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# **Developer manual of RasPy**

***Release 0.0.1***

**bibi21000**

January 21, 2015



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## Installation

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The following lines “clone” a GitHub repository. If you want to submit “pull requests”, you need to “fork” RasPy using this [guide](#).

### 1.1 Raspbian

Install official raspbian from here : <http://www.raspbian.org/>.

Newbies can install it from : <http://www.raspberrypi.org/downloads/>.

Developpers or others can also install it on standard distributions (Ubuntu, Debian, RedHat, ...).

### 1.2 Update packages

You can now update packages

```
sudo apt-get -y update
sudo apt-get -y dist-upgrade
```

We need to install some packages to download and build RasPy:

```
sudo apt-get -y install build-essential python-dev python-minimal python python2.7-dev python2.7-r
sudo apt-get -y install git python-setuptools python-docutils python-pylint
```

And some development librairies for rrdtool (for the logger) :

```
sudo apt-get -y install libcairo2-dev libpangol1.0-dev libglib2.0-dev libxml2-dev librrd-dev
```

Some packages need to be removed as new versions are available from eggs :

```
sudo apt-get remove python-zmq libzmq1 libzmq-dev python-nose pylint
```

### 1.3 Download it

You should now download RasPy using git. You should not download and install RasPy with root user. Idealy, you should create a special user for running RasPy or the pi user. Keep in mind root is baaadddd (Not support for installation as root !!!).

```
git clone https://github.com/bibi21000/RasPy.git
```

## 1.4 Configure your system

- access rights
- sudo nopasswd
- ...

## 1.5 Installation

If you want to develop for RasPy, you need to install it in develop mode :

```
sudo make develop
```

Otherwise install it normally ... but not now ;) :

```
sudo make install
```

And be patient ... installation need to compile zmq ... It takes a while ...

If something goes wrong during install or if you want to remove RasPy from you computer, you type :

```
sudo make uninstall
```

If you want to remove dependencies, look at setup.py to get the list and use the following command for every package:

```
sudo pip uninstall package
```

## 1.6 Run the tests

Check that the SLEEP constant in tests/common.py ist set to 1.0 or 1.5

```
vim tests/common.py
```

You can now check that everything is fine running the tests :

```
make tests
```

If it fails ... run it again :) At last, copy / paste the full screen output and send it to the core team.

## 1.7 Start it

In the next monthes, you should be abble to start it :

```
make start
```

## 1.8 Read the doc

- docs/pdf
- docs/html

---

## Before starting

---

If you want to develop you surely need vim :

```
sudo apt-get -y install vim-nox vim-addon-manager
```

### 2.1 Philosophy

Tests, tests, ... and tests :

- A bug -> a test -> a patch
- A new feature -> many test

And documentation

- A new feature -> documentation

### 2.2 Documentation

If you want to generate the documentation, you need to install some packages :

```
sudo apt-get -y install python-sphinx graphviz
```

And some eggs :

```
sudo pip install seqdiag sphinxcontrib-seqdiag
sudo pip install blockdiag sphinxcontrib-blockdiag
sudo pip install nwdiag sphinxcontrib-nwdiag
sudo pip install actdiag sphinxcontrib-actdiag
```

You can now generate the full documentation using :

```
make docs
```

You can also generate a part of it, for example :

```
cd docs
make html
```

### 2.3 Tests

Nosetests and pylint are used to test quality of code. There reports are here :

- Nosetests report

- Coverage report
- Pylint report

Coverage is not the goal but it's one : a module must have a coverage of 90% to be accepted by core team. Otherwise it will block the packaging process. Of course, a FAILED test will also.

Keep in mind that all tests must succeed before submitting pull request. But :

- if a test is a work in progress, you can skip it using `self.wipTest()`
- if a test can only be run on Raspberry (ie onewire), it must call `self.skipTest(message)` at its start.

There is 2 ways to launch the tests. The first one to use on a Raspberry :

```
make tests
```

You can also run the developers tests (without skipped one) on a standard computer running :

```
make devtests
```

If you're on a raspberry, you can run the full tests like this :

```
make tests
```

Running only one test module :

```
/usr/local/bin/nosetests --verbosity=2 --cover-package=raspy --with-coverage --cover-inclusive --cover-erase
```

You can follow automatic tests on [travis-ci](#).

## 2.4 GitHub

You can test the code, build the doc and commit it using the following command :

```
make git
```

You may use `ssh_keys` to do it automatically without typing password.



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**Develop**

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**3.1 A new device**

**3.2 A new server**



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## raspy package

---

### 4.1 Subpackages

#### 4.1.1 raspy.common package

##### Subpackages

**raspy.common.devices package**

##### Submodules

**raspy.common.devices.device module** Devices.

**class** `raspy.common.devices.device.BaseDevice` (*json=None*)

Bases: `object`

The base device object

What is a device :

- a temperature sensor
- a wind sensor
- a camera
- the clock RTC
- a dimmer
- a TV
- ...

What can we do with a device : a command (same “spirit” as zwave’s command classes)

- configure it
- get value of a sensor
- dim a dimmer
- take a photo with camera
- ...

We should do auto-mapping :

- python object <-> json
- python object <-> html

We should manage complex devices, ie a TV : it groups a channel selector (+, -, and direct access to a channel), a volume selector, ... In an ideal world we should not be obliged to create each sub-devices.

Naming convention of devices on the network : (MDP.routing\_key(hostname, service)).{device\_name}[.subdevice] Naming convention for devices / subdevices : categorie.device-subdevice (ie media.tv-volume, ... )

**check** (*json=None*)

Check that the JSON is a valid device

**cmd\_commands** (*value=None*)

Command for retrieving all commands supported by this device

**Parameters** **value** – the value. If value is None this command send the current config.  
Otherwise it will set it to value

**cmd\_config** (*value=None*)

Command for configuring device Must be overloaded and called by the subclass

**Parameters** **value** – the value. If value is None this command send the current config.  
Otherwise it will set it to value

**cmd\_log** (*value=None*)

Command for configuring logging of the device

**cmd\_poll** (*value=None*)

Command for configuring polling of the device

**cmd\_reset** (*value=None*)

Command for resetting device Must be overloaded (and called) by the subclass

**commands** = {}

The commands available on the device

**config** = {'name': None}

The device's configuration

**do\_poll** ()

Grab the value and return it

**exec\_cmd** (*oid, command, value=None*)

Execute a command

**Parameters**

- **oid** – the oid device
- **command** – the cid device
- **value** – the value

**Returns** a value if the command succeed. None if it fails

**fullname** (*prefix*)

The fullname of the device

**json**

Check that the JSON is a valid device

**log** = False

Should we log this value (in the RasPy Logger)

**name**

The name of the device Must be unique for the instance server.

**new** (*json=None*)

Create a new device and return it

**oid = 'base'**

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

**poll = -1**

The poll value of this device : -1 not pollable, 0 : not poll and other = poll delay in seconds

**subdevices = None**

The subdevices of this device

**template**

The template of the device

**templates = {}**

The templates dictionnary Every device must add an entry for its config Will be used to check the device

**class** `raspy.common.devices.device.Command` (*\*\*kwargs*)

Bases: `object`

A command for a device. Use the same “spirit” as ZWave command classes

**callback = None**

The callback method associated with this command

**from\_json** (*json=None*)

Create the command from JSON

**info = 'info'**

Some information about the command Will be used to represent the value ie in a form, in a graph, ...

**readonly = False**

Is this command readonly ie a sensor

**to\_json** ()

Copy command to JSON

**type = 'List'**

The type of the value Will be used to represent the value ie in a form, in a graph, ...

**value = None**

The value

**writeonly = False**

Is this command writeonly ie a change dimmer command

**class** `raspy.common.devices.device.DeviceRegister`

Bases: `object`

The device register

All devices must register to this register (in main module)

**check** (*json=None*)

Check that the JSON is a valid device

**new** (*\*\*kwargs*)

Create a new device and return it

**register** (*device\_type*)

Register a device\_type under key

**raspy.common.devices.media module** Media devices

**class** `raspy.common.devices.media.MediaCamera` (*\*\*kwargs*)

Bases: `raspy.common.devices.media.MediaDevice`

The camera device object

**new** (*\*\*kwargs*)

Create a new device and return it

**oid** = 'media.camera'

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

**class** `raspy.common.devices.media.MediaDevice` (*\*\*kwargs*)

Bases: `raspy.common.devices.device.BaseDevice`

The sensor device object

**check** (*json=None*)

Check that the JSON is a valid device

**oid** = 'media'

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

**class** `raspy.common.devices.media.MediaTV` (*\*\*kwargs*)

Bases: `raspy.common.devices.media.MediaDevice`

The temperature sensor device object

**new** (*\*\*kwargs*)

Create a new device and return it

**oid** = 'media.tv'

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

#### **raspy.common.devices.sensor module** Sensors devices

**class** `raspy.common.devices.sensor.SensorDevice` (*\*\*kwargs*)

Bases: `raspy.common.devices.device.BaseDevice`

The sensor device object

**check** (*json=None*)

Check that the JSON is a valid device

**oid** = 'sensor'

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

**class** `raspy.common.devices.sensor.SensorTemperature` (*\*\*kwargs*)

Bases: `raspy.common.devices.sensor.SensorDevice`

The temperature sensor device object

**new** (*\*\*kwargs*)

Create a new device and return it

**oid** = 'sensor.temperature'

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

**class** `raspy.common.devices.sensor.SensorWind` (*\*\*kwargs*)

Bases: `raspy.common.devices.sensor.SensorDevice`

The wind sensor device object

**new** (*\*\*kwargs*)

Create a new device and return it

**oid** = 'sensor.wind'

The Object Identifier It should be given by the core team as it can break other devices. Need to define a naming convention : sensor, sensor.temperature, media.camera, ...

## Module contents

### Submodules

#### raspy.common.MDP module

**exception** `raspy.common.MDP.ClientError (value)`

Bases: `raspy.common.MDP.GenericError`

Client side exception

**exception** `raspy.common.MDP.GenericError (value)`

Bases: `exceptions.Exception`

Generic exception

**exception** `raspy.common.MDP.ServerError (value)`

Bases: `raspy.common.MDP.GenericError`

Server side exception

`raspy.common.MDP.logger = <logging.Logger object at 0x2aea67c1c050>`

Majordomo Protocol definitions

`raspy.common.MDP.routing_key (hostname, service)`

#### raspy.common.dynamic module

`raspy.common.dynamic.importCode (code, name, add_to_sys_modules=False)`

#### raspy.common.executive module

**class** `raspy.common.executive.Executive (hostname='localhost', service='executive', broker_ip='127.0.0.1', broker_port=5514)`

Bases: `object`

The Executive mother class for all workers

**todo :**

- bug : can't stop when jobs in queues

**destroy ()**

Wait for threads and destroy contexts.

**get\_instance\_id ()**

Return the instance of the executive

... todo : must be multihost and multithread.

**run ()**

Run the executive

**shutdown ()**

Shutdown executive.

**class** `raspy.common.executive.ExecutiveProcess (executive, executive_name)`

Bases: `multiprocessing.process.Process`

Process executing tasks from a given tasks queue

**run ()**

**shutdown ()**

Method to deactivate the client connection completely.

Will delete the stream and the underlying socket.

**Warning:** The instance MUST not be used after `shutdown ()` has been called.

**Return type** None

## raspy.common.kvcliapi module

kvsimple - simple key-value message class for example applications

Author: Min RK <[benjaminrk@gmail.com](mailto:benjaminrk@gmail.com)>

From : <http://zguide.zeromq.org/py:kvsimple>

```
class raspy.common.kvcliapi.KvPublisherClient (hostname='localhost', broker_ip='127.0.0.1', broker_port=5514)
```

Bases: object

KeyValue Protocol Client API, Python version.

Implements the client defined at <http://zguide.zeromq.org/page:all#Working-with-Subtrees>

From <https://raw.githubusercontent.com/imatix/zguide/master/examples/Python/clonecli4.py>

**destroy ()**

Destroy object

**send** (subtree='subtree', key='key', body='body')

Send the update

```
class raspy.common.kvcliapi.KvSubscriberClient (hostname='localhost', subtree='subtree', broker_ip='127.0.0.1', broker_port=5514, speed=1.0)
```

Bases: object

KeyValue Protocol Client API, Python version.

Implements the client defined at <http://zguide.zeromq.org/page:all#Working-with-Subtrees> From <https://raw.githubusercontent.com/imatix/zguide/master/examples/Python/clonecli4.py>

**destroy ()**

Destroy object

**run ()**

Run the poller

**shutdown ()**

Shutdown the broker.

## raspy.common.kvsimple module

kvsimple - simple key-value message class for example applications

Author: Min RK <[benjaminrk@gmail.com](mailto:benjaminrk@gmail.com)>

From : <http://zguide.zeromq.org/py:kvsimple>

```
class raspy.common.kvsimple.KVMsg (sequence, key=None, body=None)
```

Bases: object

**Message is formatted on wire as 3 frames:**

- frame 0: key (OMQ string)
- frame 1: sequence (8 bytes, network order)



- frame 2: body (blob)

**body** = None

**dump** ()

Dump me to a string"

**key** = None

**classmethod** **recv** (*socket*)

Reads key-value message from socket, returns new kvmsg instance.

**send** (*socket*)

Send key-value message to socket; any empty frames are sent as such.

**sequence** = 0

**store** (*dikt*)

Store me in a dict if I have anything to store

### raspy.common.mdcliapi module

Majordomo Protocol Client API, Python version.

Implements the MDP/Worker spec at <http://rfc.zeromq.org/spec:7>.

Author: Min RK <[benjaminrk@gmail.com](mailto:benjaminrk@gmail.com)> Based on Java example by Arkadiusz Orzechowski

**class** `raspy.common.mdcliapi.MajorDomoClient` (*broker*)

Bases: object

Majordomo Protocol Client API, Python version.

Credits : <https://github.com/imatix/zguide/blob/master/examples/Python/mdcliapi.py>

**broker** = None

**client** = None

**ctx** = None

**destroy** ()

Destroy object

**poller** = None

**reconnect\_to\_broker** ()

Connect or reconnect to broker

**retries** = 5

**send** (*service, request*)

Send request to broker and get reply by hook or crook.

Takes ownership of request message and destroys it when sent. Returns the reply message or None if there was no reply.

**timeout** = 500

**verbose** = False

**class** `raspy.common.mdcliapi.TitanicClient` (*broker\_ip='localhost', broker\_port=5514, poll=1500, ttl=900*)

Bases: object

The titanic client

Credits: <https://github.com/imatix/zguide/blob/master/examples/Python/ticlient.py>

```
request (hostname='localhost', service='worker', data=['mmi.echo'], callback=None, args=(),  
         kwargs={})  
    Request a job for a worker to titanic  
  
run ()  
    Run the client in a loop  
  
send (service, request)  
    Send a Majordomo request directly to worker  
  
shutdown ()  
    Shutdown executive.  
  
status (uuid)  
    Retrieve the status of a work from titanic
```

### **raspy.common.mdwrkapi module**

Majordomo Protocol Worker API, Python version

Implements the MDP/Worker spec at <http://rfc.zeromq.org/spec:7>.

Author: Min RK <[benjaminrk@gmail.com](mailto:benjaminrk@gmail.com)> Based on Java example by Arkadiusz Orzechowski

```
class raspy.common.mdwrkapi.MajorDomoWorker (broker, service)  
    Bases: object  
  
    Majordomo Protocol Worker API, Python version  
  
    Implements the MDP/Worker spec at http://rfc.zeromq.org/spec:7.  
  
    HEARTBEAT_LIVENESS = 5  
  
    broker = None  
  
    ctx = None  
  
    destroy ()  
        Destroy object  
  
    expect_reply = False  
  
    heartbeat = 3500  
  
    heartbeat_at = 0  
  
    liveness = 0  
  
    reconnect = 3500  
  
    reconnect_to_broker ()  
        Connect or reconnect to broker  
  
    recv (reply=None)  
        Send reply, if any, to broker and wait for next request.  
  
    reply_to = None  
  
    send_to_broker (command, option=None, msg=None)  
        Send message to broker.  
  
        . If no msg is provided, creates one internally  
  
    service = None  
  
    shutdown ()  
        Shutdown executive.  
  
    status = True  
        The status of the worker. Should be update by callback in the future
```

```
timeout = 2500
verbose = False
worker = None
```

## raspy.common.runner module

## raspy.common.server module

```
class raspy.common.server.Server (hostname='localhost',      service='worker',      bro-
                                   ker_ip='127.0.0.1', broker_port=5514)
    Bases: raspy.common.executive.Executive, raspy.common.statistics.Statistics
    The generic worker
    From http://zguide.zeromq.org/py:all#header-48
    worker_mmi ()
        Retrieve mmi informations of the worker
```

## raspy.common.statistics module

```
class raspy.common.statistics.SNMP (oid='module.snmp.key', doc='A statistic integer value',
                                     initial=0)
    Bases: object
    Abstract statistic item
    set (value)
        Set a value to the snmp object

class raspy.common.statistics.SNMPCounter (oid='module.snmp.key', doc='A statistic
                                           counter value with overflow', initial=0,
                                           overflow=4294967296)
    Bases: raspy.common.statistics.SNMP
    Long (32bits) with overflow
    set (value=1)
        Add value (default=1) to current value. Also manage overflow.

class raspy.common.statistics.SNMPFloat (oid='module.snmp.key', doc='A statistic float
                                       value', initial=0.0)
    Bases: raspy.common.statistics.SNMP
    Float counter

class raspy.common.statistics.SNMPString (oid='module.snmp.key', doc='A statistic string
                                       value', initial='')
    Bases: raspy.common.statistics.SNMP
    Float counter

class raspy.common.statistics.Statistics
    Bases: object
    The statistics manager
    add_statistic ()
        Add a new statistic to the manager
    remove_statistic (oid)
        Remove a statistic from the manager
    update_statistic (oid='')
        Add a new statistic to the manager
```

**worker\_statistics()**  
Send statistics via mmi

### raspy.common.supervisor module

**class** `raspy.common.supervisor.Supervisor` (*runner=None*)

The worker supervisor

Start executives in separate process see futures Each executive start multiples threads of workers

**todo :**

- bug : can't stop when jobs in queues

**get\_instance\_id()**

Return the instance of the worker : must be multihost and multithread.

**reload()**

Request the workers configuration against the configurator.

Will unregister all workers, stop all timers and ignore all further messages.

**Warning:** The instance MUST not be used after `shutdown()` has been called.

**Return type** None

**run()**

Start the IOLoop instance

**shutdown()**

Shutdown supervisor.

Will unregister all workers, stop all timers and ignore all further messages.

**Warning:** The instance MUST not be used after `shutdown()` has been called.

**Return type** None

**stop\_executives()**

Shutdown executives.

### raspy.common.zhelpers module

Helper module for example applications. Mimics ZeroMQ Guide's zhelpers.h.

`raspy.common.zhelpers.set_id(zsocket)`

Set simple random printable identity on socket

`raspy.common.zhelpers.zpipe(ctx)`

build inproc pipe for talking to threads

mimic pipe used in czmq zthread\_fork.

Returns a pair of PAIRs connected via inproc

## Module contents

### 4.1.2 raspy.servers package

#### Submodules

#### raspy.servers.broker module

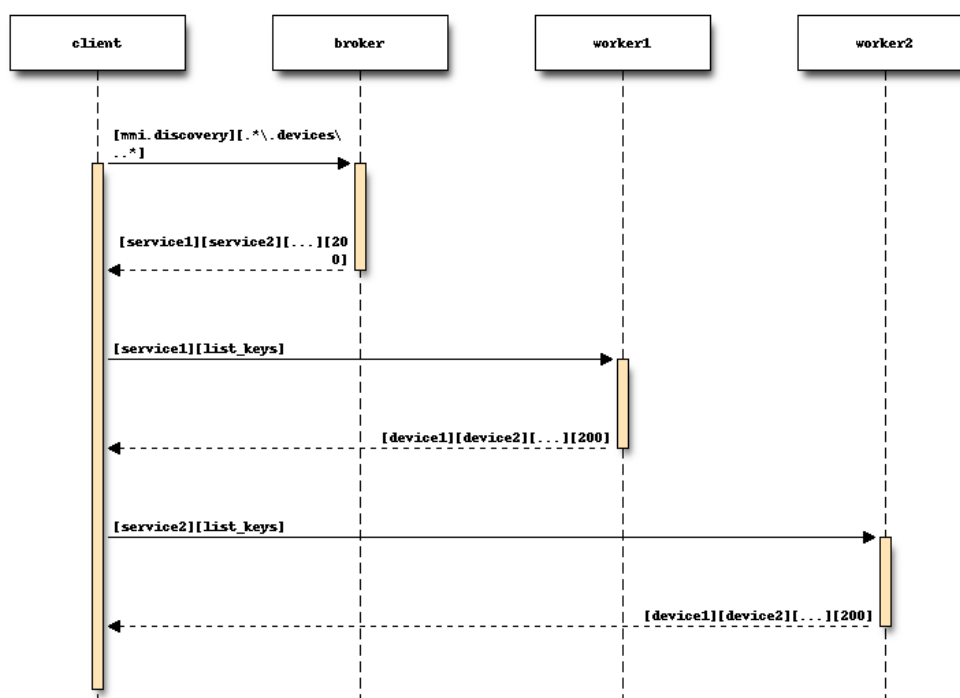
**class** `raspy.servers.broker.Broker` (*hostname='localhost', service='broker', broker\_ip='127.0.0.1', broker\_port=15514*)

Bases: `raspy.common.executive.Executive`

Majordomo Protocol broker and key/value proxy.

#### Discovery process

Here is the way for a client to discover all devices on network



You can do the same for crons and scenarios

**HEARTBEAT\_EXPIRY** = 17500

**HEARTBEAT\_INTERVAL** = 3500

**HEARTBEAT\_LIVENESS** = 5

**INTERNAL\_SERVICE\_PREFIX** = 'mmi.'

**ctx** = None

**delete\_worker** (*worker, disconnect*)

Deletes worker from all data structures, and deletes worker.

**destroy** ()

Disconnect all workers, destroy context.

**dispatch** (*service, msg*)

Dispatch requests to waiting workers as possible

**heartbeat\_at** = None

**poller** = None

**process\_client** (*sender, msg*)  
Process a request coming from a client.

**process\_worker** (*sender, msg*)  
Process message sent to us by a worker.

**purge\_workers** ()  
Look for & kill expired workers.  
  
Workers are oldest to most recent, so we stop at the first alive worker.

**require\_service** (*name*)  
Locates the service (creates if necessary).

**require\_worker** (*address*)  
Finds the worker (creates if necessary).

**run** ()  
Main broker work happens here

**send\_heartbeats** ()  
Send heartbeats to idle workers if it's time

**send\_to\_worker** (*worker, command, option, msg=None*)  
Send message to worker.  
  
. If message is provided, sends that message.

**service\_internal** (*service, msg*)  
Handle internal service according to 8/MMI specification

**services** = None

**shutdown** ()  
Shutdown the broker.

**socket** = None

**waiting** = None

**worker\_waiting** (*worker*)  
This worker is now waiting for work.

**workers** = None

**class** raspy.servers.broker.**Proxy** (*hostname='localhost', service='broker', broker\_ip='\*',  
broker\_port=5514, speed=1.0*)  
Bases: threading.Thread  
The publisher  
**Tree :**

- /event/
- /scenario/
- /device/

from : <http://zguide.zeromq.org/page:all#Working-with-Subtrees>

**run** ()  
Run the proxy

**send\_single** (*key, kvmsg, route*)  
Send one state snapshot key-value pair to a socket

**shutdown** ()  
Shutdown the proxy.

```
class raspy.servers.broker.Route (socket, identity, subtree)

class raspy.servers.broker.Service (name)
    Bases: object
    a single Service
    name = None
    requests = None
    waiting = None

class raspy.servers.broker.Worker (identity, address, lifetime)
    Bases: object
    a Worker, idle or active
    address = None
    expiry = None
    identity = None
    service = None
```

### raspy.servers.core module

```
class raspy.servers.core.Core (hostname='localhost', service='core', broker_ip='127.0.0.1',  
                               broker_port=5514)
    Bases: raspy.common.server.Server
```

The Core server

- Cron

- Generate events in the publisher

- Scenario

- a scenario can run in background at startup (ie thermostat) or fired by an event (ie cron, sun is down, temperature is under 0°C)
- a scenario can be a loop so it must be launch in a separate thread : start filling, loop until water level is ok : need to call `self._stopevent.isSet()` in it so that the tread can shutdown.
- look for updates in entries list (cron, sensors, variables in the publisher) : a list mapped in friendly user's names (using store)
- it can publish some values with publisher
- do some work using inline code python :
- send commands to devices, cron jobs, start other scenario, update some variables in publisher
- we can export/import scenarios : share with friends

- NTP / Sytem Time / RTC Sync

- sync from ntp to rtc
- sync from trc to system : using sudo with no password

**worker\_cron** ()

Create a worker to handle cron requests

**worker\_scenario** ()

Create a worker to handle scenario's requests

**worker\_scenarios** ()

Create a worker to handle scenarios requests (list\_keys, ...)

**class** `raspy.servers.core.Cron`

Bases: `object`

A cron job

**aps\_job** = `None`

**class** `raspy.servers.core.CronManager`

Bases: `object`

The manager of cron job

**jobs** = `{}`

**class** `raspy.servers.core.Scenario` (*name='scenar1', publisher=None*)

Bases: `threading.Thread`

A scenario

**code** = `None`

The code we must exec

**conf** = `{}`

The configuration of the scenario

**entries** = `{}`

The entries we must look at for an event driven scenario

**fire** ()

Check if the scenario must be fired using entries and that is not already running. If so, call `self.run()`

**Returns** True if the thread must be launch (`self.run()`), False otherwise

**Return type** boolean

**load** (*store*)

Load the scenario from titanic store

**Parameters** *store* – the store to get info from

**Type** `titani_store`

**Returns** True if the scenario was loaded from store

**Return type** boolean

**run** ()

Run the scenario

**running** = `False`

Is the scenario running

**shutdown** ()

Shutdown the scenario

**store** (*store*)

Store the scenario to titanic store

**class** `raspy.servers.core.ScenarioManager` (*publisher=None*)

Bases: `object`

The manager of scenarios

<http://etutorials.org/Programming/Python+tutorial/Part+III+Python+Library+and+Extension+Modules/Chapter+13.+Control>

<http://lucumr.pocoo.org/2011/2/1/exec-in-python/> <http://late.am/post/2012/04/30/the-exec-statement-and-a-python-mystery>

**add** (*name='scenar1', entries={}, code=None, conf={}*)

Add a scenario

**delete** (*name='scenar1'*)

Delete a scenario



**list()**  
Return all scenarios with conf, entries, ... as json dict

**list\_keys()**  
Return all scenarios key (=name) ... as json list

**load(store)**  
Load the scenarios from titanic store

store keys :

- scenario.main.conf : a json dict for configuration of scenario
- scenario.main.keys : a json list of the scenario's names
- scenario.key1.conf : a json dict for configuration of scenario key1
- scenario.key1.entries : a json dict of entries of scenario key1
- scenario.key1.code : a json string of code of scenario key1

**scenarios = {}**  
The scenarios

**shutdown()**  
Shutdown the scenario manager

**store(store)**  
Store the scenarios to titanic store

**update(name='scenar1', entries={}, code=None, conf={})**  
Update a scenario

### raspy.servers.fake module

**class** `raspy.servers.fake.Fake` (*hostname='localhost', service='fake', broker\_ip='127.0.0.1',  
broker\_port=5514*)  
Bases: `raspy.common.server.Server`

A fake server to test RasPy

- we must developp “real” fake device : ie a temperature sensors must not send random values
- a cyclic sensor : parameters : cycle length, min, max and unit. Will do cycle from min temp to max temp (at cycle/2) and fall back tp min temp at end of if
- a linear sensor
- 

**worker\_devices()**  
Create a worker to handle devices requests

### raspy.servers.logger module

**class** `raspy.servers.logger.CompressedFile` (*logfile='log1.log', mode='a+', compresslevel=1*)

Bases: `object`

A compressed log file

**close()**

**log(level, message)**

**open()**

**readlines(start=0, end=-1, limit=20)**  
Return lines from a file

**rotate ()**

**class** `raspy.servers.logger.Graph` (`logfile='log1.log'`, `mode='a+'`, `compresslevel=1`)

Bases: `object`

A graph

**class** `raspy.servers.logger.Logger` (`hostname='localhost'`, `service='logger'`,  
`broker_ip='127.0.0.1'`, `broker_port=5514`,  
`data_dir='.raspy'`)

Bases: `raspy.common.server.Server`

The logger server

Will log data, events, ... in files, rrd, ... It can be called via the worker or it can log data in pthe publisher

What to log :

- numeric : data for a device. We must be able to aggregate data from multiple devices ( ie a graph for inside/outside temperature)
- text events : door open, notification, server log, ...
- images for webcam ??? large amount of data, not a good idea to transport it using zmq. A ftp client which sync to a server.

How to log :

- RRDtool for numerical values:
  - <http://sefault.in/2010/03/python-rrdtool-tutorial/>
  - we must use rrcached : <https://github.com/pbanaszekiewicz/python-rrdtool/blob/master/rrdtool-1.4.7/etc/rrdcached-init>
- Compressed text files for log :
- stream compression : <http://pymotw.com/2/bz2/index.html#module-bz2>
- file rotation
- <http://pymotw.com/2/gzip/>
- [http://www.tutorialspoint.com/python/python\\_files\\_io.htm](http://www.tutorialspoint.com/python/python_files_io.htm)

How to distribute graph, text logs

- via a local directory. The http server will server them to the final client => raspyweb and the logger must be launch on the same server : NO
- via sync : add a ftp server service (in python or a a package : vsftp with xinet or in standalone) : Use a lot of bandwidth, How to transfer log : every minutes ??? : NO
- add a simpleHttp server here which will serve file to the proxy (apache ? so that it will cache them).
- /graph/graphkey/day, /graph/graphkey/week, /graph/graphkey/month, /graph/graphkey/year
- /log/logkey

**graphes = {}**

**shutdown ()**

Shutdown executive.

**worker\_graph ()**

Create a worker to handle graph requests

**worker\_log()**

Create a worker to handle logger requests

**class** `raspy.servers.logger.RrdCachedClient` (`socket_path='/var/run/rrdcached.sock'`)  
 demonstration class only - coded for clarity, not efficiency

**shutdown()**

Shutdown the client

**update** (`rrdfile`, `rrdtime`, `msg`)

**class** `raspy.servers.logger.ThreadedTCPRequestHandler` (`request`, `client_address`,  
`server`)

Bases: `SocketServer.BaseRequestHandler`

The request handler

**handle()**

**class** `raspy.servers.logger.ThreadedTCPServer` (`server_address`, `RequestHandlerClass`,  
`bind_and_activate=True`)

Bases: `SocketServer.ThreadingMixIn`, `SocketServer.TCPServer`

The simple HTTP server Be careful ... no security at all

**logger = None**

The logger used to retrieve data\_dir, log and graph dictionnaires

**raspy.servers.onewire module**

**class** `raspy.servers.onewire.OneWire` (`hostname='localhost'`, `service='onewire'`, `bro-`  
`ker_ip='127.0.0.1'`, `broker_port=5514`, `de-`  
`vices_dir='/sys/bus/w1/devices'`)

Bases: `raspy.common.server.Server`

The OneWire server

**Configuration**

You need to load kernel module :

```
sudo vim /etc/modules
```

```
# /etc/modules: kernel modules to load at boot time.
#
# This file contains the names of kernel modules that should be loaded
# at boot time, one per line. Lines beginning with "#" are ignored.
# Parameters can be specified after the module name.
w1-therm
w1-gpio pullup=1
i2c-dev
i2c-bcm2708
spi-bcm2708
snd-bcm2835
```

And check that blacklist is correct :

```
sudo vim /etc/modprobe.d/raspi-blacklist.conf
```

```
# blacklist spi and i2c by default (many users don't need them)
blacklist spi-bcm2708
blacklist i2c-bcm2708
blacklist snd-soc-pcm512x
blacklist snd-soc-wm8804
```

At last, we must load the module in init script sothat we don't need to update this.

From <https://www.modmypi.com/blog/ds18b20-one-wire-digital-temperature-sensor-and-the-raspberry-pi>

**worker\_devices()**

Create a worker to handle devices requests

### raspy.servers.sync module

**class** `raspy.servers.sync.Sync` (*hostname='localhost', service='sync', broker\_ip='127.0.0.1', broker\_port=5514*)

Bases: `raspy.common.server.Server`

The Sync server

Sync data from a or many folders (which we can configure via zmq) to a remote server.

Used by logger, camera, ...

Sync can be sheduled ( ie every day, ...) or lauchn on demand via worker We can sync a file or a directory

**run()**

Sync data in a separate thread

**worker\_sync()**

Create a worker to handle sync requests

### raspy.servers.titanic module

**class** `raspy.servers.titanic.Titanic` (*hostname='localhost', service='titanic', broker\_ip='127.0.0.1', broker\_port=5514, data\_dir='/tmp/raspy'*)

Bases: `raspy.common.executive.Executive`

The Titanic helper

Also integrates a store for keys/values

**From** <http://zguide.zeromq.org/py:all#Disconnected-Reliability-Titanic-Pattern>

<http://zguide.zeromq.org/py:all#Service-Oriented-Reliable-Queuing-Majordomo-Pattern>

<https://github.com/imatix/zguide/tree/master/examples/Python>

**reply\_filename(uuid)**

Returns freshly allocated reply filename for given UUID

**request\_filename(uuid)**

Returns freshly allocated request filename for given UUID

**run()**

Run the hub

**service\_success(client, uuid)**

Attempt to process a single request, return True if successful

**store\_filename(service)**

Returns store filename for given service

**titanic\_close()**

Create a worker to handle titanic.close

titanic.close: confirm that a reply has been stored and processed.

**titanic\_reply()**

Create a worker to handle titanic.service

titanic.reply: fetch a reply, if available, for a given request UUID.

**titanic\_request(pipe)**

Create a worker to handle titanic.request

titanic.request: store a request message, and return a UUID for the request.

`titanic_store()`

Create a worker to handle store services

## Module contents

## 4.2 Module contents



---

## raspyweb package

---

### 5.1 Subpackages

#### 5.1.1 raspyweb.app package

##### Subpackages

**raspyweb.app.ajax package**

##### Submodules

**raspyweb.app.ajax.constants module** The main views

**raspyweb.app.ajax.models module** The main views

**raspyweb.app.ajax.views module** The main views

`raspyweb.app.ajax.views.devices()`

`raspyweb.app.ajax.views.home()`

`raspyweb.app.ajax.views.mmi()`

##### Module contents

##### Submodules

**raspyweb.app.views module**

The main views

`raspyweb.app.views.home()`

`raspyweb.app.views.not_found(error)`

##### Module contents

RasPyWeb app module.

Use templates : <https://pythonhosted.org/Flask-Themes/>

```
raspyweb.app.install_secret_key(app, filename='secret_key')
```

Configure the SECRET\_KEY from a file in the instance directory.

If the file does not exist, print instructions to create it from a shell with a random key, then exit.

## 5.2 Submodules

## 5.3 raspyweb.config module

Storing all the module configurations. Here, the database is setup to use SQLite, because it's a very convenient dev env database. Most likely /config.py won't be a part of your repository and will be different on your test and production servers.

- `_basedir` is a trick for you to get the folder where the script runs
- `DEBUG` indicates that it is a dev environment, you'll get the very helpful error page from flask when an error occurs.
- `SECRET_KEY` will be used to sign cookies. Change it and all your users will have to login again.
- `ADMINS` will be used if you need to email information to the site administrators.
- `SQLALCHEMY_DATABASE_URI` and `DATABASE_CONNECT_OPTIONS` are SQLAlchemy connection options (hard to guess)
- `THREAD_PAGE` my understanding was `2/core...` might be wrong :)
- `CSRF_ENABLED` and `CSRF_SESSION_KEY` are protecting against form post fraud
- `RECAPTCHA_*` WTForms comes with a RecaptchaField ready to use... just need to go to recaptcha website and get your public and private key.

Credits : <https://github.com/mitsuhiko/flask/wiki/Large-app-how-to>

```
class raspyweb.config.Config
```

```
    Bases: object
```

```
    ADMINS = frozenset(['bibi21000@gmail.com'])
```

```
    BROKER_IP = '127.0.0.1'
```

```
    BROKER_PORT = 5514
```

```
    CSRF_ENABLED = True
```

```
    CSRF_SESSION_KEY = 'somethingimpossibletoguess'
```

```
    DATABASE_URI = 'sqlite://:memory:'
```

```
    DEBUG = False
```

```
    RECAPTCHA_OPTIONS = {'theme': 'white'}
```

```
    RECAPTCHA_PRIVATE_KEY = '6LeYIbsSAAAAAJezaIq3Ft_hSTo0YtyeFG-JgRtu'
```

```
    RECAPTCHA_PUBLIC_KEY = '6LeYIbsSAAAAACRPillxA7wvXjIE411PfdB2gt2J'
```

```
    RECAPTCHA_USE_SSL = False
```

```
    SECRET_KEY = 'This string will be replaced with a proper key in production.'
```

```
    TESTING = False
```

```
    THREADS_PER_PAGE = 8
```

```
class raspyweb.config.DevelopmentConfig
```

```
    Bases: raspyweb.config.Config
```

```
    DEBUG = True
```



```
TESTING = True

class raspyweb.config.ProductionConfig
    Bases: raspyweb.config.Config

    DATABASE_URI = 'mysql://user@localhost/foo'

class raspyweb.config.TestingConfig
    Bases: raspyweb.config.Config

    TESTING = True
```

## 5.4 raspyweb.run module

Used to launch the web server.

Credits : <https://github.com/mitsuhiko/flask/wiki/Large-app-how-to>

```
raspyweb.run.main()
```

## 5.5 raspyweb.shell module

will allow you to get a console and enter commands within your flask environment. Maybe not as nice as debugging with pdb, but always useful (when you will initialize your database).

Credits : <https://github.com/mitsuhiko/flask/wiki/Large-app-how-to>

## 5.6 Module contents



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