Managing and Monitoring a
Virtualization Environment Using
OpenManage Essentials

This Dell Technical White Paper explains how to manage and monitor a virtualization environment which includes VMware ESXi, VMware ESX and Microsoft Hyper-V servers.
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Executive Summary

OpenManage Essentials is a one to many management tool which helps in monitoring servers, storage devices, printers, KVMs, UPSs, PDUs, chassis and network devices, etc. It supports managing and monitoring of the VMware ESXi, VMware ESX, Microsoft Hyper-V and Citrix XenServers present in the virtualization environment. Using OpenManage Essentials you can perform the following on these servers: discovery and inventory, receive alerts, system update, and deploy OpenManage Server Administrator (OMSA). This white paper provides information you need to manage and monitor these servers easily.

Introduction

The goal of this white paper is to describe the management and monitoring of a virtualization environment which includes VMware ESXi, VMware ESX, Microsoft Hyper-V and Citrix XenServers using OpenManage Essentials. The most important benefits of using OpenManage Essentials to manage a virtualization environment are:

- All the members of the virtualization environment which include servers and their virtual machines are grouped together in the device tree after discovery and inventory. The virtual machines which are created on a virtualization server are shown as sub nodes of the virtualization server in the device tree.
  
  Note: OpenManage Essentials does not support the classification of Citrix XenServer virtual machines.

- It is possible to manage all types of virtualization servers through a single console and single task. Discovery and inventory of a range including all the virtual machines and their host servers with all the supported protocols is possible.

- Host servers such as VMware ESXi, VMware ESX, Microsoft Hyper-V and Citrix XenServers can be updated to the latest applicable packages through a single task.

- The host servers can be configured to send alerts to the OpenManage Essentials console. More actions can be performed on the reception of these alerts from the alert actions feature of OpenManage Essentials.

- A detailed discovery and inventory of the host servers and basic discovery and inventory details along with the power status of the virtual machines can be found using OpenManage Essentials.

- Similar kinds of host servers are grouped under a separate group in the device tree. All the ESXi and ESX servers are grouped under “VMware ESX servers”, the Hyper-V servers are grouped under “Microsoft Virtualization” and the XenServers are grouped under “Citrix XenServers” in the device tree. A separate group for Citrix XenServers has been provided in the device tree from OpenManage Essentials v1.2. Before v1.2, it was represented as a part of servers group in the device tree. All of these servers will have a duplicate entry under “Servers” in the device tree.

Virtualization Servers: Discovery and Inventory

The discovery and inventory of the virtualization servers is performed using different protocols. Table 1 elaborates the protocols required for the discovery and inventory of the host server and the virtual machines. SNMP protocol must be enabled for the discovery of the host servers and another protocol may be required for the proper classification as a virtualization server in the device tree. This allows the grouping of virtual machines with the host server in the device tree.
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Table 1. Supported Protocol For the Discovery of the Host Server and Virtual Machine

<table>
<thead>
<tr>
<th>Host Server</th>
<th>Protocol for Discovery, Inventory and Virtual Machine Correlation</th>
<th>Protocol for Virtual Machine Discovery and Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citrix XenServer</td>
<td>SNMP</td>
<td>N/A</td>
</tr>
<tr>
<td>Microsoft Hyper-V</td>
<td>WMI</td>
<td>SNMP</td>
</tr>
<tr>
<td>VMware ESX</td>
<td>SNMP</td>
<td>SNMP</td>
</tr>
<tr>
<td>VMware ESXi</td>
<td>SNMP+WSMAN</td>
<td>SNMP</td>
</tr>
</tbody>
</table>

Configuring SNMP in Microsoft Hyper-V

To enable SNMP on Microsoft Hyper-V server:

1. Click Start-> Run, type "services.msc" and then click OK.
2. Right-click SNMP Service and click Properties.
3. In the Security tab, provide the community string as shown in Figure 1.

Figure 1. Configuring the SNMP Community String in Microsoft Hyper-V
Configuring SNMP in VMware ESX and Citrix XenServers

To enable SNMP in the VMware ESX and Citrix XenServers, add "rocommunity <community>" to the /etc/snmp/snmpd.conf file, where <community> is your community string, and then restart the snmp service using the service snmpd restart command.

Configuring SNMP in the ESXi host

To enable SNMP on ESXi host, perform the following steps after logging in to the ESXi console using putty:

1. First - Open ESX Firewall
   
   esxcfg-firewall -e snmpd

2. Next configure SNMP.
   
   vicfg-snmp.pl -server <server>-username <user> -password <pass> -p <port>
   vicfg-snmp.pl -server <server>-username <user> -password <pass> -c <community>

   where <community> is the SNMP community string.

3. Enable the SNMP service
   
   vicfg-snmp.pl -server <server>-username <user> -password <pass> -enable

This turns on SNMP. You should now be able to walk your host.

For more information on configuring SNMP on ESXi, see the "How to setup and configure ESXi 5 for use in OpenManage Essentials" white paper at

Classification of Host Servers and their Virtual Machines in the Device Tree

Figure 2 shows the grouping of host servers (ESXi, ESX, Hyper-V and XenServers) and their virtual machines in the device tree after discovery and inventory.

Figure 2. Host Servers and Virtual Machines Classification in the Device Tree
Virtualization Servers: Alert Reception

The host servers and their virtual machines can be configured to send alerts/traps to the OpenManage Essentials console. From these alerts, various in-built alert actions can be performed which include:

- Application launch: Using this alert action, an application can be executed if that specific alert is received.
- Email: Using this alert action feature, if an alert is received, the OpenManage Essentials console forwards that alert to the configured email address.
- Ignore: If the administrator does not want to receive any alert, this feature can be used to ignore that alert. By default, the DefaultDuplicateAlertFilter is enabled which ignores any duplicate alert, if the alert is received twice in span of 15 seconds.
- Trap Forwarding: OpenManage Essentials can be configured to send alerts to another OpenManage Essentials console or a third-party console such as Microsoft SCOM, Dell-DMC, etc. These alerts can be sent in the same format as it is received or they can be sent as an alert forwarded from the OpenManage Essentials console.

For more information about alert trap forwarding, see the “Forwarding Dell Hardware Alerts in a Tiered Monitoring Environment” white paper at http://en.community.dell.com/techcenter/extras/m/white_papers/20278428.aspx

Configuring Trap Destination in Microsoft Hyper-V Server

To enable SNMP in Microsoft Hyper-V server:

1. Click Start-> Run, type "services.msc" and then click OK.
2. Right-click SNMP Service and click Properties.
3. In the Traps tab, provide the community string as shown in Figure 3.
Figure 3. Configuring Trap Destination in a Microsoft Hyper-V Server

Configuring Trap destination in VMware ESX and Citrix XenServers

To configure trap destination in a VMware ESX server or Citrix XenServer, edit the /etc/snmp/snmpd.conf file and add “trapsink <destination_IP> <community>”, where <destination_IP> is the IP address of the OpenManage Essentials server, and <community> is the SNMP community string.

To configure SNMP and trap destination on the remote server running Windows or Linux, see the “Dell SNMP Configuration Tool” at http://en.community.dell.com/techcenter/extras/m/white_papers/20097170.aspx

Configuring Trap Destination in VMware ESXi

To configure trap destination in a VMware ESXi server, execute the following command:

```
vicfg-snmp -server <server>-username <user> -password <pass> -t <destination>@<port>/<community>```

where <destination> is the destination IP or hostname, and <port> is the port at which the communication is expected to happen. <community> is the SNMP community string.

When running any of the earlier commands, the following error message may be displayed: “Failed : A general system error occurred: Load persistent store failed”. This indicates that the /etc/vmware/snmp.xml file is corrupt or has a bad tag. To fix this problem, perform the following steps:

1. Rename /etc/vmware/snmp.xml to snmp.xml.old (or some other unique name) using the following command:

```
mv snmp.xml snmp.xml.old
```
2. Now create a new snmp.xml using the following command
   
   ```
   vi /etc/vmware/snmp.xml
   ```

3. Paste the following into the new snmp.xml file
   
   ```xml
   <config>
   <snmpSettings>
   <communities>public</communities>
   <enable>true</enable>
   </snmpSettings>
   </config>
   ```

   Make sure that any extra line breaks or white spaces are not present before or after the text. Save the file and restart the VMware services using the "/sbin/services.sh restart" command.

For a detailed description on configuring ESXi for OpenManage Essentials, see the "How to setup and configure ESXi 5 for use in OpenManage Essentials" white paper at http://en.community.dell.com/techcenter/extras/m/white_papers/20071085.aspx. Information on setting up ESXi for management by OpenManage Essentials is also available in the Tutorials section in OpenManage Essentials.

### Virtualization Servers: System Update

OpenManage Essentials can be used to update all the virtualization host servers. It supports updating servers running VMware ESX and ESXi, Citrix XenServers and Microsoft Hyper-V. In fact, all of these host servers can be updated using a single task. OpenManage Essentials supports updating a maximum of 30 servers in one task. For updating servers running Microsoft Hyper-V, Citrix XenServers and VMware ESX, there is an option to update either through OMSA method or iDRAC method. For VMware ESXi, the update method has to be iDRAC method. Before performing system update on a server, the latest catalog needs to be downloaded. The catalog source can be SUU, RM, or FTP. For downloading the FTP catalog, an internet connection is required. If the management server connects to the Internet through a proxy server, the proxy settings must be configured as shown in Figure 4.
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**Figure 4. Proxy Settings in OpenManage Essentials in Preferences Page.**

System update through iDRAC is supported only for iDRAC6 and later. The iDRAC of the server needs to be discovered and inventoried using the WSMAN protocol for performing system update using iDRAC method. If the RAC of the server is also discovered, then a duplicate entry with the server name can be seen in the device tree under RAC.

After proper discovery and inventory, if there are components which need to be updated in the server, then the component will be listed under non-compliant systems in the System Update tab. If the servers have the latest updates, they will be listed under the compliant systems in the System Updates tab.

From the “Advanced settings” option in the “System update” page, the administrator can select whether to perform the system update through iDRAC or OMSA. The option that is selected is saved as the default method for system update. If a system can be updated only via OMSA method and the default method is set as iDRAC, then OpenManage Essentials performs the system update through OMSA and vice versa. If the server is discovered using required protocol and its iDRAC is discovered using the WSMAN protocol, then in the Non-compliant systems, the update method will be shown as OMSA or iDRAC as shown in Figure 5 and default system update method will be used while applying the update. For VMware ESXi, the system update can only be done through iDRAC method as shown in Figure 5.

For those components, which cannot be updated through iDRAC, if the server is also discovered and inventoried, then they are updated through OMSA method as shown in Figure 5.
If a system can be updated only via iDRAC method then, you must provide the iDRAC credentials while creating the system update task and same applies for a system update task through OMSA method. If a task is created which has a server which can be updated only through OMSA method and a server which can be updated only through iDRAC method, then you must provide the credentials for both the systems. For example: Assume that a Microsoft Hyper-V server is discovered and inventoried using the WMI protocol and the VMware ESXi server and its iDRAC discovered and inventoried using the WSMAN protocol. Now, while creating a system update task if both the servers are chosen, you must provide the credentials of both the Hyper-V server and the iDRAC of the ESXi as shown in Figure 6.
It is possible to directly update the host servers to the latest available package directly from the device tree as well, if the catalog is already imported. In the device tree, select the group where the host server is classified (for example, VMware ESX Servers). As shown in Figure 8, the Non-Compliant Systems tab in the right pane displays the systems that can be updated using the procedure described earlier.
Virtualization Servers: OMSA Deploy

Using OpenManage Essentials, OMSA can be deployed on the virtualization host servers which include VMware ESX and Microsoft Hyper-V. Both 64-bit and 32-bit OMSA can be deployed on the supported servers.

Note: Deploying OMSA is not supported on Citrix XenServer and VMware ESX.

Perform the discovery of the host server on which OMSA needs to be deployed. If an older version of OMSA is already installed, it is properly classified in the device tree. Upgrading OMSA from an earlier to later version is also supported by OpenManage Essentials.

To create an OMSA deploy task, the following steps need to be performed:

1. Navigate to "Remote Tasks" and click "Create Deployment Task".

2. A pop-up is displayed as shown in Figure 7. Provide the path of the OMSA package by clicking on the Browse button. If it is a VMware ESX server, then select the "Linux" option. Providing the install arguments is optional. It allows choosing specific components during OMSA installation on the target server. For more information, see the "Deploying OpenManage Server Administrator using OpenManage Essentials" white paper at http://en.community.dell.com/techcenter/extras/m/white_papers/20069180.aspx

3. Click Next. Provide the host target where you want to deploy OMSA. If OMSA is already installed, it will be found under "Servers", else it will be displayed under "Unknown".
4. Click **Next**. Provide the credentials of the host server. If the need is to run the OMSA deployment task immediately, select “**Run now**”. By default, the task is scheduled to run 10 minutes after the current time. You can also update the schedule to run the task at a later time and date.

![OMSA Deployment](image)

**Figure 8. OMSA Deployment**

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**Conclusion**

Using OpenManage Essentials, the management and monitoring of a virtualization environment is possible. OpenManage Essentials allows you to manage the virtualization environment through a single task creation and allows the flexibility of creating individual management tasks for individual host servers as well. With OpenManage Essentials v1.2, the Citrix XenServers are shown as a separate group in the device tree which makes the management of XenServers easier by segregating them as a separate sub group.