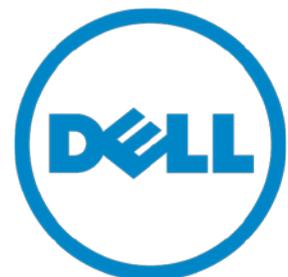


Installing Virtual Machines on Dell PowerEdge Servers using Dell OEM Media

Dell | Product Group

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SUMMARY

When a Dell™ PowerEdge server is purchased with a Windows® Server® 2008 or Windows® Server® 2008 R2 operating system, this system is shipped with a corresponding Dell OEM media. The benefit of using the Dell OEM media is that the product key is not needed when the OS is reinstalled, and the OS on this Dell system will automatically be activated after the OS installation is complete.

However, this activation process is different when using the Dell OEM media to install a virtual machine or guest OS. The activation code included in the Dell OEM media no longer works in a virtualization environment. The guest OS is not automatically pre-activated. Instead, a virtual product key is needed to activate the guest OS.

This article describes the steps required to activate guest OS installed with Dell OEM media on virtual machines. The article also describes the necessary steps to create a pre-activated master virtual machine image. The master virtual image can be used as a template to be deployed onto multiple virtual machines in the same hypervisor environment or to be used in different virtual environments. The overall process of using Dell OEM media to install a guest OS is the same for both Windows Server 2008 and Windows Server 2008 R2, except the differences which are noted below.

Note:

- Throughout this article, the term “guest OS” refers to the Windows Server 2008 or Windows Server 2008 R2 OS installed on the virtual machine or the "child partition".

Product Key and Virtual Key

The product key is composed of a 25-character string with each of the 5 characters separated by “-”. The product key is optional during the OS setup process but it is required during the activation process.

The Windows® Server® 2003 OS was delivered with only one product key. The same product key could be used to activate the OS deployed on the physical systems as well as the guest OS deployed on the virtual machines.

Starting with Windows Server 2008, there are two product keys printed on the COA (Certificate of Authenticity) sticker: the product key and the virtual key. The product key is used to activate the OS that is running on the physical system. If the OS is purchased from Dell as a preinstalled option, then as already mentioned, this key is not needed during the OS reinstallation. The virtual key is used to activate the guest OS installed on virtual machines on any hypervisor. This virtual key allows user to activate from one up to unlimited instances of the guest OS and the number of the allowance varies by editions. For instance, four simultaneous instances of guest OS can be run on a licensed server for the Enterprise edition. If more than four instances of guest OS is needed to run simultaneously on a licensed server, it may be more economical to license the server with the Datacenter edition. With the Datacenter edition, unlimited instances of guest OS's are allowed to run simultaneously.

For Windows Server 2008 R2, Microsoft allows to run down-edition of OS on a licensed server. For instance, the product key for the enterprise edition or the standard edition for the guest OSes can be requested from Microsoft for a licensed datacenter edition. For detailed license terms related to guest operating system instances, refer to the Microsoft Windows Server 2008 R2 Licensing information at www.microsoft.com/windowsserver2008/en/us/licensing-R2.aspx

MASTER INSTANCE SETUP

When using Dell OEM media to deploy the guest OS on a virtual machine, the setup process does not display the product key entry screen. The setup process automatically uses the pre-activation code included in the Dell OEM media and successfully completes the installation process. However, there is no technical way to pre-activate this installed guest OS. To activate the guest OS, there are two steps to take as following:

1. Substitute the product key with the virtual key.
2. Contact Microsoft activation server through the internet or a telephone.

Replacing the Existing Product Key with the Virtual Key

During the guest OS installation process, the Dell OEM media installs a generic product key that is not valid for activating the guest OS. The generic product key need to be replaced with the virtual key printed on the COA, which is pasted on the system chassis.



The virtual key can be installed by using either the command line mode or the GUI mode.

Command Line Mode

1. Start the command prompt window with administrative privileges.
2. Run the command : `slmgr.vbs /ipk <Virtual Key>`

e.g., `slmgr.vbs /ipk XYZ12-PQRS1-ABCDE-12345-VWXTZ`

GUI Mode

The GUI mode to replace the product key refers to the Windows Activation window. The Windows Activation can be launched by taking these steps:

1. Open the System Properties Dialog window by right clicking Computer in a Windows Explorer and choosing Properties (System Properties Dialog window can be opened via Control Panel as well. The steps via Control Panel are slightly different between Windows Server 2008 and Windows Server 2008 R2)
2. Click Change Product Key in the Windows Activation section.

In the Windows Activation screen, enter the virtual key. Once the virtual key is entered, it automatically tries to activate Windows over the internet. This activation may not succeed if the guest operating system is not configured properly to contact the Microsoft activation server via the internet.

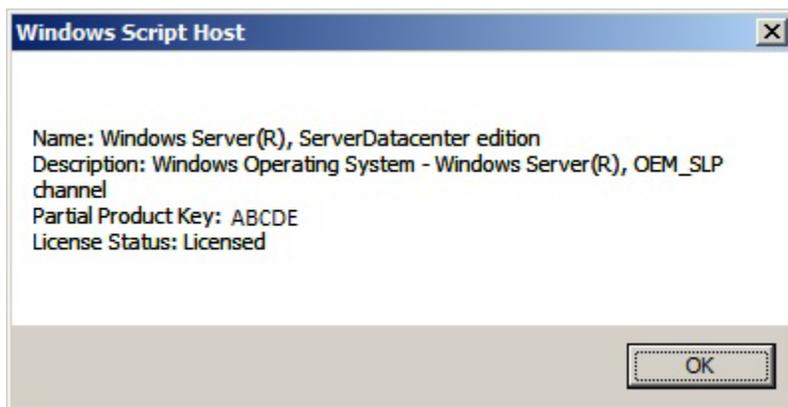
Confirming the Product Key Installation

Since the virtual key that is installed in the previous section is going to be used for activating the guest OS, it is a good practice to confirm that the correct key is installed.

Use the following command to display the Partial Product Key window:

1. Start the **Command Prompt** window with administrative privileges.
2. Run the command: `slmgr.vbs /dli`

The `slmgr.vbs /dli` command displays the Partial Product key in a window similar to the one shown in the figure below.



Ensure that the Partial Product key displayed in the window matches some part of the virtual key.

ACTIVATING THE GUEST OS

Activation via Internet

For online activation to be successful, the guest OS must be able to access the internet. When accessing the internet via a proxy server and the proxy server is configured for basic authentication, the user credentials need to be saved in the browser first. The user credentials will be used to access the internet during the activation process.

For more information on alternative procedures for online activation, see the Microsoft knowledge base article located on the Microsoft Support website at <http://support.microsoft.com/kb/921471>.

The activation process can be started at a Command line prompt or in a GUI mode.

Command line Mode

1. Start the **Command Prompt** window with Administrative privileges.
2. Run the command: `slmgr.vbs /ato`

GUI Mode

1. Open the **System Properties Dialog** window
2. Click on the **Activate Windows Now** link in the Windows Activation section if the product key has already been changed to the virtual key as described in previous section.

Activation via Telephone

The OS activation for the Windows Server 2008 and Windows Server 2008 R2 can be also conducted over the automated telephone system. The telephone activation process requires the installation ID. By

entering the installation ID over the phone, a confirmation ID will be provided. Use either the command line or the GUI to complete this process.

Command Line Mode

1. Start the **Command Prompt** window with administrative privileges.
2. Run the following command: to get the installation ID:
`slmgr.vbs /dti`
3. Call the phone number assigned to your region. Provide the installation ID.
4. Enter the confirmation ID by running this command:
`slmgr.vbs /atp <Confirmation ID>`

For Windows Server 2008, the `slmgr.vbs /dti` command displays the installation ID and provides the location for the `phone.inf` file. The `phone.inf` files contains the telephone number. Normally the `phone.inf` file is located at `%systemroot%\system32\slui\phone.inf`. (Note: For Windows Server 2008 R2, only installation ID is displayed. The `phone.inf` file can be found at this folder: `%systemroot%\system32\spui\phone.inf` by default)

GUI Mode

1. Open the **System Properties Dialog** window
2. Click on the **Activate Windows now** link in the Windows Activation section.
3. Click on **Show me other Ways to Activate** link.
4. Click on the Use **Automated Phone system**.

Or

1. Run this command with Administrative privileges: `SLUI 04`

Once the telephone activation wizard is displayed, continue with the following steps:

1. Select the country from which the call is being made so that an appropriate phone number can be shown in the product UI.
2. Dial the phone number displayed on the screen
3. Provide the installation ID
4. Enter the confirmation ID provided by the automated phone system.

Confirming the Activation

Once the activation process is complete, Windows changes the licensing status of the guest operating system installation. The license status can be confirmed via the command line or the GUI mode

Command Line Mode

1. Start the **Command Prompt** window with Administrative privileges.
2. Run the command: `slmgr.vbs /dli`

In the result window, the license status should be displayed as Licensed. The figure below shows the Windows Script Host window with the License Status displayed as **Licensed**.



GUI Mode

1. Open the System Properties Dialog window
2. Verify the Windows is activated message and the Genuine Microsoft Software logo are displayed in the Windows Activation section



CREATING AND DEPLOYING MASTER VIRTUAL IMAGES

The entire guest OS and its application is stored in a single file with in the format of Virtual Hard Disk (VHD). To be cost-efficient, a master image or a VHD template can be created to deploy the guest OS on multiple virtual machines. Microsoft recommends to use the System Preparation Utility (Sysprep), a built-in tool in Windows, to prepare the master image of the guest OS with the following exceptions.

1. Before running the **Sysprep /generalize** process, ensure the following steps are taken else each instance of the guest OS needs to be activated separately.
 - 1) Ensure that the guest operating system is **activated**
 - 2) Ensure to delete the **SETUPCOMPLETE.cmd** file located at the %SystemRoot%\Setup\SCRIPTS\ folder on Windows Server 2008 R2 only if it is installed with using the Windows Server 2008 R2 Dell OEM media. No need for Windows Server 2008.
2. Ensure to set the **skipream** value before or during the sysprep process so that the Activation Status or the License Information will not be removed during the sysprep generalize process.
3. Whether the out of box experience (OOBE) process is automated or not, ensure to use the **same virtual key** during the machine OOBE process or in the unattend.xml file. Using a different virtual key will require to re-activate the guest OS.
4. There is no need to use the imagex.exe file to capture the master installation as the guest operating system installation is in the virtual disk image format.

Note: Documenting the details about the sysprep technology is beyond the scope of this document. For more information, refer to the Microsoft website.

SkipReram

By default, the sysprep generalize process removes the licensing information and forces the guest operating system to be activated for every deployment. Once the guest operating system is successfully activated using the virtual key, implement the following change either directly in the registry or in the unattend.xml file before running the sysprep /generalize command. This change ensures that the sysprep generalize process does NOT reset activation-related licensing.

Modifying Registry before Running Sysprep /generalize

1. Click **Start**, click **Run**, type `regedit`, and then press <Enter>.
2. Locate and open the following registry key:
For Windows Server 2008 R2:
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\SoftwareProtectionPlatform
For Windows Server 2008:
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\SL
3. Right-click the registry entry named **SkipRearm** and click **Modify**. Then change the value into any positive integer, such as 00000001. Save the changes, and close the Registry Editor.

Using Unattend.xml file

Window System Image Manager (WSIM), a component of Windows Automated Installation Kit) from Microsoft, can be used to create the unattend.xml file for sysprep the guest OS image. Inside the unattend.xml file, reset the SkipRearm value to 1 by using the **Microsoft-Windows-Security-SPP** component in the **Generalize** pass for Windows Server 2008 R2.

Note: For a Windows Server 2008 image, use **Microsoft-Windows-Security-Licensing-SLC** component in the **Generalize** pass.

The virtual product key can be also included in the unattend.xml by using the **Microsoft-Windows-Shell-Setup** component for the **Specialize** pass.

The following is an example of unattend.xml for sysprep a Windows Server 2008 R2 image.

```
<?xml version="1.0" encoding="utf-8"?>
<unattend xmlns="urn:schemas-microsoft-com:unattend">
  <settings pass="generalize">
    <component name="Microsoft-Windows-Security-SPP" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIconfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
      <SkipRearm>1</SkipRearm>
    </component>
  </settings>
  <settings pass="specialize">
    <component name="Microsoft-Windows-Shell-Setup" processorArchitecture="amd64"
publicKeyToken="31bf3856ad364e35" language="neutral" versionScope="nonSxS"
xmlns:wcm="http://schemas.microsoft.com/WMIconfig/2002/State"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
      <ProductKey>XYZ12-PQRS1-ABCDE-12345-VWXYZ</ProductKey>
    </component>
  </settings>
</unattend>
```

Sysprep the Guest Operating System

Sysprep is a valuable tool from Microsoft that prepares a windows operating system for duplication (or cloning) and customization. It does not itself perform the actual duplication of the master image onto target machines, but helps to ensure that the security identifiers (SIDs) are unique for each new instance of operating system. Sysprep's OOBÉ pass can be used to customize duplicated images with computer-specific information such as user name, computer name, time zone, and domain membership.

- Ensure that there is no static IP assigned to network adapters. It is also a good practice not to have network work interface cards installed when creating master images of guest operating system and add the card during the deployment of virtual machine.
- Not all server roles support Sysprep. If running the sysprep /generalize command against an installation with specific server roles configured, those server roles may not continue to function after imaging and deployment.
- The Sysprep generalize process also initializes the BCD settings so make sure correct BCD setting are configured in guest operating system after deployment.

REFERENCES

- Windows Automated Deployment Kit (Windows AIK):
[http://technet.microsoft.com/en-us/library/cc748933\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc748933(WS.10).aspx)
- Unattended Windows Setup Reference:
[http://technet.microsoft.com/en-us/library/ff699026\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ff699026(WS.10).aspx)
- Sysprep Technical Reference:
[http://technet.microsoft.com/en-us/library/cc766049\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc766049(WS.10).aspx)
- Sysprep Support for Server Roles:
[http://technet.microsoft.com/en-us/library/cc722158\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/cc722158(WS.10).aspx)