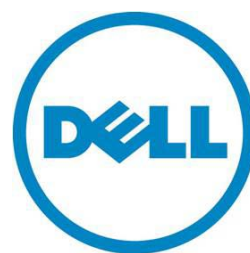

Scripting WSMAN to Deploy OS using remote ISO image to stage and boot

This Dell Technical White Paper provides information about scripting WSMAN Operating System Deployment for attaching remote ISO's on Dell PowerEdge servers with iDRAC.



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Executive summary

This paper provides information for administrators looking to script operating system deployment to attach remote ISO images to available Dell PowerEdge servers with an iDRAC, through a secure and standards-based WSMAN service.

Introduction

Dell PowerEdge servers equipped with Integrated Dell Remote Access Controller (iDRAC) provides secure, simple, scriptable and standards-based remote management capability through Web Services for Management (WSMAN). WSMAN is a network-based management protocol that enables a user to access systems management data objects and methods supported by the target platform. You can utilize the WSMAN API by scripting. WSMAN can be scripted using command line tools, such as *wintrm* on Windows and *wsmancli* on Linux. The scripting language used in this document is Python, which can run on both Windows and Linux. You may need to read specification documents to understand the terminology and concepts in this document. The audience for this document is systems administrators who typically work with command line tools and scripts.

In this document, you will learn how to:

- (A) Attach Network ISO image to host OS as Emulated USB Device for immediate one-time boot.
- (B) Detach Emulated USB Device from (A).
- (C) Retrieve the Job Status of the attached image.
- (D) Attach Network ISO image to host OS as Emulated USB Device for persistent boot.
- (E) Detach Emulated USB Device from (D).
- (F) Retrieve the status of (D).
- (G) Skip booting to the persistent Emulated USB Device with the Network ISO Image, one-time on next boot.

Environmental Check Point

Before you begin, complete the following tasks:

1. Prepare a target system, Dell PowerEdge server with iDRAC enabled, configured and network reachable to talk to WSMAN.
2. Verify Python version 2.7 is installed on your system. If you need assistance, refer to the [python release site](#).
3. Download the python scripts package from [Dell Tech Center](#). The scripts relevant to this document include the following:



- a. `osd_boot_network.py`
- b. `provider_common.py`
- c. `wsman_common.py`

Figure 1. Environment Diagram

Pictorial View of the Environment

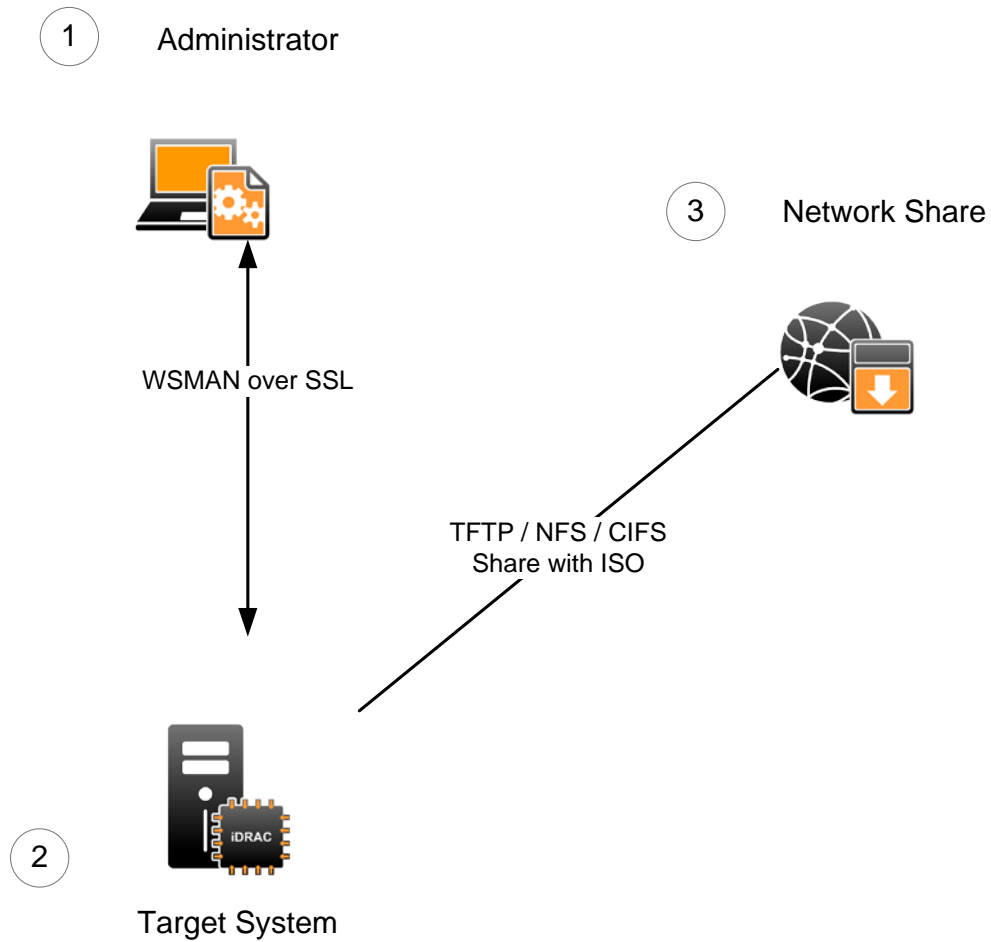


Figure 1 shows the pictorial view of the environment. It starts with administrator (1) running scripts to send WSMAN commands through an SSL connection. The target system (2) is a Dell PowerEdge 11G or later server equipped with iDRAC service processor. The network share (3) is used to attach the ISO image to the target iDRAC's host. The iDRAC's host will boot to the emulated USB holding the ISO image.



The operating system booting to a network ISO provides the following capabilities:

- (A) Attaches Network ISO image to host OS as Emulated USB Device for immediate one-time boot.
- (B) Detaches Emulated USB Device from (A).
- (C) Retrieves the Job Status of the attached image.
- (D) Attaches Network ISO image to host OS as Emulated USB Device for persistent boot.
- (E) Detaches Emulated USB Device from (D).
- (F) Retrieves the status of (D).
- (G) Skips booting to the persistent Emulated USB Device with the Network ISO Image, one-time on next boot.

Script Usage

Use the following script for harnessing the above capabilities:

```
osd_boot_network.py
```

The script is interactive and menu-driven. It does not have positional arguments. The script package contains the file README_OSD_Boot_Network. This readme provides more information on the script usage.

1. On running the `osd_boot_network.py` script, you will be prompted for

```
Enter iDRAC IP Address: [iDRAC IP]
```

```
Enter User Name: [USER NAME]
```

```
Enter User Password: [PASSWORD]
```

The first argument asks for the iDRAC's IP address on the target system. The second argument asks for the iDRAC's user name. If the user is an AD account, then the syntax is "USER@DOMAIN". The third argument asks for the iDRAC's password.

2. The script establishes a connection with the iDRAC and also performs Certificate validation.

```
Pinging [iDRAC IP]. Waiting for response. Done.
```

```
Getting SSL Certificate. Waiting for response. Done.
```



3. Once a successful connection is established, the following main menu is returned. The main menu allows you to pick an option number, which corresponds to a needed operation on the system.

Sample output of the main menu:

```
1:Attach and Boot to Network ISO one-time
2:Detach Network ISO from option 1
3:Get Job Status
4:Attach Network ISO for persistent boot
5:Status of option 4
6:Skip next boot to persistent Network ISO
7:Detach Network ISO from option 4
8:Change iDRAC Target
9:Quit
Enter option 1 - 9:
```

Attach Network ISO image for immediate one-time boot

This capability attaches a remote ISO image to the target iDRAC's host OS as an Emulated USB device. The host will boot to the emulated USB device one-time, if the attachment is successful. Option 1 from the main menu, 'Attach and Boot to Network ISO one-time' allows usage of this capability.

Sample menu option:

```
Enter option 1 - 9: 1
```

The user must enter a choice of either NFS or CIFS share type. The NFS share requires the IP address, image name, and share name of the Linux's system carrying the ISO image. The CIFS share requires the IP address, image name, share name, user name, and password of the Window's system holding the ISO image.

Sample script and user interaction:

```
0 - NFS
2 - CIFS
```



```
Enter share type: 0
```

Specify NFS required information.

```
Enter IP address: [iDRAC IP]
```

```
Enter image name (ex: iso.img): [IMAGE NAME]
```

```
Enter share name (ex: /home/share): [SHARE NAME]
```

Boot in progress. Waiting for response. Response received.

A job is created.

Retrieve job status in progress. Waiting for response. Response received.

Job is in state "Rebooting to ISO".

Select choice 3 to monitor job status.

The main menu is returned at the end of the operation.

Detach Network ISO image from one-time boot

This capability is used to detach the Emulated USB device from the target iDRAC's host, attached previously using option 1. Option 2 from the main menu, 'Detach Network ISO from option 1' allows usage of this capability.

```
Enter option 1-9: 2
```

Sample output of the response:

```
Detach in progress. Waiting for response. Response received.
```

```
ISO image has been detached successfully.
```

The main menu is returned at the end of the operation. The Emulated USB containing the ISO image is detached.



Retrieve the Job Status

This capability pulls the job status of attaching the Emulated USB containing an ISO image onto the iDRAC's host. Option 3 from the main menu, 'Get Job Status' allows usage of this capability.

```
Enter option 1-9: 3
```

Sample output of the response:

```
Retrieving job status in progress. Waiting for response. Response received.
```

```
JobName           JobStatus           MessageID Message
-----
BootToNetworkISO Rebooting to ISO
```

Once the Job status is polled, the menu comes back up. You can continue to poll the status using option 3. The host will boot to the Emulated USB.

WARNING: If the iDRAC and host are sharing a NIC while the host is booting to the emulated USB, the JobStatus will fail. The JobStatus requires for an iDRAC have network connection at all times. The iDRAC loses its network connection when the host is being rebooted if the host and iDRAC are sharing the same NIC.

A few expected responses when polling for job status:

```
JobName           JobStatus MessageID Message
-----
BootToNetworkISO Success   OSD1      The command was successful
BootToNetworkISO Rebooting to ISO
Timed out. Unable to get job status.
```

Attach Network ISO image for persistent boot

This capability is used to connect an image at either an NFS or CIFS mount location to the host as an Emulated USB device. When the host reboots, it will automatically boot to the USB device until



detached. Option 4 from the main menu, 'Attach Network ISO for persistent boot' allows usage of this capability.

```
Enter option 1-9: 4
```

The user will have to enter their choice of either NFS or CIFS share type. The NFS share requires the IP address, image name, and share name of the Linux's system carrying the ISO image. The CIFS share requires the IP address, image name, share name, user name, and password of the Windows system holding the ISO image.

Sample script and user interaction:

Specify share type.

```
0 - NFS
```

```
2 - CIFS
```

```
Enter share type: 2
```

Specify CIFS required information.

```
Enter IP address: [IP ADDRESS]
```

```
Enter image name (ex: img.iso): [IMAGE NAME]
```

```
Enter share name (ex: /home/share): [SHARE]
```

```
Enter user name: [USER NAME OF SHARED LOCATION]
```

```
Enter password: [PASSWORD]
```

```
Attach in progress. Waiting for response. Response received.
```

```
Check status of job either with option 3 or 5.
```

The main menu is returned after attempting to connect the device. To check if the device has been connected correctly, use option 3 or 5 for more information.

Detach Network ISO image from persistent boot

This capability disconnects the persistent connection to the network iso image (option 4). The option that allows usage of this capability is option 7, 'Detach Network ISO from option 4'.



```
Enter option 1 - 9: 7
```

Sample Output

```
Detach in progress. Waiting for response. Response received.
```

```
ISO image has been detached successfully.
```

The main menu is returned at the end of operation.

Retrieve the status of the attachment of Network ISO image for persistent boot

This capability is used check if the connection of the network ISO image was successful. If it is successful the type of image and the location of the image that is currently connected to the iDRAC's host system will be outputted. Option 5 from the main menu, 'Status of option 4' allows usage of this capability.

```
Enter option 1 - 9: 5
```

Sample Output

```
Checking Status. Waiting for response. Response received.
```

```
Persistent attachment of network [iso name] at [share ip address] is  
successful
```

The main menu is returned at the end of operation.

Skip booting to the persistent Network ISO Image on next boot

This capability skips booting to the attached ISO Image next time the host reboots for one time. Option 6 of the main menu, 'Skip next boot to persistent Network ISO' allows usage of this capability.

```
Enter option 1 - 9: 6
```

Sample Output

```
Checking Status. Waiting for response. Response received.
```

```
Skip booting to remote ISO image for one cycle is successful.
```



The main menu is returned at the end of operation.

Changing iDRAC Target

The option 4 from the main menu, 'Change iDRAC Target' allows you to change the iDRAC target being used. You can use this option to shift to a different iDRAC.

```
Enter option 1-5: 4
```

Sample output of the response:

```
Enter iDRAC IP Address: [New iDRAC IP]
```

```
Enter User Name: [USER NAME]
```

```
Enter User Password: [PASSWORD]
```

```
Pinging [New iDRAC IP]. Waiting for response. Response received.
```

```
iDRAC IP address is set to [New iDRAC IP].
```

The script establishes a connection with the iDRAC and also performs Certificate validation. Once a successful connection is established, the main menu is returned.

NOTE: The option to attach an ISO image to the host also boots the host to the ISO image. If the iDRAC and iDRAC's host both share a NIC, the iDRAC will lose network connection when the host is booting to the ISO image.



Where to Find More Information

Learn more about firmware inventory as defined by the Dell CIM profile specification:

<http://www.delltechcenter.com/page/DCIM.Library.Profiles.DCIM+Software+Inventory+Profile+1.0>

Learn more about firmware update as defined by the Dell CIM profile specification:

<http://www.delltechcenter.com/page/DCIM.Library.Profile.DCIM+Software+Update+Profile+1.0>

Learn more about job control as defined by the Dell CIM profile specification:

<http://www.delltechcenter.com/page/DCIM+Job+Control+Profile+1.1>

WSMAN Interface Guide for Linux:

http://attachments.wetpaintserv.us/BMJk79WsVP3F0jwI50xR_w2088275

WSMAN Interface Guide for Windows:

http://attachments.wetpaintserv.us/utYVFQFaHmnfG_LHEnx1YQ2026735

WSMAN command line open source for Linux (Openwsman):

<http://sourceforge.net/projects/openwsman/>

WSMAN command line for Windows (Winrm):

[http://msdn.microsoft.com/en-us/library/windows/desktop/aa384291\(v=VS.85\).aspx](http://msdn.microsoft.com/en-us/library/windows/desktop/aa384291(v=VS.85).aspx)

All about Lifecycle Controller in iDRAC:

http://support.dell.com/support/edocs/software/smusc/smlc/lc_1_5/index.htm

Summary

This document provides information on how to (A) Attach Network ISO image to host OS as Emulated USB Device for immediate one-time boot, (B) Detach Emulated USB Device from (A), (C) Retrieve the Job Status of the attached image, (D) Attach Network ISO image to host OS as Emulated USB Device for persistent boot, (E) Detach Emulated USB Device from (D), (F) Retrieve the status of (D) and (G)

Skip booting to the persistent Emulated USB Device with the Network ISO Image, one-time on next boot. Having these done remotely and securely, Dell iDRAC with Lifecycle Controller enables you to be more productive and efficient.

Learn more

Visit Dell.com/PowerEdge for more information on Dell's enterprise-class servers.

