

Dell Lifecycle Controller 1.4 simplifies server management



MORE ROBUST
inventory and
log reports

EASIER
disk controller
replacement



Dell™ PowerEdge™ R710 server vs. HP ProLiant DL380 G6 server with HP Smart Update

OUR FINDINGS

–The Dell Lifecycle Controller simplifies server management

when compared to HP Smart Update. To validate these points we performed two common system administrator tasks, which included replacing a storage controller and obtaining the current system firmware versions and a firmware revision log.

–In our tests, the Dell Lifecycle Controller took fewer steps to perform a part replacement than the HP Smart Update

Firmware Manager; one step compared to eight steps. The Dell Lifecycle Controller automatically updated the new storage controller to the correct firmware version and transferred all pertinent setup information. The HP Smart Update Firmware Manager not only required more steps to complete the controller change, but we also had to record the firmware version of the old controller and then manually update the controller firmware.

–The Dell Lifecycle Controller provided enhanced reporting compared to HP Smart Update and was available bare-metal

without requiring OS-based agents. The Dell Lifecycle Controller Log reports for the current system state were also richer in content and provided a complete firmware revision log, which was not available through the HP Smart Update Firmware Manager. In addition, the Lifecycle Log had all of

the revisions and history available without having to boot to the operating system, requiring no logon credentials.

OUR PROCESS

To compare the Dell Lifecycle Controller with HP Smart Update, we performed our two system-management operations on the Dell PowerEdge R710 server and the HP ProLiant DL380 G6 server. We replaced the storage controller card and remotely retrieved and exported current firmware versions as well as a revision log. We then counted the number of steps involved in each task to determine the efficiency of each management system. In addition, we observed the relative difficulty and automation possibilities of each task on the competing systems. The goal was to evaluate the ease of use of each server-management tool as each relates to server part replacement and system reporting capabilities. We represent the results in terms of number of steps required to perform the tasks and as an evaluation of the level of automation possible on each system. We also describe our observations of the relative difficulty of the desired tasks in the Server management features and What we found sections.

SERVER MANAGEMENT FEATURES

We configured a pair of 2U servers from Dell and HP and matched the hardware and operating systems as closely as possible. The Dell server management tool was the Dell Lifecycle Controller 1.4, while the HP tool was the HP Smart Update Firmware Manager 9.00. Appendix A provides complete configuration information for the two servers.

The Dell Lifecycle Controller's ability to retain configuration and firmware data makes Dell servers nearly self-repairing for many replacement parts and allows less-skilled technicians to perform what are normally more technical tasks. These serviceability and management features are built-in and require little or no additional infrastructure as the Dell Lifecycle Controller leverages industry standards like Unified Extensible Firmware Interface (UEFI) and Human Interface Infrastructure (HII). The Dell Lifecycle Controller also has the capability to download updates via FTP and takes advantage of built-in operating system components such as Windows Remote Management and Web Services for Management.



The Dell Lifecycle Controller's ease of use allows less skilled technicians to perform what are normally more technical tasks.

Serviceability: Part replacement

The Dell Lifecycle Controller allows administrators to replace parts without worrying about firmware versions, part configurations, additional software media, or other utilities. With logging enabled, the Dell Lifecycle Controller tracks firmware revisions and automatically updates replacement parts to the current firmware version during the first boot process after the replacement occurs. The technician simply replaces the part and the Dell Lifecycle Controller does the rest. The replacement options can also

be set locally or remotely. The technician can set them to match whatever the previously installed firmware of the replacement part was (whether it is upgrade or downgrade revision), to upgrade and configure only if the firmware matches, or to upgrade always.

Note: The Dell Lifecycle Controller's part replacement capabilities support other components as well, including network cards and power supplies. See

http://support.dell.com/support/edocs/software/smusc/smlc/lc_1_4/usclce/en/index.htm for more information. We did not test these items in this study.

HP offers an automatic firmware update via their bootable HP Smart Update Firmware Manager DVD, which auto-installs the latest firmware version included on the DVD. This process, however, requires administrators to continually download and create the latest DVD from the HP Web site. If the HP Smart Update Firmware Manager DVD does not include the latest firmware, the administrator must create a bootable USB key with the latest drivers found on the HP Web site. There is an automatic process with the HP Smart Update Firmware Manager DVD, which checks for earlier versions of firmware and updates as needed from the DVD. This process, however, requires intervention in order to roll back any version of software, assuming the replacement part has newer firmware than desired.

Remote services: Reporting

Dell Lifecycle Controller's built-in log reporting capabilities allow for more robust current system data than the corresponding HP offering, and also offer additional historical log functions that HP does not offer. The Dell Lifecycle Controller takes advantage of Microsoft® Windows Server®-based and Linux®-based operating systems to work with Web Services for Management (WS-Management) and Windows Remote Management (WinRM) to access the Dell Lifecycle Controller data locally or remotely to provide these rich reporting capabilities, which include hardware inventory with firmware revisions and the Lifecycle Log. The Lifecycle Log report shows a comprehensive list of firmware and BIOS revision changes, available for updating or rolling back versions, in an easy-to-export XML format. The content also includes the "as shipped" information, making it extremely easy to reset firmware on any component to a version matching the original factory-shipped configuration. Administrators can open the file in Microsoft Excel® or any other XML-compatible software. All of this data is accessible remotely via WinRM.

In contrast, HP includes a command-line switch in the latest release of the HP Smart Update Manager to retrieve inventory information. (Note: The HP Smart Update Manager is a component of the HP Smart Update Firmware DVD 9.00.) While this tool generates a hardware and firmware inventory report similar to the Dell Lifecycle Controller report, the HP report is more basic, reporting only current hardware and firmware versions. Our testers also found it more confusing than the Dell Lifecycle Log report; for example, the command-line report shows the category and product ID number with the version number, but does not specify the name of the item. The HP report is in HTML and XML formats and can be executed from the DVD or copied locally to the host computer. With additional configuration and command-line switches, the system administrator also has the option of running the reports remotely.

WHAT WE FOUND

Serviceability: Storage controller card replacement

Flashing the firmware for the replacement part and recovering the card settings

For this test, we replaced a RAID controller card in each server and flashed the firmware to bring the component into compliance with the other components in the server. For the Dell PowerEdge R710, we replaced a Dell PERC 6/i RAID controller card. For the HP ProLiant DL380 G6, we replaced an HP Smart Array P212 RAID controller card.

It took only one step to replace the controller card and flash the firmware on the Dell PowerEdge R710, while it took eight steps to complete the same task on the HP ProLiant DL380 G6. For detailed information on the steps we followed to complete this task on each server, see the How we tested section.

Due to the media-free design and self-discovery features of the Dell Lifecycle Controller, the Dell PowerEdge R710 required no external media. Because the Dell PowerEdge R710 had been running with Collect System Inventory enabled, the Dell Lifecycle Controller recorded the version of firmware on the previous PERC 6/i. We only had to install the new Dell PERC 6/i and boot the system to complete the part replacement. The Dell Lifecycle Controller detected the new component, matched the card configuration, and automatically flashed the firmware to match the version on the old card. In addition, we ran several tests where we individually changed all Dell PERC 6/i settings and we noted that the configurations were recovered 100 percent of the time.

In this report, we discuss the automated nature of replacing a storage controller. However, the Dell Lifecycle Controller's part replacement capabilities support other components as well. For example, the Dell Lifecycle Controller will automatically upgrade the firmware on a replacement power supply. For a replacement NIC, the Dell Lifecycle Controller will update the firmware and preserve the NIC configuration information. We did not test these capabilities. You can, however, find more information and a list of supported devices in the *Dell Lifecycle Controller USC/USC-LCE Version 1.4 User's Guide* in the Part



The Dell Lifecycle Controller simplifies administrator tasks, such as installing a controller card, by automatically updating firmware and configuration information.

Replacement Configuration section, starting on page 66. The user's guide is available in HTML and PDF formats at http://support.dell.com/support/edocs/software/smusc/smlc/lc_1_4/usclce/en/index.htm.

The HP ProLiant DL380 G6 required us to download and create an HP Smart Update Firmware Manager DVD for the part replacement. We used the DVD and automatically updated the firmware to the latest available on the DVD. Unlike the Dell Lifecycle Controller, the HP Smart Update Firmware Manager offered no automatic tracking of previous firmware versions, so we had to record and track this information manually. These additional steps could cause significant time delays or could introduce human error into the process for the HP Smart Update Firmware Manager.

Remote services: Inventory and log reports

For this test, we took advantage of Web Services for Management and Windows Remote Management—both standard components of the Microsoft Windows Server 2008 R2 operating system—to retrieve the information from the Dell Lifecycle Controller and export it to XML files.



The Dell Lifecycle Controller includes both an Inventory report and the Lifecycle Log, which automatically track all firmware and BIOS revision changes to allow easy updates and rollbacks to a desired firmware version.

Dell Lifecycle Controller's inventory feature enables consoles to create a report of bare-metal inventory for a new system or the entire data center for auditing, maintaining firmware and configuration baselines, and reporting. The Dell Lifecycle Log enables consoles to create a report of firmware, configuration, and part changes in a system. The server automatically stores the log information without any user intervention. The user can also append custom comments to the log as required.

Because the HP Smart Update Firmware Manager does not log the firmware or BIOS changes as the Dell Lifecycle Controller does, we must manually gather the system firmware information.

HOW WE TESTED

Serviceability: Storage controller card replacement

We started the replacement of the storage controller card in each server with a cold boot. For the Dell PowerEdge R710, we replaced and updated a Dell PERC 6/i RAID controller card in one step. For the HP ProLiant DL380 G6, we replaced and updated an HP Smart Array P212 RAID controller card in eight steps. This

assumes we previously downloaded and created the HP Firmware Maintenance v9.00 CD; a process that would otherwise add approximately 30 minutes to the task. Figure 1 details the steps required to flash the firmware and update the configuration of a replacement part on each server. Fewer steps are better. The Dell Lifecycle Controller part replacement process took fewer steps and required no downloading or creation of additional media.

Dell PowerEdge R710: Flashing firmware for the replacement part (1 step)	HP ProLiant DL380 G6: Flashing firmware for the replacement part (8 steps)
<p><i>Note: We previously enabled Collect System Inventory on Restart in the Part Replacement Configuration from within the USC GUI. We then turned off the server and replaced the Dell PERC 6i RAID card.</i></p> <ol style="list-style-type: none"> 1. Turn on the server. Wait through the three-step firmware upgrade and reboot process for the firmware update to automatically complete. Once the three-step firmware process has completed, the system will reboot. 	<p><i>Note: We previously downloaded and created the HP Firmware Maintenance v9.00 CD to perform this test. We then turned off the server and replaced the HP Smart Array P212 RAID card.</i></p> <ol style="list-style-type: none"> 1. Turn on the server, and insert the HP Firmware Maintenance CD. 2. Select Interactive Firmware Update Version 9.00. 3. Select English, and click Continue. 4. Accept the license agreement by clicking Agree. 5. Select the Firmware Update tab, and click Install Firmware. 6. Select Smart Array P212, and click Install. 7. When prompted to reboot, click reboot and wait while the system restarts. 8. Visually check controller firmware version on POST to ensure the correct version is present.

Figure 1: Steps each server requires to flash the firmware for the replacement part. Fewer steps are better.

Remote services: Hardware/firmware inventory and Lifecycle Log reports

Retrieving inventory reports takes more intervention than the RAID controller replacement and requires manual command-line input for both the Dell PowerEdge R710 and the HP ProLiant DL380 G6. By leveraging the built-in WinRM and WS-Management tools, Dell has provided libraries and functions that, when used with the WinRM commands, return and export a wide variety of reports.

Here we present an overview of the steps we used for the testing and retrieval. The steps we followed assume that the WinRM and WS-Management services have already been set up and are running properly.

Figure 2 details the steps required for retrieving and exporting the inventory report for both test servers. Figure 3 illustrates the steps required for retrieving and exporting the Lifecycle Log report for the Dell

PowerEdge R710. Fewer steps are better. The Dell reporting process took fewer steps and required no downloading or creation of additional media.

Dell PowerEdge R710: inventory report (3 steps)	HP ProLiant DL380 G6: inventory report (5 steps)
<p><i>Note: We initially generated the commands in Microsoft Windows® Notepad so we could copy and paste them into the command window.</i></p> <ol style="list-style-type: none"> 1. Open a command prompt. 2. Enter WinRM command to execute Inventory report. (Please see Appendix B for exact text.) 3. Open the reports in Microsoft Excel. 	<p><i>Note: We previously downloaded and created the HP Firmware Maintenance v9.00 CD in order to perform this test.</i></p> <ol style="list-style-type: none"> 1. Insert HP Smart Update Firmware DVD. 2. Open a command prompt, and change to DVD-ROM drive letter. 3. At the command prompt, type <code>cd\hp\swpackages</code> 4. At the command prompt, type <code>hp_sum/firmware_inventory</code> 5. Open the html file in Internet Explorer®.

Figure 2: Steps required to generate the inventory reports. Fewer steps are better.

Dell PowerEdge R710: Lifecycle Log (3 steps)	HP ProLiant DL380 G6
<p><i>Note: We initially generated the commands in Microsoft Windows Notepad so we could copy and paste them into the command window.</i></p> <ol style="list-style-type: none"> 1. Open a command prompt. 2. Enter WinRM command to execute Lifecycle Log report. (Please see Appendix B for exact text.) 3. Open the reports in Microsoft Excel. 	<p>We noted no Lifecycle Log or equivalent in this test.</p>

Figure 3: Steps required to generate the Lifecycle Log report.

APPENDIX A – SERVER CONFIGURATION INFORMATION

Figure 4 provides detailed configuration information for the two test servers.

Servers	Dell PowerEdge R710	HP ProLiant DL380 G6
General dimension information		
Height (inches)	3.50	3.39
Width (inches)	17.50	17.53
Depth (inches)	27.00	25.81
U size in server rack (U)	2	2
Power supplies		
Total number	2	2
Wattage of each (W)	570	460
Cooling fans		
Total number	5	6
Dimensions (h x w) of each	2.50" x 2.50"	2.38" x 2.50"
Voltage (V)	12	12
Amps (A)	1.60	2.45
General processor setup		
Number of processor packages	2	2
Number of cores per processor package	4	4
Number of hardware threads per core	2	2
CPU		
Vendor	Intel	Intel
Name	Xeon E5540	Xeon E5540
Stepping	D0	D0
Socket type	LGA1366	LGA1366
Core frequency (GHz)	2.53	2.53
L1 cache	4 x 32 KB + 32 KB	4 x 32 KB + 32 KB
L2 cache	4 x 256 KB	4 x 256 KB
L3 cache (MB)	8 (shared)	8 (shared)
Platform		
Vendor and model number	Dell PowerEdge R710	HP ProLiant DL380 G6
Motherboard model number	0M233H	PADAB0G9VXC1CQ
Motherboard revision number	13	0G
BIOS name and version	Dell 2.1.9 (5/21/2010)	HP BIOS P62 (01/13/2010)
BIOS settings	Memory Operating Mode set to Optimizer Mode	Advanced Memory Protection set to Advanced ECC Support
Management tool	Dell's Lifecycle Controller 1.4	HP Smart Update Firmware Manager 9.00 released April 12, 2010
Out-of-bound management	iDRAC6 Enterprise (version 1.50)	iLO2

Servers	Dell PowerEdge R710	HP ProLiant DL380 G6
Memory modules		
Total RAM in system (GB)	12	12
Vendor and model number	Samsung M393B5673DZ1	Samsung M393B5673DZ1
Type	PC3-10600R DDR3	PC3-10600R DDR3
Speed (MHz)	1,333	1,333
Speed in the system currently running @ (MHz)	1,066	1,066
Timing/latency (tCL-tRCD-iRP-tRASmin)	7-7-7-37.5	7-7-7-37.5
Size (GB)	12	12
Number of RAM modules	6 x 2 GB	6 x 2 GB
Chip organization	Double-sided	Double-sided
Hard disk		
Vendor and model number	Seagate ST973451SS	HP DH072BB978 (Seagate ST973451SS)
Number of disks in system	4	4
Size (GB)	73	72
Buffer size (MB)	16	16
RPM	15,000	15,000
Type	SAS	SAS
Operating system		
Name	Windows Server 2008 R2 Enterprise Edition	Windows Server 2008 R2 Enterprise Edition
Build number	7600	7600
File system	NTFS	NTFS
Language	English	English
Network card/subsystem		
Vendor and model number	2 x Broadcom NetXtreme II 5709C Dual-Port Ethernet	HP NC382i Dual Port Multifunction Gigabit Server Adapter
Type	Integrated	Integrated
Optical drive		
Vendor and model number	TEAC DV-28S-VDB	LG GDR-D20N DVD-ROM
USB ports		
Number	4	4
Type	2.0	2.0

Figure 4: Detailed system configuration information for the two test servers.

APPENDIX B – DETAILED WINRM COMMAND INFORMATION

Command script for exporting the Hardware Inventory report for the Lifecycle Controller:

```
winrm i ExportHWInventory http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla  
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:USERNAME -  
p:PASSWORD -r:https://IDRAC_IP/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic  
{IPAddress="IP_OF_SHARE";ShareName="SHARE_NAME";ShareType="0";Username="USERNAME_2";Pass  
word="PASSWORD_2";FileName="HWInvlog.xml"}
```

Command script for exporting the Lifecycle Log report for the Lifecycle Controller:

```
winrm i ExportLCLog http://schemas.dmtf.org/wbem/wscim/1/cim-  
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla  
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:USERNAME -  
p:PASSWORD -r:https://IDRAC_IP/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic  
{IPAddress="IP_OF_SHARE";ShareName="SHARE_NAME";ShareType="0";Username=""  
USERNAME_2";Password=" PASSWORD_2";FileName="LCLInvlog.xml"}
```

Note: The USERNAME and PASSWORD parameters are for the IDRAC interface. The IDRAC_IP is the IP address of the IDRAC. “IP_OF_SHARE” refers to the IP of server where you would like to store the report. The SHARE_NAME, USERNAME_2 and PASSWORD_2 must be included to gain access to the share. In our case, we exported back to a directory on the same computer we were testing.

ABOUT PRINCIPLED TECHNOLOGIES



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