

# Oracle® Linux Storage Appliance Deployment and User's Guide

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### **About this document**

This guide describes the Oracle Linux Storage Appliance that is delivered as an Oracle Cloud Infrastructure image. The guide includes overview information, deployment instructions, and a basic use summary.

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## Preface

The *Oracle Linux Storage Appliance Deployment and User's Guide* describes how to launch and deploy Oracle Linux Storage Appliance compute instances and covers the following topics: overview information, requirements, prerequisite tasks, deployment tasks, and a description of the Oracle Linux Storage Appliance web interface.

Note that support for the Oracle Linux Storage Appliance is limited to use on Oracle Cloud Infrastructure.

## Audience

This guide is intended for users and administrators who want to use the Oracle Linux Storage Appliance to administer NFS and SMB shares on compute instances that they provision on Oracle Cloud Infrastructure. The guide includes an overview of the appliance, deployment instructions, and basic instructions on accessing and using its web interface. It is assumed that readers have a general understanding of the Oracle Linux operating system.

## Document Organization

The document is organized as follows:

- [Chapter 1, \*About the Oracle Linux Storage Appliance\*](#) provides an overview of the Oracle Linux Storage Appliance.
- [Chapter 2, \*Deploying an Oracle Linux Storage Appliance Compute Instance\*](#) describes tasks for deploying the Oracle Linux Storage Appliance.
- [Chapter 3, \*Working With the Oracle Linux Storage Appliance Web Interface\*](#) summarizes the various pages that constitute the Oracle Linux Storage Appliance web interface.
- [Chapter 4, \*Accessing Appliance Shares Over the NFS and SMB Protocols\*](#) describes how to access shares that you create on client VMs over the NFS and SMB protocols.
- [Chapter 5, \*Migrating Appliance Instances\*](#) describes how to migrate an appliance storage pool from one Oracle Cloud Infrastructure compute instance to another Oracle Cloud Infrastructure compute instance.
- [Chapter 6, \*Known Issues\*](#) describes known issues for the Oracle Linux Storage Appliance.

## Related Documents

The latest version of this document and other documentation for this product are available at:

<https://www.oracle.com/technetwork/server-storage/linux/documentation/index.html>

## Conventions

The following text conventions are used in this document:

Convention	Meaning
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.

Convention	Meaning
<code>monospace</code>	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at

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For information on documentation accessibility features specific to this document, please refer to the *Oracle Linux 7 Accessibility User's Guide* at:

[https://docs.oracle.com/cd/E52668\\_01/E92218/html/index.html](https://docs.oracle.com/cd/E52668_01/E92218/html/index.html).

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# Chapter 1 About the Oracle Linux Storage Appliance

This chapter introduces you to the Oracle Linux Storage Appliance, which is a Linux-based server that is used as a file server on Oracle Cloud Infrastructure. The Oracle Linux Storage Appliance simplifies the deployment of a file server on Oracle Cloud Infrastructure by providing a preconfigured custom image to tenants.

The Oracle Linux Storage Appliance provides a fast and easy way to build a shared storage system on Oracle Cloud Infrastructure and enables you to export files by using multiple protocols, namely Network File System (NFS) v3 and v4, and Windows Server Message Block (SMB) v3 (Samba).

This appliance can run on any Oracle Cloud Infrastructure compute shape. When no NVMe devices are attached to a shape, block volumes can be used.



## Note

The Oracle Linux Storage Appliance is intended for use on Oracle Cloud Infrastructure *only*. If you are not managing compute instances on Oracle Cloud Infrastructure, use the standard tools that are provided in Oracle Linux to manage NFS and SMB configuration. For more information, see the chapter on administering shared file systems in the *Oracle Linux System Administrator's Guide for Release 7* in the Oracle Linux 7 Documentation Library at [https://docs.oracle.com/cd/E52668\\_01/index.html](https://docs.oracle.com/cd/E52668_01/index.html).

After deploying the appliance and configuring the web interface, tenants can configure and monitor the file server by using the web interface. Supported browsers include the following: Google Chrome, version 63 and later, and Mozilla Firefox Extended Support Release (ESR), version 52 and later. For detailed instructions on using the web interface, refer to the online help.

Tasks that you can perform by using the web interface include the following:

- View the storage capacity that is available for sharing.
- View status and configuration information about the appliance.
- Create and manage shares that use the NFS and SMB protocols.

The Oracle Linux Storage Appliance currently provides support for the following export protocols: NFSv3 and NFSv4 and SMB version 3.

When deploying an Oracle Linux Storage Appliance compute instance, block volume selection is only supported at creation time and cannot be modified afterwards. Also, detaching and reattaching block volumes while the appliance is running is not supported and will result in data corruption or loss. See [Section 2.3, “Configuring an Oracle Linux Storage Appliance Compute Instance”](#) for instructions.

- Perform backup and restore operations for shares.
- Perform instance migration.

The Oracle Linux Storage appliance now supports compute instance migration, where you can migrate one appliance compute instance to another Oracle Cloud Infrastructure compute instance. Note that migration support is *only* for compute instances that have remotely attached block volumes. Migrating DenseIO shapes with local NVMe devices is not supported. For migration instructions, refer to [Chapter 5, \*Migrating Appliance Instances\*](#) and the online help in the web interface.

- 
- Perform the following system and user administrative actions on the appliance: reboot and update the appliance, restart NFS and SMB services, enable and configure supported features, view system, boot, and service logs.

You access the shares that you create with the appliance on client virtual machines (VMs) over NFS and SMB by using a standard `mount` command.

The remaining chapters of this guide provide instructions on configuring Oracle Cloud Infrastructure requirements, deploying an Oracle Linux Storage Appliance compute instance, configuring and accessing the web interface for the appliance, and basic information about creating, managing, and mounting shares over NFS and SMB.



# Chapter 2 Deploying an Oracle Linux Storage Appliance Compute Instance

This chapter describes how to deploy Oracle Linux Storage Appliance compute instances on Oracle Cloud Infrastructure.

This chapter provides instructions on launching an Oracle Linux Storage Appliance compute instance on Oracle Cloud Infrastructure by using the embedded Marketplace; and, alternatively, by using the Custom Image import feature. Note that using the embedded Marketplace is preferred over the method where you import the appliance image.

For more information about the Marketplace, visit <https://www.oracle.com/technetwork/server-storage/linux/technologies/default-3868073.html>.

## 2.1 Oracle Linux Storage Appliance Deployment Prerequisites



### Note

If you have previously deployed the Oracle Linux Storage Appliance and are running an earlier version, you can upgrade to the latest package version for the appliance by using the appliance's web interface. Select the **Update Appliance** option, which is located on the Administration page. See [Chapter 3, Working With the Oracle Linux Storage Appliance Web Interface](#).

Before you upgrade to the latest appliance package version, refer to [Chapter 6, Known Issues](#).

Before you deploy Oracle Linux Storage Appliance compute instances, review the following information and perform all of the prerequisite tasks that are described:

- **Obtain an Oracle Cloud Infrastructure account.**

For more information, go to <https://cloud.oracle.com/infrastructure/compute>.

- **Configure ports for the Virtual Cloud Network.**

To access the appliance and its services, you must add the required ports to the stateful ingress rules, which is located in the default security list for the Virtual Cloud Network (VCN). The appliance will then be associated with each of these ports, thereby allowing traffic on that port for the specified protocol, service, and function.

The following table lists each of the ports that you can configure.

**Table 2.1 Ports to Associate With the Virtual Cloud Network**

Service	Destination Port Range	Protocol Type	Function
<a href="#">nfs-server</a>	111	TCP	NFS
<a href="#">nfs-server</a>	2049	TCP	NFS
<a href="#">mountd</a>	111	UDP	Autofs/Showmount
<a href="#">httpd</a>	443	TCP	HTTPS
<a href="#">statd</a>	662	TCP	NFS <a href="#">statd</a>
<a href="#">mountd</a>	20048	TCP	Autofs/Showmount

Service	Destination Port Range	Protocol Type	Function
lockd	32803	TCP	NFS lockd
sshd	22	TCP	SSH
smbd	135	TCP	smbd
smbd	139	TCP	smbd
smbd	445	TCP	smbd
nmbd	137	UDP	nmbd
nmbd	138	UDP	nmbd

When adding the port configuration, use the following format:

**Source:** *CIDR-range-of-your-VCN*

**IP Protocol:** *IP-protocol*

**Source Port Range:** All

**Destination Port Range:** *port-range*

For example, if your VCN Classless Inter-Domain Routing (CIDR) range is `172.16.0.0/16`, you would use the following port configuration:

**Source:** `172.16.0.0/16`

**IP Protocol:** TCP

**Source Port Range:** All

**Destination Port Range:** `111`

The port configuration in the previous example provides access to the appliance from any instance within your VCN. You can restrict access to a smaller set of instances by changing the source CIDR, as required. For more details, see <https://docs.us-phoenix-1.oraclecloud.com/Content/Network/Concepts/securitylists.htm>.

Note that the source CIDR range for SSH should be `0.0.0.0/0` so that you can access SSH remotely. See Step 2g. of [Section 2.3, “Configuring an Oracle Linux Storage Appliance Compute Instance”](#) for instructions on accessing the web interface over SSH.

## 2.2 Launching an Oracle Linux Storage Appliance Compute Instance

You can launch an Oracle Linux Storage Appliance compute instance by using the embedded Marketplace, which is accessed from the Oracle Cloud Infrastructure console. Or, alternatively, you can use the Custom Image import feature on Oracle Cloud Infrastructure to launch an Oracle Linux Storage Appliance compute instance. Using the Marketplace method is preferred over the method where you import the appliance image, as it is easier and quicker. You can then deploy the image directly from the Marketplace on your Oracle Cloud Infrastructure compute instance.



### Note

If you are using the Marketplace to launch an Oracle Linux Storage Appliance compute instance, you can skip the steps in [Section 2.2.2, “Launching an Oracle](#)

[Linux Storage Appliance Compute Instance by Using the Custom Image Import Feature](#)".

## 2.2.1 Launching an Oracle Linux Storage Appliance Compute Instance by Using the Marketplace

The preferred method for launching an Oracle Linux Storage Appliance compute instance is to use the embedded Marketplace on Oracle Cloud Infrastructure. To launch an Oracle Linux Storage Appliance compute instance by using this method, follow these steps:

1. Access the Oracle Cloud Infrastructure console, then click the navigation menu icon, which is located on the top left side of the console.
2. Under **Solutions, Platform and Edge** option, select **Marketplace** from the drop-down list.
3. Select the Oracle Linux Storage Appliance application, then follow the click-through instructions.

The click-through instructions take you to the **Create Compute Instance** dialog box where the Oracle Linux Storage Appliance image is pre-populated as the source image.

4. Follow the instructions in [Section 2.3, "Configuring an Oracle Linux Storage Appliance Compute Instance"](#) to configure the compute instance by using the **Create Compute Instance** dialog box.

## 2.2.2 Launching an Oracle Linux Storage Appliance Compute Instance by Using the Custom Image Import Feature

You can alternatively launch an Oracle Linux Storage Appliance compute image on Oracle Cloud Infrastructure by first importing the image using the Custom Image import feature. However, because this method requires additional steps, the preferred method is to use the embedded Marketplace, as described in [Section 2.2.1, "Launching an Oracle Linux Storage Appliance Compute Instance by Using the Marketplace"](#). To launch the compute instance by importing a custom image, follow these steps:

1. Access the Oracle Cloud Infrastructure console.  
From the **Compute** menu, select the **Custom Images** option.
2. Click **Import Image** to open the **Import Image** dialog box.
3. In the **Custom Image** dialog box, provide the following information:
  - From the **Create Compartment** drop-down list, select the compartment in which the image will be visible.
  - In the **Name** field, provide a name for the image.

Take note of the name of the image, as you need to select this image in Step 2c. of [Section 2.3, "Configuring an Oracle Linux Storage Appliance Compute Instance"](#).

- In the **Object Storage URL** field, type the URL to the latest image, which is available at:  
<https://www.oracle.com/technetwork/server-storage/linux/technologies/default-3868073.html>.
- For the **Image Type** setting, select the **QCOW2** option.
- For the **Launch Mode** setting, select the **Native Mode** option.
- Click **Import Image**.

After it is imported, the appliance image becomes available in the **Custom Images** section.

4. From the **Compute** menu on the Oracle Cloud Infrastructure console, select **Instances**, then click **Create Instance**.
5. Follow the instructions in [Section 2.3, “Configuring an Oracle Linux Storage Appliance Compute Instance”](#) to configure the compute instance by using the **Create Compute Instance** dialog box.

## 2.3 Configuring an Oracle Linux Storage Appliance Compute Instance

When you have reached the **Create Compute Instance** dialog box, after completing the launch instructions by using either of the previously described methods, you can configure and create the compute instance as follows:

1. Provide a name for the instance.
2. Select the availability domain.
3. If you imported the appliance image to a custom image, click **Change Image Source**, and select the image that you imported previously, which is located in the **Custom Images** section.



### Note

If you launched the image by using the embedded Marketplace, the appliance image source should be automatically selected.

4. Select a supported shape instance.

The Oracle Linux Storage Appliance can run on all Oracle Cloud Infrastructure shapes. When selecting a shape instance, note the following additional information:

- For Oracle Cloud Infrastructure compute instances with NVMe disks attached, the storage pool is created automatically.



### Note

When you create an Oracle Linux Storage Appliance instance on a Dense I/O shape or VM compute instance with attached NVMe devices, any block volumes that are attached to the instance are not available for share creation. Mixed NVMe and block volume support per instance is not available.

- For Oracle Cloud Infrastructure shape instances without NVMe disks attached, block volumes that are attached to the shape instance can be used as the storage pool.

For this shape instance, you must create the block volumes and attach them to an instance. For instructions, see <https://docs.us-phoenix-1.oraclecloud.com/Content/GSG/Tasks/addingstorage.htm>.

Note that attached block volumes are automatically mounted and attached. There is no need to mount them manually.

After an initial login to the web interface for the Oracle Linux Storage appliance, you are presented with a list of available block volumes that you can use to create the appliance storage pool.



### Caution

Block volume selection is only supported at creation time and cannot be modified afterwards. Also, detaching and reattaching block volumes while the appliance is running is not supported and will result in data corruption or loss.

5. Select the VCN that has its ports configured with the appropriate information.

Refer to [Section 2.1, “Oracle Linux Storage Appliance Deployment Prerequisites”](#).

6. Define any remaining parameters for the instance as you normally would for any other instance.
7. When you are done configuring the instance, click **Create**.

The instance will deploy and start immediately.

8. Gain secure access to the web interface by using SSH to port forward, as follows:

- a. On your local Linux or macOS client, run the following command:

```
# ssh -N -L 8443:127.0.0.1:443 opc@public_IP_of_the_storage_appliance
```

Note that the command does not return.

- b. Open a browser and point to <https://localhost:8443>, then accept the self-signed certificate to continue.



### Note

If you are running at least Oracle Linux 7 Update 3, you will also need to perform an NFS client installation as part of the deployment. See [Chapter 4, \*Accessing Appliance Shares Over the NFS and SMB Protocols\*](#).

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# Chapter 3 Working With the Oracle Linux Storage Appliance Web Interface

This chapter provides a summary of the web interface for the Oracle Linux Storage Appliance. For detailed instructions on using the web interface, refer to the online help that is included with the appliance.

After you have deployed the Oracle Linux Storage Appliance, you must configure access to the web interface by pointing your browser at the instance's public IP address. See [Section 2.3, “Configuring an Oracle Linux Storage Appliance Compute Instance”](#). In addition, you must create an `Admin` password.

After logging into the web interface with the appropriate credentials, you can do the following:

- View the storage capacity that is available for shares.
- Display status and configuration information about the appliance.
- Create and manage shares and associate them with the NFS and SMB protocols.
- Migrate an appliance storage pool from one Oracle Cloud Infrastructure compute instance to another Oracle Cloud Infrastructure compute instance.
- Perform backup and recovery operations and other system and user administrative actions.
- Check for known issues.

## 3.1 Dashboard Page

The Dashboard page provides an overview of the storage capacity that is available for sharing. You can also view the number of NFS and SMB clients that are currently connected to the appliance on this page.

The Dashboard page also includes information about the appliance itself, such as configuration information and the status of the appliance's main resources, for example, CPU, memory, swap usage, and file system utilization. Items with an `Okay` status are shown in Green on this page, while a Red status for any item indicates a potential problem.

## 3.2 Storage Page

The Storage page is where you can view information about the storage capacity that is available for sharing, as well as create and manage shares and perform backup and recovery operations.

You can view the following information about existing shares on this page:

- Name of the share
- Disk space that is reserved for the share
- Remaining free space that is available for the share
- List of the protocols that are used to export the share content
- Date of the last backup for the share

You can also view information about the RAID health status of the appliance on the Storage page.

On the Storage page, you can perform the following actions:

- Add a share.

- Associate an export protocol with a share.

The protocols that you can associate with a share include NFS and SMB. See [Section 2.1, “Oracle Linux Storage Appliance Deployment Prerequisites”](#) for additional, required configuration information.

**Note**

If you associate the SMB export protocol with a share, you must also configure the **Samba global settings** on the Administration page of the appliance for the export protocol to work.

- Delete a share.
- View and modify a share and its associated exports.
- Duplicate a share.
- Perform backup and restore operations for shares.

### 3.3 Appliance Page

The Appliance page is where you can view configuration information for the appliance, including the status of its main resources and the state of key services.

On the Appliance page, you can view the following platform status information about the appliance:

- CPU
- Memory
- Swap usage
- Utilization of the `root` file system

Items that shown in Green indicate an Okay status for the appliance, while items in Red indicate a potential problem. If you need to troubleshoot common issues, go to the Administration page, where you can view log files and perform several administrative actions.

### 3.4 Administration Page

The Administration page is where you can perform several administrative actions and troubleshoot problems with the appliance.

This page is also where you can migrate an appliance storage pool from one Oracle Cloud Infrastructure compute instance to another Oracle Cloud Infrastructure compute instance. This feature is useful if any initial instance resources, such as Oracle Compute Unit (OCPU) or memory resources are running out. For instructions, see [Chapter 5, \*Migrating Appliance Instances\*](#) and the online help in the web interface.

Administrative actions that you can perform on the Administration page include the following:

- Reboot the appliance.
- Update the appliance.

**Note**

This option updates the system with the latest available security updates and appliance package version.



- Restart NFS and SMB services.
- Enable the Ksplice feature.
- Configure Samba global settings.
- View system, boot, and service log entries.

User actions that you can perform on this page include the following:

- Change the [Admin](#) password.
- Update the list of SSH public keys.
- Configure service access for the Oracle Cloud Infrastructure.



**Note**

Using the command line to modify the appliance is *not* supported. Per Oracle support, only use the command line for recovery purposes. Refer to the recovery instructions that are described in the online help in the web interface for more information. See also the documentation at <https://docs.us-phoenix-1.oraclecloud.com/Content/API/Concepts/sdkconfig.htm#CLIConfiguration>.

## 3.5 Release Notes Page

This Release Notes page is where you can learn about current, known issues for the Oracle Linux Storage Appliance. When available, any workarounds or step-by-step instructions are also provided.



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## Chapter 4 Accessing Appliance Shares Over the NFS and SMB Protocols

This chapter describes how to access shares that you create on client VMs over the NFS and SMB protocols by using a standard `mount` command.

For example, you would mount an NFS share as follows:

```
# mount appliance_ip:share_path destination_path
```

See [https://docs.oracle.com/cd/E52668\\_01/E54669/html/ol7-cfgclnt-nfs.html](https://docs.oracle.com/cd/E52668_01/E54669/html/ol7-cfgclnt-nfs.html) for more information.



### Note

Starting with Oracle Linux 7 Update 3, the installation image does not install NFS packages by default. To mount NFS shares on this release, you must install the `nfs-utils` package on the client:

```
# yum install -y nfs-utils
```

If you are mounting an SMB share, type the following command:

```
# mount -t cifs -o guest //server_address/share_name mountpoint
```

See [https://docs.oracle.com/cd/E52668\\_01/E54669/html/ol7-s4-sharedfs.html](https://docs.oracle.com/cd/E52668_01/E54669/html/ol7-s4-sharedfs.html) for more information.

If you want to make automount directories available, such as `/net`, you must first install the `autofs` package.



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## Chapter 5 Migrating Appliance Instances

This chapter describes how to use the Oracle Linux Storage Appliance migration feature, which enables you to easily migrate an appliance storage pool from one Oracle Cloud Infrastructure compute instance to another Oracle Cloud Infrastructure compute instance. This feature is useful if you need to deploy your appliance on a new compute instance with additional Oracle OCPU and memory resources, as it eliminates the need to rebuild your existing file system server.

Note the following additional information about migration:

- During the migration process the block volume storage pool is reconfigured on the newly migrated Oracle Cloud Infrastructure compute instance.
- No shared file systems are migrated during the migration process, as these file systems remain on the existing block volumes.
- Migration only works for compute instances that have remotely attached block volumes. Migrating DenseIO shapes with local NVMe devices is not supported.

You initiate the migration process in the Administration page of the Oracle Linux Storage Appliance web interface. You then complete the migration steps in the Oracle Cloud Infrastructure console.

The following procedure describes how to migrate an existing appliance compute instance to a new Oracle Cloud Infrastructure compute instance.

1. In the web interface for the source compute instance, click the **Administration** tab, then click **Prepare for migration**.
2. In the Oracle Cloud Infrastructure console for the source instance, do the following:
  - a. Stop the source instance.
  - b. Detach all of the block volumes that are currently attached to the source instance, then terminate the source instance.



### Note

After you have stopped the source instance, detached the block volumes, and terminated the source instance, the web interface for the appliance becomes unavailable.

3. In the Oracle Cloud Infrastructure console for the destination instance, do the following:
  - a. Create a new appliance instance that meets the following requirements:
    - Must use a shape with no local storage attached.
    - Must be in the same compartment and availability domain as the source instance.
    - Must be the same or later appliance version as the source instance's version.
  - b. Attach all of the block volumes that were detached from the source instance to the destination instance.



### Note

The process of attaching the volumes can take a few minutes.

- 
- c. Reboot the destination instance.
  - d. Log in to the web interface for the destination instance and confirm that all of the shares and exports that you migrated are available.

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## Chapter 6 Known Issues

The following are known issues for the Oracle Linux Storage Appliance.

### 6.1 Upgrading From Version 1.7.1 to Version 1.8 of the Oracle Linux Storage Appliance

To enable Active Directory support after you upgrade from version 1.7.1 to version 1.8, all of the SMB exports that are present on the system must be updated.

For each SMB export on the system, do the following:

1. Launch the web interface for the Oracle Linux Storage Appliance.
2. On the Storage page, select the SMB export to modify, then from the **Actions** drop-down list, select **View/Modify**.
3. Under **Export Protocols**, change the name of the SMB export using the **SMB share name** field.
4. Click **Modify** to validate the change.
5. Open the **View/Modify** dialog box for the SMB export again, then revert the change that you made in Step 3.
6. Click **Modify** to validate the change.

