES setting:

```
CELERY_ROUTES = {
        "feeds.tasks.import_feed": {
            "queue": "feed_tasks",
            "routing_key": "feed.import",
        },
}
```

You can also override this using the routing_key argument to apply_async(), or send_task():

```
>>> from feeds.tasks import import_feed
>>> import_feed.apply_async(args=["http://cnn.com/rss"],
...                         queue="feed_tasks",
...                         routing_key="feed.import")
```

To make server `z` consume from the feed queue exclusively you can start it with the `-Q` option:

```
(z)$ celeryd -Q feed_tasks --hostname=z.example.com
```

Servers `x` and `y` must be configured to consume from the default queue:

```
(x)$ celeryd -Q default --hostname=x.example.com
(y)$ celeryd -Q default --hostname=y.example.com
```

If you want, you can even have your feed processing worker handle regular tasks as well, maybe in times when there's a lot of work to do:

```
(z)$ celeryd -Q feed_tasks,default --hostname=z.example.com
```

If you have another queue but on another exchange you want to add, just specify a custom exchange and exchange type:

```
CELERY_QUEUES = {
        "feed_tasks": {
            "binding_key": "feed.#",
        },
        "regular_tasks": {
            "binding_key": "task.#",
        },
        "image_tasks": {
            "binding_key": "image.compress",
            "exchange": "mediatasks",
            "exchange_type": "direct",
        },
    }
```

If you're confused about these terms, you should read up on AMQP.

**See also:**

In addition to the *AMQP Primer* below, there's Rabbits and Warrens, an excellent blog post describing queues and exchanges. There's also AMQP in 10 minutes*: Flexible Routing Model, and Standard Exchange Types. For users of RabbitMQ the RabbitMQ FAQ could be useful as a source of information.

## 2.8.2 AMQP Primer

### Messages

A message consists of headers and a body. Celery uses headers to store the content type of the message and its content encoding. The content type is usually the serialization format used to serialize the message. The body contains the name of the task to execute, the task id (UUID), the arguments to execute it with and some additional metadata – like the number of retries or an ETA.

This is an example task message represented as a Python dictionary:

```
{"task": "myapp.tasks.add",
 "id": "54086c5e-6193-4575-8308-dbab76798756",
 "args": [4, 4],
 "kwargs": {}}
```

### Producers, consumers and brokers

The client sending messages is typically called a *publisher*, or a *producer*, while the entity receiving messages is called a *consumer*.

The *broker* is the message server, routing messages from producers to consumers.

You are likely to see these terms used a lot in AMQP related material.

### Exchanges, queues and routing keys.

1. Messages are sent to exchanges.
2. An exchange routes messages to one or more queues. Several exchange types exists, providing different ways to do routing, or implementing different messaging scenarios.
3. The message waits in the queue until someone consumes it.
4. The message is deleted from the queue when it has been acknowledged.

The steps required to send and receive messages are:

1. Create an exchange
2. Create a queue
3. Bind the queue to the exchange.

Celery automatically creates the entities necessary for the queues in `CELERY_QUEUES` to work (except if the queue's `auto_declare` setting is set to `False`).

Here's an example queue configuration with three queues; One for video, one for images and one default queue for everything else:

```
CELERY_QUEUES = {
    "default": {
        "exchange": "default",
        "binding_key": "default"},
    "videos": {
        "exchange": "media",
        "binding_key": "media.video",
    },
    "images": {
        "exchange": "media",
        "binding_key": "media.image",
    }
}
CELERY_DEFAULT_QUEUE = "default"
CELERY_DEFAULT_EXCHANGE_TYPE = "direct"
CELERY_DEFAULT_ROUTING_KEY = "default"
```

**Note:** In Celery the `routing_key` is the key used to send the message, while `binding_key` is the key the queue is bound with. In the AMQP API they are both referred to as the routing key.

### Exchange types

The exchange type defines how the messages are routed through the exchange. The exchange types defined in the standard are *direct*, *topic*, *fanout* and *headers*. Also non-standard exchange types are available as plug-ins to RabbitMQ, like the last-value-cache plug-in by Michael Bridgen.

#### Direct exchanges

Direct exchanges match by exact routing keys, so a queue bound by the routing key `video` only receives messages with that routing key.

#### Topic exchanges

Topic exchanges matches routing keys using dot-separated words, and the wildcard characters: `*` (matches a single word), and `#` (matches zero or more words).

With routing keys like `usa.news`, `usa.weather`, `norway.news` and `norway.weather`, bindings could be `*.news` (all news), `usa.#` (all items in the USA) or `usa.weather` (all USA weather items).

### Related API commands

**`exchange.declare(exchange_name, type, passive, durable, auto_delete, internal)`**
Declares an exchange by name.

**Parameters**

- **passive** – Passive means the exchange won't be created, but you can use this to check if the exchange already exists.
- **durable** – Durable exchanges are persistent. That is - they survive a broker restart.
- **auto_delete** – This means the queue will be deleted by the broker when there are no more queues using it.

`queue.`**`declare`**(*queue_name*, *passive*, *durable*, *exclusive*, *auto_delete*)
Declares a queue by name.

Exclusive queues can only be consumed from by the current connection. Exclusive also implies `auto_delete`.

`queue.`**`bind`**(*queue_name*, *exchange_name*, *routing_key*)
Binds a queue to an exchange with a routing key. Unbound queues will not receive messages, so this is necessary.

`queue.`**`delete`**(*name*, *if_unused=False*, *if_empty=False*)
Deletes a queue and its binding.

`exchange.`**`delete`**(*name*, *if_unused=False*)
Deletes an exchange.

**Note:** Declaring does not necessarily mean "create". When you declare you *assert* that the entity exists and that it's operable. There is no rule as to whom should initially create the exchange/queue/binding, whether consumer or producer. Usually the first one to need it will be the one to create it.

### Hands-on with the API

Celery comes with a tool called **camqadm** (short for Celery AMQ Admin). It's used for command-line access to the AMQP API, enabling access to administration tasks like creating/deleting queues and exchanges, purging queues or sending messages.

You can write commands directly in the arguments to `camqadm`, or just start with no arguments to start it in shell-mode:

```
$ camqadm
-> connecting to amqp://guest@localhost:5672/.
-> connected.
1>
```

Here *1>* is the prompt. The number 1, is the number of commands you have executed so far. Type *help* for a list of commands available. It also supports auto-completion, so you can start typing a command and then hit the *tab* key to show a list of possible matches.

Let's create a queue we can send messages to:

```
1> exchange.declare testexchange direct
ok.
2> queue.declare testqueue
ok. queue:testqueue messages:0 consumers:0.
3> queue.bind testqueue testexchange testkey
ok.
```

This created the direct exchange `testexchange`, and a queue named `testqueue`. The queue is bound to the exchange using the routing key `testkey`.

From now on all messages sent to the exchange `testexchange` with routing key `testkey` will be moved to this queue. We can send a message by using the `basic.publish` command:

```
4> basic.publish "This is a message!" testexchange testkey
ok.
```

Now that the message is sent we can retrieve it again. We use the `basic.get` command here, which pops a single message off the queue, this command is not recommended for production as it implies polling, any real application would declare consumers instead.

Pop a message off the queue:

```
5> basic.get testqueue
{'body': 'This is a message!',
 'delivery_info': {'delivery_tag': 1,
                   'exchange': u'testexchange',
                   'message_count': 0,
                   'redelivered': False,
                   'routing_key': u'testkey'},
 'properties': {}}
```

AMQP uses acknowledgment to signify that a message has been received and processed successfully. If the message has not been acknowledged and consumer channel is closed, the message will be delivered to another consumer.

Note the delivery tag listed in the structure above; Within a connection channel, every received message has a unique delivery tag, This tag is used to acknowledge the message. Also note that delivery tags are not unique across connections, so in another client the delivery tag `1` might point to a different message than in this channel.

You can acknowledge the message we received using `basic.ack`:

```
6> basic.ack 1
ok.
```

To clean up after our test session we should delete the entities we created:

```
7> queue.delete testqueue
ok. 0 messages deleted.
8> exchange.delete testexchange
ok.
```

## 2.8.3 Routing Tasks

### Defining queues

In Celery available queues are defined by the CELERY_QUEUES setting.

Here's an example queue configuration with three queues; One for video, one for images and one default queue for everything else:

```
CELERY_QUEUES = {
    "default": {
        "exchange": "default",
        "binding_key": "default"},
    "videos": {
        "exchange": "media",
        "exchange_type": "topic",
        "binding_key": "media.video",
    },
    "images": {
        "exchange": "media",
        "exchange_type": "topic",
        "binding_key": "media.image",
    }
}
CELERY_DEFAULT_QUEUE = "default"
CELERY_DEFAULT_EXCHANGE = "default"
CELERY_DEFAULT_EXCHANGE_TYPE = "direct"
CELERY_DEFAULT_ROUTING_KEY = "default"
```

Here, the CELERY_DEFAULT_QUEUE will be used to route tasks that doesn't have an explicit route.

The default exchange, exchange type and routing key will be used as the default routing values for tasks, and as the default values for entries in CELERY_QUEUES.

### Specifying task destination

The destination for a task is decided by the following (in order):

1. The *Routers* defined in CELERY_ROUTES.
2. The routing arguments to apply_async().
3. Routing related attributes defined on the Task itself.

It is considered best practice to not hard-code these settings, but rather leave that as configuration options by using *Routers*; This is the most flexible approach, but sensible defaults can still be set as task attributes.

### Routers

A router is a class that decides the routing options for a task.

All you need to define a new router is to create a class with a route_for_task method:

```
class MyRouter(object):

    def route_for_task(self, task, args=None, kwargs=None):
        if task == "myapp.tasks.compress_video":
            return {"exchange": "video",
                    "exchange_type": "topic",
                    "routing_key": "video.compress"}
        return None
```

If you return the `queue` key, it will expand with the defined settings of that queue in `CELERY_QUEUES`:

```
{"queue": "video", "routing_key": "video.compress"}

becomes -->

    {"queue": "video",
     "exchange": "video",
     "exchange_type": "topic",
     "routing_key": "video.compress"}
```

You install router classes by adding them to the `CELERY_ROUTES` setting:

```
CELERY_ROUTES = (MyRouter, )
```

Router classes can also be added by name:

```
CELERY_ROUTES = ("myapp.routers.MyRouter", )
```

For simple task name -> route mappings like the router example above, you can simply drop a dict into `CELERY_ROUTES` to get the same behavior:

```
CELERY_ROUTES = ({"myapp.tasks.compress_video": {
                        "queue": "video",
                        "routing_key": "video.compress"
                 }}, )
```

The routers will then be traversed in order, it will stop at the first router returning a true value, and use that as the final route for the task.

## 2.9 Monitoring Guide

## 2.9.1 Introduction

There are several tools available to monitor and inspect Celery clusters.

This document describes some of these, as as well as features related to monitoring, like events and broadcast commands.

## 2.9.2 Workers

### celeryctl: Management Utility

New in version 2.1.

`celeryctl` is a command line utility to inspect and manage worker nodes (and to some degree tasks).

To list all the commands available do:

```
$ celeryctl help
```

or to get help for a specific command do:

```
$ celeryctl <command> --help
```

#### Commands

- **status: List active nodes in this cluster**

  ```
  $ celeryctl status
  ```

- **result: Show the result of a task**

```
$ celeryctl result -t tasks.add 4e196aa4-0141-4601-8138-7aa33db0f577
```

Note that you can omit the name of the task as long as the task doesn't use a custom result backend.

- **inspect active: List active tasks**

  ```
  $ celeryctl inspect active
  ```

  These are all the tasks that are currently being executed.

- **inspect scheduled: List scheduled ETA tasks**

  ```
  $ celeryctl inspect scheduled
  ```

  These are tasks reserved by the worker because they have the `eta` or `countdown` argument set.

- **inspect reserved: List reserved tasks**

  ```
  $ celeryctl inspect reserved
  ```

  This will list all tasks that have been prefetched by the worker, and is currently waiting to be executed (does not include tasks with an eta).

- **inspect revoked: List history of revoked tasks**

  ```
  $ celeryctl inspect revoked
  ```

- **inspect registered_tasks: List registered tasks**

  ```
  $ celeryctl inspect registered_tasks
  ```

- **inspect states: Show worker statistics**

  ```
  $ celeryctl inspect stats
  ```

- **inspect enable_events: Enable events**

  ```
  $ celeryctl inspect enable_events
  ```

- **inspect disable_events: Disable events**

  ```
  $ celeryctl inspect disable_events
  ```

**Note:** All `inspect` commands supports a `--timeout` argument, This is the number of seconds to wait for responses. You may have to increase this timeout if you're getting empty responses due to latency.

#### Specifying destination nodes

By default the inspect commands operates on all workers. You can specify a single, or a list of workers by using the `--destination` argument:

```
$ celeryctl inspect -d w1,w2 reserved
```

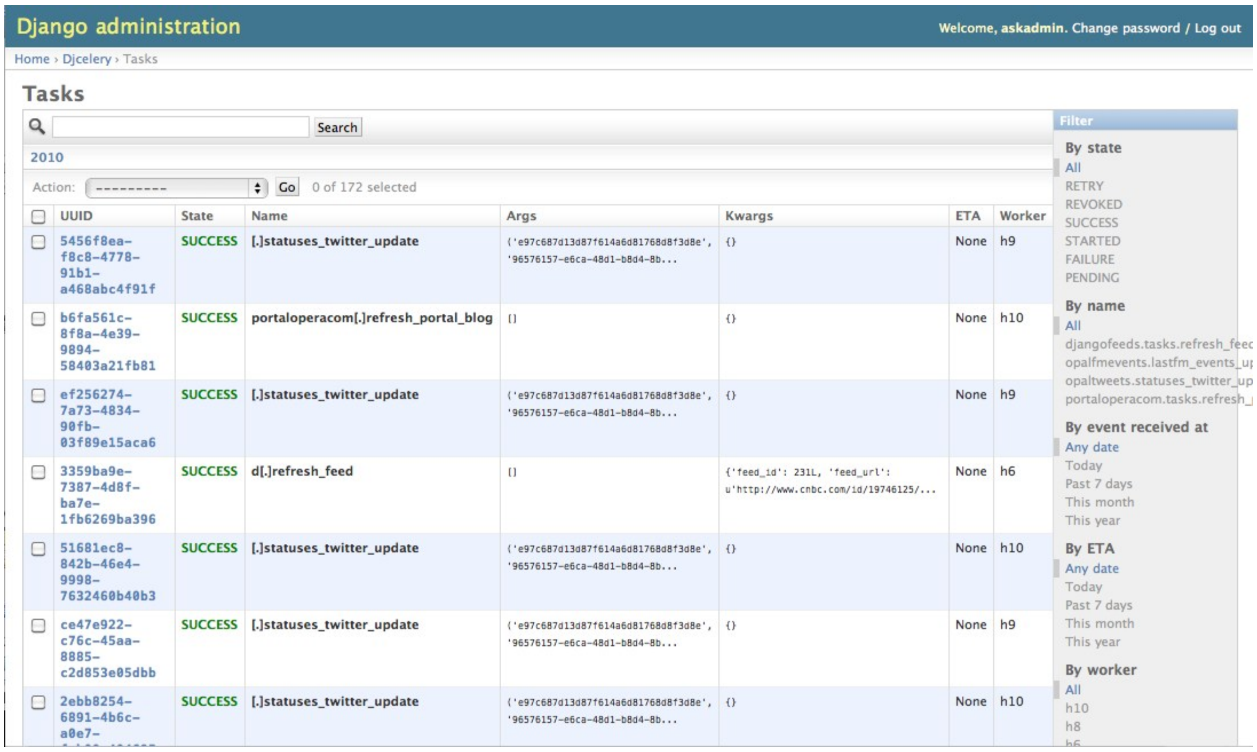
### Django Admin Monitor

New in version 2.1.

When you add django-celery to your Django project you will automatically get a monitor section as part of the Django admin interface.

This can also be used if you're not using Celery with a Django project.

*Screenshot*



Django administration

Welcome, askadmin. Change password / Log out

Home › Djcelery › Tasks

Tasks

2010

Action: --------- Go 0 of 172 selected

| UUID | State | Name | Args | Kwargs | ETA | Worker |
|---|---|---|---|---|---|---|
| 5456f8ea-f8c8-4778-91b1-a468abc4f91f | SUCCESS | [.]statuses_twitter_update | ('e97c687d13d87f614a6d81768d8f3d8e', '96576157-e6ca-48d1-b8d4-8b... | {} | None | h9 |
| b6fa561c-8f8a-4e39-9894-58403a21fb81 | SUCCESS | portaloperacom[.]refresh_portal_blog | [] | {} | None | h10 |
| ef256274-7a73-4834-90fb-03f89e15aca6 | SUCCESS | [.]statuses_twitter_update | ('e97c687d13d87f614a6d81768d8f3d8e', '96576157-e6ca-48d1-b8d4-8b... | {} | None | h9 |
| 3359ba9e-7387-4d8f-ba7e-1fb6269ba396 | SUCCESS | d[.]refresh_feed | [] | {'feed_id': 231L, 'feed_url': u'http://www.cnbc.com/id/19746125/... | None | h6 |
| 51681ec8-842b-46e4-9998-7632460b40b3 | SUCCESS | [.]statuses_twitter_update | ('e97c687d13d87f614a6d81768d8f3d8e', '96576157-e6ca-48d1-b8d4-8b... | {} | None | h10 |
| ce47e922-c76c-45aa-8885-c2d853e05dbb | SUCCESS | [.]statuses_twitter_update | ('e97c687d13d87f614a6d81768d8f3d8e', '96576157-e6ca-48d1-b8d4-8b... | {} | None | h9 |
| 2ebb8254-6891-4b6c-a0e7- | SUCCESS | [.]statuses_twitter_update | ('e97c687d13d87f614a6d81768d8f3d8e', '96576157-e6ca-48d1-b8d4-8b... | {} | None | h10 |

Filter

By state
All
RETRY
REVOKED
SUCCESS
STARTED
FAILURE
PENDING

By name
All
djangofeeds.tasks.refresh_fee
opalfmevents.lastfm_events_u
opaltweets.statuses_twitter_up
portaloperacom.tasks.refresh_

By event received at
Any date
Today
Past 7 days
This month
This year

By ETA
Any date
Today
Past 7 days
This month
This year

By worker
All
h10
h8

## Starting the monitor

The Celery section will already be present in your admin interface, but you won't see any data appearing until you start the snapshot camera.

The camera takes snapshots of the events your workers sends at regular intervals, storing them in your database (See *Snapshots*).

To start the camera run:

```
$ python manage.py celerycam
```

If you haven't already enabled the sending of events you need to do so:

```
$ python manage.py celeryctl inspect enable_events
```

**Tip** You can enable events when the worker starts using the `-E` argument to `celeryd`.

Now that the camera has been started, and events have been enabled you should be able to see your workers and the tasks in the admin interface (it may take some time for workers to show up).

The admin interface shows tasks, worker nodes, and even lets you perform some actions, like revoking and rate limiting tasks, or shutting down worker nodes.

### Shutter frequency

By default the camera takes a snapshot every second, if this is too frequent or you want to have higher precision, then you can change this using the `--frequency` argument. This is a float describing how often, in seconds, it should wake up to check if there are any new events:

```
$ python manage.py celerycam --frequency=3.0
```

The camera also supports rate limiting using the `--maxrate` argument. While the frequency controls how often the camera thread wakes up, the rate limit controls how often it will actually take a snapshot.

The rate limits can be specified in seconds, minutes or hours by appending `/s`, `/m` or `/h` to the value. Example: `--maxrate=100/m`, means "hundred writes a minute".

The rate limit is off by default, which means it will take a snapshot for every `--frequency` seconds.

The events also expire after some time, so the database doesn't fill up. Successful tasks are deleted after 1 day, failed tasks after 3 days, and tasks in other states after 5 days.

### Using outside of Django

*django-celery* also installs the **djcelerymon** program. This can be used by non-Django users, and runs both a web server and a snapshot camera in the same process.

**Installing**

Using **pip**:

```
$ pip install -U django-celery
```

or using **easy_install**:

```
$ easy_install -U django-celery
```

**Running**

**djcelerymon** reads configuration from your Celery configuration module, and sets up the Django environment using the same settings:

```
$ djcelerymon
```

Database tables will be created the first time the monitor is run. By default an `sqlite3` database file named `djcelerymon.db` is used, so make sure this file is writeable by the user running the monitor.

If you want to store the events in a different database, e.g. MySQL, then you can configure the `DATABASE*` settings directly in your Celery config module. See http://docs.djangoproject.com/en/dev/ref/settings/#databases for more information about the database options available.

You will also be asked to create a superuser (and you need to create one to be able to log into the admin later):

```
Creating table auth_permission
Creating table auth_group_permissions
[...]

You just installed Django's auth system, which means you don't
have any superusers defined.  Would you like to create
one now? (yes/no): yes
Username (Leave blank to use 'username'): username
E-mail address: me@example.com
Password: ******
```

```
Password (again): ******
Superuser created successfully.

[...]
Django version 1.2.1, using settings 'celeryconfig'
Development server is running at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

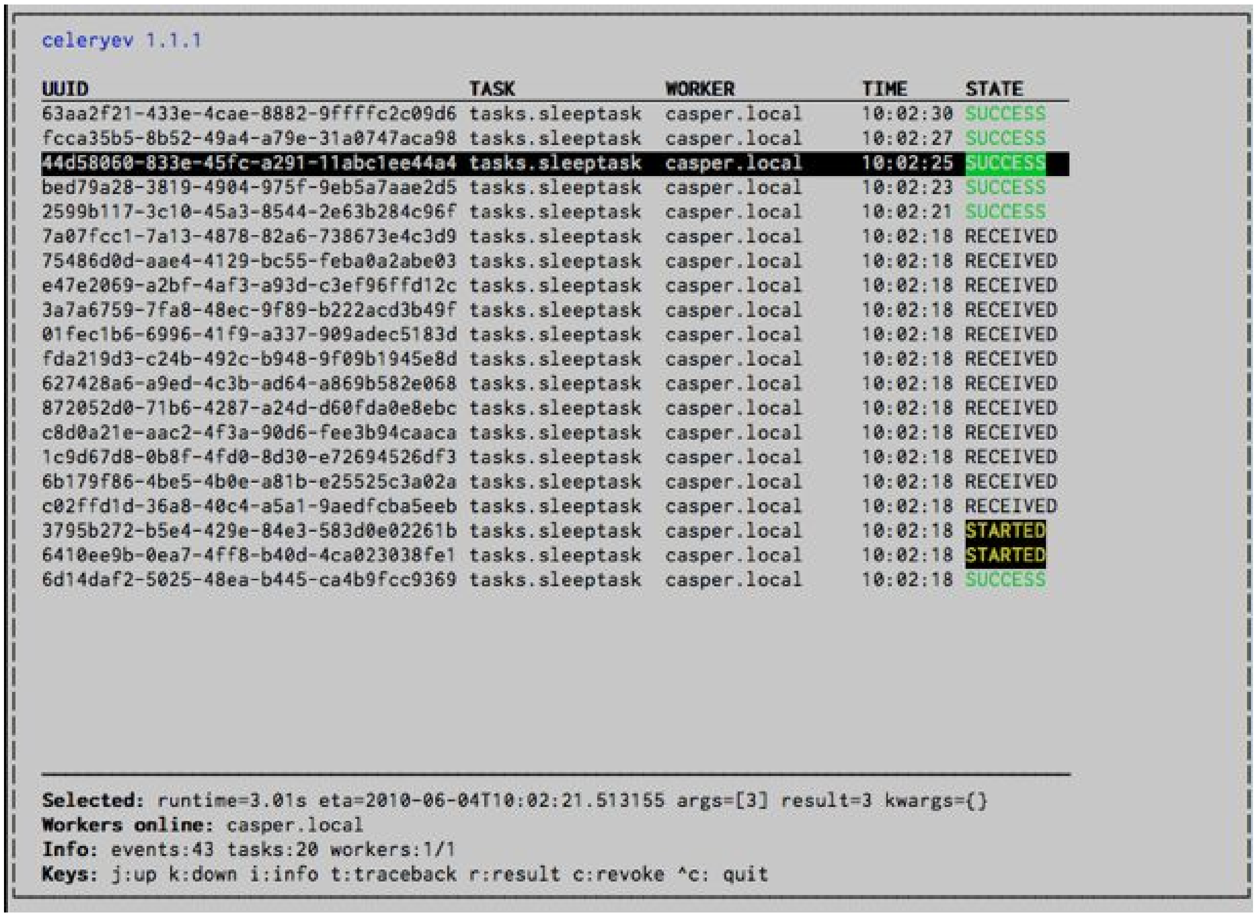
Now that the service is started you can visit the monitor at http://127.0.0.1:8000, and log in using the user you created.

For a list of the command line options supported by **djcelerymon**, please see `djcelerymon --help`.

### celeryev: Curses Monitor

New in version 2.0.

`celeryev` is a simple curses monitor displaying task and worker history. You can inspect the result and traceback of tasks, and it also supports some management commands like rate limiting and shutting down workers.



```
celeryev 1.1.1

UUID                                 TASK              WORKER          TIME     STATE
63aa2f21-433e-4cae-8882-9ffffc2c09d6 tasks.sleeptask  casper.local    10:02:30 SUCCESS
fcca35b5-8b52-49a4-a79e-31a0747aca98 tasks.sleeptask  casper.local    10:02:27 SUCCESS
44d58060-833e-45fc-a291-11abc1ee44a4 tasks.sleeptask  casper.local    10:02:25 SUCCESS
bed79a28-3819-4904-975f-9eb5a7aae2d5 tasks.sleeptask  casper.local    10:02:23 SUCCESS
2599b117-3c10-45a3-8544-2e63b284c96f tasks.sleeptask  casper.local    10:02:21 SUCCESS
7a07fcc1-7a13-4878-82a6-738673e4c3d9 tasks.sleeptask  casper.local    10:02:18 RECEIVED
75486d0d-aae4-4129-bc55-feba0a2abe03 tasks.sleeptask  casper.local    10:02:18 RECEIVED
e47e2069-a2bf-4af3-a93d-c3ef96ffd12c tasks.sleeptask  casper.local    10:02:18 RECEIVED
3a7a6759-7fa8-48ec-9f89-b222acd3b49f tasks.sleeptask  casper.local    10:02:18 RECEIVED
01fec1b6-6996-41f9-a337-909adec5183d tasks.sleeptask  casper.local    10:02:18 RECEIVED
fda219d3-c24b-492c-b948-9f09b1945e8d tasks.sleeptask  casper.local    10:02:18 RECEIVED
627428a6-a9ed-4c3b-ad64-a869b582e068 tasks.sleeptask  casper.local    10:02:18 RECEIVED
872052d0-71b6-4287-a24d-d60fda0e8ebc tasks.sleeptask  casper.local    10:02:18 RECEIVED
c8d0a21e-aac2-4f3a-90d6-fee3b94caaca tasks.sleeptask  casper.local    10:02:18 RECEIVED
1c9d67d8-0b8f-4fd0-8d30-e72694526df3 tasks.sleeptask  casper.local    10:02:18 RECEIVED
6b179f86-4be5-4b0e-a81b-e25525c3a02a tasks.sleeptask  casper.local    10:02:18 RECEIVED
c02ffd1d-36a8-40c4-a5a1-9aedfcba5eeb tasks.sleeptask  casper.local    10:02:18 RECEIVED
3795b272-b5e4-429e-84e3-583d0e02261b tasks.sleeptask  casper.local    10:02:18 STARTED
6410ee9b-0ea7-4ff8-b40d-4ca023038fe1 tasks.sleeptask  casper.local    10:02:18 STARTED
6d14daf2-5025-48ea-b445-ca4b9fcc9369 tasks.sleeptask  casper.local    10:02:18 SUCCESS

Selected: runtime=3.01s eta=2010-06-04T10:02:21.513155 args=[3] result=3 kwargs={}
Workers online: casper.local
Info: events:43 tasks:20 workers:1/1
Keys: j:up k:down i:info t:traceback r:result c:revoke ^c: quit
```

`celeryev` is also used to start snapshot cameras (see *Snapshots*:

```
$ celeryev --camera=<camera-class> --frequency=1.0
```

and it includes a tool to dump events to `stdout`:

```
$ celeryev --dump
```

For a complete list of options use `--help`:

```
$ celeryev --help
```

### celerymon: Web monitor

celerymon is the ongoing work to create a web monitor. It's far from complete yet, and does currently only support a JSON API. Help is desperately needed for this project, so if you, or someone you know would like to contribute templates, design, code or help this project in any way, please get in touch!

**Tip** The Django admin monitor can be used even though you're not using Celery with a Django project. See *Using outside of Django*.

## 2.9.3 RabbitMQ

To manage a Celery cluster it is important to know how RabbitMQ can be monitored.

RabbitMQ ships with the rabbitmqctl(1) command, with this you can list queues, exchanges, bindings, queue lengths, the memory usage of each queue, as well as manage users, virtual hosts and their permissions.

**Note:** The default virtual host (`"/"`) is used in these examples, if you use a custom virtual host you have to add the `-p` argument to the command, e.g: `rabbitmqctl list_queues -p my_vhost ....`

### Inspecting queues

Finding the number of tasks in a queue:

```
$ rabbitmqctl list_queues name messages messages_ready \
                          messages_unacknowlged
```

Here `messages_ready` is the number of messages ready for delivery (sent but not received), `messages_unacknowledged` is the number of messages that has been received by a worker but not acknowledged yet (meaning it is in progress, or has been reserved). `messages` is the sum of ready and unacknowledged messages combined.

Finding the number of workers currently consuming from a queue:

```
$ rabbitmqctl list_queues name consumers
```

Finding the amount of memory allocated to a queue:

```
$ rabbitmqctl list_queues name memory
```

**Tip** Adding the `-q` option to rabbitmqctl(1) makes the output easier to parse.

## 2.9.4 Munin

This is a list of known Munin plug-ins that can be useful when maintaining a Celery cluster.

- rabbitmq-munin: Munin plug-ins for RabbitMQ.

  http://github.com/ask/rabbitmq-munin

- celery_tasks: Monitors the number of times each task type has been executed (requires `celerymon`).

  http://exchange.munin-monitoring.org/plugins/celery_tasks-2/details

- celery_task_states: Monitors the number of tasks in each state (requires `celerymon`).

  http://exchange.munin-monitoring.org/plugins/celery_tasks/details

## 2.9.5 Events

The worker has the ability to send a message whenever some event happens. These events are then captured by tools like **celerymon** and **celeryev** to monitor the cluster.

### Snapshots

Even a single worker can produce a huge amount of events, so storing the history of all events on disk may be very expensive.

A sequence of events describes the cluster state in that time period, by taking periodic snapshots of this state we can keep all history, but still only periodically write it to disk.

To take snapshots you need a Camera class, with this you can define what should happen every time the state is captured; You can write it to a database, send it by e-mail or something else entirely.

**celeryev** is then used to take snapshots with the camera, for example if you want to capture state every 2 seconds using the camera `myapp.Camera` you run **celeryev** with the following arguments:

```
$ celeryev -c myapp.Camera --frequency=2.0
```

#### Custom Camera

Here is an example camera, dumping the snapshot to screen:

```
from pprint import pformat

from celery.events.snapshot import Polaroid


class DumpCam(Polaroid):

    def shutter(self, state):
        if not state.event_count:
            # No new events since last snapshot.
            return
        print("Workers: %s" % (pformat(state.workers, indent=4), ))
        print("Tasks: %s" % (pformat(state.tasks, indent=4), ))
        print("Total: %s events, %s tasks" % (
            state.event_count, state.task_count))
```

See the API reference for `celery.events.state` to read more about state objects.

Now you can use this cam with `celeryev` by specifying it with the `-c` option:

```
$ celeryev -c myapp.DumpCam --frequency=2.0
```

Or you can use it programmatically like this:

```
from celery.events import EventReceiver
from celery.messaging import establish_connection
from celery.events.state import State
from myapp import DumpCam

def main():
    state = State()
    with establish_connection() as connection:
        recv = EventReceiver(connection, handlers={"*": state.event})
        with DumpCam(state, freq=1.0):
            recv.capture(limit=None, timeout=None)

if __name__ == "__main__":
    main()
```

### Event Reference

This list contains the events sent by the worker, and their arguments.

#### Task Events

- `task-received(uuid, name, args, kwargs, retries, eta, hostname, timestamp)`

  Sent when the worker receives a task.

- `task-started(uuid, hostname, timestamp)`

  Sent just before the worker executes the task.

- `task-succeeded(uuid, result, runtime, hostname, timestamp)`

  Sent if the task executed successfully.

  Runtime is the time it took to execute the task using the pool. (Starting from the task is sent to the worker pool, and ending when the pool result handler callback is called).

- `task-failed(uuid, exception, traceback, hostname, timestamp)`

  Sent if the execution of the task failed.

- `task-revoked(uuid)`

  Sent if the task has been revoked (Note that this is likely to be sent by more than one worker).

- `task-retried(uuid, exception, traceback, hostname, timestamp)`

  Sent if the task failed, but will be retried in the future.

#### Worker Events

- `worker-online(hostname, timestamp)`

  The worker has connected to the broker and is online.

- `worker-heartbeat(hostname, timestamp)`

  Sent every minute, if the worker has not sent a heartbeat in 2 minutes, it is considered to be offline.

- `worker-offline(hostname, timestamp)`

The worker has disconnected from the broker.

## 2.10 Optimizing

### 2.10.1 Introduction

The default configuration, like any good default, is full of compromises. It is not tweaked to be optimal for any single use case, but tries to find middle ground that works *well enough* for most situations.

There are key optimizations to be done if your application is mainly processing lots of short tasks, and also if you have fewer but very long tasks.

### 2.10.2 Worker Settings

#### Prefetch limit

*Prefetch* is a term inherited from AMQP, and it is often misunderstood.

The prefetch limit is a limit for how many tasks a worker can reserve in advance. If this is set to zero, the worker will keep consuming messages *ad infinitum*, not respecting that there may be other available worker nodes (that may be able to process them sooner), or that the messages may not fit in memory.

The workers initial prefetch count is set by multiplying the `CELERYD_PREFETCH_MULTIPLIER` setting by the number of child worker processes. The default is 4 messages per child process.

If you have many expensive tasks with a long duration you would want the multiplier value to be 1, which means it will only reserve one unacknowledged task per worker process at a time.

However – If you have lots of short tasks, and throughput/roundtrip latency is important to you, then you want this number to be large. Say 64, or 128 for example, as the worker is able to process a lot more tasks/s if the messages have already been prefetched in memory. You may have to experiment to find the best value.

If you have a combination of both very long and short tasks, then the best option is to use two worker nodes that is configured individually, and route the tasks accordingly (see *Routing Tasks*).

### 2.10.3 Scenario 1: Lots of short tasks

```
CELERYD_PREFETCH_MULTIPLIER = 128
CELERY_DISABLE_RATE_LIMITS = True
```

### 2.10.4 Scenario 2: Expensive tasks

```
CELERYD_PREFETCH_MULTIPLIER = 1
```

CHAPTER 3

# Configuration and defaults

This document describes the configuration options available.

If you're using the default loader, you must create the `celeryconfig.py` module and make sure it is available on the Python path.

## 3.1 Example configuration file

This is an example configuration file to get you started. It should contain all you need to run a basic Celery set-up.

```
# List of modules to import when celery starts.
CELERY_IMPORTS = ("myapp.tasks", )

## Result store settings.
CELERY_RESULT_BACKEND = "database"
CELERY_RESULT_DBURI = "sqlite:///mydatabase.db"
```

```
## Broker settings.
BROKER_HOST = "localhost"
BROKER_PORT = 5672
BROKER_VHOST = "/"
BROKER_USER = "guest"
BROKER_PASSWORD = "guest"

## Worker settings
## If you're doing mostly I/O you can have more processes,
## but if mostly spending CPU, try to keep it close to the
## number of CPUs on your machine. If not set, the number of CPUs/cores
## available will be used.
CELERYD_CONCURRENCY = 10
# CELERYD_LOG_FILE = "celeryd.log"
# CELERYD_LOG_LEVEL = "INFO"
```

## 3.2 Configuration Directives

### 3.2.1 Concurrency settings

#### CELERYD_CONCURRENCY

The number of concurrent worker processes, executing tasks simultaneously.

Defaults to the number of CPUs/cores available.

#### CELERYD_PREFETCH_MULTIPLIER

How many messages to prefetch at a time multiplied by the number of concurrent processes. The default is 4 (four messages for each process). The default setting is usually a good choice, however – if you have very long running tasks waiting in the queue and you have to start the workers, note that the first worker to start will receive four times the number of messages initially. Thus the tasks may not be fairly distributed to the workers.

### 3.2.2 Task result backend settings

#### CELERY_RESULT_BACKEND

The backend used to store task results (tombstones). Can be one of the following:

- **database (default)** Use a relational database supported by SQLAlchemy. See *Database backend settings*.
- **cache** Use memcached to store the results. See *Cache backend settings*.
- **mongodb** Use MongoDB to store the results. See *MongoDB backend settings*.
- **redis** Use Redis to store the results. See *Redis backend settings*.
- **tyrant** Use Tokyo Tyrant to store the results. See *Tokyo Tyrant backend settings*.
- **amqp** Send results back as AMQP messages See *AMQP backend settings*.

### 3.2.3 Database backend settings

#### CELERY_RESULT_DBURI

Please see Supported Databases for a table of supported databases. To use this backend you need to configure it with an Connection String, some examples include:

```
# sqlite (filename)
CELERY_RESULT_DBURI = "sqlite:///celerydb.sqlite"

# mysql
CELERY_RESULT_DBURI = "mysql://scott:tiger@localhost/foo"

# postgresql
CELERY_RESULT_DBURI = "postgresql://scott:tiger@localhost/mydatabase"

# oracle
CELERY_RESULT_DBURI = "oracle://scott:tiger@127.0.0.1:1521/sidname"
```

See Connection String for more information about connection strings.

#### CELERY_RESULT_ENGINE_OPTIONS

To specify additional SQLAlchemy database engine options you can use the `CELERY_RESULT_ENGINE_OPTIONS` setting:

```
# echo enables verbose logging from SQLAlchemy.
CELERY_RESULT_ENGINE_OPTIONS = {"echo": True}
```

#### Example configuration

```
CELERY_RESULT_BACKEND = "database"
CELERY_RESULT_DBURI = "mysql://user:password@host/dbname"
```

### 3.2.4 AMQP backend settings

#### CELERY_AMQP_TASK_RESULT_EXPIRES

The time in seconds of which the task result queues should expire.

**Note:** AMQP result expiration requires RabbitMQ versions 2.1.0 and higher.

#### CELERY_RESULT_EXCHANGE

Name of the exchange to publish results in. Default is `"celeryresults"`.

#### CELERY_RESULT_EXCHANGE_TYPE

The exchange type of the result exchange. Default is to use a `direct` exchange.

#### CELERY_RESULT_SERIALIZER

Result message serialization format. Default is `"pickle"`. See *Serializers*.

#### CELERY_RESULT_PERSISTENT

If set to `True`, result messages will be persistent. This means the messages will not be lost after a broker restart. The default is for the results to be transient.

#### Example configuration

```
CELERY_RESULT_BACKEND = "amqp"
CELERY_AMQP_TASK_RESULT_EXPIRES = 18000  # 5 hours.
```

## 3.2.5 Cache backend settings

**Note:** The cache backend supports the pylibmc and *python-memcached* libraries. The latter is used only if pylibmc is not installed.

#### CELERY_CACHE_BACKEND

Using a single memcached server:

```
CELERY_CACHE_BACKEND = 'memcached://127.0.0.1:11211/'
```

Using multiple memcached servers:

```
CELERY_RESULT_BACKEND = "cache"
CELERY_CACHE_BACKEND = 'memcached://172.19.26.240:11211;172.19.26.242:11211/'
```

#### CELERY_CACHE_BACKEND_OPTIONS

You can set pylibmc options using the `CELERY_CACHE_BACKEND_OPTIONS` setting:

```
CELERY_CACHE_BACKEND_OPTIONS = {"binary": True,
                                "behaviors": {"tcp_nodelay": True}}
```

## 3.2.6 Tokyo Tyrant backend settings

**Note:** The Tokyo Tyrant backend requires the `pytyrant` library: http://pypi.python.org/pypi/pytyrant/

This backend requires the following configuration directives to be set:

#### TT_HOST

Host name of the Tokyo Tyrant server.

#### TT_PORT

The port the Tokyo Tyrant server is listening to.

#### Example configuration

```
CELERY_RESULT_BACKEND = "tyrant"
TT_HOST = "localhost"
TT_PORT = 1978
```

### 3.2.7 Redis backend settings

**Note:** The Redis backend requires the `redis` library: http://pypi.python.org/pypi/redis/0.5.5

To install the redis package use `pip` or `easy_install`:

```
$ pip install redis
```

This backend requires the following configuration directives to be set.

#### REDIS_HOST

Host name of the Redis database server. e.g. *“localhost”*.

#### REDIS_PORT

Port to the Redis database server. e.g. `6379`.

#### REDIS_DB

Database number to use. Default is 0

#### REDIS_PASSWORD

Password used to connect to the database.

#### Example configuration

```
CELERY_RESULT_BACKEND = "redis"
REDIS_HOST = "localhost"
REDIS_PORT = 6379
REDIS_DB = 0
REDIS_CONNECT_RETRY = True
```

### 3.2.8 MongoDB backend settings

**Note:** The MongoDB backend requires the pymongo library: http://github.com/mongodb/mongo-python-driver/tree/master

#### CELERY_MONGODB_BACKEND_SETTINGS

This is a dict supporting the following keys:

- **host** Host name of the MongoDB server. Defaults to "localhost".
- **port** The port the MongoDB server is listening to. Defaults to 27017.
- **user** User name to authenticate to the MongoDB server as (optional).
- **password** Password to authenticate to the MongoDB server (optional).
- **database** The database name to connect to. Defaults to "celery".
- **taskmeta_collection** The collection name to store task meta data. Defaults to "celery_taskmeta".

#### Example configuration

```
CELERY_RESULT_BACKEND = "mongodb"
CELERY_MONGODB_BACKEND_SETTINGS = {
    "host": "192.168.1.100",
    "port": 30000,
    "database": "mydb",
    "taskmeta_collection": "my_taskmeta_collection",
}
```

### 3.2.9 Message Routing

#### CELERY_QUEUES

The mapping of queues the worker consumes from. This is a dictionary of queue name/options. See *Routing Tasks* for more information.

The default is a queue/exchange/binding key of `"celery"`, with exchange type `direct`.

You don't have to care about this unless you want custom routing facilities.

#### CELERY_ROUTES

A list of routers, or a single router used to route tasks to queues. When deciding the final destination of a task the routers are consulted in order. See *Routers* for more information.

#### CELERY_CREATE_MISSING_QUEUES

If enabled (default), any queues specified that is not defined in `CELERY_QUEUES` will be automatically created. See *Automatic routing*.

#### CELERY_DEFAULT_QUEUE

The queue used by default, if no custom queue is specified. This queue must be listed in `CELERY_QUEUES`. The default is: `celery`.

**See also:**

*Changing the name of the default queue*

#### CELERY_DEFAULT_EXCHANGE

Name of the default exchange to use when no custom exchange is specified. The default is: `celery`.

#### CELERY_DEFAULT_EXCHANGE_TYPE

Default exchange type used when no custom exchange is specified. The default is: `direct`.

#### CELERY_DEFAULT_ROUTING_KEY

The default routing key used when sending tasks. The default is: `celery`.

#### CELERY_DEFAULT_DELIVERY_MODE

Can be `transient` or `persistent`. The default is to send persistent messages.

### 3.2.10 Broker Settings

#### BROKER_BACKEND

The messaging backend to use. Default is `"amqplib"`.

#### BROKER_HOST

Hostname of the broker.

#### BROKER_PORT

Custom port of the broker. Default is to use the default port for the selected backend.

#### BROKER_USER

Username to connect as.

#### BROKER_PASSWORD

Password to connect with.

#### BROKER_VHOST

Virtual host. Default is `"/"`.

#### BROKER_USE_SSL

Use SSL to connect to the broker. Off by default. This may not be supported by all transports.

#### BROKER_CONNECTION_TIMEOUT

The default timeout in seconds before we give up establishing a connection to the AMQP server. Default is 4 seconds.

#### BROKER_CONNECTION_RETRY

Automatically try to re-establish the connection to the AMQP broker if lost.

The time between retries is increased for each retry, and is not exhausted before `CELERY_BROKER_CONNECTION_MAX_RETRIES` is exceeded.

This behavior is on by default.

#### CELERY_BROKER_CONNECTION_MAX_RETRIES

Maximum number of retries before we give up re-establishing a connection to the AMQP broker.

If this is set to `0` or `None`, we will retry forever.

Default is 100 retries.

### 3.2.11 Task execution settings

#### CELERY_ALWAYS_EAGER

If this is `True`, all tasks will be executed locally by blocking until it is finished. `apply_async` and `Task.delay` will return a `EagerResult` which emulates the behavior of `AsyncResult`, except the result has already been evaluated.

Tasks will never be sent to the queue, but executed locally instead.

#### CELERY_EAGER_PROPAGATES_EXCEPTIONS

If this is `True`, eagerly executed tasks (using `.apply`, or with `CELERY_ALWAYS_EAGER` on), will raise exceptions.

It's the same as always running `apply` with `throw=True`.

#### CELERY_IGNORE_RESULT

Whether to store the task return values or not (tombstones). If you still want to store errors, just not successful return values, you can set `CELERY_STORE_ERRORS_EVEN_IF_IGNORED`.

### CELERY_TASK_RESULT_EXPIRES

Time (in seconds, or a `timedelta` object) for when after stored task tombstones will be deleted.

A built-in periodic task will delete the results after this time (`celery.task.builtins.backend_cleanup`).

**Note:** For the moment this only works with the database, cache, redis and MongoDB backends. For the AMQP backend see `CELERY_AMQP_TASK_RESULT_EXPIRES`.

When using the database or MongoDB backends, `celerybeat` must be running for the results to be expired.

### CELERY_MAX_CACHED_RESULTS

Total number of results to store before results are evicted from the result cache. The default is 5000.

### CELERY_TRACK_STARTED

If `True` the task will report its status as "started" when the task is executed by a worker. The default value is `False` as the normal behaviour is to not report that level of granularity. Tasks are either pending, finished, or waiting to be retried. Having a "started" state can be useful for when there are long running tasks and there is a need to report which task is currently running.

### CELERY_TASK_SERIALIZER

A string identifying the default serialization method to use. Can be `pickle` (default), `json`, `yaml`, or any custom serialization methods that have been registered with `carrot.serialization.registry`.

**See also:**

*Serializers*.

### CELERY_DEFAULT_RATE_LIMIT

The global default rate limit for tasks.

This value is used for tasks that does not have a custom rate limit The default is no rate limit.

### CELERY_DISABLE_RATE_LIMITS

Disable all rate limits, even if tasks has explicit rate limits set.

### CELERY_ACKS_LATE

Late ack means the task messages will be acknowledged **after** the task has been executed, not *just before*, which is the default behavior.

**See also:**

FAQ: *Should I use retry or acks_late?*.

## 3.2.12 Worker: celeryd

### CELERY_IMPORTS

A sequence of modules to import when the celery daemon starts.

This is used to specify the task modules to import, but also to import signal handlers and additional remote control commands, etc.

### CELERYD_MAX_TASKS_PER_CHILD

Maximum number of tasks a pool worker process can execute before it's replaced with a new one. Default is no limit.

### CELERYD_TASK_TIME_LIMIT

Task hard time limit in seconds. The worker processing the task will be killed and replaced with a new one when this is exceeded.

### CELERYD_TASK_SOFT_TIME_LIMIT

Task soft time limit in seconds.

The `SoftTimeLimitExceeded` exception will be raised when this is exceeded. The task can catch this to e.g. clean up before the hard time limit comes.

Example:

```
from celery.decorators import task
from celery.exceptions import SoftTimeLimitExceeded

@task()
def mytask():
    try:
        return do_work()
    except SoftTimeLimitExceeded:
        cleanup_in_a_hurry()
```

### CELERY_STORE_ERRORS_EVEN_IF_IGNORED

If set, the worker stores all task errors in the result store even if `Task.ignore_result` is on.

### CELERYD_STATE_DB

Name of the file used to stores persistent worker state (like revoked tasks). Can be a relative or absolute path, but be aware that the suffix `.db` may be appended to the file name (depending on Python version).

Can also be set via the *--statedb* argument to `celeryd`.

Not enabled by default.

#### CELERYD_ETA_SCHEDULER_PRECISION

Set the maximum time in seconds that the ETA scheduler can sleep between rechecking the schedule. Default is 1 second.

Setting this value to 1 second means the schedulers precision will be 1 second. If you need near millisecond precision you can set this to 0.1.

### 3.2.13 Error E-Mails

#### CELERY_SEND_TASK_ERROR_EMAILS

The default value for the *Task.send_error_emails* attribute, which if set to `True` means errors occurring during task execution will be sent to `ADMINS` by e-mail.

#### CELERY_TASK_ERROR_WHITELIST

A white list of exceptions to send error e-mails for.

#### ADMINS

List of *(name, email_address)* tuples for the administrators that should receive error e-mails.

#### SERVER_EMAIL

The e-mail address this worker sends e-mails from. Default is celery@localhost.

#### MAIL_HOST

The mail server to use. Default is `"localhost"`.

#### MAIL_HOST_USER

User name (if required) to log on to the mail server with.

#### MAIL_HOST_PASSWORD

Password (if required) to log on to the mail server with.

#### MAIL_PORT

The port the mail server is listening on. Default is `25`.

#### Example E-Mail configuration

This configuration enables the sending of error e-mails to george@vandelay.com and kramer@vandelay.com:

```
# Enables error e-mails.
CELERY_SEND_TASK_ERROR_EMAILS = True

# Name and e-mail addresses of recipients
ADMINS = (
    ("George Costanza", "george@vandelay.com"),
    ("Cosmo Kramer", "kosmo@vandelay.com"),
)

# E-mail address used as sender (From field).
SERVER_EMAIL = "no-reply@vandelay.com"

# Mailserver configuration
EMAIL_HOST = "mail.vandelay.com"
EMAIL_PORT = 25
# EMAIL_HOST_USER = "servers"
# EMAIL_HOST_PASSWORD = "s3cr3t"

EMAIL_TIMEOUT = 2   # two seconds is the default
```

## 3.2.14 Events

#### CELERY_SEND_EVENTS

Send events so the worker can be monitored by tools like `celerymon`.

#### CELERY_EVENT_QUEUE

Name of the queue to consume event messages from. Default is `"celeryevent"`.

#### CELERY_EVENT_EXCHANGE

Name of the exchange to send event messages to. Default is `"celeryevent"`.

#### CELERY_EVENT_EXCHANGE_TYPE

The exchange type of the event exchange. Default is to use a `"direct"` exchange.

#### CELERY_EVENT_ROUTING_KEY

Routing key used when sending event messages. Default is `"celeryevent"`.

#### CELERY_EVENT_SERIALIZER

Message serialization format used when sending event messages. Default is `"json"`. See *Serializers*.

## 3.2.15 Broadcast Commands

### CELERY_BROADCAST_QUEUE

Name prefix for the queue used when listening for broadcast messages. The workers host name will be appended to the prefix to create the final queue name.

Default is `"celeryctl"`.

### CELERY_BROADCAST_EXCHANGE

Name of the exchange used for broadcast messages.

Default is `"celeryctl"`.

### CELERY_BROADCAST_EXCHANGE_TYPE

Exchange type used for broadcast messages. Default is `"fanout"`.

## 3.2.16 Logging

### CELERYD_LOG_FILE

The default file name the worker daemon logs messages to. Can be overridden using the *`--logfile`* option to `celeryd`.

The default is `None` (`stderr`)

### CELERYD_LOG_LEVEL

Worker log level, can be one of `DEBUG`, `INFO`, `WARNING`, `ERROR` or `CRITICAL`.

Can also be set via the *`--loglevel`* argument to `celeryd`.

See the `logging` module for more information.

### CELERYD_LOG_FORMAT

The format to use for log messages.

Default is `[%(asctime)s: %(levelname)s/%(processName)s] %(message)s`

See the Python `logging` module for more information about log formats.

### CELERYD_TASK_LOG_FORMAT

The format to use for log messages logged in tasks. Can be overridden using the *`--loglevel`* option to `celeryd`.

Default is:

```
[%(asctime)s: %(levelname)s/%(processName)s]
    [%(task_name)s(%(task_id)s)] %(message)s
```

See the Python `logging` module for more information about log formats.

#### CELERY_REDIRECT_STDOUTS

If enabled `stdout` and `stderr` will be redirected to the current logger.

Enabled by default. Used by **celeryd** and **celerybeat**.

#### CELERY_REDIRECT_STDOUTS_LEVEL

The log level output to *stdout* and *stderr* is logged as. Can be one of `DEBUG`, `INFO`, `WARNING`, `ERROR` or `CRITICAL`.

Default is `WARNING`.

### 3.2.17 Custom Component Classes (advanced)

#### CELERYD_POOL

Name of the task pool class used by the worker. Default is `celery.concurrency.processes.TaskPool`.

#### CELERYD_LISTENER

Name of the listener class used by the worker. Default is `celery.worker.listener.CarrotListener`.

#### CELERYD_MEDIATOR

Name of the mediator class used by the worker. Default is `celery.worker.controllers.Mediator`.

#### CELERYD_ETA_SCHEDULER

Name of the ETA scheduler class used by the worker. Default is `celery.worker.controllers.ScheduleController`.

### 3.2.18 Periodic Task Server: celerybeat

#### CELERYBEAT_SCHEDULE

The periodic task schedule used by `celerybeat`. See *Entries*.

#### CELERYBEAT_SCHEDULER

The default scheduler class. Default is `"celery.beat.PersistentScheduler"`.

Can also be set via the *-S* argument to `celerybeat`.

#### CELERYBEAT_SCHEDULE_FILENAME

Name of the file used by `PersistentScheduler` to store the last run times of periodic tasks. Can be a relative or absolute path, but be aware that the suffix `.db` may be appended to the file name (depending on Python version).

Can also be set via the *--schedule* argument to `celerybeat`.

#### CELERYBEAT_MAX_LOOP_INTERVAL

The maximum number of seconds `celerybeat` can sleep between checking the schedule. Default is 300 seconds (5 minutes).

#### CELERYBEAT_LOG_FILE

The default file name to log messages to. Can be overridden using the *–logfile*‘ option to `celerybeat`.

The default is `None` (`stderr`).

#### CELERYBEAT_LOG_LEVEL

Logging level. Can be any of `DEBUG`, `INFO`, `WARNING`, `ERROR`, or `CRITICAL`.

Can also be set via the `--loglevel` argument to `celerybeat`.

See the `logging` module for more information.

### 3.2.19 Monitor Server: celerymon

#### CELERYMON_LOG_FILE

The default file name to log messages to. Can be overridden using the `--logfile` argument to `celerymon`.

The default is `None` (`stderr`)

#### CELERYMON_LOG_LEVEL

Logging level. Can be any of `DEBUG`, `INFO`, `WARNING`, `ERROR`, or `CRITICAL`.

See the `logging` module for more information.

CHAPTER 4

# Cookbook

## 4.1 Creating Tasks

### 4.1.1 Ensuring a task is only executed one at a time

You can accomplish this by using a lock.

In this example we'll be using the cache framework to set a lock that is accessible for all workers.

It's part of an imaginary RSS feed importer called `djangofeeds`. The task takes a feed URL as a single argument, and imports that feed into a Django model called `Feed`. We ensure that it's not possible for two or more workers to import the same feed at the same time by setting a cache key consisting of the MD5 checksum of the feed URL.

The cache key expires after some time in case something unexpected happens (you never know, right?)

```
from celery.task import Task
from django.core.cache import cache
from django.utils.hashcompat import md5_constructor as md5
from djangofeeds.models import Feed

LOCK_EXPIRE = 60 * 5 # Lock expires in 5 minutes

class FeedImporter(Task):
    name = "feed.import"

    def run(self, feed_url, **kwargs):
        logger = self.get_logger(**kwargs)

        # The cache key consists of the task name and the MD5 digest
        # of the feed URL.
        feed_url_digest = md5(feed_url).hexdigest()
        lock_id = "%s-lock-%s" % (self.name, feed_url_hexdigest)

        # cache.add fails if if the key already exists
        acquire_lock = lambda: cache.add(lock_id, "true", LOCK_EXPIRE)
        # memcache delete is very slow, but we have to use it to take
        # advantage of using add() for atomic locking
        release_lock = lambda: cache.delete(lock_id)
        logger.debug("Importing feed: %s" % feed_url)
        if acquire_lock():
            try:
                feed = Feed.objects.import_feed(feed_url)
            finally:
                release_lock()
            return feed.url

        logger.debug(
            "Feed %s is already being imported by another worker" % (
                feed_url))
        return
```

## 4.2 Running celeryd as a daemon

Celery does not daemonize itself, please use one of the following daemonization tools.

### 4.2.1 start-stop-daemon (Debian/Ubuntu/++)

See the contrib/debian/init.d/ directory in the celery distribution, this directory contains init scripts for celeryd and celerybeat.

These scripts are configured in `/etc/default/celeryd`.

#### Init script: celeryd

**Usage** `/etc/init.d/celeryd {start|stop|force-reload|restart|try-restart|status}`

**Configuration file** /etc/default/celeryd

To configure celeryd you probably need to at least tell it where to change directory to when it starts (to find your *celeryconfig*).

##### Example configuration

This is an example configuration for a Python project.

`/etc/default/celeryd`:

```
# Where to chdir at start.
CELERYD_CHDIR="/opt/Myproject/"

# Extra arguments to celeryd
CELERYD_OPTS="--time-limit 300"

# Name of the celery config module.#
CELERY_CONFIG_MODULE="celeryconfig"
```

#### Example Django configuration

This is an example configuration for those using `django-celery`:

```
# Where the Django project is.
CELERYD_CHDIR="/opt/Project/"

# Path to celeryd
CELERYD="/opt/Project/manage.py celeryd"

# Name of the projects settings module.
export DJANGO_SETTINGS_MODULE="settings"
```

#### Available options

- **CELERYD_OPTS** Additional arguments to celeryd, see `celeryd --help` for a list.
- **CELERYD_CHDIR** Path to change directory to at start. Default is to stay in the current directory.
- **CELERYD_PID_FILE** Full path to the PID file. Default is /var/run/celeryd.pid.
- **CELERYD_LOG_FILE** Full path to the celeryd log file. Default is /var/log/celeryd.log
- **CELERYD_LOG_LEVEL** Log level to use for celeryd. Default is INFO.
- **CELERYD** Path to the celeryd program. Default is `celeryd`. You can point this to an virtualenv, or even use manage.py for django.
- **CELERYD_USER** User to run celeryd as. Default is current user.
- **CELERYD_GROUP** Group to run celeryd as. Default is current user.

### Init script: celerybeat

**Usage** `/etc/init.d/celerybeat {start|stop|force-reload|restart|try-restart|status}`

**Configuration file** /etc/default/celerybeat or /etc/default/celeryd

#### Example configuration

This is an example configuration for a Python project:

`/etc/default/celeryd`:

```
# Where to chdir at start.
CELERYD_CHDIR="/opt/Myproject/"

# Extra arguments to celeryd
CELERYD_OPTS="--time-limit 300"

# Extra arguments to celerybeat
CELERYBEAT_OPTS="--schedule=/var/run/celerybeat-schedule"

# Name of the celery config module.#
CELERY_CONFIG_MODULE="celeryconfig"
```

#### Example Django configuration

This is an example configuration for those using `django-celery`:

```
# Where the Django project is.
CELERYD_CHDIR="/opt/Project/"

# Name of the projects settings module.
DJANGO_SETTINGS_MODULE="settings"

# Path to celeryd
CELERYD="/opt/Project/manage.py celeryd"

# Path to celerybeat
CELERYBEAT="/opt/Project/manage.py celerybeat"

# Extra arguments to celerybeat
CELERYBEAT_OPTS="--schedule=/var/run/celerybeat-schedule"
```

#### Available options

- **CELERYBEAT_OPTS** Additional arguments to celerybeat, see `celerybeat --help` for a list.
- **CELERYBEAT_PIDFILE** Full path to the PID file. Default is /var/run/celeryd.pid.
- **CELERYBEAT_LOGFILE** Full path to the celeryd log file. Default is /var/log/celeryd.log
- **CELERYBEAT_LOG_LEVEL** Log level to use for celeryd. Default is INFO.
- **CELERYBEAT** Path to the celeryd program. Default is `celeryd`. You can point this to an virtualenv, or even use manage.py for django.
- **CELERYBEAT_USER** User to run celeryd as. Default is current user.
- **CELERYBEAT_GROUP** Group to run celeryd as. Default is current user.

### Troubleshooting

If you can't get the init scripts to work, you should try running them in *verbose mode*:

```
$ sh -x /etc/init.d/celeryd start
```

This can reveal hints as to why the service won't start.

Also you will see the commands generated, so you can try to run the celeryd command manually to read the resulting error output.

For example my `sh -x` output does this:

```
++ start-stop-daemon --start --chdir /opt/Opal/release/opal --quiet \
    --oknodo --background --make-pidfile --pidfile /var/run/celeryd.pid \
    --exec /opt/Opal/release/opal/manage.py celeryd -- --time-limit=300 \
    -f /var/log/celeryd.log -l INFO
```

Run the celeryd command after `--exec` (without the `--`) to show the actual resulting output:

```
$ /opt/Opal/release/opal/manage.py celeryd --time-limit=300 \
    -f /var/log/celeryd.log -l INFO
```

### 4.2.2 supervisord

- contrib/supervisord/

### 4.2.3 launchd (OS X)

- contrib/mac/

This page contains common recipes and techniques.

CHAPTER 5

# Community Resources

This is a list of external blog posts, tutorials and slides related to Celery. If you have a link that's missing from this list, please contact the mailing-list or submit a patch.

## 5.1 Resources

### 5.1.1 Who's using Celery

http://wiki.github.com/ask/celery/using

### 5.1.2 Wiki

http://wiki.github.com/ask/celery/

### 5.1.3 Celery questions on Stack Overflow

http://stackoverflow.com/search?q=celery&tab=newest

### 5.1.4 Mailing-list Archive: celery-users

http://blog.gmane.org/gmane.comp.python.amqp.celery.user

### 5.1.5 IRC Logs

http://botland.oebfare.com/logger/celery/

## 5.2 News

### 5.2.1 Building a Django App Server with Chef

http://ericholscher.com/blog/2010/nov/11/building-django-app-server-chef-part-4/

### 5.2.2 Introducció a Celery (Catalan)

http://trespams.com/2010/11/13/introduccio-celery/

### 5.2.3 Django and Celery - Death to Cron

http://tensixtyone.com/django-and-celery-death-to-cron

### 5.2.4 Celery Tips

http://ericholscher.com/blog/2010/nov/2/celery-tips/

### 5.2.5 What's your favorite Django app?

http://jacobian.org/writing/favorite-apps/

### 5.2.6 Virtualenv Tips

http://ericholscher.com/blog/2010/nov/1/virtualenv-tips/

### 5.2.7 10 Tools That Make Django Better

http://iamseb.com/seb/2010/10/10-django-tools/

### 5.2.8 Distributed Task Locking in Celery

http://www.loose-bits.com/2010_10_10_archive.html

### 5.2.9 Celery —   Python (Russian)

http://www.bitbybit.ru/article/216

### 5.2.10  Celery (Russian)

http://vorushin.ru/blog/34-celery-described/

### 5.2.11 Celery, RabbitMQ and sending messages directly.

http://blog.timc3.com/2010/10/17/celery-rabbitmq-and-sending-messages-directly/

### 5.2.12 Cron dentro do Django com Celery (Portugese)

http://blog.avelino.us/2010/10/cron-dentro-do-django-com-celery.html

### 5.2.13 RabbitMQCeleryDjango (Japanese)

http://d.hatena.ne.jp/yuku_t/

### 5.2.14 Kaninchen & Schlangen: RabbitMQ & Python (German)

http://www.scribd.com/doc/37562923/Kaninchen-Schlangen-RabbitMQ-Python

### 5.2.15 Celery - Eine asynchrone Task Queue (nicht nur) für Django (German)

http://www.scribd.com/doc/39203296/Celery-Eine-asynchrone-Task-Queue-nicht-nur-fur-Django

### 5.2.16 Asynchronous Processing Using Celery (historio.us)

http://blog.historio.us/asynchronous-processing-using-celery

### 5.2.17 "Massaging the Pony: Message Queues and You" (Djangocon 2010)

http://www.slideshare.net/shawnrider/massaging-the-pony-message-queues-and-you

### 5.2.18 "Large problems, Mostly Solved" (Djangocon 2010)

http://www.slideshare.net/ericholscher/large-problems

### 5.2.19 A Simple Celery with Django How-To

http://shawnmilo.blogspot.com/2010/07/simple-celery-with-django-how-to.html

### 5.2.20 Django and asynchronous jobs

http://www.davidfischer.name/2010/09/django-and-asynchronous-jobs/

### 5.2.21 Celery:    Django (Russian)

http://www.proft.com.ua/2010/09/4/celery-dobavlyaem-parallelizm-v-django/

### 5.2.22 Celery presentation at PyCon India 2010

http://in.pycon.org/2010/talks/50-python-celery http://in.pycon.org/2010/static/files/talks/50/mahendra-celery-pycon-2010.pdf

### 5.2.23 celery, django and virtualenv playing nice.

http://tumblr.whatupderek.com/post/1072002968/celery-django-and-virtualenv-playing-nice

### 5.2.24 Django Task Queueing with Celery

http://justinvoss.wordpress.com/2010/06/22/django-task-queueing-with-celery/

### 5.2.25 django-celery presentation at DJUGL 2010.

http://www.slideshare.net/matclayton/django-celery

### 5.2.26 Django/Celery Quickstart (or, how I learned to stop using cron and love celery)

http://bitkickers.blogspot.com/2010/07/djangocelery-quickstart-or-how-i.html

### 5.2.27 Using Python magic to improve the deferred API

http://blog.notdot.net/2010/06/Using-Python-magic-to-improve-the-deferred-API

### 5.2.28 How Celery, Carrot, and your messaging stack work

http://jasonmbaker.com/how-celery-carrot-and-your-messaging-stack-wo

### 5.2.29 Large Problems in Django, Mostly Solved: Delayed Execution

http://ericholscher.com/blog/2010/jun/23/large-problems-django-mostly-solved-delayed-execut/

### 5.2.30 Introduction to Celery

Awesome slides from when Idan Gazit had a talk about Celery at PyWeb-IL: http://www.slideshare.net/idangazit/an-introduction-to-celery

### 5.2.31 RabbitMQ, Celery and Django

Great Celery tutorial by Robert Pogorzelski at his blog "Happy Stream of Thoughts": http://robertpogorzelski.com/blog/2009/09/10/rabbitmq-celery-and-django/

### 5.2.32 Message Queues, Django and Celery Quick Start

Celery tutorial by Rich Leland, the installation section is Mac OS X specific: http://mathematism.com/2010/feb/16/message-queues-django-and-celery-quick-start/

### 5.2.33 Background task processing and deferred execution in Django

**Alon Swartz writes about celery and RabbitMQ on his blog:** http://www.turnkeylinux.org/blog/django-celery-rabbitmq

### 5.2.34 Build a processing queue [...] in less than a day using RabbitMQ and Celery

Tutorial in 2 parts written by Tim Bull: http://timbull.com/build-a-processing-queue-with-multi-threading

### 5.2.35 How to get celeryd to work on FreeBSD

Installing multiprocessing on FreeBSD isn't that easy, but thanks to Viktor Petersson we now have a step-to-step guide: http://www.playingwithwire.com/2009/10/how-to-get-celeryd-to-work-on-freebsd/

### 5.2.36 Web-based 3D animation software

Indy Chang Liu at ThinkingCactus uses Celery to render animations asynchronously (PDF): http://ojs.pythonpapers.org/index.php/tppm/article/viewFile/105/122

### 5.2.37 Queued Storage Backend for Django

http://stepsandnumbers.com/archive/2010/01/04/queued-storage-backend-for-django/

### 5.2.38 RabbitMQ with Python and Ruby

http://www.slideshare.net/hungryblank/rabbitmq-with-python-and-ruby-rupy-2009

CHAPTER 6

# Contributing

## 6.1 Community Code of Conduct

The goal is to maintain a diverse community that is pleasant for everyone. That is why we would greatly appreciate it if everyone contributing to and interacting with the community also followed this Code of Conduct.

The Code of Conduct covers our behavior as members of the community, in any forum, mailing list, wiki, website, Internet relay chat (IRC), public meeting or private correspondence.

The Code of Conduct is heavily based on the Ubuntu Code of Conduct, and the Pylons Code of Conduct.

### 6.1.1 Be considerate.

Your work will be used by other people, and you in turn will depend on the work of others. Any decision you take will affect users and colleagues, and we expect you to take those consequences into account when making decisions. Even if it's not obvious at the time, our contributions to Ubuntu will impact the work of others. For example, changes to code, infrastructure, policy, documentation and translations during a release may negatively impact others work.

### 6.1.2 Be respectful.

The Celery community and its members treat one another with respect. Everyone can make a valuable contribution to Celery. We may not always agree, but disagreement is no excuse for poor behavior and poor manners. We might all experience some frustration now and then, but we cannot allow that frustration to turn into a personal attack. It's important to remember that a community where people feel uncomfortable or threatened is not a productive one. We expect members of the Celery community to be respectful when dealing with other contributors as well as with people outside the Celery project and with users of Celery.

### 6.1.3 Be collaborative.

Collaboration is central to Celery and to the larger free software community. We should always be open to collaboration. Your work should be done transparently and patches from Celery should be given back to the community when they are made, not just when the distribution releases. If you wish to work on new code for existing upstream projects, at least keep those projects informed of your ideas and progress. It many not be possible to get consensus from upstream, or even from your colleagues about the correct implementation for an idea, so don't feel obliged to have that agreement before you begin, but at least keep the outside world informed of your work, and publish your work in a way that allows outsiders to test, discuss and contribute to your efforts.

### 6.1.4 When you disagree, consult others.

Disagreements, both political and technical, happen all the time and the Celery community is no exception. It is important that we resolve disagreements and differing views constructively and with the help of the community and community process. If you really want to go a different way, then we encourage you to make a derivative distribution or alternate set of packages that still build on the work we've done to utilize as common of a core as possible.

### 6.1.5 When you are unsure, ask for help.

Nobody knows everything, and nobody is expected to be perfect. Asking questions avoids many problems down the road, and so questions are encouraged. Those who are asked questions should be responsive and helpful. However, when asking a question, care must be taken to do so in an appropriate forum.

### 6.1.6 Step down considerately.

Developers on every project come and go and Celery is no different. When you leave or disengage from the project, in whole or in part, we ask that you do so in a way that minimizes disruption to the project. This means you should tell people you are leaving and take the proper steps to ensure that others can pick up where you leave off.

## 6.2 Reporting a Bug

Bugs can always be described to the *Mailing list*, but the best way to report an issue and to ensure a timely response is to use the issue tracker.

1. Create a GitHub account.

You need to create a GitHub account to be able to create new issues and participate in the discussion.

2. Determine if your bug is really a bug.

You should not file a bug if you are requesting support. For that you can use the *Mailing list*, or *IRC*.

3. Make sure your bug hasn't already been reported.

Search through the appropriate Issue tracker. If a bug like yours was found, check if you have new information that could be reported to help the developers fix the bug.

4. Collect information about the bug.

To have the best chance of having a bug fixed, we need to be able to easily reproduce the conditions that caused it. Most of the time this information will be from a Python traceback message, though some bugs might be in design, spelling or other errors on the website/docs/code.

If the error is from a Python traceback, include it in the bug report.

We also need to know what platform you're running (Windows, OSX, Linux, etc), the version of your Python interpreter, and the version of Celery, and related packages that you were running when the bug occurred.

5. Submit the bug.

By default GitHub will email you to let you know when new comments have been made on your bug. In the event you've turned this feature off, you should check back on occasion to ensure you don't miss any questions a developer trying to fix the bug might ask.

### 6.2.1 Issue Trackers

Bugs for a package in the Celery ecosystem should be reported to the relevant issue tracker.

- Celery: http://github.com/ask/celery/issues/
- Django-Celery: http://github.com/ask/django-celery/issues
- Flask-Celery: http://github.com/ask/flask-celery/issues
- Celery-Pylons: http://bitbucket.org/ianschenck/celery-pylons/issues
- Kombu: http://github.com/ask/kombu/issues
- Carrot: http://github.com/ask/carrot/issues
- Ghettoq: http://github.com/ask/ghettoq/issues

If you are unsure of the origin of the bug you can ask the *Mailing list*, or just use the Celery issue tracker.

## 6.3 Coding Style

You should probably be able to pick up the coding style from surrounding code, but it is a good idea to be aware of the following conventions.

- All Python code must follow the PEP-8 guidelines.

pep8.py is an utility you can use to verify that your code is following the conventions.

- Docstrings must follow the PEP-257 conventions, and use the following style.

  Do this:

  ```
  def method(self, arg):
      """Short description.

      More details.

      """
  ```

  or:

  ```
  def method(self, arg):
      """Short description."""
  ```

  but not this:

```
def method(self, arg):
    """
    Short description.
    """
```

- Lines should not exceed 78 columns.
- Import order
  - Python standard library (*import xxx*)
  - Python standard library (‘from xxx import‘)
  - Third party packages.
  - Other modules from the current package.

  or in case of code using Django:

  - Python standard library (*import xxx*)
  - Python standard library (‘from xxx import‘)
  - Third party packages.
  - Django packages.
  - Other modules from the current package.

  Within these sections imports should be sorted by name.

  Example:

```
import threading
import time

from collections import deque
from Queue import Queue, Empty

from celery.datastructures import TokenBucket
from celery.utils import timeutils
from celery.utils.compat import all, izip_longest, chain_from_iterable
```

- Wildcard imports must not be used (*from xxx import* *).

CHAPTER 7

# Tutorials

**Release** 2.1

**Date** February 04, 2014

## 7.1 Using Celery with Redis/Database as the messaging queue.

There's a plug-in for celery that enables the use of Redis or an SQL database as the messaging queue. This is not part of celery itself, but exists as an extension to carrot.

### 7.1.1 Installation

You need to install the ghettoq library:

```
$ pip install -U ghettoq
```

### 7.1.2 Redis

For the Redis support you have to install the Python redis client:

```
$ pip install -U redis
```

#### Configuration

Configuration is easy, set the carrot backend, and configure the location of your Redis database:

```
CARROT_BACKEND = "ghettoq.taproot.Redis"

BROKER_HOST = "localhost"  # Maps to redis host.
BROKER_PORT = 6379         # Maps to redis port.
BROKER_VHOST = "0"         # Maps to database number.
```

### 7.1.3 Database

#### Configuration

The database backend uses the Django `DATABASE_*` settings for database configuration values.

1. Set your carrot backend:

   ```
   CARROT_BACKEND = "ghettoq.taproot.Database"
   ```

2. Add `ghettoq` to `INSTALLED_APPS`:

   ```
   INSTALLED_APPS = ("ghettoq", )
   ```

3. Verify you database settings:

   ```
   DATABASE_ENGINE = "mysql"
   DATABASE_NAME = "mydb"
   DATABASE_USER = "myuser"
   DATABASE_PASSWORD = "secret"
   ```

   The above is just an example, if you haven't configured your database before you should read the Django database settings reference: http://docs.djangoproject.com/en/1.1/ref/settings/#database-engine

1. Sync your database schema.

   When using Django:

   ```
   $ python manage.py syncdb
   ```

#### Important notes

These message queues does not have the concept of exchanges and routing keys, there's only the queue entity. As a result of this you need to set the name of the exchange to be the same as the queue:

```
CELERY_DEFAULT_EXCHANGE = "tasks"
```

or in a custom queue-mapping:

```
CELERY_QUEUES = {
    "tasks": {"exchange": "tasks"},
    "feeds": {"exchange": "feeds"},
}
```

This isn't a problem if you use the default queue setting, as the default is already using the same name for queue/exchange.

## 7.2 Tutorial: Creating a click counter using carrot and celery

### 7.2.1 Introduction

A click counter should be easy, right? Just a simple view that increments a click in the DB and forwards you to the real destination.

This would work well for most sites, but when traffic starts to increase, you are likely to bump into problems. One database write for every click is not good if you have millions of clicks a day.

So what can you do? In this tutorial we will send the individual clicks as messages using `carrot`, and then process them later with a `celery` periodic task.

Celery and carrot is excellent in tandem, and while this might not be the perfect example, you'll at least see one example how of they can be used to solve a task.

### 7.2.2 The model

The model is simple, `Click` has the URL as primary key and a number of clicks for that URL. Its manager, `ClickManager` implements the `increment_clicks` method, which takes a URL and by how much to increment its count by.

*clickmuncher/models.py*:

```
from django.db import models
from django.utils.translation import ugettext_lazy as _


class ClickManager(models.Manager):

    def increment_clicks(self, for_url, increment_by=1):
        """Increment the click count for an URL.

            >>> Click.objects.increment_clicks("http://google.com", 10)

        """
        click, created = self.get_or_create(url=for_url,
                                defaults={"click_count": increment_by})
        if not created:
            click.click_count += increment_by
            click.save()

        return click.click_count


class Click(models.Model):
    url = models.URLField(_(u"URL"), verify_exists=False, unique=True)
    click_count = models.PositiveIntegerField(_(u"click_count"),
                                              default=0)
    objects = ClickManager()

    class Meta:
        verbose_name = _(u"URL clicks")
        verbose_name_plural = _(u"URL clicks")
```

### 7.2.3 Using carrot to send clicks as messages

The model is normal django stuff, nothing new there. But now we get on to the messaging. It has been a tradition for me to put the projects messaging related code in its own `messaging.py` module, and I will continue to do so here so maybe you can adopt this practice. In this module we have two functions:

- `send_increment_clicks`

  This function sends a simple message to the broker. The message body only contains the URL we want to increment as plain-text, so the exchange and routing key play a role here. We use an exchange called `clicks`, with a routing key of `increment_click`, so any consumer binding a queue to this exchange using this routing key will receive these messages.

- `process_clicks`

  This function processes all currently gathered clicks sent using `send_increment_clicks`. Instead of issuing one database query for every click it processes all of the messages first, calculates the new click count and issues one update per URL. A message that has been received will not be deleted from the broker until it has been acknowledged by the receiver, so if the receiver dies in the middle of processing the message, it will be re-sent at a later point in time. This guarantees delivery and we respect this feature here by not acknowledging the message until the clicks has actually been written to disk.

  **Note**: This could probably be optimized further with some hand-written SQL, but it will do for now. Let's say it's an exercise left for the picky reader, albeit a discouraged one if you can survive without doing it.

On to the code...

*clickmuncher/messaging.py*:

```
from celery.messaging import establish_connection
from carrot.messaging import Publisher, Consumer
from clickmuncher.models import Click


def send_increment_clicks(for_url):
    """Send a message for incrementing the click count for an URL."""
    connection = establish_connection()
    publisher = Publisher(connection=connection,
                          exchange="clicks",
                          routing_key="increment_click",
                          exchange_type="direct")

    publisher.send(for_url)

    publisher.close()
    connection.close()


def process_clicks():
    """Process all currently gathered clicks by saving them to the
    database."""
    connection = establish_connection()
    consumer = Consumer(connection=connection,
                        queue="clicks",
                        exchange="clicks",
                        routing_key="increment_click",
                        exchange_type="direct")

    # First process the messages: save the number of clicks
    # for every URL.
    clicks_for_url = {}
    messages_for_url = {}
    for message in consumer.iterqueue():
        url = message.body
        clicks_for_url[url] = clicks_for_url.get(url, 0) + 1
        # We also need to keep the message objects so we can ack the
        # messages as processed when we are finished with them.
        if url in messages_for_url:
            messages_for_url[url].append(message)
        else:
            messages_for_url[url] = [message]

    # Then increment the clicks in the database so we only need
    # one UPDATE/INSERT for each URL.
    for url, click_count in clicks_for_urls.items():
        Click.objects.increment_clicks(url, click_count)
        # Now that the clicks has been registered for this URL we can
        # acknowledge the messages
        [message.ack() for message in messages_for_url[url]]

    consumer.close()
    connection.close()
```

### 7.2.4 View and URLs

This is also simple stuff, don't think I have to explain this code to you. The interface is as follows, if you have a link to http://google.com you would want to count the clicks for, you replace the URL with:

> http://mysite/clickmuncher/count/?u=http://google.com

and the `count` view will send off an increment message and forward you to that site.

*clickmuncher/views.py*:

```
from django.http import HttpResponseRedirect
from clickmuncher.messaging import send_increment_clicks


def count(request):
    url = request.GET["u"]
    send_increment_clicks(url)
    return HttpResponseRedirect(url)
```

*clickmuncher/urls.py*:

```
from django.conf.urls.defaults import patterns, url
from clickmuncher import views

urlpatterns = patterns("",
    url(r'^$', views.count, name="clickmuncher-count"),
)
```

### 7.2.5 Creating the periodic task

Processing the clicks every 30 minutes is easy using celery periodic tasks.

*clickmuncher/tasks.py*:

```
from celery.task import PeriodicTask
from clickmuncher.messaging import process_clicks
from datetime import timedelta


class ProcessClicksTask(PeriodicTask):
    run_every = timedelta(minutes=30)

    def run(self, **kwargs):
        process_clicks()
```

We subclass from `celery.task.base.PeriodicTask`, set the `run_every` attribute and in the body of the task just call the `process_clicks` function we wrote earlier.

### 7.2.6 Finishing

There are still ways to improve this application. The URLs could be cleaned so the URL http://google.com and http://google.com/ is the same. Maybe it's even possible to update the click count using a single UPDATE query?

If you have any questions regarding this tutorial, please send a mail to the mailing-list or come join us in the #celery IRC channel at Freenode: http://celeryq.org/introduction.html#getting-help

CHAPTER 8

# Frequently Asked Questions

## 8.1 General

### 8.1.1 What kinds of things should I use Celery for?

**Answer:** Queue everything and delight everyone is a good article describing why you would use a queue in a web context.

These are some common use cases:

- Running something in the background. For example, to finish the web request as soon as possible, then update the users page incrementally. This gives the user the impression of good performance and "snappiness", even though the real work might actually take some time.
- Running something after the web request has finished.
- Making sure something is done, by executing it asynchronously and using retries.
- Scheduling periodic work.

And to some degree:

- Distributed computing.
- Parallel execution.

## 8.2 Misconceptions

### 8.2.1 Is Celery dependent on pickle?

**Answer:** No.

Celery can support any serialization scheme and has support for JSON/YAML and Pickle by default. You can even send one task using pickle, and another one with JSON seamlessly, this is because every task is associated with a content-type. The default serialization scheme is pickle because it's the most used, and it has support for sending complex objects as task arguments.

You can set a global default serializer, the default serializer for a particular Task, or even what serializer to use when sending a single task instance.

### 8.2.2 Is Celery for Django only?

**Answer:** No.

Celery does not depend on Django anymore. To use Celery with Django you have to use the django-celery package.

### 8.2.3 Do I have to use AMQP/RabbitMQ?

**Answer**: No.

You can also use Redis or an SQL database, see Using other queues.

Redis or a database won't perform as well as an AMQP broker. If you have strict reliability requirements you are encouraged to use RabbitMQ or another AMQP broker. Redis/database also use polling, so they are likely to consume more resources. However, if you for some reason are not able to use AMQP, feel free to use these alternatives. They will probably work fine for most use cases, and note that the above points are not specific to Celery; If using

Redis/database as a queue worked fine for you before, it probably will now. You can always upgrade later if you need to.

### 8.2.4 Is Celery multilingual?

**Answer:** Yes.

`celeryd` is an implementation of Celery in python. If the language has an AMQP client, there shouldn't be much work to create a worker in your language. A Celery worker is just a program connecting to the broker to process messages.

Also, there's another way to be language independent, and that is to use REST tasks, instead of your tasks being functions, they're URLs. With this information you can even create simple web servers that enable preloading of code. See: User Guide: Remote Tasks.

## 8.3 Troubleshooting

### 8.3.1 MySQL is throwing deadlock errors, what can I do?

**Answer:** MySQL has default isolation level set to `REPEATABLE-READ`, if you don't really need that, set it to `READ-COMMITTED`. You can do that by adding the following to your `my.cnf`:

```
[mysqld]
transaction-isolation = READ-COMMITTED
```

For more information about InnoDB's transaction model see MySQL - The InnoDB Transaction Model and Locking in the MySQL user manual.

(Thanks to Honza Kral and Anton Tsigularov for this solution)

### 8.3.2 celeryd is not doing anything, just hanging

**Answer: See MySQL is throwing deadlock errors, what can I do?.** or *Why is Task.delay/apply* just hanging?*.

### 8.3.3 Why is Task.delay/apply*/celeryd just hanging?

**Answer:** There is a bug in some AMQP clients that will make it hang if it's not able to authenticate the current user, the password doesn't match or the user does not have access to the virtual host specified. Be sure to check your broker logs (for RabbitMQ that is `/var/log/rabbitmq/rabbit.log` on most systems), it usually contains a message describing the reason.

### 8.3.4 Why won't celeryd run on FreeBSD?

**Answer:** multiprocessing.Pool requires a working POSIX semaphore implementation which isn't enabled in FreeBSD by default. You have to enable POSIX semaphores in the kernel and manually recompile multiprocessing.

Luckily, Viktor Petersson has written a tutorial to get you started with Celery on FreeBSD here: http://www.playingwithwire.com/2009/10/how-to-get-celeryd-to-work-on-freebsd/

### 8.3.5 I'm having `IntegrityError: Duplicate Key` errors. Why?

**Answer:** See MySQL is throwing deadlock errors, what can I do?. Thanks to howsthedotcom.

### 8.3.6 Why aren't my tasks processed?

**Answer:** With RabbitMQ you can see how many consumers are currently receiving tasks by running the following command:

```
$ rabbitmqctl list_queues -p <myvhost> name messages consumers
Listing queues ...
celery     2891    2
```

This shows that there's 2891 messages waiting to be processed in the task queue, and there are two consumers processing them.

One reason that the queue is never emptied could be that you have a stale worker process taking the messages hostage. This could happen if celeryd wasn't properly shut down.

When a message is received by a worker the broker waits for it to be acknowledged before marking the message as processed. The broker will not re-send that message to another consumer until the consumer is shut down properly.

If you hit this problem you have to kill all workers manually and restart them:

```
ps auxww | grep celeryd | awk '{print $2}' | xargs kill
```

You might have to wait a while until all workers have finished the work they're doing. If it's still hanging after a long time you can kill them by force with:

```
ps auxww | grep celeryd | awk '{print $2}' | xargs kill -9
```

### 8.3.7 Why won't my Task run?

**Answer:** There might be syntax errors preventing the tasks module being imported.

You can find out if Celery is able to run the task by executing the task manually:

```
>>> from myapp.tasks import MyPeriodicTask
>>> MyPeriodicTask.delay()
```

Watch celeryd's log file to see if it's able to find the task, or if some other error is happening.

### 8.3.8 Why won't my Periodic Task run?

**Answer:** See Why won't my Task run?.

### 8.3.9 How do I discard all waiting tasks?

**Answer:** Use `discard_all()`, like this:

```
>>> from celery.task.control import discard_all
>>> discard_all()
1753
```

The number 1753 is the number of messages deleted.

You can also start `celeryd` with the `--discard` argument which will accomplish the same thing.

### 8.3.10 I've discarded messages, but there are still messages left in the queue?

**Answer:** Tasks are acknowledged (removed from the queue) as soon as they are actually executed. After the worker has received a task, it will take some time until it is actually executed, especially if there are a lot of tasks already waiting for execution. Messages that are not acknowledged are held on to by the worker until it closes the connection to the broker (AMQP server). When that connection is closed (e.g. because the worker was stopped) the tasks will be re-sent by the broker to the next available worker (or the same worker when it has been restarted), so to properly purge the queue of waiting tasks you have to stop all the workers, and then discard the tasks using `discard_all()`.

## 8.4 Results

### 8.4.1 How do I get the result of a task if I have the ID that points there?

**Answer**: Use `Task.AsyncResult`:

```
>>> result = MyTask.AsyncResult(task_id)
>>> result.get()
```

This will give you a `BaseAsyncResult` instance using the tasks current result backend.

If you need to specify a custom result backend you should use `celery.result.BaseAsyncResult` directly:

```
>>> from celery.result import BaseAsyncResult
>>> result = BaseAsyncResult(task_id, backend=...)
>>> result.get()
```

## 8.5 Security

### 8.5.1 Isn't using *pickle* a security concern?

**Answer**: Yes, indeed it is.

You are right to have a security concern, as this can indeed be a real issue. It is essential that you protect against unauthorized access to your broker, databases and other services transmitting pickled data.

For the task messages you can set the `CELERY_TASK_SERIALIZER` setting to "json" or "yaml" instead of pickle. There is currently no alternative solution for task results (but writing a custom result backend using JSON is a simple task)

Note that this is not just something you should be aware of with Celery, for example also Django uses pickle for its cache client.

### 8.5.2 Can messages be encrypted?

**Answer**: Some AMQP brokers supports using SSL (including RabbitMQ). You can enable this using the `BROKER_USE_SSL` setting.

It is also possible to add additional encryption and security to messages, if you have a need for this then you should contact the *Mailing list*.

### 8.5.3 Is it safe to run celeryd as root?

**Answer**: No!

We're not currently aware of any security issues, but it would be incredibly naive to assume that they don't exist, so running the Celery services (**celeryd**, **celerybeat**, **celeryev**, etc) as an unprivileged user is recommended.

## 8.6 Brokers

### 8.6.1 Why is RabbitMQ crashing?

**Answer:** RabbitMQ will crash if it runs out of memory. This will be fixed in a future release of RabbitMQ. please refer to the RabbitMQ FAQ: http://www.rabbitmq.com/faq.html#node-runs-out-of-memory

**Note:** This is no longer the case, RabbitMQ versions 2.0 and above includes a new persister, that is tolerant to out of memory errors. RabbitMQ 2.1 or higher is recommended for Celery.

If you're still running an older version of RabbitMQ and experience crashes, then please upgrade!

Misconfiguration of Celery can eventually lead to a crash on older version of RabbitMQ. Even if it doesn't crash, this can still consume a lot of resources, so it is very important that you are aware of the common pitfalls.

- Events.

Running `celeryd` with the *-E/--events* option will send messages for events happening inside of the worker.

Events should only be enabled if you have an active monitor consuming them, or if you purge the event queue periodically.

- AMQP backend results.

When running with the AMQP result backend, every task result will be sent as a message. If you don't collect these results, they will build up and RabbitMQ will eventually run out of memory.

If you don't use the results for a task, make sure you set the `ignore_result` option:

Results can also be disabled globally using the `CELERY_IGNORE_RESULT` setting.

**Note:** Celery version 2.1 added support for automatic expiration of AMQP result backend results.

To use this you need to run RabbitMQ 2.1 or higher and enable the `CELERY_AMQP_TASK_RESULT_EXPIRES` setting.

### 8.6.2 Can I use Celery with ActiveMQ/STOMP?

**Answer**: Yes, but this is somewhat experimental for now. It is working ok in a test configuration, but it has not been tested in production. If you have any problems using STOMP with Celery, please report an issue here:

`http://github.com/ask/celery/issues/`

The STOMP carrot backend requires the stompy library:

```
$ pip install stompy
$ cd python-stomp
$ sudo python setup.py install
$ cd ..
```

In this example we will use a queue called `celery` which we created in the ActiveMQ web admin interface.

**Note**: When using ActiveMQ the queue name needs to have `"/queue/"` prepended to it. i.e. the queue `celery` becomes `/queue/celery`.

Since STOMP doesn't have exchanges and the routing capabilities of AMQP, you need to set `exchange` name to the same as the queue name. This is a minor inconvenience since carrot needs to maintain the same interface for both AMQP and STOMP.

Use the following settings in your `celeryconfig.py`/ django `settings.py`:

```
# Use the stomp carrot backend.
CARROT_BACKEND = "stomp"

# STOMP hostname and port settings.
BROKER_HOST = "localhost"
BROKER_PORT = 61613

# The queue name to use (the exchange *must* be set to the
# same as the queue name when using STOMP)
CELERY_DEFAULT_QUEUE = "/queue/celery"
CELERY_DEFAULT_EXCHANGE = "/queue/celery"

CELERY_QUEUES = {
    "/queue/celery": {"exchange": "/queue/celery"}
}
```

### 8.6.3 What features are not supported when using ghettoq/STOMP?

This is a (possible incomplete) list of features not available when using the STOMP backend:

- routing keys
- exchange types (direct, topic, headers, etc)
- immediate
- mandatory

## 8.7 Tasks

### 8.7.1 How can I reuse the same connection when applying tasks?

**Answer**: See *Connections and connection timeouts.*.

### 8.7.2 Can I execute a task by name?

**Answer**: Yes. Use `celery.execute.send_task()`. You can also execute a task by name from any language that has an AMQP client.

```
>>> from celery.execute import send_task
>>> send_task("tasks.add", args=[2, 2], kwargs={})
<AsyncResult: 373550e8-b9a0-4666-bc61-ace01fa4f91d>
```

### 8.7.3 How can I get the task id of the current task?

**Answer**: Celery does set some default keyword arguments if the task accepts them (you can accept them by either using `**kwargs`, or list them specifically):

```
@task
def mytask(task_id=None):
    cache.set(task_id, "Running")
```

The default keyword arguments are documented here: http://celeryq.org/docs/userguide/tasks.html#default-keyword-arguments

### 8.7.4 Can I specify a custom task_id?

**Answer**: Yes. Use the `task_id` argument to `apply_async()`:

```
>>> task.apply_async(args, kwargs, task_id="...")
```

### 8.7.5 Can I use decorators with tasks?

**Answer**: Yes. But please see note at *Decorating tasks*.

### 8.7.6 Can I use natural task ids?

**Answer**: Yes, but make sure it is unique, as the behavior for two tasks existing with the same id is undefined.

The world will probably not explode, but at the worst they can overwrite each others results.

### 8.7.7 How can I run a task once another task has finished?

**Answer**: You can safely launch a task inside a task. Also, a common pattern is to use callback tasks:

```
@task()
def add(x, y, callback=None):
    result = x + y
    if callback:
        subtask(callback).delay(result)
    return result


@task(ignore_result=True)
def log_result(result, **kwargs):
    logger = log_result.get_logger(**kwargs)
    logger.info("log_result got: %s" % (result, ))
```

Invocation:

```
>>> add.delay(2, 2, callback=log_result.subtask())
```

See *Sets of tasks, Subtasks and Callbacks* for more information.

### 8.7.8 Can I cancel the execution of a task?

**Answer**: Yes. Use `result.revoke`:

```
>>> result = add.apply_async(args=[2, 2], countdown=120)
>>> result.revoke()
```

or if you only have the task id:

```
>>> from celery.task.control import revoke
>>> revoke(task_id)
```

### 8.7.9 Why aren't my remote control commands received by all workers?

**Answer**: To receive broadcast remote control commands, every worker node uses its host name to create a unique queue name to listen to, so if you have more than one worker with the same host name, the control commands will be received in round-robin between them.

To work around this you can explicitly set the host name for every worker using the *`--hostname`* argument to `celeryd`:

```
$ celeryd --hostname=$(hostname).1
$ celeryd --hostname=$(hostname).2
```

etc., etc...

### 8.7.10 Can I send some tasks to only some servers?

**Answer:** Yes. You can route tasks to an arbitrary server using AMQP, and a worker can bind to as many queues as it wants.

See *Routing Tasks* for more information.

### 8.7.11 Can I change the interval of a periodic task at runtime?

**Answer**: Yes. You can override `PeriodicTask.is_due` or turn `PeriodicTask.run_every` into a property:

```
class MyPeriodic(PeriodicTask):

    def run(self):
        # ...

    @property
    def run_every(self):
        return get_interval_from_database(...)
```

### 8.7.12 Does celery support task priorities?

**Answer**: No. In theory, yes, as AMQP supports priorities. However RabbitMQ doesn't implement them yet.

The usual way to prioritize work in Celery, is to route high priority tasks to different servers. In the real world this may actually work better than per message priorities. You can use this in combination with rate limiting to achieve a highly responsive system.

### 8.7.13 Should I use retry or acks_late?

**Answer**: Depends. It's not necessarily one or the other, you may want to use both.

*Task.retry* is used to retry tasks, notably for expected errors that is catchable with the *try:* block. The AMQP transaction is not used for these errors: **if the task raises an exception it is still acknowledged!**.

The `acks_late` setting would be used when you need the task to be executed again if the worker (for some reason) crashes mid-execution. It's important to note that the worker is not known to crash, and if it does it is usually an unrecoverable error that requires human intervention (bug in the worker, or task code).

In an ideal world you could safely retry any task that has failed, but this is rarely the case. Imagine the following task:

```
@task()
def process_upload(filename, tmpfile):
    # Increment a file count stored in a database
    increment_file_counter()
    add_file_metadata_to_db(filename, tmpfile)
    copy_file_to_destination(filename, tmpfile)
```

If this crashed in the middle of copying the file to its destination the world would contain incomplete state. This is not a critical scenario of course, but you can probably imagine something far more sinister. So for ease of programming we have less reliability; It's a good default, users who require it and know what they are doing can still enable acks_late (and in the future hopefully use manual acknowledgement)

In addition `Task.retry` has features not available in AMQP transactions: delay between retries, max retries, etc.

So use retry for Python errors, and if your task is reentrant combine that with `acks_late` if that level of reliability is required.

### 8.7.14 Can I schedule tasks to execute at a specific time?

**Answer**: Yes. You can use the `eta` argument of `Task.apply_async()`.

Or to schedule a periodic task at a specific time, use the `celery.task.schedules.crontab` schedule behavior:

```
from celery.task.schedules import crontab
from celery.decorators import periodic_task

@periodic_task(run_every=crontab(hours=7, minute=30, day_of_week="mon"))
def every_monday_morning():
    print("This is run every Monday morning at 7:30")
```

### 8.7.15 How do I shut down `celeryd` safely?

**Answer**: Use the `TERM` signal, and the worker will finish all currently executing jobs and shut down as soon as possible. No tasks should be lost.

You should never stop `celeryd` with the `KILL` signal (*-9*), unless you've tried `TERM` a few times and waited a few minutes to let it get a chance to shut down. As if you do tasks may be terminated mid-execution, and they will not be re-run unless you have the `acks_late` option set (`Task.acks_late` / `CELERY_ACKS_LATE`).

**See also:**

*Stopping the worker*

### 8.7.16 How do I run celeryd in the background on [platform]?

**Answer**: Please see *Running celeryd as a daemon*.

## 8.8 Windows

### 8.8.1 celeryd keeps spawning processes at startup

**Answer**: This is a known issue on Windows. You have to start celeryd with the command:

```
$ python -m celeryd.bin.celeryd
```

Any additional arguments can be appended to this command.

See http://bit.ly/bo9RSw

### 8.8.2 The `-B` / `--beat` option to celeryd doesn't work?

**Answer**: That's right. Run `celerybeat` and `celeryd` as separate services instead.

### 8.8.3 *django-celery* can't find settings?

**Answer**: You need to specify the `--settings` argument to **manage.py**:

```
$ python manage.py celeryd start --settings=settings
```

See http://bit.ly/bo9RSw

CHAPTER 9

# API Reference

**Release** 2.1

**Date** February 04, 2014

## 9.1 Task Decorators - celery.decorators

Decorators

celery.decorators.**periodic_task**(***options*)

Task decorator to create a periodic task.

Example task, scheduling a task once every day:

```
from datetime import timedelta

@periodic_task(run_every=timedelta(days=1))
def cronjob(**kwargs):
    logger = cronjob.get_logger(**kwargs)
    logger.warn("Task running...")
```

celery.decorators.**task**(**args*, ***options*)

Decorator to create a task class out of any callable.

Examples:

```
@task()
def refresh_feed(url):
    return Feed.objects.get(url=url).refresh()
```

With setting extra options and using retry.

```
@task(exchange="feeds")
def refresh_feed(url, **kwargs):
    try:
        return Feed.objects.get(url=url).refresh()
    except socket.error, exc:
        refresh_feed.retry(args=[url], kwargs=kwargs, exc=exc)
```

Calling the resulting task:

```
>>> refresh_feed("http://example.com/rss") # Regular
<Feed: http://example.com/rss>
```

```
>>> refresh_feed.delay("http://example.com/rss") # Async
<AsyncResult: 8998d0f4-da0b-4669-ba03-d5ab5ac6ad5d>
```

## 9.2 Defining Tasks - celery.task.base

**class** `celery.task.base.`**`Task`**

A celery task.

All subclasses of `Task` must define the `run()` method, which is the actual method the `celery` daemon executes.

The `run()` method can take use of the default keyword arguments, as listed in the `run()` documentation.

The resulting class is callable, which if called will apply the `run()` method.

**`name`**
Name of the task.

**`abstract`**
If `True` the task is an abstract base class.

**`type`**
The type of task, currently this can be `regular`, or `periodic`, however if you want a periodic task, you should subclass `PeriodicTask` instead.

**`queue`**
Select a destination queue for this task. The queue needs to exist in `CELERY_QUEUES`. The `routing_key`, `exchange` and `exchange_type` attributes will be ignored if this is set.

**`routing_key`**
Override the global default `routing_key` for this task.

**`exchange`**
Override the global default `exchange` for this task.

**`exchange_type`**
Override the global default exchange type for this task.

**`delivery_mode`**
Override the global default delivery mode for this task. By default this is set to `2` (persistent). You can change this to `1` to get non-persistent behavior, which means the messages are lost if the broker is restarted.

**`mandatory`**
Mandatory message routing. An exception will be raised if the task can't be routed to a queue.

**`immediate:`**
Request immediate delivery. An exception will be raised if the task can't be routed to a worker immediately.

**`priority:`**
The message priority. A number from `0` to `9`, where `0` is the highest. Note that RabbitMQ doesn't support priorities yet.

**`max_retries`**
Maximum number of retries before giving up. If set to `None`, it will never stop retrying.

**`default_retry_delay`**
Default time in seconds before a retry of the task should be executed. Default is a 3 minute delay.

**`rate_limit`**
Set the rate limit for this task type, Examples: `None` (no rate limit), `"100/s"` (hundred tasks a second), `"100/m"` (hundred tasks a minute), `"100/h"` (hundred tasks an hour)

**`ignore_result`**
Don't store the return value of this task.

**`store_errors_even_if_ignored`**
If true, errors will be stored even if the task is configured to ignore results.

**`send_error_emails`**
If true, an e-mail will be sent to the admins whenever a task of this type raises an exception.

**`error_whitelist`**
List of exception types to send error e-mails for.

**`serializer`**
The name of a serializer that has been registered with `carrot.serialization.registry`. Example: `"json"`.

**`backend`**
The result store backend used for this task.

**`autoregister`**
If `True` the task is automatically registered in the task registry, which is the default behaviour.

**`track_started`**
If `True` the task will report its status as "started" when the task is executed by a worker. The default value is `False` as the normal behaviour is to not report that level of granularity. Tasks are either pending, finished, or waiting to be retried. Having a "started" status can be useful for when there are long running tasks and there is a need to report which task is currently running.

The global default can be overridden by the `CELERY_TRACK_STARTED` setting.

**`acks_late`**
If set to `True` messages for this task will be acknowledged **after** the task has been executed, not *just before*, which is the default behavior.

Note that this means the task may be executed twice if the worker crashes in the middle of execution, which may be acceptable for some applications.

The global default can be overriden by the `CELERY_ACKS_LATE` setting.

**`expires`**
Default task expiry time in seconds or a `datetime`.

**classmethod `AsyncResult`**(*task_id*)
Get AsyncResult instance for this kind of task.

**Parameters** **task_id** – Task id to get result for.

**exception `MaxRetriesExceededError`**
The tasks max restart limit has been exceeded.

`Task.`**`after_return`**(*status*, *retval*, *task_id*, *args*, *kwargs*, *einfo=None*)
Handler called after the task returns.

**Parameters**

- **status** – Current task state.
- **retval** – Task return value/exception.
- **task_id** – Unique id of the task.

- **args** – Original arguments for the task that failed.
- **kwargs** – Original keyword arguments for the task that failed.
- **einfo** – `ExceptionInfo` instance, containing the traceback (if any).

The return value of this handler is ignored.

**classmethod** `Task.`**`apply`**`(`*args=None*, *kwargs=None*, ***options*`)`
Execute this task locally, by blocking until the task has finished executing.

**Parameters**

- **args** – positional arguments passed on to the task.
- **kwargs** – keyword arguments passed on to the task.
- **throw** – Re-raise task exceptions. Defaults to the `CELERY_EAGER_PROPAGATES_EXCEPTIONS` setting.

:rtype `celery.result.EagerResult`:

See `celery.execute.apply()`.

**classmethod** `Task.`**`apply_async`**`(`*args=None*, *kwargs=None*, ***options*`)`
Delay this task for execution by the `celery` daemon(s).

**Parameters**

- **args** – positional arguments passed on to the task.
- **kwargs** – keyword arguments passed on to the task.
- ****options** – Any keyword arguments to pass on to `celery.execute.apply_async()`.

See `celery.execute.apply_async()` for more information.

:returns `celery.result.AsyncResult`:

**classmethod** `Task.`**`delay`**`(`**args*, ***kwargs*`)`
Shortcut to `apply_async()`, with star arguments, but doesn't support the extra options.

**Parameters**

- ***args** – positional arguments passed on to the task.
- ****kwargs** – keyword arguments passed on to the task.

:returns `celery.result.AsyncResult`:

**classmethod** `Task.`**`establish_connection`**`(`*connect_timeout=4*`)`
Establish a connection to the message broker.

`Task.`**`execute`**`(`*wrapper*, *pool*, *loglevel*, *logfile*`)`
The method the worker calls to execute the task.

**Parameters**

- **wrapper** – A `TaskRequest`.
- **pool** – A task pool.
- **loglevel** – Current loglevel.
- **logfile** – Name of the currently used logfile.

**classmethod** `Task.`**`get_consumer`**(*connection=None*, *connect_timeout=4*)

Get a celery task message consumer.

:rtype `celery.messaging.TaskConsumer`:

Please be sure to close the AMQP connection when you're done with this object. i.e.:

```
>>> consumer = self.get_consumer()
>>> # do something with consumer
>>> consumer.connection.close()
```

**classmethod** `Task.`**`get_logger`**(*loglevel=None*, *logfile=None*, *propagate=False*, ***kwargs*)

Get task-aware logger object.

See `celery.log.setup_task_logger()`.

**classmethod** `Task.`**`get_publisher`**(*connection=None*, *exchange=None*, *connect_timeout=4*, *exchange_type=None*)

Get a celery task message publisher.

:rtype `celery.messaging.TaskPublisher`:

Please be sure to close the AMQP connection when you're done with this object, i.e.:

```
>>> publisher = self.get_publisher()
>>> # do something with publisher
>>> publisher.connection.close()
```

`Task.`**`on_failure`**(*exc*, *task_id*, *args*, *kwargs*, *einfo=None*)

Error handler.

This is run by the worker when the task fails.

**Parameters**

- **exc** – The exception raised by the task.
- **task_id** – Unique id of the failed task.
- **args** – Original arguments for the task that failed.
- **kwargs** – Original keyword arguments for the task that failed.
- **einfo** – `ExceptionInfo` instance, containing the traceback.

The return value of this handler is ignored.

`Task.`**`on_retry`**(*exc*, *task_id*, *args*, *kwargs*, *einfo=None*)

Retry handler.

This is run by the worker when the task is to be retried.

**Parameters**

- **exc** – The exception sent to `retry()`.
- **task_id** – Unique id of the retried task.
- **args** – Original arguments for the retried task.
- **kwargs** – Original keyword arguments for the retried task.
- **einfo** – `ExceptionInfo` instance, containing the traceback.

The return value of this handler is ignored.

`Task.`**`on_success`**`(`*retval*, *task_id*, *args*, *kwargs*`)`

Success handler.

Run by the worker if the task executes successfully.

**Parameters**

- **retval** – The return value of the task.
- **task_id** – Unique id of the executed task.
- **args** – Original arguments for the executed task.
- **kwargs** – Original keyword arguments for the executed task.

The return value of this handler is ignored.

**classmethod** `Task.`**`retry`**`(`*args=None*, *kwargs=None*, *exc=None*, *throw=True*, ***options*`)`

Retry the task.

**Parameters**

- **args** – Positional arguments to retry with.
- **kwargs** – Keyword arguments to retry with.
- **exc** – Optional exception to raise instead of `MaxRetriesExceededError` when the max restart limit has been exceeded.
- **countdown** – Time in seconds to delay the retry for.
- **eta** – Explicit time and date to run the retry at (must be a `datetime.datetime` instance).
- ****options** – Any extra options to pass on to meth:*apply_async*. See `celery.execute.apply_async()`.
- **throw** – If this is `False`, do not raise the `RetryTaskError` exception, that tells the worker to mark the task as being retried. Note that this means the task will be marked as failed if the task raises an exception, or successful if it returns.

**Raises celery.exceptions.RetryTaskError** To tell the worker that the task has been re-sent for retry. This always happens, unless the `throw` keyword argument has been explicitly set to `False`, and is considered normal operation.

Example

```
>>> class TwitterPostStatusTask(Task):
...
...     def run(self, username, password, message, **kwargs):
...         twitter = Twitter(username, password)
...         try:
...             twitter.post_status(message)
...         except twitter.FailWhale, exc:
...             # Retry in 5 minutes.
...             self.retry([username, password, message], kwargs,
...                        countdown=60 * 5, exc=exc)
```

`Task.`**`run`**`(`**args*, ***kwargs*`)`

The body of the task executed by the worker.

The following standard keyword arguments are reserved and is passed by the worker if the function/method supports them:

- task_id

- task_name
- task_retries
- task_is_eager
- logfile
- loglevel
- delivery_info

Additional standard keyword arguments may be added in the future. To take these default arguments, the task can either list the ones it wants explicitly or just take an arbitrary list of keyword arguments (**kwargs).

**classmethod** `Task.`**`subtask`**`(`**args*, ***kwargs*`)`

Returns a `subtask` object for this task that wraps arguments and execution options for a single task invocation.

`Task.`**`update_state`**`(`*task_id*, *state*, *meta=None*`)`

Update task state.

**Parameters**

- **task_id** – Id of the task to update.
- **state** – New state (`str`).
- **meta** – State metadata (`dict`).

**class** `celery.task.base.`**`PeriodicTask`**

A periodic task is a task that behaves like a *`cron`* job.

Results of periodic tasks are not stored by default.

**`run_every`**

*REQUIRED* Defines how often the task is run (its interval), it can be a `timedelta` object, a `crontab` object or an integer specifying the time in seconds.

**`relative`**

If set to `True`, run times are relative to the time when the server was started. This was the previous behaviour, periodic tasks are now scheduled by the clock.

**Raises NotImplementedError** if the `run_every` attribute is not defined.

Example

```
>>> from celery.task import tasks, PeriodicTask
>>> from datetime import timedelta
>>> class EveryThirtySecondsTask(PeriodicTask):
...     run_every = timedelta(seconds=30)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every 30 seconds")
```

```
>>> from celery.task import PeriodicTask
>>> from celery.task.schedules import crontab
```

```
>>> class EveryMondayMorningTask(PeriodicTask):
...     run_every = crontab(hour=7, minute=30, day_of_week=1)
...
```

```
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every Monday at 7:30AM.")

>>> class EveryMorningTask(PeriodicTask):
...     run_every = crontab(hours=7, minute=30)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every day at 7:30AM.")

>>> class EveryQuarterPastTheHourTask(PeriodicTask):
...     run_every = crontab(minute=15)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every 0:15 past the hour every day.")
```

**`is_due`**(*last_run_at*)
Returns tuple of two items `(is_due, next_time_to_run)`, where next time to run is in seconds.

See `celery.schedules.schedule.is_due()` for more information.

**`remaining_estimate`**(*last_run_at*)
Returns when the periodic task should run next as a timedelta.

**`timedelta_seconds`**(*delta*)
Convert `timedelta` to seconds.

Doesn't account for negative timedeltas.

**class** `celery.task.base.`**`TaskType`**
Metaclass for tasks.

Automatically registers the task in the task registry, except if the `abstract` attribute is set.

If no `name` attribute is provided, the name is automatically set to the name of the module it was defined in, and the class name.

## 9.3 Task Sets, Subtasks and Callbacks - celery.task.sets

**class** `celery.task.sets.`**`TaskSet`**(*task=None*, *tasks=None*)
A task containing several subtasks, making it possible to track how many, or when all of the tasks has been completed.

**Parameters** **tasks** – A list of `subtask` instances.

**`total`**
Total number of subtasks in this task set.

Example:

```
>>> from djangofeeds.tasks import RefreshFeedTask
>>> from celery.task.sets import TaskSet, subtask
>>> urls = ("http://cnn.com/rss",
...         "http://bbc.co.uk/rss",
...         "http://xkcd.com/rss")
>>> subtasks = [RefreshFeedTask.subtask(kwargs={"feed_url": url})
...                 for url in urls]
```

```
>>> taskset = TaskSet(tasks=subtasks)
>>> taskset_result = taskset.apply_async()
>>> list_of_return_values = taskset_result.join()
```

**Publisher**
alias of TaskPublisher

**apply**()
Applies the taskset locally.

**apply_async**(**args*, ***kwargs*)
Run all tasks in the taskset.

Returns a celery.result.TaskSetResult instance.

Example

```
>>> ts = TaskSet(tasks=(
...         RefreshFeedTask.subtask(["http://foo.com/rss"]),
...         RefreshFeedTask.subtask(["http://bar.com/rss"]),
... ))
>>> result = ts.apply_async()
>>> result.taskset_id
"d2c9b261-8eff-4bfb-8459-1e1b72063514"
>>> result.subtask_ids
["b4996460-d959-49c8-aeb9-39c530dcde25",
"598d2d18-ab86-45ca-8b4f-0779f5d6a3cb"]
>>> result.waiting()
True
>>> time.sleep(10)
>>> result.ready()
True
>>> result.successful()
True
>>> result.failed()
False
>>> result.join()
[True, True]
```

**task**

**task_name**

**tasks**

**class** celery.task.sets.**subtask**(*task=None*, *args=None*, *kwargs=None*, *options=None*, ***extra*)
Class that wraps the arguments and execution options for a single task invocation.

Used as the parts in a TaskSet or to safely pass tasks around as callbacks.

**Parameters**

- **task** – Either a task class/instance, or the name of a task.
- **args** – Positional arguments to apply.
- **kwargs** – Keyword arguments to apply.
- **options** – Additional options to celery.execute.apply_async().

Note that if the first argument is a dict, the other arguments will be ignored and the values in the dict will be used instead.

```
>>> s = subtask("tasks.add", args=(2, 2))
>>> subtask(s)
{"task": "tasks.add", args=(2, 2), kwargs={}, options={}}
```

**apply**(*args=()*, *kwargs={}*, ***options*)
Apply this task locally.

**apply_async**(*args=()*, *kwargs={}*, ***options*)
Apply this task asynchronously.

**delay**(**argmerge*, ***kwmerge*)
Shortcut to `apply_async(argmerge, kwargs)`.

**get_type**()

## 9.4 Executing Tasks - celery.execute

`celery.execute.`**apply**(*task*, *args*, *kwargs*, ***options*)
Apply the task locally.

**Parameters throw** – Re-raise task exceptions. Defaults to the `CELERY_EAGER_PROPAGATES_EXCEPTIONS` setting.

This will block until the task completes, and returns a `celery.result.EagerResult` instance.

`celery.execute.`**apply_async**(**args*, ***kwargs*)
Run a task asynchronously by the celery daemon(s).

**Parameters**

- **task** – The `Task` to run.
- **args** – The positional arguments to pass on to the task (a `list` or `tuple`).
- **kwargs** – The keyword arguments to pass on to the task (a `dict`)
- **countdown** – Number of seconds into the future that the task should execute. Defaults to immediate delivery (Do not confuse that with the `immediate` setting, they are unrelated).
- **eta** – A `datetime` object that describes the absolute time and date of when the task should execute. May not be specified if `countdown` is also supplied. (Do not confuse this with the `immediate` setting, they are unrelated).
- **expires** – Either a `int`, describing the number of seconds, or a `datetime` object that describes the absolute time and date of when the task should expire. The task will not be executed after the expiration time.
- **connection** – Re-use existing broker connection instead of establishing a new one. The `connect_timeout` argument is not respected if this is set.
- **connect_timeout** – The timeout in seconds, before we give up on establishing a connection to the AMQP server.
- **routing_key** – The routing key used to route the task to a worker server. Defaults to the tasks `exchange` attribute.
- **exchange** – The named exchange to send the task to. Defaults to the tasks `exchange` attribute.
- **exchange_type** – The exchange type to initalize the exchange as if not already declared. Defaults to the tasks `exchange_type` attribute.

- **immediate** – Request immediate delivery. Will raise an exception if the task cannot be routed to a worker immediately. (Do not confuse this parameter with the `countdown` and `eta` settings, as they are unrelated). Defaults to the tasks `immediate` attribute.
- **mandatory** – Mandatory routing. Raises an exception if there's no running workers able to take on this task. Defaults to the tasks `mandatory` attribute.
- **priority** – The task priority, a number between `0` and `9`. Defaults to the tasks `priority` attribute.
- **serializer** – A string identifying the default serialization method to use. Defaults to the `CELERY_TASK_SERIALIZER` setting. Can be `pickle json`, `yaml`, or any custom serialization methods that have been registered with `carrot.serialization.registry`. Defaults to the tasks `serializer` attribute.

**Note**: If the `CELERY_ALWAYS_EAGER` setting is set, it will be replaced by a local `apply()` call instead.

`celery.execute.`**`delay_task`**`(`*task_name*, **args*, ***kwargs*`)`

Delay a task for execution by the `celery` daemon.

**Parameters**

- **task_name** – the name of a task registered in the task registry.
- ***args** – positional arguments to pass on to the task.
- ****kwargs** – keyword arguments to pass on to the task.

**Raises celery.exceptions.NotRegistered** exception if no such task has been registered in the task registry.

:returns `celery.result.AsyncResult`:

Example

```
>>> r = delay_task("update_record", name="George Costanza", age=32)
>>> r.ready()
True
>>> r.result
"Record was updated"
```

`celery.execute.`**`send_task`**`(`**args*, ***kwargs*`)`

Send task by name.

Useful if you don't have access to the `Task` class.

**Parameters** **name** – Name of task to execute.

Supports the same arguments as `apply_async()`.

## 9.5 Task Result - celery.result

**class** `celery.result.`**`AsyncResult`**`(`*task_id*, *backend=None*, *task_name=None*`)`

Pending task result using the default backend.

**Parameters** **task_id** – see `task_id`.

**`task_id`**

The unique identifier for this task.

**backend**
Instance of `celery.backends.DefaultBackend`.

**class** `celery.result.`**`BaseAsyncResult`**(*task_id*, *backend*, *task_name=None*)
Base class for pending result, supports custom task result backend.

**Parameters**

- **task_id** – see `task_id`.
- **backend** – see `backend`.

**task_id**
The unique identifier for this task.

**backend**
The task result backend used.

**exception** **`TimeoutError`**
The operation timed out.

`BaseAsyncResult.`**`failed`**()
Returns `True` if the task failed by exception.

`BaseAsyncResult.`**`forget`**()
Forget about (and possibly remove the result of) this task.

`BaseAsyncResult.`**`get`**(*timeout=None*)
Alias to `wait()`.

`BaseAsyncResult.`**`info`**
Get state metadata.

Alias to `result()`.

`BaseAsyncResult.`**`ready`**()
Returns `True` if the task executed successfully, or raised an exception.

If the task is still running, pending, or is waiting for retry then `False` is returned.

`BaseAsyncResult.`**`result`**
When the task has been executed, this contains the return value.

If the task raised an exception, this will be the exception instance.

`BaseAsyncResult.`**`revoke`**(*connection=None*, *connect_timeout=None*)
Send revoke signal to all workers.

The workers will ignore the task if received.

`BaseAsyncResult.`**`state`**
The current status of the task.

Can be one of the following:

*PENDING*

The task is waiting for execution.

*STARTED*

The task has been started.

*RETRY*

The task is to be retried, possibly because of failure.

*FAILURE*

The task raised an exception, or has been retried more times than its limit. The `result` attribute contains the exception raised.

*SUCCESS*

The task executed successfully. The `result` attribute contains the resulting value.

`BaseAsyncResult.`**`status`**

Deprecated alias of `state`.

`BaseAsyncResult.`**`successful`**`()`

Returns `True` if the task executed successfully.

`BaseAsyncResult.`**`traceback`**

Get the traceback of a failed task.

`BaseAsyncResult.`**`wait`**`(`*timeout=None*`)`

Wait for task, and return the result when it arrives.

**Parameters** **timeout** – How long to wait, in seconds, before the operation times out.

**Raises** **celery.exceptions.TimeoutError** if `timeout` is not `None` and the result does not arrive within `timeout` seconds.

If the remote call raised an exception then that exception will be re-raised.

**class** `celery.result.`**`EagerResult`**`(`*task_id*, *ret_value*, *status*, *traceback=None*`)`

Result that we know has already been executed.

**exception** **`TimeoutError`**

The operation timed out.

`EagerResult.`**`ready`**`()`

Returns `True` if the task has been executed.

`EagerResult.`**`result`**

The tasks return value

`EagerResult.`**`revoke`**`()`

`EagerResult.`**`state`**

The tasks state.

`EagerResult.`**`status`**

The tasks status (alias to `state`).

`EagerResult.`**`successful`**`()`

Returns `True` if the task executed without failure.

`EagerResult.`**`traceback`**

The traceback if the task failed.

`EagerResult.`**`wait`**`(`*timeout=None*`)`

Wait until the task has been executed and return its result.

**class** `celery.result.`**`TaskSetResult`**`(`*taskset_id*, *subtasks*`)`

Working with `TaskSet` results.

An instance of this class is returned by `TaskSet`‘s `apply_async()`. It enables inspection of the subtasks status and return values as a single entity.

**Option taskset_id** see `taskset_id`.

**Option subtasks** see `subtasks`.

**taskset_id**
The UUID of the taskset itself.

**subtasks**
A list of `AsyncResult` instances for all of the subtasks.

**completed_count**()
Task completion count.

**Returns** the number of tasks completed.

**failed**()
Did the taskset fail?

**Returns** `True` if any of the tasks in the taskset failed. (i.e., raised an exception)

**forget**()
Forget about (and possible remove the result of) all the tasks in this taskset.

**iterate**()
Iterate over the return values of the tasks as they finish one by one.

**Raises** The exception if any of the tasks raised an exception.

**itersubtasks**()
Taskset subtask iterator.

**Returns** an iterator for iterating over the tasksets `AsyncResult` objects.

**join**(*timeout=None*, *propagate=True*)
Gather the results of all tasks in the taskset, and returns a list ordered by the order of the set.

**Parameters**

- **timeout** – The number of seconds to wait for results before the operation times out.
- **propagate** – If any of the subtasks raises an exception, the exception will be reraised.

**Raises** **celery.exceptions.TimeoutError** if `timeout` is not `None` and the operation takes longer than `timeout` seconds.

**Returns** list of return values for all subtasks in order.

**ready**()
Is the task ready?

**Returns** `True` if all of the tasks in the taskset has been executed.

**classmethod restore**(*taskset_id*, *backend=<celery.backends.amqp.AMQPBackend object at 0x48a73d0>*)
Restore previously saved taskset result.

**revoke**(**args*, ***kwargs*)

**save**(*backend=<celery.backends.amqp.AMQPBackend object at 0x48a73d0>*)
Save taskset result for later retrieval using `restore()`.

Example:

```
>>> result.save()
>>> result = TaskSetResult.restore(task_id)
```

**successful**()
Was the taskset successful?

**Returns** `True` if all of the tasks in the taskset finished successfully (i.e. did not raise an exception).

**`total`**
The total number of tasks in the `TaskSet`.

**`waiting()`**
Is the taskset waiting?

**Returns** `True` if any of the tasks in the taskset is still waiting for execution.

## 9.6 Task Information and Utilities - celery.task

Working with tasks and task sets.

**class** `celery.task.`**`Task`**
A celery task.

All subclasses of `Task` must define the `run()` method, which is the actual method the `celery` daemon executes.

The `run()` method can take use of the default keyword arguments, as listed in the `run()` documentation.

The resulting class is callable, which if called will apply the `run()` method.

**`name`**
Name of the task.

**`abstract`**
If `True` the task is an abstract base class.

**`type`**
The type of task, currently this can be `regular`, or `periodic`, however if you want a periodic task, you should subclass `PeriodicTask` instead.

**`queue`**
Select a destination queue for this task. The queue needs to exist in `CELERY_QUEUES`. The `routing_key`, `exchange` and `exchange_type` attributes will be ignored if this is set.

**`routing_key`**
Override the global default `routing_key` for this task.

**`exchange`**
Override the global default `exchange` for this task.

**`exchange_type`**
Override the global default exchange type for this task.

**`delivery_mode`**
Override the global default delivery mode for this task. By default this is set to `2` (persistent). You can change this to `1` to get non-persistent behavior, which means the messages are lost if the broker is restarted.

**`mandatory`**
Mandatory message routing. An exception will be raised if the task can't be routed to a queue.

**`immediate:`**
Request immediate delivery. An exception will be raised if the task can't be routed to a worker immediately.

**`priority:`**
The message priority. A number from `0` to `9`, where `0` is the highest. Note that RabbitMQ doesn't support priorities yet.

**`max_retries`**
Maximum number of retries before giving up. If set to `None`, it will never stop retrying.

**`default_retry_delay`**
Default time in seconds before a retry of the task should be executed. Default is a 3 minute delay.

**`rate_limit`**
Set the rate limit for this task type, Examples: `None` (no rate limit), `"100/s"` (hundred tasks a second), `"100/m"` (hundred tasks a minute), `"100/h"` (hundred tasks an hour)

**`ignore_result`**
Don't store the return value of this task.

**`store_errors_even_if_ignored`**
If true, errors will be stored even if the task is configured to ignore results.

**`send_error_emails`**
If true, an e-mail will be sent to the admins whenever a task of this type raises an exception.

**`error_whitelist`**
List of exception types to send error e-mails for.

**`serializer`**
The name of a serializer that has been registered with `carrot.serialization.registry`. Example: `"json"`.

**`backend`**
The result store backend used for this task.

**`autoregister`**
If `True` the task is automatically registered in the task registry, which is the default behaviour.

**`track_started`**
If `True` the task will report its status as "started" when the task is executed by a worker. The default value is `False` as the normal behaviour is to not report that level of granularity. Tasks are either pending, finished, or waiting to be retried. Having a "started" status can be useful for when there are long running tasks and there is a need to report which task is currently running.

The global default can be overridden by the `CELERY_TRACK_STARTED` setting.

**`acks_late`**
If set to `True` messages for this task will be acknowledged **after** the task has been executed, not *just before*, which is the default behavior.

Note that this means the task may be executed twice if the worker crashes in the middle of execution, which may be acceptable for some applications.

The global default can be overriden by the `CELERY_ACKS_LATE` setting.

**`expires`**
Default task expiry time in seconds or a `datetime`.

**classmethod `AsyncResult`**(*task_id*)
Get AsyncResult instance for this kind of task.

**Parameters** **task_id** – Task id to get result for.

**exception `MaxRetriesExceededError`**
The tasks max restart limit has been exceeded.

`Task.`**`acks_late`** = **False**

`Task.`**`after_return`**(*status*, *retval*, *task_id*, *args*, *kwargs*, *einfo=None*)

Handler called after the task returns.

**Parameters**

- **status** – Current task state.
- **retval** – Task return value/exception.
- **task_id** – Unique id of the task.
- **args** – Original arguments for the task that failed.
- **kwargs** – Original keyword arguments for the task that failed.
- **einfo** – `ExceptionInfo` instance, containing the traceback (if any).

The return value of this handler is ignored.

**classmethod** `Task.`**`apply`**(*args=None*, *kwargs=None*, ***options*)

Execute this task locally, by blocking until the task has finished executing.

**Parameters**

- **args** – positional arguments passed on to the task.
- **kwargs** – keyword arguments passed on to the task.
- **throw** – Re-raise task exceptions. Defaults to the `CELERY_EAGER_PROPAGATES_EXCEPTIONS` setting.

:rtype `celery.result.EagerResult`:

See `celery.execute.apply()`.

**classmethod** `Task.`**`apply_async`**(*args=None*, *kwargs=None*, ***options*)

Delay this task for execution by the `celery` daemon(s).

**Parameters**

- **args** – positional arguments passed on to the task.
- **kwargs** – keyword arguments passed on to the task.
- ****options** – Any keyword arguments to pass on to `celery.execute.apply_async()`.

See `celery.execute.apply_async()` for more information.

:returns `celery.result.AsyncResult`:

`Task.`**`autoregister`** = **True**

`Task.`**`backend`** = **<celery.backends.amqp.AMQPBackend object at 0x48a73d0>**

`Task.`**`default_retry_delay`** = **180**

**classmethod** `Task.`**`delay`**(**args*, ***kwargs*)

Shortcut to `apply_async()`, with star arguments, but doesn't support the extra options.

**Parameters**

- ***args** – positional arguments passed on to the task.
- ****kwargs** – keyword arguments passed on to the task.

:returns `celery.result.AsyncResult`:

`Task.`**`delivery_mode`** = 2

`Task.`**`disable_error_emails`** = False

`Task.`**`error_whitelist`** = ()

**classmethod** `Task.`**`establish_connection`**(*connect_timeout=4*)
Establish a connection to the message broker.

`Task.`**`exchange`** = None

`Task.`**`exchange_type`** = 'direct'

`Task.`**`execute`**(*wrapper*, *pool*, *loglevel*, *logfile*)
The method the worker calls to execute the task.

**Parameters**

- **wrapper** – A `TaskRequest`.
- **pool** – A task pool.
- **loglevel** – Current loglevel.
- **logfile** – Name of the currently used logfile.

`Task.`**`expires`** = None

**classmethod** `Task.`**`get_consumer`**(*connection=None*, *connect_timeout=4*)
Get a celery task message consumer.

:rtype `celery.messaging.TaskConsumer`:

Please be sure to close the AMQP connection when you're done with this object. i.e.:

```
>>> consumer = self.get_consumer()
>>> # do something with consumer
>>> consumer.connection.close()
```

**classmethod** `Task.`**`get_logger`**(*loglevel=None*, *logfile=None*, *propagate=False*, ***kwargs*)
Get task-aware logger object.

See `celery.log.setup_task_logger()`.

**classmethod** `Task.`**`get_publisher`**(*connection=None*, *exchange=None*, *connect_timeout=4*, *exchange_type=None*)
Get a celery task message publisher.

:rtype `celery.messaging.TaskPublisher`:

Please be sure to close the AMQP connection when you're done with this object, i.e.:

```
>>> publisher = self.get_publisher()
>>> # do something with publisher
>>> publisher.connection.close()
```

`Task.`**`ignore_result`** = False

`Task.`**`immediate`** = False

`Task.`**`mandatory`** = False

`Task.`**`max_retries`** = 5

`Task.`**`name`** = None

`Task.`**`on_failure`**`(`*exc*, *task_id*, *args*, *kwargs*, *einfo=None*`)`

Error handler.

This is run by the worker when the task fails.

**Parameters**

- **exc** – The exception raised by the task.
- **task_id** – Unique id of the failed task.
- **args** – Original arguments for the task that failed.
- **kwargs** – Original keyword arguments for the task that failed.
- **einfo** – `ExceptionInfo` instance, containing the traceback.

The return value of this handler is ignored.

`Task.`**`on_retry`**`(`*exc*, *task_id*, *args*, *kwargs*, *einfo=None*`)`

Retry handler.

This is run by the worker when the task is to be retried.

**Parameters**

- **exc** – The exception sent to `retry()`.
- **task_id** – Unique id of the retried task.
- **args** – Original arguments for the retried task.
- **kwargs** – Original keyword arguments for the retried task.
- **einfo** – `ExceptionInfo` instance, containing the traceback.

The return value of this handler is ignored.

`Task.`**`on_success`**`(`*retval*, *task_id*, *args*, *kwargs*`)`

Success handler.

Run by the worker if the task executes successfully.

**Parameters**

- **retval** – The return value of the task.
- **task_id** – Unique id of the executed task.
- **args** – Original arguments for the executed task.
- **kwargs** – Original keyword arguments for the executed task.

The return value of this handler is ignored.

`Task.`**`priority`** **= None**

`Task.`**`queue`** **= None**

`Task.`**`rate_limit`** **= None**

**classmethod** `Task.`**`retry`**`(`*args=None*, *kwargs=None*, *exc=None*, *throw=True*, ***options*`)`

Retry the task.

**Parameters**

- **args** – Positional arguments to retry with.
- **kwargs** – Keyword arguments to retry with.

- **exc** – Optional exception to raise instead of `MaxRetriesExceededError` when the max restart limit has been exceeded.
- **countdown** – Time in seconds to delay the retry for.
- **eta** – Explicit time and date to run the retry at (must be a `datetime.datetime` instance).
- ****options** – Any extra options to pass on to meth:*apply_async*. See `celery.execute.apply_async()`.
- **throw** – If this is `False`, do not raise the `RetryTaskError` exception, that tells the worker to mark the task as being retried. Note that this means the task will be marked as failed if the task raises an exception, or successful if it returns.

**Raises celery.exceptions.RetryTaskError** To tell the worker that the task has been re-sent for retry. This always happens, unless the `throw` keyword argument has been explicitly set to `False`, and is considered normal operation.

Example

```
>>> class TwitterPostStatusTask(Task):
...
...     def run(self, username, password, message, **kwargs):
...         twitter = Twitter(username, password)
...         try:
...             twitter.post_status(message)
...         except twitter.FailWhale, exc:
...             # Retry in 5 minutes.
...             self.retry([username, password, message], kwargs,
...                         countdown=60 * 5, exc=exc)
```

`Task.`**`routing_key`** **= None**

`Task.`**`run`**(**args*, ***kwargs*)

The body of the task executed by the worker.

The following standard keyword arguments are reserved and is passed by the worker if the function/method supports them:

- task_id
- task_name
- task_retries
- task_is_eager
- logfile
- loglevel
- delivery_info

Additional standard keyword arguments may be added in the future. To take these default arguments, the task can either list the ones it wants explicitly or just take an arbitrary list of keyword arguments (**kwargs).

`Task.`**`send_error_emails`** **= False**

`Task.`**`serializer`** **= 'pickle'**

`Task.`**`store_errors_even_if_ignored`** **= False**

**classmethod** `Task.`**`subtask`**`(`**args*, ***kwargs*`)`
Returns a `subtask` object for this task that wraps arguments and execution options for a single task invocation.

`Task.`**`track_started`** **= False**

`Task.`**`type`** **= 'regular'**

`Task.`**`update_state`**`(`*task_id*, *state*, *meta=None*`)`
Update task state.

**Parameters**

- **task_id** – Id of the task to update.
- **state** – New state (`str`).
- **meta** – State metadata (`dict`).

**class** `celery.task.`**`TaskSet`**`(`*task=None*, *tasks=None*`)`
A task containing several subtasks, making it possible to track how many, or when all of the tasks has been completed.

**Parameters** **tasks** – A list of `subtask` instances.

**`total`**
Total number of subtasks in this task set.

Example:

```
>>> from djangofeeds.tasks import RefreshFeedTask
>>> from celery.task.sets import TaskSet, subtask
>>> urls = ("http://cnn.com/rss",
...         "http://bbc.co.uk/rss",
...         "http://xkcd.com/rss")
>>> subtasks = [RefreshFeedTask.subtask(kwargs={"feed_url": url})
...                 for url in urls]
>>> taskset = TaskSet(tasks=subtasks)
>>> taskset_result = taskset.apply_async()
>>> list_of_return_values = taskset_result.join()
```

**`Publisher`**
alias of `TaskPublisher`

**`apply`**`()`
Applies the taskset locally.

**`apply_async`**`(`**args*, ***kwargs*`)`
Run all tasks in the taskset.

Returns a `celery.result.TaskSetResult` instance.

Example

```
>>> ts = TaskSet(tasks=(
...         RefreshFeedTask.subtask(["http://foo.com/rss"]),
...         RefreshFeedTask.subtask(["http://bar.com/rss"]),
... ))
>>> result = ts.apply_async()
>>> result.taskset_id
"d2c9b261-8eff-4bfb-8459-1e1b72063514"
>>> result.subtask_ids
["b4996460-d959-49c8-aeb9-39c530dcde25",
"598d2d18-ab86-45ca-8b4f-0779f5d6a3cb"]
```

```
>>> result.waiting()
True
>>> time.sleep(10)
>>> result.ready()
True
>>> result.successful()
True
>>> result.failed()
False
>>> result.join()
[True, True]
```

**task**

**task_name**

**tasks**

**class** `celery.task.`**`PeriodicTask`**

A periodic task is a task that behaves like a *cron* job.

Results of periodic tasks are not stored by default.

**run_every**

*REQUIRED* Defines how often the task is run (its interval), it can be a `timedelta` object, a `crontab` object or an integer specifying the time in seconds.

**relative**

If set to `True`, run times are relative to the time when the server was started. This was the previous behaviour, periodic tasks are now scheduled by the clock.

**Raises NotImplementedError** if the `run_every` attribute is not defined.

Example

```
>>> from celery.task import tasks, PeriodicTask
>>> from datetime import timedelta
>>> class EveryThirtySecondsTask(PeriodicTask):
...     run_every = timedelta(seconds=30)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every 30 seconds")

>>> from celery.task import PeriodicTask
>>> from celery.task.schedules import crontab

>>> class EveryMondayMorningTask(PeriodicTask):
...     run_every = crontab(hour=7, minute=30, day_of_week=1)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every Monday at 7:30AM.")

>>> class EveryMorningTask(PeriodicTask):
...     run_every = crontab(hours=7, minute=30)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every day at 7:30AM.")
```

```
>>> class EveryQuarterPastTheHourTask(PeriodicTask):
...     run_every = crontab(minute=15)
...
...     def run(self, **kwargs):
...         logger = self.get_logger(**kwargs)
...         logger.info("Execute every 0:15 past the hour every day.")
```

**`ignore_result`** = **True**

**`is_due`**(*last_run_at*)
Returns tuple of two items `(is_due, next_time_to_run)`, where next time to run is in seconds.

See `celery.schedules.schedule.is_due()` for more information.

**`relative`** = **False**

**`remaining_estimate`**(*last_run_at*)
Returns when the periodic task should run next as a timedelta.

**`timedelta_seconds`**(*delta*)
Convert `timedelta` to seconds.

Doesn't account for negative timedeltas.

**`type`** = **'periodic'**

`celery.task.`**`discard_all`**(**args*, ***kwargs*)
Discard all waiting tasks.

This will ignore all tasks waiting for execution, and they will be deleted from the messaging server.

**Returns** the number of tasks discarded.

`celery.task.`**`dmap`**(*fun*, *args*, *timeout=None*)
Distribute processing of the arguments and collect the results.

Example

```
>>> from celery.task import dmap
>>> import operator
>>> dmap(operator.add, [[2, 2], [4, 4], [8, 8]])
[4, 8, 16]
```

`celery.task.`**`dmap_async`**(*fun*, *args*, *timeout=None*)
Distribute processing of the arguments and collect the results asynchronously.

:returns `celery.result.AsyncResult`:

Example

```
>>> from celery.task import dmap_async
>>> import operator
>>> presult = dmap_async(operator.add, [[2, 2], [4, 4], [8, 8]])
>>> presult
<AsyncResult: 373550e8-b9a0-4666-bc61-ace01fa4f91d>
>>> presult.status
'SUCCESS'
>>> presult.result
[4, 8, 16]
```

`celery.task.`**`execute_remote`**(*fun*, **args*, ***kwargs*)
Execute arbitrary function/object remotely.

**Parameters**

- **fun** – A callable function or object.
- ***args** – Positional arguments to apply to the function.
- ****kwargs** – Keyword arguments to apply to the function.

The object must be picklable, so you can't use lambdas or functions defined in the REPL (the objects must have an associated module).

:returns class:*celery.result.AsyncResult*:

`celery.task.`**`ping`**`()`

Test if the server is alive.

Example:

```
>>> from celery.task import ping
>>> ping()
'pong'
```

**class** `celery.task.`**`HttpDispatchTask`**

Task dispatching to an URL.

**Parameters**

- **url** – The URL location of the HTTP callback task.
- **method** – Method to use when dispatching the callback. Usually `GET` or `POST`.
- ****kwargs** – Keyword arguments to pass on to the HTTP callback.

**`url`**

If this is set, this is used as the default URL for requests. Default is to require the user of the task to supply the url as an argument, as this attribute is intended for subclasses.

**`method`**

If this is set, this is the default method used for requests. Default is to require the user of the task to supply the method as an argument, as this attribute is intended for subclasses.

**`method`** **= None**

**`name`** **= 'celery.task.http.HttpDispatchTask'**

**`run`**`(`*url=None*, *method='GET'*, ***kwargs*`)`

**`url`** **= None**

## 9.7 Configuration - celery.conf

### 9.7.1 Queues

celery.conf.**QUEUES**
Queue name/options mapping.

celery.conf.**DEFAULT_QUEUE**
Name of the default queue.

celery.conf.**DEFAULT_EXCHANGE**
Default exchange.

celery.conf.**DEFAULT_EXCHANGE_TYPE**
Default exchange type.

celery.conf.**DEFAULT_DELIVERY_MODE**
Default delivery mode (`"persistent"` or `"non-persistent"`). Default is `"persistent"`.

celery.conf.**DEFAULT_ROUTING_KEY**
Default routing key used when sending tasks.

celery.conf.**BROKER_CONNECTION_TIMEOUT**
The timeout in seconds before we give up establishing a connection to the AMQP server.

celery.conf.**BROADCAST_QUEUE**
Name prefix for the queue used when listening for broadcast messages. The workers hostname will be appended to the prefix to create the final queue name.

Default is `"celeryctl"`.

celery.conf.**BROADCAST_EXCHANGE**
Name of the exchange used for broadcast messages.

Default is `"celeryctl"`.

celery.conf.**BROADCAST_EXCHANGE_TYPE**
Exchange type used for broadcast messages. Default is `"fanout"`.

celery.conf.**EVENT_QUEUE**
Name of queue used to listen for event messages. Default is `"celeryevent"`.

celery.conf.**EVENT_EXCHANGE**
Exchange used to send event messages. Default is `"celeryevent"`.

celery.conf.**EVENT_EXCHANGE_TYPE**
Exchange type used for the event exchange. Default is `"topic"`.

celery.conf.**EVENT_ROUTING_KEY**
Routing key used for events. Default is `"celeryevent"`.

celery.conf.**EVENT_SERIALIZER**
Type of serialization method used to serialize events. Default is `"json"`.

celery.conf.**RESULT_EXCHANGE**
Exchange used by the AMQP result backend to publish task results. Default is `"celeryresult"`.

### 9.7.2 Sending E-Mails

celery.conf.**CELERY_SEND_TASK_ERROR_EMAILS**
If set to `True`, errors in tasks will be sent to `ADMINS` by e-mail.

celery.conf.**ADMINS**
List of `(name, email_address)` tuples for the admins that should receive error e-mails.

celery.conf.**SERVER_EMAIL**
The e-mail address this worker sends e-mails from. Default is `"celery@localhost"`.

celery.conf.**MAIL_HOST**
The mail server to use. Default is `"localhost"`.

celery.conf.**MAIL_HOST_USER**
Username (if required) to log on to the mail server with.

celery.conf.**MAIL_HOST_PASSWORD**
Password (if required) to log on to the mail server with.

celery.conf.**MAIL_PORT**
The port the mail server is listening on. Default is `25`.

## 9.7.3 Execution

celery.conf.**ALWAYS_EAGER**
Always execute tasks locally, don't send to the queue.

celery.conf.**EAGER_PROPAGATES_EXCEPTIONS**
If set to `True`, `celery.execute.apply()` will re-raise task exceptions. It's the same as always running apply with `throw=True`.

celery.conf.**TASK_RESULT_EXPIRES**
Task tombstone expire time in seconds.

celery.conf.**IGNORE_RESULT**
If enabled, the default behavior will be to not store task results.

celery.conf.**TRACK_STARTED**
If enabled, the default behavior will be to track when tasks starts by storing the `STARTED` state.

celery.conf.**ACKS_LATE**
If enabled, the default behavior will be to acknowledge task messages after the task is executed.

celery.conf.**STORE_ERRORS_EVEN_IF_IGNORED**
If enabled, task errors will be stored even though `Task.ignore_result` is enabled.

celery.conf.**MAX_CACHED_RESULTS**
Total number of results to store before results are evicted from the result cache.

celery.conf.**TASK_SERIALIZER**
A string identifying the default serialization method to use. Can be `pickle` (default), `json`, `yaml`, or any custom serialization methods that have been registered with `carrot.serialization.registry`.

Default is `pickle`.

celery.conf.**RESULT_BACKEND**
The backend used to store task results (tombstones).

celery.conf.**CELERY_CACHE_BACKEND**
Celery cache backend.

celery.conf.**SEND_EVENTS**
If set, celery will send events that can be captured by monitors like `celerymon`. Default is: `False`.

celery.conf.**DEFAULT_RATE_LIMIT**
The default rate limit applied to all tasks which doesn't have a custom rate limit defined. (Default: `None`)

celery.conf.**DISABLE_RATE_LIMITS**
If `True` all rate limits will be disabled and all tasks will be executed as soon as possible.

### 9.7.4 Broker

`celery.conf.`**`BROKER_CONNECTION_RETRY`**
Automatically try to re-establish the connection to the AMQP broker if it's lost.

`celery.conf.`**`BROKER_CONNECTION_MAX_RETRIES`**
Maximum number of retries before we give up re-establishing a connection to the broker.

If this is set to `0` or `None`, we will retry forever.

Default is `100` retries.

### 9.7.5 Celerybeat

`celery.conf.`**`CELERYBEAT_LOG_LEVEL`**
Default log level for celerybeat. Default is: `INFO`.

`celery.conf.`**`CELERYBEAT_LOG_FILE`**
Default log file for celerybeat. Default is: `None` (stderr)

`celery.conf.`**`CELERYBEAT_SCHEDULE_FILENAME`**
Name of the persistent schedule database file. Default is: `celerybeat-schedule`.

`celery.conf.`**`CELERYBEAT_MAX_LOOP_INTERVAL`**
The maximum number of seconds celerybeat is allowed to sleep between checking the schedule. The default is 5 minutes, which means celerybeat can only sleep a maximum of 5 minutes after checking the schedule run-times for a periodic task to apply. If you change the run_times of periodic tasks at run-time, you may consider lowering this value for changes to take effect faster (A value of 5 minutes, means the changes will take effect in 5 minutes at maximum).

### 9.7.6 Celerymon

`celery.conf.`**`CELERYMON_LOG_LEVEL`**
Default log level for celerymon. Default is: `INFO`.

`celery.conf.`**`CELERYMON_LOG_FILE`**
Default log file for celerymon. Default is: `None` (stderr)

### 9.7.7 Celeryd

`celery.conf.`**`LOG_LEVELS`**
Mapping of log level names to `logging` module constants.

`celery.conf.`**`CELERYD_LOG_FORMAT`**
The format to use for log messages.

`celery.conf.`**`CELERYD_TASK_LOG_FORMAT`**
The format to use for task log messages.

`celery.conf.`**`CELERYD_LOG_FILE`**
Filename of the daemon log file. Default is: `None` (stderr)

`celery.conf.`**`CELERYD_LOG_LEVEL`**
Default log level for daemons. (`WARN`)

`celery.conf.`**`CELERYD_CONCURRENCY`**
The number of concurrent worker processes. If set to `0` (the default), the total number of available CPUs/cores will be used.

`celery.conf.`**`CELERYD_PREFETCH_MULTIPLIER`**
The number of concurrent workers is multipled by this number to yield the wanted AMQP QoS message prefetch count. Default is: `4`

`celery.conf.`**`CELERYD_POOL`**
Name of the task pool class used by the worker. Default is `"celery.concurrency.processes.TaskPool"`.

`celery.conf.`**`CELERYD_LISTENER`**
Name of the listener class used by the worker. Default is `"celery.worker.listener.CarrotListener"`.

`celery.conf.`**`CELERYD_MEDIATOR`**
Name of the mediator class used by the worker. Default is `"celery.worker.controllers.Mediator"`.

`celery.conf.`**`CELERYD_ETA_SCHEDULER`**
Name of the ETA scheduler class used by the worker. Default is `"celery.worker.controllers.ScheduleController"`.

## 9.8 Remote Management of Workers - celery.task.control

`celery.task.control.`**`broadcast`**`(`**args*, ***kwargs*`)`
Broadcast a control command to the celery workers.

**Parameters**

- **command** – Name of command to send.
- **arguments** – Keyword arguments for the command.
- **destination** – If set, a list of the hosts to send the command to, when empty broadcast to all workers.
- **connection** – Custom broker connection to use, if not set, a connection will be established automatically.
- **connect_timeout** – Timeout for new connection if a custom connection is not provided.
- **reply** – Wait for and return the reply.
- **timeout** – Timeout in seconds to wait for the reply.
- **limit** – Limit number of replies.
- **callback** – Callback called immediately for each reply received.

`celery.task.control.`**`discard_all`**`(`**args*, ***kwargs*`)`
Discard all waiting tasks.

This will ignore all tasks waiting for execution, and they will be deleted from the messaging server.

**Returns** the number of tasks discarded.

`celery.task.control.`**`flatten_reply`**`(`*reply*`)`

**class** `celery.task.control.`**`inspect`**`(`*destination=None*, *timeout=1*, *callback=None*`)`

**`active`**`(`*safe=False*`)`

**`add_consumer`**(*queue*, *exchange=None*, *exchange_type='direct'*, *routing_key=None*, ***options*)

**`cancel_consumer`**(*queue*, ***kwargs*)

**`disable_events`**()

**`enable_events`**()

**`ping`**()

**`registered_tasks`**()

**`reserved`**(*safe=False*)

**`revoked`**()

**`scheduled`**(*safe=False*)

**`stats`**()

`celery.task.control.`**`ping`**(*destination=None*, *timeout=1*, ***kwargs*)

Ping workers.

Returns answer from alive workers.

**Parameters**

- **destination** – If set, a list of the hosts to send the command to, when empty broadcast to all workers.
- **connection** – Custom broker connection to use, if not set, a connection will be established automatically.
- **connect_timeout** – Timeout for new connection if a custom connection is not provided.
- **reply** – Wait for and return the reply.
- **timeout** – Timeout in seconds to wait for the reply.
- **limit** – Limit number of replies.

`celery.task.control.`**`rate_limit`**(*task_name*, *rate_limit*, *destination=None*, ***kwargs*)

Set rate limit for task by type.

**Parameters**

- **task_name** – Type of task to change rate limit for.
- **rate_limit** – The rate limit as tasks per second, or a rate limit string (`"100/m"`, etc. see `celery.task.base.Task.rate_limit` for more information).
- **destination** – If set, a list of the hosts to send the command to, when empty broadcast to all workers.
- **connection** – Custom broker connection to use, if not set, a connection will be established automatically.
- **connect_timeout** – Timeout for new connection if a custom connection is not provided.
- **reply** – Wait for and return the reply.
- **timeout** – Timeout in seconds to wait for the reply.
- **limit** – Limit number of replies.

`celery.task.control.`**`revoke`**(*task_id*, *destination=None*, ***kwargs*)

Revoke a task by id.

If a task is revoked, the workers will ignore the task and not execute it after all.

**Parameters**

- **task_id** – Id of the task to revoke.
- **destination** – If set, a list of the hosts to send the command to, when empty broadcast to all workers.
- **connection** – Custom broker connection to use, if not set, a connection will be established automatically.
- **connect_timeout** – Timeout for new connection if a custom connection is not provided.
- **reply** – Wait for and return the reply.
- **timeout** – Timeout in seconds to wait for the reply.
- **limit** – Limit number of replies.

## 9.9 HTTP Callback Tasks - celery.task.http

**class** `celery.task.http.`**`HttpDispatch`**(*url*, *method*, *task_kwargs*, *logger*)

Make task HTTP request and collect the task result.

**Parameters**

- **url** – The URL to request.
- **method** – HTTP method used. Currently supported methods are `GET` and `POST`.
- **task_kwargs** – Task keyword arguments.
- **logger** – Logger used for user/system feedback.

**`dispatch`**()

Dispatch callback and return result.

**`http_headers`**

**`make_request`**(*url*, *method*, *params*)

Makes an HTTP request and returns the response.

**`timeout`** = 5

**`user_agent`** = 'celery/2.1.4'

**class** `celery.task.http.`**`HttpDispatchTask`**

Task dispatching to an URL.

**Parameters**

- **url** – The URL location of the HTTP callback task.
- **method** – Method to use when dispatching the callback. Usually `GET` or `POST`.
- ****kwargs** – Keyword arguments to pass on to the HTTP callback.

**`url`**

If this is set, this is used as the default URL for requests. Default is to require the user of the task to supply the url as an argument, as this attribute is intended for subclasses.

**`method`**

If this is set, this is the default method used for requests. Default is to require the user of the task to supply the method as an argument, as this attribute is intended for subclasses.

**`method`** = None

**name = 'celery.task.http.HttpDispatchTask'**

**run** (*url=None*, *method='GET'*, ***kwargs*)

**url = None**

**exception** celery.task.http.**InvalidResponseError**
The remote server gave an invalid response.

**class** celery.task.http.**MutableURL** (*url*)
Object wrapping a Uniform Resource Locator.

Supports editing the query parameter list. You can convert the object back to a string, the query will be properly urlencoded.

Examples

```
>>> url = URL("http://www.google.com:6580/foo/bar?x=3&y=4#foo")
>>> url.query
{'x': '3', 'y': '4'}
>>> str(url)
'http://www.google.com:6580/foo/bar?y=4&x=3#foo'
>>> url.query["x"] = 10
>>> url.query.update({"George": "Costanza"})
>>> str(url)
'http://www.google.com:6580/foo/bar?y=4&x=10&George=Costanza#foo'
```

**query**

**exception** celery.task.http.**RemoteExecuteError**
The remote task gave a custom error.

**class** celery.task.http.**URL** (*url*, *dispatcher=None*)
HTTP Callback URL

Supports requesting an URL asynchronously.

**Parameters**

- **url** – URL to request.
- **dispatcher** – Class used to dispatch the request. By default this is HttpDispatchTask.

**dispatcher**
alias of HttpDispatchTask

**get_async** (***kwargs*)

**post_async** (***kwargs*)

**exception** celery.task.http.**UnknownStatusError**
The remote server gave an unknown status.

celery.task.http.**extract_response** (*raw_response*)
Extract the response text from a raw JSON response.

celery.task.http.**maybe_utf8** (*value*)
Encode utf-8 value, only if the value is actually utf-8.

celery.task.http.**utf8dict** (*tup*)
With a dict's items() tuple return a new dict with any utf-8 keys/values encoded.

## 9.10 Periodic Task Schedule Behaviors - celery.schedules

**class** `celery.schedules.`**`crontab`**(*minute='*', hour='*', day_of_week='*', nowfun=<built-in method now of type object at 0x7fa9b7bd5c40>*)

A crontab can be used as the `run_every` value of a `PeriodicTask` to add cron-like scheduling.

Like a *`cron`* job, you can specify units of time of when you would like the task to execute. It is a reasonably complete implementation of cron's features, so it should provide a fair degree of scheduling needs.

You can specify a minute, an hour, and/or a day of the week in any of the following formats:

**`minute`**

- A (list of) integers from 0-59 that represent the minutes of an hour of when execution should occur; or
- A string representing a crontab pattern. This may get pretty advanced, like *minute="*/15"* (for every quarter) or *minute="1,13,30-45,50-59/2"*.

**`hour`**

- A (list of) integers from 0-23 that represent the hours of a day of when execution should occur; or
- A string representing a crontab pattern. This may get pretty advanced, like *hour="*/3"* (for every three hours) or *hour="0,8-17/2"* (at midnight, and every two hours during office hours).

**`day_of_week`**

- A (list of) integers from 0-6, where Sunday = 0 and Saturday = 6, that represent the days of a week that execution should occur.
- A string representing a crontab pattern. This may get pretty advanced, like *day_of_week="mon-fri"* (for weekdays only). (Beware that *day_of_week="*/2"* does not literally mean "every two days", but "every day that is divisible by two"!)

**`is_due`**(*last_run_at*)

Returns tuple of two items `(is_due, next_time_to_run)`, where next time to run is in seconds.

See `celery.schedules.schedule.is_due()` for more information.

**`remaining_estimate`**(*last_run_at*)

Returns when the periodic task should run next as a timedelta.

**class** `celery.schedules.`**`crontab_parser`**(*max_=60*)

Parser for crontab expressions. Any expression of the form 'groups' (see BNF grammar below) is accepted and expanded to a set of numbers. These numbers represent the units of time that the crontab needs to run on:

```
digit   :: '0'..'9'
dow     :: 'a'..'z'
number  :: digit+ | dow+
steps   :: number
range   :: number ( '-' number ) ?
numspec :: '*' | range
expr    :: numspec ( '/' steps ) ?
groups  :: expr ( ',' expr ) *
```

The parser is a general purpose one, useful for parsing hours, minutes and day_of_week expressions. Example usage:

```
>>> minutes = crontab_parser(60).parse("*/15")
[0, 15, 30, 45]
>>> hours = crontab_parser(24).parse("*/4")
[0, 4, 8, 12, 16, 20]
```

```
>>> day_of_week = crontab_parser(7).parse("*")
[0, 1, 2, 3, 4, 5, 6]
```

**parse**(*cronspec*)

celery.schedules.**maybe_schedule**(*s*, *relative=False*)

**class** celery.schedules.**schedule**(*run_every=None*, *relative=False*)

**is_due**(*last_run_at*)
Returns tuple of two items `(is_due, next_time_to_run)`, where next time to run is in seconds.

e.g.

- **`(True, 20)`, means the task should be run now, and the next** time to run is in 20 seconds.
- `(False, 12)`, means the task should be run in 12 seconds.

You can override this to decide the interval at runtime, but keep in mind the value of `CELERYBEAT_MAX_LOOP_INTERVAL`, which decides the maximum number of seconds celerybeat can sleep between re-checking the periodic task intervals. So if you dynamically change the next run at value, and the max interval is set to 5 minutes, it will take 5 minutes for the change to take effect, so you may consider lowering the value of `CELERYBEAT_MAX_LOOP_INTERVAL` if responsiveness is of importance to you.

**relative = False**

**remaining_estimate**(*last_run_at*)
Returns when the periodic task should run next as a timedelta.

## 9.11 Signals - celery.signals

### 9.11.1 Basics

Several kinds of events trigger signals, you can connect to these signals to perform actions as they trigger.

Example connecting to the `task_sent` signal:

```
from celery.signals import task_sent

def task_sent_handler(sender=None, task_id=None, task=None, args=None,
                      kwargs=None, **kwds):
    print("Got signal task_sent for task id %s" % (task_id, ))

task_sent.connect(task_sent_handler)
```

Some signals also have a sender which you can filter by. For example the `task_sent` signal uses the task name as a sender, so you can connect your handler to be called only when tasks with name `"tasks.add"` has been sent by providing the `sender` argument to `connect`:

```
task_sent.connect(task_sent_handler, sender="tasks.add")
```

## 9.11.2 Signals

### Task Signals

`celery.signals.`**`task_sent`**

Dispatched when a task has been sent to the broker. Note that this is executed in the client process, the one sending the task, not in the worker.

Sender is the name of the task being sent.

Provides arguments:

- **task_id** Id of the task to be executed.
- **task** The task being executed.
- **args** the tasks positional arguments.
- **kwargs** The tasks keyword arguments.
- **eta** The time to execute the task.
- **taskset** Id of the taskset this task is part of (if any).

`celery.signals.`**`task_prerun`**

Dispatched before a task is executed.

Sender is the task class being executed.

Provides arguments:

- **task_id** Id of the task to be executed.
- **task** The task being executed.
- **args** the tasks positional arguments.
- **kwargs** The tasks keyword arguments.

`celery.signals.`**`task_postrun`**

Dispatched after a task has been executed.

Sender is the task class executed.

Provides arguments:

- **task_id** Id of the task to be executed.
- **task** The task being executed.
- **args** The tasks positional arguments.
- **kwargs** The tasks keyword arguments.
- retval

  The return value of the task.

### Worker Signals

celery.signals.**worker_init**
Dispatched before the worker is started.

celery.signals.**worker_ready**
Dispatched when the worker is ready to accept work.

celery.signals.**worker_process_init**
Dispatched by each new pool worker process when it starts.

celery.signals.**worker_shutdown**
Dispatched when the worker is about to shut down.

## 9.12 Exceptions - celery.exceptions

Common Exceptions

**exception** celery.exceptions.**AlreadyRegistered**
The task is already registered.

**exception** celery.exceptions.**ImproperlyConfigured**
Celery is somehow improperly configured.

**exception** celery.exceptions.**MaxRetriesExceededError**
The tasks max restart limit has been exceeded.

**exception** celery.exceptions.**NotConfigured**
Celery has not been configured, as no config module has been found.

**exception** celery.exceptions.**NotRegistered**(*message*, **args*, ***kwargs*)
The task is not registered.

**exception** celery.exceptions.**QueueNotFound**
Task routed to a queue not in CELERY_QUEUES.

**exception** celery.exceptions.**RetryTaskError**(*message*, *exc*, **args*, ***kwargs*)
The task is to be retried later.

**exception** celery.exceptions.**SoftTimeLimitExceeded**
The soft time limit has been exceeded. This exception is raised to give the task a chance to clean up.

**exception** celery.exceptions.**TaskRevokedError**
The task has been revoked, so no result available.

**exception** celery.exceptions.**TimeLimitExceeded**
The time limit has been exceeded and the job has been terminated.

**exception** celery.exceptions.**TimeoutError**
The operation timed out.

**exception** celery.exceptions.**WorkerLostError**
The worker processing a job has exited prematurely.

## 9.13 Built-in Task Classes - celery.task.builtins

**class** celery.task.builtins.**AsynchronousMapTask**
Task used internally by `dmap_async()` and `TaskSet.map_async()`.

**name = 'celery.map_async'**

**run** (*serfun*, *args*, *timeout=None*, ***kwargs*)

celery.task.builtins.**DeleteExpiredTaskMetaTask**
alias of backend_cleanup

**class** celery.task.builtins.**ExecuteRemoteTask**
Execute an arbitrary function or object.

*Note* You probably want `execute_remote()` instead, which this is an internal component of.

The object must be pickleable, so you can't use lambdas or functions defined in the REPL (that is the python shell, or `ipython`).

**name = 'celery.execute_remote'**

**run** (*ser_callable*, *fargs*, *fkwargs*, ***kwargs*)

**Parameters**

- **ser_callable** – A pickled function or callable object.
- **fargs** – Positional arguments to apply to the function.
- **fkwargs** – Keyword arguments to apply to the function.

**class** celery.task.builtins.**PingTask**
The task used by `ping()`.

**name = 'celery.ping'**

**run** (***kwargs*)

**Returns** the string `"pong"`.

**class** celery.task.builtins.**backend_cleanup**

**name = 'celery.backend_cleanup'**

**run** ()

## 9.14 Loaders - celery.loaders

celery.loaders.**current_loader** ()
Detect and return the current loader.

celery.loaders.**get_loader_cls** (*loader*)
Get loader class by name/alias

celery.loaders.**load_settings** ()
Load the global settings object.

celery.loaders.**setup_loader** ()

## 9.15 Loader Base Classes - celery.loaders.base

**class** celery.loaders.base.**BaseLoader**
The base class for loaders.

Loaders handles to following things:

- Reading celery client/worker configurations.
- **What happens when a task starts?** See `on_task_init()`.
- **What happens when the worker starts?** See `on_worker_init()`.
- What modules are imported to find tasks?

**`conf`**
Loader configuration.

**`configured`** = **False**

**`import_default_modules`**()

**`import_from_cwd`**(*module*, *imp=None*)
Import module, but make sure it finds modules located in the current directory.

Modules located in the current directory has precedence over modules located in `sys.path`.

**`import_module`**(*module*)

**`import_task_module`**(*module*)

**`init_worker`**()

**`mail_admins`**(*subject*, *body*, *fail_silently=False*)

**`on_process_cleanup`**()
This method is called after a task is executed.

**`on_task_init`**(*task_id*, *task*)
This method is called before a task is executed.

**`on_worker_init`**()
This method is called when the worker (`celeryd`) starts.

**`override_backends`** = **{}**

**`worker_initialized`** = **False**

## 9.16 Default Loader - celery.loaders.default

**class** `celery.loaders.default.`**`Loader`**
The default loader.

See the FAQ for example usage.

**`on_worker_init`**()
Imports modules at worker init so tasks can be registered and used by the worked.

The list of modules to import is taken from the `CELERY_IMPORTS` setting.

**`read_configuration`**()
Read configuration from `celeryconfig.py` and configure celery and Django so it can be used by regular Python.

**`setup_settings`**(*settingsdict*)

`celery.loaders.default.`**`wanted_module_item`**(*item*)

## 9.17 Task Registry - celery.registry

celery.registry

**class** `celery.registry.`**`TaskRegistry`**
Site registry for tasks.

**exception** **`NotRegistered`**(*message*, **args*, ***kwargs*)
The task is not registered.

`TaskRegistry.`**`filter_types`**(*type*)
Return all tasks of a specific type.

`TaskRegistry.`**`periodic`**()
Get all periodic task types.

`TaskRegistry.`**`pop`**(*key*, **args*)

`TaskRegistry.`**`register`**(*task*)
Register a task in the task registry.

The task will be automatically instantiated if not already an instance.

`TaskRegistry.`**`regular`**()
Get all regular task types.

`TaskRegistry.`**`unregister`**(*name*)
Unregister task by name.

**Parameters** **name** – name of the task to unregister, or a `celery.task.base.Task` with a valid `name` attribute.

**Raises** **celery.exceptions.NotRegistered** if the task has not been registered.

## 9.18 Task States - celery.states

### 9.18.1 States

See *Task States*.

### 9.18.2 Sets

#### READY_STATES

Set of states meaning the task result is ready (has been executed).

#### UNREADY_STATES

Set of states meaning the task result is not ready (has not been executed).

#### EXCEPTION_STATES

Set of states meaning the task returned an exception.

#### PROPAGATE_STATES

Set of exception states that should propagate exceptions to the user.

#### ALL_STATES

Set of all possible states.

`celery.states.`**`precedence`**(*state*)
Get the precedence index for state.

Lower index means higher precedence.

**class** `celery.states.`**`state`**
State is a subclass of `str`, implementing comparison methods adhering to state precedence rules.

**`compare`**(*other*, *fun*, *default=False*)

## 9.19 Messaging - celery.messaging

Sending and Receiving Messages

**class** `celery.messaging.`**`BroadcastConsumer`**(**args*, ***kwargs*)
Consume broadcast commands

**`auto_delete`** = **False**

**`consume`**(**args*, ***kwargs*)

**`durable`** = **True**

**`exchange`** = **'celeryctl'**

**`exchange_type`** = **'fanout'**

**`no_ack`** = **True**

**`queue`** = **'celeryctl'**

**`verify_exclusive`**()

**class** `celery.messaging.`**`BroadcastPublisher`**(*connection*, *exchange=None*, *routing_key=None*, ***kwargs*)
Publish broadcast commands

**`ReplyTo`**
alias of `ControlReplyConsumer`

**`auto_delete`** = **False**

**`durable`** = **True**

**exchange** = **'celeryctl'**

**exchange_type** = **'fanout'**

**send**(*type*, *arguments*, *destination=None*, *reply_ticket=None*)
Send broadcast command.

**class** celery.messaging.**ConsumerSet**(*connection*, *from_dict=None*, *consumers=None*, *callbacks=None*, ***options*)
ConsumerSet with an optional decode error callback.

For more information see `carrot.messaging.ConsumerSet`.

**on_decode_error**
Callback called if a message had decoding errors. The callback is called with the signature:

```
callback(message, exception)
```

**on_decode_error** = **None**

**class** celery.messaging.**ControlReplyConsumer**(*connection*, *ticket*, ***kwargs*)

**auto_delete** = **True**

**collect**(*limit=None*, *timeout=1*, *callback=None*)

**durable** = **False**

**exchange** = **'celerycrq'**

**exchange_type** = **'direct'**

**exclusive** = **False**

**no_ack** = **True**

**class** celery.messaging.**ControlReplyPublisher**(*connection*, *exchange=None*, *routing_key=None*, ***kwargs*)

**auto_delete** = **True**

**delivery_mode** = **'non-persistent'**

**durable** = **False**

**exchange** = **'celerycrq'**

**exchange_type** = **'direct'**

**class** celery.messaging.**EventConsumer**(*connection*, *queue=None*, *exchange=None*, *routing_key=None*, ***kwargs*)
Consume events

**auto_delete** = **False**

**durable** = **True**

**exchange** = **'celeryevent'**

**exchange_type** = **'direct'**

**no_ack** = **True**

**queue** = **'celeryevent'**

**routing_key** = **'celeryevent'**

**class** `celery.messaging.`**`EventPublisher`**(*connection*, *exchange=None*, *routing_key=None*, ***kwargs*)

Publish events

**`auto_delete`** = **False**

**`delivery_mode`** = **2**

**`durable`** = **True**

**`exchange`** = **'celeryevent'**

**`exchange_type`** = **'direct'**

**`routing_key`** = **'celeryevent'**

**`serializer`** = **'json'**

**class** `celery.messaging.`**`TaskConsumer`**(*connection*, *queue=None*, *exchange=None*, *routing_key=None*, ***kwargs*)

Consume tasks

**`exchange`** = **'celery'**

**`exchange_type`** = **'direct'**

**`queue`** = **'celery'**

**`routing_key`** = **'celery'**

**class** `celery.messaging.`**`TaskPublisher`**(**args*, ***kwargs*)

Publish tasks.

**`auto_declare`** = **False**

**`declare`**()

**`delay_task`**(*task_name*, *task_args=None*, *task_kwargs=None*, *countdown=None*, *eta=None*, *task_id=None*, *taskset_id=None*, *exchange=None*, *exchange_type=None*, *expires=None*, ***kwargs*)

Delay task for execution by the celery nodes.

**`exchange`** = **'celery'**

**`exchange_type`** = **'direct'**

**`routing_key`** = **'celery'**

**`serializer`** = **'pickle'**

`celery.messaging.`**`establish_connection`**(*hostname=None*, *userid=None*, *password=None*, *virtual_host=None*, *port=None*, *ssl=None*, *insist=None*, *connect_timeout=None*, *backend_cls=None*, *defaults=<module 'celery.conf' from '../celery/conf.pyc'>*)

Establish a connection to the message broker.

`celery.messaging.`**`extract_msg_options`**(*d*)

`celery.messaging.`**`get_consumer_set`**(*connection*, *queues=None*, ***options*)

Get the `carrot.messaging.ConsumerSet`` for a queue configuration.

Defaults to the queues in `CELERY_QUEUES`.

`celery.messaging.`**`with_connection`**(*fun*)

Decorator for providing default message broker connection for functions supporting the `connection` and `connect_timeout` keyword arguments.

## 9.20 Contrib: Abortable tasks - celery.contrib.abortable

### 9.20.1 Abortable tasks overview

For long-running `Task`'s, it can be desirable to support aborting during execution. Of course, these tasks should be built to support abortion specifically.

The `AbortableTask` serves as a base class for all `Task` objects that should support abortion by producers.

- Producers may invoke the `abort()` method on `AbortableAsyncResult` instances, to request abortion.
- Consumers (workers) should periodically check (and honor!) the `is_aborted()` method at controlled points in their task's `run()` method. The more often, the better.

The necessary intermediate communication is dealt with by the `AbortableTask` implementation.

#### Usage example

In the consumer:

```
from celery.contrib.abortable import AbortableTask

def MyLongRunningTask(AbortableTask):

    def run(self, **kwargs):
        logger = self.get_logger(**kwargs)
        results = []
        for x in xrange(100):
            # Check after every 5 loops..
            if x % 5 == 0:  # alternatively, check when some timer is due
                if self.is_aborted(**kwargs):
                    # Respect the aborted status and terminate
                    # gracefully
                    logger.warning("Task aborted.")
                    return None
            y = do_something_expensive(x)
            results.append(y)
        logger.info("Task finished.")
        return results
```

In the producer:

```
from myproject.tasks import MyLongRunningTask

def myview(request):

    async_result = MyLongRunningTask.delay()
    # async_result is of type AbortableAsyncResult

    # After 10 seconds, abort the task
    time.sleep(10)
    async_result.abort()
```

```
...
```

After the `async_result.abort()` call, the task execution is not aborted immediately. In fact, it is not guaranteed to abort at all. Keep checking the `async_result` status, or call `async_result.wait()` to have it block until the task is finished.

---

**Note:** In order to abort tasks, there needs to be communication between the producer and the consumer. This is currently implemented through the database backend. Therefore, this class will only work with the database backends.

---

**class** `celery.contrib.abortable.`**`AbortableAsyncResult`**(*task_id*, *backend=None*, *task_name=None*)

Represents a abortable result.

Specifically, this gives the `AsyncResult` a `abort()` method, which sets the state of the underlying Task to `"ABORTED"`.

**`abort`**()

Set the state of the task to `ABORTED`.

Abortable tasks monitor their state at regular intervals and terminate execution if so.

Be aware that invoking this method does not guarantee when the task will be aborted (or even if the task will be aborted at all).

**`is_aborted`**()

Returns `True` if the task is (being) aborted.

**class** `celery.contrib.abortable.`**`AbortableTask`**

A celery task that serves as a base class for all `Task`'s that support aborting during execution.

All subclasses of `AbortableTask` must call the `is_aborted()` method periodically and act accordingly when the call evaluates to `True`.

**classmethod** **`AsyncResult`**(*task_id*)

Returns the accompanying AbortableAsyncResult instance.

**`is_aborted`**(***kwargs*)

Checks against the backend whether this `AbortableAsyncResult` is `ABORTED`.

Always returns `False` in case the *task_id* parameter refers to a regular (non-abortable) `Task`.

Be aware that invoking this method will cause a hit in the backend (for example a database query), so find a good balance between calling it regularly (for responsiveness), but not too often (for performance).

**`name`** **= 'celery.contrib.abortable.AbortableTask'**

## 9.21 Events - celery.events

`celery.events.`**`Event`**(*type*, ***fields*)

Create an event.

An event is a dictionary, the only required field is the type.

**class** `celery.events.`**`EventDispatcher`**(*connection*, *hostname=None*, *enabled=True*)

Send events as messages.

**Parameters**

- **connection** – Carrot connection.

- **hostname** – Hostname to identify ourselves as, by default uses the hostname returned by `socket.gethostname()`.
- **enabled** – Set to `False` to not actually publish any events, making `send()` a noop operation.

You need to `close()` this after use.

**close**()
Close the event dispatcher.

**disable**()

**enable**()

**flush**()

**send**(*type*, ***fields*)
Send event.

**Parameters**

- **type** – Kind of event.
- ****fields** – Event arguments.

**class** `celery.events.`**EventReceiver**(*connection*, *handlers=None*, *wakeup=True*)
Capture events.

**Parameters**

- **connection** – Carrot connection.
- **handlers** – Event handlers.

`handlers`` is a dict of event types and their handlers, the special handler `"*`" captures all events that doesn't have a handler.

**capture**(*limit=None*, *timeout=None*)
Open up a consumer capturing events.

This has to run in the main process, and it will never stop unless forced via `KeyboardInterrupt` or `SystemExit`.

**consumer**()

**handlers = {}**

**process**(*type*, *event*)
Process the received event by dispatching it to the appropriate handler.

`celery.events.`**create_event**(*type*, *fields*)

## 9.22 In-memory Representation of Cluster State - celery.events.state

**class** `celery.events.state.`**Element**

**class** `celery.events.state.`**State**(*callback=None*, *max_workers_in_memory=5000*, *max_tasks_in_memory=10000*)
Records clusters state.

**alive_workers**()
Returns a list of (seemingly) alive workers.

**`clear`**(*ready=True*)

**`clear_tasks`**(*ready=True*)

**`event`**(*event*)

**`event_count` = 0**

**`freeze_while`**(*fun*, **args*, ***kwargs*)

**`get_or_create_task`**(*uuid*)
Get or create task by uuid.

**`get_or_create_worker`**(*hostname*, ***kwargs*)
Get or create worker by hostname.

**`task_count` = 0**

**`task_event`**(*type*, *fields*)
Process task event.

**`task_types`**()
Returns a list of all seen task types.

**`tasks_by_timestamp`**(*limit=None*)
Get tasks by timestamp.

Returns a list of `(uuid, task)` tuples.

**`tasks_by_type`**(*name*, *limit=None*)
Get all tasks by type.

Returns a list of `(uuid, task)` tuples.

**`tasks_by_worker`**(*hostname*, *limit=None*)
Get all tasks by worker.

Returns a list of `(uuid, task)` tuples.

**`worker_event`**(*type*, *fields*)
Process worker event.

**class** `celery.events.state.`**`Task`**(***fields*)
Task State.

**`info`**(*fields=None*, *extra=[]*)

**`merge`**(*state*, *timestamp*, *fields*)

**`merge_rules` = {'RECEIVED': ('name', 'args', 'kwargs', 'retries', 'eta', 'expires')}**

**`on_failed`**(*timestamp=None*, ***fields*)

**`on_received`**(*timestamp=None*, ***fields*)

**`on_retried`**(*timestamp=None*, ***fields*)

**`on_revoked`**(*timestamp=None*, ***fields*)

**`on_started`**(*timestamp=None*, ***fields*)

**`on_succeeded`**(*timestamp=None*, ***fields*)

**`ready`**

**`update`**(*state*, *timestamp*, *fields*)

**class** `celery.events.state.`**`Worker`**(***fields*)

Worker State.

**`alive`**

**`heartbeat_max`** = 4

**`on_heartbeat`**(*timestamp=None*, ***kwargs*)

**`on_offline`**(***kwargs*)

**`on_online`**(*timestamp=None*, ***kwargs*)

## 9.23 App: Worker Node - celery.apps.worker

**class** `celery.apps.worker.`**`Worker`**(*concurrency=None*, *loglevel=None*, *logfile=None*, *hostname=None*, *discard=False*, *run_clockservice=False*, *schedule=None*, *task_time_limit=None*, *task_soft_time_limit=None*, *max_tasks_per_child=None*, *queues=None*, *events=False*, *db=None*, *include=None*, *defaults=None*, *pidfile=None*, *redirect_stdouts=None*, *redirect_stdouts_level=None*, *scheduler_cls=None*, ***kwargs*)

**class** **`WorkController`**(*concurrency=None*, *logfile=None*, *loglevel=None*, *send_events=False*, *hostname=None*, *ready_callback=<function noop at 0x487c050>*, *embed_clockservice=False*, *pool_cls='celery.concurrency.processes.TaskPool'*, *listener_cls='celery.worker.listener.CarrotListener'*, *mediator_cls='celery.worker.controllers.Mediator'*, *eta_scheduler_cls='celery.utils.timer2.Timer'*, *schedule_filename='celerybeat-schedule'*, *task_time_limit=None*, *task_soft_time_limit=None*, *max_tasks_per_child=None*, *pool_putlocks=True*, *disable_rate_limits=False*, *db=None*, *scheduler_cls='celery.beat.PersistentScheduler'*)

Executes tasks waiting in the task queue.

**Parameters**

- **concurrency** – see `concurrency`.
- **logfile** – see `logfile`.
- **loglevel** – see `loglevel`.
- **embed_clockservice** – see `embed_clockservice`.
- **send_events** – see `send_events`.

**`concurrency`**

The number of simultaneous processes doing work (default: `conf.CELERYD_CONCURRENCY`)

**`loglevel`**

The loglevel used (default: `logging.INFO`)

**`logfile`**

The logfile used, if no logfile is specified it uses `stderr` (default: *celery.conf.CELERYD_LOG_FILE*).

**`embed_clockservice`**

If `True`, celerybeat is embedded, running in the main worker process as a thread.

**send_events**
Enable the sending of monitoring events, these events can be captured by monitors (celerymon).

**logger**
The `logging.Logger` instance used for logging.

**pool**
The `multiprocessing.Pool` instance used.

**ready_queue**
The `Queue.Queue` that holds tasks ready for immediate processing.

**schedule_controller**
Instance of `celery.worker.controllers.ScheduleController`.

**mediator**
Instance of `celery.worker.controllers.Mediator`.

**listener**
Instance of `CarrotListener`.

**concurrency** = 0

**logfile** = None

**loglevel** = 40

**on_timer_error**(*exc_info*)

**on_timer_tick**(*delay*)

**process_task**(*wrapper*)
Process task by sending it to the pool of workers.

**start**()
Starts the workers main loop.

**stop**()
Graceful shutdown of the worker server.

**terminate**()
Not so graceful shutdown of the worker server.

`Worker.`**die**(*msg*, *exitcode=1*)

`Worker.`**init_loader**()

`Worker.`**init_queues**()

`Worker.`**install_platform_tweaks**(*worker*)
Install platform specific tweaks and workarounds.

`Worker.`**on_listener_ready**(*listener*)

`Worker.`**osx_proxy_detection_workaround**()
See http://github.com/ask/celery/issues#issue/161

`Worker.`**purge_messages**()

`Worker.`**redirect_stdouts_to_logger**()

`Worker.`**run**()

`Worker.`**run_worker**()

`Worker.`**set_process_status**(*info*)

Worker.**startup_info**()

Worker.**tasklist**(*include_builtins=True*)

Worker.**worker_init**()

celery.apps.worker.**install_HUP_not_supported_handler**(*worker*)

celery.apps.worker.**install_worker_int_again_handler**(*worker*)

celery.apps.worker.**install_worker_int_handler**(*worker*)

celery.apps.worker.**install_worker_restart_handler**(*worker*)

celery.apps.worker.**install_worker_term_handler**(*worker*)

celery.apps.worker.**run_worker**(**args*, ***kwargs*)

## 9.24 App: Periodic Task Scheduler - celery.apps.beat

**class** celery.apps.beat.**Beat**(*loglevel=None*, *logfile=None*, *schedule=None*, *max_interval=None*, *scheduler_cls=None*, *defaults=None*, *socket_timeout=30*, *redirect_stdouts=None*, *redirect_stdouts_level=None*, ***kwargs*)

**class Service**(*logger=None*, *max_interval=300*, *schedule={'celery.backend_cleanup': {'task': 'celery.backend_cleanup', 'schedule': <crontab: 00 04 * (m/h/d)>}}*, *schedule_filename='celerybeat-schedule'*, *scheduler_cls=None*)

**get_scheduler**(*lazy=False*)

**scheduler**

**scheduler_cls**
alias of PersistentScheduler

**start**(*embedded_process=False*)

**stop**(*wait=False*)

**sync**()

Beat.**init_loader**()

Beat.**install_sync_handler**(*beat*)
Install a SIGTERM + SIGINT handler that saves the celerybeat schedule.

Beat.**run**()

Beat.**set_process_title**()

Beat.**setup_logging**()

Beat.**start_scheduler**(*logger=None*)

Beat.**startup_info**(*beat*)

celery.apps.beat.**run_celerybeat**(**args*, ***kwargs*)

## 9.25 Base Command - celery.bin.base

**class** celery.bin.base.**Command**(*defaults=None*)

**Parser**
alias of `OptionParser`

**args** = ‘’

**create_parser**(*prog_name*)

**execute_from_commandline**(*argv=None*)

**get_options**()

**option_list** = ()

**parse_options**(*prog_name, arguments*)
Parse the available options.

**run**(**args, **options*)

**usage**()

**version** = **‘2.1.4’**

## 9.26 celeryd - celery.bin.celeryd

celeryd

**-c, --concurrency**
Number of child processes processing the queue. The default is the number of CPUs available on your system.

**-f, --logfile**
Path to log file. If no logfile is specified, `stderr` is used.

**-l, --loglevel**
Logging level, choose between `DEBUG`, `INFO`, `WARNING`, `ERROR`, `CRITICAL`, or `FATAL`.

**-n, --hostname**
Set custom hostname.

**-B, --beat**
Also run the `celerybeat` periodic task scheduler. Please note that there must only be one instance of this service.

**-Q, --queues**
List of queues to enable for this worker, separated by comma. By default all configured queues are enabled. Example: `-Q video,image`

**-I, --include**
Comma separated list of additional modules to import. Example: -I foo.tasks,bar.tasks

**-s, --schedule**
Path to the schedule database if running with the `-B` option. Defaults to `celerybeat-schedule`. The extension ”.db” will be appended to the filename.

**--scheduler**
Scheduler class to use. Default is celery.beat.PersistentScheduler

**-E, --events**
Send events that can be captured by monitors like `celerymon`.

**--purge, --discard**
Discard all waiting tasks before the daemon is started. **WARNING**: This is unrecoverable, and the tasks will be deleted from the messaging server.

**`--time-limit`**
Enables a hard time limit (in seconds) for tasks.

**`--soft-time-limit`**
Enables a soft time limit (in seconds) for tasks.

**`--maxtasksperchild`**
Maximum number of tasks a pool worker can execute before it's terminated and replaced by a new worker.

**class** `celery.bin.celeryd.`**`WorkerCommand`**(*defaults=None*)

**`get_options`**()

**`run`**(**args*, ***kwargs*)

`celery.bin.celeryd.`**`main`**()

`celery.bin.celeryd.`**`windows_main`**()

## 9.27 Celery Periodic Task Server - celery.bin.celerybeat

celerybeat

**`-s, --schedule`**
Path to the schedule database. Defaults to `celerybeat-schedule`. The extension ".db" will be appended to the filename.

**`-S, --scheduler`**
Scheduler class to use. Default is celery.beat.PersistentScheduler

**`-f, --logfile`**
Path to log file. If no logfile is specified, `stderr` is used.

**`-l, --loglevel`**
Logging level, choose between `DEBUG`, `INFO`, `WARNING`, `ERROR`, `CRITICAL`, or `FATAL`.

**class** `celery.bin.celerybeat.`**`BeatCommand`**(*defaults=None*)

**`get_options`**()

**`run`**(**args*, ***kwargs*)

`celery.bin.celerybeat.`**`main`**()

## 9.28 celeryev: Curses Event Viewer - celery.bin.celeryev

`celery.bin.celeryev.`**`main`**()

`celery.bin.celeryev.`**`parse_options`**(*arguments*)
Parse the available options to `celeryev`.

`celery.bin.celeryev.`**`run_celeryev`**(*dump=False*, *camera=None*, *frequency=1.0*, *maxrate=None*, *loglevel=30*, *logfile=None*, *prog_name='celeryev'*, ***kwargs*)

`celery.bin.celeryev.`**`set_process_status`**(*prog*, *info=''*)

## 9.29 celeryctl - celery.bin.celeryctl

**class** `celery.bin.celeryctl.`**`Command`**(*no_color=False*)

**`args`** = **‘’**

**`create_parser`**(*prog_name*, *command*)

**`error`**(*s*)

**`help`** = **‘’**

**`option_list`** = **(<Option at 0x6a51c68: -q/–quiet>, <Option at 0x6a51cb0: –conf>, <Option at 0x6a51b48: –loader>, <O**

**`out`**(*s*, *fh=<open file ‘<stdout>’, mode ‘w’ at 0x7fa9bafbf150>*)

**`prettify`**(*n*)

**`prettify_dict_ok_error`**(*n*)

**`prettify_list`**(*n*)

**`run`**(**args*, ***kwargs*)

**`run_from_argv`**(*argv*)

**`usage`**(*command*)

**`version`** = **‘2.1.4’**

**exception** `celery.bin.celeryctl.`**`Error`**

**class** `celery.bin.celeryctl.`**`apply`**(*no_color=False*)

**`args`** = **‘<task_name>’**

**`option_list`** = **(<Option at 0x6a51c68: -q/–quiet>, <Option at 0x6a51cb0: –conf>, <Option at 0x6a51b48: –loader>, <O**

**`run`**(*name*, **_*, ***kw*)

**class** `celery.bin.celeryctl.`**`celeryctl`**

**`commands`** = **{‘status’: <class ‘celery.bin.celeryctl.status’>, ‘apply’: <class ‘celery.bin.celeryctl.apply’>, ‘inspect’: <class ‘**

**`execute`**(*command*, *argv=None*)

**`execute_from_commandline`**(*argv=None*)

`celery.bin.celeryctl.`**`command`**(*fun*)

**class** `celery.bin.celeryctl.`**`help`**(*no_color=False*)

**`run`**(**args*, ***kwargs*)

**`usage`**(*command*)

`celery.bin.celeryctl.`**`indent`**(*s*, *n=4*)

**class** `celery.bin.celeryctl.`**`inspect`**(*no_color=False*)

**`choices`** = **{‘scheduled’: 1.0, ‘reserved’: 1.0, ‘cancel_consumer’: 1.0, ‘active’: 1.0, ‘add_consumer’: 1.0, ‘stats’: 1.0, ‘revo**

**`option_list`** = **(<Option at 0x6a51c68: -q/–quiet>, <Option at 0x6a51cb0: –conf>, <Option at 0x6a51b48: –loader>, <O**

**run** (**args*, ***kwargs*)

**say** (*direction*, *title*, *body=''*)

**usage** (*command*)

celery.bin.celeryctl.**main** ()

class celery.bin.celeryctl.**result** (*no_color=False*)

**args = '<task_id>'**

**option_list = (<Option at 0x6a51c68: -q/–quiet>, <Option at 0x6a51cb0: –conf>, <Option at 0x6a51b48: –loader>, <O**

**run** (*task_id*, **args*, ***kwargs*)

class celery.bin.celeryctl.**status** (*no_color=False*)

**option_list = (<Option at 0x6a51c68: -q/–quiet>, <Option at 0x6a51cb0: –conf>, <Option at 0x6a51b48: –loader>, <O**

**run** (**args*, ***kwargs*)

## 9.30 caqmadm: AMQP API Command-line Shell - celery.bin.camqadm

camqadm

class celery.bin.camqadm.**AMQPAdmin** (**args*, ***kwargs*)
The celery `camqadm` utility.

**connect** (*conn=None*)

**run** ()

**say** (*m*)

class celery.bin.camqadm.**AMQShell** (**args*, ***kwargs*)
AMQP API Shell.

**Parameters**

- **connect** – Function used to connect to the server, must return connection object.
- **silent** – If `True`, the commands won't have annoying output not relevant when running in non-shell mode.

**amqp**
Mapping of AMQP API commands and their `Spec`.

**amqp = {'queue.declare': <celery.bin.camqadm.Spec object at 0x58a5210>, 'queue.purge': <celery.bin.camqadm.Spec obj**

**builtins = {'exit': 'do_exit', 'EOF': 'do_exit', 'help': 'do_help'}**

**chan = None**

**completenames** (*text*, **ignored*)
Return all commands starting with `text`, for tab-completion.

**conn = None**

**counter = 1**

**default** (*line*)

**dispatch** (*cmd*, *argline*)
Dispatch and execute the command.

Lookup order is: `builtins` -> `amqp`.

**display_command_help** (*cmd*, *short=False*)

**do_exit** (**args*)
The "`exit`" command.

**do_help** (**args*)

**get_amqp_api_command** (*cmd*, *arglist*)
With a command name and a list of arguments, convert the arguments to Python values and find the corresponding method on the AMQP channel object.

**Returns** tuple of `(method, processed_args)`.

Example:

```
>>> get_amqp_api_command("queue.delete", ["pobox", "yes", "no"])
(<bound method Channel.queue_delete of
 <amqplib.client_0_8.channel.Channel object at 0x...>>,
 ('testfoo', True, False))
```

**get_names** ()

**identchars = '.'**

**inc_counter = <method-wrapper 'next' of itertools.count object at 0x65ac488>**

**needs_reconnect = False**

**onecmd** (*line*)
Parse line and execute command.

**parseline** (*line*)
Parse input line.

**Returns** tuple of three items: `(command_name, arglist, original_line)`

E.g:

```
>>> parseline("queue.delete A 'B' C")
("queue.delete", "A 'B' C", "queue.delete A 'B' C")
```

**prompt**

**prompt_fmt = '%d> '**

**respond** (*retval*)
What to do with the return value of a command.

**say** (*m*)
Say something to the user. Disabled if `silent``.

class `celery.bin.camqadm.`**Spec** (**args*, ***kwargs*)
AMQP Command specification.

Used to convert arguments to Python values and display various help and tooltips.

**Parameters**

- **args** – see `args`.
- **returns** – see `returns`.

**coerce** (*index*, *value*)
Coerce value for argument at index.

E.g. if `args` is `[("is_active", bool)]`:

```
>>> coerce(0, "False")
False
```

**format_arg** (*name*, *type*, *default_value=None*)

**format_response** (*response*)
Format the return value of this command in a human-friendly way.

**format_signature** ()

**str_args_to_python** (*arglist*)
Process list of string arguments to values according to spec.

e.g:

```
>>> spec = Spec([("queue", str), ("if_unused", bool)])
>>> spec.str_args_to_python("pobox", "true")
("pobox", True)
```

`celery.bin.camqadm.`**camqadm** (**args*, ***options*)

`celery.bin.camqadm.`**dump_message** (*message*)

`celery.bin.camqadm.`**format_declare_queue** (*ret*)

`celery.bin.camqadm.`**main** ()

`celery.bin.camqadm.`**parse_options** (*arguments*)
Parse the available options to `celeryd`.

`celery.bin.camqadm.`**say** (*m*)

## 9.31 Celeryd Multi Tool - celery.bin.celeryd_multi

### 9.31.1 Examples

```
# Advanced example starting 10 workers in the background:
#   * Three of the workers processes the images and video queue
#   * Two of the workers processes the data queue with loglevel DEBUG
#   * the rest processes the default' queue.
$ celeryd-multi start 10 -l INFO -Q:1-3 images,video -Q:4,5:data
    -Q default -L:4,5 DEBUG

# You can show the commands necessary to start the workers with
# the "show" command:
$ celeryd-multi show 10 -l INFO -Q:1-3 images,video -Q:4,5:data
    -Q default -L:4,5 DEBUG

# 3 workers, with 3 processes each
$ celeryd-multi start 3 -c 3
```

```
celeryd -n celeryd1.myhost -c 3
celeryd -n celeryd2.myhost -c 3
celeryd- n celeryd3.myhost -c 3

# start 3 named workers
$ celeryd-multi start image video data -c 3
celeryd -n image.myhost -c 3
celeryd -n video.myhost -c 3
celeryd -n data.myhost -c 3

# specify custom hostname
$ celeryd-multi start 2 -n worker.example.com -c 3
celeryd -n celeryd1.worker.example.com -c 3
celeryd -n celeryd2.worker.example.com -c 3

# Additionl options are added to each celeryd',
# but you can also modify the options for ranges of or single workers

# 3 workers: Two with 3 processes, and one with 10 processes.
$ celeryd-multi start 3 -c 3 -c:1 10
celeryd -n celeryd1.myhost -c 10
celeryd -n celeryd2.myhost -c 3
celeryd -n celeryd3.myhost -c 3

# can also specify options for named workers
$ celeryd-multi start image video data -c 3 -c:image 10
celeryd -n image.myhost -c 10
celeryd -n video.myhost -c 3
celeryd -n data.myhost -c 3

# ranges and lists of workers in options is also allowed:
# (-c:1-3 can also be written as -c:1,2,3)
$ celeryd-multi start 5 -c 3  -c:1-3 10
celeryd -n celeryd1.myhost -c 10
celeryd -n celeryd2.myhost -c 10
celeryd -n celeryd3.myhost -c 10
celeryd -n celeryd4.myhost -c 3
celeryd -n celeryd5.myhost -c 3

# lists also works with named workers
$ celeryd-multi start foo bar baz xuzzy -c 3 -c:foo,bar,baz 10
celeryd -n foo.myhost -c 10
celeryd -n bar.myhost -c 10
celeryd -n baz.myhost -c 10
celeryd -n xuzzy.myhost -c 3
```

**class** `celery.bin.celeryd_multi.`**`MultiTool`**

**`error`**(*msg=None*)

**`execute_from_commandline`**(*argv*, *cmd='celeryd'*)

**`expand`**(*argv*, *cmd=None*)

**`get`**(*argv*, *cmd*)

**`getpids`**(*p*, *cmd*, *callback=None*)

**`help`**(*argv*, *cmd=None*)

**info**(*msg*, *newline=True*)

**kill**(*argv*, *cmd*)

**names**(*argv*, *cmd*)

**node_alive**(*pid*)

**note**(*msg*, *newline=True*)

**restart**(*argv*, *cmd*)

**retcode** = 0

**show**(*argv*, *cmd*)

**shutdown_nodes**(*nodes*, *sig=15*, *retry=None*, *callback=None*)

**signal_node**(*nodename*, *pid*, *sig*)

**splash**()

**start**(*argv*, *cmd*)

**stop**(*argv*, *cmd*)

**usage**()

**waitexec**(*argv*, *path='/home/docs/checkouts/readthedocs.org/user_builds/celery/envs/2.1-archived/bin/python'*)

**with_detacher_default_options**(*p*)

class celery.bin.celeryd_multi.**NamespacedOptionParser**(*args*)

**add_option**(*name*, *value*, *short=False*, *ns=None*)

**optmerge**(*ns*, *defaults=None*)

**parse**()

**process_long_opt**(*arg*, *value=None*)

**process_short_opt**(*arg*, *value=None*)

celery.bin.celeryd_multi.**abbreviations**(*map*)

celery.bin.celeryd_multi.**findsig**(*args*, *default=15*)

celery.bin.celeryd_multi.**format_opt**(*opt*, *value*)

celery.bin.celeryd_multi.**main**()

celery.bin.celeryd_multi.**multi_args**(*p*, *cmd='celeryd'*, *append=''*, *prefix=''*, *suffix=''*)

celery.bin.celeryd_multi.**parse_ns_range**(*ns*, *ranges=False*)

celery.bin.celeryd_multi.**quote**(*v*)

celery.bin.celeryd_multi.**say**(*m*, *newline=True*)

CHAPTER 10

# Internals

**Release** 2.1

**Date** February 04, 2014

## 10.1 Celery Deprecation Timeline

### 10.1.1 Removals for version 2.0

- The following settings will be removed:

| Setting name | Replace with |
|---|---|
| `CELERY_AMQP_CONSUMER_QUEUES` | `CELERY_QUEUES` |
| `CELERY_AMQP_CONSUMER_QUEUES` | `CELERY_QUEUES` |
| `CELERY_AMQP_EXCHANGE` | `CELERY_DEFAULT_EXCHANGE` |
| `CELERY_AMQP_EXCHANGE_TYPE` | `CELERY_DEFAULT_AMQP_EXCHANGE_TYPE` |
| `CELERY_AMQP_CONSUMER_ROUTING_KEY` | `CELERY_QUEUES` |
| `CELERY_AMQP_PUBLISHER_ROUTING_KEY` | `CELERY_DEFAULT_ROUTING_KEY` |

- `CELERY_LOADER` definitions without class name.

  E.g. `celery.loaders.default`, needs to include the class name: `celery.loaders.default.Loader`.

- **`TaskSet.run()`. Use `celery.task.base.TaskSet.apply_async()`** instead.
- The module `celery.task.rest`; use `celery.task.http` instead.

## 10.2 Internals: The worker

### 10.2.1 Introduction

The worker consists of 4 main components: the broker listener, the scheduler, the mediator and the task pool. All these components runs in parallel working with two data structures: the ready queue and the ETA schedule.

### 10.2.2 Data structures

#### ready_queue

The ready queue is either an instance of `Queue.Queue`, or *celery.buckets.TaskBucket*. The latter if rate limiting is enabled.

#### eta_schedule

The ETA schedule is a heap queue sorted by time.

### 10.2.3 Components

#### CarrotListener

Receives messages from the broker using `carrot`.

When a message is received it's converted into a `celery.worker.job.TaskRequest` object.

Tasks with an ETA are entered into the `eta_schedule`, messages that can be immediately processed are moved directly to the `ready_queue`.

#### ScheduleController

The schedule controller is running the `eta_schedule`. If the scheduled tasks eta has passed it is moved to the `ready_queue`, otherwise the thread sleeps until the eta is met (remember that the schedule is sorted by time).

#### Mediator

The mediator simply moves tasks in the `ready_queue` over to the task pool for execution using `celery.worker.job.TaskRequest.execute_using_pool()`.

#### TaskPool

This is a slightly modified `multiprocessing.Pool`. It mostly works the same way, except it makes sure all of the workers are running at all times. If a worker is missing, it replaces it with a new one.

## 10.3 Task Message Protocol

### 10.3.1 Message format

- **task** `string`

  Name of the task. **required**

- **id** `string`

  Unique id of the task (UUID). **required**

- **args** `list`

  List of arguments. Will be an empty list if not provided.

- **kwargs** `dictionary`

  Dictionary of keyword arguments. Will be an empty dictionary if not provided.

- **retries** `int`

  Current number of times this task has been retried. Defaults to `0` if not specified.

- **eta** `string` (ISO 8601)

  Estimated time of arrival. This is the date and time in ISO 8601 format. If not provided the message is not scheduled, but will be executed asap.

- **expires (introduced after v2.0.2)** `string` (ISO 8601)

  Expiration date. This is the date and time in ISO 8601 format. If not provided the message will never expire. The message will be expired when the message is received and the expiration date has been exceeded.

### 10.3.2 Example message

This is an example invocation of the `celery.task.PingTask` task in JSON format:

```
{"task": "celery.task.PingTask",
 "args": [],
 "kwargs": {},
 "retries": 0,
 "eta": "2009-11-17T12:30:56.527191"}
```

### 10.3.3 Serialization

The protocol supports several serialization formats using the `content_type` message header.

The MIME-types supported by default are shown in the following table.

| Scheme | MIME Type |
|---|---|
| json | application/json |
| yaml | application/x-yaml |
| pickle | application/x-python-serialize |
| msgpack | application/x-msgpack |

## 10.4 List of Worker Events

This is the list of events sent by the worker. The monitor uses these to visualize the state of the cluster.

### 10.4.1 Task Events

- task-received(uuid, name, args, kwargs, retries, eta, hostname, timestamp)

  Sent when the worker receives a task.

- task-started(uuid, hostname, timestamp)

  Sent just before the worker executes the task.

- task-succeeded(uuid, result, runtime, hostname, timestamp)

  Sent if the task executed successfully. Runtime is the time it took to execute the task using the pool. (Time starting from the task is sent to the pool, and ending when the pool result handlers callback is called).

- task-failed(uuid, exception, traceback, hostname, timestamp)

  Sent if the execution of the task failed.

- task-revoked(uuid)

  Sent if the task has been revoked (Note that this is likely to be sent by more than one worker)

- task-retried(uuid, exception, traceback, hostname, timestamp)

  Sent if the task failed, but will be retried.

### 10.4.2 Worker Events

- worker-online(hostname, timestamp)

  The worker has connected to the broker and is online.

- worker-heartbeat(hostname, timestamp)

  Sent every minute, if the worker has not sent a heartbeat in 2 minutes, it's considered to be offline.

- worker-offline(hostname, timestamp)

The worker has disconnected from the broker.

## 10.5 Module Index

### 10.5.1 Worker

#### celery.worker

- `WorkController`

This is the worker's main process. It starts and stops all the components required by the worker: Pool, Mediator, Scheduler, ClockService, and Listener.

- `process_initializer()`

This is the function used to initialize pool processes. It sets up loggers and imports required task modules, etc.

#### celery.worker.job

- `TaskRequest`

A request to execute a task. Contains the task name, id, args and kwargs. Handles acknowledgement, execution, writing results to backends and error handling (including error e-mails)

#### celery.worker.pool

#### celery.worker.listener

#### celery.worker.controllers

#### celery.worker.scheduler

#### celery.worker.buckets

#### celery.worker.heartbeat

#### celery.worker.revoke

#### celery.worker.control

- celery.worker.registry
- celery.worker.builtins

### 10.5.2 Tasks

#### celery.decorators

#### celery.registry

#### celery.task

#### celery.task.base

#### celery.task.http

#### celery.task.control

#### celery.task.builtins

### 10.5.3 Execution

#### celery.execute

#### celery.execute.trace

#### celery.result

#### celery.states

celery.signals

### 10.5.4 Messaging

#### celery.messaging

### 10.5.5 Result backends

#### celery.backends

#### celery.backends.base

#### celery.backends.amqp

#### celery.backends.database

### 10.5.6 Loaders

#### celery.loaders

Loader autodetection, and working with the currently selected loader.

#### celery.loaders.base - Loader base classes

#### celery.loaders.default - The default loader

### 10.5.7 CeleryBeat

#### celery.beat

### 10.5.8 Events

#### celery.events

### 10.5.9 Logging

#### celery.log

#### celery.utils.patch

### 10.5.10 Configuration

#### celery.conf

### 10.5.11 Miscellaneous

#### celery.datastructures

#### celery.exceptions

#### celery.platform

#### celery.utils

#### celery.utils.info

#### celery.utils.compat

## 10.6 Internal Module Reference

**Release** 2.1

**Date** February 04, 2014

### 10.6.1 Multiprocessing Worker - celery.worker

The Multiprocessing Worker Server

**class** `celery.worker.`**`WorkController`**(*concurrency=None, logfile=None, loglevel=None, send_events=False, hostname=None, ready_callback=<function noop at 0x487c050>, embed_clockservice=False, pool_cls='celery.concurrency.processes.TaskPool', listener_cls='celery.worker.listener.CarrotListener', mediator_cls='celery.worker.controllers.Mediator', eta_scheduler_cls='celery.utils.timer2.Timer', schedule_filename='celerybeat-schedule', task_time_limit=None, task_soft_time_limit=None, max_tasks_per_child=None, pool_putlocks=True, disable_rate_limits=False, db=None, scheduler_cls='celery.beat.PersistentScheduler'*)

Executes tasks waiting in the task queue.

**Parameters**

- **concurrency** – see `concurrency`.
- **logfile** – see `logfile`.
- **loglevel** – see `loglevel`.
- **embed_clockservice** – see `embed_clockservice`.
- **send_events** – see `send_events`.

**`concurrency`**
The number of simultaneous processes doing work (default: `conf.CELERYD_CONCURRENCY`)

**`loglevel`**
The loglevel used (default: `logging.INFO`)

**`logfile`**
The logfile used, if no logfile is specified it uses `stderr` (default: *celery.conf.CELERYD_LOG_FILE*).

**`embed_clockservice`**
If `True`, celerybeat is embedded, running in the main worker process as a thread.

**`send_events`**
Enable the sending of monitoring events, these events can be captured by monitors (celerymon).

**`logger`**
The `logging.Logger` instance used for logging.

**`pool`**
The `multiprocessing.Pool` instance used.

**`ready_queue`**
The `Queue.Queue` that holds tasks ready for immediate processing.

**`schedule_controller`**
Instance of `celery.worker.controllers.ScheduleController`.

**`mediator`**
Instance of `celery.worker.controllers.Mediator`.

**`listener`**
Instance of `CarrotListener`.

**`concurrency`** = **0**

**`logfile`** = **None**

**loglevel** = 40

**on_timer_error**(*exc_info*)

**on_timer_tick**(*delay*)

**process_task**(*wrapper*)
Process task by sending it to the pool of workers.

**start**()
Starts the workers main loop.

**stop**()
Graceful shutdown of the worker server.

**terminate**()
Not so graceful shutdown of the worker server.

celery.worker.**process_initializer**(*hostname*)
Initializes the process so it can be used to process tasks.

Used for multiprocessing environments.

## 10.6.2 Worker Message Listener - celery.worker.listener

This module contains the component responsible for consuming messages from the broker, processing the messages and keeping the broker connections up and running.

- `start()` is an infinite loop, which only iterates again if the connection is lost. For each iteration (at start, or if the connection is lost) it calls `reset_connection()`, and starts the consumer by calling `consume_messages()`.
- `reset_connection()`, clears the internal queues, establishes a new connection to the broker, sets up the task consumer (+ QoS), and the broadcast remote control command consumer.

  Also if events are enabled it configures the event dispatcher and starts up the hartbeat thread.
- Finally it can consume messages. `consume_messages()` is simply an infinite loop waiting for events on the AMQP channels.

  Both the task consumer and the broadcast consumer uses the same callback: `receive_message()`. The reason is that some carrot backends doesn't support consuming from several channels simultaneously, so we use a little nasty trick (`_detect_wait_method()`) to select the best possible channel distribution depending on the functionality supported by the carrot backend.
- So for each message received the `receive_message()` method is called, this checks the payload of the message for either a `task` key or a `control` key.

  If the message is a task, it verifies the validity of the message converts it to a `celery.worker.job.TaskRequest`, and sends it to `on_task()`.

  If the message is a control command the message is passed to `on_control()`, which in turn dispatches the control command using the control dispatcher.

  It also tries to handle malformed or invalid messages properly, so the worker doesn't choke on them and die. Any invalid messages are acknowledged immediately and logged, so the message is not resent again, and again.
- If the task has an ETA/countdown, the task is moved to the `eta_schedule` so the `timer2.Timer` can schedule it at its deadline. Tasks without an eta are moved immediately to the `ready_queue`, so they can be picked up by the `Mediator` to be sent to the pool.

- When a task with an ETA is received the QoS prefetch count is also incremented, so another message can be reserved. When the ETA is met the prefetch count is decremented again, though this cannot happen immediately because amqplib doesn't support doing broker requests across threads. Instead the current prefetch count is kept as a shared counter, so as soon as `consume_messages()` detects that the value has changed it will send out the actual QoS event to the broker.
- Notice that when the connection is lost all internal queues are cleared because we can no longer ack the messages reserved in memory. Hoever, this is not dangerous as the broker will resend them to another worker when the channel is closed.
- **WARNING**: `stop()` does not close the connection! This is because some pre-acked messages may be in processing, and they need to be finished before the channel is closed. For celeryd this means the pool must finish the tasks it has acked early, *then* close the connection.

**class** `celery.worker.listener.`**`CarrotListener`**(*ready_queue*, *eta_schedule*, *logger*, *init_callback=<function noop at 0x487c050>*, *send_events=False*, *hostname=None*, *initial_prefetch_count=2*, *pool=None*)

Listen for messages received from the broker and move them the the ready queue for task processing.

**Parameters**

- **ready_queue** – See `ready_queue`.
- **eta_schedule** – See `eta_schedule`.

**`ready_queue`**
The queue that holds tasks ready for immediate processing.

**`eta_schedule`**
Scheduler for paused tasks. Reasons for being paused include a countdown/eta or that it's waiting for retry.

**`send_events`**
Is events enabled?

**`init_callback`**
Callback to be called the first time the connection is active.

**`hostname`**
Current hostname. Defaults to the system hostname.

**`initial_prefetch_count`**
Initial QoS prefetch count for the task channel.

**`control_dispatch`**
Control command dispatcher. See `celery.worker.control.ControlDispatch`.

**`event_dispatcher`**
See `celery.events.EventDispatcher`.

**`hart`**
`Heart` sending out heart beats if events enabled.

**`logger`**
The logger used.

**`apply_eta_task`**(*task*)

**`close_connection`**()

**`consume_messages`**()
Consume messages forever (or until an exception is raised).

**`info`**

**maybe_conn_error**(*fun*)

**on_control**(*control*)
Handle received remote control command.

**on_decode_error**(*message*, *exc*)
Callback called if the message had decoding errors.

**Parameters**

- **message** – The message with errors.
- **exc** – The original exception instance.

**on_task**(*task*)
Handle received task.

If the task has an `eta` we enter it into the ETA schedule, otherwise we move it the ready queue for immediate processing.

**receive_message**(*message_data*, *message*)
The callback called when a new message is received.

**reset_connection**()
Re-establish connection and set up consumers.

**restart_heartbeat**()

**start**()
Start the consumer.

If the connection is lost, it tries to re-establish the connection and restarts consuming messages.

**stop**()
Stop consuming.

Does not close connection.

**stop_consumers**(*close=True*)
Stop consuming.

**class** `celery.worker.listener.`**QoS**(*consumer*, *initial_value*, *logger*)
Quality of Service for Channel.

For thread-safe increment/decrement of a channels prefetch count value.

**Parameters**

- **consumer** – A `carrot.messaging.Consumer` instance.
- **initial_value** – Initial prefetch count value.
- **logger** – Logger used to log debug messages.

**decrement**()
Decrement the current prefetch count value by one.

**decrement_eventually**()
Decrement the value, but do not update the qos.

The MainThread will be responsible for calling `update()` when necessary.

**increment**()
Increment the current prefetch count value by one.

**next**

**prev** = None

**set**(*pcount*)
Set channel prefetch_count setting.

**update**()
Update prefetch count with current value.

### 10.6.3 Executable Jobs - celery.worker.job

**exception** `celery.worker.job.`**AlreadyExecutedError**
Tasks can only be executed once, as they might change world-wide state.

**exception** `celery.worker.job.`**InvalidTaskError**
The task has invalid data or is not properly constructed.

**class** `celery.worker.job.`**TaskRequest**(*task_name*, *task_id*, *args*, *kwargs*, *on_ack=<function noop at 0x487c050>*, *retries=0*, *delivery_info=None*, *hostname=None*, *email_subject=None*, *email_body=None*, *logger=None*, *eventer=None*, *eta=None*, *expires=None*, ***opts*)
A request for task execution.

**Parameters**

- **task_name** – see `task_name`.
- **task_id** – see `task_id`.
- **args** – see `args`
- **kwargs** – see `kwargs`.

**task_name**
Kind of task. Must be a name registered in the task registry.

**task_id**
UUID of the task.

**args**
List of positional arguments to apply to the task.

**kwargs**
Mapping of keyword arguments to apply to the task.

**on_ack**
Callback called when the task should be acknowledged.

**message**
The original message sent. Used for acknowledging the message.

**executed**
Set to `True` if the task has been executed. A task should only be executed once.

**delivery_info**
Additional delivery info, e.g. the contains the path from producer to consumer.

**acknowledged**
Set to `True` if the task has been acknowledged.

**acknowledge**()

**acknowledged** = False

**email_body** = **'\nTask %(name)s with id %(id)s raised exception:\n%(exc)r\n\n\nTask was called with args: %(args)s k**

**email_subject** = **' [celery@%(hostname)s] Error: Task %(name)s (%(id)s): %(exc)s\n '**

**error_msg** = **' Task %(name)s[%(id)s] raised exception: %(exc)s\n%(traceback)s\n '**

**execute** (*loglevel=None*, *logfile=None*)
Execute the task in a `WorkerTaskTrace`.

**Parameters**

- **loglevel** – The loglevel used by the task.
- **logfile** – The logfile used by the task.

**execute_using_pool** (*pool*, *loglevel=None*, *logfile=None*)
Like `execute()`, but using the `multiprocessing` pool.

**Parameters**

- **pool** – A `multiprocessing.Pool` instance.
- **loglevel** – The loglevel used by the task.
- **logfile** – The logfile used by the task.

**executed** = **False**

**extend_with_default_kwargs** (*loglevel*, *logfile*)
Extend the tasks keyword arguments with standard task arguments.

Currently these are `logfile`, `loglevel`, `task_id`, `task_name`, `task_retries`, and `delivery_info`.

See `celery.task.base.Task.run()` for more information.

**classmethod from_message** (*message*, *message_data*, *on_ack=<function noop at 0x487c050>*, *logger=None*, *eventer=None*, *hostname=None*)
Create a `TaskRequest` from a task message sent by `celery.messaging.TaskPublisher`.

**Raises UnknownTaskError** if the message does not describe a task, the message is also rejected.

:returns `TaskRequest`:

**info** (*safe=False*)

**maybe_expire** ()

**on_accepted** (**a*, ***kw*)
Handler called when task is accepted by worker pool.

**on_failure** (*exc_info*)
The handler used if the task raised an exception.

**on_retry** (*exc_info*)

**on_success** (*ret_value*)
The handler used if the task was successfully processed ( without raising an exception).

**on_timeout** (*soft*)

**repr_result** (*result*, *maxlen=46*)

**retry_msg** = **' Task %(name)s[%(id)s] retry: %(exc)s\n '**

**revoked** ()

**send_error_email** (*task*, *context*, *exc*, *whitelist=None*, *enabled=False*, *fail_silently=True*)

**send_event**(*type*, ***fields*)

**shortinfo**()

**success_msg** = ' **Task %(name)s[%(id)s] succeeded in %(runtime)ss: %(return_value)s\n** '

**time_start** = **None**

**class** celery.worker.job.**WorkerTaskTrace**(**args*, ***kwargs*)
Wraps the task in a jail, catches all exceptions, and saves the status and result of the task execution to the task meta backend.

If the call was successful, it saves the result to the task result backend, and sets the task status to `"SUCCESS"`.

If the call raises `celery.exceptions.RetryTaskError`, it extracts the original exception, uses that as the result and sets the task status to `"RETRY"`.

If the call results in an exception, it saves the exception as the task result, and sets the task status to `"FAILURE"`.

**Parameters**

- **task_name** – The name of the task to execute.
- **task_id** – The unique id of the task.
- **args** – List of positional args to pass on to the function.
- **kwargs** – Keyword arguments mapping to pass on to the function.

**Returns** the evaluated functions return value on success, or the exception instance on failure.

**execute**()
Execute, trace and store the result of the task.

**execute_safe**(**args*, ***kwargs*)
Same as `execute()`, but catches errors.

**handle_failure**(*exc*, *type_*, *tb*, *strtb*)
Handle exception.

**handle_retry**(*exc*, *type_*, *tb*, *strtb*)
Handle retry exception.

**handle_success**(*retval*, **args*)
Handle successful execution.

celery.worker.job.**execute_and_trace**(*task_name*, **args*, ***kwargs*)
This is a pickleable method used as a target when applying to pools.

It's the same as:

```
>>> WorkerTaskTrace(task_name, *args, **kwargs).execute_safe()
```

## 10.6.4 Worker Controller Threads - celery.worker.controllers

Worker Controller Threads

**class** celery.worker.controllers.**Mediator**(*ready_queue*, *callback*, *logger=None*)
Thread continuously sending tasks in the queue to the pool.

**ready_queue**
The task queue, a `Queue.Queue` instance.

**callback**
The callback used to process tasks retrieved from the `ready_queue`.

**move**()

**run**()

**stop**()
Gracefully shutdown the thread.

### 10.6.5 Token Bucket (rate limiting) - celery.worker.buckets

class `celery.worker.buckets.`**FastQueue**(*maxsize=0*)
`Queue.Queue` supporting the interface of `TokenBucketQueue`.

**clear**()

**expected_time**(*tokens=1*)

**items**

**wait**(*block=True*)

exception `celery.worker.buckets.`**RateLimitExceeded**
The token buckets rate limit has been exceeded.

class `celery.worker.buckets.`**TaskBucket**(*task_registry*)
This is a collection of token buckets, each task type having its own token bucket. If the task type doesn't have a rate limit, it will have a plain `Queue` object instead of a `TokenBucketQueue`.

The `put()` operation forwards the task to its appropriate bucket, while the `get()` operation iterates over the buckets and retrieves the first available item.

Say we have three types of tasks in the registry: `celery.ping`, `feed.refresh` and `video.compress`, the TaskBucket will consist of the following items:

```
{"celery.ping": TokenBucketQueue(fill_rate=300),
 "feed.refresh": Queue(),
 "video.compress": TokenBucketQueue(fill_rate=2)}
```

The get operation will iterate over these until one of the buckets is able to return an item. The underlying datastructure is a `dict`, so the order is ignored here.

**Parameters** **task_registry** – The task registry used to get the task type class for a given task name.

**add_bucket_for_type**(*task_name*)
Add a bucket for a task type.

Will read the tasks rate limit and create a `TokenBucketQueue` if it has one. If the task doesn't have a rate limit a regular Queue will be used.

**clear**()

**empty**()

**get**(*block=True, timeout=None*)
Retrive the task from the first available bucket.

Available as in, there is an item in the queue and you can consume tokens from it.

**get_bucket_for_type**(*task_name*)
Get the bucket for a particular task type.

**get_nowait**()

**init_with_registry**()
Initialize with buckets for all the task types in the registry.

**items**

**put**(*request*)
Put a TaskRequest into the appropiate bucket.

**put_nowait**(*request*)
Put a TaskRequest into the appropiate bucket.

**qsize**()
Get the total size of all the queues.

**refresh**()
Refresh rate limits for all task types in the registry.

**update_bucket_for_type**(*task_name*)

**class** celery.worker.buckets.**TokenBucketQueue**(*fill_rate*, *queue=None*, *capacity=1*)
Queue with rate limited get operations.

This uses the token bucket algorithm to rate limit the queue on get operations.

**Parameters**

- **fill_rate** – The rate in tokens/second that the bucket will be refilled.
- **capacity** – Maximum number of tokens in the bucket. Default is 1.

**exception RateLimitExceeded**
The token buckets rate limit has been exceeded.

TokenBucketQueue.**clear**()

TokenBucketQueue.**empty**()

TokenBucketQueue.**expected_time**(*tokens=1*)
Returns the expected time in seconds when a new token should be available.

TokenBucketQueue.**get**(*block=True*)
Remove and return an item from the queue.

**Raises**

- **RateLimitExceeded** – If a token could not be consumed from the token bucket (consuming from the queue too fast).
- **Queue.Empty** – If an item is not immediately available.

Also see Queue.Queue.get().

TokenBucketQueue.**get_nowait**()
Remove and return an item from the queue without blocking.

**Raises**

- **RateLimitExceeded** – If a token could not be consumed from the token bucket (consuming from the queue too fast).
- **Queue.Empty** – If an item is not immediately available.

Also see Queue.Queue.get_nowait().

TokenBucketQueue.**items**

TokenBucketQueue.**put**(*item*, *block=True*)
Put an item into the queue.

Also see Queue.Queue.put().

`TokenBucketQueue.`**`put_nowait`**`(`*item*`)`
Put an item into the queue without blocking.

**Raises Queue.Full** If a free slot is not immediately available.

Also see `Queue.Queue.put_nowait()`

`TokenBucketQueue.`**`qsize`**`()`
Returns the size of the queue.

See `Queue.Queue.qsize()`.

`TokenBucketQueue.`**`wait`**`(`*block=False*`)`
Wait until a token can be retrieved from the bucket and return the next item.

`celery.worker.buckets.`**`chain_from_iterable`**`()`
chain.from_iterable(iterable) –> chain object

Alternate chain() contructor taking a single iterable argument that evaluates lazily.

## 10.6.6 Worker Heartbeats - celery.worker.heartbeat

**class** `celery.worker.heartbeat.`**`Heart`**`(`*eventer*, *interval=None*`)`
Thread sending heartbeats at an interval.

**Parameters**

- **eventer** – Event dispatcher used to send the event.
- **interval** – Time in seconds between heartbeats. Default is 2 minutes.

**`bpm`**
Beats per minute.

**`bpm`** **= 0.5**

**`run`**`()`

**`stop`**`()`
Gracefully shutdown the thread.

## 10.6.7 Worker Control - celery.worker.control

**class** `celery.worker.control.`**`ControlDispatch`**`(`*logger=None*, *hostname=None*, *listener=None*`)`
Execute worker control panel commands.

**class** **`Panel`**`(`*logger*, *listener*, *hostname=None*`)`

**`data`** **= {'stats': <function stats at 0x63e7320>, 'revoke': <function revoke at 0x629f668>, 'enable_events': <function**

**classmethod** **`register`**`(`*method*, *name=None*`)`

`ControlDispatch.`**`ReplyPublisher`**
alias of `ControlReplyPublisher`

`ControlDispatch.`**`dispatch_from_message`**`(`*message*`)`
Dispatch by using message data received by the broker.

Example:

```
>>> def receive_message(message_data, message):
...     control = message_data.get("control")
...     if control:
...         ControlDispatch().dispatch_from_message(control)
```

`ControlDispatch.`**`execute`**(*command*, *kwargs=None*, *reply_to=None*)
Execute control command by name and keyword arguments.

**Parameters**

- **command** – Name of the command to execute.
- **kwargs** – Keyword arguments.

`ControlDispatch.`**`reply`**(**args*, ***kwargs*)

## 10.6.8 Built-in Remote Control Commands - celery.worker.control.builtins

`celery.worker.control.builtins.`**`add_consumer`**(*panel*, *queue=None*, *exchange=None*, *exchange_type='direct'*, *routing_key=None*, ***options*)

`celery.worker.control.builtins.`**`cancel_consumer`**(*panel*, *queue=None*, ***_*)

`celery.worker.control.builtins.`**`disable_events`**(*panel*)

`celery.worker.control.builtins.`**`dump_active`**(*panel*, *safe=False*, ***kwargs*)

`celery.worker.control.builtins.`**`dump_reserved`**(*panel*, *safe=False*, ***kwargs*)

`celery.worker.control.builtins.`**`dump_revoked`**(*panel*, ***kwargs*)

`celery.worker.control.builtins.`**`dump_schedule`**(*panel*, *safe=False*, ***kwargs*)

`celery.worker.control.builtins.`**`dump_tasks`**(*panel*, ***kwargs*)

`celery.worker.control.builtins.`**`enable_events`**(*panel*)

`celery.worker.control.builtins.`**`heartbeat`**(*panel*)

`celery.worker.control.builtins.`**`ping`**(*panel*, ***kwargs*)

`celery.worker.control.builtins.`**`rate_limit`**(*panel*, *task_name*, *rate_limit*, ***kwargs*)
Set new rate limit for a task type.

See `celery.task.base.Task.rate_limit`.

**Parameters**

- **task_name** – Type of task.
- **rate_limit** – New rate limit.

`celery.worker.control.builtins.`**`revoke`**(*panel*, *task_id*, ***kwargs*)
Revoke task by task id.

`celery.worker.control.builtins.`**`set_loglevel`**(*panel*, *loglevel=None*)

`celery.worker.control.builtins.`**`shutdown`**(*panel*, ***kwargs*)

`celery.worker.control.builtins.`**`stats`**(*panel*, ***kwargs*)

### 10.6.9 Remote Control Command Registry - celery.worker.control.registry

**class** `celery.worker.control.registry.`**`Panel`**(*logger*, *listener*, *hostname=None*)

**`data`** = **{'stats': <function stats at 0x63e7320>, 'revoke': <function revoke at 0x629f668>, 'enable_events': <function enal**

**classmethod** **`register`**(*method*, *name=None*)

### 10.6.10 Worker State - celery.worker.state

**class** `celery.worker.state.`**`Persistent`**(*filename*)

**`close`**()

**`db`**

**`merge`**(*d*)

**`open`**()

**`save`**()

**`storage`** = **<module 'shelve' from '/usr/lib/python2.7/shelve.pyc'>**

**`sync`**(*d*)

`celery.worker.state.`**`REVOKE_EXPIRES`** = **3600**

`celery.worker.state.`**`active_requests`**

Set of currently active `TaskRequest`'s.

`celery.worker.state.`**`total_count`**

Count of tasks executed by the worker, sorted by type.

`celery.worker.state.`**`revoked`**

The list of currently revoked tasks. (PERSISTENT if statedb set).

`celery.worker.state.`**`task_accepted`**(*request*)

Updates global state when a task has been accepted.

`celery.worker.state.`**`task_ready`**(*request*)

Updates global state when a task is ready.

### 10.6.11 Multiprocessing Pool Support - celery.concurrency.processes

Process Pools.

**class** `celery.concurrency.processes.`**`TaskPool`**(*limit*, *logger=None*, *initializer=None*, *maxtasksperchild=None*, *timeout=None*, *soft_timeout=None*, *putlocks=True*, *initargs=()*)

Process Pool for processing tasks in parallel.

**Parameters**

- **limit** – see `limit`.

- **logger** – see `logger`.

**`limit`**
The number of processes that can run simultaneously.

**`logger`**
The logger used for debugging.

class **`Pool`** (*processes=None*, *initializer=None*, *initargs=()*, *maxtasksperchild=None*, *timeout=None*, *soft_timeout=None*)
Class which supports an async version of the *apply()* builtin

class **`Process`** (*group=None*, *target=None*, *name=None*, *args=()*, *kwargs={}*)
Process objects represent activity that is run in a separate process

The class is analagous to *threading.Thread*

**`authkey`**

**`daemon`**
Return whether process is a daemon

**`exitcode`**
Return exit code of process or *None* if it has yet to stop

**`ident`**
Return identifier (PID) of process or *None* if it has yet to start

**`is_alive`**()
Return whether process is alive

**`join`**(*timeout=None*)
Wait until child process terminates

**`name`**

**`pid`**
Return identifier (PID) of process or *None* if it has yet to start

**`run`**()
Method to be run in sub-process; can be overridden in sub-class

**`start`**()
Start child process

**`terminate`**()
Terminate process; sends SIGTERM signal or uses TerminateProcess()

class `TaskPool.Pool.`**`ResultHandler`**(*outqueue*, *get*, *cache*, *poll*, *join_exited_workers*, *putlock*)

**`body`**()

exception `TaskPool.Pool.`**`SoftTimeLimitExceeded`**
The soft time limit has been exceeded. This exception is raised to give the task a chance to clean up.

class `TaskPool.Pool.`**`Supervisor`**(*pool*)

**`body`**()

class `TaskPool.Pool.`**`TaskHandler`**(*taskqueue*, *put*, *outqueue*, *pool*)

**`body`**()

**class** `TaskPool.Pool.`**`TimeoutHandler`**(*processes*, *cache*, *t_soft*, *t_hard*, *putlock*)

**`body`**()

`TaskPool.Pool.`**`apply`**(*func*, *args=()*, *kwds={}*)
Equivalent of *apply()* builtin

`TaskPool.Pool.`**`apply_async`**(*func*, *args=()*, *kwds={}*, *callback=None*, *accept_callback=None*, *timeout_callback=None*, *waitforslot=False*, *error_callback=None*)
Asynchronous equivalent of *apply()* builtin.

Callback is called when the functions return value is ready. The accept callback is called when the job is accepted to be executed.

Simplified the flow is like this:

```
>>> if accept_callback:
...     accept_callback()
>>> retval = func(*args, **kwds)
>>> if callback:
...     callback(retval)
```

`TaskPool.Pool.`**`close`**()

`TaskPool.Pool.`**`imap`**(*func*, *iterable*, *chunksize=1*)
Equivalent of *itertools.imap()* – can be MUCH slower than *Pool.map()*

`TaskPool.Pool.`**`imap_unordered`**(*func*, *iterable*, *chunksize=1*)
Like *imap()* method but ordering of results is arbitrary

`TaskPool.Pool.`**`join`**()

`TaskPool.Pool.`**`map`**(*func*, *iterable*, *chunksize=None*)
Equivalent of *map()* builtin

`TaskPool.Pool.`**`map_async`**(*func*, *iterable*, *chunksize=None*, *callback=None*)
Asynchronous equivalent of *map()* builtin

`TaskPool.Pool.`**`terminate`**()

`TaskPool.`**`apply_async`**(*target*, *args=None*, *kwargs=None*, *callbacks=None*, *errbacks=None*, *accept_callback=None*, *timeout_callback=None*, ***compat*)
Equivalent of the :func:`apply` built-in function.

All `callbacks` and `errbacks` should complete immediately since otherwise the thread which handles the result will get blocked.

`TaskPool.`**`info`**

`TaskPool.`**`on_ready`**(*callbacks*, *errbacks*, *ret_value*)
What to do when a worker task is ready and its return value has been collected.

`TaskPool.`**`on_worker_error`**(*errbacks*, *exc*)

`TaskPool.`**`safe_apply_callback`**(*fun*, **args*)

`TaskPool.`**`start`**()
Run the task pool.

Will pre-fork all workers so they're ready to accept tasks.

`TaskPool.`**`stop`**()
Gracefully stop the pool.

`TaskPool.`**`terminate`**`()`
Force terminate the pool.

`celery.concurrency.processes.`**`pingback`**`(`*i*`)`

## 10.6.12 extended multiprocessing.pool - celery.concurrency.processes.pool

**class** `celery.concurrency.processes.pool.`**`Pool`**`(`*processes=None*, *initializer=None*, *initargs=()*, *maxtasksperchild=None*, *timeout=None*, *soft_timeout=None*`)`
Class which supports an async version of the *apply()* builtin

**class** **`Process`**`(`*group=None*, *target=None*, *name=None*, *args=()*, *kwargs={}*`)`
Process objects represent activity that is run in a separate process

The class is analagous to *threading.Thread*

**`authkey`**

**`daemon`**
Return whether process is a daemon

**`exitcode`**
Return exit code of process or *None* if it has yet to stop

**`ident`**
Return identifier (PID) of process or *None* if it has yet to start

**`is_alive`**`()`
Return whether process is alive

**`join`**`(`*timeout=None*`)`
Wait until child process terminates

**`name`**

**`pid`**
Return identifier (PID) of process or *None* if it has yet to start

**`run`**`()`
Method to be run in sub-process; can be overridden in sub-class

**`start`**`()`
Start child process

**`terminate`**`()`
Terminate process; sends SIGTERM signal or uses TerminateProcess()

**class** `Pool.`**`ResultHandler`**`(`*outqueue*, *get*, *cache*, *poll*, *join_exited_workers*, *putlock*`)`

**`body`**`()`

**exception** `Pool.`**`SoftTimeLimitExceeded`**
The soft time limit has been exceeded. This exception is raised to give the task a chance to clean up.

**class** `Pool.`**`Supervisor`**`(`*pool*`)`

**`body`**`()`

**class** `Pool.`**`TaskHandler`**`(`*taskqueue*, *put*, *outqueue*, *pool*`)`

**body**()

class Pool.**TimeoutHandler**(*processes*, *cache*, *t_soft*, *t_hard*, *putlock*)

**body**()

Pool.**apply**(*func*, *args=()*, *kwds={}*)
Equivalent of *apply()* builtin

Pool.**apply_async**(*func*, *args=()*, *kwds={}*, *callback=None*, *accept_callback=None*, *timeout_callback=None*, *waitforslot=False*, *error_callback=None*)
Asynchronous equivalent of *apply()* builtin.

Callback is called when the functions return value is ready. The accept callback is called when the job is accepted to be executed.

Simplified the flow is like this:

```
>>> if accept_callback:
...     accept_callback()
>>> retval = func(*args, **kwds)
>>> if callback:
...     callback(retval)
```

Pool.**close**()

Pool.**imap**(*func*, *iterable*, *chunksize=1*)
Equivalent of *itertools.imap()* – can be MUCH slower than *Pool.map()*

Pool.**imap_unordered**(*func*, *iterable*, *chunksize=1*)
Like *imap()* method but ordering of results is arbitrary

Pool.**join**()

Pool.**map**(*func*, *iterable*, *chunksize=None*)
Equivalent of *map()* builtin

Pool.**map_async**(*func*, *iterable*, *chunksize=None*, *callback=None*)
Asynchronous equivalent of *map()* builtin

Pool.**terminate**()

## 10.6.13 Thread Pool Support EXPERIMENTAL - celery.concurrency.threads

class celery.concurrency.threads.**TaskPool**(*limit*, *logger=None*, ***kwargs*)

**apply_async**(*target*, *args=None*, *kwargs=None*, *callbacks=None*, *errbacks=None*, *accept_callback=None*, ***compat*)

**on_ready**(*callbacks*, *errbacks*, *ret_value*)
What to do when a worker task is ready and its return value has been collected.

**start**()

**stop**()

celery.concurrency.threads.**do_work**(*target*, *args=()*, *kwargs={}*, *callback=None*, *accept_callback=None*)

## 10.6.14 Clock Service - celery.beat

Periodic Task Scheduler

`celery.beat.`**`EmbeddedService`**`(`**args*, ***kwargs*`)`

Return embedded clock service.

**Parameters** **thread** – Run threaded instead of as a separate process. Default is `False`.

**class** `celery.beat.`**`PersistentScheduler`**`(`**args*, ***kwargs*`)`

**`close`**`()`

**`info`**

**`persistence`** **= <module 'shelve' from '/usr/lib/python2.7/shelve.pyc'>**

**`setup_schedule`**`()`

**`sync`**`()`

**class** `celery.beat.`**`ScheduleEntry`**`(`*name=None*, *task=None*, *last_run_at=None*, *total_run_count=None*, *schedule=None*, *args=()*, *kwargs={}*, *options={}*, *relative=False*`)`

An entry in the scheduler.

**Parameters**

- **name** – see `name`.
- **schedule** – see `schedule`.
- **args** – see `args`.
- **kwargs** – see `kwargs`.
- **last_run_at** – see `last_run_at`.
- **total_run_count** – see `total_run_count`.

**`name`**

The task name.

**`schedule`**

The schedule (run_every/crontab)

**`args`**

Args to apply.

**`kwargs`**

Keyword arguments to apply.

**`last_run_at`**

The time and date of when this task was last run.

**`total_run_count`**

Total number of times this periodic task has been executed.

**`is_due`**`()`

See `celery.task.base.PeriodicTask.is_due()`.

**`next`**`(`*last_run_at=None*`)`

Returns a new instance of the same class, but with its date and count fields updated.

**update** (*other*)
Update values from another entry.

Does only update "editable" fields (schedule, args, kwargs, options).

**class** `celery.beat.`**Scheduler** (*schedule=None*, *logger=None*, *max_interval=None*, *lazy=False*, ***kwargs*)
Scheduler for periodic tasks.

**Parameters**

- **schedule** – see `schedule`.
- **logger** – see `logger`.
- **max_interval** – see `max_interval`.

**schedule**
The schedule dict/shelve.

**logger**
The logger to use.

**max_interval**
Maximum time to sleep between re-checking the schedule.

**Entry**
alias of `ScheduleEntry`

**Publisher**
alias of `TaskPublisher`

**add** (***kwargs*)

**apply_async** (*entry*, *publisher=None*, ***kwargs*)

**close** ()

**get_schedule** ()

**info**

**maybe_due** (*entry*, *publisher=None*)

**merge_inplace** (*b*)

**reserve** (*entry*)

**schedule**

**send_task** (**args*, ***kwargs*)

**setup_schedule** ()

**sync** ()

**tick** ()
Run a tick, that is one iteration of the scheduler.

Executes all due tasks.

**update_from_dict** (*dict_*)

**exception** `celery.beat.`**SchedulingError**
An error occured while scheduling a task.

**class** `celery.beat.`**Service** (*logger=None*, *max_interval=300*, *schedule={}*, *schedule_filename='celerybeat-schedule'*, *scheduler_cls=None*)

**get_scheduler** (*lazy=False*)

**scheduler**

**scheduler_cls**
alias of `PersistentScheduler`

**start** (*embedded_process=False*)

**stop** (*wait=False*)

**sync** ()

## 10.6.15 Backends - celery.backends

`celery.backends.`**DefaultBackend**

`celery.backends.`**default_backend**
An instance of `DefaultBackend`.

alias of `AMQPBackend`

`celery.backends.`**get_backend_cls** (*backend*)
Get backend class by name/alias

`celery.backends.`**get_default_backend_cls = <functools.partial object at 0x48de0a8>**

**class** `celery.backends.`**DefaultBackend**
The default backend class used for storing task results and status, specified in the `CELERY_RESULT_BACKEND` setting.

## 10.6.16 Backend: Base - celery.backends.base

celery.backends.base

**class** `celery.backends.base.`**BaseBackend** (**args*, ***kwargs*)
The base backend class. All backends should inherit from this.

**EXCEPTION_STATES = frozenset(['FAILURE', 'RETRY', 'REVOKED'])**

**READY_STATES = frozenset(['FAILURE', 'REVOKED', 'SUCCESS'])**

**exception TimeoutError**
The operation timed out.

`BaseBackend.`**UNREADY_STATES = frozenset(['STARTED', 'RECEIVED', 'RETRY', 'PENDING'])**

`BaseBackend.`**cleanup** ()
Backend cleanup. Is run by `celery.task.DeleteExpiredTaskMetaTask`.

`BaseBackend.`**encode_result** (*result*, *status*)

`BaseBackend.`**exception_to_python** (*exc*)
Convert serialized exception to Python exception.

`BaseBackend.`**forget** (*task_id*)

`BaseBackend.`**get_result** (*task_id*)
Get the result of a task.

`BaseBackend.`**`get_status`**(*task_id*)
: Get the status of a task.

`BaseBackend.`**`get_traceback`**(*task_id*)
: Get the traceback for a failed task.

`BaseBackend.`**`mark_as_done`**(*task_id*, *result*)
: Mark task as successfully executed.

`BaseBackend.`**`mark_as_failure`**(*task_id*, *exc*, *traceback=None*)
: Mark task as executed with failure. Stores the execption.

`BaseBackend.`**`mark_as_retry`**(*task_id*, *exc*, *traceback=None*)
: Mark task as being retries. Stores the current exception (if any).

`BaseBackend.`**`mark_as_revoked`**(*task_id*)

`BaseBackend.`**`mark_as_started`**(*task_id*, ***meta*)
: Mark a task as started

`BaseBackend.`**`prepare_exception`**(*exc*)
: Prepare exception for serialization.

`BaseBackend.`**`prepare_value`**(*result*)
: Prepare value for storage.

`BaseBackend.`**`process_cleanup`**()
: Cleanup actions to do at the end of a task worker process.

`BaseBackend.`**`reload_task_result`**(*task_id*)
: Reload task result, even if it has been previously fetched.

`BaseBackend.`**`reload_taskset_result`**(*task_id*)
: Reload taskset result, even if it has been previously fetched.

`BaseBackend.`**`restore_taskset`**(*taskset_id*, *cache=True*)
: Get the result of a taskset.

`BaseBackend.`**`save_taskset`**(*taskset_id*, *result*)
: Store the result and status of a task.

`BaseBackend.`**`store_result`**(*task_id*, *result*, *status*)
: Store the result and status of a task.

`BaseBackend.`**`wait_for`**(*task_id*, *timeout=None*)
: Wait for task and return its result.

  If the task raises an exception, this exception will be re-raised by `wait_for()`.

  If `timeout` is not `None`, this raises the `celery.exceptions.TimeoutError` exception if the operation takes longer than `timeout` seconds.

**class** `celery.backends.base.`**`BaseDictBackend`**(**args*, ***kwargs*)

**`forget`**(*task_id*)

**`get_result`**(*task_id*)
: Get the result of a task.

**`get_status`**(*task_id*)
: Get the status of a task.

**`get_task_meta`**(*task_id*, *cache=True*)

**get_taskset_meta**(*taskset_id*, *cache=True*)

**get_traceback**(*task_id*)
Get the traceback for a failed task.

**reload_task_result**(*task_id*)

**reload_taskset_result**(*taskset_id*)

**restore_taskset**(*taskset_id*, *cache=True*)
Get the result for a taskset.

**save_taskset**(*taskset_id*, *result*)
Store the result of an executed taskset.

**store_result**(*task_id*, *result*, *status*, *traceback=None*)
Store task result and status.

class `celery.backends.base.`**KeyValueStoreBackend**(**args*, ***kwargs*)

**delete**(*key*)

**get**(*key*)

**get_key_for_task**(*task_id*)
Get the cache key for a task by id.

**get_key_for_taskset**(*task_id*)
Get the cache key for a task by id.

**set**(*key*, *value*)

## 10.6.17 Backend: SQLAlchemy Database - celery.backends.database

class `celery.backends.database.`**DatabaseBackend**(*dburi=None*, *result_expires=None*, *engine_options=None*, ***kwargs*)
The database result backend.

**ResultSession**()

**cleanup**()
Delete expired metadata.

## 10.6.18 Backend: Memcache - celery.backends.cache

class `celery.backends.cache.`**CacheBackend**(*expires=datetime.timedelta(1)*, *backend=None*, *options={}*, ***kwargs*)

**client**

**delete**(*key*)

**get**(*key*)

**set**(*key*, *value*)

class `celery.backends.cache.`**DummyClient**(**args*, ***kwargs*)

**delete**(*key*, **args*, ***kwargs*)

**get**(*key*, **args*, ***kwargs*)

**set** (*key*, *value*, **args*, ***kwargs*)

`celery.backends.cache.`**get_best_memcache** (**args*, ***kwargs*)

## 10.6.19 Backend: AMQP - celery.backends.amqp

celery.backends.amqp

**class** `celery.backends.amqp.`**AMQPBackend** (*connection=None*, *exchange=None*, *exchange_type=None*, *persistent=None*, *serializer=None*, *auto_delete=None*, *expires=None*, ***kwargs*)

AMQP backend. Publish results by sending messages to the broker using the task id as routing key.

**NOTE:** Results published using this backend is read-once only. After the result has been read, the result is deleted. (however, it's still cached locally by the backend instance).

**close** ()

**connection**

**consume** (*task_id*, *timeout=None*)

**get_task_meta** (*task_id*, *cache=True*)

**poll** (*task_id*)

**reload_task_result** (*task_id*)

**reload_taskset_result** (*task_id*)
Reload taskset result, even if it has been previously fetched.

**restore_taskset** (*taskset_id*, *cache=True*)
Get the result of a taskset.

**save_taskset** (*taskset_id*, *result*)
Store the result and status of a task.

**store_result** (*task_id*, *result*, *status*, *traceback=None*, *max_retries=20*, *retry_delay=0.2*)
Send task return value and status.

**wait_for** (*task_id*, *timeout=None*, *cache=True*)

**exception** `celery.backends.amqp.`**AMQResultWarning**

**class** `celery.backends.amqp.`**ResultConsumer** (*connection*, *task_id*, ***kwargs*)

**auto_delete = True**

**durable = False**

**exchange = 'celeryresults'**

**exchange_type = 'direct'**

**no_ack = True**

**class** `celery.backends.amqp.`**ResultPublisher** (*connection*, *task_id*, ***kwargs*)

**auto_delete = True**

**delivery_mode = 1**

**durable = False**

**exchange** = 'celeryresults'

**exchange_type** = 'direct'

**serializer** = 'pickle'

### 10.6.20 Backend: MongoDB - celery.backends.mongodb

MongoDB backend for celery.

**class** `celery.backends.mongodb.`**`Bunch`**(***kw*)

**class** `celery.backends.mongodb.`**`MongoBackend`**(**args*, ***kwargs*)

**`cleanup`**()
Delete expired metadata.

**mongodb_database** = 'celery'

**mongodb_host** = 'localhost'

**mongodb_password** = None

**mongodb_port** = 27017

**mongodb_taskmeta_collection** = 'celery_taskmeta'

**mongodb_user** = None

**`process_cleanup`**()

### 10.6.21 Backend: Redis - celery.backends.pyredis

**class** `celery.backends.pyredis.`**`RedisBackend`**(*redis_host=None*, *redis_port=None*, *redis_db=None*, *redis_timeout=None*, *redis_password=None*, *redis_connect_retry=None*, *redis_connect_timeout=None*, *expires=None*)

Redis based task backend store.

**`redis_host`**
The hostname to the Redis server.

**`redis_port`**
The port to the Redis server.

Raises `celery.exceptions.ImproperlyConfigured` if the `REDIS_HOST` or `REDIS_PORT` settings is not set.

**`close`**()
Close the connection to redis.

**`delete`**(*key*)

**deprecated_settings** = frozenset(['REDIS_TIMEOUT', 'REDIS_CONNECT_RETRY'])

**expires** = None

**`get`**(*key*)

**open** ()
Get `redis.Redis`` instance with the current server configuration.

The connection is then cached until you do an explicit `close()`.

**process_cleanup** ()

**redis_connect_retry** = None

**redis_db** = 0

**redis_host** = 'localhost'

**redis_password** = None

**redis_port** = 6379

**redis_timeout** = None

**set** (*key*, *value*)

## 10.6.22 Backend: Cassandra - celery.backends.cassandra

celery.backends.cassandra

**class** `celery.backends.cassandra.`**CassandraBackend** (*servers=None*, *keyspace=None*, *column_family=None*, *cassandra_options=None*, ***kwargs*)
Highly fault tolerant Cassandra backend.

**servers**
List of Cassandra servers with format: "hostname:port".

**Raises** celery.exceptions.ImproperlyConfigured if module `pycassa` is not available.

**cleanup** ()
Delete expired metadata.

**column_family** = None

**i** = 63

**keyspace** = None

**process_cleanup** ()

**servers** = []

## 10.6.23 Backend: Tokyo Tyrant - celery.backends.tyrant

celery.backends.tyrant

**class** `celery.backends.tyrant.`**TyrantBackend** (*tyrant_host=None*, *tyrant_port=None*)
Tokyo Cabinet based task backend store.

**tyrant_host**
The hostname to the Tokyo Tyrant server.

**tyrant_port**
The port to the Tokyo Tyrant server.

**close**()
Close the tyrant connection and remove the cache.

**delete**(*key*)

**get**(*key*)

**open**()
Get `pytyrant.PyTyrant`` instance with the current server configuration.

The connection is then cached until you do an explicit `close()`.

**process_cleanup**()

**set**(*key*, *value*)

**tyrant_host** = None

**tyrant_port** = None

## 10.6.24 Tracing Execution - celery.execute.trace

**class** `celery.execute.trace.`**TaskTrace**(*task_name*, *task_id*, *args*, *kwargs*, *task=None*, *propagate=None*, ***_*)

**execute**()

**handle_after_return**(*status*, *retval*, *type_*, *tb*, *strtb*)

**handle_failure**(*exc*, *type_*, *tb*, *strtb*)
Handle exception.

**handle_retry**(*exc*, *type_*, *tb*, *strtb*)
Handle retry exception.

**handle_success**(*retval*, **args*)
Handle successful execution.

**class** `celery.execute.trace.`**TraceInfo**(*status='PENDING'*, *retval=None*, *exc_info=None*)

**classmethod trace**(*fun*, *args*, *kwargs*, *propagate=False*)
Trace the execution of a function, calling the appropiate callback if the function raises retry, an failure or returned successfully.

**Parameters** **propagate** – If true, errors will propagate to the caller.

## 10.6.25 Serialization Tools - celery.serialization

**exception** `celery.serialization.`**UnpickleableExceptionWrapper**(*exc_module*, *exc_cls_name*, *exc_args*)

Wraps unpickleable exceptions.

**Parameters**

- **exc_module** – see `exc_module`.
- **exc_cls_name** – see `exc_cls_name`.
- **exc_args** – see `exc_args`

**exc_module**
The module of the original exception.

**exc_cls_name**
The name of the original exception class.

**exc_args**
The arguments for the original exception.

Example

```
>>> try:
...     something_raising_unpickleable_exc()
>>> except Exception, e:
...     exc = UnpickleableException(e.__class__.__module__,
...                                 e.__class__.__name__,
...                                 e.args)
...     pickle.dumps(exc) # Works fine.
```

**classmethod from_exception**(*exc*)

**restore**()

celery.serialization.**create_exception_cls**(*name*, *module*, *parent=None*)
Dynamically create an exception class.

celery.serialization.**find_nearest_pickleable_exception**(*exc*)
With an exception instance, iterate over its super classes (by mro) and find the first super exception that is pickleable. It does not go below `Exception` (i.e. it skips `Exception`, `BaseException` and `object`). If that happens you should use `UnpickleableException` instead.

**Parameters** **exc** – An exception instance.

**Returns** the nearest exception if it's not `Exception` or below, if it is it returns `None`.

:rtype `Exception`:

celery.serialization.**get_pickleable_exception**(*exc*)
Make sure exception is pickleable.

celery.serialization.**get_pickled_exception**(*exc*)
Get original exception from exception pickled using `get_pickleable_exception()`.

celery.serialization.**subclass_exception**(*name*, *parent*, *module*)

## 10.6.26 Datastructures - celery.datastructures

**class** celery.datastructures.**AttributeDict**
Dict subclass with attribute access.

**class** celery.datastructures.**ExceptionInfo**(*exc_info*)
Exception wrapping an exception and its traceback.

**Parameters** **exc_info** – The exception tuple info as returned by `traceback.format_exception()`.

**exception**
The original exception.

**traceback**
A traceback from the point when `exception` was raised.

**class** `celery.datastructures.`**`LimitedSet`**(*maxlen=None*, *expires=None*)

Kind-of Set with limitations.

Good for when you need to test for membership (`a in set`), but the list might become to big, so you want to limit it so it doesn't consume too much resources.

**Parameters**

- **maxlen** – Maximum number of members before we start deleting expired members.
- **expires** – Time in seconds, before a membership expires.

**`add`**(*value*)

Add a new member.

**`as_dict`**()

**`chronologically`**

**`clear`**()

Remove all members

**`first`**

Get the oldest member.

**`pop_value`**(*value*)

Remove membership by finding value.

**`update`**(*other*)

**class** `celery.datastructures.`**`LocalCache`**(*limit=None*)

Dictionary with a finite number of keys.

Older items expires first.

**class** `celery.datastructures.`**`PositionQueue`**(*length*)

A positional queue of a specific length, with slots that are either filled or unfilled. When all of the positions are filled, the queue is considered `full()`.

**Parameters** **length** – see `length`.

**`length`**

The number of items required for the queue to be considered full.

**class** **`UnfilledPosition`**(*position*)

Describes an unfilled slot.

`PositionQueue.`**`filled`**

Returns the filled slots as a list.

`PositionQueue.`**`full`**()

Returns `True` if all of the slots has been filled.

**class** `celery.datastructures.`**`SharedCounter`**(*initial_value*)

Thread-safe counter.

Please note that the final value is not synchronized, this means that you should not update the value by using a previous value, the only reliable operations are increment and decrement.

Example

```
>>> max_clients = SharedCounter(initial_value=10)
```

# Thread one >>> max_clients += 1 # OK (safe)

# Thread two >>> max_clients -= 3 # OK (safe)

# Main thread >>> if client >= int(max_clients): # Max clients now at 8 ... wait()

```
>>> max_client = max_clients + 10 # NOT OK (unsafe)
```

**decrement** (*n=1*)
Decrement value.

**increment** (*n=1*)
Increment value.

**class** celery.datastructures.**TokenBucket** (*fill_rate*, *capacity=1*)
Token Bucket Algorithm.

See http://en.wikipedia.org/wiki/Token_Bucket Most of this code was stolen from an entry in the ASPN Python Cookbook: http://code.activestate.com/recipes/511490/

**Parameters**

- **fill_rate** – see `fill_rate`.
- **capacity** – see `capacity`.

**fill_rate**
The rate in tokens/second that the bucket will be refilled.

**capacity**
Maximum number of tokens in the bucket. Default is `1`.

**timestamp**
Timestamp of the last time a token was taken out of the bucket.

**can_consume** (*tokens=1*)

**expected_time** (*tokens=1*)
Returns the expected time in seconds when a new token should be available. *Note: consumes a token from the bucket*

celery.datastructures.**consume_queue** (*queue*)
Iterator yielding all immediately available items in a `Queue.Queue`.

The iterator stops as soon as the queue raises `Queue.Empty`.

Example

```
>>> q = Queue()
>>> map(q.put, range(4))
>>> list(consume_queue(q))
[0, 1, 2, 3]
>>> list(consume_queue(q))
[]
```

## 10.6.27 Message Routers - celery.routes

**class** celery.routes.**MapRoute** (*map*)
Makes a router out of a `dict`.

**route_for_task** (*task*, **args*, ***kwargs*)

**class** celery.routes.**Router** (*routes=None*, *queues=None*, *create_missing=False*)

**add_queue** (*queue*)

**expand_destination**(*route*)

**lookup_route**(*task*, *args=None*, *kwargs=None*)

**route**(*options*, *task*, *args=()*, *kwargs={}*)

`celery.routes.`**merge**(*a*, *b*)
Like `dict(a, **b)` except it will keep values from `a`, if the value in `b` is `None`.

`celery.routes.`**prepare**(*routes*)
Expand ROUTES setting.

## 10.6.28 Logging - celery.log

celery.log

**class** `celery.log.`**ColorFormatter**(*msg*, *use_color=True*)

**format**(*record*)

**formatException**(*ei*)

**class** `celery.log.`**LoggingProxy**(*logger*, *loglevel=None*)
Forward file object to `logging.Logger` instance.

**Parameters**

- **logger** – The `logging.Logger` instance to forward to.
- **loglevel** – Loglevel to use when writing messages.

**close**()
When the object is closed, no write requests are forwarded to the logging object anymore.

**closed = False**

**fileno**()

**flush**()
This object is not buffered so any `flush()` requests are ignored.

**isatty**()
Always returns `False`. Just here for file support.

**loglevel = 40**

**mode = 'w'**

**name = None**

**write**(*data*)

**writelines**(*sequence*)
`writelines(sequence_of_strings) -> None.`

Write the strings to the file.

The sequence can be any iterable object producing strings. This is equivalent to calling `write()` for each string.

**class** `celery.log.`**SilenceRepeated**(*action*, *max_iterations=10*)
Only log action every n iterations.

`celery.log.`**`emergency_error`**(*logfile*, *message*)
Emergency error logging, for when there's no standard file descriptors open because the process has been daemonized or for some other reason.

`celery.log.`**`get_default_logger`**(*loglevel=None*, *name='celery'*)
Get default logger instance.

**Parameters** **loglevel** – Initial log level.

`celery.log.`**`get_task_logger`**(*loglevel=None*, *name=None*)

`celery.log.`**`redirect_stdouts_to_logger`**(*logger*, *loglevel=None*)
Redirect `sys.stdout` and `sys.stderr` to a logging instance.

**Parameters**

- **logger** – The `logging.Logger` instance to redirect to.
- **loglevel** – The loglevel redirected messages will be logged as.

`celery.log.`**`setup_logger`**(*loglevel=30*, *logfile=None*, *format='[%(asctime)s: %(levelname)s/%(processName)s] %(message)s'*, *colorize=False*, *name='celery'*, *root=True*, ***kwargs*)
Setup the `multiprocessing` logger. If `logfile` is not specified, then `stderr` is used.

Returns logger object.

`celery.log.`**`setup_logging_subsystem`**(*loglevel=30*, *logfile=None*, *format='[%(asctime)s: %(levelname)s/%(processName)s] %(message)s'*, *colorize=False*, ***kwargs*)

`celery.log.`**`setup_task_logger`**(*loglevel=30*, *logfile=None*, *format='[%(asctime)s: %(levelname)s/%(processName)s] [%(task_name)s(%(task_id)s)] %(message)s'*, *colorize=False*, *task_kwargs=None*, *propagate=False*, ***kwargs*)
Setup the task logger. If `logfile` is not specified, then `stderr` is used.

Returns logger object.

### 10.6.29 Event Snapshots - celery.events.snapshot

**class** `celery.events.snapshot.`**`Polaroid`**(*state*, *freq=1.0*, *maxrate=None*, *cleanup_freq=3600.0*, *logger=None*)

**`cancel`**()

**`capture`**()

**`cleanup`**()

**`cleanup_signal`** = **<Signal: Signal>**

**`clear_after`** = **False**

**`debug`**(*msg*)

**`install`**()

**`on_cleanup`**()

**`on_shutter`**(*state*)

**`shutter`**()

**`shutter_signal`** = **<Signal: Signal>**

celery.events.snapshot.**evcam**(*camera*, *freq=1.0*, *maxrate=None*, *loglevel=0*, *logfile=None*)

## 10.6.30 Curses Monitor - celery.events.cursesmon

**class** celery.events.cursesmon.**CursesMonitor**(*state*, *keymap=None*)

**alert**(*callback*, *title=None*)

**alert_remote_control_reply**(*reply*)

**background** = 7

**display_width**

**draw**()

**find_position**()

**foreground** = 0

**format_row**(*uuid*, *task*, *worker*, *timestamp*, *state*)

**greet** = 'celeryev 2.1.4'

**handle_keypress**()

**help** = 'j:up k:down i:info t:traceback r:result c:revoke ^c: quit'

**help_title** = 'Keys: '

**info_str** = 'Info: '

**init_screen**()

**keyalias** = {258: 'J', 259: 'K', 343: 'I'}

**keymap** = {}

**limit** = 20

**move_selection**(*direction=1*)

**move_selection_down**()

**move_selection_up**()

**nap**()

**online_str** = 'Workers online: '

**readline**(*x*, *y*)

**resetscreen**()

**revoke_selection**()

**screen_delay** = 10

**screen_width** = None

**selected_position** = 0

**selected_str** = 'Selected: '

**selected_task** = None

**selection_info**()

**selection_rate_limit**()

**selection_result**()

**selection_traceback**()

**tasks**

**win** = None

**workers**

class celery.events.cursesmon.**DisplayThread**(*display*)

**run**()

celery.events.cursesmon.**evtop**()

## 10.6.31 Event Dumper Tool - celery.events.dumper

class celery.events.dumper.**Dumper**

**format_task_event**(*hostname*, *timestamp*, *type*, *task*, *event*)

**on_event**(*event*)

celery.events.dumper.**evdump**()

celery.events.dumper.**humanize_type**(*type*)

## 10.6.32 SQLAlchemy Models - celery.db.models

class celery.db.models.**Task**(*task_id*)

Task result/status.

**date_done**

**id**

**result**

**status**

**task_id**

**to_dict**()

**traceback**

class celery.db.models.**TaskSet**(*taskset_id*, *result*)

TaskSet result

**date_done**

**id**

**result**

**taskset_id**

**to_dict**()

### 10.6.33 SQLAlchemy Session - celery.db.session

`celery.db.session.`**`ResultSession`**(*dburi=None*, ***kwargs*)

`celery.db.session.`**`create_session`**(*dburi*, ***kwargs*)

`celery.db.session.`**`get_engine`**(*dburi*, ***kwargs*)

`celery.db.session.`**`setup_results`**(*engine*)

### 10.6.34 Utilities - celery.utils

`celery.utils.`**`abbr`**(*S*, *max*, *ellipsis='...'*)

`celery.utils.`**`abbrtask`**(*S*, *max*)

`celery.utils.`**`chunks`**(*it*, *n*)

Split an iterator into chunks with `n` elements each.

Examples

# n == 2 >>> x = chunks(iter([0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]), 2) >>> list(x) [[0, 1], [2, 3], [4, 5], [6, 7], [8, 9], [10]]

# n == 3 >>> x = chunks(iter([0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]), 3) >>> list(x) [[0, 1, 2], [3, 4, 5], [6, 7, 8], [9, 10]]

`celery.utils.`**`first`**(*predicate*, *iterable*)

Returns the first element in `iterable` that `predicate` returns a `True` value for.

`celery.utils.`**`firstmethod`**(*method*)

Returns a functions that with a list of instances, finds the first instance that returns a value for the given method.

The list can also contain promises (`promise`.)

`celery.utils.`**`fun_takes_kwargs`**(*fun*, *kwlist=[]*)

With a function, and a list of keyword arguments, returns arguments in the list which the function takes.

If the object has an `argspec` attribute that is used instead of using the `inspect.getargspec`()` introspection.

**Parameters**

- **fun** – The function to inspect arguments of.
- **kwlist** – The list of keyword arguments.

Examples

```
>>> def foo(self, x, y, logfile=None, loglevel=None):
...     return x * y
>>> fun_takes_kwargs(foo, ["logfile", "loglevel", "task_id"])
["logfile", "loglevel"]

>>> def foo(self, x, y, **kwargs):
>>> fun_takes_kwargs(foo, ["logfile", "loglevel", "task_id"])
["logfile", "loglevel", "task_id"]
```

`celery.utils.`**`gen_unique_id`**()

Generate a unique id, having - hopefully - a very small chance of collission.

For now this is provided by `uuid.uuid4()`.

`celery.utils.`**`get_cls_by_name`**(*name*, *aliases={}*)
Get class by name.

The name should be the full dot-separated path to the class:

```
modulename.ClassName
```

Example:

```
celery.concurrency.processes.TaskPool
                            ^- class name
```

If `aliases` is provided, a dict containing short name/long name mappings, the name is looked up in the aliases first.

Examples:

```
>>> get_cls_by_name("celery.concurrency.processes.TaskPool")
<class 'celery.concurrency.processes.TaskPool'>

>>> get_cls_by_name("default", {
...     "default": "celery.concurrency.processes.TaskPool"})
<class 'celery.concurrency.processes.TaskPool'>
```

# Does not try to look up non-string names. >>> from celery.concurrency.processes import TaskPool >>> get_cls_by_name(TaskPool) is TaskPool True

`celery.utils.`**`get_full_cls_name`**(*cls*)
With a class, get its full module and class name.

`celery.utils.`**`instantiate`**(*name*, **args*, ***kwargs*)
Instantiate class by name.

See `get_cls_by_name()`.

`celery.utils.`**`is_iterable`**(*obj*)

`celery.utils.`**`kwdict`**(*kwargs*)
Make sure keyword arguments are not in unicode.

**This should be fixed in newer Python versions,** see: http://bugs.python.org/issue4978.

`celery.utils.`**`mattrgetter`**(**attrs*)
Like `operator.itemgetter()` but returns `None` on missing attributes instead of raising `AttributeError`.

`celery.utils.`**`maybe_iso8601`**(*dt*)
`Either datetime | str -> datetime or None -> None`

`celery.utils.`**`maybe_promise`**(*value*)
Evaluates if the value is a promise.

`celery.utils.`**`mitemgetter`**(**items*)
Like `operator.itemgetter()` but returns `None` on missing items instead of raising `KeyError`.

**class** `celery.utils.`**`mpromise`**(*fun*, **args*, ***kwargs*)
Memoized promise.

The function is only evaluated once, every subsequent access will return the same value.

**`evaluated`**
Set to to `True` after the promise has been evaluated.

**`evaluate`**()

**evaluated** = False

`celery.utils.`**noop**(**args*, ***kwargs*)
No operation.

Takes any arguments/keyword arguments and does nothing.

`celery.utils.`**padlist**(*container*, *size*, *default=None*)
Pad list with default elements.

Examples:

```
>>> first, last, city = padlist(["George", "Costanza", "NYC"], 3)
("George", "Costanza", "NYC")
>>> first, last, city = padlist(["George", "Costanza"], 3)
("George", "Costanza", None)
>>> first, last, city, planet = padlist(["George", "Costanza",
                                          "NYC"], 4, default="Earth")
("George", "Costanza", "NYC", "Earth")
```

**class** `celery.utils.`**promise**(*fun*, **args*, ***kwargs*)
A promise.

Evaluated when called or if the `evaluate()` method is called. The function is evaluated on every access, so the value is not memoized (see `mpromise`).

**Overloaded operations that will evaluate the promise:** `__str__()`, `__repr__()`, `__cmp__()`.

**evaluate**()

`celery.utils.`**repeatlast**(*it*)
Iterate over all elements in the iterator, and when its exhausted yield the last value infinitely.

`celery.utils.`**retry_over_time**(*fun*, *catch*, *args=[]*, *kwargs={}*, *errback=<function noop at 0x487c050>*, *max_retries=None*, *interval_start=2*, *interval_step=2*, *interval_max=30*)
Retry the function over and over until max retries is exceeded.

For each retry we sleep a for a while before we try again, this interval is increased for every retry until the max seconds is reached.

**Parameters**

- **fun** – The function to try
- **catch** – Exceptions to catch, can be either tuple or a single exception class.
- **args** – Positional arguments passed on to the function.
- **kwargs** – Keyword arguments passed on to the function.
- **errback** – Callback for when an exception in `catch` is raised. The callback must take two arguments: `exc` and `interval`, where `exc` is the exception instance, and `interval` is the time in seconds to sleep next..
- **max_retries** – Maximum number of retries before we give up. If this is not set, we will retry forever.
- **interval_start** – How long (in seconds) we start sleeping between retries.
- **interval_step** – By how much the interval is increased for each retry.
- **interval_max** – Maximum number of seconds to sleep between retries.

`celery.utils.`**truncate_text**(*text*, *maxlen=128*, *suffix='...'*)
Truncates text to a maximum number of characters.

### 10.6.35 Terminal Utilities - celery.utils.term

term utils.

```
>>> c = colored(enabled=True)
>>> print(str(c.red("the quick "), c.blue("brown ", c.bold("fox ")),
              c.magenta(c.underline("jumps over")),
              c.yellow(" the lazy "),
              c.green("dog ")))
```

**class** `celery.utils.term.`**`colored`**(**s*, ***kwargs*)

**`black`**(**s*)

**`blink`**(**s*)

**`blue`**(**s*)

**`bold`**(**s*)

**`bright`**(**s*)

**`cyan`**(**s*)

**`green`**(**s*)

**`iblue`**(**s*)

**`icyan`**(**s*)

**`igreen`**(**s*)

**`imagenta`**(**s*)

**`ired`**(**s*)

**`iwhite`**(**s*)

**`iyellow`**(**s*)

**`magenta`**(**s*)

**`no_color`**()

**`node`**(*s*, *op*)

**`red`**(**s*)

**`reset`**(**s*)

**`reverse`**(**s*)

**`underline`**(**s*)

**`white`**(**s*)

**`yellow`**(**s*)

`celery.utils.term.`**`fg`**(*s*)

### 10.6.36 Time and Date Utilities - celery.utils.timeutils

`celery.utils.timeutils.`**`delta_resolution`**(*dt*, *delta*)

Round a datetime to the resolution of a timedelta.

If the timedelta is in days, the datetime will be rounded to the nearest days, if the timedelta is in hours the datetime will be rounded to the nearest hour, and so on until seconds which will just return the original datetime.

`celery.utils.timeutils.`**`rate`**`(`*rate*`)`
Parses rate strings, such as `"100/m"` or `"2/h"` and converts them to seconds.

`celery.utils.timeutils.`**`remaining`**`(`*start*, *ends_in*, *now=None*, *relative=True*`)`
Calculate the remaining time for a start date and a timedelta.

e.g. "how many seconds left for 30 seconds after start?"

**Parameters**

- **start** – Start `datetime`.
- **ends_in** – The end delta as a `timedelta`.
- **relative** – If set to `False`, the end time will be calculated using `delta_resolution()` (i.e. rounded to the resolution of `ends_in`).
- **now** – Function returning the current time and date, defaults to `datetime.now()`.

`celery.utils.timeutils.`**`timedelta_seconds`**`(`*delta*`)`
Convert `datetime.timedelta` to seconds.

Doesn't account for negative values.

`celery.utils.timeutils.`**`weekday`**`(`*name*`)`
Return the position of a weekday (0 - 7, where 0 is Sunday).

Example:

```
>>> weekday("sunday"), weekday("sun"), weekday("mon")
(0, 0, 1)
```

## 10.6.37 Debugging Info - celery.utils.info

`celery.utils.info.`**`format_broker_info`**`(`*info=None*`)`
Get message broker connection info string for log dumps.

`celery.utils.info.`**`format_queues`**`(`*queues*, *indent=0*`)`
Format routing table into string for log dumps.

`celery.utils.info.`**`get_broker_info`**`(`*broker_connection=None*`)`

`celery.utils.info.`**`humanize_seconds`**`(`*secs*, *prefix=''*`)`
Show seconds in human form, e.g. 60 is "1 minute", 7200 is "2 hours".

`celery.utils.info.`**`textindent`**`(`*t*, *indent=0*`)`
Indent text.

## 10.6.38 Python Compatibility - celery.utils.compat

**class** `celery.utils.compat.`**`OrderedDict`**`(`**args*, ***kwds*`)`
Dictionary that remembers insertion order

**`clear`**`()` → None. Remove all items from od.

**`copy`**`()` → a shallow copy of od

**classmethod** **`fromkeys`**`(`*S*[, *v* ]`)` → New ordered dictionary with keys from S
and values equal to v (which defaults to None).

**items**()

**iteritems**()

**iterkeys**()

**itervalues**()

**keys**()

**pop**(*key*, *default=<object object at 0x3f8a650>*)

**popitem**() -> (*k*, *v*)
Return and remove a (key, value) pair. Pairs are returned in LIFO order if last is true or FIFO order if false.

**setdefault**(*key*, *default=None*)

**update**(*other=()*, ***kwds*)

**values**()

`celery.utils.compat.`**chain_from_iterable**()
chain.from_iterable(iterable) –> chain object

Alternate chain() contructor taking a single iterable argument that evaluates lazily.

`celery.utils.compat.`**log_with_extra**(*logger*, *level*, *msg*, **args*, ***kwargs*)

### 10.6.39 Sending E-mail - celery.utils.mail

**class** `celery.utils.mail.`**Mailer**(*host='localhost'*, *port=0*, *user=None*, *password=None*, *timeout=None*)

**send**(*message*)

**class** `celery.utils.mail.`**Message**(*to=None*, *sender=None*, *subject=None*, *body=None*, *charset='us-ascii'*)

**exception** `celery.utils.mail.`**SendmailWarning**
Problem happened while sending the e-mail message.

`celery.utils.mail.`**mail_admins**(*subject*, *message*, *fail_silently=False*)
Send a message to the admins in conf.ADMINS.

### 10.6.40 Compatibility Patches - celery.utils.patch

`celery.utils.patch.`**ensure_process_aware_logger**()

### 10.6.41 functools compat - celery.utils.functional

Functional utilities for Python 2.4 compatibility.

### 10.6.42 timer2 - celery.utils.timer2

timer2 - Scheduler for Python functions.

**class** `celery.utils.timer2.`**Entry**(*fun*, *args=None*, *kwargs=None*)

**cancel**()

**cancelled** = False

class `celery.utils.timer2.`**Schedule**(*max_interval=2*, *on_error=None*)

ETA scheduler.

**clear**()

**empty**()

Is the schedule empty?

**enter**(*entry*, *eta=None*, *priority=0*)

Enter function into the scheduler.

**Parameters**

- **entry** – Item to enter.
- **eta** – Scheduled time as a `datetime.datetime` object.
- **priority** – Unused.

**handle_error**(*exc_info*)

**info**()

**on_error** = None

**queue**

exception `celery.utils.timer2.`**TimedFunctionFailed**

class `celery.utils.timer2.`**Timer**(*schedule=None*, *on_error=None*, *on_tick=None*, ***kwargs*)

class **Entry**(*fun*, *args=None*, *kwargs=None*)

**cancel**()

**cancelled** = False

`Timer.`**apply_after**(*msecs*, *fun*, *args=()*, *kwargs={}*, *priority=0*)

`Timer.`**apply_at**(*eta*, *fun*, *args=()*, *kwargs={}*, *priority=0*)

`Timer.`**apply_entry**(*entry*)

`Timer.`**apply_interval**(*msecs*, *fun*, *args=()*, *kwargs={}*, *priority=0*)

`Timer.`**cancel**(*tref*)

`Timer.`**clear**()

`Timer.`**empty**()

`Timer.`**ensure_started**()

`Timer.`**enter**(*entry*, *eta*, *priority=None*)

`Timer.`**enter_after**(*msecs*, *entry*, *priority=0*)

`Timer.`**exit_after**(*msecs*, *priority=10*)

`Timer.`**next**()

`Timer.`**on_tick** = None

`Timer.`**queue**

`Timer.`**run**()

Timer.**running** = **False**

Timer.**stop**()

celery.utils.timer2.**to_timestamp**(*d*)

### 10.6.43 Signal Dispatch - celery.utils.dispatch

### 10.6.44 Signals: Dispatcher - celery.utils.dispatch.signal

Signal class.

**class** celery.utils.dispatch.signal.**Signal**(*providing_args=None*)

Base class for all signals

**receivers**
**Internal attribute, holds a dictionary of**
**``{receriverkey (id): weakref(receiver)}`` mappings.**

**connect**(*receiver*, *sender=None*, *weak=True*, *dispatch_uid=None*)

Connect receiver to sender for signal.

**Parameters**

- **receiver** – A function or an instance method which is to receive signals. Receivers must be hashable objects.

  if weak is `True`, then receiver must be weak-referencable (more precisely `saferef.safe_ref()` must be able to create a reference to the receiver).

  Receivers must be able to accept keyword arguments.

  If receivers have a `dispatch_uid` attribute, the receiver will not be added if another receiver already exists with that `dispatch_uid`.

- **sender** – The sender to which the receiver should respond. Must either be of type `Signal`, or `None` to receive events from any sender.
- **weak** – Whether to use weak references to the receiver. By default, the module will attempt to use weak references to the receiver objects. If this parameter is false, then strong references will be used.
- **dispatch_uid** – An identifier used to uniquely identify a particular instance of a receiver. This will usually be a string, though it may be anything hashable.

**disconnect**(*receiver=None*, *sender=None*, *weak=True*, *dispatch_uid=None*)

Disconnect receiver from sender for signal.

If weak references are used, disconnect need not be called. The receiver will be removed from dispatch automatically.

**Parameters**

- **receiver** – The registered receiver to disconnect. May be none if `dispatch_uid` is specified.
- **sender** – The registered sender to disconnect.
- **weak** – The weakref state to disconnect.
- **dispatch_uid** – the unique identifier of the receiver to disconnect

**send**(*sender*, ***named*)

Send signal from sender to all connected receivers.

If any receiver raises an error, the error propagates back through send, terminating the dispatch loop, so it is quite possible to not have all receivers called if a raises an error.

**Parameters**

- **sender** – The sender of the signal. Either a specific object or `None`.
- ****named** – Named arguments which will be passed to receivers.

**Returns** a list of tuple pairs: `[(receiver, response), ... ]`.

**send_robust**(*sender*, ***named*)

Send signal from sender to all connected receivers catching errors.

**Parameters**

- **sender** – The sender of the signal. Can be any python object (normally one registered with a connect if you actually want something to occur).
- ****named** – Named arguments which will be passed to receivers. These arguments must be a subset of the argument names defined in `providing_args`.

**Returns** a list of tuple pairs: `[(receiver, response), ... ]`.

**Raises DispatcherKeyError**

if any receiver raises an error (specifically any subclass of `Exception`), the error instance is returned as the result for that receiver.

## 10.6.45 Signals: Safe References - celery.utils.dispatch.saferef

"Safe weakrefs", originally from pyDispatcher.

Provides a way to safely weakref any function, including bound methods (which aren't handled by the core weakref module).

**class** `celery.utils.dispatch.saferef.`**BoundMethodWeakref**(*target*, *on_delete=None*)

'Safe' and reusable weak references to instance methods.

BoundMethodWeakref objects provide a mechanism for referencing a bound method without requiring that the method object itself (which is normally a transient object) is kept alive. Instead, the BoundMethodWeakref object keeps weak references to both the object and the function which together define the instance method.

**key**

the identity key for the reference, calculated by the class's `calculate_key()` method applied to the target instance method

**deletion_methods**

sequence of callable objects taking single argument, a reference to this object which will be called when *either* the target object or target function is garbage collected (i.e. when this object becomes invalid). These are specified as the on_delete parameters of `safe_ref()` calls.

**weak_self**

weak reference to the target object

**weak_func**

weak reference to the target function

**_all_instances**
class attribute pointing to all live BoundMethodWeakref objects indexed by the class's `calculate_key(target)` method applied to the target objects. This weak value dictionary is used to short-circuit creation so that multiple references to the same (object, function) pair produce the same BoundMethodWeakref instance.

**classmethod `calculate_key`**(*target*)
Calculate the reference key for this reference

Currently this is a two-tuple of the `id()`'s of the target object and the target function respectively.

**class** `celery.utils.dispatch.saferef.`**`BoundNonDescriptorMethodWeakref`**(*target*, *on_delete=None*)
A specialized `BoundMethodWeakref`, for platforms where instance methods are not descriptors.

It assumes that the function name and the target attribute name are the same, instead of assuming that the function is a descriptor. This approach is equally fast, but not 100% reliable because functions can be stored on an attribute named differenty than the function's name such as in:

```
>>> class A(object):
...     pass

>>> def foo(self):
...     return "foo"
>>> A.bar = foo
```

But this shouldn't be a common use case. So, on platforms where methods aren't descriptors (such as Jython) this implementation has the advantage of working in the most cases.

`celery.utils.dispatch.saferef.`**`get_bound_method_weakref`**(*target*, *on_delete*)
Instantiates the appropiate `BoundMethodWeakRef`, depending on the details of the underlying class method implementation.

`celery.utils.dispatch.saferef.`**`safe_ref`**(*target*, *on_delete=None*)
Return a *safe* weak reference to a callable target

**Parameters**

- **target** – the object to be weakly referenced, if it's a bound method reference, will create a `BoundMethodWeakref`, otherwise creates a simple `weakref.ref`.
- **on_delete** – if provided, will have a hard reference stored to the callable to be called after the safe reference goes out of scope with the reference object, (either a `weakref.ref` or a `BoundMethodWeakref`) as argument.

## 10.6.46 Platform Specific - celery.platforms

**class** `celery.platforms.`**`DaemonContext`**(*pidfile=None*, *working_directory='/'*, *umask=0*, ***kwargs*)

**`close`**()

**`detach`**()

**`open`**()

**exception** `celery.platforms.`**`LockFailed`**

**class** `celery.platforms.`**`PIDFile`**(*path*)

**`acquire`**()

**is_locked**()

**read_pid**()

**release**()

**remove**()

**remove_if_stale**()

**write_pid**()

celery.platforms.**create_daemon_context**(*logfile=None*, *pidfile=None*, *uid=None*, *gid=None*, ***options*)

celery.platforms.**create_pidlock**(*pidfile*)
Create and verify pidfile.

If the pidfile already exists the program exits with an error message, however if the process it refers to is not running anymore, the pidfile is just deleted.

celery.platforms.**get_fdmax**(*default=None*)

celery.platforms.**ignore_signal**(*signal_name*)
Ignore signal using `SIG_IGN`.

Does nothing if the platform doesn't support signals, or the specified signal in particular.

celery.platforms.**install_signal_handler**(*signal_name*, *handler*)
Install a handler.

Does nothing if the current platform doesn't support signals, or the specified signal in particular.

celery.platforms.**parse_gid**(*gid*)
Parse group id.

gid can be an integer (gid) or a string (group name), if a group name the gid is taken from the password file.

celery.platforms.**parse_uid**(*uid*)
Parse user id.

uid can be an interger (uid) or a string (username), if a username the uid is taken from the password file.

celery.platforms.**reset_signal**(*signal_name*)
Reset signal to the default signal handler.

Does nothing if the platform doesn't support signals, or the specified signal in particular.

celery.platforms.**set_effective_user**(*uid=None*, *gid=None*)
Change process privileges to new user/group.

If uid and gid is set the effective user/group is set.

If only uid is set, the effective uer is set, and the group is set to the users primary group.

If only gid is set, the effective group is set.

celery.platforms.**set_mp_process_title**(*progname*, *info=None*, *hostname=None*)
Set the ps name using the multiprocessing process name.

Only works if `setproctitle` is installed.

celery.platforms.**set_process_title**(*progname*, *info=None*)
Set the ps name for the currently running process.

Only works if `setproctitle` is installed.

`celery.platforms.`**`setegid`**`(`*gid*`)`
Set effective group id.

`celery.platforms.`**`seteuid`**`(`*uid*`)`
Set effective user id.

`celery.platforms.`**`strargv`**`(`*argv*`)`

CHAPTER 11

# Change history

## 11.1 2.1.5

- In 2.2 remote control commands are not persistent anymore. There is now a new setting you can use to disable persistence in 2.1 as well: the `CELERY_BROADCAST_PERSISTENT` setting.

  This setting will not have any effect in 2.2.

## 11.2 2.1.4

**release-date** 2010-12-03 12:00 PM CEST

- Celery programs now hijacks the root logger by default (Issue #250).

  In 2.1 logging behavior was changed to not configure logging if it was already configured. The problem is that some libraries does not play nice and hijack the root logger, or use *logging.basicConfig* – resulting in users not getting any output or logs.

  So instead we now always hijack the root logger, but if you want the previous behavior you can disable the `CELERYD_HIJACK_ROOT_LOGGER` setting:

  ```
  CELERYD_HIJACK_ROOT_LOGGER = False
  ```

### 11.2.1 Fixes

- Execution options to *apply_async* now takes precedence over options returned by active routers. This was a regression introduced recently (Issue #244).
- *celeryev* curses monitor: Long arguments are now truncated so curses doesn't crash with out of bounds errors. (Issue #235).
- *celeryd*: Channel errors occurring while handling control commands no longer crash the worker but are instead logged with severity error.
- SQLAlchemy database backend: Fixed a race condition occurring when the client wrote the pending state. Just like the Django database backend, it does no longer save the pending state (Issue #261 + Issue #262).
- *task.apply*: *propagate=True* now raises exceptions from the original frame, keeping the same stacktrace (Issue #256).
- Error email body now uses *repr(exception)* instead of *str(exception)*, as the latter could result in Unicode decode errors (Issue #245).
- Error e-mail timeout value is now configurable by using the `EMAIL_TIMEOUT` setting.
- *celeryev*: Now works on Windows (but the curses monitor won't work without having curses).
- Unit test output no longer emits non-standard characters.
- *celeryd*: The broadcast consumer is now closed if the connection is reset.
- *celeryd*: Now properly handles errors occurring while trying to acknowledge the message.
- Happy holidays :)

### 11.2.2 Documentation

- Adding *Contributing*.
- Added *Optimizing*.
- Added *Security* section to the FAQ.
- Periodic Task User Guide: Fixed typo in crontab example table (Issue #239).

## 11.3 2.1.3

**release-date** 2010-11-09 17:00 PM CEST

- Fixed deadlocks in *timer2* which could lead to *djcelerymon/celeryev -c* hanging.
- *EventReceiver*: now sends heartbeat request to find workers.

  This means **celeryev** and friends finds workers immediately at startup.
- celeryev cursesmon: Set screen_delay to 10ms, so the screen refreshes more often.
- Fixed pickling errors when pickling `AsyncResult` on older Python versions.
- celeryd: prefetch count was decremented by eta tasks even if there were no active prefetch limits.

## 11.4 2.1.2

**release-date** 2010-10-29 15:00 PM CEST

### 11.4.1 Fixes

- AMQP result backend: Delete result queue after having successfully polled the result.
- *task.queue* attribute and *queue* argument to *apply_async* was not working.
- Fixed bug with task log messages being output twice when logging to stderr.
  - Default logfile is now *sys.__stderr__* instead of *sys.stderr*, so the messages are not being redirected back to the stderr logger.
  - In addition task loggers now disable *propagate* by default. You can re-enable this by using the *propagate* argument to *task.get_logger*.
- A 2 second timeout for sending error e-mails has been added.

  The mail server used should have as little latency as possible, as the sending of error e-mails is currently blocking the worker. Preferably the mailserver should be local.
- celeryd: Now sends the *task-retried* event for retried tasks.

  This means retried tasks will show as RETRY in the event monitors.
- Logging should now handle utf-8 correctly.
- celeryd: Added *exc_info* error logging messages.

  This is used by tools like django-sentry to provide more context.
- The *time_start* for a task is now set when the task is acknowledged, not when it is sent to the pool.

See Issue #233.

- Fixed Sunday issue with the crontab scheduler.
- Fixed a race condition where Timer.enter is called twice before the thread actually runs.
- The *mail_admins* method is now in the loader, so it can be overriden. (django-celery now uses the Django mail admins mechanism)).
- celeryd: Added –scheduler option to be used in combination with -B.

  See Issue #229.
- Tasks Userguide: Added section about decorating tasks (Issue #224).
- Now links to celery-pylons on PyPI instead of on Bitbucket.
- celeryd: Now honors ignore result for `WorkerLostError` and timeout errors.
- celerybeat: Fixed `UnboundLocalError` in celerybeat logging when using logging setup signals.
- celeryd: All log messages now includes `exc_info`.
- ETA scheduler now uses a *not_empty* condition to wait for new tasks instead of a sleep polling loop
- celeryd now shows the total runtime for a task in the task succeeded log message.

## 11.5 2.1.1

**release-date** 2010-10-14 14:00 PM CEST

### 11.5.1 Fixes

- Now working on Windows again.

  Removed dependency on the pwd/grp modules.
- snapshots: Fixed race condition leading to loss of events.
- celeryd: Reject tasks with an eta that cannot be converted to a time stamp.

  See issue #209
- concurrency.processes.pool: The semaphore was released twice for each task (both at ACK and result ready).

  This has been fixed, and it is now released only once per task.
- docs/configuration: Fixed typo `CELERYD_SOFT_TASK_TIME_LIMIT` -> `CELERYD_TASK_SOFT_TIME_LIMIT`.

  See issue #214
- control command `dump_scheduled`: was using old .info attribute
- **celeryd-multi: Fixed `set changed size during iteration` bug** occurring in the restart command.
- celeryd: Accidentally tried to use additional command line arguments.

  This would lead to an error like:

```
got multiple values for keyword argument 'concurrency'.
```

Additional command line arguments are now ignored, and does not produce this error. However – we do reserve the right to use positional arguments in the future, so please do not depend on this behavior.

- celerybeat: Now respects routers and task execution options again.
- celerybeat: Now reuses the publisher instead of the connection.
- Cache result backend: Using `float` as the expires argument to `cache.set` is deprecated by the memcached libraries, so we now automatically cast to `int`.
- unit tests: No longer emits logging and warnings in test output.

## 11.5.2 News

- Now depends on carrot version 0.10.7.
- Added `CELERY_REDIRECT_STDOUTS`, and `CELERYD_REDIRECT_STDOUTS_LEVEL` settings.

  `CELERY_REDIRECT_STDOUTS` is used by **celeryd** and **celerybeat**. All output to `stdout` and `stderr` will be redirected to the current logger if enabled.

  `CELERY_REDIRECT_STDOUTS_LEVEL` decides the log level used and is `WARNING` by default.

- Added `CELERYBEAT_SCHEDULER` setting.

  This setting is used to define the default for the -S option to **celerybeat**.

  Example:

  ```
  CELERYBEAT_SCHEDULER = "djcelery.schedulers.DatabaseScheduler"
  ```

- Added Task.expires: Used to set default expiry time for tasks.
- New remote control commands: `add_consumer` and `cancel_consumer`.

  **`add_consumer(queue, exchange, exchange_type, routing_key, **options)`**
  Tells the worker to declare and consume from the specified declaration.

  **`cancel_consumer`**(*queue_name*)
  Tells the worker to stop consuming from queue (by queue name).

  Commands also added to **celeryctl** and `inspect`.

  Example using celeryctl to start consuming from queue "queue", in exchange "exchange", of type "direct" using binding key "key":

  ```
  $ celeryctl inspect add_consumer queue exchange direct key
  $ celeryctl inspect cancel_consumer queue
  ```

  See *celeryctl: Management Utility* for more information about the **celeryctl** program.

  Another example using `inspect`:

  ```
  >>> from celery.task.control import inspect
  >>> inspect.add_consumer(queue="queue", exchange="exchange",
  ...                      exchange_type="direct",
  ...                      routing_key="key",
  ...                      durable=False,
  ...                      auto_delete=True)
  ```

```
>>> inspect.cancel_consumer("queue")
```

- celerybeat: Now logs the traceback if a message can't be sent.
- celerybeat: Now enables a default socket timeout of 30 seconds.
- README/introduction/homepage: Added link to Flask-Celery.

## 11.6 2.1.0

**release-date** 2010-10-08 12:00 PM CEST

### 11.6.1 Important Notes

- Celery is now following the versioning semantics defined by semver.

  This means we are no longer allowed to use odd/even versioning semantics By our previous versioning scheme this stable release should have been version 2.2.

- Now depends on Carrot 0.10.7.
- No longer depends on SQLAlchemy, this needs to be installed separately if the database result backend is used.
- django-celery now comes with a monitor for the Django Admin interface. This can also be used if you're not a Django user. See *Django Admin Monitor* and *Using outside of Django* for more information.
- If you get an error after upgrading saying: `AttributeError: 'module' object has no attribute 'system'`,

  Then this is because the `celery.platform` module has been renamed to `celery.platforms` to not collide with the built-in `platform` module.

  You have to remove the old `platform.py` (and maybe `platform.pyc`) file from your previous Celery installation.

  To do this use **python** to find the location of this module:

  ```
  $ python
  >>> import celery.platform
  >>> celery.platform
  <module 'celery.platform' from '/opt/devel/celery/celery/platform.pyc'>
  ```

  Here the compiled module is in `/opt/devel/celery/celery/`, to remove the offending files do:

  ```
  $ rm -f /opt/devel/celery/celery/platform.py*
  ```

### 11.6.2 News

- Added support for expiration of AMQP results (requires RabbitMQ 2.1.0)

  The new configuration option `CELERY_AMQP_TASK_RESULT_EXPIRES` sets the expiry time in seconds (can be int or float):

  ```
  CELERY_AMQP_TASK_RESULT_EXPIRES = 30 * 60  # 30 minutes.
  CELERY_AMQP_TASK_RESULT_EXPIRES = 0.80     # 800 ms.
  ```

- celeryev: Event Snapshots

  If enabled, **celeryd** sends messages about what the worker is doing. These messages are called "events". The events are used by real-time monitors to show what the cluster is doing, but they are not very useful for monitoring over a longer period of time. Snapshots lets you take "pictures" of the clusters state at regular intervals. This can then be stored in a database to generate statistics with, or even monitoring over longer time periods.

  django-celery now comes with a Celery monitor for the Django Admin interface. To use this you need to run the django-celery snapshot camera, which stores snapshots to the database at configurable intervals. See *Using outside of Django* for information about using this monitor if you're not using Django.

  To use the Django admin monitor you need to do the following:

  1. Create the new database tables.

     $ python manage.py syncdb

  2. Start the django-celery snapshot camera:

     ```
     $ python manage.py celerycam
     ```

  3. Open up the django admin to monitor your cluster.

  The admin interface shows tasks, worker nodes, and even lets you perform some actions, like revoking and rate limiting tasks, and shutting down worker nodes.

  There's also a Debian init.d script for `celeryev` available, see *Running celeryd as a daemon* for more information.

  New command line arguments to celeryev:

  – `-c|--camera`: Snapshot camera class to use.
  – `--logfile|-f`: Log file
  – `--loglevel|-l`: Log level
  – `--maxrate|-r`: Shutter rate limit.
  – `--freq|-F`: Shutter frequency

  The `--camera` argument is the name of a class used to take snapshots with. It must support the interface defined by `celery.events.snapshot.Polaroid`.

  Shutter frequency controls how often the camera thread wakes up, while the rate limit controls how often it will actually take a snapshot. The rate limit can be an integer (snapshots/s), or a rate limit string which has the same syntax as the task rate limit strings (`"200/m"`, `"10/s"`, `"1/h"`, etc).

  For the Django camera case, this rate limit can be used to control how often the snapshots are written to the database, and the frequency used to control how often the thread wakes up to check if there's anything new.

  The rate limit is off by default, which means it will take a snapshot for every `--frequency` seconds.

**See also:**

*Django Admin Monitor* and *Snapshots*.

- `broadcast()`: Added callback argument, this can be used to process replies immediately as they arrive.
- celeryctl: New command-line utility to manage and inspect worker nodes, apply tasks and inspect the results of tasks.

**See also:**

The *celeryctl: Management Utility* section in the *User Guide*.

Some examples:

```
$ celeryctl apply tasks.add -a '[2, 2]' --countdown=10

$ celeryctl inspect active
$ celeryctl inspect registered_tasks
$ celeryctl inspect scheduled
$ celeryctl inspect --help
$ celeryctl apply --help
```

- Added the ability to set an expiry date and time for tasks.

  Example:

```
>>> # Task expires after one minute from now.
>>> task.apply_async(args, kwargs, expires=60)
>>> # Also supports datetime
>>> task.apply_async(args, kwargs,
...                  expires=datetime.now() + timedelta(days=1))
```

  When a worker receives a task that has been expired it will be marked as revoked (`celery.exceptions.TaskRevokedError`).

- Changed the way logging is configured.

  We now configure the root logger instead of only configuring our custom logger. In addition we don't hijack the multiprocessing logger anymore, but instead use a custom logger name for different applications:

| Application | Logger Name |
|---|---|
| `celeryd` | "celery" |
| `celerybeat` | "celery.beat" |
| `celeryev` | "celery.ev" |

  This means that the `loglevel` and `logfile` arguments will affect all registered loggers (even those from 3rd party libraries). Unless you configure the loggers manually as shown below, that is.

  *Users can choose to configure logging by subscribing to the :data:'~celery.signals.setup_logging' signal:*

```
from logging.config import fileConfig
from celery import signals

def setup_logging(**kwargs):
    fileConfig("logging.conf")
signals.setup_logging.connect(setup_logging)
```

  If there are no receivers for this signal, the logging subsystem will be configured using the *`--loglevel`*/*`--logfile`* argument, this will be used for *all defined loggers*.

  Remember that celeryd also redirects stdout and stderr to the celery logger, if manually configure logging you also need to redirect the stdouts manually:

```
 from logging.config import fileConfig
 from celery import log

def setup_logging(**kwargs):
     import logging
```

```
        fileConfig("logging.conf")
        stdouts = logging.getLogger("mystdoutslogger")
        log.redirect_stdouts_to_logger(stdouts, loglevel=logging.WARNING)
```

- celeryd: Added command-line option *-I*/*--include*:

  A comma separated list of (task) modules to be imported.

  Example:

  ```
  $ celeryd -I app1.tasks,app2.tasks
  ```

- celeryd: now emits a warning if running as the root user (euid is 0).
- `celery.messaging.establish_connection()`: Ability to override defaults used using keyword argument "defaults".
- celeryd: Now uses `multiprocessing.freeze_support()` so that it should work with **py2exe**, **PyInstaller**, **cx_Freeze**, etc.
- celeryd: Now includes more metadata for the `STARTED` state: PID and host name of the worker that started the task.

  See issue #181

- subtask: Merge additional keyword arguments to `subtask()` into task keyword arguments.

  e.g.:

  ```
  >>> s = subtask((1, 2), {"foo": "bar"}, baz=1)
  >>> s.args
  (1, 2)
  >>> s.kwargs
  {"foo": "bar", "baz": 1}
  ```

  See issue #182.

- celeryd: Now emits a warning if there is already a worker node using the same name running on the same virtual host.
- AMQP result backend: Sending of results are now retried if the connection is down.
- **AMQP result backend: `result.get()`: Wait for next state if state is not** in `READY_STATES`.
- TaskSetResult now supports subscription.

  ```
  >>> res = TaskSet(tasks).apply_async()
  >>> res[0].get()
  ```

- Added `Task.send_error_emails` + `Task.error_whitelist`, so these can be configured per task instead of just by the global setting.
- Added `Task.store_errors_even_if_ignored`, so it can be changed per Task, not just by the global setting.
- The crontab scheduler no longer wakes up every second, but implements `remaining_estimate` (*Optimization*).
- **celeryd: Store `FAILURE` result if the** `WorkerLostError` exception occurs (worker process disappeared).
- celeryd: Store `FAILURE` result if one of the `*TimeLimitExceeded` exceptions occurs.
- Refactored the periodic task responsible for cleaning up results.

  - **The backend cleanup task is now only added to the schedule if**
    `CELERY_TASK_RESULT_EXPIRES` is set.
  - If the schedule already contains a periodic task named "celery.backend_cleanup" it won't change it, so the behavior of the backend cleanup task can be easily changed.
  - The task is now run every day at 4:00 AM, rather than every day since the first time it was run (using crontab schedule instead of `run_every`)
  - **Renamed `celery.task.builtins.DeleteExpiredTaskMetaTask` ->**
    `celery.task.builtins.backend_cleanup`
  - The task itself has been renamed from "celery.delete_expired_task_meta" to "celery.backend_cleanup"

  See issue #134.

- Implemented `AsyncResult.forget` for sqla/cache/redis/tyrant backends. (Forget and remove task result).

  See issue #184.

- `TaskSetResult.join`: Added 'propagate=True' argument.

  When set to `False` exceptions occurring in subtasks will not be re-raised.

- Added `Task.update_state(task_id, state, meta)` as a shortcut to `task.backend.store_result(task_id, meta, state)`.

  The backend interface is "private" and the terminology outdated, so better to move this to `Task` so it can be used.

- timer2: Set `self.running=False` in `stop()` so it won't try to join again on subsequent calls to `stop()`.
- Log colors are now disabled by default on Windows.
- `celery.platform` renamed to `celery.platforms`, so it doesn't collide with the built-in `platform` module.
- Exceptions occurring in Mediator+Pool callbacks are now caught and logged instead of taking down the worker.
- Redis result backend: Now supports result expiration using the Redis `EXPIRE` command.
- unit tests: Don't leave threads running at tear down.
- celeryd: Task results shown in logs are now truncated to 46 chars.
- **`Task.__name__` is now an alias to `self.__class__.__name__`.** This way tasks introspects more like regular functions.
- `Task.retry`: Now raises `TypeError` if kwargs argument is empty.

  See issue #164.

- timedelta_seconds: Use `timedelta.total_seconds` if running on Python 2.7
- `TokenBucket`: Generic Token Bucket algorithm
- `celery.events.state`: Recording of cluster state can now be paused and resumed, including support for buffering.

  `State.`**`freeze`**`(`*buffer=True*`)`
  Pauses recording of the stream.

  If `buffer` is true, events received while being frozen will be buffered, and may be replayed later.

`State.`**`thaw`**`(`*replay=True*`)`
Resumes recording of the stream.

If `replay` is true, then the recorded buffer will be applied.

`State.`**`freeze_while`**`(`*fun*`)`
With a function to apply, freezes the stream before, and replays the buffer after the function returns.

- `EventReceiver.capture` Now supports a timeout keyword argument.
- celeryd: The mediator thread is now disabled if `CELERY_RATE_LIMITS` is enabled, and tasks are directly sent to the pool without going through the ready queue (*Optimization*).

## 11.6.3 Fixes

- Pool: Process timed out by *TimeoutHandler* must be joined by the Supervisor, so don't remove it from the internal process list.

  See issue #192.

- *TaskPublisher.delay_task* now supports exchange argument, so exchange can be overridden when sending tasks in bulk using the same publisher

  See issue #187.

- celeryd no longer marks tasks as revoked if `CELERY_IGNORE_RESULT` is enabled.

  See issue #207.

- AMQP Result backend: Fixed bug with `result.get()` if `CELERY_TRACK_STARTED` enabled.

  `result.get()` would stop consuming after receiving the `STARTED` state.

- Fixed bug where new processes created by the pool supervisor becomes stuck while reading from the task Queue.

  See http://bugs.python.org/issue10037

- Fixed timing issue when declaring the remote control command reply queue

  This issue could result in replies being lost, but have now been fixed.

- Backward compatible *LoggerAdapter* implementation: Now works for Python 2.4.

  Also added support for several new methods: `fatal`, `makeRecord`, `_log`, `log`, `isEnabledFor`, `addHandler`, `removeHandler`.

## 11.6.4 Experimental

- celeryd-multi: Added daemonization support.

  celeryd-multi can now be used to start, stop and restart worker nodes.

  $ celeryd-multi start jerry elaine george kramer

  This also creates PID files and log files (`celeryd@jerry.pid`, ..., `celeryd@jerry.log`. To specify a location for these files use the `--pidfile` and `--logfile` arguments with the `%n` format:

```
$ celeryd-multi start jerry elaine george kramer \
                --logfile=/var/log/celeryd@%n.log \
                --pidfile=/var/run/celeryd@%n.pid
```

Stopping:

```
$ celeryd-multi stop jerry elaine george kramer
```

Restarting. The nodes will be restarted one by one as the old ones are shutdown:

```
$ celeryd-multi restart jerry elaine george kramer
```

Killing the nodes (**WARNING**: Will discard currently executing tasks):

```
$ celeryd-multi kill jerry elaine george kramer
```

See `celeryd-multi help` for help.

- celeryd-multi: `start` command renamed to `show`.

  `celeryd-multi start` will now actually start and detach worker nodes. To just generate the commands you have to use `celeryd-multi show`.

- celeryd: Added `--pidfile` argument.

  The worker will write its pid when it starts. The worker will not be started if this file exists and the pid contained is still alive.

- Added generic init.d script using `celeryd-multi`

  http://github.com/ask/celery/tree/master/contrib/generic-init.d/celeryd

### 11.6.5 Documentation

- Added User guide section: Monitoring
- Added user guide section: Periodic Tasks

  Moved from *getting-started/periodic-tasks* and updated.

- tutorials/external moved to new section: “community”.
- References has been added to all sections in the documentation.

  This makes it easier to link between documents.

## 11.7 2.0.3

**release-date** 2010-08-27 12:00 P.M CEST

### 11.7.1 Fixes

- celeryd: Properly handle connection errors happening while closing consumers.
- celeryd: Events are now buffered if the connection is down, then sent when the connection is re-established.
- No longer depends on the `mailer` package.

  This package had a name space collision with *django-mailer*, so its functionality was replaced.

- Redis result backend: Documentation typos: Redis doesn’t have database names, but database numbers. The default database is now 0.
- `inspect`: `registered_tasks` was requesting an invalid command because of a typo.

See issue #170.

- CELERY_ROUTES: Values defined in the route should now have precedence over values defined in CELERY_QUEUES when merging the two.

  With the follow settings:

  ```
  CELERY_QUEUES = {"cpubound": {"exchange": "cpubound",
                                "routing_key": "cpubound"}}

  CELERY_ROUTES = {"tasks.add": {"queue": "cpubound",
                                 "routing_key": "tasks.add",
                                 "serializer": "json"}}
  ```

  The final routing options for tasks.add will become:

  ```
  {"exchange": "cpubound",
   "routing_key": "tasks.add",
   "serializer": "json"}
  ```

  This was not the case before: the values in CELERY_QUEUES would take precedence.

- Worker crashed if the value of CELERY_TASK_ERROR_WHITELIST was not an iterable
- apply(): Make sure kwargs["task_id"] is always set.
- AsyncResult.traceback: Now returns None, instead of raising KeyError if traceback is missing.
- inspect: Replies did not work correctly if no destination was specified.
- Can now store result/metadata for custom states.
- celeryd: A warning is now emitted if the sending of task error e-mails fails.
- celeryev: Curses monitor no longer crashes if the terminal window is resized.

  See issue #160.

- celeryd: On OS X it is not possible to run os.exec* in a process that is threaded.

  > This breaks the SIGHUP restart handler, and is now disabled on OS X, emitting a warning instead.

  See issue #152.

- celery.execute.trace: Properly handle raise(str), which is still allowed in Python 2.4.

  See issue #175.

- Using urllib2 in a periodic task on OS X crashed because of the proxy auto detection used in OS X.

  This is now fixed by using a workaround. See issue #143.

- Debian init scripts: Commands should not run in a sub shell

  See issue #163.

- Debian init scripts: Use the absolute path of celeryd to allow stat

  See issue #162.

## 11.7.2 Documentation

- getting-started/broker-installation: Fixed typo

  set_permissions "" -> set_permissions ".*".

- Tasks User Guide: Added section on database transactions.

  See issue #169.
- Routing User Guide: Fixed typo *"feed": -> {"queue": "feeds"}*.

  See issue #169.
- Documented the default values for the `CELERYD_CONCURRENCY` and `CELERYD_PREFETCH_MULTIPLIER` settings.
- Tasks User Guide: Fixed typos in the subtask example
- celery.signals: Documented worker_process_init.
- Daemonization cookbook: Need to export DJANGO_SETTINGS_MODULE in `/etc/default/celeryd`.
- Added some more FAQs from stack overflow
- Daemonization cookbook: Fixed typo `CELERYD_LOGFILE/CELERYD_PIDFILE`

  to `CELERYD_LOG_FILE` / `CELERYD_PID_FILE`

  Also added troubleshooting section for the init scripts.

## 11.8 2.0.2

**release-date** 2010-07-22 11:31 A.M CEST

- Routes: When using the dict route syntax, the exchange for a task could disappear making the task unroutable.

  See issue #158.
- Test suite now passing on Python 2.4
- No longer have to type *PYTHONPATH=.* to use celeryconfig in the current directory.

  This is accomplished by the default loader ensuring that the current directory is in `sys.path` when loading the config module. `sys.path` is reset to its original state after loading.

  Adding the current working directory to *sys.path* without the user knowing may be a security issue, as this means someone can drop a Python module in the users directory that executes arbitrary commands. This was the original reason not to do this, but if done *only when loading the config module*, this means that the behavior will only apply to the modules imported in the config module, which I think is a good compromise (certainly better than just explicitly setting *PYTHONPATH=.* anyway)
- Experimental Cassandra backend added.
- celeryd: SIGHUP handler accidentally propagated to worker pool processes.

  In combination with 7a7c44e39344789f11b5346e9cc8340f5fe4846c this would make each child process start a new celeryd when the terminal window was closed :/
- celeryd: Do not install SIGHUP handler if running from a terminal.

  This fixes the problem where celeryd is launched in the background when closing the terminal.
- celeryd: Now joins threads at shutdown.

  See issue #152.
- Test tear down: Don't use *atexit* but nose's *teardown()* functionality instead.

  See issue #154.
- Debian init script for celeryd: Stop now works correctly.

- Task logger: *warn* method added (synonym for *warning*)
- Can now define a white list of errors to send error e-mails for.

  Example:

  ```
  CELERY_TASK_ERROR_WHITELIST = ('myapp.MalformedInputError')
  ```

  See issue #153.
- celeryd: Now handles overflow exceptions in `time.mktime` while parsing the ETA field.
- LoggerWrapper: Try to detect loggers logging back to stderr/stdout making an infinite loop.
- Added `celery.task.control.inspect`: Inspects a running worker.

  Examples:

  ```
  # Inspect a single worker
  >>> i = inspect("myworker.example.com")

  # Inspect several workers
  >>> i = inspect(["myworker.example.com", "myworker2.example.com"])

  # Inspect all workers consuming on this vhost.
  >>> i = inspect()

  ### Methods

  # Get currently executing tasks
  >>> i.active()

  # Get currently reserved tasks
  >>> i.reserved()

  # Get the current eta schedule
  >>> i.scheduled()

  # Worker statistics and info
  >>> i.stats()

  # List of currently revoked tasks
  >>> i.revoked()

  # List of registered tasks
  >>> i.registered_tasks()
  ```
- Remote control commands `dump_active`/`dump_reserved`/`dump_schedule` now replies with detailed task requests.

  Containing the original arguments and fields of the task requested.

  In addition the remote control command *set_loglevel* has been added, this only changes the log level for the main process.
- Worker control command execution now catches errors and returns their string representation in the reply.
- Functional test suite added

  `celery.tests.functional.case` contains utilities to start and stop an embedded celeryd process, for use in functional testing.

## 11.9 2.0.1

**release-date** 2010-07-09 03:02 P.M CEST

- multiprocessing.pool: Now handles encoding errors, so that pickling errors doesn't crash the worker processes.
- The remote control command replies was not working with RabbitMQ 1.8.0's stricter equivalence checks.

  If you've already hit this problem you may have to delete the declaration:

  ```
  $ camqadm exchange.delete celerycrq
  ```

  or:

  ```
  $ python manage.py camqadm exchange.delete celerycrq
  ```

- A bug sneaked in the ETA scheduler that made it only able to execute one task per second(!)

  The scheduler sleeps between iterations so it doesn't consume too much CPU. It keeps a list of the scheduled items sorted by time, at each iteration it sleeps for the remaining time of the item with the nearest deadline. If there are no eta tasks it will sleep for a minimum amount of time, one second by default.

  A bug sneaked in here, making it sleep for one second for every task that was scheduled. This has been fixed, so now it should move tasks like hot knife through butter.

  In addition a new setting has been added to control the minimum sleep interval; `CELERYD_ETA_SCHEDULER_PRECISION`. A good value for this would be a float between 0 and 1, depending on the needed precision. A value of 0.8 means that when the ETA of a task is met, it will take at most 0.8 seconds for the task to be moved to the ready queue.

- Pool: Supervisor did not release the semaphore.

  This would lead to a deadlock if all workers terminated prematurely.

- Added Python version trove classifiers: 2.4, 2.5, 2.6 and 2.7
- Tests now passing on Python 2.7.
- Task.__reduce__: Tasks created using the task decorator can now be pickled.
- setup.py: nose added to `tests_require`.
- Pickle should now work with SQLAlchemy 0.5.x
- New homepage design by Jan Henrik Helmers: http://celeryproject.org
- New Sphinx theme by Armin Ronacher: http://docs.celeryproject.org/
- Fixed "pending_xref" errors shown in the HTML rendering of the documentation. Apparently this was caused by new changes in Sphinx 1.0b2.
- Router classes in `CELERY_ROUTES` are now imported lazily.

  Importing a router class in a module that also loads the Celery environment would cause a circular dependency. This is solved by importing it when needed after the environment is set up.

- `CELERY_ROUTES` was broken if set to a single dict.

  This example in the docs should now work again:

  ```
  CELERY_ROUTES = {"feed.tasks.import_feed": "feeds"}
  ```

- `CREATE_MISSING_QUEUES` was not honored by apply_async.
- New remote control command: `stats`

Dumps information about the worker, like pool process ids, and total number of tasks executed by type.

Example reply:

```
[{'worker.local':
     'total': {'tasks.sleeptask': 6},
     'pool': {'timeouts': [None, None],
              'processes': [60376, 60377],
              'max-concurrency': 2,
              'max-tasks-per-child': None,
              'put-guarded-by-semaphore': True}}]
```

- New remote control command: `dump_active`

  Gives a list of tasks currently being executed by the worker. By default arguments are passed through repr in case there are arguments that is not JSON encodable. If you know the arguments are JSON safe, you can pass the argument `safe=True`.

  Example reply:

```
>>> broadcast("dump_active", arguments={"safe": False}, reply=True)
[{'worker.local': [
    {'args': '(1,)',
     'time_start': 1278580542.6300001,
     'name': 'tasks.sleeptask',
     'delivery_info': {
         'consumer_tag': '30',
         'routing_key': 'celery',
         'exchange': 'celery'},
     'hostname': 'casper.local',
     'acknowledged': True,
     'kwargs': '{}',
     'id': '802e93e9-e470-47ed-b913-06de8510aca2',
    }
]}]
```

- Added experimental support for persistent revokes.

  Use the `-S|--statedb` argument to celeryd to enable it:

```
$ celeryd --statedb=/var/run/celeryd
```

  This will use the file: `/var/run/celeryd.db`, as the `shelve` module automatically adds the `.db` suffix.

## 11.10 2.0.0

**release-date** 2010-07-02 02:30 P.M CEST

### 11.10.1 Foreword

Celery 2.0 contains backward incompatible changes, the most important being that the Django dependency has been removed so Celery no longer supports Django out of the box, but instead as an add-on package called django-celery.

We're very sorry for breaking backwards compatibility, but there's also many new and exciting features to make up for the time you lose upgrading, so be sure to read the *News* section.

Quite a lot of potential users have been upset about the Django dependency, so maybe this is a chance to get wider adoption by the Python community as well.

Big thanks to all contributors, testers and users!

### 11.10.2 Upgrading for Django-users

Django integration has been moved to a separate package: django-celery.

- To upgrade you need to install the django-celery module and change:

  ```
  INSTALLED_APPS = "celery"
  ```

  to:

  ```
  INSTALLED_APPS = "djcelery"
  ```

- If you use `mod_wsgi` you need to add the following line to your `.wsgi` file:

  ```
  import os
  os.environ["CELERY_LOADER"] = "django"
  ```

- The following modules has been moved to django-celery:

| Module name | Replace with |
|---|---|
| `celery.models` | `djcelery.models` |
| `celery.managers` | `djcelery.managers` |
| `celery.views` | `djcelery.views` |
| `celery.urls` | `djcelery.urls` |
| `celery.management` | `djcelery.management` |
| `celery.loaders.djangoapp` | `djcelery.loaders` |
| `celery.backends.database` | `djcelery.backends.database` |
| `celery.backends.cache` | `djcelery.backends.cache` |

Importing `djcelery` will automatically setup Celery to use Django loader. loader. It does this by setting the `CELERY_LOADER` environment variable to `"django"` (it won't change it if a loader is already set.)

When the Django loader is used, the "database" and "cache" result backend aliases will point to the `djcelery` backends instead of the built-in backends, and configuration will be read from the Django settings.

### 11.10.3 Upgrading for others

#### Database result backend

The database result backend is now using SQLAlchemy instead of the Django ORM, see Supported Databases for a table of supported databases.

The `DATABASE_*` settings has been replaced by a single setting: `CELERY_RESULT_DBURI`. The value here should be an SQLAlchemy Connection String, some examples include:

```
# sqlite (filename)
CELERY_RESULT_DBURI = "sqlite:///celerydb.sqlite"

# mysql
CELERY_RESULT_DBURI = "mysql://scott:tiger@localhost/foo"

# postgresql
CELERY_RESULT_DBURI = "postgresql://scott:tiger@localhost/mydatabase"
```

```
# oracle
CELERY_RESULT_DBURI = "oracle://scott:tiger@127.0.0.1:1521/sidname"
```

See SQLAlchemy Connection Strings for more information about connection strings.

To specify additional SQLAlchemy database engine options you can use the `CELERY_RESULT_ENGINE_OPTIONS` setting:

```
# echo enables verbose logging from SQLAlchemy.
CELERY_RESULT_ENGINE_OPTIONS = {"echo": True}
```

#### Cache result backend

The cache result backend is no longer using the Django cache framework, but it supports mostly the same configuration syntax:

```
CELERY_CACHE_BACKEND = "memcached://A.example.com:11211;B.example.com"
```

To use the cache backend you must either have the pylibmc or python-memcached library installed, of which the former is regarded as the best choice.

The support backend types are `memcached://` and `memory://`, we haven't felt the need to support any of the other backends provided by Django.

### 11.10.4 Backward incompatible changes

- Default (python) loader now prints warning on missing `celeryconfig.py` instead of raising `ImportError`.

  celeryd raises `ImproperlyConfigured` if the configuration is not set up. This makes it possible to use *–help* etc., without having a working configuration.

  Also this makes it possible to use the client side of celery without being configured:

  ```
  >>> from carrot.connection import BrokerConnection
  >>> conn = BrokerConnection("localhost", "guest", "guest", "/")
  >>> from celery.execute import send_task
  >>> r = send_task("celery.ping", args=(), kwargs={}, connection=conn)
  >>> from celery.backends.amqp import AMQPBackend
  >>> r.backend = AMQPBackend(connection=conn)
  >>> r.get()
  'pong'
  ```

- The following deprecated settings has been removed (as scheduled by the deprecation timeline):

  | Setting name | Replace with |
  |---|---|
  | CELERY_AMQP_CONSUMER_QUEUES | CELERY_QUEUES |
  | CELERY_AMQP_EXCHANGE | CELERY_DEFAULT_EXCHANGE |
  | CELERY_AMQP_EXCHANGE_TYPE | CELERY_DEFAULT_EXCHANGE_TYPE |
  | CELERY_AMQP_CONSUMER_ROUTING_KEY | CELERY_QUEUES |
  | CELERY_AMQP_PUBLISHER_ROUTING_KEY | CELERY_DEFAULT_ROUTING_KEY |

- The `celery.task.rest` module has been removed, use `celery.task.http` instead (as scheduled by the deprecation timeline).

- It's no longer allowed to skip the class name in loader names. (as scheduled by the deprecation timeline):

  Assuming the implicit `Loader` class name is no longer supported, if you use e.g.:

```
CELERY_LOADER = "myapp.loaders"
```

You need to include the loader class name, like this:

```
CELERY_LOADER = "myapp.loaders.Loader"
```

- `CELERY_TASK_RESULT_EXPIRES` now defaults to 1 day.

  Previous default setting was to expire in 5 days.

- AMQP backend: Don't use different values for *auto_delete*.

  This bug became visible with RabbitMQ 1.8.0, which no longer allows conflicting declarations for the auto_delete and durable settings.

  If you've already used celery with this backend chances are you have to delete the previous declaration:

  ```
  $ camqadm exchange.delete celeryresults
  ```

- Now uses pickle instead of cPickle on Python versions <= 2.5

  cPickle is broken in Python <= 2.5.

  It unsafely and incorrectly uses relative instead of absolute imports, so e.g.:

  ```
  exceptions.KeyError
  ```

  becomes:

  ```
  celery.exceptions.KeyError
  ```

  Your best choice is to upgrade to Python 2.6, as while the pure pickle version has worse performance, it is the only safe option for older Python versions.

### 11.10.5 News

- **celeryev**: Curses Celery Monitor and Event Viewer.

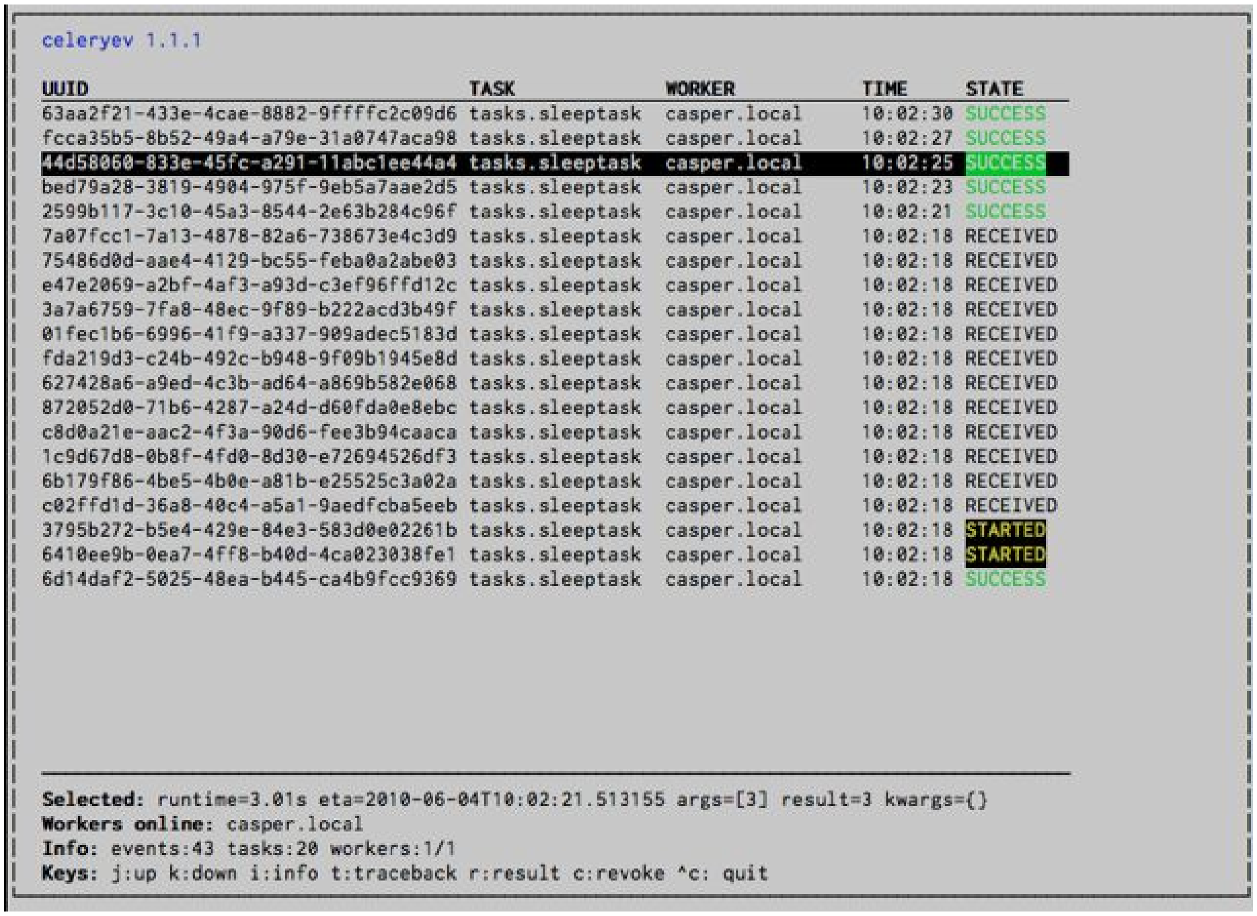
  This is a simple monitor allowing you to see what tasks are executing in real-time and investigate tracebacks and results of ready tasks. It also enables you to set new rate limits and revoke tasks.

  Screenshot:

  If you run `celeryev` with the `-d` switch it will act as an event dumper, simply dumping the events it receives to standard out:

  ```
  $ celeryev -d
  -> celeryev: starting capture...
  casper.local [2010-06-04 10:42:07.020000] heartbeat
  casper.local [2010-06-04 10:42:14.750000] task received:
      tasks.add(61a68756-27f4-4879-b816-3cf815672b0e) args=[2, 2] kwargs={}
      eta=2010-06-04T10:42:16.669290, retries=0
  casper.local [2010-06-04 10:42:17.230000] task started
      tasks.add(61a68756-27f4-4879-b816-3cf815672b0e) args=[2, 2] kwargs={}
  casper.local [2010-06-04 10:42:17.960000] task succeeded:
      tasks.add(61a68756-27f4-4879-b816-3cf815672b0e)
      args=[2, 2] kwargs={} result=4, runtime=0.782663106918

  The fields here are, in order: *sender hostname*, *timestamp*, *event type* and
  *additional event fields*.
  ```



```
celeryev 1.1.1

UUID                                 TASK             WORKER        TIME     STATE
63aa2f21-433e-4cae-8882-9ffffc2c09d6 tasks.sleeptask  casper.local  10:02:30 SUCCESS
fcca35b5-8b52-49a4-a79e-31a0747aca98 tasks.sleeptask  casper.local  10:02:27 SUCCESS
44d58060-833e-45fc-a291-11abc1ee44a4 tasks.sleeptask  casper.local  10:02:25 SUCCESS
bed79a28-3819-4904-975f-9eb5a7aae2d5 tasks.sleeptask  casper.local  10:02:23 SUCCESS
2599b117-3c10-45a3-8544-2e63b284c96f tasks.sleeptask  casper.local  10:02:21 SUCCESS
7a07fcc1-7a13-4878-82a6-738673e4c3d9 tasks.sleeptask  casper.local  10:02:18 RECEIVED
75486d0d-aae4-4129-bc55-feba0a2abe03 tasks.sleeptask  casper.local  10:02:18 RECEIVED
e47e2069-a2bf-4af3-a93d-c3ef96ffd12c tasks.sleeptask  casper.local  10:02:18 RECEIVED
3a7a6759-7fa8-48ec-9f89-b222acd3b49f tasks.sleeptask  casper.local  10:02:18 RECEIVED
01fec1b6-6996-41f9-a337-909adec5183d tasks.sleeptask  casper.local  10:02:18 RECEIVED
fda219d3-c24b-492c-b948-9f09b1945e8d tasks.sleeptask  casper.local  10:02:18 RECEIVED
627428a6-a9ed-4c3b-ad64-a869b582e068 tasks.sleeptask  casper.local  10:02:18 RECEIVED
872052d0-71b6-4287-a24d-d60fda0e8ebc tasks.sleeptask  casper.local  10:02:18 RECEIVED
c8d0a21e-aac2-4f3a-90d6-fee3b94caaca tasks.sleeptask  casper.local  10:02:18 RECEIVED
1c9d67d8-0b8f-4fd0-8d30-e72694526df3 tasks.sleeptask  casper.local  10:02:18 RECEIVED
6b179f86-4be5-4b0e-a81b-e25525c3a02a tasks.sleeptask  casper.local  10:02:18 RECEIVED
c02ffd1d-36a8-40c4-a5a1-9aedfcba5eeb tasks.sleeptask  casper.local  10:02:18 RECEIVED
3795b272-b5e4-429e-84e3-583d0e02261b tasks.sleeptask  casper.local  10:02:18 STARTED
6410ee9b-0ea7-4ff8-b40d-4ca023038fe1 tasks.sleeptask  casper.local  10:02:18 STARTED
6d14daf2-5025-48ea-b445-ca4b9fcc9369 tasks.sleeptask  casper.local  10:02:18 SUCCESS

Selected: runtime=3.01s eta=2010-06-04T10:02:21.513155 args=[3] result=3 kwargs={}
Workers online: casper.local
Info: events:43 tasks:20 workers:1/1
Keys: j:up k:down i:info t:traceback r:result c:revoke ^c: quit
```

- AMQP result backend: Now supports `.ready()`, `.successful()`, `.result`, `.status`, and even responds to changes in task state
- New user guides:
  - *Workers Guide*
  - *Sets of tasks, Subtasks and Callbacks*
  - *Routing Tasks*
- celeryd: Standard out/error is now being redirected to the log file.
- `billiard` has been moved back to the celery repository.

  | Module name | celery equivalent |
  |---|---|
  | `billiard.pool` | `celery.concurrency.processes.pool` |
  | `billiard.serialization` | `celery.serialization` |
  | `billiard.utils.functional` | `celery.utils.functional` |

  The `billiard` distribution may be maintained, depending on interest.
- now depends on `carrot` >= 0.10.5
- now depends on `pyparsing`
- celeryd: Added `--purge` as an alias to `--discard`.
- celeryd: Ctrl+C (SIGINT) once does warm shutdown, hitting Ctrl+C twice forces termination.
- Added support for using complex crontab-expressions in periodic tasks. For example, you can now use:

  ```
  >>> crontab(minute="*/15")
  ```

  or even:

  ```
  >>> crontab(minute="*/30", hour="8-17,1-2", day_of_week="thu-fri")
  ```

  See *Periodic Tasks*.
- celeryd: Now waits for available pool processes before applying new tasks to the pool.

  This means it doesn't have to wait for dozens of tasks to finish at shutdown because it has applied prefetched tasks without having any pool processes available to immediately accept them.

  See issue #122.
- New built-in way to do task callbacks using `subtask`.

  See *Sets of tasks, Subtasks and Callbacks* for more information.
- TaskSets can now contain several types of tasks.

  `TaskSet` has been refactored to use a new syntax, please see *Sets of tasks, Subtasks and Callbacks* for more information.

  The previous syntax is still supported, but will be deprecated in version 1.4.
- TaskSet failed() result was incorrect.

  See issue #132.
- Now creates different loggers per task class.

  See issue #129.
- Missing queue definitions are now created automatically.

You can disable this using the CELERY_CREATE_MISSING_QUEUES setting.

The missing queues are created with the following options:

```
CELERY_QUEUES[name] = {"exchange": name,
                       "exchange_type": "direct",
                       "routing_key": "name}
```

This feature is added for easily setting up routing using the -Q option to celeryd:

```
$ celeryd -Q video, image
```

See the new routing section of the User Guide for more information: *Routing Tasks*.

- New Task option: `Task.queue`

  If set, message options will be taken from the corresponding entry in CELERY_QUEUES. `exchange`, `exchange_type` and `routing_key` will be ignored

- Added support for task soft and hard time limits.

  New settings added:

  - CELERYD_TASK_TIME_LIMIT

    Hard time limit. The worker processing the task will be killed and replaced with a new one when this is exceeded.

  - CELERYD_SOFT_TASK_TIME_LIMIT

    Soft time limit. The `celery.exceptions.SoftTimeLimitExceeded` exception will be raised when this is exceeded. The task can catch this to e.g. clean up before the hard time limit comes.

  New command line arguments to celeryd added: `--time-limit` and `--soft-time-limit`.

  What's left?

  This won't work on platforms not supporting signals (and specifically the *SIGUSR1* signal) yet. So an alternative the ability to disable the feature all together on nonconforming platforms must be implemented.

  Also when the hard time limit is exceeded, the task result should be a `TimeLimitExceeded` exception.

- Test suite is now passing without a running broker, using the carrot in-memory backend.

- Log output is now available in colors.

| Log level | Color |
|---|---|
| DEBUG | Blue |
| WARNING | Yellow |
| CRITICAL | Magenta |
| ERROR | Red |

  This is only enabled when the log output is a tty. You can explicitly enable/disable this feature using the CELERYD_LOG_COLOR setting.

- Added support for task router classes (like the django multi-db routers)

  - New setting: CELERY_ROUTES

  This is a single, or a list of routers to traverse when sending tasks. Dictionaries in this list converts to a `celery.routes.MapRoute` instance.

Examples:

```
>>> CELERY_ROUTES = {"celery.ping": "default",
                     "mytasks.add": "cpu-bound",
                     "video.encode": {
                         "queue": "video",
                         "exchange": "media"
                         "routing_key": "media.video.encode"}}

>>> CELERY_ROUTES = ("myapp.tasks.Router",
                     {"celery.ping": "default})
```

Where `myapp.tasks.Router` could be:

```
class Router(object):

    def route_for_task(self, task, args=None, kwargs=None):
        if task == "celery.ping":
            return "default"
```

route_for_task may return a string or a dict. A string then means it's a queue name in `CELERY_QUEUES`, a dict means it's a custom route.

When sending tasks, the routers are consulted in order. The first router that doesn't return `None` is the route to use. The message options is then merged with the found route settings, where the routers settings have priority.

Example if `apply_async()` has these arguments:

```
>>> Task.apply_async(immediate=False, exchange="video",
...                  routing_key="video.compress")
```

and a router returns:

```
{"immediate": True,
 "exchange": "urgent"}
```

the final message options will be:

```
immediate=True, exchange="urgent", routing_key="video.compress"
```

(and any default message options defined in the `Task` class)

- New Task handler called after the task returns: `after_return()`.
- **`ExceptionInfo` now passed to** `on_retry()`/`on_failure()` as einfo keyword argument.
- celeryd: Added `CELERYD_MAX_TASKS_PER_CHILD` / *`--maxtasksperchild`*

  Defines the maximum number of tasks a pool worker can process before the process is terminated and replaced by a new one.
- Revoked tasks now marked with state `REVOKED`, and `result.get()` will now raise `TaskRevokedError`.
- `celery.task.control.ping()` now works as expected.
- `apply(throw=True)` / `CELERY_EAGER_PROPAGATES_EXCEPTIONS`: Makes eager execution re-raise task errors.
- New signal: `worker_process_init`: Sent inside the pool worker process at init.
- celeryd *`-Q`* option: Ability to specify list of queues to use, disabling other configured queues.

For example, if `CELERY_QUEUES` defines four queues: `image`, `video`, `data` and `default`, the following command would make celeryd only consume from the `image` and `video` queues:

```
$ celeryd -Q image,video
```

- celeryd: New return value for the `revoke` control command:

  Now returns:

  ```
  {"ok": "task $id revoked"}
  ```

  instead of `True`.

- celeryd: Can now enable/disable events using remote control

  Example usage:

  ```
  >>> from celery.task.control import broadcast
  >>> broadcast("enable_events")
  >>> broadcast("disable_events")
  ```

- Removed top-level tests directory. Test config now in celery.tests.config

  This means running the unit tests doesn't require any special setup. *celery/tests/__init__* now configures the `CELERY_CONFIG_MODULE` and `CELERY_LOADER` environment variables, so when *nosetests* imports that, the unit test environment is all set up.

  Before you run the tests you need to install the test requirements:

  ```
  $ pip install -r contrib/requirements/test.txt
  ```

  Running all tests:

  ```
  $ nosetests
  ```

  Specifying the tests to run:

  ```
  $ nosetests celery.tests.test_task
  ```

  Producing HTML coverage:

  ```
  $ nosetests --with-coverage3
  ```

  The coverage output is then located in `celery/tests/cover/index.html`.

- celeryd: New option `--version`: Dump version info and exit.

- `celeryd-multi`: Tool for shell scripts to start multiple workers.

  Some examples:

  ```
  # Advanced example with 10 workers:
  #   * Three of the workers processes the images and video queue
  #   * Two of the workers processes the data queue with loglevel DEBUG
  #   * the rest processes the default' queue.
  $ celeryd-multi start 10 -l INFO -Q:1-3 images,video -Q:4,5:data
      -Q default -L:4,5 DEBUG

  # get commands to start 10 workers, with 3 processes each
  $ celeryd-multi start 3 -c 3
  celeryd -n celeryd1.myhost -c 3
  celeryd -n celeryd2.myhost -c 3
  celeryd- n celeryd3.myhost -c 3
  ```

```
# start 3 named workers
$ celeryd-multi start image video data -c 3
celeryd -n image.myhost -c 3
celeryd -n video.myhost -c 3
celeryd -n data.myhost -c 3

# specify custom hostname
$ celeryd-multi start 2 -n worker.example.com -c 3
celeryd -n celeryd1.worker.example.com -c 3
celeryd -n celeryd2.worker.example.com -c 3

# Additionl options are added to each celeryd',
# but you can also modify the options for ranges of or single workers

# 3 workers: Two with 3 processes, and one with 10 processes.
$ celeryd-multi start 3 -c 3 -c:1 10
celeryd -n celeryd1.myhost -c 10
celeryd -n celeryd2.myhost -c 3
celeryd -n celeryd3.myhost -c 3

# can also specify options for named workers
$ celeryd-multi start image video data -c 3 -c:image 10
celeryd -n image.myhost -c 10
celeryd -n video.myhost -c 3
celeryd -n data.myhost -c 3

# ranges and lists of workers in options is also allowed:
# (-c:1-3 can also be written as -c:1,2,3)
$ celeryd-multi start 5 -c 3  -c:1-3 10
celeryd-multi -n celeryd1.myhost -c 10
celeryd-multi -n celeryd2.myhost -c 10
celeryd-multi -n celeryd3.myhost -c 10
celeryd-multi -n celeryd4.myhost -c 3
celeryd-multi -n celeryd5.myhost -c 3

# lists also works with named workers
$ celeryd-multi start foo bar baz xuzzy -c 3 -c:foo,bar,baz 10
celeryd-multi -n foo.myhost -c 10
celeryd-multi -n bar.myhost -c 10
celeryd-multi -n baz.myhost -c 10
celeryd-multi -n xuzzy.myhost -c 3
```

- The worker now calls the result backends `process_cleanup` method *after* task execution instead of before.
- AMQP result backend now supports Pika.

## 11.11 1.0.6

**release-date** 2010-06-30 09:57 A.M CEST

- RabbitMQ 1.8.0 has extended their exchange equivalence tests to include `auto_delete` and `durable`. This broke the AMQP backend.

  If you've already used the AMQP backend this means you have to delete the previous definitions:

  ```
  $ camqadm exchange.delete celeryresults
  ```

or:

```
$ python manage.py camqadm exchange.delete celeryresults
```

## 11.12 1.0.5

**release-date** 2010-06-01 02:36 P.M CEST

### 11.12.1 Critical

- SIGINT/Ctrl+C killed the pool, abruptly terminating the currently executing tasks.

  Fixed by making the pool worker processes ignore `SIGINT`.

- Should not close the consumers before the pool is terminated, just cancel the consumers.

  See issue #122.

- Now depends on `billiard` >= 0.3.1
- celeryd: Previously exceptions raised by worker components could stall startup, now it correctly logs the exceptions and shuts down.
- celeryd: Prefetch counts was set too late. QoS is now set as early as possible, so celeryd can't slurp in all the messages at start-up.

### 11.12.2 Changes

- `celery.contrib.abortable`: Abortable tasks.

  Tasks that defines steps of execution, the task can then be aborted after each step has completed.

- `EventDispatcher`: No longer creates AMQP channel if events are disabled
- Added required RPM package names under `[bdist_rpm]` section, to support building RPMs from the sources using setup.py
- Running unit tests: `NOSE_VERBOSE` environment var now enables verbose output from Nose.
- `celery.execute.apply()`: Pass log file/log level arguments as task kwargs.

  See issue #110.

- celery.execute.apply: Should return exception, not `ExceptionInfo` on error.

  See issue #111.

- Added new entries to the *FAQs*:
  - Should I use retry or acks_late?
  - Can I execute a task by name?

## 11.13 1.0.4

**release-date** 2010-05-31 09:54 A.M CEST

- Changelog merged with 1.0.5 as the release was never announced.

## 11.14 1.0.3

**release-date** 2010-05-15 03:00 P.M CEST

### 11.14.1 Important notes

- Messages are now acknowledged *just before* the task function is executed.

  This is the behavior we've wanted all along, but couldn't have because of limitations in the multiprocessing module. The previous behavior was not good, and the situation worsened with the release of 1.0.1, so this change will definitely improve reliability, performance and operations in general.

  For more information please see http://bit.ly/9hom6T

- Database result backend: result now explicitly sets `null=True` as `django-picklefield` version 0.1.5 changed the default behavior right under our noses :(

  See: http://bit.ly/d5OwMr

  This means those who created their celery tables (via syncdb or celeryinit) with picklefield versions >= 0.1.5 has to alter their tables to allow the result field to be `NULL` manually.

  MySQL:

  ```
  ALTER TABLE celery_taskmeta MODIFY result TEXT NULL
  ```

  PostgreSQL:

  ```
  ALTER TABLE celery_taskmeta ALTER COLUMN result DROP NOT NULL
  ```

- Removed `Task.rate_limit_queue_type`, as it was not really useful and made it harder to refactor some parts.

- Now depends on carrot >= 0.10.4

- Now depends on billiard >= 0.3.0

### 11.14.2 News

- AMQP backend: Added timeout support for `result.get()` / `result.wait()`.

- New task option: `Task.acks_late` (default: `CELERY_ACKS_LATE`)

  Late ack means the task messages will be acknowledged **after** the task has been executed, not *just before*, which is the default behavior.

  **Note:** This means the tasks may be executed twice if the worker crashes in mid-execution. Not acceptable for most applications, but desirable for others.

- Added crontab-like scheduling to periodic tasks.

  Like a cron job, you can specify units of time of when you would like the task to execute. While not a full implementation of cron's features, it should provide a fair degree of common scheduling needs.

  You can specify a minute (0-59), an hour (0-23), and/or a day of the week (0-6 where 0 is Sunday, or by names: sun, mon, tue, wed, thu, fri, sat).

  Examples:

```
from celery.task.schedules import crontab
from celery.decorators import periodic_task

@periodic_task(run_every=crontab(hour=7, minute=30))
def every_morning():
    print("Runs every morning at 7:30a.m")

@periodic_task(run_every=crontab(hour=7, minute=30, day_of_week="mon"))
def every_monday_morning():
    print("Run every monday morning at 7:30a.m")

@periodic_task(run_every=crontab(minutes=30))
def every_hour():
    print("Runs every hour on the clock. e.g. 1:30, 2:30, 3:30 etc.")
```

**Note:** This a late addition. While we have unittests, due to the nature of this feature we haven't been able to completely test this in practice, so consider this experimental.

- `TaskPool.apply_async`: Now supports the `accept_callback` argument.
- `apply_async`: Now raises `ValueError` if task args is not a list, or kwargs is not a tuple (Issue #95).
- `Task.max_retries` can now be `None`, which means it will retry forever.
- Celerybeat: Now reuses the same connection when publishing large sets of tasks.
- Modified the task locking example in the documentation to use `cache.add` for atomic locking.
- Added experimental support for a *started* status on tasks.

  If `Task.track_started` is enabled the task will report its status as "started" when the task is executed by a worker.

  The default value is `False` as the normal behaviour is to not report that level of granularity. Tasks are either pending, finished, or waiting to be retried. Having a "started" status can be useful for when there are long running tasks and there is a need to report which task is currently running.

  The global default can be overridden by the `CELERY_TRACK_STARTED` setting.
- User Guide: New section `Tips and Best Practices`.

  Contributions welcome!

## 11.14.3 Remote control commands

- Remote control commands can now send replies back to the caller.

  Existing commands has been improved to send replies, and the client interface in `celery.task.control` has new keyword arguments: `reply`, `timeout` and `limit`. Where reply means it will wait for replies, timeout is the time in seconds to stop waiting for replies, and limit is the maximum number of replies to get.

  By default, it will wait for as many replies as possible for one second.

  - rate_limit(task_name, destination=all, reply=False, timeout=1, limit=0)

    Worker returns `{"ok": message}` on success, or `{"failure": message}` on failure.

```
>>> from celery.task.control import rate_limit
>>> rate_limit("tasks.add", "10/s", reply=True)
[{'worker1': {'ok': 'new rate limit set successfully'}},
 {'worker2': {'ok': 'new rate limit set successfully'}}]
```

- ping(destination=all, reply=False, timeout=1, limit=0)

  Worker returns the simple message "pong".

```
>>> from celery.task.control import ping
>>> ping(reply=True)
[{'worker1': 'pong'},
 {'worker2': 'pong'},
```

- revoke(destination=all, reply=False, timeout=1, limit=0)

  Worker simply returns True.

```
>>> from celery.task.control import revoke
>>> revoke("419e46eb-cf6a-4271-86a8-442b7124132c", reply=True)
[{'worker1': True},
 {'worker2'; True}]
```

- You can now add your own remote control commands!

  Remote control commands are functions registered in the command registry. Registering a command is done using `celery.worker.control.Panel.register()`:

```
from celery.task.control import Panel

@Panel.register
def reset_broker_connection(panel, **kwargs):
    panel.listener.reset_connection()
    return {"ok": "connection re-established"}
```

  With this module imported in the worker, you can launch the command using `celery.task.control.broadcast`:

```
>>> from celery.task.control import broadcast
>>> broadcast("reset_broker_connection", reply=True)
[{'worker1': {'ok': 'connection re-established'},
 {'worker2': {'ok': 'connection re-established'}}]
```

  **TIP** You can choose the worker(s) to receive the command by using the `destination` argument:

```
>>> broadcast("reset_broker_connection", destination=["worker1"])
[{'worker1': {'ok': 'connection re-established'}]
```

- New remote control command: `dump_reserved`

  Dumps tasks reserved by the worker, waiting to be executed:

```
>>> from celery.task.control import broadcast
>>> broadcast("dump_reserved", reply=True)
[{'myworker1': [<TaskRequest ....>]}]
```

- New remote control command: `dump_schedule`

  Dumps the workers currently registered ETA schedule. These are tasks with an `eta` (or `countdown`) argument waiting to be executed by the worker.

```
>>> from celery.task.control import broadcast
>>> broadcast("dump_schedule", reply=True)
[{'w1': []},
 {'w3': []},
 {'w2': ['0. 2010-05-12 11:06:00 pri0 <TaskRequest
            {name:"opalfeeds.tasks.refresh_feed_slice",
             id:"95b45760-4e73-4ce8-8eac-f100aa80273a",
             args:"(<Feeds freq_max:3600 freq_min:60
                           start:2184.0 stop:3276.0>,)",
             kwargs:"{'page': 2}"}>']},
 {'w4': ['0. 2010-05-12 11:00:00 pri0 <TaskRequest
            {name:"opalfeeds.tasks.refresh_feed_slice",
             id:"c053480b-58fb-422f-ae68-8d30a464edfe",
             args:"(<Feeds freq_max:3600 freq_min:60
                           start:1092.0 stop:2184.0>,)",
             kwargs:"{\'page\': 1}"}>',
        '1. 2010-05-12 11:12:00 pri0 <TaskRequest
            {name:"opalfeeds.tasks.refresh_feed_slice",
             id:"ab8bc59e-6cf8-44b8-88d0-f1af57789758",
             args:"(<Feeds freq_max:3600 freq_min:60
                           start:3276.0 stop:4365>,)",
             kwargs:"{\'page\': 3}"}>']}]
```

### 11.14.4 Fixes

- Mediator thread no longer blocks for more than 1 second.

  With rate limits enabled and when there was a lot of remaining time, the mediator thread could block shutdown (and potentially block other jobs from coming in).

- Remote rate limits was not properly applied (Issue #98).
- Now handles exceptions with Unicode messages correctly in *TaskRequest.on_failure*.
- Database backend: `TaskMeta.result`: default value should be `None` not empty string.

## 11.15 1.0.2

**release-date** 2010-03-31 12:50 P.M CET

- Deprecated: `CELERY_BACKEND`, please use `CELERY_RESULT_BACKEND` instead.
- We now use a custom logger in tasks. This logger supports task magic keyword arguments in formats.

  The default format for tasks (`CELERYD_TASK_LOG_FORMAT`) now includes the id and the name of tasks so the origin of task log messages can easily be traced.

  **Example output::**

  **[2010-03-25 13:11:20,317: INFO/PoolWorker-1]** [tasks.add(a6e1c5ad-60d9-42a0-8b24-9e39363125a4)] Hello from add

  To revert to the previous behavior you can set:

  ```
  CELERYD_TASK_LOG_FORMAT = """
      [%(asctime)s: %(levelname)s/%(processName)s] %(message)s
  """.strip()
  ```

- Unit tests: Don't disable the django test database tear down, instead fixed the underlying issue which was caused by modifications to the DATABASE_NAME setting (Issue #82).
- Django Loader: New config CELERY_DB_REUSE_MAX (max number of tasks to reuse the same database connection)

  The default is to use a new connection for every task. We would very much like to reuse the connection, but a safe number of reuses is not known, and we don't have any way to handle the errors that might happen, which may even be database dependent.

  See: http://bit.ly/94fwdd
- celeryd: The worker components are now configurable: CELERYD_POOL, CELERYD_LISTENER, CELERYD_MEDIATOR, and CELERYD_ETA_SCHEDULER.

  The default configuration is as follows:

  ```
  CELERYD_POOL = "celery.concurrency.processes.TaskPool"
  CELERYD_MEDIATOR = "celery.worker.controllers.Mediator"
  CELERYD_ETA_SCHEDULER = "celery.worker.controllers.ScheduleController"
  CELERYD_LISTENER = "celery.worker.listener.CarrotListener"
  ```

  The CELERYD_POOL setting makes it easy to swap out the multiprocessing pool with a threaded pool, or how about a twisted/eventlet pool?

  Consider the competition for the first pool plug-in started!
- Debian init scripts: Use -a not && (Issue #82).
- Debian init scripts: Now always preserves $CELERYD_OPTS from the /etc/default/celeryd and /etc/default/celerybeat.
- celery.beat.Scheduler: Fixed a bug where the schedule was not properly flushed to disk if the schedule had not been properly initialized.
- celerybeat: Now syncs the schedule to disk when receiving the SIGTERM and SIGINT signals.
- Control commands: Make sure keywords arguments are not in Unicode.
- ETA scheduler: Was missing a logger object, so the scheduler crashed when trying to log that a task had been revoked.
- management.commands.camqadm: Fixed typo camqpadm -> camqadm (Issue #83).
- PeriodicTask.delta_resolution: Was not working for days and hours, now fixed by rounding to the nearest day/hour.
- Fixed a potential infinite loop in BaseAsyncResult.__eq__, although there is no evidence that it has ever been triggered.
- celeryd: Now handles messages with encoding problems by acking them and emitting an error message.

## 11.16 1.0.1

**release-date** 2010-02-24 07:05 P.M CET

- Tasks are now acknowledged early instead of late.

  This is done because messages can only be acknowledged within the same connection channel, so if the connection is lost we would have to refetch the message again to acknowledge it.

This might or might not affect you, but mostly those running tasks with a really long execution time are affected, as all tasks that has made it all the way into the pool needs to be executed before the worker can safely terminate (this is at most the number of pool workers, multiplied by the `CELERYD_PREFETCH_MULTIPLIER` setting.)

We multiply the prefetch count by default to increase the performance at times with bursts of tasks with a short execution time. If this doesn't apply to your use case, you should be able to set the prefetch multiplier to zero, without sacrificing performance.

**Note:** A patch to `multiprocessing` is currently being worked on, this patch would enable us to use a better solution, and is scheduled for inclusion in the `2.0.0` release.

- celeryd now shutdowns cleanly when receiving the `SIGTERM` signal.
- celeryd now does a cold shutdown if the `SIGINT` signal is received (Ctrl+C), this means it tries to terminate as soon as possible.
- Caching of results now moved to the base backend classes, so no need to implement this functionality in the base classes.
- Caches are now also limited in size, so their memory usage doesn't grow out of control.

  You can set the maximum number of results the cache can hold using the `CELERY_MAX_CACHED_RESULTS` setting (the default is five thousand results). In addition, you can refetch already retrieved results using `backend.reload_task_result` + `backend.reload_taskset_result` (that's for those who want to send results incrementally).
- `celeryd` now works on Windows again.

  **Warning:** If you're using Celery with Django, you can't use `project.settings` as the settings module name, but the following should work:

  ```
  $ python manage.py celeryd --settings=settings
  ```
- Execution: `.messaging.TaskPublisher.send_task` now incorporates all the functionality apply_async previously did.

  Like converting countdowns to eta, so `celery.execute.apply_async()` is now simply a convenient front-end to `celery.messaging.TaskPublisher.send_task()`, using the task classes default options.

  Also `celery.execute.send_task()` has been introduced, which can apply tasks using just the task name (useful if the client does not have the destination task in its task registry).

  Example:

  ```
  >>> from celery.execute import send_task
  >>> result = send_task("celery.ping", args=[], kwargs={})
  >>> result.get()
  'pong'
  ```
- `camqadm`: This is a new utility for command line access to the AMQP API.

  Excellent for deleting queues/bindings/exchanges, experimentation and testing:

  ```
  $ camqadm
  1> help
  ```

  Gives an interactive shell, type `help` for a list of commands.

When using Django, use the management command instead:

```
$ python manage.py camqadm
1> help
```

- Redis result backend: To conform to recent Redis API changes, the following settings has been deprecated:
  - REDIS_TIMEOUT
  - REDIS_CONNECT_RETRY

  These will emit a DeprecationWarning if used.

  A REDIS_PASSWORD setting has been added, so you can use the new simple authentication mechanism in Redis.
- The redis result backend no longer calls SAVE when disconnecting, as this is apparently better handled by Redis itself.
- If settings.DEBUG is on, celeryd now warns about the possible memory leak it can result in.
- The ETA scheduler now sleeps at most two seconds between iterations.
- The ETA scheduler now deletes any revoked tasks it might encounter.

  As revokes are not yet persistent, this is done to make sure the task is revoked even though it's currently being hold because its eta is e.g. a week into the future.
- The task_id argument is now respected even if the task is executed eagerly (either using apply, or CELERY_ALWAYS_EAGER).
- The internal queues are now cleared if the connection is reset.
- New magic keyword argument: delivery_info.

  Used by retry() to resend the task to its original destination using the same exchange/routing_key.
- Events: Fields was not passed by *.send()* (fixes the UUID key errors in celerymon)
- Added --schedule/-s option to celeryd, so it is possible to specify a custom schedule filename when using an embedded celerybeat server (the -B/--beat) option.
- Better Python 2.4 compatibility. The test suite now passes.
- task decorators: Now preserve docstring as cls.__doc__, (was previously copied to cls.run.__doc__)
- The testproj directory has been renamed to tests and we're now using nose + django-nose for test discovery, and unittest2 for test cases.
- New pip requirements files available in contrib/requirements.
- TaskPublisher: Declarations are now done once (per process).
- Added Task.delivery_mode and the CELERY_DEFAULT_DELIVERY_MODE setting.

  These can be used to mark messages non-persistent (i.e. so they are lost if the broker is restarted).
- Now have our own ImproperlyConfigured exception, instead of using the Django one.
- Improvements to the Debian init scripts: Shows an error if the program is not executable. Does not modify *CELERYD* when using django with virtualenv.

## 11.17 1.0.0

**release-date** 2010-02-10 04:00 P.M CET

## 11.17.1 Backward incompatible changes

- Celery does not support detaching anymore, so you have to use the tools available on your platform, or something like Supervisord to make celeryd/celerybeat/celerymon into background processes.

  We've had too many problems with celeryd daemonizing itself, so it was decided it has to be removed. Example startup scripts has been added to `contrib/`:

  - Debian, Ubuntu, (start-stop-daemon)

    `contrib/debian/init.d/celeryd` `contrib/debian/init.d/celerybeat`

  - Mac OS X launchd

    ```
    contrib/mac/org.celeryq.celeryd.plist
    contrib/mac/org.celeryq.celerybeat.plist
    contrib/mac/org.celeryq.celerymon.plist
    ```

  - Supervisord (http://supervisord.org)

    `contrib/supervisord/supervisord.conf`

  In addition to `--detach`, the following program arguments has been removed: `--uid`, `--gid`, `--workdir`, `--chroot`, `--pidfile`, `--umask`. All good daemonization tools should support equivalent functionality, so don't worry.

  Also the following configuration keys has been removed: `CELERYD_PID_FILE`, `CELERYBEAT_PID_FILE`, `CELERYMON_PID_FILE`.

- Default celeryd loglevel is now `WARN`, to enable the previous log level start celeryd with `--loglevel=INFO`.

- Tasks are automatically registered.

  This means you no longer have to register your tasks manually. You don't have to change your old code right away, as it doesn't matter if a task is registered twice.

  If you don't want your task to be automatically registered you can set the `abstract` attribute

  ```
  class MyTask(Task):
      abstract = True
  ```

  By using `abstract` only tasks subclassing this task will be automatically registered (this works like the Django ORM).

  If you don't want subclasses to be registered either, you can set the `autoregister` attribute to `False`.

  Incidentally, this change also fixes the problems with automatic name assignment and relative imports. So you also don't have to specify a task name anymore if you use relative imports.

- You can no longer use regular functions as tasks.

  This change was added because it makes the internals a lot more clean and simple. However, you can now turn functions into tasks by using the `@task` decorator:

  ```
  from celery.decorators import task

  @task
  def add(x, y):
      return x + y
  ```

  **See also:**

  *Tasks* for more information about the task decorators.

- The periodic task system has been rewritten to a centralized solution.

  This means `celeryd` no longer schedules periodic tasks by default, but a new daemon has been introduced: `celerybeat`.

  To launch the periodic task scheduler you have to run celerybeat:

  ```
  $ celerybeat
  ```

  Make sure this is running on one server only, if you run it twice, all periodic tasks will also be executed twice.

  If you only have one worker server you can embed it into celeryd like this:

  ```
  $ celeryd --beat # Embed celerybeat in celeryd.
  ```

- The supervisor has been removed.

  This means the `-S` and `--supervised` options to `celeryd` is no longer supported. Please use something like http://supervisord.org instead.

- `TaskSet.join` has been removed, use `TaskSetResult.join` instead.
- The task status `"DONE"` has been renamed to *"SUCCESS"*.
- `AsyncResult.is_done` has been removed, use `AsyncResult.successful` instead.
- The worker no longer stores errors if `Task.ignore_result` is set, to revert to the previous behaviour set `CELERY_STORE_ERRORS_EVEN_IF_IGNORED` to `True`.
- The statistics functionality has been removed in favor of events, so the *-S* and –statistics‘ switches has been removed.
- The module `celery.task.strategy` has been removed.
- `celery.discovery` has been removed, and it's `autodiscover` function is now in `celery.loaders.djangoapp`. Reason: Internal API.
- The `CELERY_LOADER` environment variable now needs loader class name in addition to module name,

  E.g. where you previously had: *"celery.loaders.default"*, you now need *"celery.loaders.default.Loader"*, using the previous syntax will result in a *DeprecationWarning*.

- Detecting the loader is now lazy, and so is not done when importing `celery.loaders`.

  To make this happen `celery.loaders.settings` has been renamed to `load_settings` and is now a function returning the settings object. `celery.loaders.current_loader` is now also a function, returning the current loader.

  So:

  ```
  loader = current_loader
  ```

  needs to be changed to:

  ```
  loader = current_loader()
  ```

## 11.17.2 Deprecations

- The following configuration variables has been renamed and will be deprecated in v2.0:
  - CELERYD_DAEMON_LOG_FORMAT -> CELERYD_LOG_FORMAT
  - CELERYD_DAEMON_LOG_LEVEL -> CELERYD_LOG_LEVEL

  - CELERY_AMQP_CONNECTION_TIMEOUT -> CELERY_BROKER_CONNECTION_TIMEOUT
  - CELERY_AMQP_CONNECTION_RETRY -> CELERY_BROKER_CONNECTION_RETRY
  - CELERY_AMQP_CONNECTION_MAX_RETRIES -> CELERY_BROKER_CONNECTION_MAX_RETRIES
  - SEND_CELERY_TASK_ERROR_EMAILS -> CELERY_SEND_TASK_ERROR_EMAILS

- The public API names in celery.conf has also changed to a consistent naming scheme.
- We now support consuming from an arbitrary number of queues.

  To do this we had to rename the configuration syntax. If you use any of the custom AMQP routing options (queue/exchange/routing_key, etc.), you should read the new FAQ entry: http://bit.ly/aiWoH.

  The previous syntax is deprecated and scheduled for removal in v2.0.

- `TaskSet.run` has been renamed to `TaskSet.apply_async`.

  `TaskSet.run` has now been deprecated, and is scheduled for removal in v2.0.

### 11.17.3 News

- Rate limiting support (per task type, or globally).
- New periodic task system.
- Automatic registration.
- New cool task decorator syntax.
- celeryd now sends events if enabled with the `-E` argument.

  Excellent for monitoring tools, one is already in the making (http://github.com/ask/celerymon).

  Current events include: worker-heartbeat, task-[received/succeeded/failed/retried], worker-online, worker-offline.

- You can now delete (revoke) tasks that has already been applied.
- You can now set the hostname celeryd identifies as using the `--hostname` argument.
- Cache backend now respects the `CELERY_TASK_RESULT_EXPIRES` setting.
- Message format has been standardized and now uses ISO-8601 format for dates instead of datetime.
- *celeryd* now responds to the `SIGHUP` signal by restarting itself.
- Periodic tasks are now scheduled on the clock.

  I.e. `timedelta(hours=1)` means every hour at :00 minutes, not every hour from the server starts. To revert to the previous behaviour you can set `PeriodicTask.relative = True`.

- Now supports passing execute options to a TaskSets list of args, e.g.:

```
>>> ts = TaskSet(add, [([2, 2], {}, {"countdown": 1}),
...                     ([4, 4], {}, {"countdown": 2}),
...                     ([8, 8], {}, {"countdown": 3})])
>>> ts.run()
```

- Got a 3x performance gain by setting the prefetch count to four times the concurrency, (from an average task round-trip of 0.1s to 0.03s!).

  A new setting has been added: `CELERYD_PREFETCH_MULTIPLIER`, which is set to `4` by default.

- Improved support for webhook tasks.

celery.task.rest is now deprecated, replaced with the new and shiny celery.task.http. With more reflective names, sensible interface, and it's possible to override the methods used to perform HTTP requests.

- The results of task sets are now cached by storing it in the result backend.

### 11.17.4 Changes

- Now depends on carrot >= 0.8.1
- New dependencies: billiard, python-dateutil, django-picklefield
- No longer depends on python-daemon
- The uuid distribution is added as a dependency when running Python 2.4.
- Now remembers the previously detected loader by keeping it in the CELERY_LOADER environment variable.

  This may help on windows where fork emulation is used.
- ETA no longer sends datetime objects, but uses ISO 8601 date format in a string for better compatibility with other platforms.
- No longer sends error mails for retried tasks.
- Task can now override the backend used to store results.
- Refactored the ExecuteWrapper, apply and CELERY_ALWAYS_EAGER now also executes the task callbacks and signals.
- Now using a proper scheduler for the tasks with an ETA.

  This means waiting eta tasks are sorted by time, so we don't have to poll the whole list all the time.
- Now also imports modules listed in CELERY_IMPORTS when running with django (as documented).
- Log level for stdout/stderr changed from INFO to ERROR
- ImportErrors are now properly propagated when autodiscovering tasks.
- You can now use celery.messaging.establish_connection to establish a connection to the broker.
- When running as a separate service the periodic task scheduler does some smart moves to not poll too regularly.

  If you need faster poll times you can lower the value of CELERYBEAT_MAX_LOOP_INTERVAL.
- You can now change periodic task intervals at runtime, by making run_every a property, or subclassing PeriodicTask.is_due.
- The worker now supports control commands enabled through the use of a broadcast queue, you can remotely revoke tasks or set the rate limit for a task type. See celery.task.control.
- The services now sets informative process names (as shown in ps listings) if the setproctitle module is installed.
- celery.exceptions.NotRegistered now inherits from KeyError, and TaskRegistry.__getitem__``+``pop raises NotRegistered instead
- You can set the loader via the CELERY_LOADER environment variable.
- You can now set CELERY_IGNORE_RESULT to ignore task results by default (if enabled, tasks doesn't save results or errors to the backend used).
- celeryd now correctly handles malformed messages by throwing away and acknowledging the message, instead of crashing.

### 11.17.5 Bugs

- Fixed a race condition that could happen while storing task results in the database.

### 11.17.6 Documentation

- Reference now split into two sections; API reference and internal module reference.

## 11.18 0.8.4

**release-date** 2010-02-05 01:52 P.M CEST

- Now emits a warning if the –detach argument is used. –detach should not be used anymore, as it has several not easily fixed bugs related to it. Instead, use something like start-stop-daemon, Supervisord or launchd (os x).
- Make sure logger class is process aware, even if running Python >= 2.6.
- Error e-mails are not sent anymore when the task is retried.

## 11.19 0.8.3

**release-date** 2009-12-22 09:43 A.M CEST

- Fixed a possible race condition that could happen when storing/querying task results using the database backend.
- Now has console script entry points in the setup.py file, so tools like Buildout will correctly install the programs celeryd and celeryinit.

## 11.20 0.8.2

**release-date** 2009-11-20 03:40 P.M CEST

- QOS Prefetch count was not applied properly, as it was set for every message received (which apparently behaves like, “receive one more”), instead of only set when our wanted value changed.

## 11.21 0.8.1

**release-date** 2009-11-16 05:21 P.M CEST

### 11.21.1 Very important note

This release (with carrot 0.8.0) enables AMQP QoS (quality of service), which means the workers will only receive as many messages as it can handle at a time. As with any release, you should test this version upgrade on your development servers before rolling it out to production!

### 11.21.2 Important changes

- If you're using Python < 2.6 and you use the multiprocessing backport, then multiprocessing version 2.6.2.1 is required.
- All AMQP_* settings has been renamed to BROKER_*, and in addition AMQP_SERVER has been renamed to BROKER_HOST, so before where you had:

  ```
  AMQP_SERVER = "localhost"
  AMQP_PORT = 5678
  AMQP_USER = "myuser"
  AMQP_PASSWORD = "mypassword"
  AMQP_VHOST = "celery"
  ```

  You need to change that to:

  ```
  BROKER_HOST = "localhost"
  BROKER_PORT = 5678
  BROKER_USER = "myuser"
  BROKER_PASSWORD = "mypassword"
  BROKER_VHOST = "celery"
  ```

- Custom carrot backends now need to include the backend class name, so before where you had:

  ```
  CARROT_BACKEND = "mycustom.backend.module"
  ```

  you need to change it to:

  ```
  CARROT_BACKEND = "mycustom.backend.module.Backend"
  ```

  where `Backend` is the class name. This is probably `"Backend"`, as that was the previously implied name.
- New version requirement for carrot: 0.8.0

### 11.21.3 Changes

- Incorporated the multiprocessing backport patch that fixes the `processName` error.
- Ignore the result of PeriodicTask's by default.
- Added a Redis result store backend
- Allow /etc/default/celeryd to define additional options for the celeryd init script.
- MongoDB periodic tasks issue when using different time than UTC fixed.
- Windows specific: Negate test for available os.fork (thanks miracle2k)
- Now tried to handle broken PID files.
- Added a Django test runner to contrib that sets `CELERY_ALWAYS_EAGER = True` for testing with the database backend.
- Added a `CELERY_CACHE_BACKEND` setting for using something other than the django-global cache backend.
- Use custom implementation of functools.partial (curry) for Python 2.4 support (Probably still problems with running on 2.4, but it will eventually be supported)
- Prepare exception to pickle when saving `RETRY` status for all backends.
- SQLite no concurrency limit should only be effective if the database backend is used.

## 11.22 0.8.0

**release-date** 2009-09-22 03:06 P.M CEST

### 11.22.1 Backward incompatible changes

- Add traceback to result value on failure.

  **Note:** If you use the database backend you have to re-create the database table `celery_taskmeta`.

  Contact the *Mailing list* or *IRC* channel for help doing this.

- Database tables are now only created if the database backend is used, so if you change back to the database backend at some point, be sure to initialize tables (django: `syncdb`, python: `celeryinit`).

**Note:** This is only applies if using Django version 1.1 or higher.

- Now depends on `carrot` version 0.6.0.
- Now depends on python-daemon 1.4.8

### 11.22.2 Important changes

- Celery can now be used in pure Python (outside of a Django project).

  This means celery is no longer Django specific.

  For more information see the FAQ entry *Is Celery for Django only?*.

- Celery now supports task retries.

  See Cookbook: Retrying Tasks for more information.

- We now have an AMQP result store backend.

  It uses messages to publish task return value and status. And it's incredibly fast!

  See issue #6 for more info!

- AMQP QoS (prefetch count) implemented:

  This to not receive more messages than we can handle.

- Now redirects stdout/stderr to the celeryd log file when detached
- **Now uses `inspect.getargspec` to only pass default arguments** the task supports.
- **Add Task.on_success, .on_retry, .on_failure handlers**

  **See `celery.task.base.Task.on_success()`,** `celery.task.base.Task.on_retry()`, `celery.task.base.Task.on_failure()`,

- **`celery.utils.gen_unique_id`: Workaround for** http://bugs.python.org/issue4607
- **You can now customize what happens at worker start, at process init, etc.,** by creating your own loaders. (see `celery.loaders.default`, `celery.loaders.djangoapp`, `celery.loaders`.)
- Support for multiple AMQP exchanges and queues.

This feature misses documentation and tests, so anyone interested is encouraged to improve this situation.

- celeryd now survives a restart of the AMQP server!

  Automatically re-establish AMQP broker connection if it's lost.

  New settings:

  - **AMQP_CONNECTION_RETRY** Set to `True` to enable connection retries.
  - **AMQP_CONNECTION_MAX_RETRIES.** Maximum number of restarts before we give up. Default: `100`.

### 11.22.3 News

- **Fix an incompatibility between python-daemon and multiprocessing,** which resulted in the `[Errno 10] No child processes` problem when detaching.
- **Fixed a possible DjangoUnicodeDecodeError being raised when saving pickled** data to Django's memcached cache backend.
- Better Windows compatibility.
- **New version of the pickled field (taken from** http://www.djangosnippets.org/snippets/513/)
- **New signals introduced: `task_sent`, `task_prerun` and** `task_postrun`, see `celery.signals` for more information.
- **`TaskSetResult.join` caused `TypeError` when `timeout=None`.** Thanks Jerzy Kozera. Closes #31
- **`views.apply` should return `HttpResponse` instance.** Thanks to Jerzy Kozera. Closes #32
- **`PeriodicTask`: Save conversion of `run_every` from `int`** to `timedelta` to the class attribute instead of on the instance.
- **Exceptions has been moved to `celery.exceptions`, but are still** available in the previous module.
- **Try to rollback transaction and retry saving result if an error happens** while setting task status with the database backend.
- jail() refactored into `celery.execute.ExecuteWrapper`.
- *views.apply* now correctly sets mime-type to "application/json"
- `views.task_status` now returns exception if state is `RETRY`
- **`views.task_status` now returns traceback if state is `FAILURE`** or `RETRY`
- Documented default task arguments.
- Add a sensible __repr__ to ExceptionInfo for easier debugging
- **Fix documentation typo .. *import map* -> .. *import dmap*.** Thanks to mikedizon

## 11.23 0.6.0

**release-date** 2009-08-07 06:54 A.M CET

### 11.23.1 Important changes

- **Fixed a bug where tasks raising unpickleable exceptions crashed pool** workers. So if you've had pool workers mysteriously disappearing, or problems with celeryd stopping working, this has been fixed in this version.
- Fixed a race condition with periodic tasks.
- **The task pool is now supervised, so if a pool worker crashes,** goes away or stops responding, it is automatically replaced with a new one.
- **Task.name is now automatically generated out of class module+name, e.g.** `"djangotwitter.tasks.UpdateStatusesTask"`. Very convenient. No idea why we didn't do this before. Some documentation is updated to not manually specify a task name.

### 11.23.2 News

- Tested with Django 1.1
- New Tutorial: Creating a click counter using carrot and celery
- **Database entries for periodic tasks are now created at `celeryd`** startup instead of for each check (which has been a forgotten TODO/XXX in the code for a long time)
- **New settings variable: `CELERY_TASK_RESULT_EXPIRES`** Time (in seconds, or a *datetime.timedelta* object) for when after stored task results are deleted. For the moment this only works for the database backend.
- **`celeryd` now emits a debug log message for which periodic tasks** has been launched.
- **The periodic task table is now locked for reading while getting** periodic task status. (MySQL only so far, seeking patches for other engines)
- **A lot more debugging information is now available by turning on the** *DEBUG* log level (–*loglevel=DEBUG*).
- Functions/methods with a timeout argument now works correctly.
- **New: `celery.strategy.even_time_distribution`:** With an iterator yielding task args, kwargs tuples, evenly distribute the processing of its tasks throughout the time window available.
- Log message *Unknown task ignored...* now has log level *ERROR*
- **Log message `"Got task from broker"` is now emitted for all tasks, even if** the task has an ETA (estimated time of arrival). Also the message now includes the ETA for the task (if any).
- **Acknowledgement now happens in the pool callback. Can't do ack in the job** target, as it's not pickleable (can't share AMQP connection, etc.)).
- Added note about .delay hanging in README
- Tests now passing in Django 1.1
- Fixed discovery to make sure app is in INSTALLED_APPS
- **Previously overridden pool behavior (process reap, wait until pool worker** available, etc.) is now handled by *multiprocessing.Pool* itself.
- Convert statistics data to Unicode for use as kwargs. Thanks Lucy!

## 11.24 0.4.1

**release-date** 2009-07-02 01:42 P.M CET

- Fixed a bug with parsing the message options (`mandatory`, `routing_key`, `priority`, `immediate`)

## 11.25 0.4.0

**release-date** 2009-07-01 07:29 P.M CET

- Adds eager execution. *celery.execute.apply*'|'*Task.apply* executes the function blocking until the task is done, for API compatibility it returns an *celery.result.EagerResult* instance. You can configure celery to always run tasks locally by setting the `CELERY_ALWAYS_EAGER` setting to `True`.
- Now depends on `anyjson`.
- 99% coverage using python `coverage` 3.0.

## 11.26 0.3.20

**release-date** 2009-06-25 08:42 P.M CET

- New arguments to `apply_async` (the advanced version of `delay_task`), `countdown` and `eta`;

```
>>> # Run 10 seconds into the future.
>>> res = apply_async(MyTask, countdown=10);

>>> # Run 1 day from now
>>> res = apply_async(MyTask,
...                   eta=datetime.now() + timedelta(days=1))
```

- Now unlinks stale PID files
- Lots of more tests.
- Now compatible with carrot >= 0.5.0.
- **IMPORTANT** The `subtask_ids` attribute on the `TaskSetResult` instance has been removed. To get this information instead use:

```
>>> subtask_ids = [subtask.task_id for subtask in ts_res.subtasks]
```

- `Taskset.run()` now respects extra message options from the task class.
- Task: Add attribute `ignore_result`: Don't store the status and return value. This means you can't use the `celery.result.AsyncResult` to check if the task is done, or get its return value. Only use if you need the performance and is able live without these features. Any exceptions raised will store the return value/status as usual.
- Task: Add attribute `disable_error_emails` to disable sending error emails for that task.
- Should now work on Windows (although running in the background won't work, so using the `--detach` argument results in an exception being raised.)
- Added support for statistics for profiling and monitoring. To start sending statistics start `celeryd` with the `--statistics` option. Then after a while you can dump the results by running `python manage.py celerystats`. See `celery.monitoring` for more information.

- The celery daemon can now be supervised (i.e. it is automatically restarted if it crashes). To use this start celeryd with the `--supervised` option (or alternatively `-S`).
- views.apply: View applying a task. Example

  ```
  http://e.com/celery/apply/task_name/arg1/arg2//?kwarg1=a&kwarg2=b
  ```

  **Warning:** Use with caution! Do not expose this URL to the public without first ensuring that your code is safe!

- Refactored `celery.task`. It's now split into three modules:
  - celery.task

    Contains `apply_async`, `delay_task`, `discard_all`, and task shortcuts, plus imports objects from `celery.task.base` and `celery.task.builtins`
  - celery.task.base

    Contains task base classes: `Task`, `PeriodicTask`, `TaskSet`, `AsynchronousMapTask`, `ExecuteRemoteTask`.
  - celery.task.builtins

    Built-in tasks: `PingTask`, `DeleteExpiredTaskMetaTask`.

## 11.27 0.3.7

**release-date** 2008-06-16 11:41 P.M CET

- **IMPORTANT** Now uses AMQP's *basic.consume* instead of *basic.get*. This means we're no longer polling the broker for new messages.
- **IMPORTANT** Default concurrency limit is now set to the number of CPUs available on the system.
- **IMPORTANT** `tasks.register`: Renamed `task_name` argument to `name`, so

  ```
  >>> tasks.register(func, task_name="mytask")
  ```

  has to be replaced with:

  ```
  >>> tasks.register(func, name="mytask")
  ```

- The daemon now correctly runs if the pidlock is stale.
- Now compatible with carrot 0.4.5
- Default AMQP connection timeout is now 4 seconds.
- *AsyncResult.read()* was always returning *True*.
- Only use README as long_description if the file exists so easy_install doesn't break.
- `celery.view`: JSON responses now properly set its mime-type.
- `apply_async` now has a `connection` keyword argument so you can re-use the same AMQP connection if you want to execute more than one task.
- Handle failures in task_status view such that it won't throw 500s.
- Fixed typo `AMQP_SERVER` in documentation to `AMQP_HOST`.
- Worker exception e-mails sent to administrators now works properly.

- No longer depends on `django`, so installing `celery` won't affect the preferred Django version installed.
- Now works with PostgreSQL (psycopg2) again by registering the `PickledObject` field.
- `celeryd`: Added `--detach` option as an alias to `--daemon`, and it's the term used in the documentation from now on.
- Make sure the pool and periodic task worker thread is terminated properly at exit. (So `Ctrl-C` works again).
- Now depends on `python-daemon`.
- Removed dependency to `simplejson`
- Cache Backend: Re-establishes connection for every task process if the Django cache backend is memcached/libmemcached.
- Tyrant Backend: Now re-establishes the connection for every task executed.

## 11.28 0.3.3

**release-date** 2009-06-08 01:07 P.M CET

- The `PeriodicWorkController` now sleeps for 1 second between checking for periodic tasks to execute.

## 11.29 0.3.2

**release-date** 2009-06-08 01:07 P.M CET

- celeryd: Added option `--discard`: Discard (delete!) all waiting messages in the queue.
- celeryd: The `--wakeup-after` option was not handled as a float.

## 11.30 0.3.1

**release-date** 2009-06-08 01:07 P.M CET

- The *PeriodicTask*' worker is now running in its own thread instead of blocking the `TaskController` loop.
- Default `QUEUE_WAKEUP_AFTER` has been lowered to `0.1` (was `0.3`)

## 11.31 0.3.0

**release-date** 2009-06-08 12:41 P.M CET

**Warning:** This is a development version, for the stable release, please see versions 0.2.x.

**VERY IMPORTANT:** Pickle is now the encoder used for serializing task arguments, so be sure to flush your task queue before you upgrade.

- **IMPORTANT** TaskSet.run() now returns a celery.result.TaskSetResult instance, which lets you inspect the status and return values of a taskset as it was a single entity.
- **IMPORTANT** Celery now depends on carrot >= 0.4.1.

- The celery daemon now sends task errors to the registered admin e-mails. To turn off this feature, set `SEND_CELERY_TASK_ERROR_EMAILS` to `False` in your `settings.py`. Thanks to Grégoire Cachet.
- You can now run the celery daemon by using `manage.py`:

  ```
  $ python manage.py celeryd
  ```

  Thanks to Grégoire Cachet.
- Added support for message priorities, topic exchanges, custom routing keys for tasks. This means we have introduced `celery.task.apply_async`, a new way of executing tasks.

  You can use `celery.task.delay` and `celery.Task.delay` like usual, but if you want greater control over the message sent, you want `celery.task.apply_async` and `celery.Task.apply_async`.

  This also means the AMQP configuration has changed. Some settings has been renamed, while others are new:

  ```
  CELERY_AMQP_EXCHANGE
  CELERY_AMQP_PUBLISHER_ROUTING_KEY
  CELERY_AMQP_CONSUMER_ROUTING_KEY
  CELERY_AMQP_CONSUMER_QUEUE
  CELERY_AMQP_EXCHANGE_TYPE
  ```

  See the entry Can I send some tasks to only some servers? in the FAQ for more information.
- Task errors are now logged using log level *ERROR* instead of *INFO*, and stacktraces are dumped. Thanks to Grégoire Cachet.
- Make every new worker process re-establish it's Django DB connection, this solving the "MySQL connection died?" exceptions. Thanks to Vitaly Babiy and Jirka Vejrazka.
- **IMPORTANT** Now using pickle to encode task arguments. This means you now can pass complex python objects to tasks as arguments.
- Removed dependency to `yadayada`.
- Added a FAQ, see `docs/faq.rst`.
- Now converts any Unicode keys in task *kwargs* to regular strings. Thanks Vitaly Babiy.
- Renamed the `TaskDaemon` to `WorkController`.
- `celery.datastructures.TaskProcessQueue` is now renamed to `celery.pool.TaskPool`.
- The pool algorithm has been refactored for greater performance and stability.

## 11.32 0.2.0

**release-date** 2009-05-20 05:14 P.M CET

- Final release of 0.2.0
- Compatible with carrot version 0.4.0.
- Fixes some syntax errors related to fetching results from the database backend.

## 11.33 0.2.0-pre3

**release-date** 2009-05-20 05:14 P.M CET

- *Internal release*. Improved handling of unpickleable exceptions, *get_result* now tries to recreate something looking like the original exception.

## 11.34 0.2.0-pre2

**release-date** 2009-05-20 01:56 P.M CET

- Now handles unpickleable exceptions (like the dynamically generated subclasses of *django.core.exception.MultipleObjectsReturned*).

## 11.35 0.2.0-pre1

**release-date** 2009-05-20 12:33 P.M CET

- It's getting quite stable, with a lot of new features, so bump version to 0.2. This is a pre-release.
- `celery.task.mark_as_read()` and `celery.task.mark_as_failure()` has been removed. Use `celery.backends.default_backend.mark_as_read()`, and `celery.backends.default_backend.mark_as_failure()` instead.

## 11.36 0.1.15

**release-date** 2009-05-19 04:13 P.M CET

- The celery daemon was leaking AMQP connections, this should be fixed, if you have any problems with too many files open (like `emfile` errors in `rabbit.log`, please contact us!

## 11.37 0.1.14

**release-date** 2009-05-19 01:08 P.M CET

- Fixed a syntax error in the `TaskSet` class. (No such variable `TimeOutError`).

## 11.38 0.1.13

**release-date** 2009-05-19 12:36 P.M CET

- Forgot to add `yadayada` to install requirements.
- Now deletes all expired task results, not just those marked as done.
- Able to load the Tokyo Tyrant backend class without django configuration, can specify tyrant settings directly in the class constructor.
- Improved API documentation
- Now using the Sphinx documentation system, you can build the html documentation by doing

```
$ cd docs
$ make html
```

and the result will be in `docs/.build/html`.

## 11.39 0.1.12

**release-date** 2009-05-18 04:38 P.M CET

- `delay_task()` etc. now returns `celery.task.AsyncResult` object, which lets you check the result and any failure that might have happened. It kind of works like the `multiprocessing.AsyncResult` class returned by `multiprocessing.Pool.map_async`.
- Added dmap() and dmap_async(). This works like the `multiprocessing.Pool` versions except they are tasks distributed to the celery server. Example:

```
>>> from celery.task import dmap
>>> import operator
>>> dmap(operator.add, [[2, 2], [4, 4], [8, 8]])
>>> [4, 8, 16]

>>> from celery.task import dmap_async
>>> import operator
>>> result = dmap_async(operator.add, [[2, 2], [4, 4], [8, 8]])
>>> result.ready()
False
>>> time.sleep(1)
>>> result.ready()
True
>>> result.result
[4, 8, 16]
```

- Refactored the task metadata cache and database backends, and added a new backend for Tokyo Tyrant. You can set the backend in your django settings file. E.g.:

```
CELERY_RESULT_BACKEND = "database"; # Uses the database
CELERY_RESULT_BACKEND = "cache"; # Uses the django cache framework
CELERY_RESULT_BACKEND = "tyrant"; # Uses Tokyo Tyrant
TT_HOST = "localhost"; # Hostname for the Tokyo Tyrant server.
TT_PORT = 6657; # Port of the Tokyo Tyrant server.
```

## 11.40 0.1.11

**release-date** 2009-05-12 02:08 P.M CET

- The logging system was leaking file descriptors, resulting in servers stopping with the EMFILES (too many open files) error. (fixed)

## 11.41 0.1.10

**release-date** 2009-05-11 12:46 P.M CET

- Tasks now supports both positional arguments and keyword arguments.
- Requires carrot 0.3.8.
- The daemon now tries to reconnect if the connection is lost.

## 11.42 0.1.8

**release-date** 2009-05-07 12:27 P.M CET

- Better test coverage
- More documentation
- celeryd doesn't emit `Queue is empty` message if `settings.CELERYD_EMPTY_MSG_EMIT_EVERY` is 0.

## 11.43 0.1.7

**release-date** 2009-04-30 1:50 P.M CET

- Added some unit tests
- Can now use the database for task metadata (like if the task has been executed or not). Set `settings.CELERY_TASK_META`
- Can now run *python setup.py test* to run the unit tests from within the *tests* project.
- Can set the AMQP exchange/routing key/queue using `settings.CELERY_AMQP_EXCHANGE`, `settings.CELERY_AMQP_ROUTING_KEY`, and `settings.CELERY_AMQP_CONSUMER_QUEUE`.

## 11.44 0.1.6

**release-date** 2009-04-28 2:13 P.M CET

- Introducing `TaskSet`. A set of subtasks is executed and you can find out how many, or if all them, are done (excellent for progress bars and such)
- Now catches all exceptions when running *Task.__call__*, so the daemon doesn't die. This doesn't happen for pure functions yet, only *Task* classes.
- `autodiscover()` now works with zipped eggs.
- celeryd: Now adds current working directory to *sys.path* for convenience.
- The `run_every` attribute of `PeriodicTask` classes can now be a `datetime.timedelta()` object.
- celeryd: You can now set the `DJANGO_PROJECT_DIR` variable for `celeryd` and it will add that to `sys.path` for easy launching.
- Can now check if a task has been executed or not via HTTP.
- You can do this by including the celery `urls.py` into your project,

  ```
  >>> url(r'^celery/$', include("celery.urls"))
  ```

  then visiting the following url,:

  ```
  http://mysite/celery/$task_id/done/
  ```

  this will return a JSON dictionary like e.g:

  ```
  >>> {"task": {"id": $task_id, "executed": true}}
  ```

- `delay_task` now returns string id, not `uuid.UUID` instance.

- Now has `PeriodicTasks`, to have `cron` like functionality.
- Project changed name from `crunchy` to `celery`. The details of the name change request is in `docs/name_change_request.txt`.

## 11.45 0.1.0

**release-date** 2009-04-24 11:28 A.M CET

- Initial release

CHAPTER 12

# Interesting Links

## 12.1 celery

- **IRC logs from `#celery` (Freenode):** http://botland.oebfare.com/logger/celery/

## 12.2 AMQP

- *RabbitMQ-shovel*: Message Relocation Equipment (as a plug-in to RabbitMQ)
- Shovel: An AMQP Relay (generic AMQP shovel)

## 12.3 RabbitMQ

- **Trixx: Administration and Monitoring tool for RabbitMQ (in** development).
- **Cony: HTTP based service for providing insight into running** RabbitMQ processes.
- **RabbitMQ Munin Plug-ins: Use Munin to monitor RabbitMQ, and alert** on critical events.

CHAPTER 13

# Indices and tables

- *genindex*
- *modindex*
- *search*