Manage Dell Hardware in a Virtual Environment Using OpenManage Integration for VMware vCenter

This Dell Technical White Paper gives an overview of using OpenManage Integration to streamline the time, tools and tasks to deploy, manage and update Dell servers in a virtual environment

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1   Executive Summary

OpenManage Integration for VMware vCenter offers extensive functionality to manage Dell hardware from vCenter client. Delivered as a simple virtual appliance,the OpenManage Integration has no dependencies on complex or expensive external frameworks. This article describes some of the key features that are supported by OpenManage Integration, which provides deep level details for inventory, monitoring and alerting of Dell hosts within vCenter and recommends or performs vCenter actions based on Dell hardware alerts. It also offers the update of BIOS and firmware updates from vCenter and access to online Dell hardware warranty information. The vCenter Administrator can perform Zero-Touch deployment of hypervisors on bare metal servers without using PXE for Dell's 11th and 12th generation of enterprise servers.

IT administrators face many challenges managing physical servers in virtualized environments; the process can be complex and time-consuming. VMware vCenter provides a scalable and extensible platform that forms the foundation for virtualization management. The integration of OpenManage Integration for VMware vCenter allows IT administrators dramatically improved control over their physical environment. An integrated easy-to-use graphical user interface (GUI) is provided to manage physical servers for hardware monitoring, update of server BIOS and firmware and hypervisor deployment on bare-metal Dell™ PowerEdge™ servers.

2 OpenManage Integration Architecture and Strategy

OpenManage Integration for VMware vCenter is a virtual appliance in Open Virtualization Format (OVF). It can be installed on any ESX/ESXi host that is managed by a vCenter Server. A virtual appliance is a virtual machine image that contains software designed to run inside a virtual machine.
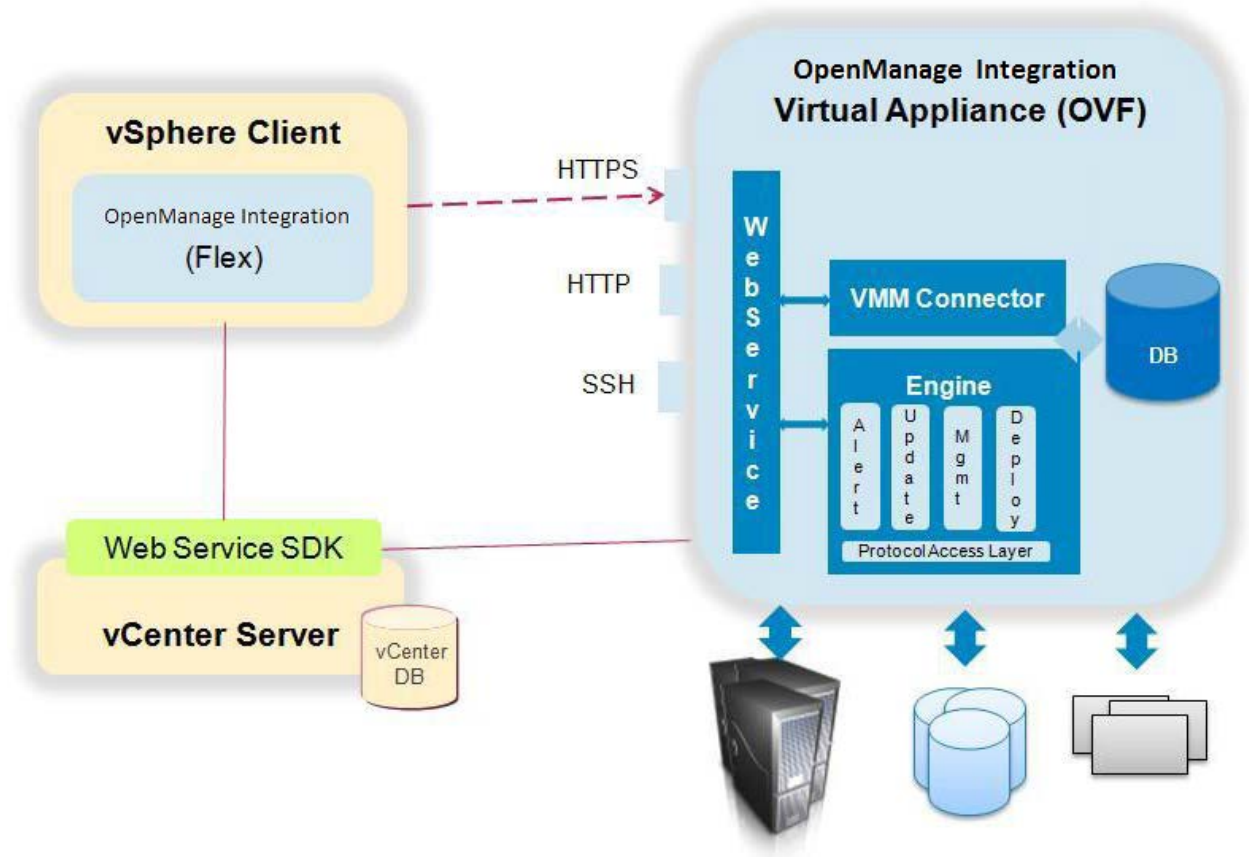

Figure 1   OpenManage Integration Architecture Components

The OpenManage Integration provides streamlined platform management with seamless integration into vCenter Server console. It makes the vCenter console the single pane of glass to manage both the virtual and physical environment. The integration goes beyond the "link and launch" to existing Dell system management tools. Instead, OpenManage Integration makes the integration natively into the vCenter console. Users do not need to learn to use additional tools for many of the management features that they are already familiar with vCenter. Another key strategy is not dumping "everything" into the OpenManage Integration. Instead, it integrates the 30% of tasks performed 80% of the time natively into the console.

3 Managing Dell Hosts

OpenManage Integration provides deep level details for inventory, monitoring, and alerting of Dell hosts within vCenter and recommends or performs vCenter actions based on Dell hardware events.

From vSphere Desktop or Web Client's "Hosts and Clusters" icon, users can view detailed Server and Storage information of Dell hosts either at Host level or at Cluster/DataCenter level by clicking on the **Dell** tab.

At the Dell host level, the Overview Page provides the Global Health Status of the physical server, as well as, the Hardware Component Health Status. It also shows a wealth of Server Information including Host Name, Power State, iDrac IP, Service Console IP, Connection Profile, Model, Service Tag, Asset Tag, Warranty data, Last Inventory Scan, Hypervisor and Firmware version info as well as the Recent System Event Log Entries.

The System Event Log will provide more detailed System Event Log (SEL) Entries which can be exported to a CSV file. The Clear Log feature can be used to clear the SEL entries.

The Warranty Status Page gives Warranty status for a Dell server from Dell's warranty database and allows for easy online warranty upgrading.

Users can also perform host commands within the Dell page or by right-clicking on a host. The commands are Blink Indicator Light, Launch Remote Access, or Launch OMSA.

At the Dell Cluster or Datacenter level, users can get an aggregated view for all Dell hosts that are under that Cluster/Datacenter, and the user can also Export all the information to a CSV file.
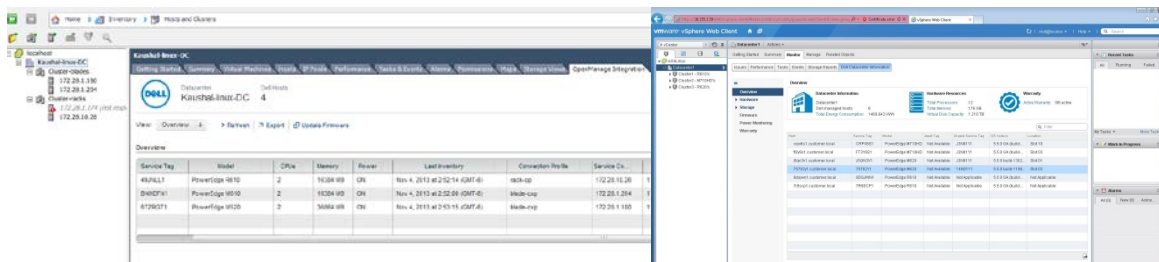

Figure 2   Roll-up reporting for all Dell hosts at Cluster or Datacenter level

By clicking on the vCenter "Tasks and Events" tab users can view any tasks or physical server hardware events that are related to Dell hosts or the OpenManage Integration virtual appliance. These can be viewed at the Host level or at the Cluster/DataCenter level.

In order to make the Dell Tab work and Dell events to show up in the vCenter "Tasks and Events" pane, users need to make sure to configure OpenManage Integration. First click on the Dell Management Center icon from the vSphere Client Home page and then go through the Configuration Wizard for the initial setup (Fig. 3). The inventory job must be run at least once (Fig. 4).
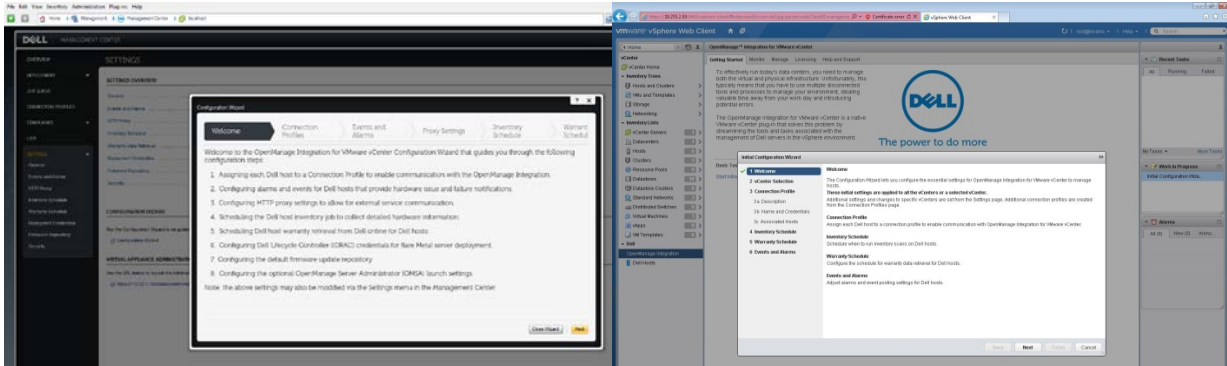

Figure 3   Dell Management Center Configuration Wizard
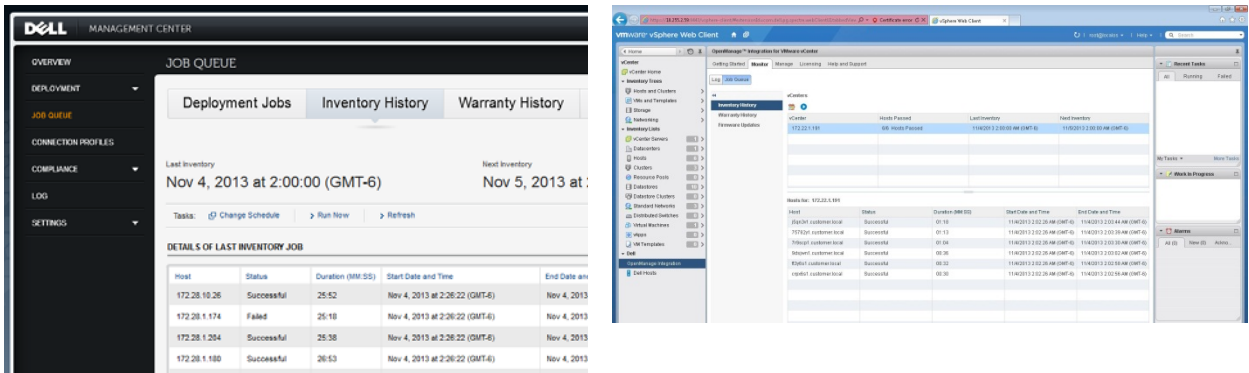

Figure 4   Dell Management Center Inventory History in Job Queue

There are some prerequisites to meet before users can successfully run the inventory job from Dell Management Center. Please use the compliance wizard in vSphere Desktop Client to help ensure your hosts have the requirements accounted for. Please refer to OpenManage Integration User Guide for detailed steps on how to use the configuration and remediation wizard.

OpenManage Integration registers predefined Alarms with recommended actions within vCenter which will be triggered by Dell hardware events. By default, all Dell Alarms will be disabled. These alarms can be enabled through the Configuration Wizard or Dell Management Center Settings->Events and Alarms.
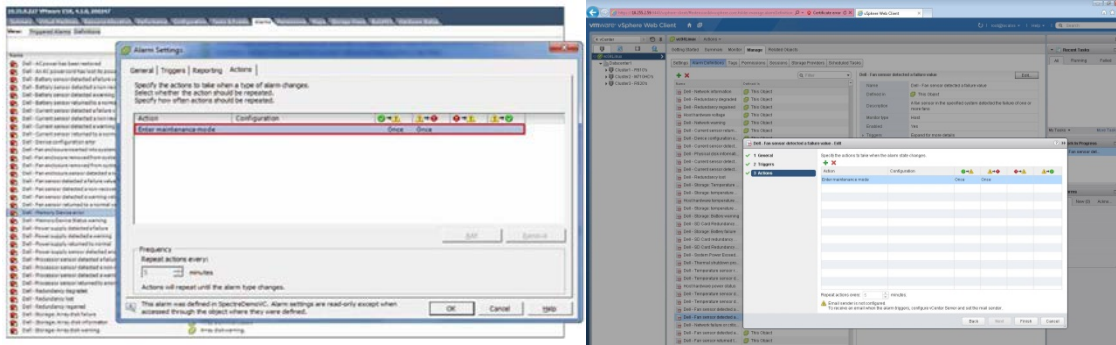

Figure 5   Dell Alarms and Actions in vCenter

4 Updating BIOS and Firmware for Dell Hosts

Within the vCenter console, users can view and perform BIOS or Firmware updates from the Dell tab at **the host or cluster leve**l. This feature will work for Dell 11th and 12th generation of servers that have Lifecycle controller firmware version 1.5.1 or higher with either iDrac express or iDrac enterprise. The feature will be grayed out for any Dell 9th or 10th generation of servers. The Firmware Page will display information including the component name such as BIOS, PERC, iDrac, the type of the update and individual update details.

Using either vSphere Desktop or Web Client, users can click Run Firmware Update Wizard to perform a set of firmware updates on Dell hosts.
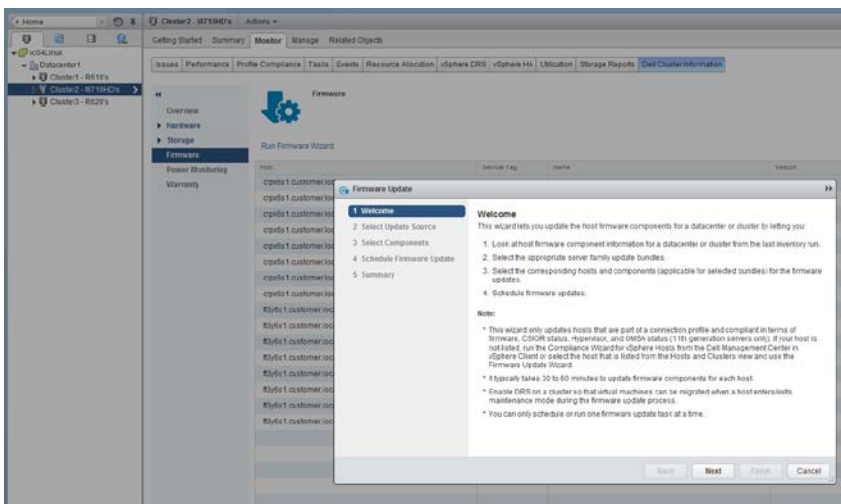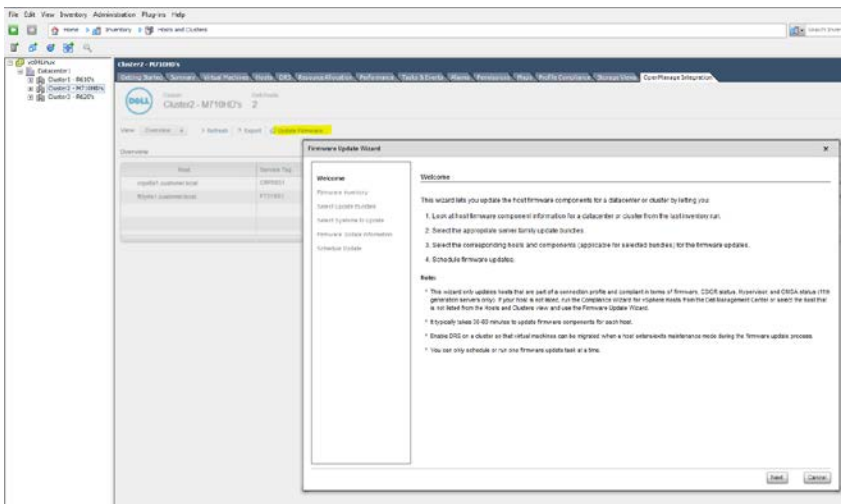

Figure 6   Cluster level firmware update

If the user already knows which component to update and has already downloaded the single Dell Update Package (DUP) from http://support.dell.com. they can use the option "Load a single firmware update from a file" at host level firmware update in vSphere Desktop Client to update a single component. In order to use this option, the DUP is put on a share that is accessible from the virtual appliance as well as the host. The required user name and password is entered to access the file.

To bring a host to a certain BIOS and firmware baseline, select the option to "Update from repository" for host level firmware update in vSphere Desktop Client. The cluster level update and vSphere Web Client automatically uses this method. The default repository can be used at http://ftp.dell.com with Dell's recommendation of a server baseline, or a baseline and local repository can be created by using Dell's "Repository Manager" tool. If the host does not have internet access to ftp.dell.com, Repository Manager can be used to create a local repository within the firewall and make it accessible from the virtual appliance and the host. If using the "Update from repository", the OpenManage Integration will scan the host and only show the applicable System Bundle (or Baseline). This is a set of BIOS and firmware updates that have been tested together against this server. If all applicable updates are selected it will bring the host to the full baseline.
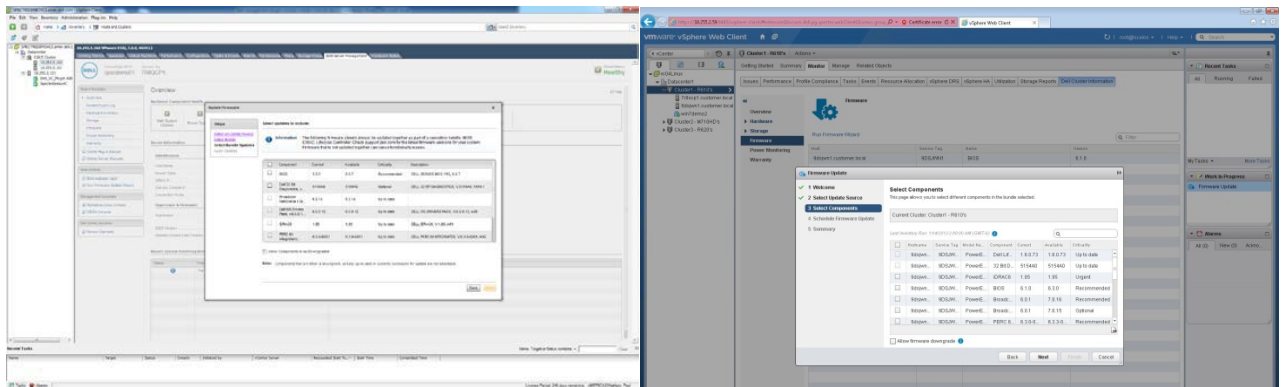

Figure 7   Select multiple updates from a System bundle

A reboot is required for the updates to take effect. For cluster level updates, hosts are automatically rebooted/placed in maintenance mode as needed. For host level, at the last step of "Run Firmware Update Wizard", there are three options to choose. The first option is to allow to bring the host to maintenance mode, then apply updates, then reboot the host. The second option is to apply updates on the next reboot. In this case, the user will be responsible to put the host in maintenance mode before the system is rebooted. Updates will happen when the host is rebooted. The third option is to apply the updates and force the reboot without entering maintenance mode. This is not a recommended option. This option will typically be used only if the host must be brought down to apply a critical BIOS or firmware update and for some reason the host cannot be put in maintenance mode.

Users can also schedule firmware updates at a future time for host (vSphere Web Client only) and cluster level firmware updates,

5 Deploying Hypervisor and Configuring New Servers

A key feature of theOpenManage Integration provides zero-touch deployment and provisioning of Dell servers without using PXE. It includes the initial handshake, hardware configuration, hypervisor deployment and registration of the server with the appropriate vCenter console. It leverages the Dell Lifecycle Controller which is the engine for advanced embedded system management and is delivered as part of iDRAC express or iDRAC enterprise in the 11th and 12th generation of Dell servers. Users can perform all the above from within **vSphere Desktop Client** on a single server or a set of new servers to make those hardware resources available in the virtualized environment.

The Deployment feature separates the deployment preparation steps from the actual hypervisor deployment. The preparation steps include Create Hardware Profile, Create Hypervisor Profile and Create Deployment Template. A reference server is selected as the base configuration to create a Hardware profile. Create Hardware profile will extract all BIOS, BOOT Order, RAID, and iDrac configuration settings from the reference server to save as a template and later those settings can be applied to a target server. The Hypervisor profile will include the information of the location of a scriptable hypervisor installation image (reference ISO image) and optional staging folder. The optional staging folder must be an NFS share folder with full read-write permissions that can be accessible by the virtual appliance. The Hypervisor profile will also include the vCenter settings of vCenter instance, destination and host profile information. A Deployment Template contains a Hardware Profile, a Hypervisor Profile, or both.

Once the user goes through all the preparation steps, the Deployment Wizard is used to provision server hardware, deploy hypervisor image and add the host to vCenter. At the end of the Deployment task, the OMSA agent will also be deployed to the host and the SNMP trap destination will be set with the OpenManage Integration virtual appliance's IP address. In order for new Dell servers to appear in Dell Management Center within vCenter console, the user will need to specify Auto-Discovery Enabled systems and then simply connect the server network and power it up. The Auto-Discovery feature is not enabled by default. It is off unless it is explicitly requested when the server is ordered or can be configured manually via CTRL-E during boot. If the option is ordered, the machine comes with DHCP enabled on the iDRAC with all of its admin accounts disabled. Therefore, it is not necessary to configure a static IP address for the iDRAC; it will get one from a DHCP server on the network. To make use of this feature, a DHCP server or a DNS server will need to be configured to support the discovery process. See "Dell Auto-Discovery Network Setup Specification" for more details. Once all of the new servers show up in the Deployment Wizard, select undeployed servers (Fig. 6); select a Deployment template; and assign network identification to the deployed servers. Then match a desired connection profile to each server and schedule the server deployment job to run. Once the wizard is complete, the Job Queue is used to help manage deployment jobs.
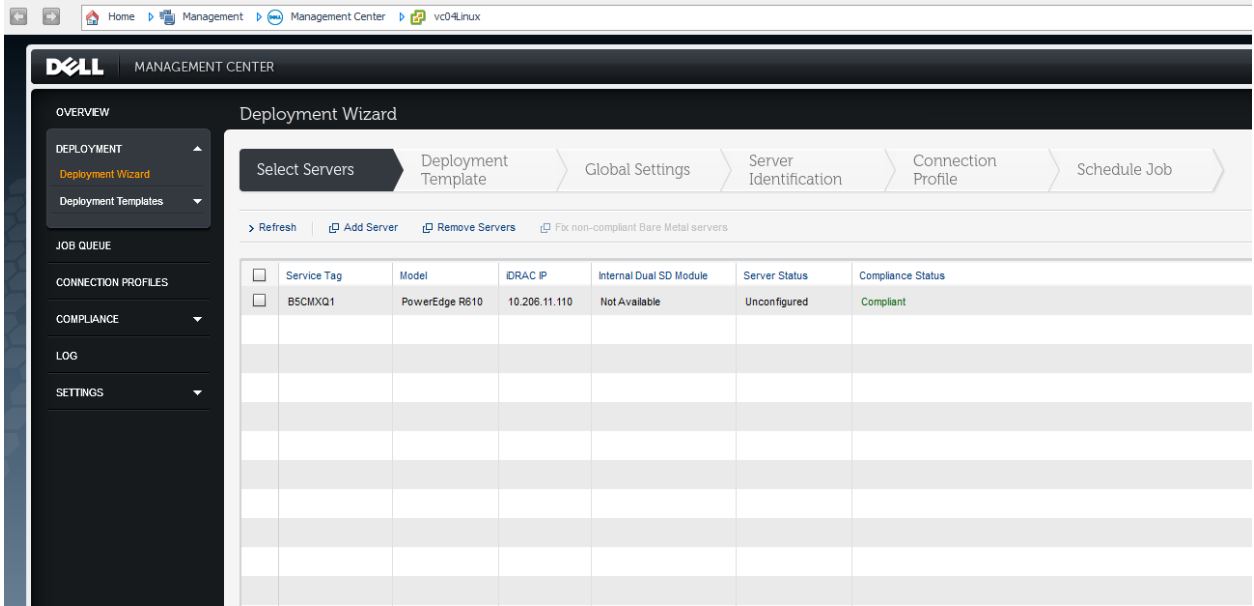
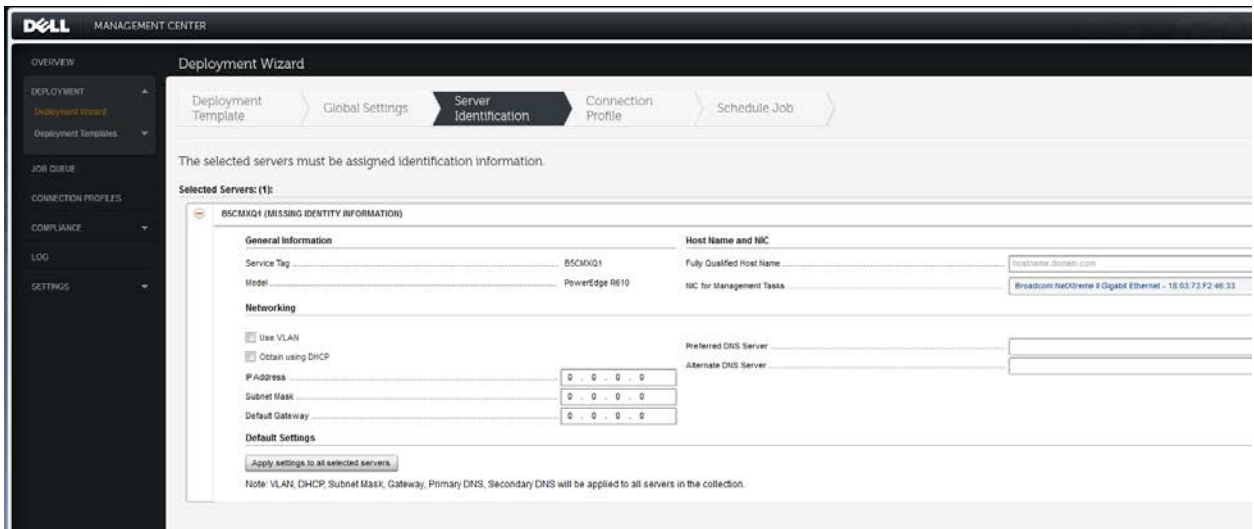Figure 8   Selecting undeployed servers from Deployment Wizard

Figure 9   Assigning network identification to servers from Deployment Wizard

6 Conclusion

The integration of the OpenManage Integration and the VMware vCenter provides a comprehensive, automated, end-to-end physical and virtual system management platform. It enables host update and deployment solutions based on easy-to-use graphical user interfaces. It hides the complexity associated with manual processes and avoids the need to jump between multiple tools. This integration helps reduce cost through a centralized, scalable and customizable approach designed to enable and significantly simplify the management of Dell PowerEdge servers in a virtualized environment.