Notes, cautions, and warnings

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

**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.
1 Introduction

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System Center Configuration Manager (SCCM) is a system management software by Microsoft for managing large groups of Windows-based computer systems. Dell Wyse supports SCCM 2012 R2 and SCCM 2016 to manage thin clients running the following operating systems:

- Windows 10 IoT Enterprise
- Windows Embedded 8 Standard
- Windows Embedded Standard 7 Enterprise
- Windows Embedded Standard 7 Professional

Topics:

- About this guide
- SCCM system requirements
- SCCM 2016 features
- SCCM 2016 pre-requisites

About this guide

This guide is intended for administrators and system engineers who work on SCCM.

This guide contains the following information:

- Features supported on the Dell Wyse Enhanced Windows Embedded builds
- Managing software on Dell Wyse thin clients
- Imaging and deploying operating systems on Dell Wyse thin clients

For more information about SCCM and Windows embedded operating system see:

- System Center Developer Documentation Library at [https://msdn.microsoft.com](https://msdn.microsoft.com)

SCCM system requirements

The minimum system requirements for SCCM are:

- Additional storage space for the installation of Microsoft quick fix engineering (QFEs) on the client
- SCCM 2016 infrastructure to support Operating Systems Deployment (OSD)

SCCM 2016 features

The main features of SCCM 2016 are:

- Asset discovery
- Asset inventory
- Image capture
- Image deployment
- Software package advertisement with write-filter management
- Task sequence advertisement

SCCM 2016 pre-requisites

Before working on SCCM 2016, you must configure the following:

- Active Directory (AD)—You must create an AD to add a set of thin clients
- Dynamic Host Configuration Protocol (DHCP)—You need to configure DHCP that hosts the IP that you have created
- Domain Name System (DNS)—DNS helps in creating a unique IP which is the domain IP
- Windows Deployment Services (WDS)—If enabled, WDS helps to deploy any Windows-related updates
- Windows Server Update Services (WSUS)—WSUS is also used to enable the Windows-related updates
- Windows Assessment and Deployment Kit (Windows ADK 10)—This is a development kit and you must install this kit on the SCCM server
- System Center Configuration Manager 2016—This is the console to access SCCM
- SQL Server 2016—The SQL server helps to connect the SCCM 2016 console to the database

For more configuration settings, see Introduction to Application Management in Configuration Manager http://technet.microsoft.com

NOTE: For reference, SCCM 2016 and Windows 10 IoT Enterprise screen shots are used in this guide. However this guide can also be used for SCCM 2012 R2.
Creating driver packages for imaging

Perform the following steps to create a driver package for imaging the thin client:

1. Click Start > All Programs > Microsoft System Center > Configuration Manager Console. The System Center Configuration Manager window is displayed.
2. Click Software Library.
3. Expand Overview > Operating Systems > Drivers, and right-click Import Driver.

The Import New Driver Wizard window is displayed.

4. On the Locate Driver page, do one of the following:
   - If you want to import all the drivers from a network path, click Import all drivers in the following path (UNC), browse to the folder, and then click Select Folder.
   - If you want to import a specific driver from a network path, click the Import a specific driver by specifying the network path (UNC) to its .inf or txtsetup.oem file radio button, browse to the specific driver, and click Open.
**Figure 2. Locate driver**

**NOTE:** The driver must be available in the local share path of SCCM.

5. Select the option for duplicate drivers from the **Specify the option for duplicate drivers** drop-down list.
6. Click **Next**.
7. On the **Driver Details** page, select the drivers you want to import.
If you want to install the selected drivers on your system, select Enable these drivers and allow computers to install them check box.

Click Next.

On the Add Driver to Packages page, select New Package.

The Create Driver Package window is displayed.

In the Create Driver Package window, enter the package name, and browse to the network UNC path where you want the Configuration Manager to store the drivers added to the package. Click Ok.
12. Select the packages to which you want to add the driver and click **Next**.

13. On the **Add Driver to Boot Images** page retain the default options and click **Next**.

14. On the **Summary** page, verify the details, and click **Next**.
15. After the configuration is complete, click **Close**.
16. Click **Software Library**.
17. Expand **Overview > Operating System > Driver Packages**.
18. Right-click the imported driver package, and select **Distribute Content**. The **Distribute Content wizard** window is displayed.

![Image of Software Library and Driver Packages]

**Figure 6. Distribute content**

19. On the **General** page, click **Next**.

![Image of Distribute Content Wizard]

**Figure 7. Review selected content**

20. On the **Content Destination** page, click **Add**, and then select **Distribution Point** from the drop-down list.
The **Add Distribution Points** window is displayed.

21. Select the available distribution points, and click **Ok**. On the **Content Destination** page, click **Next**.
NOTE: SCCM 2016 uses distribution points to store files needed for packages to run on client computers. These distribution points function as distribution centers for the files used by the package and enable you to download and run files, programs, and scripts when a package is advertised.

22. On the Summary page, verify the details, and click Next.
23. After the configuration is complete, click Close.
24. Refresh the Driver Packages screen, and ensure that the Success message is displayed on the Content Status page.

![Content Status](image)

Figure 10. Content status

25. Click Software Library.
27. Right-click the appropriate boot image, and select Properties.

![Properties](image)

Figure 11. Properties

28. In the Properties window, select Drivers, and add the relevant client driver.
29. Click Apply, and then click Yes.
30. Right-click the appropriate boot image, and select Update Distribution Points.
31. In the Update Distribution Points page, click Next and then click Close.
32. Refresh the Boot Images window, and ensure that the Success message is displayed on the Content Status page.

Preparing the operating system image for capturing

This section describes how to prepare an operating system image to capture, import, and deploy to the supported Wyse thin clients running Windows 10 IoT Enterprise operating system in a Configuration Manager environment. The reference image must be captured as a Windows Imaging (WIM) format file.
NOTE: To prepare a reference WIE10 image, Dell recommends that you start with a newly imaged thin client. Customize the build as required, and prepare the build for the Configuration Manager image capture.

1. Click Start > Log off, and hold the Shift key until the login window is displayed.
2. Log in as an administrator.

NOTE:
- For WIE10 image, the default user name is Admin, and the default password is DellCCCvdi.
- For WES7P/WES7E image, the default user name is Administrator, and the default password is DellCCCvdi.

3. Double-click the green icon on the desktop to disable the write filter.
   The system restarts after the write filter is disabled.
4. Customize the drivers, application, wallpapers and so on.
5. Navigate to the C:\windows\setup folder, and run the Build_Master.cmd file.

NOTE:
- For legacy scripts, run the WIE10_ConfigMgr_Capture.ps1 file as an administrator.
- For Powershell ported scripts, run Build_Master.cmd.

7. To run the complete script, restart the thin client.
8. To open the Services window, press Windows+R, and type services.msc in the Open field.
10. Ensure that the SMS Agent Host service is running. If the service is not active, right-click the service, and click Start.
   The image in the thin client is ready for capturing.

NOTE: If you restart the thin client during capturing, all the Configuration Manager related customizations are reverted.

Creating capture media task sequence

Capture media in the Configuration Manager allows you to capture an operating system image from a reference computer. To create a capture media task sequence, do the following:

1. Click Start > All Programs > Microsoft System Center > Configuration Manager Console

![Software library](image)

The System Center Configuration Manager window is displayed.

2. Click Software Library
4. Select Create Task Sequence Media.
   The Create Task Sequence Media Wizard window is displayed.
5. Select the Capture Media radio button, and click Next.
6. On the Media Type page, select the media type which you want to use for capturing media.
   - To use a removable USB drive for the image deployment, select the **Removable USB drive** radio button, and from the drop-down list, select the drive.
   - To use a CD/DVD set for the image deployment, select the **CD/DVD set** radio button, and browse to the media file.
7. Click **Next**.

8. On the **Boot Image** page, browse to the appropriate boot image and distribution point.

![Image Choice for Boot Image]

**NOTE:** If necessary, you must include Ethernet/ SFP driver in the boot image. You can also contact the Dell Wyse support team for the respective driver.

9. Click **Next**.

10. On the **Summary** page, verify the details, and click **Next**.
    The captured media or ISO is created.

11. After the installation is complete, click **Close**.

12. Extract and copy the ISO to a removable USB drive.

### Capturing Windows image from reference system

To capture the Windows image from a reference system, do the following:

1. Plug in the prepared USB flash drive or CD/DVD to the reference thin client.
2. Open the USB pen drive or CD/DVD drive, and go to `D:\SMS\Bin\i386`.
3. Run the `D:\SMS\Bin\i386\TSMBAutoRun.exe` file.
   The **Image Capture Wizard** is displayed.
4. On the **Welcome to the Image Capture Wizard** page, click **Next**.
5. On the **Image Destination** page, browse to any of the following:
   - A shared location on the remote network—recommended
   - A local USB drive path along with the `.wim` file name extension

6. Click **Next**.

7. On the **Image Information** page, click **Next**.

8. On the **Summary** page, click **Finish**.

   The installer takes 5–10 minutes to start the capture process. During the capture process, the machine completes the Sysprep and boots into the Windows Preinstallation Environment. In the Windows Preinstallation Environment session, the image is captured. After the image capture, the `.wim` file is generated and stored to the location specified in the **Capture Wizard** page.

**NOTE:**
After the image is captured, the reference thin client will not be in the same state as it was before the capture. To bring the reference thin client back to its original state, see msdn.microsoft.com/library/.

For a media creation standalone deployment, go to C:\Program Files (x86)\Microsoft Configuration Manager\AdminConsole\bin\i386, and open the command prompt. Run the command. For example:

```
CreateMedia.exe /K:full /p:"SCCM2016.cloud.com" /D:"SCCM2016.cloud.com" /S:"IND" /L:"FullMediaLabel" /A:"IND0004A" /K:"False" /T:"CD" /M:"44482" /F:"C:\deployment.iso" /X:"OSDComputerName=" /X:"OSType=Enterprise"
```
Deploying operating system image by using Operating Systems Deployment (OSD)

Configuration Manager provides two default boot images. Capture an image of the operating system that you want to deploy by using a task sequence. Distribute the boot image, operating system image, and any related content to a distribution point.

**Topics:**
- Associating target thin clients with Configuration Manager server
- Importing a captured Windows reference image into Configuration Manager
- Creating task sequence to deploy Windows reference image
- Deploying Windows reference image

**Associating target thin clients with Configuration Manager server**

To associate a target thin client with the Configuration Manager server, do the following:

1. Add the thin client to the domain.

2. Go to Control Panel > Configuration Manager > Site > Configuration Settings.

3. In the Configuration Manager service location section, enter the site code.

The thin client is added to the Configuration Manager server.

5. On the Configuration Manager server side, go to **Asset and Compliance > Device Collections**.

6. Right-click **Device Collection** and select **Create Device Collection**.
7. In the **General** page, enter the name of the collection, and from the **Limiting collection** drop-down list, select **All Systems**.

8. Click **Next**.

**NOTE:** Add a rule when multiple clients are available. For more information about rules, see how to create collections in configuration manager in [https://technet.microsoft.com](https://technet.microsoft.com).
9. On the Summary page, click Next. The selected settings are applied.

10. Click Close.
11. In the Devices list, right-click a device, and click Add Selected Items > Add Selected Items to Existing Device collection.

12. In the Device Collections window, select the device to add to the collection, and click OK.
In the **Asset and Compliance** section, click **Device Collections** and verify whether the device is added. The **Member count** is displayed as 1.

## Importing a captured Windows reference image into Configuration Manager

To import a captured Windows reference image into Configuration Manager, do the following:

1. Expand **Software Library > Overview > Operating Systems**.
2. Right-click **Operating System Images**, and click **Add Operating System Image**.
3. Enter the network path (UNC), and click **Next**.

![Figure 26. Add operating system image](image)
Figure 27. Data source

4. Enter the necessary information, and click Next.
5. Verify the information that you have provided and click Next. The settings are applied.
6. Click Close.
7. Expand Software Library > Overview > Operating Systems, and select an operating system image.
8. Right-click Distribute Content, and click Next.
9. In the Content Destination section, add a Distribution Point.
10. Select your destination point, and click Next.
11. When the wizard installation is complete, click Close.
12. Refresh the Operating System screen. Ensure that the content status displays Success before proceeding to the next task.

Creating task sequence to deploy Windows reference image

To create a task sequence, do the following:

2. Right-click Task Sequence, and click Create Task Sequence.
3. In the New Task Sequence wizard, select Install an existing image package, and click Next.
4. Enter the Task sequence name, select the appropriate boot image, and then click Next.

5. Enter the package name and image index and click Next. The Index number may vary depending on the configuration of your thin client.
6. On the Configure the network page, specify your preferred configuration, and click Next.
7. On the Install the Configuration Manager Client page, click Browse, and select Configuration Manager Client Package and then click Next.
Figure 32. Install configuration manager

8. Clear the following check boxes and click **Next**:
   - Capture user settings and files
   - Capture network settings
   - Capture Microsoft Windows settings
9. On the Include Software Updates page, select Do not install any software updates check box, and click Next.
10. On the Install applications page click Next.
11. On the Summary page, verify the information that you have provided, and click Next.
The selected settings are applied.

12. Click **Close**.

13. Right-click the deployment task sequence, and click **Edit**.

In the **Task Sequence Editor** window, click **Capture Files and Settings**.
15. In the **Options** tab, select the **Disable this Step** check box and click **Apply**.

16. Click **Install Operating System**, and do the following:

17. Click the **Properties** tab, and add the following command line for mapping the network drive:

```
net use \IPAddress\share\PrepareOS_WIE10 password /user: domainname\Username
```

**NOTE:** Copy the `PrepareOSPartition.wss` file available in the C:\windows\setup folder to the Configuration Manager server's shared folder. The operating system partition file is used to format the operating system partition before deployment. For PowerShell ported images, the path is C:\windows\setup\tools.

18. Click **Install Operating System**, and click **Add**.

19. In the **Properties** tab, enter **Mapping_DEW** in the **Name** field.

![Task Sequence 5 Task Sequence Editor](image)

**Figure 37. Mapping DEW**

20. Enter the command line to map the network drive of the SCCM Server share where the DEW files are copied.

21. Create cmd scripts `execute-DEW-script.cmd` and `Task-sequence-dew-script.ps1`, and copy to the DEW folder in share path. For more information, see [Pre-requisites to capture and deploy an operating system](#).

22. Click **Apply** and then click **OK**.

23. Click **Install Operating System**, and click **Add**.

24. In the **Properties** tab, enter **DEW_Directory** in the **Name** field.
25. Enter `cmd.exe /c md C:\DEW\Temp` in the Command line field.
26. Click Apply and then click OK.
27. Click Install Operating System, and click Add.
28. In the Properties tab, enter `CopyFiles_DEW` in the Name field.
29. Enter `xcopy L:\ C:\DEW_Temp /c /d /e /h /i /k /q /r /s /x /y` in the Command line field.

30. Click **Apply** and then click **OK**.

31. Click **Install Operating System**, and click **Add**.

32. In the **Properties** tab, enter `Invoke_DEW_Script` in the **Name** field.
33. Enter `cmd.exe /c "C:\DEW_Temp\execute-DEW-script.cmd"` in the **Command line** field.
34. Type `C:\DEW_Temp` in the **Start** field.
35. Click **Apply** and then click **OK**.
36. Click **Install Operating System**, and click **Add**.
37. In the **Properties** tab, enter **Restart in Windows PE** in the **Name** field.
Click **Apply** and then click **OK**.

39. Click **Install Operating System**, and click **Add**.

40. In the **Properties** tab, enter **Mapping** in the **Name** field.
41. Enter the command line to map the network drive of the SCCM Server share where the DEW files are copied.
42. Click **Apply** and then click **OK**.
43. Click **Install Operating System**, and click **Add**.
44. In the **Properties** tab, enter **Format** in the **Name** field.
Figure 43. Format

45. Enter `Diskpart.exe /s PrepareOSPartition.wss` in the Command line field.

46. Enter `K:\` in the Start in field.

47. Click Apply and then click OK.

48. Click Install Operating System, and click Add.

49. Click the Properties tab, and do the following:
   a) Click the Apply an operating system from a captured image radio button.
b) Browse to the location where you have placed the image package.

c) From the Image index drop-down list, select a value of the image. Ensure that the value is the highest of 1-1, 2-2, 3-3.

**NOTE:** If only a single image exists, then by default the value is displayed as 1-1.

d) Select the Use an Unattended or Sysprep answer file for a custom installation check box.

e) Browse to the location where you have placed the unattended installation software package created in step b.

f) In the File name field, enter the file name of the unattended installation software package.

g) From the Destination folder drop-down menu, select Specific disk and partition for destination.

h) From the Disk drop-down menu, select 0.

i) From the Partition drop-down menu, select 5.

j) Click Apply and then click OK.

50. Click Install Operating System, and click Add.

51. In the Properties tab, enter Apply Network Settings in the Name field.
52. Select the **Join a workgroup** radio button and specify the workgroup name.

53. Click **Apply** and then click **OK**.

54. Click **Setup Operating System**, and click **Add**.

55. In the **Properties** tab, enter Setup Windows and Configuration Manager in the **Name** field.
56. In the Client Package field, browse and select Configuration Manager Client Package.

57. Click Apply and then click OK.

**Deploying Windows reference image**

To deploy the Windows reference image, do the following:

1. Right-click the created task sequence, and click Deploy.
2. Specify the collection to which you want to deploy the task sequence, and click Next.
3. On the Specify settings to control how this software is deployed page, select Required from the Purpose drop-down list.

4. To make this task sequence available for software deployment, select Configuration Manager Clients, media and PXE from the drop-down list and click Next.
Figure 48. Deployment settings

5. On the Specify the schedule for this deployment page, click New.
The Assignment Schedule window is displayed.

6. On the Assignment Schedule window, do one of the following:
   - Select the specific time to start the deployment.
   - Select the As soon as possible option to deploy the software after you complete the configuration.

7. In Assignment Schedule click OK.
8. On the User Experience page, retain the default options and click Next.
9. On the Alert page, retain the default options and click Next.
10. On the Distribution Points page, select the Download content locally when needed by running task sequence deployment option, and then select the When no local distribution point is available, use a remote distribution point option and then click Next.

11. On the Summary page, verify the details, and click Next, and then click Close.

After the task sequence is complete, the thin client restarts in the Windows pre-installation environment.

**NOTE:** Time for the advertisement to appear at the client side depends on the thin client and the user policy refresh interval time. It also depends on the server and network parameters such as server capacity to handle the clients and network traffic. If you do not receive an advertisement, go to Control Panel > Configuration Manager > Actions > Machine Policy Retrieval & Evaluation Cycle, and click Run Now.
12. Deploy the Windows 10 IoT Enterprise reference image. After successful deployment, the thin client automatically logs in using the local user account, and the Dell Wyse scripts run on the destination thin client. The scripts enable the Unified Write Filter, and restarts the thin client.
Pre-requisites to deploy software applications

The following are the pre-requisites to deploy the third party software applications:

- The device should be discovered in the Configuration Manager server.
- Disable the write filter.
- Obtain the latest application, and copy it to the local drive on the Configmgr site server's shared location C:\ConfigMgr\packages\apps\.
- The device should be a member of a collection that has a configured maintenance window. This configured maintenance window allows you to manage the device when the write filter is disabled and enabled, and when the device restarts.
- For more information about the application deployment with System Center 2016 Configuration Manager, see Deploy applications with System Center Configuration Manager at https://docs.microsoft.com/.

**NOTE:**

- When you deploy applications to the devices running Windows 10, that are write-filter-enabled, you can specify whether to disable the write filter on the device during the deployment. After you disable the write filter, restart the device. If the write filter is not disabled, the software is deployed to a temporary overlay, and the software is not installed when you restart the device.
- In the Deploy Software Wizard, the user experience setting that controls the write filter behavior is a check box named Commit changes at deadline or during a maintenance window.

For more information on managing Windows Embedded devices that are write-filer enabled, see blogs.technet.microsoft.com and Planning for client deployment to Windows Embedded devices in System Center Configuration Manager at https://docs.microsoft.com.
Prerequisites to capture and deploy an operating system

- When capturing an operating system image by using capture media task sequence, ensure that the FODPacks folder is not present in the C drive. If there is any FODPacks folder, delete the folder.
- When you deploy an operating system image to the client by using a task sequence, the size of the wim file that is captured using the capture media and the size of the used space of drive C in the reference device put together must be less than the capacity of drive C.

For example, if the size of the wim file that is captured from reference device is 8 GB, the size of the used space in the drive C is 17 GB, then you can deploy the wim file only if the capacity of operating system drive is greater than 25 GB.

1. Create a text file with name execute-DEW-script and copy the following content to the file:

```
%Windir%\System32\WindowsPowerShell\v1.0\powershell.exe -command Set-ExecutionPolicy Unrestricted
%Windir%\System32\WindowsPowerShell\v1.0\powershell.exe "C:\DEW_Temp\Task-sequence-dew-script.ps1"
```

2. Save the text file in the SCCM Share DEW folder with name execute-DEW-script.cmd.
3. Create a text file with name Task-sequence-dew-script and copy the following content to the file:

```
#C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe Set-ExecutionPolicy -ExecutionPolicy Unrestricted
#Get GUID
$id = Get-WmiObject -Class Win32_Volume |Where-Object {$_._Name -like "C:\DEW\"} | Select-Object -property "DeviceID"
#Set-Volume -UniqueId $test.DeviceID -NewFileSystemLabel DEW_VOLUME` formatting DEW volume
Format-Volume -Path $id.DeviceID -FileSystem NTFS -Force -Full
Set-Service -Name $service -StartupType Disabled
New-Item -path 'C:\DEW\DEW_VOLUME' -ItemType Directory
New-Item C:\DEW\DEW_VOLUME\DEW.txt
Set-Content C:\DEW\DEW_VOLUME\DEW.txt 'DEW_PARTITION'
```

4. Save the text file in the SCCM Share DEW folder with name Task-sequence-dew-script.ps1.

NOTE:
- It is recommended that the size of the wim file and the used space put together is 1 GB less than the size of drive C for better performance during imaging.
Creating software package for unattended installation

You must create a software package for unattended installation. Unattended installation is an automated installation technology that you can use to install or upgrade an operating system with minimal user intervention.

**NOTE:** Copy the C:\windows\setup\sysprep.xml file (for legacy scripts) and C:\windows\setup\tools \sysprep.xml file (for PowerShell ported scripts) with supported images to the \SCCMserver\share-folder location on the Configuration Manager server. The .xml file must be accessible by the Configuration Manager server.

1. Expand **Software Library > Overview > Application management > Packages**.
2. Right-click **Packages** and click **Create Package**.
3. Enter the package name, description, manufacturer name, language, and version.

![Figure 52. Packages](image)
4. Browse to the source folder where you have copied the sysprep files.

5. Click Next.

6. Select Program for device radio button, and then click Next.

**NOTE:** Based on your requirement, you can select any one of the options available on the Program type page.
7. Enter the package device information, and click Next.
8. Enter the estimated disk space, and click Next.
Figure 55. Estimated disk space

9. Verify the information that you have provided and click **Next**.
The settings are applied.

10. Click Close.

11. In the Distribute Content wizard, right-click the software package which you have created, and click Distribute content.
12. From the Add drop-down list, select Distribution Point.

13. In Available distribution points, select the check boxes applicable to the distribution points that host your content, and click OK.

14. Click Next.
Figure 59. Content status

The content status is displayed in green. It may take a few minutes to complete the distribution process.