



# Red Hat OpenStack Platform 16.1

## Upgrading Red Hat OpenStack Platform (15 to 16.1)

In-place upgrades from Red Hat OpenStack Platform 15 to 16.1



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## Abstract

Upgrade your OpenStack Platform environment from version 15 (Stein) to 16.1 (Train).

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# CHAPTER 1. INTRODUCTION TO UPGRADING OPENSTACK PLATFORM 15 TO 16.1

This document provides a workflow to help you upgrade your Red Hat OpenStack Platform 15 to 16.1 and update your environment with the latest packages and containers.

This guide provides an upgrade path through the following versions:

Old OpenStack Version	New OpenStack Version
Red Hat OpenStack Platform 15.0	Red Hat OpenStack Platform 16.1

## 1.1. HIGH LEVEL WORKFLOW

The following table provides an outline of the tasks required for the upgrade process:

Task	Description
Preparing your environment for the upgrade	Prepare and configure the repositories, modules, and containers that are required for the upgrade.
Upgrading the undercloud	Upgrade the undercloud to the latest OpenStack Platform 16.1 version.
Upgrading the overcloud	Upgrade the overcloud to the latest OpenStack Platform 16.1 version. Upgrade all Controller, Compute, and Ceph Storage services. Run the convergence command to refresh your overcloud stack.
Rebooting the overcloud	Reboot the overcloud.

## 1.2. KNOWN ISSUES

Review the following list of known issues that might affect the upgrade from OpenStack Platform 15 to 16.1.

### [BZ#1872404 - restarting nodes in parallel while maintaining quorum creates an unexpected node shutdown](#)

Until this issue is resolved, for nodes based on composable roles, you must update the **Database** role first, before you can update **Controller, Messaging, Compute, Ceph**, and other roles.

### [BZ#1884556 - Minor update procedure not triggering online DB migrations in "openstack overcloud external-update run --tags online\\_upgrade"](#)

Until this issue is resolved, to perform online database updates, instead of the **openstack overcloud external-update run --tags online\_upgrade** use the **openstack overcloud external-update run --tags online\_upgrade** command.

## CHAPTER 2. PREPARING YOUR ENVIRONMENT FOR THE UPGRADE

To upgrade your environment from Red Hat OpenStack Platform 15 to Red Hat OpenStack Platform 16.1, you must configure the correct repositories, modules, and parameters, before you can upgrade the undercloud toolset and core Heat template collection.

To prepare your undercloud and overcloud nodes for the upgrade, complete the following preparation tasks:

1. [Section 2.1, "Locking the environment to a Red Hat Enterprise Linux release"](#)
2. [Section 2.2, "Changing to Extended Update Support \(EUS\) repositories"](#)
3. [Section 2.3, "Updating Red Hat Openstack Platform and Ansible repositories"](#)
4. [Section 2.4, "Setting the container-tools and virt module versions"](#)
5. [Section 2.5, "Updating your container image preparation file"](#)

### 2.1. LOCKING THE ENVIRONMENT TO A RED HAT ENTERPRISE LINUX RELEASE

Red Hat OpenStack Platform 16.1 is supported on Red Hat Enterprise Linux 8.2. Prior to performing the upgrade, lock the undercloud and overcloud repositories to the Red Hat Enterprise Linux 8.2 release to avoid upgrading the operating system to a newer minor release.

#### Procedure

1. Log in to the undercloud as the **stack** user.
2. Source the **stackrc** file:

```
$ source ~/stackrc
```
3. Edit your overcloud subscription management environment file, which is the file that contains the **RhsmVars** parameter. The default name for this file is usually **rhsm.yml**.
4. Check your subscription management configuration for the **rhsm\_release** parameter. If this parameter is not set, add this parameter and set the parameter to 8.2:

```
parameter_defaults:
  RhsmVars:
    ...
    rhsm_username: "myusername"
    rhsm_password: "p@55w0rd!"
    rhsm_org_id: "1234567"
    rhsm_pool_ids: "1a85f9223e3d5e43013e3d6e8ff506fd"
    rhsm_method: "portal"
    rhsm_release: "8.2"
```

5. Save the overcloud subscription management environment file.
6. Create a static inventory file of your overcloud:



```
$ tripleo-ansible-inventory --ansible_ssh_user heat-admin --static-yaml-inventory
~/inventory.yaml
```

If you use an overcloud name different to the default overcloud name of **overcloud**, set the name of your overcloud with the **--plan** option.

7. Create a playbook that contains a task to lock the operating system version to Red Hat Enterprise Linux 8.2 on all nodes:

```
$ cat > ~/set_release.yaml <<'EOF'
- hosts: all
  gather_facts: false
  tasks:
    - name: set release to 8.2
      command: subscription-manager release --set=8.2
      become: true
EOF
```

8. Run the **set\_release.yaml** playbook:

```
$ ansible-playbook -i ~/inventory.yaml -f 25 ~/set_release.yaml --limit
undercloud,Controller,Compute
```

Use the **--limit** option to apply the content to all Red Hat OpenStack Platform nodes. Do not run this playbook against Ceph Storage nodes because you are most likely using a different subscription for these nodes.



#### NOTE

To manually lock a node to a version, log in to the node and run the **subscription-manager release** command:

```
$ sudo subscription-manager release --set=8.2
```

## 2.2. CHANGING TO EXTENDED UPDATE SUPPORT (EUS) REPOSITORIES

Your Red Hat OpenStack Platform subscription includes repositories for Red Hat Enterprise Linux 8.2 Extended Update Support (EUS). The EUS repositories include the latest security patches and bug fixes for Red Hat Enterprise Linux 8.2. Switch to the following repositories before performing an upgrade.

Standard Repository	EUS Repository
rhel-8-for-x86_64-baseos-rpms	rhel-8-for-x86_64-baseos-eus-rpms
rhel-8-for-x86_64-appstream-eus-rpms	rhel-8-for-x86_64-appstream-eus-rpms
rhel-8-for-x86_64-highavailability-rpms	rhel-8-for-x86_64-highavailability-eus-rpms



## IMPORTANT

You must use EUS repositories to retain compatibility with a specific version of Podman. Later versions of Podman are untested for this Red Hat OpenStack Platform release and can cause unexpected results.

### Procedure

1. Log in to the undercloud as the **stack** user.
2. Source the **stackrc** file:

```
$ source ~/stackrc
```

3. Edit your overcloud subscription management environment file, which is the file that contains the **RhsmVars** parameter. The default name for this file is usually **rhsm.yml**.
4. Check the **rhsm\_repos** parameter in your subscription management configuration. If this parameter does not include the EUS repositories, change the relevant repositories to the EUS versions:

```
parameter_defaults:
  RhsmVars:
    rhsm_repos:
      - rhel-8-for-x86_64-baseos-eus-rpms
      - rhel-8-for-x86_64-appstream-eus-rpms
      - rhel-8-for-x86_64-highavailability-eus-rpms
      - ansible-2.9-for-rhel-8-x86_64-rpms
      - advanced-virt-for-rhel-8-x86_64-rpms
      - openstack-16.1-for-rhel-8-x86_64-rpms
      - rhceph-4-tools-for-rhel-8-x86_64-rpms
      - fast-datapath-for-rhel-8-x86_64-rpms
```

5. Save the overcloud subscription management environment file.
6. Create a static inventory file of your overcloud:

```
$ tripleo-ansible-inventory --ansible_ssh_user heat-admin --static-yaml-inventory
~/inventory.yaml
```

If you use an overcloud name different to the default overcloud name of **overcloud**, set the name of your overcloud with the **--plan** option.

7. Create a playbook that contains a task to set the repositories to Red Hat Enterprise Linux 8.2 EUS on all nodes:

```
$ cat > ~/change_eus.yaml <<'EOF'
- hosts: all
  gather_facts: false
  tasks:
    - name: change to eus repos
      command: subscription-manager repos --disable=rhel-8-for-x86_64-baseos-rpms --
disable=rhel-8-for-x86_64-appstream-rpms --disable=rhel-8-for-x86_64-highavailability-rpms
--enable=rhel-8-for-x86_64-baseos-eus-rpms --enable=rhel-8-for-x86_64-appstream-eus-
```

```
rpms --enable=rhel-8-for-x86_64-highavailability-eus-rpms
  become: true
EOF
```

8. Run the **change\_eus.yaml** playbook:

```
$ ansible-playbook -i ~/inventory.yaml -f 25 ~/change_eus.yaml --limit
undercloud,Controller,Compute
```

Use the **--limit** option to apply the content to all Red Hat OpenStack Platform nodes. Do not run this playbook against Ceph Storage nodes because you are most likely using a different subscription for these nodes.

## 2.3. UPDATING RED HAT OPENSTACK PLATFORM AND ANSIBLE REPOSITORIES

Update your repositories to use Red Hat OpenStack Platform 16.1 and Ansible 2.9 packages.

### Procedure

1. Log in to the undercloud as the **stack** user.
2. Source the **stackrc** file:
 

```
$ source ~/stackrc
```
3. Edit your overcloud subscription management environment file, which is the file that contains the **RhsmVars** parameter. The default name for this file is usually **rhsm.yml**.
4. Check the **rhsm\_repos** parameter in your subscription management configuration. If the **rhsm\_repos** parameter is using the Red Hat OpenStack Platform 13 and Ansible 2.9 repositories, change the repository to the correct versions:

```
parameter_defaults:
  RhsmVars:
    rhsm_repos:
      - rhel-8-for-x86_64-baseos-eus-rpms
      - rhel-8-for-x86_64-appstream-eus-rpms
      - rhel-8-for-x86_64-highavailability-eus-rpms
      - ansible-2.9-for-rhel-8-x86_64-rpms
      - advanced-virt-for-rhel-8-x86_64-rpms
      - openstack-16.1-for-rhel-8-x86_64-rpms
      - rhceph-4-osd-for-rhel-8-x86_64-rpms
      - rhceph-4-mon-for-rhel-8-x86_64-rpms
      - rhceph-4-tools-for-rhel-8-x86_64-rpms
      - fast-datapath-for-rhel-8-x86_64-rpms
```

5. Save the overcloud subscription management environment file.
6. Create a static inventory file of your overcloud:

```
$ tripleo-ansible-inventory --ansible_ssh_user heat-admin --static-yaml-inventory
~/inventory.yaml
```

If you use an overcloud name different to the default overcloud name of **overcloud**, set the name of your overcloud with the **--plan** option.

7. Create a playbook that contains a task to set the repositories to Red Hat OpenStack Platform 16.1 on all nodes:

```
$ cat > ~/update_rhosp_repos.yaml <<'EOF'
- hosts: all
  gather_facts: false
  tasks:
    - name: change osp repos
      command: subscription-manager repos --disable=openstack-16-for-rhel-8-x86_64-rpms --
enable=openstack-16.1-for-rhel-8-x86_64-rpms --disable=ansible-2.8-for-rhel-8-x86_64-rpms
--enable=ansible-2.9-for-rhel-8-x86_64-rpms
      become: true
EOF
```

8. Run the **update\_rhosp\_repos.yaml** playbook:

```
$ ansible-playbook -i ~/inventory.yaml -f 25 ~/update_rhosp_repos.yaml --limit
undercloud,Controller,Compute
```

Use the **--limit** option to apply the content to all Red Hat OpenStack Platform nodes. Do not run this playbook against Ceph Storage nodes because you are most likely using a different subscription for these nodes.

9. Create a playbook that contains a task to set the repositories to Red Hat OpenStack Platform 16.1 on all nodes:

```
$ cat > ~/update_ceph_repos.yaml <<'EOF'
- hosts: all
  gather_facts: false
  tasks:
    - name: change ceph repos
      command: subscription-manager repos --disable=openstack-16-deployment-tools-for-
rhel-8-x86_64-rpms --enable=openstack-16.1-deployment-tools-for-rhel-8-x86_64-rpms --
disable=ansible-2.8-for-rhel-8-x86_64-rpms --enable=ansible-2.9-for-rhel-8-x86_64-rpms
      become: true
EOF
```

10. Run the **update\_ceph\_repos.yaml** playbook:

```
$ ansible-playbook -i ~/inventory.yaml -f 25 ~/update_rhosp_repos.yaml --limit CephStorage
```

Use the **--limit** option to apply the content to Ceph Storage nodes.

## 2.4. SETTING THE CONTAINER-TOOLS AND VIRT MODULE VERSIONS

Set the **container-tools** module to version **2.0** and the **virt** module to **8.2** to ensure you use the correct package versions on all nodes.

### Procedure

1. Log in to the undercloud as the **stack** user.

2. Source the **stackrc** file:

```
$ source ~/stackrc
```

3. Create a static inventory file of your overcloud:

```
$ tripleo-ansible-inventory --ansible_ssh_user heat-admin --static-yaml-inventory
~/inventory.yaml
```

If you use an overcloud name different to the default overcloud name of **overcloud**, set the name of your overcloud with the **--plan** option.

4. Create a playbook that contains a task to set the **container-tools** module to version **2.0** on all nodes:

```
$ cat > ~/container-tools.yaml <<'EOF'
- hosts: all
  gather_facts: false
  tasks:
    - name: disable default dnf module for container-tools
      command: dnf module disable -y container-tools:rhel8
      become: true
    - name: set dnf module for container-tools:2.0
      command: dnf module enable -y container-tools:2.0
      become: true
    - name: disable default dnf module for virt
      command: dnf module disable -y virt:rhel
      become: true
    - name: disable 8.1 dnf module for virt
      command: dnf module disable -y virt:8.1
      become: true
    - name: set dnf module for virt:8.2
      command: dnf module enable -y virt:8.2
      become: true
EOF
```

5. Run the **container-tools.yaml** playbook against all nodes:

```
$ ansible-playbook -i ~/inventory.yaml -f 25 ~/container-tools.yaml
```

## 2.5. UPDATING YOUR CONTAINER IMAGE PREPARATION FILE

Your container preparation file is the file that contains the **ContainerImagePrepare** parameter. You use this file to define the rules for obtaining container images for the undercloud and overcloud. Before you upgrade your environment, check the file to ensure you obtain the correct image versions.

### Procedure

1. Edit the container preparation file. The default name for this file is usually **containers-prepare-parameter.yaml**.
2. Set the **tag** parameter to **16.1** and update the **namespace** parameter to **registry.redhat.io/rhosp-rhel8**:

```
parameter_defaults:  
  ContainerImagePrepare:  
    - push_destination: true  
  set:  
    namespace: registry.redhat.io/rhosp-rhel8  
    ...  
    tag: '16.1'  
    tag_from_label: '{version}-{release}'
```

3. Save this file.

## CHAPTER 3. UPGRADING THE UNDERCLOUD FROM OPENSTACK PLATFORM VERSION 15 TO 16.1

To upgrade the undercloud from OpenStack Platform version 15 to 16.1, you must perform a procedure that is used for a minor update of a containerized undercloud. During this procedure you update the undercloud toolset, core Heat template collection, and the undercloud environment.

### 3.1. PERFORMING A MINOR UPDATE OF A CONTAINERIZED UNDERCLOUD

Director provides commands that you can use to update the main packages on the undercloud node. This allows you to upgrade your OpenStack Platform version 15 environment to version 16.1.

#### Procedure

1. Log in to the director as the **stack** user.
2. Run **dnf** to upgrade the director main packages:

```
$ sudo dnf update -y python3-tripleoclient* openstack-tripleo-common openstack-tripleo-heat-templates tripleo-ansible ansible
```

3. The director uses the **openstack undercloud upgrade** command to update the undercloud environment. Run the command:

```
$ openstack undercloud upgrade
```

4. Wait until the undercloud upgrade process completes.
5. Reboot the undercloud to update the operating system's kernel and other system packages:

```
$ sudo reboot
```

6. Wait until the node boots.

### 3.2. UNDERCLOUD POST-UPGRADE NOTES

- If you use a local set of core templates in your **stack** users home directory, ensure you update the templates using the recommended workflow in [Using Customized Core Heat Templates](#) in the *Advanced Overcloud Customization* guide. You must update the local copy before upgrading the overcloud.

### 3.3. NEXT STEPS

The undercloud upgrade is complete. You can now upgrade the overcloud.

## CHAPTER 4. UPGRADING THE OVERCLOUD FROM OPENSTACK PLATFORM VERSION 15 TO 16.1

To upgrade the overcloud, you must update the overcloud plan, prepare the nodes for the upgrade, prepare all container image configuration that applies to your environment, and upgrade the nodes.



### IMPORTANT

Until [BZ#1872404](#) is resolved, for nodes based on composable roles, you must update the **Database** role first, before you can update **Controller, Messaging, Compute, Ceph**, and other roles.

### Prerequisites

- You have upgraded the undercloud node from OpenStack Platform version 15 to 16.1.

To upgrade the overcloud, complete the following tasks:

1. [Section 4.1, "Preparing container images for rolling upgrade of HA services"](#)
2. [Section 4.2, "Running the overcloud update preparation"](#)
3. [Section 4.3, "Running the container image preparation"](#)
4. [Section 4.4, "Updating all Controller nodes"](#)
5. [Section 4.5, "Updating all Compute nodes"](#)
6. [Section 4.6, "Updating all Ceph Storage nodes"](#)
7. [Section 4.7, "Performing online database updates"](#)
8. [Section 4.8, "Finalizing the update"](#)

### 4.1. PREPARING CONTAINER IMAGES FOR ROLLING UPGRADE OF HA SERVICES

When a change in the **namespace**, **name\_prefix** or **name\_suffix** occurs for a container image used by a HA service, Pacemaker automatically restarts all the instances of this service in the control plane to recreate containers with the newly configured container image name.

Because Red Hat OpenStack 15 and 16.1 use different **name\_prefix** values, after the first node in the cluster is updated, the remaining nodes start using the new container image and expect it to be present locally.

To allow a rolling update of HA container image names, Red Hat OpenStack 16.1 introduces the **ClusterCommonTag** heat parameter to configure HA services to use an intermediate image name with a fixed **name\_prefix** that is **cluster.common.tag** and a fixed **name\_suffix** that is **pcmklatest**. Every time director pulls new container images on a node, it updates the intermediate image tags so that they point to the newly pulled images.

To transition to the OpenStack 16.1 intermediate container image naming scheme, you must create the initial container tags manually for each HA container image present on the controller nodes. The new **cluster.common.tag/rhosp16-openstack-\*** container tag will point to the same container image ID that is referenced by the original **registry/rhosp15-openstack-\*:pcmklatest** tag.



**Procedure**

1. Log in to the undercloud as the **stack** user.
2. Source the **stackrc** file:

```
$ source ~/stackrc
```

3. Create a static inventory file of your overcloud:

```
$ tripleo-ansible-inventory --static-yaml-inventory ~/inventory.yaml
```

4. Create the script that tags the existing image with the new name:

```
cat > pcmkr_common_tag.sh <<'EOF'
#!/bin/sh
# Due to a change in internal CI repo, we need to adjust
# the HA relate containers before running the update.
# See bz#1846042/PIDONE
OLD_PREFIX=${1:-"openstack-"}
NEW_PREFIX=${2:-"openstack-"}
TRANSFORM=s%${OLD_PREFIX}%${NEW_PREFIX}%p

# Get all images used by HA containers (disregards images with cluster common tag in their
# name)
IMAGES=$(sudo podman images | awk '$1 !~ /cluster.common.tag/ && $2 ~ /pcmklatest/
{print $1}')

if [ -n "$IMAGES" ]; then
    echo "Creating cluster common tags and linking them to current HA images"
fi

# i: 192.168.24.1:8787/rhosp15-rhel8/openstack-mariadb
# image: openstack-mariadb
# transformed: openstack-mariadb
# full_i: 192.168.24.1:8787/rhosp15-rhel8/openstack-mariadb:pcmklatest
# full_icommon: cluster.common.tag/openstack-mariadb:pcmklatest
for i in $IMAGES; do
    image=$(echo "$i" | sed 's%.*%/%%')
    transformed=$(echo $image | sed -n $TRANSFORM)
    full_i=$i:pcmklatest
    full_icommon=cluster.common.tag/${transformed}:pcmklatest
    # echo $i - $TRANSFORM "=>" $image - $transformed

    # original image points to a image hash, create a new tag
    # with cluster.common.tag and make it point to the same image hash
    echo $full_i "-->" $full_icommon
    sudo podman tag $full_i $full_icommon
done
EOF
```

5. To tag the existing image with the new name, run the script:

```
$ ansible -i inventory.yaml 'overcloud' -m script -a './pcmkcr_common_tag.sh'
```

## 4.2. RUNNING THE OVERCLOUD UPDATE PREPARATION

The update requires running **openstack overcloud update prepare** command, which performs the following tasks:

- Updates the overcloud plan to OpenStack Platform 16.1
- Prepares the nodes for the update

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the update preparation command:

```
$ openstack overcloud update prepare \
  --templates \
  --stack STACK_NAME \
  -r ROLES_DATA_FILE \
  -n NETWORK_DATA_FILE \
  -e ENVIRONMENT_FILE \
  -e ENVIRONMENT_FILE \
  ...
```

Include the following options relevant to your environment:

- If the name of your overcloud stack is different to the default name **overcloud**, include the **--stack** option in the update preparation command and replace **<STACK\_NAME>** with the name of your stack.
  - If using your own custom roles, include your custom roles (**roles\_data**) file (**-r**)
  - If using custom networks, include your composable network (**network\_data**) file (**-n**)
  - Any custom configuration environment files (**-e**)
3. Wait until the update preparation completes.

## 4.3. RUNNING THE CONTAINER IMAGE PREPARATION

The overcloud requires the latest OpenStack Platform 16.1 container images before performing the update. This involves executing the **container\_image\_prepare** external update process. To execute this process, run the **openstack overcloud external-update run** command against tasks tagged with the **container\_image\_prepare** tag. These tasks:

- Automatically prepare all container image configuration relevant to your environment.
- Pull the relevant container images to your undercloud, unless you have previously disabled this option.

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the **openstack overcloud external-update run** command against tasks tagged with the **container\_image\_prepare** tag:

```
$ openstack overcloud external-update run --tags container_image_prepare
```

## 4.4. UPDATING ALL CONTROLLER NODES

This process updates all the Controller nodes to the latest OpenStack Platform 16.1 version. The process involves running the **openstack overcloud update run** command and including the **--limit Controller** option to restrict operations to the Controller nodes only.



### IMPORTANT

Until [BZ#1872404](#) is resolved, for nodes based on composable roles, you must update the **Database** role first, before you can update **Controller, Messaging, Compute, Ceph**, and other roles.



### NOTE

If you are not using the default stack name (**overcloud**), set your stack name with the **--stack STACK\_NAME** option replacing **STACK\_NAME** with the name of your stack.

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the update command:

```
$ openstack overcloud update run --stack STACK_NAME --limit Controller --playbook all
```

3. Wait until the Controller node update completes.

## 4.5. UPDATING ALL COMPUTE NODES

This process updates all Compute nodes to the latest OpenStack Platform 16.1 version. The process involves running the **openstack overcloud update run** command and including the **--nodes Compute** option to restrict operations to the Compute nodes only.

When you are updating a large number of compute nodes, to improve performance, run the **openstack overcloud update run** command in batches of maximum 20 nodes.



### NOTE

If you are not using the default stack name (**overcloud**), set your stack name with the **--stack STACK\_NAME** option replacing **STACK\_NAME** with the name of your stack.

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the update command:

```
$ openstack overcloud update run --stack STACK_NAME --limit Compute --playbook all
```

3. Wait until the Compute node update completes.

## 4.6. UPDATING ALL CEPH STORAGE NODES

This process updates the Ceph Storage nodes. The process involves:

- Running the **openstack overcloud update run** command and including the **--nodes CephStorage** option to restrict operations to the Ceph Storage nodes only.
- Running the **openstack overcloud external-update run** command to run **ceph-ansible** as an external process and update the Red Hat Ceph Storage 3 containers.



### NOTE

If you are not using the default stack name (**overcloud**), set your stack name with the **--stack STACK\_NAME** option replacing **STACK\_NAME** with the name of your stack.

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the update command:

```
$ openstack overcloud update run --stack _STACK_NAME --limit CephStorage --playbook all
```

3. Wait until the node update completes.

4. Run the Ceph Storage container update command:

```
$ openstack overcloud external-update run --tags ceph
```

5. Wait until the Ceph Storage container update completes.

## 4.7. PERFORMING ONLINE DATABASE UPDATES

Some overcloud components require an online upgrade (or migration) of their databases tables. This involves executing the **online\_upgrade** external update process. To execute this process, run the **openstack overcloud external-update run** command against tasks tagged with the **online\_upgrade** tag. This performs online database updates to the following components:

- OpenStack Block Storage (cinder)

- OpenStack Compute (nova)

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the **openstack overcloud external-upgrade run** command against tasks tagged with the **online\_upgrade** tag:

```
$ openstack overcloud external-upgrade run --tags online_upgrade
```

## 4.8. FINALIZING THE UPDATE

The update requires a final step to update the overcloud stack. This ensures the stack's resource structure aligns with a regular deployment of OpenStack Platform 16.1 and allows you to perform standard **openstack overcloud deploy** functions in the future.

### Procedure

1. Source the **stackrc** file:

```
$ source ~/stackrc
```

2. Run the update finalization command:

```
$ openstack overcloud update converge \
  --templates \
  --stack STACK_NAME \
  -r ROLES_DATA_FILE \
  -n NETWORK_DATA_FILE \
  -e ENVIRONMENT_FILE \
  -e ENVIRONMENT_FILE \
  ...
  ...
```

Include the following options relevant to your environment:

- If the name of your overcloud stack is different to the default name **overcloud**, include the **--stack** option in the update preparation command and replace **<STACK\_NAME>** with the name of your stack.
  - If using your own custom roles, include your custom roles (**roles\_data**) file (**-r**)
  - If using custom networks, include your composable network (**network\_data**) file (**-n**)
  - Any custom configuration environment files (**-e**).
3. Wait until the update finalization completes.

## CHAPTER 5. REBOOTING THE OVERCLOUD AFTER THE UPGRADE

After you have upgraded your Red Hat OpenStack environment from version 15 to 16.1, you must reboot your overcloud. The reboot refreshes the nodes with any associated kernel, system-level, and container component updates that provide performance and security benefits.

Plan downtime to perform the following reboot procedures.

To reboot your overcloud, complete the following tasks:

1. [Section 5.1, “Rebooting Controller and composable nodes”](#)
2. [Section 5.2, “Rebooting a Ceph Storage \(OSD\) cluster”](#)
3. [Section 5.3, “Rebooting Compute nodes”](#)

### 5.1. REBOOTING CONTROLLER AND COMPOSABLE NODES

Complete the following steps to reboot Controller nodes and standalone nodes based on composable roles, excluding Compute nodes and Ceph Storage nodes.

#### Procedure

1. Log in to the node that you want to reboot.
2. Optional: If the node uses Pacemaker resources, stop the cluster:

```
[heat-admin@overcloud-controller-0 ~]$ sudo pcs cluster stop
```

3. Reboot the node:

```
[heat-admin@overcloud-controller-0 ~]$ sudo reboot
```

4. Wait until the node boots.
5. Check the services. For example:
  - a. If the node uses Pacemaker services, check that the node has rejoined the cluster:

```
[heat-admin@overcloud-controller-0 ~]$ sudo pcs status
```

- b. If the node uses Systemd services, check that all services are enabled:

```
[heat-admin@overcloud-controller-0 ~]$ sudo systemctl status
```

- c. If the node uses containerized services, check that all containers on the node are active:

```
[heat-admin@overcloud-controller-0 ~]$ sudo podman ps
```

### 5.2. REBOOTING A CEPH STORAGE (OSD) CLUSTER

Complete the following steps to reboot a cluster of Ceph Storage (OSD) nodes.

### Procedure

1. Log into a Ceph MON or Controller node and disable Ceph Storage cluster rebalancing temporarily:

```
$ sudo podman exec -it ceph-mon-controller-0 ceph osd set noout
$ sudo podman exec -it ceph-mon-controller-0 ceph osd set norebalance
```

2. Select the first Ceph Storage node that you want to reboot and log in to the node.
3. Reboot the node:

```
$ sudo reboot
```

4. Wait until the node boots.
5. Log into the node and check the cluster status:

```
$ sudo podman exec -it ceph-mon-controller-0 ceph status
```

Check that the **pgmap** reports all **pgs** as normal (**active+clean**).

6. Log out of the node, reboot the next node, and check its status. Repeat this process until you have rebooted all Ceph storage nodes.
7. When complete, log into a Ceph MON or Controller node and re-enable cluster rebalancing:

```
$ sudo podman exec -it ceph-mon-controller-0 ceph osd unset noout
$ sudo podman exec -it ceph-mon-controller-0 ceph osd unset norebalance
```

8. Perform a final status check to verify that the cluster reports **HEALTH\_OK**:

```
$ sudo podman exec -it ceph-mon-controller-0 ceph status
```

## 5.3. REBOOTING COMPUTE NODES

Complete the following steps to reboot Compute nodes. To ensure minimal downtime of instances in your Red Hat OpenStack Platform environment, this procedure also includes instructions about migrating instances from the Compute node that you want to reboot. This involves the following workflow:

- Decide whether to migrate instances to another Compute node before rebooting the node.
- Select and disable the Compute node you want to reboot so that it does not provision new instances.
- Migrate the instances to another Compute node.
- Reboot the empty Compute node.
- Enable the empty Compute node.

## Prerequisites

Before you reboot the Compute node, you must decide whether to migrate instances to another Compute node while the node is rebooting.

If for some reason you cannot or do not want to migrate the instances, you can set the following core template parameters to control the state of the instances after the Compute node reboots:

### NovaResumeGuestsStateOnHostBoot

Determines whether to return instances to the same state on the Compute node after reboot. When set to **False**, the instances remain down and you must start them manually. Default value is: **False**

### NovaResumeGuestsShutdownTimeout

Number of seconds to wait for an instance to shut down before rebooting. It is not recommended to set this value to **0**. Default value is: 300

For more information about overcloud parameters and their usage, see [Overcloud Parameters](#).

## Procedure

1. Log in to the undercloud as the **stack** user.
2. List all Compute nodes and their UUIDs:

```
$ source ~/stackrc
(undercloud) $ openstack server list --name compute
```

Identify the UUID of the Compute node that you want to reboot.

3. From the undercloud, select a Compute node. Disable the node:

```
$ source ~/overcloudrc
(overcloud) $ openstack compute service list
(overcloud) $ openstack compute service set [hostname] nova-compute --disable
```

4. List all instances on the Compute node:

```
(overcloud) $ openstack server list --host [hostname] --all-projects
```

5. If you decide not to migrate instances, skip to [this step](#).
6. If you decide to migrate the instances to another Compute node, use one of the following commands:

- Migrate the instance to a different host:

```
(overcloud) $ openstack server migrate [instance-id] --live [target-host]--wait
```

- Let **nova-scheduler** automatically select the target host:

```
(overcloud) $ nova live-migration [instance-id]
```

- Live migrate all instances at once:

```
$ nova host-evacuate-live [hostname]
```



**NOTE**

The **nova** command might cause some deprecation warnings, which are safe to ignore.

7. Wait until migration completes.

8. Confirm that the migration was successful:

```
(overcloud) $ openstack server list --host [hostname] --all-projects
```

9. Continue to migrate instances until none remain on the chosen Compute node.

10. Log in to the Compute node and reboot the node:

```
[heat-admin@overcloud-compute-0 ~]$ sudo reboot
```

11. Wait until the node boots.

12. Re-enable the Compute node:

```
$ source ~/overcloudrc  
(overcloud) $ openstack compute service set [hostname] nova-compute --enable
```

13. Check that the Compute node is enabled:

```
(overcloud) $ openstack compute service list
```