Principled Technologies®

TEST REPORT
MARCH 2010

Comparison of system administration tasks: Dell Unified Server Configurator version 1.3 vs. HP SmartStart version 8.30 x64

Executive summary

Dell Inc. (Dell) commissioned Principled Technologies (PT) to compare the following eight system management operations on the Dell™ PowerEdge™ R710 and HP ProLiant DL380 G6:

- Pre-OS deployment
- Windows Server® 2008 R2 deployment
- Updating the BIOS
- Rolling back the BIOS
- Configuring BIOS and NIC options
- Configuring RAID 5 (outside of OS installation)
- Loading diagnostics
- Flashing the firmware for a replacement part

For the Dell PowerEdge R710, the Dell Unified Server Configurator (Dell USC) version 1.3 enabled by the Lifecycle Controller provides a single interface for firmware and other updates, hardware configuration, RAID management, native deployment of supported operating systems, and system diagnostics. Because the Dell USC is on an embedded chip, no compact discs (CDs) are necessary and no recovery partition is required; your system management is not at risk should a disk drive go bad. We were able to perform all the system management tasks via the Dell USC.

KEY FINDINGS

- The Dell USC 1.3's unified design let us complete all tasks in this report on the Dell PowerEdge R710 through a single interface. For the HP ProLiant DL380 G6, we had to use four different utilities.
- The Dell USC 1.3's media-free design greatly reduced the external media we needed to complete the tasks in this report compared to the HP ProLiant DL380 G6, which required a maintenance CD and two ROMPaq bootable USB drives.
- The system data archived in the Lifecycle Controller's dedicated, on-chip RAM greatly simplifies rollback operations and keeps firmware versions in sync after replacing a system component, such as a RAID controller.
- Dell USC 1.3 has many features beyond those the tasks in this report required, including onboard support for six languages, powerful remote management capabilities, UEFI and HII standards compliance and FTP downloading capabilities directly to the Lifecycle controller.

For the HP ProLiant DL380 G6, we had to use four utilities. The main utility we used was HP SmartStart (SmartStart) version 8.30, x64. Unlike the Dell USC, SmartStart is a CD-based utility. However, we could not execute all management tasks using SmartStart; we also had to use the ROM-Based Setup Utility (RBSU), two different ROMPaq bootable USB drives, and the HP Firmware Maintenance v8.70 CD.

For results and a description of the comparison, see the Test results section. For complete test system configuration information, see Appendix A; for more detailed test information, see Appendix B.

The Dell USC also has many features that we did not need for the tasks in this report. These include the following:

- Onboard support for six languages (English, Spanish, French, German, Japanese, and Simplified Chinese),
- Powerful remote management capabilities, full compliance with the UEFI and HII standards
- The ability to connect directly to the Dell FTP site and automatically determine the firmware versions available for update for the specific machine that makes the request.

The Dell USC has many features whose benefits are not quantified as part of this study, but can be significant in real-world user environments.. One example is the reduced staff training for future updates that a single, standards-based interface allows.

For more information, see http://www.delltechcenter.com/page/Lifecycle+Controller.

What we tested/What we found

Pre-OS deployment

For this test, we selected Microsoft® Windows Server 2008 R2 Enterprise as the operating system to deploy, but stopped the timers when the system prompted us for the installation media. Therefore, the operations in this test, such as configuring the RAID, should apply to installing any supported OS.

Due to the media-free design of the Dell Unified Server Configurator (USC), the Dell PowerEdge R710 required no external media at all.

The HP ProLiant DL380 G6 required the HP SmartStart 8.30 x64 CD to configure the server.

Figure 1 shows the times required to prepare a server to deploy an operating system. The Dell USC 1.3 on the Dell PowerEdge R710 took 3 minutes and 36 seconds to prepare for the deployment. This is 58.54 percent faster than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 8 minutes and 41 seconds.

Pre-OS deployment	Dell USC 1.3 on Dell PowerEdge R710	HP SmartStart 8.30 x64 on HP ProLiant DL380 G6
Total time required	3:36	8:41

Figure 1: Time to prepare for deployment. Times are in minutes:seconds. Shorter times are better.

Windows Server 2008 R2 deployment

For this test, we fully deployed Microsoft Windows Server 2008 R2 Enterprise.

Due to the media-free design of the Dell USC, the Dell PowerEdge R710 only required the Windows Server 2008 R2 installation DVD. The HP ProLiant DL380 G6 required both the HP SmartStart 8.30 x64 CD and the Windows Server 2008 R2 DVD to deploy the operating system.

Figure 2 shows the times required for a complete deployment of Microsoft Windows Server 2008 R2 Enterprise. The Dell USC 1.3 on the Dell PowerEdge R710 took 32 minutes and 25 seconds to complete the deployment. This is 10.29 percent faster than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 36 minutes and 8 seconds.

Windows Server 2008 R2 deployment	Dell USC 1.3 on Dell PowerEdge R710	HP SmartStart 8.30 x64 on HP ProLiant DL380 G6
Total time required	32:25	36:08

Figure 2: Time to deploy Windows Server 2008 R2. Times are in minutes:seconds. Shorter times are better.

Note: Had the system administrator been unable to find the HP SmartStart CD, he or she could download it and burn a copy. Adding the time to download the image and burn the CD increased the deployment time on the HP ProLiant DL380 G6 to 55 minutes and 55 seconds. However, because this would be a one-time cost, we exclude it from the time in the table above.

Updating the BIOS

The media-free design of the USC lets you update the Dell PowerEdge R710 running Dell USC 1.3 to the latest BIOS with no external media. The USC can connect directly to Dell's FTP server and find the latest BIOS for the machine making the request automatically. There is never any confusion about what version a specific machine requires. However, for this test, we needed to make sure the version of the BIOS did not change and we did not want Internet latency and bandwidth to affect our results. Therefore, we created a repository containing version 1.3.6 of the BIOS and stored it on a USB thumb drive. The fixed nature of the test thus handicapped the USC somewhat, forcing the use of a USB drive that would not be required for updating to the latest BIOS.

For the HP ProLiant DL380 G6, we used the ROMPaq utility to create a bootable USB thumb drive. (You cannot update the BIOS using HP SmartStart.) This bootable USB drive is always required to update the BIOS for the HP ProLiant DL380 G6.

Figure 3 shows the times required update the BIOS, not including the reboot after. The Dell USC 1.3 on the Dell PowerEdge R710 took 4 minutes and 9 seconds to update the BIOS, not counting the time to reboot. This is 29.69 percent slower than ROMPaq bootable USB thumb drive on the HP ProLiant DL380 G6, which took 3 minutes and 12 seconds.

Updating the BIOS	Dell USC 1.3 on Dell PowerEdge R710	ROMPaq bootable USB drive on HP ProLiant DL380 G6
Total time required, not including the reboot	4:09	3:12

Figure 3: Time to update the BIOS. Times are in minutes:seconds. Shorter times are better.

Rolling back the BIOS

Dell USC version 1.3 can roll back the BIOS to its previous version with no extra media at all. This is because the Lifecycle Controller archives the previous version of the BIOS in its dedicated on-chip RAM. There is never any confusion about the previous version of the BIOS. You know that the version to which you are rolling back is the correct version.

For the HP ProLiant DL380 G6, we used the ROMPaq utility to create a bootable USB thumb drive. (You cannot update the BIOS using HP SmartStart.) This bootable USB drive is always required to roll back the BIOS for the HP ProLiant DL380 G6. There is no automatic way to determine the previous version of the BIOS, so you must record and track this manually.

Figure 4 shows the times required to roll back the BIOS, not including the reboot after. The Dell USC 1.3 on the Dell PowerEdge R710 took 4 minutes and 1 second to update the BIOS. This is 22.34 percent slower than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 3 minutes and 17 seconds.

Rolling back the BIOS	Dell USC 1.3 on Dell PowerEdge R710	ROMPaq bootable USB drive on HP ProLiant DL380 G6
Total time required, not including the reboot	4:01	3:17

Figure 4: Time to roll back the BIOS. Times are in minutes:seconds. Shorter times are better.

Configuring BIOS and NIC options

The integrated design of the Dell USC allowed us to perform this operation from the same interface as our other test cases.

For the HP ProLiant DL380 G6, we had to use the ROM-based Setup Utility (RBSU), rather than HP SmartStart for this operation.

Figure 5 shows the times required to configure the BIOS and a NIC. We explain the exact configuration options below. The Dell USC 1.3 on the Dell PowerEdge R710 took 4 minutes and 42 seconds to configure the BIOS and NIC. This is 4.06 percent slower than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 4 minutes and 31 seconds.

Configuring BIOS and NIC options	Dell USC 1.3 on Dell PowerEdge R710	HP RBSU on HP ProLiant DL380 G6
Total time required	4:42	4:31

Figure 5: Time to configure the BIOS and NIC. Times are in minutes:seconds. Shorter times are better.

Configuring RAID 5 (outside of OS installation)

Due to the media-free design of the Dell USC, the Dell PowerEdge R710 required no external media. The HP ProLiant DL380 G6 required the HP SmartStart 8.30 x64 CD to configure the server.

Figure 6 shows the times required to configure a RAID 5 outside of an OS installation. We explain the exact configuration options below. The Dell USC 1.3 on the Dell PowerEdge R710 took 2 minutes and 38 seconds to configure the RAID. This is 48.03 percent faster than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 5 minutes and 4 seconds.

Configuring RAID 5 (outside of OS installation)	Dell USC 1.3 on Dell PowerEdge R710	HP SmartStart 8.30 x64 on HP ProLiant DL380 G6
Total time required	2:38	5:04

Figure 6: Time to configure a RAID 5 outside of an OS installation. Times are in minutes:seconds. Shorter times are better.

Loading diagnostics

Due to the media-free design of the Dell USC, the Dell PowerEdge R710 required no external media at all. The HP ProLiant DL380 G6 required the HP SmartStart 8.30 x64 CD to configure the server.

Figure 7 shows the times required to power on the server and load the diagnostics. The Dell USC 1.3 on the Dell PowerEdge R710 took 2 minutes and 33 seconds to load the diagnostics. This is 46.69 percent faster than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 4 minutes and 47 seconds.

Loading diagnostics	Dell USC 1.3 on Dell PowerEdge R710	HP SmartStart 8.30 x64 on HP ProLiant DL380 G6
Total time required	2:33	4:47

Figure 7: Time to load the diagnostics. Times are in minutes:seconds. Shorter times are better.

Flashing the firmware for the replacement part

For this test, we replaced a RAID controller 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 PERC 6/i RAID controller. For the HP ProLiant DL380 G6, we replaced a P410i RAID controller.

Due to the media-free design and self-discovery features of the Dell USC, the Dell PowerEdge R710 required no external media. Because the Dell PowerEdge R710 had been running with Collect System Inventory enabled, the Lifecycle Controller had recorded the version of firmware on the previous PERC 6/i. All we had to do was install the new PERC 6/i and boot the system. The Lifecycle Controller detected the new component and automatically flashed the firmware to the version on the old card. We used F10 to enter the Dell USC 1.3 GUI and stopped the timer when the GUI was up.

The HP ProLiant DL380 G6 required that we download and create an HP Firmware Maintenance v8.70 CD. (Because it is a one-time step, we do not include the time to download and burn this CD in the time below.) There is no automatic way to determine the previous version of the firmware, so one must record and track this manually. These additional steps could cause significant time delays for the HP solution.

Figure 8 shows the times required to power on the server and flash the firmware for a replacement part. The Dell USC 1.3 on the Dell PowerEdge R710 took 7 minutes and 11 seconds to power on the server and flash the part's firmware. This is 13.80 percent faster than SmartStart 8.30 x64 on the HP ProLiant DL380 G6, which took 8 minutes and 20 seconds.

Flashing the firmware for the replacement part	Dell USC 1.3 on Dell PowerEdge R710	HP Firmware Maintenance v8.70 on HP ProLiant DL380 G6
Total time required	7:11	8:20

Figure 8: Time to power on the server and flash the firmware for the replacement part. Times are in minutes:seconds. Shorter times are better.

Appendix A – Test system configuration information

This appendix provides detailed configuration information about each of the test server systems.

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	8
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 1.3.6 (12/14/2009)	HP BIOS P62 (01/13/2010)
BIOS settings	Memory Operating Mode set to Optimizer Mode	Advanced Memory Protection set to Advanced ECC Support

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	Seagate ST973451SS
Number of disks in system	5	5
Size (GB)	73	73
Buffer size (MB)	16	16
RPM	15,000	15,000
Type	SAS	SAS
Operating system		
Name	Windows Server 2008 R2 Enterprise	Windows Server 2008 R2 Enterprise
Build number	7600	7600
File system	NTFS	NTFS
Language	English	English
Network card/subsystem		
Vendor and model number	Broadcom NetXtreme II 5709C Dual-Port Ethernet	Broadcom NetXtreme II 5709C Dual-Port Ethernet
Type	Integrated	Integrated
Optical drive		
Vendor and model number	TSSTcorp TS-L333A DVD-ROM	LG GDR-D20N DVD-ROM
USB ports		
Number	4	4
Type	2.0	2.0

Figure 9: Detailed system configuration information for the two test servers.

Appendix B – Detailed test information

This document provides detailed information about how we will conduct the tests. All test cases start with a cold boot. Because reboot times can vary based on the system state when the reboot command starts shutting the system down, we begin the times section of each usage case with the system powered off.

Figure 10 details the steps required to prepare each server to deploy Windows Server 2008 R2.

Dell PowerEdge R710: Pre-OS deployment (13 steps)	HP ProLiant DL380 G6: Pre-OS deployment (20 steps)
Before starting this case, confirm there is no existing RAID on the system. Start of the timed test 1. Simultaneously start the timer and turn on the Dell PowerEdge R710 server. 2. When prompted by the POST screen, press F10. 3. When the Unified Server Configurator GUI is available, select OS Deployment. 4. Using the mouse, select Deploy OS in the right panel. 5. On the screen titled RAID Configuration (Step 1 of 5), click Next. 6. On the screen titled RAID Configuration (Step 2 of 5), accept the default of PERC 6/i Integrated. Click Next. 7. On the screen titled RAID Configuration (Step 3 of 5), accept the default of Express Wizard. Click Next. 8. On the screen titled RAID Configuration (Step 4 of 5), select the RAID Level of RAID 5. Accept all other defaults. Click Next. 9. On the screen titled RAID Configuration (Step 1 of 5), click Finish. 10. When you see the message box saying Do you wish to apply these modifications now?, click Yes. 11. When you see the message RAID configuration successful, click OK. Wait while the USC populates the OS list. 12. On the screen titled Operating System Deployment (Step 1 of 3), select Windows Server 2008 R2, and click Next. 13. Wait while the USC populates the drivers for the OS. At the prompt to insert the Installation DVD, stop the timer.	Before starting this case, confirm there is no existing RAID on the system. Start of the timed test 1. Simultaneously start the timer and turn on the HP ProLiant DL380 G6 server, and insert the SmartStart CD. 2. At the Select the language to use during the Smart Start Process screen, accept the default of English, and click Next. 3. Accept the license agreement by clicking Agree. 4. Click Maintenance. 5. Click HP Array Configuration and Diagnostics. 6. Using the drop-down list in the upper left corner, select Smart Array P410i in Embedded Slot. 7. Click the Wizards tab, and click Express Configuration in the right-hand pane. 8. Accept the default of RAID 5, and click Next. 9. Click Finish when you see the Configuration Wizard Complete message. It will save the configuration automatically. 10. Click Exit ACU. 11. Click Previous to go back to the main menu. 12. Click Install. 13. At the Install – Boot Controller Selection screen, click Next. 14. At the Install – Operating System Selection screen, expand the list for Windows Server 2008 R2 x64, and choose Microsoft Windows Server 2008 R2, Enterprise Edition x64. Click Next. 15. At the Install – Operating System Media Source screen, accept the defaults, and click Next. 16. At the Install – Disk Partitioning Options screen, accept the defaults, and click Next. 17. At the Install – Enter Product Set Up Information screen, enter the Computer name

	and the Password, and click Next. 18. At the Install – WBEM/SNMP Configuration screen, select No for both, and click Next. 19. At the Install – ProLiant Support Pack screen, accept the default of Express, and click Next. 20. At the Install – Ready to Install screen, click Next, and wait while SmartStart prepares the disks. At the prompt to insert the Installation DVD, stop the timer.

Figure 10: Steps each server requires to prepare each server to deploy Windows Server 2008 R2.

Figure 11 details the steps required to deploy Windows Server 2008 R2 on each server.

Dell PowerEdge R710: Windows Server 2008 R2 deployment (20 steps)	HP ProLiant DL380 G6: Windows Server 2008 R2 deployment (23 steps)
Before starting this case, delete the RAID created by the previous usage case. Start of the timed test 1. Simultaneously start the timer and turn on the Dell PowerEdge R710 server. 2. Press F10 when prompted by the POST screen. 3. Wait for the USC GUI to appear. Select OS Deploy on the left. 4. Select OS deploy. 5. On the screen titled RAID Configuration (Step 1 of 5), click Next. 6. On the screen titled RAID Configuration (Step 2 of 5), accept the default of PERC 6/i Integrated. Click Next. 7. On the screen titled RAID Configuration (Step 3 of 5), accept the default of Express Wizard. Click Next. 8. On the screen titled RAID Configuration (Step 4 of 5), select the RAID Level of RAID 5. Accept all other defaults. Click Next. 9. On the screen titled RAID Configuration (Step 1 of 5), click Finish. 10. When you see the message box saying, Do you wish to apply these modifications now? click Yes. 11. When you see the message RAID configuration successful, click OK. Wait while the USC populates the OS list. 12. On the screen titled Operating System Deployment (Step 1 of 3), select Windows Server 2008 R2, and click Next. 13. Wait while the USC populates the drivers for the OS. On the screen titled Operating System Deployment (Step 2 of 3), insert the DVD, and click Next. 14. On the screen titled Operating System Deployment (Step 3 of 3), click Finish. 15. After the system reboots, on the screen titled Install Windows, accept the default Language, Time and currency format, and Keyboard or input Method. Click Next. 16. On the next screen, also titled Install Windows, click Install now. 17. On the next screen, also titled Install Windows,	Before starting this case, delete the RAID created by the previous usage case. Start of the timed test 1. Simultaneously start the timer and turn on the HP ProLiant DL380 G6 server, and insert the SmartStart CD. 2. At the Select the language to use during the Smart Start Process screen, accept the default of English, and click Next. 3. Accept the license agreement by clicking Agree. 4. Click Maintenance. 5. Click HP Array Configuration and Diagnostics. 6. Using the drop-down list in the upper left corner, select Smart Array P410i in Embedded Slot. 7. Click the Wizards tab, and click Express Configuration, in the right-hand pane. 8. Accept the default of RAID 5, and click Next. 9. Click Finish when you see the Configuration Wizard Complete message. It will save the configuration automatically. 10. Click Exit ACU. 11. Click Previous to go back to the main menu. 12. Click Install. 13. At the Install – Boot Controller Selection screen, click Next. 14. At the Install – Operating System Selection screen, expand the list for Windows Server 2008 R2 x64, and choose Microsoft Windows Server 2008 R2, Enterprise Edition x64. Click Next. 15. At the Install – Operating System Media Source screen, accept the defaults, and click Next. 16. At the Install – Disk Partitioning Options screen, accept the defaults, and click Next. 17. At the Install – Enter Product Set Up Information screen, enter the Computer name and the Password, and click Next. 18. At the Install – WBEM/SNMP Configuration screen, select No for both, and click Next. 19. At the Install – ProLiant Support Pack screen, accept the default of Express, and click Next.

select Windows Server 2008 Enterprise (Full Installation). Click Next. 18. Accept the license agreement, and click Next. 19. Select Custom (Advanced) by clicking on it. 20. You should see only one partition available for installing Windows Server 2008. Accept that as the default, and click Next. At the notice to change the password, stop the timer.	20. At the Install – Ready to Install screen, click Next, and wait while SmartStart prepares the disks. 21. When SmartStart prompts you, remove the SmartStart CD, and insert the Windows DVD for Windows Server 2008 R2 x64. Click Next. 22. At the Install – Browse Media screen, click Browse, and select DVD. Click Next. 23. Accept the license agreement, and click Next. At the notice to change the password, stop the timer.

Figure 11: Steps each server requires to deploy Windows Server 2008 R2.

Figure 12 details the steps required to update the BIOS on each server.

Dell PowerEdge R710: Updating the BIOS (10 steps)	HP ProLiant DL380 G6: Updating the BIOS (5 steps)
Note: We previously created a valid repository on a USB key and copied BIOS version 1.3.6 to it. This process is outside the scope of this report. See Dell's documentation. Before starting this case, delete the RAID created by the previous usage case. Start of the timed test 1. Simultaneously start the timer and turn on the Dell PowerEdge R710 server. 2. When prompted by the POST screen, press F10. 3. Wait for the USC GUI to appear. Select Platform Update on the left. 4. Select Launch Platform Update. 5. On the screen titled Platform Update (Step 1 of 3), select USB Device, and click Next. 6. On the screen titled Platform Update (Step 2 of 2), the Available Updates list should show the current BIOS level 1.1.4 and the available BIOS level as 1.3.6. Select BIOS 1.3.6, and deselect everything else. Click Apply. 7. The server will apply the update and reboot. You will see a 10-second countdown before the reboot. 8. Record time when the system starts reboot. 9. During reboot, check the version of the BIOS to verify that it is version 1.3.6. 10. The system reboots into USC. When you get control of the GUI, stop the timer.	Note: We previously created a bootable USB key containing BIOS version 01/13/2010. This process is outside the scope of this report. See HP's documentation. Before starting this case, delete the RAID created by the previous usage case. Start of the timed test 1. Simultaneously start the timer and turn on the HP ProLiant DL 380 G6 server. 2. On the screen titled Ready To Flash!, make sure that the current version is 10/01/2009 and the selected version is 01/13/2010. Press Enter to continue. 3. When you see the screen ROMPAQ Flash Complete!, remove the USB key, and power cycle the server. 4. During reboot, check the version of the BIOS to verify that it's version 01/13/2010. 5. Press F9 to load the BIOS. When the BIOS loads, stop the timer.

Figure 12: Steps each server requires to update the BIOS.

Figure 13 details the steps required to roll back the BIOS on each server.

Dell PowerEdge R710: Rolling back the BIOS (9 steps)	HP ProLiant DL380 G6: Rolling back the BIOS (5 steps)
Before starting this case, make sure the server is powered off. Start of the timed test 1. Simultaneously start the timer and turn on the server. 2. When prompted by the POST screen, press F10. 3. Wait for the USC GUI to appear. Select Platform Update on the left. 4. Select Launch Platform Rollback. 5. On the screen titled Platform Rollback, the Available Components list should show the current BIOS level and 1.3.6 and the previous BIOS level as 1.1.4. Select BIOS 1.1.4 and deselect everything else. Click Apply. 6. The server will apply update and reboot. You will see a 10-second countdown before the reboot. 7. Record time when the system starts reboot. 8. During reboot, check the version of the BIOS to verify that it is version 1.1.4. 9. The system reboots into USC. When you get control of the GUI, stop the timer.	Note: We previously created a bootable USB key containing BIOS version 10/01/2009. This process is outside the scope of this report. See HP's documentation. Before starting this case, make sure the server is powered off and make sure the USB key is in the server. Start of the timed test 1. Simultaneously the start timer and turn on the server. 2. On the screen titled Ready To Flash!, make sure that the current version is 01/13/2010 and the selected version is 10/01/2009. Press Enter to continue. 3. When you see the screen ROMPAQ Flash Complete!, remove the USB key, and power cycle the server. 4. During reboot, check the version of the BIOS to verify that it's version 10/01/2009. 5. Press F9 to load the BIOS. When the BIOS loads, stop the timer.

Figure 13: Steps each server requires to roll back the BIOS.

Figure 14 details the steps required to configure the BIOS and NIC settings on each server.

Dell PowerEdge R710: Configuring BIOS and NIC options(15 steps)	HP ProLiant DL380 G6: Configuring BIOS and NIC options (14 steps)
Before starting this case, make sure that the system is not set to the changes we are about to make. Start of the timed test 1. Simultaneously start the timer and turn on the server. 2. When prompted by the POST screen, press F10. 3. Wait for the USC GUI to appear. Select Hardware Configuration. 4. Select Advanced Configuration. 5. On the screen titled Advanced Configuration, select the first NIC card in the list. It will be immediately below System BIOS Settings. 6. On the screen titled Main Page, select the MBA Configuration Menu. 7. Select PXE as the Boot Protocol, and click Back. 8. On the screen titled Main Page, click Finish. 9. When you see the message box asking you to confirm your changes, click Yes. 10. Select System BIOS Settings. 11. Select Serial Communication. 12. Under the Serial Communication, choose On with Console Redirection via COM1, and click Back. 13. Click Finish. Click Yes on the pop-out message to confirm changes. 14. When you see the message box asking you to reboot, click Yes. 15. The system reboots to the OS. When you see the Windows login screen, stop the timer.	Before starting this case, make sure that the system is not set to the changes we are about to make. Start of the timed test 1. Simultaneously start the timer and turn on the server. 2. When prompted by the BIOS screen, press F9. 3. On the screen titled ROM-Based Setup Utility, select System Options. 4. Select Embedded NICs. 5. Select NIC1 Boot Options. 6. Press Enter to clear the warning. 7. Select Network Boot, and press Enter. 8. Press Escape twice to return to the main menu. 9. Select BIOS Serial Console & EMS, and press Enter. 10. Select BIOS Serial Console Port, and press Enter. 11. Select COM1; IRQ4; IO: 3F8H-3FFH, and press Enter. 12. Press Escape to return to the main menu. 13. Press the Esc key to exit, and, upon confirmation, press the F10 key complete the process. 14. The system reboots to the OS. When you see the Windows login prompt, stop the timer.

Figure 14: Steps each server requires to configure BIOS and NIC settings.

Figure 15 details the steps required to configure a RAID 5 on each server, outside of an OS installation.

Dell PowerEdge R710: Configuring RAID 5 (outside of OS installation) (13 steps)	HP ProLiant DL380 G6: Configuring RAID 5 (outside of OS installation) (11 steps)
Before starting this case, delete the RAID created by the previous usage case. Start of the timed test 1. Simultaneously start the timer and turn on the server. 2. When prompted by the POST screen, press F10. 3. Wait for the USC GUI to appear. Select Hardware Configuration. 4. Select Configuration Wizards. 5. Select RAID Configuration. 6. On the screen titled RAID Configuration (Step 1 of 5), click Next. 7. On the screen titled RAID Configuration (Step 2 of 5), accept the default of PERC 6/i Integrated. Click Next. 8. On the screen titled RAID Configuration (Step 3 of 5), accept the default of Express Wizard. Click Next. 9. On the screen titled RAID Configuration (Step 4 of 5), select the RAID Level of RAID 5. Accept all other defaults. Click Next. 10. On the screen titled RAID Configuration (Step 1 of 5), click Finish. 11. When you see the message box saying, Do you wish to apply these modifications now?, click Yes. 12. When you see the message RAID configuration successful, click OK. 13. On the screen titled Configuration Wizards, click Back. Stop the timer. (Reboot not included in this test.)	Before starting this case, delete the RAID created by the previous usage case. Start of the timed test 1. Simultaneously start the timer and turn on the server. It will boot into SmartStart automatically. 2. At the Select the language to use during the Smart Start Process screen, accept the default of English, and click Next. 3. Accept the license agreement by clicking Agree. 4. Click Maintenance. 5. Click HP Array Configuration and Diagnostics. 6. Using the drop-down list in the upper left corner, select Smart Array P410i in Embedded Slot. 7. Click the Wizards tab, and click Express Configuration in the right-hand pane. 8. Accept the default of RAID 5, and click Next. 9. When you see the Configuration Wizard Complete message, click Finish. It will save the configuration automatically. 10. Click Exit ACU. 11. Click Previous to go back to the main menu. Stop the timer. (Reboot not included in this test.)

Figure 15: Steps each server requires to configure a RAID 5 outside of an OS installation.

Figure 16 details the steps required to load the diagnostics on each server.

Dell PowerEdge R710: Loading diagnostics (3 steps)	HP ProLiant DL380 G6: Loading diagnostics (5 steps)
Start of the timed test 1. Simultaneously start the timer and turn on the server. 2. When prompted by the BIOS screen, press F10. 3. Wait for the USC GUI to appear. Select the Diagnostics option from the left menu of the USC. When Diagnostics has finished loading, stop the timer.	Start of the timed test 1. Simultaneously start the timer and turn on the server, and insert the SmartStart CD. 2. At the Select the language to use during the Smart Start Process screen, accept the default of English, and click Next. 3. Accept the license agreement by clicking Agree. 4. Click Maintenance. 5. Click Diagnostics. When Diagnostics has finished loading, stop the timer.

Figure 16: Steps each server requires to load the diagnostics.

Figure 17 details the steps required to flash the firmware for a replacement part on each server.

Dell PowerEdge R710: Flashing firmware for the replacement part (1 steps)	HP ProLiant DL380 G6: Flashing firmware for the replacement part (6 steps)
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. Start of the timed test 1. Simultaneously start the timer and 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. Stop the timer when the F10 prompt appears.	Note: We previously downloaded and created the HP Firmware Maintenance v8.70 CD in order to perform this test. We then turned off the server and replaced the HP Smart Array P410i RAID card. Start of the timed test 1. Simultaneously start the timer and turn on the server, and insert the HP Firmware Maintenance CD. 2. Select English, and click Continue. 3. Accept the license agreement by clicking Agree. 4. Select the Firmware Update tab, and click Install Firmware. 5. Select Smart Array P410i, and click Install. 6. When prompted to reboot, click reboot and wait while the system restarts. Stop the timer when the F9 prompt appears.

Figure 17: Steps each server requires to flash the firmware for the replacement part.

About Principled Technologies

We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help you assess how it will fare against its competition, its performance, whether it's ready to go to market, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.

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