iDRAC and Lifecycle Controller - A Recommended Workflow for Performing Firmware Updates on PowerEdge Servers

This Dell Technical White Paper discusses the best practices and workflow for performing firmware updates on PowerEdge servers.

Author(s)

Raja Tamilarasan
This document is for informational purposes only and may contain typographical errors and technical inaccuracies. The content is provided as is, without express or implied warranties of any type.

© 2013 Dell Inc. All rights reserved. Dell and its affiliates cannot be responsible for errors or omissions in typography or photography. Dell, the Dell logo, and PowerEdge are trademarks of Dell Inc. Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell disclaims proprietary interest in the marks and names of others.

June 2013 | Rev 1.0
Contents
Summary ........................................................................................................................................... 4
Before You Begin ................................................................................................................................. 4
  Direct versus Staged Updates ............................................................................................................. 5
  Server Reboot Requirement for performing iDRAC updates ............................................................... 6
Recommended Firmware Update workflow ......................................................................................... 7
How to View the Current Firmware Inventory .................................................................................... 7
  Firmware Inventory from iDRAC GUI ................................................................................................. 8
  Viewing Firmware Inventory from CMC GUI ...................................................................................... 9
  Viewing Firmware Inventory from Lifecycle Controller GUI ............................................................ 10
  Viewing Firmware Inventory using WS-MAN ...................................................................................... 10
  Firmware Inventory using RACADM ................................................................................................. 12
How to Get the Latest Updates Available for Servers ......................................................................... 13
  Firmware Update FAQ ....................................................................................................................... 16
Learn more .......................................................................................................................................... 17
A recommended workflow for performing firmware updates on PowerEdge servers

Summary
Dell recommends that the firmware running on your PowerEdge servers be kept up to date to make sure that the servers deliver peak performance. The firmware update feature supported by iDRAC and Lifecycle Controller (LC) makes it easy to keep the various firmware running on the PowerEdge server up to date.

iDRAC and Lifecycle Controller support the following interfaces that perform firmware updates:

1. RACADM
   - See “RACADM reference” at http://www.delltechcenter.com/idrac
2. Industry-standard Web Services Management (WSMAN) command line interface (CLI)
3. OMSA and Operating System (OS)–based Dell Update Packages (DUP)
   - http://en.community.dell.com/techcenter/extras/m/white_papers/20097364.aspx
4. iDRAC GUI
5. Chassis Management Controller (CMC) GUI.
   - http://en.community.dell.com/techcenter/extras/m/white_papers/20097364.aspx

Before You Begin
Before you start updating a firmware, review all the supported user interfaces and select the one that suits your environment.

1. The Dell RACADM (Remote Access Controller Admin) utility is a CLI–based tool that allows for remote or local management of Dell Servers by using iDRAC or DRAC.
2. Web Services-Management (WS-Management) is a DMTF open standard defining a SOAP–based protocol for the management of servers, devices, applications, and various Web services. When accessing the iDRAC using the WSMAN interface, for Windows, make sure the WinRM CLI
A recommended workflow for performing firmware updates on PowerEdge servers

tool is configured (for help, see Installation and Configuration of Windows Remote Management). For Linux, make sure the Openwsman CLI is built and installed (for help, see Openwsman Home). Make sure the target system is a PowerEdge server with iDRAC enabled, configured, and network accessible, so that you can communicate by using WS-MAN.

3. Dell OpenManage Server Administrator (OMSA) is a software agent that provides a comprehensive, one-to-one systems management solution in two ways—from an integrated, Web browser–based GUI and from a CLI by using the operating system.

4. The iDRAC GUI is a Web browser–based management application that you can use to interactively manage the iDRAC and monitor the managed server. It is the primary interface for day-to-day tasks, such as monitoring system health, viewing the system event log, managing local iDRAC users, and launching the CMC Web interface and console redirection sessions.

5. The CMC GUI is a Web browser–based management application that can be used to view the status and manage all the servers in that chassis.

6. Lifecycle controller supports local one-one system management tasks by using a GUI on the server’s KVM for operating system installation, update, configuration, and for performing diagnostics on single- and local servers.

Direct versus Staged Updates

The updates supported on Dell PowerEdge servers can be classified into Direct and Staged Updates.

- Direct Updates are those that do not require a server restart for the update to take effect.
- Staged updates are the ones where the updates are staged and are applied only when the server is restarted. Lifecycle Controller will be invoked during the server startup.

<table>
<thead>
<tr>
<th>Direct Updates</th>
<th>Staged Updates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lifecycle Controller</td>
<td>1. BIOS</td>
</tr>
<tr>
<td>2. iDRAC7 Firmware</td>
<td>2. NIC Firmware</td>
</tr>
<tr>
<td>3. Diagnostics</td>
<td>3. RAID Firmware</td>
</tr>
<tr>
<td>4. OS Driver Pack</td>
<td>4. Backplane Firmware</td>
</tr>
<tr>
<td>5. Identity Module</td>
<td>5. PSU Firmware</td>
</tr>
<tr>
<td></td>
<td>6. CPLD</td>
</tr>
</tbody>
</table>

Note: iDRAC and driver pack updates for 11G PowerEdge systems are staged updates. For 12G and future generations, the iDRAC and OS Driver Pack updates are direct updates.
A recommended workflow for performing firmware updates on PowerEdge servers

Server Reboot Requirement for performing iDRAC updates

The need to reboot the server to apply an iDRAC update varies based on the current version of the iDRAC firmware and the interface used to update the iDRAC. Refer to Table 1 below for more information.

<table>
<thead>
<tr>
<th>iDRAC6 Firmware Version / Update Interface</th>
<th>RACADM</th>
<th>WSMAN</th>
<th>iDRAC GUI</th>
<th>CMC GUI</th>
<th>OME</th>
</tr>
</thead>
<tbody>
<tr>
<td>fwupdate command (using .d6 (or) .imc image)</td>
<td>update command (using windows DUP)</td>
<td>(using .imc image)</td>
<td>(using windows DUP)</td>
<td>(using windows DUP)</td>
<td>In-Band</td>
</tr>
<tr>
<td>All iDRAC6 Versions</td>
<td>No Reboot</td>
<td>Not Supported</td>
<td>Reboot</td>
<td>No Reboot</td>
<td>Not Supported</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>iDRAC7 Firmware Version / Update Interface</th>
<th>RACADM</th>
<th>WSMAN</th>
<th>iDRAC GUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>fwupdate command (using .d7 image)</td>
<td>update command (using windows DUP)</td>
<td>(using .d7 image)</td>
<td>(using windows DUP)</td>
</tr>
<tr>
<td>1.00.00 / 1.20.20/ 1.23.23</td>
<td>No Reboot</td>
<td>Not Supported</td>
<td>Reboot</td>
</tr>
<tr>
<td>1.30.30 and above</td>
<td>No Reboot</td>
<td>No Reboot</td>
<td>No Reboot</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>iDRAC7 Firmware Version / Update Interface</th>
<th>CMC GUI</th>
<th>OME</th>
</tr>
</thead>
<tbody>
<tr>
<td>(using windows DUP)</td>
<td>In-Band</td>
<td>Out-Of-Band</td>
</tr>
<tr>
<td>1.00.00 / 1.20.20/ 1.23.23</td>
<td>Reboot</td>
<td>No Reboot</td>
</tr>
<tr>
<td>1.30.30 and above</td>
<td>No Reboot</td>
<td>No Reboot</td>
</tr>
</tbody>
</table>

Table 1: iDRAC Update and Server Reboot
Recommended Firmware Update workflow

iDRAC and Lifecycle Controller provide the infrastructure for updating most component firmware on PowerEdge servers. The iDRAC and Lifecycle Controller (LC) are released as two individual firmware components, but are dependent on one another for various change management features and hardware that they support. It is recommended that these components are updated together. Regardless of the methodology used to perform firmware updates, iDRAC and LC firmware should always be upgraded first before upgrading the other components on the server.

It is recommended to use the following sequence when updating firmware on the Dell PowerEdge servers.

1. iDRAC
2. Lifecycle Controller
3. BIOS
4. Diagnostics
5. OS Driver Pack
6. RAID
7. NIC
8. PSU
9. CPLD
10. Other update

Staged updates can be combined together to apply on a single-host restart. That is, BIOS, RAID, NIC, PSU, CPLD, and so on can all be staged together and applied with a single-host restart.

Note: If multiple updates are staged together from consoles such as iDRAC GUI, CMC GUI, Lifecycle Controller GUI, and any other Dell-supported consoles such as Open Manage Essentials, the updates might be reordered automatically on the basis of time to install optimizations built in for those management tools.

How to View the Current Firmware Inventory

Dell PowerEdge servers support gathering Firmware Inventory data using both in-band (using the servers’ operating system drivers) and out-band (using the dedicated systems management channel, running on the iDRAC service process or pre-OS UEFI environment) tools. Listed here are some examples on how to view the current firmware inventory on any PowerEdge Server.
A recommended workflow for performing firmware updates on PowerEdge servers

**Firmware Inventory from iDRAC GUI**

1. Log in to the IDRAC Web interface.
2. Go to **Server → System Inventory → Firmware Inventory**.

<table>
<thead>
<tr>
<th>Component</th>
<th>Firmware Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Slot 1</td>
<td>07.00.00</td>
</tr>
<tr>
<td>Power Supply Slot 2</td>
<td>07.00.40</td>
</tr>
<tr>
<td>Integrated Dell Remote Access Controller</td>
<td>1.50.50</td>
</tr>
<tr>
<td>Lifecycle Controller, 1.3.0.566, X18</td>
<td>1.3.0.566</td>
</tr>
<tr>
<td>Enterprise UEFI Diagnostics, 4225A2, 4225.4</td>
<td>4225A2</td>
</tr>
<tr>
<td>OS Drivers Pack, 7.2.1.4, A00</td>
<td>7.2.1.4</td>
</tr>
<tr>
<td>System CPLD</td>
<td>1.0.3</td>
</tr>
<tr>
<td>Intel(R) Gigabit 4P I350-t rNDC - BC:30:5B.EF.F5:20</td>
<td>14.0.12</td>
</tr>
<tr>
<td>Intel(R) Gigabit 4P I350-t rNDC - BC:30:5B.EF.F5:21</td>
<td>14.0.12</td>
</tr>
<tr>
<td>Intel(R) Gigabit 4P I350-t rNDC - BC:30:5B.EF.F5:22</td>
<td>14.0.12</td>
</tr>
<tr>
<td>Intel(R) Gigabit 4P I350-t rNDC - BC:30:5B.EF.F5:23</td>
<td>14.0.12</td>
</tr>
<tr>
<td>Broadcom NetXtreme II 10 Gb Ethernet BCM57810 - 00:10:18:B9:08:E0</td>
<td>7.4.8</td>
</tr>
<tr>
<td>Broadcom NetXtreme II 10 Gb Ethernet BCM57810 - 00:10:18:B9:08:E2</td>
<td>7.4.8</td>
</tr>
<tr>
<td>Broadcom NetXtreme II 10 Gb Ethernet BCM57810 - 00:10:18.99:AC:C0</td>
<td>7.4.8</td>
</tr>
<tr>
<td>Broadcom NetXtreme II 10 Gb Ethernet BCM57810 - 00:10:18.99:AC:C2</td>
<td>7.4.8</td>
</tr>
<tr>
<td>BIOS</td>
<td>16.0</td>
</tr>
<tr>
<td>PERC H710 Mini</td>
<td>21.0.1-0132</td>
</tr>
</tbody>
</table>
A recommended workflow for performing firmware updates on PowerEdge servers

**Viewing Firmware Inventory from CMC GUI**

1. Launch the CMC Web interface.
2. Go to Server Overview → Update → Server Component Update.

---

**Component/Device Update Filter**

**Component/Device Firmware Inventory**

<table>
<thead>
<tr>
<th>Slot</th>
<th>Name</th>
<th>Model</th>
<th>Component/Device</th>
<th>Current Version</th>
<th>Rollback Version</th>
<th>Job Status</th>
<th>Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>SLOT-03</td>
<td>PowerEdge M620</td>
<td>BIOS</td>
<td>1.3.6</td>
<td>1.6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Integrated Dell Remote Access Controller</td>
<td>1.00.02</td>
<td>1.00.02.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lifecycle Controller</td>
<td>1.1.1.18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Diagnostics</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OS Drivers Pack</td>
<td>7.1.1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System CPLD</td>
<td>1.0.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Broadcom NetXtreme II 903 BCM7810-24</td>
<td>7.4.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Broadcom NetXtreme II 903 BCM7810-24</td>
<td>7.4.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PERC S110 Controller</td>
<td>3.0.0.0-139</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PERC H310 Mini</td>
<td>29.10.1-0084</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Physical Disk 0:0</td>
<td>HT55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Physical Disk 0:1</td>
<td>HT65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BP120G-0:1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SLOT-04</td>
<td>PowerEdge M630</td>
<td>BIOS</td>
<td>6.0.7</td>
<td>2.3.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IDRACS</td>
<td>2.20</td>
<td>3.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dell Lifecycle Controller</td>
<td>1.5.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dell 32 Bit Diagnostics</td>
<td>5148/60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dell OS Drivers Pack</td>
<td>6.5.1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Broadcom NetXtreme II Gigabit Ethernet (Embedded 1-1)</td>
<td>6.2.10</td>
<td>6.2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Broadcom NetXtreme II Gigabit Ethernet (Embedded 2-1)</td>
<td>6.2.10</td>
<td>6.2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CERC 64 Integrated (Embedded)</td>
<td>6.2.0.0013</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A recommended workflow for performing firmware updates on PowerEdge servers

**Viewing Firmware Inventory from Lifecycle Controller GUI**

1. Launch the Lifecycle Controller GUI by pressing F10 during Power On Self-Test (POST).
2. Go to Firmware Update → View Current Versions.

**Viewing Firmware Inventory using WS-MAN**

Firmware inventory can be viewed using WSMAN by enumerating the `DCIM_SoftwareIdentity` class.

The most important fields in the `DCIM_SoftwareIdentity` enumeration output are:

- **ComponentName**
  Denotes the type of the firmware

- **FQDD**
  Fully Qualified Device Descriptor (FQDD) uniquely identifies the device on the server.

- **Status**
  Installed: This instance is already installed on the device
  Available: An instance of the device firmware that is available with Lifecycle controller and can be used to perform an upgrade / downgrade.

- **Updateable**
  True: Firmware update supported by Lifecycle Controller.
  False: Firmware update not supported by Lifecycle Controller.

Input

```
```
A recommended workflow for performing firmware updates on PowerEdge servers

Partial Output

DCIM_SoftwareIdentity
BuildNumber = 0
Classifications = 11
ComponentID = 159
ComponentType = BIOS
DeviceID = null
ElementName = BIOS
FQDD = BIOS.Setup.1-1
IdentityInfoType = OrgID:ComponentType:ComponentID
IdentityInfoValue = DCIM:BIOS:159
InstanceID = DCIM:PREVIOUS#741__BIOS.Setup.1-1
IsEntity = true
MajorVersion = 1
MinorVersion = 4
RevisionNumber = 5
RevisionString = null
Status = Available
SubDeviceID = null
SubVendorID = null
Updateable = true
VendorID = null
VersionString = 1.4.5
impactsTPMmeasurements = true

DCIM_SoftwareIdentity
BuildNumber = 0
Classifications = 11
ComponentID = 159
ComponentType = BIOS
DeviceID = null
ElementName = BIOS
FQDD = BIOS.Setup.1-1
IdentityInfoType = OrgID:ComponentType:ComponentID
IdentityInfoValue = DCIM:BIOS:159
InstanceID = DCIM:CURRENT#741__BIOS.Setup.1-1
IsEntity = true
MajorVersion = 1
MinorVersion = 4
RevisionNumber = 4
RevisionString = null
Status = Available
SubDeviceID = null
SubVendorID = null
Updateable = true
VendorID = null
VersionString = 1.4.4
impactsTPMmeasurements = true

DCIM_SoftwareIdentity
BuildNumber = 0
Classifications = 11
ComponentID = 159
ComponentType = BIOS
DeviceID = null
ElementName = BIOS
FQDD = BIOS.Setup.1-1
IdentityInfoType = OrgID:ComponentType:ComponentID
IdentityInfoValue = DCIM:BIOS:159
InstanceID = DCIM:INSTALLED#741__BIOS.Setup.1-1
IsEntity = true
MajorVersion = 1
MinorVersion = 4
A recommended workflow for performing firmware updates on PowerEdge servers

RevisionNumber = 4
RevisionString = null
Status = Installed
SubDeviceID = null
SubVendorID = null
Updateable = true
VendorID = null
VersionString = 1.4.4
impactsTPMmeasurements = true

Firmware Inventory using RACADM

Firmware inventory can be viewed using RACADM by running the `swinventory` command.

- `racadm swinventory` (local racadm)
- `racadm -r <iDRACIP> -u <iDRAC UserName> -p <iDRAC Password> swinventory`

ComponentType = FIRMWARE
ElementName = Power Supply.Slot.1
FQDD = PSU.Slot.1
InstallationDate = NA
VersionString = 07.2B.7D

ComponentType = FIRMWARE
ElementName = Power Supply.Slot.1
FQDD = PSU.Slot.1
InstallationDate = 2013-04-22T11:39:10Z
VersionString = 07.00.00

ComponentType = FIRMWARE
ElementName = Power Supply.Slot.2
FQDD = PSU.Slot.2
InstallationDate = 2013-04-22T11:39:10Z
VersionString = 07.09.40

ComponentType = FIRMWARE
ElementName = Integrated Dell Remote Access Controller
FQDD = iDRAC.Embedded.1
Rollback Status = Available
VersionString = 1.50.03.50

ComponentType = FIRMWARE
ElementName = Integrated Dell Remote Access Controller
FQDD = iDRAC.Embedded.1
InstallationDate = 2013-05-11T13:23:12Z
VersionString = 1.50.50

ComponentType = APPLICATION
ElementName = Lifecycle Controller, 1.3.0.568, X10
FQDD = USC.Embedded.1:LC.Embedded.1
InstallationDate = 2013-05-29T14:24:45Z
VersionString = 1.3.0.568

ComponentType = APPLICATION
ElementName = Enterprise UEFI Diagnostics, 4225A2, 4225.4
A recommended workflow for performing firmware updates on PowerEdge servers

FQDD = Diagnostics.Embedded.1:LC.Embedded.1
InstallationDate = 2013-05-09T00:31:26Z
VersionString = 4225A2

ComponentType = APPLICATION
ElementName = OS Drivers Pack, 7.2.1.4, A00
FQDD = DriverPack.Embedded.1:LC.Embedded.1
InstallationDate = 2013-05-09T00:38:08Z
VersionString = 7.2.1.4

ComponentType = FIRMWARE
ElementName = System CPLD
FQDD = CPLD.Embedded.1
InstallationDate = 2013-06-11T15:43:55Z
VersionString = 1.0.3

ComponentType = FIRMWARE
ElementName = Intel(R) Gigabit 4P rNDC - BC:30:5B:ED:F5:20
FQDD = NIC.Integrated.1
InstallationDate = NA
Rollback Status = Available
VersionString = 13.5.6

--More--

How to Get the Latest Updates Available for Servers

After you know about the current versions of the firmware installed on a PowerEdge server, check for any available updates.

2. Type the service tag of the server, and then click Submit.

3. Click Drivers and Downloads.
A recommended workflow for performing firmware updates on PowerEdge servers

4. Download the firmware Dell Update Packages (DUPs) that are applicable to your server.

   Note: iDRAC GUI, CMC GUI, Lifecycle Controller GUI, RACADM and WSMAN Updates support only Windows-based DUPs.
Conclusion

The objective of this Whitepaper is to describe the recommended sequencing of updates, how to get current firmware version info, how to find firmware updates, and provide an overview of the various methodologies and tools available to perform a firmware update.
A recommended workflow for performing firmware updates on PowerEdge servers

Firmware Update FAQ

1. What is the recommended order to stage firmware updates when updates are available for both the consoles (OMSA / OME) and the devices installed (BIOS, NIC, iDRAC)?

Fresh install or Updates to consoles should not be staged together with firmware updates. It is recommended that all device firmwares are updated prior to updating consoles such as OMSA / OME.

2. Can device firmware updates and configuration changes be performed at the same time or staged together to be applied on the same system reboot?

iDRAC and Lifecycle Controller does support scheduling a update and configuration job together to be applied on the same system reboot. Lifecycle Controller internally has logic to optimize the order in which all scheduled jobs are executed.

For example, a BIOS update and a BIOS configuration can be scheduled to be applied together on the same reboot and Lifecycle Controller will optimize the ordering based on the jobs scheduled.

For features or settings that are new and is available only with a newer release of the device firmware, it is recommend that you update the firmware and wait for the job to complete successfully before making any configuration changes.
A recommended workflow for performing firmware updates on PowerEdge servers

Learn more

Visit [Dell.com/PowerEdge](http://Dell.com/PowerEdge) for more information on Dell’s enterprise-class servers.

Reference Profiles

Reference MOFs

Best Practices Guide
[http://en.community.dell.com/techcenter/extras/m/white_papers/20066173.aspx](http://en.community.dell.com/techcenter/extras/m/white_papers/20066173.aspx)

Associated Scripts:
[http://en.community.dell.com/techcenter/extras/m/white_papers/20066178.aspx](http://en.community.dell.com/techcenter/extras/m/white_papers/20066178.aspx)

Web Services Interface Guide for Windows
[http://en.community.dell.com/techcenter/extras/m/white_papers/20066174.aspx](http://en.community.dell.com/techcenter/extras/m/white_papers/20066174.aspx)

Associated scripts
[http://en.community.dell.com/techcenter/extras/m/white_papers/20066179.aspx](http://en.community.dell.com/techcenter/extras/m/white_papers/20066179.aspx)

Web Services Interface Guide for Linux
[http://en.community.dell.com/techcenter/extras/m/white_papers/20066176.aspx](http://en.community.dell.com/techcenter/extras/m/white_papers/20066176.aspx)

Associated scripts
[http://en.community.dell.com/techcenter/extras/m/white_papers/20066181.aspx](http://en.community.dell.com/techcenter/extras/m/white_papers/20066181.aspx)

WS-MAN command line for Windows (Winrm)

WSMAN command line open source for Linux (Openwsman)

Scripting the Dell Lifecycle Controller

All about Lifecycle Controller in iDRAC
[http://support.dell.com/support/edocs/software/smusclc_1_5/index.htm](http://support.dell.com/support/edocs/software/smusclc_1_5/index.htm)