Scripting WSMAN to Deploy OS Drivers

This Dell Technical White Paper provides information about scripting WSMAN Operating System Deployment for drivers on Dell PowerEdge servers with iDRAC.

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Executive summary

This paper describes how to script deployment of operating system drivers available for Dell PowerEdge servers through a secure and agentless standards-based web service.

Introduction

Dell PowerEdge servers equipped with Integrated Dell Remote Access Controller (iDRAC) provide 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. The WSMAN API can be utilized by scripting WSMAN using command line tools such as `winrm` on Windows and `wsmancli` on Linux. The scripting language used in this document is Python which can run on both Windows and Linux. Some reading of specification documents may be required to understand the terminology and concepts in this document. If you are a systems administrator who typically works with command line tools and scripts, then you have come to the right place.

Driver Packs are packages containing drivers for the hardware for every operating system (OS) type, flavor and version. In this document, you will learn how to:

(A) Get Driver Pack information.

(B) Unpack drivers for a particular operating system and attach to the host OS as an emulated USB device.

(C) Detach the emulated USB device containing the drivers.

(D) Unpack the drivers for a particular operating system and copy to network share; for use by traditional software deployment tools.

Environmental Check Point

Before you start, here is a list of items that you need to prepare:

1. Verify that your target system is a Dell PowerEdge server with iDRAC enabled, and that it is configured and accessible through the network to reach WSMAN.

2. It is recommended that the latest OS Driver Pack is installed so that drivers are available for newer operating systems and newer devices.

3. Verify Python version 2.7 is installed on your system. If you need help with this, refer to the [python release site](#).

4. Download the python scripts package from [Dell Tech Center](#). The scripts relevant to this document are below:

   a. `osd_drivers.py`
   b. `provider_common.py`
   c. `wsman_common.py`
Figure 1 shows a pictorial view of the environment. It starts with the 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 an iDRAC service processor. The network share (3) is used to copy the unpacked drivers for a particular operating system used for deployment on the target system (capability (D) below).

The operating system deployment for drivers feature provides the following capabilities:

(A) Get Driver Pack information
(B) Unpack drivers for the selected operating system and attach to the host OS as a USB device
(C) Detach the emulated USB device containing the drivers
(D) Unpack the drivers for the selected operating system and copy to the network share
Script Usage

The script to use for harnessing the above capabilities is:

`osd_drivers.py`

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

1. On running the `osd_drivers.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 is the IP address of the iDRAC on the target system. The second is the user name. If the user is an AD account, then the syntax is “USER@DOMAIN”. The third is the user 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 will be returned. This allows you to pick the option based on the operation you need to perform.

   Sample output of the main menu:

   OS Deployment - Drivers:
   ***********************
   1: Get Driver Pack Info
   2: Unpack Selected Drivers and Attach to Host OS
   3: Detach Emulated USB Device Containing Drivers
   4: Unpack Selected Drivers and Copy to Network Share
   5: Change iDRAC Target
   6: Quit

   Enter choice 1-5 or 6 to Quit:

Get Driver Pack Information

This capability returns the embedded driver pack version and the list of supported operating systems for OS deployment that can be installed on the server using the embedded device drivers present in the Lifecycle Controller. Option 1 from the main menu, Get Driver Pack Info, allows usage of this capability.

Enter choice 1-5 or 6 to Quit: 1
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Sample output of the response:

Pinging [iDRAC IP]. Waiting for response. Done.
Getting SSL Certificate. Waiting for response. Done.
sending ...
Invoke Completed Successfully

OS Driver Pack List
-------------------
1 Microsoft Windows Server 2008 with SP2
2 Microsoft Windows Server 2008, x64 with SP2
3 Microsoft Windows Server 2008 R2 with SP1
4 Microsoft Windows Small Business Server 2011
5 Red Hat Enterprise Linux 5 SP7 x86
6 Red Hat Enterprise Linux 5 SP7 x64
7 Red Hat Enterprise Linux 6 SP1 x64
8 SuSE Enterprise Linux 10 SP4 x64
9 SuSE Enterprise Linux 11 SP2 x64
10 VMware ESX 4.1 U2
11 VMware ESXi 4.1 U2 HDD
12 VMware ESXi 5.0 HDD
13 Citrix Xen Server 6.0 FP1 HDD

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

Unpack Drivers for Selected Operating System and Attach to Host OS as Emulated USB Device

This capability is used to unpack the drivers for the selected OS to an iDRAC-based internal storage partition, and to then attach this partition to the host OS as an emulated USB storage device. Option 2 from the main menu, Unpack Selected Drivers and Attach to Host OS, allows usage of this capability.

Enter choice 1-5 or 6 to Quit: 2

Sample output of the response:

Pinging [iDRAC IP]. Waiting for response. Done.
Getting SSL Certificate. Waiting for response. Done.
sending ...
Invoke Completed Successfully

OS Driver Pack List
-------------------
1 Microsoft Windows Server 2008 with SP2
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2 Microsoft Windows Server 2008, x64 with SP2
3 Microsoft Windows Server 2008 R2 with SP1
4 Microsoft Windows Small Business Server 2011
5 Red Hat Enterprise Linux 5 SP7 x86
6 Red Hat Enterprise Linux 5 SP7 x64
7 Red Hat Enterprise Linux 6 SP1 x64
8 SuSE Enterprise Linux 10 SP4 x64
9 SuSE Enterprise Linux 11 SP2 x64
10 VMware ESX 4.1 U2
11 VMware ESXi 4.1 U2 HDD
12 VMware ESXi 5.0 HDD
13 Citrix Xen Server 6.0 FP1 HDD

Select OS Driver Pack from list (1,2...n): 2
Enter expose duration (in mins): 23
Pinging [iDRAC IP]. Waiting for response. Done.
Certificate exists!
sending ...
Response received.

A job is created to complete the operation.
Polling job status on the operation . . . . . . . .
The operation status is "Success"!
The main menu is returned at the end of the operation. The drivers for the requested operating system are extracted and placed on an internal USB device labeled OEMDRV. The OEMDRV is displayed as a locally attached USB device to the system.

Detach Emulated USB Device Containing Drivers
This capability is used to detach the USB device attached to the system by a previous invocation of the capability (B) or option 2 from the main menu. Option 3 from the main menu, Detach Emulated USB Device Containing Drivers, allows usage of this capability.

Enter choice 1-5 or 6 to Quit: 3

Sample output of the response:
Pinging [iDRAC IP]. Waiting for response. Done.
Certificate exists!
sending ...
Invoke Completed Successfully
The Emulated USB Device containing Drivers has been successfully detached from the Host OS!
The main menu is returned at the end of the operation. The OEMDRV device that had been previously attached is detached and removed from the system.

Unpack Drivers for Selected Operating System and Copy to Network Share
This capability is used to unpack the drivers for the selected OS and copy them to a specified network share, for use with OS deployment tools; NFS and CIFS network share technologies are supported. Note that the values for the CIFSUSER and CIFSPASSWORD must be alphanumeric characters, and must not contain special characters. Option 4 from the main menu, Unpack Selected Drivers and Copy to Network Share, allows usage of this capability.

Enter choice 1-5 or 6 to Quit: 4

Sample output of the response:

Enter Network Share type (0->NFS, 1->TFTP, 2->CIFS): 0
Enter IP address of share server: [Share IP]
Enter directory path on the share server (ex. /home/nfsshare): [Share dir path]
Enter user name for share server: [USER NAME]
Enter password for share server: [PASSWORD]
Pinging [iDRAC IP]. Waiting for response. Done.
Certificate exists!
sending ...
Invoke Completed Successfully

OS Driver Pack List
-------------------
1 Microsoft Windows Server 2008 with SP2
2 Microsoft Windows Server 2008, x64 with SP2
3 Microsoft Windows Server 2008 R2 with SP1
4 Microsoft Windows Small Business Server 2011
5 Red Hat Enterprise Linux 5 SP7 x86
6 Red Hat Enterprise Linux 5 SP7 x64
7 Red Hat Enterprise Linux 6 SP1 x64
8 SuSE Enterprise Linux 10 SP4 x64
9 SuSE Enterprise Linux 11 SP2 x64
10 VMware ESX 4.1 U2
11 VMware ESXi 4.1 U2 HDD
12 VMware ESXi 5.0 HDD
13 Citrix Xen Server 6.0 FP1 HDD
Select OS Driver Pack from list to unpack and copy (1,2...n): 3
Response received.

A job is created to complete the operation.
Polling job status on the operation . . . . . . . . . . . . . . . .
The operation status is "Success"!

The main menu is returned at the end of the operation. The drivers for the requested operating system are extracted and copied to the network share.

**Changing iDRAC Target**
Option 5 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 choice 1-5 or 6 to Quit: 5

Sample output of the response:

Enter iDRAC IP Address: [New iDRAC IP]  
Enter User Name: [USER NAME]  
Enter User Password: [PASSWORD]

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

**Things to note**
- The drivers unpacked and attached are removed from the host OS after the time specified in Enter expose duration (in mins): for option 2 from the main menu, or if no time is specified, then by default the OEMDRV USB device is removed after 18 hours.
- When installing Red Hat Linux 5.3 using remote services commands, the installation will fail whenever there is an OEMDRV (for driver source) attached. To avoid failure, do not attach the OEMDRV when using remote services commands to install Red Hat Enterprise Linux 5.3.
- After operating system deployment, the OEMDRV drive is attached for 18 hours by default, unless otherwise specified. If you want to perform other operations such as update, configuration, or export and import after operating system deployment, you must detach OEMDRV drive explicitly, reset Lifecycle controller, or cancel and enable Lifecycle Controller.

**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](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](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](http://www.delltechcenter.com/page/DCIM+Job+Control+Profile+1.1)
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WSMAN Interface Guide for Linux:
http://attachments.wetpaintserv.us/BMJk79WsVP3F0jwl50xR_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):

All about Lifecycle Controller in iDRAC:
http://support.dell.com/support/edocs/software/smusc/smlc/lc_1_5/index.htm

Summary
Using the native or open source command line tools available in Windows and Linux, the Python script working sample described provides a way to use and get the OS device drivers that are stored in the Dell PowerEdge server iDRAC service processor. The script uses the WSMAN web service protocol to:

(A) Get OS Driver Pack information.
(B) Unpack drivers for the selected OS and attach to the host OS as an emulated USB Device.
(C) Detach the emulated USB device containing the drivers.
(D) Unpack the drivers for the selected OS and copy to a network share.

By enabling a remote, secure, agentless and media-less way of deploying and updating OS device drivers, the Dell iDRAC with Lifecycle Controller technology enhances productivity and efficiency.

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