Volume and LUN management with System Manager

ONTAP 9

NetApp
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Volume administration overview with System Manager

Beginning with ONTAP 9.7, you can use System Manager to manage logical storage, such as FlexVol volumes and LUNs, qtrees, storage efficiency, and quotas.

If you are using the classic System Manager (available only in ONTAP 9.7 and earlier), refer to Managing logical storage

Manage volumes

After you display a list of volumes in System Manager, you can perform various actions to manage the volumes.

Steps

1. In System Manager, click **Storage > Volumes**.

   The list of volumes is displayed.

2. You can perform the following:

To perform this task…	Take these actions…
Add a volume	Click **+ Add** . See Add a volume.

Manage multiple volumes	Check the boxes next to the volumes.
	
	 • Click 🗑 Delete to delete the selected volumes.
	 • Click 🛡 Protect to assign a protection policy to the selected volumes.
	 • Click ⋮ More to select one of the following actions to perform for all selected volumes:
	     ◦ Enable quota
	     ◦ Take offline
	     ◦ Move
	     ◦ Show Deleted Volumes

Manage a single volume	Next to the volume, click ⋮, then select one of the following actions to perform:
	• Edit
	• Resize (Beginning with ONTAP 9.10.1, and only for online volumes and DP FlexVol volumes)
	• Delete
	• Clone
	• Take Offline (or Bring Online)
	• Enable Quota (or Disable Quota)
	• Edit Export Policy
	• Edit Mount Path
	• Move
	• Edit Cloud Tier Settings
	• Protect

Add a volume

You can create a volume and add it to an existing storage VM that is configured for NFS or SMB service.

Before you Start

A storage VM that is configured for NFS or SMB service should exist in the cluster.

Steps

1. Go to **Storage > Volumes**.
2. Click ➕ Add .
3. Specify a name and size for the volume.
4. Perform one of the following steps:

Click this button…	To perform this action…
Save	The volume is created and added using the system defaults. No additional steps are required.
More Options	Proceed to Step 5 to define the specifications for the volume.

5. The volume name and size are shown if you previously specified them. Otherwise, enter the name and size.

6. Select a storage VM from the pull-down list.

   Only storage VMs configured with the NFS protocol are listed. If only one storage VM configured with the NFS protocol is available, the **Storage VM** field is not shown.

7. To add a cache for the remote volume, select **Add a cache for remote volume** and specify the following values:

   ◦ Select a cluster.

   ◦ Select a storage VM.

   ◦ Select the volume that you want to be a cache volume.

8. In the **Storage and Optimization** section, specify the following values:

   a. The capacity of the volume is already shown, but you can modify it.

   b. In the **Performance Service Level** field, select a service level:

When you select this service level…	This occurs…
An existing service level, such as "Extreme", "Performance", or "Value". Only the service levels that are valid for the system platform (AFF, FAS, or others) are displayed.	A local tier or tiers are automatically chosen. Proceed to Step 9.
Custom	Proceed to Step 8c to define a new service level.

   c. Beginning with ONTAP 9.9.1, you can use System Manager to manually select the local tier on which you want to place the volume you are creating (if you have selected the "Custom" service level).

   ⓘ   This option is not available if you select **Add as a cache for a remote volume** or **Distribute volume data across the cluster** (see below).

When you make this choice…	You perform these steps…
Manual placement	Manual placement is enabled. The **Distribute volume data across the cluster** selection is disabled (see below). Proceed to Step 8d to complete the process.
No selection	Manual placement is not enabled. The local tier is automatically selected. Proceed to Step 9.

 d. Select a local tier from the pull-down menu.

 e. Select a QoS policy.

  Select "Existing" to choose from a list of existing policies, or select "New" to enter the specifications of a new policy.

9. In the **Optimization options** section, determine if you want to distribute the volume data across the cluster:

When you make this choice…	This occurs…
Distribute volume data across the cluster	The volume you are adding becomes a FlexGroup volume. This option is not available if you previously selected **Manual placement**.
No selection	The volume you are adding becomes a FlexVol volume by default.

10. In the **Access Permissions** section, specify the access permissions for the protocols for which the volume is configured.

Beginning with ONTAP 9.11.1, the new volume will not be shareable by default. You can specify the default access permissions by ensuring the following check boxes are checked:

- **Export via NGS**: Creates the volume with the "default" export policy that grants users full access to the data.
- **Share via SMB/CIFS**: Creates a share with an auto-generated name, which you can edit. Access is granted to "Everyone". Also, you can specify the permission level.

11. In the **Protection** section, specify the protections for the volume. If you select **Enable SnapMirror (Local or Remote)**, then specify the protection policy and settings for the destination cluster from the pull-down lists.

12. Click **Save**.

The volume is created and added to the cluster and storage VM.

> ⓘ You can also save the specifications of this volume to an Ansible Playbook. For more details, go to Use Ansible Playbooks to add or edit volumes or LUNs.

Add LUNs

You can create LUNs and add them to an existing storage VM that is configured with the

SAN protocol.

Before you Start

A storage VM that is configured for SAN service should exist in the cluster.

Steps

1. Go to **Storage > LUNs**.

2. Click ➕ Add .

3. Specify a prefix that will be used at the start of each LUN name. (If you are creating only one LUN, enter the LUN name.)

4. Select a storage VM from the pull-down list.

   Only storage VMs that are configured for the SAN protocol are listed. If only one storage VM that is configured for the SAN protocol is available, then the **Storage VM** field is not displayed.

5. Indicate how many LUNs you want to create and the size of each LUN.

6. Select the host operating system and LUN format from the pull-down lists.

7. Enter the host initiators, and separate them with commas.

8. Perform one of the following actions:

Click this button…	To perform this action…
Save	The LUNs are created with the specifications you entered. System defaults are used for other specifications. No additional steps are required.
More Options	Proceed to Step 9 to define additional specifications for the LUNs.

9. The LUN prefix is already shown if you previously entered it, but you can modify it. Otherwise, enter the prefix.

10. Select a storage VM from the pull-down list.

    Only storage VMs that are configured for the SAN protocol are listed. If only one storage VM that is configured for the SAN protocol is available, then the **Storage VM** field is not displayed.

11. Determine how you want the LUNs to be grouped:

When you make this choice…	This occurs…
Group with related LUNs	The LUNs will be grouped together with related LUNs on an existing volume on the storage VM.
No selection	The LUNs will be grouped together on a volume called "container".

12. In the **Storage and Optimization** section, specify the following values:

    a. The number and capacity of the LUNs are already shown if you previously entered them, but you can modify them. Otherwise, enter the values.

    b. In the **Performance Service Level** field, select a service level:

When you select this service level…	This occurs…
An existing service level, such as "Extreme", "Performance", or "Value". Only the service levels that are valid for the system platform (AFF, FAS, or others) are displayed.	A local tier is automatically chosen. Proceed to Step 13.
Custom	Proceed to Step 12c to define a new service level.

    c.   Beginning with ONTAP 9.9.1, you can use System Manager to manually select the local tier on which you want to place the LUNs you are creating (if you have selected the "Custom" service level).

When you make this choice…	You perform these steps…
Manual placement	Manual placement is enabled. Proceed to Step 12d to complete the process.
No selection	Manual selection is not enabled. The local tier is automatically selected. Proceed to Step 13.

    d.   Select a local tier from the pull-down menu.

    e. Select a QoS policy.

    Select "Existing" to choose from a list of existing policies, or select "New" to enter the specifications of a new policy.

13.   In the **Host Information** section, the host operating system and LUN format are already shown, but you can modify them.

14. Under **Host Mapping**, select the type of initiators for the LUNs:

- **Existing initiator group**: Select an initiator group for the list that displays.
- **New initiator group using existing initiator groups**: Specify the name of the new group, and select the group or groups that you want to use to create the new group.
- **Host initiators**: Specify a name from the new initiator group, and click **+Add Initiator** to add initiators to the group.

15. In the **Protection** section, specify the protections for the LUNs.

    If you select **Enable SnapMirror (Local or Remote)**, then specify the protection policy and settings for the destination cluster from the pull-down lists.

16. Click **Save**.

    The LUNs are created and added to the cluster and storage VM.

    > (i) You can also save the specifications of these LUNs to an Ansible Playbook. For more details, go to Use Ansible Playbooks to add or edit volumes or LUNs.

Expand storage

Using System Manager, you can increase the size of your volume or LUN so that more space is available to your host. The size of a LUN cannot exceed the size of the containing volume.

- Increase the size of a volume
- Increase the size of a LUN

Also, you can add a LUN to an existing volume. The processes are different when using System Manager with ONTAP 9.7 or 9.8

- Add a LUN to an existing volume (ONTAP 9.7)
- Add a LUN to an existing volume (ONTAP 9.8)

Also, beginning with ONTAP 9.8, you can use System Manager to add a LUN to an existing volume.

Increase the size of a volume

Steps

1. Click **Storage > Volumes**.
2. Hover over the name of the volume you want to increase in size.
3. Click ⋮.
4. Select **Edit**.
5. Increase the capacity value.

Increase the size of a LUN

Steps

1. Click **Storage > LUNs**.

2. Hover over the name of the LUN you want to increase in size.

3. Click ⋮.

4. Select **Edit**.

5. Increase the capacity value.

Add a LUN to an existing volume (ONTAP 9.7)

To use System Manager with ONTAP 9.7 to add a LUN to an existing volume, you should switch to the Classical View first.

Steps

1. Log in to System Manager in ONTAP 9.7.

2. Click **Classical View**.

3. Select **Storage > LUNs > Create**

4. Specify the details to create the LUN.

5. Specify to which existing volume or qtree the LUN should be added.

Add a LUN to an existing volume (ONTAP 9.8)

Beginning with ONTAP 9.8, you can use System Manager to add a LUN to an existing volume that already has a least one LUN.

Steps

1. Click **Storage > LUNs**.

2. Click **Add+**.

3. Complete the fields in the **Add LUNs** window.

4. Select **More Options**.

5. Select the checkbox labeled **Group with related LUNs**.

6. In the drop-down field, select a LUN that exists on the volume to which you want to add another LUN.

7. Complete the rest of the fields. For **Host Mapping**, click one of the radio buttons:

   ◦ **Existing initiator group** lets you select an existing group from a list.

   ◦ **New initiator group** lets you enter a new group in the field.

Recover deleted volumes

If you have accidently deleted one or more FlexVol volumes, you can use System Manager to recover these volumes. Beginning with ONTAP 9.8, you can also user System Manager to recover FlexGroup volumes. You can also delete the volumes permanently by purging the volumes.

The volume retention time can be set on a storage VM level. By default, the volume retention time is set to 12 hours.

Selecting deleted volumes

Steps

1. Click **Storage > Volumes**.

2. Click **More > Show Deleted Volumes**.

3. Select the volumes and click the desired action to recover or permanently delete the volumes.

Resetting the volume configurations

Deleting a volume deletes the associated configurations of the volume. Recovering a volume does not reset all the configurations. Perform the following tasks manually after recovering a volume to bring the volume back to its original state:

Steps

1. Rename the volume.

2. Set up a junction path (NAS).

3. Create mappings for LUNs in the volume (SAN).

4. Associate a Snapshot policy and export policy with the volume.

5. Add new quota policy rules for the volume.

6. Add a QOS policy for the volume.

Save storage space using compression, compaction, and deduplication

For volumes on non-AFF clusters, you can run deduplication, data compression, and data compaction together or independently to achieve optimal space savings.

- Deduplication eliminates duplicate data blocks.

- Data compression compresses the data blocks to reduce the amount of physical storage that is required.

- Data compaction stores more data in less space to increase storage efficiency.

> ⓘ These tasks are supported for volumes on non-AFF clusters. Beginning with ONTAP 9.2, all inline storage efficiency features, such as inline deduplication and inline compression, are enabled by default on AFF volumes.
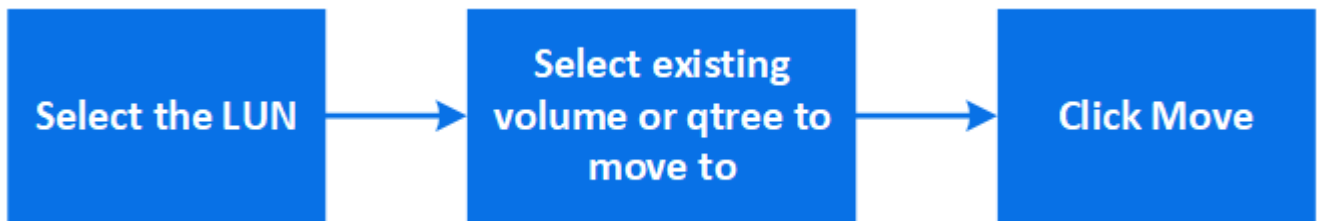
Steps

1. Click **Storage > Volumes**.

2. Next to the name of the volume for which you want to save storage, click ⋮.

3. Click **Edit** and scroll to **Storage Efficiency**.

4. *Optional*: If you want to enable background deduplication, ensure the checkbox is checked.

5. *Optional*: If you want to enable background compression, specify the storage efficiency policy and ensure the checkbox is checked.

6. *Optional*: If you want to enable inline compression, ensure the checkbox is checked.

Balance loads by moving LUNs

You can move a LUN to another volume within the storage VM to balance the load, or you can move it to a volume with a higher performance service level to improve performance.

Move restrictions

- A LUN cannot be moved to a qtree within the same volume.

- A LUN created from a file using the CLI cannot be moved with System Manager.

- LUNs that are online and serving data cannot be moved.

- LUNs cannot be moved if the allocated space in the destination volume cannot contain the LUN (even if autogrow is enabled on the volume).

- LUNs on SnapLock volumes cannot be moved with System Manager.

Steps

1. Click **Storage > LUNs**.

2. Select the LUN that you want to move and click **Move**.

3. Select an existing volume to which you want to move the LUN. If the volume contains qtrees, select the qtree.

> ⓘ While the Move operation is in progress, the LUN is displayed on both the origin and destination volume.

Balance loads by moving volumes to another tier

Beginning with ONTAP 9.8, you can use System Manager to move a volume to another tier to balance the load.

Beginning with ONTAP 9.9.1, you can also move volumes based on analysis of active and inactive data storage. For more information, see File System Analytics overview.

Steps

1. Click **Storage > Volumes**.

2. Select the volume or volumes that you want to move, and then click **Move**.

3. Select an existing tier (aggregate) to which you want to move the volume or volumes.

Use Ansible Playbooks to add or edit volumes or LUNs

Beginning with ONTAP 9.9.1, you can use Ansible Playbooks with System Manager when

you want to add or edit volumes or LUNs.

This feature lets you use the same configuration multiple times or use the same configuration with slight changes when you add or edit volumes or LUNs.

Enable or disable Ansible Playbooks

You can enable or disable the use of Ansible Playbooks with System Manager.

Steps

1. In System Manager, go to the UI settings in the cluster settings page:

   Cluster > Settings

2. Under **UI Settings**, change the slider switch to "Enabled" or "Disabled".

Save a volume configuration to an Ansible Playbook

When you create or modify the configuration of a volume, you can save the configuration as Ansible Playbook files.

Steps

1. Add or Edit the volume:

   Volume > Add (or **Volume > Edit**)

2. Specify or edit the configuration values of the volume.

3. Select **Save to Ansible Playbook** to save the configuration to Ansible Playbook files.

   A zip file is downloaded that contains the following files:

   - `variable.yaml`: The values you entered or modified to add or edit the volume.

   - `volumeAdd.yaml` (or `volumeEdit.yaml`): The test cases that are required to create or modify the values when reading the inputs from the `variable.yaml` file.

Save a LUN configuration to an Ansible Playbook

When you create or modify the configuration of a LUN, you can save the configuration as Ansible Playbook files.

Steps

1. Add or Edit the LUN:

   LUN > Add (or **LUN > Edit**)

2. Specify or edit the configuration values of the LUN.

3. Select **Save to Ansible Playbook** to save the configuration to Ansible Playbook files:

   A zip file is downloaded that contains the following files:

   - `variable.yaml`: The values you entered or modified to add or edit the LUN.

- **lunAdd.yaml** (or **lunEdit.yaml**): The test cases that are required to create or modify the values when reading the inputs from the `variable.yaml` file.

Download Ansible Playbook files from global search results

You can download Ansible Playbook files when you do a global search.

Steps

1. In the search field, enter "volume" or "LUN" or "Playbook".

2. Find the search result, either "Volume Management (Ansible Playbook)" or "LUN Management (Ansible Playbook)".

3. Click on ⬇ to download the Ansible Playbook files.

Work with Ansible Playbook files

Ansible Playbook files can be modified and run to specify configurations for volumes and LUNs.

About this task

You use two files to perform an operation (either an "add" or an "edit"):

If you want to…	Use this variable file…	And use this run file…
Add a volume	`volumeAdd-varible.yaml`	`valueAdd.yaml`
Edit a volume	`volumeEdit-variable.yaml`	`volumeEdit.yaml`
Add a LUN	`lunAdd-variable.yaml`	`lunAdd.yaml`
Edit a LUN	`lunEdit-variable.yaml`	`lunEdit.yaml`

Steps

1. Modify the variables file.

   The file contains the various values that you use to configure the volume or LUN.

   - If you do not change the values, leave them commented.
   - If you modify the values, remove the commenting.

2. Run the associated run file.

   The run file contains the test cases that are required to create or modify the values when reading the inputs from the variable file.

3. Enter your user login credentials.

Manage storage efficiency policies

Beginning with ONTAP 9.8, you can use System Manager to enable, disable, add, edit, or delete efficiency policies for storage VMs on FAS systems.

ⓘ　This function is not available on AFF systems.

Steps

1. Select **Storage > Storage VMs**

2. Select the storage VM for which you want to manage efficiency policies.

3. On the **Settings** tab, select ➔ in the **Efficiency Policy** section. The efficiency policies for that storage VM are displayed.

You can perform the following tasks:

- **Enable or disable** an efficiency policy by clicking the toggle button in the Status column.
- **Add** an efficiency policy by clicking on **Add+**.
- **Edit** an efficiency policy by clicking on ⋮ to the right of the policy name and selecting **Edit**.
- **Delete** an efficiency policy by clicking on ⋮ to the right of the policy name and selecting **Delete**.

Manage resources using quotas

Beginning with ONTAP 9.7, you can configure and manage usage quotas with System Manager.

If you are using the ONTAP CLI to configure and manage usage quotas, refer to the Logical Storage Management Guide.

If you are using legacy OnCommand System Manager for ONTAP 9.7 and earlier releases to configure and manage usage quotas, see the following for your release:

- ONTAP 9.6 and 9.7 Documentation
- ONTAP 9.5 Documentation
- ONTAP 9.4 Documentation
- ONTAP 9.3 Documentation
- ONTAP 9.2 Archived Documentation
- ONTAP 9.0 Archived Documentation

Quota overview

Quotas provide a way to restrict or track the disk space and number of files used by a user, group, or qtree. Quotas are applied to a specific volume or qtree.

You can use quotas to track and limit resource usage in volumes and provide notification when resource usage reaches specific levels.

Quotas can be soft or hard. Soft quotas cause ONTAP to send a notification when specified limits are exceeded, and hard quotas prevent a write operation from succeeding when specified limits are exceeded.

Set quotas to limit resource use

Add quotas to limit the amount of disk space the quota target can use.

You can set a hard limit and a soft limit for a quota.

Hard quotas impose a hard limit on system resources; any operation that would result in exceeding the limit fails. Soft quotas send a warning message when resource usage reaches a certain level, but they do not affect data access operations, so you can take appropriate action before the quota is exceeded.

Steps

1. Click **Storage > Quotas**.
2. Click **Add**.

Clone volumes and LUNs for testing

You can clone volumes and LUNs to create temporary, writable copies for testing. The clones reflect the current, point-in-time state of the data. You can also use clones to give additional users access to data without giving them access to production data.

> (i)   The FlexClone license should be installed on the storage system.

Cloning a volume

Create a clone of a volume, as follows:

Steps

1. Click **Storage > Volumes**.
2. Click ⋮ next to the name of the volume you want to clone.
3. Select **Clone** from the list.
4. Specify a name for the clone and complete the other selections.
5. Click **Clone** and verify that the volume clone appears in the list of volumes.

Alternatively, you can clone a volume from the **Overview** that displays when you view volume details.

Cloning a LUN

Create a clone of a LUN, as follows:

Steps

1. Click **Storage > LUNs**.
2. Click ⋮ next to the name of the LUN you want to clone.
3. Select **Clone** from the list.
4. Specify a name for the clone and complete the other selections.
5. Click **Clone** and verify that the LUN clone appears in the list of LUNs.

Alternatively, you can clone a LUN from the **Overview** that displays when you view LUN details.

When you create a LUN clone, System Manager automatically enables the deletion of the clone when space is needed.

Search, filter, and sort information in System Manager

You can search for various actions and objects in System Manager. You can also search table data for specific entries.

System Manager provides two types of searching:

- Global searching

    When you enter a search argument in the field at the top of each page, System Manager searches throughout the interface to find matches. You can then sort and filter the results.

- Table-grid searching

    Beginning with ONTAP 9.8, when you enter a search argument in the field at the top of a table grid, System Manager searches only the columns and rows of that table to find matches.

Global searching

At the top of each page in System Manager, you can use a global search field to search various objects and actions in the interface. For example, you can search for different objects by name, pages available in the navigator column (on the left side), various action items, like "Add Volume" or "Add License", and links to external help topics. You can also filter and sort the results.

> ⓘ For better results, perform searching, filtering, and sorting one minute after logging in and five minutes after creating, modifying, or deleting an object.

Getting search results

The search is not case-sensitive. You can enter a variety of text strings to find the page, actions, or topics you need. Up to 20 results are listed. If more results are found, you can click **Show more** to view all results. The following examples describe typical searches:

Type of search	Sample search string	Sample search results
By object name	vol_	vol_lun_dest on storage VM: svm0 (Volume) /vol/vol…est1/lun on storage VM: svm0 (LUN) svm0:vol_lun_dest1 role: Destination (Relationship)
By location in interface	volume	Add Volume (Action) Protection – Overview (Page) Recover deleted volume (Help)
By actions	add	Add Volume (Action) Network – Overview (Page) Expand volumes and LUNs (Help)

| By help content | san | Storage – Overview (Page)
SAN overview (Help)
Provision SAN storage for databases (Help) |

Filtering search results

You can narrow the results with filters, as shown in the following examples:

Filter	Syntax	Sample search string
By object type	<type>:<objectName>	volume:vol_2
By object size	<type><size-symbol><number><units>	luns<500mb
By broken disks	"broken disk" or "unhealthy disk"	unhealthy disk
By network interface	<IP address>	172.22.108.21

Sorting search results

When you view all the search results, they are sorted alphabetically. You can sort the results by clicking

▤ Filter and selecting how you want to sort the results.

Table-grid searching

Beginning with ONTAP 9.8, whenever System Manager displays information in a table-grid format, a search button appears at the top of the table.

When you click **Search**, a text field appears in which you can enter a search argument. System Manager searches the entire table and displays only the rows that contain text that matches your search argument.

You can use an asterisk (*) as a "wildcard" character as a substitute for characters. For example, searching for `vol*` might provide rows that contain the following:

- vol_122_D9
- vol_lun_dest1
- vol2866
- volspec1
- volum_dest_765
- volume
- volume_new4
- volume9987

Monitor capacity in System Manager

Using System Manager, you can view how much storage capacity has been used and how much is still available for a cluster. Also, beginning with ONTAP 9.10.1, you can use

System Manager to view historical data about the cluster's capacity and projections about how much capacity will be used or available in the future.

- Capacity measurements in System Manager
- Measurements of used capacity
- Measurement terms
- Capacity measurement units
- View capacity measurements for the cluster

Capacity measurements in System Manager

System capacity can be measured as physical space or logical space. Recent versions of System Manager use measurements of both physical and logical capacity.

The differences between the two measurements are explained in the following descriptions:

- **Physical capacity**: Physical space refers to the physical blocks of storage used in the volume. The value for physical used capacity is typically smaller than the value for logical used capacity due to the reduction of data from storage efficiency features (such as deduplication and compression).

- **Logical capacity**: Logical space refers to the usable space (the logical blocks) in a volume. Logical space refers to how theoretical space can be used, without accounting for results of deduplication or compression. The value for logical space used is derived from the amount of physical space used plus the savings from storage efficiency features (such as deduplication and compression) that have been configured. This measurement often appears larger than the physical used capacity because it includes Snapshot copies, clones, and other components, and it does not reflect the data compression and other reductions in the physical space. Thus, the total logical capacity could be higher than the provisioned space.

> ℹ️ In System Manager, capacity representations do not account for root storage tier (aggregate) capacities.

Measurements of used capacity

Measurements of used capacity are displayed differently depending on the version of System Manager you are using, as explained in the following table:

Version of System Manager	Term used for capacity	Type of capacity referred to
9.5 and 9.6 (Classic view)	Used	Physical space used
9.7 and 9.8	Used	Logical space used (if storage efficiency settings have been enabled)
9.9.1 and later	Logical Used	Logical space used (if storage efficiency settings have been enabled)

Measurement terms

The following terms are used when describing capacity:

- **Physical used**: Displays the amount of capacity used in the physical blocks of a volume.
- **Physical used %**: Displays the percentage of capacity used in the physical blocks of a volume compared to the provisioned size.
- **Logical used**: Displays the amount of used space without considering the space saved by storage efficiency features.
- **Logical used %**: Displays the percentage of the current logical used capacity compared to the provisioned size, excluding the Snapshot reserve of the volume. This value can be greater than 100%, because it includes efficiency savings in the volume.

Capacity measurement units

System Manager calculates storage capacity based on binary units of 1024 (2^{10}) bytes. In ONTAP 9.10.0 and earlier, these units were displayed in System Manager as KB, MB, GB, TB, and PB. Beginning with ONTAP 9.10.1, they are displayed in System Manager as KiB, MiB, GiB, TiB, and PiB.

> ⓘ The units used in System Manager for throughput continue to be KB/s, MB/s, GB/s, TB/s, and PB/s for all releases of ONTAP.

Capacity unit displayed in System Manager for ONTAP 9.10.0 and earlier	Capacity unit displayed in System Manager for ONTAP 9.10.1	Calculation	Value in bytes
KB	KiB	1024	1024 bytes
MB	MiB	1024 * 1024	1,048,576 bytes
GB	GiB	1024 * 1024 * 1024	1,073,741,824 bytes
TB	TiB	1024 * 1024 * 1024 * 1024	1,099,511,627,776 bytes
PB	PiB	1024 * 1024 * 1024 * 1024 * 1024	1,125,898,010,834,824 bytes

Additional information:

Logical space reporting and enforcement for volumes

View capacity measurements for the cluster

You can view capacity measurements for the cluster on the Dashboard in System Manager.

Before you begin

To view data related to the capacity in the cloud, you must have an account with Active IQ Digital Advisor and be connected.

Steps

1. In System Manager, click **Dashboard**.

2. In the **Capacity** section, you can view the following:

   ◦ Total used capacity of the cluster

   ◦ Total available capacity of the cluster

   ◦ Percentages of used and available capacity.

   ◦ Ratio of data reduction.

   ◦ Amount of capacity used in the cloud.

   ◦ History of capacity usage.

   ◦ Projection of capacity usage

3. Click ➔ to view more details about the capacity of the cluster.