
MONK Testframework Documentation

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Intro

Using MONK you can write tests like you would write unit tests, just that they are able to interact with your embedded system.

Let's look at an example. In the following example we have an embedded system with a serial terminal and a network interface. We want to write a test, which checks whether the network interface receives correct information via dhcp.

The test case written with nosetests:

```
import nose.tools as nt

import monk_tf.conn as mc
import monk_tf.dev as md

def test_dhcp():
    """ check whether dhcp is implemented correctly
    """
    # setup
    device = md.Device(mc.SerialConn('/dev/ttyUSB1', 'root', 'sosecure'))
    # exercise
    device.cmd('dhcpc -i eth0')
    # verify
    ifconfig_out = device.cmd('ifconfig eth0')
    nt.ok_('192.168.2.100' in ifconfig_out)
```

Even for non python programmers it should be not hard to guess, that this test will connect to a serial interface on /dev/ttyUSB1, send the shell command dhcpc to get a new IP adress for the eth0 interface, and in the end it checks whether the received IP address that the tester would expect. No need to worry about connection handling, login and session handling.

For more information see the [API Docs](#).

monk_tf package

monk_tf.fixture module

Instead of creating `Device` and `ConnectionBase` objects by yourself, you can also choose to put corresponding data in a separate file and let this layer handle the object construction and destruction for you. Doing this will probably make your test code look more clean, keep the number of places where you need to change something as small as possible, and enables you to reuse data that you already have described.

A hello world test with a fixture looks like this:

```
import nose
from monk_tf import fixture

def test_hello():
    ''' say hello
    '''
    with fixture.Fixture(__file__) as (fix, dev):
        # set up
        expected_out = "hello"
        # execute
        retcode, out = dev.cmd('echo "hello"')
        # assert
        nose.tools.eq_(expected_out, out)
        # tear down - automatically done by Fixture
```

Everything is handled in a context that manages the fixture and your *target device*. The Fixture is automatically looking for `fixture.cfg` in the current directory or its parents. The `fixture.cfg` contains the data that is necessary to build your test fixture. This includes connection data like IP, user name, and password. MONK separates this data from the code, that the tests can be executed on different *target devices* without changing the tests themselves. The format of these files is quite close to ini files, just with an added layer of depth, enabling sections to contain other sections if the inner section is surrounded by an additional set of square brackets (`[]`).

An example Xini data file might look like this:

```
[device1]
    type=Device
    [[serial1]]
        type=SerialConnection
        port=/dev/ttyUSB1
        user=example
        password=secret
```

As you can see it looks like an *INI* file. There are sections, consisting of a title enclosed in squared brackets (`[]`) and

lists of properties, consisting of key-value pairs separated by equality signs (=). The unusual part is that the section *serial1* is surrounded by two pairs of squared brackets ([]). This is the specialty of this format indicating that *serial1* is a subsection of *device1* and therefore is a nested section. This nesting can be done unlimited, by surrounding a section with more and more pairs of squared brackets ([]) according to the level of nesting intended. In this example *serial1* belongs to *device1* and the types indicate the corresponding *MONK* object to be created.

Classes

exception `monk_tf.fixture.AFixtureException`

Bases: `monk_tf.general_purpose.MonkException`

Base class for exceptions of the fixture layer.

If you want to make sure that you catch all exceptions that are related to this layer, you should catch *AFixtureExceptions*. This also means that if you extend this list of exceptions you should inherit from this exception and not from *Exception*.

exception `monk_tf.fixture.AParseException`

Bases: `monk_tf.fixture.AFixtureException`

Base class for exceptions concerning parsing errors.

exception `monk_tf.fixture.CantParseException`

Bases: `monk_tf.fixture.AFixtureException`

is raised when a Fixture cannot parse a given file.

class `monk_tf.fixture.FileHandler(name, sink, target, format, level)`

Bases: `monk_tf.fixture.LogHandler`

pre_register()

class `monk_tf.fixture.Fixture(call_location, name=None, fixture_locations=None, parsers=None)`

Bases: `monk_tf.general_purpose.MonkObject`

Creates *MONK* objects based on dictionary like objects.

Use this class if you want to separate the details of your *MONK* objects from your code. Also use it if you want to write tests with it, as described above.

default_fixturelocations()

this is preferred over a list/dict

because some paths need to be set dynamically!

default_parsers()

firstdev

parse_conns (*name, sectype, section*)

parse_device (*name, sectype, section*)

parse_filehandler (*name, sectype, section*)

parse_logging (*name, sectype, section*)

parse_serialconn (*name, sectype, section*)

parse_sshconn (*name, sectype, section*)

parse_streamhandler (*name, sectype, section*)

parsers

read (*sources*)

Read more data, either as a file name or as a parser.

Parameters *sources* – a iterable of data sources; each is either a file name or a `AParser` child class instance.

Returns *self*

tear_down ()

Can be used for explicit destruction of managed objects.

This should be called in every *test case* as the last step.

update (***kwargs*)

update the externally manageable data of this fixture object

class `monk_tf.fixture.LogHandler` (*name, sink, target, format, level*)

Bases: `monk_tf.general_purpose.MonkObject`

config_subs (*txt, subs=None*)

replace the strings in the config that we have reasonable values for

post_register ()

pre_register ()

register ()

class `monk_tf.fixture.LogManager` (***config*)

Bases: `monk_tf.general_purpose.MonkObject`

managing configuration and setup of logging mechanics

Might strongly interact with your nose config or similar.

exception `monk_tf.fixture.NoDeviceException`

Bases: `monk_tf.fixture.AFixtureException`

is raised when a `:py:clas:~monk_tf.fixture.Fixture` requires a device but has none.

exception `monk_tf.fixture.NoDevicesDefinedException`

Bases: `monk_tf.fixture.AFixtureException`

is raised when we found out that there are no devices.

Currently it makes no sense to use a fixture without devices.

exception `monk_tf.fixture.NoDevsChosenException`

Bases: `monk_tf.fixture.AFixtureException`

If the `use_devs` attribute is not set this is raised

exception `monk_tf.fixture.NoPropsException`

Bases: `monk_tf.fixture.AFixtureException`

is raised when

exception `monk_tf.fixture.NoSectypeException`

Bases: `monk_tf.fixture.AFixtureException`

If no name can be derived from parsing a section

class `monk_tf.fixture.StreamHandler` (*name, sink, target, format, level*)

Bases: `monk_tf.fixture.LogHandler`

pre_register ()

exception `monk_tf.fixture.UnknownTypeException`

Bases: `monk_tf.fixture.AFixtureException`

Handler Type was not recognized

exception `monk_tf.fixture.WrongNameException`

Bases: `monk_tf.fixture.AFixtureException`

is raised when no devs with a given name could be found.

monk_tf.dev module

This module implements device handling. Using the classes from this module you can abstract a complete *target device* in a single object. On instantiation you give it some connections and then (theoretically) let the device handle the rest.

Example:

```
import monk_tf.dev as md
import monk_tf.conn as mc
# create a device with a ssh connection and a serial connection
d=md.Device(
    mc.SshConn('192.168.2.100', 'tester', 'secret'),
    mc.SerialConn('/dev/ttyUSB2', 'root', 'muchmoresecret'),
)
# send a command (the same way as with connections)
return_code, output = d.cmd('ls -al')
print output
[...]
```

exception `monk_tf.dev.ADeviceException`

Bases: `monk_tf.general_purpose.MonkException`

Base class for exceptions of the device layer.

class `monk_tf.dev.Device(*args, **kwargs)`

Bases: `monk_tf.general_purpose.MonkObject`

is the API abstraction of a *target device*.

close_all()

loop through all connections calling `close()`.

cmd(`msg`, `expect=None`, `timeout=30`, `login_timeout=None`, `do_retcode=True`, `fallback_conn=None`, `conn=None`)

Send a *shell command* to the *target device*.

Parameters

- **msg** – the *shell command*.
- **expect** – if you don't expect a prompt in the end but something else, you can add a regex here.
- **timeout** – when command should return without finding what it's looking for in the output. Will raise a **:py:exception:pexpect.Timeout** Exception.
- **do_retcode** – should this command retrieve a returncode
- **fallback_conn** – use this connection to reboot command.
- **conn** – the name of the connection that should be used for this command.

Returns *returncode*, *standard output* of the shell command

cp (*src_path*, *trgt_path*)
send files via scp to target device

Parameters

- **src_path** – the path to the file on the host machine
- **trgt_path** – the path of the file on the target machine

eval_cmd (*msg*, *timeout=None*, *expect=None*, *do_retcode=True*)
apply the same method from the first connection

firstconn

wait_for (*msg*, *retries=3*, *sleep=5*, *timeout=10*)
apply the same method from the first connection

class `monk_tf.dev.PromptReplacement`

Bases: `object`

should be replaced by each connection's own prompt.

classmethod **replace** (*c*, *expect*)
this is an awful workaround...

exception `monk_tf.dev.UpdateFailedException`

Bases: `monk_tf.dev.ADeviceException`

is raised if an update didn't get finished or was rolled back.

exception `monk_tf.dev.WrongNameException`

Bases: `monk_tf.dev.ADeviceException`

is raised when no connection with a given name could be found.

monk_tf.conn module

This module implements connection handling. Using the classes from this module you can connect directly to a *target device* via serial or ssh. Example:

```
import monk_tf.conn as mc
# create a serial connection
serial=mc.SerialConn(name="ser1", port="/dev/ttyUSB3", user="tester", pw="test")
# create a ssh connection
ssh=mc.SshConn(name="ssh1", host="192.168.2.123", user="tester", pw="test")
# send a command
print serial.cmd("ls -al")
[...]
# send a command
ssh.cmd("ls -al")
[...]
```

exception `monk_tf.conn.AConnectionException`

Bases: `monk_tf.general_purpose.MonkException`

Base class for Exceptions from this module

exception `monk_tf.conn.BccException`

Bases: `monk_tf.conn.AConnectionException`

is raised to explain some BCC behaviour

exception `monk_tf.conn.CantCreateConnException`

Bases: `monk_tf.conn.AConnectionException`

is raised when even several attempt were not able to create a connection.

class `monk_tf.conn.Capture` (*handle=None*)

Bases: `object`

a helper class

that supports `ConnectionBase` in handling Terminal special chars.

draw (*ch, **flags*)

linefeed ()

tab ()

exception `monk_tf.conn.CmdFailedException`

Bases: `monk_tf.conn.AConnectionException`

is raised in an `eval_cmd()` request if the returncode was `!= 0`. The returncode can be parsed from the Exception's message.

class `monk_tf.conn.ConnectionBase` (*name, target, user, pw, default_timeout=None, first_prompt_timeout=None*)

Bases: `monk_tf.general_purpose.MonkObject`

is the base class for all connections.

Don't instantiate this class directly.

This class implements the behaviour of `cmd()` interactions, makes sure you get logged in etc.

Extending this class requires to implement `_get_exp()` and `_login()`.

close ()

close the connection and get rid of the inner objects

cmd (*msg, timeout=None, expect=None, do_retcode=True*)

send a shell command and retrieve its output.

Parameters

- **msg** – the shell command
- **timeout** – how long we wait for expect; if None is set to `self.default_timeout`
- **expect** – a list of things to expect, e.g. output strings
- **do_retcode** – boolean which says whether or not a returncode should be retrieved.

eval_cmd (*msg, timeout=None, expect=None, do_retcode=True*)

evaluate `cmd`'s returncode and therefore don't return it

exp

the pexpect object - Don't bother with this if you don't know what it means already. Really!

expect_prompt (*timeout=None*)

enter + look in the output for what is currently set as `self.prompt`

wait_for (*msg, retries=3, sleep=5, timeout=20*)

repeatedly send shell command until output is found

Parameters

- **msg** – the shell command that should be executed
- **retries(3)** – how often should we try it. should be at least 1, otherwise the loop is not executed.
- **sleep(5)** – the time to wait between requests
- **timeout(20)** – the timeout used for every cmd() request

wait_for_prompt (*timeout=-1*)

this method continuously retries to get a working connection

(by means of self.expect_prompt()) and raises an exception otherwise

Parameters **timeout** – how long we retry

exception `monk_tf.conn.NoBCCException`

Bases: `monk_tf.conn.BccException`

is raised when the BCC class does not find the drbcc tool needed for execution.

exception `monk_tf.conn.NoRetcodeException`

Bases: `monk_tf.conn.AConnectionException`

is raised when the output doesn't contain a retcode for unknown reasons.

exception `monk_tf.conn.OutputParseException`

Bases: `monk_tf.conn.AConnectionException`

is raised when cmd output cannot be parsed to utf8 for further processing

exception `monk_tf.conn.RetriesExceededException`

Bases: `monk_tf.conn.AConnectionException`

when trying something repeatedly didn't succeed but a more specific reason is not available

class `monk_tf.conn.SerialConn` (*name, port, user, pw, prompt='r?n?[^n]*#', default_timeout=None, first_prompt_timeout=None, speed=115200*)

Bases: `monk_tf.conn.ConnectionBase`

implements a serial connection.

port

prompt

class `monk_tf.conn.SshConn` (*name, host, user, pw, prompt=None, default_timeout=None, force_password=True, first_prompt_timeout=None, login_timeout=10*)

Bases: `monk_tf.conn.ConnectionBase`

implements an ssh connection.

close ()

cp (*src_path, trgt_path, retry=5, sleep=5, timeout=10*)

send files via scp to target device

Parameters

- **src_path** – the path to the file on the host machine
- **trgt_path** – the path of the file on the target machine

expect_prompt (*timeout=None*)

host

prompt

exception `monk_tf.conn.TimeoutException`

Bases: `monk_tf.conn.AConnectionException`

is raised if retrying something was not successful until its timeout

class `monk_tf.conn.pxsshWorkaround` (*timeout=30, maxread=2000, searchwindowsize=None, logfile=None, cwd=None, env=None, echo=True*)

Bases: `pexpect.pxssh.pxssh`

just to add that `echo=False`

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