Oracle Private Cloud Appliance

Patching Guide for Release 2.4.3.x and Release 2.4.4.x

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Preface

This document is part of the documentation set for Oracle Private Cloud Appliance (PCA) Release 2.4. All Oracle Private Cloud Appliance product documentation is available at:

- Oracle Private Cloud Appliance
- Oracle Private Cloud Appliance Release 2.x
- Oracle Private Cloud Appliance Release 2.4.x

The documentation set consists of the following items:

Oracle Private Cloud Appliance Release Notes
The release notes provide a summary of the new features, changes, fixed bugs, and known issues in this release of Oracle Private Cloud Appliance. The release notes also provide the link on My Oracle Support to the upgrade guide for the release.

Oracle Private Cloud Appliance Upgrade Guide
The upgrade guide provides specific instructions for how to upgrade an Oracle Private Cloud Appliance to a new release by using the Upgrader Tool.
Newer Oracle Private Cloud Appliance upgrade information is on My Oracle Support. See the release notes for the release for specific links.
Upgrade instructions for Release 2.4.4.1 are in the Oracle Private Cloud Appliance Upgrade Guide for Release 2.4.4.1.
Prior to Oracle Private Cloud Appliance Release 2.4.4.1, upgrade instructions are in a chapter in the Oracle Private Cloud Appliance Administrator's Guide for the release.

Oracle Private Cloud Appliance Patching Guide
The patching guide describes how to patch a Private Cloud Appliance using dedicated channels on the Unbreakable Linux Network (ULN). Patching provides security updates, kernel changes, and bug fixes between larger ISO releases, for both management and compute nodes.

Oracle Private Cloud Appliance Installation Guide
The installation guide provides detailed instructions to prepare the installation site and install Oracle Private Cloud Appliance. It also includes the procedures to install additional compute nodes, and to connect and configure external storage components.

Oracle Private Cloud Appliance Safety and Compliance Guide
The safety and compliance guide is a supplemental guide to the safety aspects of Oracle Private Cloud Appliance.

Oracle Private Cloud Appliance Administrator's Guide
The administrator's guide provides instructions for using the management software. It is a comprehensive guide to how to configure, monitor and administer Oracle Private Cloud Appliance.

Oracle Private Cloud Appliance Licensing Information User Manual
The licensing information user manual provides information about the various product licenses applicable to the use of Oracle Private Cloud Appliance.

Oracle Private Cloud Appliance Quick Start Poster
The quick start poster provides a step-by-step description of the hardware installation and initial software configuration of Oracle Private Cloud Appliance. A printed quick start poster is shipped with each Oracle Private Cloud Appliance base rack, and is intended for data center operators and administrators who are new to the product.
The quick start poster is also available in the documentation set as an HTML guide, which contains alternate text for ADA 508 compliance.

Oracle Private Cloud Appliance Expansion Node Setup Poster
The expansion node setup poster provides a step-by-step description of the installation procedure for an Oracle Private Cloud Appliance expansion node. A printed expansion node setup poster is shipped with each Oracle Private Cloud Appliance expansion node.
The expansion node setup poster is also available in the documentation set as an HTML guide, which contains alternate text for ADA 508 compliance.

Audience

The Oracle Private Cloud Appliance documentation is written for technicians, authorized service providers, data center operators and system administrators who want to install, configure and maintain a private cloud environment in order to deploy virtual machines for users. It is assumed that readers have experience installing and troubleshooting hardware, are familiar with web and virtualization technologies and have a general understanding of operating systems such as UNIX (including Linux) and Windows.

The Oracle Private Cloud Appliance makes use of Oracle Linux and Oracle Solaris operating systems within its component configuration. It is advisable that administrators have experience of these operating systems at the very least. Oracle Private Cloud Appliance is capable of running virtual machines with a variety of operating systems including Oracle Solaris and other UNIX systems, Linux, and Microsoft Windows. The selection of operating systems deployed in guests on Oracle Private Cloud Appliance determines the requirements of your administrative knowledge.

Related Documentation

Additional Oracle components are included with Oracle Private Cloud Appliance depending on configuration. Following are references to documentation for common additional components:

- Oracle Rack Cabinet 1242

  https://docs.oracle.com/en/servers/options/rack-cabinet-1242/index.html
- Oracle Server X86 Servers

  https://docs.oracle.com/en/servers/index.html
- Oracle ZFS Storage Appliance ZS7-2

  https://docs.oracle.com/en/storage/zfs-storage/zfs-appliance/os8-8-x/
- Oracle Integrated Lights Out Manager (ILOM) 4.0.x

  https://docs.oracle.com/cd/E81115_01/index.html
- Oracle Integrated Lights Out Manager (ILOM) 5.0

https://docs.oracle.com/en/servers/management/ilom/index.html

- Oracle VM

  https://docs.oracle.com/en/virtualization/oracle-vm/index.html

- Oracle VM Manager Release 3.4.7.2

  Oracle VM : What's New with Release 3.4.7 - Latest Information (Doc ID 2832974.1)

- Oracle VM Manager/Oracle Linux Server/Kernel versions

  [PCA 2.x] OVMM/OVS/Kernel Versions Matrix (Doc ID 2325981.1)

- Oracle Enterprise Manager Plug-in

  https://docs.oracle.com/en/enterprise-manager/cloud-control/enterprise-manager-cloud-control/13.5/index.html

Feedback

Provide feedback about this documentation at:

https://www.oracle.com/goto/docfeedback

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at https://www.oracle.com/corporate/accessibility/.

Access to Oracle Support for Accessibility

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit https://www.oracle.com/corporate/accessibility/learning-support.html#support-tab.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our

initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1

Patching Your Oracle Private Cloud Appliance

This guide describes the patching process for your Oracle Private Cloud Appliance.

Patching is different from upgrading.

Upgrading
Upgrades are delivered as ISO files and performed by using the Upgrader Tool. ISO releases include any patch updates that were delivered prior to the ISO release. For information about upgrading, see Upgrading Oracle Private Cloud Appliance in the *Oracle Private Cloud Appliance Administration Guide for Release 2.4.4*.

Patching
Patches are available as RPM packages through dedicated channels on the Unbreakable Linux Network (ULN). Patching provides security updates, kernel changes, and bug fixes between larger ISO releases.

This chapter describes two ways to configure ULN access for the Private Cloud Appliance:

- Through a local mirror server in your data center.
- Direct access to ULN without going through a mirror.

To use patching, do the following:

1. Obtain a valid Customer Support Identifier (CSI).

   Access to ULN requires a valid Customer Support Identifier (CSI). Your CSI is an identifier that is issued to you when you purchase Oracle Support for an Oracle product. If you do not already have one, get a valid CSI for Oracle Private Cloud Appliance 2.4.x engineered systems. You must provide a valid CSI that covers the support entitlement for each system that you register with ULN. For more information, see CSI Administration in Oracle Linux Unbreakable Linux Network User's Guide for Oracle Linux 6 and Oracle Linux 7.

2. Configure your environment to access channel updates. See Configuring Private Cloud Appliance Direct Access, Registering Your Oracle Private Cloud Appliance for ULN Updates, and Configuring a Mirror Server.

Configuring Private Cloud Appliance Direct Access

This procedure describes how to set up channels on the Private Cloud Appliance that are directly connected to ULN repositories on `linux.oracle.com`.

1. (Optional) Set the proxy.

   If your organization uses a proxy server as an intermediary for Internet access, specify the `proxy` setting as described in Configuring the Use of a Proxy Server in the Oracle Linux documentation.

> **Note:**
>
> For Private Cloud Appliance direct configurations, specify the `proxy` setting in the `/etc/sysconfig/rhn/up2date` file, not in the `/etc/yum.conf` file.

2. Ensure that this appliance can access `linux.oracle.com` on ports 80 and 443.

   See also the My Oracle Support document How to troubleshoot ULN connectivity (Doc ID 1958230.1).

3. Register the Private Cloud Appliance management node with ULN.

   Follow the instructions in Registering Your Oracle Private Cloud Appliance for ULN Updates.

   See also ULN Registration in the Oracle Linux documentation.

4. Subscribe the appliance to the ULN channels.

   a. Log in to the ULN site.

   b. In the list of registered systems, find this Private Cloud Appliance.

   c. Deselect all channels. Some channels are pre-selected by default.

   d. Subscribe to the appropriate PCA channels.

      For example, for Oracle Private Cloud Appliance release 2.4.4.2, subscribe to PCA 2.4.4.2 MN (`pca2442_x86_64_mn`) and PCA 2.4.4.2 CN (`pca2442_x86_64_cn`). For Oracle Private Cloud Appliance release 2.4.3.2, subscribe to `pca2432_x86_64_mn` and `pca2432_x86_64_cn`.

      PCA MN and CN channels are the only supported ULN channels for patching a Private Cloud Appliance. Any channels other than those will be deactivated during patching operations.

   To add ULN channels from the command line, see the My Oracle Support document Oracle Linux: Managing ULN Channel Subscriptions via Command Line (Doc ID 1674425.1).

   Use the following command to verify that the channels are visible on the management node:

   ```
   # /usr/sbin/uln-channel --list
   ```

5. Create the ULN repositories on the appliance.

   Run the following command on the master management node:

   ```
   # /usr/sbin/pca-admin create uln-repo direct
   Status: Success
   ```

   This command checks whether a ULN repository is already configured by checking whether the file `/nfs/shared_storage/conf/uln.conf` exists. If this file does not already exist, this command creates the `uln.conf` file with entries that define the repository configuration as direct.

   When successful, the repositories are available for management node and compute node updates at the following location:

   `/nfs/shared_storage/yum/pca_patch_`***`pca_version`***

For example, repositories are configured at the following locations:

```
/nfs/shared_storage/yum/pca_patch_2.4.4.2/cn
/nfs/shared_storage/yum/pca_patch_2.4.4.2/mn
```

The entry for the ULN compute node repository is added to the `ovm.repo` file in the `/etc/yum.repos.d` directory on the compute nodes and enabled.

Use the following command to further verify that the repositories were created successfully:

```
# /usr/sbin/pca-admin show uln-repo
----------------------------------------
Repository Type Direct
Management Patch Repo Created Yes
Compute Patch Repo Created Yes
----------------------------------------

Status: Success
```

The value of Created is No if no RPM packages have been delivered to that repository yet.

The `ovca.log` file catalogs repository creation operations, including information such as the channels that were used to populate the repositories, the names of the management node and compute node repositories, and the full path to the ULN configuration file.

The ULN configuration file shows the following:

```
# cat /nfs/shared_storage/conf/uln.conf
[uln]
repo_type = direct
cn_repo = False
mn_repo = False
```

The values of `cn_repo` or `mn_repo` will be True once the repositories are set up.

The following information is available if the repository setup did not complete successfully:

- The `show uln-repo` command shows the message "No patch repositories setup. Run create uln-repo to create repositories."
- The `ovca.log` file shows failure messages.

If the `create uln-repo` command completed successfully, any subsequent execution of the `create uln-repo` command will fail with a message that a repository is already set up and showing the URI of the repository.

6. Continue to Patching Management and Compute Nodes.

Registering Your Oracle Private Cloud Appliance for ULN Updates

This topic demonstrates how to register your Oracle Private Cloud Appliance for ULN patch updates.

Log in to the master management node.

Run the `uln_register` command. If the appliance is already registered with ULN, the `uln_register` command will fail. You can run `uln_register -f` to update the existing registration.

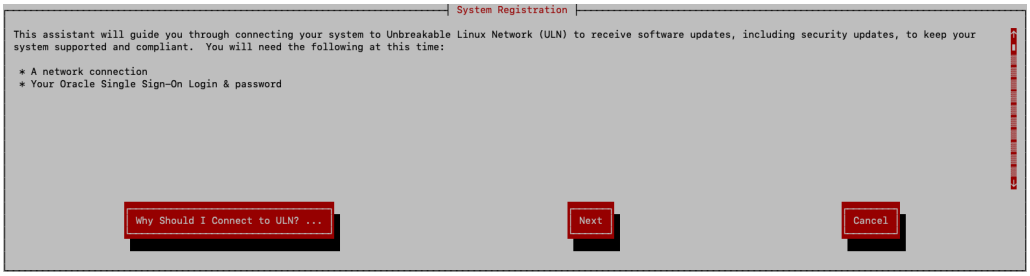
```
# /usr/sbin/uln_register
```

Follow the instructions on the screens.

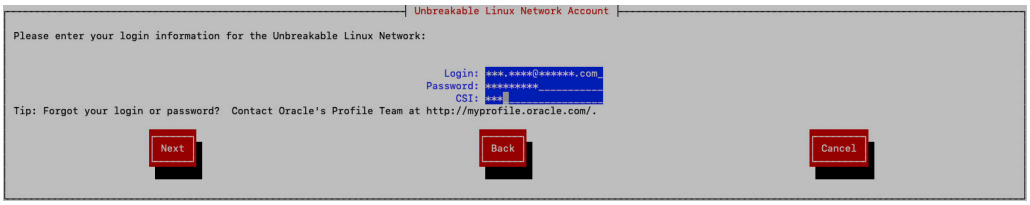
As an alternative to clicking on elements with your mouse, you can use the Tab and Alt+Tab keyboard keys to navigate between elements, and press the space bar to toggle a selection.

To go to the next screen, click the Next button, press the F12 key, or tab to the Next button and press the Enter key.

The first screen is the System Registration screen. After reading it, go to the next screen.

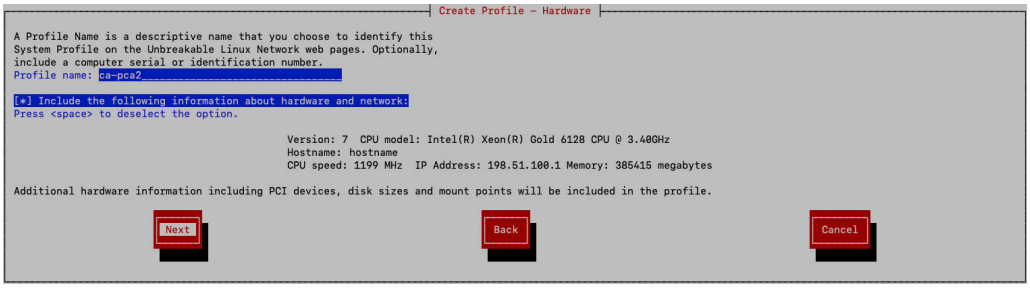


On the second screen, log in to your ULN account. After entering your user name, password, and CSI, go to the next screen.

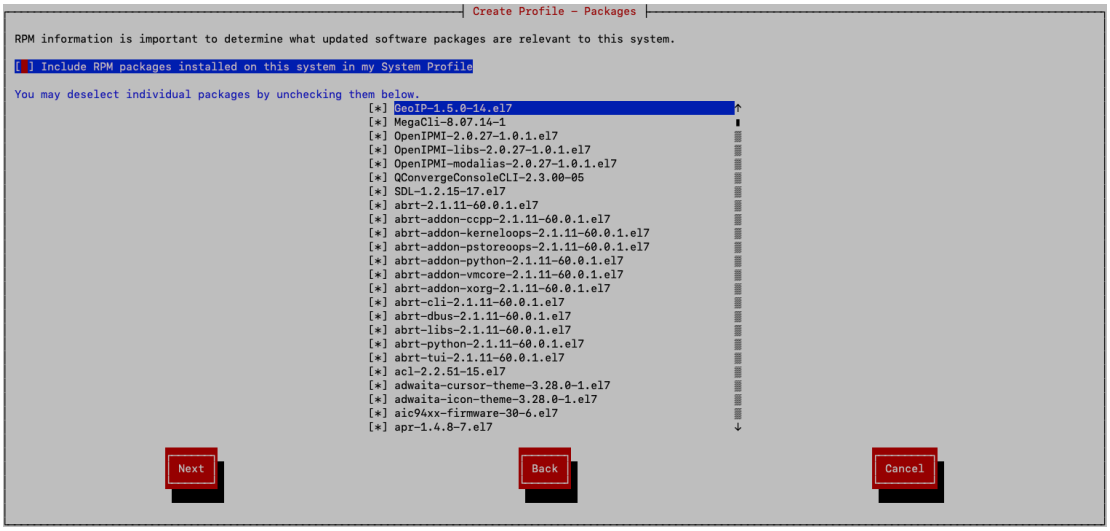


On the third screen, create the hardware profile for this appliance. Enter a descriptive name for the profile. The default profile name is the system host name.

Decide whether to include the information that the registration tool finds about the appliance. This information is shown on the screen. To exclude that information, select (highlight) the "Include the following information about hardware and network" field and then press the space bar to deselect that option. Go to the next screen.

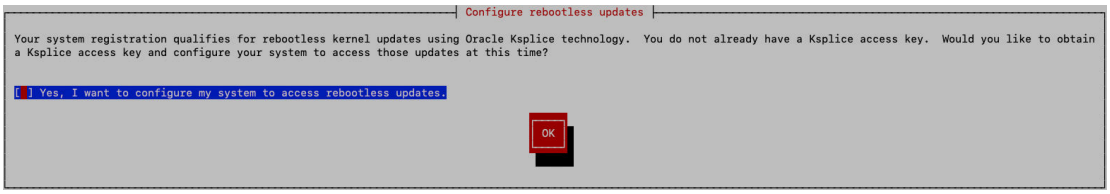


On the select packages screen, select (highlight) the "Include RPM packages installed on this system in my System Profile" field and then press the space bar to deselect that option. Go to the next screen.



On the next screen, confirm that you want to use the information from the previous screens to create the system profile for this appliance. To confirm, select Next to register the appliance with ULN and go to the next screen.

Rebootless kernel updates are not supported for channel updates. Select (highlight) the "Yes, I want to configure my system to access rebootless updates" field and then press the space bar to deselect that option. Click OK to go to the next screen.



Read the Review Subscription screen, and click the OK button to finalize the registration and exit the ULN registration tool.

The file `/etc/sysconfig/rhn/systemid` is created, which contains the ULN registration and configuration of the system.

The `yum-rhn-plugin` is enabled.

Return to Configuring Private Cloud Appliance Direct Access.

Configuring a Mirror Server

This procedure describes how to set up channels on a ULN mirror server.

1. (Optional) Set the proxy.

   If your organization uses a proxy server as an intermediary for Internet access, specify the `proxy` setting in the `/etc/yum.conf` file as described in Configuring the Use of a Proxy Server in the Oracle Linux documentation.

2. Ensure the following:

   - This server can access `linux.oracle.com` on ports 80 and 443.

     See also the My Oracle Support document How to troubleshoot ULN connectivity (Doc ID 1958230.1).

   - The Private Cloud Appliance to be patched can access this server.

3. Configure the ULN mirror.

   See Creating and Using a Local ULN Mirror in the Oracle Linux documentation.

   > **Note:**
   >
   > You must be running version `uln-yum-mirror-0.3.0-10.el7.noarch.rpm` or later. Otherwise, running `uln-yum-mirror` might result in a misconfigured repository path.

4. Subscribe the mirror server to the appropriate PCA ULN channels.

   For example, for Oracle Private Cloud Appliance release 2.4.4.2, subscribe to PCA 2.4.4.2 MN (`pca2442_x86_64_mn`) and PCA 2.4.4.2 CN (`pca2442_x86_64_cn`). For Oracle Private Cloud Appliance release 2.4.3.2, subscribe to `pca2432_x86_64_mn` and `pca2432_x86_64_cn`.

   A mirror server can be subscribed to additional channels.

- Use only these PCA MN and CN channels to install Private Cloud Appliance patches. Updating the appliance using other channels and other methods is not supported.
- Best practice is to isolate Private Cloud Appliance ULN channels from other ULN channels.

5. Create a local `yum` ULN mirror on this server.

   Follow the instructions in Prerequisites for the Local ULN Mirror in the Oracle Linux documentation to set up the channel mirror on a data center server that the Private Cloud Appliance can access.

6. Ensure that updates are enabled.

   See Oracle Linux 7 - "uln-yum-mirror" Fails to Build Local YUM Repository and Reports Error "Warning: cannot find repository" (Doc ID 2540192.1).

7. Verify the repositories are configured on the mirror server.

   ```
   # yum repolist
   ```

8. Connect to the repositories from the Private Cloud Appliance.

   Run the following command from the master management node:

   ```
   # /usr/sbin/pca-admin create uln-repo mirror mirror_uri
   ```

   The format of ***mirror_uri*** is `http://`***your_datacenter_uri***`/yum`, as shown in the following example:

   ```
   # /usr/sbin/pca-admin create uln-repo mirror http://198.51.100.10/yum
   Status: Success
   ```

   The ULN repository configuration file, `/nfs/shared_storage/conf/uln.conf`, is constructed for access to the ULN mirror, and the repositories are pulled over and set up on the active management node. This configuration file is populated with the mirror repository URI (***mirror_uri***), with `repo_type` set to Mirror, and with values for `cn_repo` and `mn_repo` to indicate which repositories have been set up on the system.

   The `/nfs/shared_storage/conf/uln.repo` file is created with the details required to pull the repositories from the mirror server for the ULN channels that are available.

   The repositories at ***mirror_uri*** are pulled over and set up on the Private Cloud Appliance in the following location:

   ```
   /nfs/shared_storage/yum/pca_patch_pca_version
   ```

   For example, repositories are configured at the following locations:

   ```
   /nfs/shared_storage/yum/pca_patch_2.4.4.2/cn
   /nfs/shared_storage/yum/pca_patch_2.4.4.2/mn
   ```

   The entry for the ULN compute node repository is added to the `ovm.repo` file in the `/etc/yum.repos.d` directory on the compute nodes and enabled.

   Repositories that are defined in `/etc/yum/plugin.d/rhn.conf`, as well as any that are enabled in other configuration files in `/etc/yum.repos.d`, are disabled.

9. Verify that the repositories are configured on the Private Cloud Appliance.

   Use the following command to verify that the repositories were created successfully:

   ```
   # /usr/sbin/pca-admin show uln-repo
   ---------------------------------------
   Repository Type Mirror
   ```

```
Mirror Location mirror_uri
Management Patch Repo Created Yes
Compute Patch Repo Created Yes
----------------------------------------

Status: Success
```

The preceding output shows that the repositories are successfully configured on the mirror server and mirrored on the appliance. The value of Created is No if no RPM packages have been delivered to that repository yet.

If repositories are not configured, the `show uln-repo` command shows the message "No patch repositories setup. Run create uln-repo to create repositories."

The ULN configuration file shows the following:

```
# cat /nfs/shared_storage/conf/uln.conf
[uln]
repo_type = mirror
uln_mirror = mirror_uri
cn_repo = False
mn_repo = False
```

The values of `cn_repo` or `mn_repo` will be True once the repositories are set up.

If the `create uln-repo` command completed successfully, any subsequent execution of the `create uln-repo` command will fail with a message that a repository is already set up and showing the URI of the repository.

10. If the repository setup completed successfully, continue to Patching Management and Compute Nodes.

Patching Management and Compute Nodes

After you have completed either Configuring Private Cloud Appliance Direct Access or Configuring a Mirror Server, you are ready to patch the appliance.

Run these commands from the master management node.

1. Verify that the repositories are configured.

   ```
   # /usr/sbin/pca-admin show uln-repo
   ```

   If repositories are not configured, the `show uln-repo` command shows the message "No patch repositories setup. Run create uln-repo to create repositories." See Configuring Private Cloud Appliance Direct Access or Configuring a Mirror Server.

2. Update the ULN repositories.

   a. If necessary, set the proxy as you did in Configuring Private Cloud Appliance Direct Access or Configuring a Mirror Server.

   b. Update local ULN repositories.

   ```
   # /usr/sbin/pca-admin update uln-repo
   ************************************************************
    WARNING !!! THIS IS A DESTRUCTIVE OPERATION.
   ************************************************************
   Are you sure [y/N]:y

   Status: Success
   ```

The management node and compute node ULN local repositories are updated with the latest packages available.

If any failure occurred, check the `ovca.log` file for messages.

c. If a proxy is set, unset the proxy.

3. Verify that the rack is in a stable state for patching.

```
# /usr/sbin/pca_upgrader -V -t patch -c remote_mn_name
```

The `pca_upgrader` pre-checks complete and report the status of the rack on the command line and to the log file:

`pca_upgrader_date_time_remote_mn_name_verify_patch.log`

4. Check whether a management node patch is available.

```
# /usr/sbin/pca-admin show uln-repo
...
Management Patch Repo Created Yes
```

This example shows that a management node patch is available. If the value of Created is No, no management node patch is available.

5. Patch the remote management node.

```
# /usr/sbin/pca_upgrader -U -t patch -c remote_mn_name
```

The non-master management node is updated with the packages in the management ULN repository. The result is reported in the log file:

`pca_upgrader_date_time_remote_mn_name_patch.log`

The appliance fails over to the patched management node.

6. Verify that the appliance failed over to the patched management node.

The previously patched manager should now be the master. The `pca-check-master` command shows True for the patched management node and False for the unpatched management node.

7. Patch the second (new remote) management node.

```
# /usr/sbin/pca_upgrader -U -t patch -c remote_mn_name
```

8. Check whether a compute node patch is available.

```
# /usr/sbin/pca-admin show uln-repo
...
Compute Patch Repo Created Yes
```

This example shows that a compute node patch is available. If the value of Created is No, no compute node patch is available.

9. Patch the compute nodes.

> **Note:**
>
> Before patching a compute node, use Oracle VM Manager to place the compute node into maintenance mode.

```
# /usr/sbin/pca-admin update compute-node cn_name
```

The compute node is updated with the packages in the compute ULN repository.

The compute node reboots to complete the patch.

Deleting ULN Channel Repositories

This procedure describes how to delete ULN channel repositories.

1. Verify that the repositories are configured.

   ```
   # /usr/sbin/pca-admin show uln-repo
   ```

   The preceding output should show a Repository Type of Direct or Mirror.

2. Delete the repositories.

   ```
   # /usr/sbin/pca-admin delete uln-repo
   ************************************************************
    WARNING !!! THIS IS A DESTRUCTIVE OPERATION.
   ************************************************************
   Are you sure [y/N]:y

   Status: Success
   ```

   Local repositories and repository configuration files are deleted.

   - The `/nfs/shared_storage/yum/pca_patch` directory is deleted.
   - All repositories are disabled.
   - The `/nfs/shared_storage/conf/uln.conf` file is deleted.
   - If a mirror server was being used, both of the following are deleted:

     ```
     /nfs/shared_storage/conf/uln.repo
     /nfs/shared_storage/conf/uln.repo.bak
     ```

   - If a direct configuration was used, the `/etc/yum/pluginconf.d/rhnplugin.conf` file is restored to its original condition, and the backup of the original is deleted.

   If any failure occurs, check the `ovca.log` file for messages.

3. (Direct configuration only) For a Private Cloud Appliance to be fully removed from a ULN configuration, perform these additional steps:

   a. Remove the system from the ULN site. If you no longer want this appliance to be subscribed, log into ULN and delete the system. See Removing a System From ULN.

   b. Log into the appliance and remove `/nfs/shared_storage/conf/systemid`.

4. Verify that the repositories are deleted.

   ```
   # /usr/sbin/pca-admin show uln-repo
   ```

   The following message is shown: "No patch repositories setup. Run create uln-repo to create repositories."