



# C

## SANtricity commands

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# C

## Change SSD cache application type

The `set ssdCache` command changes the application type associated with the SSD cache. The application type can be web server, database, or multimedia. Changing the application type changes the block size, sub-block size, populate on read threshold, and populate on write threshold for the volumes underlying the SSD cache.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, and E5700 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800 or E5700 storage array, you must have the Support Admin role.

### Syntax

```
set ssdCache [ssdCacheName]usageHint=(webServer|dataBase|fileSystem)
```

### Parameter

Parameter	Description
ssdCache	The name of the SSD cache for which you want to change the application type. Enclose the SSD cache name in square brackets ([ ]). If the SSD cache name contains special characters or consists only of numbers, you must enclose the SSD cache name in double quotation marks (" ") inside square brackets.
usageHint	The values are based on the typical I/O usage pattern of the application that is using the SSD cache. Valid values are <code>webServer</code> , <code>dataBase</code> , or <code>fileSystem</code> .

### Minimum firmware level

7.84

## Check asynchronous mirror group consistency

The `check asyncMirrorGroup repositoryConsistency` command produces a report based on analysis of the data in the underlying repository volume of the specified asynchronous mirror group.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, and E5700 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800 or E5700 storage array, you must have the Storage Admin role.

## Syntax

```
check asyncMirrorGroup[asyncMirrorGroupName]
repositoryConsistency localVolume=[localVolumeName"]
file="filePath"
```

## Parameters

Parameter	Description
asyncMirrorGroup	The name of the asynchronous mirror group on which to run a consistency check. Enclose the asynchronous mirror group name in square brackets ([ ]). If the asynchronous mirror group name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.
repositoryConsistency	Specifies that the asynchronous mirror group is checked for consistency.
localVolume	Specifies the name of a local volume that participates in the mirror relationship. You can specify a local volume that is either the source or the destination on a mirror relationship. If the local volume name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.
file	<p>The file path and the file name to which you want to save the report that results from the consistency check. Enclose the file name in double quotation marks (" "). For example:</p> <pre>file="C:\Program Files\CLI\logs\repoConsistency.txt"</pre> <p>This parameter must appear last, after any of the optional parameters.</p>

## Notes

The report generated by this command is intended for use by technical support to analyze problems.

## Minimum firmware level

7.83

## Check repository consistency

The `check repositoryConsistency` command produces a report based on analysis of the data in a specified object's underlying repository volume.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```
check (snapGroup [snapGroupName] repositoryConsistency |
snapVolume [snapVolumeName] repositoryConsistency |
volume [volumeName] repositoryConsistency |
volumeCopy target [targetName] repositoryConsistency |
asyncMirrorGroup [asyncMirrorGroupName]
repositoryConsistency localVolume="localVolumeName"]
file="filePath"
```

## Parameters

Parameter	Description
repositoryConsistency	Specifies that the snapshot group, snapshot volume, volume, or asynchronous mirror group (depending on which is specified by the corresponding parameter) is checked for consistency.
snapGroup	The name of the snapshot group on which to run a consistency check. Enclose the snapshot group name in square brackets ([ ]). If the snapshot group name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.

Parameter	Description
snapVolume	The name of the snapshot volume on which to run a consistency check. Enclose the snapshot volume name in square brackets ([ ]). If the snapshot volume name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.
volume	The name of the thin volume on which to run a consistency check. Enclose the thin volume name in square brackets ([ ]). If the thin volume name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.
volumeCopy	Specifies that the target of a volume copy relationship is checked for consistency.
target	Use only in conjunction with the volumeCopy parameter to specify the name of the volume that is the target of the volume copy relationship. If the volume name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.
asyncMirrorGroup	The name of the asynchronous mirror group on which to run a consistency check. Enclose the asynchronous mirror group name in square brackets ([ ]). If the asynchronous mirror group name contains special characters or consists only of numbers, you also must enclose the name in double quotation marks (" ") inside square brackets.
localVolume	Use only with the asyncMirrorGroup parameter to specify the name of a local volume that participates in the mirror relationship. You can specify a local volume that is either the source or the destination on a mirror relationship. Enclose the local volume name in double quotation marks (" ").
file	<p>The file path and the file name to which you want to save the report that results from the consistency check. Enclose the file name in double quotation marks (" "). For example:</p> <pre>file="C:\Program Files\CLI\logs\repoConsistency.txt"</pre> <p>This parameter must appear last, after any of the optional parameters.</p>

## Notes

The report generated by this command is intended for use by technical support to analyze problems.

## Minimum firmware level

7.83

## Check storage array connectivity

The `check storageArray connectivity` command verifies that the local storage array and the remote storage array have a communication path and displays the connection details between the local and remote storage array.

## Supported Arrays

This command applies to any individual storage array, with some restrictions. If you are running the command on the E2700 or E5600 array, there are no restrictions.



If you are running the command on the E2800 or E5700 array, the client type must be set to `symbol`. This command will not execute if the client type is set to `https`.

## Roles

To execute this command on an E2800 or E5700 storage array, you must have the Storage Admin role.

## Context

Before creating an asynchronous mirror group, you should check whether the local storage array and the remote storage array can communicate with each other. When you execute this command, the system queries for the remote storage array on all eligible host ports to determine what ports are connected to the remote storage array. The result of the test is a list of all ports on the local storage array along with a list of the remote storage array port addresses accessible through that port.



Connectivity is tested using all possible channels, and if it is a dual controller configuration, connectivity is checked from each controller. It might take up to 20 minutes to check connectivity between two storage arrays.

## Syntax

```
check storageArray connectivity
(remoteStorageArrayName="storageArrayName"|
remoteStorageArrayWwid=<wwID>)
```

## Parameters



Parameter	Description
<code>remoteStorageArrayName</code>	The name for the remote storage array for which you are checking connectivity. Enclose the storage array name in double quotation marks (" ").
<code>remoteStorageArrayWwid</code>	The World Wide Identifier (WWID) of the storage array for which you are checking connectivity. You can use the WWID instead of the storage array name to identify the storage array. Enclose the WWID in angle brackets (< >).

## Notes

Before a mirror can be established between two storage arrays, they must be connected through a Fibre Channel connection or an iSCSI connection.

Fibre Channel asynchronous mirroring must be activated on both storage arrays before they can communicate with each other for mirroring or connectivity checking.

If the local storage array supports iSCSI, connectivity over iSCSI is checked. If the local storage array supports Fibre Channel and mirroring over Fibre Channel has been activated, connectivity over Fibre Channel is checked. If the local storage array does not support iSCSI or Fibre Channel, an error message is displayed and the operation aborted.

## Minimum firmware level

7.84

## Check synchronous mirroring status

The `check syncMirror` command returns the status of a remote-mirror volume. Use this command to determine when the status of the remote-mirror volume becomes Optimal.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, and E5700 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800 or E5700 storage array, you must have the Storage Admin role.

## Context



In previous versions of this command the feature identifier was `remoteMirror`. This feature identifier is no longer valid and is replaced by `syncMirror`.

## Syntax

```
check syncMirror localVolume [volumeName] optimalStatus  
timeout=timeoutValue
```

## Parameters

Parameter	Description
localVolume	The name of any remote-mirror volume. The remote-mirror volume can be the primary volume or the secondary volume of a remote mirrored pair. Enclose the volume name in square brackets ([ ]). If the volume name has special characters, you must enclose the volume name in double quotation marks (" ").
timeout	The time interval within which the software can return the remote-mirror volume status. The timeout value is in minutes.

## Notes

This command waits until the status becomes Optimal or the timeout interval expires. Use this command when you run the Asynchronous Synchronous Mirroring utility.

## Check volume parity

The `check volume parity` command checks a volume for parity and media errors, and then writes the results of the check to a file.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```

check volume [volumeName] parity
[parityErrorFile=filename]
[mediaErrorFile=filename]
[priority=(highest | high | medium | low | lowest)]
[startingLBA=LBAvalue]
[endingLBA=LBAvalue]
[verbose=(TRUE | FALSE)]

```

## Parameters

Parameter	Description
volume	<p>The name of the specific volume for which you want to check parity. Enclose the volume name in square brackets ([ ]). If the volume name contains special characters or consists only of numbers, you must enclose the identifier in double quotation marks (" ") inside square brackets.</p>
parityErrorFile	<p>The file path and the file name to which you want to save the parity error information. Enclose the file name in double quotation marks (" "). For example:</p> <pre>file="C:\Program Files\CLI\logs\parerr.txt"</pre> <p>This command does not automatically append a file extension to the saved file. You must specify a file extension when entering the file name.</p>
mediaErrorFile	<p>The file path and the file name to which you want to save the media error information. Enclose the file name in double quotation marks (" "). For example:</p> <pre>file="C:\Program Files\CLI\logs\mederr.txt"</pre> <p>This command does not automatically append a file extension to the saved file. You must specify a file extension when entering the file name.</p>
priority	<p>The priority that the parity check has relative to host I/O activity. Valid values are highest, high, medium, low, or lowest. The lowest priority rate benefits system performance, but the parity check takes longer. The highest priority rate benefits the parity check, but system performance might be compromised.</p>

Parameter	Description
startingLBA	The starting logical block address.
endingLBA	The ending logical block address.
verbose	The setting to capture progress details, such as percent complete, and to show the information as the volume parity is being scanned. To capture progress details, set this parameter to <code>TRUE</code> . To prevent capturing progress details, set this parameter to <code>FALSE</code> .

## Notes

The starting logical block address and the ending logical block address are useful for very large single-volume LUNs or namespaces. Running a volume parity check on a very large single volume LUN or namespace can take a long time. By defining the beginning address and ending address of the data blocks, you can reduce the time that a volume parity check takes to complete.

## Clear drive channel statistics

The `clear allDriveChannels stats` command resets the statistics for all of the drive channels.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin or Support Admin role.

## Syntax

```
clear allDriveChannels stats
```

## Parameters

None.

## Clear asynchronous mirroring fault

The `clear asyncMirrorFault` command clears an asynchronous mirroring "sticky" fault from one or more asynchronous mirror groups and from one or more asynchronous

mirror group member volumes.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, and E5700 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, or E5700 storage array, you must have the Storage Admin role.

## Context

An asynchronous mirror group and its member volumes can encounter asynchronous mirroring "sticky" faults, which occur at a single point-in-time but do not impact the functionality of the mirrors. These type of faults must be reviewed, but might not require any changes to the configuration.

An asynchronous mirror group and its member volumes might or can have more than one associated sticky fault. This command clears all of the faults associated with the asynchronous mirror group and its member volume. However, if an asynchronous mirror group has a fault and one of its member volumes has a fault, clearing the fault on the asynchronous mirror group does not clear the fault on its member volume.

## Syntax

```
clear asyncMirrorFault(all |
  asyncMirrorGroup [asyncMirrorGroupName] |
  asyncMirrorGroups ["asyncMirrorGroupName1"
    ... "asyncMirrorGroupNameN"] |
  volume [volumeName] |
  volumes ["volumeName1" ... "volumeNameN"])
```

## Parameter

Parameter	Description
all	Use this parameter if you want to clear all asynchronous mirroring faults from all asynchronous mirror groups and on all asynchronous mirror group member volumes.
asyncMirrorGroup	The name of the asynchronous mirror group from which you want to clear the asynchronous mirroring fault. Enclose the asynchronous mirror group name in square brackets ([ ]). If the asynchronous mirror group name contains special characters or consists only of numbers, you must enclose the name in double quotation marks (" ") inside square brackets.

Parameter	Description
<code>asyncMirrorGroups</code>	<p>The names of several asynchronous mirror groups from which you want to clear the asynchronous mirroring fault. Enter the names of the asynchronous mirror groups using these rules:</p> <ul style="list-style-type: none"> <li>• Enclose all of the names in square brackets ([ ]).</li> <li>• Enclose each of the names in double quotation marks (" ").</li> <li>• Separate each of the names with a space.</li> </ul>
<code>volume</code>	<p>The name of the specific member volume (in an asynchronous mirror group) from which you want to clear the asynchronous mirroring fault. Enclose the member volume name in square brackets ([ ]). If the volume name contains special characters or consists only of numbers, you must enclose the name in double quotation marks (" ") inside square brackets.</p>
<code>volumes</code>	<p>The names of several member volumes (in an asynchronous mirror group) from which you want to clear the asynchronous mirroring fault. Enter the names of the member volumes using these rules:</p> <ul style="list-style-type: none"> <li>• Enclose all of the names in square brackets ([ ]).</li> <li>• Enclose each of the names in double quotation marks (" ").</li> <li>• Separate each of the names with a space.</li> </ul>

## Minimum firmware level

7.84

## Clear email alert configuration

The `clear emailAlert configuration` command clears the email alert configuration to default values.

### Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin or Support Admin role.

## Syntax

```
clear emailAlert configuration
```

## Parameters

None.

## Examples

```
SMcli -n Array1 -c "clear emailAlert configuration;"
```

```
SMcli completed successfully.
```

## Minimum firmware level

8.40

# Clear storage array configuration

The `clear storageArray configuration` command clears an entire storage array configuration or part of a storage array configuration, or clears volume group and volume configuration only.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context

Use this command to perform one of these operations:

- Clear the entire storage array configuration, and return it back to the initial installation state.
- Clear the configuration except for security information and identification information.
- Clear volume group configuration information and volume configuration information only.




**Possible damage to the storage array configuration** — As soon as you run this command, the existing storage array configuration is deleted.

## Syntax

```
clear storageArray configuration (all | volumeGroups)
```

```
clear storageArray configuration factoryReset
```

## Parameters

Parameter	Description
None	If you do not enter a parameter, this command removes all configuration information for the storage array, except for information related to security and identification.
all	The setting to remove the entire configuration of the storage array, including security information and identification information. Removing all configuration information returns the storage array to its initial state.
volumeGroups	The setting to remove the volume configuration and the volume group configuration. The rest of the configuration stays intact.
factoryReset	This setting removes the entire configuration of the storage array (the same function as the <code>all</code> parameter), but also resets network configuration and any password information stored in the controller.
supportReset	<div> This command is for technical support use only.</div> This setting behaves like the <code>factoryReset</code> parameter, but also clears all bundle keys.

## Notes

With this command, you can clear the configuration of the storage array in a number of different ways. When you clear the storage array for volume groups, recovery mode automatically starts. In recovery mode, onboard (cache) backups (if they exist on the platform) are retained. When the storage array is in recovery mode, you can, optionally, restore the storage array configuration from a host-based backup file or from one of the onboard (cache) backups.

This command also resets the storage array identifier. Any premium features enabled with a key file are invalidated, and new premium feature keys must be created and applied. Contact technical support.

When you run this command, the storage array becomes unresponsive, and all script processing is canceled.



You must remove and re-add the storage array to resume communication with the host. To remove an unresponsive storage array, use this SMcli wrapper command:

```
SMcli -X -n storageArrayName
```

The **X** is a unique SMcli terminal and must be uppercase.

To re-add the storage array, use this SMcli wrapper command:

```
SMcli -A -n storageArrayName
```

The **A** is a unique SMcli terminal and must be uppercase.

## Minimum firmware level

7.10 adds these parameters:

- `all`
- `volumeGroups`

7.83 adds the recovery mode capability.

11.41 adds these parameters:

- `factoryReset`
- `supportReset`

## Clear storage array event log

The `clear storageArray eventLog` command clears the event log in the storage array by deleting the data in the Event Log buffer.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

### Context



**Possible damage to the storage array configuration** — As soon as you run this command, the existing event log in the storage array is deleted.

## Syntax

```
clear storageArray eventLog
```

## Parameters

None.

## Clear storage array firmware pending area

The `clear storageArray firmwarePendingArea` command deletes a firmware image or NVSRAM values that you have previously downloaded from the pending area buffer.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context



**Possible damage to the storage array configuration** — As soon as you run this command, the contents of the existing pending area in the storage array are deleted.

## Syntax

```
clear storageArray firmwarePendingArea
```

## Parameters

None.

## Clear storage array recovery mode

The `clear storageArray recoveryMode` command forces a storage array to exit recovery mode.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```
clear storageArray recoveryMode
```

## Parameters

None.

## Notes



Recovery mode is entered during start-of-day operations when the system configuration is cleared and a valid on board backup is available. This mode is exited by either restoring the system configuration from a backup location, or by clearing the existing on board backups. While recovery mode is in force, a needs attention condition is raised and the Recovery Guru is available from the user interface. However, the system configuration is empty during recovery mode.



If you want to return the storage array to a previous configuration, you must restore the configuration from the backup before clearing recovery mode. You must perform validation checks or check with technical support to make sure that the restore was successful. After determining that the restore was successful, recovery mode can be cleared.

## Minimum firmware level

7.83

## Clear syslog configuration

The `clear syslog configuration` command clears the syslog alert information.

## Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin or Support Admin role.

## Syntax

```
clear syslog configuration
```

## Parameters

None.

## Examples

```
SMcli -n Array1 -c "clear syslog configuration;"

SMcli completed successfully.
```

## Minimum firmware level

8.40

# Clear volume reservations

The `clear volume reservations` command clears persistent volume reservations.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```
clear (allVolumes | volume [volumeName] |
volumes ["volumeName1" ... "volumeNameN"]) reservations
```

## Parameters

Parameter	Description
allVolumes	The setting to clear persistent volume reservations on all of the volumes in the storage array.

Parameter	Description
volume	The name of a volume for which you are clearing persistent reservations. Enclose the volume name in square brackets ([ ]). If the volume name contains special characters or consists only of numbers, you must enclose the name in double quotation marks (" ") inside square brackets.
volumes	<p>The names of several volumes for which you are clearing persistent reservations. Enter the names of the member volumes using these rules:</p> <ul style="list-style-type: none"> <li>• Enclose all of the names in square brackets ([ ]).</li> <li>• Enclose each of the names in double quotation marks (" ").</li> <li>• Separate each of the names with a space.</li> </ul>

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

## Clear volume unreadable sectors

The `clear volume unreadableSectors` command clears unreadable sector information from one or more volumes.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```
clear (allVolumes | volume [volumeName] |
volumes ["volumeName1" ... "volumeNameN"]) unreadableSectors
```

## Parameters

Parameter	Description
<code>allVolumes</code>	The setting to clear unreadable sector information from all of the volumes in the storage array.
<code>volume</code>	The name of a volume for which you are clearing unreadable sector information. Enclose the volume name in square brackets ([ ]). If the volume name contains special characters or consists only of numbers, you must enclose the name in double quotation marks (" ") inside square brackets.
<code>volumes</code>	<p>The names of several volumes for which you are clearing unreadable sector information. Enter the names of the member volumes using these rules:</p> <ul style="list-style-type: none"> <li>• Enclose all of the names in square brackets ([ ]).</li> <li>• Enclose each of the names in double quotation marks (" ").</li> <li>• Separate each of the names with a space.</li> </ul>

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

## Create asynchronous mirror group

The `create asyncMirrorGroup` command creates a new, empty asynchronous mirror group on both the local storage array and the remote storage array.

### Supported Arrays

This command applies to any individual storage array, with some restrictions. If you are running the command on the E2700 or E5600 array, there are no restrictions.



If you are running the command on the E2800 or E5700 array, the client type must be set to `symbol`. This command will not execute if they client type is set to `https`.

## Roles

To execute this command on an E2800 or E5700 storage array, you must have the Storage Admin role.

## Context

An asynchronous mirror group is a container that can house several mirrored pairs so that they can be managed as one entity. You create an asynchronous mirror group to define the synchronization settings for all mirrored pairs within the group. Each mirrored pair in an asynchronous mirror group share the same synchronization settings, primary and secondary role, and write mode.

The asynchronous mirror group is associated with the local storage array and remote storage array that is used for mirroring. The local storage array is the primary side of the asynchronous mirror group, while the remote storage array is the secondary side of the asynchronous mirror group. All volumes added to the asynchronous mirror group on the local storage array hold the primary role in the mirror relationship. Subsequently, all volumes added to the asynchronous mirror group on the remote storage array hold the secondary role in the mirror relationship.



Make sure that you execute the `Create Asynchronous Mirror Group` command on the local storage array. Asynchronous mirror group creation is initiated from the storage array that contains the volumes that hold the primary role in the mirror relationship. You use the `Create Asynchronous Mirror Group` command to specify the identity of the remote storage array that contains the volumes that hold the secondary role in the mirror relationship.

## Syntax



```
create asyncMirrorGroup userLabel="asyncMirrorGroupName"  
(remoteStorageArrayName="storageArrayName" | remoteStorageArrayWWN="wwID")  
[remotePassword="password"  
interfaceType=(FC | iSCSI)  
[syncInterval=integer(minutes | hours | days)]  
[warningSyncThreshold=integer(minutes | hours | days)]  
[warningRecoveryThreshold=integer(minutes | hours | days)]  
[warningThresholdPercent=percentValue]  
[autoResync=(TRUE | FALSE)]
```

## Parameters

Parameter	Description
userLabel	<p>The name of the new asynchronous mirror group that you want to create. Enclose the new asynchronous mirror group name in double quotation marks (" ").</p> <p>The name must be unique on the local and remote storage arrays.</p>
remoteStorageArrayName	<p>The name for the remote storage array on which you are mirroring the asynchronous mirror group. Enclose the storage array name in double quotation marks (" ").</p> <p>The remote storage array must have the same connection type as the local storage array.</p>

Parameter	Description
remoteStorageArrayWWN	<p>The World Wide Identifier (WWID) of the remote storage array on which you are mirroring the asynchronous mirror group. You can use the WWID instead of the storage array name to identify the storage array. Enclose the WWID in angle brackets (&lt; &gt;).</p> <p>The remote storage array must have the same connection type as the local storage array.</p>
remotePassword	<p>The password for the remote storage array. Use this parameter when the remote storage array is password protected. Enclose the password in double quotation marks (" ").</p>
interfaceType	<p>Specify which connection type to use: either Fibre Channel fabric or iSCSI interface. (The default is Fibre Channel.) The local storage array and the remote storage array must be connected through a proper Fibre Channel fabric or iSCSI interface.</p>
syncInterval	<p>Specify the length of time between automatically sending updates of modified data from the local storage array to the remote storage array. You can specify the length of time in minutes, hours, or days.</p> <div>  <p>Do not add a space between the integer and the length of time.</p> </div> <p>Example: 10minutes</p>
warningSyncThreshold	<p>Specify the length of time to wait until a warning is triggered for cases in which the synchronization of all of the volumes within the asynchronous mirror group takes longer than the defined time. You can specify the length of time in minutes, hours, or days.</p> <div>  <p>Do not add a space between the integer and the length of time.</p> </div> <p>Example: 30minutes</p>



Parameter	Description
warningRecoveryThreshold	<p>Specify the length of time to wait until a warning is triggered when the automatic data update for the point-in-time image on the remote storage array is older than the defined time. Define the threshold from the end of the previous update. You can specify the length of time in minutes, hours, or days.</p> <div>  You must set the Recovery Point Threshold to be twice as large as the synchronization interval threshold. </div> <div>  Do not add a space between the integer and the length of time. </div> <p>Example: 60minutes</p>
warningThresholdPercent	<p>Specify the length of time to wait until a warning is triggered when the capacity of a mirror repository volume reaches the defined percentage. Define the threshold by percentage (%) of the capacity remaining.</p>
autoResync	<p>The settings for automatic resynchronization between the primary volumes and the secondary volumes of an asynchronous mirrored pair within an asynchronous mirror group. This parameter has these values:</p> <ul style="list-style-type: none"> <li>• <b>enabled</b> — Automatic resynchronization is turned on. You do not need to do anything further to resynchronize the primary volume and the secondary volume.</li> <li>• <b>disabled</b> — Automatic resynchronization is turned off. To resynchronize the primary volume and the secondary volume, you must run the <code>resume asyncMirrorGroup</code> command.</li> </ul>

## Notes

- The Asynchronous Mirroring feature must be enabled and activated on the local and remote storage arrays that will be used for mirror activities.
- You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.
- The local and remote storage arrays must be connected through a Fibre Channel fabric or iSCSI interface.
- Passwords are stored on each storage array in a management domain. If a password was not previously set, you do not need a password. The password can be any combination of a alphanumeric characters with a maximum of 30 characters. (You can define a storage array password by using the `set storageArray`

command.)

- Depending on your configuration, there is a maximum number of asynchronous mirror groups you can create on a storage array.
- Asynchronous mirror groups are created empty and mirrored pairs are added to them later on. Only mirrored pairs can be added to an asynchronous mirror group. Each mirrored pair is associated with exactly one asynchronous mirror group.
- The Asynchronous Mirroring process is initiated at a defined synchronization interval. Periodic point-in-time images are replicated as only the changed data is copied and not the entire volume.

## Minimum firmware level

7.84

## Create consistency group snapshot image

The `create cgSnapImage consistencyGroup` command creates a new snapshot image for each base volume that is a member of a snapshot consistency group.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

### Syntax

```
create cgSnapImage consistencyGroup="consistencyGroupName"
```

### Parameter

Parameter	Description
consistencyGroup	The name of the consistency group for which you are creating snapshot images. Enclose the consistency group name in double quotation marks (" ").

### Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

The command causes all pending I/O operations to each base volume that is a member of the consistency group to be drained and suspended before creating the snapshot images. If the creation of all of the snapshot images cannot be completed successfully for all of the consistency group members, the operation fails and

new snapshot images are not created.

Normally, all members of a snapshot consistency group have the same number of snapshot images. When you add a new member to a snapshot consistency group, that new member lacks the snapshot images that were previously created on the established members of the snapshot consistency group. This is not an error condition. Requests for deletion or rollback of snapshot images that exist on only a subset of the snapshot consistency group members affects only those members for which the specified snapshot image actually exists.

## Minimum firmware level

7.83

## Create consistency group snapshot volume

The `create cgSnapVolume` command creates a snapshot volume of specific images in the base volumes in a consistency group.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

### Context

You can select one base volume or more than one base volume from the consistency group to include in the snapshot volume. When you create a snapshot volume of a consistency group, you are creating a volume with contents that you can view.

### Syntax with user specified base volumes

```
create cgSnapVolume userLabel="cgVolumeName"
cgSnapImageID="snapCGID:imageID"
members=(baseVolume1:repos_XXXX ... baseVolumen:repos_YYYY)
```

### Syntax when setting the consistency group snapshot volume to read only

```
create cgSnapVolume userLabel="cgVolumeName"
cgSnapImageID="snapCGID:imageID"
readOnly
```

## Syntax when setting the repository full limit

```
create cgSnapVolume userLabel="cgVolumeName"
cgSnapImageID="snapCGID:imageID"
members=(baseVolume1:repos_XXXX |
baseVolume1: (volumeGroupName [capacity=capacityValue]) |
(baseVolume1:diskPoolName [capacity=capacityValue])
... baseVolumen:repos_YYYY |
baseVolumen: (volumeGroupName [capacity=capacityValue]) |
baseVolumen: (diskPoolName [capacity=pass:quotes{_capacityValue_]})
repositoryFullLimit=percentValue
```

## Parameters

Parameter	Description
userLabel	The name that you want to give the consistency group snapshot volume that you are creating. Enclose the consistency group snapshot volume name in double quotation marks (" ").
cgSnapImageID	<p>The name of the snapshot image in a consistency group. The name of a snapshot image is comprised of two parts:</p> <ul style="list-style-type: none"><li>• The name of the consistency group</li><li>• An identifier for the snapshot image in the consistency group</li></ul> <p>The identifier for the snapshot image can be one of the following:</p> <ul style="list-style-type: none"><li>• <code>newest</code> - Use this option when you want to show the latest snapshot image created in the consistency group.</li><li>• <code>oldest</code> - Use this option when you want to show the earliest snapshot image created in the consistency group.</li></ul> <p>Enclose the snapshot image name in double quotation marks (" ").</p> <p>You can enter more than one snapshot image name or sequence number. Enclose all of the snapshot image names inside parentheses. Separate each snapshot image name with a space.</p>

Parameter	Description
members	<p>The identifier of one base volume or more than one base volume that you want to add. The members identifier is comprised of the base volume name concatenated with the repository volume name. You must use a colon (:) between the two names. Enclose all of the member identifiers in parentheses. If you enter more than one member separated the members with a space.</p> <p>When you do not use the members parameter, all of the members are automatically added to the new consistency group snapshot volume.</p>

Parameter	Description
repositoryVolume	<p>The name of the repository volume that will contain the consistency group member volumes.</p> <p>You have two options for defining the name of a repository volume:</p> <ul style="list-style-type: none"> <li>• Use an existing repository volume: name</li> <li>• Create a new repository volume when you run this command</li> </ul> <p>The name of an existing repository volume is comprised of two parts:</p> <ul style="list-style-type: none"> <li>• The term "repos"</li> <li>• A four-digit numerical identifier that the storage management software assigns to the repository volume name</li> </ul> <p>Enclose the name of the existing repository volume in double quotation marks (" ").</p> <p>If you want to create a new repository volume when you run this command, you must enter the name of either a volume group or a disk pool in which you want the repository volume. Optionally, you can also define the capacity of the repository volume. If you want to define the capacity you can use these values:</p> <ul style="list-style-type: none"> <li>• An integer value that represents a percentage of the base volume capacity</li> <li>• A decimal fraction value that represents a percentage of the base volume capacity</li> <li>• A specific size for the repository volume. Size is defined in units of <code>bytes</code>, KB, MB, GB, or TB.</li> </ul> <p>If you do not use the capacity option, the storage management software sets the capacity to 20 percent of the base volume capacity.</p> <p>When you run this command the storage management software creates the repository volume for the snapshot volume.</p>
repositoryFullLimit	<p>The percentage of repository capacity at which the consistency group snapshot repository volume is nearing full. Use integer values. For example, a value of 70 means 70 percent.</p>

Parameter	Description
<code>readOnly</code>	The setting to determine whether you can write to the snapshot volume or only read from the snapshot volume. To write to the snapshot volume, do not include this parameter. To prevent writing to the snapshot volume, include this parameter.

## Notes

You can use any combination of alphanumeric characters, underscore (\_), hyphen (-), and pound (#) for the names. Names can have a maximum of 30 characters.

The name of a snapshot image has two parts separated by a colon (:):

- The identifier of the snapshot group
- The identifier of the snapshot image

If you do not specify the `repositoryVolumeType` or `readOnly` parameters, the storage management software selects the repositories for the consistency group snapshot volume. If the volume group or disk pool where the base volume resides does not have enough space, this command fails.

The `create cgSnapVolume` command has unique forms that are explained by these examples:

- Creating a read/write consistency group snapshot volume on a snapshot consistency group named "snapCG1" that has three members: `cgm1`, `cgm2`, and `cgm3`. The repository volumes already exist and are selected by the user in this command.

```
create cgSnapVolume userLabel="cgSnapVolume1"
cgSnapImageID="snapCG1:oldest"
members=(cgm1:repos_0010 cgm2:repos_0011 cgm3:repos_0007);
```

Note the use of the colon (:) in the name of the snapshot image to be included in the consistency group snapshot volume. The colon is a delimiter that separates the name of the snapshot volume from a particular snapshot image that you might want to use. You can use one of these options following the colon:

- An integer value that is the actual sequence number of the snapshot image.
- `newest` - Use this option when you want to show the latest consistency group snapshot image.
- `oldest` - Use this option when you want to show the earliest snapshot image created. The use of the colon following the names of the members of the snapshot consistency group define the mapping between the member and a repository volume. For example, in `cgm1:repos_10`, member `cgm1` maps to repository volume `repos_0010`.
- Creating a read/write consistency group snapshot volume on a snapshot consistency group named "snapCG1" of only members `cgm1` and `cgm2`:

```
create cgSnapVolume userLabel="cgSnapVolume2"  
cgSnapImageID="snapCG1:14214"  
members=(cgm1:repos_1000 cgm2:repos_1001);
```

- Creating a read-only consistency group snapshot volume on a snapshot consistency group named snapCG1 that has three members: cgm1, cgm2, and cgm3:

```
create cgSnapVolume userLabel="cgSnapVolume3"  
cgSnapImageID="snapCG1:oldest" readOnly;
```

- Creating a consistency group snapshot volume that has a repository full limit set to 60 percent on a snapshot consistency group named snapCG1 that has three members: cgm1, cgm2, and cgm3:

```
create cgSnapVolume userLabel="cgSnapVolume3"  
cgSnapImageID="snapCG1:oldest"  
repositoryFullLimit=60;
```

- Creating a read/write consistency group snapshot volume with automatic repository selection on a snapshot consistency group named snapCG1 that has three members: cgm1, cgm2, and cgm3:

```
create cgSnapVolume userLabel="cgSnapVolume4"  
cgSnapImageID="snapCG1:oldest";
```

## Minimum firmware level

7.83

## Create consistency group

The `create consistencyGroup` command creates a new, empty consistency group that can contain snapshot groups. You must add the snapshot groups using the `set consistencyGroup addCGMember` command.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.



## Syntax

```
create consistencyGroup userLabel="consistencyGroupName"  
[repositoryFullPolicy=(failBaseWrites | purgeSnapImages)]  
[repositoryFullLimit=percentValue]  
[autoDeleteLimit=numberOfSnapImages]  
[enableSchedule=(TRUE | FALSE)]  
[schedule (immediate | snapSchedule)]  
[rollbackPriority=(lowest | low | medium | high | highest)]
```

## Parameters

Parameter	Description
userLabel	The name of the new consistency group that you want to create. Enclose the new consistency group name in double quotation marks (" ").
repositoryFullPolicy	How you want snapshot processing to continue if the snapshot repository volumes are full. You can choose to fail writes to the base volume ( <i>failBaseWrites</i> ) or delete (purge) the snapshot images ( <i>purgeSnapImages</i> ). The default action is <i>purgeSnapImages</i> .
repositoryFullLimit	The percentage of repository capacity at which you receive a warning that the snapshot repository volume is nearing full. Use integer values. For example, a value of 70 means 70 percent. The default value is 75.
autoDeleteLimit	Each snapshot group can be configured to perform automatic deletion of its snapshot images to keep the total number of snapshot images in the snapshot group at or below a designated level. When this option is enabled, then any time a new snapshot image is created in the snapshot group, the system automatically deletes the oldest snapshot image in the group to comply with the limit value. This action frees repository capacity so it can be used to satisfy ongoing copy-on-write requirements for the remaining snapshot images.
enableSchedule	Whether the ability to schedule a snapshot operation is turned on or turned off. To turn on snapshot scheduling, set this parameter to <i>TRUE</i> . To turn off snapshot scheduling, set this parameter to <i>FALSE</i> .

Parameter	Description
<code>rollbackPriority</code>	Determines whether system resources should be allocated to the rollback operation at the expense of system performance. A value of <code>high</code> indicates that the rollback operation is prioritized over all other host I/O. A value of <code>low</code> indicates that the rollback operation should be performed with minimal impact to host I/O.

## Notes

A consistency group is a logical entity that enables you to manage in batch form all of the snapshot images that you add to the collection. The consistency group is a collection of snapshot groups that have mutual consistency requirements or dependencies for their snapshot images. Any snapshot images that you create and use for this collection must be managed in accordance with the consistency dependencies.

You can use any combination of alphanumeric characters, underscore (`_`), hyphen (`-`), and pound (`#`) for the names. Names can have a maximum of 30 characters.

The snapshot images in a consistency group can be deduced based on the existence of a snapshot image within a consistency group. All snapshot images that reside within a consistency group share a common time stamp and sequence number.

An operation on a snapshot image consistency group is treated as a single request, and causes all pending I/O operations to the associated base volume of each member to be drained and suspended before creating the snapshot images. If creation of the snapshot images cannot be completed successfully for all of the consistency group members, the operation fails and has no affect (that is, new snapshot images are not created).

Based on this behavior all members for a consistency group usually have the same number of snapshot images. However, when a new member is added to a consistency group, that new member lacks the snapshot images that were previously created on the established members of the consistency group. The lack of snapshot images is not considered an error condition. Ensuing requests for deletion or rollback of snapshot images that only exist on a subset of the consistency group members will only affect the members for which the specified snapshot images actually exists.




## Auto delete


You can configure each snapshot group to automatically delete its snapshot images to keep the total number of snapshot images in the snapshot group at or below a maximum number of images. When the number of snapshot images in the snapshot group is at the maximum limit, the `autoDeleteLimit` parameter automatically deletes snapshot images whenever a new snapshot image is created in the snapshot group. The `autoDeleteLimit` parameter deletes the oldest snapshot images in the snapshot group until the maximum number of images defined with the parameter is met. This has the effect of freeing repository capacity so it can be used to satisfy ongoing copy-on-write requirements for the remaining snapshot images.



## Scheduling snapshot images in a consistency group

The `enableSchedule` parameter and the `schedule` parameter provide a way for you to schedule snapshots. Using these parameters, you can schedule snapshots daily, weekly, or monthly (by day or by date). The `enableSchedule` parameter turns on or turns off the ability to schedule snapshots. When you enable scheduling, you use the `schedule` parameter to define when you want the snapshots to occur.

This table explains how to use the options for the `schedule` parameter:

Parameter	Description
<code>schedule</code>	Required for specifying schedule parameters.
<code>immediate</code>	Start the operation immediately. This item is mutually exclusive with any other scheduling parameters.
<code>enableSchedule</code>	<p>When set to <code>true</code>, scheduling is turned on. When set to <code>false</code>, scheduling is turned off.</p> <div>  <p>The default is <code>false</code>.</p> </div>
<code>startDate</code>	<p>A specific date on which to start the operation. The format for entering the date is <code>MM:DD:YY</code>. The default is the current date. An example of this option is <code>startDate=06:27:11</code>.</p>
<code>scheduleDay</code>	<p>A day of the week on which to start the operation. Can either be all or one or more of the following values:</p> <ul style="list-style-type: none"> <li>• <code>monday</code></li> <li>• <code>tuesday</code></li> <li>• <code>wednesday</code></li> <li>• <code>thursday</code></li> <li>• <code>friday</code></li> <li>• <code>saturday</code></li> <li>• <code>sunday</code></li> </ul> <div>  <p>Enclose the value in parentheses. For example, <code>scheduleDay=(wednesday)</code>.</p> </div> <p>More than one day can be specified by enclosing the days in a single set of parentheses and separating each day with a space. For example, <code>scheduleDay=(monday wednesday friday)</code>.</p> <div>  <p>This parameter is not compatible with a monthly schedule.</p> </div>

Parameter	Description
startTime	<p>The time of a day on which to start the operation. The format for entering the time is HH:MM, where HH is the hour and MM is the minute past the hour. Uses a 24-hour clock. For example, 2:00 in the afternoon is 14:00. An example of this option is <code>startTime=14:27</code>.</p>
scheduleInterval	<p>An amount of time, in minutes, to have as a minimum between operations. Schedule interval should not be more than 1440 (24 hours) and it should be a multiple of 30.</p> <p>An example of this option is <code>ischeduleInterval=180</code>.</p>
endDate	<p>A specific date on which to stop the operation. The format for entering the date is MM:DD:YY. If no end date is desired, you can specify <code>noEndDate</code>. An example of this option is <code>endDate=11:26:11</code>.</p>
timesPerDay	<p>The number of times to perform the operation in a day. An example of this option is <code>timesPerDay=4</code>.</p>
timezone	<p>Specifies the time zone to be used for the schedule. Can be specified in two ways:</p> <ul style="list-style-type: none"> <li> <b>GMT±HH:MM</b> <p>The time zone offset from GMT. Example: <code>timezone=GMT-06:00</code>.</p> </li> <li> <b>Text String</b> <p>Standard time zone text string, must be enclosed in quotes. Example: <code>timezone="America/Chicago"</code></p> </li> </ul>
scheduleDate	<p>A day of the month on which to perform the operation. The values for the days are numerical and in the range of 1-31.</p> <div>  <p>This parameter is not compatible with a weekly schedule.</p> </div> <p>An example of the <code>scheduleDate</code> option is <code>scheduleDate= ("15")</code>.</p>

Parameter	Description
month	<p>A specific month on which to perform the operation. The values for the months are:</p> <ul style="list-style-type: none"> <li>• jan - January</li> <li>• feb - February</li> <li>• mar - March</li> <li>• apr - April</li> <li>• may - May</li> <li>• jun - June</li> <li>• jul - July</li> <li>• aug - August</li> <li>• sep - September</li> <li>• oct - October</li> <li>• nov - November</li> <li>• dec - December</li> </ul> <p> Enclose the value in parentheses. For example, month=(jan).</p> <p>More than one month can be specified by enclosing the months in a single set of parentheses and separating each month with a space. For example, month=(jan jul dec).</p> <p>Use this parameter with the <code>scheduleDate</code> parameter to perform the operation on a specific day of the month.</p> <p> This parameter is not compatible with a weekly schedule.</p>

This table explains how to use the `timeZone` parameter:

Timezone Name	GMT offset
Etc/GMT+12	GMT-12:00
Etc/GMT+11	GMT-11:00
Pacific/Honolulu	GMT-10:00

<b>Timezone Name</b>	<b>GMT offset</b>
America/Anchorage	GMT-09:00
America/Santa_Isabel	GMT-08:00
America/Los_Angeles	GMT-08:00
America/Phoenix	GMT-07:00
America/Chihuahua	GMT-07:00
America/Denver	GMT-07:00
America/Guatemala	GMT-06:00
America/Chicago	GMT-06:00
America/Mexico_City	GMT-06:00
America/Regina	GMT-06:00
America/Bogota	GMT-05:00
America/New_York	GMT-05:00
Etc/GMT+5	GMT-05:00
America/Caracas	GMT-04:30
America/Asuncion	GMT-04:00
America/Halifax	GMT-04:00
America/Cuiaba	GMT-04:00
America/La_Paz	GMT-04:00
America/Santiago	GMT-04:00
America/St_Johns	GMT-03:30

<b>Timezone Name</b>	<b>GMT offset</b>
America/Sao_Paulo	GMT-03:00
America/Buenos_Aires	GMT-03:00
America/Cayenne	GMT-03:00
America/Godthab	GMT-03:00
America/Montevideo	GMT-03:00
Etc/GMT+2	GMT-02:00
Atlantic/Azores	GMT-01:00
Atlantic/Cape_Verde	GMT-01:00
Africa/Casablanca	GMT
Etc/GMT	GMT
Europe/London	GMT
Atlantic/Reykjavik	GMT
Europe/Berlin	GMT+01:00
Europe/Budapest	GMT+01:00
Europe/Paris	GMT+01:00
Europe/Warsaw	GMT+01:00
Africa/Lagos	GMT+01:00
Africa/Windhoek	GMT+01:00
Asia/Anman	GMT+02:00
Asia/Beirut	GMT+02:00

<b>Timezone Name</b>	<b>GMT offset</b>
Africa/Cairo	GMT+02:00
Asia/Damascus	GMT+02:00
Africa/Johannesburg	GMT+02:00
Europe/Kiev	GMT+02:00
Asia/Jerusalem	GMT+02:00
Europe/Istanbul	GMT+03:00
Europe/Minsk	GMT+02:00
Asia/Baghdad	GMT+03:00
Asia/Riyadh	GMT+03:00
Africa/Nairobi	GMT+03:00
Asia/Tehran	GMT+03:30
Europe/Moscow	GMT+04:00
Asia/Dubai	GMT+04:00
Asia/Baku	GMT+04:00
Indian/Mauritius	GMT+04:00
Asia/Tbilisi	GMT+04:00
Asia/Yerevan	GMT+04:00
Asia/Kabul	GMT+04:30
Asia/Karachi	GMT+05:00
Asia//Tashkent	GMT+05:00



<b>Timezone Name</b>	<b>GMT offset</b>
Asia/Calcutta	GMT+05:30
Asia/Colombo	GMT+05:30
Asia/Katmandu	GMT+05:45
Asia/Yekaterinburg	GMT+06:00
Asia/Almaty	GMT+06:00
Asia/Dhaka	GMT+06:00
Asia/Rangoon	GMT+06:30
Asia/Novosibirsk	GMT+07:00
Asia/Bangkok	GMT+07:00
Asia/Krasnoyarsk	GMT+08:00
Asia/Shanghai	GMT+08:00
Asia/Singapore	GMT+08:00
Australia/Perth	GMT+08:00
Asia/Taipei	GMT+08:00
Asia/Ulaanbaatar	GMT+08:00
Asia/Irkutsk	GMT+09:00
Asia/Tokyo	GMT+09:00
Asia/Seoul	GMT+09:00
Australia/Adelaide	GMT+09:30
Australia/Darwin	GMT+09:30

Timezone Name	GMT offset
Asia/Yakutsk	GMT+10:00
Australia/Brisbane	GMT+10:00
Australia/Sydney	GMT+10:00
Pacific/Port Moresby	GMT+10:00
Australia/Hobart	GMT+10:00
Asia/Vladivostok	GMT+11:00
Pacific/Guadalcanal	GMT+11:00
Pacific/Auckland	GMT+12:00
Etc/GMT-12	GMT+12:00
Pacific/Fiji	GMT+12:00
Asia/Kamchatka	GMT+12:00
Pacific/Tongatapu	GMT+13:00

The code string for defining a schedule is similar to these examples:

```
enableSchedule=true schedule startTime=14:27
```

```
enableSchedule=true schedule scheduleInterval=180
```

```
enableSchedule=true schedule timeZone=GMT-06:00
```

```
enableSchedule=true schedule timeZone="America/Chicago"
```

If you also use the `scheduleInterval` option, the firmware chooses between the `timesPerDay` option and the `scheduleInterval` option by selecting the lowest value of the two options. The firmware calculates an integer value for the `scheduleInterval` option by dividing 1440 by the `scheduleInterval` option value that you set. For example,  $1440/180 = 8$ . The firmware then compares the `timesPerDay` integer value with

the calculated `scheduleInterval` integer value and uses the smaller value.

To remove a schedule, use the `delete volume` command with the `schedule` parameter. The `delete volume` command with the `schedule` parameter deletes only the schedule, not the snapshot volume.

When performing a rollback in a consistency group, the default operation is to rollback all members of the consistency group. If a rollback cannot be started successfully for all of the members in the consistency group, the rollback fails and has no effect. The snapshot image is not rolled back.

## Minimum firmware level

7.83

7.86 adds the `scheduleDate` option and the `month` option.

## Create disk pool

The `create diskPool` command creates a new disk pool based on the specified parameters.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

### Context

You can create the disk pool by entering either a list of drives or a type of drive that you want to use for the disk pool.



If you enter a list of drives, make sure that all of the drives have the same capacity. If the drives do not have the same capacity, each drive in the disk pool reports capacity equal to the smallest drive.

### Syntax


```

create diskPool
(drives=(trayID1,[drawerID1,]slotID1 ... trayIDN,[drawerIDN,]slotIDN) |
driveType=(fibre | SATA | SAS | NVMe4K))
  userLabel="diskPoolName"
[driveCount=driveCountValue]
[trayLossProtect=(TRUE | FALSE)]
[drawerLossProtect=(TRUE | FALSE)]
[warningThreshold=(warningThresholdValue | default)]
[criticalThreshold=(criticalThresholdValue | default)]
[criticalPriority=(highest|high|medium|low|lowest)]
[backgroundPriority=(highest|high|medium|low|lowest)]
[degradedPriority=(highest|high|medium|low|lowest)]
[securityType=(none | capable | enabled )]
[secureDrives=(fips | fde )]
[driveMediaType=(hdd | ssd | allMedia | unknown)]
[dataAssurance=(none|enabled)]
[resourceProvisioningCapable=(TRUE | FALSE)]



```


## Parameters

Parameter	Description
drives	<p>The drives you want to assign to the disk pool that you want to create. For high-capacity drive trays, specify the tray ID value, the drawer ID value, and the slot ID value for the drive. For low-capacity drive trays, specify the tray ID value and the slot ID value for the drive. Tray ID values are 0 to 99. Drawer ID values are 1 to 5.</p> <p>All slot ID maximums are 24. Slot ID values either begin at 0 or 1, depending on the tray model. Drive trays compatible with E2800 and E5700 controllers have slot ID numbers starting at 0. Drive trays compatible with E2700 and E5600 controllers have slot ID numbers starting at 1.</p> <p>Enclose the tray ID value, the drawer ID value, and the slot ID value in square brackets ([ ]).</p>
userLabel	<p>The name that you want to give the new disk pool. Enclose the disk pool name in double quotation marks (" ").</p>

Parameter	Description
driveCount	<p>The <code>driveCount</code> parameter limits the disk pool candidates to the given number. When using this parameter, the minimum value that you can enter for HDD drives is 11. For SSD drives, the minimum value you can enter is 8.</p> <div>  <p>SSD Pools with a <code>driveCount</code> less than 11 are restricted to RAID 1 volumes.</p> </div>
warningThreshold	<p>The percentage of storage capacity at which you receive a warning alert that the disk pool is nearing full. Use integer values. For example, a value of 60 means 60 percent. For best operation, the value for this parameter must be less than the value for the <code>criticalThreshold</code> parameter.</p> <p>Valid values are from 0 to 100.</p> <p>The default value is 50.</p> <p>Setting this parameter to 0 (zero) disables warning alerts.</p> <p>If you set this to <code>default</code>, the warning alert threshold value is determined by the controller firmware.</p>
criticalThreshold	<p>The percentage of storage capacity at which you receive a critical alert that the disk pool is nearing full. Use integer values. For example, a value of 70 means 70 percent. For best operation, the value for this parameter must be greater than the value for the <code>warningThreshold</code> parameter.</p> <p>Valid values are from 0 to 100.</p> <p>The default value is 85 percent.</p> <p>Setting this parameter to 0 (zero) disables both warning alerts and critical alerts.</p> <p>If you set this to <code>default</code>, the critical alert threshold value is determined by the controller firmware.</p>

Parameter	Description
<code>criticalPriority</code>	<p>The priority for reconstruction operations for critical events on the disk pool. For example, disk pool reconstruction after at least two drive failures.</p> <p>Valid values are <code>highest</code>, <code>high</code>, <code>medium</code>, <code>low</code>, and <code>lowest</code>. The default value is <code>highest</code>.</p>
<code>backgroundPriority</code>	<p>The priority for background operations on the disk pool.</p> <p>Valid values are <code>highest</code>, <code>high</code>, <code>medium</code>, <code>low</code>, and <code>lowest</code>. The default value is <code>low</code>.</p>
<code>degradedPriority</code>	<p>The priority for degraded activities on the disk pool. For example, disk pool reconstruction after one drive failures.</p> <p>Valid values are <code>highest</code>, <code>high</code>, <code>medium</code>, <code>low</code>, and <code>lowest</code>. The default value is <code>high</code>.</p>
<code>securityType</code>	<p>The setting to specify the security level when creating the disk pool. All volume candidates for the disk pool will have the specified security type.</p> <p>These settings are valid:</p> <ul style="list-style-type: none"> <li>• <code>none</code> — The volume candidates are not secure.</li> <li>• <code>capable</code> — The volume candidates are capable of having security set, but security has not been enabled.</li> <li>• <code>enabled</code> — The volume candidates have security enabled.</li> </ul> <p>The default value is <code>none</code>.</p>

Parameter	Description
secureDrives	<p>The type of secure drives to use in the volume group. These settings are valid:</p> <ul style="list-style-type: none"> <li>• <code>fips</code> — To use FIPS compliant drives only.</li> <li>• <code>fde</code> — To use FDE compliant drives.</li> </ul> <div>  <p>Use this parameter along with the <code>securityType</code> parameter. If you specify <code>none</code> for the <code>securityType</code> parameter, the value of the <code>secureDrives</code> parameter is ignored, because non-secure disk pools do not need to have secure drive types specified.</p> </div> <div>  <p>This parameter is ignored unless you are also using the <code>driveCount</code> parameter. If you are specifying the drives to use for the disk pool instead of providing a count, specify the appropriate type of drives in the selection list based on the security type you desire.</p> </div>

Parameter	Description
driveMediaType	<p>The type of drive media that you want to use for the disk pool.</p> <p>You must use this parameter when you have more than one type of drive media in your storage array.</p> <p>These drive media are valid:</p> <ul style="list-style-type: none"> <li>• <code>hdd</code> — Use this option when you have hard drives.</li> <li>• <code>ssd</code> — Use this option when you have solid-state disks.</li> <li>• <code>unknown</code> — Use this option if you are not sure what types of drive media are in the drive tray.</li> <li>• <code>allMedia</code> — Use this option when you want to use all types of drive media that are in the drive tray.</li> </ul> <p>The default value is <code>hdd</code>.</p> <div>  <p>The controller firmware does not mix <code>hdd</code> and <code>ssd</code> drive media in the same disk pool, regardless of using the setting you select.</p> </div>
resourceProvisioningCapable	<p>The setting to specify if resource provisioning capabilities are enabled. To disable resource provisioning, set this parameter to <code>FALSE</code>. The default value is <code>TRUE</code>.</p>

## Notes

Each disk pool name must be unique. You can use any combination of alphanumeric characters, underscore (`_`), hyphen (`-`), and pound (`#`) for the user label. User labels can have a maximum of 30 characters.

If the parameters you specify cannot be satisfied by any of the available candidate drives, the command fails. Normally, all drives that match the quality of service attributes are returned as the top candidates. However, if you specifying a drive list, some of the available drives returned as candidates might not match the quality of service attributes.

If you do not specify a value for an optional parameter, a default value is assigned.

## Drives

When you use the `driveType` parameter, all of the unassigned drives that are of that drive type are used to create the disk pool. If you want to limit the number of drives found by the `driveType` parameter in the disk pool, you can specify the number of drives using the `driveCount` parameter. You can use the `driveCount` parameter only when you use the `driveType` parameter.



The `drives` parameter supports both high-capacity drive trays and low-capacity drive trays. A high-capacity drive tray has drawers that hold the drives. The drawers slide out of the drive tray to provide access to the drives. A low-capacity drive tray does not have drawers. For a high-capacity drive tray, you must specify the identifier (ID) of the drive tray, the ID of the drawer, and the ID of the slot in which a drive resides. For a low-capacity drive tray, you need only specify the ID of the drive tray and the ID of the slot in which a drive resides. For a low-capacity drive tray, an alternative method for identifying a location for a drive is to specify the ID of the drive tray, set the ID of the drawer to 0, and specify the ID of the slot in which a drive resides.

If you enter specifications for a high-capacity drive tray, but a drive tray is not available, the storage management software returns an error message.

## Disk pool alert thresholds

Each disk pool has two progressively severe levels of alerts to inform users when the storage capacity of the disk pool is approaching full. The threshold for an alert is a percent of the used capacity to the total usable capacity in the disk pool. The alerts are as follows:

- **Warning** — This is the first level of alert. This level indicates that the used capacity in a disk pool is approaching full. When the threshold for the warning alert is reached, a Needs Attention condition is generated and an event is posted to the storage management software. The warning threshold is superseded by the critical threshold. The default warning threshold is 50 percent.
- **Critical** — This is the most severe level of alert. This level indicates that the used capacity in a disk pool is approaching full. When the threshold for the critical alert is reached, a Needs Attention condition is generated and an event is posted to the storage management software. The warning threshold is superseded by the critical threshold. The default threshold for the critical alert is 85 percent.

To be effective, the value for a warning alert always must be less than the value for a critical alert. If the value for the warning alert is the same as the value for a critical alert, only the critical alert is sent.

## Disk pool background operations

Disk pools support these background operations:

- Reconstruction
- Instant Availability Format (IAF)
- Format
- Dynamic Capacity Expansion (DCE)
- Dynamic Volume Expansion (DVE) (For disk pools, DVE is actually not a background operation, but DVE is supported as a synchronous operation.)

Disk pools do not queue background commands. You can start several background commands sequentially, but starting more than one background operation at a time delays the completion of commands that you started previously. The supported background operations have the following relative priority levels:

1. Reconstruction
2. Format
3. IAF
4. DCE

## Security type

Use the `securityType` parameter to specify the security settings for the storage array.

Before you can set the `securityType` parameter to `enabled`, you must create a storage array security key. Use the `create storageArray securityKey` command to create a storage array security key. These commands are related to the security key:

- `create storageArray securityKey`
- `export storageArray securityKey`
- `import storageArray securityKey`
- `set storageArray securityKey`
- `enable volumeGroup [volumeGroupName] security`
- `enable diskPool [diskPoolName] security`

## Secure drives

Secure-capable drives can be either Full Disk Encryption (FDE) drives or Federal Information Processing Standard (FIPS) drives. Use the `secureDrives` parameter to specify the type of secure drives to use. The values you can use are `fips` and `fde`.

## Example command

```
create diskPool driveType=SAS userLabel="FIPS_Pool" driveCount=11
securityType=capable secureDrives=fips;
```

## Minimum firmware level

7.83

8.20 adds these parameters:

- `trayLossProtect`
- `drawerLossProtect`

8.25 adds the `secureDrives` parameter.

8.63 adds the `resourceProvisioningCapable` parameter.

11.73 updates the `driveCount` parameter.

## Create host

The `create host` command creates a new host.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context

For E2700 and E5600 storage arrays, if you do not specify a host group in which to create the new host, the new host is created in the Default Group.

## Syntax

```
create host userLabel="hostName"
[hostGroup=("hostGroupName" | defaultGroup)]
[hostType=(hostTypeIndexLabel | hostTypeIndexNumber)]
```

## Parameters

Parameter	Description
userLabel	The name that you want to give the host that you are creating. Enclose the host name in double quotation marks (" ").
hostGroup	The name of the host group in which you want to create a new host. Enclose the host group name in double quotation marks (" "). (If a host group does not exist, you can create a new host group by using the <code>create hostGroup</code> command.) The <code>defaultGroup</code> option is the host group that contains the host to which the volume is mapped.
hostType	The index label or the index number that identifies the host type. Use the <code>show storageArray hostTypeTable</code> command to generate a list of available host type identifiers. If the host type has special characters, enclose the host type in double quotation marks (" ").

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

A host is a computer that is attached to the storage array and accesses the volumes on the storage array through the host ports. You can define specific mappings to an individual host. You also can assign the host to a host group that shares access to one or more volumes.

A host group is an optional topological element that you can define if you want to designate a collection of hosts that share access to the same volumes. The host group is a logical entity. Define a host group only if you have two or more hosts that share access to the same volumes.

If you do not specify a host group in which to place the host that you are creating, the newly defined host belongs to the default host group.

**Minimum firmware level**

5.20

7.10 adds the `hostType` parameter.

**Create host group**

The `create hostGroup` command creates a new host group.

**Supported Arrays**

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

**Roles**

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

**Syntax**

```
create hostGroup userLabel="hostGroupName"
```

**Parameter**

Parameter	Description
userLabel	The name that you want to give the host group that you are creating. Enclose the host group name in double quotation marks (" ").

**Notes**

A host group is an optional topological element that you can define if you want to designate a collection of hosts that share access to the same volumes. The host group is a logical entity. Define a host group only if you have two or more hosts that can share access to the same volumes.

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

### Minimum firmware level

5.20

## Create host port

The `create hostPort` command creates a new host port identification on a host bus adapter (HBA) or on a host channel adapter (HCA).

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

### Context

The host port identification is a software value that represents the physical HBA or HCA host port to the controller. Without the correct host port identification, the controller cannot receive instructions or data from the host port.

### Syntax

```
create hostPort identifier=("wwID" | "gid")
userLabel="portLabel"
[host="hostName"]
[interfaceType=(FC | SAS | IB)]
```

### Parameters

Parameter	Description
identifier	The 8-byte World Wide Identifier (WWID) or the 16-byte group identifier (GID) of the HBA or HCA host port. Enclose the WWID or the GID in double quotation marks (" ").
userLabel	The name that you want to give to the new HBA or HCA host port. Enclose the host port label in double quotation marks (" ").

Parameter	Description
host	The name of the host for which you are defining an HBA or HCA host port. Enclose the host name in double quotation marks (" ").
interfaceType	<p>The identifier of the type of interface for the host port.</p> <p>The choices for the types of host port interfaces are:</p> <ul style="list-style-type: none"> <li>• FC — Fibre Channel</li> <li>• SAS — Serial-Attached SCSI</li> <li>• IB — InfiniBand</li> </ul> <p>An FC or a SAS selection requires an 8-byte WWID. An IB selection requires a 16-byte group identifier (GID).</p> <p>If you do not specify the type of interface, FC is used as the default interface for the host port.</p>

## Notes

An HBA host port or an HCA host port is a physical connection on a host bus adapter or on a host channel adapter that resides in a host computer. An HBA host port or an HCA host port provides host access to the volumes in a storage array. If the HBA or the HCA has only one physical connection (one host port), the terms host port and host bus adapter or host channel adapter are synonymous.

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

## Minimum firmware level

5.20

7.10 deprecates the `hostType` parameter. The `hostType` parameter has been added to the `create host` command.

7.32 adds the `interfaceType` parameter.

## Create initiator

The `create initiator` command creates the initiator object.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context



This command replaces the deprecated [Create iSCSI initiator](#) command.



This command is only applicable to iSCSI, iSER, NVMe over RoCE, NVMe over InfiniBand, and NVMe over Fibre Channel.

## Syntax

```
create initiator identifier="initiatorQualifiedName"
userLabel="initiatorName" host="hostName"
interfaceType=(iscsi | iser | nvmeof) [chapSecret="securityKey"]
```

## Parameters

Parameter	Description
identifier	Allows you to specify the identifier qualified name (such as iqn or nqn) to create an initiator . Enclose the identifier in double quotation marks (" ").
userLabel	Allows you to specify a user label for the initiator. Enclose the name in double quotation marks (" ").
host	Allows you to specify the host name where the initiator is installed. Enclose the name in double quotation marks (" ").
interfaceType	Allows you to specify which interface type the initiator is for. Valid choices are: iscsi, iser, or nvmeof.
chapSecret	Allows you to enter the security key that you want to use to authenticate a peer connection. Enclose the security key in double quotation marks (" "). This parameter is applicable only to iSCSI and iSER host interface types.

## Minimum firmware level

8.41

# Create iSCSI initiator

The `create iscsiInitiator` command creates a new iSCSI initiator object.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.



This command is deprecated and is replaced by the [Create initiator](#) command.

## Syntax

```
create iscsiInitiator iscsiName="iscsiID"
userLabel="name"
host="hostName"
[chapSecret="securityKey"]
```

## Parameters

Parameters	Description
iscsiName	The default identifier of the iSCSI initiator. Enclose the identifier in double quotation marks (" ").
userLabel	The name that you want to use for the iSCSI initiator. Enclose the name in double quotation marks (" ").
host	The name of the host in which the iSCSI initiator is installed. Enclose the name in double quotation marks (" ").
chapSecret	The security key that you want to use to authenticate a peer connection. Enclose the security key in double quotation marks (" ").

## Notes

Challenge Handshake Authentication Protocol (CHAP) is a protocol that authenticates the peer of a connection. CHAP is based upon the peers sharing a *secret*. A secret is a security key that is similar to a password.



Use the `chapSecret` parameter to set up the security keys for initiators that require a mutual authentication.

**Minimum firmware level**

7.10

8.41 This command is deprecated.

**Create consistency group snapshot volume mapping**

The `create mapping cgSnapVolume` command creates a logical mapping from a consistency group snapshot volume to a host or a host group.

**Supported Arrays**

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

**Roles**

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

**Syntax**

```
create mapping cgSnapVolume="snapVolumeName"
(host="hostName" | hostGroup="hostGroupName" | defaultGroup)
```

**Parameters**

Parameter	Description
cgSnapVolume	The name of the consistency group snapshot volume for which you want to create a logical mapping. Enclose the consistency group snapshot volume name in double quotation marks (" ").
host	The name of a host to which you want to create a logical mapping. Enclose the host name in double quotation marks (" ").
hostGroup	The name of a host group to which you want to create a logical mapping. Enclose the host group name in double quotation marks (" "). If you use the <code>defaultGroup</code> keyword, do not enclose it in quotation marks.

## Notes

A host is a computer that is attached to the storage array and accesses the volumes on the storage array through the host ports. You can define specific mappings to an individual host. You also can assign the host to a host group that shares access to one or more volumes.

A host group is an optional topological element that you can define if you want to designate a collection of hosts that share access to the same volumes. The host group is a logical entity. Define a host group only if you have two or more hosts that share access to the same volumes.

## Minimum firmware level

7.83

## Create Volume Mapping

The `create mapping volume` command creates a logical mapping from a volume to a host or a host group.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles


To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```
create mapping volume="VolumeName"
(host="hostName" | hostGroup="hostGroupName" | defaultGroup)
logicalUnitNumber=lun
mapWaitPeriod=mapWaitPeriodValue
```

## Parameters

Parameter	Description
Volume	The name of the volume for which you want to create a logical mapping. Enclose the volume name in double quotation marks (" ").
host	The name of a host to which you want to create a logical mapping. Enclose the host name in double quotation marks (" ").

Parameter	Description
hostGroup	The name of a host group to which you want to create a logical mapping. Enclose the host group name in double quotation marks (" "). If you use the defaultGroup keyword, do not enclose it in quotation marks.
logicalUnitNumber	<p>The logical number or namespace ID that you want to use to map to a specific host. This parameter also assigns the host to a host group.</p> <div>  <p>The logical unit number or namespace ID you specify must not already be in use, and must be within the range supported by the host Operating System. There will be no error if you map the volume to a logical unit number or namespace ID not supported by the host, but the host won't be able to access the volume.</p> </div>
mapWaitPeriod	Blocks the mapping until it is able to complete the command or it times out as not to affect the interaction. If a value is not entered, the default behavior is to fail the action if the volume cannot be mapped immediately.

## Minimum firmware level

7.83

8.63 adds the mapWaitPeriod parameter.

## Create RAID volume (automatic drive select)

The `create volume` command creates a volume group across the drives in the storage array and a new volume in the volume group. The storage array controllers choose the drives to be included in the volume.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context



If you have drives with different capacities, you cannot automatically create volumes by specifying the `driveCount` parameter. If you want to create volumes with drives of different capacities, see [Create RAID volume \(manual drive select\)](#).

## Syntax



```
create volume driveCount=numberOfDrives
[volumeGroupUserLabel="volumeGroupUserLabel"]
raidLevel=(0 | 1 | 3 | 5 | 6)
userLabel="userLabel"
driveMediaType=(HDD | SSD | unknown | allMedia)
[driveType=(SAS | NVMe4K)]
[capacity=volumeCapacity]
[owner=(a|b)]
[mapping=(none | default)]
[cacheReadPrefetch=(TRUE | FALSE)]
[segmentSize=segmentSizeValue]
[usageHint=(fileSystem | dataBase | multiMedia)]
[trayLossProtect=(TRUE | FALSE)]
[drawingLossProtect=(TRUE | FALSE)]
[dssPreAllocate=(TRUE | FALSE)]
[securityType=(none | capable | enabled)]
[secureDrives=(fips | fde)]
[dataAssurance=(none | enabled)]
[resourceProvisioningCapable=(TRUE | FALSE)]
[blockSize=blockSizeValue]
```

```

create volume driveCount=numberOfDrives
[volumeGroupUserLabel="volumeGroupName"]
raidLevel=(0 | 1 | 5 | 6)
userLabel="volumeName"
driveMediaType=(HDD | SSD | unknown | allMedia)
[driveType=SAS]
[capacity=volumeCapacity]
[owner=(a|b)]
[mapping=(none | default)]
[cacheReadPrefetch=(TRUE | FALSE)]
[segmentSize=segmentSizeValue]
[usageHint=(fileSystem | dataBase | multiMedia)]
[trayLossProtect=(TRUE | FALSE)]
[drawingLossProtect=(TRUE | FALSE)]
[dssPreAllocate=(TRUE | FALSE)]
[securityType=(none | capable | enabled)]
[secureDrives=(fips | fde)]
[dataAssurance=(none | enabled)]
[resourceProvisioningCapable=(TRUE | FALSE)]
[blockSize=blockSizeValue]

```

## Parameters

Parameter	Description
driveCount	The number of unassigned drives that you want to use in the volume group.
volumeGroupUserLabel	<p>The name that you want to give the new volume group. Enclose the new volume group name in double quotation marks (" ").</p> <div>  <p>If you do not specify a user label for the volume group, the controller firmware assigns it a number.</p> </div>
raidLevel	The RAID level of the volume group that contains the volume. Valid values are 0, 1, 3, 5, or 6.
userLabel	<p>The name that you want to give to the new volume. Enclose the new volume name in double quotation marks (" ").</p> <div>  <p>This parameter is required.</p> </div>

Parameter	Description
<code>driveMediaType</code>	<p>The type of drive media that you want to use for the volume group. These drive media are valid:</p> <ul style="list-style-type: none"> <li>• <code>HDD</code> — Use this option when you have hard drives in the drive tray.</li> <li>• <code>SSD</code> — Use this option when you have solid state drives in the drive tray.</li> <li>• <code>unknown</code> — Use this option if you are not sure what types of drive media are in the drive tray.</li> <li>• <code>allMedia</code> — Use this option when you want to use all types of drive media that are in the drive tray.</li> </ul>
<code>driveType</code>	<p>The type of drive that you want to use in the volume. You cannot mix drive types.</p> <p>You must use this parameter when you have more than one type of drive in your storage array.</p> <p>These drive types are valid:</p> <ul style="list-style-type: none"> <li>• <code>SAS</code></li> <li>• <code>NVMe4K</code></li> </ul> <p>If you do not specify a drive type, the command defaults to <code>any</code> type.</p>
<code>capacity</code>	<p>The size of the volume that you are adding to the storage array. Size is defined in units of <code>bytes</code>, <code>KB</code>, <code>MB</code>, <code>GB</code>, or <code>TB</code>.</p>
<code>owner</code>	<p>The controller that owns the volume. Valid controller identifiers are <code>a</code> or <code>b</code>, where <code>a</code> is the controller in slot A, and <code>b</code> is the controller in slot B. If you do not specify an owner, the controller firmware determines the owner.</p>
<code>cacheReadPrefetch</code>	<p>The setting to turn on or turn off cache read prefetch. To turn off cache read prefetch, set this parameter to <code>FALSE</code>. To turn on cache read prefetch, set this parameter to <code>TRUE</code>.</p>
<code>segmentSize</code>	<p>The amount of data (in <code>KB</code>) that the controller writes on a single drive in a volume before writing data on the next drive. Valid values are 8, 16, 32, 64, 128, 256, or 512.</p>

Parameter	Description
usageHint	The setting for both <code>cacheReadPrefetch</code> parameter and the <code>segmentSize</code> parameter to be default values. The default values are based on the typical I/O usage pattern of the application that is using the volume. Valid values are <code>fileSystem</code> , <code>dataBase</code> , or <code>multiMedia</code> .
trayLossProtect	The setting to enforce tray loss protection when you create the volume group. To enforce tray loss protection, set this parameter to <code>TRUE</code> . The default value is <code>FALSE</code> .
drawerLossProtect	The setting to enforce drawer loss protection when you create the mirror repository volume group. To enforce drawer loss protection, set this parameter to <code>TRUE</code> . The default value is <code>FALSE</code> .
dssPreAllocate	The setting to make sure that reserve capacity is allocated for future segment size increases. The default value is <code>TRUE</code> .
securityType	<p>The setting to specify the security level when creating the volume groups and all associated volumes. These settings are valid:</p> <ul style="list-style-type: none"> <li>• <code>none</code> — The volume group and volumes are not secure.</li> <li>• <code>capable</code> — The volume group and volumes are capable of having security set, but security has not been enabled.</li> <li>• <code>enabled</code> — The volume group and volumes have security enabled.</li> </ul>
resourceProvisioningCapable	The setting to specify if resource provisioning capabilities are enabled. To disable resource provisioning, set this parameter to <code>FALSE</code> . The default value is <code>TRUE</code> .
mapping	This parameter enables you to map the volume to a host. If you want to map later, set this parameter to <code>none</code> . If you want to map now, set this parameter to <code>default</code> . The volume is mapped to all hosts that have access to the storage pool. The default value is <code>none</code> .

Parameter	Description
<code>blockSize</code>	This parameter sets the block size of the volume being created. A value of 0 or the parameter not set uses the default block size.

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

The `driveCount` parameter lets you choose the number of drives that you want to use in the volume group. You do not need to specify the drives by tray ID and slot ID. The controllers choose the specific drives to use for the volume group.

The `owner` parameter defines which controller owns the volume.

If you do not specify a capacity using the `capacity` parameter, all of the drive capacity that is available in the volume group is used. If you do not specify capacity units, `bytes` is used as the default value.

## Segment size

The size of a segment determines how many data blocks that the controller writes on a single drive in a volume before writing data on the next drive. Each data block stores 512 bytes of data. A data block is the smallest unit of storage. The size of a segment determines how many data blocks that it contains. For example, an 8-KB segment holds 16 data blocks. A 64-KB segment holds 128 data blocks.

When you enter a value for the segment size, the value is checked against the supported values that are provided by the controller at run time. If the value that you entered is not valid, the controller returns a list of valid values. Using a single drive for a single request leaves other drives available to simultaneously service other requests. If the volume is in an environment where a single user is transferring large units of data (such as multimedia), performance is maximized when a single data transfer request is serviced with a single data stripe. (A data stripe is the segment size that is multiplied by the number of drives in the volume group that are used for data transfers.) In this case, multiple drives are used for the same request, but each drive is accessed only once.

For optimal performance in a multiuser database or file system storage environment, set your segment size to minimize the number of drives that are required to satisfy a data transfer request.

## Usage Hint



You do not need to enter a value for the `cacheReadPrefetch` parameter or the `segmentSize` parameter. If you do not enter a value, the controller firmware uses the `usageHint` parameter with `fileSystem` as the default value. Entering a value for the `usageHint` parameter and a value for the `cacheReadPrefetch` parameter or a value for the `segmentSize` parameter does not cause an error. The value that you enter for the `cacheReadPrefetch` parameter or the `segmentSize` parameter takes priority over the value for the `usageHint` parameter. The segment size and cache read prefetch settings for various usage hints are shown in the following table:



Usage hint	Segment size setting	Dynamic cache read prefetch setting
File system	128 KB	Enabled
Database	128 KB	Enabled
Multimedia	256 KB	Enabled

## Cache read prefetch

Cache read prefetch lets the controller copy additional data blocks into cache while the controller reads and copies data blocks that are requested by the host from the drive into cache. This action increases the chance that a future request for data can be fulfilled from cache. Cache read prefetch is important for multimedia applications that use sequential data transfers. Valid values for the `cacheReadPrefetch` parameter are `TRUE` or `FALSE`. The default is `TRUE`.

## Security type

Use the `securityType` parameter to specify the security settings for the storage array.

Before you can set the `securityType` parameter to `enabled`, you must create a storage array security key. Use the `create storageArray securityKey` command to create a storage array security key. These commands are related to the security key:

- `create storageArray securityKey`
- `export storageArray securityKey`
- `import storageArray securityKey`
- `set storageArray securityKey`
- `enable volumeGroup [volumeGroupName] security`
- `enable diskPool [diskPoolName] security`

## Secure drives

Secure-capable drives can be either Full Disk Encryption (FDE) drives or Federal Information Processing Standard (FIPS) drives. Use the `secureDrives` parameter to specify the type of secure drives to use. The values you can use are `fips` and `fde`.

## Tray loss protection and drawer loss protection

To enable tray/drawer loss protection, refer to the following tables for additional criteria:

Level	Criteria for Tray Loss Protection	Minimum number of trays required
Disk Pool	The disk pool contains no more than two drives in a single tray.	6

Level	Criteria for Tray Loss Protection	Minimum number of trays required
RAID 6	The volume group contains no more than two drives in a single tray.	3
RAID 3 or RAID 5	Each drive in the volume group is located in a separate tray.	3
RAID 1	Each drive in a RAID 1 pair must be located in a separate tray.	2
RAID 0	Cannot achieve Tray Loss Protection.	Not applicable

Level	Criteria for drawer loss protection	Minimum number of drawers required
Disk Pool	The pool includes drives from all five drawers and there are an equal number of drives in each drawer. A 60-drive tray can achieve Drawer Loss Protection when the disk pool contains 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 drives.	5
RAID 6	The volume group contains no more than two drives in a single drawer.	3
RAID 3 or RAID 5	Each drive in the volume group is located in a separate drawer.	3
RAID 1	Each drive in a mirrored pair must be located in a separate drawer.	2
RAID 0	Cannot achieve Drawer Loss Protection.	Not applicable

## Example command

```
create volume driveCount=2 volumeGroupUserLabel="FIPS_VG" raidLevel=1
userLabel="FIPS_V"
```

```
driveMediaType=HDD securityType=capable secureDrives=fips
```

## Minimum firmware level

7.10 adds RAID Level 6 capability and the `dssPreAllocate` parameter.

7.50 adds the `securityType` parameter.

7.60 adds the `drawerLossProtect` parameter.

7.75 adds the `dataAssurance` parameter.

8.25 adds the `secureDrives` parameter.

8.63 adds the `resourceProvisioningCapable` parameter.

11.70 adds the `blockSize` parameter.

## Create RAID volume (free extent based select)

The `create volume` command creates a volume in the free space of a volume group.

### Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.




### Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

### Syntax

```
create volume volumeGroup="volumeGroupName"
userLabel="volumeName"
[freeCapacityArea=freeCapacityIndexNumber]
[capacity=volumeCapacity]
[owner=(a|b)]
[mapping=(none | default)]
[cacheReadPrefetch=(TRUE | FALSE)]
[segmentSize=segmentSizeValue]
[usageHint=(fileSystem | dataBase | multiMedia)]
[dssPreAllocate=(TRUE | FALSE)]
[securityType=(none | capable | enabled)]
[dataAssurance=(none | enabled)]
[blockSize=blockSizeValue]
```

## Parameters

Parameter	Description
<code>volumeGroup</code>	The name of a specific volume group in your storage array. Enclose the volume group name in double quotation marks (" ").
<code>userLabel</code>	<p>The name that you want to give the new volume. Enclose the new volume name in double quotation marks (" ").</p> <div> This parameter is required.</div>
<code>freeCapacityArea</code>	<p>The index number of the free space in an existing volume group that you want to use to create the new volume. Free capacity is defined as the free capacity between existing volumes in a volume group. For example, a volume group might have the following areas: volume 1, free capacity, volume 2, free capacity, volume 3, free capacity. To use the free capacity following volume 2, you would enter this index number:</p> <pre>freeCapacityArea=2</pre> <div> Run the <code>show volumeGroup</code> command to determine whether the free capacity area exists.</div> <div> If this parameter is not specified, the volume is created in the lowest-numbered free capacity area with sufficient capacity for the volume.</div>
<code>capacity</code>	The size of the volume that you are adding to the storage array. Size is defined in units of <code>bytes</code> , <code>KB</code> , <code>MB</code> , <code>GB</code> , or <code>TB</code> .
<code>owner</code>	The controller that owns the volume. Valid controller identifiers are <code>a</code> or <code>b</code> , where <code>a</code> is the controller in slot A, and <code>b</code> is the controller in slot B. If you do not specify an owner, the controller firmware determines the owner.
<code>cacheReadPrefetch</code>	The setting to turn on or turn off cache read prefetch. To turn on cache read prefetch, set this parameter to <code>TRUE</code> . To turn off cache read prefetch, set this parameter to <code>FALSE</code> .

Parameter	Description
<code>segmentSize</code>	The amount of data (in KB) that the controller writes on a single drive in a volume before writing data on the next drive. Valid values are 8, 16, 32, 64, 128, 256, or 512.
<code>usageHint</code>	The settings for both the <code>cacheReadPrefetch</code> parameter and the <code>segmentSize</code> parameter to be default values. The default values are based on the typical I/O usage pattern of the application that is using the volume. Valid values are <code>fileSystem</code> , <code>dataBase</code> , or <code>multiMedia</code> .
<code>dssPreAllocate</code>	The setting to make sure that reserve capacity is allocated for future segment size increases. The default value is <code>TRUE</code> .
<code>securityType</code>	<p>The setting to specify the security level when creating the volume groups and all associated volumes. These settings are valid:</p> <p><code>none</code> — The volume group and volumes are not secure.</p> <p><code>capable</code> — The volume group and volumes are capable of having security set, but security has not been enabled.</p> <p><code>enabled</code> — The volume group and volumes have security enabled.</p>
<code>mapping</code>	This parameter enables you to map the volume to a host. If you want to map later, set this parameter to <code>none</code> . If you want to map now, set this parameter to <code>default</code> . The volume is mapped to all hosts that have access to the storage pool. The default value is <code>none</code> .
<code>blockSize</code>	This parameter sets the block size of the volume being created. A value of 0 or the parameter not set uses the default block size.

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

The `owner` parameter defines which controller owns the volume. The preferred controller ownership of a volume is the controller that currently owns the volume group.

If you do not specify a capacity using the `capacity` parameter, all of the available capacity in the free capacity area of the volume group is used. If you do not specify capacity units, `bytes` is used as the default value.

## Segment size

The size of a segment determines how many data blocks that the controller writes on a single drive in a volume before writing data on the next drive. Each data block stores 512 bytes of data. A data block is the smallest unit of storage. The size of a segment determines how many data blocks that it contains. For example, an 8-KB segment holds 16 data blocks. A 64-KB segment holds 128 data blocks.

When you enter a value for the segment size, the value is checked against the supported values that are provided by the controller at run time. If the value that you entered is not valid, the controller returns a list of valid values. Using a single drive for a single request leaves other drives available to simultaneously service other requests. If the volume is in an environment where a single user is transferring large units of data (such as multimedia), performance is maximized when a single data transfer request is serviced with a single data stripe. (A data stripe is the segment size that is multiplied by the number of drives in the volume group that are used for data transfers.) In this case, multiple drives are used for the same request, but each drive is accessed only once.

For optimal performance in a multiuser database or file system storage environment, set your segment size to minimize the number of drives that are required to satisfy a data transfer request.

## Usage Hint



You do not need to enter a value for the `cacheReadPrefetch` parameter or the `segmentSize` parameter. If you do not enter a value, the controller firmware uses the `usageHint` parameter with `fileSystem` as the default value. Entering a value for the `usageHint` parameter and a value for the `cacheReadPrefetch` parameter or a value for the `segmentSize` parameter does not cause an error. The value that you enter for the `cacheReadPrefetch` parameter or the `segmentSize` parameter takes priority over the value for the `usageHint` parameter. The segment size and cache read prefetch settings for various usage hints are shown in the following table:

Usage hint	Segment size setting	Dynamic cache read prefetch setting
File system	128 KB	Enabled
Database	128 KB	Enabled
Multimedia	256 KB	Enabled

## Cache read prefetch

Cache read prefetch lets the controller copy additional data blocks into cache while the controller reads and copies data blocks that are requested by the host from the drive into cache. This action increases the chance that a future request for data can be fulfilled from cache. Cache read prefetch is important for multimedia applications that use sequential data transfers. Valid values for the `cacheReadPrefetch` parameter are `TRUE` or `FALSE`. The default is `TRUE`.

## Security type

Use the `securityType` parameter to specify the security settings for the storage array.

Before you can set the `securityType` parameter to `enabled`, you must create a storage array security key. Use the `create storageArray securityKey` command to create a storage array security key. These commands are related to the security key:

- `create storageArray securityKey`
- `export storageArray securityKey`
- `import storageArray securityKey`
- `set storageArray securityKey`
- `enable volumeGroup [volumeGroupName] security`
- `enable diskPool [diskPoolName] security`

## Minimum firmware level

7.10 adds the `dssPreAllocate` parameter.

7.50 adds the `securityType` parameter.

7.75 adds the `dataAssurance` parameter.

11.70 adds the `blockSize` parameter.

## Create RAID volume (manual drive select)

The `create volume` command creates a new volume group and volume, and lets you specify the drives for the volume.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax

```

create volume drives=(trayID1,[drawerID1,]slotID1 ... trayIDn,[drawerIDn,]slotIDn)
[volumeGroupUserLabel="volumeGroupName"]
raidLevel=(0 | 1 | 3 | 5 | 6)
userLabel="volumeName"
[capacity=volumeCapacity]
[owner=(a|b)]
[mapping=(none | default)]
[cacheReadPrefetch=(TRUE | FALSE)]
[segmentSize=segmentSizeValue]
[usageHint=(fileSystem | dataBase | multiMedia)]
[trayLossProtect=(TRUE | FALSE)]
[drawerLossProtect=(TRUE | FALSE)]
[dssPreAllocate=(TRUE | FALSE)]
[securityType=(none | capable | enabled)]
[dataAssurance=(none | enabled)]
[resourceProvisioningCapable=(TRUE | FALSE)]
[blockSize=blockSizeValue]

```



```

create volume drives=(trayID1,[drawerID1,slotID1 ... trayIDn,[drawerIDn,]slotIDn)
[volumeGroupUserLabel="volumeGroupName"]
raidLevel=(0 | 1 | 5 | 6)
userLabel="volumeName"
[capacity=volumeCapacity]
[owner=(a|b)]
[mapping=(none | default)]
[cacheReadPrefetch=(TRUE | FALSE)]
[segmentSize=segmentSizeValue]
[usageHint=(fileSystem | dataBase | multiMedia)]
[trayLossProtect=(TRUE | FALSE)]
[drawerLossProtect=(TRUE | FALSE)]
[dssPreAllocate=(TRUE | FALSE)]
[securityType=(none | capable | enabled)]
[dataAssurance=(none | enabled)]
[resourceProvisioningCapable=(TRUE | FALSE)]
[blockSize=blockSizeValue]

```

## Parameters



Parameter	Description
drives	<p>The drives that you want to assign to the volume that you want to create. For high-capacity drive trays, specify the tray ID value, the drawer ID value, and the slot ID value for the drive. For low-capacity drive trays, specify the tray ID value and the slot ID value for the drive. Tray ID values are 0 to 99. Drawer ID values are 1 to 5.</p> <p>All slot ID maximums are 24. Slot ID values either begin at 0 or 1, depending on the tray model. Drive trays compatible with E2800 and E5700 controllers have slot ID numbers starting at 0. Drive trays compatible with E2700 and E5600 controllers have slot ID numbers starting at 1.</p> <p>Enclose the tray ID value, the drawer ID value, and the slot ID value in square brackets ([ ]).</p>
volumeGroupUserLabel	<p>The name that you want to give the new volume group. Enclose the volume group name in double quotation marks (" ").</p> <div>  <p>If you do not specify a user label for the volume group, the controller firmware assigns it a number.</p> </div>
raidLevel	The RAID level of the volume group that contains the volume. Valid values are 0, 1, 3, 5, or 6.
userLabel	<p>The name that you want to give the new volume. Enclose the new volume name in double quotation marks (" ").</p> <div>  <p>This parameter is required.</p> </div>
capacity	The size of the volume that you are adding to the storage array. Size is defined in units of bytes, KB, MB, GB, or TB.
owner	The controller that owns the volume. Valid controller identifiers are a or b, where a is the controller in slot A, and b is the controller in slot B. If you do not specify an owner, the controller firmware determines the owner.

Parameter	Description
cacheReadPrefetch	The setting to turn on or turn off cache read prefetch. To turn off cache read prefetch, set this parameter to <code>FALSE</code> . To turn on cache read prefetch, set this parameter to <code>TRUE</code> .
segmentSize	The amount of data (in KB) that the controller writes on a single drive in a volume before writing data on the next drive. Valid values are 4 (SSD only) 8, 16, 32, 64, 128, 256, or 512.
usageHint	The settings for both the <code>cacheReadPrefetch</code> parameter and the <code>segmentSize</code> parameter to be default values. The default values are based on the typical I/O usage pattern of the application that is using the volume. Valid values are <code>fileSystem</code> , <code>dataBase</code> , or <code>multiMedia</code> .
trayLossProtect	The setting to enforce tray loss protection when you create the repository. To enforce tray loss protection, set this parameter to <code>TRUE</code> . The default value is <code>FALSE</code> .
drawerLossProtect	The setting to enforce drawer loss protection when you create the mirrored repository volume. To enforce drawer loss protection, set this parameter to <code>TRUE</code> . The default value is <code>FALSE</code> .
dssPreAllocate	The setting to make sure that reserve capacity is allocated for future segment size increases. This default value is <code>TRUE</code> .
securityType	<p>The setting to specify the security level when creating the volume groups and all associated volumes. These settings are valid:</p> <ul style="list-style-type: none"> <li>• <code>none</code> — The volume group and volumes are not secure.</li> <li>• <code>capable</code> — The volume group and volumes are capable of having security set, but security has not been enabled.</li> <li>• <code>enabled</code> — The volume group and volumes have security enabled.</li> </ul>

Parameter	Description
<code>resourceProvisioningCapable</code>	The setting to specify if resource provisioning capabilities are enabled. To disable resource provisioning, set this parameter to <code>FALSE</code> . The default value is <code>TRUE</code> .
<code>mapping</code>	This parameter enables you to map the volume to a host. If you want to map later, set this parameter to <code>none</code> . If you want to map now, set this parameter to <code>default</code> . The volume is mapped to all hosts that have access to the storage pool. The default value is <code>none</code> .
<code>blockSize</code>	This parameter sets the block size of the volume being created. A value of 0 or the parameter not set uses the default block size.

## Notes

The `drives` parameter supports both high-capacity drive trays and low-capacity drive trays. A high-capacity drive tray has drawers that hold the drives. The drawers slide out of the drive tray to provide access to the drives. A low-capacity drive tray does not have drawers. For a high-capacity drive tray, you must specify the identifier (ID) of the drive tray, the ID of the drawer, and the ID of the slot in which a drive resides. For a low-capacity drive tray, you need only specify the ID of the drive tray and the ID of the slot in which a drive resides. For a low-capacity drive tray, an alternative method for identifying a location for a drive is to specify the ID of the drive tray, set the ID of the drawer to 0, and specify the ID of the slot in which a drive resides.

If you set the `raidLevel` parameter to RAID level 1:

- There are an even number of drives in the group, by RAID 1 definition
- The first half of the group, in listed order (and in stripe order), are primary drives
- The second half of the group, in listed order (and in stripe order), are the corresponding mirror drives

You can use any combination of alphanumeric characters, underscore (`_`), hyphen (`-`), and pound (`#`) for the names. Names can have a maximum of 30 characters.

The `owner` parameter defines which controller owns the volume. The preferred controller ownership of a volume is the controller that currently owns the volume group.

If you do not specify a capacity using the `capacity` parameter, all of the drive capacity that is available in the volume group is used. If you do not specify capacity units, `bytes` is used as the default value.

## Tray loss protection and drawer loss protection

For tray loss protection to work, your configuration must adhere to the following guidelines:

<b>Level</b>	<b>Criteria for Tray Loss Protection</b>	<b>Minimum number of trays required</b>
Disk Pool	The disk pool contains no more than two drives in a single tray.	6
RAID 6	The volume group contains no more than two drives in a single tray.	3
RAID 3 or RAID 5	Each drive in the volume group is located in a separate tray.	3
RAID 1	Each drive in a RAID 1 pair must be located in a separate tray.	2
RAID 0	Cannot achieve Tray Loss Protection.	Not applicable

For drawer loss protection to work (in high density enclosure environments), your configuration must adhere to the following guidelines:

<b>Level</b>	<b>Criteria for drawer loss protection</b>	<b>Minimum number of drawers required</b>
Disk Pool	The pool includes drives from all five drawers and there are an equal number of drives in each drawer. A 60-drive tray can achieve Drawer Loss Protection when the disk pool contains 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 drives.	5
RAID 6	The volume group contains no more than two drives in a single drawer.	3
RAID 3 or RAID 5	Each drive in the volume group is located in a separate drawer.	3
RAID 1	Each drive in a mirrored pair must be located in a separate drawer.	2
RAID 0	Cannot achieve Drawer Loss Protection.	Not applicable

## Segment size

The size of a segment determines how many data blocks that the controller writes on a single drive in a volume

before writing data on the next drive. Each data block stores 512 bytes of data. A data block is the smallest unit of storage. The size of a segment determines how many data blocks that it contains. For example, an 8-KB segment holds 16 data blocks. A 64-KB segment holds 128 data blocks.

When you enter a value for the segment size, the value is checked against the supported values that are provided by the controller at run time. If the value that you entered is not valid, the controller returns a list of valid values. Using a single drive for a single request leaves other drives available to simultaneously service other requests. If the volume is in an environment where a single user is transferring large units of data (such as multimedia), performance is maximized when a single data transfer request is serviced with a single data stripe. (A data stripe is the segment size that is multiplied by the number of drives in the volume group that are used for data transfers.) In this case, multiple drives are used for the same request, but each drive is accessed only once.

For optimal performance in a multiuser database or file system storage environment, set your segment size to minimize the number of drives that are required to satisfy a data transfer request.

## Usage Hint



You do not need to enter a value for the `cacheReadPrefetch` parameter or the `segmentSize` parameter. If you do not enter a value, the controller firmware uses the `usageHint` parameter with `fileSystem` as the default value. Entering a value for the `usageHint` parameter and a value for the `cacheReadPrefetch` parameter or a value for the `segmentSize` parameter does not cause an error. The value that you enter for the `cacheReadPrefetch` parameter or the `segmentSize` parameter takes priority over the value for the `usageHint` parameter. The segment size and cache read prefetch settings for various usage hints are shown in the following table:

Usage hint	Segment size setting	Dynamic cache read prefetch setting
File system	128 KB	Enabled
Database	128 KB	Enabled
Multimedia	256 KB	Enabled

## Cache read prefetch

Cache read prefetch lets the controller copy additional data blocks into cache while the controller reads and copies data blocks that are requested by the host from the drive into cache. This action increases the chance that a future request for data can be fulfilled from cache. Cache read prefetch is important for multimedia applications that use sequential data transfers. Valid values for the `cacheReadPrefetch` parameter are `TRUE` or `FALSE`. The default is `TRUE`.

You do not need to enter a value for the `cacheReadPrefetch` parameter or the `segmentSize` parameter. If you do not enter a value, the controller firmware uses the `usageHint` parameter with `fileSystem` as the default value. Entering a value for the `usageHint` parameter and a value for the `cacheReadPrefetch` parameter or a value for the `segmentSize` parameter does not cause an error. The value that you enter for the `cacheReadPrefetch` parameter or the `segmentSize` parameter takes priority over the value for the `usageHint` parameter.

## Security type

Use the `securityType` parameter to specify the security settings for the storage array.

Before you can set the `securityType` parameter to `enabled`, you must create a storage array security key. Use the `create storageArray securityKey` command to create a storage array security key. These commands are related to the security key:

- `create storageArray securityKey`
- `export storageArray securityKey`
- `import storageArray securityKey`
- `set storageArray securityKey`
- `enable volumeGroup [volumeGroupName] security`
- `enable diskPool [diskPoolName] security`

## Minimum firmware level

7.10 adds RAID Level 6 capability and the `dssPreAllocate` parameter.

7.50 adds the `securityType` parameter.

7.60 adds the *drawerID* user input and the `drawerLossProtect` parameter.

7.75 adds the `dataAssurance` parameter.

8.63 adds the `resourceProvisioningCapable` parameter.

11.70 adds the `blockSize` parameter.

## Create read-only snapshot volume

The `create snapVolume` command creates a read-only snapshot volume for the snapshot images of a base volume. To change a read-only snapshot volume to a read/write volume, use the `set snapVolume convertToReadWrite` command.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context




You cannot use this command for a snapshot image that is used in online volume copy.

## Syntax

```
create snapVolume userLabel="snapVolumeName"
snapImageID="snapCGID:imageID"
readOnly
```

## Parameters

Parameter	Description
userLabel	The name that you want to give to a snapshot volume. Enclose the snapshot volume name in double quotation marks (" ").
snapImageID	<p>The name of a snapshot image that you want to add to the new read-only snapshot volume. The name of a snapshot image is comprised of two parts:</p> <ul style="list-style-type: none"><li>• The name of the snapshot group</li><li>• An identifier for the snapshot image in the snapshot group</li></ul> <p>The identifier for the snapshot image can be one of these:</p> <ul style="list-style-type: none"><li>• An integer value that is the sequence number of the snapshot in the snapshot group.</li><li>• <b>NEWEST</b> - Use this option when you want to show the latest snapshot image created in the snapshot group.</li><li>• <b>OLDEST</b> - Use this option when you want to show the earliest snapshot image created in the snapshot group.</li></ul> <p>Enclose the snapshot image name in double quotation marks (" ").</p>

Parameter	Description
readOnly	<p>This parameter sets the snapshot volume to read-only. This parameter is actually a Boolean; however, in the context of this command, the Boolean value is always <code>TRUE</code>.</p> <div>  <p>With the <code>readOnly</code> parameter, snapshot volumes are not created.</p> </div>

## Notes

You can use any combination of alphanumeric characters, underscore (`_`), hyphen (`-`), and pound (`#`) for the names. Names can have a maximum of 30 characters.

The identifier of a snapshot image has two parts separated by a colon (`:`):

- The name of the snapshot group
- The identifier of the snapshot image

For example, if you want to create a read-only volume named `engData1` using the most recent snapshot image in a snapshot group that has the name `snapGroup1`, you would use this command:

```
create snapVolume userLabel="engData1" snapImageID="snapGroup1:newest"
readOnly;
```

## Minimum firmware level

7.83

## Create snapshot group

The `create snapGroup` command creates a new snapshot group and the associated repository volume.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context

A snapshot group contains a sequence of snapshot images of an associated base volume. A snapshot group



has a repository volume that is used to save data for all of the snapshot images that are part of the snapshot group.



Before you create a snapshot group, make sure a volume group with free capacity is available.

Syntax

```
create snapGroup userLabel="snapGroupName" sourceVolume="volumeName"
[(repositoryVolume="repos_XXXX" |
repositoryVolume=(volumeGroupName [capacity=capacityValue]) |
repositoryVolume=(diskPoolName [capacity=capacityValue]))]
[repositoryFullPolicy=(failBaseWrites | purgeSnapImages)]
[rollbackPriority=(highest | high | medium | low | lowest)]
[repositoryFullLimit=percentValue]
[autoDeleteLimit=numberOfSnapImages] |
[enableSchedule=(TRUE | FALSE)]
[schedule (immediate | snapshotSchedule)]
```

Parameters

Parameter	Description
userLabel	The name that you want to give the new snapshot group. Enclose the snapshot group identifier in double quotation marks (" ").
sourceVolume	The name of the volume that you want to use as the source for your snapshot images. Enclose the source volume name in double quotation marks (" ").

Parameter	Description
repositoryVolume	<p>The name of the repository volume that will contain the changed data of the snapshot group.</p> <p>You have two options for defining the name of a repository volume:</p> <ul style="list-style-type: none"> <li>• Use an existing repository volume: name</li> <li>• Create a new repository volume when you run this command</li> </ul> <p>The name of an existing repository volume is comprised of two parts:</p> <ul style="list-style-type: none"> <li>• The term "repos"</li> <li>• A four digit numerical identifier that the storage management software assigns to the repository volume name</li> </ul> <p>Enclose the name of the existing repository volume in double quotation marks (" ").</p> <p>If you want to create a new repository volume when you run this command you must enter the name of either a volume group or a disk pool in which you want the repository volume. Optionally, you also can define the capacity of the repository volume. If you want to define the capacity you can use these values:</p> <ul style="list-style-type: none"> <li>• An integer value that represents a percentage of the base volume capacity</li> <li>• A decimal fraction value that represents a percentage of the base volume capacity</li> <li>• A specific size for the repository volume. Size is defined in units of <code>bytes</code>, KB, MB, GB, or TB.</li> </ul> <p>If you do not use the capacity option, the storage management software sets the capacity to 20 percent of the base volume capacity.</p> <p>When you run this command the storage management software creates the repository volume for the snapshot volume.</p>

Parameter	Description
<code>repositoryFullPolicy</code>	Defines how snapshot image processing continues if the snapshot group repository volume is full. You can choose to fail I/O writes to the base volume ( <code>failBaseWrites</code> ) or delete (purge) the snapshot images ( <code>purgeSnapImages</code> ) in the repository volume. The <code>purgeSnapImages</code> option deletes the oldest snapshot images to free up space. The default action is <code>purgeSnapImages</code> .
<code>rollbackPriority</code>	Determines whether system resources should be allocated to the rollback operation at the expense of system performance. A value of <code>high</code> indicates that the rollback operation is prioritized over all other host I/O. A value of <code>low</code> indicates that the rollback operation should be performed with minimal impact to host I/O. The default value is <code>medium</code> .
<code>repositoryFullLimit</code>	The percentage of repository capacity at which you receive a warning that the snapshot group repository volume is nearing full. Use integer values. For example, a value of 70 means 70 percent. The default value is 75.
<code>autoDeleteLimit</code>	Each snapshot group can be configured to perform automatic deletion of its snapshot images to keep the total number of snapshot images in the snapshot group at or below a designated level. When this option is enabled, then any time a new snapshot image is created in the snapshot group, the system automatically deletes the oldest snapshot image in the group to comply with the limit value. This action frees repository capacity so it can be used to satisfy ongoing copy-on-write requirements for the remaining snapshot images.
<code>enableSchedule</code>	Use this parameter to turn on or to turn off the ability to schedule a snapshot operation. To turn on snapshot scheduling, set this parameter to <code>TRUE</code> . To turn off snapshot scheduling, set this parameter to <code>FALSE</code> .

## Notes

Each snapshot group name must be unique. You can use any combination of alphanumeric characters, underscore (`_`), hyphen (`-`), and pound (`#`) for the user label. User labels can have a maximum of 30 characters.

To create a snapshot group, you must have an associated repository volume in which you store the snapshot images. You can either use an existing repository volume or create a new repository volume. You can create

the repository volume when you create the snapshot group. A snapshot group repository volume is an expandable volume that is structured as a concatenated collection of up to 16 standard volume entities. Initially, an expandable repository volume has only a single element. The capacity of the expandable repository volume is exactly that of the single element. You can increase the capacity of an expandable repository volume by attaching additional standard volumes to it. The composite expandable repository volume capacity then becomes the sum of the capacities of all of the concatenated standard volumes.

A snapshot group has a strict ordering of snapshot images based on the time that each snapshot image is created. A snapshot image that is created after another snapshot image is a *successor* relative to that other snapshot image. A snapshot image that is created before another snapshot image is a *predecessor* relative to that other one.

A snapshot group repository volume must satisfy a minimum capacity requirement that is the sum of the following:

- 32 MB to support fixed overhead for the snapshot group and for copy-on-write processing.
- Capacity for rollback processing, which is 1/5000th of the capacity of the base volume.

The minimum capacity is enforcement by the controller firmware and the storage management software.

When you first create a snapshot group, it does not contain any snapshot images. When you create snapshot images, you add the snapshot images to a snapshot group. Use the `create snapImage` command to create snapshot images and add the snapshot images to a snapshot group.




A snapshot group can have one of these states:

- **Optimal** — The snapshot group is operating normally.
- **Full** — The snapshot group repository is full. Additional copy-on-write operations cannot be performed. This state is possible only for snapshot groups that have the Repository Full policy set to Fail Base Writes. Any snapshot group in a Full state causes a Needs-Attention condition to be posted for the storage array.
- **Over Threshold** — The snapshot group repository volume usage is at or beyond its alert threshold. Any snapshot group in this state causes a Needs-Attention condition to be posted for the storage array.
- **Failed** — The snapshot group has encountered a problem that has made all snapshot images in the snapshot group unusable. For example, certain types of repository volume failures can cause a Failed state. To recover from a Failed state use the `revive snapGroup` command.



You can configure each snapshot group to automatically delete the snapshot images by using the `autoDeleteLimit` parameter. Automatically deleting the snapshot images enables you to avoid having to routinely, manually delete the images that you do not want and that might prevent the creation of future snapshot images because the repository volume is full. When you use the `autoDeleteLimit` parameter it causes the storage management software to automatically delete snapshot images, starting with the oldest. The storage management software deletes snapshot images until it reaches a number of snapshot images that is equal to the number that you enter with `autoDeleteLimit` parameter. When new snapshot images are added to the repository volume, the storage management software deletes the oldest snapshot images until the `autoDeleteLimit` parameter number is reached.

The `enableSchedule` parameter and the `schedule` parameter provide a way for you to schedule creating snapshot images for a snapshot group. Using these parameters, you can schedule snapshots daily, weekly, or monthly (by day or by date). The `enableSchedule` parameter turns on or turns off the ability to schedule snapshots. When you enable scheduling, you use the `schedule` parameter to define when you want the snapshots to occur.

This table explains how to use the options for the `schedule` parameter:

Parameter	Description
<code>schedule</code>	Required for specifying schedule parameters.
<code>immediate</code>	Start the operation immediately. This item is mutually exclusive with any other scheduling parameters.
<code>enableSchedule</code>	<p>When set to <code>true</code>, scheduling is turned on. When set to <code>false</code>, scheduling is turned off.</p> <div>  <p>The default is <code>false</code>.</p> </div>
<code>startDate</code>	A specific date on which to start the operation. The format for entering the date is MM:DD:YY. The default is the current date. An example of this option is <code>startDate=06:27:11</code> .
<code>scheduleDay</code>	<p>A day of the week on which to start the operation. Can either be all or one or more of the following values:</p> <ul style="list-style-type: none"> <li>• <code>monday</code></li> <li>• <code>tuesday</code></li> <li>• <code>wednesday</code></li> <li>• <code>thursday</code></li> <li>• <code>friday</code></li> <li>• <code>saturday</code></li> <li>• <code>sunday</code></li> </ul> <div>  <p>Enclose the value in parentheses. For example, <code>scheduleDay= (wednesday)</code>.</p> </div> <p>More than one day can be specified by enclosing the days in a single set of parentheses and separating each day with a space. For example, <code>scheduleDay=(monday wednesday friday)</code>.</p> <div>  <p>This parameter is not compatible with a monthly schedule.</p> </div>

Parameter	Description
startTime	<p>The time of a day on which to start the operation. The format for entering the time is HH:MM, where HH is the hour and MM is the minute past the hour. Uses a 24-hour clock. For example, 2:00 in the afternoon is 14:00. An example of this option is <code>startTime=14:27</code>.</p>
scheduleInterval	<p>An amount of time, in minutes, to have as a minimum between operations. Schedule interval should not be more than 1440 (24 hours) and it should be a multiple of 30.</p> <p>An example of this option is <code>scheduleInterval=180</code>.</p>
endDate	<p>A specific date on which to stop the operation. The format for entering the date is MM:DD:YY. If no end date is desired, you can specify <code>noEndDate</code>. An example of this option is <code>endDate=11:26:11</code>.</p>
timesPerDay	<p>The number of times to perform the operation in a day. An example of this option is <code>timesPerDay=4</code>.</p>
timezone	<p>Specifies the time zone to be used for the schedule. Can be specified in two ways:</p> <ul style="list-style-type: none"> <li> <b>GMT±HH:MM</b> <p>The time zone offset from GMT. Example: <code>timezone=GMT-06:00</code>.</p> </li> <li> <b>Text String</b> <p>Standard time zone text string, must be enclosed in quotes. Example: <code>timezone="America/Chicago"</code></p> </li> </ul>
scheduleDate	<p>A day of the month on which to perform the operation. The values for the days are numerical and in the range of 1-31.</p> <div>  <p>This parameter is not compatible with a weekly schedule.</p> </div> <p>An example of the <code>scheduleDate</code> option is <code>scheduleDate= ("15")</code>.</p>

Parameter	Description
month	<p>A specific month on which to perform the operation. The values for the months are:</p> <ul style="list-style-type: none"> <li>• jan - January</li> <li>• feb - February</li> <li>• mar - March</li> <li>• apr - April</li> <li>• may - May</li> <li>• jun - June</li> <li>• jul - July</li> <li>• aug - August</li> <li>• sep - September</li> <li>• oct - October</li> <li>• nov - November</li> <li>• dec - December</li> </ul> <p> Enclose the value in parentheses. For example, month=(jan).</p> <p>More than one month can be specified by enclosing the months in a single set of parentheses and separating each month with a space. For example, month=(jan jul dec).</p> <p>Use this parameter with the <code>scheduleDate</code> parameter to perform the operation on a specific day of the month.</p> <p> This parameter is not compatible with a weekly schedule.</p>

This table explains how to use the `timeZone` parameter:

Timezone Name	GMT offset
Etc/GMT+12	GMT-12:00
Etc/GMT+11	GMT-11:00
Pacific/Honolulu	GMT-10:00

<b>Timezone Name</b>	<b>GMT offset</b>
America/Anchorage	GMT-09:00
America/Santa_Isabel	GMT-08:00
America/Los_Angeles	GMT-08:00
America/Phoenix	GMT-07:00
America/Chihuahua	GMT-07:00
America/Denver	GMT-07:00
America/Guatemala	GMT-06:00
America/Chicago	GMT-06:00
America/Mexico_City	GMT-06:00
America/Regina	GMT-06:00
America/Bogota	GMT-05:00
America/New_York	GMT-05:00
Etc/GMT+5	GMT-05:00
America/Caracas	GMT-04:30
America/Asuncion	GMT-04:00
America/Halifax	GMT-04:00
America/Cuiaba	GMT-04:00
America/La_Paz	GMT-04:00
America/Santiago	GMT-04:00
America/St_Johns	GMT-03:30



Timezone Name	GMT offset
America/Sao_Paulo	GMT-03:00
America/Buenos_Aires	GMT-03:00
America/Cayenne	GMT-03:00
America/Godthab	GMT-03:00
America/Montevideo	GMT-03:00
Etc/GMT+2	GMT-02:00
Atlantic/Azores	GMT-01:00
Atlantic/Cape_Verde	GMT-01:00
Africa/Casablanca	GMT
Etc/GMT	GMT
Europe/London	GMT
Atlantic/Reykjavik	GMT
Europe/Berlin	GMT+01:00
Europe/Budapest	GMT+01:00
Europe/Paris	GMT+01:00
Europe/Warsaw	GMT+01:00
Africa/Lagos	GMT+01:00
Africa/Windhoek	GMT+01:00
Asia/Anman	GMT+02:00
Asia/Beirut	GMT+02:00

<b>Timezone Name</b>	<b>GMT offset</b>
Africa/Cairo	GMT+02:00
Asia/Damascus	GMT+02:00
Africa/Johannesburg	GMT+02:00
Europe/Kiev	GMT+02:00
Asia/Jerusalem	GMT+02:00
Europe/Istanbul	GMT+03:00
Europe/Minsk	GMT+02:00
Asia/Baghdad	GMT+03:00
Asia/Riyadh	GMT+03:00
Africa/Nairobi	GMT+03:00
Asia/Tehran	GMT+03:30
Europe/Moscow	GMT+04:00
Asia/Dubai	GMT+04:00
Asia/Baku	GMT+04:00
Indian/Mauritius	GMT+04:00
Asia/Tbilisi	GMT+04:00
Asia/Yerevan	GMT+04:00
Asia/Kabul	GMT+04:30
Asia/Karachi	GMT+05:00
Asia//Tashkent	GMT+05:00

<b>Timezone Name</b>	<b>GMT offset</b>
Asia/Calcutta	GMT+05:30
Asia/Colombo	GMT+05:30
Asia/Katmandu	GMT+05:45
Asia/Yekaterinburg	GMT+06:00
Asia/Almaty	GMT+06:00
Asia/Dhaka	GMT+06:00
Asia/Rangoon	GMT+06:30
Asia/Novosibirsk	GMT+07:00
Asia/Bangkok	GMT+07:00
Asia/Krasnoyarsk	GMT+08:00
Asia/Shanghai	GMT+08:00
Asia/Singapore	GMT+08:00
Australia/Perth	GMT+08:00
Asia/Taipei	GMT+08:00
Asia/Ulaanbaatar	GMT+08:00
Asia/Irkutsk	GMT+09:00
Asia/Tokyo	GMT+09:00
Asia/Seoul	GMT+09:00
Australia/Adelaide	GMT+09:30
Australia/Darwin	GMT+09:30

Timezone Name	GMT offset
Asia/Yakutsk	GMT+10:00
Australia/Brisbane	GMT+10:00
Australia/Sydney	GMT+10:00
Pacific/Port Moresby	GMT+10:00
Australia/Hobart	GMT+10:00
Asia/Vladivostok	GMT+11:00
Pacific/Guadalcanal	GMT+11:00
Pacific/Auckland	GMT+12:00
Etc/GMT-12	GMT+12:00
Pacific/Fiji	GMT+12:00
Asia/Kamchatka	GMT+12:00
Pacific/Tongatapu	GMT+13:00

The code string for defining a schedule is similar to these examples:

```
enableSchedule=true schedule startTime=14:27
```

```
enableSchedule=true schedule scheduleInterval=180
```

```
enableSchedule=true schedule timeZone=GMT-06:00
```

```
enableSchedule=true schedule timeZone="America/Chicago"
```

If you also use the `scheduleInterval` option, the firmware chooses between the `timesPerDay` option and the `scheduleInterval` option by selecting the lowest value of the two options. The firmware calculates an integer value for the `scheduleInterval` option by dividing 1440 by the `scheduleInterval` option value that you set. For example,  $1440/180 = 8$ . The firmware then compares the `timesPerDay` integer value with

the calculated `scheduleInterval` integer value and uses the smaller value.

To remove a schedule, use the `delete volume` command with the `schedule` parameter. The `delete volume` command with the `schedule` parameter deletes only the schedule, not the snapshot volume.

**Minimum firmware level**

7.83

7.86 adds the `scheduleDate` option and the `month` option.

**Create snapshot image**

The `create snapImage` command creates a new snapshot image in one or more existing snapshot groups.

**Supported Arrays**

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

**Roles**

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

**Context**

Before you can create a snapshot image, you must first have at least one snapshot group into which you can place the snapshot image. To create a snapshot group use the `create snapGroup` command.

**Syntax**

```
create snapImage (snapGroup="snapGroupName" |
snapGroups=("_snapGroupName1"... "snapGroupName"))
```

**Parameters**

Parameter	Description
snapGroup	The name of the snapshot group that will contain the snapshot image. Enclose the name of the snapshot group in double quotation marks (" ").

Parameter	Description
snapGroups	<p>The names of several snapshot groups that will contain the snapshot image. Enter the names of the snapshot groups using these rules:</p> <ul style="list-style-type: none"> <li>• Enclose all of the names in parentheses.</li> <li>• Enclose each of the names in double quotation marks (" ").</li> <li>• Separate each of the names with a space.</li> </ul>

## Notes

You can use any combination of alphanumeric characters, underscore (\_), hyphen (-), and pound (#) for the names. Names can have a maximum of 30 characters.

A snapshot image is a logical point-in-time image of the contents of an associated *base* volume. The snapshot image is created instantly and records the state of the base volume at that moment. Every snapshot image is created in the context of exactly one *snapshot group*. A snapshot group is a sequence of snapshot images of the associated base volume. A snapshot group has one *repository volume* used to save all of the data from the snapshot images. The snapshot images in a snapshot group have a specific order. The specific order of the snapshot images enables you to manage the snapshot images, such as restoring a specific snapshot image to the base volume or deleting the snapshot images that you no longer need.

The result of creating a snapshot image of a consistency group is a snapshot image of every member volume of the consistency group.

## Minimum firmware level

7.83

## Create snapshot volume

The `create snapVolume` command creates a snapshot volume with read-write capabilities for snapshot images of a base volume.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context

You can map the snapshot volume to a host and all of the host writes reside in the repository volume associated with the snapshot volume. You can assign the new snapshot volume to an existing repository

volume, or you can create a new repository volume in a volume group or disk pool.



You cannot use this command for a snapshot image that is used in online volume copy.

## Syntax

```
create snapVolume userLabel="snapVolumeName" snapImageID="
snapCGID:imageID"
[(repositoryVolume="repos_xxxx")
(repositoryVolume=(volumeGroupName[capacity=capacityValue])]
(repositoryVolume=(diskPoolName[capacity=capacityValue)])]
(repositoryFullLimit=percentValue)
```

## Parameters

Parameter	Description
userLabel	The name that you want to give to a snapshot volume. Enclose the snapshot volume name in double quotation marks (" ").
snapImageID	<p>The alphanumeric identifier of a snapshot image that you want to add to the new snapshot volume. The identifier of a snapshot image is comprised of two parts:</p> <ul style="list-style-type: none"><li>• The name of the snapshot group</li><li>• An identifier for the snapshot image in the snapshot group</li></ul> <p>The identifier for the snapshot image can be one of these:</p> <ul style="list-style-type: none"><li>• An integer value that is the sequence number of the snapshot in the snapshot group.</li><li>• <b>NEWEST</b> - Use this option when you want to show the latest snapshot image created in the snapshot group.</li><li>• <b>OLDEST</b> - Use this option when you want to show the earliest snapshot image created in the snapshot group.</li></ul> <p>Enclose the snapshot image name in double quotation marks (" ").</p>

Parameter	Description
<code>repositoryVolume</code>	<p>The name of the repository volume that holds changed data from the snapshot image.</p> <p>You have two options for defining the name of a repository volume:</p> <ul style="list-style-type: none"> <li>• Use an existing repository volume name</li> <li>• Create a new repository volume when you run this command</li> </ul> <p>The name of an existing repository volume is comprised of two parts:</p> <ul style="list-style-type: none"> <li>• The term "repos"</li> <li>• A four digit numerical identifier that the storage management software assigns to the repository volume name</li> </ul> <p>Enclose the name of the existing repository volume in double quotation marks (" ").</p> <p>If you want to create a new repository volume when you run this command you must enter the name of either a volume group or a disk pool in which you want the repository volume. Optionally, you can also define the capacity of the repository volume. If you want to define the capacity you can use these values:</p> <ul style="list-style-type: none"> <li>• An integer value that represents a percentage of the base volume capacity</li> <li>• A decimal fraction value that represents a percentage of the base volume capacity</li> <li>• A specific size for the repository volume. Size is defined in units of <code>bytes</code>, KB, MB, GB, or TB.</li> </ul> <p>If you do not use the capacity option, the storage management software sets the capacity to 20 percent of the base volume capacity.</p> <p>When you run this command the storage management software creates the repository volume for the snapshot volume.</p>
<code>repositoryFullLimit</code>	<p>The percentage of repository capacity at which you receive a warning that the snapshot repository volume is nearing full. Use integer values. For example, a value of 70 means 70 percent. The default value is 75.</p>



## Notes

You can use any combination of alphanumeric characters, underscore (\_), hyphen (-), and pound (#) for the names. Names can have a maximum of 30 characters.

The identifier of a snapshot image has two parts separated by a colon (:):

- The name of the snapshot group
- The identifier of the snapshot image

For example, if you want to create a snapshot volume named snapData1 using the most recent snapshot image in a snapshot group that has the name snapGroup1 with a maximum fill limit of 80 percent for the repository volume, you would use this command:

```
create snapVolume userLabel="snapData1" snapImageID="snapGroup1:newest"  
repositoryVolume="repos_1234" repositoryFullLimit=80;
```

The repository volume identifier is automatically created by the storage management software and the firmware when you create a new snapshot group. You cannot rename the repository volume because renaming the repository volume breaks the linkage with the snapshot images.

## Minimum firmware level

7.83

## Register SNMP community

The `create snmpCommunity` command creates a new Simple Network Management Protocol (SNMP) community, community name string and registers the new community as a known entity to the SNMP agent. Any attempt to register a new community with the same name as that of an existing community is rejected and the firmware returns an error message.

## Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin or Support Admin role.

## Syntax

```
create snmpCommunity communityName="snmpCommunityName"
```

## Parameters

Parameter	Description
communityName	The name of the SNMP community that you want to create. Enclose the SNMP community name in double quotation marks (" ").

## Minimum firmware level

8.30

## Register SNMP trap destination

The `create snmpTrapDestination` command creates a new Simple Network Management Protocol (SNMP) trap destination. A trap destination is the SNMP manager to receive the trap messages.

## Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin or Support Admin role.

## Syntax

```
create snmpTrapDestination trapReceiverIP=ipAddress
    (communityName="communityName" | (userName="userName" [engineId=(local
| engineId)]))
    [sendAuthenticationFailureTraps=(TRUE | FALSE)]
```

## Parameters

Parameter	Description
trapReceiverIP	The IP address of the SNMP manager to which you want to send trap messages.
communityName	The name of the SNMP community for which you want to send trap messages.
userName	The name of the SNMP user for which you want to send trap messages.

Parameter	Description
engineId	The engine ID of the SNMP user for which you want to send trap messages. The engine ID is required if there is more than one USM user with the same user name. The value may be "local" to specify the local SNMP agent is the authoritative agent or a hexadecimal digit string to specify a remote SNMP agent engine ID.
sendAuthenticationFailureTraps	This parameter turns on or turns off sending authentication failure messages to an SNMP manager. To send authentication failure messages, set the parameter to <code>TRUE</code> . To prevent sending authentication failure messages, set the parameter to <code>FALSE</code> . The default is <code>TRUE</code> .

## Minimum firmware level

8.30

## Register SNMPv3 USM user

The `create snmpUser userName` command creates a new Simple Network Management Protocol (SNMP) user and registers the new user as a known entity to the SNMP agent. Any attempt to register a new user with the same name and engine ID as that of an existing user is rejected.

## Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin or Support Admin role.

## Syntax

```
create snmpUser userName="snmpUserName"
    [engineId=(local | engineId)]
    [authProtocol=(none | sha | sha256 | sha512)]
    authPassword="authPassword"
    [privProtocol=(none | aes128) privPassword="privPassword"]
```

## Parameters

Parameter	Description
userName	The name of the SNMP USM user that you want to create. Enclose the SNMP USM user name in double quotation marks (" ")
engineId	The identifier of the authoritative SNMP engine ID for the user. The value may be "local" to specify the local SNMP agent to be the authoritative agent or a hexadecimal digit string to specify a remote SNMP agent engine ID. The default value is "local".
authProtocol	The authentication protocol (HMAC) to be used for the user. The value may be one of the following: <ul style="list-style-type: none"><li>• none - No authentication of SNMP messages (default)</li><li>• sha - SHA-1 authentication</li><li>• sha256 - SHA-256 authentication</li><li>• sha512 - SHA-512 authentication</li></ul>
authPassword	The password to be used for authentication for the user. Must be specified if the authentication protocol is "sha", "sha256" or "sha512"
privProtocol	The privacy protocol (encryption) to be used for the user. The value may be one of the following: <ul style="list-style-type: none"><li>• none - No encryption of SNMP messages (default)</li><li>• aes128 - AES-128 encryption</li></ul>
privPassword	The password to be used for privacy/encryption for the user. Must be specified if the privacy protocol is "aes128".

## Minimum firmware level

8.72

## Create SSD cache

The `create ssdCache` command creates a read cache for a storage array using Solid State Disks (SSDs).

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, and E5700 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800 or E5700 storage array, you must have the Support Admin role.

## Context

Using high performance SSDs to cache read data improves the application I/O performance and response times, and delivers sustained performance improvement across different workloads, especially for high-IOP workloads. SSD cache maximizes the use of expensive fast SSDs. SSD cache works in addition to the primary cache in the controller DRAM. With controller cache, the data is stored in DRAM after a host read. With SSD cache, the data is copied from user-specified base volumes, and then cached on SSDs.

## Syntax

```
create ssdCache userLabel="ssdCacheName"  
drives=(trayID1,[drawerID1,]slotID1 ... trayIDn,[drawerIDn,]slotIDn)  
[updateExistingVolumes=(TRUE|FALSE)]  
[securityType=(none|capable|enabled)]
```

## Parameters

Parameter	Description
userLabel	The name that you want to name the new SSD cache. Enclose the SSD cache name in double quotation marks (" ").
drives	<p>The drives that you want to use to create the SSD cache. For high-capacity drive trays, specify the tray ID value, the drawer ID value, and the slot ID value for the drive. For low-capacity drive trays, specify the tray ID value and the slot ID value for the drive. Tray ID values are 0 to 99. Drawer ID values are 1 to 5.</p> <p>All slot ID maximums are 24. Slot ID values either begin at 0 or 1, depending on the tray model. Drive trays compatible with E2800 and E5700 controllers have slot ID numbers starting at 0. Drive trays compatible with E2700 and E5600 controllers have slot ID numbers starting at 1.</p> <p>Enclose the tray ID value, the drawer ID value, and the slot ID value in square brackets ([ ]).</p>

Parameter	Description
<code>updateExistingVolumes</code>	This optional parameter specifies whether the SSD cache should be enabled for all existing volumes in the storage array. To enable the SSD cache for all existing volumes, set this parameter to <code>TRUE</code> . If you want to enable the SSD cache for individual volumes later, set this parameter to <code>FALSE</code> . The default value is <code>TRUE</code> .
<code>securityType</code>	<p>This optional parameter specifies the security level when creating an SSD cache. These settings are valid:</p> <ul style="list-style-type: none"> <li>• <code>none</code> - The SSD cache is not secure.</li> <li>• <code>capable</code> - The SSD cache is capable of having security set, but security has not been enabled.</li> <li>• <code>enabled</code> - The SSD cache has security enabled.</li> </ul>

## Notes

You can use any combination of alphanumeric characters, underscore (`_`), hyphen (`-`), and pound (`#`) for the name. Names can have a maximum of 30 characters.

A storage array can have only one SSD cache.

Only volumes created using hard disk drives can use the SSD cache. You cannot enable SSD cache on snapshot images.

If all of the SSDs in the SSD cache are data assurance (DA)-capable and the DA feature is enabled, DA is automatically enabled for the SSD cache and cannot be disabled. In addition, you cannot add non-DA capable SSDs to a DA-enabled SSD cache.

## Minimum firmware level

7.84

8.20 \_M3 - FDE drives are now supported. Added the `securityType` parameter.

## Create storage array directory server

The `create storageArray directoryServer` command allows you to add a new directory server to be used for authenticating and authorizing users.

## Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

## Roles



To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Security Admin role.

## Syntax

```
create storageArray directoryServer
  [domainId="domainId"
  domainNames=("domainName1"... "domainNameN")
  serverUrl="serverUrl"
  [bindAccount="username" bindPassword="password"]
  searchBaseDN="distinguishedName"
  usernameAttribute="attributeName"
  groupAttributes=("attrName1"... "attrNameN")
  [skipConfigurationTest={true | false}]
```

## Parameters

Parameter	Description
domainId	Allows you to specify a unique ID for this domain. If not specified, a unique GUID will be generated.
domainNames	Allows you to specify one or more valid domain names for the directory server. If you enter more than one name, separate the values with a space.
serverUrl	Allows you to specify the URL to access the LDAP server in the form of ldap[s]://hostAddress:port. If the LDAPS protocol is used, ensure that the root/intermediate certificate(s) to validate the directory server's signed certificate is imported using the certificate commands.
bindAccount	Allows you to specify the username or bind ID to be used as the binding account.
bindPassword	Allows you to specify the password to be used as the binding password.
searchBaseDN	Allows you to specify the search base Distinguished Name to search for LDAP user objects for determining group membership.

Parameter	Description
usernameAttribute	Allows you to specify the attribute to be used to search for user objects for determining group membership. If specified, the string must contain the variable {uid} that will be replaced with the username used during login. Example: sAMAccountName={uid}
groupAttributes	<p>Allows you to set one or more group attributes to be used to look for group Distinguished Names. Distinguished names are used to determine group membership for role mapping.</p> <div>  If you enter more than one group, separate the values with a space. </div> <div>  Using this parameter will clear out existing groups. </div>
skipConfigurationTest	Allows you to skip the configuration test before the configuration is saved. The default is false.

## Examples

```
SMcli -n Array1 -c "create storageArray directoryServer
domainNames=("company.com") serverUrl="ldap://hqldap.company.com:389"
bindAccount="dummyBindDN" bindPassword="dummyPassword"
searchBaseDN="OU=_Users,DC=hq, DC=company,DC=com"
usernameAttributes="sAMAccountName={uid}" groupAttributes="memberOf";"

SMcli completed successfully.
```

## Create storage array security key

The `create storageArray securityKey` command creates or changes a new security key for a storage array that has full disk encryption (FDE) drives.

### Supported Arrays

If external key management is enabled, then this command applies only to the E2800, E5700, EF600, and EF300 arrays. If internal key management is enabled, then the command applies to any individual storage array, as long as all SMcli packages are installed.



## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Security Admin role.

## Context


For internal key management, this command enables the Internal Key Management feature and creates the security key. After creating the key, use the `set storageArray securityKey` command to put the key into use. This command can also be used to change the security key.



For external key management, this command creates a different key to replace the key initially created when you enabled the feature. Use the `enable storageArray externalKeyManagement` command to enable the External Key Management feature and create the initial security key. This command can also be used to change the security key.

## Syntax

```
create storageArray securityKey
[keyIdentifier="keyIdentifierString"]
passPhrase="passPhraseString"
file="fileName"
[commitSecurityKey=(TRUE | FALSE)]
```

## Parameters

Parameter	Description
<p><code>keyIdentifier</code> - only applicable for internal key management</p>	<p>A character string that you can read that is a wrapper around a security key. Enclose the key identifier in double quotation marks (" ").</p> <p>You can enter characters for the key identifier for internal security keys to help you identify the key later. These are the formatting rules:</p> <ul style="list-style-type: none"> <li>• You can enter up to 189 alphanumeric characters for a key identifier. The key identifier cannot have these characters: <ul style="list-style-type: none"> <li>◦ Spaces</li> <li>◦ Punctuation</li> <li>◦ Symbols</li> </ul> </li> <li>• If you do not enter the <code>keyIdentifier</code> parameter for internal keys, the controller automatically generates the <code>keyIdentifier</code> parameter.</li> </ul> <p>Additional characters are automatically generated and appended to the end of the string that you enter for the key identifier. If you do not enter any string for the <code>keyIdentifier</code> parameter, the key identifier consists of only the characters that are automatically generated.</p> <div data-bbox="850 1381 906 1440">  </div> <div data-bbox="964 1087 1455 1738"> <p>This parameter is ignored for external key management, because the key identifier is completely automatically generated. If the storage array has a user label, this automatically generated string is composed of the characters <code>sa.</code>, followed by the storage array user label, the storage array identifier, and a randomly generated string. Any characters in the user label that are not alpha-numeric are converted to an underscore (<code>_</code>) character. For example, a user label of <code>abc#8</code> will be converted to <code>sa.abc_8</code> before being prepended to the rest of the key identifier. For storage arrays without a user label, the key identifier is composed of the storage array identifier and a randomly generated string.</p> </div>

Parameter	Description
passPhrase	<p>A character string that encrypts the security key so that you can store the security key in an external file. Enclose the pass phrase in double quotation marks (" ").</p> <p>For information about the correct form for creating a valid pass phrase, refer to the Notes in this command description.</p> <p>Your pass phrase must meet these criteria:</p> <ul style="list-style-type: none"> <li>• Must be between eight and 32 characters long.</li> <li>• Must contain no whitespace.</li> <li>• Must contain at least one uppercase letter.</li> <li>• Must contain at least one lowercase letter.</li> <li>• Must contain at least one number.</li> <li>• Must contain at least one non-alphanumeric character, for example, &lt; &gt; @ +.</li> </ul> <div>  <p>If your pass phrase does not meet these criteria, you will receive an error message and will be asked to retry the command.</p> </div>
file	<p>The file path and the file name to which you want to save the security key. For example:</p> <div> <pre>file="C:\Program Files\CLI\sup\drivesecurity.slk"</pre> </div> <div>  <p>The file name must have an extension of .slk.</p> </div> <p>Enclose the file path and name in double quotation marks (" ").</p>

Parameter	Description
<code>commitSecurityKey</code> - only applicable for internal key management	<p>This parameter commits the security key to the storage array for all FDE drives as well as the controllers. After the security key is committed, a key is required to access data on Security Enabled drives in the storage array. The data can only be read or changed by using a key, and the drive can never be used in a non-secure mode without rendering the data useless or totally erasing the drive.</p> <p>The default value is FALSE. If this parameter is set to FALSE, send a separate <code>set storageArray securityKey</code> command to commit the security key to the storage array.</p>

## Minimum firmware level

7.40, introduced for internal key management

8.40, introduced for external key management

## Create storage array syslog configuration

The `create storageArray syslog` command allows you to archive audit logs onto an external syslog server. After a connection is established between the storage array and syslog server, audit logs are automatically saved to the syslog server.

## Supported Arrays

This command applies to an individual E2800, E5700, EF600 or EF300 storage array. It does not operate on E2700 or E5600 storage arrays.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Security Admin role.

## Syntax

```
create storageArray syslog serverAddress="<address>" port=<port>
protocol=("udp" | "tcp" | "tls") components=(componentName=("auditLog")
...)
```

## Parameters

Parameter	Description
serverAddress	Syslog receiver hostname or IP address.
port	Syslog receiver port number.
protocol	Syslog transmission protocol. Acceptable values include udp, tcp, or tls.
components	List of component entries that will be logged to the syslog server. Currently, only audit logs are supported.
componentName	Component name; currently only "auditLog" is supported.

### Example

```
SMcli -n Array1 -c "create storageArray syslog
serverAddress=\"192.168.2.1\" port=514 protocol=\"udp\"
components=(componentName=\"auditLog\");"
ID: 331998fe-3154-4489-b773-b0bb60c6b48e
Server Address: 192.168.2.1.com
Port: 514
Protocol: udp
Components
1. Component Name: auditLog
SMcli completed successfully.
```

### Minimum firmware level

8.42

## Create synchronous mirroring

The `create syncMirror` command creates both the primary volume and the secondary volume for a synchronous remote mirrored pair. This command also sets the write mode (synchronous write mode or asynchronous write mode) and the synchronization priority.

### Supported Arrays

This command applies to any individual storage array, with some restrictions. If you are running the command on the E2700 or E5600 array, there are no restrictions.



If you are running the command on the E2800 or E5700 array, the client type must be set to `symbol`. This command will not execute if they client type is set to `https`.

## Roles

To execute this command on an E2800 or E5700storage array, you must have the Storage Admin role.

## Context



In previous versions of this command the feature identifier was `remoteMirror`. This feature identifier is no longer valid and is replaced by `syncMirror`.

## Syntax

```
create syncMirror primary="primaryVolumeName"
secondary="secondaryVolumeName"
(remoteStorageArrayName="storageArrayName" |
remoteStorageArrayWwn="wwID")
[remotePassword="password"]
[syncPriority=(highest | high | medium | low | lowest)]
[autoResync=(enabled | disabled)]
[writeOrder=(preserved | notPreserved)]
[writeMode=(synchronous | asynchronous)]
[role=(primary | secondary)]
[force=(TRUE | FALSE)]
```

## Parameters

Parameter	Description
primary	The name of an existing volume on the local storage array that you want to use for the primary volume. Enclose the primary volume name in double quotation marks (" ").
secondary	The name of an existing volume on the remote storage array that you want to use for the secondary volume. Enclose the secondary volume name in double quotation marks (" ").
remoteStorageArrayName	The name of the remote storage array. Enclose the remote storage array name in double quotation marks (" ").

Parameter	Description
<code>remoteStorageArrayWwn</code>	The World Wide Identifier (WWID) of the remote storage array. Enclose the WWID in double quotation marks (" ").
<code>remotePassword</code>	The password for the remote storage array. Use this parameter when the remote storage array is password protected. Enclose the password in double quotation marks (" ").
<code>syncPriority</code>	The priority that full synchronization has relative to host I/O activity. Valid values are <code>highest</code> , <code>high</code> , <code>medium</code> , <code>low</code> , or <code>lowest</code> .
<code>autoResync</code>	<p>The settings for automatic resynchronization between the primary volumes and the secondary volumes of a remote-mirror pair. This parameter has these values:</p> <ul style="list-style-type: none"> <li>• <code>enabled</code> — Automatic resynchronization is turned on. You do not need to do anything further to resynchronize the primary volume and the secondary volume.</li> <li>• <code>disabled</code> — Automatic resynchronization is turned off. To resynchronize the primary volume and the secondary volume, you must run the <code>resume syncMirror</code> command.</li> </ul>
<code>writeOrder</code>	The write order for data transmission between the primary volume and the secondary volume. Valid values are <code>preserved</code> or <code>notPreserved</code> .
<code>writeMode</code>	How the primary volume writes to the secondary volume. Valid values are <code>synchronous</code> or <code>asynchronous</code> .
<code>role</code>	Use this parameter to promote the asynchronous mirror group to a primary role or demote the asynchronous mirror group to a secondary role. To define the asynchronous mirror group as the primary role, set this parameter to <code>primary</code> . To define the asynchronous mirror group as the secondary role, set this parameter to <code>secondary</code> .

Parameter	Description
<code>force</code>	The role reversal is forced if the communications link between the storage arrays is down and promotion or demotion on the local side results in a dual-primary condition or a dual-secondary condition. To force a role reversal, set this parameter to <code>TRUE</code> . The default value is <code>FALSE</code> .

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

When you choose the primary volume and the secondary volume, the secondary volume must be of equal or greater size than the primary volume. The RAID level of the secondary volume does not have to be the same as the primary volume.

Passwords are stored on each storage array in a management domain. If a password was not previously set, you do not need a password. The password can be any combination of alphanumeric characters with a maximum of 30 characters. (You can define a storage array password by using the `set storageArray` command.)

Synchronization priority defines the amount of system resources that are used to synchronize the data between the primary volume and the secondary volume of a mirror relationship. If you select the highest priority level, the data synchronization uses the most system resources to perform the full synchronization, which decreases performance for host data transfers.

The `writeOrder` parameter applies only to asynchronous write modes and makes the mirrored pair part of a consistency group. Setting the `writeOrder` parameter to `preserved` causes the remote mirrored pair to transmit data from the primary volume to the secondary volume in the same order as the host writes to the primary volume. In the event of a transmission link failure, the data is buffered until a full synchronization can occur. This action can require additional system overhead to maintain the buffered data, which slows operations. Setting the `writeOrder` parameter to `notPreserved` frees the system from having to maintain data in a buffer, but it requires forcing a full synchronization to make sure that the secondary volume has the same data as the primary volume.

## Minimum firmware level

6.10

## Create volume in disk pool

The `create volume diskPool` command creates a new standard RAID volume or a thin volume in an existing disk pool.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.



## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context



Some parameters for creating a standard RAID volume in a volume group are not compatible for creating volumes of any type in a disk pool. When using older scripts to create volumes in disk pools, make sure that all of the parameters are valid for disk pools. Invalid parameters prevent the scripts from running correctly and cause an error to be posted.

## Syntax for Creating a Standard Volume

```
create volume diskPool="diskPoolName"
userLabel="volumeName"
capacity=volumeCapacity
[thinProvisioned=(TRUE | FALSE)]
[owner=(a|b)]
[mapping=(none|default)]
[dataAssurance=(none|enabled)]
[cacheReadPrefetch=(TRUE | FALSE)]
[raidLevel=(1 | 6)]
[blockSize=requestedBlockSizeValue]
```

## Syntax for Creating a Thin Provisioned Volume


```
create volume diskPool="diskPoolName"
userLabel="volumeName"
capacity=volumeCapacity
[thinProvisioned=(TRUE | FALSE)]
[owner=(a|b)]
[mapping=(none|default)]
[dataAssurance=(none|enabled)]
[(existingRepositoryLabel=existingRepositoryName |
newRepositoryCapacity=newRepositoryCapacityValue (KB | MB | GB | TB |
Bytes))]
[repositoryMaxCapacity=repositoryMaxCapacityValue (KB|MB|GB|TB|Bytes)]
[warningThresholdPercent=warningThresholdPercentValue]
[repositoryExpansionPolicy=(automatic|manual)]
[cacheReadPrefetch=(TRUE | FALSE)]
```

```

create volume diskPool="diskPoolName"
userLabel="volumeName"
capacity=volumeCapacity
[thinProvisioned=(TRUE | FALSE)]
[owner=(a|b)]
[mapping=(none|default)]
[(existingRepositoryLabel=existingRepositoryName |
newRepositoryCapacity=newRepositoryCapacityValue (KB | MB | GB | TB |
Bytes)]
[repositoryMaxCapacity=repositoryMaxCapacityValue (KB|MB|GB|TB|Bytes)]
[warningThresholdPercent=warningThresholdPercentValue]
[repositoryExpansionPolicy=(automatic|manual)]
[cacheReadPrefetch=(TRUE | FALSE)]

```

## Parameters

Parameter	Description
diskPool	The name of the disk pool in which to create the new volume. Enclose the disk pool name in double quotation marks (" ").
userLabel	The name that you want to give the new volume. Enclose the volume name in double quotation marks (" ").
capacity	<p>The size of the volume that you are creating.</p> <p>For a standard RAID volume, the capacity that will be allocated for the volume.</p> <p>For a thin volume, the virtual capacity value that will be exposed by the thin volume.</p> <p>Size is defined in units of <code>bytes</code>, KB, MB, GB, or TB. The following are examples of the syntax:</p> <ul style="list-style-type: none"> <li>• <code>capacity=500MB</code></li> <li>• <code>capacity=2GB</code></li> </ul>
thinProvisioned	<p>This parameter enables thin provisioning for the new volume. To use thin provisioning, set this parameter to <code>TRUE</code>. If you do not want thin provisioning, set this parameter to <code>FALSE</code>.</p> <div>  <p>Thin provisioning is not available for RAID1 level volumes.</p> </div>

Parameter	Description
owner	The controller that owns the volume. Valid controller identifiers are a or b, where a is the controller in slot A, and b is the controller in slot B. If you do not specify an owner, the controller firmware determines the owner.
mapping	<p>This parameter enables you to map the volume to a host. If you want to map later, set this parameter to <code>none</code>. If you want to map now, set this parameter to <code>default</code>. The volume is mapped to all hosts that have access to the storage pool.</p> <p>The default value is <code>none</code>.</p>
existingRepositoryLabel	This parameter identifies an existing repository for a thin volume. A repository volume has the physical capacity for a thin volume. This parameter applies only for thin provisioning. If you use the <code>existingRepositoryLabel</code> parameter, you must not use the <code>newRepositoryCapacity</code> parameter.
newRepositoryCapacity	<p>This parameter creates a new repository for a thin volume. A repository volume has the physical capacity for a thin volume. Use this parameter only if you set the value of the <code>thinProvisioned</code> parameter to <code>TRUE</code>.</p> <p>Size is defined in units of MB, GB, or TB. The following are examples of the syntax:</p> <ul style="list-style-type: none"> <li>• <code>capacity=500MB</code></li> <li>• <code>capacity=2GB</code></li> </ul> <p>The default value is 50 percent of the virtual capacity.</p>
repositoryMaxCapacity	<p>This parameter defines the maximum capacity for a repository for a thin volume. Use this parameter only if you set the value of the <code>thinProvisioned</code> parameter to <code>TRUE</code>.</p> <p>Size is defined in units of MB, GB, or TB. The following are examples of the syntax:</p> <ul style="list-style-type: none"> <li>• <code>capacity=500MB</code></li> <li>• <code>capacity=2GB</code></li> </ul>

Parameter	Description
<code>warningThresholdPercent</code>	<p>The percentage of thin volume capacity at which you receive a warning alert that the thin volume is nearing full. Use integer values. For example, a value of 70 means 70 percent.</p> <p>Valid values are from 1 to 100.</p> <p>Setting this parameter to 100 disables warning alerts.</p>
<code>repositoryExpansionPolicy</code>	<p>This parameter sets the expansion policy to <code>automatic</code> or <code>manual</code>. When you change the policy from <code>automatic</code> to <code>manual</code>, the maximum capacity value (quota) changes to the physical capacity of the repository volume.</p>
<code>cacheReadPrefetch</code>	<p>The setting to turn on or turn off cache read prefetch. To turn off cache read prefetch, set this parameter to <code>FALSE</code>. To turn on cache read prefetch, set this parameter to <code>TRUE</code>.</p>
<code>raidLevel</code>	<p>Sets the raid level for the volume being created in the disk pool. To specify RAID1, set to 1. To specify RAID6, set to 6. If the raid level is not set, RAID6 is used for the disk pool by default.</p>
<code>blockSize</code>	<p>This parameter sets the block size of the volume being created. A value of 0 or the parameter not set uses the default block size.</p>

## Notes

Each volume name must be unique. You can use any combination of alphanumeric characters, underscore (\_), hyphen (-), and pound (#) for the user label. User labels can have a maximum of 30 characters.

For thin volumes, the `capacity` parameter specifies the virtual capacity of the volume, and the `repositoryCapacity` parameter specifies the capacity of the volume created as the repository volume. Use the `existingRepositoryLabel` parameter to specify an existing unused repository volume instead of creating a new volume.

For best results when creating a thin volume, the repository volume must already exist or must be created in an already existing disk pool. If you do not specify some of the optional parameters when creating thin volumes the storage management software will attempt to create the repository volume. The most desirable candidate volume is a repository volume that already exists and that is within the size requirements. The next most desirable candidate volume is a new repository volume that is created in the disk pool free extent.

Repository volumes for thin volumes cannot be created in volume groups.

## Data assurance management

The Data Assurance (DA) feature increases data integrity across the entire storage system. DA enables the storage array to check for errors that might occur when data is moved between the hosts and the drives. When this feature is enabled, the storage array appends error-checking codes (also known as cyclic redundancy checks or CRCs) to each block of data in the volume. After a data block is moved, the storage array uses these CRC codes to determine if any errors occurred during transmission. Potentially corrupted data is neither written to disk nor returned to the host.

If you want to use the DA feature, start with a pool or volume group that includes only drives that support DA. Then, create DA-capable volumes. Finally, map these DA-capable volumes to the host using an I/O interface that is capable of DA. I/O interfaces that are capable of DA include Fibre Channel, SAS, and iSER over InfiniBand (iSCSI Extensions for RDMA/IB). DA is not supported by iSCSI over Ethernet, or by the SRP over InfiniBand.



When all drives are DA-capable, you can set the `dataAssurance` parameter to `enabled` and then use DA with certain operations. For example, you can create a volume group that includes DA-capable drives, and then create a volume within that volume group that is DA-enabled. Other operations that use a DA-enabled volume have options to support the DA feature.

If `dataAssurance` parameter is set to `enabled`, only data assurance capable drives will be considered for volume candidates, otherwise both data assurance capable and non-data assurance capable drives will be considered. If only data assurance drives are available, the new volume will be created using the enabled data assurance drives.

## Minimum firmware level

7.83

8.70 adds the `raidLevel` and `_blockSize` parameters.

## Create volume copy

The `create volumeCopy` command creates a volume copy and starts the volume copy operation. This command is valid for snapshot image volume copy pairs.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Context



Starting a volume copy operation overwrites all existing data on the target volume, makes the target volume read-only to hosts, and fails all snapshot image volumes associated with the target volume, if any exist. If you have used the target volume as a copy before, be sure you no longer need the data or have it backed up.

This command creates volume copies in two ways:

- Volume copy without snapshot image, also called *offline* volume copy
- Volume copy with snapshot image, also called *online* volume copy

If you use volume copy without snapshot image, you cannot write to the source volume until the copy operation is complete. If you want to be able to write to the source volume before the copy operation is complete, use volume copy with snapshot image. You can select volume copy with snapshot image through the optional parameters in the command syntax.

After completion of the volume copy with snapshot image operation, the snapshot image is deleted and the snapshot volume is disabled.



You can have a maximum of eight volume copies in progress at one time. If you try to create more than eight volume copies at one time, the controllers return a status of Pending until one of the volume copies that is in progress finishes and returns a status of Complete.

## Syntax

```
create volumeCopy source="sourceName"
target="targetName"
[copyPriority=(highest | high | medium | low | lowest)]
[targetReadOnlyEnabled=(TRUE | FALSE)]
[copyType=(offline | online)]
[repositoryPercentOfBase=(20 | 40 | 60 | 120 | default)]
[repositoryGroupPreference=(sameAsSource | otherThanSource | default)]
```

## Parameters

Parameter	Description
source	The name of an existing volume that you want to use as the source volume. Enclose the source volume name in double quotation marks (" ").
target	The name of an existing volume that you want to use as the target volume. Enclose the target volume name in double quotation marks (" ").
copyPriority	The priority that volume copy has relative to host I/O activity. Valid values are highest, high, medium, low, or lowest.

Parameter	Description
targetReadOnlyEnabled	The setting so that you can write to the target volume or only read from the target volume. To write to the target volume, set this parameter to <code>FALSE</code> . To prevent writing to the target volume, set this parameter to <code>TRUE</code> .
copyType	<p>Use this parameter to create a volume copy with a snapshot image. Creating a volume copy with a snapshot image enables you to continue to write to the source volume while creating the volume copy. To create a volume copy with a snapshot image, set this parameter to <code>online</code>. To create a volume copy without a snapshot image, set this parameter to <code>offline</code>.</p> <p>If you do not use this parameter, the volume copy is created without a snapshot image.</p>
repositoryPercentOfBase	<p>This parameter determines the size of the repository volume for the snapshot image when you are creating a volume copy with a snapshot image. The size of the repository volume is expressed as a percentage of the source volume, which is also called the base volume. Valid values for this parameter are 20, 40, 60, 120, and <code>default</code>. The default value is 20. If you do not use this parameter, the firmware uses a value of 20 percent.</p> <p>You must use the <code>copyType</code> parameter with the <code>repositoryPercentOfBase</code> parameter.</p>

Parameter	Description
<code>repositoryGroupPreference</code>	<p>This parameter determines to which volume group the snapshot image repository volume is written. You have these choices:</p> <ul style="list-style-type: none"> <li>• <code>sameAsSource</code> — The snapshot image volume is written to the same volume group as the source volume if space is available.</li> <li>• <code>otherThanSource</code> — Deprecated parameter. Do not use</li> <li>• <code>default</code> — The snapshot image repository volume is written to any volume group that has space.</li> </ul> <p>For best performance, use the <code>sameAsSource</code> option.</p> <p>You must use the <code>copyType</code> parameter with the <code>repositoryGroupPreference</code> parameter.</p>

## Notes

You can use any combination of alphanumeric characters, hyphens, and underscores for the names. Names can have a maximum of 30 characters.

Copy priority defines the amount of system resources that are used to copy the data between the source volume and the target volume of a volume copy pair. If you select the highest priority level, the volume copy uses the most system resources to perform volume copy, which decreases performance for host data transfers.

## Create volume group

The `create volumeGroup` command creates either a free-capacity volume group or a volume group with one volume when you enter a set of unassigned drives.

## Supported Arrays

This command applies to any individual storage array, including the E2700, E5600, E2800, E5700, EF600 and EF300 arrays, as long as all SMcli packages are installed.

## Roles

To execute this command on an E2800, E5700, EF600, or EF300 storage array, you must have the Storage Admin role.

## Syntax



```

create volumeGroup
drives=(trayID1,[drawerID1,]slotID1 ... trayIDn,[drawerIDn,slotIDn)
raidLevel=(0 | 1 | 3 | 5 | 6)
userLabel="volumeGroupName"
[driveMediaType=(HDD | SSD | unknown | allMedia)]
[driveType=(SAS | NVMe4K)]
[trayLossProtect=(TRUE | FALSE)]
[drawerLossProtect=(TRUE | FALSE)]
[securityType=(none | capable | enabled )]
[dataAssurance=(none | enabled)]
[resourceProvisioningCapable=(TRUE | FALSE)]

```

## Parameters

Parameter	Description
drives	<p>The drives that you want to assign to the volume group that you want to create. For high-capacity drive trays, specify the tray ID value, the drawer ID value, and the slot ID value for the drive. For low-capacity drive trays, specify the tray ID value and the slot ID value for the drive. Tray ID values are 0 to 99. Drawer ID values are 1 to 5.</p> <p>All slot ID maximums are 24. Slot ID values either begin at 0 or 1, depending on the tray model. Drive trays compatible with E2800 and E5700 controllers have slot ID numbers starting at 0. Drive trays compatible with E2700 and E5600 controllers have slot ID numbers starting at 1.</p> <p>Enclose the tray ID value, the drawer ID value, and the slot ID value in square brackets ([ ]).</p>
raidLevel	The RAID level of the volume group that contains the volume. Valid values are 0, 1, 3, 5, or 6.
userLabel	The name that you want to give the new volume group. Enclose the volume group name in double quotation marks (" ").

Parameter	Description
<code>driveMediaType</code>	<p>The type of drive media that you want to use for the volume group</p> <p>You must use this parameter when you have more than one type of drive media in your storage array.</p> <p>These drive media are valid:</p> <ul style="list-style-type: none"> <li>• <code>HDD</code> — Use this option when you have hard drives in the drive tray.</li> <li>• <code>SSD</code> — Use this option when you have solid state drives in the drive tray.</li> <li>• <code>unknown</code> — Use this option if you are not sure what types of drive media are in the drive tray.</li> <li>• <code>allMedia</code> — Use this option when you want to use all types of drive media that are in the drive tray.</li> </ul>
<code>driveType</code>	<p>The type of drive that you want to use in the volume group. You cannot mix drive types.</p> <p>You must use this parameter when you have more than one type of drive in your storage array.</p> <p>These drive types are valid:</p> <ul style="list-style-type: none"> <li>• <code>SAS</code></li> <li>• <code>NVMe4K</code></li> </ul> <p>If you do not specify a drive type, the code does not verify that the specified drives are of this drive type.</p>
<code>trayLossProtect</code>	<p>The setting to enforce Tray Loss Protection when you create the volume group. To enforce Tray Loss Protection, set this parameter to <code>TRUE</code>. The default value is <code>FALSE</code>.</p>
<code>drawerLossProtect</code>	<p>The setting to enforce Drawer Loss Protection when you create the volume group. To enforce Drawer Loss Protection, set this parameter to <code>TRUE</code>. The default value is <code>FALSE</code>.</p>

Parameter	Description
<code>securityType</code>	<p>The setting to specify the security level when creating the volume groups and all associated volumes. These settings are valid:</p> <ul style="list-style-type: none"> <li>• <code>none</code> — The volume group and volumes are not secure.</li> <li>• <code>capable</code> — The volume group and volumes are capable of having security set, but security has not been enabled.</li> <li>• <code>enabled</code> — The volume group and volumes have security enabled.</li> </ul>
<code>resourceProvisioningCapable</code>	<p>The setting to specify if resource provisioning capabilities are enabled. To disable resource provisioning, set this parameter to <code>FALSE</code>. The default value is <code>TRUE</code>.</p>

## Drives and volume groups

A volume group is a set of drives that are logically grouped together by the controllers in the storage array. The number of drives in a volume group is a limitation of the RAID level and the controller firmware. When you create a volume group, follow these guidelines:

- Beginning with firmware version 7.10, you can create an empty volume group so that you can reserve the capacity for later use.
- You cannot mix drive types within a single volume group.
- You cannot mix HDD and SSD drives within a single volume group.
- The maximum number of drives in a volume group depends on these conditions:
  - The type of controller
  - The RAID level
- RAID levels include: 0, 1, 3, 5, and 6 .
  - A volume group with RAID level 3, RAID level 5, or RAID level 6 cannot have more than 30 drives.
  - A volume group with RAID level 6 must have a minimum of five drives.
  - If a volume group with RAID level 1 has four or more drives, the storage management software automatically converts the volume group to a RAID level 10, which is RAID level 1 + RAID level 0.
- To enable tray/drawer loss protection, refer to the following tables for additional criteria:

Level	Criteria for Tray Loss Protection	Minimum number of trays required
Disk Pool	The disk pool contains no more than two drives in a single tray.	6

<b>Level</b>	<b>Criteria for Tray Loss Protection</b>	<b>Minimum number of trays required</b>
RAID 6	The volume group contains no more than two drives in a single tray.	3
RAID 3 or RAID 5	Each drive in the volume group is located in a separate tray.	3
RAID 1	Each drive in a RAID 1 pair must be located in a separate tray.	2
RAID 0	Cannot achieve Tray Loss Protection.	Not applicable

<b>Level</b>	<b>Criteria for drawer loss protection</b>	<b>Minimum number of drawers required</b>
Disk Pool	The pool includes drives from all five drawers and there are an equal number of drives in each drawer. A 60-drive tray can achieve Drawer Loss Protection when the disk pool contains 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 drives.	5
RAID 6	The volume group contains no more than two drives in a single drawer.	3
RAID 3 or RAID 5	Each drive in the volume group is located in a separate drawer.	3
RAID 1	Each drive in a mirrored pair must be located in a separate drawer.	2
RAID 0	Cannot achieve Drawer Loss Protection.	Not applicable

## Hot spares

With volume groups, a valuable strategy to protect data is to assign available drives in the storage array as hot spare drives. A hot spare is a drive, containing no data, that acts as a standby in the storage array in case a drive fails in a RAID 1, RAID 3, RAID 5, or RAID 6 volume group. The hot spare adds another level of redundancy to the storage array.

Generally, hot spare drives must have capacities that are equal to or greater than the used capacity on the drives that they are protecting. Hot spare drives must be of the same media type, the same interface type, and the same capacity as the drives that they are protecting.

If a drive fails in the storage array, the hot spare is normally substituted automatically for the failed drive without requiring your intervention. If a hot spare is available when a drive fails, the controller uses redundancy data parity to reconstruct the data onto the hot spare. Data evacuation support also allows data to be copied to a hot spare before the software marks the drive "failed."

After the failed drive is physically replaced, you can use either of the following options to restore the data:

When you have replaced the failed drive, the data from the hot spare is copied back to the replacement drive. This action is called copyback.

If you designate the hot spare drive as a permanent member of a volume group, the copyback operation is not needed.

The availability of tray loss protection and drawer loss protection for a volume group depends on the location of the drives that comprise the volume group. Tray loss protection and drawer loss protection might be lost because of a failed drive and the location of the hot spare drive. To make sure that tray loss protection and drawer loss protection are not affected, you must replace a failed drive to initiate the copyback process.

The storage array automatically selects Data Assurance (DA)-capable drives for hot spare coverage of DA-enabled volumes.

Make sure you have DA-capable drives in the storage array for hot spare coverage of DA-enabled volumes. For more information about DA-capable drives, refer to Data Assurance feature.

Secure-capable (FIPS and FDE) drives can be used as a hot spare for both secure-capable and non-secure-capable drives. Non-secure-capable drives can provide coverage for other non-secure-capable drives, and for secure-capable drives if the volume group does not have the security enabled. A FIPS volume group can only use a FIPS drive as a hot spare; however, you can use a FIPS hot spare for non-secure-capable, secure-capable, and secure-enabled volume groups.

If you do not have a hot spare, you can still replace a failed drive while the storage array is operating. If the drive is part of a RAID 1, RAID 3, RAID 5, or RAID 6 volume group, the controller uses redundancy data parity to automatically reconstruct the data onto the replacement drive. This action is called reconstruction.

## Segment size

The size of a segment determines how many data blocks that the controller writes on a single drive in a volume before writing data on the next drive. Each data block stores 512 bytes of data. A data block is the smallest unit of storage. The size of a segment determines how many data blocks that it contains. For example, an 8-KB segment holds 16 data blocks. A 64-KB segment holds 128 data blocks.

When you enter a value for the segment size, the value is checked against the supported values that are provided by the controller at run time. If the value that you entered is not valid, the controller returns a list of valid values. Using a single drive for a single request leaves other drives available to simultaneously service other requests. If the volume is in an environment where a single user is transferring large units of data (such as multimedia), performance is maximized when a single data transfer request is serviced with a single data stripe. (A data stripe is the segment size that is multiplied by the number of drives in the volume group that are used for data transfers.) In this case, multiple drives are used for the same request, but each drive is accessed only once.

For optimal performance in a multiuser database or file system storage environment, set your segment size to minimize the number of drives that are required to satisfy a data transfer request.

## Usage Hint



You do not need to enter a value for the `cacheReadPrefetch` parameter or the `segmentSize` parameter. If you do not enter a value, the controller firmware uses the `usageHint` parameter with `fileSystem` as the default value. Entering a value for the `usageHint` parameter and a value for the `cacheReadPrefetch` parameter or a value for the `segmentSize` parameter does not cause an error. The value that you enter for the `cacheReadPrefetch` parameter or the `segmentSize` parameter takes priority over the value for the `usageHint` parameter. The segment size and cache read prefetch settings for various usage hints are shown in the following table:

Usage hint	Segment size setting	Dynamic cache read prefetch setting
File system	128 KB	Enabled
Database	128 KB	Enabled
Multimedia	256 KB	Enabled

## Cache read prefetch

Cache read prefetch lets the controller copy additional data blocks into cache while the controller reads and copies data blocks that are requested by the host from the drive into cache. This action increases the chance that a future request for data can be fulfilled from cache. Cache read prefetch is important for multimedia applications that use sequential data transfers. Valid values for the `cacheReadPrefetch` parameter are `TRUE` or `FALSE`. The default is `TRUE`.

## Security type

Use the `securityType` parameter to specify the security settings for the storage array.

Before you can set the `securityType` parameter to `enabled`, you must create a storage array security key. Use the `create storageArray securityKey` command to create a storage array security key. These commands are related to the security key:

- `create storageArray securityKey`
- `export storageArray securityKey`
- `import storageArray securityKey`
- `set storageArray securityKey`
- `enable volumeGroup [volumeGroupName] security`
- `enable diskPool [diskPoolName] security`

## Secure drives

Secure-capable drives can be either Full Disk Encryption (FDE) drives or Federal Information Processing Standard (FIPS) drives. Use the `secureDrives` parameter to specify the type of secure drives to use. The

values you can use are `fips` and `fde`.

## Data assurance management

The Data Assurance (DA) feature increases data integrity across the entire storage system. DA enables the storage array to check for errors that might occur when data is moved between the hosts and the drives. When this feature is enabled, the storage array appends error-checking codes (also known as cyclic redundancy checks or CRCs) to each block of data in the volume. After a data block is moved, the storage array uses these CRC codes to determine if any errors occurred during transmission. Potentially corrupted data is neither written to disk nor returned to the host.

If you want to use the DA feature, start with a pool or volume group that includes only drives that support DA. Then, create DA-capable volumes. Finally, map these DA-capable volumes to the host using an I/O interface that is capable of DA. I/O interfaces that are capable of DA include Fibre Channel, SAS, and iSER over InfiniBand (iSCSI Extensions for RDMA/IB). DA is not supported by iSCSI over Ethernet, or by the SRP over InfiniBand.



When all the drives are DA-capable, you can set the `dataAssurance` parameter to `enabled` and then use DA with certain operations. For example, you can create a volume group that includes DA-capable drives, and then create a volume within that volume group that is DA-enabled. Other operations that use a DA-enabled volume have options to support the DA feature.

If the `dataAssurance` parameter is set to `enabled`, only data assurance capable drives will be considered for volume candidates; otherwise, both data assurance capable and non-data assurance capable drives will be considered. If only data assurance drives are available the new volume group will be created using the enabled data assurance drives.

## Minimum firmware level

7.10

7.50 adds the `securityType` parameter.

7.60 adds the `drawerID` user input, the `driveMediaType` parameter, and the `drawerLossProtect` parameter.

7.75 adds the `dataAssurance` parameter.

8.63 adds the `resourceProvisioningCapable` parameter.

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