

The Oracle logo is displayed in a bold, red, sans-serif font. The background of the slide features a light gray grid with various geometric shapes: a large gear in the upper left, several circles of different sizes and colors (red, gray, orange), and thick, curved red lines at the bottom.

Cloud Infrastructure

# Oracle Linux Storage Appliance

July 11, 2024



---

# Legal Notices

---

## Copyright Notice

Copyright © 2024, Oracle and/or its affiliates.

## License Restrictions

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

## Warranty Disclaimer

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

## Restricted Rights Notice

If this is software, software documentation, data (as defined in the Federal Acquisition Regulation), or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

**U.S. GOVERNMENT END USERS:** Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software," "commercial computer software documentation," or "limited rights data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed, or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

## Hazardous Applications Notice

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

## Trademark Notice

Oracle®, Java, and MySQL are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

### **Third-Party Content, Products, and Services Disclaimer**

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

### **Documentation Accessibility**

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

### **Access to Oracle Support**

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

# Contents

<b>Legal Notices.....</b>	<b>iii</b>
<b>Oracle Linux Storage Appliance.....</b>	<b>7</b>
Oracle Linux Storage Appliance Image.....	7
Creating an Instance.....	7
Configuring Ports for the Virtual Cloud Network.....	8
Using the Web Interface.....	9
Managing the Appliance.....	10
Working with NFS and SMB Shares.....	13
Upgrading an Appliance Instance.....	15
<b>Release Notes.....</b>	<b>17</b>



---

# 🏠 Oracle Linux Storage Appliance

---

The Oracle Linux Storage Appliance provides a fast and easy way to build a shared storage system on Oracle Cloud Infrastructure.

[What's new](#)

**Support**

---

[Get help and contact Support](#)  
[Create a service request](#)

**Developer Tools**

---

[Oracle Linux Cloud Developer Image](#)  
[SDKs and the CLI](#)  
[Cloud Shell](#)

**Learn More**

---

[General Oracle Linux documentation](#)  
[Unbreakable Enterprise Kernel documentation](#)

**Community**

---

[Oracle Cloud Infrastructure blog](#)  
[Cloud infrastructure community forum](#)

---

## Oracle Linux Storage Appliance Image

---

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

**Note:**

The Oracle Linux Storage Appliance is intended for use on Oracle Cloud Infrastructure *only*. If you are managing compute instances not on Oracle Cloud Infrastructure, use the standard tools provided in Oracle Linux to manage NFS and SMB configuration. For more information, see the chapter on administering shared file systems in [Oracle Linux 7: Managing File Systems](#).

## Creating an Instance

Follow the instructions in [Creating an Instance](#), but note the following exceptions:

- **Shape Selection:** The Oracle Linux Storage Appliance can run on all Oracle Cloud Infrastructure shapes. However, depending on if the image has NVMe disks affects the storage pool configuration. See [Configuring the Storage Pool](#) on page 10.
- **Network Configuration:** When configuring the instance's network, select the VCN that has its ports configured with the appropriate information as defined in [Configuring Ports for the Virtual Cloud Network](#) on page 8.

## Configuring Ports for the Virtual Cloud Network

To access the appliance and its services, add the required ports to the stateful ingress rules in the default security list for the Virtual Cloud Network (VCN).

### List of Ports to Configure

Configure the VCN ingress rules for these ports to allow traffic for the specified protocol, service, and function.

Service	Destination Port Range	Protocol Type	Function
nfs-server	111	TCP	NFS
nfs-server	2049	TCP	NFS
mountd	111	UDP	Autofs/Showmount
httpd	443	TCP	HTTPS
statd	662	TCP	NFS statd
mountd	20048	TCP	Autofs/Showmount
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

### Format for Port Configuration

When adding the port configuration, you must use a specific 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 [Security Lists](#).

The source CIDR range for SSH should be `0.0.0.0/0` so that you can access SSH remotely. See [Accessing the Web Interface](#) on page 9.

## Using the Web Interface

The web interface of the Oracle Linux Storage Appliance allows you to manage shares and monitor the storage appliance.

Supported browsers include:

- Google Chrome version 63 and later
- Mozilla Firefox Extended Support Release (ESR) version 52 and later

### Important:

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 [Security Lists](#) in the Oracle Cloud Infrastructure documentation.

## What can I do with the web interface?

- View the storage capacity available for shares.
- Display status and configuration information about the appliance.
- Create and manage shares that use 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.
- Perform autonomous actions (if using the Autonomous Linux version of the appliance). For more information, see [Oracle Autonomous Linux Image](#).
- 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, service, and autonomous logs.

## Accessing the Web Interface

Connect to the web interface by using SSH to port forward. The first time you connect, you must set the admin password and define the storage pool.

1. On your local client, run the following command:

```
ssh -N -L 8443:127.0.0.1:443 opc@INSTANCE_PUBLIC_IP_ADDRESS -  
i PATH_TO_PRIVATE_KEY
```

The command does not return.

2. Open a browser and point to `https://localhost:8443`, then accept the self-signed certificate to continue.
3. The first time you access the web interface, you must set the admin password.

Password requirements:

- Must be at least eight characters long
  - Must contain at least one number, one special character, one uppercase, and one lowercase letter
4. If using a shape without NVMe disks, define the storage pool from a list of available block volumes. See [Configuring the Storage Pool](#) on page 10.

## Changing the Admin Password

You must set the password the first time you access the interface, but you can change the password at any time.

1. Within the web interface, click **Administration** in the upper menu.
2. Under the User Actions section, click **Change password**.
3. Enter the current password, and then enter the new password twice.

Password requirements:

- Must be at least eight characters long
- Must contain at least one number, one special character, one uppercase, and one lowercase letter

## Managing the Appliance

After deploying the appliance and configuring the web interface, you can configure and monitor the file server by using the web interface.

## Configuring the Storage Pool

Instances with NVMe disks, automatically have the storage pool created. Instances without NVMe disks, require you to attach block volumes and select them for the storage pool after you initially log into the web interface.

### CAUTION:

You cannot modify the block volumes after defining the storage pool. Detaching and reattaching block volumes while the appliance is running is not supported and will cause data corruption or loss.

### Instances with NVMe Disks

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

When you create an Oracle Linux Storage Appliance instance on a Dense I/O shape or a 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 per instance is not supported.

### Instances that use Block Volumes only

For Oracle Cloud Infrastructure instances without NVMe disks attached, you must attach block volumes to the instance and then select them for the storage pool.

1. Create and attach the block volumes to the instance. For instructions, see [Adding a Block Volume](#) in the Oracle Cloud Infrastructure documentation.

When attaching the volumes within the Oracle Cloud Infrastructure Console, you do not need to run iSCSI commands. You can ignore the iSCSI instructions as the storage appliance attaches and mounts the volumes automatically.

### Important:

You cannot modify the block volumes after creating the storage pool. Ensure you have attached all the volumes that you want to use before defining the storage pool within the web interface.

2. Log into the web interface. See [Accessing the Web Interface](#) on page 9.
3. The appliance automatically detects the attached volumes. Select the volumes to use for the storage pool, and then click **Create**.

## Viewing Storage Appliance Status

Use the Dashboard page to view high-level status information. Or use the Appliance page to view more detailed status information.

Green items indicate okay status, while red indicates 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.

### For high-level status information:

1. Within the web interface, click **Dashboard** in the top menu.
2. Review the status of the appliance.

The Storage Status section displays:

- Number of NFS and SMB clients that are currently connected to the appliance

The Appliance Status section displays:

- Configuration information
- Status of appliance resources (such as CPU, memory, disk, and network usage)

### For detailed status information:

1. Click **Appliance** in the top menu.
2. Review the status of the appliance. The Appliance page displays:
  - Platform information (version, shape, CPU, memory, swap usage, and so on)
  - Utilization of the `root` file system
  - State of key services

## Viewing System Logs

Use the system, boot, service, and autonomous logs to troubleshoot issues.

1. Within the web interface, click **Administration** in the upper menu.
2. Within the System Logs section, click the tab for the log you want to view.
  - System logs
  - Boot logs
  - Service logs
  - Autonomous logs (this tab is only available for Autonomous Linux instances)

## Rebooting the Appliance

Rebooting immediately disconnects all currently running client sessions and restarts the system.

1. Within the web interface, click **Administration** in the upper menu.
2. Within the System Actions section, click **Reboot appliance**.

## Using Autonomous Linux

You can select an Oracle Linux Storage Appliance image configured with Oracle Autonomous Linux when creating the instance. Autonomous Linux provides autonomous package updates and automated Oracle Ksplice patching with zero downtime, and known exploit detection, to keep the appliance instance highly secure, reliable, and up to date.

The Autonomous Linux version of the appliance includes autonomous actions in the web interface.

1. Within the web interface, click **Administration** in the upper menu.
2. Under the Autonomous Actions section, you can:
  - View and modify the Oracle Cloud Infrastructure Notifications service topic OCID (Oracle Cloud Identifier) used for receiving auto-update messages.

For information about configuring topics using the Oracle Cloud Infrastructure Notifications service, see [Notifications Overview](#) in the Oracle Cloud Infrastructure documentation.

- View and modify the time window for auto-updates.

## Enabling Ksplice Auto Updates

Ksplice allows you to update the operating system without requiring a reboot. Use the web interface to enable or disable automatic Ksplice updates for the appliance.

For Autonomous Linux versions of the appliance, Ksplice automatically updates by default. You cannot enable or disable it.

1. Within the web interface, click **Administration** in the upper menu.
2. Within the System Actions section, click **Enable Ksplice**.

## Updating the SSH Keys

Update the list of SSH public keys that are allowed to connect through SSH as the default user (opc) for the OCI instance. Direct SSH login to the appliance is not supported, but you can use SSH for port forward access to the web interface.

1. Within the web interface, click **Administration** in the top menu.
2. Under the User Actions, click **Update ssh keys**.
3. Paste the SSH public key within the field.
4. Click **Update keys**.

## Migrating an Appliance Instance

Migrate an existing appliance from one Oracle Cloud Infrastructure Compute instance to a new Compute instance.

Before migrating your appliance instance, understand that the migration process:

- Reconfigures the block volume storage pool on the newly migrated Compute instance.
- Does not migrate shared file systems (these file systems remain on the existing block volumes).
- Only works for Compute instances that have remotely attached block volumes. You cannot migrate DenseIO shapes with local NVMe devices.

Migration is useful if you need to deploy your appliance on a new Compute instance with more Oracle OCPU and memory resources, as it eliminates the need to rebuild your existing file system server. Migration is required if you need to upgrade your appliance from version 1 to version 2 or from an Oracle Linux to an Oracle Autonomous Linux version of the appliance.

### Important:

Before migrating, first back up your appliance instance, including **Samba global settings**, **ssh keys**, and **OCI service access configuration** on the **Administration** page.

1. Ensure you have backed up your appliance instance before starting migration.
2. In the web interface for the source instance, click the **Administration** tab, then click **Prepare for migration**.
3. In the Oracle Cloud Infrastructure Console for the source instance, do the following:
  - a) Stop the source instance.
  - b) Detach all block volumes that are currently attached to the source instance.
  - c) Terminate the source instance.

### Note:

The web interface for the appliance will become unavailable after you stop the source instance, detach the block volumes, and terminate the source instance.

4. In the Oracle Cloud Infrastructure console for the destination instance, do the following:
  - a) Create an 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 block volumes that were detached from the source instance. This process 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 shares and exports that you migrated are available.

## Working with NFS and SMB Shares

You can add, manage, and access the NFS or SMB shares associated with the appliance.

### Adding a Share

Add NFS or SMB exports to the Storage Appliance. Supported protocols include: NFSv3, NFSv4, and SMB version 3.

1. Within the web interface, click **Storage** in the upper menu.
2. Click **Add**.
3. Specify the share parameters:
  - *Share name* - Enter the name of the share. For NFS exports, the name forms the exported path `/shares/<sharename>`.
  - *Share size* - Enter a size for the share between 16 MB and 2 TB.
  - *Use 32-bit inodes* - Select this option if using 32-bit applications on shares larger than 1 TB.
4. Click **Add export...** and select **NFS export** or **SMB export**.

**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.

5. Specify the export parameters, and then click **Create**.
6. Access the shares that you create with the appliance on client virtual machines (VMs) over NFS and SMB by using a standard `mount` command.

### Configuring Samba Global Settings

You must define the Samba settings when using SMB exports.

1. Within the web interface, click **Administration** in the upper menu.
2. Within the System Actions section, click **Configure Samba global settings**.

### Modifying, Duplicating, and Deleting Shares

1. Within the web interface, click **Storage** in the upper menu.
2. Click the **Actions** menu next to the share.
3. Select an action:
  - View/Modify
  - Duplicate
  - Delete

### Backing up and Restoring Shares

The appliance backs up shares to the Oracle Cloud Infrastructure Object Storage service.

#### Prerequisites

1. You can do either of the following:
  - Provide Oracle Cloud Infrastructure credentials on the **Administration** page by clicking **Configure access to OCI services**. Ensure you have configured API Keys. See [Generating an API Signing Key](#) or run `oci setup config` on the instance. Once created, the credentials are located in `$HOME/.oci/config`.
  - Make the Oracle Linux Storage Appliance instance part of a [dynamic group](#). In this case, Oracle Cloud Infrastructure credentials aren't required.
2. Create a bucket (or reuse an existing bucket) to store the archived objects in the Oracle Cloud Infrastructure Object Store. See [Managing Buckets](#).

### Backing up a Share

The appliance backs up the share as an object within an Oracle Cloud Infrastructure object bucket.

1. Within the web interface, click **Storage** in the upper menu.
2. Click the **Actions** menu next to the share.
3. Select **Backup**.
4. Enter the object information:
  - *Object Name*: See [Object Names](#) for more information.
  - *Bucket Name*: The bucket name can be found within the bucket details on the Console. See [To view bucket details](#).
  - *Bucket Namespace*: The bucket namespace can be found within the bucket details on the Console. See [To view bucket details](#).
5. Click **Backup**.

### Restoring a Share

Restore the share from the Oracle Cloud Infrastructure object storage. Restoring overwrites the current content for the share.

1. Within the web interface, click **Storage** in the upper menu.
2. Click the **Actions** menu next to the share.
3. Select **Restore**.
4. Enter the object information:
  - *Object Name*: See [Object Names](#) for more information.
  - *Bucket Name*: The bucket name can be found within the bucket details on the Console. See [To view bucket details](#).
  - *Bucket Namespace*: The bucket namespace can be found within the bucket details on the Console. See [To view bucket details](#).
5. Click **Restore**.

## Accessing Shares Over the NFS and SMB Protocols

You can access the Storage Appliance shares using NFS or SMB.

See [Oracle Linux 7: Managing File Systems](#) and [Oracle Linux 8: Managing Shared File Systems](#) for more information about configuring NFS or SMB shares.

### Viewing Share Mount and Map Instructions

1. Within the web interface, click **Storage** in the upper menu.
2. Click the **Actions** menu next to the share.
3. Select **Mount Information**.
4. Use the commands listed to access the shares.

### Accessing NFS Shares

1. Starting with Oracle Linux 7.3, the installation image does not install NFS packages by default. You must install the `nfs-utils` package on the client:

```
sudo yum install -y nfs-utils
```

2. Mount the export. For example:

```
sudo mount appliance_ip:share_path destination_path
```

### Accessing SMB Shares

1. Mount the export. For example:

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

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

### Restarting the NFS or SMB Service

Use the web interface to restart the NFS or Samba and related services.

1. Within the web interface, click **Administration** in the upper menu.
2. Within the System Actions section, click either **Restart NFS services** or **Restart SMB services**.

## Upgrading an Appliance Instance

You can upgrade the Storage Appliance from Version 1.7.1 to 1.8 using the web interface. To upgrade from Version 1 to Version 2, you must migrate the instance.

### Update From Version 1.7.1 to Version 1.8

If you previously deployed an earlier version of the Oracle Linux Storage Appliance, you can upgrade to the latest package version for the appliance by using the appliance's web interface.

1. Click **Administration** in the upper menu.
2. Within the System Actions section, click **Update appliance**.
3. To enable Active Directory support after you upgrade from version 1.7.1 to version 1.8, you must update all SMB exports that are present on the system.

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

- a. In the web interface, click **Storage** in the upper menu,
- b. Select the SMB export to modify, then from the **Actions** menu, select **View/Modify**.
- c. Under **Export Protocols**, change the name of the SMB export using the **SMB share name** field.
- d. Click **Modify** to validate the change.
- e. Open the **View/Modify** dialog box for the SMB export again, then revert the change that you made in Step c.
- f. Click **Modify** to validate the change.

### Update From Version 1 to Version 2 or to Autonomous Linux

You cannot upgrade directly from version 1 to version 2 or to an Autonomous Linux version of the instance. Instead, you must migrate the appliance instance.

#### Important:

Before migrating an appliance instance, back up the existing appliance instance's **Samba global settings**, **ssh keys**, and **OCI service access configuration** on the **Administration** page.

1. Create a new Compute instance based on the latest 2.x version of the Oracle Linux Storage Appliance. For more information, see [Creating an Instance](#) on page 7.
2. Migrate the existing appliance instance to a Compute instance that is running version 2.x. For more information, see [Migrating an Appliance Instance](#) on page 12.



---

# Release Notes

---

You can find the (PRODUCT NAME) [Release Notes](#) online.

