

Best Practices to clone Hardware Configurations from a Reference Server with Dell EMC OpenManage Integration for Microsoft System Center

Abstract

This technical white paper describes best practices for hardware configuration of target servers using reference server configuration through OpenManage Integration for Microsoft System Center (OMIMSSC). This whitepaper is intended for those individuals who are looking to clone hardware configurations from a reference server to target servers seamlessly.

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Executive Summary

Modern datacenters require efficient and automated methods to configure servers for use in a production environment. OpenManage Integration for Microsoft System Center (OMIMSSC) integrates with the Microsoft System Center suite of products and monitors the hardware components of connected PowerEdge servers. It is delivered as a virtual machine that sets up the OMIMSSC appliance.

The configuration from a server designated as a reference server can be made into an Operational Template. This Operational Template will contain configuration information about firmware, hardware, and operating system components, and their attributes with default values set as current values from the reference server. These values can be modified before applying this template to different target servers that have identical hardware components as that of the reference server. The Operational Template also contains system specific attributes marked as **Pool Value**. Few of these attributes may be selected by default in the Operational Template and may needed to be changed before deploying it on a target server.

This whitepaper guides you to identify and modify the pool value attributes in the Operational Template as needed to be configured on the target servers for seamless deployment using Operational Templates.

Operational Template

Operational Templates (OT) contain complete configuration information about devices being managed and are used for provisioning PowerEdge servers and PowerEdge MX7000 Modular Chassis while being monitored using the Microsoft System Center suite. Operational Template contains configuration information about

- Firmware.
- Hardware Components (from Reference server).
- Operating System.

Firmware component in OT requires Update Source input. Update Source is the location of update repository and catalog. Update Source options that OMIMSSC supports are

- Online Dell EMC Enterprise Catalog.
- Offline repositories created using Dell Repository Manager (DRM).

Hardware configurations include the components BIOS, iDRAC, NIC/CNA, RAID & FC for Server and Modular Chassis component for MX7000.

Operating System component in OT requires Operating System to be deployed and other related inputs. OMIMSSC supports provisioning with Windows, and Non-Windows (ESXi and RHEL) operating systems.

Reference server

A server configuration with a preferred boot sequence, BIOS, RAID settings, and other hardware configuration parameters that is ideally suited for specific workloads is called reference server configuration.

Target server

Set of servers targeted to be provisioned by replicating hardware configurations of a Reference server.

NOTE: Target servers must be homogenous for a seamless apply.

Hardware apply is based on the component FQDD, e.g. NIC.Slot.1-2. Hence apply would be attempted only when reference server and target server component slots, device types match.

Newer server generations would have newer supported attributes. Applying a reference server configuration of older generation on to newer generations would not configure newer attributes, vice versa may fail since newer attributes are not present in older generations. Another aspect to note is that different server models would have a different set of attributes. Applying a reference server configuration of one model on to another model of target servers may also fail.

System specific attributes

Operational Template captures the current configuration of a reference server. System specific attributes are the attributes captured in OT that should have unique values for deploying on target servers, for example Static IPv4 address for iDRAC. These attributes are marked as Pool Value in OT. Values to these attributes can be provided using the Export Pool Attribute option in **Deploy Operational Template** workflow which exports all selected system specific attributes to a CSV file.

NOTE: Pool Value attribute and System Specific attribute may be interchangeably used in this paper.

Operational Template operations

Create and Edit

Creating an OT captures hardware configurations from Reference server and adds Firmware and OS component to these hardware components to make it an “One Template” for end to end provisioning of servers. The attributes of these components in the template can be modified before applying to target servers.

Assign and Run compliance

Created OT can be assigned to one or more servers in **Server View** to and run compliance of hardware configurations against the assigned target servers. Assignment of OT on target servers would display overall compliance status of the target server against the assigned OT. When non-compliant, users can furthermore drill down to find the components and attributes that are non-compliant.

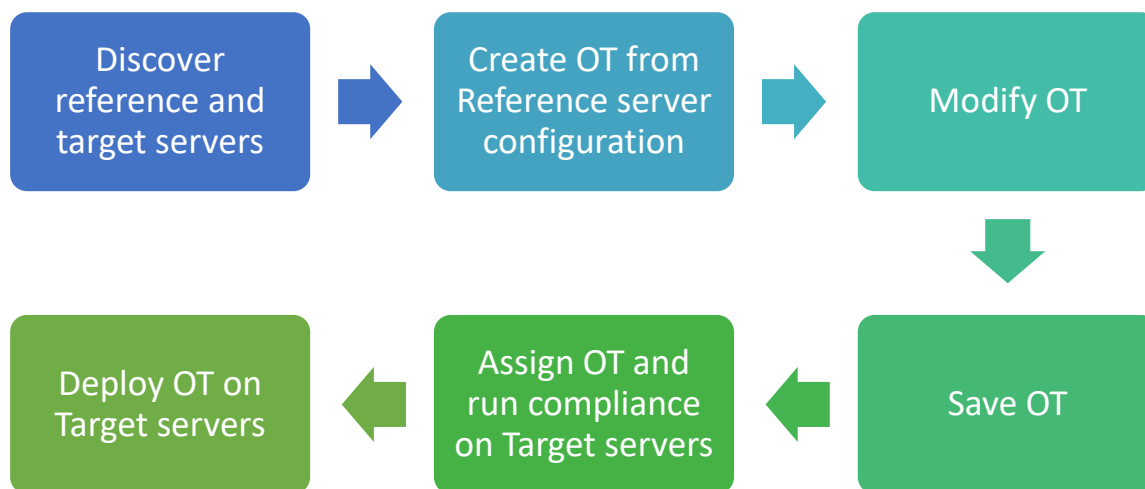
Compliance can be manually run at any point of time, runs automatically whenever the assigned OT is modified or applied on the target servers.

Deploy

Assigning OT to all target servers is mandatory to deploy OT on those target servers. Deploying OT step would include selecting the target servers from **Server View** that are assigned with same OT and providing all the selected system specific pool value attributes through a CSV file.

Capturing and applying reference server configuration workflow

The following flowchart describes the flow of capturing the reference server configuration and applying it on target servers.



The workflow is detailed below:

1. Discover the reference server and target servers in OMIMSSC.
OMIMSSC allows users to auto-discover, synchronize already discovered servers in System Center or discover the devices to be managed through the iDRAC IP.
2. Capture the hardware configuration of reference server as an Operational Template.
OMIMSSC allows users to select a reference server iDRAC IP that is already discovered and create an Operation Template that serves as a baseline for configuring and provisioning other servers.
3. Modify the created OT by removing the Pool Value attributes that are not required to be applied on the target servers.
4. Save the Operational Template on completing all modifications.
OMIMSSC allows users to save the retrieved or modified Operational Template with Name and Description fields for template identification.
5. Assign the Operational Template to the target servers to view the differences in hardware configurations.
OMIMSSC allows users to assign a reference Operation Template to many servers that are not managed by System Center yet and ready to be configured and deployed. Assigning a template would automatically calculate the compliance of assigned server hardware configurations against the assigned template.
6. Deploy the Operational Template on the assigned servers to configure and provision them.
OMIMSSC allows users to select the assigned servers and deploy the assigned template to update, configured with template configurations as baseline and deploy specified Operating System in OT.

This white paper details the Step 3 of the deployment workflow for seamless configuration of target servers.

For details on other steps see the *OpenManage Integration for Microsoft System Center Version 7.3 for Microsoft Endpoint Configuration Manager and System Center Virtual Machine Manager Unified User's Guide* on the Dell Support Website

Identifying and removing attributes with Pool Value in OT

Hardware configuration captured from reference servers may include few system specific attributes that are selected by default which in turn requires to be provided with system specific values for each attribute in a CSV at deployment step of the workflow. If these attributes are not required to be applied on the target servers, you can remove them before deploying. The following sections provide details about identifying such attributes for a smoother deployment.

In this section we would identify and remove the Pool Value attributes which may not be required for provisioning. Table 1 lists all pool value attributes that are **selected by default in OT and not mandatory**, along with information on associated attribute group and hardware component.

Component	Attribute Group	Attribute Name (Display Name in CSV)
BIOS	Network Settings	ISCSI Initiator Name (IscsiInitiatorName)
BIOS	Connection 1 Settings	Initiator Gateway (IscsiDev1Con1Gateway)
BIOS	Connection 1 Settings	Initiator IP Address (IscsiDev1Con1Ip)
BIOS	Connection 1 Settings	Initiator Subnet Mask (IscsiDev1Con1Mask)
BIOS	Connection 1 Settings	Target IP Address (IscsiDev1Con1TargetIp)
BIOS	Connection 1 Settings	Target Name (IscsiDev1Con1TargetName)
BIOS	Connection 2 Settings	Initiator Gateway (IscsiDev1Con2Gateway)
BIOS	Connection 2 Settings	Initiator IP Address (IscsiDev1Con2Ip)
BIOS	Connection 2 Settings	Initiator Subnet Mask (IscsiDev1Con2Mask)
BIOS	Connection 2 Settings	Target IP Address (IscsiDev1Con2TargetIp)
BIOS	Connection 2 Settings	Target Name (IscsiDev1Con2TargetName)
iDRAC	Active Directory	Active Directory RAC Name (RacName)
iDRAC	Ipv4 Static Information	Ipv4 Address (Address)
iDRAC	Ipv4 Static Information	Net Mask (Netmask)
iDRAC	Ipv4 Static Information	Gateway (Gateway)
iDRAC	Ipv4 Static Information	DNS Server 1 (DNS1)
iDRAC	Ipv4 Static Information	DNS Server 2 (DNS2)
iDRAC	Ipv6 Static Information	Ipv6 Address 1 (Address1)
iDRAC	Ipv6 Static Information	Ipv6 Gateway (Gateway)
iDRAC	Ipv6 Static Information	IPV6 Link Local Prefix Length (PrefixLength)
iDRAC	Ipv6 Static Information	IPV6 DNS Server 1 (DNS1)
iDRAC	Ipv6 Static Information	Ipv6 DNS Server 2 (DNS2)

Table 1: Pool Value attributes in OT

NOTE: Additional to the above listed attributes, there are pool value attributes in OT that are unselected by default or mandatory to be applied.

Unselecting Pool Value attributes in BIOS Component

1. Select **BIOS** component
2. Scroll down to attribute group **Network Settings**.
3. Identify and remove the attribute **ISCSI Initiator Name** as shown in Figure.1.

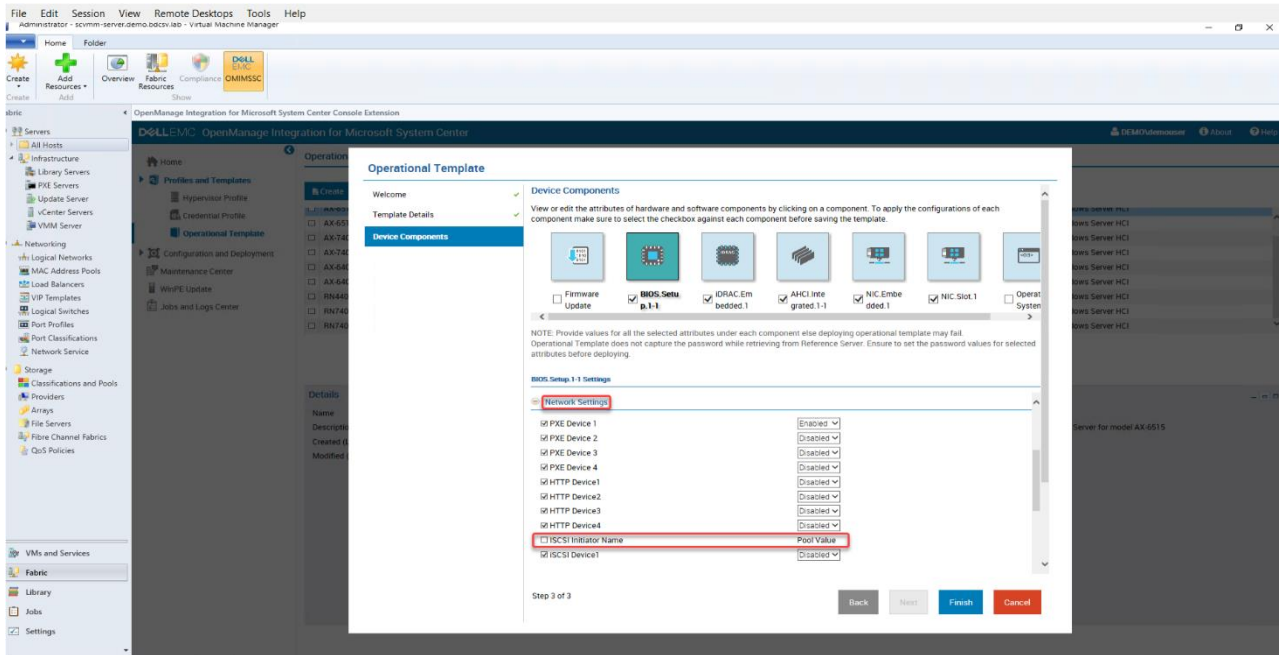


Figure 1: Network Settings

4. Scroll down to attribute group **Connection 1 Settings**.
5. Identify and remove the attributes **Initiator IP Address, Initiator Subnet Mask, Initiator Gateway, Target Name, and Target IP Address** as shown in Figure 2.

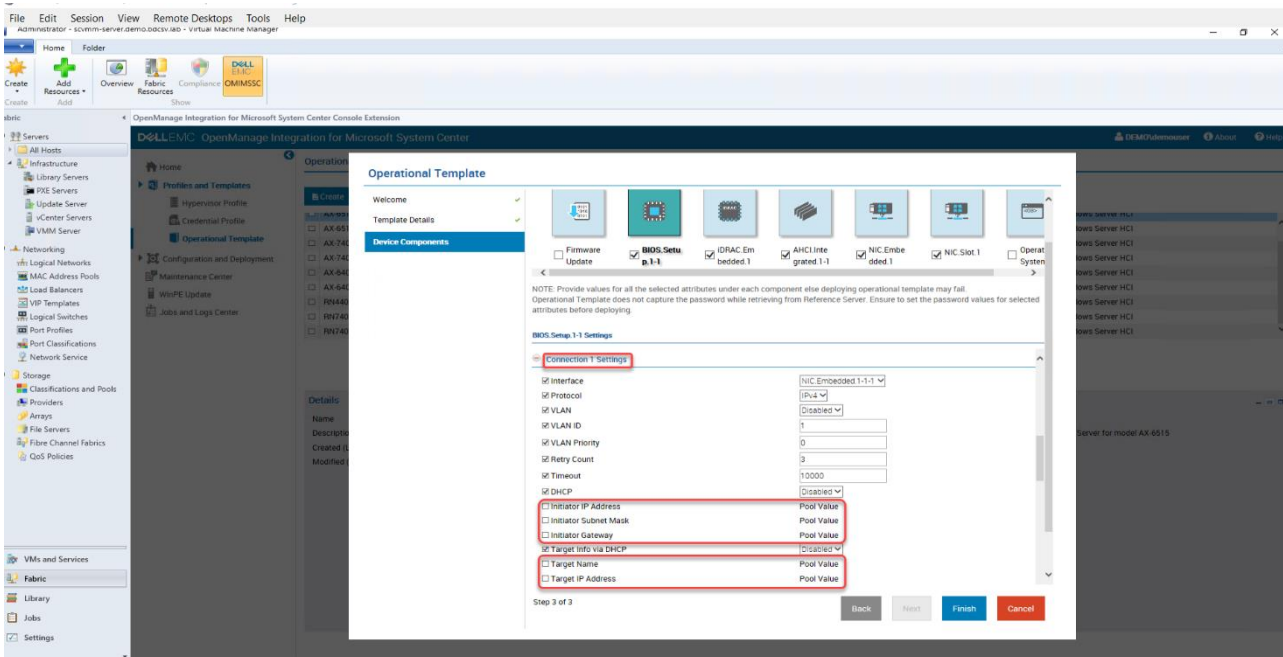


Figure 2: Connection 1 Settings

6. Scroll down to attribute group **Connection 2 Settings**.
7. Identify and remove the attributes **Initiator IP Address, Initiator Subnet Mask, Initiator Gateway, Target Name, and Target IP Address** as shown in Figure 3.

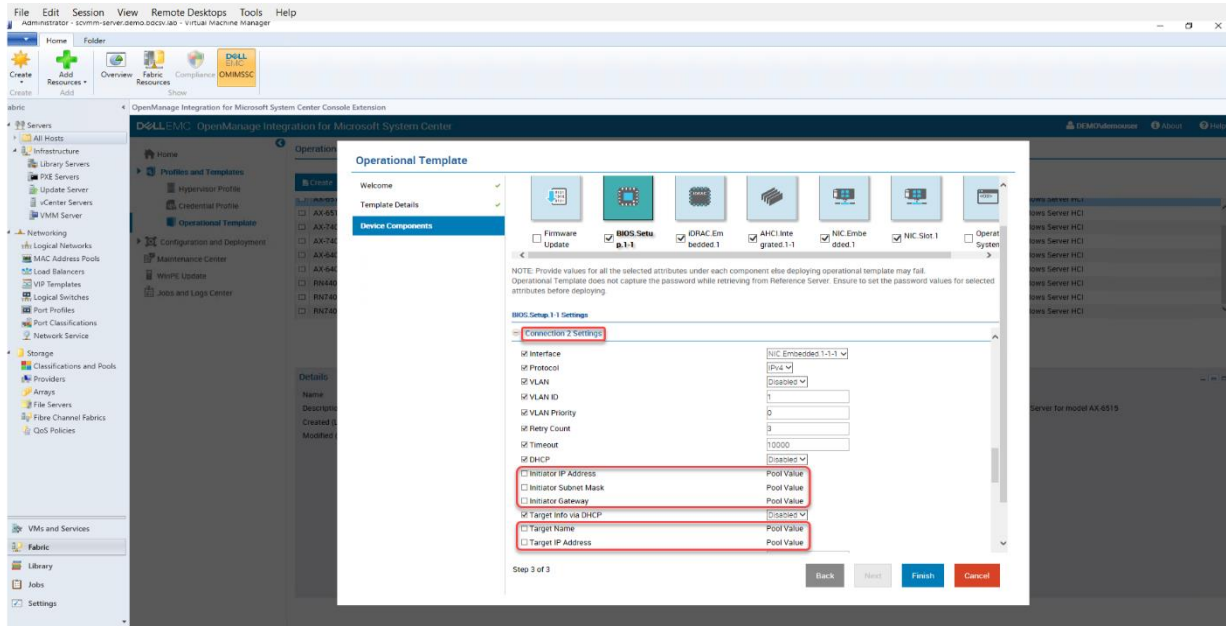


Figure 3: Connection 2 Settings

Unselecting Pool Value attributes in iDRAC component

1. Select **iDRAC** component.
2. Scroll down to attribute group **ActiveDirectory1**.
3. Identify and unselect the attribute **Active Directory RAC Name** as shown in Figure 4.

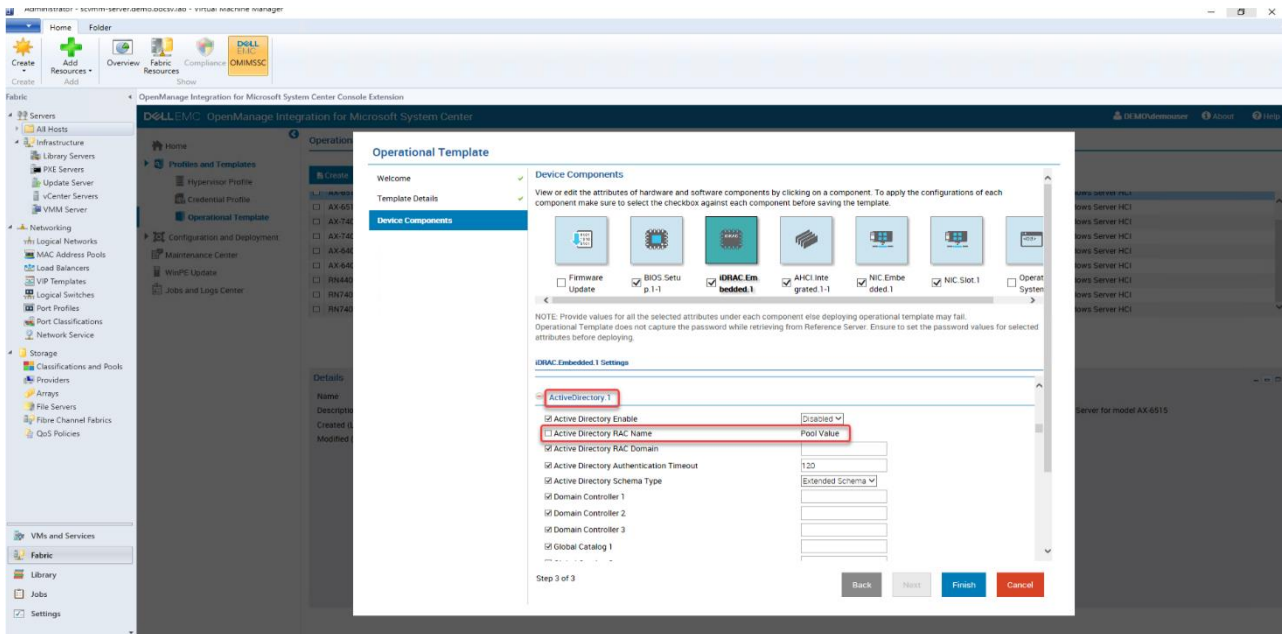


Figure 4: Active Directory1

4. Scroll down to attribute group **IPv4Static.1**.
5. Identify and remove the attributes **IPv4 Address**, **Net Mask**, **Gateway**, **DNS Server 1**, and **DNS Server 2** as shown in Figure 5.
6. Scroll down to attribute group **IPv6Static.1**.
7. Identify and unselect the attribute **IPv6 Address 1**, **IPv6 Gateway**, **IPv6 Link Local Prefix Length**, **DNS Server 1** and **DNS Server 2** as shown in Figure 5.

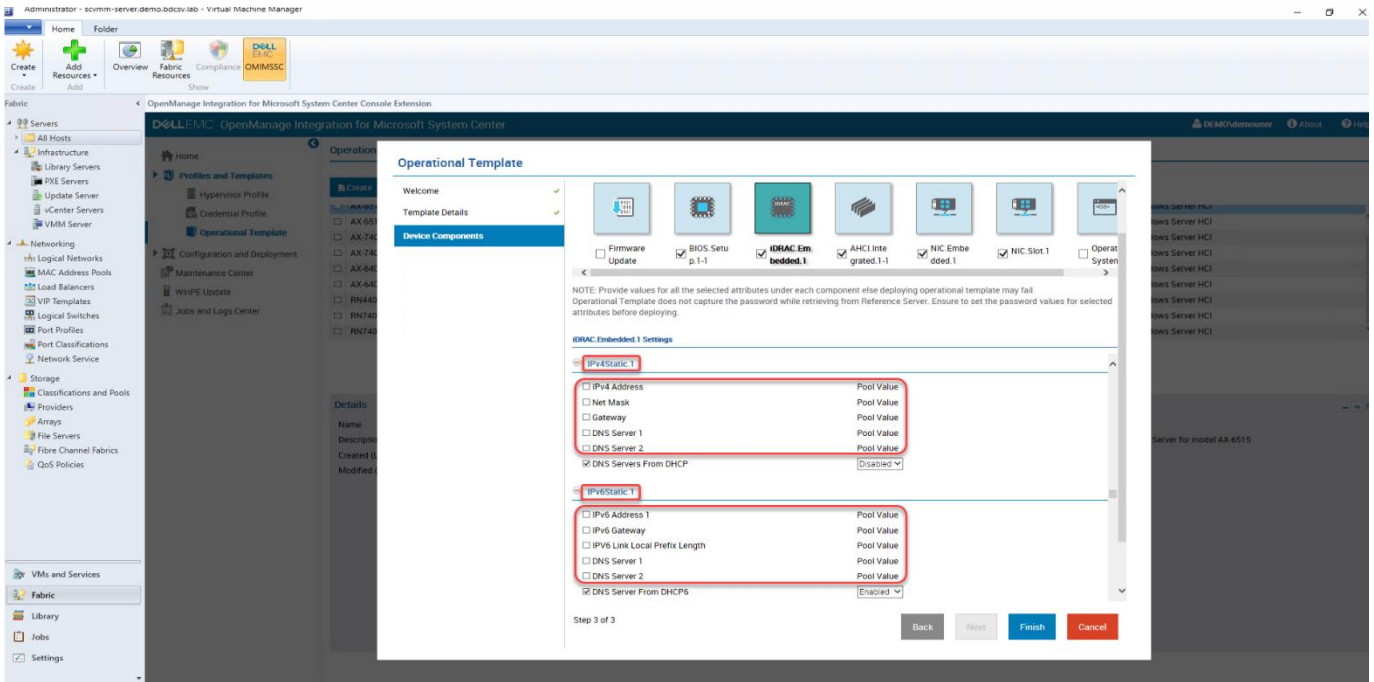


Figure 5: IPv4 Static 1 and IPv6 Static 1

8. After removing the components in both **BIOS** and **IDRAC** components, click on **Finish**.

For a complete list of system specific attributes refer **Appendix**

Exporting and verifying System Specific Pool values in OT

If the pool value attributes are not removed before saving the Operational template and if the required pool values are not provided in a CSV format to **Deploy Operational Template**, operation would fail with error: *“Failed to start deploying Operational Template. Either CSV file is not valid, or is not available, or attributes and attribute values of the components in the CSV file are not available”*.

To verify the pool value attributes that are selected in the OT, run **Export Attribute Value Pool** in Deploy OT operation of the above workflow as shown in Fig 6. Sample CSV file exported is shown in Fig. 7 when the pool value attributes are selected in the OT. If you choose to apply these exported attributes, provide the values accordingly and save the **attribute.csv** file to deploy on target servers. If there is no need for system specific values, modify the reference OT created as mentioned in the section **Identifying and removing attributes with Pool Value**.

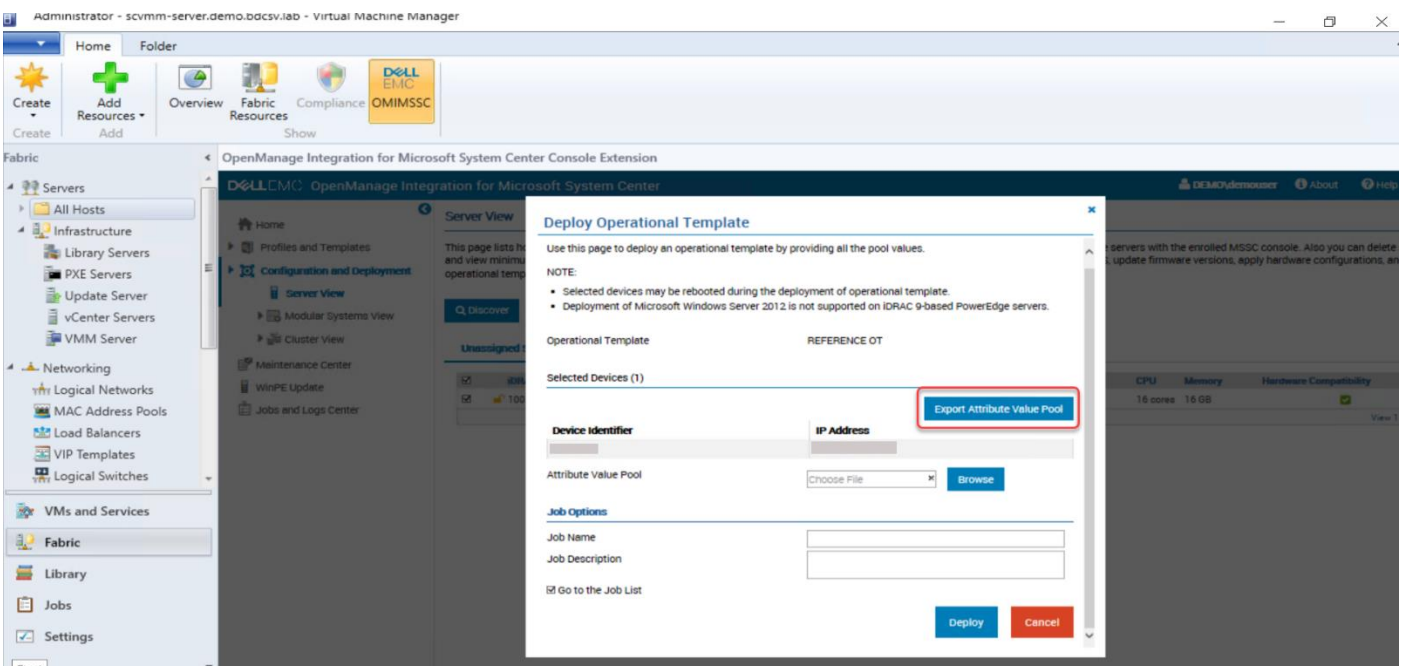


Figure 6: Deploy Operational Template screen

	A	B	C	D
1	serviceTag	fqdd	poolAttributeName	poolAttributeValue
2	XXXXXXX	BIOS.Setup.1-1	IscsiInitiatorName	
3	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con1Ip	
4	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con1Mask	
5	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con1Gateway	
6	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con1TargetName	
7	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con1TargetIp	
8	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con2Ip	
9	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con2Mask	
10	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con2Gateway	
11	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con2TargetName	
12	XXXXXXX	BIOS.Setup.1-1	IscsiDev1Con2TargetIp	
13	XXXXXXX	iDRAC.Embedded.1	ActiveDirectory.1#RacName	
14	XXXXXXX	iDRAC.Embedded.1	IPv4Static.1#Address	
15	XXXXXXX	iDRAC.Embedded.1	IPv4Static.1#Netmask	
16	XXXXXXX	iDRAC.Embedded.1	IPv4Static.1#Gateway	
17	XXXXXXX	iDRAC.Embedded.1	IPv4Static.1#DNS1	
18	XXXXXXX	iDRAC.Embedded.1	IPv4Static.1#DNS2	
19	XXXXXXX	iDRAC.Embedded.1	IPv6Static.1#Address1	
20	XXXXXXX	iDRAC.Embedded.1	IPv6Static.1#Gateway	
21	XXXXXXX	iDRAC.Embedded.1	IPv6Static.1#PrefixLength	
22	XXXXXXX	iDRAC.Embedded.1	IPv6Static.1#DNS1	
23	XXXXXXX	iDRAC.Embedded.1	IPv6Static.1#DNS2	
24	XXXXXXX	WINDOWS	HOSTNAME	
25	XXXXXXX	WINDOWS	ServerMngNIC	
26				
27				

Figure 7: attribute.csv file with system specific pool values

Providing values to the selected System Specific attributes in CSV

Exported CSV file from the above section would contain all pool value attributes that are selected in OT for all the servers that are selected for deployment

- serviceTag: ServiceTag of the selected server for identification.
- fqdd: This is the format of the component name selected in OT (see the list of components in Appendix section)
- poolAttributeName: Name of the system specific attribute. If this value has “#” in it, anything that is on the left of “#” is the group name of the attribute and on the right would be the actual attribute name.
e.g.: In IPv6Static.1#Address, IPv6Static is the attribute group name, and Address is the attribute name.
- poolAttributeValue: Value to be provided by the users which is specific to the serviceTag. For information on attribute description refer the Appendix section.

Appendix

System specific attributes in OT

BIOS Component

1. Attribute Name: Asset Tag
 - Attribute Group: Miscellaneous Settings
 - Attribute Name in CSV: AssetTag
 - Attribute Description: This field displays the Asset Tag and allows you to modify it. The Asset Tag is a string assigned to a system, usually by an administrator, for security or tracking purposes. The Asset Tag can be up to 63 printable US-ASCII characters.
2. Attribute Name: Initiator Gateway (IscsiDev1Con1Gateway)
 - Attribute Group: Connection 1 Settings
 - Attribute Name in CSV: IscsiDev1Con1Gateway
 - Attribute Description: Initiator Gateway for this iSCSI connection
3. Attribute Name: Initiator IP Address (IscsiDev1Con1Ip)
 - Attribute Group: Connection 1 Settings

- Attribute Name in CSV: IscsiDev1Con1Ip
 - Attribute Description: Initiator IP Address for this iSCSI connection
4. Attribute Name: Initiator Subnet Mask (IscsiDev1Con1Mask)
 - Attribute Group: Connection 1 Settings
 - Attribute Name in CSV: IscsiDev1Con1Mask
 - Attribute Description: Initiator Subnet Mask for this iSCSI connection.
 5. Attribute Name: Target IP Address (IscsiDev1Con1TargetIp)
 - Attribute Group: Connection 1 Settings
 - Attribute Name in CSV: IscsiDev1Con1TargetIp
 - Attribute Description: Target IP Address for this iSCSI connection.
 6. Attribute Name: Target Name (IscsiDev1Con1TargetName)
 - Attribute Group: Connection 1 Settings
 - Attribute Name in CSV: IscsiDev1Con1TargetName
 - Attribute Description: Target name for this iSCSI connection in IQN format.
 7. Attribute Name: Initiator Gateway (IscsiDev1Con2Gateway)
 - Attribute Group: Connection 2 Settings
 - Attribute Name in CSV: IscsiDev1Con2Gateway
 - Attribute Description: Initiator Gateway for this iSCSI connection.
 8. Attribute Name: Initiator IP Address (IscsiDev1Con2Ip)
 - Attribute Group: Connection 2 Settings
 - Attribute Name in CSV: IscsiDev1Con2Ip
 - Attribute Description: Initiator IP Address for this iSCSI connection.
 9. Attribute Name: Initiator Subnet Mask (IscsiDev1Con2Mask)
 - Attribute Group: Connection 2 Settings
 - Attribute Name in CSV: IscsiDev1Con2Mask
 - Attribute Description: Initiator Subnet Mask for this iSCSI connection.
 10. Attribute Name: Target IP Address (IscsiDev1Con2TargetIp)
 - Attribute Group: Connection 2 Settings
 - Attribute Name in CSV: IscsiDev1Con2TargetIp
 - Attribute Description: Target IP Address for this iSCSI connection.
 11. Attribute Name: Target Name (IscsiDev1Con2TargetName)
 - Attribute Group: Connection 2 Settings
 - Attribute Name in CSV: IscsiDev1Con2TargetName
 - Attribute Description: Target name for this iSCSI connection in IQN format.
 12. Attribute Name: iSCSI Initiator Name
 - Attribute Group: Network Settings
 - Attribute Name in CSV: IscsiInitiatorName
 - Attribute Description: This field specifies the name of the iSCSI Initiator in IQN format.
 13. Attribute Name: Integrated Network Card 1 PCIe Link1
 - Attribute Group: Integrated Devices
 - Attribute Name in CSV: Ndc1PcieLink1

- Attribute Description: Enables or disables the integrated network card (NDC) PCIe link. When set to Disabled, the NDC link is not available to the operating system (OS).

NOTE: If set to Disabled (OS), the Integrated NIC may still be available for shared network access by iDRAC.

14. Attribute Name: Integrated Network Card 1 PCIe Link2

- Attribute Group: Integrated Devices
- Attribute Name in CSV: Ndc1PcieLink2
- Attribute Description: "Enables or disables the integrated network card (NDC) PCIe link. When set to Disabled, the NDC link is not available to the operating system (OS).

NOTE: If set to Disabled (OS), the Integrated NIC may still be available for shared network access by iDRAC."

15. Attribute Name: Integrated Network Card 1 PCIe Link3

- Attribute Group: Integrated Devices
- Attribute Name in CSV: Ndc1PcieLink3
- Attribute Description: "Enables or disables the integrated network card (NDC) PCIe link. When set to Disabled, the NDC link is not available to the operating system (OS).

NOTE: If set to Disabled (OS), the Integrated NIC may still be available for shared network access by iDRAC."

Network Component

1. Attribute Name: CHAP Mutual Authentication

- Attribute Group: iSCSI General Parameters
- Attribute Name in CSV: ChapMutualAuth
- Attribute Description: To use mutual CHAP authentication, specify an initiator secret on the Initiator Parameters page and configure that secret on the target.

2. Attribute Name: Connect (ConnectFirstTgt)

- Attribute Group: iSCSI First Target Parameters
- Attribute Name in CSV: ConnectFirstTgt
- Attribute Description: Setting to enable whether connection to the first target is attempted.

3. Attribute Name: Connect (ConnectSecondTgt)

- Attribute Group: iSCSI Second Target Parameters
- Attribute Name in CSV: (ConnectSecondTgt)
- Attribute Description: Setting to enable whether connection to the second target is attempted.

4. Attribute Name: Boot LUN

- Attribute Group: iSCSI First Target Parameters
- Attribute Name in CSV: FirstTgtBootLun
- Attribute Description: Specifies the first iSCSI target boot LUN.

5. Attribute Name: CHAP ID

- Attribute Group: iSCSI First Target Parameters
- Attribute Name in CSV: FirstTgtChapId
- Attribute Description: First Target CHAP ID (up to 128 characters in length). If only a single value of CHAP ID supported then it is stored here.

6. Attribute Name: CHAP Secret

- Attribute Group: iSCSI First Target Parameters

- Attribute Name in CSV: FirstTgtChapPwd
 - Attribute Description: First Target CHAP Secret (0 or 12 to 16 characters in length). If only a single value of CHAP Secret is supported then it is stored here.
7. Attribute Name: IP Address
- Attribute Group: iSCSI First Target Parameters
 - Attribute Name in CSV: FirstTgtIpAddress
 - Attribute Description: First iSCSI target IP address. Will be either IPv4 or IPv6 format depending on the value of the FirstTgtIpVer attribute.
8. Attribute Name: iSCSI Name
- Attribute Group: iSCSI First Target Parameters
 - Attribute Name in CSV: FirstTgtIscsiName
 - Attribute Description: The iSCSI Qualified Name (IQN) of the first target.
9. Attribute Name: TCP Port
- Attribute Group: iSCSI First Target Parameters
 - Attribute Name in CSV: FirstTgtTcpPort
 - Attribute Description: TCP Port number of the first iSCSI target.
10. Attribute Name: CHAP ID
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorChapId
 - Attribute Description: Initiator CHAP ID (up to 128 characters in length). If this can be set on a per target basis, then the first target value shall be stored here.
11. Attribute Name: CHAP Secret
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorChapPwd
 - Attribute Description: iSCSI initiator CHAP secret (0 or 12 to 16 characters in length). If this can be set on a per target basis, then the value for the first target shall be stored here.
12. Attribute Name: Default Gateway
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorGateway
 - Attribute Description: iSCSI initiator default Gateway IP address. Will be in either IPv4 or IPv6 format depending on the value of the IpVer attribute.
13. Attribute Name: IP Address
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorIpAddr
 - Attribute Description: The iSCSI initiator IP address. Will be either in IPv4 or IPv6 format depending on value of the IpVer attribute.
14. Attribute Name: IPv4 Address
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorIpv4Addr
 - Attribute Description: The iSCSI initiator IP address in IPv4 format when iSCSIDualIPVersionSupport is available.
15. Attribute Name: IPv4 Default Gateway
- Attribute Group: iSCSI Initiator Parameters

- Attribute Name in CSV: IscsilInitiatorIpv4Gateway
- Attribute Description: The iSCSI initiator default Gateway IP address in IPv4 format when iSCSIDualIPVersionSupport is available.

16. Attribute Name: IPv4 Primary DNS

- Attribute Group: IPv4 Primary DNS
- Attribute Name in CSV: IscsilInitiatorIpv4PrimDns
- Attribute Description: iSCSI initiator Primary DNS IP Address in IPv4 format when iSCSIDualIPVersionSupport is Available.

17. Attribute Name: IPv4 Secondary DNS

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorIpv4SecDns
- Attribute Description: iSCSI initiator Secondary DNS IP address in IPv4 format when iSCSIDualIPVersionSupport is Available.

18. Attribute Name: IPv6 Address

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorIpv6Addr
- Attribute Description: The iSCSI initiator IP address in IPv6 format when iSCSIDualIPVersionSupport is available.

19. Attribute Name: IPv6 Default Gateway

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorIpv6Gateway
- Attribute Description: The iSCSI initiator default Gateway IP address in IPv6 format when iSCSIDualIPVersionSupport is available.

20. Attribute Name: IPv6 Primary DNS

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorIpv6PrimDns
- Attribute Description: The iSCSI initiator Primary DNS IP Address in IPv6 format when iSCSIDualIPVersionSupport is Available.

21. Attribute Name: IPv6 Secondary DNS

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorIpv6SecDns
- Attribute Description: The iSCSI initiator Secondary DNS IP address in IPv6 format when iSCSIDualIPVersionSupport is Available.

22. Attribute Name: iSCSI Name

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorName
- Attribute Description: Setting to represent and set the iSCSI initiator iSCSI Qualified Name (IQN).

23. Attribute Name: Primary DNS

- Attribute Group: iSCSI Initiator Parameters
- Attribute Name in CSV: IscsilInitiatorPrimDns
- Attribute Description: The iSCSI initiator Primary DNS IP Address. Will be in either IPv4 or IPv6 format depending on the value of the IpVer attribute.

24. Attribute Name: Secondary DNS

- Attribute Group: iSCSI Initiator Parameters

- Attribute Name in CSV: IscsilInitiatorSecDns
 - Attribute Description: The iSCSI initiator Secondary DNS IP address. Will be in either IPv4 or IPv6 format depending on the value of the IpVer attribute.
25. Attribute Name: Subnet Mask
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorSubnet
 - Attribute Description: The iSCSI initiator Subnet Mask for an IPv4 initiator configuration.
26. Attribute Name: Subnet Mask Prefix
- Attribute Group: iSCSI Initiator Parameters
 - Attribute Name in CSV: IscsilInitiatorSubnetPrefix
 - Attribute Description: The iSCSI initiator Subnet Mask Prefix for an IPv6 initiator configuration.
27. Attribute Name: Secondary Device MAC Address
- Attribute Group: iSCSI Secondary Device Parameters
 - Attribute Name in CSV: SecondaryDeviceMacAddr
 - Attribute Description: MAC address of the secondary iSCSI boot adapter.
28. Attribute Name: Boot LUN
- Attribute Group: iSCSI Second Target Parameters
 - Attribute Name in CSV: SecondTgtBootLun
 - Attribute Description: Specifies the second iSCSI target boot LUN.
29. Attribute Name: CHAP Secret
- Attribute Group: iSCSI Second Target Parameters
 - Attribute Name in CSV: SecondTgtChapPwd
 - Attribute Description: Second Target CHAP Secret (0 or 12 to 16 characters in length). If only a single value of CHAP Secret is supported then it is stored here
30. Attribute Name: CHAP ID
- Attribute Group: iSCSI Second Target Parameters
 - Attribute Name in CSV: SecondTgtChapId
 - Attribute Description: Second Target CHAP ID (up to 128 characters in length). If only a single value of CHAP ID supported for all targets then it is stored here
31. Attribute Name: IP Address
- Attribute Group: iSCSI Second Target Parameters
 - Attribute Name in CSV: SecondTgtIpAddress
 - Attribute Description: Second iSCSI target IP address. Will be either IPv4 or IPv6 format depending on the value of the SecondTgtIpVer attribute
32. Attribute Name: iSCSI Name
- Attribute Group: iSCSI Second Target Parameters
 - Attribute Name in CSV: SecondTgtIscsiName
 - Attribute Description: The iSCSI Qualified Name (IQN) of the second target
33. Attribute Name: TCP Port
- Attribute Group: iSCSI Second Target Parameters
 - Attribute Name in CSV: SecondTgtTcpPort
 - Attribute Description: TCP Port number of second iSCSI target

34. Attribute Name: Use Independent Target Name

- Attribute Group: iSCSI Secondary Device Parameters
- Attribute Name in CSV: UseIndTgtName
- Attribute Description: Use Independent Target Name when multipath I/O is enabled

35. Attribute Name: Use Independent Target Portal

- Attribute Group: iSCSI Secondary Device Parameters
- Attribute Name in CSV: UseIndTgtPortal
- Attribute Description: Setting to use independent target portal when multipath I/O is enabled

36. Attribute Name: Virtual FIP MAC Address

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: VirtFIPMacAddr
- Attribute Description: Programmatically assignable FIP-MAC address for FCoE. Virtual addresses written will also generate corresponding VVWNN and VVWPN addresses as defined in Y741D. The supported method of reverting to the permanent FIP-MAC address is by writing 0's as the virtual address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's. If supported, the current address value should be readable at all times, irrespective of feature enablement.

37. Attribute Name: Virtual iSCSI Offload MAC Address

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: VirtIscsiMacAddr
- Attribute Description: Programmatically assignable MAC address for iSCSI offload. Programmatic write for support of I/O Identity feature. The supported method of reverting to the permanent MAC address is by writing 0's as the virtual address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's. If supported, the current address value should be readable at all times, irrespective of feature enablement.

38. Attribute Name: Virtual MAC Address

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: VirtMacAddr
- Attribute Description: Programmatically assignable MAC address. Programmatic write for support of I/O Identity feature. The supported method of reverting to the permanent MAC address is by writing 0's to the virtual MAC. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's. If supported, the current address value should be readable at all times, irrespective of feature enablement.

39. Attribute Name: Virtual MAC Address

- Attribute Group: Partition n Configuration
- Attribute Name in CSV: VirtMacAddr[Partition:n]
- Attribute Description: Programmatically assignable MAC address. Programmatic write for support of I/O Identity feature. Replace n with the number of the partition. The supported method of reverting to the permanent MAC address is by writing 0's as the virtual address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's. If supported, the current address value should be readable at all times, irrespective of feature and partition enablement.

40. Attribute Name: Virtual Port GUID

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: VirtPortGUID
- Attribute Description: Programmatically assignable Port GUID. Virtual addresses written will also generate corresponding GUID as defined in Y741D. The supported method of reverting to the permanent GUID is by writing 0's as the virtual address. If the virtual address has not been set or if it

has been cleared by the defined method, its value shall be returned as 0's. If supported, the current address value should be readable at all times, irrespective of feature enablement.

41. Attribute Name: Virtual World Wide Node Name

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: VirtWWN
- Attribute Description: Programmatically assignable Fibre Channel World Wide Node Name identifier for FCoE. Virtual addresses written will also be modified by subsequent writes to the VirtFIP-MAC addresss as defined in Y741D. The supported method of clearing this virtual address is by writing 0's as the address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's.

42. Attribute Name: Virtual World Wide Node Name

- Attribute Group: Partition n Configuration
- Attribute Name in CSV: VirtWWN[Partition:n]
- Attribute Description: Programmatically assignable Fibre Channel World Wide Node Name identifier for FCoE. Virtual addresses written will also be modified by subsequent writes to the VirtFIP-MAC addresss as defined in Y741D. Replace n with the number of the partition. The supported method of clearing this virtual address is by writing 0's as the address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's.

43. Attribute Name: Virtual World Wide Port Name

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: VirtWWPN
- Attribute Description: Programmatically assignable Fibre Channel World Wide Port Name identifier for FCoE. Virtual addresses written will also be modified by subsequent writes to the VirtFIP-MAC addresss as defined in Y741D. The supported method of clearing this virtual address is by writing 0's as the address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's.

44. Attribute Name: Virtual World Wide Port Name

- Attribute Group: Partition n Configuration
- Attribute Name in CSV: VirtWWPN[Partition:n]
- Attribute Description: Programmatically assignable Fibre Channel World Wide Port Name identifier for FCoE. Virtual addresses written will also be modified by subsequent writes to the VirtFIP-MAC addresss as defined in Y741D. Replace n with the number of the partition. The supported method of clearing this virtual address is by writing 0's as the address. If the virtual address has not been set or if it has been cleared by the defined method, its value shall be returned as 0's.

45. Attribute Name: World Wide Node Name

- Attribute Group: Main Configuration Page
- Attribute Name in CSV: WWN
- Attribute Description: Fibre Channel World Wide Node Name identifier for FCoE

46. Attribute Name: World Wide Node Name

- Attribute Group: Partition n Configuration
- Attribute Name in CSV: WWN[Partition:n]
- Attribute Description: Fibre Channel World Wide Node Name identifier for FCoE. Replace n with the number of the partition.

Fiber Channel Component

1. Attribute Name: Boot Scan Selection

- Attribute Group: Fibre Channel Target Configuration
- Attribute Name in CSV: BootScanSelection

- Attribute Description: "Configuration of the port's behavior in booting the system from FC Target(s). Only behaviors supported by the option-ROM need to be implemented.

In the following cases no fabric discovery shall be attempted:

Disabled - Initiator does not attempt to boot.

Specified LUN - Initiator attempts to boot to the specified World Wide Port Name and LUN for 1st target, if that fails then a boot using the 2nd target parameters shall be attempted.

In the following cases, fabric discovery shall be attempted and the resulting discovered targets will be put in a list sorted by the reported FC destination ID. This list will be checked in order until the selected LUN policy is met:

First LUN - attempt boot from the first bootable LUN of the targets discovered by adapter.

First LUN 0 - attempt boot from the first bootable LUN 0 of the targets discovered by adapter.

First LUN Not LUN 0 - attempt boot from the first bootable LUN that is not LUN 0 of the targets discovered by adapter.

Fabric Discovered LUN - attempt boot based on the LUN assignment provided by management infrastructure in the fabric

2. Attribute Name: First FC Target LUN
 - Attribute Group: Fibre Channel Target Configuration
 - Attribute Name in CSV: FirstFCTargetLUN
 - Attribute Description: Specifies the LUN (Logical Unit Number) of the first Fibre Channel boot target
3. Attribute Name: First FC Target World Wide Port Name
 - Attribute Group: Fibre Channel Target Configuration
 - Attribute Name in CSV: FirstFCTargetWWPN
 - Attribute Description: Specifies the World Wide Port Name of the first Fibre Channel boot target
4. Attribute Name: Second FC Target LUN
 - Attribute Group: Fibre Channel Target Configuration
 - Attribute Name in CSV: SecondFCTargetLUN
 - Attribute Description: Specifies the LUN (Logical Unit Number) of the second Fibre Channel boot target
5. Attribute Name: Second FC Target World Wide Port Name
 - Attribute Group: Fibre Channel Target Configuration
 - Attribute Name in CSV: SecondFCTargetWWPN
 - Attribute Description: Specifies the World Wide Port Name of the second Fibre Channel boot target
6. Attribute Name: Virtual World Wide Node Name
 - Attribute Group: Port Configuration Page
 - Attribute Name in CSV: VirtualWWN
 - Attribute Description: Virtual World Wide Node Name of adapter port. Can be set through x-UEFI language or other programmatic means in accordance with the Dell IO Identity Behavior Addendum specification and the Dell NC-SI OEM Extensions specification.
7. Attribute Name: Virtual World Wide Port Name
 - Attribute Group: Port Configuration Page
 - Attribute Name in CSV: VirtualWWPN
 - Attribute Description: Virtual World Wide Port Name of adapter port. Can be set using the Dell Lifecycle Controller programmatic interface in accordance with the Dell IO Identity Behavior Addendum specification

RAID Component

1. Attribute Name: Enclosure Requested Configuration Mode
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: RAIDEnclosureRequestedCfgMode
 - Attribute Description: This indicates enclosures requested configuration mode setting
2. Attribute Name: Enclosure Current Configuration Mode
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: RAIDEnclosureCurrentCfgMode
 - Attribute Description: This indicates enclosures current configuration mode setting

iDRAC Component

1. Attribute Name: DNS RAC Name
 - Attribute Group: NIC Information
 - Attribute Name in CSV: DNSRacName
 - Attribute Description: The iDRAC name, which is iDRAC-<SVCTAG> by default
2. Attribute Name: Enable VLAN
 - Attribute Group: NIC Information
 - Attribute Name in CSV: VLanEnable
 - Attribute Description: Enables or Disables the VLAN capabilities of the iDRAC
3. Attribute Name: VLAN ID
 - Attribute Group: NIC Information
 - Attribute Name in CSV: VLanID
 - Attribute Description: Specifies the VLAN ID for the network VLAN configuration
4. Attribute Name: IPv4 Enable
 - Attribute Group: IPv4 Information
 - Attribute Name in CSV: Enable
 - Attribute Description: Enables or Disables the iDRAC IPv4 stack
5. Attribute Name: IPv4 DHCP Enable
 - Attribute Group: IPv4 Information
 - Attribute Name in CSV: DHCPEnable
 - Attribute Description: Specifies if DHCP is used to assign the iDRAC IPv4 address
6. Attribute Name: IPV6 Enable
 - Attribute Group: IPv6 Information
 - Attribute Name in CSV: Enable
 - Attribute Description: Enables or Disables iDRAC IPv6 stack
7. Attribute Name: IPV6 Auto Config
 - Attribute Group: IPv6 Information
 - Attribute Name in CSV: AutoConfig
 - Attribute Description: Enables or Disables the iDRAC IPv6 auto configuration option
8. Attribute Name: Data Center Name
 - Attribute Group: Server Topology

- Attribute Name in CSV: DataCenterName
 - Attribute Description: The data center the system is located in.
9. Attribute Name: Aisle Name
- Attribute Group: Server Topology
 - Attribute Name in CSV: AisleName
 - Attribute Description: The aisle the system is located in.
10. Attribute Name: Rack Name
- Attribute Group: Server Topology
 - Attribute Name in CSV: RackName
 - Attribute Description: Name of the rack on which the system is located.
11. Attribute Name: Rack Slot
- Attribute Group: Server Topology
 - Attribute Name in CSV: RackSlot
 - Attribute Description: Slot in the rack where the system is located.
12. Attribute Name: Active Directory RAC Name
- Attribute Group: Active Directory
 - Attribute Name in CSV: RacName
 - Attribute Description: Name of iDRAC as recorded in the Active Directory forest.
13. Attribute Name: DNS Domain Name
- Attribute Group: NIC Static Information
 - Attribute Name in CSV: DNSDomainName
 - Attribute Description: Specifies that the iDRAC DNS Domain Name should be assigned from the network DHCP server.
14. Attribute Name: IPv4 Address
- Attribute Group: IPv4 Static Information
 - Attribute Name in CSV: Address
 - Attribute Description: iDRAC static IPv4 address (can be configured even when DHCP is enabled)
15. Attribute Name: Net Mask
- Attribute Group: IPv4 Static Information
 - Attribute Name in CSV: Netmask
 - Attribute Description: iDRAC static IPv4 subnet mask (can be configured even when DHCP is enabled)
16. Attribute Name: Gateway
- Attribute Group: IPv4 Static Information
 - Attribute Name in CSV: Gateway
 - Attribute Description: iDRAC static IPv4 gateway (can be configured even when DHCP is enabled)
17. Attribute Name: DNS Server 1
- Attribute Group: IPv4 Static Information
 - Attribute Name in CSV: DNS1
 - Attribute Description: Statically configurable DNS Server 1
18. Attribute Name: DNS Server 2
- Attribute Group: IPv4 Static Information

- Attribute Name in CSV: DNS2
 - Attribute Description: Statically configurable DNS Server 2
19. Attribute Name: IPv6 Address 1
- Attribute Group: IPv6 Static Information
 - Attribute Name in CSV: Address1
 - Attribute Description: iDRAC static IPv6 address
20. Attribute Name: IPv6 Gateway
- Attribute Group: IPv6 Static Information
 - Attribute Name in CSV: Gateway
 - Attribute Description: iDRAC static IPv6 gateway
21. Attribute Name: IPv6 Link Local Prefix Length
- Attribute Group: IPv6 Static Information
 - Attribute Name in CSV: PrefixLength
 - Attribute Description: Prefix length for the iDRAC IPv6 Address
22. Attribute Name: IPv6 DNS Server 1
- Attribute Group: IPv6 Static Information
 - Attribute Name in CSV: DNS1
 - Attribute Description: Statically configurable DNS Server 1
23. Attribute Name: IPv6 DNS Server 2
- Attribute Group: IPv6 Static Information
 - Attribute Name in CSV: DNS2
 - Attribute Description: Statically configurable DNS Server 2
24. Attribute Name: Server Host Name
- Attribute Group:
 - Server Operating System
 - Attribute Name in CSV: HostName
 - Attribute Description: Host Name of a Server
25. Attribute Name: Room Name
- Attribute Group: Server Topology
 - Attribute Name in CSV: RoomName
 - Attribute Description: Room Name
26. Attribute Name: DNS RAC Name
- Attribute Group: NIC Information
 - Attribute Name in CSV: DNSRacName
 - Attribute Description: The iDRAC name, which is iDRAC-`<SVCTAG>` by default
27. Attribute Name: DNS RAC Name
- Attribute Group: NIC Information
 - Attribute Name in CSV: DNSRacName
 - Attribute Description: The iDRAC name, which is iDRAC-`<SVCTAG>` by default
28. Attribute Name: IPv4 DHCP Enable
- Attribute Group: IPv4 Information

- Attribute Name in CSV: DHCPEnable
- Attribute Description: Specifies if DHCP is used to assign the iDRAC IPv4 address

29. Attribute Name: IPv4 Address

- Attribute Group: IPv4 Static Information
- Attribute Name in CSV: Address
- Attribute Description: iDRAC static IPv4 address (can be configured even when DHCP is enabled)

30. Attribute Name: Net Mask

- Attribute Group: IPv4 Static Information
- Attribute Name in CSV: Netmask
- Attribute Description: iDRAC static IPv4 subnet mask (can be configured even when DHCP is enabled)

31. Attribute Name: Gateway

- Attribute Group: IPv4 Static Information
- Attribute Name in CSV: Gateway
- Attribute Description: iDRAC static IPv6 gateway

32. Attribute Name: DNS Server 1

- Attribute Group: IPv4 Static Information
- Attribute Name in CSV: DNS1
- Attribute Description: Statically configurable DNS Server 1

33. Attribute Name: DNS Server 2

- Attribute Group: IPv4 Static Information
- Attribute Name in CSV: DNS2
- Attribute Description: Statically configurable DNS Server 2

34. Attribute Name: IPv6 Gateway

- Attribute Group: IPv6 Static Information
- Attribute Name in CSV: Gateway
- Attribute Description: iDRAC static IPv6 gateway

35. Attribute Name: IPV6 Link Local Prefix Length

- Attribute Group: IPv6 Static Information
- Attribute Name in CSV: PrefixLength
- Attribute Description: Prefix length for the iDRAC IPv6 Address

36. Attribute Name: DNS Server 1

- Attribute Group: IPv6 Static Information
- Attribute Name in CSV: DNS1
- Attribute Description: Statically configurable DNS Server 1

37. Attribute Name: DNS Server 2

- Attribute Group: IPv6 Static Information
- Attribute Name in CSV: DNS2
- Attribute Description: Statically configurable DNS Server 2

Modular Chassis Component

1. Attribute Name: Data Center

- Attribute Group: Not Applicable
 - Attribute Name in CSV: DataCenterName
 - Attribute Description: Specify the name of the Data Center
2. Attribute Name: Room
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: RoomName
 - Attribute Description: Specify name of the room where datacenter is located
 3. Attribute Name: Aisle
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: AisleName
 - Attribute Description: Specify name of aisle
 4. Attribute Name: Rack
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: RackName
 - Attribute Description: Specify the name of the rack where Server is located
 5. Attribute Name: Rack Slot
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: RackSlot
 - Attribute Description: Specify the rack slot of chassis when mounted in the rack server
 6. Attribute Name: Location
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: Location
 - Attribute Description: Specify name of the room where datacenter is located

Operating System Component

Windows OS Deployment Attributes

1. Attribute Name: Host Name
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: HOSTNAME
 - Attribute Description: Specify the Hostname for Operating System to be deployed
2. Attribute Name: Server Management NIC
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: ServerMngNIC
 - Attribute Description: Specify MAC Address of the connected management Network port for Operating System Deployment
3. Attribute Name: Console Logical Network
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: LOGICALNETWORK
 - Attribute Description: Specify Logical Network profile name created in SCVMM for Operating System deployment
4. Attribute Name: IP Subnet
 - Attribute Group: Not Applicable

- Attribute Name in CSV: IPSUBNET
 - Attribute Description: Specify IP Subnet details for Operating System deployment
5. Attribute Name: Static IP Address
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: IPADDRESS
 - Attribute Description: Specify a static IP Address for Windows Operating System deployment

RHEL/ESXi OS Deployment Attributes

1. Attribute Name: Host Name
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: HOSTNAME
 - Attribute Description: Specify the Hostname for Operating System to be deployed
2. Attribute Name: IP Address
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: IPADDRESS
 - Attribute Description: Specify a static IP Address for Windows Operating System deployment
3. Attribute Name: Subnet Mask
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: SUBNETMASK
 - Attribute Description: Specify IP Subnet mask details for Operating System deployment
4. Attribute Name: Default Gateway
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: DEFAULTGATEWAY
 - Attribute Description: Specify Default Gateway for Operating System deployment
5. Attribute Name: Primary DNS Server
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: PRIMARYDNSSERVER
 - Attribute Description: Specify Primary DNS details for Operating System deployment
6. Attribute Name: Secondary DNS Server
 - Attribute Group: Not Applicable
 - Attribute Name in CSV: SECONDARYDNSSERVER
 - Attribute Description: Specify Secondary DNS details for Operating System deployment

For complete list of Attributes, refer Attribute Registry document of specific iDRAC version in Dell Support. Find the latest iDRAC Attribute Registry [here](#).

Conclusion

Applying the hardware configuration from a reference server on to the target servers requires system specific attributes to be removed in the captured Operational Template for smooth deployment. For more information about Operational Templates, see the *OpenManage Integration for Microsoft System Center Version 7.3 for Microsoft Endpoint Configuration Manager and System Center Virtual Machine Manager Unified User's Guide* on the Dell Support Website.

Technical support and resources

<https://www.dell.com/support/home/en-us/product-support/product/omimssc-mecm-sccm-scvmm/docs>