



Hewlett Packard
Enterprise

HPE Smart Storage Administrator

Scripting

Cookbook

Abstract

This document provides basic and advanced scripting terminology and scenarios for HPE Smart Storage Administrator users. The primary audience is the system administrator with a good working knowledge of storage hardware and the configuration of logical drives and arrays.

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Overview

About HPE SSA

HPE SSA is the main tool for configuring arrays on Smart Array controllers. It exists in three interface formats: the HPE SSA GUI, the HPE SSA CLI, and HPE SSA Scripting. All formats provide support for configuration tasks. Some of the advanced tasks are available in only one format.

The diagnostic features in HPE SSA are also available in the standalone software HPE Smart Storage Administrator Diagnostics Utility CLI.

Starting with HPE SSA and ProLiant Gen8 servers and server blades, HPE SSA is accessible both offline and online:

- Accessing HPE SSA in the offline environment
Using one of multiple methods, you can run HPE SSA before launching the host operating system. In offline mode, users can configure or maintain detected and supported ProLiant devices, such as optional Smart Array controllers and integrated Smart Array controllers. Some HPE SSA features are only available in the offline environment, such as setting the boot controller and boot volume.
- Accessing HPE SSA in the online environment
This method requires an administrator to download the HPE SSA executables and install them. You can run HPE SSA online after launching the host operating system.

For more information, see the *HPE Smart Storage Administrator User Guide* on the Hewlett Packard Enterprise website (<http://www.hpe.com/info/smartstorage/docs>).

How to use this guide

This guide builds upon the instructions and explanation of the scripting functions for the HPE Array Configuration Utility. The scenarios provided here are scripting-based solutions to the most common array configuration needs. Each scenario outlines the task, the hardware configuration, the scripting solution, and a summary that explains the use of certain options and their values.

The guide covers basic scripting scenarios that use general commands familiar to ACU or HPE SSA users. For advanced users, the guide also contains advanced commands only available with the latest versions of HPE SSA. Advanced scripting scenarios show how to combine basic and advanced commands for users' configuration needs.

Before using these scenarios, become familiar with the HPE SSA scripting capabilities, specifically:

- Capturing a configuration
- Using an input script
- Creating HPE SSA script files
- Understanding script file options

For information about these capabilities, and general HPE SSA usage, see the *Configuring Arrays on HPE Smart Array Controllers Reference Guide* on the Documentation CD that ships with the controller or on the Hewlett Packard Enterprise website (<http://www.hpe.com/info/enterprise/docs>).

Changes to the Method mode Auto option

When creating a script, you must select options for the Action mode and the Method mode. In earlier versions of ACU Scripting, the `Auto` option was the default value for the Method mode. `Auto` is no longer the preferred option in HPE SSA, and the Method mode no longer has a default option.

Beginning with ACU v8.28.13, Hewlett Packard Enterprise changed the underlying library of rules that the software uses to optimize a configuration when employing the `Auto` option. The new library of rules is limited and is not backward compatible with existing configurations.

To provide greater flexibility and control during configuration, Hewlett Packard Enterprise developed the advanced scripting commands outlined in this guide. Hewlett Packard Enterprise recommends that users create a custom script with these commands to resolve the original configuration problems addressed by the `Auto` option.

Sample custom input script

The sample script in this section gives all possible values for each option.

- If an **option** is shown in bold type, you must enter a value for that option when writing your own script.
- Default options are not universal across controllers and firmware.

You can use this script as a template for your own script.

```
Action = Configure|Reconfigure
Method = Custom
Controller = All|Slot [N][:N] | WWN [N] | First | SerialNumber [N] | IOcabinet
[N],IOBay [N],IOChassis [N],Slot [N],Cabinet [N],Cell [N]
ClearConfigurationWithDataLoss = Yes|No|Forced
LicenseKey = XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
DeleteLicenseKey = XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
ReadCache = 0|10|20|25|30|40|50|60|70|75|80|90|100
WriteCache = 0|10|20|25|30|40|50|60|70|75|80|90|100
RapidParityInitialization = Enable|Disable
RebuildPriority = Low|Medium|Mediumhigh|High
ExpandPriority = Low|Medium|High
SurfaceScanDelay = N
SurfaceScanDelayExtended = N
SurfaceScanMode = Idle|High|Disabled
MNPDelay = 0..60
IRPEnable = Enable|Disable
DPOEnable = Enable|Disable
ElevatorSortEnable = Enable|Disable
QueueDepth = 2|4|8|16|32|Automatic
DriveWriteCache = Enable|Disable
NoBatteryWriteCache = Enable|Disable
PreferredPathMode = Auto|Manual
BootVolumePrimary = Logical Drive Number|None
BootVolumeSecondary = Logical Drive Number|None
HBAMode = Enable|Disable
PowerMode = MinPower|Balanced|MaxPerformance
```

```

Latency = Disable|Low|High

; Array Options
; There can be multiple array specifications in the file
Array = A|B|C|D|E|F|G|...Z|AA|AB|AC... | Next
Drive = Port:ID... | Box:Bay... | Port:Box:Bay,... | N | *
OnlineSpareMode = Dedicated | AutoReplace
OnlineSpare = Port:ID,... | Box:Bay,... | Port:Box:Bay | None | N
SplitMirror = SplitWithBackup|Rollback|Remirror|ActivateBackup

; Caching Array Options
; There can be only one Caching Array specification in the file
CachingArray = A|B|C|D|E|F|...Z|AA|AB|AC...
Drive = Port:ID,... | Box:Bay,... | Port:Box:Bay,...

; Logical Drive Options
; There can be multiple logical drive specifications in the file
; The maximum strip size depends on the number of drives in an array and the
size of the controller cache
LogicalDrive = 1|2|3... max Volumes | Next
Repeat = 0... max Volumes
RAID = 0|1|10|5|6|ADG|50|60
Size = N|Max|MAXMBR
SizeBocks = N
NumberOfParityGroups = N
Sectors = 32|63
StripSize = 8|16|32|64|128|256|512|1024
ArrayAccelerator = Enable|Disable
SSDOverProvisioningOptimization = Enable|Disable
OPTIONAL: Renumber = N
OPTIONAL: SetBootVolumePrimary = Enable
OPTIONAL: SetBootVolumeSecondary = Enable

; Caching Logical Drive Options
CachingLogicalDrive = 1|2|3... max Volumes/2
RAID = 0|1 ;FW and Controller dependent
Size = N
CachedLogicalDrive = Logical Drive Number

```

Sample custom capture script

Running HPE SSA Scripting in capture mode captures the configuration of all array controllers on the server in a capture file. The capture file can be used in input mode with minor edits to replicate the configuration to other array controllers.

Use of the "--internal" or "--external" command line switches effectively filters the controllers captured. For example, if the "--external" switch is used, then any controllers internal to the host computer are not captured in the output file.

Example:

```
; Date captured: Wed Jan 15 15:33:14 2014
; Version: 1:60:0:5

Action= Configure
Method= Custom

; Controller Specifications
; Controller HP Smart Array P800, Firmware Version 5.20
Controller= Slot 9
ReadCache= 25
WriteCache= 75
RebuildPriority= Medium
ExpandPriority= Medium
SurfaceScanDelay= 3
DriveWriteCache= Disabled
MNPDelay= 60
IRPEnable= Disabled
DPOEnable= Disabled
ElevatorSortEnable= Enabled
QueueDepth= Automatic
; Unassigned Drives
; 2E:2:1 (300 GB), 2E:2:8 (146 GB), 2E:2:9 (146 GB), 2E:2:10 (146 GB), 2E:2:11
(300 GB), 2E:2:12 (300 GB), 2E:2:13 (146 GB), 2E:2:14 (146 GB), 2E:2:15 (146 GB),
2E:2:16 (146 GB), 2E:2:17 (146 GB), 2E:2:18 (146 GB)

; Array Specifications
Array= A
; Array Drive Type is SAS
; 2E:1:1 (146 GB)
Drive= 2E:1:1
OnlineSpare= No

; Logical Drive Specifications
LogicalDrive= 1
RAID= 0
Size= 139979
Sectors= 32
StripeSize= 128
ArrayAccelerator= Enabled
```

Custom script file descriptions

Option	Value Description
Action	<p>Defines whether or not you are changing existing arrays and logical drives or adding new ones. This option is required.</p> <ul style="list-style-type: none"> Configure: HPE SSA Scripting runs in Configure mode which means that existing arrays and logical drives are not modified. Only new arrays and new logical drives can be created in this mode. Reconfigure: HPE SSA Scripting runs in Reconfigure mode, which means that existing arrays and logical drives may be modified in a non-data-destructive manner. In this mode, the user can create new arrays, expand existing arrays, create new logical drives, migrate existing logical drives, and extend existing logical drives. <p>If the "-reset" command line input switch is used, the existing controller configuration is cleared with data loss as the first step in the configuration process, regardless of the setting of the Action flag. This is true even if errors are later found in the configuration input script, which terminates the program before completion.</p>
Method	<p>Defines whether you are in Automatic or Custom mode</p> <ul style="list-style-type: none"> Custom: When creating a Custom configuration, you must specify Custom here. Auto: HPE SSA Scripting automatically creates a default configuration based on its internal rules and the connected controllers and disks. This setting is not recommended.
Controller commands	
Controller	<p>Identifies which controllers to configure. This option is required.</p> <ul style="list-style-type: none"> Slot N[:N]: The internal controller with slot number N is used. External controllers can be identified by appending the Port Number. For example, an MSA1500 connected to a SA6402 might be found at "Slot 4:2", where 4 is the internal Slot number for the SA6402 and 2 is the SCSI port. WWN N: The external controller with WWN N is used. SerialNumber N: The shared storage controller with serial number N is used. All: All detected internal and external controllers in the system are used. IOCabinet N, IOBay N, IOChassis N, Slot N, Cabinet N, Cell N: The controller identified by the IPF Slot path information is used.
ClearConfigurationWithDataLoss	<p>Specifies whether or not the configuration should be cleared. This option causes data loss since it deletes all arrays and logical drives on the controller. You can use other scripting commands to recreate a new configuration.</p> <ul style="list-style-type: none"> Yes: The configuration is cleared. All arrays and logical drives on the controller are deleted. This option fails if there are mounted logical volumes in the Operating System. Forced: The configuration is cleared. All arrays and logical drives on the controller are deleted. No: The configuration is not cleared. This is the default option if the command is not specified in the script file.
LicenseKey	<p>Specifies a license key to install a controller feature XXXXXX-XXXXXX-XXXXXX-XXXXXX-XXXXXX 25 character key separated by hyphens. The hyphens are optional. Multiple hyphens are allowed.</p>
DeleteLicenseKey	<p>Specifies a license key to uninstall XXXXXX-XXXXXX-XXXXXX-XXXXXX-XXXXXX * 25 character key separated by hyphens. The hyphens are optional. Multiple hyphens are allowed. Note: * is a wild card that enables you to delete all license keys on the specified controller.</p>

Option	Value Description
ReadCache	Specifies the Read Cache percentage. This option is not required. If this option is not specified, the Read/Write cache ratio remains unchanged. This value is a numeric value from 0 to 100. It must form a valid read/write cache ratio that is supported on the controller with the WriteCache option.
WriteCache	Specifies the Write Cache percentage. This option is not required. If this option is not specified, the Read/Write cache ratio remains unchanged. This value is a numeric value from 0 to 100. It must form a valid read/write cache ratio that is supported on the controller with the ReadCache option.
CacheState	Allows for flushing and optional disabling of the cache. Added so that Manufacturing can flush and shut off the controller cache before shipment to the customer to prevent stale cache issues. <ul style="list-style-type: none"> FlushEnable FlushDisable
RPI	Enables Rapid Parity Initialization <ul style="list-style-type: none"> Enable Disable This command is not supported by all controllers and is dependent on firmware and Hard Disk support.
RebuildPriority	Specifies the Rebuild Priority. This option is not required. If this option is not specified, the Rebuild Priority remains unchanged. <ul style="list-style-type: none"> Low Medium High MediumHigh MediumHigh is only valid if Rapid Parity Initialization is enabled.
ExpandPriority	Specifies the Expand Priority. This option is not required. If this option is not specified, the Expand Priority remains unchanged. <ul style="list-style-type: none"> Low Medium High
SurfaceScanDelay	Specifies the Surface Scan Delay in seconds. This option is not required. If this option is not specified, the Surface Scan Delay remains unchanged. If the value is set to 0, surface scan is disabled. <ul style="list-style-type: none"> N This value is a numeric value between 0 and 30 seconds.
SurfaceScanDelayExtended	Specifies the Surface Scan Delay in tenths of seconds. This option is not required. If this option is not specified, the Surface Scan Delay remains unchanged. If the value is set to 0, surface scan is disabled. If this parameter and SurfaceScanDelay are both seen in the input file, this parameter takes precedence. <ul style="list-style-type: none"> N This value is a numeric value between 0 and 300 seconds.
SurfaceScanMode	Specifies the Surface Scan Mode. If set to Idle, the normal SurfaceScanDelay[Extended] values are used to set the delay interval. If set to High, surface scan enters a mode where it is guaranteed to make progress despite the level of controller I/O. <ul style="list-style-type: none"> Idle High Disabled

Option	Value Description
DriveWriteCache	<p>Controls the settings of the write cache for all connected physical disks</p> <ul style="list-style-type: none"> • Enable • Disable <p>Not all physical disks or controllers support this option.</p>
NoBatteryWriteCache	<p>Allows the controller to enable write cache even if no battery is present, or the battery has failed. Not available on all controllers. The default is Disable.</p> <ul style="list-style-type: none"> • Enable • Disable <p>Not all controllers support this option.</p>
MNPDelay	<p>Controls the behavior of the controller Monitor and Performance Analysis Delay</p> <ul style="list-style-type: none"> • 0..60 <p>A value of 0 disables MNP. Requires the installation of a valid license key. This option is primarily used to tune controller performance for Video applications.</p>
IRPEnable	<p>Controls the behavior of the controller Inconsistency Repair Policy</p> <ul style="list-style-type: none"> • Enable • Disable <p>Requires the installation of a valid license key. This option is primarily used to tune controller performance for Video applications.</p>
DPOEnable	<p>Controls the behavior of the controller Degraded Mode Performance Optimization</p> <ul style="list-style-type: none"> • Enable • Disable <p>Requires the installation of a valid license key. This option is primarily used to tune controller performance for Video applications.</p>
ElevatorSortEnable	<p>Controls the behavior of the controller cache write Elevator sort algorithm</p> <ul style="list-style-type: none"> • Enable • Disable <p>Requires the installation of a valid license key. This option is primarily used to tune controller performance for Video applications.</p>
QueueDepth	<p>Controls the behavior of the cache write Queue</p> <ul style="list-style-type: none"> • 2 4 8 16 32 Automatic <p>Requires the installation of a valid license key. This option is primarily used to tune controller performance for Video applications.</p>
BootVolumePrimary	<p>Sets the specified logical volume to be the primary boot volume on the controller, or clears the primary boot volume</p> <ul style="list-style-type: none"> • Logical Volume Number • None <p>Not supported on all array controllers</p>
BootVolumeSecondary	<p>Sets the specified logical volume to be the secondary boot volume on the controller, or clears the secondary boot volume</p> <ul style="list-style-type: none"> • Logical Volume Number • None <p>Not supported on all array controllers</p>
HBAMode	<p>Enables or disables HBA mode on the controller</p> <ul style="list-style-type: none"> • Enable • Disable <p>Not supported on all array controllers</p>

Option	Value Description
PowerMode	<p>Modifies the power mode on the controller</p> <ul style="list-style-type: none"> • MinPower • Balanced • MaxPerformance <p>Not supported on all array controllers</p>
Latency	<p>Modifies the latency setting (Flexible Latency Scheduler feature) on the controller</p> <ul style="list-style-type: none"> • Disable • Low • High <p>Not supported on all array controllers</p>
PreferredPathMode	<p>Determines how I/O traffic to the logical drives is managed on controllers that are in an active/active configuration</p> <ul style="list-style-type: none"> • Auto • Manual
Array Commands	
ArrayR0	<p>Creates a single drive array with a RAID 0 volume for each argument, which can be an ID for a particular drive, a list of drives, or a number of drives</p> <ul style="list-style-type: none"> • X:Y, ...: Port:ID for controllers that use Port/ID drive numbering schemes, for example, Box:Bay for controllers that use Box/Bay numbering schemes • X:Y:Z, ...: Port:Box:Bay for SAS controllers • N: N number of drives are used. • *: Use all unconfigured drives. <p>Specifies the physical drives for the automatically configured RAID0 array/volume. When <code>ArrayR0</code> is specified, the only other valid command in the Array section is <code>DriveType</code>.</p>
Array	<p>Specifies the Array ID: A-Z AA-ZZ Next</p> <p>In <code>Configure Mode</code>, a new array is created. For the new array, use the next available array letter in the existing configuration, or use <code>Next</code> to have the utility select the next available value. In <code>Reconfigure Mode</code>, the array letter can identify an existing array, or it can identify the next available array letter in the existing configuration to create a new array.</p>
CachingArray	<p>Specifies the Caching Array ID: A-Z, AA-ZZ</p> <p>In <code>Configure Mode</code>, a new caching array is created. The array letter specified must be the next available array letter in the existing configuration. In <code>Reconfigure Mode</code>, the array letter can identify an existing array, or it can identify the next available array letter in the existing configuration to create a new array.</p> <p>Only one caching array is allowed per controller.</p>
DriveType	<p>Specifies the interface type of physical drives to be used for the array</p> <ul style="list-style-type: none"> • SAS • SATA • SATASSD • SASSSD <p>Normally used in conjunction with the Wildcard (*) or Number argument for <code>Drive</code></p>

Option	Value Description
Drive	<p>Specifies the physical drives for the array. A comma-separated list specifies the location of physical drives that are to be used in the array. In <code>Configure Mode</code>, the physical drives listed are used to create the new array. In <code>Reconfigure Mode</code>, all physical drives that are in the array must be listed here. Any additional physical drives that are listed are added for an array expansion.</p> <p>Drive interface type and Spare Drive interface type must match (for example, all SAS or all SATA).</p> <ul style="list-style-type: none"> • <code>Port:ID Box:Bay ...</code>: Port:ID for controllers that use Port/ID drive numbering schemes. It is Box:Bay for controllers that use Box/Bay numbering schemes. • <code>X:Y:Z...</code>: Port:Box:Bay for SAS controllers • <code>N</code>: N number of drives are used for the array. HPE SSA Scripting selects the best available unused physical drives unless <code>DriveType</code> is also specified. • <code>*</code>: All available physical drives are added to the array. Specifying this option consumes all drives and makes adding spare drives impossible. <p>Drives specified for Caching Arrays must be SSDs.</p>
OnlineSpareMode	<p>Specifies the behavior of spare drives when activated. For controllers that support Auto Replace spares (Roaming Spares), this value can be set to <code>AutoReplace</code> so that a spare, upon completion of a rebuild, becomes a data drive in the array, removing the need for a second array rebuild when the failed data drive is replaced. When the failed data drive is replaced it assumes the role of the former spare.</p> <ul style="list-style-type: none"> • <code>Dedicated</code>: This is the default behavior for spares. • <code>AutoReplace</code>: The spare becomes a data drive upon completion of the rebuild. <p>Only supported on selected HPE Smart Array controllers for ProLiant Gen8 servers.</p> <p>Autoreplace spares cannot be shared across arrays.</p>
OnlineSpare	<p>Specifies the spare drives for the array. A comma-separated list specifies the location of spare drives that are to be used in the array. Spare drive interface type and Drive interface type must match (for example, all SAS or all SATA).</p> <ul style="list-style-type: none"> • <code>Port:ID Box:Bay ...</code>: Port:ID for controllers that use Port/ID drive numbering schemes, Box:Bay for controllers that use Box/Bay numbering schemes • <code>X:Y:Z, ...</code>: Port:Box:Bay for SAS controllers • <code>None</code>: No spares are added to the array, and any existing spares on the array are removed from the array. In <code>Configure Mode</code>, if the <code>OnlineSpare</code> option is not specified, <code>None</code> is the default value. In <code>Reconfigure Mode</code>, if the <code>OnlineSpare</code> option is not specified, the spare state of the array remains unchanged. • <code>N</code>: N number of spares are added to the array. HPE SSA Scripting selects the best available unused physical drives for the spares.
SmartPath	<p>Enables the SmartPath feature, which improves access speed to the array.</p> <ul style="list-style-type: none"> • <code>Enable</code> • <code>Disable</code> <p>This command requires both support in the controller firmware and a compatible OS driver to be installed. Only valid with arrays created with SSD physical drives.</p>

Option	Value Description
SplitMirror	<p>Operates on RAID1, RAID10 or ADM volumes; splits the original mirrored volumes into individual RAID0 volumes (plus RAID1/10 volumes if ADM), optionally hiding the new volume from the Operating System. Also used to recombine the volumes.</p> <ul style="list-style-type: none"> • <code>SplitWithBackup</code>: The mirrored array is split into two new arrays and the newly created (Backup) array is hidden from the operating system. • <code>Rollback</code>: The two arrays are recombined using the backup array as source data. Any changes made to the online array are lost. • <code>Remirror</code>: The two arrays are recombined using the online array as source data. • <code>ActivateBackup</code>: The backup volume is made visible to the OS.
Logical Drive Commands	
LogicalDrive	<p>Specifies the Logical Drive ID. The maximum number of drives is controller dependent.</p> <p>1-N: In <code>Configure Mode</code>, a new logical drive is created. The logical drive number specified must be the next available logical drive number in the existing configuration. In <code>Reconfigure Mode</code>, the logical drive number may identify an existing logical drive, or it can identify the next available logical drive in the existing configuration to create a new logical drive. In most cases, logical drives must appear in the configuration file in increasing order.</p>
CachingLogicalDrive	<p>Specifies the Caching Logical Drive ID. The maximum number of drives is controller dependent.</p> <ul style="list-style-type: none"> • 1-N: In <code>Configure Mode</code>, a new logical drive is created. The logical drive number specified must be the next available logical drive number in the existing configuration. In <code>Reconfigure Mode</code>, the logical drive number may identify an existing logical drive, or it can identify the next available logical drive in the existing configuration to create a new logical drive. In most cases, logical drives must appear in the configuration file in increasing order. <p>Caching Logical Drives and Cached data drives must be on the same array controller.</p>
CachedLogicalDrive	<p>Specifies the Data logical drive ID to associate with the Caching Logical Drive.</p> <ul style="list-style-type: none"> • 1-N: In <code>Configure Mode</code>, the ID of an existing data logical drive <p>Caching Logical Drives and Cached data drives must be on the same Array Controller.</p>
Repeat	<p>Specifies the number of times HPE SSA Scripting is to repeat this logical drive configuration</p> <ul style="list-style-type: none"> • N: In <code>Configure Mode</code>, N new logical drives are created. • MAX: The maximum number of logical drives are created. The number of drives created depends on the number of existing drives and the maximum number of logical drives supported by the controller. <p>The logical drive ID specified must be <code>Next</code>. The <code>Size</code> option controls the size of each logical volume. If <code>Size</code> is set to <code>MAX</code>, then the size of the volumes is set to consume all available space on the array.</p>

Option	Value Description
RAID	<p>Specifies the RAID level for the current logical drive. In <i>Configure Mode</i>, the RAID is the RAID for the new logical drive. In <i>Reconfigure Mode</i>, if the logical drive already exists and the RAID is different than the existing RAID on the logical drive, then HPE SSA Scripting attempts to migrate the logical drive to the specified RAID.</p> <p>If the RAID is not specified for an existing logical drive in <i>Reconfigure Mode</i>, then the current RAID setting remains unchanged.</p> <ul style="list-style-type: none"> ● 60: RAID 60 ● 50: RAID 50 ● ADG: RAID ADG is equivalent to RAID 6 (deprecated) ● 6: RAID 6 ● 5: RAID 5 ● 10ADM: RAID 1 with 3 way mirroring ● 10: RAID 10 (mirroring with 2 disks) ● 1ADM: RAID 1 with 3 way mirroring ● 1: RAID 1 (mirroring with 2 disks) ● 0: RAID 0 <p>If RAID 50 or 60 are specified, the NPG value must also be provided. The RAID levels supported in a Caching Logical Volume are limited by the firmware.</p>
Size	<p>Specifies the size of the logical drive. If the logical drive is new, the size is for the new logical drive. In <i>Reconfigure Mode</i>, if the logical drive already exists and the size is different than the existing size of the logical drive, then HPE SSA Scripting attempts to extend the logical drive to the new size. The Size option is not required. If the size is not specified for a new logical drive, then the default is MAX. If the size is not specified for an existing logical drive, then the current logical drive size remains unchanged.</p> <p>If the size is set to "0", the logical drive is deleted (this feature is not exposed to customers).</p> <ul style="list-style-type: none"> ● N: Size in MiB ● MAX: Uses all available unused space in the array for the logical drive ● MAXMBR: Creates the largest sized volume supportable by a 32 bit MBR (2 TiB)
SizeBlocks	<p>Specifies the size of the logical drive in 512 Byte blocks. This keyword was added to allow setting an exact size without rounding. Currently when Scripting captures a configuration, it reports volume sizes rounded down to the nearest MiB. If the capture is then played back, the size is reduced to fit under the already rounded MiB size. This leads to a loss of size in successive generations of replicas.</p> <p>If the size does not exactly fit the geometry of the array (due to different disks or RAID levels) the size is rounded down to fit the geometry.</p> <ul style="list-style-type: none"> ● N: size in 512 Byte blocks.
Sectors	<p>Specifies the Max Boot setting (Sectors Per Track) for the logical drive. The Sectors option is not required. If the logical drive is new, the default is 32. If the logical drive already exists, then the default is the current Sectors setting on the logical drive.</p> <ul style="list-style-type: none"> ● 32: Disable Max Boot (32 sectors per track) ● 63: Enable Max Boot (63 sectors per track)

Option	Value Description
StripSize	<p>Specifies the Strip Size for the logical drive in KiB. In <code>Configure Mode</code>, the Strip Size is the Strip Size for the new logical drive. In <code>Reconfigure Mode</code>, if the logical drive already exists and the Strip Size is different than the existing Strip Size on the logical drive, then HPE SSA Scripting attempts to migrate the logical drive to the specified Strip Size.</p> <p>The Strip Size option is not required. If the Strip Size is not specified for a new logical drive, the Strip Size is the default Strip Size for the RAID level of the logical drive. If the Strip Size is not specified for an existing logical drive in <code>Reconfigure Mode</code> and the user is not migrating the RAID level, then the current Strip Size setting remains unchanged.</p> <p>The following Strip Size values are available:</p> <ul style="list-style-type: none"> • 8: 8 KiB • 16: 16 KiB • 32: 32 KiB • 64: 64 KiB • 128: 128 KiB • 256: 256 KiB • 512: 512 KiB • 1024: 1024 KiB <p>Strip Sizes available for a RAID level vary, based on the controller and the controller firmware level. The default size is 256 KiB on later controllers. Also, the maximum Strip Size changes dynamically and is reduced for arrays with a large number of data drives or with smaller controller cache sizes. The controller needs to read an entire Stripe of data at a time into cache memory during transformations, the available memory being a limiting factor. 1024 KiB is only available on HPE Smart Array controllers for HPE ProLiant Gen8 and later servers.</p>
NumberOfParityGroups (NPG)	<p>Specifies the number of parity groups to create when specifying RAID levels 50 or 60</p> <ul style="list-style-type: none"> • N <p>The number of physical disks in the array must be a multiple of this value.</p>
ArrayAccelerator	<p>Specifies the Array Accelerator setting for the logical drive</p> <ul style="list-style-type: none"> • <code>Enable</code>: Enables the Array Accelerator for the logical drive. This is the default setting for new logical drives. • <code>Disable</code>: Disables the Array Accelerator for the logical drive
Renumber	<p>Renumbers the logical drive</p> <ul style="list-style-type: none"> • N: The logical drive is renumbered to N. <p>This is typically used after a <code>Join</code> command to ensure the proper logical volume numbering is set, that is, the boot volume is ID 1.</p>
SetBootVolumePrimary	<p>Sets the current logical volume to be the primary boot volume on the current controller</p> <ul style="list-style-type: none"> • <code>Enable</code> <p>Not supported on all array controllers</p>
SetBootVolumeSecondary	<p>Sets the current logical volume to be the secondary boot volume on the current controller</p> <ul style="list-style-type: none"> • <code>Enable</code> <p>Not supported on all array controllers</p>
SSDOverProvisioningOptimization (SSDOPO)	<p>Sets the over provisioning optimization parameter at volume creation time</p> <ul style="list-style-type: none"> • <code>Enable</code> • <code>Disable</code> <p>Not supported on all array controllers. Only supported on some SSDs. Not valid in <code>Reconfigure Mode</code>.</p>

Encryption support commands

The following commands have been added to HPE SSA Scripting versions 1.60.0.0 and later to support new data encryption features. For more information on HPE Secure Encryption, see the *HPE Secure Encryption Installation and User Guide*.

Controller command	Value
AcceptEULA	<p>Accepts the Encryption EULA (End User License Agreement)</p> <ul style="list-style-type: none"> • Yes <p>The EULA (End User License Agreement) must be accepted before Encryption can be enabled.</p>
EncryptionUser	<p>Sets the Encryption User Role</p> <ul style="list-style-type: none"> • User • Crypto <p>Currently only the two Roles above are supported. The selected Role determines which encryption commands are available.</p>
EncryptionPassword	<p>Provides the encryption password for the selected Role as defined by EncryptionUser</p>
EncryptionCryptoPasswordSet	<p>Sets the encryption password for the Crypto User Role</p>
EncryptionUserPasswordSet	<p>Sets the encryption password for the User Role</p>
Encryption	<p>Enables or disables controller encryption</p> <ul style="list-style-type: none"> • Enable • Disable <p>Before Encryption can be enabled, set the Crypto user password, the key management mode, the Initial Master Key, and accept the EULA.</p>
EncryptionKeyManager	<p>Sets the Key Manager mode</p> <ul style="list-style-type: none"> • Local • Remote <p>If set to Remote Key Manager mode, ensure the external configuration is configured properly on the server's iLO configuration screens and the system configuration is added to the remote key manager.</p>
EncryptionMasterKey	<p>The initial Master Key Name</p>
EncryptionClearConfig	<p>Deletes all secret and Critical Security Parameters from the controller.</p> <ul style="list-style-type: none"> • KeyName <p>Does not delete or modify any existing logical volumes. However, if the volumes are encrypted, they are placed in an offline state by the controller. If any encrypted logical volumes exist on the controller, this command must be run offline. The KeyName is required if existing encrypted logical volumes exist on the controller; otherwise, this argument may be omitted.</p>
EncryptionForeignMasterKey	<p>Provides the Master Key name to the controller for one or more foreign volumes imported into the system, allowing them to be unlocked and used on the current system</p>
EncryptionRekeyControl	<p>Rekeys the controller</p> <ul style="list-style-type: none"> • Yes
EncryptionRescanKeys	<p>Rescans the controller keys. Only valid when in Remote Key Management Mode.</p> <ul style="list-style-type: none"> • Yes

Controller command	Value
EncryptionKeyManagerAuthentication	<p>When enabled, this feature allows the firmware to skip prompting the user for the boot time controller password.</p> <ul style="list-style-type: none"> • Enable • Disable <p>The boot time controller password must be set to utilize this feature.</p>
ControllerPassword	Sets the boot time controller password to the supplied value
ControllerPasswordUnlock	Unlocks the controller and any locked logical volumes with the supplied controller password
ControllerPasswordMode	<p>Sets the boot password mode, allowing it to be suspended or deleted</p> <ul style="list-style-type: none"> • Remove • Suspend • Resume
AllowPlainText	<p>Allows future plaintext volumes to be created when encryption is enabled. Existing volumes are not modified.</p> <ul style="list-style-type: none"> • Yes • No
FirmwareLock	<p>Locks or unlocks the array controller firmware. Firmware must be unlocked prior to updating.</p> <ul style="list-style-type: none"> • On • Off
EncryptionRecoveryQuestion	<p>Sets the controller recovery question. Used when the user wants to change the Crypto User password but has forgotten it and is unable to log in.</p> <ul style="list-style-type: none"> • *****
EncryptionRecoveryAnswer	Sets the controller password recovery answer
EncryptionLocalKeyCacheEnable	<p>Enables or disables the controller local key cache. Only valid in Remote Key Management Mode.</p> <ul style="list-style-type: none"> • Yes • No <p>Not supported on all controllers</p>
EncryptionLocalKeyCacheRetryAttempts	<p>Sets the controller local key cache retry attempts. Only valid in Remote Key Management Mode.</p> <ul style="list-style-type: none"> • N <p>Not supported on all controllers</p>
EncryptionLocalKeyCacheRetryInterval	<p>Sets the controller local key cache retry interval from 1-15 minutes. Only valid in Remote Key Management Mode.</p> <ul style="list-style-type: none"> • N <p>Not supported on all controllers</p>
ExpressLocalEncryption	<p>This command performs a full setup of the controller encryption configuration.</p> <ul style="list-style-type: none"> • Enable <p>The following items are enabled:</p> <ul style="list-style-type: none"> • Controller encryption • Local Key Manager Mode • Random crypto password, not recoverable • Random master key name, not recoverable • Future plaintext volumes not allowed <p>To disable, the entire encryption configuration must be cleared, which will require deleting any configured encrypted volumes.</p>

Logical Volume Commands

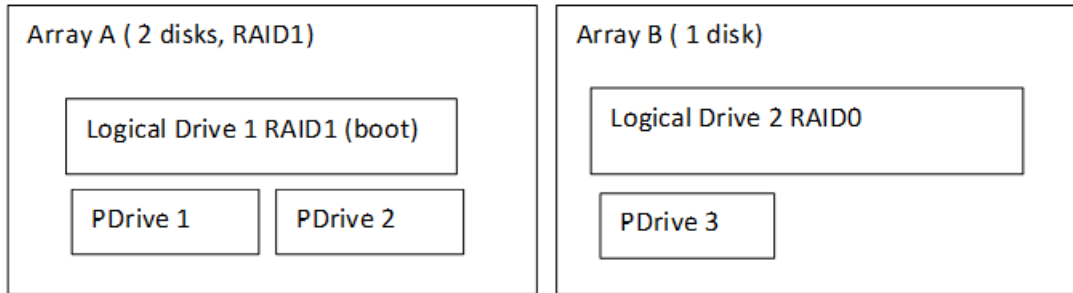
Controller command	Value
EncryptionRekeyVolume	<p>Rekeys the logical volume</p> <ul style="list-style-type: none"> • Yes <p>Results in a volume transformation and may take a long time</p>
Encode	<p>Converts a plaintext logical volume to an encrypted volume, optionally converting the existing data or deleting it</p> <ul style="list-style-type: none"> • PreserveData • DestroyData <p>If <code>PreserveData</code> is selected, a volume transformation occurs and may take a long time.</p>
PlainText	<p>Specifies whether to create a new logical volume in either plaintext or encrypted form. Default is encrypted (<code>Enable</code>).</p> <ul style="list-style-type: none"> • Enable • Disable <p>To create a plaintext volume when encryption is enabled, the <code>AllowPlainText</code> option must have been set when initially configuring the array controller.</p>
InstantSecureErase	<p>Performs an instant cryptographic erase on the current logical volume. All user data is lost.</p> <ul style="list-style-type: none"> • Yes
EncryptionVolatileKeys	<p>Configures the volatile key status of the selected volume. If enabled and the system experiences a power outage, the encryption keys will be lost and there will be no access to the volume.</p> <ul style="list-style-type: none"> • Enable • Disable <p>Keys are not automatically backed up when enabling this feature.</p>
EncryptionVolatileKeyAction	<p>Modifies the status of the volatile keys for the volume.</p> <ul style="list-style-type: none"> • Backup — Backs up the current encryption key to the remote key manager • Restore — Restores the current encryption key from the remote key manager. The key must be backed up before it can be restored. • Remove — Removes the current encryption key from the remote key manager. The key must be backed up before it can be removed. <p>Volatile keys must be enabled and the controller in Remote Key Manager Mode. These operations may take some time depending on the workload and responsiveness of the remote key manager.</p>

Split/Join scripting

The `SPLITMIRROR` command enables you to split or join arrays and their associated drives. It is possible to execute the command only after starting the script with the `-offline` command in the CLI. The target volumes for the join operation cannot be in use by the operating system.

Initial configuration example

In this example, two arrays are each set up with a logical drive, and three physical drives (PDrives) between them.



Performing the split operation

Use the following syntax for the Split operation:

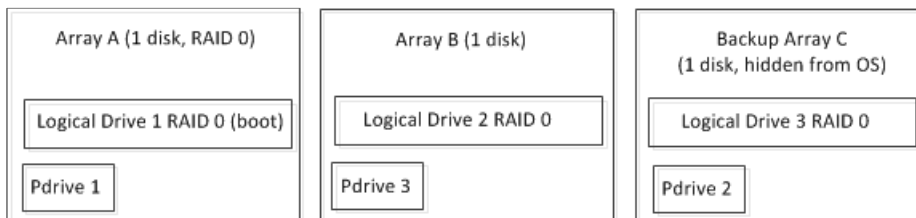
```
SplitMirror = SplitWithBackup
```

When the command executes, the mirrored array is split into two new arrays with one becoming a backup array.

In the example, Backup Array C will be hidden from the operating system. To split the RAID1 logical drive in the example configuration, the command would be used as follows, with the controller in Slot 6:

```
Action= Reconfigure  
Method= Custom  
Controller= SLOT 6  
Array= A  
SplitMirror= SplitWithBackup
```

The `SPLITMIRROR` command creates a new logical drive (3) and a new array (C) from the original Array. The configuration is shown in the following diagram:



Executing the join command

Scripting must be launched with the `-offline` command line option to enable this command. This command has three options:

- `SplitMirror = Remirror`
- `SplitMirror = Rollback`
- `SplitMirror = ActivateBackup`

Example 1: SplitMirror = Remirror

This form of the command does the following:

- Recreates the original array
- Retains data from Logical Drive 1

- Removes Logical Drive 3, along with all data

To keep the modifications made to Logical Drive 1 after the SPLITMIRROR:

```
Action= Reconfigure
Method= Custom
Controller= SLOT 6
Array= A
SplitMirror= Remirror
```

After the command executes, Array C is removed and physical drive 2 (PDrive2) is now a mirror of PDrive1, with the original contents of PDrive2 lost.

Example 2: SplitMirror = Rollback

This form of the command does the following:

- Recreates the original array
- Retains data from Logical Drive 3 (that is, the original data at the time of the split)
- Removes Logical Drive 1, along with all data

To return to the original configuration at the time of the SPLITMIRROR:

```
Action= Reconfigure
Method= Custom
Controller= SLOT 6
Array= A
SplitMirror= Rollback
```

After the command executes, physical drive 1 (PDrive1) becomes a mirror of PDrive2 (the original data at the time of the split), with the modifications to PDrive1 lost.

If this example is attempted while the system is online (that is, booted from Logical Drive 1), a blue-screen or kernel panic will likely result. Perform this command offline and ensure the volumes involved in the join are not mounted or otherwise used by the Operating System.

Example 3: SplitMirror = ActivateBackup

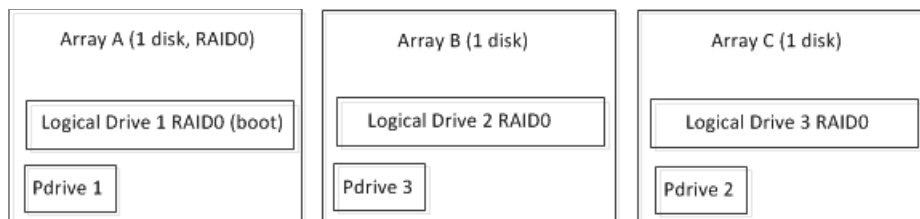
- Exposes the hidden logical drive to the operating system
- Retains the data from Logical Drive 1
- Retains the data from Logical Drive 3

To keep the modifications made to Logical Drive 1 and also access the original logical volume data at the time of the SPLIT, enter the following:

```
Action= Reconfigure
Method= Custom
Controller= SLOT 6
Array= A
SplitMirror= ActivateBackup
```

After the command executes, Logical Volume 3 is exposed to the Operating System.

There might be implications with the operating system with respect to the volume name, unique IDs, and so forth, which may require manual intervention by the System Administrator.



Basic scripting scenarios

Scenario 1: Configure a two-disk array

Task

Create a simple two-disk array with a 100 GB RAID 1 logical volume.

Hardware configuration

- Storage system
- An unconfigured HPE Smart Array controller in slot 1
If the controller contains an existing configuration, the script fails unless you add the `-reset` parameter to the command line to clear the existing configuration.
- Two available physical drives at the following location: 11:4:8 and 11:4:7

Script

```
Action=Configure
Method=Custom

Controller=Slot1

Array=A
Drive=11:4:8, 11:4:7

LogicalDrive=1
RAID=0
Size=100000
```

Summary

The script combines the two physical drives into a single 100 GB logical drive.

Scenario 2: Reconfigure to modify logical drive size

Task

Reconfigure an existing 100 GB logical volume to modify its size to 200 GB.

Hardware configuration

- Storage system
- An HPE Smart Array controller in slot 1
- An existing logical drive with a capacity equal to or larger than 200 GB

Script

```
Action=Reconfigure
Method=Custom

Controller=Slot1
```

```
Array=A
LogicalDrive=1
RAID=0
Size=200000
```

Summary

The script modifies the size of the logical drive only, because multiple transformations of a logical drive cannot be performed at the same time. For example, HPE SSA must complete the size expansion before beginning another transformation, such as a RAID level change.

To modify existing arrays and volumes, the HPE SSA GUI may be a more intuitive tool for some users. The GUI provides graphical feedback that guides the user and displays only available options.

Scenario 3: Reconfigure to modify RAID level

Task

Reconfigure an existing RAID 0 logical volume to be a RAID 1 logical volume.

The selected RAID level is supported only if the minimum number of physical drives are available.

Hardware configuration

- Storage system
- An HPE Smart Array controller in slot 1
- An existing logical drive

Script

```
Action=Reconfigure
Method=Custom

Controller=Slot1

Array=A
LogicalDrive=1
RAID=1
```

Summary

The script modifies the RAID level of the logical drive only, because multiple transformations of a logical drive cannot be performed at the same time. For example, HPE SSA must complete the RAID level change before beginning another transformation, such as a size expansion.

To modify existing arrays and volumes, the HPE SSA GUI may be a more intuitive tool for some users. The GUI provides graphical feedback that guides the user and displays only available options. For example, the HPE SSA GUI only displays optional RAID levels based on the minimum number of required physical drives. For more information, see the *Configuring Arrays on HPE Smart Array Controllers Reference Guide*.

Scenario 4: Configure by disk type and count

Task

Create an array by specifying the type and count of disks for HPE SSA to use. This example use two SAS drives. This method does not require you to specify physical disks by location.

Hardware configuration

- Storage system
- An HPE Smart Array controller in slot 1
- Two available SAS physical disks

This script fails if two unused SAS drives are not available on the controller.

Script

```
Action=Configure  
Method=Custom
```

```
Controller=Slot1
```

```
Array=A  
Drive=2  
DriveType=SAS  
LogicalDrive=1  
RAID=0
```

Summary

This script does not specify a size, but uses the `MAX` default value to consume the fully available capacity of the physical drives.

HPE SSA does not support arrays with mixed drive types. An array must comprise drives of the same type, for example all SAS or all SATA drives. Different arrays can have different drive types.

Scenario 5: Configure two arrays, one with a spare

Task

Create two arrays with one online spare on a controller. One array uses two physical drives in a RAID 1 logical volume. The second array uses the remaining physical disks to create 20 identically sized RAID 5 logical volumes.

Hardware configuration

- Storage system
- An unconfigured HPE Smart Array controller in slot 1

If the controller contains an existing configuration, the script fails unless you add the `-reset` parameter to the command line to clear the existing configuration.

- Numerous available physical drives at unspecified locations

Script

```
Action=Configure  
Method=Custom
```

```
Controller=Slot1
```

```
Array=A  
Drive=2  
OnlineSpare=1  
LogicalDrive=1
```

```
RAID=1
Size=MAX

Array=B
Drive=*
LogicalDrive=NEXT
Repeat=20
RAID=5
Size=MAX
```

Summary

For both arrays, this script uses the `MAX` value to consume the fully available capacity of the physical drives.

For Array B, the `Repeat` option specifies the number of times to repeat the configuration. Instead of using the number 2, the script uses the `NEXT` value to specify the ID of the second logical drive. When using the `Repeat` option, you must also use the `NEXT` value for the `LogicalDrive` option.

This script will fail if the controller does not have the required number of disks connected.

Advanced commands

Controller=ALL

You can use `Controller=All` instead of the `Slot=N` command.

Advantages

- You do not need to determine where controllers are installed.
- You can target all controllers at once.

Examples

Change read cache to 100% on all controllers (only configured controllers, those with volumes, accept this command):

```
Controller=ALL
ReadCache=100
```

Clear the configuration on all controllers:

```
Controller=ALL
ClearConfigurationWithDataLoss=Yes
```

Controller=First

You can use `Controller=First` instead of the `Slot=N` command.

Advantages

- You do not need to determine where controllers are installed.
- You can target the first controller found, a common practice with embedded controllers, because they are always slot 0. (Controllers are sorted by slot number, lowest to highest, and internal controllers before external ones.)

Example

Configure a volume on the embedded controller (or the controller in the lowest slot number, if an embedded controller does not exist):

```
Controller=First
Array=A
Drive=1E:1:1, 1E:1:2
LogicalDrive=1
RAID=1
```

-internal or -external

You can use the command line option `-internal` or `-external` instead of the default option, which is both internal and external controllers.

Advantage

This option filters the discovered controllers, restricting the command to only internal or only external controllers.

Example

When using the `Controller=First` command, if the system had no internal controllers (due to hardware failure or discovery failure) but had an external controller for shared storage, the script would attempt to create a volume on the external controller. To prevent that action, the `-internal` command line argument restricts discovery to only internal controllers:

```
# ssascripting -i input.txt -internal
Controller=First
Array=A
Drive=1E:1:1, 1E:1:2
LogicalDrive=1
RAID=1
```

Array=Next

You can use `Array=Next` instead of the `Array=A` command.

Advantage

You do not need to know how many arrays exist. The scripting software selects the next valid array identifier.

Example

Add one array to the configuration, regardless of how many arrays already exist:

```
Controller=Slot1
Array=Next
Drive=1E:1:1, 1E:1:2
LogicalDrive=2
RAID=1
```

Hewlett Packard Enterprise recommends pairing the `Array=Next` command with `LogicalDrive=Next` (on page 26), because you would not create an array without also creating a logical drive, and this additional command does not require you to know how many logical drives already exist.

LogicalDrive=Next

You can use `LogicalDrive=Next` instead of the `LogicalDrive=N` command.

Advantage

You do not need to know how many logical drives exist. The scripting software selects the next valid identifier.

Example

Add one logical drive to Array A, regardless of how many logical drives already exist:

```
Controller=Slot1
Array=A
Drive=1E:1:1, 1E:1:2
LogicalDrive=Next
RAID=1
```

Repeat=N | MAX

You can use this command as part of the logical drive specification.

Advantage

You can quickly divide the available space on an array into multiple volumes without specifying each volume individually.

Example

Create the maximum number of logical volumes the controller supports (each volume is the same size, and the volumes, in total, use all available free space):

```
Controller=Slot1
Array=A
Drive=*
LogicalDrive=Next
Repeat=Max
RAID=1
```

Drive=N

You can use `Drive=N` instead of specifying the actual paths (`Drive=1E:1:1, 1E:1:2`).

Advantage

You can specify the number of drives needed for the configuration, and the scripting software selects the first available drives based on increasing path. This command is most useful when all drives in the configuration are the same size.

Example

Add a logical drive to the configuration using four physical drives:

```
Controller=Slot1
Array=A
Drive=4
LogicalDrive=1
RAID=5
```

Drive=*

You can use `Drive=*` instead of specifying the actual paths (`Drive=1E:1:1, 1E:1:2`).

Advantage

You can use all available drives for the configuration without knowing their number or actual path.

For this command to execute, all configuration rules must be met. For example, if only two physical drives exist, the scripting software uses both drives, but does not create volumes that require more than two drives, such as a RAID 5 volume.

Example

Add a logical drive to the configuration using all unassigned drives:

```
Controller=Slot1
Array=A
Drive=*
LogicalDrive=1
RAID=5
```

In this example, three or more physical drives must be available to support the RAID level.

OnlineSpare=N

You can use `OnlineSpare=N` instead of specifying the actual paths (`OnlineSpare=1E:1:1, 1E:1:2`).

Advantage

You can specify the number of spares needed for the configuration, and the scripting software selects the first available drives based on increasing path. This command is most useful when all drives in the configuration are the same size.

Example

Add a logical drive to the configuration using two spare drives:

```
Controller=Slot1
Array=A
Drive=1E:1:1, 1E:1:2
OnlineSpare=2
LogicalDrive=1
RAID=1
```

OnlineSpare=*

You can use `OnlineSpare=*` instead of specifying the actual paths (`OnlineSpare=1E:1:1, 1E:1:2`).

Advantage

You can use all available, unassigned drives as spares for the configuration without knowing the number of drives available or their actual paths.

Observe the following guidelines:

- You cannot exceed the controller settings for maximum number of spares allowed in an array, typically eight spares.
- You cannot combine this command with `Drive=*` (on page 27), because the script processes the `Drive` specification first and uses all available drives for that action, leaving no unassigned drives for the `OnlineSpare` request.

Example

Add a logical drive to the configuration using all unassigned drives as spares:

```
Controller=Slot1
Array=A
Drive=1E:1:1, 1E:1:2
OnlineSpare=*
LogicalDrive=1
RAID=1
```

DriveType=SCSI | SAS | SATA | SATASSD | SASSSD

You can specify what type of drive to use in a configuration.

Advantage

You can ensure that only a certain type of drive is used in a configuration where multiple drive types exist.

Example

Create one volume using all existing SAS solid state drives, and create one volume using all existing SATA drives:

```
Controller=Slot1
Array=A
Drive=*
DriveType=SASSSD
LogicalDrive=1
RAID=0

Array=B
Drive=*
DriveType=SATA
```

```
LogicalDrive=2  
RAID=0
```

Size=MAXMBR

You can use this command to limit the size of the volume to 2^{32} blocks (2 TiB), which is the largest bootable volume supported on MBR-based systems.

Advantage

You configure the largest possible, bootable volume size regardless of the free space available, provided that the free space is at least 2 TiB.

Example

Create an array with a max sized bootable volume from a 3 TB disk at 1I:1:1:

```
Controller= Slot 1  
Array= Next  
Drive= 1I:1:1  
LogicalDrive=Next  
RAID= 0  
Size= MAXMBR
```

SizeBlocks=N

You can use this option to capture the exact number of 512-byte blocks in a volume, and then to recreate the exact size when playing back a capture.

Advantage

The `Size` value is rounded to the nearest Mebibyte. When you capture the same system repeatedly, this rounding can result in the eventual loss of a small amount of volume size. This option eliminates the rounding.

Example

Create an array with volume using exactly 20,971,520 512-byte blocks (exactly 10 GiB) using the disk at 1I:1:1:

```
Controller= Slot 1  
Array= Next  
Drive= 1I:1:1  
LogicalDrive=Next  
RAID= 0  
SizeBlocks= 20971520
```

Advanced scripting scenarios

Scenario 6: Clear the configuration on all internal controllers

Task

Clear the current configuration on all internal controllers in the system.

Hardware configuration

Unspecified

Script

```
# ssascripting -i input.txt -internal

Controller=ALL
ClearConfigurationWithDataLoss=Yes
```

Summary

By combining the advanced commands to specify `-internal` controllers first, and then `ALL` controllers, the user can clear configurations without affecting external controllers attached externally and without having to identify the internal controllers by slot or clear them one at a time.

Scenario 7: Add a simple volume on systems with mixed controller and physical disk configurations

Task

Add a simple, one-disk RAID 0 volume on each system, using one script. However, do not add a new volume to systems booting from an external controller.

Hardware configuration

The administrator has 500 systems, some with embedded controllers, some with controllers in expansion slots, and some booting from an external controller, such as an HPE StorageWorks MSA1500cs Modular Smart Array.

Each system has a different physical disk configuration, some disks in an internal drive cage and some in an external storage box. Each system can have a different number of arrays and volumes.

Script

```
# ssascripting -i input.txt -internal

Controller=First
Array=Next
Drive=1
LogicalDrive=Next
RAID=0
```

Summary

By combining the advanced commands to specify `-internal` controllers only, and then `First` controllers, the user does not add volumes to external controllers or to additional internal controllers on the same system. The `Next` command eliminates the need to identify specific arrays and volumes.

Scenario 8: Create multiple arrays on unconfigured systems with mixed physical disk configurations

Task

Add two arrays, each with one volume, to each system. Configure the first array as an OS volume with RAID 1 and a single spare. Configure the second array to use all remaining disks in a RAID 5 volume with no spares.

Hardware configuration

The administrator has 500 unconfigured systems with embedded controllers. Each system has a different physical disk configuration, some disks in an internal drive cage and some in an external storage box.

Script

```
Controller=Slot0

Array=A
Drive=2
OnlineSpare=1
LogicalDrive=1
RAID=1

Array=B
Drive=*
LogicalDrive=2
RAID=5
```

Summary

The `Slot0` specification targets embedded controllers only. Each array is configured using available drives. Array A uses two available drives, and the script eliminates the need to specify the drives by address. Array B uses all remaining available drives, again without specific drive addresses, but also without the administrator having to specify the number of drives, which can vary for each system.

Scenario 9: Create the maximum size bootable volume

Task

When more than 2TiB of disk space is available, use all possible physical disks to create an array, create the maximum sized boot volume, and then consume the remaining space in another volume.

Hardware configuration

The administrator has an unconfigured system with a controller.

Script

```
Controller= Slot 1
Array= A
Drive= *
```

```
LogicalDrive=1 ; consumes the first 2TiB
RAID= 0
Size= MAXMBR
LogicalDrive=2 ; consumes remainder of free space
RAID=0
```

Summary

Without specifying drives by name, the administrator instructs the controller to use available disk space, up to 2TiB, to create the first volume in an array. Any remaining disk space is consumed in a second volume automatically.

Scenario 10: Create a configuration with a specific block size

Task

Identify the size of a logical volume in blocks, and then create a configuration for another logical volume that matches exactly, using block size instead of capacity.

Currently, all Smart Array volumes consist of 512-byte blocks. When you create a custom configuration that uses the `Size` parameter, the script specifies the input size in MiB, which rounds the requested value into some number of blocks equal to or slightly greater than the requested size; the exact value depends on the array configuration.

However, if you use the `SizeBlocks` parameter to create the logical volume, then the script specifies the input size in the exact number of blocks, and no rounding occurs. In some cases, the RAID configuration might adjust the number of blocks in the new logical drive.

Hardware configuration

The administrator has a system with a controller and a configured logical volume.

Script output

To identify the size of an existing logical volume, in blocks, observe the output when you capture the existing configuration. Scripting outputs the current size of volumes in block units in a comment.

```
; Logical Drive Specifications
LogicalDrive= 2
RAID= 5
Size= 279964
; SizeBlocks= 573367088
Sectors= 32
StripSize= 512
Caching= Enabled
```

You can then use the size, specified in blocks, to configure another logical volume that is an exact match in size. When using an input script, you can specify either `Size` or `SizeBlocks`, but not both.

Summary

To create a logical drive that uses the exact same configuration of another logical drive, use the `SizeBlocks` parameter to specify the size, thus avoiding the rounding that can occur with the `Size` parameter.

Scenario 11: Configuring HPE SmartCache

Task

This script illustrates how to configure HPE SmartCaching.

Hardware configuration

The administrator has a system with a controller, physical drives, and logical drives configured.

Script output

```
Action= Configure
Method= Custom

Controller= Slot 1

Array= A
Drive= 2E:1:1, 2E:1:2, 2E:1:3

LogicalDrive= 1
RAID= 5
Size= 139947

CachingArray= B
Drive= 6I:0:5

CachingLogicalDrive= 2
CachedLogicalDrive= 1
RAID= 0
Size= 13993
```

Summary

Caching Logical Drives and Cached data drives must be on the same Controller.

Array A is created with 3 SAS physical drives, containing a single RAID 5 data logical drive (Logical Drive 1). Caching Array B is created using a single SSD drive, containing a single RAID 0 caching logical drive (Logical Drive 2) and is associated with Logical Drive 1.

Scenario 12: Configuring HPE Secure Encryption

Task

This script illustrates how to configure HPE Secure Encryption.

Hardware configuration

The administrator has a system with a new and unconfigured controller, or the user has executed "EncryptionClearConfig" command to delete the encryption configuration.

Script output

```
Action= Configure
Method= Custom
Controller= SLOT 1

AcceptEULA=yes
EncryptionCryptoPasswordSet=Password.12345
EncryptionMasterKey= MyKeyName
EncryptionKeyManager= Local
AllowPlainText= True
Encryption= Enable

EncryptionUserPasswordSet= UPassword.9995 ; optional
ControllerPassword= MyBootTimePasswd ; optional
```

```
FirmwareLock= On ; optional
EncryptionRecoveryQuestion=This is my question ; optional
EncryptionRecoveryAnswer=This is my answer ; optional
```

Summary

Encryption is now configured with a password, master key name, recovery question and answer, and settings for either local or remote key mode.

Scenario 13: Modifying encryption configurations

Task

This script illustrates how to modify encryption settings in HPE Secure Encryption.

Configuration

The administrator has a system with a configured controller.

Script output 1

```
Action= Reconfigure
Method= Custom
Controller= SLOT 1

; first, log in
EncryptionUser= crypto
EncryptionPassword= Password.12345

; now change the parameters
FirmwareLock = Off
AllowPlainText= false
```

Summary: The actual parameters to be changed will vary based on the controller capabilities and the version of controller firmware.

Script output 2

```
Action= Configure
Method= Custom
Controller= SLOT 1

EncryptionUser= crypto
EncryptionPassword= Password.12345

Array= A
Drives= 1
LogicalDrive= 1
RAID= 0
PlainText= Enable
```

Summary: When creating volumes, there is an additional volume option to set to determine whether the volume will be encrypted or plaintext. Prior login as the crypto user is required to use this feature. By default, volumes are encrypted.

Script output 3

```
Action= Reconfigure
Method= Custom
Controller= SLOT 1

EncryptionUser= crypto
EncryptionPassword= Password.12345
```

```
Array= A  
LogicalDrive= 1  
Encode= DestroyData
```

Summary: This example encodes (converts from plaintext to cyphertext) an existing plaintext volume, without preserving data.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website (<http://www.hpe.com/assistance>).
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website (<http://www.hpe.com/support/hpesc>).

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
 - Hewlett Packard Enterprise Support Center Get connected with updates page (<http://www.hpe.com/support/e-updates>)
 - Software Depot website (<http://www.hpe.com/support/softwaredepot>)
- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center More Information on Access to Support Materials page (<http://www.hpe.com/support/AccessToSupportMaterials>).



IMPORTANT: Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Websites

- Hewlett Packard Enterprise Information Library (<http://www.hpe.com/info/enterprise/docs>)
- Hewlett Packard Enterprise Support Center (<http://www.hpe.com/support/hpesc>)
- Contact Hewlett Packard Enterprise Worldwide (<http://www.hpe.com/assistance>)

- Subscription Service/Support Alerts (<http://www.hpe.com/support/e-updates>)
- Software Depot (<http://www.hpe.com/support/softwaredepot>)
- Customer Self Repair (<http://www.hpe.com/support/selfrepair>)
- Insight Remote Support (<http://www.hpe.com/info/insightremotesupport/docs>)
- Serviceguard Solutions for HP-UX (<http://www.hpe.com/info/hpux-serviceguard-docs>)
- Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix (<http://www.hpe.com/storage/spock>)
- Storage white papers and analyst reports (<http://www.hpe.com/storage/whitepapers>)

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the Insight Remote Support website (<http://www.hpe.com/info/insightremotesupport/docs>).

Acronyms and abbreviations

ACU

Array Configuration Utility

ADM

Advanced Data Mirroring

HBA

host bus adapter

HPE SSA

HPE Smart Storage Administrator

iLO

Integrated Lights-Out

MBR

master boot record

MiB

Mebibyte

MNP

Monitor and Performance Analysis Delay

SAS

serial attached SCSI

SATA

serial ATA

WWN

World Wide Name

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