Server Cloning with Server Configuration Profiles

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Executive summary

Modern datacenter administrators require efficient and automated methods to rapidly prepare servers for production use.   The Dell PowerEdge servers' embedded integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller provides the ability to capture an entire configuration in a single human-readable output called a Server Configuration Profile. This profile can be applied to multiple servers, enabling rapid, reliable and reproducible configuration. An administrator can clone or replicate a profile, modify that profile as needed, and then preview the deployment on a target server. Being able to take these steps saves time and minimizes configuration errors, thereby reducing the need for manual intervention and decreasing configuration time. This whitepaper describes the behavior of these features and examines sample uses cases.

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Introduction

The heart of embedded management in every Dell PowerEdge server, the iDRAC with Lifecycle Controller provides the ability to generate a human-readable snapshot of server configuration via a Server Configuration Profile. This single file contains all BIOS, iDRAC, Lifecycle Controller, Network, and Storage settings. After capturing this file can be modified, as needed, and then applied to other servers, even different server models. However, this operation requires attention to details such as I/O identity, storage configuration, and other settings that could cause issues if misconfigured.

Among the operational features of the Server Configuration Profile are "Clone" and "Replace" modes of Profile Export and a "Preview" mode for Profile Import. As these names suggest, these methods can save significant time in highly automated IT environments where multiple servers are to be configured, cloned, and, in the future, re-configured for different workloads. This whitepaper illustrates the practical use of these features – showing how to clone or replace settings from a designated source or "golden" server, preview applying these settings, and finally, importing the settings to a target server.

Normal profile export

Server Configuration Profile (SCP) operations are provided via the RACADM command line interface and the iDRAC's WS-Man application programming interface (API); SCP exports and imports can be directed to or from local file systems and network shares (NFS / CIFS). The SCP-generated profile includes all aspects of the system, such as BIOS, NIC, RAID, FC, iDRAC, and Lifecycle Controller settings. By default, an "Export Configuration" invocation results in a Normal Export. In a typical use-case for a Normal Export operation, an administrator will export the SCP, creating a "snapshot" of all the current system configuration settings without having to invoke multiple commands. For example, the RAID configuration on a source system could include multiple Virtual Disks that have been setup. Unless it was the express intent to reconfigure storage on the target system, users would not want SCP snapshots taken on the source system to disrupt the target system on an Import operation by wiping out the Virtual Disks on the target system. The "Normal Mode" for Export keeps this in mind, and the SCP generated has **non-destructive settings** and actions that will not cause disruption to a target system if the "Normal Mode" SCP is imported.

The following Winrm command, using the WS-Man API, can be used to export an SCP in the "Normal" mode:

```
winrm i ExportSystemConfiguration http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.0.10/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic
@{IPAddress="192.168.100.50";ShareName="/nfs";ShareType="0";FileName="Export.xml"}
```

The SCP can be exported to NFS (0) or CIFS (2) shares, as specified by the **ShareType** parameter. **ShareName** identifies the network share where the exported file specified by **FileName** should reside. In the case of CIFS shares, credentials to access the share should also be specified by the **UserName** and **Password** parameters.

The following RACADM command exports a "Normal" mode SCP to a CIFS share:

```
racadm get -f file -t xml -u myuser -p mypass -l //192.168.100.50/share
```

This RACADM command can be used to export a "Normal" mode SCP to an NFS share:

```
racadm get -f file -t xml -l 192.168.100.50:/myshare
```

And finally, this remote RACADM command can be used to export a "Normal" mode SCP to a local file:

```
racadm –r <iDRAC IP address> -u <admin user name> -p <password> get –f file –t xml
```

The RACADM and Winrm SCP export commands will return a job ID. Job Status commands can be used to check the status of job completion. Once the job is complete, the SCP file is available on the specified share or local file.

Clone profile export

If the user intends to duplicate settings from a "golden" source server to a target server with an identical hardware setup, Clone export mode can be used. Clone mode profiles are distinguished from Normal mode by enabling configuration settings to be replicated on the target server. For this reason, Clone profiles — such as those containing RAID storage configuration - are potentially "data destructive" and should be used with awareness of the potential impacts to the target server.

I/O identity attributes are commented out in an SCP generated via "Clone" mode, but authentication attributes are not. By default, passwords for configured iDRAC users are exported as "calvin" (the default clear text password). In iDRAC version 4.40.00.00 and later versions, the default exported password was updated to "Calvin#SCP#CloneReplace1" to align with the new minimum password score feature. If the   actual passwords are to be retained, the **includeph** option can be used during export to output the actual passwords in hashed format. In the Clone mode of export, since the user intent is to duplicate settings including those for storage subsystems, Virtual Disk creation action is set to **CreateAuto**, and **ResetConfig** is set to **True** in the generated SCP file.

The **--clone** option can be used with RACADM commands to generate an SCP that is ready for cloning:

```
racadm get -f file -t xml -u myuser -p mypass -l //192.168.100.50/share –clone
```

The **ExportUse** parameter with option "1" can be used with Winrm WS-Man commands to generate SCP file suitable for cloning:

```
winrm i ExportSystemConfiguration http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.0.10/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic
@{IPAddress="192.168.100.50";FileName="file.xml";ShareName="workshare";ShareType="2";User
name="user";Password="pwd";ExportUse="1"}
```

Replace profile export

If the user intends to retire a server from the datacenter and replace it with another or restore a server's settings to a known baseline, the Replace mode of export can be used. In addition to authentication attributes that are uncommented and storage actions that will cause changes to the storage configuration, the I/O identity properties for NICs and Fiber Channel cards are also uncommented and exported.

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For this mode of export, the **–replace** option is used with RACADM commands:

```
racadm get -f file -t xml -u myuser -p mypass -l //192.168.100.50/share –replace
```

The **ExportUse** parameter can be used with Winrm WS-Man commands to generate Replace mode SCP files:

```
winrm i ExportSystemConfiguration http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.0.10/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic
@{IPAddress="192.168.100.50";FileName="file.xml";ShareName="workshare";ShareType="2";User
name="user";Password="pwd";ExportUse="2"}
```

Checking SCP export job status

SCP import and export operations will create a job. The status of this job can be checked with the following Winrm WS-Man and RACADM commands:

```
winrm g "http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/DCIM_LifecycleJob?InstanceID=JID_186409478164+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.0.10/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck

racadm jobqueue view -i JID_186409478164
```

Attribute formats during SCP export

As described in the previous sections, attributes may be commented ("hidden") or set to a default in the SCP file so they do not affect the target system on a subsequent import. Attributes may be uncommented, or the default value of the attribute changed. The following reasons help determine how an attribute is listed:

1. Destructive: The attribute or action intended by the attribute could destroy customer data on the server.
2. Server Location: The attribute relates to information that indicate where the server is physically located and is specific to each server.
3. I/O Identity: The attribute describes information used to identify a server within a network of servers; duplication of this information may cause a conflict on the network.
4. Security Obfuscated: The attribute contains password or key information that has been hidden.
5. Boot Settings/One-time boot settings: The attribute contains information describing the boot behavior of the server. Some of this information may only be relevant to a specific server, dependent on the server's installed devices.
6. Dependency: The attribute value settings are dependent on the values or presence of another attribute. These attributes may be either commented or uncommented at the time of export based on the dependent settings.
7. Capability/Feature Enablement: The attribute enables or disables a capability or feature.
8. General – User action required: The attribute will not be applied unless the user has modified the configuration XML to uncomment the attribute or change it from the default.

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The tables found in the Appendices describe the format of every attribute that may be impacted based on the type of export performed. The reason for the behavior is provided in the State column.

Limitations of Virtual Disk RAIDaction of AutoCreate

When a Server Configuration Profile clone is exported, the Virtual Disk **RAIDaction** of **CreateAuto** has the following limitations:

- When a Virtual Disk is created using a set of physical disks, any remaining free space will not be reused for subsequent Virtual Disks.
- Physical disks of different sizes connected to the same PERC RAID controller may not be efficiently used. The created Virtual Disk(s) will use a set of physical disks without regard to wasted space.
- Multi-span Virtual Disk RAID levels such as RAID 50 may not work beyond the minimum span length and depth.

Because of these limitations, not all Virtual Disks may be created when the cloned Profile is imported to a target server. To resolve these limitations, the exported clone Server Configuration Profile should be modified. The following items in each the Virtual Disk component section of the Profile must be modified to use specific physical disks for the Virtual Disk; the modifications include:

- Change the **RAIDAction** to the value "Create":

  <Attribute Name="RAIDaction">Create</Attribute>

- Un-comment the IncludedPhysicalDiskID attributes:

  <Attribute Name="IncludedPhysicalDiskID">Disk.Bay.0:Enclosure.Internal.0–1:RAID.Integrated.1–1</Attribute>

- Un-comment the **SpanDepth** and **SpanLength** attributes:

  <Attribute Name="SpanDepth">1</Attribute>
  <Attribute Name="SpanLength">3</Attribute>

- Change the RAIDPDState to the value "Ready":

  <Attribute Name="RAIDPDState">Ready</Attribute>

See the sample **RAIDAction** XML files in the Appendix for details on applying these edits.

Using profile export Preview

In some circumstances, the target server to which an SCP is being imported may not exactly match the source server. Consider two systems, an R630 and an R730 that differ in their network cards or in their storage controllers. Taking an SCP from the R630 and applying it directly to the R730 would result in errors due to these differences. The user can identify sections of the source SCP that would cause errors by utilizing the **Preview** functionality.

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The Winrm WS-Man command for **Preview** is:

```
winrm i ImportSystemConfigurationPreview http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.0.10/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic
@{IPAddress="192.168.100.50";ShareName="/nfs";ShareType="0";FileName="Preview-test.xml"}
```

The RACADM command for **Preview** is:

```
racadm set -f myfile.xml -t xml -u myuser -p mypass -l //192.168.100.50/myshare –preview
```

In response to a **Preview** command, a job ID is returned, and the job status commands can be used to check status of the import operation.

Preview ensures that the changes are analyzed as applicable to the target, but the target system is undisturbed. This will not cause any reboots or application of the settings specified by the SCP on the target system.

When the **Preview** is completed, any errors are logged to the Lifecycle Controller Log, and can be viewed by running a Winrm **GetConfigResults** command or by exporting the Lifecycle Controller Log and searching for the Preview Job ID.

The entries in Lifecycle Controller Log will also indicate if a system reboot will be required to apply the changes as specified in the SCP, as well as the estimated time to apply the changes.

The Winrm WS-Man command to retrieve the **Preview** results for a given job ID is:

```
winrm i GetConfigResults "http://schemas.dell.com/wbem/wscim/1/cim-
schema/2/DCIM_LCRecordLog?InstanceID=DCIM:LifecycleLog+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.0.10/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck @{JobID="JID_123456789"}
```

And to retrieve the Preview results with RACADM:

```
racadm jobqueue view -i <JOB ID>
```

After the **Preview**, the user may choose to delete the "Component" sections in the SCP file that are not applicable to the target system or keep only the specific sections that should be applied to the target – for example, copy only the BIOS settings from one system to another. This can be accomplished by editing the SCP and using the appropriate Import commands.

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Sample Workflow Use Case: Cloning configuration settings from a PowerEdge R730 to a PowerEdge R430

This sample use case illustrates propagating the configuration settings from a source system – an R730 with an H730P storage controller and an Intel x540 network card – to a target system - an R430, with an H330 storage controller and a Broadcom 5720 network card. The table below lists the differences between the two systems:

	Server_A	Server_B
Platform	**PowerEdge R730**	**PowerEdge R430**
Storage		
RAID Level	RAID-0	RAID-50
Storage Controller	PERC H730P Mini	PERC H330 Mini
Networking		
Network Interfaces	Intel® Gigabit X540/I350 rNDC	Broadcom Gigabit Ethernet BCM5720

1) Export Template Clone from the R730, call the resulting SCP file 01_R730_Export_Template_Clone.xml

```
winrm i ExportSystemConfiguration http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.0.10/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic
@{IPAddress="192.168.100.50";FileName="01_R730_Export_Template_Clone.xml";ShareName="work
share";ShareType="2";Username="user";Password="pwd";ExportUse="1"}
```

2) Execute **Preview** operation on the R430 using '01_R730_Export_Template_Clone.xml'. Wait for the job to complete using the Get Job Status command.   Job completes with message 'Preview of system configuration XML file completed. Some configuration changes may not be successful.'

```
winrm i ImportSystemConfigurationPreview http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.100.40/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -
a:basic @{IPAddress="192.168.100.50";ShareName="/nfs";ShareType="0";
FileName="01_R730_Export_Template_Clone.xml"}
```

Assuming JID_18640978164 is the JID returned:

```
winrm g "http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/DCIM_LifecycleJob?InstanceID=JID_186409478164+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.100.40/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck
```

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3) Execute **GetConfigResults** on the R430 using preview JobID and save the Lifecycle Controller Log ConfigResults in '02_R430_Preview_LCLog_Clone_of_R730.xml'. This will be used to examine any settings that are not successful and to determine the required edits.

```
winrm i GetConfigResults "http://schemas.dell.com/wbem/wscim/1/cim-
schema/2/DCIM_LCRecordLog?InstanceID=DCIM:LifecycleLog+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.100.40/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck @{JobID="JID_18640978164"}
```

For example,

- When you execute **GetConfigResults**, the output will be similar to following:

```
GetConfigResults_OUTPUT
ConfigResults = <ConfigResults><JobID>JID_935431814669</JobID><JobName>Preview
Configuration</JobName><Messages><MessageID>SYS087</MessageID><Message>A system reboot
is required to apply configuration
changes.</Message><MessageID>SYS088</MessageID><Message>Estimated time for applying
configuration changes is 2330 seconds.</Message></Messages></ConfigResults>
ReturnValue = 0
```

- Copy all the text for 'ConfigResults' into a new text file, add the XML tag 'Event' and save the file with extension as '.xml'.

```
<Event><ConfigResults><JobID>JID_935431814669</JobID><JobName>Preview
Configuration</JobName><Messages><MessageID>SYS087</MessageID><Message>A system reboot
is required to apply configuration
changes.</Message><MessageID>SYS088</MessageID><Message>Estimated time for applying
configuration changes is 2330 seconds.</Message></Messages></ConfigResults></Event>
```

4) Create a copy of '01_R730_Export_Template_Clone.xml' as '03_R730_Export_Template_Clone_Modified_for_R430.xml' and compare it to '02_R430_Preview_LCLog_Clone_of_R730.xml' for making corrections in '03_R730_Export_Template_Clone_Modified_for_R430.xml'.

cp 01_R730_Export_Template_Clone.xml 03_R730_Export_Template_Clone_Modified_for_R430.xml

For example,

- If the LC log indicates a failure 'Invalid AttributeName' then remove that attribute from '03_R730_Export_Template_Clone_Modified_for_R430.xml' file. This error can occur if there are differences in the BIOS versions or if some settings are not applicable for the target system.

```
<FQDD>BIOS.Setup.1-1</FQDD>
<Operation name="CHANGE">
<DisplayValue>ControlledTurbo</DisplayValue>
<MessageID>BIOS013</MessageID>
<Message>Invalid AttributeName</Message>
```

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```
<Status>Failure</Status>
<ErrorCode>6</ErrorCode>
</Operation>
```

- Because the network controller families differ, the networking FQDD and ports will be different between the R430 (NIC.Embedded.2-1-1) and the R730 (NIC.Integrated.1-4-1). If the Lifecycle Controller log indicates a failure 'Invalid parameter value for Target', then remove that component from '03_R730_Export_Template_Clone_Modified_for_R430.xml' file.

```
FQDD>NIC.Integrated.1-4-1</FQDD>
<Operation name="CHANGE">
<DisplayValue>NIC.Integrated.1-4-1</DisplayValue>
<MessageID>NIC004</MessageID>
<Message>Invalid parameter value for Target</Message>
<Status>Failure</Status>
<ErrorCode>8</ErrorCode>
</Operation>
```

- The storage controllers differ between the R430 and the R730 and if the Lifecycle Controller log indicates a failure for RAID configuration as below, then make appropriate changes according to the available storage.

```
<FQDD>RAID.Integrated.1-1</FQDD>
<Operation name="CHANGE">
<DisplayValue>RAIDaction</DisplayValue>
<Name>RAIDaction</Name>
<Detail>
<NewValue>CreateAuto</NewValue>
</Detail>
<MessageID>STOR029</MessageID>
<Message>Physical disk not found</Message>
<Status>Failure</Status>
<ErrorCode>a2</ErrorCode>
</Operation>
```

- Make the following changes in '03_R730_Export_Template_Clone_Modified_for_R430.xml' to support RAID configuration cloning similar to the R730

```
<Component FQDD="RAID.Integrated.1–1">
<Attribute Name="RAIDresetConfig">True</Attribute>
<Attribute Name="RAIDforeignConfig">Clear</Attribute>
<!--Modified:NOTFOUND Attribute Name="RAIDrekey">False</Attribute-->
<!--Modified:NOTFOUND Attribute Name="EncryptionMode">None</Attribute-->
```

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```xml
<!--<Attribute Name="KeyID"></Attribute>-->
<!--<Attribute Name="OldControllerKey">******</Attribute>-->
<!--<Attribute Name="NewControllerKey">******</Attribute>-->
<Attribute Name="RAIDprMode">Manual</Attribute>
<Attribute Name="RAIDloadBalancedMode">Disabled</Attribute>
<Attribute Name="RAIDccMode">Stop on Error</Attribute>
<Attribute Name="RAIDcopybackMode">On with SMART</Attribute>
<!--Modified:NOTFOUND Attribute Name="RAIDControllerBootMode">User Mode</Attribute>-->
<Attribute Name="RAIDEnhancedAutoImportForeignConfig">Disabled</Attribute>
<Attribute Name="RAIDrebuildRate">100</Attribute>
<Attribute Name="RAIDbgiRate">100</Attribute>
<Attribute Name="RAIDccRate">5</Attribute>
<Attribute Name="RAIDreconstructRate">100</Attribute>
<Component FQDD="Disk.Virtual.0:RAID.Integrated.1-1">
<Attribute Name="RAIDaction">CreateAuto</Attribute>
<!--Modified:NOTFOUND Attribute Name="LockStatus">Unlocked</Attribute>-->
<Attribute    Name="RAIDinitOperation">None</Attribute>
<Attribute Name="DiskCachePolicy">Default</Attribute>
<Attribute    Name="RAIDdefaultWritePolicy">WriteThrough</Attribute>
<Attribute Name="RAIDdefaultReadPolicy">NoReadAhead</Attribute>
<Attribute Name="Name">RAID 50</Attribute>
<Attribute Name="Size">0</Attribute>
<!--Modified: StripeSize changed according to supported for H310 Mini-->
<Attribute Name="StripeSize">128</Attribute>
<!--<Attribute Name="SpanDepth">2</Attribute>-->
<!--<Attribute Name="SpanLength">3</Attribute>-->
<Attribute Name="RAIDTypes">RAID 0</Attribute>
<!--<Attribute Name="IncludedPhysicalDiskID">Disk.Bay.0:Enclosure.Internal.0-:RAID.Integrated.1-1</Attribute>-->
</Component>
```

5) Execute the **Preview** operation on the R430 using '03_R730_Export_Template_Clone_Modified_for_R430.xml'

```
winrm i ImportSystemConfigurationPreview http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.100.40/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -
a:basic
@{IPAddress="192.168.100.50";ShareName="/nfs";ShareType="0";FileName="03_R730_Export_Temp
late_Clone_Modified_for_R430.xml"}
```

Assuming JID_186409478165 is the JID returned, check the job status

```
winrm g "http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/DCIM_LifecycleJob?InstanceID=JID_186409478165+_cimnamespace=root/dcim" -u:root
```

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```
-p:calvin -r:https://192.168.100.40/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck
```

6) Execute **GetConfigResults** on the R430 using the **Preview** JobID and save the Lifecycle Controller log ConfigResults in '04_R430_Preview_LCLog_Clone_of_R730.xml'. Make sure there are no failures identified.

```
winrm i GetConfigResults "http://schemas.dell.com/wbem/wscim/1/cim-
schema/2/DCIM_LCRecordLog?InstanceID=DCIM:LifecycleLog+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.100.40/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck @{JobID="JID_18640978165"}
```

7) Execute Import operation on the R430 using corrected '03_R730_Export_Template_Clone_Modified_for_R430.xml'

```
winrm i ImportSystemConfigurationPreview http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.100.40/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -
a:basic @{IPAddress="192.168.100.50";ShareName="/nfs";ShareType="0";
FileName="03_R730_Export_Template_Clone_Modified_for_R430.xml";
ShutdownType="1";EndHostPowerState="1"}
```

Assuming JID_18640947816 is the JID returned, to check for job status

```
winrm g "http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/DCIM_LifecycleJob?InstanceID=JID_186409478166+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.100.40/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck
```

8) Once the job is completed, execute **GetConfigResults** command on the R430 using Import JobID and save the Lifecycle Controller log ConfigResults in '05_R430_Import_LCLog_Clone_of_R730.xml''. Verify that Lifecycle Controller log doesn't show any failures.

```
winrm i GetConfigResults "http://schemas.dell.com/wbem/wscim/1/cim-
schema/2/DCIM_LCRecordLog?InstanceID=DCIM:LifecycleLog+_cimnamespace=root/dcim" -u:root
-p:calvin -r:https://192.168.100.40/wsman -encoding:utf-8 -a:basic -SkipCNcheck -
SkipCAcheck @{JobID="JID_18640978166"}
```

9) Export Template Clone on the R430 to '06_R430_Export_Template_Clone.xml' and compare it with '03_R730_Export_Template_Clone_Modified_for_R430.xml'. Make sure there are no errors.

```
winrm i ExportSystemConfiguration http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/root/dcim/DCIM_LCService?SystemCreationClassName=DCIM_ComputerSystem+CreationCla
ssName=DCIM_LCService+SystemName=DCIM:ComputerSystem+Name=DCIM:LCService -u:root -
p:calvin -r:https://192.168.0.40/wsman -SkipCNCheck -SkipCACheck -encoding:utf-8 -a:basic
@{IPAddress="192.168.100.50";FileName="06_R430_Export_Template_Clone.xml";ShareName="work
share";ShareType="2";Username="user";Password="pwd";ExportUse="1"}
```

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Summary

The iDRAC with Lifecycle Controller technology enables system administrators to create human-readable snapshots   of an entire server system configuration using Server Configuration Profiles. This paper shows how settings from one server can be checked for applicability to another server without disturbing the target. The user can then either modify the source Profile for applicability to the target system, or choose to apply only the component sections that can be used without error.

Additional Information

The iDRAC with Lifecycle Controller home page on Dell TechCenter provides access to product documents, technical white papers, how-to videos and more: http://delltechcenter.com/iDRAC

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Appendix 1: RAIDaction Profile Example – Before Edit

```
<SystemConfiguration Model="PowerEdge R730" ServiceTag="1KG0X52" TimeStamp="Thu Jun 9 17:14:34 2016">
<!--Export type is Clone,Selective-->
<!--Exported configuration may contain commented attributes. Attributes may be commented due to dependency,
destructive nature, preserving server identity or for security reasons.-->
<Component FQDD="RAID.Integrated.1–1">
   <Attribute Name="RAIDresetConfig">True</Attribute>
   <Attribute Name="RAIDforeignConfig">Clear</Attribute>
   <Attribute Name="CurrentControllerMode">RAID</Attribute>
   <Attribute Name="RAIDrekey">False</Attribute>
   <Attribute Name="EncryptionMode">None</Attribute>
   <!-- <Attribute Name="KeyID"></Attribute> -->
   <!-- <Attribute Name="OldControllerKey">******</Attribute> -->
   <!-- <Attribute Name="NewControllerKey">******</Attribute> -->
   <Attribute Name="RAIDprMode">Automatic</Attribute>
   <Attribute Name="RAIDPatrolReadUnconfiguredArea">Enabled</Attribute>
   <Attribute Name="RAIDloadBalancedMode">Automatic</Attribute>
   <Attribute Name="RAIDccMode">Normal</Attribute>
   <Attribute Name="RAIDcopybackMode">On</Attribute>
   <Attribute Name="RAIDControllerBootMode">Continue Boot On  Error</Attribute>
   <Attribute  Name="RAIDEnhancedAutoImportForeignConfig">Disabled</Attribute>
   <Attribute Name="RAIDrebuildRate">80</Attribute>
   <Attribute Name="RAIDbgiRate">30</Attribute>
   <Attribute Name="RAIDccRate">30</Attribute>
   <Attribute Name="RAIDreconstructRate">30</Attribute>
   <Component FQDD="Disk.Virtual.0:RAID.Integrated.1–1">
      <Attribute Name="RAIDaction">CreateAuto</Attribute>
      <Attribute Name="LockStatus">Unlocked</Attribute>
      <Attribute Name="RAIDinitOperation">None</Attribute>
      <!-- <Attribute Name="T10PIStatus">Disabled</Attribute> -->
      <Attribute Name="DiskCachePolicy">Default</Attribute>
      <Attribute Name="RAIDdefaultWritePolicy">WriteBack</Attribute>
      <Attribute Name="RAIDdefaultReadPolicy">ReadAhead</Attribute>
      <Attribute Name="Name">Virtual Disk 0</Attribute>
      <Attribute    Name="Size">107374182400</Attribute>
      <Attribute Name="StripeSize">128</Attribute>
      <!-- <Attribute Name="SpanDepth">1</Attribute> -->
      <!-- <Attribute Name="SpanLength">2</Attribute> -->
      <Attribute Name="RAIDTypes">RAID 1</Attribute>
      <!–– <Attribute Name="IncludedPhysicalDiskID">Disk.Bay.0:Enclosure.Internal.0–1:RAID.Integrated.1–1</Attribute>
-->
```

```
      <!-- <Attribute Name="IncludedPhysicalDiskID">Disk.Bay.1:Enclosure.Internal.0–1:RAID.Integrated.1–1</Attribute>
-->
   </Component>
   <Component FQDD="Enclosure.Internal.0–1:RAID.Integrated.1–1">
      <Component FQDD="Disk.Bay.0:Enclosure.Internal.0–1:RAID.Integrated.1–1">
         <Attribute Name="RAIDHotSpareStatus">No</Attribute>
         <Attribute Name="RAIDPDState">Online</Attribute>
      </Component>
      <Component FQDD="Disk.Bay.1:Enclosure.Internal.0–1:RAID.Integrated.1–1">
         <Attribute Name="RAIDHotSpareStatus">No</Attribute>
         <Attribute Name="RAIDPDState">Online</Attribute>
      </Component>
   <Attribute Name="RAIDremoveControllerKey">False</Attribute>
</Component>
</SystemConfiguration>
```

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Appendix 2: RAIDaction Profile Example – After Edit

Note the changes marked with <mark>yellow highlighting</mark> below:

```
<SystemConfiguration Model="PowerEdge R730" ServiceTag="1KG0X52" TimeStamp="Thu Jun 9 17:14:34 2016">
<!--Export type is Clone,Selective-->
<!--Exported configuration may contain commented attributes. Attributes may be commented due to dependency,
destructive nature, preserving server identity or for security reasons.-->
<Component FQDD="RAID.Integrated.1–1">
    <Attribute Name="RAIDresetConfig">True</Attribute>
    <Attribute Name="RAIDforeignConfig">Clear</Attribute>
    <Attribute Name="CurrentControllerMode">RAID</Attribute>
    <Attribute Name="RAIDrekey">False</Attribute>
    <Attribute Name="EncryptionMode">None</Attribute>
    <!-- <Attribute Name="KeyID"></Attribute> -->
    <!-- <Attribute Name="OldControllerKey">******</Attribute> -->
    <!-- <Attribute Name="NewControllerKey">******</Attribute> -->
    <Attribute Name="RAIDprMode">Automatic</Attribute>
    <Attribute Name="RAIDPatrolReadUnconfiguredArea">Enabled</Attribute>
    <Attribute Name="RAIDloadBalancedMode">Automatic</Attribute>
    <Attribute Name="RAIDccMode">Normal</Attribute>
    <Attribute Name="RAIDcopybackMode">On</Attribute>
    <Attribute Name="RAIDControllerBootMode">Continue Boot On  Error</Attribute>
    <Attribute  Name="RAIDEnhancedAutoImportForeignConfig">Disabled</Attribute>
    <Attribute Name="RAIDrebuildRate">80</Attribute>
    <Attribute Name="RAIDbgiRate">30</Attribute>
    <Attribute Name="RAIDccRate">30</Attribute>
    <Attribute Name="RAIDreconstructRate">30</Attribute>
    <Component FQDD="Disk.Virtual.0:RAID.Integrated.1–1">
        <Attribute Name="RAIDaction">Create</Attribute>
        <Attribute Name="LockStatus">Unlocked</Attribute>
        <Attribute Name="RAIDinitOperation">None</Attribute>
        <!-- <Attribute Name="T10PIStatus">Disabled</Attribute> -->
        <Attribute Name="DiskCachePolicy">Default</Attribute>
        <Attribute Name="RAIDdefaultWritePolicy">WriteBack</Attribute>
        <Attribute Name="RAIDdefaultReadPolicy">ReadAhead</Attribute>
        <Attribute Name="Name">Virtual Disk 0</Attribute>
        <Attribute    Name="Size">107374182400</Attribute>
        <Attribute Name="StripeSize">128</Attribute>
        <Attribute Name="SpanDepth">1</Attribute>
        <Attribute Name="SpanLength">2</Attribute>
        <Attribute Name="RAIDTypes">RAID 1</Attribute>
        <Attribute Name="IncludedPhysicalDiskID">Disk.Bay.0:Enclosure.Internal.0–1:RAID.Integrated.1–1</Attribute>
        <Attribute Name="IncludedPhysicalDiskID">Disk.Bay.1:Enclosure.Internal.0–1:RAID.Integrated.1–1</Attribute>
```

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```xml
    </Component>
    <Component FQDD="Enclosure.Internal.0-1:RAID.Integrated.1-1">
      <Component FQDD="Disk.Bay.0:Enclosure.Internal.0-1:RAID.Integrated.1-1">
        <Attribute Name="RAIDHotSpareStatus">No</Attribute>
        <Attribute Name="RAIDPDState">Ready</Attribute>
      </Component>
      <Component FQDD="Disk.Bay.1:Enclosure.Internal.0-1:RAID.Integrated.1-1">
        <Attribute Name="RAIDHotSpareStatus">No</Attribute>
        <Attribute Name="RAIDPDState">Ready</Attribute>
      </Component>
      <Attribute Name="RAIDremoveControllerKey">False</Attribute>
    </Component>
  </SystemConfiguration>
```

Appendix 3: Attribute Behavior in Normal Export

Component	Attribute	State	Value
LifecycleController.Embedded.1	LCAttributes.1#LifecycleControllerState	Commented (Capability/ Feature Enablement)	As set (ex, Enabled)
System.Embedded.1	ServerPwr.1#PowerCapValue	Commented (Dependency)	As set (ex, 247)
System.Embedded.1	ServerTopology.1#DataCenterName	Commented (Server Location)	As set (ex, Dell-DC)
System.Embedded.1	ServerTopology.1#AisleName	Commented (Server Location)	As set (ex, Aisle-5)
System.Embedded.1	ServerTopology.1#RackName	Commented (Server Location)	As set (ex, Rack-2)
System.Embedded.1	ServerTopology.1#RackSlot	Commented (Server Location)	As set (ex, Slot-1)
System.Embedded.1	ServerTopology.1#RoomName	Commented (Server Location)	As set (ex, SWLab)
System.Embedded.1	ServerOS.1#HostName	Commented (I/O Identity)	As set (ex, ganymede.us.dell.com)
System.Embedded.1	ServerOS.1#OSName	Commented (General-User action required)	As set (ex, CentOS 6.5)
iDRAC.Embedded.1	Users.n#Password	Commented (Security Obfuscated)	******
iDRAC.Embedded.1	LDAP.1#BindPassword	Commented (Security Obfuscated)	******
iDRAC.Embedded.1	NICStatic.1#DNSDomainName	Commented (I/O Identity)	As set (ex, us.dell.com)
iDRAC.Embedded.1	IPv4Static.1#Address	Commented (I/O Identity)	As set (ex, 192.168.0.120)
iDRAC.Embedded.1	IPv6Static.1#Address	Commented, (I/O Identity)	As set (ex, ::)
iDRAC.Embedded.1	NIC.1#DNSRacName	Commented, (I/O Identity)	As set (idrac-60)
iDRAC.Embedded.1	VNCServer.1#Password	Commented (Security Obfuscated)	******
Bios.Setup.1-1	OldSysPassword	Commented, (Security Obfuscated)	******
Bios.Setup.1-1	NewSysPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	OldSetupPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	NewSetupPassword	Commented, (Security Obfuscated)	******
Bios.Setup.1-1	TpmActivation	(Dependency)	As set
Bios.Setup.1-1	TpmClear	(Dependency)	As set
Bios.Setup.1-1	IntelTxt	(Dependency)	As set
Bios.Setup.1-1	AcPwrRcvryUserDelay	(Dependency)	As set

Component	Attribute	State	Value
Bios.Setup.1-1	UefiBootSeq	Commented, (Boot Settings)	As set (ex, NIC.Integrated.1-1-1, NIC.Integrated.1-2-1 …)
Bios.Setup.1-1	BiosBootSeq	Commented, (Boot Settings)	As set (HardDisk.List.1-1, NIC.Integrated.1-1-1)
Bios.Setup.1-1	HddSeq	Commented (Boot Settings)	As set (RAID.Integrated.1-1)
Bios.Setup.1-1	OneTimeBiosBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	OneTimeUefiBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	OneTimeHddBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	SataPortA	(Dependent)	As set
Bios.Setup.1-1	SataPortB	(Dependent)	As set
Bios.Setup.1-1	ProcPwrPerf	(Dependent)	As set
Bios.Setup.1-1	MemFrequency	(Dependent)	As set
Bios.Setup.1-1	ProcTurboMode	(Dependent)	As set
Bios.Setup.1-1	ProcC1E	(Dependent)	As set
Bios.Setup.1-1	ProcCStates	(Dependent)	As set
Bios.Setup.1-1	MonitorMwait	(Dependent)	As set
Bios.Setup.1-1	MemPatrolScrub	(Dependent)	As set
Bios.Setup.1-1	MemRefreshRate	(Dependent)	As set
Bios.Setup.1-1	MemVolt	(Dependent)	As set
Bios.Setup.1-1	CollaborativeCpuPerfCtrl	(Dependent)	As set
Bios.Setup.1-1	AssetTag	Commented (General-User action required)	As set
NIC.Integrated.1-x-1	VirtMacAddr	Commented (I/O Identity)	As set (ex, BC:30:5B:F1:4C:80)
NIC.Integrated.1-x-1	IpAutoConfig	Commented (Dependent , I/O Identity)	As set (ex, Enabled)
NIC.Integrated.1-x-1	IscsiInitiatorIpAddr	Commented, (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	IscsiInitiatorSubnet	Commented (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	IscsiInitiatorSubnetPrefix	Commented (Dependent, I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorGateway	Commented (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	IscsiInitiatorPrimDns	Commented (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	IscsiInitiatorSecDns	Commented (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	IscsiInitiatorName	Commented (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	IscsiInitiatorChapId	Commented (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	IscsiInitiatorChapPwd	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	ConnectFirstTgt	Commented (I/O Identity)	As set (ex, Disabled)
NIC.Integrated.1-x-1	FirstTgtIpAddress	Commented (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	FirstTgtBootLun	Commented (I/O Identity)	As set (number)

Component	Attribute	State	Value
NIC.Integrated.1-x-1	FirstTgtTcpPort	Commented (I/O Identity)	As set (number)
NIC.Integrated.1-x-1	FirstTgtIscsiName	Commented (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	FirstTgtChapId	Commented, (I/O Identity)	As set (number)
NIC.Integrated.1-x-1	FirstTgtChapPwd	Commented, (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	ConnectSecondTgt	Commented,(I/O Identity)	As set (ex, Disabled)
NIC.Integrated.1-x-1	SecondTgtIpAddress	Commented, (I/O Identity)	As set (ex, 0.0.0.0)
NIC.Integrated.1-x-1	SecondTgtTcpPort	Commented,(I/O Identity)	As set (number)
NIC.Integrated.1-x-1	SecondTgtBootLun	Commented, (I/O Identity)	As set (number)
NIC.Integrated.1-x-1	SecondTgtIscsiName	Commented, (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	SecondTgtChapId	Commented, (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	SecondTgtChapPwd	Commented, (I/O Identity)	As set (string)
NIC.Integrated.1-x-1	VLanId	Commented, (I/O Identity, Dependent)	As set (number)
NIC.Integrated.1-x-1	SecondaryDeviceMacAddr	Commented, (I/O Identity)	As set (MAC address string)
NIC.Integrated.1-x-1	UseIdTgtPortal	Commented, (I/O Identity)	As set (ex, Disabled)
NIC.Integrated.1-x-1	UseIndTgtName	Commented, (I/O Identity)	As set (ex, Disabled)
NIC.Slot.x-x-x	VirtMacAddr	Commented, (I/O Identity)	As set (ex, MAC address string)
NIC.Slot.x-x-x	ChapMutualAuth	Commented, (I/O Identity)	As set (ex, Disabled)
NIC.Slot.x-x-x	IscsiInitiatorName	Commented, (I/O Identity)	As set (string)
FC.Slot.x-x	VirtualWWN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	VirtualWWPN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	BootScanSelection	Commented (Boot Settings)	As set (string)
FC.Slot.x-x	FirstFCTargetWWPN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCTargetLUN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	SecondFCTargetConnect	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	SecondFCTargetLUN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	ConnectFirstFCoETarget	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCoEWWPNTarget	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCoEBootTargetLUN	Commented (I/O Identity)	As set (integer)
FC.Slot.x-x	FirstFCoEEFCVLANID	Commented (I/O Identity)	As set (integer)
RAID Controller	RAIDresetConfig	Uncommented (Destructive)	Set to "False"
	RAIDforeignConfig	Uncommented (Destructive)	Set to "Ignore"
	CurrentControllerMode	Commented (Destructive)	Set to "RAID"
	RAIDrekey	Uncommented (Destructive)	Set to "False"
	KeyID	Commented (Dependent)	As set, string

Component	Attribute	State	Value
	OldControllerKey	Commented (Dependent, Security Obfuscated)	******
	NewControllerKey	Commented (Dependent, Security Obfuscated)	******
Virtual Disk	RAIDaction	Uncommented (Destructive)	Set to "Update"
	RAIDinitOperation	Uncommented (Destructive)	As set (ex, "None")
	Cachecade	Commented (Dependent)	As set (ex, "Not a cachecade VD")
	Name	Commented (Dependent)	As set (ex, "vd1")
	Size	Commented (Dependent)	As set, number
	StripeSize	Commented (Dependent)	As set, number
	SpanDepth	Commented (Dependent)	As set, number
	SpanLength	Commented (Dependent)	As set, number
	RAIDTypes	Commented (Dependent)	As set, string (ex, "RAID 1")
	IncludedPhysicalDiskID	Commented (Dependent)	As set, string (ex, "Disk.Bay.0:Enclosure.Internal.0-1:RAID.Integrated.1-1")
	RAIDdedicatedSpare	Commented (Dependent)	As set, string
	T10PIStatus	Commented (Dependent)	As set
Physical Drive	RAIDHotSpareStatus	Commented (Capability/Feature Enablement)	As set
	RAIDPDState	Commented (Destructive)	As set

Appendix 4: Attribute Behavior in Clone Export

Component	Attribute	State	Value
LifecycleController. Embedded.1	LCAttributes.1#LifecycleControllerState	Commented (Capability/ Feature Enablement)	As set (ex, Enabled)
System.Embedded.1	ServerPwr.1#PowerCapValue	Commented (Dependency)	As set (ex, 247)
System.Embedded.1	ServerTopology.1#DataCenterName	Commented, (Server Location)	As set (ex, Dell-DC)
System.Embedded.1	ServerTopology.1#AisleName	Commented, (Server Location)	As set (ex, Aisle-5)
System.Embedded.1	ServerTopology.1#RackName	Commented, (Server Location)	As set (ex, Rack-2)
System.Embedded.1	ServerTopology.1#RackSlot	Commented, (Server Location)	As set (ex, Slot-1)
System.Embedded.1	ServerTopology.1#RoomName	Commented, (Server Location)	As set (ex, SWLab)
System.Embedded.1	ServerOS.1#HostName	Commented (I/O Identity)	As set (ex, Ganymede.us.dell.com)
System.Embedded.1	ServerOS.1#OSName	Commented (General-User action required)	As set (ex, SWlab)
iDRAC.Embedded.1	Users.n#Password	Uncommented (Security Obfuscated)	Defaults (calvin for #2 or enabled users, blank for everything else)
iDRAC.Embedded.1	LDAP.1#BindPassword	Uncommented (Security Obfuscated)	Defaults
iDRAC.Embedded.1	NICStatic.1#DNSDomainName	Commented (I/O Identity)	Blank As set (ex, us.dell.com)
iDRAC.Embedded.1	IPv4Static.1#Address	Uncommented (I/O Identity)	Defaults (192.168.0.120)
iDRAC.Embedded.1	IPv6Static.1#Address	Uncommented (I/O Identity)	Defaults (::)
iDRAC.Embedded.1	NIC.1#DNSRacName	Commented (I/O Identity)	Blank (whatever instantaneous value of attribute)
iDRAC.Embedded.1	DefaultCredentialMitigationConfigGroup.1#DefaultCredentialMitigation	Enabled	
iDRAC.Embedded.1	VNCServer.1#Password	Uncommented (Security Obfuscated)	Defaults (blank)
Bios.Setup.1-1	OldSysPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	NewSysPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	OldSetupPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	NewSetupPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	TpmActivation	(Dependency)	As set

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Component	Attribute	State	Value
Bios.Setup.1-1	TpmClear	(Dependency)	As set
Bios.Setup.1-1	IntelTxt	(Dependency)	As set
Bios.Setup.1-1	AcPwrRcvryUserDelay	(Dependency)	As set
Bios.Setup.1-1	UefiBootSeq	Uncommented (Boot Settings)	As set
Bios.Setup.1-1	BiosBootSeq	Uncommented (Boot Settings)	As set
Bios.Setup.1-1	HddSeq	Uncommented (Boot Settings)	As set
Bios.Setup.1-1	OneTimeBiosBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	OneTimeUefiBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	OneTimeHddBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	SataPortA	(Dependent)	As set
Bios.Setup.1-1	SataPortB	(Dependent)	As set
Bios.Setup.1-1	ProcPwrPerf	(Dependent)	As set
Bios.Setup.1-1	MemFrequency	(Dependent)	As set
Bios.Setup.1-1	ProcTurboMode	(Dependent)	As set
Bios.Setup.1-1	ProcC1E	(Dependent)	As set
Bios.Setup.1-1	ProcCStates	(Dependent)	As set
Bios.Setup.1-1	MonitorMwait	(Dependent)	As set
Bios.Setup.1-1	MemPatrolScrub	(Dependent)	As set
Bios.Setup.1-1	MemRefreshRate	(Dependent)	As set
Bios.Setup.1-1	MemVolt	(Dependent)	As set
Bios.Setup.1-1	CollaborativeCpuPerfCtrl	(Dependent)	As set
Bios.Setup.1-1	AssetTag	Commented (General-User action required)	As set
NIC.Integrated.1-x-1	VirtMacAddr	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IpAutoConfig	Commented (Dependent , I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorIpAddr	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorSubnet	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorSubnetPrefix	Commented (Dependent, I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorGateway	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorPrimDns	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorSecDns	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorName	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorChapId	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorChapPwd	Commented (I/O Identity)	As set

Component	Attribute	State	Value
NIC.Integrated.1-x-1	ConnectFirstTgt	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtIpAddress	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtBootLun	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtTcpPort	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtIscsiName	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtChapId	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtChapPwd	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	ConnectSecondTgt	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtIpAddress	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtTcpPort	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtBootLun	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtIscsiName	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtChapId	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtChapPwd	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	VLanId	Commented (I/O Identity, Dependent)	As set
NIC.Integrated.1-x-1	SecondaryDeviceMacAddr	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	UseIdTgtPortal	Commented (I/O Identity)	As set
NIC.Integrated.1-x-1	UseIndTgtName	Commented (I/O Identity)	As set
NIC.Slot.x-x-x	VirtMacAddr	Commented (I/O Identity)	As set
NIC.Slot.x-x-x	ChapMutualAuth	Commented (I/O Identity)	As set
NIC.Slot.x-x-x	IscsiInitiatorName	Commented (I/O Identity)	As set
FC.Slot.x-x	VirtualWWN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	VirtualWWPN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	BootScanSelection	Commented (Boot Settings)	As set (string)
FC.Slot.x-x	FirstFCTargetWWPN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCTargetLUN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	SecondFCTargetConnect	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	SecondFCTargetLUN	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	ConnectFirstFCoETarget	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCoEWWPNTarget	Commented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCoEBootTargetLUN	Commented (I/O Identity)	As set (integer)
FC.Slot.x-x	FirstFCoEEFCVLANID	Commented (I/O Identity)	As set (integer)
RAID Controller	RAIDresetConfig	Uncommented (Destructive)	TRUE
	RAIDforeignConfig	Uncommented (Destructive)	Clear

Component	Attribute	State	Value
	CurrentControllerMode	Uncommented (Destructive)	As set (string)
	RAIDrekey	Uncommented (Destructive)	False
	KeyID	Commented (Dependent)	As set, string
	OldControllerKey	Commented (Dependent, Security Obfuscated)	******
	NewControllerKey	Commented (Dependent, Security Obfuscated)	******
Virtual Disk	RAIDaction	Uncommented (Destructive)	Set to CreateAuto
	RAIDinitOperation	Uncommented (Destructive)	As set
	Cachecade	Uncommented (Dependent)	As set
	Name	Uncommented (Dependent)	As set
	Size	Uncommented (Dependent)	As set
	StripeSize	Uncommented (Dependent)	As set
	SpanDepth	Commented (Dependent)	As set
	SpanLength	Commented (Dependent)	As set
	RAIDTypes	Uncommented (Dependent)	As set
	IncludedPhysicalDiskID	Commented (Dependent)	As set
	RAIDdedicatedSpare	Uncommented (Dependent)	Set to "AutoSelect" when "RAID Action" is "CreateAuto"
	T10PIStatus	Uncommented (Dependent)	As set (ex, "Enabled")
Physical Drive	RAIDHotSpareStatus	Uncommented (Capability/ Feature enablement)	As set (ex, Dedicated)

	RAIDPDState	Uncommented (Destructive) only when Status is Ready or Non-RAID	As set

Appendix 5: Attribute Behavior in Replace Export

Component	Attribute	State	Value
LifecycleController. Embedded.1	LCAttributes.1#LifecycleControllerState	Commented (Capability/ Feature Enablement)	As set (ex, Enabled)
System.Embedded.1	ServerPwr.1#PowerCapValue	Commented (Dependency)	As set (ex, 247)
System.Embedded.1	ServerTopology.1#DataCenterName	Uncommented, (Server Location)	As set (ex, Dell-DC)
System.Embedded.1	ServerTopology.1#AisleName	Uncommented, (Server Location)	As set (ex, Aisle-5)
System.Embedded.1	ServerTopology.1#RackName	Uncommented, (Server Location)	As set (ex, Rack-2)
System.Embedded.1	ServerTopology.1#RackSlot	Uncommented, (Server Location)	As set (ex, Slot-1)
System.Embedded.1	ServerTopology.1#RoomName	Uncommented, (Server Location)	As set (ex, SWLab)
System.Embedded.1	ServerOS.1#HostName	Commented (Server Identity)	As set (ex, Ganymede.us.dell.com)
System.Embedded.1	ServerOS.1#OSName	Commented (Server Identity)	As set (ex, SWlab)
iDRAC.Embedded.1	Users.n#Password	Uncommented (Security Obfuscated)	Defaults (calvin for #2 or enabled users, blank for everything else)
iDRAC.Embedded.1	LDAP.1#BindPassword	Uncommented (Security Obfuscated)	Defaults
iDRAC.Embedded.1	NICStatic.1#DNSDomainName	Commented (I/O Identity)	Blank As set (ex, us.dell.com)
iDRAC.Embedded.1	IPv4Static.1#Address	Uncommented (I/O Identity)	Defaults (192.168.0.120)
iDRAC.Embedded.1	IPv6Static.1#Address	Uncommented (I/O Identity)	Defaults (::)
iDRAC.Embedded.1	NIC.1#DNSRacName	Commented (I/O Identity)	Blank (whatever instantaneous value of attribute)
iDRAC.Embedded.1	DefaultCredentialMitigationConfigGroup.1#DefaultCredentialMitigation	Enabled	
iDRAC.Embedded.1	VNCServer.1#Password	Uncommented (Security Obfuscated)	As Set
Bios.Setup.1-1	OldSysPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	NewSysPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	OldSetupPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	NewSetupPassword	Commented (Security Obfuscated)	******
Bios.Setup.1-1	TpmActivation	(Dependency)	As set
Bios.Setup.1-1	TpmClear	(Dependency)	As set
Bios.Setup.1-1	IntelTxt	(Dependency)	As set

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Component	Attribute	State	Value
Bios.Setup.1-1	AcPwrRcvryUserDelay	(Dependency)	As set
Bios.Setup.1-1	UefiBootSeq	Uncommented (Boot Settings)	As set
Bios.Setup.1-1	BiosBootSeq	Uncommented (Boot Settings)	As set
Bios.Setup.1-1	HddSeq	Uncommented (Boot Settings)	As set
Bios.Setup.1-1	OneTimeBiosBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	OneTimeUefiBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	OneTimeHddBootSeq	Commented (One-time boot settings)	As set
Bios.Setup.1-1	SataPortA	(Dependent)	As set
Bios.Setup.1-1	SataPortB	(Dependent)	As set
Bios.Setup.1-1	ProcPwrPerf	(Dependent)	As set
Bios.Setup.1-1	MemFrequency	(Dependent)	As set
Bios.Setup.1-1	ProcTurboMode	(Dependent)	As set
Bios.Setup.1-1	ProcC1E	(Dependent)	As set
Bios.Setup.1-1	ProcCStates	(Dependent)	As set
Bios.Setup.1-1	MonitorMwait	(Dependent)	As set
Bios.Setup.1-1	MemPatrolScrub	(Dependent)	As set
Bios.Setup.1-1	MemRefreshRate	(Dependent)	As set
Bios.Setup.1-1	MemVolt	(Dependent)	As set
Bios.Setup.1-1	CollaborativeCpuPerfCtrl	(Dependent)	As set
Bios.Setup.1-1	AssetTag	Commented (General-User action required)	As set
NIC.Integrated.1-x-1	VirtMacAddr	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IpAutoConfig	Uncommented (Dependent , I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorIpAddr	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorSubnet	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorSubnetPrefix	Uncommented (Dependent, I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorGateway	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorPrimDns	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorSecDns	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorName	Uncommented (I/O Identity)	As set

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Component	Attribute	State	Value
NIC.Integrated.1-x-1	IscsiInitiatorChapId	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	IscsiInitiatorChapPwd	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	ConnectFirstTgt	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtIpAddress	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtBootLun	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtTcpPort	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtIscsiName	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtChapId	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	FirstTgtChapPwd	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	ConnectSecondTgt	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtIpAddress	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtTcpPort	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtBootLun	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtIscsiName	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtChapId	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	SecondTgtChapPwd	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	VLanId	Uncommented (I/O Identity, Dependent)	As set
NIC.Integrated.1-x-1	SecondaryDeviceMacAddr	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	UseIdTgtPortal	Uncommented (I/O Identity)	As set
NIC.Integrated.1-x-1	UseIndTgtName	Uncommented (I/O Identity)	As set
NIC.Slot.x-x-x	VirtMacAddr	Uncommented (I/O Identity)	As set
NIC.Slot.x-x-x	ChapMutualAuth	Uncommented (I/O Identity)	As set
NIC.Slot.x-x-x	IscsiInitiatorName	Uncommented (I/O Identity)	As set
FC.Slot.x-x	VirtualWWN	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	VirtualWWPN	Uncommented (I/O Identity)	As set (string)

Component	Attribute	State	Value
FC.Slot.x-x	BootScanSelection	Uncommented (Boot Settings)	As set (string)
FC.Slot.x-x	FirstFCTargetWWPN	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCTargetLUN	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	SecondFCTargetConnect	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	SecondFCTargetLUN	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	ConnectFirstFCoETarget	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCoEWWPNTarget	Uncommented (I/O Identity)	As set (string)
FC.Slot.x-x	FirstFCoEBootTargetLUN	Uncommented (I/O Identity)	As set (integer)
FC.Slot.x-x	FirstFCoEEFCVLANID	Uncommented (I/O Identity)	As set (integer)
RAID Controller	RAIDresetConfig	Uncommented (Destructive)	TRUE
	RAIDforeignConfig	Uncommented (Destructive)	Clear
	CurrentControllerMode	Uncommented (Destructive)	As set (string)
	RAIDrekey	Uncommented (Destructive)	False
	KeyID	Commented (Dependent)	As set, string
	OldControllerKey	Commented (Dependent, Security Obfuscated)	******
	NewControllerKey	Commented (Dependent, Security Obfuscated)	******
Virtual Disk	RAIDaction	Uncommented CreateAuto (Destructive)	Set to CreateAuto
	RAIDinitOperation	Uncommented (Destructive)	As set
	Cachecade	Uncommented (Dependent)	As set
	Name	Uncommented (Dependent)	As set
	Size	Uncommented (Dependent)	As set
	StripeSize	Uncommented (Dependent)	As set
	SpanDepth	Commented (Dependent)	As set
	SpanLength	Commented (Dependent)	As set
	RAIDTypes	Uncommented (Dependent)	As set
	IncludedPhysicalDiskID	Commented (Dependent)	As set

Component	Attribute	State	Value
	RAIDdedicatedSpare	Uncommented (Dependent)	Set to "AutoSelect" when "RAID Action" is "CreateAuto"
	T10PIStatus	Uncommented (Dependent)	As set (ex, "Enabled")
Physical Drive	RAIDHotSpareStatus	Uncommented (Capability/ Feature enablement)	As set (ex, Dedicated)
	RAIDPDState	Uncommented (Destructive) only when Status is Ready or Non-RAID	As set