

Lifecycle Controller Remote Services Quick Start Guide

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

Chapter 1: Introduction.....	4
Benefits of using iDRAC with Lifecycle Controller.....	4
Benefits of using Lifecycle Controller Remote Services.....	5
Key features.....	5
Licensed features in Lifecycle Controller.....	6
New in this release.....	6
About iDRAC RESTful API with Redfish and Web Service API.....	6
About Lifecycle Controller API.....	6
About one-to-many management.....	7
Chapter 2: Operations using Remote Services.....	8
Deployment and configuration.....	8
Monitor.....	8
Maintain.....	8
Chapter 3: Getting started with API collateral and links.....	9
WSMAN Profiles.....	9
WSMAN MOF WSDL and XSD API definitions.....	9
Web services interface guide.....	9
Attribute registry XML.....	9
Event message registry XML.....	10
XML schemas.....	10
iDRAC RESTful API with Redfish.....	10
Authorization and licensing requirements for API access.....	10
Chapter 4: Integrating the Lifecycle Controller API.....	12
API clients.....	12
Best practices workflow references.....	12
Sample scripts and tools.....	12
Applications using Lifecycle Controller-Remote Services.....	13
WinRM and OpenWSMAN installation and configuration.....	13
Chapter 5: Social media reference.....	14
Related Documentation.....	14
Accessing documents from Dell support site.....	15
Contacting Dell.....	15
Chapter 6: Terms and definitions.....	16

Introduction

Dell Lifecycle Controller provides advanced embedded systems management to perform various systems management tasks using a Graphical User Interface (GUI). It is delivered as part of the integrated Dell Remote Access Controller (iDRAC) out-of-band solution and embedded Unified Extensible Firmware Interface (UEFI) applications in the latest Dell servers. iDRAC works with the UEFI firmware to access and manage every aspect of the hardware, including component and subsystem management that is beyond the traditional Baseboard Management Controller (BMC) capabilities.

It is developed on the industry standard interfaces such as:

- Unified Extensible Firmware Interface (UEFI) platform
- Web Services for Management (WSMAN) interface
- Redfish management interface

Dell Lifecycle Controller Remote Services includes WSMAN and iDRAC RESTful API with Redfish management interfaces. It helps to perform remote deployment, configuration, and updates integrated with Dell OpenManage Essentials and partner consoles. It can be accessed over the network using the secure web services interfaces and can be used by applications and scripts. Also, it provides a single view of all the system settings that can be imported and exported from the server to perform one-to-many cloning operations.

Using Remote Services, you can perform the following tasks:

- Enable management consoles to perform one-to-many bare-metal server provisioning.
- Identify and authenticate the attached Dell system to the network.
- Integrate one-to-many management consoles and reduce the manual steps to perform server setup and management.
- Deploy an operating system, perform remote update and inventory, and automate the setup and configuration.

Topics:

- [Benefits of using iDRAC with Lifecycle Controller](#)
- [Benefits of using Lifecycle Controller Remote Services](#)
- [Key features](#)
- [Licensed features in Lifecycle Controller](#)
- [New in this release](#)
- [About iDRAC RESTful API with Redfish and Web Service API](#)
- [About Lifecycle Controller API](#)
- [About one-to-many management](#)

Benefits of using iDRAC with Lifecycle Controller

The iDRAC with Lifecycle Controller technology in the server's embedded management allows you to perform useful tasks such as configuring BIOS and hardware settings, deploying operating systems, changing RAID settings, and saving hardware profiles. Together, iDRAC and Lifecycle Controller provide a robust set of management functions that can be used throughout the entire server Lifecycle.

Lifecycle Controller simplifies server Lifecycle management — from provisioning, deployment, patching and updating to servicing — both locally and remotely. Lifecycle Controller includes managed and persistent storage that embeds systems management features and Operating System device drivers directly on the server. This eliminates the media-based system management tools and utilities traditionally needed for systems management.

The benefits include:

- **Increased Uptime** — Notifies the potential or actual failures quickly to prevent a server failure or reduce recovery time after a failure.
- **Improved Productivity and Lower Total Cost of Ownership (TCO)** — Extends the reach of administrators to larger number of remote servers. This helps IT staff to be more productive and also reduces the operational expenses such as travel.
- **Enhanced Security**— Provides secure access to remote servers to help administrators perform critical management functions while maintaining server and network security.

- Increased Efficiency— Automates the server configuration management using Dell OpenManage Essentials and Dell partner consoles, which enables efficient administration as server deployments scale.

For more information about iDRAC, see the *iDRAC User's Guide* available at www.dell.com/idracmanuals.

Benefits of using Lifecycle Controller Remote Services

Most common management tasks require more time because the functions are split between multiple tools. Tasks such as provisioning and updating require multiple tools and multiple media formats. You may need to manually search for resources, such as drivers and firmware, to perform the tasks.

Lifecycle Controller Remote Service simplifies these management tasks by providing the following:

- Integrated interface to access multiple functions
- Ability to perform systems management tasks such as provisioning, deployment, and update from a unified interface
- Automatic download of the required drivers and firmware to perform updates and manage systems
- Reduced errors and security risks

Key features

You can perform the following systems management tasks using Lifecycle Controller-Remote Services:

- Install operating systems and drivers
- Manage licensing
- Perform server firmware update including IDSDM, NVDIMM, BOSS adapters, BIOS, iDRAC/LC, backplane and enclosure controllers, RAID, NIC/CNA, Fibre Channel host bus adapters, PCIe SSDs, SAS HDDs and SSDs, and SATA HDD
- Perform part replacement and automatic restore of server configuration
- Get hardware inventory information
- Get and set NIC/CNA, Fibre Channel host bus adapters (FC-HBA), PCIe SSDs, and RAID configuration
- Get and set BIOS configuration and BIOS passwords
- Full export of Lifecycle log and add work notes
- Export current- and factory-shipped hardware inventory log
- Manage, attach, and boot to vFlash SD card partitions
- Lock the controllers using the local key
- Export and import the server profile
- Import server license
- View firmware details during server update
- Schedule and track the status of the update and configuration
- Import and export Server Configuration Profiles file that contains information about a component configuration
- Out-of-band server performance monitoring
- Enhance security using hash password
- View logs, monitoring, and server information, and configure the network parameters of a server using a mobile device
- Delete server-related information
- View the managed system using Physical Computer System View
- Manage the web server certificate
- Configure the USB management port
- View SupportAssist Collection to resolve business-critical issues
- Replace motherboard using Import Server Profile feature

Lifecycle Controller-Remote Services features are based on the type of license you purchase. The available licenses are Basic Management, iDRAC Express, iDRAC Express for Blades, or iDRAC Enterprise. Only licensed features are available in the iDRAC web interface and Lifecycle Controller-Remote Services. For more information about managing licenses, see *iDRAC User's Guide*. For more information about Lifecycle Controller-Remote Services licensing, see [Licensable Features](#).

Licensed features in Lifecycle Controller

The Web Services-Management (WSMAN) License and Privilege Specification encompasses all the license and privilege information required to utilize the WSMAN API provided by the integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller.

Lifecycle Controller is delivered as part of the iDRAC (Express and Enterprise licenses, and vFlash SD card feature) starting with the 11th generation of PowerEdge servers. On 12th, 13th, and 14th generation of PowerEdge servers, the vFlash feature is included with the iDRAC Enterprise license, so you need not separately license vFlash with Lifecycle Controller 2.0 and later. The 12th, 13th, and 14th generation of PowerEdge servers use only Express or Enterprise licensing.

The Lifecycle Controller management capabilities are partitioned into distinct areas and represented by the Dell Common Information Model (DCIM) profile specifications that provide comprehensive details about each manageability feature or capability. These features may be free, partially licensed, or fully licensed. Also, the accessibility of a feature is defined by the credentials provided with the WSMAN request and maps to the user-assigned privilege credentials, such as administrator- or read-only access.

New in this release

The updates that are supported in this release are:

- Added support for Storage drive SMARTlogs data to the SupportAssist collection validation.
- Added support for Enterprise Key Management in iDRAC.
- Added support for Extend System Lockdown to 3rd party I/O devices.
- Added support for Telemetry streaming from iDRAC.
- Added support for multi-level filtering for LC Log viewing.
- Added support for enabling 'No Config' on LCUI Network setting page.
- Updates for Dell.com made easier.
- Added support for file browsing for LCUI update function from USB device.

About iDRAC RESTful API with Redfish and Web Service API

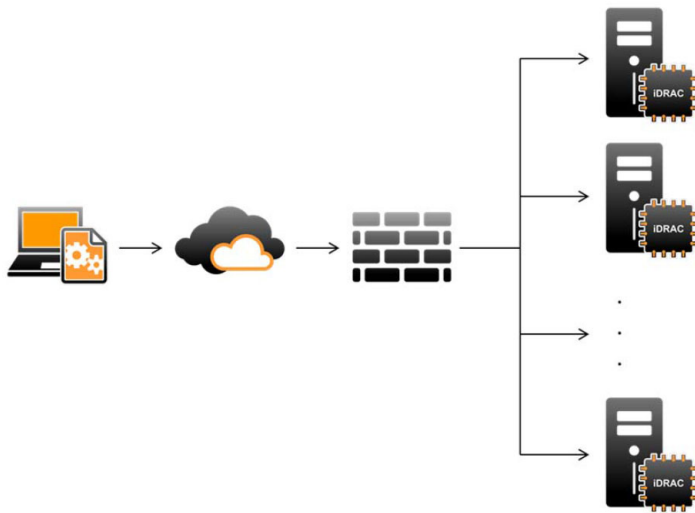
Web Services-Management (WSMAN) is a Distributed Management Task Force (DMTF) open standard, defining a Simple Object Access Protocol (SOAP) for managing servers, devices, applications, and various Web Services. WSMAN provides a common way for systems to access and exchange management information across the IT infrastructure.

DMTF is an industry organization that develops, maintains, and promotes standards for systems management in enterprise IT environments. The DMTF data model is complex and typically requires multiple transactions to accomplish simple operations such as specifying a user name and password, or giving administrator privileges to a user account. To reduce the number of transactions, Lifecycle Controller also offers a Dell data model for management that is based on an attribute model.

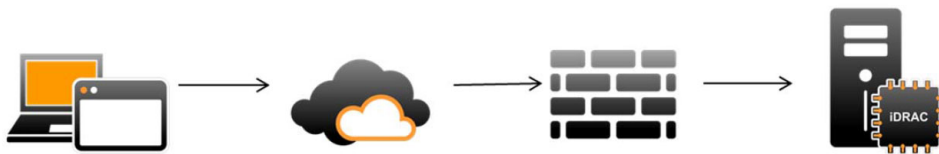
The Scalable Platforms Management Forum (SPMF) has published the Distributed Management Task Force (DMTF)'s Redfish API. It is an open industry standard specification and schema which is designed to meet the needs of IT administrators for simple, modern, and secure management of scalable platform hardware. Redfish is a NextGen management standard using a data model representation inside a hypermedia RESTful interface. The data model is defined in terms of a standard and machine-readable schema, with the payload of the messages expressed in JSON and the protocol using OData v4. Redfish is a hypermedia API, and can represent various implementations using a consistent interface. It has mechanisms for discovering and managing data center resources, handling events, and managing tasks.

About Lifecycle Controller API

Lifecycle Controller Remote Services is a standards-based interface that enables consoles to integrate bare-metal provisioning and one-to-many operating system deployments for remotely located servers. Lifecycle Controller takes advantage of the capabilities of both Lifecycle Controller GUI and Lifecycle Controller Remote Services to deliver significant improvement and simplification of server deployment.

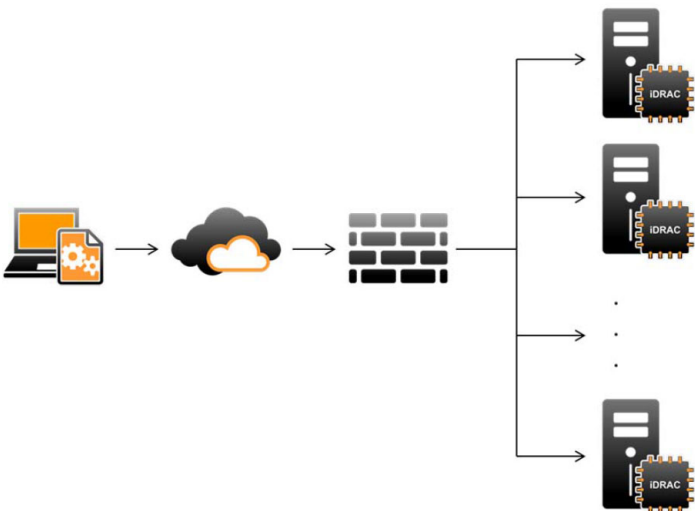


Lifecycle Controller also supports local one-to-one system management tasks through a graphical user interface (GUI) using the server's Keyboard Video Mouse (KVM) or the **Virtual Console** in iDRAC for operating system installation, updates, configuration, and for running diagnostics on single and local servers. This eliminates the need for multiple option ROMs for hardware configuration. For more information, see *iDRAC User's Guide* available at www.dell.com/idracmanuals.



About one-to-many management

A management station sends WSMAN and Redfish commands over a network and these commands pass securely through the network from outside the firewall and maintain security.



Operations using Remote Services

Using Lifecycle Controller-Remote Services, you can perform the following operations:

- Deploy and Configure
- Monitor
- Maintain
- Create and schedule jobs

Topics:

- [Deployment and configuration](#)
- [Monitor](#)
- [Maintain](#)

Deployment and configuration

Using various Lifecycle Controller-Remote Services' capabilities, you can perform different configurations on a system throughout its Lifecycle. You can perform operations such as BIOS, iDRAC, RAID, FC-HBA, NIC configurations, and operating system deployment on the system.

Monitor

Using various Lifecycle Controller-Remote Services capabilities, you can monitor a system throughout its lifecycle. Current and factory-shipped hardware inventory, Lifecycle Log, System Event Log, Firmware Inventory are some of the features that help you monitor the system.

Maintain

Using various Lifecycle Controller-Remote Services capabilities, you can maintain the health of a system throughout its Lifecycle. You can use features such as remote firmware management, part replacement, server profile import or export, and provisioning server to maintain a system.

Getting started with API collateral and links

Perform the following steps to start using the Lifecycle Controller API:

1. Identify the feature or the required management operation.
2. Determine how the API is constructed for the required management activity.
3. Utilize a client to access the API.
4. Use the best practices work flows for the client to interact with the API to accomplish the activity.

Topics:

- [WSMAN Profiles](#)
- [WSMAN MOF WSDL and XSD API definitions](#)
- [Web services interface guide](#)
- [Attribute registry XML](#)
- [Event message registry XML](#)
- [XML schemas](#)
- [iDRAC RESTful API with Redfish](#)
- [Authorization and licensing requirements for API access](#)

WSMAN Profiles

Profiles describe the behavior of each feature and necessary classes, properties, methods, and configurable management attributes that represent the feature. The Profile documents explain the features that are supported in the Lifecycle Controller-Remote Services provided within the context of the CIM architecture. Profile specifications are organized around different management areas or domains.

WSMAN MOF WSDL and XSD API definitions

A complement to the profile documentation is the Managed Object File (MOF) that documents the implementation of the Dell-specific CIM classes. Web Service Description Language (WSDL) and XML Schema Definition (XSD) files describe the resulting functionality.

Web services interface guide

The Web Services Interface Guide (WSIG) serves as a guideline for utilizing the functionality available from embedded Lifecycle Controller Remote Services web Services interfaces. It provides information and examples for utilizing the web services for WSMAN protocol using Windows WinRM and open source WSMANCLI command-line utilities.

To access WSIGs for Microsoft Windows and Linux with scripting examples, see API Integration Guides section at www.dell.com/support/article/sln311809.

Attribute registry XML

The attribute registry lists all the attributes and properties for the particular component in XML format. For attribute registries of RAID, NIC, iDRAC, BIOS, FC HBA, and PCIeSSD, see **Attribute Registry** document in **Manuals and Documents** section of Documentation.

Event message registry XML

The message registry XML describes all messages, message IDs, and message arguments from all profiles.

This zipped file contains the iDRAC and Lifecycle Controller event and error message data in XML, conforming to the DMTF DSP0228 message registry XML schema. The zipped file also includes an XSL file that helps to search the content easily.

For more details, see Event/Error Message Reference section at www.dell.com/support/article/sln311809. The Event Message Reference document contains the error and event information generated by firmware and other agents that monitor system components. These events are logged and displayed to the user on any one of the system management consoles.

XML schemas

The *Lifecycle Controller XML Schema Guide* provides interpretation of XML used by the Lifecycle Controller to describe various Lifecycle Controller output XML content such as:

- Logs
- Configuration results
- Hardware Inventory
- Attributes
- Server Configuration Profiles

 **NOTE:** To view *Lifecycle Controller XML Schema Guide*, go to API Reference Guide section at www.dell.com/support/article/sln311809.

iDRAC RESTful API with Redfish

The iDRAC RESTful API with Redfish is a web-based API which implies that resources are accessed using client supplied URLs. URLs are required to identify Redfish resources. The Redfish API uses a simple URL hierarchy which follows a `/redfish/v1/` pattern for all resources. To access a Redfish resource, use the URL pattern `https://<iDRAC IP>/redfish/v1/<Resource Path>`.

The Redfish API Reference Guide provides an overview of the Redfish Scalable Platforms Management API standard and describes the Dell implementation of Redfish for 12th, 13th, and 14th generation of PowerEdge servers, delivered by the integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller.

For more information, see *iDRAC Redfish API Guide* available at www.dell.com/idracmanuals.

Authorization and licensing requirements for API access

There are four levels of iDRAC licensing:

 **NOTE:** Use the link en.community.dell.com/techcenter/extras/m/white_papers/20067632.aspx to download the WSMAN License and Privilege Specification white paper.

- Base Management with IPMI
- Express
- Express for blades
- Enterprise

Table 1. Details of Licensing feature matrix

Feature	iDRAC9 Basic	iDRAC9 Express	iDRAC9 Express for Blades	iDRAC9 Enterprise
Remote Firmware Update	*Yes	Yes	Yes	Yes
Repository Based Update	No	No	No	Yes
Automatic Update	No	No	No	Yes

Table 1. Details of Licensing feature matrix (continued)

Feature	iDRAC9 Basic	iDRAC9 Express	iDRAC9 Express for Blades	iDRAC9 Enterprise
Operating system Deployment	No	Yes	Yes	Yes
Device Configuration	*Yes	Yes	Yes	Yes
Diagnostics	Yes	Yes	Yes	Yes
Server Profile Export	No	No	No	Yes
Server Profile Import	Yes	Yes	Yes	Yes
Part Replacement	No	Yes	Yes	Yes
Remote Services (through iDRAC RESTful API with Redfish and WSMAN)	Yes	Yes	Yes	Yes

* indicates that the feature is supported only on latest available PowerEdge servers.

Integrating the Lifecycle Controller API

This section outlines the resources required to integrate the Lifecycle Controller API into an application:

- **API Clients**— Lists the API clients that are available to support WinRM or WSMAN. The API clients enables you to create an application in a variety of programming languages.
- **Best Practices Guide**— Provides information about the common work flows, where in ready-to-use Python scripts are provided for all the common work flows.
- **Sample Scripts and Tools**— Provides additional working examples and reference.
- **Applications Using Lifecycle Controller-Remote Services** — Lists several existing applications that are already integrated with the Lifecycle Controller API.
- **WinRM and OpenWSMAN Installation and Configuration**— Identifies resources for configuring WinRM and WSMAN.

Topics:

- [API clients](#)
- [Best practices workflow references](#)
- [Sample scripts and tools](#)
- [Applications using Lifecycle Controller-Remote Services](#)
- [WinRM and OpenWSMAN installation and configuration](#)

API clients

Following are links to various API clients:

- [WinRM Scripting API, MSDN](#)
- [Advanced REST Client for Google Chrome](#)
- [Postman REST Client for Google Chrome](#)
- [cURL command line interface](#)
- [Python requests library for Redfish operations](#)
- [Redfishtool](#)
- [Openwsman CLI](#)
- [Windows PowerShell blog](#)
- [Windows PowerShell ScriptCenter](#)
- [Intel WSMAN Java Client Library](#)

Best practices workflow references

To access *Best Practices Guide* go to API Reference Guide section at www.dell.com/support/article/sln311809.

Sample scripts and tools

- Python and PowerShell scripting examples for iDRAC RESTful API with Redfish - github.com/DELL/IDRAC-REDFISH-SCRIPTING
- PowerShell scripting examples for WS-Man - github.com/dell/DellPEWSMANTools

Applications using Lifecycle Controller-Remote Services

The following applications use Lifecycle Controller-Remote Services:

- Dell OpenManage Integration Suite for Microsoft System Center - www.dell.com/esmmanuals
- OpenManage Essentials - Systems Management — www.dell.com/esmmanuals
- Chassis Management Controller (CMC) — www.dell.com/esmmanuals
- Dell OpenManage Integration for VMware vCenter - www.dell.com/esmmanuals
- OpenManage Power Center - www.dell.com/esmmanuals

WinRM and OpenWSMAN installation and configuration

It is recommended to use WinRM 3.0 on Windows Management Stations. WinRM 3.0 is installed by default as a part of Windows 8, Windows 10, and Windows Server 2012. It can also be installed as a part of the Windows Management Framework Core package on the following operating systems:

- Windows Server 2008 SP1
- Windows Server 2008 SP2
- Windows Server 2003 SP2
- Windows Vista SP1
- Windows Vista SP2
- Windows XP SP3
- Windows Server 2012
- Windows 8
- Windows 10
- Windows 2012 R2
- Windows 2016

NOTE: If you use WinRM and WSMAN to configure many attributes, about 60 attributes or more, you may observe a iDRAC timeout failure. To avoid the iDRAC timeout failure, you can use Server Configuration Profile (SCP) methodology to perform the setup operation.

For more information about how to install WinRM 3.0 as a part of the Windows Management Framework Core package, see article 968929 in the Microsoft Knowledge Base at technet.microsoft.com.

OpenWSMAN CLI is an open source Linux WSMAN client. The OpenWSMAN CLI source code and installation information are available at openwsman.github.io/.

NOTE:

Information about **Transport Layer Security (TLS)**

- To ensure a secure connection, Dell recommends using TLS 1.1 and higher.
- By default, iDRAC is configured to use TLS1.1. If you are using any older versions of Windows, install the required windows updates and modify the registry for TLS 1.1 or the latest version.
- To use TLS 1.1, you must have the WSMAN CLI v2.6.0. If you want to use an older version of WSMAN CLI, you should change the iDRAC TLS setting to TLS 1.0.
- When you compile invoke commands in WSMAN 2.6.0, use & as a separator. Comma (,) is not a supported separator.

Social media reference

To obtain the most up-to-date information, go to the Dell Support Site and search for the required information.

Table 2. Product Information

Product Name and related Topics	Link
Lifecycle Controller	www.dell.com/idracmanuals
Integrated Dell Remote Access Controller (iDRAC)	www.dell.com/idracmanuals

Topics:

- [Related Documentation](#)
- [Accessing documents from Dell support site](#)
- [Contacting Dell](#)

Related Documentation

In addition to this guide, you can refer to the following guides available at www.dell.com/support or www.dell.com/idracmanuals:

- The *Lifecycle Controller Online Help* provides information about the fields available on the GUI and the descriptions for the same. To view the online help information in Lifecycle Controller user interface, click **Help** in the upper-right corner, or press <F1>.
- The *Lifecycle Controller Release Notes* is available with the product. To read the Release Notes in Lifecycle Controller user interface, click **About**, and then click **View Release Notes**. A web version is also given to provide last-minute updates to the system or documentation or advanced technical reference material intended for users or technicians.
- The *Dell iDRAC Licensing White paper* at Dell TechCenter. This document provides an overview of iDRAC digital licensing and how the latest licensing is different from iDRAC available in the PowerEdge servers. The white paper also provides information about iDRAC Express and other Enterprise value offerings.
- The *Lifecycle Controller Remote Services For PowerEdgeServers Quick Start Guide* provides information about using remote services.
- The *Systems Management Overview Guide* provides brief information about the various Dell software available for performing systems management tasks.
- The *Integrated Dell Remote Access Controller (iDRAC) User's Guide* provides information about configuring and using iDRAC for rack, tower, and blade servers to remotely manage and monitor a system and the system's shared resources through a network.
- The *Dell Repository Manager User's Guide* provides information about creating customized bundles and repositories that include Dell Update Packages (DUPs) for systems running supported Microsoft Windows operating systems.
- The "Lifecycle Controller Supported Dell Systems and Operating Systems" section in the *Dell Systems Software Support Matrix* provides the list of Dell systems and operating systems that you can deploy on target systems.
- The *PowerEdge RAID Controller (PERC) 9 User's Guide* provides specification and configuration-related information about the PERC 9 controllers.
- The *Glossary* provides information about the terms used in this document.
- The *Dell OpenManage Server Update Utility User's Guide* provides information about using the DVD-based application for identifying and applying updates to the system.

The following system documents are available to provide more information:

- The safety instructions that are included with a system provide important safety and regulatory information. For additional regulatory information, see the [Regulatory Compliance](#) home page. Warranty information may be included within this document or as a separate document.
- The *Rack Installation Instructions* included with a rack solution describe how to install a system into a rack.

- The *Getting Started Guide* provides an overview of system features, setting up the system, and technical specifications.
- The *Owner's Manual* provides information about system features and describes how to troubleshoot the system and install or replace system components.
- *Lifecycle Controller Web Services Interface Guide—Windows and Linux*.

White papers help you to know in-depth information about a business-critical process that you can complete by using firmware products such as Lifecycle Controller, iDRAC and so on. You can perform these processes by using GUI features, RACADM commands, and WS-MAN commands.

For more information, see www.dell.com/support/article/sln311809

Accessing documents from Dell support site

You can access the required documents in one of the following ways:

- Using the following links:
 - For all Enterprise Systems Management documents — www.dell.com/esmmanuals
 - For OpenManage documents — www.dell.com/openmanagemanuals
 - For iDRAC and Lifecycle Controller documents — www.dell.com/idracmanuals
 - For Serviceability Tools documents — www.dell.com/serviceabilitytools
 - For Client Command Suite Systems Management documents — www.dell.com/omconnectionsclient
- From Dell support site,
 1. Go to www.dell.com/support.
 2. In the **Enter a Service Tag, Serial Number...** search box, type the product name. For example, **PowerEdge** or **iDRAC**.
A list of matching products is displayed.
 3. Select your product and click the search icon or press enter.
 4. Click **Manuals & documents**.

Accessing documents using product selector

You can also access documents by selecting your product.

1. Go to www.dell.com/support.
 2. Click **Browse all products**.
 3. Click the desired product category, such as Servers, Software, Storage, and so on.
 4. Click the desired product and then click the desired version if applicable.
-  **NOTE:** For some products, you may need to navigate through the subcategories.
5. Click **Manuals & documents**.
- Using search engines:
 - Type the name and version of the document in the search box.

Contacting Dell

 **NOTE:** If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Go to www.dell.com/support
2. Select your support category.
3. Verify your country or region in the **Choose a Country/Region** drop-down list at the bottom of the page.
4. Select the appropriate service or support link based on your need.

Terms and definitions

The following table lists the terms used in this document and their definitions.

Table 3. Terms and definitions

Term	Definition
LC	Lifecycle Controller
Enumerate	Refers to WS-MAN ENUMERATE operation as described in Section 8.2 of DSP0226_V1.1 and Section 9.1 of DSP0227_V1.0
Get	Refers to WS-MAN GET operation as defined in Section 7.3 of DSP00226_V1.1 and Section 7.1 of DSP0227_V1.0
iDRAC	Integrated Dell Remote Access Controller management controller for blades, rack, and tower servers
USC	Unified Server Configurator
iSCSI	Internet Small Computer System Interface, an Internet Protocol (IP) based storage networking standard for linking data storage facilities
SSM	System Services Manager
CSIOR	Collect System Inventory on Restart
SSIB	System Services Information Block
UEFI	Unified Extensible Firmware Interface
BIOS	Basic Input/Output System
NIC	Network Interface Controller
FC-HBA	Fibre Channel – Host Bus Adapters
FQDD	Fully Qualified Device Description
LCL	Lifecycle Log
WSIG	Web Services Interface Guide
WSMan	Web Service Management
RACADM	Remote Access Controller Admin, a scripting interface for the iDRAC and Lifecycle Controller