

iDRAC Service Module – OS based capabilities for Out-of-band management with iDRAC9

This technical white paper lists the latest enhancements that iDRAC Service Module (iSM) provides to out-of-band management with iDRAC9 to the customers in the Dell EMC 14th generation PowerEdge servers.

May 2021

Revisions

Date	Description
May 2021	Initial release

Acknowledgments

Authors: Aparna Giri, Ramesha HE

The information in this publication is provided “as is.” Dell Inc. makes no representations or warranties of any kind with respect to the information in this publication, and specifically disclaims implied warranties of merchantability or fitness for a particular purpose.

Use, copying, and distribution of any software described in this publication requires an applicable software license.

Copyright © 2021 Dell Inc. or its subsidiaries. All Rights Reserved. Dell, EMC, Dell EMC and other trademarks are trademarks of Dell Inc. or its subsidiaries. Other trademarks may be trademarks of their respective owners. [5/19/2021] [White Paper] [469]

Table of Contents

- 1 Introduction5
- 2 iDRAC9 - The server industry's leading Embedded Management solution6
 - 2.1 iDRAC Service Module (iSM)6
- 3 iSM Key Capabilities with 14G/15G systems8
 - 3.1 Storage management8
 - 3.1.1 Prepare to Remove NVMe Devices8
 - 3.1.2 Auto-dispatch of Drives8
 - 3.1.3 SMART Monitoring of Storage Alerts in the AHCI Mode8
 - 3.2 Troubleshooting and Serviceability8
 - 3.2.1 Co-relation of software failures in S2D environment with hardware alerts in iDRAC and LC9
 - 3.2.2 Addition of LC logs in OS logs9
 - 3.3 Security9
 - 3.3.1 Support for IPv6 and toggle between IPv4 and IPv69
 - 3.3.2 Windows DLL enhancements9
 - 3.3.3 TLS layer encryption between iSM and iDRAC10
- 4 Conclusion11
- A Technical support and resources12

Executive summary

The traditional approach to server systems management has been an agent-based approach to manage the server. These legacy 'in-band' agents required greater CPU and memory cycles and were heavy weight. Dell EMC first introduced full agent free architecture in 2012 with iDRAC (integrated Dell Remote Access Controller). The iDRAC9 has greatly reduced the need for in-band agents and has led to the modern way of server systems management via out-of-band management.

However, there are still some OS dependent capabilities the use of an in-band module. This paper discusses the unique value that iSM brings to out-of-band management with iDRAC9 for these key OS-based capabilities.

1 Introduction

Dell OpenManage products help IT administrators deploy, update, monitor, and manage IT assets and Serviceability. The portfolio helps customers manage Dell EMC PowerEdge servers in physical, virtual, local, and remote environments by using in-band and out-of-band technologies.

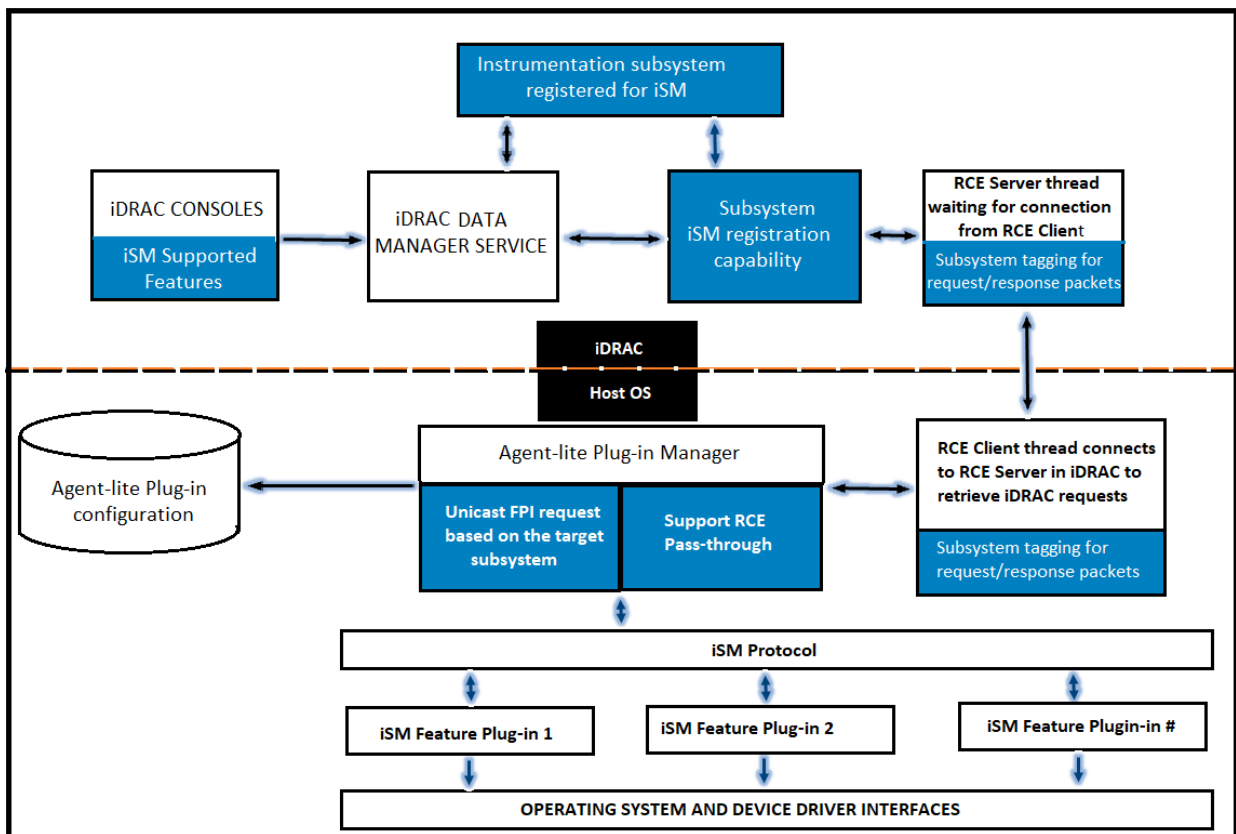
While in-band method was adopted greatly by customers for many years, with evolving technology organizations are gradually adopting to an out-of-band approach to systems management. The legacy, in-band approach of Dell EMC has been through the OpenManage Server Administrator (OMSA) component. The out-of-band approach uses the iDRAC, which is embedded into each server, thus requiring no extra software in order to start functioning. Along with iDRAC, Dell EMC iDRAC Service Module (iSM) is a small OS-resident module that provides OS-specific information and capabilities to iDRAC. The combination of iDRAC and iSM is a viable replacement for OMSA for customers. Also, iSM with iDRAC offers several features that OMSA does not provide. The combination of iDRAC and iSM continues to evolve to provide greater value and functionality.

2 iDRAC9 - The server industry's leading Embedded Management solution

The integrated Dell Remote Access Controller 9 (iDRAC9) delivers advanced, agent-free, local and remote server administration. Embedded in every PowerEdge server, iDRAC9 provides a secure means to automate all the common management tasks. With iDRAC embedded in every PowerEdge server, even before installing an operating system or hypervisor, IT administrators have a complete set of server management features at their fingertips.

As iDRAC9 is available across the Dell EMC PowerEdge portfolio, the same IT administration tools and techniques are available consistently for management. Besides the intuitive HTML5 user interface of iDRAC9, customers can also leverage iDRAC RESTful API for the latest in-scalable automation capabilities of management of PowerEdge servers.

2.1 iDRAC Service Module (iSM)



iDRAC Service Module (iSM) is a small module which installs on a wide variety of supported operating systems and hypervisor. iSM makes OS-related information and capabilities available to the iDRAC. iSM also provides features like a watchdog timer for automatic server recovery, which are important in certain IT environments. iSM does not have its own interface but complements iDRAC by providing data to the iDRAC GUI interface, Dell Remote Access Controller Admin (RACADM), Redfish or the Web Services for

Management (WS-Man) API. A single release of iSM also supports multiple generations of PowerEdge servers.

Besides a smaller memory footprint when compared to OMSA, iSM is also supported on more operating systems. There are also features offered by iSM that OMSA does not provide. One such iDRAC9 feature is the option to completely drain the power from the server remotely. The result means no longer requiring a technician in the data center to physically pull the power cable from the back of the server. Other value-added capabilities available in iDRAC via iSM includes availability of Lifecycle logs in OS logs, accessing iDRAC via Host OS and OS Credentials, iDRAC SNMP alerts via in-band and auto-dispatch of drives for certain predictive alerts.

iSM bridges the gap between the operating system and iDRAC and provides several additional features available. For example, having iSM installed greatly reduces the time that is spent on the phone with Tech Support. Automation of SupportAssist Collection (SAC) logs along with addition of valuable information such as operating system and application logs, lead to faster time to resolution.

3 iSM Key Capabilities with 14G/15G systems

iDRAC Service Module continues to evolve to add and expand the features and functionality complimenting iDRAC and SupportAssist Capabilities. The below section provides greater details on the same.

3.1 Storage management

The following storage enhancements are added by iSM to iDRAC's Storage Management Capabilities:

- Prepare to Remove NVMe Devices
- Auto-dispatch of Drives
- SMART Monitoring of Storage Alerts in the AHCI Mode

3.1.1 Prepare to Remove NVMe Devices

Non-Volatile Memory Express (NVMe) Peripheral Component Interconnect Express (PCIe) Solid State Device (SSD) can be removed without shutting down or rebooting the system. To prevent loss of data, use the Prepare to Remove option, that halts all the device-associated background activities and allows instant removal of the NVMe PCIe SSD.

3.1.2 Auto-dispatch of Drives

Starting iSM version 3.4, proactive support for drive failures is added by iSM and iDRAC. If the server hits one of the following SNMP events: PDR16 and PDR63, then ProSupport+ customers who are registered with SupportAssist, get a recommendation from Dell EMC support via email regarding the dispatch of the predictive failure.

Once you receive the email, you must provide the service address to Dell EMC support for the delivery of the replaceable parts. This feature ensures support for drive failure can be automated and thus reduces complexity and time taken for troubleshooting for select drive issues.

3.1.3 SMART Monitoring of Storage Alerts in the AHCI Mode

Starting iSM version 3.5, S.M.A.R.T monitoring feature supports hard disk drives enabled with SATA in AHCI mode. It has built-in capability to monitor S.M.A.R.T alerts through iDRAC's supported auditing methods for hard drives under SATA Chipset controller. Previously, the only option was to monitor such alerts by open-source utilities to monitor the hard drives set in RAID Mode.

3.2 Troubleshooting and Serviceability

iSM also adds value to out-of-band management for faster troubleshooting and easy Serviceability with features supporting SupportAssist capabilities.

- Co-relation of software failures in S2D environment with hardware alerts in iDRAC and LC
- Addition of LC logs in OS logs
- Anonymous upload of SAC and filter of PII information
- Automated Ticket Creation

3.2.1 Co-relation of software failures in S2D environment with hardware alerts in iDRAC and LC

Often customers in S2D environments face an issue in understanding co-relation between software failures with corresponding hardware issues if any. iSM being at an OS level can provide the ideal correlation for this deeper insight and easier resolution.

Starting iSM version 3.5, the event logs for hardware storage pool alerts or events will be monitored by iSM with Server Storage correlation feature. Currently the server storage subsystem is monitored when Dell EMC storage controllers are used in RAID mode. But in Storage Spaces (SS) or Storage Space Direct (S2D), the server storage subsystem is monitored in a pass-thru mode or the SATA chipset is used to create the storage pool. With this feature, the hardware defined alerts covered by Lifecycle log and software defined alerts covered by OS logs are merged and the alerts are registered in the iDRAC Lifecycle logs.

3.2.2 Addition of LC logs in OS logs

Though most of the hardware diagnosis information is available with the Lifecycle Controller Logs (LCL), there are Host OS driver/software generated logs related to the hardware diagnosis that are not available with LCL. During issue resolution, you must look at two different logs to diagnose a hardware issue.

This feature ensures faster and smoother diagnosis with Lifecycle Controller Logs being available in OS logs, providing a consolidated view of hardware and related host software logs.

3.3 Security

iSM and iDRAC9 communicate through a secure USB-NIC connection. Following enhancements make the communication truly secure:-

- TLS layer encryption between iSM and iDRAC
- Windows DLL enhancements
- Support for IPv6 and toggle between IPv4 and IPv6

3.3.1 Support for IPv6 and toggle between IPv4 and IPv6

With deeper adoption of IPv6 in Datacenter environments, for enhanced security iSM supports both IPv4 and IPv6 modes of communication. This capability provides you an option to choose either IPv4 or IPv6 or toggle between the two as required.

Once you install iSM, iSM service attempts to connect to iDRAC using IPv4 link-local address. If there is no IP address on the host USB NIC interface, iSM tries to configure IPv4 address on the host side. This USB NIC interface configuration on the host OS from iSM is done only once. iSM remains disconnected from iDRAC if there is any subsequent scenario of incomplete configuration of USBNIC on the host OS. In case the connection fails even after configuring IPv4 address, iSM tries to connect to iDRAC using IPv6.

3.3.2 Windows DLL enhancements

Some of recent security Common Vulnerabilities and Exposures (CVE) indicate that the OS Library search path may have issues wherein an intruder could replace the path and get their own infected library loaded instead of the intended one.

Microsoft supports verification of Authenticode signature when the CLR loads assembly. To support this, in iSM the windows loader verifies the Authenticode signature of ISM service executable or the DLL's

executable links and loads. This ensures only an authentic iSM executable can get installed, adding to security.

3.3.3 TLS layer encryption between iSM and iDRAC

To further enhance the security, the data communication between iSM and iDRAC happens through TLS protected USBNIC INET sockets. This ensures protection of all the data that transports from iDRAC to iSM over USBNIC.

iSM and iDRAC use self-signed certificates to control authentication. The self-signed certificates have 10 years of validity. Fresh self-signed certificates are generated while installing iSM every time. Reinstall or upgrade iSM if the certificates expire.

4 Conclusion

As seen from the above capabilities, the functionality of iSM continues to evolve and complement iDRAC9 features. With iSM installed, the need for OMSA significantly decreases. iDRAC with iSM together provide nearly the full range of monitoring and management functionality.

Dell EMC OpenManage continues to deliver more features to the out-of-band iDRAC and iSM solution based on customer feedback. This feedback helps provide greater functionality and reduce the need for in-band software agents.

A Technical support and resources

The iSM and iDRAC support home page provide access to product documents, technical white papers, how-to videos, and more.

www.dell.com/support/idrac

<https://www.dell.com/support/article/en-us/sln310557/>

Dell Technical Support

www.Dell.com/support