Abstract

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PART I. MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code and documentation. We are beginning with these four terms: master, slave, blacklist, and whitelist. Due to the enormity of this endeavor, these changes will be gradually implemented over upcoming releases. For more details on making our language more inclusive, see our CTO Chris Wright’s message.
CHAPTER 1. OVERVIEW OF RED HAT OPENSTACK APPLICATION AND VNF POLICIES

Use this guide to understand the prerequisites and environmental testing requirements that are necessary to successfully complete and obtain a Red Hat OpenStack Platform (RHOSP) application certification.

This includes applications that depend on RHOSP API's, provide additional functionality in RHOSP cloud, such as a Virtual Network Function (VNF), Network Functions Virtualization (NFV), Management and Orchestration (MANO), and those applications which run on top of a RHOSP environment. It includes the applications that do not implement infrastructure software (plug-in or driver) for use with Red Hat OpenStack Platform in a supported customer environment.

1.1. AUDIENCE

Red Hat OpenStack Application certification policy guide is intended for Partners who want to certify their system using an Openstack application like Virtual Network Function (VNF), Network Functions Virtualization (NFV), Management and Orchestration (MANO) and others.

1.2. CREATING VALUE FOR OUR CUSTOMERS

Red Hat OpenStack application certification creates value for customers as it ensures that the certified application can be used with RHOSP in addition to making sure the underlying architecture is still supportable after installation of application. The certification process, through a series of tests, validates that a certified solution meets the requirements of an enterprise cloud, and is jointly supported by Red Hat and your organization.
CHAPTER 2. CERTIFICATION PREREQUISITES FOR RED HAT OPENSTACK PLATFORM APPLICATION

1. Companies must be Partners in Red Hat Connect for Technology Partners. This program enables an ecosystem for commercial OpenStack deployments and includes numerous technology companies.

2. You must have a support relationship with Red Hat. This can be fulfilled through the multi-vendor support network of TSANet, or through a custom support agreement.

3. You must have a good working knowledge of Red Hat OpenStack Platform (RHOSP) including installation and configuration of the product.

4. You must have a tested application on a supported RHOSP release.

**NOTE**

The RHOSP application certification does not verify if your application’s intended behavior matches the application’s actual behavior. This responsibility remains under your full control.

Additional resources

- For more information about the product, see detailed product documentation on Red Hat Customer Portal
- To undertake the product training or certification, see Red Hat Training Page
CHAPTER 3. TESTING REQUIREMENTS FOR RED HAT OPENSTACK PLATFORM APPLICATION

The RHOSP Application Testing Requirements will be required and provided by Red Hat in a test plan for each certification. The following tests are explained in Certification tests of this guide.

- System Report Test
- Supportability Test
- Director Test
- VNF Configuration Testing Report Test (for VNF only)

You are expected to perform System Report, Supportability, and Director test for a regular RHOSP application. For VNF certification along with these three test you also need to perform the VNF Testing Configuration report test.
CHAPTER 4. CERTIFICATION TESTS

The Red Hat OpenStack application policy includes multiple tests each with a series of subtests and checks. Different certifications will require different tests. Following are the certification tests:

4.1. OVERVIEW OF SYSTEM REPORT

The System Report test, also known as openstack/sosreport, captures the basic sosreport. Red Hat uses a tool called sos to collect the configuration and diagnostics information from a Red Hat Enterprise Linux (RHEL) system, and to assist the customers in troubleshooting their system by following the recommended practices.

The system report subtest ensures that the sos tool functions as expected on the image or system and captures a basic sosreport.

Success Criteria

- A basic sosreport can be captured from the system under test
- The test status will be PASS if a valid rpm version captures and collects the openstack data.

Additional resources

- For more information about sosreport, see What is an sosreport and how to create one in Red Hat Enterprise Linux?

4.2. OVERVIEW OF SUPPORTABILITY TEST

The Supportability test, also known as openstack/supportable, ensures that the test environment is compliant with Red Hat’s support policy. The test confirms that the test node (an OpenStack deployment-under-test) consists only of components RHOSP and RHEL that are supported by Red Hat or the Partner.

NOTE

An OpenStack deployment-under-test refers to the node where the plugin/application-under-test is installed and also the Undercloud Director node.

4.2.1. Kernel subtest

The Kernel subtest confirms the kernel that the image is running is from Red Hat, is appropriate and supported for the version of RHEL undergoing certification, and has not been modified. The kernel version may be the original General Availability (GA) version or any subsequent kernel errata released for the RHEL major and minor release.

The kernel subtest also ensures that the kernel is not tainted when running in the environment.

Success criteria

- The running kernel is a Red Hat kernel.
- The running kernel is released by Red Hat for use with the RHEL version.
- The running kernel is not tainted.
Additional resources

- For more information on Red Hat Enterprise Linux Life Cycle and Kernel Versions, see [Red Hat Enterprise Linux Life Cycle](#).
- [Red Hat Enterprise Linux Release Dates](#).
- For more information about kernel tainting, see link: [Why is the kernel "tainted" and how are the taint values deciphered?](#).

4.2.2. Kernel modules subtest

The Kernel Modules subtest confirms the loaded kernel modules are from Red Hat, either from the running kernel’s package or a Red Hat Driver Update. The kernel module subtest also ensures the kernel modules do not identify as Technology Preview when running in the environment.

Success criteria

The kernel modules are from Red Hat and supported.

Additional resources

- For more information about Technology Preview, see [What does a "Technology Preview" feature mean?](#).

4.2.3. Hardware Health subtest

The Hardware Health subtest checks the system’s health by testing if the hardware is supported, meets the requirements, and has any known hardware vulnerabilities. The subtest does the following:

- Checks that the Red Hat Enterprise Linux (RHEL) kernel does not identify hardware as unsupported. When the kernel identifies unsupported hardware, it will display an unsupported hardware message in the system logs and/or trigger an unsupported kernel taint. This subtest prevents customers from possible production risks which may arise from running Red Hat products on unsupported configurations and environments. In hypervisor, partitioning, cloud instances, and other virtual machine situations, the kernel may trigger an unsupported hardware message or taint based on the hardware data presented to RHEL by the virtual machine (VM).

- Checks that the system under test (SUT) meets the minimum hardware requirements.

  - RHEL 8: Minimum system RAM should be 1.5GB, per CPU logical core count.
  - RHEL 7: Minimum system RAM should be 1GB, per CPU logical core count.

- Checks if the kernel has reported any known hardware vulnerabilities, if those vulnerabilities have mitigations and if those mitigations have resolved the vulnerability. Many mitigations are automatic to ensure that customers do not need to take active steps to resolve vulnerabilities. In some cases this is not possible; where most of these remaining cases require changes to the configuration of the system BIOS/firmware which may not be modifiable by customers in all situations.

- Confirms the system does not have any offline CPUs.

- Confirms if Simultaneous Multithreading (SMT) is available, enabled, and active in the system.
Failing any of these tests will result in a WARN from the test suite and should be verified by the partner to have correct and intended behavior.

**Success criteria**

- The kernel does not have the UNSUPPORTEDHARDWARE taint bit set.
- The kernel does not report an unsupported hardware system message.
- The kernel should not report any vulnerabilities with mitigations as vulnerable.
- The kernel does not report the logic core to installed memory ratio as out of range.
- The kernel does not report CPUs in an offline state.

**Additional resources**

- Minimum required memory
- For more information about hardware support available in RHEL 7 but removed from RHEL 8, see [Hardware Enablement](#).
- For more information about hardware support available in RHEL 6 but removed from RHEL 7, see [Changes to Packages, Functionality, and Support](#).

### 4.2.4. Installed RPMs subtest

Confirms that RPM packages installed on the system are from Red Hat and not modified, potentially enabling customers to avoid the significant risks arising from unexpected software/packages, further ensuring that customers are starting with a supportable environment.

Non-Red Hat packages may be installed if they are necessary to enable the cloud environment, but they are acceptable where they are documented and if they DO NOT modify or conflict with Red Hat packages/software. This subtest will require detailed review at Red Hat to confirm success or failure if non Red Hat packages are installed.

**Success criteria**

- The installed Red Hat provided RPM packages are from Red Hat products available in the offering.
- The installed Red Hat RPM packages are not modified.
- The installed Non-Red Hat RPM packages are necessary to enable the cloud environment and are documented.
- The installed Non Red Hat RPM packages do not conflict with Red Hat provided packages/software available in Red Hat products included in the offering.

**Additional resources**

- For more information on Red Hat support policies on third-party software, see [Production Support Scope of Coverage](#).

### 4.2.5. SELinux subtest
Security-Enhanced Linux (SELinux) adds Mandatory Access Control (MAC) to the Linux kernel, and is enabled by default in RHEL. The SELinux subtest confirms that SELinux is running in enforcing mode on the OpenStack deployment-under test.

**NOTE**

SELinux policy is administratively-defined, enforced system-wide, and is not set at user discretion reducing vulnerability to privilege escalation attacks helping limit the damage made by configuration mistakes.

**Success criteria**

SELinux is configured and running in enforcing mode on the OpenStack deployment-under-test.

**Additional resources**

- For more information on SELinux in RHEL, see [SELinux Users and Administrators Guide](#).

### 4.3. DIRECTOR TEST

The Director test also known as openstack/director ensures that the deployment-under-test is originally installed using Red Hat OpenStack Platform Director. This test is required for all OpenStack software certifications.

Red Hat OpenStack Platform Director is the supported toolset for installing and managing a Red Hat OpenStack Platform environment in production. It helps in easy installation of a lean and robust OpenStack cloud and is targeted specifically for enterprise cloud environments where updates, upgrades and infrastructure control are critical for underlying OpenStack operations.

**Success criteria**

The deployment under test is originally installed using Red Hat OpenStack Platform Director.

**Additional resources**

- For more information about installing Red Hat OpenStack Platform Director, see [Director Installation and Usage Guide](#).

### 4.4. VNF TESTING CONFIGURATION REPORT TEST

The VNF testing configuration report test is applicable only for VNF certification. In this test, a Partner selects the operating system on which the VNF is based; provides the link to a report, or uploads a VNF configuration testing report file. The VNF SME, reviews the report that describes the installation, configuration, and testing details that the Partner conducts.

The format of the required report is pre-defined and is at the Partner’s discretion, however it will need to include the following information:

- Hardware configuration
  - Server make and model
  - CPU: make, model, speed, cores, HT
  - NIC make/model
Networking HW make/model
Storage make/model
Traffic Generator make/model

- Firmware configuration
  - Server firmware version
  - BMC firmware version
  - NIC firmware version

- System software configuration
  - Version and architecture of Red Hat Enterprise Linux used on the host
  - NUMA, Cores, Huge Pages config.
  - OpenStack Platform version
  - Third party OSP plug-ins used, with versions
  - Storage software used
  - Architectural / Topology Diagram

- VNF configuration
  - VNF version
  - vCPUs, Memory, storage used in testing
  - Dataplane acceleration (ovs-dpdk, sr-iov, etc.)
  - Cores allocation - DPDK vs. application
  - Bandwidth, IOPS, latency, etc. requirements
  - Test cases performed:
    - Instantiation, termination, scale out/in, healing, HA, and others
CHAPTER 5. VNF CERTIFICATION LEVEL

Most certification do not have levels; instead a Partner solution is either certified or not. VNF however includes an additional certification level to address that these applications often include a VM that is not otherwise supportable by Red Hat. If a Partners performs a VNF certification following VNF certification levels will get generated:

- **Certified**: The Red Hat team generates a Certified level when the certificate is completed. The VNF test level will be Certified if the VNF image is based on the RHEL operating system during the VNF certification process. The following screenshot illustrates the Certified level:

![Figure 5.1. VNF Certified Level](image1)

<table>
<thead>
<tr>
<th>Target Product</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat OpenStack Platform 10.0 Base: Red Hat Enterprise Linux (x86_64) 7.3-7.x</td>
<td>Certified</td>
</tr>
<tr>
<td>Red Hat OpenStack Platform 9.0 Base: Red Hat Enterprise Linux (x86_64) 7.2-7.x</td>
<td>Certified</td>
</tr>
</tbody>
</table>

- **Vendor Validated**: The Red Hat team generates a Vendor Validated level when the certificate is completed. The VNF test level will be Vendor Validated if the VNF image is based on a non-RHEL operating system during the VNF certification process. The following screenshot illustrates the Vendor Validated level:

![Figure 5.2. VNF Vendor Validated Level](image2)

<table>
<thead>
<tr>
<th>Target Product</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat OpenStack Platform 10.0 Base: Red Hat Enterprise Linux (x86_64) 7.4-7.x</td>
<td>Vendor Validated</td>
</tr>
</tbody>
</table>