Agent Free Monitoring Using Microsoft System Center Operations Manager 2012

Monitoring 12th Generation Dell Servers

This technical white paper provides an overview of monitoring 12th Generation Dell Servers using Microsoft System Center Operations Manager 2012.

Author(s)

Vaideeswaran Ganesan

Anirban Kundu



Executive summary

With increased focus on virtualization and dynamic workloads, continuous availability of server infrastructure and increased productivity are becoming critical factors for success of a cloud environment. Dell Out-of-Band management packs enable continuous availability of server infrastructure in Microsoft System Center 2012 environment by leveraging agent-free monitoring capabilities of 12th Generation Dell Servers and enhancing productivity by combining it with the power of sophisticated Dell tools.

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Introduction

Microsoft System Center 2012 is a comprehensive management platform that enables managing IT infrastructure for traditional datacenters, private, and public clouds across server infrastructure and client devices.

Dell OpenManage Integration Suite for Microsoft System Center enables IT administrators to leverage the capabilities of System Center and provide enhanced monitoring and effective management of Dell hardware. The Integration Suite for System Center Operations Manager supports end-to-end monitoring of various Dell product lines covering Dell servers, storage, printers and client devices. Through the Dell OpenManage Integration Suite, administrators can selectively download and install individual monitoring suites based on the monitoring needs of the organization's environment.

Dell Server Management Pack Suite

In the Integration Suite portfolio, Dell Server Management Pack Suite offers monitoring of Dell server hardware – Servers, PowerVault NAS, DRACs, iDRACs and CMCs. The Latest version of this suite enables monitoring of the Dell server hardware using System Center Operations Manager 2007 R2, System Center Essentials 2010, and System Center 2012 Operations Manager and integration with various Dell tools. Additionally, new support is added for monitoring 12th Generation Dell Servers through the new agent-free monitoring capabilities of Life Cycle Controller running on the integrated Dell Remote Access Controllers version 7 (iDRAC7).

The agent-free monitoring of 12th Generation Dell Servers is facilitated through Dell Server Out-of-Band Monitoring Management Packs that make use of secure WS-Management protocol to monitor the various components of Dell Servers through the Life Cycle Controller in iDRAC7. The Out-Of-Band Monitoring Management Packs monitor inventory, health and performance metrics of the Dell Server, without requiring an OpsMgr agent installed on the server.

Agent-free monitoring

Agent free monitoring enables monitoring of 12th Generation Servers without utilizing key server resources like CPU, memory and leaving the server resources to be completely utilized for business critical applications. Enabled by Life Cycle Controller running on iDRAC7, agent-free monitoring enables you to monitor the server in real time, independent of the way the server is being used and the operating system installed on it. Agent free monitoring provides for a one monitoring solution, without depending on agents but at the same time providing the same level of monitoring capability as is provided through an otherwise in-band agent based solutions.



Architecture of Dell Out-of-Band Monitoring Feature

Dell Out-of-Band (OOB) Monitoring through System Center 2012 is a licensed feature. The monitoring feature makes use of Microsoft System Center 2012 Monitoring Pack for WS-Management and SMASH Device Discovery to discover 12th Generation Dell Servers. Once the 12th Generation Servers are discovered, the OOB Monitoring solution makes use of Dell OOB Helper Utility installed on the management server to efficiently extract the inventory, health and metrics from the LifeCycle Controller through secure WS-Management interfaces. The collected inventory, health, and metrics are then represented in the various Dell Server specific presentation views. The OOB Monitoring solution converts the device events received from LifeCycle Controller as Simple Network Management Protocol (SNMP) traps into OpsMgr alerts associated with the Dell Server.

Figure 1 Out-of-Band Monitoring Architecture



Installing and Configuring Dell Out-of-Band Monitoring Feature

Before installing the Dell Server Management Pack Suite, import Microsoft Monitoring Pack for WS-Management and SMASH Device Discovery, purchase licenses for the Out-of-Band Server Monitoring through Dell Server Management Pack Suite, install and configure Connections License Manager and finally enable Server (Out-of-Band) monitoring feature from Feature Management Dashboard.

Monitoring Pack for WS-Management and SMASH Device Discovery - Microsoft System Center 2012 has released a monitoring pack for discovery and monitoring of devices that support SMASH profiles through WS-Management protocol. The pack includes a discovery wizard that can be used to discover devices in a network segment by providing a range of IP

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Addresses or list of IP Addresses. Provide the credentials for discovering the devices that are either the iDRAC7 local accounts or Active Directory accounts if the iDRAC is integrated with Active Directory.

Devices compliant with WS-Management protocol and support SMASH profiles are classified as SMASH devices and are associated with their corresponding Server instances (Windows Computer objects). The Monitoring pack also supports propagating the health of the SMASH device to the Windows Computer instance, thereby consolidating the hardware and the software health together at the Windows Computer instance.

Dell Out-of-Band Monitoring Licenses need to be purchased from Dell Sales in order to use Dell Out-of-Band monitoring feature. Licenses can be purchased based on the network size and the future capacity expansion of the datacenter. The licenses are delivered to you through email or as downloadable from the Dell Support Site.

Dell Connections License Manager is a separate downloadable from Dell Support Site. In order to monitor licensed features, this product needs to be setup in your environment. Once the license manager is setup, the purchased licenses are imported into the Dell Connections License Manager.

Dell Server Management Pack Suite is then installed on the management servers where the 12th Generation Dell Servers are monitored via agent-free monitoring. The installation will ensure that Dell OOB helper utility is properly installed on the management server and the management server is now capable of monitoring Dell Servers through agent-free monitoring. With System Center 2012, the management servers can be grouped into resource pools. Resource pools enable the management servers to distribute work amongst them and ensure that monitoring is uninterrupted on management server failures. Dell Server Management Pack Suite must be installed on all management servers in a management pool, so that all Dell OOB Monitoring workflows continue to work even during management server failures.

Feature Management Dashboard of Dell Server Management Pack Suite 5.0.1 allows you to be able to import, remove, or manage monitoring features. This dashboard is created once the Dell Server Management Pack Suite is installed on any one of the management servers. In this dashboard, the Dell Out-of-Band Monitoring appears as a monitor feature "Server Out-of-Band Monitoring." Associated with this feature are a set of tasks, which can be used for configuring the feature. All possible tasks for this feature are listed in

Table 2 Server Out-of-Band Monitoring Feature Tasks.

Dell Server Management Pack Suite provides two prepackaged monitoring levels of Dell Out-of-Band monitoring based on the network capacity and needs. The different monitoring levels and possible customer scenarios are provided in the following table. You

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can leverage these prepackaged monitoring levels or create their own customized monitoring by overriding the various unit monitors available as part of the monitoring feature.

Table 1 Dell Out-of-Band Monitoring Levels

Monitoring Feature Level	Features	Scenarios
Scalable Monitoring	Full inventory, alerts	Mid-size to large cloud environment with many
	High level health up to component groups	virtual servers
Detailed Monitoring	Full inventory, alerts	Small datacenter or a small private cloud with few virtual
	Full health up to component groups	servers

Once the right level of monitoring for the network is determined, customer needs to simply select one of the tasks ("Set to Server (Out-of-Band) Scalable Feature" or "Set to Server (Out-of-Band) Detailed Feature") to enable the monitoring at that level. These tasks will import all the relevant Dell Out-of-Band monitoring management packs. (The Feature Management dashboard will now change the Available Version to 5.0.1). License availability and usage is also shown in the Feature Management dashboard.

Figure 2 Dell Feature Management Dashboard





Figure 3 Dell Connections License Manager

	. CONNECTI	ONS LICENSE	MANAGER			Support Ab	bout
Server User: SCOMADSIADMINISTRATOR	Licenses	8: Export	Delete				
Licenses		Status 🔺	License Description Dell Server Management Pack Suite for System Center Operations Manager. This lice monitoring 50 servers via out of band.	nse is for	Perpetual	Nodes used/ Total 💌	
	License Entitlen Descrip License License Nodes Remair	e Details: nent ID ense is for moni 3 Type ad Nodes in Use ning Nodes		License Features: Server Out-of-Band	Monitoring		

Table 2 Server Out-of-Band Monitoring Feature Tasks

Task Name	Function
Set to Server (Out-of-Band) Scalable Feature	Enables high level monitoring of Dell Servers. Use this feature to monitor large number of servers.
	Imports all the relevant management packs for high level monitoring of Dell Servers through OOB Monitoring.
Set to Server (Out-of-Band) Detailed Feature	Enables detailed monitoring of Dell Servers. Use this feature for monitoring the health up to component level.
	Imports all the relevant management packs for detailed monitoring of Dell Servers through OOB Monitoring.
Set Server (Out of Band) Monitoring as Preferred Monitoring Method	Select the preferred monitoring method. If a server is discovered both in-band and OOB, then use the OOB as the preferred method of monitoring.



Configure License Manager	Configure the License Manager URL. Out-of-Band Monitoring Licenses should be imported into this License Manager
Remove Server (Out-of- Band) Feature	Removes the Dell Server OOB Monitoring feature.
Launch Dell Connections License Manager	Launches the Connections License Manager Web Interface.

Dell Out-of-Band Monitoring Features

Once all the setup requirements are met, Dell Out-of-Band Management packs starts monitoring the devices which were discovered through the Microsoft WS-Management and SMASH device discovery template. The management packs enable collection of inventory, health, and performance metrics of the discovered Dell servers based on the level of monitoring feature and render the data in the various views provided by the management packs. The monitoring information is collected from the devices using secure WS-Management interfaces using either local iDRAC7 credentials or Active Directory credentials (if iDRAC7 is integrated with Active Directory). Device events are collected through Simple Network Management Protocol (SNMP) Traps and converted into OpsMgr Alerts in the various Alerts Views. Dell Out-of-band management packs automatically configure the SNMP Trap destination on the Dell Servers with the IP Address of the management server, so that customer need not configure this for every device in the network. Dell Out-of-Band Management packs provide the following views.

Component	Inventory	Health	Performance	Alerts
Server	Asset Tag, Service Tag, OMSA URL, RAC URL, and Model	Yes	N/A	Yes
iDRAC7	LCC Version, Storage Size, and Model	N/A	N/A	Yes
BIOS	Manufacturer, Version, and Serial Number	N/A	N/A	N/A
Power Supplies	Serial/Part Numbers, Model, Type, Manufacturer, and Total Output Power	Yes	Yes*	Yes
Memory	Serial Numbers, Model, Manufacturer, Capacity, and Speed	Yes	N/A	Yes

Table 3 Server Inventory, Health, Performance and Alerts



Processors	Family, Model, Manufacturer, Speed, and Number of Cores	Yes	N/A	Yes
Network Interfaces	MAC & IP Address, Speed, Media Type, Vendor/Product Name, Family, and NIC attributes	Yes	Yes	Yes
Storage Enclosures	Service/Asset Tags, Firmware/EMM version, and Enclosure properties	Yes	N/A	Yes
Storage EM Modules	Part number, firmware version, and type	Yes	N/A	Yes
Virtual Disks	Name, Capacity, Layout, Media Type, and VD properties	Yes	N/A	Yes
Physical Disks	Name, Capacity, Vendor, Serial Number, Versions, Manufacture Date, Drive form factor, and Physical Disk properties	Yes	N/A	Yes

* Power/energy and headroom metrics are collected

Table 4 Sensor Health, Performance and Alerts

Sensors	Health	Performance	Alerts
Temperature	Yes	Yes	Yes
Battery	Yes	N/A	Yes
Voltage	Yes	N/A	Yes
Current	Yes	Yes	Yes
Chassis Intrusion	Yes	N/A	Yes
Fan	Yes	N/A	Yes

Diagram Views – Dell Out-of-Band management packs monitor the inventory of the various components of the Dell Server and create a hierarchical representation of the device in the

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Dell Server Views. All servers that are discovered through in-band or Out-of-band are grouped under single Dell Servers groups – so that the customer has a single view of all the Dell servers in the environment, irrespective of the monitoring methodology. You can drill down the hierarchy for a deeper insight into the component inventory and health. Out-of-band Management packs collects asset tags, part numbers, serial numbers and firmware versions for all components where applicable, so that you can create an on demand custom inventory and asset reports.



Figure 4 Dell Server Diagram View

Alert Views – Dell Out-of-Band management packs collects the SNMP Traps from the various Dell Servers and associates them as OpsMgr Alerts with the Dell Servers which originated the events. All the alerts contain detailed knowledge articles with causes and resolutions to assist in troubleshooting. Customers can utilize the knowledge articles to look up the alert condition and take appropriate resolution steps to remediate the problem. The management pack also provides two common alert views across all servers – Server Alerts View for all alerts from the Dell Server and NIC Alerts View for network interface specific alerts. These alert views contain the alerts from both Out-of-Band and in-band Discovered servers – so that customer has one single view for getting a holistic picture of all alerts in the network.



Figure 5 Health and Alert Knowledge Articles

Reset Health 🔀 Recalculate Health 🐨 Filter Monitors 🙆 Refr	esh 📰 Properties 🙆 Help 🗄 🗮 Overrides	•			
whether the second s					
Entitle Health Davier Supply	Knowledge State Change Events (1)				
Control Health - Power Supply (Object)	State change Excito (1)				
Availability - Power Supply (Object)	Furnamental				
Configuration Rever Supply Group - Power supply (Dell Server Po	summary				
Configuration - Power Supply (Object) Berformance - Berley Supply (Object)	Power Supply Group Unit Monitor				
Sequeity Dever Supply (Object)	Causes				
Security-Power supply (Object)	 If one or more Power Supply is in warn 	ing state, causes/resolutions for this condition:			
	Cause	Resolutions			
	A predictive failure detected on power supply <number>.</number>	Remove and re-install the power supply at the next service window. If the issue persists, contact technical support. Refer to the product documentation to choose a convenient contact method.			
	The power input for power supply <number> is outside of the allowable range, but it is attached to the system.</number>	Verify the input power is within the operating requirements for the power supply.			
	The temperature for power supply <number> is in a warning range.</number>	Check the system operating environment, including airflow and inlet temperature. Check system logs for temperature and thermal component failures.			
	Power supply in <enclosure name=""> was disrupted.</enclosure>	Reconnect the power cable to the power supply unit if it was disconnected. Restore the input AC power supply. Make sure the power supply is restored to the enclosure from the mains.			
	The power supply in <enclosure name=""> is switched OFF.</enclosure>	Reseat the power supply, check the cable connection and verify the power supply is turned on. See the storage hardware documentation for more information.			
	Power supply redundancy is degraded.	Check the event log for power supply failures. Review system configuration and power consumption.			

Performance Views – Dell Out-of-band monitoring management pack monitors several temperature, power, energy and network interface performance attributes and displays them as graphs under the Dell Out-of-Band Performance Views. Customer can select different attributes and either compare amongst the attributes (for example, Peak Power vs Power Consumption) or compare the attributes across different Dell Servers. Customer can also customize the views based on selected time ranges. Customers can also launch various Dell tools to either troubleshoot on the specific device or launch OpenManage PowerCenter to monitor and manage power for the devices being monitored.







Out-of-Band Server State Views – Dell Out-of-band management packs also provide for a state view for out-of-band monitored servers. The state views provide a very easy consolidated health view of the Dell Servers and their components in the network. OpsMgr Operations Console enables the customer to sort and examine the servers in the order of health severity and launch the server specific alert, diagram, and performance views or console tools for further troubleshooting.



Figure 7 Out-of-Band Servers State View

Monitoring <	Managed Servers	(Out-Of-Band) (2)						Tasks
🔢 Windows Computers 📃	🔍 Look for: 🛛			Find Now C	ear			×	
Agentless Exception Monitoring			Dell Server	Dell	Dell	Dell	_ Dell	Dell Serve	State Actions
Application Monitoring Data Warehouse	State V	Name	Processor Group	SMASH Device	Storage Group	O BIOS		Memo Group	Tasks
	🔞 Critical	WIN-HIFT	A Healthy	A Healthy	Healthy	Not monit	Not monit	A Healt	Tusks
Eesture Management Dashhoard	A Marning	10 94 172 240	Healthy	Healthy	Healthy	Not monit	O Not monit	A Healt	Navigation
A Control of the second sec	<u> </u>	1010 1121212 10	• Healthy	Uncarally 1	• nearray	0.000		• near	Dell Server Tasks
Network Interface Alerts									
Server Alerts									Get Warranty Information
🔺 🚰 Diagram Views									Launch Dell License Manager
🚽 Complete Diagram View									耳 Launch Dell OpenManage Power Center
< Modular Systems Diagram									Launch Dell OpenManage Server Administrato
🗲 Monolithic Servers Diagram									Launch Dell Remote Access Console
Performance and Power Monitoring Views	4							Þ	Launch Remote Deckton (Modular Blade)
a 🚘 State Views	Datail View								
🗰 Managed Servers (Out-Of-Band)	Detail view							· ·	
🛄 Unmanaged Servers (Out-Of-Band)	Dell Serve	properties of WT	I.HITET					-	
Dell 12G server SMASH	Denserver	properties of the							
Dell FMP	Display Name	WIN-		MARDS COMMUNI	uner				
Microsoft Audit Collection Services	UID	76543	321	MADS.COM					
	Host Name	WIN-	HIFI						
Show or Hide Views	Server IP Addres	s Not A	pplicable						
New View 🕨	OMSA URL	https	://WIN-HIFI:1311/ //192.168.1.10:443/						
	RAC URL Demote Access T	D 192.1	168.1.10						
Monitoring	Asset Tag	Not A	wailable						
Authoring	Service Tag	76543	321						
<u> </u>	Express Service	Code 15608	8862073						
Administration	Model Committee	Powe	rEdge M420						
Wy Workspace	Chassis Service	un 126 P Fac BIS93	/louular /15						
	BIOS Version	0.2.7							
•	Total Memory	2 GB						-	

Console Launch – Dell Out-of-band management packs also enable the customer to launch Dell iDRAC7 Console from the server context. The management packs also enable you to also troubleshoot through in-band tools by either launching the corresponding in-band console (OpenManage Server Administrator Console) or Remote Desktop Console into Windows operating system installed on the dell server. The consoles can be launched from any of the diagram, state, alert, or performance views. With internet access available from management server, customer can also launch and view Dell Warranty information for the selected server and renew warranty from the same context.

Unmanaged Servers View

Dell devices that do not meet the criteria of monitoring (for example, 11th Generation Dell Servers) are classified as Unmanaged Servers and shown in a separate state view. In this view, the servers are shown with the reason why they are not classified by the Dell Out-of-Band management pack – so that customers are able to troubleshoot and take necessary steps to remediate the problem.

Dell Tools integration

With the latest Dell Server Management Pack suite, you can now leverage all Dell tools and their features available from a single OpsMgr console. With this Suite, you can integrate and launch Dell License Manager and Dell OpenManage PowerCenter from the OpsMgr Console.

Dell License Manager is a one-to-many license deployment and reporting tool for monitoring and managing iDRAC7 licenses. Customer can monitor, backup and deploy



iDRAC7 licenses on one or more 12th Generation Dell Servers in network. Customer can also now view iDRAC7 license inventory and status reports, all starting from OpsMgr Console.

Dell OpenManage PowerCenter enables monitoring and management of energy consumption in a data center thereby providing increased visibility into power consumption, utilization, and anomalies of Dell Servers in the network. With this increased insight, customers can gain precise control by identifying underutilized servers and enabling power reduction policies to maximize uptime of business critical applications and increase cost savings on overall power consumption in the datacenter.

Conclusion

Dell OpenManage Integration Suite for Microsoft System Center enables capabilities of Microsoft System Center to be leveraged in the most efficient way for managing and monitoring Dell Servers. Dell Out-of-band Monitoring management brings in the capabilities of Microsoft System Center, 12th Generation Dell Server agent-free monitoring features and Dell tools together to provide a comprehensive solution to monitor Dell Servers in real time, providing the ability to quickly respond to hardware failures in the most effective manner, optimize datacenter utilization, and increase productivity in IT environments.

Links

- Dell OpenManage PowerCenter User Guide
 [https://support.dell.com/support/edocs/SOFTWARE/OMPC1.0/1_1/EN/ug/ug.pdf]
- Dell License Manager User Guide
 [http://support.dell.com/support/edocs/software/dlm/10/en/UG/UG_en.pdf]
- Dell Connections License Manager User Guide
 [http://support.dell.com/support/edocs/software/smconect/clm/10/ug/ug-en.pdf]
- Dell Server Management Pack Suite User Guide [http://support.dell.com/support/edocs/software/smconect/msscom/501/en/ug/ugen.pdf]



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About the author

Vaideeswaran Ganesan is a Systems Management Technologist at Dell working on Dell OpenManage Integrations for Microsoft System Center Operations Manager.

Anirban Kundu is a Systems Management Engineer at Dell working on Dell OpenManage Integrations for Microsoft System Center Operations Manager.

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