



# **Red Hat OpenStack Platform 10**

## **OpenStack Integration Test Suite Guide**

Introduction to the OpenStack Integration Test Suite



# Red Hat OpenStack Platform 10 OpenStack Integration Test Suite Guide

---

Introduction to the OpenStack Integration Test Suite

OpenStack Team  
rhos-docs@redhat.com

## Legal Notice

Copyright © 2018 Red Hat, Inc.

The text of and illustrations in this document are licensed by Red Hat under a Creative Commons Attribution–Share Alike 3.0 Unported license ("CC-BY-SA"). An explanation of CC-BY-SA is available at

<http://creativecommons.org/licenses/by-sa/3.0/>

. In accordance with CC-BY-SA, if you distribute this document or an adaptation of it, you must provide the URL for the original version.

Red Hat, as the licensor of this document, waives the right to enforce, and agrees not to assert, Section 4d of CC-BY-SA to the fullest extent permitted by applicable law.

Red Hat, Red Hat Enterprise Linux, the Shadowman logo, JBoss, OpenShift, Fedora, the Infinity logo, and RHCE are trademarks of Red Hat, Inc., registered in the United States and other countries.

Linux ® is the registered trademark of Linus Torvalds in the United States and other countries.

Java ® is a registered trademark of Oracle and/or its affiliates.

XFS ® is a trademark of Silicon Graphics International Corp. or its subsidiaries in the United States and/or other countries.

MySQL ® is a registered trademark of MySQL AB in the United States, the European Union and other countries.

Node.js ® is an official trademark of Joyent. Red Hat Software Collections is not formally related to or endorsed by the official Joyent Node.js open source or commercial project.

The OpenStack ® Word Mark and OpenStack logo are either registered trademarks/service marks or trademarks/service marks of the OpenStack Foundation, in the United States and other countries and are used with the OpenStack Foundation's permission. We are not affiliated with, endorsed or sponsored by the OpenStack Foundation, or the OpenStack community.

All other trademarks are the property of their respective owners.

## Abstract

This guide provides instructions to install, configure and manage the OpenStack Integration Test Suite in a Red Hat OpenStack Platform environment.

---

## Table of Contents

<b>PREFACE</b> .....	<b>3</b>
<b>CHAPTER 1. INTRODUCTION</b> .....	<b>4</b>
<b>CHAPTER 2. OPENSTACK INTEGRATION TEST SUITE TESTS</b> .....	<b>5</b>
2.1. SCENARIO TESTS .....	5
2.2. API TESTS .....	5
<b>CHAPTER 3. INSTALLING THE OPENSTACK INTEGRATION TEST SUITE</b> .....	<b>6</b>
3.1. USING THE DIRECTOR .....	6
3.2. PREPARING A MANUAL INSTALLATION .....	6
3.3. INSTALLING THE OPENSTACK INTEGRATION TEST SUITE PACKAGES .....	7
3.3.1. List of Tempest Plug-in Packages .....	7
<b>CHAPTER 4. CONFIGURING THE OPENSTACK INTEGRATION TEST SUITE</b> .....	<b>9</b>
4.1. CREATING A WORKSPACE .....	9
4.2. VERIFYING YOUR TEMPEST CONFIGURATION .....	9
4.3. CHANGING THE LOGGING CONFIGURATION .....	10
4.4. CONFIGURING MICROVERSION TESTS .....	10
<b>CHAPTER 5. USING OSTESTR TO RUN TEMPEST</b> .....	<b>11</b>
5.1. RUNNING SMOKE TESTS .....	11
5.2. RUNNING SPECIFIC TESTS USING WHITELIST FILES .....	11
5.3. SKIPPING TESTS USING BLACKLIST FILES .....	12
5.4. RUNNING TESTS IN PARALLEL CONCURRENTLY, OR SERIALY .....	12
<b>CHAPTER 6. CLEANING TEMPEST RESOURCES</b> .....	<b>13</b>
6.1. PERFORMING A CLEAN UP .....	13
6.2. PERFORMING A DRY RUN .....	13
6.3. DELETING TEMPEST OBJECTS .....	13



# PREFACE

This guide provides instructions to install, configure and manage the OpenStack Integration Test Suite in a Red Hat OpenStack Platform environment.

## CHAPTER 1. INTRODUCTION

As OpenStack consists of many different projects, it is important to test their interoperability within your OpenStack cluster. The OpenStack Integration Test Suite (tempest) automates the integration testing of your Red Hat OpenStack Platform deployment. Running tests ensures your cluster is working as expected, and can also provide early warning of potential problems, especially after an upgrade. The Integration Test Suite contains tests for OpenStack API validation and scenario testing, as well as unit testing for self-validation. It performs black box testing using the OpenStack public APIs, with **ostestr** as the test runner.



## CHAPTER 2. OPENSTACK INTEGRATION TEST SUITE TESTS

The OpenStack Integration Test Suite has many applications. It acts as a gate for commits to the OpenStack core projects, it can stress test to generate load on a cloud deployment, and it can perform CLI tests to check the response formatting of the command line. However, the functionality that we are concerned with are the scenario tests and API tests. These tests are run against your OpenStack cloud deployment. The following sections briefly describe each of these tests and how you can implement them.

### 2.1. SCENARIO TESTS

Scenario tests simulate a typical end user action workflow to test the integration points between services. The testing framework conducts the set up, tests the integration between services, and then it is torn down. You should tag the tests with which services they relate to, to make it clear which client libraries the test uses. A scenario is based on a use case, for example:

- Upload an image to the Image Service
- Deploy an instance from the image
- Attach a volume to the instance
- Create a snapshot of the instance
- Detach the volume from the instance

### 2.2. API TESTS

API tests validate the OpenStack API. Tests use the OpenStack Integration Test Suite implementation of the Openstack API. Both valid and invalid JSON can be used to make sure error responses are valid. Tests can be run independently, and do not rely on the state left by the previous test.

## CHAPTER 3. INSTALLING THE OPENSTACK INTEGRATION TEST SUITE

This section describes how to install the OpenStack Integration Test Suite using either the director or a manual installation.

### 3.1. USING THE DIRECTOR

Edit `/home/stack/undercloud.conf`. By default, `enable_tempest` is set to `false`. Change this to `true`:

```
enable_tempest = true
```

You are now ready to install the tempest packages and plug-ins, described in [Section 3.3, “Installing the OpenStack Integration Test Suite Packages”](#).

### 3.2. PREPARING A MANUAL INSTALLATION

To run the OpenStack Integration Test Suite, you need to first install the necessary packages and create a configuration file that will tell the Integration Test Suite where to find the various OpenStack services and other testing behaviour switches.

On the controller node, as a root user, create a virtual machine named **tempest**. This machine must run Red Hat Enterprise Linux 7.3 or greater; it also needs to be able to reach the cloud, but it does not have to be part of the cloud. For more information, see [Creating Guests with Virt-Manager](#).

In addition, before installing the OpenStack Integration Test Suite, the following networks are required within your Red Hat OpenStack Platform environment:

- An external network that can provide a floating IP address.
- A private network.
- These networks must be connected through a router.

1. Create the private network:

```
$ openstack network create _<network_name>_ --share
$ openstack subnet create _<subnet_name>_ --subnet-range
  _<address/prefix>_
$ openstack router create _<router_name>_
$ openstack router add subnet _<router_name>_ _<subnet_name>_ --
  network _<network_name>_
```

2. Create the public network:

```
$ openstack network create _<network_name>_ --external \
  --provider-network-type flat
$ openstack subnet create _<subnet_name>_ --subnet-range
  _<address/prefix>_ \
  --gateway _<default_gateway>_ --no-dhcp --network
  _<network_name>_
$ openstack router set _<router_name>_ --external_gateway
  _<public_network_name>_
```

```
$ neutron router-gateway-set _<router_name>_ _<network_name>_
```

- Create the required keystone roles:

```
$ openstack role create swiftoperator
$ openstack role create heat_stack_owner
```

You are now ready to install and configure the OpenStack Integration Test Suite within the tempest virtual machine. For more information, see [Section 3.3, “Installing the OpenStack Integration Test Suite Packages”](#).

### 3.3. INSTALLING THE OPENSTACK INTEGRATION TEST SUITE PACKAGES

1. Install the packages related to the OpenStack Integration Test Suite:

```
$ sudo yum install openstack-tempest
```

However, this command will not install any tempest plug-ins. These are installed manually in the following steps, depending on your OpenStack installation:

2. Install the appropriate tempest plug-in for each component you have, separated by spaces, in the following format:

```
$ sudo yum install <component1> <component2> <component3>
```

You can list multiple components in the same command.

Or:

```
$ sudo python /usr/share/openstack-tempest-13.0.0/tools/install_test_packages.py
```

3. Review the list of installed plugins:

```
$ tempest list-plugins
```

See [Section 3.3.1, “List of Tempest Plug-in Packages”](#) for a list of available tempest plug-ins for each OpenStack component.

#### 3.3.1. List of Tempest Plug-in Packages

Component	Package Name
aodh	python-aodh-tests
ceilometer	python-ceilometer-tests
cinder	python-cinder-tests

Component	Package Name
designate	python-designate-tests-tempest
gnocchi	python-gnocchi-tests
heat	python-heat-tests
horizon	python-horizon-tests-tempest
ironic	python-ironic-tests
keystone	python-keystone-tests
manila	python-manila-tests
mistral	python-mistral-tests
neutron	python-neutron-tests
neutron-fwaas	python-neutron-fwaas-tests
neutron-lbaas	python-neutron-lbaas-tests
neutron-vpnaas	python-neutron-vpnaas-tests
sahara	python-sahara-tests-tempest
zaqar	python-zaqar-tests

**NOTE**

nova, swift, and glance do not have individual test plugins; their tests reside within the tempest package.

## CHAPTER 4. CONFIGURING THE OPENSTACK INTEGRATION TEST SUITE

### 4.1. CREATING A WORKSPACE

1. Source the admin credentials:

- In the undercloud:

```
$ source stackrc
```

- Or in the overcloud:

```
$ source overcloudrc
```

2. Initialize tempest:

```
$ cd ~
$ mkdir mytempest
$ cd mytempest
$ /usr/share/openstack-tempest-13.0.0/tools/configure-tempest-
directory
```

This creates a tempest workspace named **mytempest** for your user account.

3. Generate the **etc/tempest.conf** file:

```
$ python tools/config_tempest.py --deployer-input ~/tempest-
deployer-input.conf --debug --create identity.uri $OS_AUTH_URL
identity.admin_password $OS_PASSWORD --network-id _<uuid>_
```

- **uuid** is the UUID of the external network.



#### NOTE

For offline systems, you can specify an existing glance image by adding the **-image** parameter. For example: **--image cirros-0.3.4-x86\_64-disk.img**

4. You can view a list of existing workspaces:

```
$ tempest workspace list
```

### 4.2. VERIFYING YOUR TEMPEST CONFIGURATION

1. Generate the **.testr.conf** in your tempest workspace:

```
$ testr init
```

2. Verify your current tempest configuration, specifying the **tempest.conf** file that was just generated:

```
$ tempest verify-config -o ~/mytempest/etc/tempest.conf
```

### 4.3. CHANGING THE LOGGING CONFIGURATION

The default location for log files is the **logs** directory within your tempest workspace.

- To change this directory, in `~/mytempest/etc/tempest.conf`, under the **[DEFAULT]** section, set **log\_dir** to the desired directory:

```
[DEFAULT]
log_dir = _<directory>_
```

- If you have your own logging configuration file, in `~/mytempest/etc/tempest.conf`, under the **[DEFAULT]** section, set **log\_config\_append** to your file:

```
[DEFAULT]
log_config_append = _<file>_
```



#### NOTE

If this is set, all other logging configuration in **tempest.conf** will be ignored, including **log\_dir**.

### 4.4. CONFIGURING MICROVERSION TESTS

The OpenStack Integration Test Suite provides stable interfaces to test the API microversions. This section describes how to implement microversion tests using these interfaces. You first need to configure options in the `tempest.conf` configuration file to specify the target microversions. This is to make sure that the supported microversions match the microversions used in the OpenStack cloud. You can run multiple microversion tests in a single Integration Test Suite operation by specifying a range of target microversions.

For example, to limit the range of microversions for the compute service, in the **[compute]** section of your configuration file, assign values to the **min\_microversion** and **max\_microversion** parameters:

```
[compute]
min_microversion = 2.14
max_microversion = latest
```

## CHAPTER 5. USING OSTESTR TO RUN TEMPEST

Ostestr is an OpenStack wrapper for the testr test runner.

1. You can view a list of the available tests:

```
$ ostestr -l
```



### NOTE

Before running tests, you can use **tempest cleanup --init-saved-state** to capture the current state. This will make cleanup easier. For more information see [Chapter 6, Cleaning Tempest Resources](#).

2. You can run specific tests using **ostestr**.

- To run just one test, use:

```
ostestr --regex '(test_regex)'
```

- To run multiple tests:

```
ostestr --regex '(test1|test2|test3)'
```

### 5.1. RUNNING SMOKE TESTS

Smoke testing is a type of preliminary testing which only covers the most important functionality. While they are not comprehensive, running smoke tests can save time if they do identify a problem.

To run the smoke tests:

```
$ ostestr --regex '(*smoke)'
```

### 5.2. RUNNING SPECIFIC TESTS USING WHITELIST FILES

A whitelist file contains specific tests to include.

1. Create a **whitelist.txt** file in your tempest workspace:

```
$ touch whitelist.txt
```

2. Append all the tests you want to run to the **whitelist.txt** file:

```
$ cat whitelist.txt
keystone_tempest_plugin.*
networking_bgpvpn_tempest.tests*
```

3. Run those tests using **ostestr**:

```
$ ostestr -w <path to whitelist tests file>
```

## 5.3. SKIPPING TESTS USING BLACKLIST FILES

A blacklist file contains a list of tests to exclude.

1. Create a **skip\_test.txt** file in your tempest workspace:

```
$ touch skip_test.txt
```

2. Append all the tests to skip to the **skip\_test.txt** file.

```
$ cat skip_test.txt
keystone_tempest_plugin.*
networking_bgpvpn_tempest.tests*
```

3. Run tests using **ostestr**:

```
$ ostestr -b <path to skip test file>
```

4. You can run specific tests by skipping the listed tests:

```
ostestr --regex '(tempest.api.object_storage) -b <path to skip test
file>
```

## 5.4. RUNNING TESTS IN PARALLEL CONCURRENTLY, OR SERIALY

- Run the tests in series:

```
$ ostestr --serial
```

- Run the tests in parallel (this is the default):

```
$ ostestr --parallel
```

Specify the number of workers to use when running tests in parallel:

```
$ ostestr --concurrency _<workers>_
```

Alternatively:

```
$ ostestr -c _<workers>_
```

By default, this is set to the number of CPUs.



## CHAPTER 6. CLEANING TEMPEST RESOURCES

After running tempest, there will be files, users and tenants created in the testing process that need to be deleted. The ability to self-clean is one of the design principles of tempest.

### 6.1. PERFORMING A CLEAN UP

First you must initialize the saved state. This creates the file **saved\_state.json**, which prevents the cleanup from deleting objects that need to be kept. Typically you would run cleanup with **--init-saved-state** prior to a tempest run. If this is not the case, **saved\_state.json** must be edited to remove objects you want cleanup to delete.

```
$ tempest cleanup --init-saved-state
```

Run the cleanup:

```
$ tempest cleanup
```

### 6.2. PERFORMING A DRY RUN

A dry run lists the files that would be deleted by a cleanup, but does not delete any files. The files are listed in the **dry\_run.json** file.

```
$ tempest cleanup --dry-run
```

### 6.3. DELETING TEMPEST OBJECTS

Delete users and tenants created by tempest:

```
$ tempest cleanup --delete-tempest-conf-objects
```