

**Dell OpenManage Deployment Toolkit
Version 5.2
Installation Guide**



Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your computer.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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Introduction

The Dell OpenManage Deployment Toolkit (DTK) includes a set of utilities, sample scripts, and sample configuration files that you can use to deploy and configure the Dell systems. You can use DTK to build script-based and RPM-based installation for deploying large number of systems on a pre-operating system environment in a reliable way, without changing their current deployment processes. Using DTK you can install operating systems on Dell systems in BIOS or Unified Extensible Firmware Interface (UEFI) mode.

Documents you may need

For a complete list of supported operating systems, BIOS firmware, and hardware, see the *Dell Systems Software Support Matrix* available at dell.com/openmanagemanuals.

- *Dell OpenManage Deployment Toolkit Command Line Interface Reference Guide*
- *Dell OpenManage Deployment Toolkit User's Guide*
- Operating system documentation

Accessing documents from Dell support site

You can access the required documents in one of the following ways:

- Using the following links:
 - For all Enterprise Systems Management documents — Dell.com/SoftwareSecurityManuals
 - For OpenManage documents — Dell.com/OpenManageManuals
 - For Remote Enterprise Systems Management documents — Dell.com/esmmanuals
 - For OpenManage Connections Enterprise Systems Management documents — Dell.com/OMConnectionsEnterpriseSystemsManagement
 - For Serviceability Tools documents — Dell.com/ServiceabilityTools
 - For OpenManage Connections Client Systems Management documents — Dell.com/DellClientCommandSuiteManuals
- From the Dell Support site:
 - a. Go to Dell.com/Support/Home.
 - b. Under **Select a product** section, click **Software & Security**.
 - c. In the **Software & Security** group box, click the required link from the following:
 - **Enterprise Systems Management**
 - **Remote Enterprise Systems Management**
 - **Serviceability Tools**
 - **Dell Client Command Suite**
 - **Connections Client Systems Management**
 - d. To view a document, click the required product version.

- Using search engines:
 - Type the name and version of the document in the search box.

Prerequisites

Before using DTK to deploy Microsoft Windows Pre-installation Environment (PE) or Linux environment (Red Hat Enterprise Linux or SUSE Linux Enterprise Server), ensure you have the following prerequisites:

Table 1. Prerequisites for Installation

Windows PE Environment	Linux Environment
The DTK self-extracting zip file (DTKX.X-WINPE-XX.exe) available at dell.com/support .	The DTK ISO image available at dell.com/support .
A Windows workstation that has at least 512 MB of RAM.	A workstation that has at least 512 MB of RAM.


Deployment overview

DTK offers a complete set of utilities, sample scripts, and RPM packages that can be used to automate the deployment of Dell systems.

Before running the deployment, ensure that you create specific deployment media to facilitate the deployment method you choose. For more information, see the *Dell OpenManage Deployment Toolkit User's Guide* available at dell.com/openmanagemanuals.


Deployment prerequisites for Windows PE

Before beginning the deployment process for Windows PE, ensure that you have all of the following tools, software, and information ready to use or consult:

 **NOTE:** For Microsoft WinPE and OS deployment support limitations refer to <http://technet.microsoft.com/en-us/library/hh824993.aspx>

- Windows AIK for Windows 7 (32-bit) and Windows 2008 SP2 to build Windows PE 3.0 (32-bit) ISO image in BIOS mode.
- Windows AIK for Windows 7 (64-bit) and Windows 2008 SP2 to build Windows PE 3.0 (64-bit) ISO image.
- Windows AIK for Windows 7 (64-bit) and Windows 2008 R2 SP1 to build Windows PE 3.0 (64-bit) ISO image.
- Windows ADK for Windows Server 2012 to build Windows PE 4.0.
- Windows ADK for Windows Server 2012 R2 to build Windows PE 5.2
- Working knowledge of Microsoft Remote Installation Services (RIS) and Automated Deployment Services (ADS) (including setting up of RIS and ADS environments) or any other third party deployment system or tool for Windows PE.
- Working knowledge of Windows Deployment Services (WDS) or any other third party deployment system or tool for Windows PE.
- A workstation with the following capabilities:
 - Writable media drive


- Network access
- A target system with a media drive, if performing a local deployment.
- A target system with a media drive and network access, if performing a network deployment.
- All DTK utilities, sample scripts, and sample configuration files.
- *Dell Systems Management Tools and Documentation* DVD.
- Your operating system software and documentation.
- An optimally configured source system with network access.

 **NOTE:** You can also download the latest drivers from www.dell.com/support.


Preparing Windows PE environment for deployment

If you are using the Windows PE environment:

1. Copy or extract DTK utilities, sample scripts, sample configuration files, and drivers provided (in the zip file) to the Windows PE image.
2. Organize DTK utilities, script files, configuration files, the operating system installation files, and the required system files and drivers on a network share or local media.
3. Set up a *Source System* using the *Dell Systems Management Tools and Documentation* DVD (to install the operating system) and the **Systems Service and Diagnostics Tools** (to load drivers). The *Source System* acts as a master server that is used to replicate settings to the *Target Servers*.

 **NOTE:** You can also download the latest drivers from the Dell Support website at support.dell.com.

4. Generate a system BIOS, BMC, RAID, and/or RAC/iDRAC configuration profile from the *Source System*. Copy the generated configuration files to a read/write share on the workstation or server.

 **NOTE:** You can obtain the system BIOS, BMC, RAID, and/or RAC/iDRAC configuration files by booting from DTK Windows PE image and running the **SYSCAP.BAT**, **RAIDCAP.BAT**, and **RACCAP.BAT** scripts.
5. Create an operating system answer file that contains unattended operating system software installation information.
6. To set up the system BIOS, BMC, RAID, and RAC/iDRAC and then, install an operating system on a *Target Server*, edit DTK sample script files that access the system configuration files.


Installing Windows server Operating System using DTK

To install Windows Server operating system using DTK:

1. On the source system, create an operating system-specific folder. For example, **WinServer_deploy**.
2. Make **WinServer_deploy** folder shareable.
3. In the folder **WinServer_deploy**, create two folders **sources** and platform name (for example, **PER730**).

 **NOTE:** The platform name must be a DTK standard name. To know the platform name, run **TKENVSET.BAT** located in the **x:\Dell\Toolkit\Template\Scripts** directory, and then run the **SET** command. In the **Details** section, see the **DT_PLATFORM** name.


4. Copy the contents of the operating system media to the **sources** folder.
5. In the folder **PER730**, create a folder **Out-of-Box Drivers**.
6. Boot the target system with DTK Windows PE image.
7. Check the RAID controllers on the target system using the command `raidcfg -ctrl`.

8. Create a virtual disk using the command `raidcfg -ctrl -ac=cvd -c=<Controller_ID> -ad=<Array_Disks>`.
9. From **support.dell.com**, download the driver for the server.
10. Copy the extracted driver file to **Out-of-Box Drivers** folder on the source system.
11. On the target system, to map the shared folder **WinServer_deploy** on to the target system, run the following command: `net use z: \\<IP address of the source system>\WinServer_deploy /USER:<user name> Password:<password>`
12. Navigate to `\Toolkit\Template\Configs`.
13. From `\Toolkit\Template\Configs`, copy **Unattend.xml** to `z:\PER730`.
 -  **NOTE:** The `unattend.xml` file is for Windows Server 2008 (32-bit and 64-bit) in BIOS mode, `unattend_uefi.xml` is for Windows Server 2008 (64-bit) in uefi mode, `unattendw2k12.xml` is for Windows Server 2012 (64-bit) in bios mode, and `unattendw2k12_uefi.xml` is for Windows Server 2012 (64-bit) in uefi mode.
14. On the source system, navigate to **PER730**.
15. In **Unattend.xml**, check the value of **DiskId** in the tags **ImageInstall** and **DiskConfiguration**. The value should be zero. If the value is not zero, set it to zero.
16. On the target system, navigate to `\Toolkit\template\scripts` and run **TKENVSET.BAT** to set the DTK paths and options.
17. Set the environment variable **DT_DRIVE=Z:**.
18. Run the script (**W2K8INST.bat** or **W2K12INST.bat**) to install the required version of Windows Server operating system.
19. Select the required operating system. The operating system installation starts and goes on unattended.

After the operating system is installed, the **Set Up Windows** screen is displayed.

Converting to RACADM and installing Windows server Operating System using RACADM scripts



To convert from DTK to RACADM deployment and to install Windows Server operating system using RACADM scripts:

-  **NOTE:** Using RACADM scripts is an alternative method to install Windows server operating system. This feature is supported on Dell's 12th generation of PowerEdge Servers and later systems. For information see, *Dell OpenManage Deployment Toolkit User's Guide* or *Dell OpenManage Deployment Toolkit Command Line Interface Reference Guide* available at dell.com/openmanagemanuals.
1. Follow the steps 1 to 15 from the section **Installation of Windows server operating system using DTK**.
 2. On the target system, navigate to `\Toolkit\Tools\CONVERTER` and run `dtktoracadm.exe` or `dtktoracadm.exe windows_scripts.lst`, where `windows_scripts.lst` is the input file which contains the list of script files to be converted to equivalent RACADM scripts.
 3. The converted RACADM scripts are available in `\Toolkit\Tools\CONVERTER\racscripts`.
 4. Navigate to `\Toolkit\Tools\CONVERTER\racscripts`, run the converted **TKENVSET.BAT**, to set the DTK paths and options.
 5. Set the environment variable **DT_DRIVE=Z:**.
 6. Run the script (**W2K8INST.bat** or **W2K12INST.bat**), to install the required version of Windows Server operating system.
 7. Select the required operating system. The operating system installation starts and goes on unattended.

After the operating system is installed, the **Set Up Windows** screen is displayed.

Installing Windows client Operating System using DTK


To install Windows client operating system using DTK:


1. On the source system, create an operating system-specific folder. For example, **WinClient_deploy**.
2. Make **WinClient_deploy** folder shareable.
3. In the folder **WinClient_deploy**, create two folders **sources** and platform name (for example, PR7910).
 **NOTE:** The platform name must be a DTK standard name. To know the platform name, run `TKENVSET.BAT` located in the `x:\Dell\Toolkit\Template\Scripts` directory, and then run the `SET` command. In the **Details** section, see the **DT_PLATFORM** name.
4. Copy the contents of the operating system media to the **sources** folder.
5. In the folder **PR7910**, create a folder **Out-of-Box Drivers**.
6. Boot the target system with DTK Windows PE image.
7. Check the RAID controllers on the target system using the command `raidcfg -ctrl`.
8. Create a virtual disk using the command `raidcfg -ctrl -ac=cvd -c=<Controller_ID> -ad=<Array_Disks>`
9. From support.dell.com, download the driver for the server.
10. Copy the extracted driver file to **Out-of-Box Drivers** folder on the source system.
11. On the target system, to connect the target system to the shared folder **WinClient_deploy**, run the following command: `net use z: \\<IP address of the source system>\WinClient_deploy /USER:<user name> Password:<password>`
12. Navigate to `\Toolkit\Template\Configs`.
13. From `\Toolkit\Template\Configs`, copy **Unattend.xml** to `z:\PR7910`.
 **NOTE:** The `unattendClient.xml` file is for Windows client operating system (32-bit and 64-bit) in BIOS mode and `unattendClient_uefi.xml` is for Windows client operating system (64-bit) in uefi mode.
14. On the source system, navigate to **PR7910**.
15. In `unattendClient.xml`, check the value of **DiskId** in the tags **ImageInstall** and **DiskConfiguration**. The value should be zero. If the value is not zero, set it to zero.
16. On the target system, navigate to `\Toolkit\template\scripts` and run **TKENVSET.BAT** to set the DTK paths and options.
17. Set the environment variable **DT_DRIVE=Z:**.
18. Run the **WINCLIENTINST.bat** script to install the required version of Windows client operating system.
19. Select the required operating system. The operating system installation starts and goes on unattended.
After the operating system is installed, the **Set Up Windows** screen is displayed.

Deployment prerequisites for embedded Linux

For Linux, ensure that you have all of the following tools, software, and information ready to use or consult:



- Advanced knowledge of Linux and Linux scripting (bash), Linux networking, installing and working with RPM Package Managers (RPMs), and creating and modifying loop file systems.

- Any third party deployment system or tool, such as Yum.
- A workstation with the following capabilities:
 - A writable media drive
 - Network access
- A target system with a media drive, if performing a local deployment.
- A target system with a media drive and network access, if performing a network deployment.
- All DTK utilities, sample scripts, sample configuration files, and RPM packages.
- All operating system RPM packages that DTK RPMs require.
 -  **NOTE:** Tools such as Yellowdog Updater Modified (YUM), Yet Another Setup Tool (YAST), and Advanced Packaging Tool (APT) can be used to manage RPM dependency issues.
- All other utilities and files necessary to perform the deployment, including all required Linux drivers, operating system drivers, and the Dell utility partition file.
- *Dell Systems Management Tools and Documentation DVD*.
- Your operating system software and documentation.
- An optimally configured source system with network access.

 **NOTE:** You can download the latest drivers from support.dell.com.


Preparing embedded Linux environment for deployment

If you are using the embedded Linux environment:


1. Obtain the DTK Linux ISO image, which is a self-contained bootable ISO image.
2. Use and customize the sample scripts as per your requirements.
3. Set up a *Source System* by using the the *Dell Systems Management Tools and Documentation DVD* (to install your operating system) and the **Systems Service and Diagnostics Tools** (to load drivers).
 -  **NOTE:** You can also download the latest drivers from the Dell Support website at support.dell.com.
4. Generate a system BIOS, BMC, RAID, and/or RAC/iDRAC configuration profile from the optimally configured source system. Copy the generated configuration files to a read/write share onto the workstation or server.
 -  **NOTE:** You can obtain the system BIOS, BMC, RAID, and/or RAC/iDRAC configuration files by booting from DTK Linux ISO image and running the **syscap.sh**, **raidcap.sh**, and **raccap.sh** scripts.
5. Create an operating system answer file that contains unattended operating system software installation information.
6. Install an operating system on a *Target Server*.


Installing Red Hat Enterprise Linux Server Operating System using DTK

 **CAUTION:** Do not change the bootmode before executing installation scripts using **syscfg**. If you do, reboot the system and start executing installation scripts.

 **NOTE:** See your operating system documentation for instructions on modifying the options in the `ks.cfg/ks-rhelx.cfg/ks_rhelx_uefi.cfg` file to customize the scripted installation of your operating system, where *x* indicates the version of the operating system.


To install Red Hat Enterprise Linux using the `lininst.sh/ lininst7.sh` script:


1. On the source system, navigate to the location of the required Red Hat Enterprise Linux operating system image.
2. Create a NFS share using the following command: `vi /etc/exports`.
3. Share `/home/rhelshare`.
 **NOTE:** If the folder you want to share is `/home`, then the `/etc/exports` file must contain the `"/home *(rw)"` line.
4. Restart the NFS service.
5. Copy the operating system image to the NFS share.
6. Copy `initrd.img` for Red Hat Enterprise Linux to NFS share.
7. Copy `vmlinuz` from Red Hat Enterprise Linux operating system image to NFS share.
8. Boot DTK on the target machine.
9. Create the virtual disk using the `raidcfg` command.
10. Create a directory under `/tmp`. For example, `os_src`.
11. Mount the NFS Share to `/tmp/os_src`.
12. Copy `ks.cfg/ks-rhelx.cfg` (in BIOS mode) or `ks_uefi.cfg/ks_rhelx_uefi.cfg` (in UEFI mode) from `/opt/dell/toolkit/template/configs` to NFS share on the source machine. Here, `x` indicates the version of the operating system. In BIOS mode, rename the `ks_rhelx.cfg` to `ks.cfg`. In UEFI mode, rename the `ks_rhelx_uefi.cfg` to `ks.cfg`.
13. Edit `ks.cfg` (in BIOS mode) or `ks_rhelx_uefi.cfg` (in UEFI mode) on the source system, where `x` indicates the version of the operating system. Set the NFS IP address (where Red Hat Enterprise Linux images are available) and the NFS share path.
14. Export the environment variables as follows:
 - a. Run `export DT_OS_DISK=/dev/sda`, the disk device on which the Dell utility partition was created.
 - b. Run `export DT_OS_SRC=/tmp/os_src`, where `vmlinuz`, `initrd.img`, and `kickstart file` are available.
 - c. Run `export DT_HD=/dev/sda`.
 - d. For Red Hat Enterprise Linux 7, run `export DT_OS_NFS_LOC=<IP address of NFS>:/<path to os source>`. Red Hat Enterprise Linux 7 deployment is supported only on Dell Precision R7910 and on Dell PowerEdge 13G servers.
15. Run the `partcfg.sh` (at `/opt/dell/toolkit/template/scripts/`) script to create the Dell utility partition, OS partition in BIOS or UEFI mode.
Ensure that the correct device is set to `DT_HD` and `DT_OS_DISK`.
16. From `/opt/dell/toolkit/template/scripts`, run `/lininst.sh` (for 5.x and 6.x) or `/lininst7.sh` (for 7.x) script. The server reboots to the `grub` prompt. The Red Hat Enterprise Linux operating system unattended installation proceeds.

 **NOTE:** For more information on installing, see en.community.dell.com/techcenter/systems-management/w/wiki/1772.dell-openmanage-deployment-toolkit.aspx.

Converting to RACADM and installing Red Hat Enterprise Linux Server Operating System using RACADM scripts

 **CAUTION:** Do not change the bootmode before running installation scripts using `syscfg`. If you do, reboot the system and start running installation scripts.

 **NOTE:** See your operating system documentation for instructions on modifying the options in the `ks.cfg/ks-rhelx.cfg/ks_rhelx_uefi.cfg` file to customize the scripted installation of your operating system, where *x* indicates the version of the operating system.


 **NOTE:** Using RACADM scripts is an alternative method to install Red Hat Enterprise Linux server operating system. This feature is supported on Dell's 12th generation of PowerEdge Servers and later systems. For information see, *Dell OpenManage Deployment Toolkit User's Guide* or *Dell OpenManage Deployment Toolkit Command Line Interface Reference Guide* available at dell.com/openmanagemanuals.

To convert from DTK to RACADM deployment and to install Red Hat Enterprise Linux using the `lininst.sh` / `lininst7.sh` script:

1. On the source system, navigate to the location of the required Red Hat Enterprise Linux operating system image.
2. Perform the steps 2 to 14 from the section **Installing Red Hat Enterprise Linux Server Operating System using DTK**.
3. From `/opt/dell/toolkit/converter`, run the command `python dtktoracadm.py` or `python dtktoracadm.py linux_scripts.lst`, where `linux_scripts.lst` is the input file which contains the list of script files to be converted to equivalent RACADM scripts.
The RACADM converted scripts are available in `/opt/dell/toolkit/converter/racsconfigs`.
4. From `/opt/dell/toolkit/converter/racsconfigs/`, run the `partcfg.sh` script to create the Dell utility partition, OS partition in BIOS or UEFI mode.
Ensure that the correct device is set to `DT_HD` and `DT_OS_DISK`.
5. Run `/lininst.sh` (for 5.x and 6.x) or `/lininst7.sh` (for 7.x) script.
The server reboots to the `grub` prompt. The Red Hat Enterprise Linux operating system unattended installation proceeds.

Installing SUSE Linux server Operating System using DTK

 **CAUTION:** It is recommended that you consult your SUSE Linux Enterprise Server operating system documentation and unattended deployment documentation to develop a thorough understanding of the unattended installation process before attempting to perform a full scripted deployment.

 **NOTE:** While installing Linux, ensure that you install grub in the boot partition. Otherwise, you cannot boot to the utility partition by pressing the <F10> key during reboot.


To install SUSE Linux Enterprise Server using the `suseinst.sh` script:

1. On the source system, navigate to the location of the required SUSE Linux Enterprise Linux operating system image.
2. Create two NFS shares at `/etc/exports`, `/osimage` and `/dtkosinstall`.
3. Restart the NFS service.
4. Copy the operating system image to `/osimage` share.
5. Copy `initrd.img` and `linux` to `/dtkosinstall` share.
6. Boot DTK on the target machine.
7. Create the virtual disk using the `raidcfg` command.
8. Create a directory under `/tmp`. For example, `os_src`.
9. Mount the NFS share (`/dtkosinstall`) to `/tmp/os_src`.
10. Copy `Sles-autoinst.xml` (in BIOS mode) or `Sles-autoinst_uefi.xml` (in UEFI mode) from `/opt/dell/toolkit/template/configs` to NFS share (`/dtkosinstall`) on the source machine. In BIOS mode, rename

the `Sles-autoinst.xml` to `autoinst.xml`. In UEFI mode, rename the `Sles-autoinst_uefi.xml` to `autoinst.xml_uefi`.

11. Export the environment variables as follows:
 - a. Run `export DT_OS_DISK=/dev/sda`, the disk device on which the Dell utility partition was created.
 - b. Run `export DT_OS_SRC=/tmp/os_src`, where `linux`, `initrd.img`, and `autoinst.xml/autoinst.xml_uefi` are available.
 - c. Run `export DT_OS_PART=/dev/sda`.
 - d. Run `export DT_OS_IMG_PATH=nfs://<IP Address>/osimage`.
 - e. Run `export DT_SUSE_AUTOINST= nfs://<IP Address>/dtkosinstall/autoinst.xml`.
 - f. Run `export DT_HD=/dev/sda`.


12. Run `partcfg.sh` at `(/opt/dell/toolkit/template/scripts/)` to create the Dell utility partition and OS partition in BIOS or UEFI mode.


 **NOTE:** Ensure that the correct device is set to `DT_HD`, `DT_OS_DISK`, and `DT_OS_PART`.


13. From `/opt/dell/toolkit/template/scripts`, run `/suseinst.sh` script.

The server reboots to the `grub` prompt. The SUSE Linux Enterprise Linux operating system unattended installation proceeds.

Converting to RACADM and installing SUSE Linux server Operating System using RACADM scripts


 **CAUTION:** It is recommended that you consult your SUSE Linux Enterprise Server operating system documentation and unattended deployment documentation to develop a thorough understanding of the unattended installation process before attempting to perform a full scripted deployment.

 **NOTE:** While installing Linux, ensure that you install `grub` in the boot partition. Otherwise, you cannot boot to the utility partition by pressing the `<F10>` key during reboot.

 **NOTE:** Using RACADM scripts is an alternative method to install SUSE Linux server operating system. This feature is supported on Dell's 12th generation of PowerEdge Servers and later systems. For information see, *Dell OpenManage Deployment Toolkit User's Guide* or *Dell OpenManage Deployment Toolkit Command Line Interface Reference Guide* available at dell.com/openmanagemanuals.

To convert from DTK to RACADM deployment and to install SUSE Linux Enterprise Server using the `suseinst.sh` script:

1. On the source system, navigate to the location of the required SUSE Linux Enterprise Linux operating system image.
2. Perform the steps 2 to 11 from the section **Installing SUSE Linux server Operating System using DTK**.
3. From `/opt/dell/toolkit/converter`, run the command `python dtktoracadm.py` or `python dtktoracadm.py linux_scripts.lst`, where `linux_scripts.lst` is the input file which contains the list of script files to be converted to equivalent RACADM scripts.
The RACADM converted scripts are available in `/opt/dell/toolkit/converter/racscripts`.
4. From `/opt/dell/toolkit/converter/racscripts/`, run the `partcfg.sh` script to create the Dell utility partition and OS partition in BIOS or UEFI mode.

 **NOTE:** Ensure that the correct device is set to `DT_HD`, `DT_OS_DISK`, and `DT_OS_PART`.

5. Run `/suseinst.sh` script, from `/opt/dell/toolkit/converter/racscripts`.

The server reboots to the **grub** prompt. The SUSE Linux Enterprise Linux operating system unattended installation proceeds.

Upgrading your DTK version

When upgrading from a previous release of DTK, ensure that you create the environment for new DTK version separately from the previous version. This step is necessary because the environments and requirements for the new DTK versions are completely different.