

Managing PERC 6 with MegaCli under Solaris 10

CONFIGURATION,
MANAGEMENT AND
MONITORING OF PERC6

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Revision History

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INTRODUCTION

The Dell™ OpenManage™ Server Administrator Storage Management application is not supported on Dell PowerEdge™ servers running the Sun® Solaris® Version 10 operating system. This means no online configuration and management solution for PERC6 controllers in a Solaris 10 environment. Furthermore, this gap also means that there is no status monitoring or event reporting. The PERC6 BIOS level tool allows some RAID management and configuration capabilities but it requires a server reboot, which may not be an option in Enterprise environments. Most of these PERC6 management operations can be performed by the LSI MegaCli for Solaris. MegaCli, as the name implies, is a command line interface that can also be scripted for management of storage attached to a Dell PERC6. MegaCli is a non-interactive and powerful tool though non-intuitive and non-user friendly. It allows virtual disk configuration, hot spare assignment, physical disk rebuilding, battery and physical disks health checks. It also allows preventive operations like consistency checks, read patrol and diagnostics for the battery. Data-destructive tasks can be performed with MegaCli, therefore, it is recommended that the user be familiar with their storage environment and storage management.

This paper provides documentation to help manage the PERC6/i with MegaCli in a Solaris10 environment. This paper covers selected MegaCli commands grouped by operation, examples of actual operations, and a script for monitoring PERC6/i with MegaCli. The output of “MegaCli -?” displays all commands and parameters supported by MegaCli. The script and command examples documented in this paper are verified with LSI MegaCli ver 2.00.12 under Sun Solaris10 update5 (05/08). The audience of this paper should be familiar with the PERC6 product, RAID concepts, and storage management functions.

Certain configuration options and features that may be implemented or supported by MegaCli are not supported and tested with PERC6 controllers; using the link below, PERC6 supported features and options matrix can be reviewed.

http://support.dell.com/support/edocs/software/svradmin/5.4/en/omss_ug/html/apndx.html#1634504

MegaCli Syntax Convention

MegaCli operation commands and parameters are not case sensitive but for clarity both upper and lower case letters are used. The order of parameters and sub-parameters must be observed. Usage of a ‘-’ before sub-parameters is optional. Some of the common sub-parameters are listed below.

Adapter number: -aN | -a0,1,2 | -aAll

Adapter number as enumerated by driver identifies the specific PERC6 in the system when multiple PERC6 controllers are installed in the system. In case of a single PERC6 controller in the system then ‘-aAll’ is same as ‘-a0’. MegaCli -AdpCount gives number of adapters identified in the system.

Physical Drive number: PhysDrv[E:S]

Physical drives are identified by enclosure and slot. The enclosure is identified by the Enclosure Device ID while Slot Number starts from zero and corresponds to physical slot numbering.

Virtual Disk number: Lx | L0,1,2 | Lall

Virtual disk number is used to specify the VD for specific operation. The first VD on an adapter is L0.

CONTROLLER OPERATIONS

Controller monitoring and management commands allow displaying and modifying controller settings in the system.

Display Complete Adapter Information (-AdpAllInfo)

Syntax: MegaCli -AdpAllInfo -aN|-a0,1,2|-aALL

Description: Displays all information about the adapter, including firmware version, BIOS version, rebuild rate, PR rate, cache flush interval, present RAM, board serial number, SAS address, and additional settings and limitations. It also provides the status of virtual disks, physical drives, and memory errors.

Display Specified Adapter Properties (-AdpGetProp)

Syntax: MegaCli -AdpGetProp CacheFlushInterval | RebuildRate
| PatrolReadRate | BgiRate | CCRate | ReconRate | SpinupDriveCount
| SpinupDelay | CoercionMode | PredFailPollInterval | EccBucketSize
| EccBucketLeakRate | EccBucketCount | ClusterEnable | BatWarnDsbl
| AbortCCOnError | AlarmDsply | AutoDetectBackPlaneDsbl | CopyBackDsbl
| LoadBalanceMode | SMARTCpyBkEnble | SSDSMARTCpyBkEnbl
| NCQDsply -aN | -a0,1,2|-aALL

Description: Displays the specified properties on the selected adapter(s). The information displayed is subset of information displayed by the -AdpAllInfo command.

Set Adapter Properties (-AdpSetProp)

Syntax: MegaCli -AdpSetProp CacheFlushInterval -val
| RebuildRate -val | PatrolReadRate -val | BgiRate -val | CCRate -val
| ReconRate -val | SpinupDriveCount -val | SpinupDelay -val
| CoercionMode -val | ClusterEnable -val | PredFailPollInterval -val
| BatWarnDsbl -val | EccBucketSize -val | EccBucketLeakRate -val
| AbortCCOnError -val | AlarmEnbl | AlarmDsbl | AlarmSilence
| SMARTCpyBkEnbl -val | NCQEnbl | NCQDsbl | SSDSMARTCpyBkEnbl -val
| AutoDetectBackPlaneDsbl -val | CopyBackDsbl -val
| LoadBalanceMode -val -aN|-a0,1,2|-aALL

Description: Sets the specified adapter property on the selected adapter(s). Attempting to set properties not supported by the adapter will fail with an exit code of 0x01. A short description and possible values for these properties are given in following table.

NOTE: The Clustering feature is not supported on PERC6 under the Solaris 10 environment.

Examples:

```
MegaCli -AdpSetProp RebuildRate 50 -A0
```

Sets the rebuild rate on the selected adapter at 50%. The default setting is 30%. This value indicates the percentage of compute cycles dedicated to rebuilding failed drives by the RAID controller. At 0 percent, the rebuild occurs only if the system is idle. At 100 percent, the rebuild has a higher priority than any other system activity.

Adapter property	Description	Value
AbortCCOnError -val	Abort consistency check on first error	0 - enabled 1 - disabled
AutoDetectBackPlaneDsbl -val	Automatically detect disk backplane controller	0=Enable Auto Detect of SGPIO and i2c SEP. 1=Disable Auto Detect of SGPIO. 2=Disable Auto Detect of i2c SEP. 3=Disable Auto Detect of SGPIO and i2c SEP.
BatWarnDsbl -val	Disable warning for missing battery	0 - enabled 1 - disabled
BgiRate -val	Background initialization rate	0 to 100 %
CacheFlushInterval -val	Cache flush interval	0 to 255 seconds
CCRate -val	Consistency check rate	0 to 100 %
ClusterEnable -val	Clustering enabled or disabled	0 - enabled 1 - disabled
CoercionMode -val	Disk size coercion mode	0 - None 1 - 128MB 2 - 1GB
CopyBackDsbl -val	Disk copy back	0 - enabled 1 - disabled
EccBucketLeakRate -val	Leak rate of ECC single-bit-error bucket	0 to 65535 minutes
EccBucketSize -val	Size of ECC single-bit-error bucket.	0 to 255.
LoadBalanceMode -val	Set loadbalance feature	0 - Auto 1 - Disabled
PatrolReadRate -val	Patrol Read rate	0 to 100 %
PredFailPollInterval -val	Predicted failure poll interval in seconds.	0 to 65535 seconds
RebuildRate -val	Rebuild rate	0 to 100 %
ReconRate -val	Reconstruction rate	0 to 100 %
SMARTCpyBkEnbl -val	Disk copy back on S.M.A.R.T. error	0 - enabled 1 - disabled
SpinupDelay -val	Delay between disk group spinup (see SpinupDriveCount)	0 to 255 seconds
SpinupDriveCount -val	Max count of disks to spin up together	0 255
SSDSMARTCpyBkEnbl -val	SMARTCpyBkEnbl for SSD	0 - enabled 1 - disabled
AlarmDsbl	Set alarm to disabled	
AlarmEnbl	Set alarm to enabled	
AlarmSilence	Silence an alarm	
NCQDsbl	Native Command Queueing disabled	
NCQEnbl	Native Command Queueing enabled	

Set Factory Defaults (-AdpFacDefSet)

Syntax: MegaCli -AdpFacDefSet -aN|-a0,1,2|-aALL

Description: Sets the factory defaults on the selected adapter(s).

Managing Controller Firmware Level Logs (-AdpEventLog)

The AdpEventLog command allows managing event entries in the event logs for the selected adapter(s).

Syntax: MegaCli -AdpEventLog GetEvents | GetSinceShutdown
| GetSinceReboot | IncludeDeleted | -f <fileName> -aN|-a0,1,2|-aALL

MegaCli -AdpEventLog GetLatest n -f <fileName> -aN|-a0,1,2|-aALL

MegaCli -AdpEventLog GetCCIncon -f <fileName> -LX|-L0,2,5...|-LALL -aN|-a0,1,2|-aALL

MegaCli -AdpEventLog GetEventLogInfo | Clear -aN|-a0,1,2|-aALL

Description: This command allows extracting and clearing logs from the controller in different ways. Note that the GetLatest n operation outputs the latest 'n' events in chronological order with the most recent event first while other operations display/write these events in reverse order such that most recent is displayed last.

Examples:

```
MegaCli -AdpEventLog GetEvents -f AllEvents -a0
```

Writes all events from controller into a file named AllEvents with the oldest event first.

```
MegaCli -AdpEventLog GetLatest 4 -f EventLog -a0
```

Writes latest four events from controller into a file named EventLog with most recent event first.

```
MegaCli -AdpEventLog Clear -aALL
```

Clears all events stored by all PERC controllers in the system.

PATROL READ-RELATED ADAPTER PROPERTIES

The Patrol Read feature scans physical disk drives for possible media errors and initiates corrective steps to ensure data availability and recoverability in case of a disk failure in redundant RAID configurations. This feature has performance implications that depend on Patrol Read settings.

Patrol Read Options (-AdpPR)

Syntax: MegaCli -AdpPR Dsbl | EnblAuto | EnblMan | Start | Stop
| Info | {SetDelay Val} -aN|-a0,1,2|-aALL

Description: Allows managing of Patrol Read options on selected adapter(s). This feature can be enabled to start automatically (EnblAuto) after controller initialization or it can be set to start manually (EnblMan) by using the Start parameter.

Examples:

```
MegaCli -AdpPR Dsbl -aALL
```

Disables Patrol Read for all PERC controllers in the system.

```
MegaCli -AdpPR SetDelay 168 -a0
```

Sets 168 hours as the delay between Patrol Read iterations on adapter-0. A delay value of zero starts the next iteration immediately.

```
MegaCli -AdpPR Info -a0
```


Shows current Patrol Read settings that include operation mode, delay, and current status.

EnblAuto: Enables Patrol Read automatically for the selected adapter(s). This means Patrol Read will start automatically after the adapter initialization is complete.

-EnblMan: Enables Patrol Read manually for the selected adapter(s). This means that Patrol Read does not start automatically; it has to be started manually by selecting the **Start** command.

-Start: Starts Patrol Read for the selected adapter(s).

-Stop: Stops Patrol Read for the selected adapter(s).

-Info: Displays the following Patrol Read information for the selected adapter(s):

BATTERY OPERATIONS

PERC6 has a battery backup unit (BBU) for protecting cache memory in case of sudden system power removal. The BBU status, settings, and other properties can be displayed and modified.

Display all BBU Information (-AdpBbuCmd)

Syntax: MegaCli -AdpBbuCmd -aN|-a0,1,2|-aALL

Description: Displays complete information about the BBU on selected adapter(s). The information displayed includes BBU status, capacity, and properties.

Display specific BBU Information

Syntax: MegaCli -AdpBbuCmd GetBbuStatus | GetBbuCapacityInfo
| GetBbuDesignInfo | GetBbuProperties -aN|-a0,1,2|-aALL

Description: Displays specific information about the BBU on selected adapter(s).

Example:

```
# MegaCli -AdpBbuCmd GetBbuCapacityInfo -a0

BBU Capacity Info for Adapter: 0

Relative State of Charge: 94 %
Absolute State of charge: 73 %
Remaining Capacity: 1396 mAh
Full Charge Capacity: 1478 mAh
Run time to empty: 65535 Min
Average time to empty: 65535 Min
Average Time to full: 65535 Min
Cycle Count: 3
Max Error: 0 %
Remaining Capacity Alarm: 190 mAh
Remaining Time Alarm: 10 Min

Exit Code: 0x00
```

Shows battery capacity information.

Perform BBU Operations

Syntax: MegaCli -AdpBbuCmd BbuLearn | BbuMfgSleep | BbuMfgSeal
| {SetBbuProperties -f <fileName>} -aN|-a0,1,2|-aALL

Description: Perform different BBU operations or set BBU properties.

PHYSICAL DISK OPERATIONS

This section covers physical disk operations, including configuration of HotSpare drives.

Display Number of Physical Drives Attached (-PDGetNum)

Syntax: MegaCli -PDGetNum -aN|-a0,1,2|-aALL

Description: Displays the number of physical drives attached to selected adapter(s). It also returns this number as an exit code.

Examples:

```
# MegaCli -PDGetNum -a0  
  
Number of Physical Drives on Adapter 0: 8  
  
Exit Code: 0x08
```

Display All Physical Devices (-PDList)

Syntax: MegaCli -PDList -aN|-a0,1,2|-aALL

Description: Displays information about all physical devices attached to the selected adapter(s). The information displayed includes location, media health, type, capacity, SAS address, and INQUIRY data from the device.

Display Physical Disk Drive Information (-PDInfo)

Syntax: MegaCli -PDInfo -PhysDrv[E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL

Description: Displays information about the specific physical drive identified by enclosure and slot number.

Examples:

```
# MegaCli -PDInfo PhysDrv[32:7] -a0  
  
Enclosure Device ID: 32  
Slot Number: 7  
Device Id: 7  
Sequence Number: 1  
Media Error Count: 0  
Other Error Count: 0  
Predictive Failure Count: 0  
Last Predictive Failure Event Seq Number: 0  
PD Type: SAS  
Raw Size: 140014MB [0x11177328 Sectors]  
Non Coerced Size: 139502MB [0x11077328 Sectors]  
Coerced Size: 139392MB [0x11040000 Sectors]  
Firmware state: Unconfigured(good)  
SAS Address(0): 0x5000c50006a337c5  
SAS Address(1): 0x0  
Connected Port Number: 7(path0)  
Inquiry Data: SEAGATE ST9146802SS          S2073NM2T5F5  
Foreign State: None  
Media Type: Hard Disk Device
```

Locate Physical Disk Drive and Activate LED (-PDLocate)

Syntax: MegaCli -PDLocate {start | stop} PhysDrv[E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL

Description: Start or stop disk slot LED to help locate selected physical drive(s).

Examples:

```
MegaCli -PDLocate start PhysDrv[32:7] -a0
MegaCli -PDLocate stop PhysDrv[32:7] -a0
```

Miscellaneous PD commands

```
MegaCli -PDOnline -PhysDrv[E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL
MegaCli -PDOffline -PhysDrv[E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL
MegaCli -PDMakeGood -PhysDrv[E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL
MegaCli -PDRbld -Start|-Stop|-ShowProg |-ProgDsply
    -PhysDrv [E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL
MegaCli -PDClear -Start|-Stop|-ShowProg |-ProgDsply
    -PhysDrv [E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL
MegaCli -PdPrpRmv [-UnDo] -physdrv[E0:S0] -aN|-a0,1,2|-aALL
```

MANAGE HOT SPARE (-PDHSP)

Syntax: MegaCli -PDHSP {Set [Dedicated [ArrayN|Array0,1,2...]]
[EnclAffinity] [nonRevertible]}
| Rmv PhysDrv[E0:S0,E1:S1,...] -aN|-a0,1,2|-aALL

Description: Allows configuring and unconfiguring selected PD(s) as Global/Dedicated HSP. The Firmware State in -PDList and -PDInfo output is marked as Hotspare for configured HSP drives.

Examples:

```
# MegaCli -PDHSP Set PhysDrv[32:7] -a0

Adapter: 0: Set Physical Drive at EnclId-32 SlotId-7 as Hot Spare
Success.

Exit Code: 0x00

# MegaCli -PDHSP rmv PhysDrv[32:7] -a0

Adapter: 0: Remove Physical Drive at EnclId-32 SlotId-7 as Hot Spare
Success.

Exit Code: 0x00

# MegaCli -PDHSP Set Dedicated Array1 PhysDrv[32:6] -a0

Adapter: 0: Set Physical Drive at EnclId-32 SlotId-6 as Hot Spare
Success.

Exit Code: 0x00
```

VIRTUAL DISK MANAGEMENT

This section introduces selected commands for virtual disk management. These commands include checking and modifying VD properties, preventive operations such as consistency checks, and reconfiguration operations such as RAID level migration and online capacity expansion.

Display Number Configured of Virtual Disks (-LDGetNum)

Syntax: MegaCli -LDGetNum -aN|-a0,1,2|-aALL

Description: Displays the number of virtual disks configured on selected adapter(s). It also returns this number as exit code.

Examples:

```
# MegaCli -LDGetNum a0

Number of Virtual Drives Configured on Adapter 0: 3

Exit Code: 0x03
```

Display Virtual Disk Information (-LDInfo)

Syntax: MegaCli -LDInfo Lx|L0,1,2|Lall -aN|-a0,1,2|-aALL

Description: Displays configuration information about selected VD(s) on selected adapter(s). The information displayed includes name, RAID level, size, state, stripe size, span depth, cache policies, access, and PD cache policy.

Examples:

```
MegaCli -LDInfo L0 a0

Displays information about first VD on adapter-0
```

```
MegaCli -LDInfo Lall aAll

Displays information about all VDs on all PERC6 adapters in the system.
```

Display Properties for Virtual Disks and Member Elements (-LdPdInfo)

Syntax: MegaCli -LdPdInfo -aN|-a0,1,2|-aALL

Description: Displays configuration information about all VDs on selected adapter(s) and information about physical drives that make up those VDs. The data displayed is a combination of -LDInfo and -PDInfo commands.

Get Virtual Disk Properties (-LdGetProp)

Syntax: MegaCli -LdGetProp Cache | Access | Name
| DskCache Lx|L0,1,2|-LALL -aN|-a0,1,2|-aALL

Description: Displays specific property of selected VD(s) on selected adapter(s). The information displayed is a subset of -PDInfo command.

Examples:

```
# MegaCli -LdGetProp Name Lall a0

Adapter 0-VD 0(target id: 0): Name: BootVol
```

```
Adapter 0-VD 1(target id: 1): Name: TestVol  
Exit Code: 0x00
```

Set Virtual Disk Properties (-LdSetProp)

Syntax: MegaCli -LdSetProp {Name LdNamestring} | RW|RO|Blocked
| WT|WB|RA|NORA|ADRA | Cached|Direct | EnDskCache|DisDskCache
| CachedBadBBU|NoCachedBadBBU Lx|L0,1,2|Lall -aN|-a0,1,2|-aALL

Description: Sets the specific property for the selected VD(s) on selected adapter(s).

Examples:

```
# MegaCli -LdSetProp Name TestVol L1 a0  
  
Set name to TestVol on Adapter 0, VD 1 (target id: 1) success  
  
Exit Code: 0x00
```

Virtual Disk Initialization Operation (-LdInit)

Syntax: MegaCli -LdInit {Start [Full]} | Abort | ShowProg
| ProgDsply Lx|L0,1,2|LALL -aN|-a0,1,2|-aALL

Description: Starts foreground initialization on selected VD(s) on selected adapter(s). A VD is not available for user data I/O during initialization. The “full initialization” process writes on all blocks of the VD while the “fast initialization” process completes very quickly after initializing a small number of starting and ending blocks of the VD. The controller automatically starts a background initialization process after certain intervals on “Fast” initialized VD(s).

NOTE: Destructive operation without any prompts – Data loss can occur.

Examples:

```
MegaCli -LDInit start L1 a0
```

Starts fast initialization on second VD on first PERC6 adapter in the system.

```
MegaCli -LDInit start full L1 a0
```

Starts full initialization on second VD on first PERC6 adapter in the system.

```
MegaCli -LDInit ShowProg Lall a0
```

Displays initialization progress information (Complete 0% in 0 Minutes) for all VDs on adapter-0.

Virtual Disk Background Initialization Operation (-LDBI)

Syntax: MegaCli -LDBI Enbl|Dsbl | getSetting | Abort | ShowProg
| ProgDsply Lx|L0,1,2|LALL -aN|-a0,1,2|-aALL

Description: Allows managing background initialization (BGI) on selected VD(s) on selected adapter(s). The PERC6 performance is impacted while BGI is in progress.

Examples:

```
# MegaCli -LDBI ShowProg Lall aall  
  
Background Initialization on VD #0 is not in Progress.  
Background Initialization on VD #1 is not in Progress.
```

Consistency Check Operation (-LDCC)

Syntax: MegaCli -LDCC {Start [force] | Abort | ShowProg
| ProgDsply Lx|L0,1,2|LALL -aN|-a0,1,2|-aALL

Description: Manages consistency check operations on selected VD(s) and adapter(s). The consistency check operation impacts the performance of the selected adapter(s).

Examples:

```
MegaCli -LDCC Start L1 -a0
```

Starts consistency check process on the second VD on the first PERC6 adapter in the system.

```
MegaCli -AdpEventLog GetCCIncon -f cclog L1 -a0
```

Reports if any errors were logged during the consistency check operation. The error details are extracted and saved in the **cclog** file.

RAID Level Migration and Online Capacity Expansion (-LDRecon)

Syntax: MegaCli -LDRecon {Start rX [{Add | Rmv} PhysDrv[E0:S0,...]]
| ShowProg | ProgDsply Lx -aN

Description: Allows RAID Level Migration (RLM) or Online Capacity Expansion (OCE) of selected VD. It also allows monitoring of the process.

Examples:

```
MegaCli -LDRecon Start r5[Add PhysDrv[32:7]] L1 -a0
```

Starts RLM of VD1 from RAID0 to RAID5 by adding PD in slot7. The VD capacity remains the same.

```
MegaCli -LDRecon Start r0[Add PhysDrv[32:7]] L1 -a0
```

Starts OCE of VD1 by adding PD in slot7. The VD RAID level remains the same.

```
MegaCli -LDRecon Start r0[Rmv PhysDrv[32:7]] L1 -a0
```

Starts RLM of VD1 from RAID5 to RAID0 by removing the PD in slot7. The VD capacity remains the same.

```
MegaCli -LDRecon Start r5[Add PhysDrv[32:6,32:7]] L1 -a0
```

Starts both RLM and OCE of VD1 from RAID0 to RAID5 by adding two PDs in slots 6 and 7. The VD RAID level and capacity both change after this process.

VIRTUAL DISK CONFIGURATION

VD configuration commands display, create, or delete virtual disks.

Display Existing RAID Configuration (-CfGdSpLy)

Syntax: MegaCli -CfGdSpLy -aN|-a0,1,2|-aALL

Description: Displays detailed information about existing Virtual Disk Configuration on selected adapter(s). Any HotSpare drives configured are not displayed but the number of dedicated HotSpare drives for a VD is provided.

Clear existing Configuration (-CfGClr)

Syntax: MegaCli -CfGClr -aN|-a0,1,2|-aALL

Description: Clears RAID configuration on selected adapter(s).

NOTE: Destructive operation without any prompts – Data loss can occur.

Delete Selected Virtual Disk (-CfGLdDel)

Syntax: MegaCli -CfGLdDel LX|L0,2,5...|LALL -aN|-a0,1,2|-aALL

Description: Deletes configuration of selected VD(s) on selected adapter(s).

NOTE: Destructive operation without any prompts – Data loss can occur.

Examples:

```
MegaCli -CfGLdDel L1 -a0
Deletes configuration of VD1 on adapter-0.
```

Configure a Virtual Disk with RAID Levels 0, 1 or 5 (-CfGLdAdd)

Syntax: MegaCli -CfGLdAdd rX[E0:S0,E1:S1,...] [WT|WB] [NORA|RA|ADRA]
[Direct|Cached] [CachedBadBBU|NoCachedBadBBU] [-szXXX [-szYYY ...]]
[-strpszM] [-Hsp[E0:S0,...]] [-AfterLdX] [-Force] -aN

Description: Performs configuration of a new VD with RAID level rX, on the selected adapter. Cache policies and other settings can optionally be selected as well. This command allows users to create a HotSpare along with configuration of a new VD.

Examples:

```
Megacli -CfGLdAdd r1[32:1,32:2] -a0
Configures a two-drive RAID1 VD with default settings.
```

```
MegaCli -CfGLdAdd r5[32:1,32:2,32:3] HSP[32:4] -a0
Configures a three-drive RAID5 VD with default settings and assigns PD in slot4 as a dedicated revertible HotSpare drive for the array hosting this VD.
```

Configure a Virtual Disk with RAID Levels 10 (-CfGSpanAdd)

Syntax: MegaCli -CfGSpanAdd r10 Array0[E0:S0,E1:S1] Array1[E0:S0,E1:S1]
[Array2[E0:S0,E1:S1] ArrayX[E0:S0,E1:S1] ...]
[WT|WB] [NORA|RA|ADRA] [Direct|Cached] [CachedBadBBU|NoCachedBadBBU]
[-szXXX[-szYYY ...]][-strpszM][-AfterLdX] -aN

Description: Performs configuration of a new VD with RAID level 10, on the selected adapter. Cache policies and other settings can optionally be selected as well.

Examples:

```
MegaCli -CfgSpanAdd r10 Array0[32:1,32:2] Array1[32:3,32:4]
Array2[32:5,32:6] -a0
```

Configures a six-drive RAID10 VD using drives in slots 1-6

Configure a Virtual Disk with RAID Levels 50 (-CfgSpanAdd)

Syntax: MegaCli -CfgSpanAdd r50 Array0[E0:S0,E1:S1,E2:S2,...]
Array1[E0:S0,E1:S1,E2:S2,...] [ArrayX[E0:S0,E1:S1,E2:S2,...] ...]
[WT|WB] [NORA|RA|ADRA] [Direct|Cached] [CachedBadBBU|NoCachedBadBBU]
[-szXXX[-szYYY ...]][-strpszM][-AfterLdX] -aN

Description: Performs configuration of a new VD with RAID level 50 on the selected adapter. Cache policies and other settings can optionally be selected as well.

Examples:

```
MegaCli -CfgSpanAdd r50 Array0[32:1,32:2,32:3] Array1[32:4,32:5,32:6]
-a0
```

Configures a six-drive RAID50 VD using drives in slots 1-6

Configure single drive RAID0 Virtual Disks (-CfgEachDskRaid0)

Syntax: MegaCli -CfgEachDskRaid0 [WT|WB] [NORA|RA|ADRA] [Direct|Cached]
[CachedBadBBU|NoCachedBadBBU] [-strpszM] -aN|-a0,1,2|-aALL

Description: Configures a VD on each physical drive attached to the controller that is in unconfigured (good) state.

MEGACLI OPERATION EXAMPLES

VD CREATE OPERATIONS

New VDs can be created with unconfigured drives on PERC controller. Such drives can be readily identified in the system by checking the output of `-PdList` command. To extract relevant information, the `grep(1M)` can be used as shown in the following syntax.

```
# MegaCli -PdList -a0 | /usr/xpg4/bin/grep -E 'Device|Firm|Inq|Coer'
```

The “Firmware state:” shows “Unconfigured (good)” for drives that can be used for creating new VDs. Check the “Coerced Size” field to ensure new VD has enough capacity. Once the drives for the new VD are identified, note the “Enclosure Device ID” and “Device ID”.

Configure a RAID0 VD

The following steps create a RAID0 VD on drives 1-5 and then perform a fast initialization. The system already has one VD configured so this new VD is L1.

```
# MegaCli -CfgLdAdd r0[32:1,32:2,32:3,32:4,32:5] -a0
# MegaCli -LdInit Start L1 -a0
```

These two operations show the new number of VDs on the controller and information about the new VD where Lx is the VD number.

```
# MegaCli -ldgetnum -a0
# MegaCli -ldinfo L1 -a0
```

Configure a RAID1 VD with WriteThru Cache Policy

The following steps create a RAID1 VD on drives 6-7 with WriteThru cache policy and then perform a full initialization. This would be the third VD configured on this controller (L2).

```
# MegaCli -CfgLdAdd r1[32:6,32:7] WT -a0
# MegaCli -LdInit Start Full L2 -a0
```

Note that the controller will start a background initialization (BGI) process after few minutes of creating a VD with redundant RAID level. Attempts to start initialization will fail if BGI has already started. The BGI progress can be checked as follows,

```
# MegaCli -LdBI ShowProg L2 -a0
```

Delete Selected VD

The following step deletes the second and third virtual disks configured on adapter-0 earlier.

```
# MegaCli -CfgLdDel L1,2 -a0
```

Configure a RAID5 VD with Dedicated HotSpare and Add a Dedicated HotSpare

A dedicated HotSpare can be configured along with the configuration of new redundant level VDs. The following command creates a RAID5 VD on drives 1-3 and a dedicated HotSpare on drive ID 4. This would be VD number L1 on this controller.

```
# MegaCli -CfgLdAdd r5[32:1,32:2,32:3] HSP[32:4] -a0
```

The following command assigns physical drive in slot 6 as a dedicated HotSpare for the diskgroup containing L1. Since this configuration has one simple VD on each diskgroup, the array number matches VD number.

```
# MegaCli -PDHSP Set Dedicated Array1 PhysDrv[32:6] -a0
```

The HotSpares configured can be verified with the following command. Note the “Firmware state:”, “Type:” and “Array #:” fields.

```
# MegaCli -PDInfo PhysDrv[32:4,32:6] a0
```

Dedicated HotSpares configured for a given VD can be checked with the following command.

```
# MegaCli -LdInfo L1 a0
```

Creating a RAID 10 Virtual Disk

The following command creates a new VD on Drives 1-6 with default settings.

```
# MegaCli -CfgSpanAdd -r10 Array0[32:1,32:2] Array1[32:3,32:4] Array2[32:5,32:6] -a0
```

Creating a RAID 50 Virtual Disk

The following command creates a new VD on Drives 1-6 with default settings.

```
# MegaCli -CfgSpanAdd -r50 Array0[32:1,32:2,32:3] Array1[32:4,32:5,32:6] -a0
```

Creating a RAID 6 Virtual Disk

The following command creates a new VD with RAID Level 6 on Drives 1-6 with default settings.

```
# MegaCli -CfgLdAdd r6[32:1,32:2,32:3,32:4,32:5,32:6] -a0
```

RLM: RAID0 to RAID5

The following example configuration has a RAID 0 on drives 1-3 on the second VD. To add another drive to this configuration and transition to RAID5, use the following steps which check the existing configuration and then start the RLM process and verify the exit status.

```
# MegaCli -LDInfo L1 a0
# MegaCli -LDRecon Start r5[Add PhysDrv[32:4]] L1 -a0
# MegaCli -LDRecon ShowProg L1 -a0
```

Check the VD information and note that it still displays as a 3-disk RAID0 but it also displays the reconfiguration in progress under "Ongoing Progresses" field. The VD configuration information changes after the RLM has completed successfully.

```
# MegaCli -LDinfo l1 a0
```

The following step increases reconstruction rate for the adapter to 60%. Note this will impact performance of the subsystem.

```
# MegaCli -AdpSetProp ReconRate 60 -a0
```

Online Capacity Expansion

In this example, the capacity of the RAID5 VD is expanded by adding two more physical drives.

```
# MegaCli -LDRecon Start r5[Add PhysDrv[32:5,32:6]] L1 -a0
```

Configuring a Global Hot Spare

The following step configures drive 7 as a global hot spare.

```
# MegaCli -PDHSP Set PhysDrv[32:7] -a0
```

EXAMPLE SCRIPT USING MEGACLI TO MONITOR PERC6 STATUS

This example perl script can be used to monitor PERC6 status in a Solaris 10 environment. It returns zero when PERC6 status is OK.

```
#!/usr/bin/perl -w
#
# Check status of RAID on PERC 6/i using MegaCli.
#####
# Last updated 6/5/2008
#
BEGIN {
$ENV{'PATH'} = '/usr/bin';
$ENV{'ENV'} = '';
}

use strict;
use warnings;

my $Adp_Name = "";
my $Adp_FW = "";
my $VD_count = "";
my $VD_degraded = 0;
my $VD_offline = 0;
my $PDisk_count = 0;
my $PD_critical = 0;
my $PD_failed = 0;
my $error_count = 0;
my $Mem_Uncorrectable = 0;

open(TMP_, "MegaCli -AdpAllinfo -a0|");
while (<TMP_>) {
  chomp;
  if ($_ =~ /^Product Name      : /) {
    $Adp_Name = substr($_,18);
    next;
  }

  if ($_ =~ /^FW Package Build: /) {
    $Adp_FW = substr($_,18);
    next;
  }

  if ($_ =~ /^Virtual Drives      : (\d+)/) {
    $VD_count = $1;
    next;
  }

  if ($_ =~ /^  Degraded          : (\d+)/) {
    if ($1 != 0) {
      $error_count = $error_count + 1;
    }
    $VD_degraded = $1;
    next;
  }
}
```

```

if ($_ =~ /^ Offline          : (\d+)/) {
    if ($1 != 0) {
        $error_count = $error_count + 1;
    }
    $VD_offline = $1;
    next;
}

if ($_ =~ /^ Disks           : (\d+)/) {
    $PDisk_count = $1;
    next;
}

if ($_ =~ /^ Critical Disks  : (\d+)/) {
    if ($1 != 0) {
        $error_count = $error_count + 1;
    }
    $PD_critical = $1;
    next;
}

if ($_ =~ /^ Failed Disks    : (\d+)/) {
    if ($1 != 0) {
        $error_count = $error_count + 1;
    }
    $PD_failed = $1;
    next;
}

if ($_ =~ /^Memory Uncorrectable Errors : (\d+)/) {
    if ($1 != 0) {
        $error_count = $error_count + 1;
    }
    $Mem_Uncorrectable = $1;
    next;
}
}
close(TMP_);
print("Checking status on $Adp_Name FW $Adp_FW \n");
print("Error count is $error_count \n");
if ($error_count > 0) {
    print("Virtual Disk count is $VD_count. Degraded = $VD_degraded and offline
= $VD_offline.\n");
    print("Physical Disk count is $PDisk_count. Critical=$PD_critical and
failed=$PD_failed.\n");
    print("Uncorrectable Memory Errors: $Mem_Uncorrectable \n");
}
exit($error_count);

```