NetApp

Consistency groups

ONTAP 9

NetApp
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Consistency groups

Learn about ONTAP consistency groups

A consistency group is a collection of volumes that are managed as a single unit. In ONTAP, consistency groups provide easy management and a protection guarantee for an application workload spanning multiple volumes.

You can use consistency groups to simplify your storage management. Imagine you have an important database spanning twenty LUNs. You could manage the LUNs on an individual basis or treat the LUNs as a solitary dataset, organizing them into a single consistency group.

Consistency groups facilitate application workload management, providing easily configured local and remote protection policies and simultaneous crash-consistent or application-consistent snapshots of a collection of volumes at a point in time. Snapshots of a consistency groups enable an entire application workload to be restored.

Learn about consistency groups

Consistency groups support any FlexVol volume regardless of protocol (NAS, SAN, or NVMe) and can be managed through the ONTAP REST API or in System Manager under the **Storage > Consistency Groups** menu item. Beginning with ONTAP 9.14.1, consistency groups can be managed with the ONTAP CLI.

Consistency groups can exist as individual entities—as a collection of volumes—or in a hierarchical relationship, which consists of other consistency groups. Individual volumes can have their own volume-granular snapshot policy. In addition, there can be a consistency group-wide snapshot policy. The consistency group can only have one SnapMirror active sync relationship and shared SnapMirror policy, which can be used to recover the entire consistency group.

The following diagram illustrates how you might use an individual consistency group. The data for an application hosted on `SVM1` spans two volumes: `vol1` and `vol2`. A snapshot policy on the consistency group captures snapshots of the data every 15 minutes.
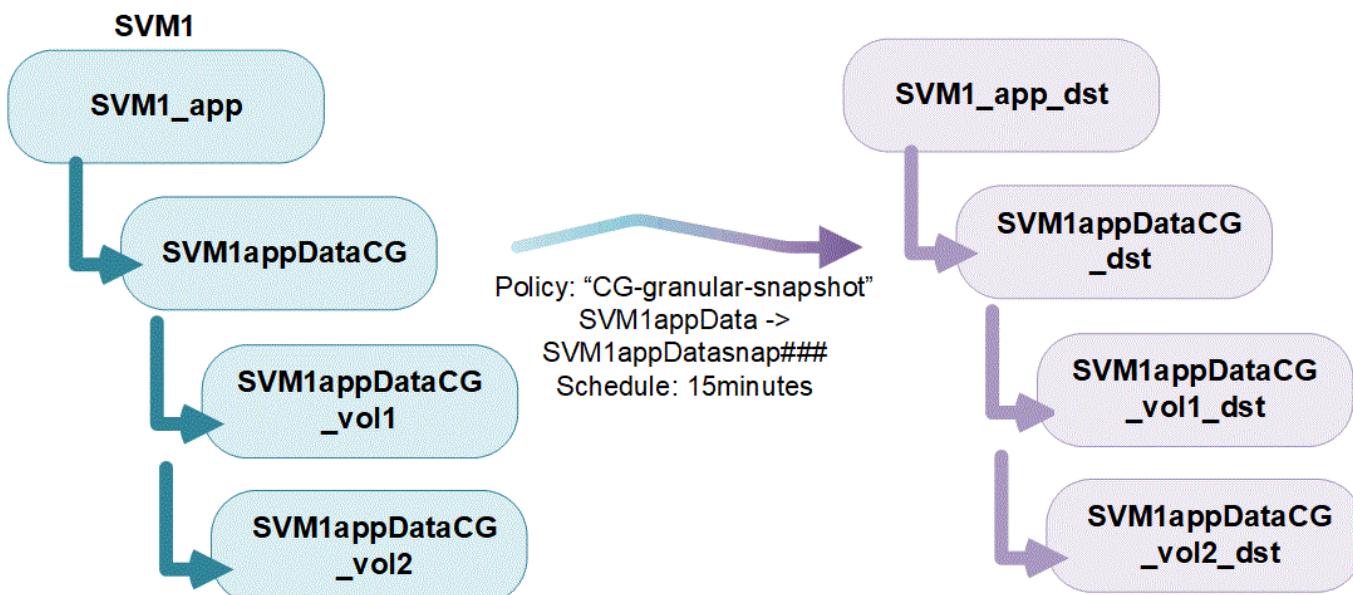
Larger application workloads might require multiple consistency groups. In these situations, you can create hierarchical consistency groups, where a single consistency group becomes the child components of a parent consistency group. The parent consistency group can include up to five child consistency groups. Like in individual consistency groups, a remote SnapMirror active sync protection policy can be applied to the entire configuration of consistency groups (parent and children) to recover the application workload.

In the following example, an application is hosted on SVM1. The administrator has created a parent consistency group, SVM1_app, which includes two child consistency groups: SVM1appDataCG for the data and SVM1app_logCG for the logs. Each child consistency group has its own snapshot policy. Snapshots of the volumes in SVM1appDataCG are taken every 15 minutes. Snapshots of SVM1app_logCG are taken hourly. The parent consistency group SVM1_app has an SnapMirror active sync policy which replicates the data to ensure continued service in the event of a disaster.
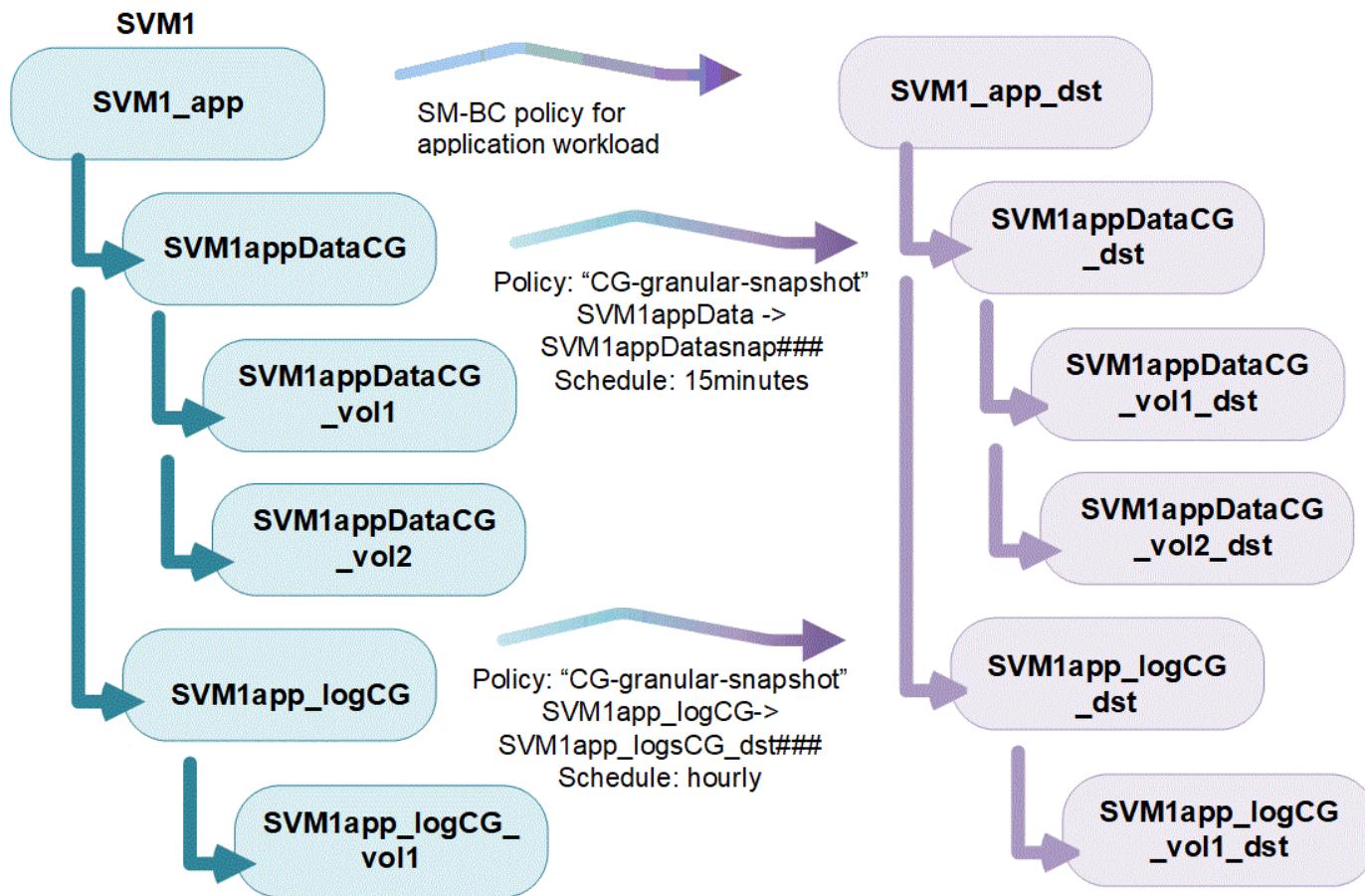
Beginning with ONTAP 9.12.1, consistency groups support cloning and modifying the members of the consistency by adding or removing volumes in both System Manager and the ONTAP REST API. Beginning with ONTAP 9.12.1, the ONTAP REST API also supports:

- Creating consistency groups with new NFS or SMB volumes or NVMe namespaces.
- Adding new or existing NFS or SMB volumes or NVMe namespaces to existing consistency groups.

For more information about the ONTAP REST API, refer to ONTAP REST API reference documentation.

Monitor consistency groups

Beginning with ONTAP 9.13.1, consistency groups offer real-time and historical capacity and performance monitoring, offering insights about the performance of applications and individual consistency groups.

Monitoring data is refreshed every five minutes and is maintained for up to one year. You can track metrics for:

- Performance: IOPS, latency, and throughput
- Capacity: Size, logical used, available

You can view monitoring data in the **Overview** tab of the consistency group menu in System Manager or by requesting it in the REST API. Beginning with ONTAP 9.14.1, you can view consistency group metrics with the CLI using the `consistency-group metrics show` command. Learn more about `consistency-group metrics show` in the ONTAP command reference.

> ⓘ In ONTAP 9.13.1, you can only retrieve historical metrics using the REST API. Beginning with ONTAP 9.14.1, historical metrics are also available in System Manager.

Protect consistency groups

Consistency groups offer application-consistent protection, ensuring consistency of your data across multiple volumes or LIFs. When creating a snapshot of a consistency group, a "fence" is established on the consistency group. The fence initiates a queue for I/O until after the snapshot operation completes, ensuring point-in-time consistency of data across all entities in the consistency group. The fence can cause a transient spike in latency during snapshot creation operations, such as a scheduled snapshot policy or creating a snapshot with System Manager. Learn more about the context of REST API and CLI in the ONTAP REST API documentation and ONTAP command reference.

Consistency groups offer protection through:

- Snapshot policies
- SnapMirror active sync
- MetroCluster (beginning with ONTAP 9.11.1)
- SnapMirror asynchronous (beginning with ONTAP 9.13.1)
- SVM disaster recovery (beginning with ONTAP 9.14.1)

Creating a consistency group does not automatically enable protection. Local and remote protection policies can be set when creating or after creating a consistency group.

To configure protection on a consistency group, see Protect a consistency group.

In order to use remote protection, you must meet the requirements for SnapMirror active sync.

> ⓘ SnapMirror active sync relationships cannot be established on volumes mounted for NAS access.

Multi-admin verification support for consistency groups

Beginning with ONTAP 9.16.1, you can use multi-admin verification (MAV) with consistency groups to ensure that certain operations, such as creating, modifying, or deleting consistency groups, can be executed only after approvals from designated administrators. This prevents compromised, malicious, or inexperienced administrators from making undesirable changes to existing configurations.

Learn more

Consistency groups in MetroCluster configurations

Beginning with ONTAP 9.11.1, you can provision consistency groups with new volumes on a cluster within a MetroCluster configuration. These volumes are provisioned on mirrored aggregates.

After they are provisioned, you can move volumes associated with consistency groups between mirrored and unmirrored aggregates. Therefore, volumes associated with consistency groups can be located on mirrored aggregates, unmirrored aggregates, or both. You can modify mirrored aggregates containing volumes associated with consistency groups to become unmirrored. Similarly, you can modify unmirrored aggregates containing volumes associated with consistency groups to enable mirroring.

Volumes and snapshots associated with consistency groups placed on mirrored aggregates are replicated to the remote site (site B). The contents of the volumes on site B provide a write-order guarantee for the consistency group, allowing you to recover from site B in the event of a disaster. You can access consistency group snapshots using consistency group with the REST API and System Manager on clusters running ONTAP 9.11.1 or later. Beginning with ONTAP 9.14.1, you can also access snapshots with the ONTAP CLI.

If some or all the volumes associated with a consistency group are located on unmirrored aggregates that are not currently accessible, GET or DELETE operations on the consistency group behave as if the local volumes or hosting aggregates are offline.

Consistency group configurations for replication

If site B is running ONTAP 9.10.1 or earlier, only the volumes associated with the consistency groups located on mirrored aggregates are replicated to site B. The consistency group configurations are only replicated to site B, if both sites are running ONTAP 9.11.1 or later. After site B is upgraded to ONTAP 9.11.1, data for consistency groups on site A that have all their associated volumes placed on mirrored aggregates are replicated to site B.

> ⓘ It's recommended you maintain at least 20% free space for mirrored aggregates for optimal storage performance and availability. Although the recommendation is 10% for non-mirrored aggregates, the additional 10% of space may be used by the filesystem to absorb incremental changes. Incremental changes increase space utilization for mirrored aggregates due to ONTAP's redirect-on-write snapshot-based architecture. Failure to adhere to these best practices may have a negative impact on performance.

Upgrade considerations

When upgrading to ONTAP 9.10.1 or later, consistency groups created with SnapMirror active sync (previously known as SnapMirror Business Continuity) in ONTAP 9.8 and 9.9.1 are automatically upgraded and become manageable under **Storage > Consistency Groups** in System Manager or the ONTAP REST API For more information about upgrading from ONTAP 9.8 or 9.9.1, see SnapMirror active sync upgrade and revert considerations.

Consistency group snapshots created in the REST API can be managed through System Manager's Consistency Group interface and through consistency group REST API endpoints. Beginning with ONTAP 9.14.1, consistency group snapshots can also be managed with the ONTAP CLI.

(i) Snapshots created with the ONTAPI commands `cg-start` and `cg-commit` are not recognized as consistency group snapshots and thus cannot be managed through System Manager's consistency group interface or the consistency group endpoints in the ONTAP REST API. Beginning with ONTAP 9.14.1, these snapshots can be mirrored to the destination volume if you are using a SnapMirror asynchronous policy. For more information, see Configure SnapMirror asynchronous.

Supported features by release

	ONTAP 9.16.1	ONTAP 9.15.1	ONTAP 9.14.1	ONTAP 9.13.1	ONTAP 9.12.1	ONTAP 9.11.1	ONTAP 9.10.1
Hierarchical consistency groups	✓	✓	✓	✓	✓	✓	✓
Local protection with snapshots	✓	✓	✓	✓	✓	✓	✓
SnapMirror active sync	✓	✓	✓	✓	✓	✓	✓
MetroCluster support	✓	✓	✓	✓	✓	✓	
Two-phase commits (REST API only)	✓	✓	✓	✓	✓	✓	
Application and component tags	✓	✓	✓	✓	✓		
Clone consistency groups	✓	✓	✓	✓	✓		
Add and remove volumes	✓	✓	✓	✓	✓		
Create CGs with new NAS volumes	✓	✓	✓	✓	REST API only		
Create CGs with new NVMe Namespaces	✓	✓	✓	✓	REST API only		
Move volumes between child consistency groups	✓	✓	✓	✓			
Modify consistency group geometry	✓	✓	✓	✓			
Monitoring	✓	✓	✓	✓			
Multi-admin verification	✓						
SnapMirror asynchronous (single consistency groups only)	✓	✓	✓	✓			
SVM disaster recovery (single consistency groups only)	✓	✓	✓				
CLI support	✓	✓	✓				

Learn more about consistency groups

Consistency Groups
for Application Management
& Protection

With NetApp ONTAP 9.10.1 + System Manager
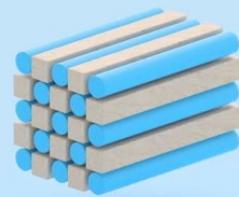
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Related information

- ONTAP automation documentation
- SnapMirror active sync
- SnapMirror asynchronous disaster recovery basics
- MetroCluster documentation
- Multi-admin verification
- ONTAP command reference

Learn about ONTAP consistency group limits

When planning and managing your consistency groups, account for object limits at the scope of both the cluster and the parent or child consistency group.

Enforced limits

The following table captures limits for consistency groups. Separate limits apply for consistency groups using SnapMirror active sync. For more information, see SnapMirror active sync limits.

Limit	Scope	Minimum	Maximum
Number of consistency groups	Cluster	0	Same as maximum volume count in cluster*
Number of parent consistency groups	Cluster	0	Same as maximum volume count in cluster
Number of individual and parent consistency groups	Cluster	0	Same as maximum volume count in cluster

Number of volumes in a consistency group	Single consistency group	1 volume	80 volumes
Number of volumes in a consistency group with SnapMirror asynchronous	Single consistency group	1 volume	• In ONTAP 9.15.1 and later: 80 volumes • In ONTAP 9.13.1 and 9.14.1: 16 volumes
Number of volumes in the child of a parent consistency group	Parent consistency group	1 volume	80 volumes
Number of volumes in a child consistency group	Child consistency group	1 volume	80 volumes
Number of child consistency groups in a parent consistency group	Parent consistency group	1 consistency group	5 consistency groups
Number of SVM disaster recovery relationships where a consistency group exists (available beginning ONTAP 9.14.1)	Cluster	0	32

* A maximum of 50 consistency groups enabled with SnapMirror asynchronous can be hosted on a cluster.

Unenforced limits

The minimum supported snapshot schedule for consistency groups is 30 minutes. This is based on testing for FlexGroup volumes, which share the same Snapshot infrastructure as consistency groups.

Configure a single ONTAP consistency group

Consistency groups can be created with existing volumes or new LUNs or volumes (depending on the version of ONTAP). A volume or LUN can only be associated with one consistency group at a time.

About this task

• In ONTAP 9.10.1 through 9.11.1, modifying the member volumes of a consistency group after it is created is not supported.

Beginning with ONTAP 9.12.1, you can modify the member volumes of a consistency group. For more information on this process, refer to Modify a consistency group.

• Beginning with ONTAP 9.17.1, you can select the NVMe protocol to map a host to an NVMe subsystem for VMware workloads in a SnapMirror active sync configuration.

Create a consistency group with new LUNs or volumes

In ONTAP 9.10.1 through 9.12.1, you can create a consistency group using new LUNs. Beginning with ONTAP 9.13.1, System Manager also supports creating a consistency group with new NVMe namespaces or new NAS volumes. (This is also supported in the ONTAP REST API beginning with ONTAP 9.12.1.)

System Manager (ONTAP 9.16.1 and earlier)

Steps

1. Select **Storage > Consistency groups**.

2. Select **+Add** then select the protocol for your storage object.

   In ONTAP 9.10.1 through 9.12.1, the only option for a new storage object is **Using new LUNs**. Beginning with ONTAP 9.13.1, System Manager supports creating consistency groups with new NVMe namespaces and new NAS volumes.

3. Name the consistency group. Designate the number of volumes or LUNs and the capacity per volume or LUN.

   a. **Application Type**: If you are using ONTAP 9.12.1 or later, select an application type. If no value is selected, the consistency group will be assigned the type of **Other** by default. Learn more about tagging consistency in Application and component tags. If you plan to create a consistency group with a remote protection policy, you must use **Other**.

   b. For **New LUNs**: Select the host operating system and LUN format. Enter the host initiator information.

   c. For **New NAS volumes**: choose the appropriate export option (NFS or SMB/CIFS) based on the NAS configuration of your SVM.

   d. For **New NVMe namespaces**: Select the host operating system and NVMe subsystem.

4. To configure protection policies, add a child consistency group, or access permissions, select **More options**.

5. Select **Save**.

6. Confirm your consistency group has been created by returning to the main consistency group menu where it will appear once the job completes. If you set a protection policy, you will know it has been applied when you see a green shield under look under the appropriate policy, remote or local.

System Manager (ONTAP 9.17.1 and later)

Steps

1. Select **Protection > Consistency groups**.

2. Select **+Add** then select the protocol for your storage object.

3. Name the consistency group. Designate the number of volumes or LUNs and the capacity per volume or LUN. **Application Type**: Select an application type. If no value is selected, the consistency group will be assigned the type of **Other** by default. Learn more about tagging consistency in Application and component tags. If you plan to create a consistency group with a remote protection policy, you must use **Other**.

   a. For **New LUNs**: Select the host operating system and LUN format. Enter the host initiator information.

   b. For **New NAS volumes**: choose the appropriate export option (NFS or SMB/CIFS) based on the NAS configuration of your SVM.

   c. For **New NVMe namespaces**: Select the host operating system and NVMe subsystem.

4. To configure protection policies, add a child consistency group, or access permissions, select **More options**.

5. Select **Save**.

6. Confirm your consistency group has been created by returning to the main consistency group menu

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where it will appear once the job completes. If you set a protection policy, you will know it has been applied when you see a green shield under look under the appropriate policy, remote or local.

CLI

Beginning with ONTAP 9.14.1, you can create a new consistency group with new volumes using the ONTAP CLI. The specific parameters depends on whether the volumes are SAN, NVMe, or NFS.

Before you begin

- You must be at the admin privilege level to perform this task.
- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Create a consistency group with NFS volumes

1. Create the consistency group:

```
consistency-group create -vserver <SVM_name> -consistency-group
<consistency-group-name> -volume-prefix <prefix_for_new_volume_names>
-volume-count <number> -size <size> -export-policy <policy_name>
```

Create a consistency group with SAN volumes

1. Create the consistency group:

```
consistency-group create -vserver <SVM_name> -consistency-group
<consistency-group-name> -lun <lun_name> -size <size> -lun-count <number>
-lun-os-type <LUN_operating_system_format> -igroup <igroup_name>
```

Create a consistency group with NVMe namespaces

1. Create the consistency group:

```
consistency-group create -vserver <SVM_name> -consistency-group
<consistency_group_name> -namespace <namespace_name> -volume-count <number>
-namespace-count <number> -size <size> -subsystem <subsystem_name>
```

Learn more about `consistency-group create` in the ONTAP command reference.

After you're done

1. Confirm your consistency group has been created using the `consistency-group show` command.

Learn more about `consistency-group show` in the ONTAP command reference.

Create a consistency group with existing volumes

You can use existing volumes to create a consistency group.

System Manager (ONTAP 9.16.1 and earlier)

Steps

1. Select **Storage > Consistency groups**.

2. Select **+Add** then **Using existing volumes**.

3. Name the consistency group and select the storage VM.

   a. **Application Type**: If you are using ONTAP 9.12.1 or later, select an application type. If no value is selected, the consistency group will be assigned the type of **Other** by default. Learn more about tagging consistency in Application and component tags. If the consistency group has a SnapMirror active sync relationship, you must use **Other**.

   > (i) In versions of ONTAP earlier than ONTAP 9.15.1, SnapMirror active sync is referred to as SnapMirror Business Continuity.

4. Select the existing volumes to include. Only volumes that are not already part of a consistency group will be available for selection.

   > (i) If creating a consistency group with existing volumes, the consistency group supports FlexVol volumes. Volumes with or SnapMirror synchronous or SnapMirror asynchronous relationships can be added to consistency groups, but they are not consistency group-aware. Consistency groups do not support S3 buckets or storage VMs with SVMDR relationships.

5. Select **Save**.

6. Confirm your consistency group has been created by returning to the main consistency group menu where it appears once the ONTAP job completes. If you have chosen a protection policy, confirm it was properly set by selecting your consistency group from the menu. If you set a protection policy, you know it has been applied when you see a green shield under look under the appropriate policy, remote or local.

CLI

Beginning with ONTAP 9.14.1, you can create a consistency group with existing volumes using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Steps

1. Issue the `consistency-group create` command. The `-volumes` parameter accepts a comma-separated list of volume names.

   ```
   consistency-group create -vserver <SVM_name> -consistency-group
   <consistency-group-name> -volume <volumes>
   ```

   Learn more about `consistency-group create` in the ONTAP command reference.

2. View your consistency group using the `consistency-group show` command.

Learn more about `consistency-group show` in the .

Next steps

- Protect a consistency group
- Modify a consistency group
- Clone a consistency group

Configure a hierarchical ONTAP consistency group

Hierarchical consistency groups enable you to manage large workloads spanning multiple volumes, creating a parent consistency group that serves as an umbrella for child consistency groups.

Hierarchical consistency groups have a parent that can include up to five individual consistency groups. Hierarchical consistency groups can support different local snapshot policies across consistency groups or individual volumes. If you use a remote protection policy, that will apply for the entire hierarchical consistency group (parent and children).

Beginning with ONTAP 9.13.1, you can modify the geometry of your consistency groups and move volumes between child consistency groups.

For object limits on consistency groups, see Object limits for consistency groups.

Create a hierarchical consistency group with new LUNs or volumes

When creating a hierarchical consistency group, you can populate it with new LUNs. Beginning with ONTAP 9.13.1, you can also use new NVMe namespaces and NAS volumes.

System Manager

Steps

1. Select **Storage > Consistency groups**.

2. Select **+Add** then select the protocol for your storage object.

   In ONTAP 9.10.1 through 9.12.1, the only option for a new storage object is **Using new LUNs**. Beginning with ONTAP 9.13.1, System Manager supports creating consistency groups with new NVMe namespaces and new NAS volumes.

3. Name the consistency group. Designate the number of volumes or LUNs and the capacity per volume or LUN.

   a. **Application Type**: If you are using ONTAP 9.12.1 or later, select an application type. If no value is selected, the consistency group will be assigned the type of **Other** by default. Learn more about tagging consistency in Application and component tags. If you plan to use a remote protection policy, you must choose **Other**.

4. Select the host operating system and LUN format. Enter the host initiator information.

   a. For **New LUNs**: Select the host operating system and LUN format. Enter the host initiator information.

   b. For **New NAS volumes**: choose the appropriate export option (NFS or SMB/CIFS) based on the NAS configuration of your SVM.

   c. For **New NVMe namespaces**: Select the host operating system and NVMe subsystem.

5. To add a child consistency group, select **More options** then **+Add child consistency group**.

6. Select the performance level, the number of LUNs or volumes, and capacity per LUN or volume. Designate the appropriate export configurations or operating system information based on the protocol you are using.

7. Optionally, select a local snapshot policy and set the access permissions.

8. Repeat for up to five child consistency groups.

9. Select **Save**.

10. Confirm your consistency group has been created by returning to the main consistency group menu where it will appear once the ONTAP job completes. If you set a protection policy, look under the appropriate policy, remote or local, which should display a green shield with a checkmark in it.

CLI

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

When creating a hierarchical consistency group in the CLI with new volumes, you must create each child consistency group individually.

Step

1. Create the new consistency group using the `consistency-group create` command.

   ```
   consistency-group create -vserver <SVM_name> -consistency-group
   <consistency_group_name> -parent-consistency-group
   ```

```
<parent_consistency_group_name> -volume-prefix <volume_prefix> -volume
-count <number_of_volumes> -size <size>
```

2. When prompted by the CLI, confirm you want to create the new parent consistency group. Enter `y`.

3. Optionally, repeat step 1 to create more child consistency groups.

   Learn more about `consistency-group create` in the ONTAP command reference.

Create a hierarchical consistency group with existing volumes

You can organize existing volumes into a hierarchical consistency group.

System Manager

Steps

1. Select **Storage > Consistency groups**.

2. Select **+Add** then **Using existing volumes**.

3. Select the storage VM.

4. Select the existing volumes to include. Only volumes that are not already part of a consistency group will be available for selection.

5. To add a child consistency group, select **+Add Child Consistency Group**. Create the necessary consistency groups, which will be named automatically.

   a. **Component Type**: If you are using ONTAP 9.12.1 or later, select a component type of "data", "logs", or "other". If no value is selected, the consistency group will be assigned the type of **Other** by default. Learn more about tagging consistency in Application and component tags. If you plan to use a remote protection policy, you must use **Other**.

6. Assign existing volumes to each consistency group.

7. Optionally, select a local snapshot policy.

8. Repeat for up to five child consistency groups.

9. Select **Save**.

10. Confirm your consistency group has been created by returning to the main consistency group menu where it will appear once the ONTAP job completes. If you have chosen a protection policy, confirm it was properly set by selecting your consistency group from the menu; under the appropriate policy type, you will see a green shield with a checkmark inside of it.

CLI

Beginning with ONTAP 9.14.1, you can create an hierarchical consistency group using the CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Steps

1. Provision a new parent consistency group and assign volumes to a new child consistency group:

   ```
   consistency-group create -vserver <svm_name> -consistency-group
   <child_consistency_group_name> -parent-consistency-group
   <parent_consistency_group_name> -volumes <volume_names>
   ```

2. Enter `y` to confirm you want to create a new parent and child consistency group.

   Learn more about `consistency-group create` in the ONTAP command reference.

Next steps

- Modify the geometry of a consistency groups

- Modify a consistency group

Protect ONTAP consistency groups

Consistency groups offer easily managed local and remote protection for SAN, NAS, and NVMe applications that span multiple volumes.

Creating a consistency group does not automatically enable protection. Protection policies can be set at the time of creation or after creating your consistency group. You can protect consistency groups using:

- Local snapshots
- SnapMirror active sync (referred to as SnapMirror Business Continuity in versions of ONTAP before 9.15.1)
- MetroCluster (beginning 9.11.1)
- SnapMirror asynchronous (beginning 9.13.1)
- Asynchronous SVM disaster recovery (beginning 9.14.1)

If you are utilizing nested consistency groups, you can set different protection policies for the parent and child consistency groups.

Beginning with ONTAP 9.11.1, consistency groups offer two-phase consistency group snapshot creation. The two-phase snapshot operation executes a pre-check, ensuring the snapshot is captured successfully.

Recovery can occur for an entire consistency group, a single consistency group in a hierarchical configuration, or for individual volumes within the consistency group. Recovery can be achieved by selecting the consistency group you want to recover from, selecting the snapshot type, and then identifying the snapshot to base the restoration on. For more information about this process, see Restore a volume from an earlier snapshot.

Configure a local snapshot policy

Setting a local snapshot protection policy allows you to create a policy spanning all volumes in a consistency group.

About this task

The minimum supported snapshot schedule for consistency groups is 30 minutes. This is based on testing for FlexGroup volumes, which share the same Snapshot infrastructure as consistency groups.

System Manager

Steps

1. Select **Storage > Consistency groups**.

2. Select the consistency group you have created from the Consistency group menu.

3. At the top right of the overview page for the consistency group, select **Edit**.

4. Check the box next to **Schedule Snapshots (local)**.

5. Select a snapshot policy. To configure a new, custom policy, refer to Create a custom data protection policy.

6. Select **Save**.

7. Return to the consistency group overview menu. In the left column under **Snapshots (Local)**, the status will say protected next to ✅.

CLI

Beginning with ONTAP 9.14.1, you can modify the protection policy of a consistency group using the CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Step

1. Issue the following command to set or modify the protection policy:

   If you are modifying the protection policy of a child consistency, you must identify the parent consistency group using the `-parent-consistency-group` *parent_consistency_group_name* parameter.

   ```
   consistency-group modify -vserver svm_name -consistency-group
   consistency_group_name -snapshot-policy policy_name
   ```

Create an on-demand snapshot

If you need to create a snapshot of your consistency group outside of a normally scheduled policy, you can create one on-demand.

System Manager

Steps

1. Navigate to **Storage** > **Consistency groups**.

2. Select the consistency group for which you want to create an on-demand snapshot.

3. Switch to the **Snapshot copies** tab then select **+Add**.

4. Provide a **Name** and a **SnapMirror Label**. In the dropdown menu for **Consistency**, select **Application consistent** or **Crash consistent**.

5. Select **Save**.

CLI

Beginning with ONTAP 9.14.1, you can create an on-demand snapshot of a consistency group using the CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Step

1. Create the snapshot:

   By default, the snapshot type is crash-consistent. You can modify the snapshot type with the optional `-type` parameter.

   ```
   consistency-group snapshot create -vserver svm_name -consistency-group
   consistency_group_name -snapshot snapshot_name
   ```

Create two-phase consistency group snapshots

Beginning with ONTAP 9.11.1, consistency groups support two-phase commits for consistency group (CG) snapshot creation, which execute a precheck before committing the snapshot. This feature is only available with the ONTAP REST API.

Two-phase CG snapshot creation is only available for snapshot creation, not provisioning consistency groups or restoring consistency groups.

A two-phase CG snapshot breaks the snapshot creation process into two phases:

1. In the first phase, the API executes prechecks and triggers snapshot creation. The first phase includes includes a timeout parameter, designating the amount of time for the snapshot to commit successfully.

2. If the request in phase one completes successfully, you can invoke the second phase within the designated interval from the first phase, committing the snapshot to the appropriate endpoint.

Before you begin

- To use two-phase CG snapshot creation, all nodes in the cluster must be running ONTAP 9.11.1 or later.

- Only one active invocation of a consistency group snapshot operation is supported on a consistency group instance at a time, whether it be a one-phase or two-phase. Attempting to invoke a snapshot operation

while another one is in progress results in a failure.

- When you invoke the snapshot creation, you can set an optional timeout value of between 5 and 120 seconds. If no timeout value is provided, the operation times out at the default of 7 seconds. In the API, set the timeout value with the `action_timeout` parameter. In the CLI, use the `-timeout` flag.

Steps

You can complete a two-phase snapshot with the REST API or, beginning with ONTAP 9.14.1, the ONTAP CLI. This operation is not supported in System Manager.

> ⓘ If you invoke the snapshot creation with the API, you must commit the snapshot with the API. If you invoke the snapshot creation with the CLI, you must commit the snapshot with the CLI. Mixing methods is not supported.

CLI

Beginning with ONTAP 9.14.1, you can create a two-phase snapshot using the CLI.

Before you begin

- You must be at the admin privilege level to perform this task.
- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Steps

1. Initiate the snapshot:

   ```
   consistency-group snapshot start -vserver svm_name -consistency-group
   consistency_group_name -snapshot snapshot_name [-timeout time_in_seconds
   -write-fence {true|false}]
   ```

2. Verify the snapshot was taken:

   ```
   consistency-group snapshot show
   ```

3. Commit the snapshot:

   ```
   consistency-group snapshot commit svm_name -consistency-group
   consistency_group_name -snapshot snapshot_name
   ```

API

1. Invoke the snapshot creation. Send a POST request to the consistency group endpoint using the `action=start` parameter.

   ```
   curl -k -X POST 'https://<IP_address>/application/consistency-
   groups/<cg-uuid>/snapshots?action=start&action_timeout=7' -H
   "accept: application/hal+json" -H "content-type: application/json"
   -d '
   {
     "name": "<snapshot_name>",
     "consistency_type": "crash",
     "comment": "<comment>",
     "snapmirror_label": "<SnapMirror_label>"
   }'
   ```

2. If the POST request succeeds, the output includes a snapshot uuid. Using that uuid, submit a PATCH request to commit the snapshot.

```
curl -k -X PATCH 'https://<IP_address>/application/consistency-
groups/<cg_uuid>/snapshots/<snapshot_id>?action=commit' -H "accept:
application/hal+json" -H "content-type: application/json"

For more information about the ONTAP REST API, see
link:https://docs.netapp.com/us-en/ontap-
automation/reference/api_reference.html[API reference^] or the
link:https://devnet.netapp.com/restapi.php[ONTAP REST API page^] at
the NetApp Developer Network for a complete list of API endpoints.
```

Set remote protection for a consistency group

Consistency groups offer remote protection through SnapMirror active sync and, beginning with ONTAP 9.13.1, SnapMirror asynchronous.

Configure protection with SnapMirror active sync

You can use SnapMirror active sync to ensure snapshots of consistency groups created on your consistency group are copied to the destination. To learn more about SnapMirror active sync or how to configure SnapMirror active sync using the CLI, see Configure protection for business continuity.

Before you begin

- SnapMirror active sync relationships cannot be established on volumes mounted for NAS access.
- The policy labels in the source and destination cluster must match.
- SnapMirror active sync will not replicate snapshots by default unless a rule with a SnapMirror label is added to the predefined `AutomatedFailOver` policy and the snapshots are created with that label.

  To learn more about this process, refer to Protect with SnapMirror active sync.

- Cascade deployments are not supported with SnapMirror active sync.
- Beginning with ONTAP 9.13.1, you can non-disruptively add volumes to a consistency group with an active SnapMirror active sync relationship. Any other changes to a consistency group require you to break the SnapMirror active sync relationship, modify the consistency group, then reestablish and resynchronize the relationship.

> 💡 To configure SnapMirror active sync with the CLI, see Protect with SnapMirror active sync.

Steps for System Manager

1. Ensure you have met the prerequisites for using SnapMirror active sync.
2. Select **Storage > Consistency groups**.
3. Select the consistency group you have created from the Consistency group menu.
4. At the top right of the overview page, select **More** then **Protect**.
5. System Manager auto-fills source-side information. Select the appropriate cluster and storage VM for the destination. Select a protection policy. Ensure that **Initialize relationship** is checked.
6. Select **Save**.

7. The consistency group needs to initialize and synchronize. Confirm synchronization has completed successfully by returning to the **Consistency group** menu. The **SnapMirror (Remote)** status displays `Protected` next to ✅.

Configure SnapMirror asynchronous

Beginning with ONTAP 9.13.1, you can configure SnapMirror asynchronous protection for a single consistency group. Beginning with ONTAP 9.14.1, you can use SnapMirror asynchronous to replicate volume-granular snapshots to the destination cluster using the consistency group relationship.

About this task

To replicate volume-granular snapshots, you must be running ONTAP 9.14.1 or later. For MirrorAndVault and Vault policies, the volume-granular snapshot policy's SnapMirror label must match the consistency group's SnapMirror policy rule. Volume-granular snapshots abide by the keep value of the consistency group's SnapMirror policy, which is calculated independently of the consistency group snapshots. For example, if you have a policy to keep two snapshots on the destination, you can have two volume-granular snapshots and two consistency group snapshots.

When resynchronizing the SnapMirror relationship with volume-granular snapshots, you can preserve volume-granular snapshots with the `-preserve` flag. Volume-granular snapshots newer than consistency group snapshots are preserved. If there is not a consistency group snapshot, no volume-granular snapshots can be transferred in the resync operation.

Before you begin

- SnapMirror asynchronous protection is only available for a single consistency group. It is not supported for hierarchical consistency groups. To convert a hierarchical consistency group into a single consistency group, see modify consistency group architecture.

- The policy labels in the source and destination cluster must match.

- You can non-disruptively add volumes to a consistency group with an active SnapMirror asynchronous relationship. Any other changes to a consistency group require you to break the SnapMirror relationship, modify the consistency group, then reestablish and resynchronize the relationship.

- Consistency groups enabled for protection with SnapMirror asynchronous have different limits. For more information, see Consistency group limits.

- If you have configured an SnapMirror asynchronous protection relationship for multiple individual volumes, you can convert those volumes into a consistency group while retaining the existing snapshots. To convert volumes successfully:

  ◦ There must be a common snapshot of the volumes.

  ◦ You must break the existing SnapMirror relationship, add the volumes to a single consistency group, then resynchronize the relationship using the following workflow.

Steps

1. From the destination cluster, select **Storage > Consistency groups**.

2. Select the consistency group you have created from the Consistency group menu.

3. At the top right of the overview page, select **More** then **Protect**.

4. System Manager auto-fills source-side information. Select the appropriate cluster and storage VM for the destination. Select a protection policy. Ensure that **Initialize relationship** is checked.

   When selecting an asynchronous policy, you have the option to **Override Transfer Schedule**.

	The minimum supported schedule (recovery point objective, or RPO) for consistency groups with SnapMirror asynchronous is 30 minutes.

5. Select **Save**.

6. The consistency group needs to initialize and synchronize. Confirm synchronization has completed successfully by returning to the **Consistency group** menu. The **SnapMirror (Remote)** status displays `Protected` next to ✅.

Configure SVM disaster recovery

Beginning with ONTAP 9.14.1, SVM disaster recovery supports consistency groups, enabling you to mirror consistency group information from the source to the destination cluster.

If you are enabling SVM disaster recovery on an SVM that already contains a consistency group, following the SVM configuration workflows for System Manager or the ONTAP CLI.

If you are adding a consistency group to an SVM that is in an active and healthy SVM disaster recovery relationship, you must update the SVM disaster recovery relationship from the destination cluster. For more information, see Update a replication relationship manually. You must update the relationship any time you expand the consistency group.

Limitations

- SVM disaster recovery does not support hierarchical consistency groups.

- SVM disaster recovery does not support consistency groups protected with SnapMirror asynchronous. You must break the SnapMirror relationship before configuring SVM disaster recovery.

- Both clusters must be running ONTAP 9.14.1 or later.

- Fan-out relationships are not supported for SVM disaster recovery configurations that contain consistency groups.

- For other limits, see consistency group limits.

Visualize relationships

System Manager visualizes LUN maps under the **Protection > Relationships** menu. When you select a source relationship, System Manager displays a visualization of the source relationships. By selecting a volume, you can delve deeper into these relationships to see a list of the contained LUNs and the initiator group relationships. This information can be downloaded as an Excel workbook from the individual volume view; the download operation runs in the background.

Related information

- Clone a consistency group
- Configure snapshots
- Create custom data protection policies
- Recover from snapshots
- Restore a volume from an earlier snapshot
- SnapMirror active sync overview
- ONTAP automation documentation
- SnapMirror asynchronous disaster recovery basics

Modify member volumes in an ONTAP consistency group

Beginning with ONTAP 9.12.1, you can modify a consistency group by removing volumes or adding volumes (expanding the consistency group). Beginning with ONTAP 9.13.1, you can move volumes between child consistency groups if they share a common parent.

Add volumes to a consistency group

Beginning with ONTAP 9.12.1, you can non-disruptively add volumes to a consistency group.

About this task

- You cannot add volumes associated with another consistency group.

- Consistency groups support NAS, SAN, and NVMe protocols.

- You can add up to 16 volumes at a time to a consistency group if the adjustments are within the overall consistency group limits.

- Beginning with ONTAP 9.13.1, you can non-disruptively add volumes to a consistency group with an active SnapMirror active sync or SnapMirror asynchronous protection policy.

- When you add volumes to a consistency group protected by SnapMirror active sync, the status of the SnapMirror active sync relationship status changes to "Expanding" until mirroring and protection are configured for the new volume. If a disaster occurs on the primary cluster before this process completes, the consistency group reverts back to its original composition as part of the failover operation.

- In ONTAP 9.12.1 and earlier, you *cannot* add volumes to a consistency group in an SnapMirror active sync relationship. You must first delete the SnapMirror active sync relationship, modify the consistency group, then restore protection with SnapMirror active sync.

- Beginning with ONTAP 9.12.1, the ONTAP REST API supports adding *new* or existing volumes to a consistency group. For more information about the ONTAP REST API, refer to ONTAP REST API reference documentation.

  Beginning with ONTAP 9.13.1, this functionality is supported in System Manager.

- When expanding a consistency group, snapshots of the consistency group captured before the modification will be considered partial. Any restore operation based on that snapshot will reflect the consistency group at the point-in-time of the snapshot.

- If you are using ONTAP 9.10.1 through 9.11.1, you cannot modify a consistency group. To change the configuration of a consistency group in ONTAP 9.10.1 or 9.11.1, you must delete the consistency group, then create a new consistency group with the volumes you want to include.

- Beginning with ONTAP 9.14.1, you can replicate volume-granular snapshots to the destination cluster when using SnapMirror asynchronous. When expanding a consistency group using SnapMirror asynchronous, volume-granular snapshots are only replicated after expanding the consistency group when the SnapMirror policy is MirrorAll or MirrorAndVault. Only volume-granular snapshots newer than the baseline consistency group snapshot are replicated.

- If you add volumes to a consistency group in an SVM disaster recovery relationship (supported beginning with ONTAP 9.14.1), you must update the SVM disaster recovery relationship from the destination cluster after expanding the consistency group. For more information, see Update a replication relationship manually.

- If you are using NVMe with ONTAP 9.17.1, you cannot modify a consistency group.

Example 1. Steps

System Manager

Beginning with ONTAP 9.12.1, you can perform this operation with System Manager.

1. Select **Storage > Consistency groups**.

2. Select the consistency group that you want to modify.

3. If you are modifying a single consistency group, at the top of the **Volumes** menu, select **More** and then **Expand** to add a volume.

   If you are modifying a child consistency group, identify the parent consistency group you want to modify. Select the **>** button to view the child consistency groups, then select ⋮ next to the name of the child consistency group you want to modify. From that menu, select **Expand**.

4. Select up to 16 volumes to add to the consistency group.

5. Select **Save**. When the operation completes, view the newly added volumes in the consistency group's **Volumes** menu.

CLI

Beginning with ONTAP 9.14.1, you can add volumes to a consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Add existing volumes

1. Issue the following command. The `-volumes` parameter accepts a comma-separated list of volumes.

   (i) Only include the `-parent-consistency-group` parameter if the consistency group is in an hierarchical relationship.

   ```
   consistency-group volume add -vserver svm_name -consistency-group
   consistency_group_name -parent-consistency-group parent_consistency_group
   -volume volumes
   ```

Add new volumes

The procedure to add new volumes depends on the protocol you are using.

   (i) Only include the `-parent-consistency-group` parameter if the consistency group is in a hierarchical relationship.

- To add new volumes without exporting them:

   ```
   consistency-group volume create -vserver SVM_name -consistency-group
   child_consistency_group -parent-consistency-group existingParentCg -volume
   volume_name -size size
   ```

- To add new NFS volumes:

```
consistency-group volume create -vserver SVM_name -consistency-group
consistency-group-name -volume volume-prefix -volume-count number -size
size -export-policy policy_name
```

- To add new SAN volumes:

```
consistency-group volume create -vserver SVM_name -consistency-group
consistency-group-name -lun lun_name -size size -lun-count number -igroup
igroup_name
```

- To add new NVMe namespaces:

```
consistency-group volume create -vserver SVM_name -consistency-group
consistency_group_name -namespace namespace_name -volume-count number
-namespace-count number -size size -subsystem subsystem_name
```

Remove volumes from a consistency group

Volumes removed from a consistency group are not deleted. They remain active in the cluster.

About this task

- You cannot remove volumes from a consistency group in a SnapMirror active sync or SVM disaster recovery relationship. You must first delete the SnapMirror active sync relationship to modify the consistency group and then reestablish the relationship.
- If a consistency group has no volumes in it following the remove operation, the consistency group will be deleted.
- When a volume is removed from a consistency group, existing snapshots of the consistency group remain but are considered invalid. The existing snapshots cannot be used to restore the contents of the consistency group. Volume-granular snapshots remain valid.
- If you delete a volume from the cluster, it is automatically removed from the consistency group.
- To change the configuration of a consistency group in ONTAP 9.10.1 or 9.11.1, you must delete the consistency group then create a new consistency group with the desired member volumes.
- Deleting a volume from the cluster will automatically remove it from the consistency group.

System Manager

Beginning with ONTAP 9.12.1, you can perform this operation with System Manager.

Steps

1. Select **Storage > Consistency groups**.

2. Select the single or child consistency group that you want to modify.

3. In the **Volumes** menu, select the checkboxes next to the individual volumes you want to remove from the consistency group.

4. Select **Remove volumes from the consistency group**.

5. Confirm that you understand removing the volumes will cause all snapshots of the consistency group to become invalid and select **Remove**.

CLI

Beginning with ONTAP 9.14.1, you can remove volumes from a consistency group using the CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Step

1. Remove the volumes. The `-volumes` parameter accepts a comma-separated list of volumes.

   Only include the `-parent-consistency-group` parameter if the consistency group is in an hierarchical relationship.

   ```
   consistency-group volume remove -vserver SVM_name -consistency-group
   consistency_group_name -parent-consistency-group
   parent_consistency_group_name -volume volumes
   ```

Move volumes between consistency groups

Beginning with ONTAP 9.13.1, you can move volumes between child consistency groups that share a parent.

About this task

- You can only move volumes between consistency groups nested under the same parent consistency group.

- Existing consistency group snapshots become invalid and no longer accessible as consistency group snapshots. Individual volume snapshots remain valid.

- Snapshots of the parent consistency group remain valid.

- If you move all volumes out of a child consistency group, that consistency group will be deleted.

- Modifications to a consistency group must abide by consistency group limits.

System Manager

Beginning with ONTAP 9.12.1, you can perform this operation with System Manager.

Steps

1. Select **Storage > Consistency groups**.

2. Select the parent consistency group that contains the volumes you want to move. Find the child consistency group and then expand the **Volumes** menu. Select the volumes you want to move.

3. Select **Move**.

4. Choose whether you want to move the volumes to a new consistency group or an existing group.

   a. To move to an existing consistency group, select **Existing child consistency group** then choose the consistency group's name from the dropdown menu.

   b. To move to a new consistency group, select **New child consistency group**. Enter a name for the new child consistency group and select a component type.

5. Select **Move**.

CLI

Beginning with ONTAP 9.14.1, you can move volumes between consistency groups using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Move volumes to a new child consistency group

1. The following command creates a new child consistency group that contains the designated volumes.

   When you create the new consistency group, you can designate new snapshot, QoS, and tiering policies.

   ```
   consistency-group volume reassign -vserver SVM_name -consistency-group
   source_child_consistency_group -parent-consistency-group
   parent_consistency_group -volume volumes -new-consistency-group
   consistency_group_name [-snapshot-policy policy -qos-policy policy -tiering
   -policy policy]
   ```

Move volumes to an existing child consistency group

1. Reassign the volumes. The `-volumes` parameter accepts a comma-separated list of volume names.

   ```
   consistency-group volume reassign -vserver SVM_name -consistency-group
   source_child_consistency_group -parent-consistency-group
   parent_consistency_group -volume volumes -to-consistency-group
   target_consistency_group
   ```

Related information

- Consistency group limits

- Clone a consistency group

Modify ONTAP consistency group geometry

Beginning with ONTAP 9.13.1, you can modify the geometry of a consistency group. Modifying the geometry of a consistency group enables you to alter the configuration of child or parent consistency groups without disruption to ongoing IO operations.

Modifying consistency group geometry has an impact on existing snapshots of the consistency group. For details, refer to the specific modification to geometry you want to perform.

> ⓘ You cannot modify the geometry of a consistency group that is configured with a remote protection policy. You must first break the protection relationship, modify the geometry, then restore remote protection.

Add a new child consistency group

Beginning with ONTAP 9.13.1, you can add a new child consistency group to an existing parent consistency group.

About this task

- A parent consistency group can contain a maximum of five child consistency groups. See consistency group limits for other limits.

- You cannot add a child consistency group to a single consistency group. You must first promote the consistency group, then you can add a child consistency group.

- Existing snapshots of the consistency group captured before the expand operation will be considered partial. Any restore operation based on that snapshot will reflect the consistency group at the point-in-time of the snapshot.

Example 2. Steps

System Manager

Beginning with ONTAP 9.13.1, you can perform this operation with System Manager.

Add a new child consistency group

1. Select **Storage > Consistency groups**.

2. Select the parent consistency group you want to which you want to add a child consistency group.

3. Next to the parent consistency group's name, select **More** then **Add new child consistency group**.

4. Enter a name for your consistency group.

5. Choose whether you would like to add new or existing volumes.

   a. If you are adding existing volumes, select **Existing volumes** then choose the volumes from the dropdown menu.

   b. If you are adding new volumes, select **New volumes** then designate the number of volumes and their size.

6. Select **Add**.

CLI

Beginning with ONTAP 9.14.1, you can add a child consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Add a child consistency group with new volumes

1. Create the new consistency group. Provide values for the consistency group name, volume prefix, number of volumes, volume size, storage service, and export policy name:

```
consistency-group create -vserver SVM_name -consistency-group
consistency_group -parent-consistency-group parent_consistency_group
-volume-prefix prefix -volume-count number -size size -storage-service
service -export-policy policy_name
```

Add a child consistency group with existing volumes

1. Create the new consistency group. The `volumes` parameter accepts a comma-separated list of volume names.

```
consistency-group create -vserver SVM_name -consistency-group
new_consistency_group -parent-consistency-group parent_consistency_group
-volumes volume
```

Detach a child consistency group

Beginning with ONTAP 9.13.1, you can remove a child consistency group from its parent, converting it into an individual consistency group.

About this task

- Detaching a child consistency group causes the parent consistency group's snapshots to become invalid and inaccessible. Volume granular snapshots remain valid.

- Existing snapshots of the individual consistency group remain valid.

- This operation will fail if there is an existing single consistency group that has the same name as the child consistency group you intend to detach. If you encounter this scenario, you must rename the consistency group when you detach it.

Example 3. Steps

System Manager

Beginning with ONTAP 9.13.1, you can perform this operation with System Manager.

Detach a child consistency group

1. Select **Storage > Consistency groups**.
2. Select the parent consistency group that contains the child you want to detach.
3. Next to the child consistency group you want to detach, select **More** then **Detach from parent**.
4. Optionally, rename the consistency group and select an application type.
5. Select **Detach**.

CLI

Beginning with ONTAP 9.14.1, you can detach a child consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Detach a child consistency group

1. Detach the consistency group. Optionally, rename the detached consistency group with the `-new-name` parameter.

   ```
   consistency-group detach -vserver SVM_name -consistency-group
   child_consistency_group -parent-consistency-group parent_consistency_group
   [-new-name new_name]
   ```

Move an existing single consistency group under a parent consistency group

Beginning with ONTAP 9.13.1, you can convert an existing single consistency group to a child consistency group. You can either move the consistency group under an existing parent consistency group or create a new parent consistency group during the move operation.

About this task

- The parent consistency group must have four or fewer children. A parent consistency group can contain a maximum of five child consistency groups. See consistency group limits for other limits.

- Existing snapshots of the *parent* consistency group captured before this operation are considered partial. Any restore operation based on one of those snapshots reflects the consistency group at the point-in-time

of the snapshot.

- Existing consistency group snapshots of the single consistency group remain valid.

Example 4. Steps

System Manager

Beginning with ONTAP 9.13.1, you can perform this operation with System Manager.

Move an existing single consistency group under a parent consistency group

1. Select **Storage > Consistency groups**.

2. Select the consistency group you want to convert.

3. Select **More** then **Move under different consistency group**.

4. Optionally, enter a new name for the consistency group and select a component type. By default, the component type will be Other.

5. Choose if you want to migrate to an existing parent consistency group or create a new parent consistency group:

   a. To migrate to an existing parent consistency group, select **Existing consistency group** then choose the consistency group from the dropdown menu.

   b. To create a new parent consistency group, select **New consistency group** then provide a name for the new consistency group.

6. Select **Move**.

CLI

Beginning with ONTAP 9.14.1, you can move a single consistency group under a parent consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Move a consistency group under a new parent consistency group

1. Create the new parent consistency group. The `-consistency-groups` parameter will migrate any existing consistency groups to the new parent.

   ```
   consistency-group attach -vserver svm_name -consistency-group
   parent_consistency_group -consistency-groups child_consistency_group
   ```

Move a consistency group under an existing consistency group

1. Move the consistency group:

   ```
   consistency-group add -vserver SVM_name -consistency-group
   consistency_group -parent-consistency-group parent_consistency_group
   ```

Promote a child consistency group

Beginning with ONTAP 9.13.1, you can promote a single consistency group to a parent consistency group. When you promote the single consistency group to a parent, you also create a new child consistency group that inherits all of the volumes in the original, single consistency group.

About this task

- If you want to convert a child consistency group to a parent consistency group, you must first [detach](#) the child consistency group then follow this procedure.
- Existing snapshots of the consistency group remain valid after you promote the consistency group.

System Manager

Beginning with ONTAP 9.13.1, you can perform this operation with System Manager.

Promote a child consistency group

1. Select **Storage > Consistency groups**.
2. Select the consistency group you want to promote.
3. Select **More** then **Promote to parent consistency group**.
4. Enter a **Name** and select a **Component type** for the child consistency group.
5. Select **Promote**.

CLI

Beginning with ONTAP 9.14.1, you can move a single consistency group under a parent consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.
- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Promote a child consistency group

1. Promote the consistency group. This command will create one parent and one child consistency group.

   ```
   consistency-group promote -vserver SVM_name -consistency-group
   existing_consistency_group -new-name new_child_consistency_group
   ```

Demote a parent to a single consistency group

Beginning with ONTAP 9.13.1, you can demote a parent consistency group to a single consistency group. Demoting the parent flattens the hierarchy of the consistency group, removing all associated child consistency groups. All volumes in the consistency group will remain under the new, single consistency group.

About this task

- Existing snapshots of the *parent* consistency group remain valid after you demote it to a single consistency. Existing snapshots of any of the associated *child* consistency groups of that parent become invalid upon demotion. The individual volume snapshots within the child consistency group continue to be accessible as volume-granular snapshots.

Example 5. Steps

System Manager

Beginning with ONTAP 9.13.1, you can perform this operation with System Manager.

Demote a consistency group

1. Select **Storage > Consistency groups**.

2. Select the parent consistency group you want to demote.

3. Select **More** then **Demote to single consistency group**.

4. A warning will advise you that all associated child consistency groups will be deleted and their volumes will be moved under the new single consistency group. Select **Demote** to confirm you understand the impact.

CLI

Beginning with ONTAP 9.14.1, you can demote a consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Demote a consistency group

1. Demote the consistency group. Use the optional `-new-name` parameter to rename the consistency group.

```
consistency-group demote -vserver SVM_name -consistency-group
parent_consistency_group [-new-name new_consistency_group_name]
```

Modify ONTAP consistency group application and component tags

Beginning with ONTAP 9.12.1, consistency groups support component and application tagging. Application and component tags are a management tool, enabling you to filter and identify different workloads in your consistency groups.

About this task

Consistency groups offer two types of tags:

- **Application tags**: these apply to individual and parent consistency groups. Application tags provide labeling for workloads such as MongoDB, Oracle, or SQL Server. The default application tag for consistency groups is Other.

- **Component tags**: Children in hierarchal consistency groups have component tags instead of application tags. The options for component tags are "data", "logs", or "other". The default value is Other.

You can apply tags when creating consistency groups or after the consistency groups have been created.

> (i) If the consistency group has a SnapMirror active sync relationship, you must use **Other** as the application or component tag.

Steps

Beginning with ONTAP 9.12.1, you can modify application and component tags using System Manager. Beginning with ONTAP 9.14.1, you can modify the application and component tags using the ONTAP CLI.

System Manager

1. Select **Storage > Consistency groups**.

2. Select the consistency group whose tag you want to modify. Select the ⋮ next to the consistency group's name then **Edit**.

3. In the dropdown menu, choose the appropriate application or component tag.

4. Select **Save**.

CLI

Beginning with ONTAP 9.14.1, you can modify the application or component tag of an existing consistency group using the ONTAP CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Modify the application tag

1. Application tags accept a limited number of preset strings. To see the accepted list of strings, run the following command:
   ```
   consistency-group modify -vserver svm_name -consistency-group
   consistency_group -application-type ?
   ```

2. Choose the appropriate string from the output, the modify the consistency group:
   ```
   consistency-group modify -vserver svm_name -consistency-group
   consistency_group -application-type application_type
   ```

Modify the component tag

1. Modify the component type. The component type can be data, logs, or other. If you are using SnapMirror active sync, it must be "other."
   ```
   consistency-group modify -vserver svm -consistency-group
   child_consistency_group -parent-consistency-group parent_consistency_group
   -application-component-type [data|logs|other]
   ```

Clone an ONTAP consistency group

Beginning with ONTAP 9.12.1, you can clone a consistency group to create a copy of a consistency group and its contents. Cloning a consistency group creates a copy of the consistency group configuration, its metadata such as application type, and all the volumes and its contents such as files, directories, LUNs or NVMe namespaces.

About this task

When cloning a consistency group, you can clone it with its current configuration, but with volume contents as they are or based on an existing consistency group snapshot.

Cloning a consistency group is supported only for the entire consistency group. You cannot clone an individual child consistency group in a hierarchical relationship: only the complete consistency group configuration can be cloned.

When you clone a consistency group, the following components are not cloned:

- iGroups
- LUN maps
- NVMe subsystems
- NVMe namespace subsystem maps

Before you begin

- When you clone a consistency group, ONTAP will not create SMB shares for the cloned volumes if a share name is not specified. * Cloned consistency groups are not mounted if a junction path is not specified.

- If you attempt to clone a consistency group based on a snapshot that does not reflect the consistency group's current constituent volumes, the operation will fail.

- After you clone a consistency group, you need to perform the appropriate mapping operation.

  Refer to Map igroups to multiple LUNs or Map an NVMe namespace to a subsystem for more information.

- Cloning a consistency group is not supported for a consistency group in a SnapMirror active sync relationship or with any associated DP volumes.

System Manager

Steps

1. Select **Storage > Consistency groups**.

2. Select the consistency group you want to clone from the **Consistency Group** menu.

3. At the top right of the overview page for the consistency group, select **Clone**.

4. Enter a name for the new, cloned consistency group or accept the default name.

   a. Choose if you want to enable **Thin Provisioning**.

   b. Choose **Split Clone** if you want to dissociate the consistency group from its source and allocate additional disk space for the cloned consistency group.

5. To clone the consistency group in its current state, choose **Add a new Snapshot**.

   To clone the consistency group based on a snapshot, choose **Use an existing snapshot**. Selecting this option will open a new sub-menu. Choose the snapshot that you want to use as the basis for the clone operation.

6. Select **Clone**.

7. Return to the **Consistency Group** menu to confirm your consistency group has been cloned.

CLI

Beginning with ONTAP 9.14.1, you can clone a consistency group using the CLI with cluster admin credentials.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Clone a consistency group

1. The `consistency-group clone create` command clones the consistency group at its current point-in-time status. To base the clone operation on a snapshot, include the `-source-snapshot` parameter.

   ```
   consistency-group clone create -vserver svm_name -consistency-group
   clone_name -source-consistency-group consistency_group_name [-source-
   snapshot snapshot_name]
   ```

   Learn more about `consistency-group clone create` in the ONTAP command reference.

Next steps

- Map igroups to multiple LUNs

- Map an NVMe namespace to a subsystem

Delete an ONTAP consistency group

If you decide that you no longer need a consistency group, you can delete it.

About this task

- Deleting a consistency group deletes the instance of the consistency group and does *not* impact the constituent volumes or LUNs. Deleting a consistency group does not result in deletion of the snapshots present on each volume, but they will no longer be accessible as consistency group snapshots. The snapshots can, however, continue to be managed as ordinary volume granular snapshots.

- ONTAP automatically deletes a consistency group if all of the volumes in the consistency group are deleted.

- Deleting a parent consistency group results in the deletion of all associated child consistency groups.

- If you are using a version of ONTAP between 9.10.1 to 9.12.0, volumes can only be removed from a consistency group if the volume itself is deleted, in which case the volume is automatically removed from the consistency group. Beginning with ONTAP 9.12.1, you can remove volumes from a consistency group without deleting the consistency group. For more information on this process, refer to Modify a consistency group.

Example 6. Steps

System Manager

1. Select **Storage > Consistency groups**.

2. Select the consistency group you would like to delete.

3. Next to the name of the consistency group, select ⋮ then **Delete**.

CLI

Beginning with ONTAP 9.14.1, you can delete a consistency group using the CLI.

Before you begin

- You must be at the admin privilege level to perform this task.

- Beginning with ONTAP 9.15.1, any user at the admin privilege level can perform this task. In ONTAP 9.14.1, you must be a cluster or SVM administrator to perform this task.

Delete a consistency group

1. Delete the consistency group:

   ```
   consistency-group delete -vserver svm_name -consistency-group
   consistency_group_name
   ```