

# Managing Dell™ PowerEdge™ C Servers in Hyperscale Environments

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A Dell Guide

Dell | Data Center Solutions



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## Introduction

Organizations that run large-scale applications on tens, hundreds, or thousands of similar servers require a diverse set of system management tools. They don't need the full set of tools typically used for one-to-one system management, but instead need tools designed for one-to-many system management.

These tools are essential for system monitoring and management in hyperscale environments, including compute farms that support e-commerce applications, online game hosting, social networking sites, and high-performance computing (HPC) applications.

Dell™ PowerEdge™ C servers, which are designed for use in hyperscale environments, require this more diverse set of tools. Other PowerEdge servers ship with a robust set of tools for system management, along with options for enhanced capabilities. These same tools aren't included with PowerEdge C servers because many of them aren't used in hyperscale environments.

Instead, PowerEdge C servers ship with a basic system management controller and the capability to support a wide range of tools designed for specific system management needs of compute farms.

To review the differences in system management tools for Dell PowerEdge servers, see the feature comparison table in Appendix A.

## PowerEdge C System Management Options

### *Manage System Health and Uptime*

To manage system health and uptime for multiple PowerEdge C servers, you can use any tool that will support SNMP-based alerts from management controllers. For one-to-one management, Dell PowerEdge systems use an on-board microcontroller called the baseboard management controller (BMC) that provides base-level system management functionality. For one-to-many system management in the PowerEdge C environment, users typically use Nagios, Ganglia, or Zenoss Core, all of which are open source tools.

### *Hardware-based management with Dell BMC*

#### **BMC**

At the one-to-one management level, the Dell PowerEdge BMC monitors the system for critical events by communicating with various sensors on the system board. It can be configured to send alerts and log events when certain server-health parameters exceed their preset thresholds.

The BMC is compliant with the Intelligent Platform Management Interface (IPMI) 1.5 and 2.0 specification, enabling you to configure, monitor and recover systems remotely. In addition, IPMI compliance makes it possible for various open source software tools to monitor the IPMI signals coming off the controllers in the PowerEdge C systems.

### *Software-based management with third-party tools*

#### **Nagios®**

Nagios® is a widely used software tool for centralized monitoring and management of computing systems, software and network services in distributed computing environments. The Nagios® interface provides a view into the status of hosts, network nodes, and services. It displays warnings and triggers alarms to alert you to potential problems and service failures.

## ***Ganglia***

Ganglia is an extremely scalable real-time, agent based monitoring tool for HPC systems, including those in cluster and grid environments. It is based on a hierarchical design targeted at federations of clusters. This open-source project that grew out of the University of California, Berkley Millennium Project is now used to manage thousands of clusters around the world.

## ***Zenoss® Core***

Zenoss® Core is designed to enable the monitoring and management of entire IT infrastructures through a single integrated software package. It allows you to monitor and manage system availability, configuration, health, and events through a web interface. Its feature set includes an open source configuration management database (CMDB) that provides a single repository for your IT assets.

## **Deploy BIOS and Firmware**

### ***Dell Update Packages***

In PowerEdge C systems, standard Dell Update Packages are used to deploy BIOS and firmware. These self-contained, easy-to-use programs are designed to update a singular system software element on the server – either the system BIOS, a specific device driver, or specific firmware.

To apply an update, execute the package directly on the running system. The Dell Update Package can determine whether prerequisites are met, which helps protect the system from invalid updates if prerequisites are not installed.

Dell Update Packages provide return codes, log files, and scripting capability that can help you effectively apply updates to one or more systems for the following components:

- System BIOS
- System firmware, also known as Embedded Server Management (ESM) firmware
- Remote access controller (RAC) firmware
- PowerEdge Expandable RAID Controller (PERC) firmware and device drivers
- Network interface card (NIC) drivers

## **Manage Drivers and Software Updates**

### ***Updates from the Network***

In PowerEdge C environments, different approaches can be used to update drivers and software. One approach is to roll out a single software image, boot servers from the network, and run the updates from the network using custom scripts for one-to-many updates.

For provisioning outside of the network, we recommend the use of Platform Computing's Platform Cluster Manager or Clustercorp Rocks+. These cluster monitoring and management platforms simplify the deployment of large numbers of systems and system upgrades in an HPC cluster. They allow you to install an OS on a single system – a head node – that distributes the OS to all of the other nodes in the cluster.

These open source platforms also simplify the provisioning of new operating systems, OS upgrades, system patches and more. In addition, they employ Nagios and Ganglia to monitor the system health, uptime and performance of individual nodes within a cluster, via IPMI signals from the baseboard management controller in PowerEdge C systems.

### ***Clustercorp Rocks+***

Rocks+ provides a robust, comprehensive software stack that is designed to provide all the necessary software components for building, deploying, and managing a cluster or cloud, including cluster middleware, tightly integrated compilers, applications, and communication libraries.

### ***Platform Cluster Manager***

Platform Cluster Manager is designed to automate system initialization and software deployment with a complete range of tools, including:

- Device drivers
- Installers
- Cluster management tools
- Resource and application monitoring
- Interconnect support
- Platform Lava, a powerful open source job scheduler
- Options such as diskless nodes and image- or packet-based provisioning

## **To Learn More**

Additional information on the tools discussed in this paper is available via the following sites:

Dell PowerEdge Systems BMC User Guide:

[http://support.dell.com/support/edocs/systems/cp\\_pe\\_c6100/en/BMC/bmc.pdf](http://support.dell.com/support/edocs/systems/cp_pe_c6100/en/BMC/bmc.pdf)

BIOS and firmware updates:

<http://support.dell.com/support/edocs/software/smdup/dup14/en/uglinhtm/1intro.htm>

Nagios®:

[www.nagios.org](http://www.nagios.org)

Zenoss®:

<http://community.zenoss.org/index.jspx>

Platform Computing:

<http://content.dell.com/us/en/enterprise/d/hpcc/Partner-Platform.aspx>

Clustercorp Rocks+:

[www.clustercorp.com](http://www.clustercorp.com)

## Appendix A

**Table 1. PowerEdge C Systems Management Feature Comparison**

Feature	BMC	PowerEdge C	iDRAC6 Express	iDRAC6 Enterprise	vFlash
<b>Interface &amp; Standards Support</b>					
IPMI 2.0	✓	✓	✓	✓	✓
Web-based GUI		✓	✓	✓	✓
SNMP	✓	✓	✓	✓	✓
WSMAN			✓	✓	✓
SMASH-CLP (SSH-only)		✓ <sup>5</sup>	✓	✓	✓
Racadm command-line (SSH & local)			✓	✓	✓
Racadm command-line (remote)				✓	✓
<b>Conductivity</b>					
Shared/failover network modes	✓	✓	✓	✓	✓
IPv4	✓	✓	✓	✓	✓
VLAN tagging	✓	✓	✓	✓	✓
IPv6		✓	✓	✓	✓
Dynamic DNS		✓	✓	✓	✓
Dedicated NIC		✓		✓	✓
<b>Security &amp; Authentication</b>					
Role-based authority	✓	✓	✓	✓	✓
Local users	✓	✓	✓	✓	✓
SSL Encryption		✓	✓	✓	✓
Microsoft® Windows Active Directory			✓	✓	✓
“Generic” LDAP support			✓	✓	✓
Two-factor authentication <sup>3</sup>			✓	✓	✓
Single sign-on			✓	✓	✓
PK Authentication (for SSH)				✓	✓
<b>Remote Management &amp; Remediation</b>					
Remote firmware update	✓ <sup>1</sup>	✓	✓	✓	✓
Server power control	✓ <sup>1</sup>	✓	✓	✓	✓
Serial-over-LAN (with proxy)	✓	✓	✓	✓	✓

Feature	BMC	PowerEdge C	iDRAC6 Express	iDRAC6 Enterprise	vFlash
Serial-over-LAN (no proxy)			✓	✓	✓
Power capping			✓	✓	✓
Last crash screen capture			✓	✓	✓
Boot capture			✓	✓	✓
Virtual media <sup>2</sup>		✓		✓	✓
Virtual console <sup>2</sup>		✓		✓	✓
Virtual console sharing <sup>2</sup>		✓		✓	✓
Remote Virtual Console Launch		✓		✓	✓
Virtual flash					✓
<b>Monitoring</b>					
Sensor monitoring & alerting	✓ <sup>1</sup>	✓	✓	✓	✓
Real-time power monitoring		✓ <sup>6</sup>	✓	✓	✓
Real-time power graphing			✓	✓	✓
Historical power counters			✓	✓	✓
<b>Logging</b>					
System Event Log	✓	✓	✓	✓	✓
RAC Log			✓	✓	✓
<b>Lifecycle Controller</b>					
Unified Server Configurator	✓ <sup>4</sup>		✓	✓	✓
Remote Services (via WSMAN)			✓	✓	
Part Replacement					✓

<sup>1</sup> Feature is available but only through IPMI and not a web graphical user interface (GUI).

<sup>2</sup> Virtual console and virtual media are available via both Java and Active-X plug-ins

<sup>3</sup> Two-factor authentication requires Microsoft Internet Explorer®

<sup>4</sup> The Dell Unified Server Configurator available via BMC is limited to operating system installation and diagnostics only.

<sup>5</sup> PowerEdge C1100/C2100 server support SOL via SSH/telnet client (default is disabled).

<sup>6</sup> Support Intel® Intelligent Node Manager, as well as provide power sensor readings.