

# System Center Configuration Manager 2007

## Operating System Deployment Guide

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*Prepared by*  
**Microsoft**

**Microsoft®**

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# 1 EXECUTIVE SUMMARY

The operating system deployment feature of Microsoft® System Center Configuration Manager 2007 (Configuration Manager) Release 2 (R2) provides the capability to create and deploy automated builds of operating systems. Combined with the software distribution feature, which allows healthcare IT Administrators to deploy software in a controlled manner, it represents a complete solution to operating system deployment of the Windows® client and server estates in a healthcare organisation.

The *System Center Configuration Manager 2007 Operating System Deployment Guide* provides information and guidance to help healthcare IT Administrators quickly and reliably use the operating system deployment feature of Configuration Manager. This guide can be used to aid healthcare organisations who have already deployed Configuration Manager, or can be used in conjunction with the *System Center Configuration Manager 2007 Deployment Guide*<sup>1</sup> to deploy Configuration Manager.

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<sup>1</sup> *System Center Configuration Manager 2007 Deployment Guide {R1}*:  
<http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx>

## 2 INTRODUCTION

### 2.1 Value Proposition

This guidance helps healthcare organisations when implementing and using the operating system deployment feature of Configuration Manager. The guidance will help a healthcare IT Administrator to:

- Decide if any infrastructure changes will be required to support operating system deployment
- Install and configure the operating system deployment feature
- Perform the steps involved to create a Windows image and deploy the image to test clients

This guidance provides the information required to become familiar with the operating system deployment feature and understand the appropriate decisions that need to be made in order to deploy and use the solution. It also provides step-by-step guidance on how to install and configure the required components, and how to use the most common features.

### 2.2 Knowledge Prerequisites

To implement the recommendations made throughout this document, a number of knowledge-based and infrastructure prerequisites should be in place. This section outlines the knowledge and skills required to use the *System Center Configuration Manager Operating System Deployment Guide*, while section 2.3 details the necessary infrastructure prerequisites.

Section 2.2.1 details the prerequisite skills and knowledge, and section 2.2.2 details the information and suggested training resources or skill assessment.

#### 2.2.1 Skills and Knowledge

The technical knowledge and minimum skills required to use this guide are discussed in the following sections. They provide an introduction to the concepts and terminology of the Configuration Manager operating system deployment feature, and describe how the process of creating and deploying an operating system image works.

##### 2.2.1.1 Overview

The operating system deployment feature of Configuration Manager allows a healthcare IT Administrator to target new or existing client machines with an operating system installation. This can be to a new machine with no existing operating system (referred to as a *bare-metal* deployment) or to a client machine that already has a Configuration Manager client deployed. The feature allows for a great deal of flexibility when delivering the new operating system including the use of the Microsoft User State Migration Tool (USMT) to allow the healthcare IT Administrator to maintain the user's data and settings during the deployment. The following sections describe the key components that relate to operating system deployment.

##### 2.2.1.1.1 Boot Images

Boot Images contain a customised version of Windows Pre-Execution Environment (Windows PE), which is used to execute the task sequence that deploys the operating system. Windows PE is used because it is wholly contained in memory on the client machine, allowing for hard disks to be partitioned and formatted prior to the new operating system being installed.

### **2.2.1.1.2 Computer Associations**

Computer associations allow a healthcare IT Administrator to generate mappings between two computers (or the same computer) so that when the new operating system is deployed and USMT is used to migrate user settings, the Configuration Manager client knows which machines to treat as the source and destination for the user data being migrated.

### **2.2.1.1.3 Operating System Images**

Operating system images are .WIM files that have been created by capturing a reference client machine. The .WIM format provides significant advantages in size and manageability over other imaging formats. These files will be targeted at client machines using task sequences, and contain everything required to build the operating system and any additional applications installed on the reference computer for the image.

### **2.2.1.1.4 Operating System Install Packages**

Operating System Install Packages contain the Windows source files. These packages are usually used to build the reference computer prior to capture.

### **2.2.1.1.5 Task Sequences**

A Task Sequence contains a list of actions that are defined by a healthcare IT Administrator to build the client operating system and install any optional software packages that are required for a healthcare organisation. The task sequence editor contains a number of predefined task sequence actions for performing tasks associated with an operating system deployment.

### **2.2.1.1.6 Drivers**

The Drivers node of the Configuration Manager console allows a healthcare IT Administrator to add drivers to Configuration Manager that will be evaluated and deployed during operating system deployment in a healthcare organisation. The drivers can be categorised into different groups such as mass storage, network, and so on.

### **2.2.1.1.7 Driver Packages**

All drivers that can be used by client machines during the operating system deployment process must be part of a driver package. The driver package is similar to a software distribution package and contains the source files for the driver installation. Configuration Manager will populate the source directory for the package with any driver files that are specified. If the healthcare organisation has multiple sites or distribution points (DPs), they can specify which driver packages will be present on which DPs. This is particularly relevant if different hardware standards or vendors are used between sites.

### **2.2.1.1.8 Unprovisioned Computers**

The Unprovisioned Computers node of the Configuration Manager console provides healthcare IT Administrators with a single view of all machines that are currently being deployed and have not yet successfully completed. When a computer starts the provisioning process, and during all stages of the process, status messages are sent back to the Configuration Manager infrastructure providing the healthcare IT Administrator with a detailed view of any errors that may have occurred in near real time.

### 2.2.1.1.9 How Operating System Deployment Works

Operating system deployment can be targeted at existing Configuration Manager clients or to new client machines that do not have an operating system installed. Targeting an existing Configuration Manager client using a task sequence works in much the same way as software distribution; the task sequence is advertised to a collection and executed by all members of the collection based on the schedule defined. Once the task sequence is received, the operating system, any relevant drivers and any additional software are installed.

There are two ways to deploy an operating system to a client machine that does not yet have an operating system. The first is to create and use boot media, such as a DVD, that contains the boot image. The second is to use a PXE-based server to deploy the boot image directly to the client machine. Figure 1 shows the high-level process for building a client machine using a PXE server. The only difference between this process and using boot media is step 1, where the boot image is provided from the DVD as opposed to being downloaded from the PXE server.

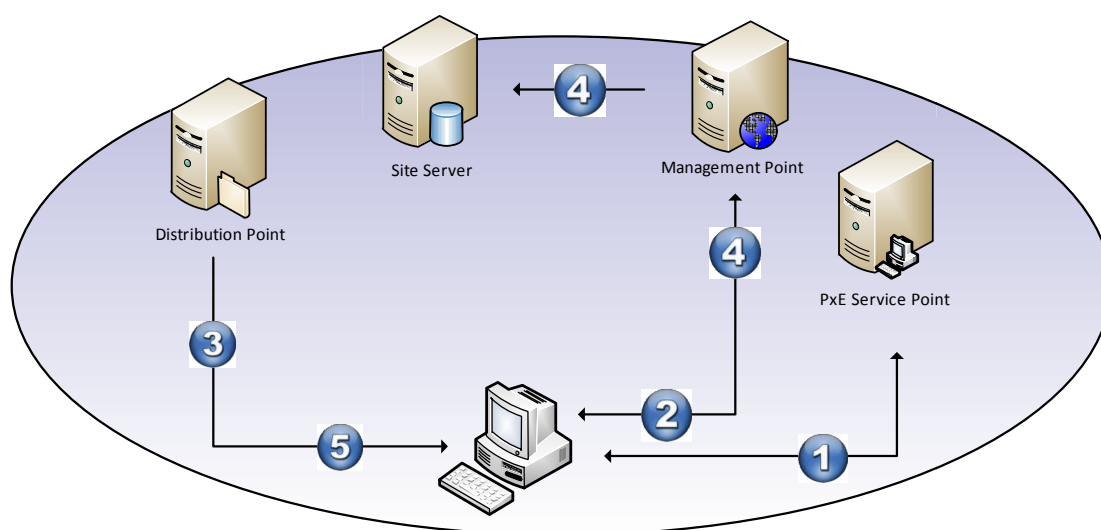


Figure 1: Operating System Deployment Overview

Table 1 describes each step of the PXE-based operating system deployment process in more detail:

Step	Description
1.	The client machine is turned on and DHCP address is acquired. F12 network service boot is selected and the client downloads the Windows PE boot image from the PXE service point and loads into Windows PE.
2.	Windows PE queries for a Management Point and determines if any task sequences are advertised to the client machine. Task sequences are targeted to machines either by importing the machine prior to the network service boot (by adding its Media Access Control (MAC) address), or using the unknown computer object. The task sequence defines which Operating System Install Package or Operating System Image package will be used to build the client machine and which DPs contain the package.
3.	The client contacts the DP and the image is installed using the parameters defined in the task sequence.
4.	The client hardware is scanned and a list of hardware devices is sent to the management point. The management point queries the database to determine if any matching drivers are available for the client and if so, returns details of the location of the driver package that contains the required drivers.
5.	The client downloads and installs any drivers that are required, and any software packages that are configured to be installed as part of the task sequence.

Table 1: PXE Boot-Based Operating System Deployment Overview Steps

## 2.2.2 Training and Assessment

Guidelines on the basic skill sets that are required in order to make best use of this guide are detailed in APPENDIX A. These represent the training courses and other resources available. All courses mentioned are optional and can be provided by a variety of certified training partners.

## 2.3 Infrastructure Prerequisites

The following are prerequisites for implementing operating system deployment in System Center Configuration Manager:

- An existing System Center Configuration Manager 2007 R2 infrastructure with Service Pack (SP) 2
- Windows® 7, Windows Vista®, Windows® XP Professional (SP2 or SP3), or Windows® 2000 Professional SP4, required for all desktop clients
- Windows® 2000 Server SP4, Windows Server® 2003 or Windows Server® 2008 (including R2) required for all Server clients
- Configuration Manager client deployed to clients (if deploying images to existing clients)
- 'Configuration Manager Software Distribution' feature enabled for Configuration Manager clients

## 2.4 Audience

The guidance contained in this document is targeted at a variety of roles within the healthcare IT organisations. Table 2 provides a reading guide for this document, illustrating the roles and the sections of the document that are likely to be of most interest. The structure of the sections referred to is described in section 3.1.

Role	Document Usage	Executive Summary	Plan	Develop	Stabilise	Deploy
IT Manager	Review of the entire document to understand the justification and drivers, and to develop an understanding of the implementation requirements	✓				
IT Architect	Review the relevant areas within the document against local architecture strategy and implementation plans	✓	✓			
IT Professional/Administrator	Detailed review and implementation of the guidance to meet local requirements	✓	✓	✓	✓	✓

Table 2: Document Audience

## 2.5 Assumptions

The guidance provided in this document assumes that the healthcare organisation has already deployed, or is planning to deploy, a Configuration Manager infrastructure in mixed security mode.

## 3 USING THIS DOCUMENT

This document is intended for use by healthcare organisations and IT administrators who wish to use Configuration Manager to perform operating system deployments. The document should be used to assist with the planning and implementation of the operating system deployment features of Configuration Manager, and as a reference guide for the most common tasks involved with its use.

### 3.1 Document Structure

This document contains four sections that deal with the Project Lifecycle, as illustrated in Figure 2 and the list below:

- Plan
- Develop
- Stabilise
- Deploy

Each section is based on the Microsoft IT Project Lifecycle as defined in the Microsoft Solutions Framework (MSF) Process Model, and the Microsoft Operations Framework (MOF). The IT Project Lifecycle is described in more detail in the *Microsoft Solutions Framework Core White Papers*<sup>2</sup> and the *MOF Executive Overview*<sup>3</sup>. The MSF Process Model and MOF describe a high-level sequence of activities for building, deploying and managing IT solutions. Rather than prescribing a specific series of procedures, they are flexible enough to accommodate a broad range of IT projects.

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<sup>2</sup> Microsoft Solutions Framework Core White Papers:  
<http://www.microsoft.com/downloads/details.aspx?FamilyID=e481cb0b-ac05-42a6-bab8-fc886956790e&DisplayLang=en>

<sup>3</sup> MOF Executive Overview:  
<http://www.microsoft.com/technet/solutionaccelerators/cits/mo/mof/mofeo.mspx>

The four sections of this document are as follows:

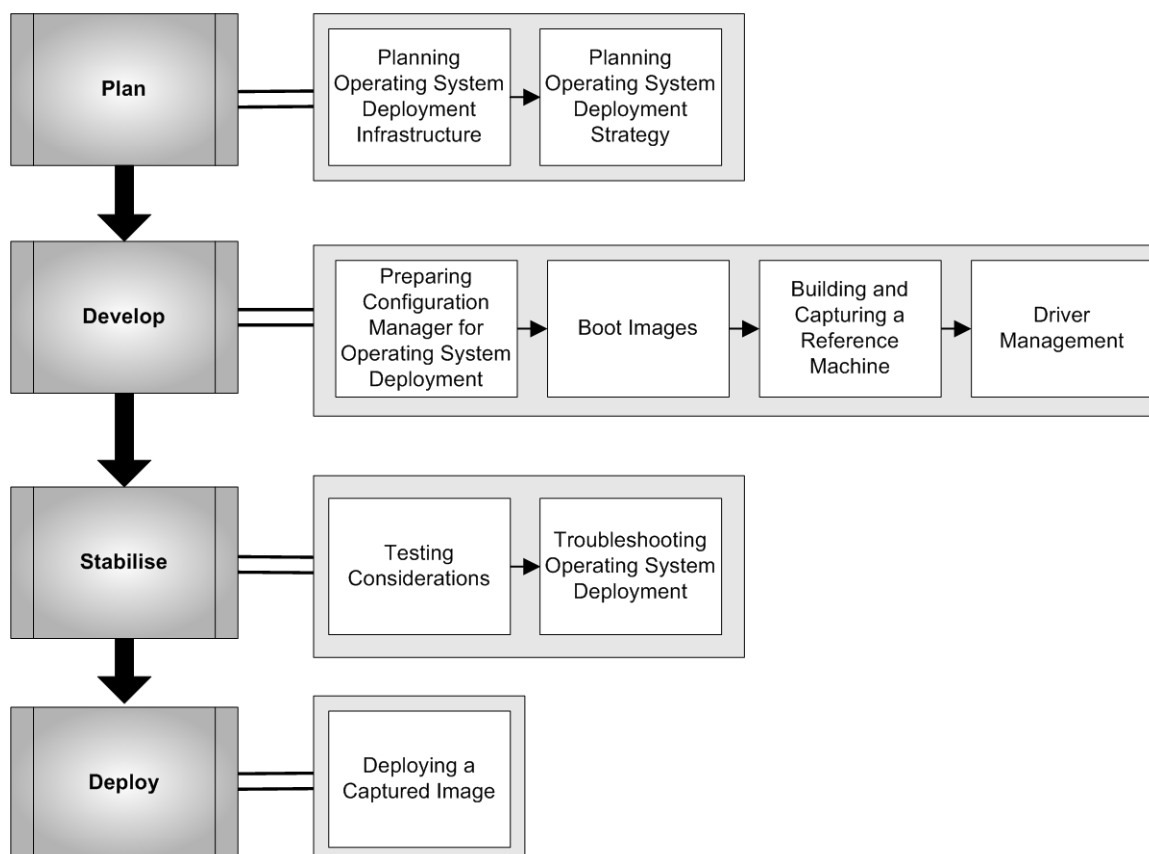


Figure 2: Microsoft Solutions Framework Process Model Phases and Document Structure

The key public documentation resources for building a Configuration Manager solution are listed below. Where appropriate, specific chapters or sections from these documents have been referenced throughout this guidance:

- *System Center Configuration Manager TechCenter*<sup>4</sup>
- *System Center Configuration Manager Product Homepage*<sup>5</sup>

<sup>4</sup> System Center Configuration Manager TechCenter {R2}:  
<http://technet.microsoft.com/en-gb/configmgr/default.aspx>

<sup>5</sup> System Center Configuration Manager Product Homepage {R3}:  
<http://www.microsoft.com/systemcenter/configurationmanager/en/us/default.aspx>

## 4 PLAN

The Plan phase is where the bulk of the implementation planning is completed. During this phase the areas for further analysis are identified and a design process commences

Figure 3 acts as a high-level checklist, illustrating the sequence of events that the IT Manager and IT Architect need to determine when planning to use the operating system deployment feature of Configuration Manager within a healthcare organisation:

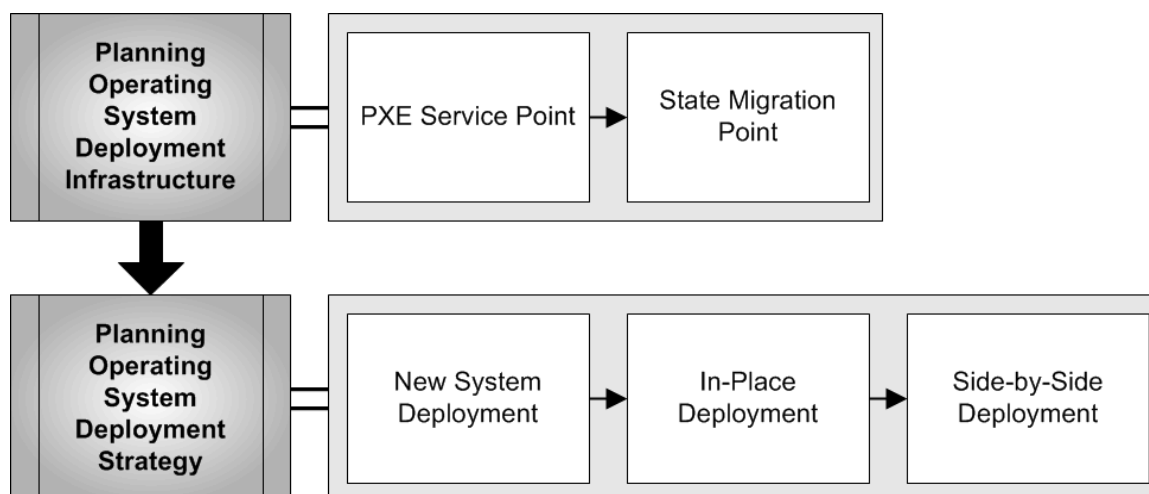


Figure 3: Sequence for Planning the Use of the Software Update Feature in Configuration Manager

### 4.1 Planning Operating System Deployment Infrastructure

When using the operating system deployment feature of Configuration Manager, there are two optional site roles that provide services related to operating system deployment:

- PXE Service Point (allows clients to be installed using F12 network service boot)
- State Migration Point (allows USMT to store data on the network while client machines are upgraded)

#### 4.1.1 PXE Service Point

The PXE service point site role responds to PXE boot requests from clients, and triggers the clients to download the customised version of Windows PE, in order to start operating system deployment task sequences. The healthcare IT Administrator should deploy at least one PXE service point in the healthcare organisation if PXE boot support is required. In order to use PXE boot in the organisation, the following must be true:

- A Dynamic Host Control Protocol (DHCP) server must be available for use
- The network must allow PXE broadcast packets to reach the PXE server

Layer 3 network devices usually prevent Bootstrap Protocol (BOOTP) broadcast packets, which are used by both DHCP and PXE, from being forwarded between network segments. If the network devices do not allow these packets to be forwarded, the healthcare IT Administrator must either deploy a PXE service point to each network segment, or modify the configuration of the Layer 3 device to allow these packets to reach the PXE server. Otherwise, only clients on the same physical segment as the PXE service point will be able to PXE boot.



**Note**

If the healthcare IT Administrator plans to install the PXE service point on a server that also hosts DHCP, additional configuration steps are required. Review the TechNet article entitled *Planning for PXE Initiated Operating System Deployments*<sup>6</sup> for further information.

## 4.1.2 State Migration Point

State migration points are used to store user data settings when performing an in-place or side-by-side deployment of an operating system. More detail on these deployment strategies can be found in section 4.2. The state migration point is a network location where USMT will store data while an operating system is deployed. Before configuring a state migration point, the healthcare IT Administrator should understand the amount of data that will be stored during the migration. This can never be accurately determined ahead of time, but using USMT to analyse the amount of data that will be created on a representative number of machines will provide a good idea of the volume that may be created. See the guidance *Healthcare Desktop User State Migration {R4}* for more information on using USMT. Multiple state migration points can be deployed in a Configuration Manager site and access to these state migration points can be strictly controlled using Configuration Manager boundaries and protected site systems. For more information on Configuration Manager boundaries and how to protect the site system to control client access, see the *System Center Configuration Manager Deployment Guide {R1}*.

## 4.2 Planning Operating System Deployment Strategy

When deploying new operating systems using Configuration Manager there are three scenarios to consider:

- New System Deployment
- In-Place Deployment
- Side-by-Side Deployment

### 4.2.1 New System Deployment

Also known as 'bare-metal' deployment, this scenario uses removable media, such as USB or DVD, or a PXE boot server to deploy an image that will completely replace the operating system on a given machine. In this scenario, none of the existing settings, such as user state from the original machine, are preserved. This scenario is useful for machines that are being deployed to new users, or where the user state of the machine is not relevant, such as kiosk machines that should not contain any user documents or settings. This is the least complex scenario as the user state does not need to be captured. Section 7.1.1 covers new system deployment in more detail.

### 4.2.2 In-Place Deployment

An in-place deployment is typically used when an operating system is being refreshed or upgraded. This scenario will be used when an operating system needs to be redeployed because it does not meet current standards or is broken beyond repair. Many healthcare organisations will choose to redeploy an operating system image if the helpdesk is unable to resolve software issues within an agreed time. The scenario may also be used when an operating system upgrade is required, such as an upgrade from Windows XP to Windows 7 where the hardware may not need to be replaced. This scenario is more complex than a new system deployment because user state must be captured and restored during the operating system deployment. Section 7.1.2 covers in-place deployment in more detail.

<sup>6</sup> Microsoft TechNet: Planning for PXE Initiated Operating System Deployments {R8}:  
<http://technet.microsoft.com/en-us/library/bb680753.aspx>

### 4.2.3 Side-by-Side Deployment

A side-by-side deployment is used when an operating system upgrade is required and the user's machine will be refreshed as part of this process. It can also be used during a scheduled hardware refresh when a user's machine is being replaced. This scenario is the most complex of the three scenarios because user state will normally need to be captured, and a mapping between the old and new computers will need to be configured to let Configuration Manager know from which machine the user state should be captured and to which machine it should be restored. Figure 4 shows the processes involved in a side-by-side migration:

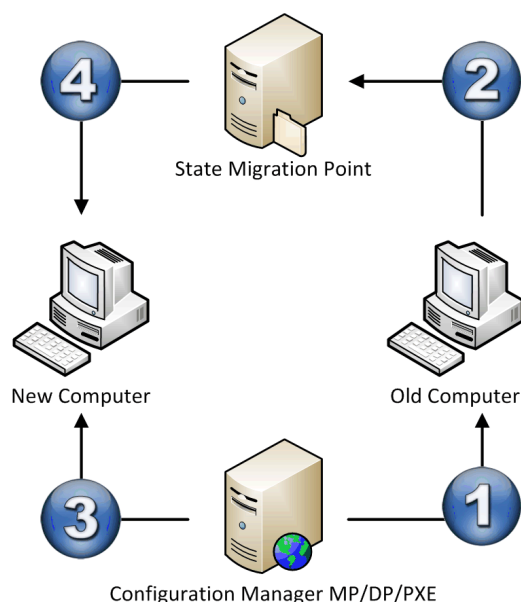


Figure 4: Side-by-Side Deployment

Table 3 describes each step during a side-by-side migration:

Step	Description
1.	A task sequence is deployed to the old machine telling the Configuration Manager client to run the ScanState feature of USMT.
2.	The Configuration Manager client receives the task sequence and scans the old computer using ScanState from USMT. The resultant files are uploaded to the state migration point to be stored until requested.
3.	The Configuration Manager server builds the new operating system on the new machine according to the task sequence deployed.
4.	After the new operating system has been deployed, the task sequence runs the LoadState feature of USMT, retrieves the user's data and settings from the state migration point and applies them to the new operating system.

Table 3: Side-by-Side Deployment Task Detail

Section 7.1.3 covers side-by-side migrations in more detail.

## 5 DEVELOP

During the Develop phase the solution components are built based on the planning completed during the earlier phases. Further refinement of these components will continue into the stabilisation phase

Figure 5 acts as a high-level checklist, illustrating the tasks that an IT Professional needs to perform when developing System Center Configuration Manager operating system deployment within a healthcare organisation:

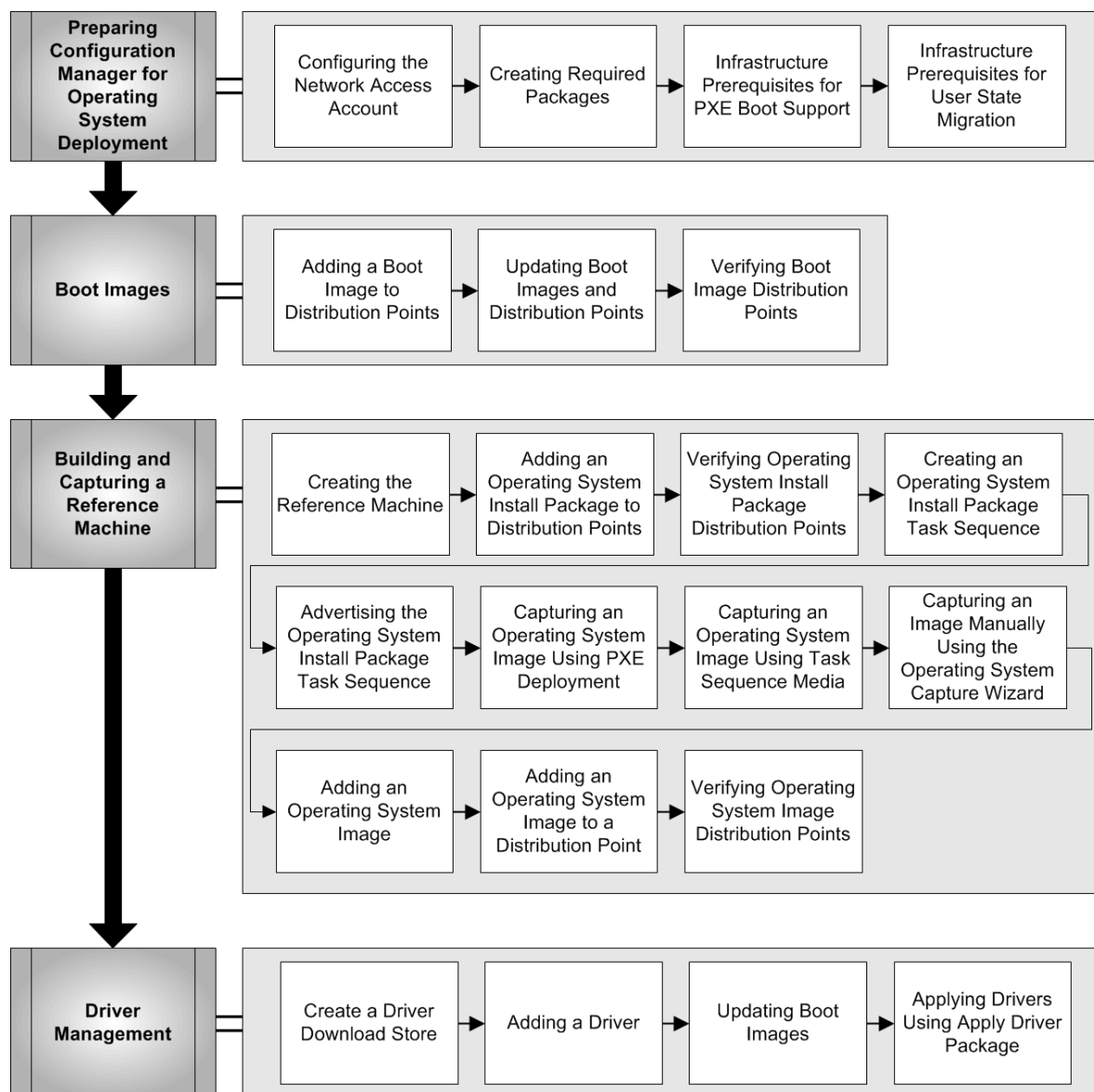


Figure 5: Sequence for Developing System Center Configuration Manager Operating System Deployment

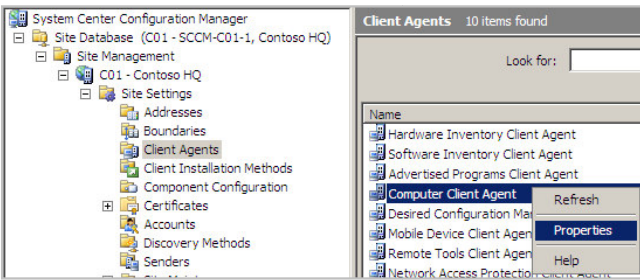
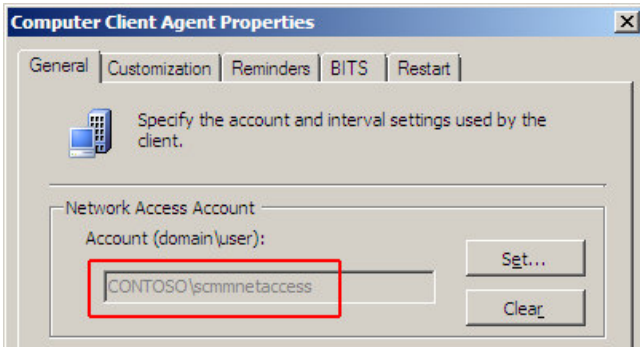
## 5.1 Preparing Configuration Manager for Operating System Deployment

The following tasks will prepare the Configuration Manager infrastructure for operating system deployment.

- Configuring the Network Access Account
- Creating the required packages
- Configuring Windows Deployment Services (WDS) and the PXE Service Point (Required for PXE-based installation)
- Configuring State Migration Points

### 5.1.1 Configuring the Network Access Account

The Network Access Account is used by the client machines during the build process to contact the Distribution Points (DPs). This account must be specified in order for the operating system deployment process to work. The account does not require administrative privileges but must have access to the required DP. By default, a member of the domain users group will provide sufficient access. Table 4 shows the steps required to configure the Network Access Account:

Step	Description	Screenshot / Details
1.	<p>Open the <b>Configuration Manager Console</b> and click <b>Client Agents</b>.</p> <p>Right click <b>Computer Client Agent</b> in the details pane and select <b>Properties</b>.</p>	 <p>The screenshot shows the Configuration Manager console with the 'Client Agents' view selected. The 'Computer Client Agent' is highlighted in the list. The 'Properties' dialog for the 'Computer Client Agent' is open, showing the 'General' tab. The 'Network Access Account' section is visible, with the 'Account (domain\user):' field containing 'CONTOSO\scmmnetaccess'.</p>
2.	<p>Ensure a Network Access Account has been specified in the <b>Account (domain\user)</b> box. If none is specified, click <b>Set</b> to configure the account.</p>	 <p>The screenshot shows the 'Computer Client Agent Properties' dialog box, 'General' tab. The 'Network Access Account' section is expanded, showing the 'Account (domain\user):' field with the text 'CONTOSO\scmmnetaccess'. The 'Set...' button is visible next to the field.</p>

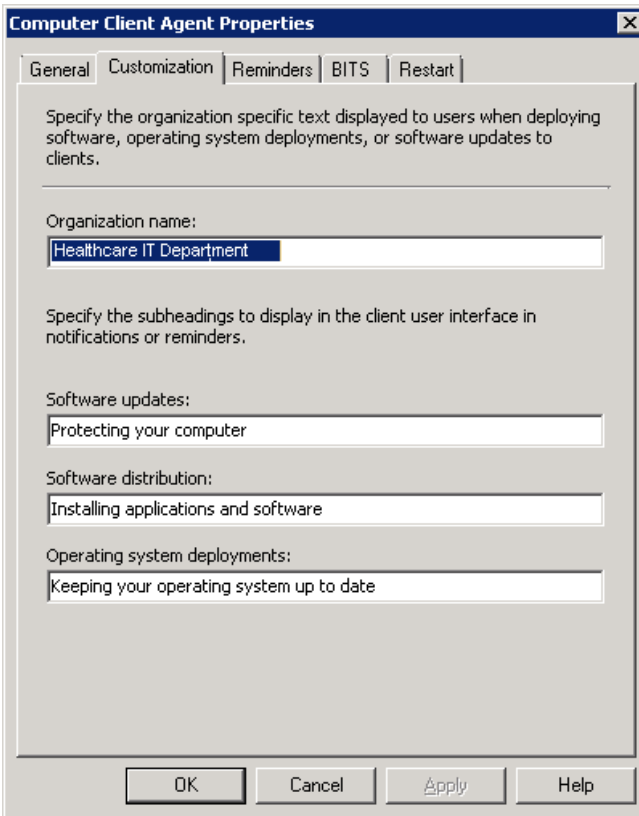
Step	Description	Screenshot / Details
3.	<p><b>Note</b></p> <p>This step is optional.</p> <p>The healthcare IT Administrator can configure the name of the healthcare organisation so all user communication dialogues will display the correct name. It is also possible to configure the text displayed when performing <b>Software updates</b>, <b>Software distribution</b> and <b>Operating system deployments</b>. Click <b>OK</b>.</p>	 <p>The screenshot shows the 'Computer Client Agent Properties' dialog box with the 'Customization' tab selected. The 'Organization name' field contains 'Healthcare IT Department'. Below it, the 'Software updates' field contains 'Protecting your computer', the 'Software distribution' field contains 'Installing applications and software', and the 'Operating system deployments' field contains 'Keeping your operating system up to date'. The 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.</p>

Table 4: Configuring the Network Access Account

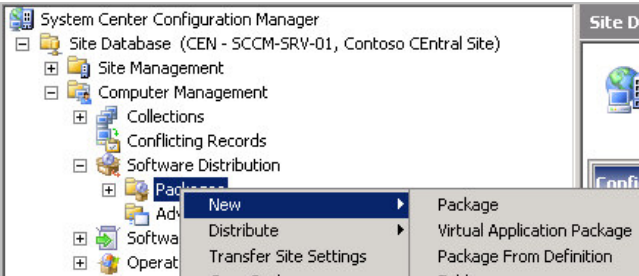
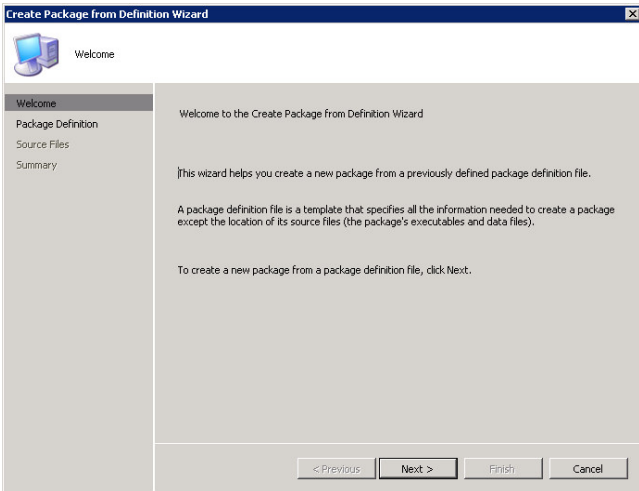
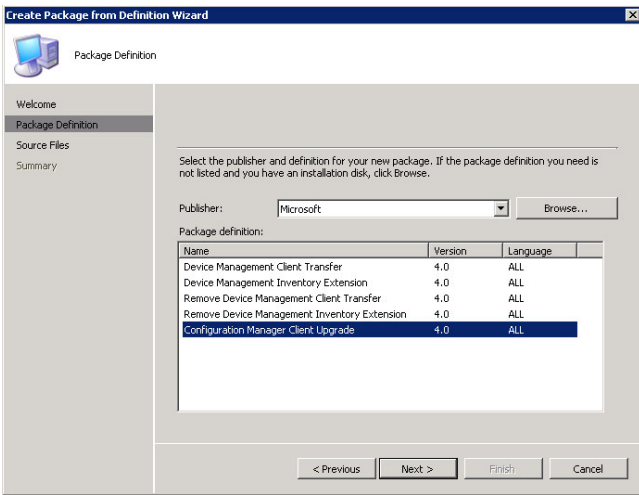
### 5.1.2 Creating Required Packages

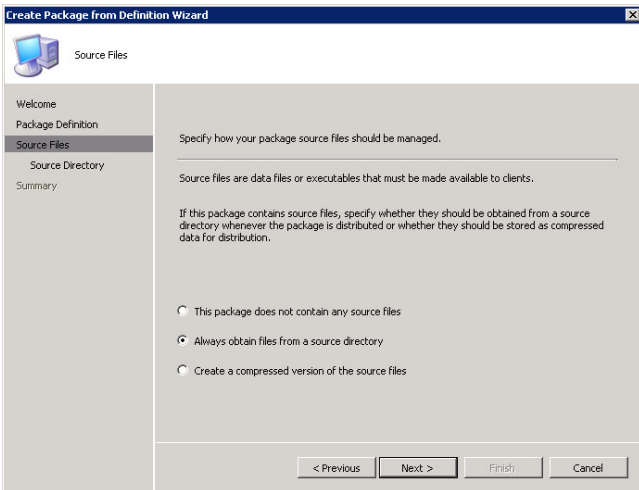
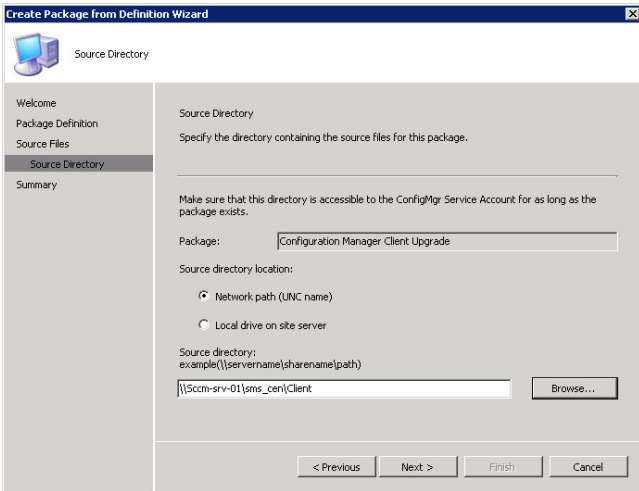
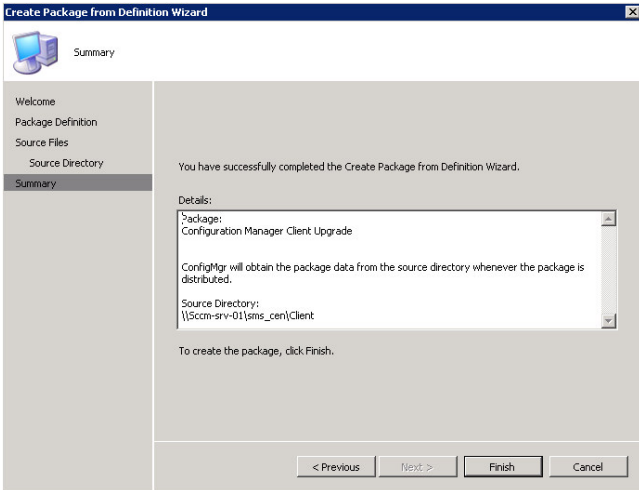
The following Configuration Manager Packages must be created in order to deploy operating systems:

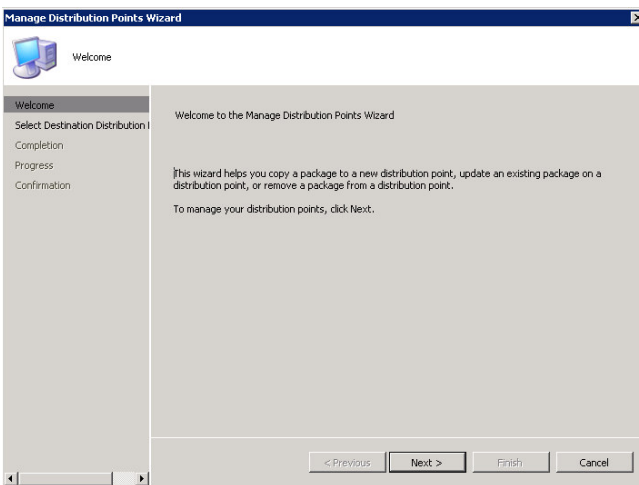
- Configuration Manager Client Package
- User State Migration Tool Package
- Sysprep Package (only required for Windows XP image creation)

### 5.1.2.1 Creating the Configuration Manager Client Package

When creating an image for operating system deployment, it is not necessary to install the Configuration Manager client, as this is performed during the task sequence. If the healthcare IT Administrator is using a different solution to create the image, or manually building the reference machine for capture, the Configuration Manager client should not be included in the image. The task sequence will download and install the Configuration Manager client using software distribution. Table 5 shows the steps to create the Configuration Manager client package:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and navigate to the <b>Packages</b> node.  Right-click on the <b>Packages</b> node and select <b>New &gt; Package From Definition</b> .	
2.	In the <b>Create Package From Definition Wizard</b> , click <b>Next</b> .	
3.	Select <b>Configuration Manager Client Upgrade</b> and click <b>Next</b> .	

Step	Description	Screenshot
4.	<p>Click <b>Always obtain files from a source directory</b> and click <b>Next</b>.</p> <p><b>Note</b> By selecting <b>Always obtain files from a source directory</b>, Configuration Manager will update the client files in the package when they are updated due to a service pack being applied.</p>	
5.	<p>In the <b>Source directory</b> text box, enter the location of the source files for the client; this must be in the format: \\&lt;SiteServerName&gt;\SMS_&lt;SiteCode&gt;\Client. Click <b>Next</b>.</p>	
6.	Click <b>Finish</b> .	

Step	Description	Screenshot
7.	Right-click the newly-created package in the <b>Packages</b> node and select <b>Manage Distribution Points</b> .	
8.	Click <b>Next</b> .	
9.	Click <b>Copy the package to new distribution points</b> and click <b>Next</b> .	



Step	Description	Screenshot
10.	<p>Select the check boxes of distribution points that will require this package.</p> <p><b>Note</b></p> <p>The healthcare IT Administrator should select all DPs that may be contacted during an operating system deployment. It is not necessary to select any DPs that are created in the SMSPXEIMAGES\$ folder because these should only contain the Boot Images</p> <p>Click <b>Next</b>.</p>	
11.	<p>Click <b>Next</b>.</p>	
12.	<p>Click <b>Close</b>.</p>	

Table 5: Creating the Configuration Manager Client Package

### 5.1.2.2 Creating the User State Migration Tool Package

USMT is used to capture and restore users' documents and settings. This tool will be used when performing either an in-place deployment or a side-by-side deployment. At the time of writing, there are two versions of USMT that could be required in a healthcare organisation; the version required will depend on the version of the operating system that is being deployed. More information on USMT is contained in the document *Healthcare Desktop User State Migration {R4}*. If the healthcare IT Administrator is deploying Windows Vista or Windows 7, USMT 4.0 should be used. If the healthcare IT Administrator is deploying Windows XP, then USMT 4.0 cannot be used, therefore, USMT 3.0.1 must be used. The tools can be obtained from the following locations:

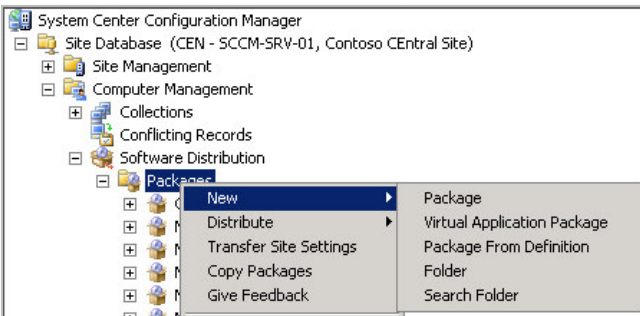
USMT 3.0.1 is available as a direct download from the *Windows User State Migration Tool (USMT) Version 3.0.1*<sup>7</sup> in the Microsoft Download Center.

USMT 4.0 is only available as part of the Windows® Automated Installation Kit (Windows AIK), which is available from *The Windows® Automated Installation Kit (AIK) for Windows® 7*<sup>8</sup> in the Microsoft Download Center.

#### Note

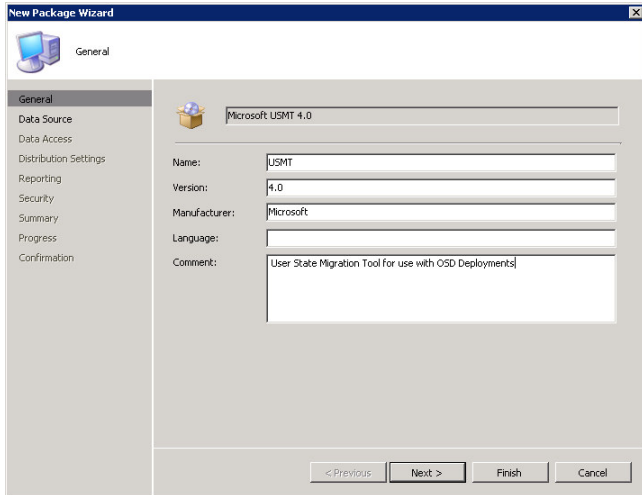
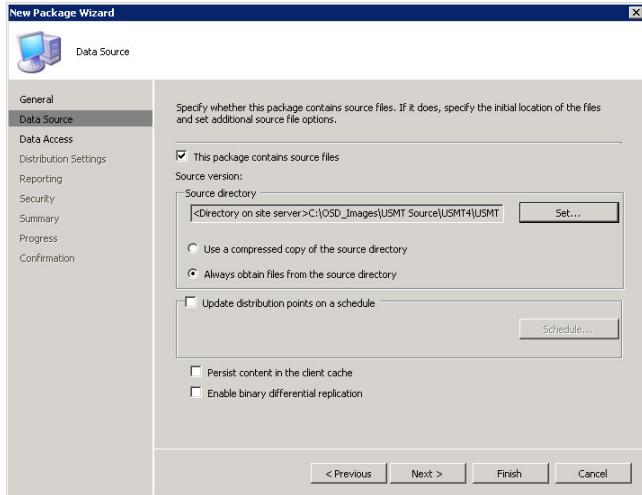
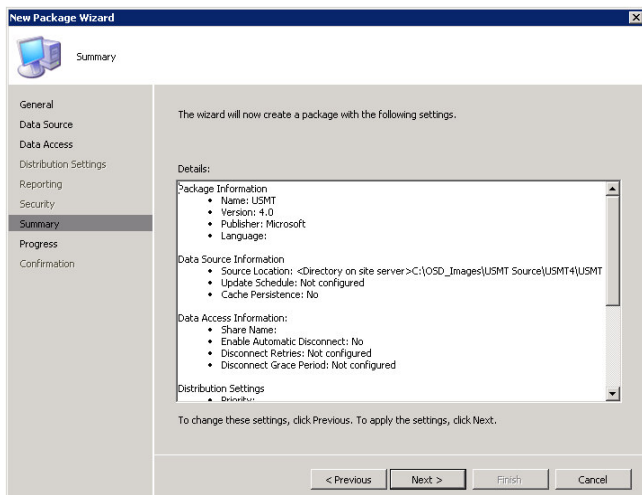
USMT comes in two different versions, one for 64-bit machines and the other for 32-bit. Unless the healthcare organisation's environment is completely 64-bit, it is recommended that the package is created using the 32-bit version of the tool; the 32-bit (X86) version will run on 64-bit machines, but the 64-bit version will only run on 64-bit machines.

Table 6 shows the steps to create the USMT package for USMT version 4.0:

Step	Description	Screenshot / Details
1.	Open the <b>Configuration Manager Console</b> and navigate to the <b>Packages</b> node.  Right-click on the <b>Packages</b> node and select <b>New &gt; Package</b> .	

<sup>7</sup> Windows User State Migration Tool (USMT) Version 3.0.1 {R5}:  
<http://www.microsoft.com/downloads/details.aspx?FamilyID=799ab28c-691b-4b36-b7ad-6c604be4c595&displaylang=en>

<sup>8</sup> The Windows® Automated Installation Kit (AIK) for Windows® 7 {R6}:  
<http://www.microsoft.com/downloads/details.aspx?familyid=696DD665-9F76-4177-A811-39C26D3B3B34&displaylang=en>

Step	Description	Screenshot / Details
2.	Enter the <b>Name</b> of the package, enter any additional details required and click <b>Next</b> .	 <p>The screenshot shows the 'New Package Wizard' window with the 'General' tab selected. The package name is 'Microsoft USMT 4.0'. The 'Name' field contains 'USMT', the 'Version' is '4.0', and the 'Manufacturer' is 'Microsoft'. The 'Language' is set to 'User State Migration Tool for use with OSD Deployments'. The 'Comment' field is empty. Navigation buttons at the bottom include '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>
3.	<p>Select <b>This package contains source files</b>. Click <b>Set</b> and add the source directory that contains the USMT files.</p> <p><b>Note</b></p> <p>If the healthcare organisation will be deploying Windows XP, USMT 3.0.1 must be used. The 32-bit version should be used as the package source. If the server is running a 64-bit operating system (OS), the healthcare IT Administrator will need to install USMT on a 32-bit machine and copy the required files to the server. This is because the 32-bit version of the USMT installer will not run on a 64-bit OS.</p> <p>Click <b>Finish</b>.</p>	 <p>The screenshot shows the 'New Package Wizard' window with the 'Data Source' tab selected. The 'This package contains source files' checkbox is checked. The 'Source version' is '4.0'. The 'Source directory' is set to '&lt;Directory on site server&gt;C:\OSD_Images\USMT Source\USMT4\USMT'. The 'Set...' button is visible. Other options include 'Use a compressed copy of the source directory' (unchecked), 'Always obtain files from the source directory' (checked), 'Update distribution points on a schedule' (unchecked), 'Persist content in the client cache' (unchecked), and 'Enable binary differential replication' (unchecked). Navigation buttons at the bottom include '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>
4.	Click <b>Next</b> .	 <p>The screenshot shows the 'New Package Wizard' window with the 'Summary' tab selected. The wizard will now create a package with the following settings:</p> <ul style="list-style-type: none"> <li><b>Package Information:</b> <ul style="list-style-type: none"> <li>Name: USMT</li> <li>Version: 4.0</li> <li>Publisher: Microsoft</li> <li>Language:</li> </ul> </li> <li><b>Data Source Information:</b> <ul style="list-style-type: none"> <li>Source Location: &lt;Directory on site server&gt;C:\OSD_Images\USMT Source\USMT4\USMT</li> <li>Update Schedule: Not configured</li> <li>Cache Persistence: No</li> </ul> </li> <li><b>Data Access Information:</b> <ul style="list-style-type: none"> <li>Share Name:</li> <li>Enable Automatic Disconnect: No</li> <li>Disconnect Retries: Not configured</li> <li>Disconnect Grace Period: Not configured</li> </ul> </li> <li><b>Distribution Settings:</b> <ul style="list-style-type: none"> <li>Distribution:</li> </ul> </li> </ul> <p>To change these settings, click Previous. To apply the settings, click Next.</p> <p>Navigation buttons at the bottom include '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>

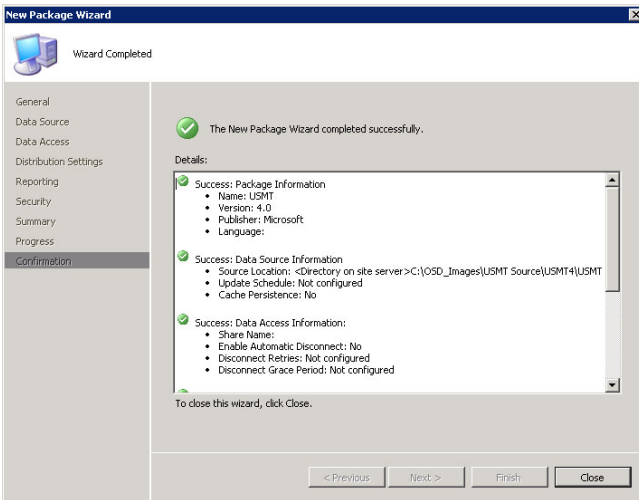
Step	Description	Screenshot / Details
5.	Click <b>Close</b> .	

Table 6: Creating the USMT Package

### 5.1.2.3 Creating the Sysprep Package

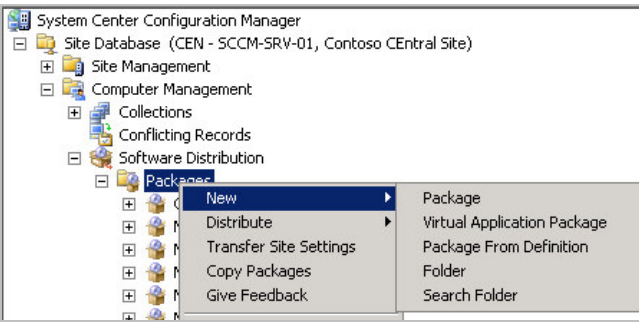
Sysprep is required when creating a task sequence that will be used to create a Windows XP image. Windows Vista and Windows 7 contain the files required to create the image, so the package will not be required. The Sysprep files are contained within the Deploy.cab file, which is located in the Support Tools directory on a Windows XP CD or can be downloaded from the *Windows XP Service Pack 3 Deployment Tools*<sup>9</sup> page in the Microsoft Download Center.

Once the Deploy.cab file has been downloaded, the contents should be extracted to a folder that will be used as the source folder for the Sysprep package.

#### Note

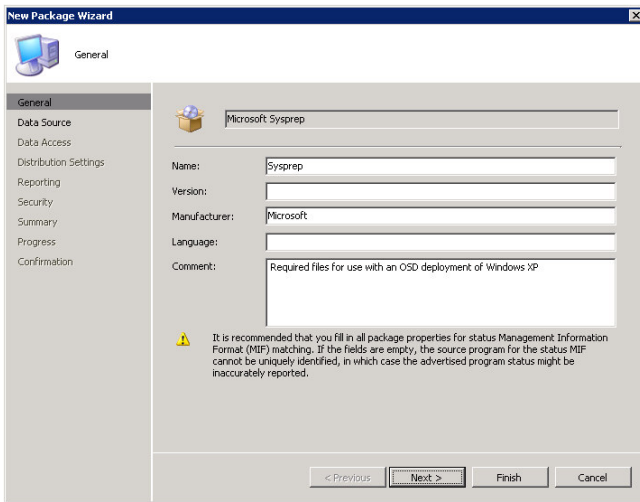
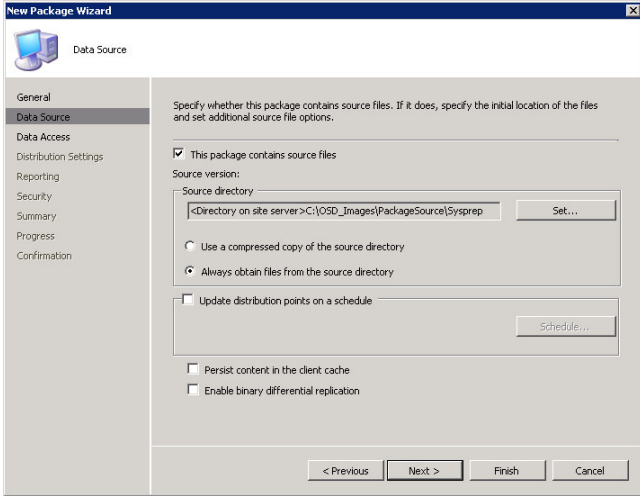
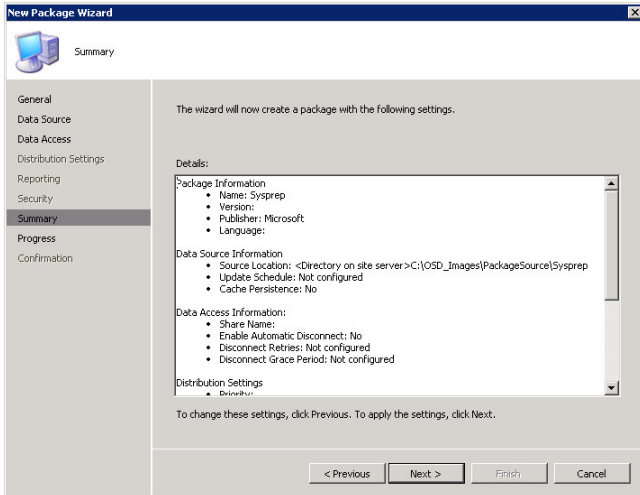
It is only necessary to include the .exe files contained within the cabinet file. The other files contain documentation that provides information to help the healthcare IT Administrator understand and use the Sysprep tools to create a Sysprep.inf file. The Sysprep.inf file contains information to automatically configure setup options when installing Windows XP.

Table 7 shows the steps required to create the Sysprep package:

Step	Description	Screenshot / Details
1.	<p>Open the <b>Configuration Manager Console</b> and navigate to the <b>Packages</b> node.</p> <p>Right-click on the <b>Packages</b> node and select <b>New &gt; Package</b>.</p>	

<sup>9</sup> Windows XP Service Pack 3 Deployment Tools {R7}:

<http://www.microsoft.com/downloads/details.aspx?familyid=673A1019-8E3E-4BE0-AC31-70DD21B5AFA7&displaylang=en>

Step	Description	Screenshot / Details
2.	Enter the <b>Name</b> of the package, enter any additional details required and click <b>Next</b> .	 <p>The screenshot shows the 'New Package Wizard' window with the 'General' tab selected. The 'Name' field is set to 'Sysprep'. The 'Version' field is empty. The 'Manufacturer' field is set to 'Microsoft'. The 'Language' field is empty. The 'Comment' field contains 'Required files for use with an OSD deployment of Windows XP'. A warning icon and text at the bottom state: 'It is recommended that you fill in all package properties for status Management Information Format (MIF) matching. If the fields are empty, the source program for the status MIF cannot be uniquely identified, in which case the advertised program status might be inaccurately reported.'</p>
3.	Select <b>This package contains source files</b> . Click <b>Set</b> and add the source directory that contains the Sysprep files. Click <b>Finish</b> .	 <p>The screenshot shows the 'New Package Wizard' window with the 'Data Source' tab selected. The 'This package contains source files' checkbox is checked. The 'Source version' section shows 'Source directory' selected with the path '&lt;Directory on site server&gt;C:\OSD_Images\PackageSource\Sysprep'. The 'Set...' button is visible. Other options like 'Use a compressed copy of the source directory' and 'Always obtain files from the source directory' are also present. The 'Update distribution points on a schedule' checkbox is unchecked. The 'Persist content in the client cache' and 'Enable binary differential replication' checkboxes are also unchecked.</p>
4.	Click <b>Next</b> .	 <p>The screenshot shows the 'New Package Wizard' window with the 'Summary' tab selected. The wizard will now create a package with the following settings:</p> <ul style="list-style-type: none"> <li><b>Package Information:</b> <ul style="list-style-type: none"> <li>Name: Sysprep</li> <li>Version:</li> <li>Publisher: Microsoft</li> <li>Language:</li> </ul> </li> <li><b>Data Source Information:</b> <ul style="list-style-type: none"> <li>Source Location: &lt;Directory on site server&gt;C:\OSD_Images\PackageSource\Sysprep</li> <li>Update Schedule: Not configured</li> <li>Cache Persistence: No</li> </ul> </li> <li><b>Data Access Information:</b> <ul style="list-style-type: none"> <li>Share Name:</li> <li>Enable Automatic Disconnect: No</li> <li>Disconnect Retries: Not configured</li> <li>Disconnect Grace Period: Not configured</li> </ul> </li> <li><b>Distribution Settings:</b> <ul style="list-style-type: none"> <li>Distribution:</li> </ul> </li> </ul> <p>To change these settings, click Previous. To apply the settings, click Next.</p>

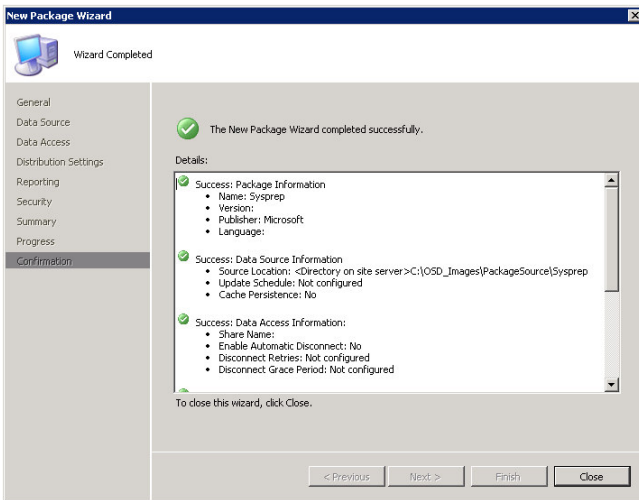
Step	Description	Screenshot / Details
5.	Click <b>Close</b> .	

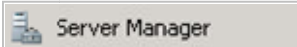
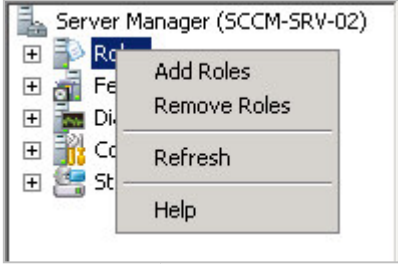
Table 7: Creating the Sysprep Package

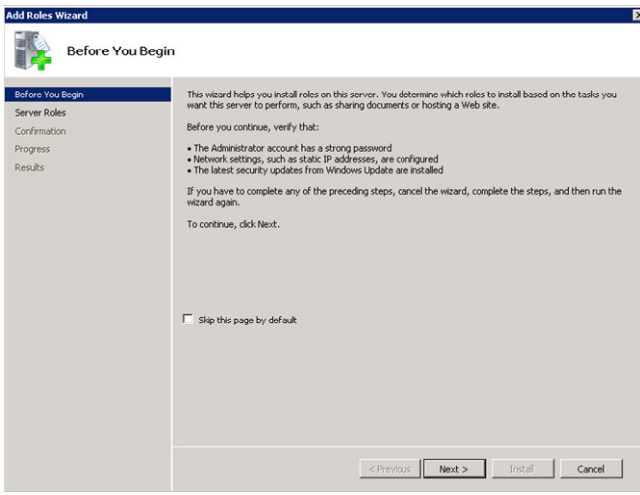
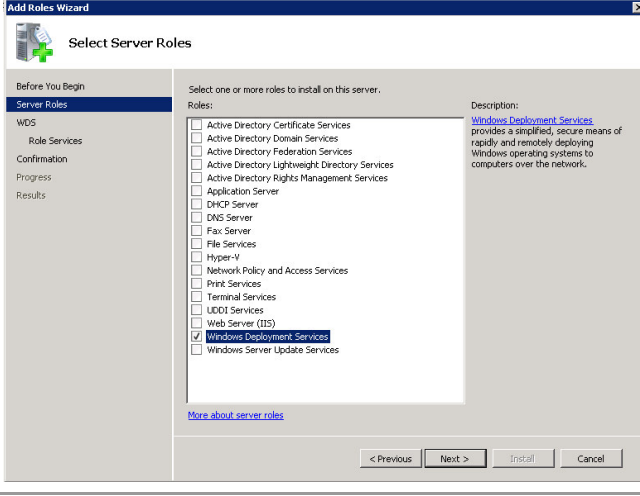
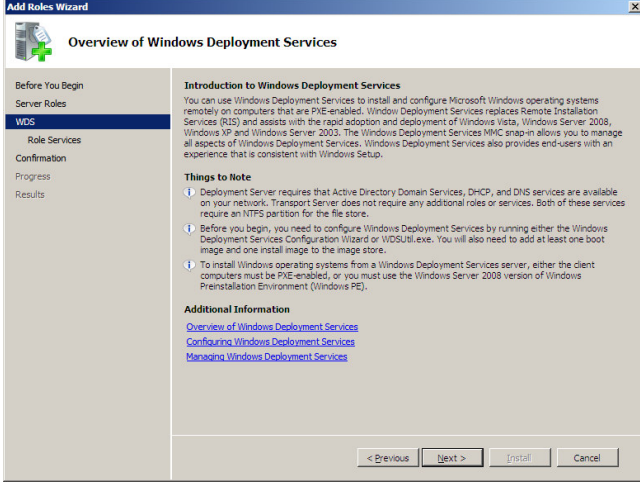
### 5.1.3 Infrastructure Prerequisites for PXE Boot Support

In order to allow clients to boot from the network and receive operating systems, the healthcare IT Administrator must configure a PXE service point. The PXE service point is a Configuration Manager site system that uses WDS to deliver boot images to clients.

#### 5.1.3.1 Windows Deployment Services Installation

Table 8 shows the steps for installing WDS. These steps need to be followed before the server can be assigned the PXE service point role in Configuration Manager.

Step	Description	Screenshot / Details
1.	Open <b>Administrative Tools &gt; Server Manager</b> .	
2.	Right-click on <b>Roles</b> and select <b>Add Roles</b>	

Step	Description	Screenshot / Details
3.	Click <b>Next</b> .	
4.	On the <b>Select Server Roles</b> page, select <b>Windows Deployment Services</b> and click <b>Next</b> .	
5.	Click <b>Next</b> .	

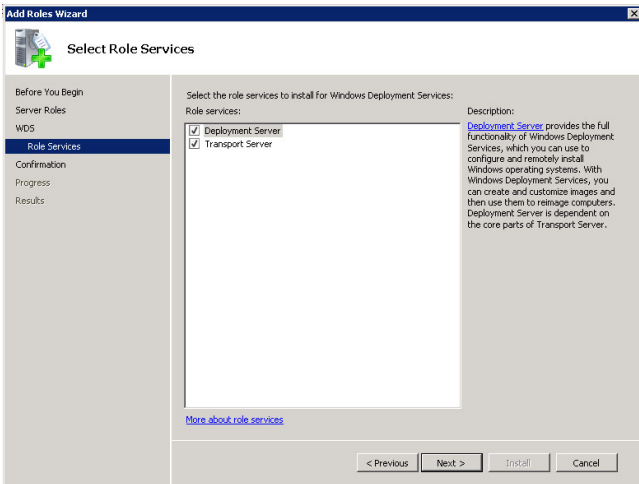
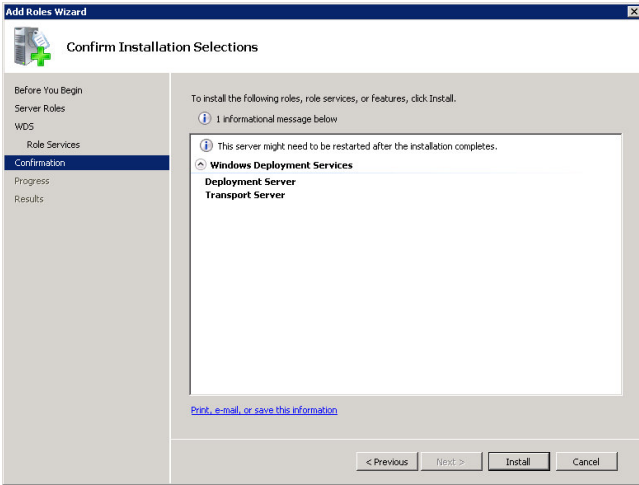
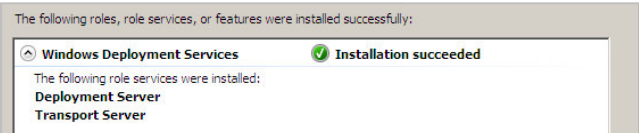
Step	Description	Screenshot / Details
6.	Click <b>Next</b> .	
7.	Click <b>Install</b> .	
8.	Click <b>Close</b> .	

Table 8: Windows Deployment Services Installation


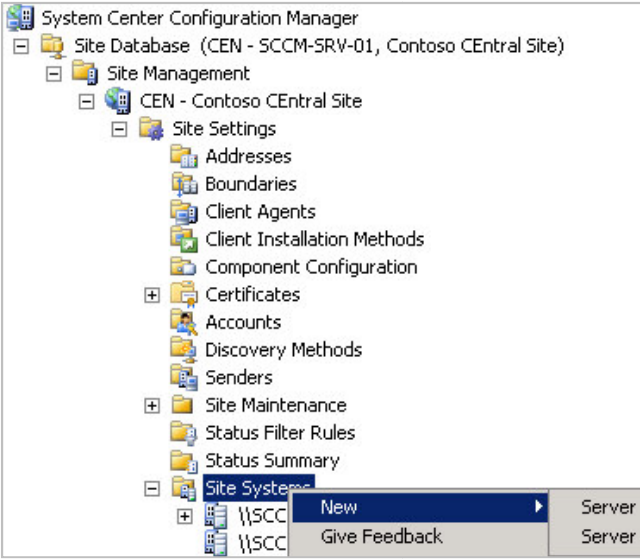
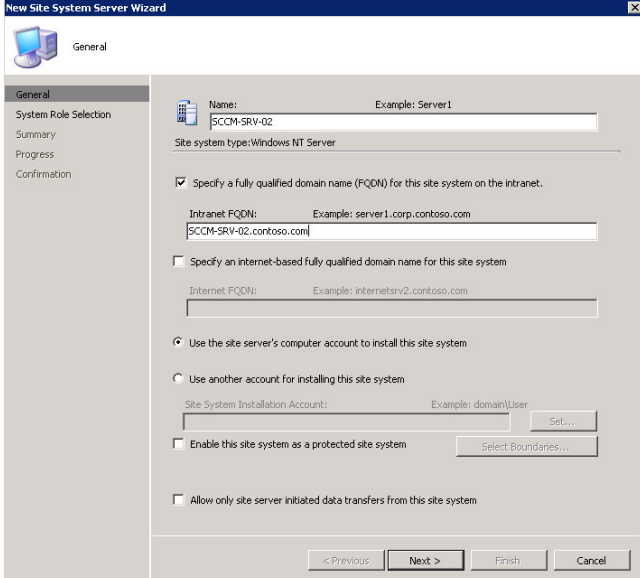
**Note**

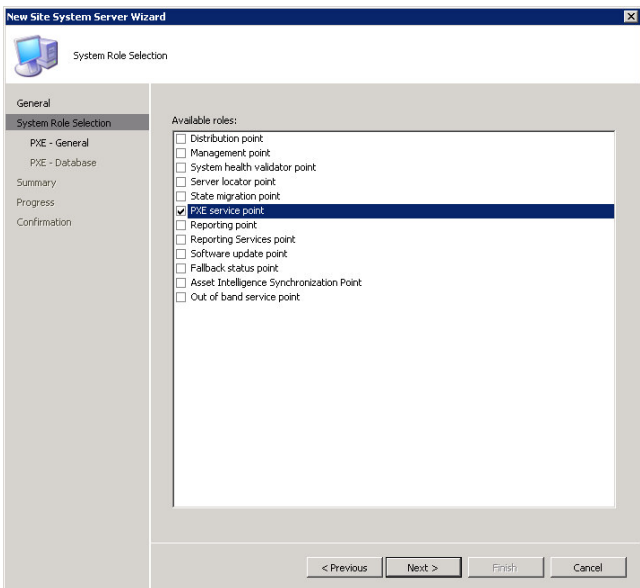
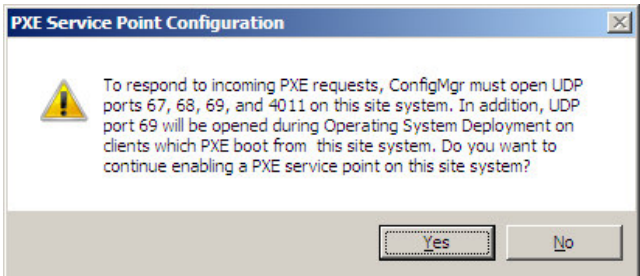
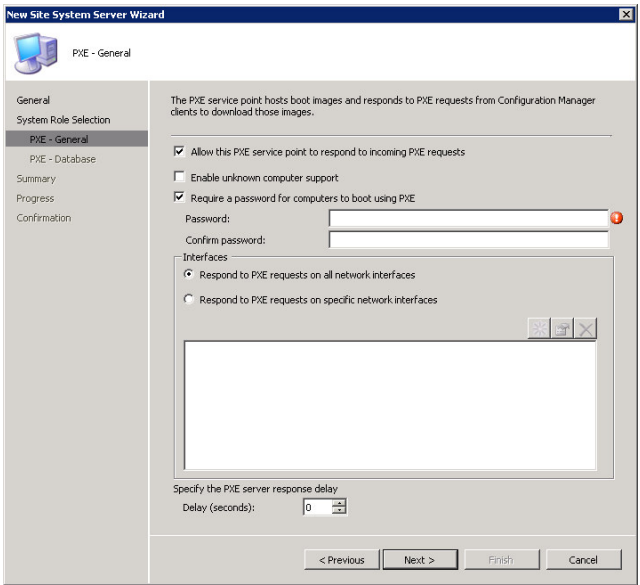
It is not necessary to configure the WDS server because Configuration Manager will perform the required configuration when the server is added as a PXE service point.

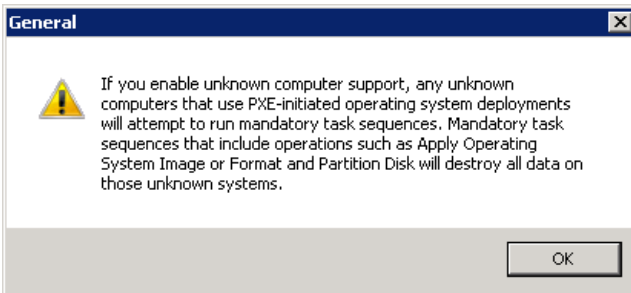
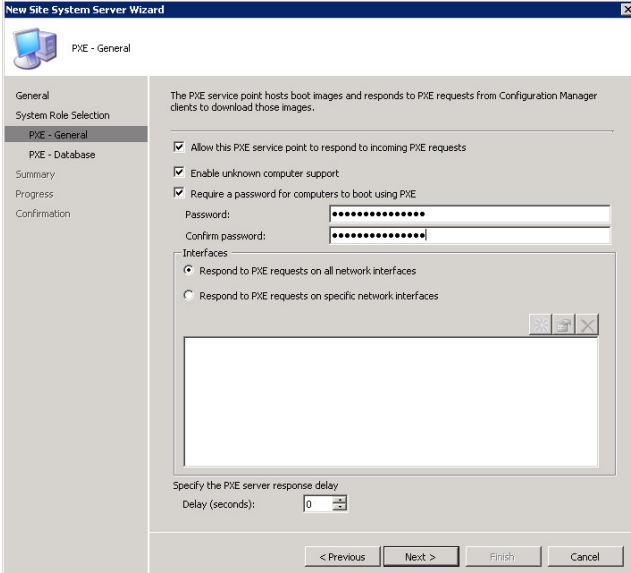


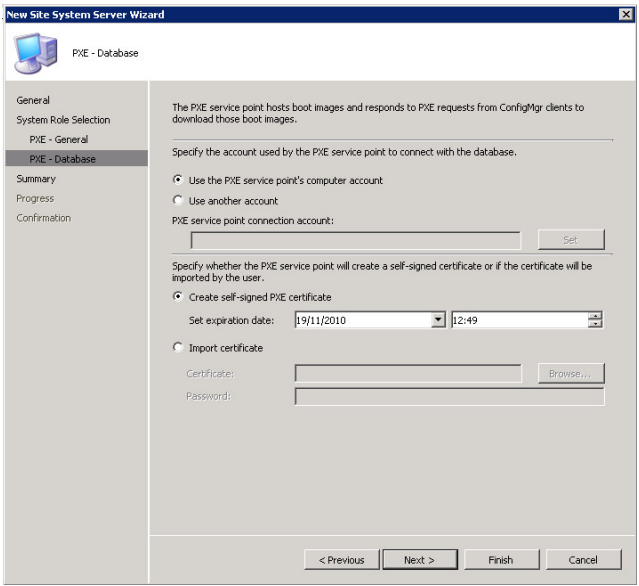
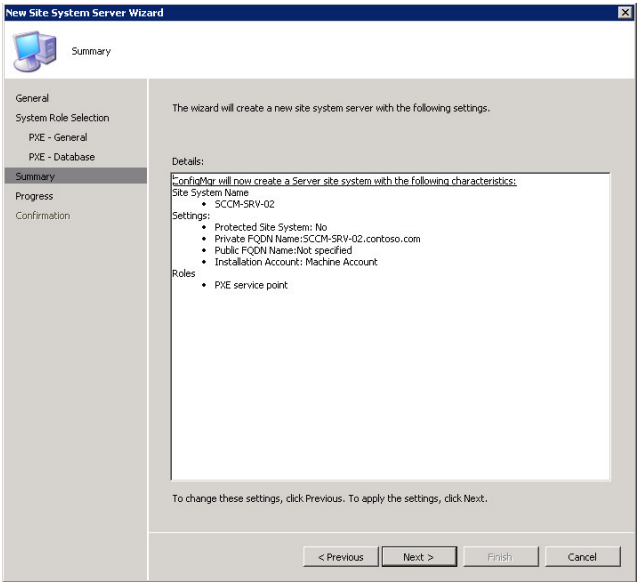
### 5.1.3.2 PXE Service Point Configuration

Table 9 shows the steps required to configure the WDS server as a PXE service point:

Step	Description	Screenshot
1.	If the WDS service is on a server other than the site server, the healthcare IT Administrator will need to add the site server's computer account as a local administrator on the WDS server using the <b>Configuration &gt; Local Users and Groups</b> node in <b>Server Manager</b> .	
2.	<p>If the WDS service is installed on a server that is not hosting any other Configuration Manager roles, it must be added as a new site system.</p> <p>Open the <b>Configuration Manager Console</b>, right-click on the <b>Site Systems</b> node and select <b>New &gt; Server</b>.</p> <p>If the WDS service was installed on the site server or a server that already hosts a Configuration Manager site system role, right-click on the server object that will host the PXE service point role under <b>Site Systems</b>, and select <b>New Roles</b>.</p>	
3.	Enter the <b>Name</b> of the server and specify the <b>Intranet FQDN</b> (for example, 'SCCM-SRV-01.contoso.com') and click <b>Next</b> .	

Step	Description	Screenshot
4.	Select <b>PXE service point</b> and click <b>Next</b> .	 <p>The screenshot shows the 'New Site System Server Wizard' window, specifically the 'System Role Selection' step. On the left, a navigation pane lists 'General', 'System Role Selection', 'PXE - General', 'PXE - Database', 'Summary', 'Progress', and 'Confirmation'. The 'System Role Selection' pane is active, showing a list of 'Available roles'. The 'PXE service point' checkbox is checked and highlighted. Other roles include Distribution point, Management point, System health validator point, Server locator point, State migration point, Reporting point, Reporting Services point, Software update point, Fallback status point, Asset Intelligence Synchronization Point, and Out of band service point. At the bottom are buttons for '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>
5.	Click <b>Yes</b> .	 <p>The screenshot shows the 'PXE Service Point Configuration' dialog box. It features a yellow warning triangle icon. The text reads: 'To respond to incoming PXE requests, ConfigMgr must open UDP ports 67, 68, 69, and 4011 on this site system. In addition, UDP port 69 will be opened during Operating System Deployment on clients which PXE boot from this site system. Do you want to continue enabling a PXE service point on this site system?'. At the bottom right, the 'Yes' button is highlighted, and the 'No' button is also visible.</p>
6.	Select <b>Enable unknown computer support</b> , if required.	 <p>The screenshot shows the 'New Site System Server Wizard' window, specifically the 'PXE - General' step. The left navigation pane is the same as in step 4. The 'PXE - General' pane is active, showing configuration options for the PXE service point. It includes a description: 'The PXE service point hosts boot images and responds to PXE requests from Configuration Manager clients to download those images.' Below this, there are three checkboxes: 'Allow this PXE service point to respond to incoming PXE requests' (checked), 'Enable unknown computer support' (checked), and 'Require a password for computers to boot using PXE' (checked). There are input fields for 'Password:' and 'Confirm password:'. Under the 'Interfaces' section, there are two radio buttons: 'Respond to PXE requests on all network interfaces' (selected) and 'Respond to PXE requests on specific network interfaces'. Below this is a list box for selecting specific interfaces. At the bottom, there is a 'Specify the PXE server response delay' section with a 'Delay (seconds):' input field set to 0. At the bottom are buttons for '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>

Step	Description	Screenshot
7.	<p><b>Important</b></p> <p>If unknown computer support is enabled, any mandatory advertisements that deploy operating systems will run on client machines that do not have the Configuration Manager already installed. If unknown computer support is not enabled, the healthcare IT Administrator must manually import computer information, such as MAC addresses and SMBIOS GUIDs, before a new computer will be able to install an image from the PXE service point. It is strongly recommended that the healthcare IT Administrator fully tests this feature in an isolated test lab before implementing into a production network, because misconfigurations could result in irretrievable loss of data and severe service interruption.</p> <p>Click <b>OK</b>.</p>	 <p>The screenshot shows a 'General' dialog box with a yellow warning icon. The text inside reads: 'If you enable unknown computer support, any unknown computers that use PXE-initiated operating system deployments will attempt to run mandatory task sequences. Mandatory task sequences that include operations such as Apply Operating System Image or Format and Partition Disk will destroy all data on those unknown systems.' There is an 'OK' button at the bottom right.</p>
8.	<p>Select <b>Require a password for computers to boot using PXE</b>, if required, and enter a <b>Password</b>.</p> <p><b>Note.</b></p> <p>By entering a password, the risk of inadvertently deploying an operating system is removed because the user will need to enter a password before the operating is deployed. However, specifying a password means that a user must be present in order for the operating system installation to run. These options should be configured in production only after full testing has been performed and the requirements of the solution are fully understood. Click <b>Next</b>.</p>	 <p>The screenshot shows the 'New Site System Server Wizard' with the 'PXE - General' tab selected. The left sidebar shows a tree view with 'General', 'System Role Selection', 'PXE - General' (selected), 'PXE - Database', 'Summary', 'Progress', and 'Confirmation'. The main area contains the following options:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Allow this PXE service point to respond to incoming PXE requests</li> <li><input checked="" type="checkbox"/> Enable unknown computer support</li> <li><input checked="" type="checkbox"/> Require a password for computers to boot using PXE       <ul style="list-style-type: none"> <li>Password: [password field]</li> <li>Confirm password: [password field]</li> </ul> </li> <li>Interfaces:       <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Respond to PXE requests on all network interfaces</li> <li><input type="radio"/> Respond to PXE requests on specific network interfaces</li> </ul> </li> </ul> <p>At the bottom, there is a section for 'Specify the PXE server response delay' with a 'Delay (seconds):' field set to 0. Navigation buttons '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel' are at the bottom right.</p>

Step	Description	Screenshot
9.	Click <b>Next</b> .	
10.	Click <b>Next</b> .	

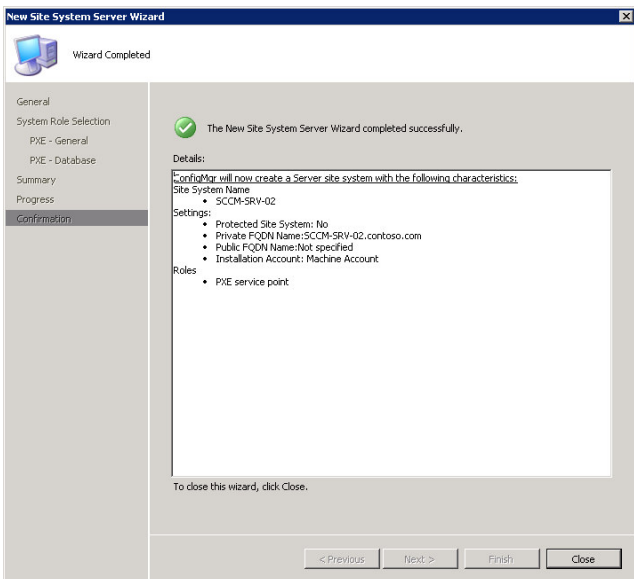
Step	Description	Screenshot
11.	Click <b>Close</b> .	

Table 9: PXE Service Point Configuration

The healthcare IT Administrator can review the following logs to determine if the PXE service point installation was successful:

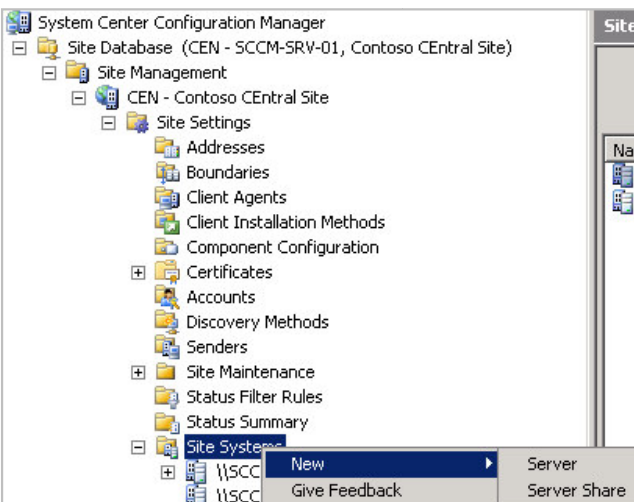
- C:\SMS\Logs\PXESetup.log, if the PXE service point is located on a server other than the site server
- <Configuration Manager Installation Directory>\Logs\PXESetup.log, if the PXE service point role is installed on the site server

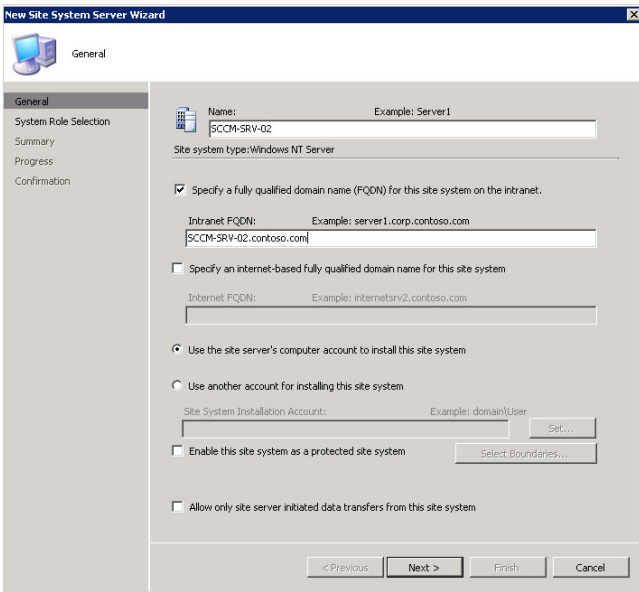
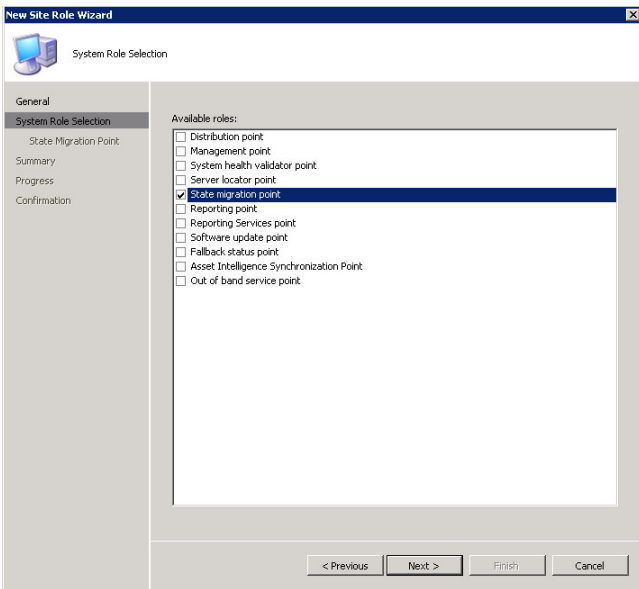
### 5.1.4 Infrastructure Prerequisites for User State Migration


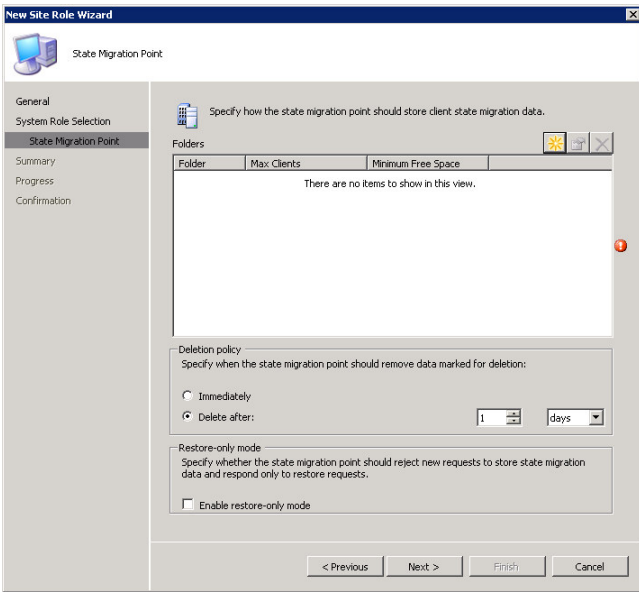
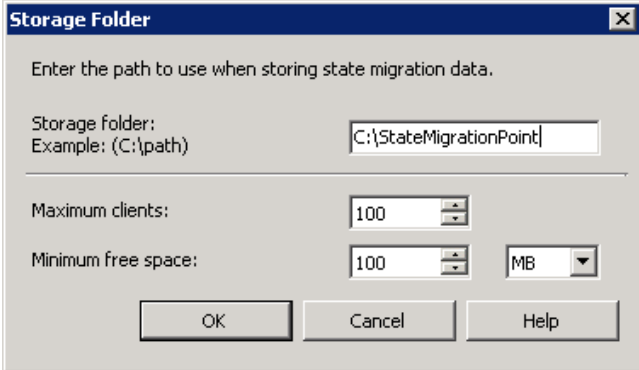
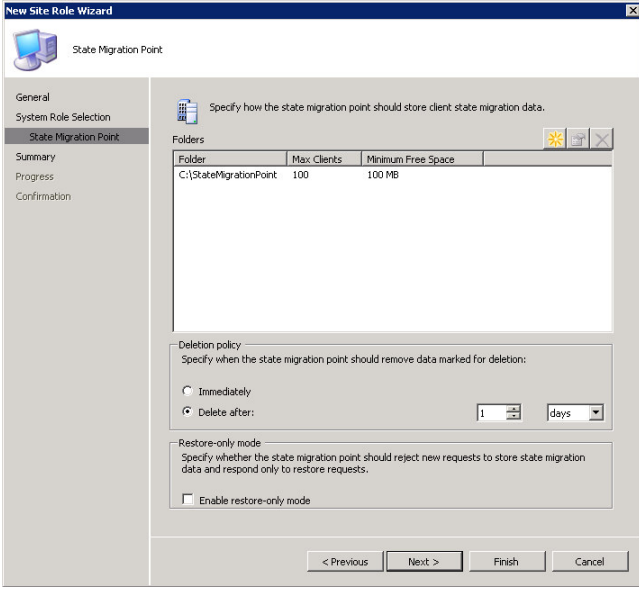
Configuration Manager uses a state migration point to store user data during an in-place upgrade or a side-by-side migration. Table 10 shows the steps for configuring the state migration point.

#### Important

The state migration point also requires Internet Information Services (IIS). If using Windows Server 2008, the IIS 6 Metabase Compatibility and IIS 6 WMI Compatibility role services must be installed.

Step	Description	Screenshot
1.	<p>If the state migration point role will be installed on a server that is not hosting any other Configuration Manager roles, it must be added as a new site system.</p> <p>Open the <b>Configuration Manager Console</b>, right-click on the <b>Site Systems</b> node and select <b>New &gt; Server</b>.</p> <p>If the state migration point will be installed on the site server or a server that already hosts a Configuration Manager site system role, right-click on the server object that will host the state migration point role under <b>Site Systems</b>, and select <b>New Roles</b>.</p>	

Step	Description	Screenshot
2.	Enter the <b>Name</b> of the server, specify the <b>Intranet FQDN</b> , (for example, 'SCCM-SRV-01.contoso.com') and click <b>Next</b> .	
3.	Select <b>State migration point</b> check box and click <b>Next</b> .	

Step	Description	Screenshot
4.	Click  to add a new folder for state location to be stored. Multiple folders can be specified, if required.	
5.	Enter a folder location in the <b>Storage folder</b> text box and specify the <b>Maximum clients</b> that can store data in this folder. The state migration point will stop accepting client state migration requests if the disk reaches the value specified in <b>Minimum free space</b> . Click <b>OK</b> .	
6.	In <b>Deletion policy</b> , specify how long the state migration point should retain data after it has been marked for deletion. Data is marked for deletion once it has been restored to the client machine. Selecting <b>Enable restore-only mode</b> prevents the state migration point from accepting new connections to store user state but allows it to accept requests to restore existing user data. Click <b>Next</b> .	

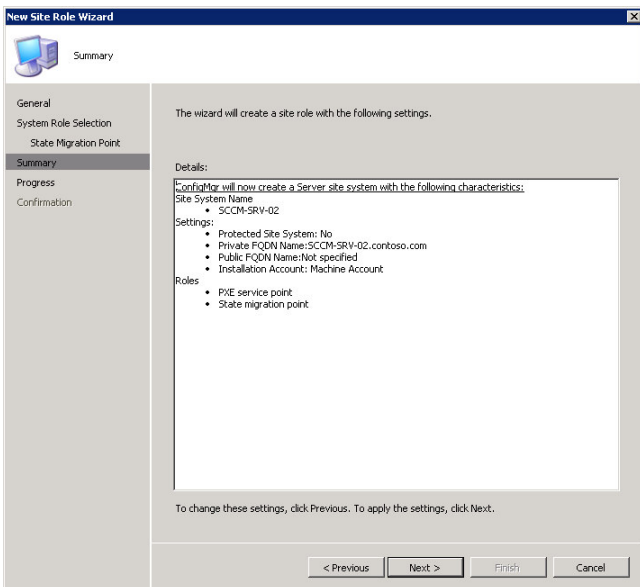
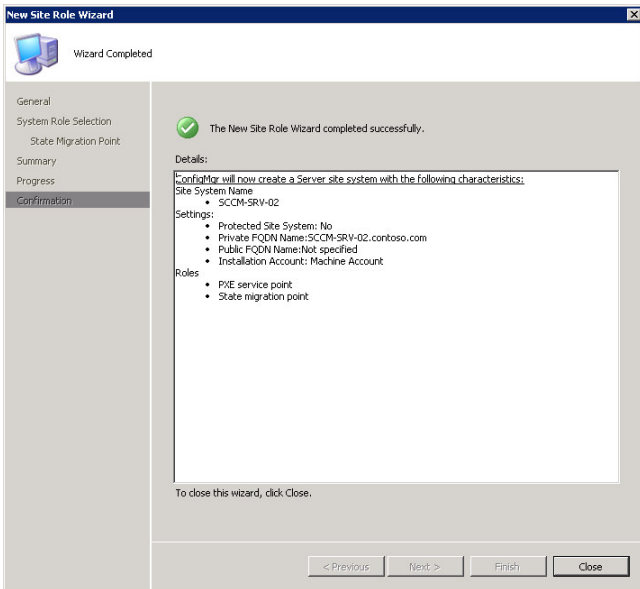
Step	Description	Screenshot
7.	Click <b>Next</b> .	
8.	Click <b>Close</b> .	

Table 10: State Migration Point Configuration

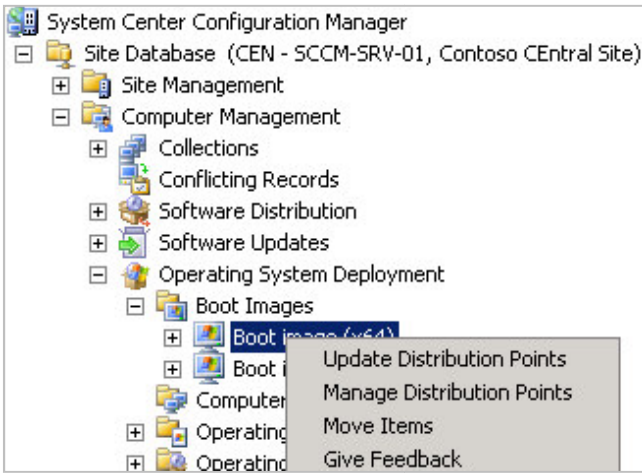
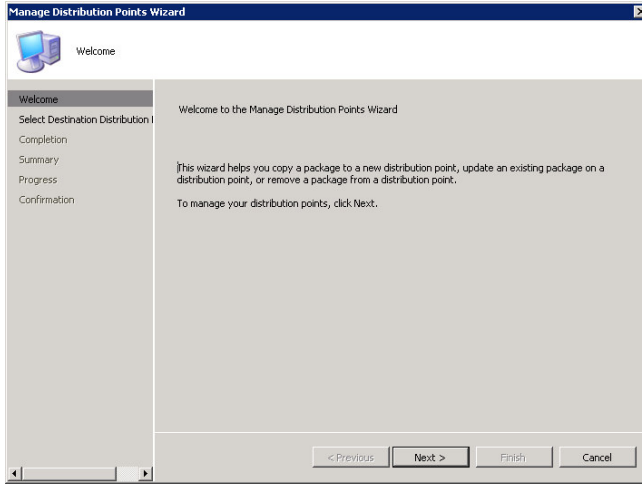
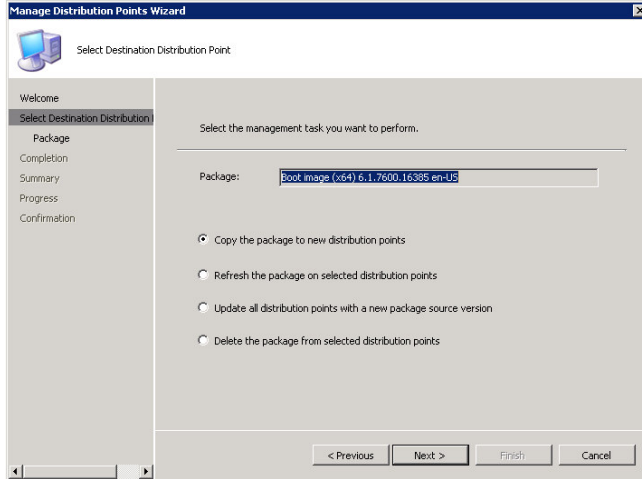
## 5.2 Boot Images

Boot images are provided with Configuration Manager and added as part of setup. The boot image is a customised version of Windows PE that is deployed to client machines to allow them to connect to Configuration Manager DPs and download the files required for operating system deployment. Once the new PXE service point has been successfully installed, the boot images must be copied to the DPs.



## 5.2.1 Adding a Boot Image to Distribution Points

Table 11 shows the steps required to add the boot images to Configuration Manager DPs:

Step	Description	Screenshot
1.	<p>Open the <b>Configuration Manager Console</b>, right-click on the boot image that will be deployed to the DPs and select <b>Manage Distribution Points</b>.</p> <p><b>Note</b></p> <p>These steps should be performed for both the x86 and X64 boot images even if the healthcare organisation only intends to deploy 32-bit operating systems.</p>	
2.	Click <b>Next</b> .	
3.	Select <b>Copy the package to new distribution points</b> and click <b>Next</b> .	

Step	Description	Screenshot
4.	Select the check boxes of all DPs that will be contacted during an operating system installation. This must include the normal DPs and any SMSPXEIMAGE\$ DPs. The SMSPXEIMAGE\$ DP is the PXE service point.	<p>The screenshot shows the 'Manage Distribution Points Wizard' in the 'Package' step. The left pane shows the wizard steps: Welcome, Select Destination Distribution Point, Package, Completion, Summary, Progress, and Confirmation. The 'Package' step is active. The main pane shows a table of distribution points with checkboxes selected for 'SCCM-SRV-01' and 'SCCM-SRV-02(SMSPXEIMAGE\$)'. The table has columns for Name, Site, and Type. Buttons for 'Select All', 'Clear All', and 'Select Group...' are on the right. Navigation buttons '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel' are at the bottom.</p>
5.	Click <b>Next</b> .	<p>The screenshot shows the 'Manage Distribution Points Wizard' in the 'Completion' step. The left pane shows the wizard steps: Welcome, Select Destination Distribution Point, Package, Completion, Summary, Progress, and Confirmation. The 'Completion' step is active. The main pane shows a message: 'You have successfully completed the Manage Distribution Points Wizard.' It also displays the package name 'Boot image (x64) 6.1.7600.16385 en-US' and instructions to click 'Next' when ready to copy the package. Navigation buttons '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel' are at the bottom.</p>
6.	Click <b>Next</b> .	<p>The screenshot shows the 'Manage Distribution Points Wizard' in the 'Summary' step. The left pane shows the wizard steps: Welcome, Select Destination Distribution Point, Package, Completion, Summary, Progress, and Confirmation. The 'Summary' step is active. The main pane shows a message: 'Updating the boot image will begin when you click 'Next''. It also displays a list of 'Selected distribution points' including 'SCCM-SRV-01' and 'SCCM-SRV-02(SMSPXEIMAGE\$)'. Navigation buttons '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel' are at the bottom.</p>

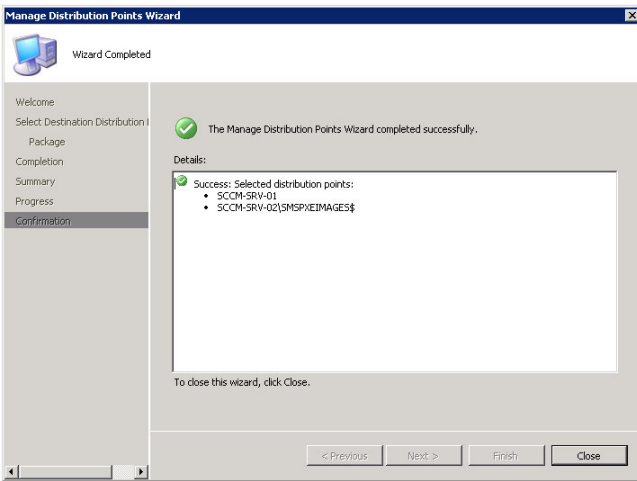
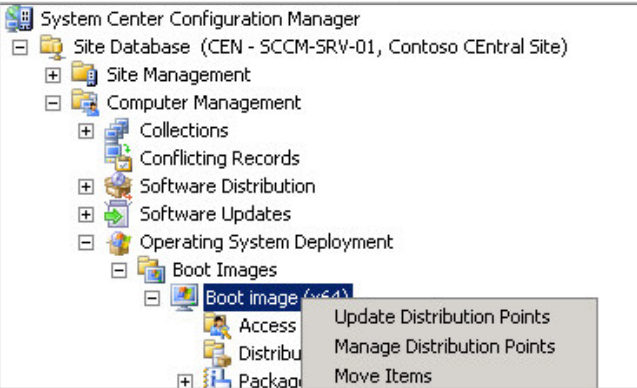
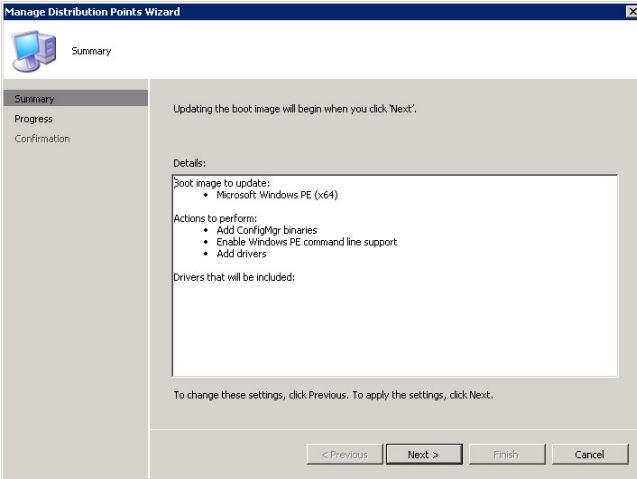
Step	Description	Screenshot
7.	Click <b>Close</b> .	

Table 11: Adding Boot Images to Distribution Points

## 5.2.2 Updating Boot Images and Distribution Points

If any changes are made to the boot images, such as enabling command-line support for troubleshooting or adding drivers, the boot images must be updated on DPs before the changes will be effective. Table 12 shows the steps required to update the DPs:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the boot image that will be deployed to the DPs and select <b>Update Distribution Points</b> .	
2.	Click <b>Next</b> .	

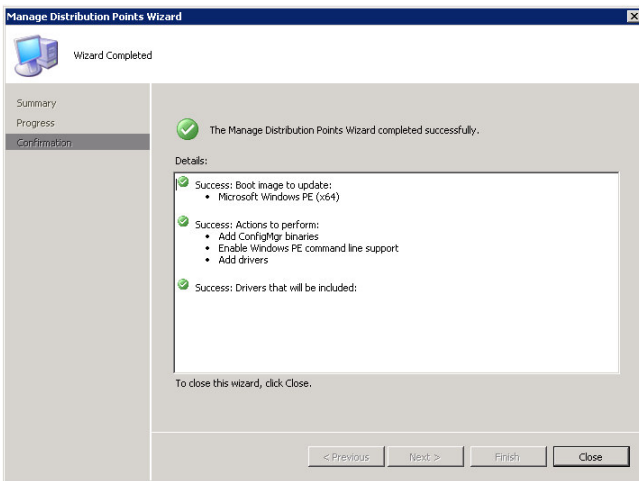
Step	Description	Screenshot
3.	Click <b>Close</b> .	

Table 12: Updating Boot Images on Distribution Points

### 5.2.3 Verifying Boot Image Distribution Points

Once the boot images have been deployed to the DPs the healthcare IT Administrator can verify that they have successfully reached the DPs by checking the package status. Table 13 shows the package status for the boot image deployment:

Step	Description	Screenshot / Details																
1.	Open the <b>Configuration Manager Console</b> and select the site object under the boot images <b>Package Status</b> node. The <b>Last Copied</b> time in the right pane shows the last successful deployment to each of the DPs.	<div><div><div>System Center Configuration Manager<ul style="list-style-type: none"><li>Site Database (CEN - SCCM-SRV-01, Cor)<ul style="list-style-type: none"><li>Site Management<ul style="list-style-type: none"><li>Computer Management<ul style="list-style-type: none"><li>Collections<ul style="list-style-type: none"><li>Conflicting Records</li><li>Software Distribution</li><li>Software Updates</li><li>Operating System Deployment<ul style="list-style-type: none"><li>Boot Images<ul style="list-style-type: none"><li>Boot image (x64)<ul style="list-style-type: none"><li>Access Accounts</li><li>Distribution Points</li><li>Package Status</li><li>Package Status<ul style="list-style-type: none"><li>CEN - Contoso</li></ul></li></ul></li></ul></li></ul></li></ul></li></ul></li></ul></li></ul></li></ul></div><div><div>CEN - Contoso Central Site 3 items found</div><div>Look for: <input type="text"/></div><table><thead><tr><th>Distribution Point</th><th>S...</th><th>State</th><th>Last Copied</th></tr></thead><tbody><tr><td>\\SCCM-SRV-01</td><td>5</td><td>Installed</td><td>19/11/2009 13:44</td></tr><tr><td>\\SCCM-SRV-01\S...</td><td>5</td><td>Installed</td><td>19/11/2009 13:44</td></tr><tr><td>\\SCCM-SRV-02\S...</td><td>5</td><td>Installed</td><td>19/11/2009 13:43</td></tr></tbody></table></div></div></div>	Distribution Point	S...	State	Last Copied	\\SCCM-SRV-01	5	Installed	19/11/2009 13:44	\\SCCM-SRV-01\S...	5	Installed	19/11/2009 13:44	\\SCCM-SRV-02\S...	5	Installed	19/11/2009 13:43
Distribution Point	S...	State	Last Copied															
\\SCCM-SRV-01	5	Installed	19/11/2009 13:44															
\\SCCM-SRV-01\S...	5	Installed	19/11/2009 13:44															
\\SCCM-SRV-02\S...	5	Installed	19/11/2009 13:43															

Table 13: Verifying Boot Image Deployment

## 5.3 Building and Capturing a Reference Machine

A Reference Machine is a computer that contains the required operating system and applications that will make up the base image for deployment within Configuration Manager. This machine can be created in one of three ways:

- Using a Configuration Manager Task Sequence
- Using *Healthcare MDT 2010 {R9}* and the Operating System Capture Wizard
- Manually installing and capturing using the Operating System Capture Wizard

It is recommended that the healthcare IT Administrator uses either of the first two options, because creating the reference machine manually can lead to inconsistencies or introduce human error. The other advantage of using an automated method to create the reference machine is that if any changes need to be made to the image in future, the reference machine can be easily modified and recreated using the task sequences in Configuration Manager or *Healthcare MDT 2010 {R9}*.

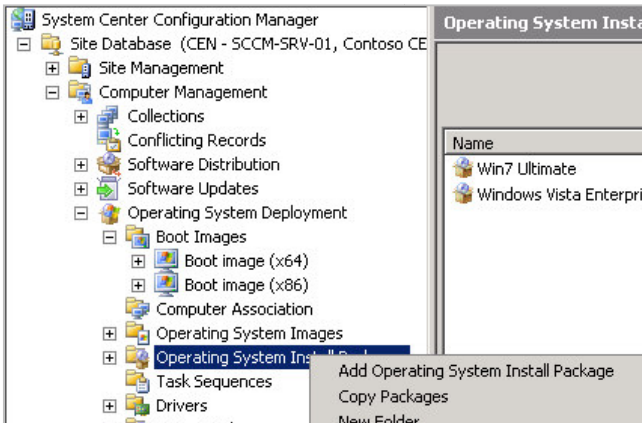
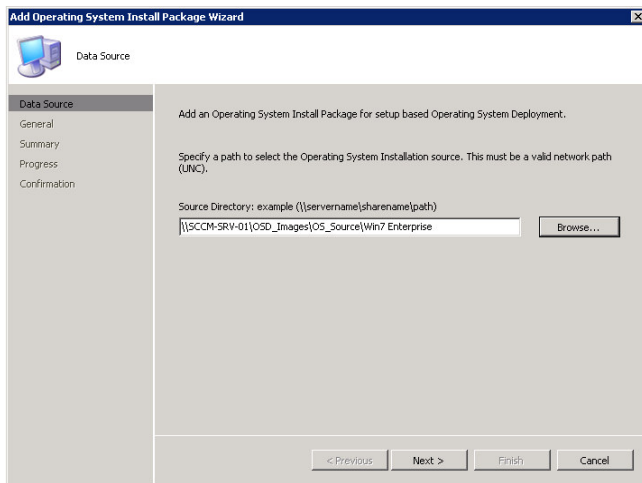
### 5.3.1 Creating the Reference Machine

In order to create an operating system image using a Configuration Manager task sequence, the administrator must perform the following tasks:

- Create an Operating System Install Package
- Create an Operating System Install Task Sequence
- Advertise the Operating System Install Task Sequence

#### 5.3.1.1 Creating an Operating System Install Package

The Operating System Install Package contains the files required to install the operating system. Table 14 shows the steps for creating the operating system install package for Windows 7 Enterprise Edition (X86):

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Operating System Install Packages</b> node and select <b>Add Operating System Install Package</b> .	
2.	In the <b>Source Directory</b> text box, enter the location of the setup files for the operating system in the format <code>\\ServerName\ShareName\Folder</code> and click <b>Next</b> .	

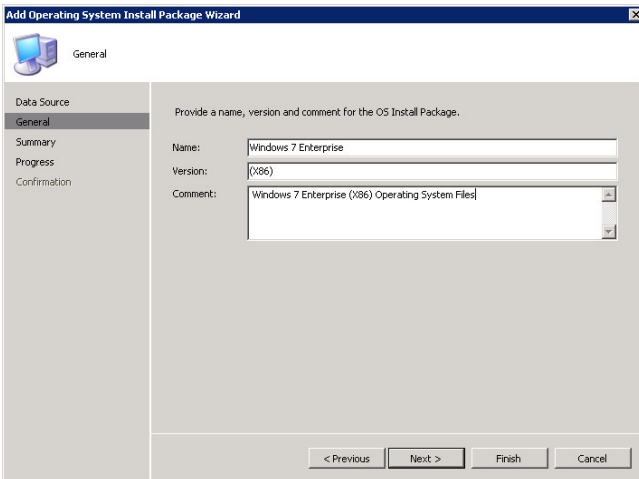
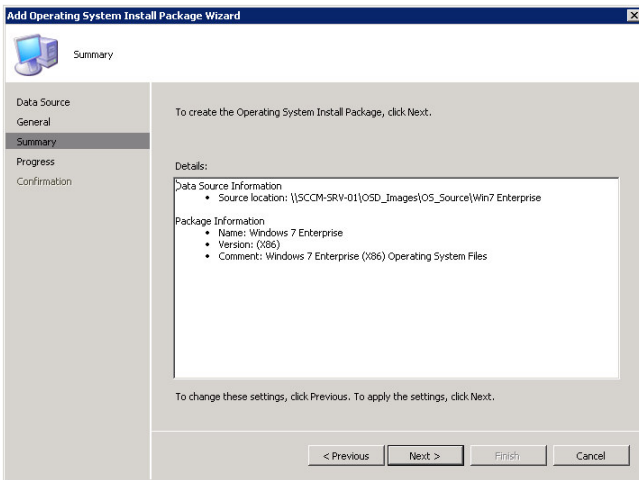
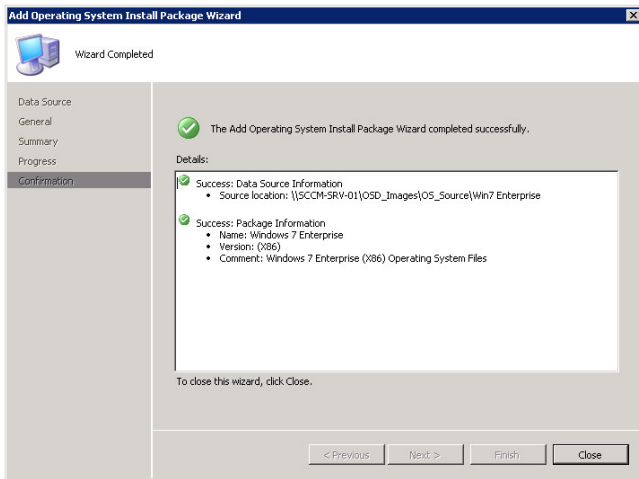
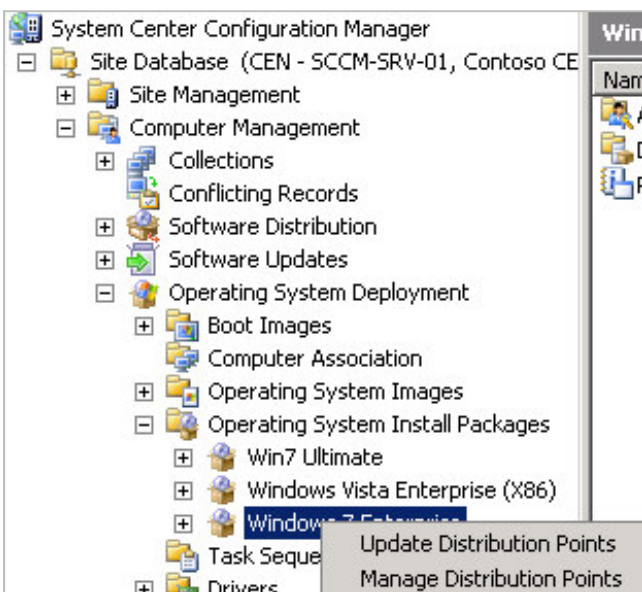
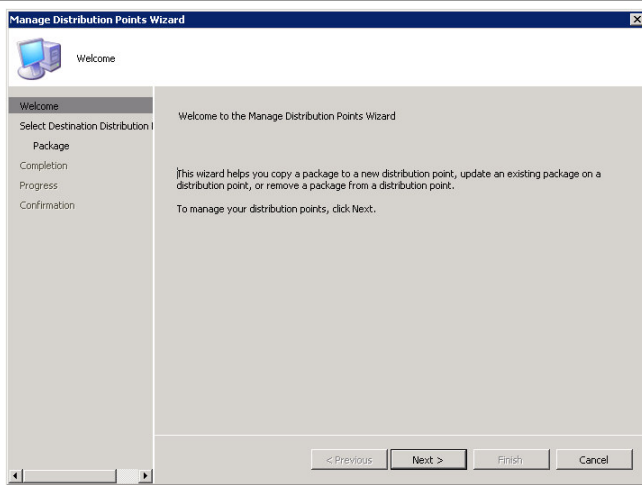
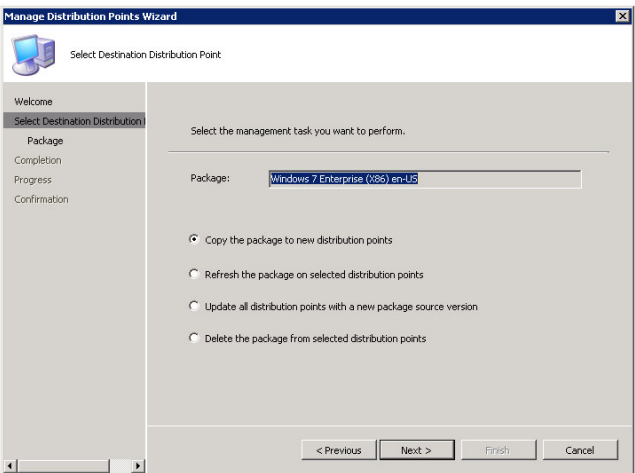
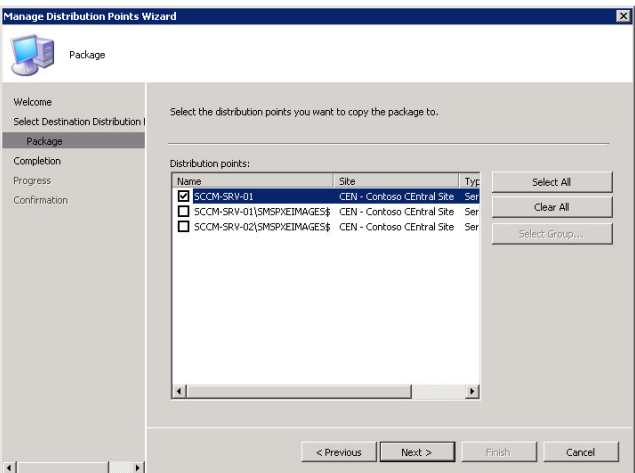
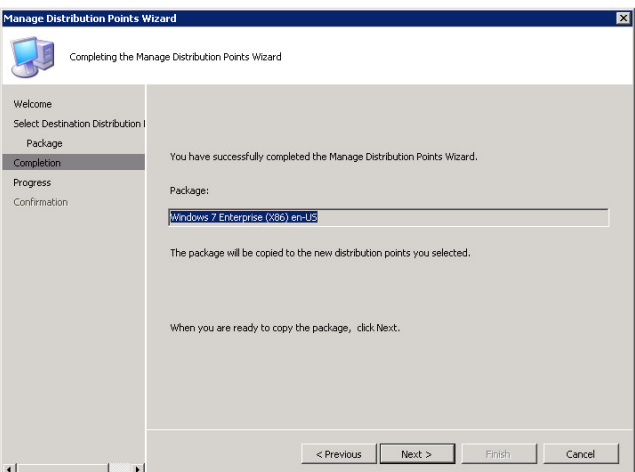
Step	Description	Screenshot
3.	Enter a <b>Name</b> for the Operating System Install Package and optionally enter the version and a comment. Click <b>Next</b> .	
4.	Click <b>Next</b> .	
5.	Click <b>Close</b> .	

Table 14: Creating an Operating System Install Package

### 5.3.2 Adding an Operating System Install Package to Distribution Points

Once the Operating System Install Package has been created, it must be deployed to any required DPs so that it is available to clients. Table 15 shows the steps required to add the Operating System Install Package to DPs:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the operating system install package that will be deployed to the DPs and select <b>Manage Distribution Points</b> .	
2.	Click <b>Next</b> .	

Step	Description	Screenshot
3.	Click <b>Copy the package to the distribution points</b> and click <b>Next</b> .	
4.	<p>Select the check boxes of the DPs that are required to host the Operating System Install Package and click <b>Next</b>.</p> <p><b>Note</b></p> <p>The healthcare IT Administrator should only select DPs that will be contacted to receive the OS Install Package for building the reference machine. DPs that are in locations other than the IM&amp;T department will likely not need the package. DPs hosted on PXE service points that have SMSPXEIMAGE\$ in the name must not be selected as these DPs should only contain boot images.</p>	
5.	Click <b>Next</b> .	



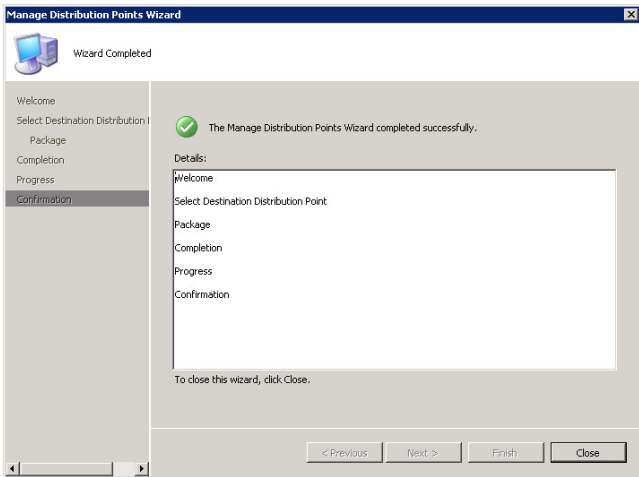
Step	Description	Screenshot
6.	Click <b>Close</b> .	

Table 15: Adding Operating System Install Package to Distribution Points

### 5.3.3 Verifying Operating System Install Package Distribution Points

Once the Operating System Install Package has been deployed to the DPs, the healthcare IT Administrator can verify that they have successfully reached the DPs by checking the package status. Table 16 shows the package status for the Operating System Install Package deployment:

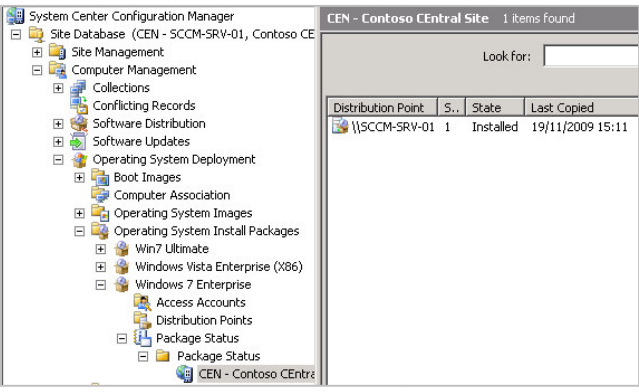
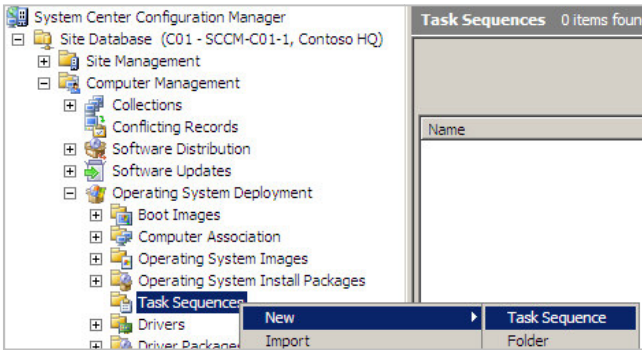
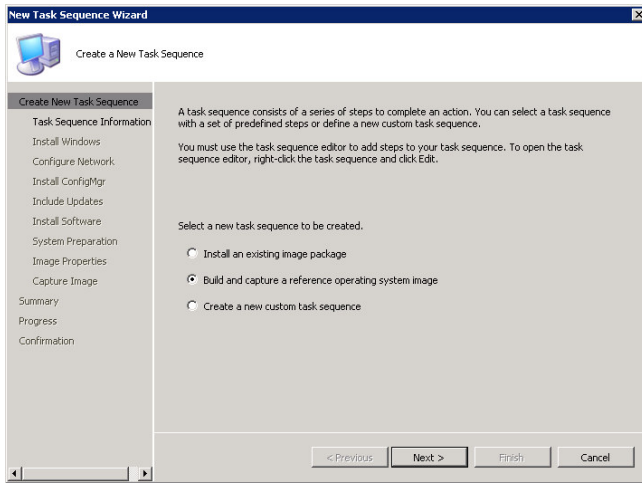
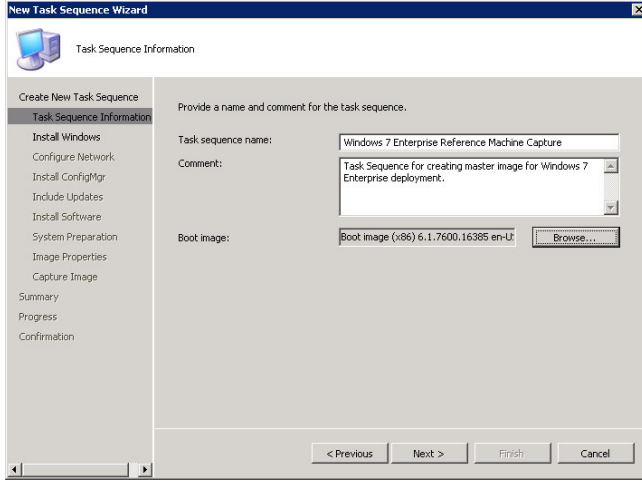
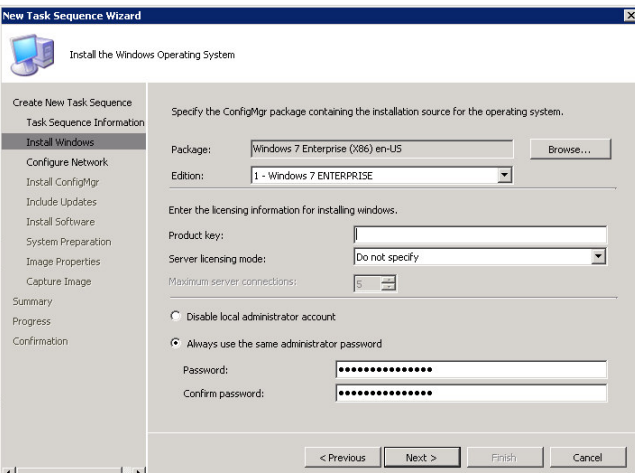
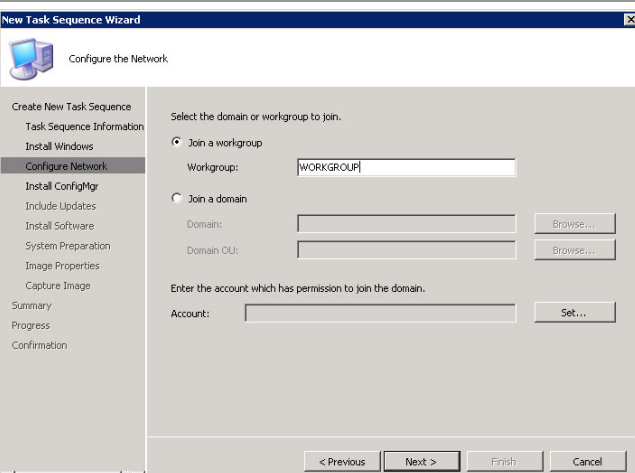
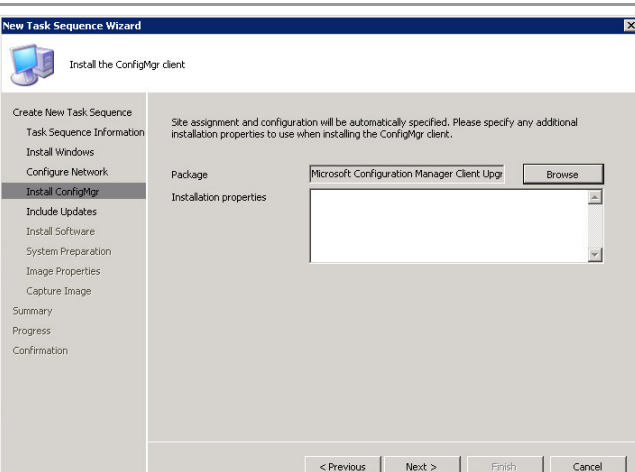
Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and select the site object under the operating system install package <b>Package Status</b> node. The <b>Last Copied</b> time in the right pane shows the last successful deployment to each of the DPs.	


Table 16: Verifying Operating System Install Package Deployment

### 5.3.4 Creating an Operating System Install Package Task Sequence

Everything is now in place to allow the operating system to be deployed and captured using a task sequence. Table 17 shows the steps required to create a task sequence for deploying and capturing an operating system image:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Task Sequences</b> node and select <b>New &gt; Task Sequence</b> .	
2.	Click <b>Build and capture a reference operating system image</b> and click <b>Next</b> .	
3.	Enter a <b>Task sequence name</b> and click the <b>Browse</b> button to select the appropriate <b>Boot image</b> . Click <b>Next</b> .	

Step	Description	Screenshot
4.	<p>Select the operating system install package using the <b>Browse</b> button and select the <b>Edition</b> from the image. If using Enterprise Edition, there will only be one edition available; this is not the case for other versions.</p> <p>Click <b>Always use the same administrative password</b> and specify a <b>Password</b>.</p> <p>Click <b>Next</b>.</p>	
5.	<p>Click <b>Join a workgroup</b> and enter the name of the <b>Workgroup</b>. Click <b>Next</b>.</p>	
6.	<p>Click <b>Browse</b> and select the Configuration Manager client package created in section 5.1.2.1, and then click <b>Next</b>.</p>	

Step	Description	Screenshot
7.	<p>Click <b>Don't install any software updates</b> and click <b>Next</b>.</p> <p><b>Note</b></p> <p>If the healthcare organisation is using software update management in Configuration Manager, software updates can be installed at this stage. This will prevent newly-deployed machines from needing to be updated. For more information on using the software update management features of Configuration Manager, see the <i>System Center Configuration Manager 2007 Software Update Management Guide {R10}</i>.</p>	
8.	<p>Use the 'Add package' button  to add any required software distribution packages that should be installed into the image. This will likely be software such as 2007 Microsoft® Office. More information on creating software distribution packages is available in the <i>System Center Configuration Manager 2007 Software Distribution Guide {R11}</i>.</p> <p>Click <b>Next</b>.</p>	
9.	<p>Click <b>Next</b>.</p> <p><b>Note</b></p> <p>If the healthcare IT Administrator is creating an image based on Windows XP, the Sysprep package created in section 5.1.2.3 should be selected using the <b>Browse</b> button.</p>	

Step	Description	Screenshot
10.	Enter the details of the healthcare IT Administrator that created the task sequence and a <b>Description</b> , and click <b>Next</b> .	
11.	In <b>Path</b> , enter the location that the Configuration Manager client should create the image file in the format \\Servername\Share\filename.wim and specify an <b>Account</b> that has permissions to create a file in the folder specified. Click <b>Next</b> .	
12.	Click <b>Next</b> .	

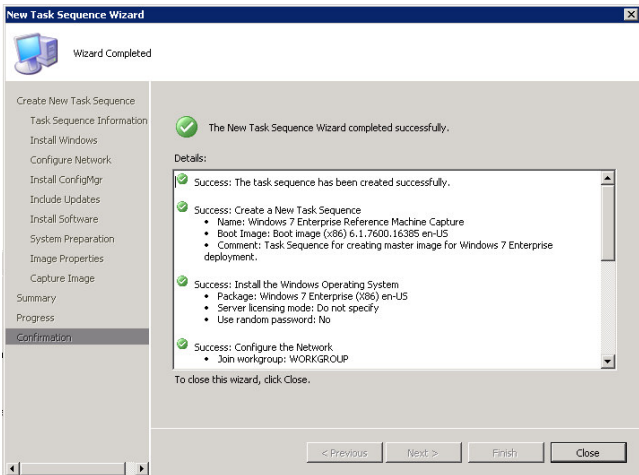
Step	Description	Screenshot
13.	Click <b>Close</b> .	

Table 17: Creating an Operating System Install and Capture Task Sequence

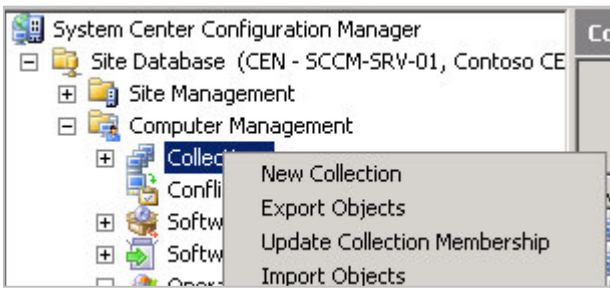
### 5.3.5 Advertising the Operating System Install Package Task Sequence

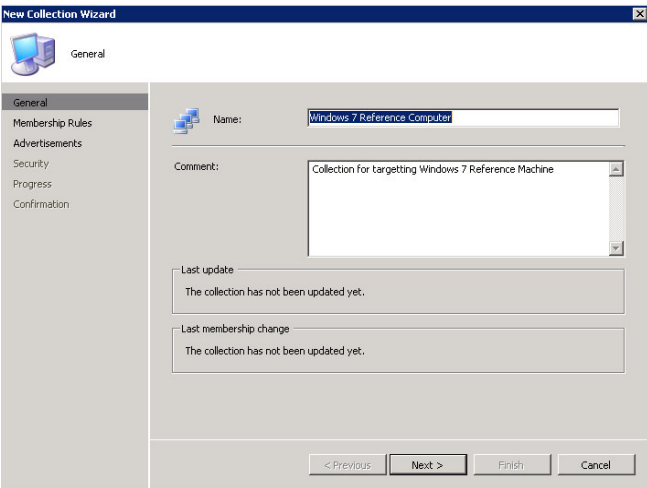
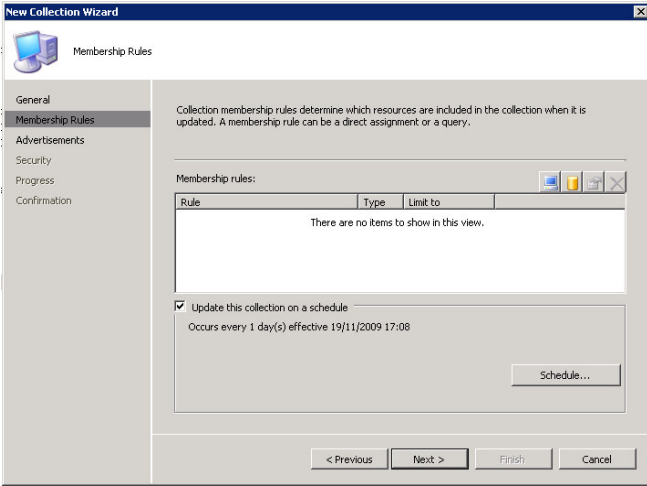
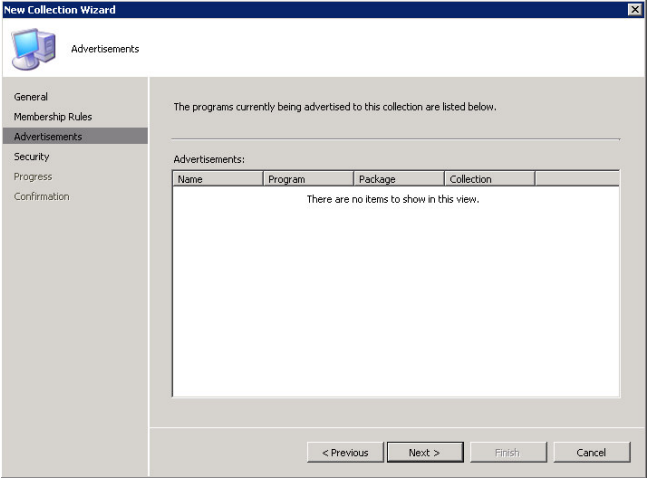
The task sequence is now ready to be deployed to the reference computer and captured. It is current best practice to use a virtual machine to act as the reference machine. This provides a number of benefits including:

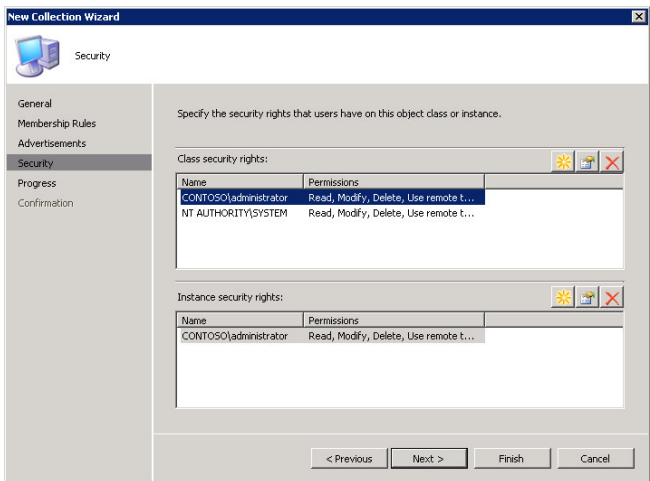
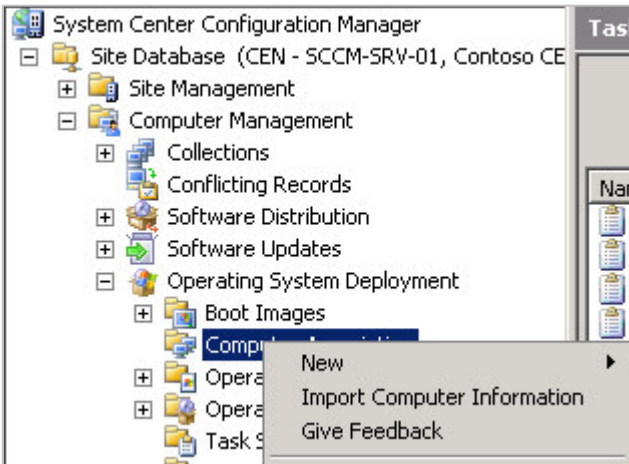
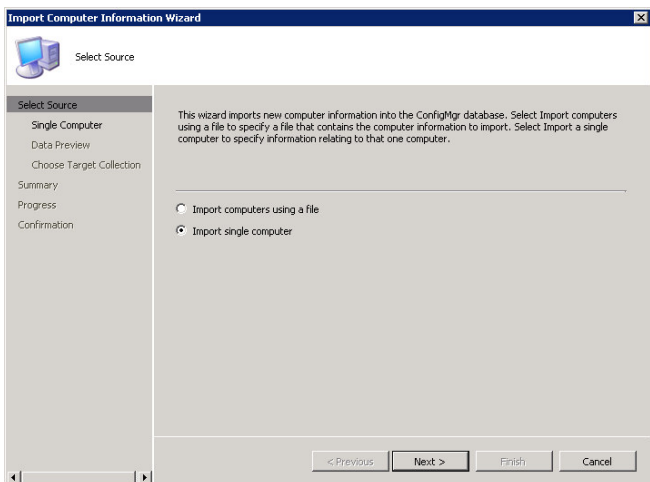
- No drivers required, if using Microsoft Hyper-V or VMWare®
- No requirement to maintain physical hardware in readiness for creating images

An healthcare IT Administrator can deploy and capture the operating system either by using the PXE service point and booting from the network, or by creating task sequence media that can be used to run the installation from a DVD or USB drive.

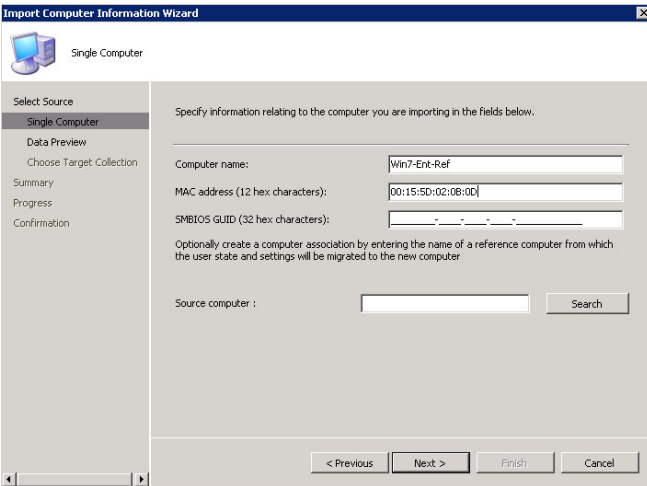
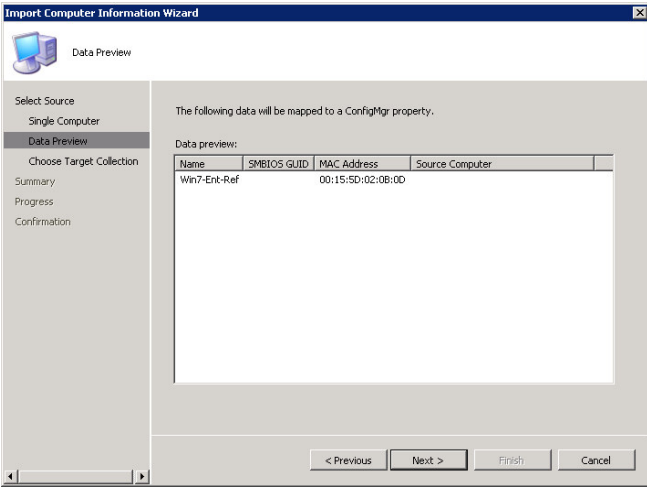
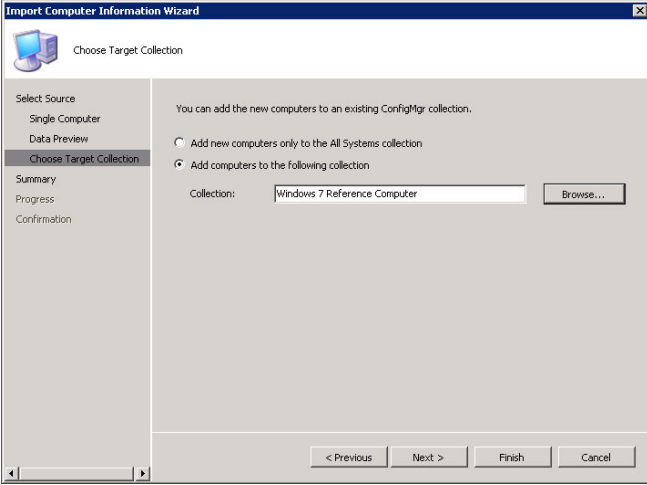
Table 19 later in this document shows the steps required to advertise the task sequence to the 'Unknown Computers' collection. This will allow the task sequence to be run by any machine that is not known to Configuration Manager. If the healthcare IT Administrator wishes to target a specific computer, the computer details need to be imported before the task sequence is advertised and a specific collection created that contains the newly-imported machine. Table 18 shows the steps required for importing computer information and adding it to a collection:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Collections</b> node and select <b>New Collection</b> .	

Step	Description	Screenshot
2.	Enter a <b>Name</b> for the collection and click <b>Next</b> .	
3.	Click <b>Next</b> .  <b>Note</b> When prompted, click <b>OK</b> to acknowledge that no membership rules have been defined.	
4.	Click <b>Next</b> .	

Step	Description	Screenshot
5.	Click <b>Finish</b> .	
6.	Right-click on <b>Computer Associations</b> and select <b>Import Computer Information</b> .	
7.	Click <b>Import single computer</b> and click <b>Next</b> .	



Step	Description	Screenshot
8.	Enter a <b>Computer name</b> and a <b>MAC address</b> for the reference computer, and click <b>Next</b> . <p><b>Tip</b> If using virtualisation, start the virtual machine with no operating system installed, and the MAC address is displayed in the BIOS startup screen.</p>	
9.	Click <b>Next</b> .	
10.	Click <b>Browse</b> to select the newly created collection and click <b>Next</b> .	

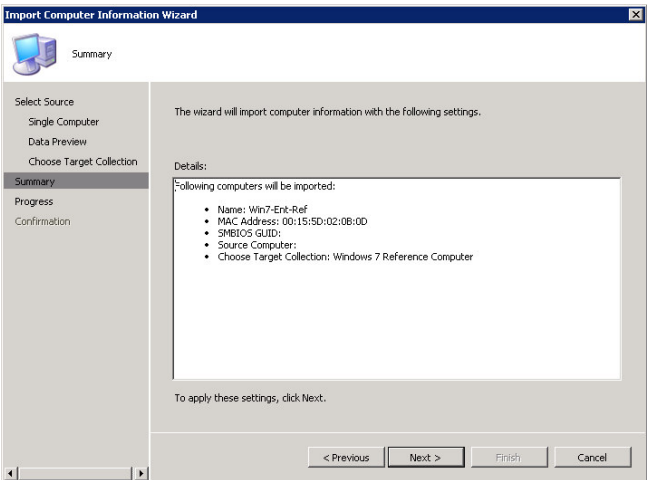
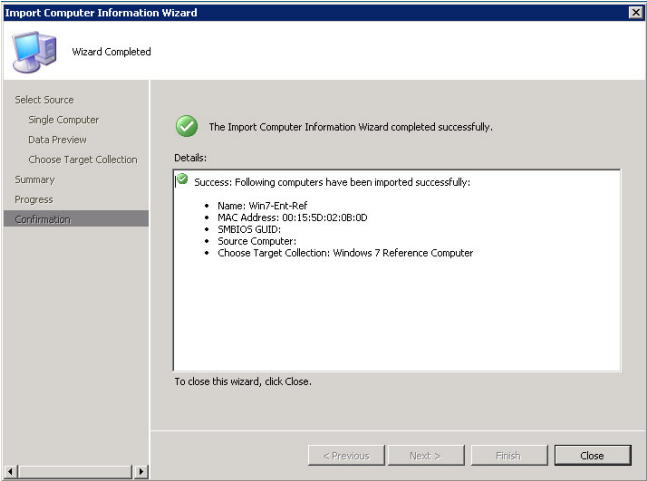
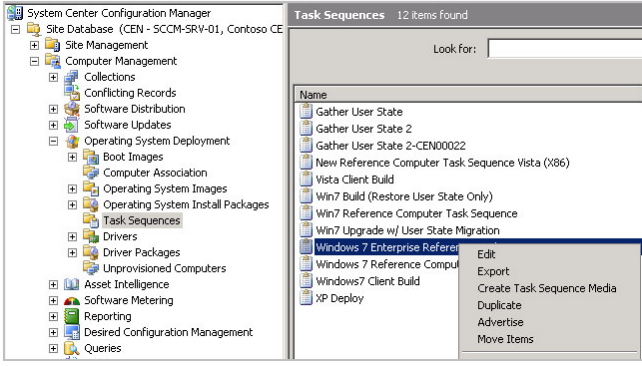
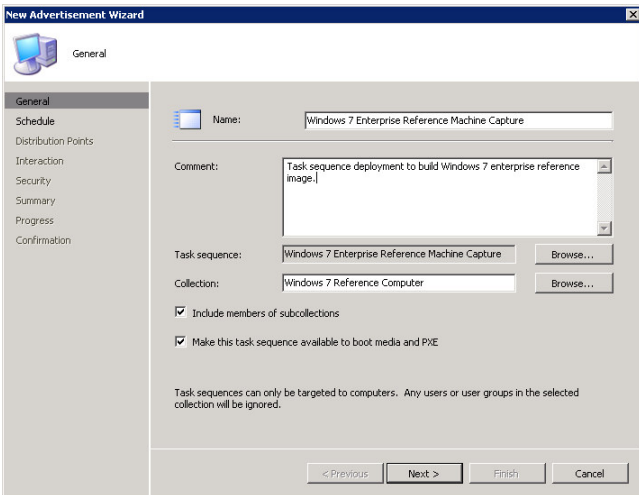
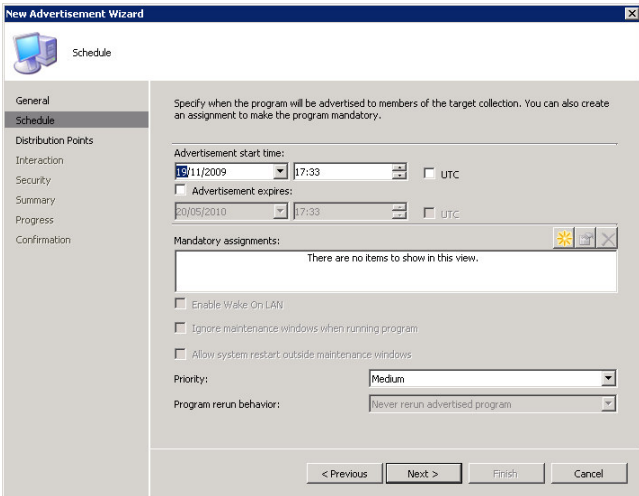
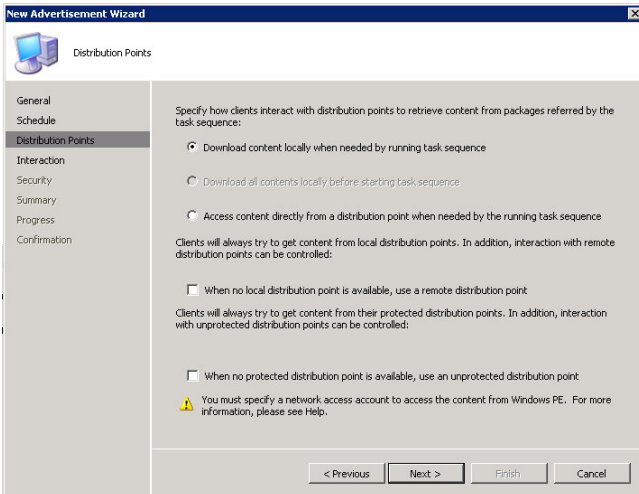

Step	Description	Screenshot
11.	Click <b>Next</b> .	
12.	Click <b>Close</b> .	

Table 18: Importing Computer Information and Creating a Collection

Table 19 shows the steps for advertising the task sequence:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , select <b>Task Sequences</b> , right-click on the task sequence created in section 5.3.4 and select <b>Advertise</b> .	

Step	Description	Screenshot
2.	<p>Enter a <b>Name for the advertisement</b> and use the <b>Browse</b> button to select a collection. If computer information has already been imported, select the collection that contains the machine. If computer information has not been imported, select the 'Unknown Computer' collection.</p> <p>Ensure the <b>Make this task sequence available to boot media and PXE</b> check box is selected and click <b>Next</b>.</p>	
3.	<p>Click <b>Next</b>.</p> <p><b>Note</b></p> <p><b>Mandatory assignments</b> can be created that will trigger the task sequence to be executed without it being selected, if required.</p>	
4.	<p>Click <b>Next</b>.</p>	

Step	Description	Screenshot
5.	Click <b>Next</b> .	
6.	If specific users or groups need to be able to modify the advertisements properties, click the  button to add any additional <b>Instance security rights</b> , and click <b>Next</b> .	
7.	Click <b>Next</b> .	

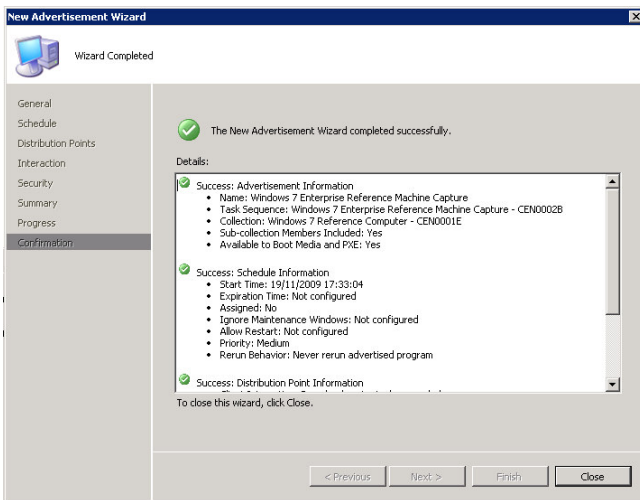


Step	Description	Screenshot
8.	Click <b>Close</b> .	

Table 19: Advertising the Task Sequence for the Reference Computer Build and Capture

### 5.3.6 Capturing an Operating System Image Using PXE Deployment

Once the task sequence has been advertised, the healthcare IT Administrator can start the deployment and capture of the operating system image. Table 20 shows the steps required for capturing the operating system image using a PXE service point deployment:

Step	Description	Screenshot / Details
1.	Start the reference computer and press F12 for a network service boot.	
2.	<p>If configured, enter the PXE service point <b>Password</b> and click <b>Next</b>.</p> <p><b>Note</b> If the PXE service point was configured without selecting the option to require a password, this step will not be required.</p>	

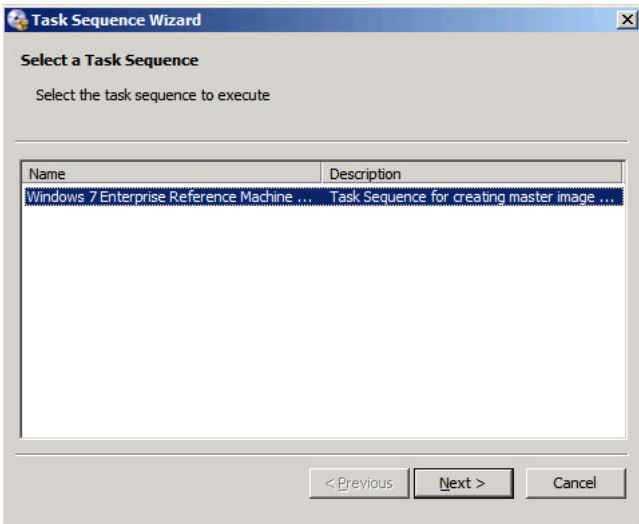
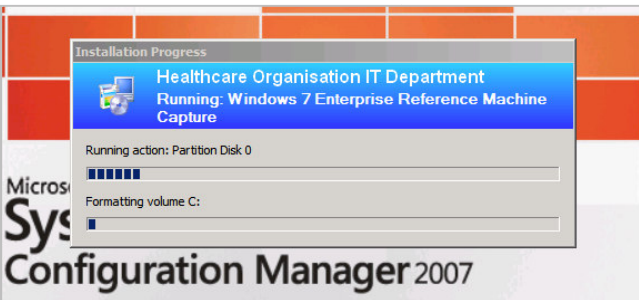

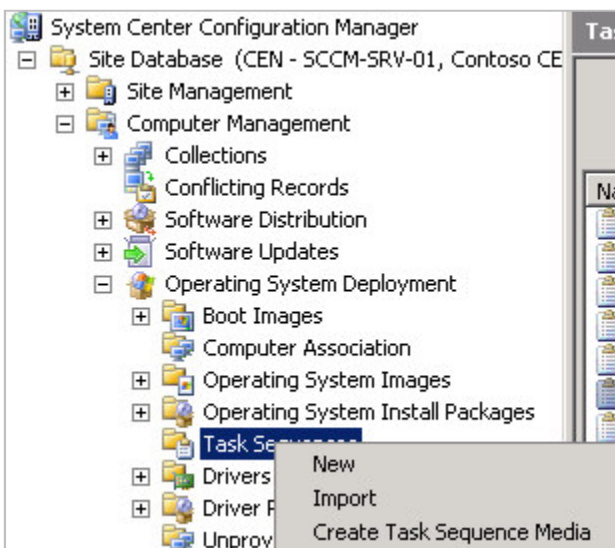
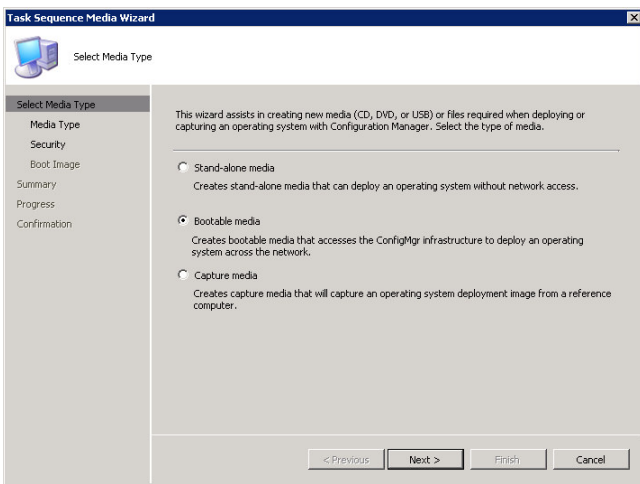
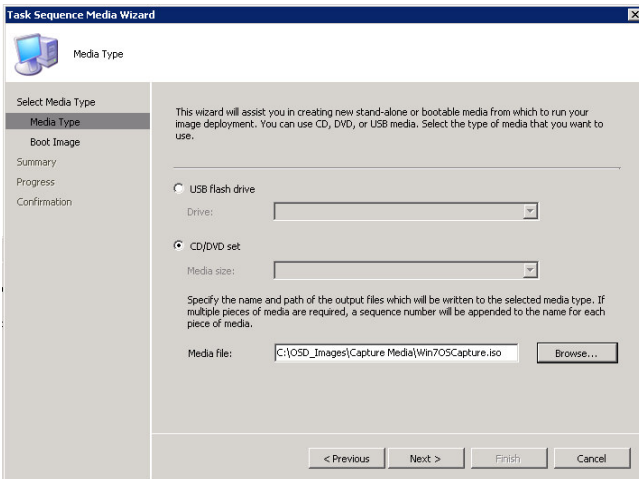
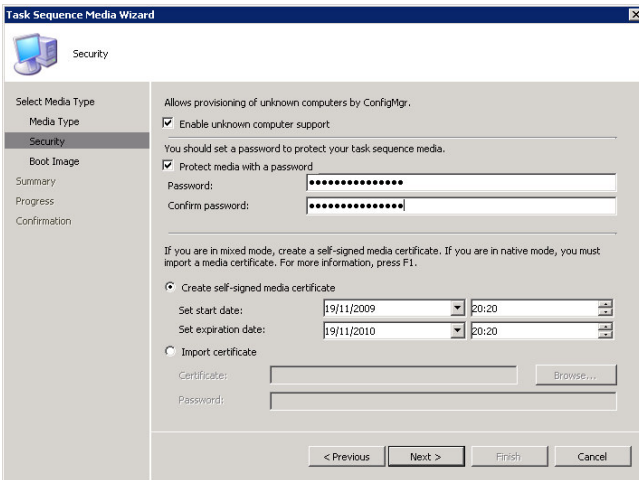
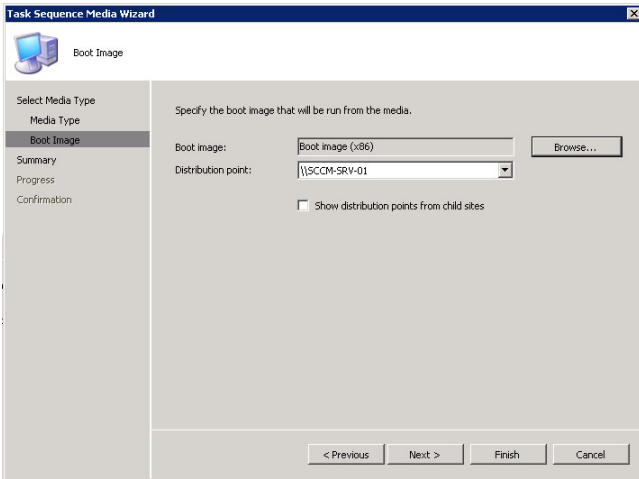
Step	Description	Screenshot / Details
3.	Select the task sequence for creating the reference machine and click <b>Next</b> .	
4.	The task sequence will now run through all the required actions to build and capture the reference machine image.	
5.	When the capture sequence completes, the reference machine will be left at the beginning of a mini-setup phase. The reference machine can now be turned off.	

Table 20: Creating an Operating System Install Package Using PXE deployment

### 5.3.7 Capturing an Operating System Image Using Task Sequence Media

If the healthcare organisation has not deployed a PXE service point, it is possible to deploy the operating system installation package using bootable media. This bypasses the PXE service point and boots into a version of Windows PE that contacts the Configuration Manager infrastructure to download the required files. Table 21 shows the steps required for creating task sequence media to perform the image creation:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on <b>Task Sequences</b> and select <b>Create Task Sequence Media</b> .	
2.	Click <b>Bootable media</b> and click <b>Next</b> .	

Step	Description	Screenshot
3.	<p>Specify a path to the <b>Media file</b> and click <b>Next</b>.</p> <p><b>Note</b></p> <p>If deploying to a virtual reference machine, an .ISO file can be mounted as a CD in the virtual operating system and booted from. If the reference machine is a physical machine, create media based on a <b>USB flash drive</b> or <b>CD/DVD set</b>.</p>	
4.	<p>Select <b>Enable unknown computer support</b> and specify a <b>Password</b>. Click <b>Next</b>.</p>	
5.	<p>Select the <b>Boot image</b> and <b>Distribution point</b> that will be used for the deployment and click <b>Next</b>.</p>	



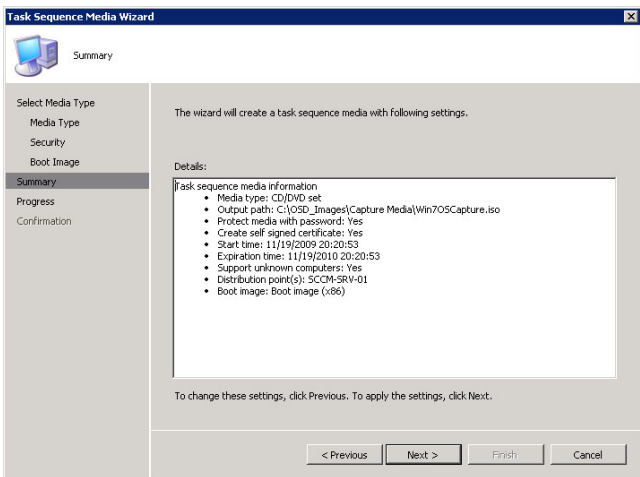
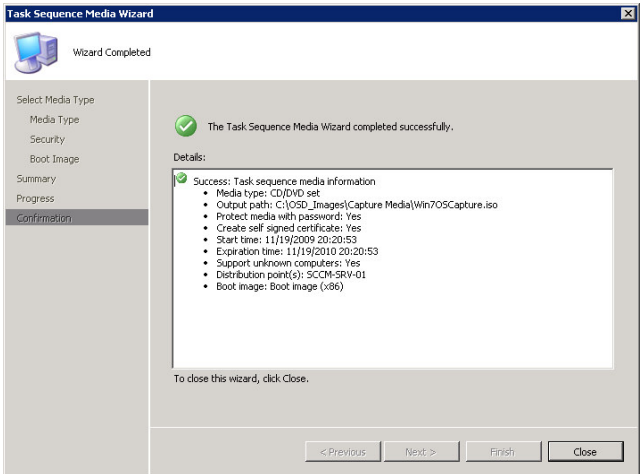
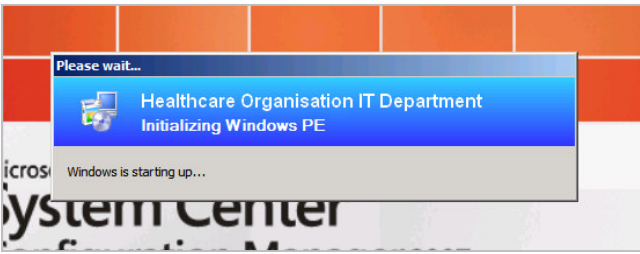
Step	Description	Screenshot
6.	Click <b>Next</b> .	
7.	Click <b>Close</b> .	

Table 21: Creating Task Sequence Media for Operating System Image Creation

Table 22 shows the steps required for creating the operating system image using task sequence media.

#### Note

The computer being used for the operating system image capture must be imported and must also be member of a collection that has the task sequence advertised to it, as shown in section 5.3.5. Otherwise, the task sequence must be advertised to the Unknown Computers collection.

Step	Description	Screenshot
1.	Start the reference machine using the bootable media created in Table 21. Ensure the reference computer is configured to boot from CD or USB (depending on the type of media created).	


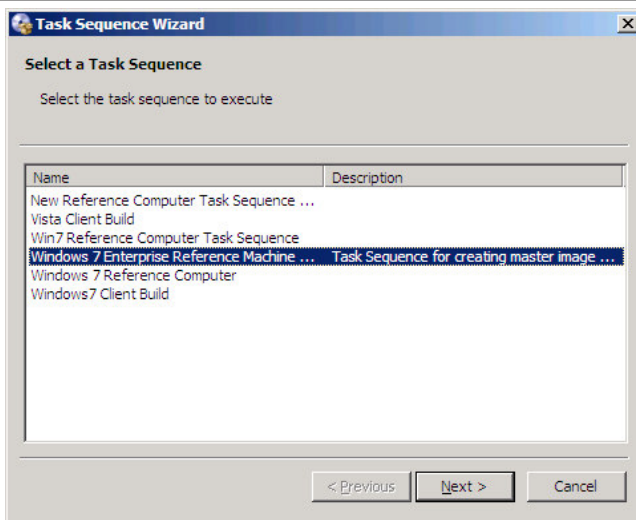
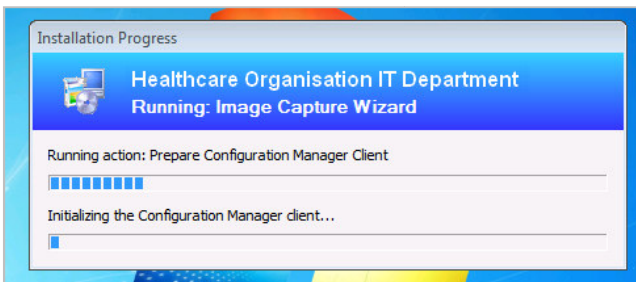

Step	Description	Screenshot
2.	<p>Enter the <b>Password</b> and click <b>Next</b>.</p> <p><b>Note</b> Custom network settings can be configured, if required, by clicking <b>Configure</b>. If none are specified, the computer will use DHCP to configure the network.</p>	
3.	Select the task sequence for creating the reference machine and click <b>Next</b> .	
4.	The task sequence will now run through all the required actions to build and capture the reference machine image.	
5.	When the capture sequence completes, the reference machine will be left at the beginning of a mini-setup phase. The reference machine can now be turned off.	

Table 22: Capturing an Operating System Using Task Sequence Media

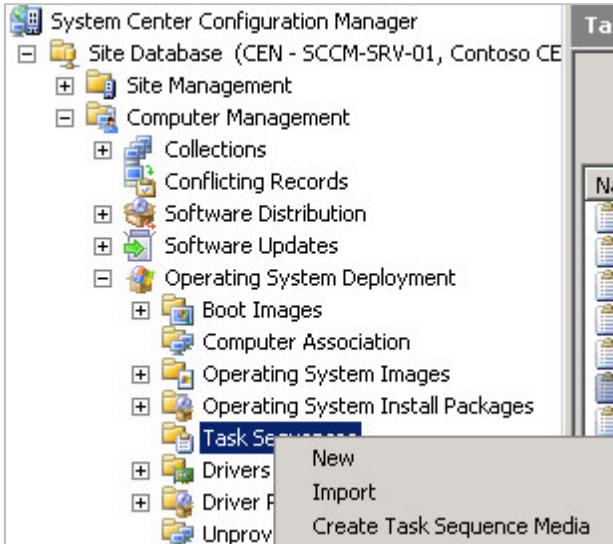
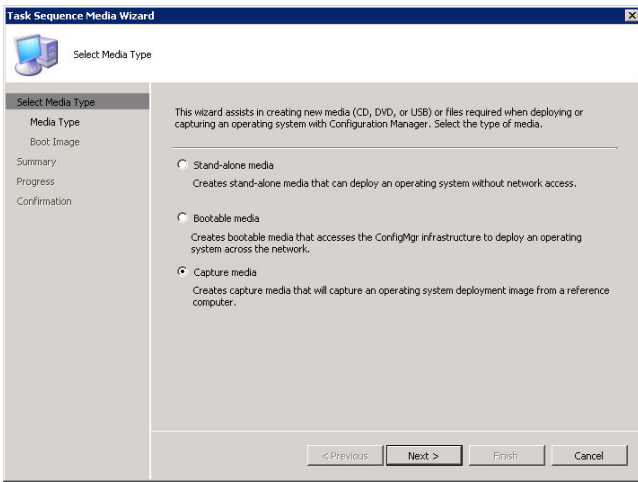
### 5.3.8 Capturing an Image Manually Using the Operating System Capture Wizard

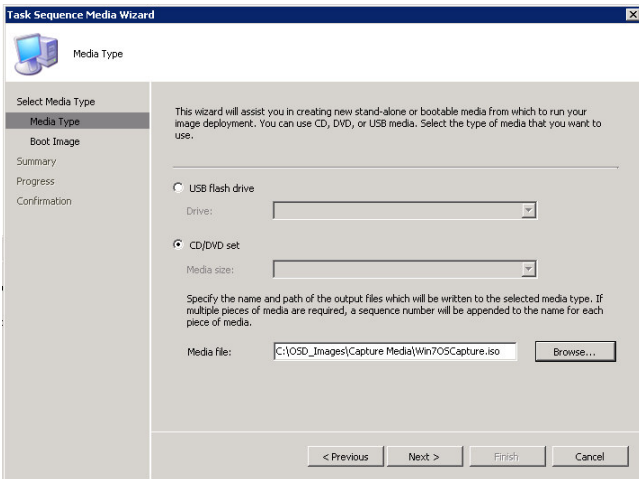
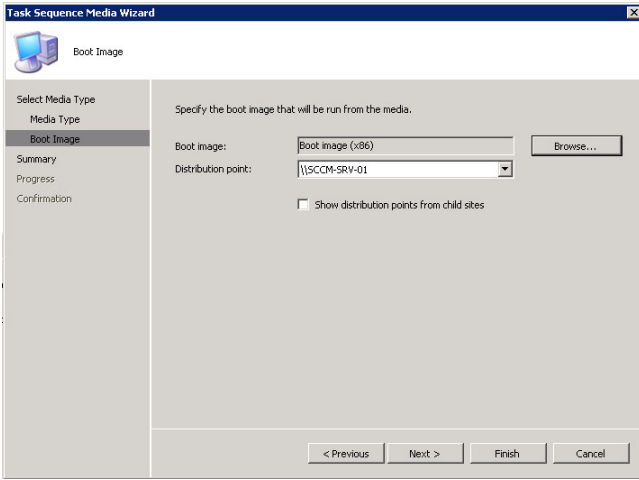
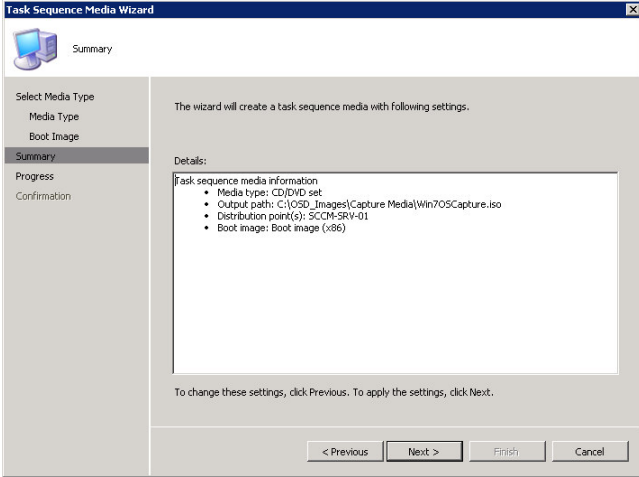
If the healthcare IT Administrator is creating an image using *Healthcare MDT 2010 {R9}*, or by manually installing the operating system and any required application, it must be captured by using the Operating System Capture Wizard. Once the capture wizard has been run, the resulting image can be imported into Configuration Manager for automated deployment. In order to capture the Operating System for use with Configuration Manager, the healthcare IT Administrator must perform the following tasks:

- Create the Capture Media
- Run the Capture Wizard on the Reference Machine

#### 5.3.8.1 Creating the Capture Task Sequence Media

Table 23 shows the steps for creating the Capture Media:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on <b>Task Sequences</b> and select <b>Create Task Sequence Media</b> .	
2.	Click <b>Capture media</b> and click <b>Next</b> .	

Step	Description	Screenshot
3.	<p>Specify a path to the <b>Media file</b> and click <b>Next</b>.</p> <p><b>Note</b></p> <p>If deploying to a virtual reference machine, an .iso file can be mounted as a CD in the virtual operating system and booted from. If the reference machine is a physical machine, create media based on a <b>USB flash drive</b> or <b>CD/DVD set</b>.</p>	
4.	<p>Select the <b>Boot image</b> and <b>Distribution point</b> that will be used for the deployment and click <b>Next</b>.</p>	
5.	<p>Click <b>Next</b>.</p>	

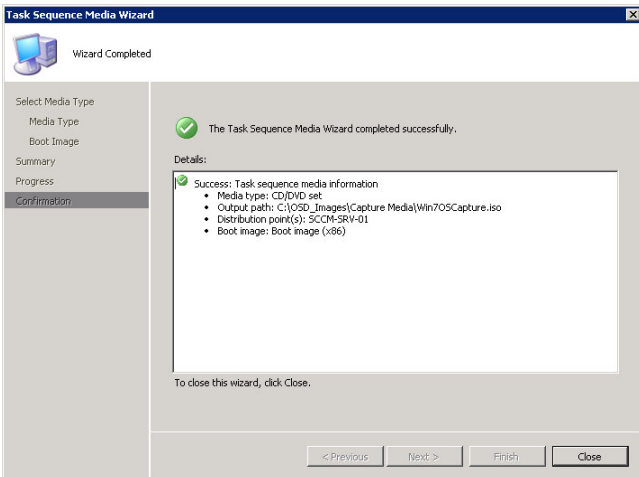
Step	Description	Screenshot
6.	Click <b>Close</b> .	

Table 23: Creating the Capture Media

### 5.3.8.2 Capturing the Reference Machine Using the Operating System Capture Wizard


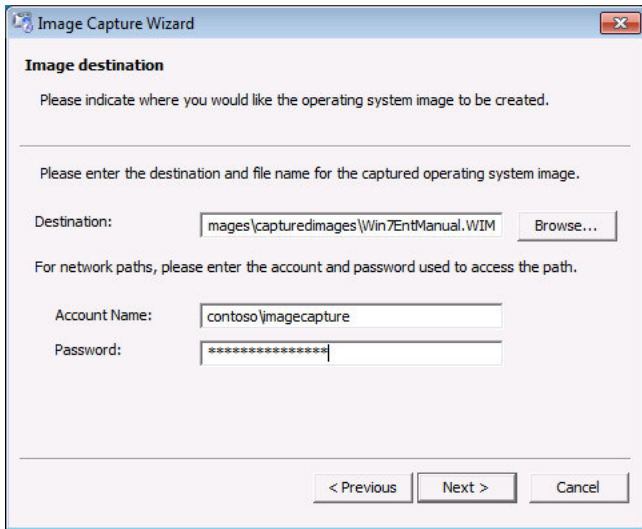
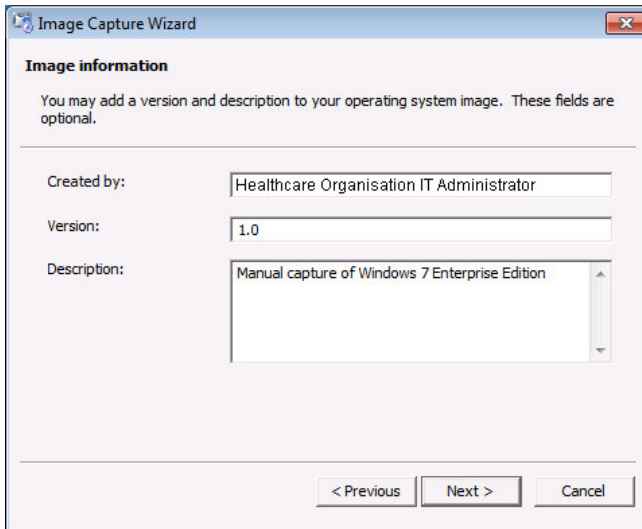
Once the reference machine has been built using *Healthcare MDT 2010 {R9}* or manually created, and has all required settings and applications, the Operating System Capture Wizard can be run to capture the machine as an operating system image that can be deployed using Configuration Manager. The reference machine must adhere to the following:

- The machine should not be joined to a domain
- The local administrator password must be blank
- No Configuration Manager client software must be installed

Table 24 shows the steps required to capture the operating system for use with Configuration Manager.

#### Tip

If the healthcare IT Administrator is using virtualisation technology, such as Hyper-V, to create the reference machine image, it is recommended that a snapshot of the machine is taken before capture. If any issues are experienced during capture, the reference machine can be reverted to the previous snapshot and recaptured once issues have been investigated and resolved.

Step	Description	Screenshot
1.	<p>Insert or mount the task sequence media created in section 5.3.8.1 into the reference machine (or virtual machine). If the capture wizard does not automatically run, it can be started by running TSMBAutorun from the SMS\Bin\i386 directory on the media.</p> <p>Click <b>Next</b>.</p>	
2.	<p>Enter the <b>Destination</b> for the captured image in the format  \\servername\share\capturefilename.wim.</p> <p>Specify the <b>Account Name</b> and <b>Password</b> of an account that has permissions to create files in the folder.</p> <p>Click <b>Next</b>.</p>	
3.	<p>Enter the name of the healthcare IT Administrator creating the image and optionally enter a <b>Version</b> and <b>Description</b>.</p> <p>Click <b>Next</b>.</p>	

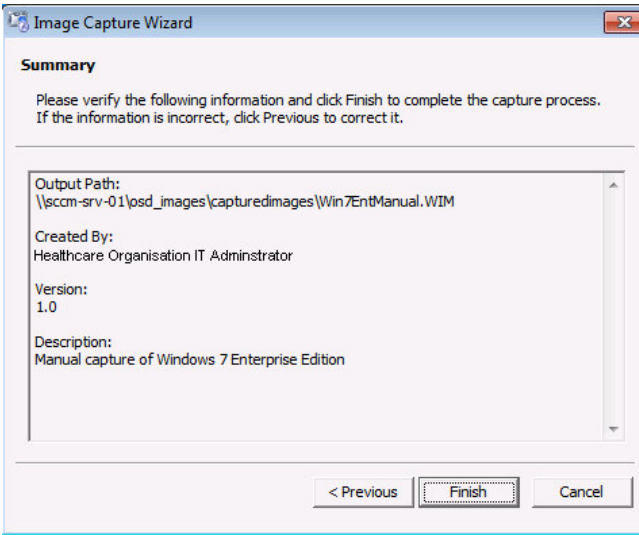
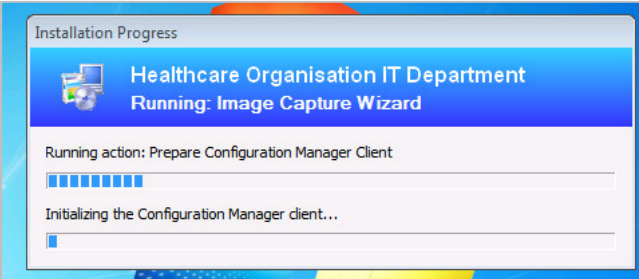
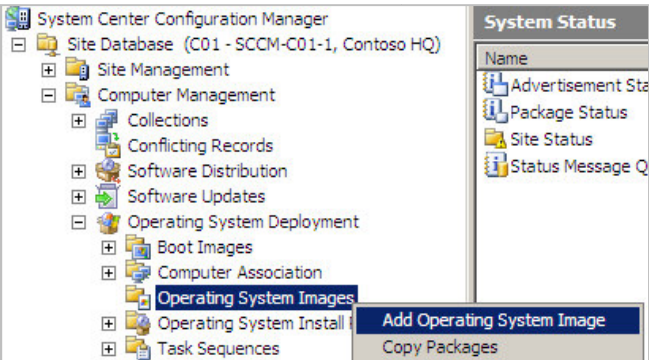
Step	Description	Screenshot
4.	Ensure the <b>Summary</b> details are correct and click <b>Finish</b> .	
5.	The image capture wizard now runs and creates the image file in the location specified.	

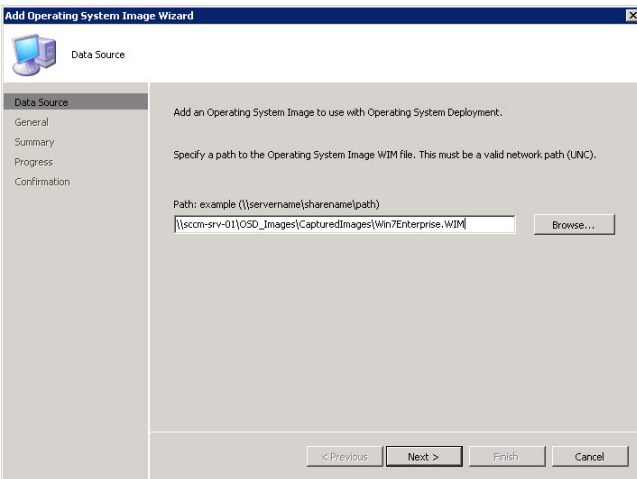
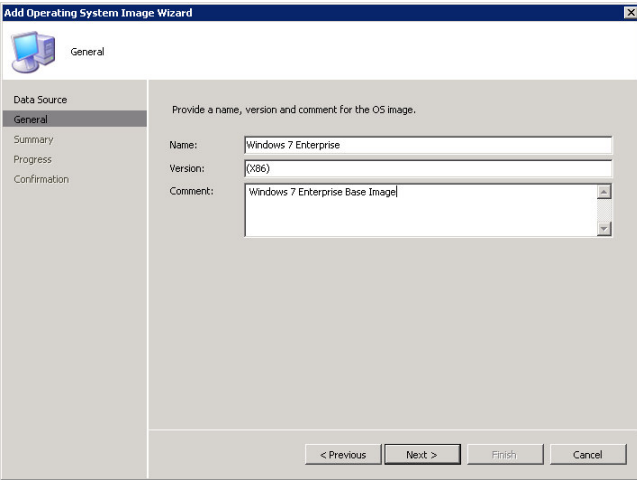
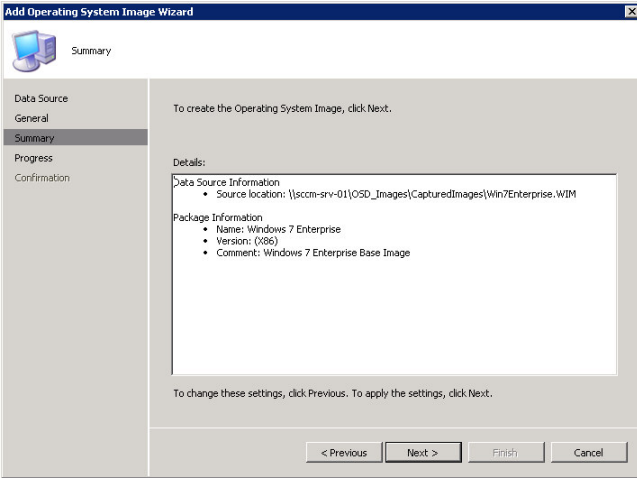
Table 24: Capturing the Reference Machine Using the Operating System Capture Wizard

### 5.3.9 Adding an Operating System Image

Once the operating system image has been captured, either by using PXE or boot media, or by using the Operating System Capture Wizard, it must be imported into Configuration Manager. Table 25 shows the steps for importing the operating system image into Configuration Manager, so that it can be deployed:

Step	Description	Screenshot / Details
1.	Open the <b>Configuration Manager Console</b> , right-click on <b>Operating System Images</b> and select <b>Add Operating System Image</b> .	



Step	Description	Screenshot / Details
2.	Enter the path to the captured image file in the format \\servername\share\capturedimagefile.wim and click <b>Next</b> .	
3.	Enter the <b>Name</b> , <b>Version</b> and a <b>Comment</b> for the operating system image and click <b>Next</b> .	
4.	Click <b>Next</b> .	



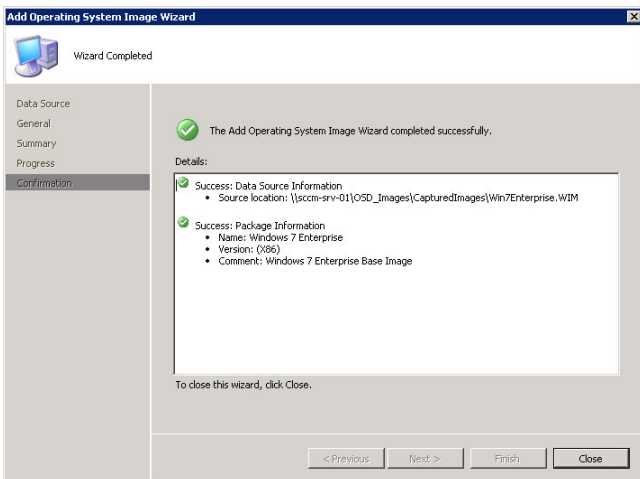
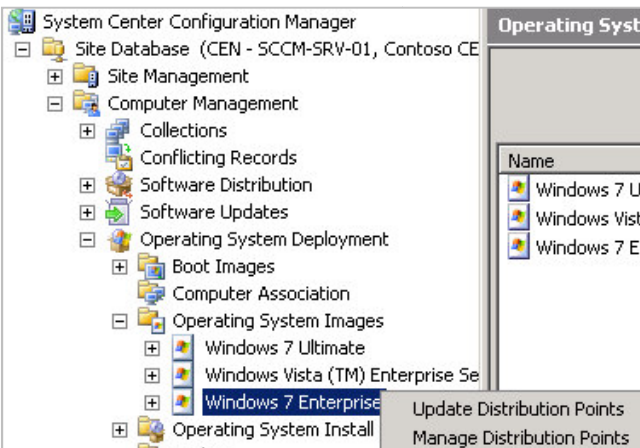
Step	Description	Screenshot / Details
5.	Click <b>Close</b> .	

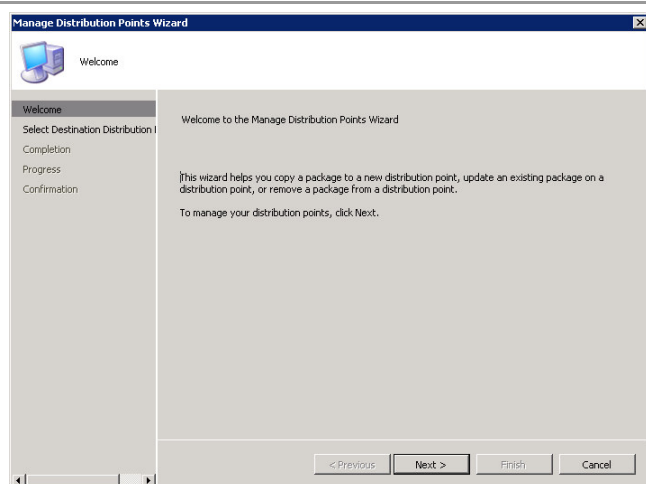
Table 25: Adding an Operating System Image

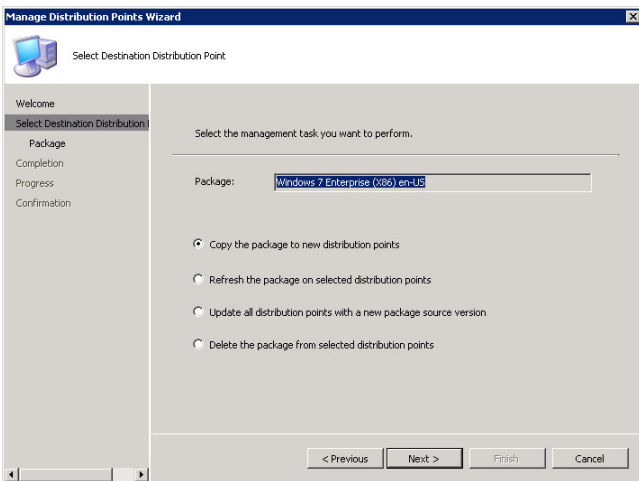
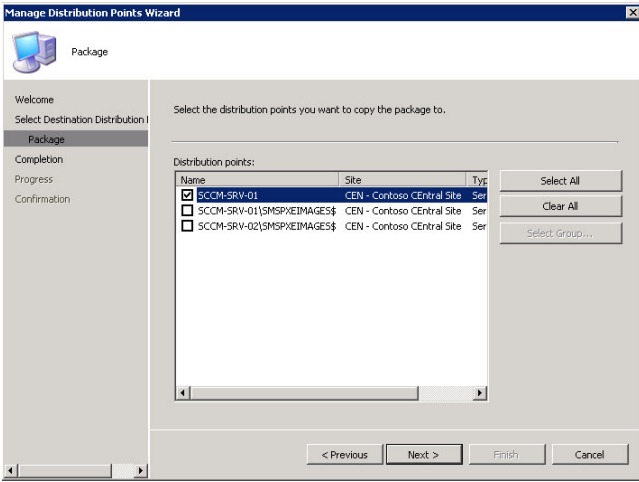
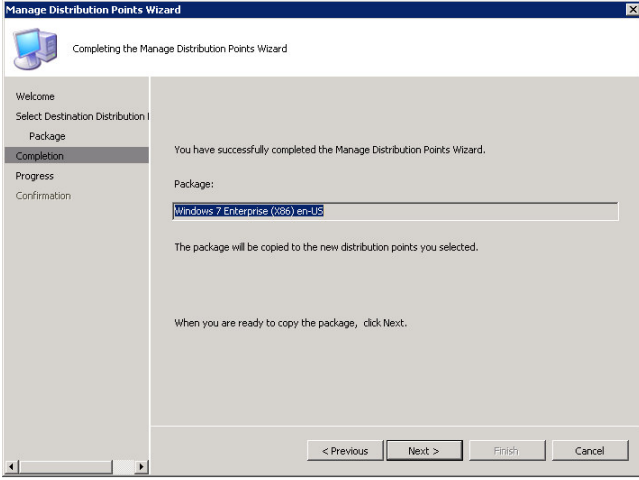
### 5.3.10 Adding an Operating System Image to a Distribution Point

The operating system image should now be added to any DPs that clients will contact while performing an operating system build. Table 26 shows the steps to add the operating system image to the DPs:

Step	Description	Screenshot / Details
1.	Open the <b>Configuration Manager Console</b> , right-click on the operating system image that will be deployed to the DPs and select <b>Manage Distribution Points</b> .	

2. Click **Next**.



Step	Description	Screenshot / Details												
3.	Click <b>Copy the package to the distribution points</b> and click <b>Next</b> .	 <p>The screenshot shows the 'Manage Distribution Points Wizard' at the 'Select Destination Distribution Point' step. The left pane shows the wizard's progress: Welcome, Select Destination Distribution Point (current), Package, Completion, Progress, and Confirmation. The main pane displays the package 'Windows 7 Enterprise (V86) en-US' and four radio button options for management tasks. The first option, 'Copy the package to new distribution points', is selected. Navigation buttons at the bottom include '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>												
4.	<p>Select the check boxes of the DPs that are required to host the Operating System Image and click <b>Next</b>.</p> <p><b>Note</b></p> <p>The healthcare IT Administrator must only select DPs that will be contacted to receive the OS Image. DPs hosted on PXE service points that have SMSPXEIMAGE\$ in the name must not be selected because these DPs should only contain boot images.</p>	 <p>The screenshot shows the 'Manage Distribution Points Wizard' at the 'Package' step. The left pane shows the progress: Welcome, Select Destination Distribution Point, Package (current), Completion, Progress, and Confirmation. The main pane displays a table of distribution points with checkboxes for selection. The first point, 'SCCM-SRV-01', is checked. Buttons on the right allow for 'Select All', 'Clear All', and 'Select Group...'. Navigation buttons at the bottom include '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Site</th> <th>Type</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> SCCM-SRV-01</td> <td>CEN - Contoso</td> <td>Central Site</td> </tr> <tr> <td><input type="checkbox"/> SCCM-SRV-01\SMSPXEIMAGE\$</td> <td>CEN - Contoso</td> <td>Central Site</td> </tr> <tr> <td><input type="checkbox"/> SCCM-SRV-02\SMSPXEIMAGE\$</td> <td>CEN - Contoso</td> <td>Central Site</td> </tr> </tbody> </table>	Name	Site	Type	<input checked="" type="checkbox"/> SCCM-SRV-01	CEN - Contoso	Central Site	<input type="checkbox"/> SCCM-SRV-01\SMSPXEIMAGE\$	CEN - Contoso	Central Site	<input type="checkbox"/> SCCM-SRV-02\SMSPXEIMAGE\$	CEN - Contoso	Central Site
Name	Site	Type												
<input checked="" type="checkbox"/> SCCM-SRV-01	CEN - Contoso	Central Site												
<input type="checkbox"/> SCCM-SRV-01\SMSPXEIMAGE\$	CEN - Contoso	Central Site												
<input type="checkbox"/> SCCM-SRV-02\SMSPXEIMAGE\$	CEN - Contoso	Central Site												
5.	Click <b>Next</b> .	 <p>The screenshot shows the 'Manage Distribution Points Wizard' at the 'Completing the Manage Distribution Points Wizard' step. The left pane shows the progress: Welcome, Select Destination Distribution Point, Package, Completion (current), Progress, and Confirmation. The main pane displays a confirmation message: 'You have successfully completed the Manage Distribution Points Wizard.' It shows the package 'Windows 7 Enterprise (V86) en-US' and states that the package will be copied to the selected distribution points. A final instruction says 'When you are ready to copy the package, click Next.' Navigation buttons at the bottom include '&lt; Previous', 'Next &gt;', 'Finish', and 'Cancel'.</p>												

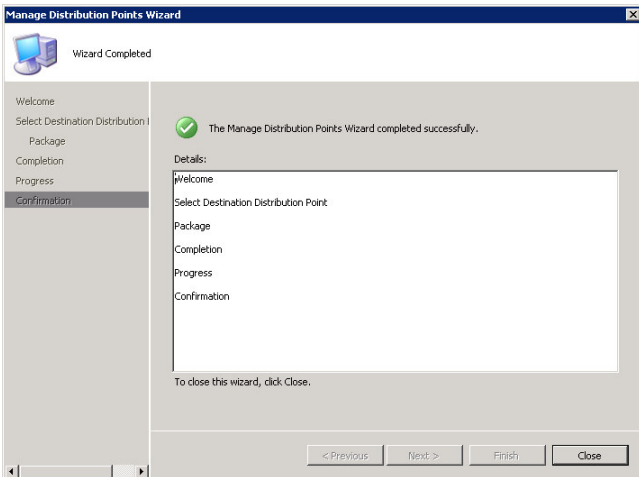
Step	Description	Screenshot / Details
6.	Click <b>Close</b> .	

Table 26: Adding an Operating System Image to a Distribution Point

### 5.3.11 Verifying Operating System Image Distribution Points

Once the Operating System Image has been deployed to the DPs, the healthcare IT Administrator can verify that they have successfully reached the DPs by checking the package status. Table 27 shows how to display the package status for the Operating System Install Package deployment:

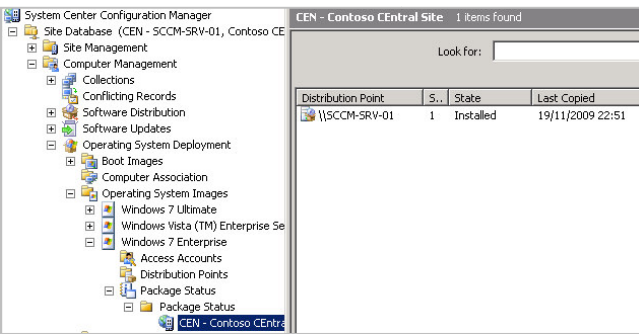
Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and select the site object under the operating system image <b>Package Status</b> node. The <b>Last Copied</b> time in the right pane shows the last successful deployment to each of the DPs and <b>State</b> shows if the copy was successful.	

Table 27: Verifying Operating System Install Package Deployment

## 5.4 Driver Management

Configuration Manager provides functionality that allows the healthcare IT Administrator to import drivers that will be deployed during the operating system deployment. Drivers are imported using the Configuration Manager Console and then distributed using a driver package. The driver package is similar to a software distribution package in that it acts as a location where the driver files are stored and from where they are distributed to distribution points. When creating task sequences for operating system deployment, these drivers can be applied in two different ways:

- Auto Apply Drivers
- Apply Driver Package

Auto Apply Drivers tells the task sequence to contact the management point during the plug-and-play detection of drivers and to install any available drivers as part of setup. This is very effective when installing newer operating systems, such as Windows Vista, Windows 7 and Windows Server 2008, but can be problematic when installing mass storage drivers for older operating systems such as Windows XP and Windows Server 2003.

Apply Driver Package tells the task sequence to install all available drivers in a specific driver package during the Windows PE phase of setup. This can be useful for providing boot critical storage drivers for Windows 2000, Windows XP and Windows Server 2003. It is also useful when using stand-alone media, or for healthcare IT Administrators who need to include a specific set of drivers, including drivers that will not be detected during plug-and-play detection, such as network printers.

There are many ways of organising the driver catalogs and folders, and the healthcare IT Administrator must decide what will work best for the organisation. The recommendations below are one way of achieving this, but not the only way.

### 5.4.1 Creating a Driver Download Store

Before importing drivers in Configuration Manager, they must be downloaded to a shared location on the healthcare organisation's network. This can be a Configuration Manager server, or any location that the Configuration Manager server's computer account will be able to access. This location will act as storage for the drivers' original source files. Configuration Manager will create copies of these driver files in a different location once the driver packages are created. A folder structure should be created that represents each manufacturer and model, as shown in Figure 6 and populate the folders with the relevant drivers. This allows the healthcare IT Administrator to easily remove driver stores for hardware platforms that have been decommissioned in the healthcare organisation. Some manufacturers provide drivers that come in installation packages rather than driver files: these can usually be extracted. If this situation occurs, refer to the setup program's help or manufacturer support for assistance. Some drivers cannot be extracted and must be installed as an application. For these types of drivers, a software package must be created and specified as part of the task sequence.

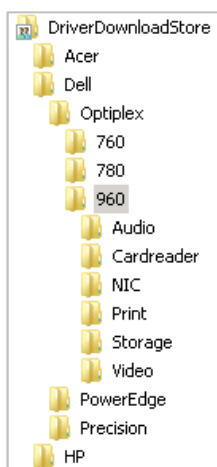


Figure 6: Driver Download Store

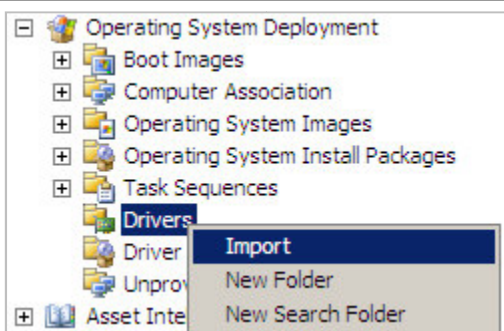
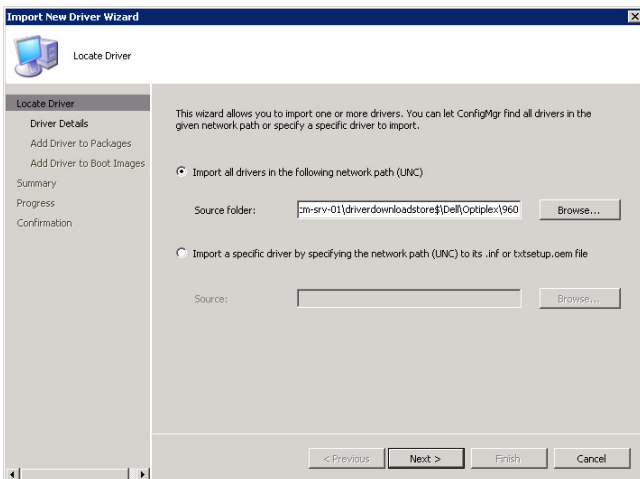
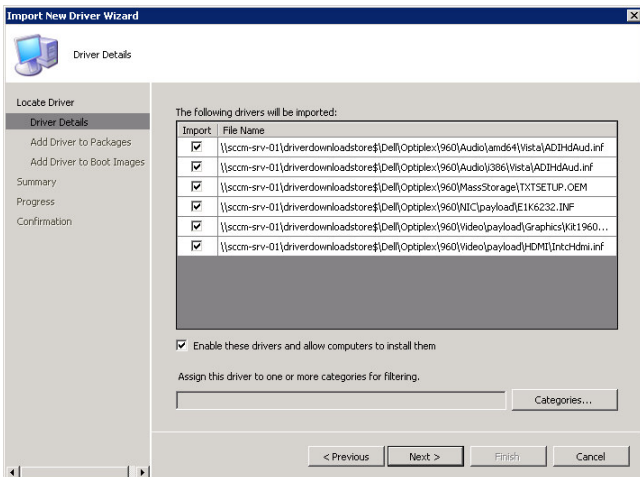
#### Note

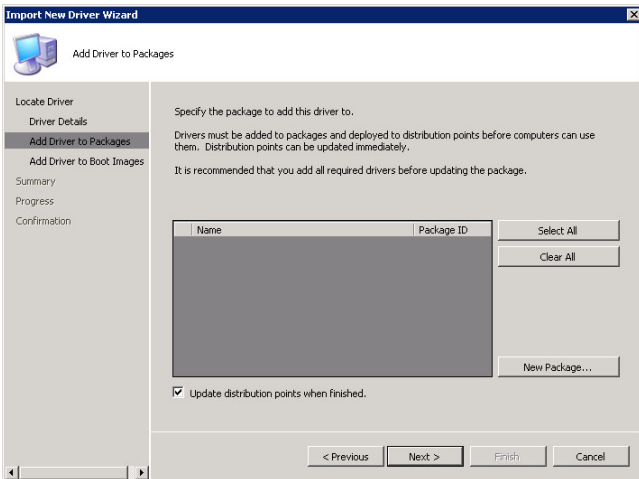
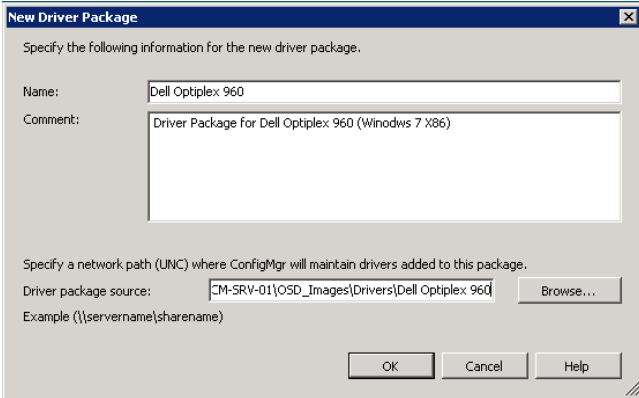
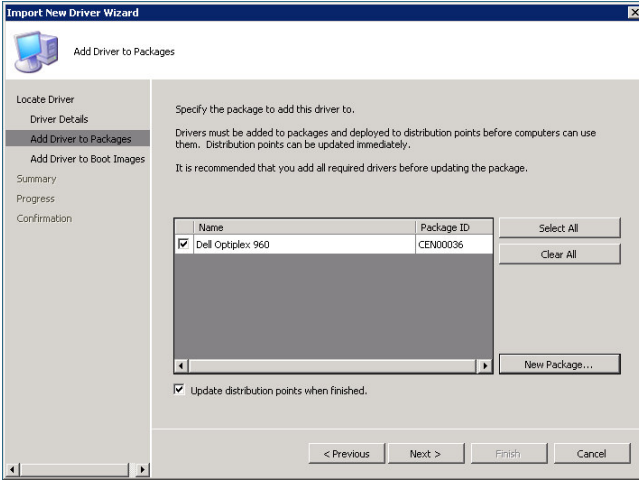
If multiple different operating systems will be deployed to the same hardware platform, a subfolder can be created for the operating system version, such as Windows Vista (X86), Windows7 (X86) and Windows7 (X64).

When a healthcare IT Administrator imports drivers into Configuration Manager, it will not import any drivers that have already been imported into the database. Because drivers can be shared across many hardware platforms, this can cause an issue when attempting to organise drivers by hardware platform. When downloading and extracting the drivers, the healthcare IT Administrator can add a text file signifying the hardware model to the folder, which will prevent Configuration Manager considering the driver as a duplicate. For example, add a text file called DellOptiplex960Audio(Win7X86).txt to the folder Driverdownloadstore\Dell\Optiplex\960\Audio, once the driver files have been extracted to the folder.

## 5.4.2 Adding a Driver

Once the driver download store has been created, the healthcare IT Administrator can import drivers into Configuration Manager. Table 28 shows the steps to import drivers and create driver packages:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on <b>Drivers</b> and select <b>Import</b> .	
2.	Enter the <b>Source folder</b> of the hardware model for which the driver package will be created and click <b>Next</b> .  <b>Note</b> A single driver can be imported by clicking <b>Import a specific driver...</b> and specifying the network path to the .inf or Txtsetup.oem file for the driver in the <b>Source</b> box.	
3.	Select the check boxes of the drivers that need to be added to Configuration Manager and select <b>Enable these drivers and allow computers to install them</b> .  <b>Note</b> If importing a single driver, or drivers that have the same purpose, such as Network, a category can be assigned to the drivers. This can be useful when creating custom task sequences because the healthcare IT Administrator can specify that only drivers with a specific category assigned should be installed.  Click <b>Next</b> .	

Step	Description	Screenshot
4.	<p>Click <b>New Package</b>.</p> <p><b>Note</b></p> <p>If the healthcare IT Administrator is importing drivers for a hardware model that already has a driver package, the package can be selected from the list and the drivers will be added to the package. Driver packages can also be created separately by right-clicking <b>Driver Packages</b> in the Configuration Manager Console.</p>	
5.	<p>Enter a <b>Name</b> and <b>Comment</b> for the driver package and specify a location to store the driver files in <b>Driver package source</b>.</p> <p><b>Note</b></p> <p>The location specified should be separate from the original source location shown in Figure 6 but in a similar format. For example, \\servername\share\Drivers\Dell\Optiplex\960.</p> <p>Click <b>OK</b>.</p>	
6.	<p>Select <b>Update distribution points when finished</b> and click <b>Next</b>.</p>	

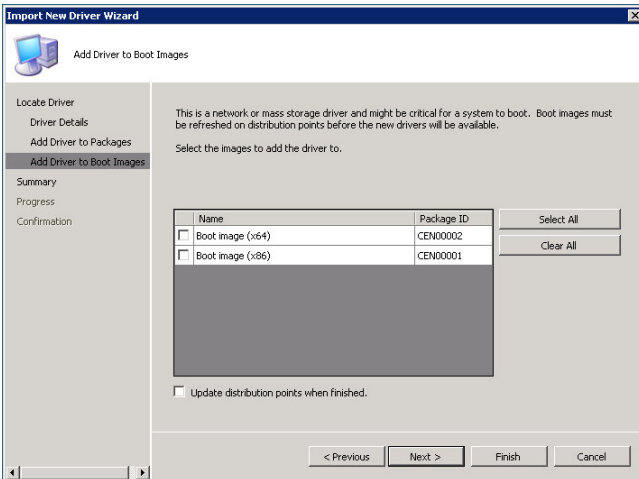
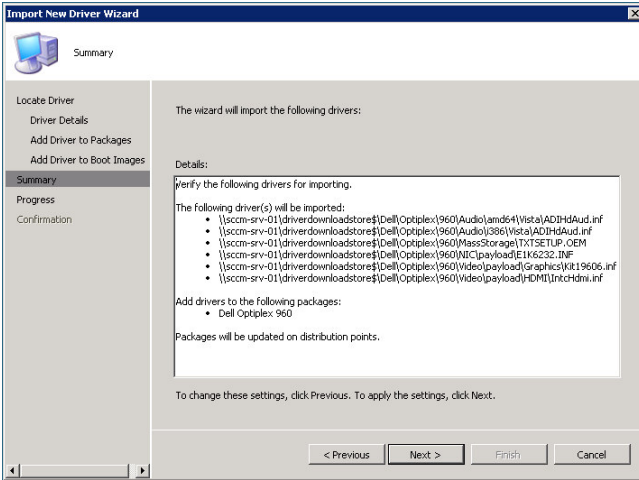
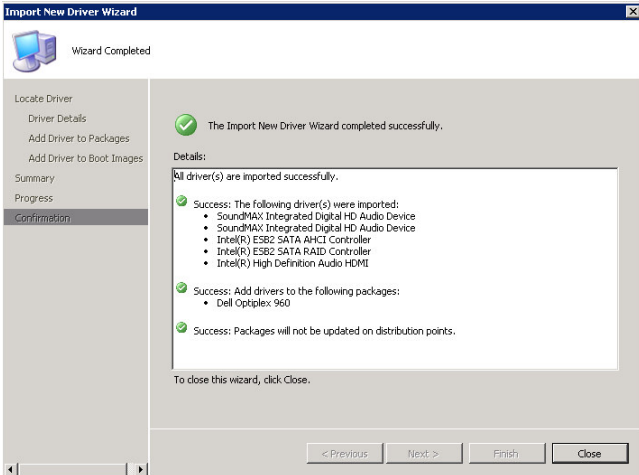
Step	Description	Screenshot
7.	Click <b>Next</b> .  <b>Note</b> Only drivers that are required to boot Windows PE should be added to the boot image. If using this step to import a single boot critical driver for Windows PE, select the appropriate boot image and select <b>Update distribution points when finished</b> . These drivers should be kept to a minimum, where possible, because they will increase the size of the boot image and increase the time taken to deploy operating systems.	
8.	Click <b>Next</b> .	
9.	Click <b>Close</b> .	

Table 28: Adding a Driver

### 5.4.3 Updating Boot Images

Critical boot drivers may need to be added to boot images in order to allow Windows PE to start on some versions of hardware. Table 29 shows the steps required to update boot images with drivers once they have been imported into Configuration Manager. Drivers should only be added to boot images if they are required to boot Windows PE. Drivers required to setup the operating system will be injected during setup if they have been imported.



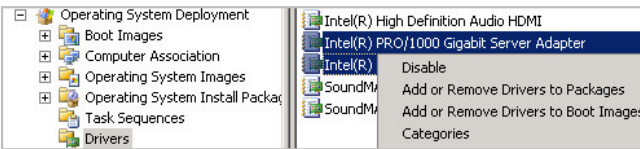
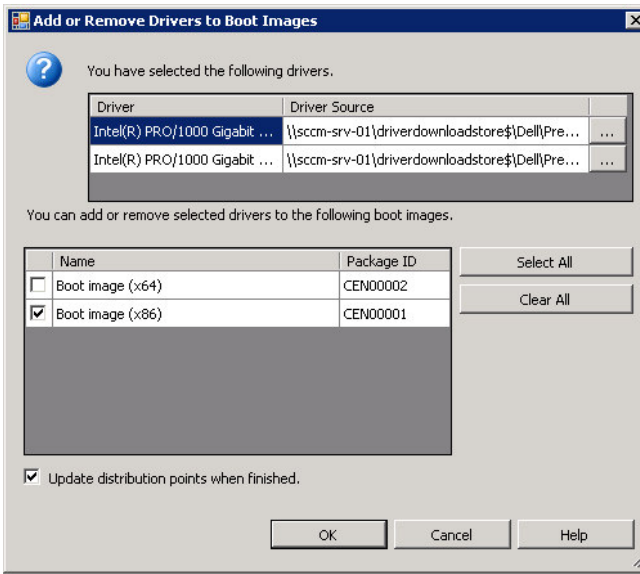
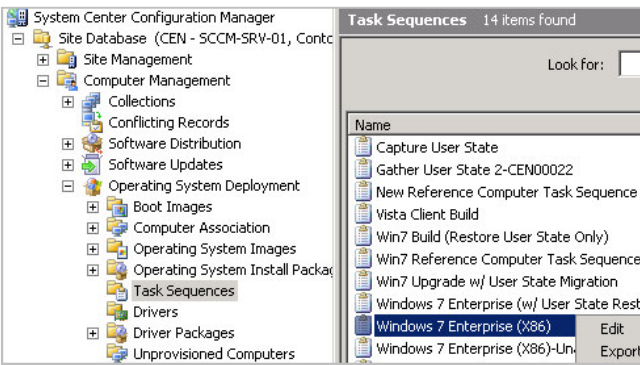
Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and select <b>Drivers</b> . In the right pane, select the drivers that will be added to the boot image (use CTRL to select multiple drivers), right-click on the highlighted drivers and select <b>Add or Remove Drivers to Boot Images</b> .	
2.	Select the boot image that will be updated and select <b>Update distribution points when finished</b> . Click <b>OK</b> .	

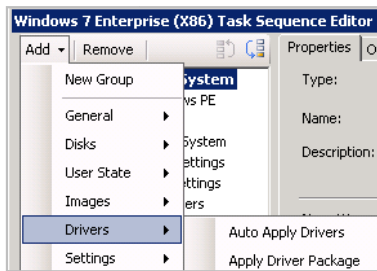

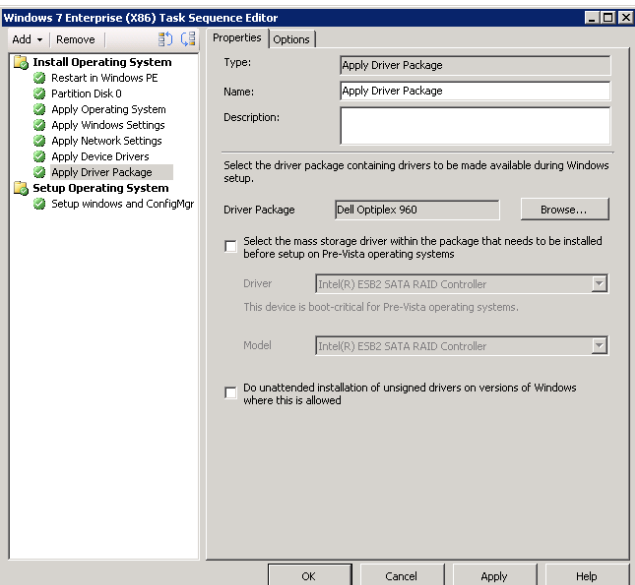
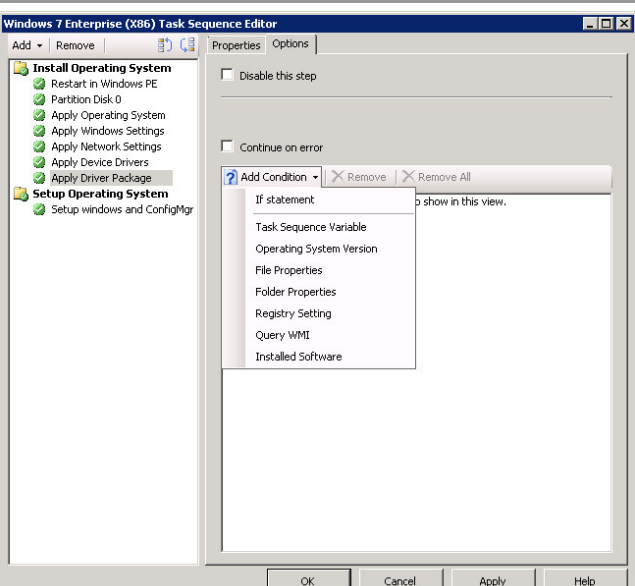
Table 29: Updating Boot Images

### 5.4.4 Applying Drivers Using Apply Driver Package

During the operating system deployment, drivers can be applied using auto driver detection. If the drivers must be applied and may not be applied during auto detection if the driver support a USB printer that may not be attached for example, the healthcare IT Administrator can use the Apply Driver Package task. Table 30 shows the steps required to add an Apply Driver Package step to a task sequence.

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and select <b>Task Sequences</b> , right-click on the task sequence to which an <b>Apply Driver Package</b> step will be added and select <b>Edit</b> . <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>Steps showing how to create task sequences for operating system image deployment are included in section 7.1. Once these steps have been followed, the task sequences created can be modified using these steps.</p> </div>	



Step	Description	Screenshot
2.	In the Task Sequence Editor, select <b>Add &gt; Drivers</b> and select <b>Apply Driver Package</b> .	
3.	<p>Using the move down button , move <b>Apply Driver Package</b> to after <b>Apply Device Drivers</b> and before <b>Setup windows and ConfigMgr</b>. Select the <b>Driver Package</b> to be applied using the <b>Browse</b> button.</p> <p><b>Note</b></p> <p>If the driver package contains a mass storage driver that is required for setup on Windows XP, select the <b>Select the mass storage driver... check box</b> and choose the <b>Driver</b> and <b>Model</b>.</p> <p>If the drivers being installed are not properly signed, select <b>Do unattended installation of unsigned drivers on version of Windows where this is allowed</b>.</p>	
4.	<p>If the task sequence will be used for multiple machine types and each will require a different <b>Apply Driver Package</b> step, use conditions to specify the hardware type.</p> <p>On the <b>Options</b> tab, select <b>Add Condition &gt; Query WMI</b>.</p>	

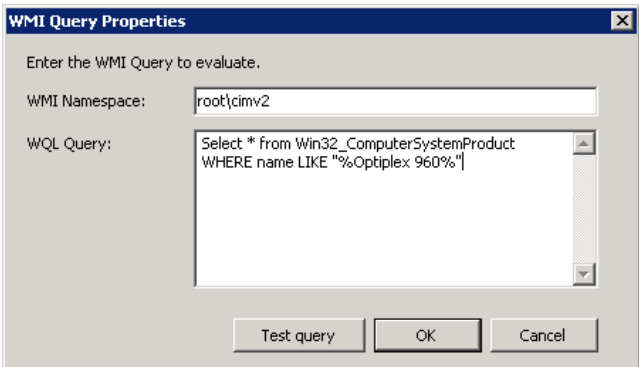
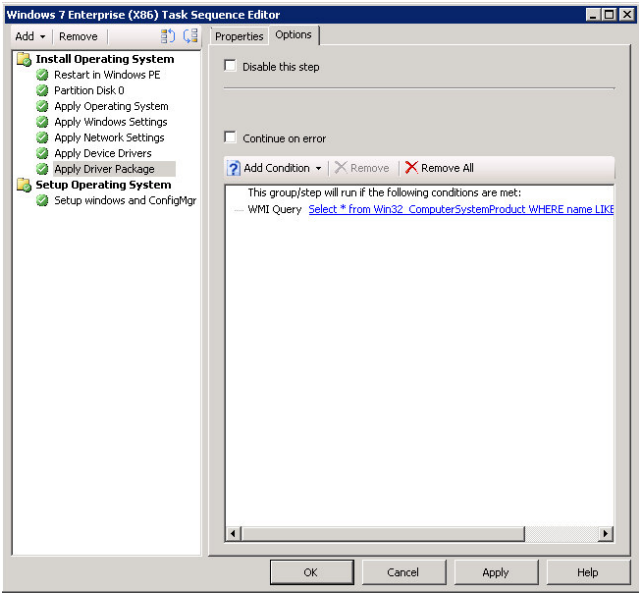
Step	Description	Screenshot
5.	<p>Enter a query that will uniquely identify the hardware model and click <b>OK</b>.</p> <p><b>Note</b></p> <p>Different hardware manufacturers store model data in different places. For example, Dell® tend to store this data in the 'Win32_ComputerSystemProduct.Name' class whereas HP® tend to store it in the 'Win32_ComputerSystem.Model' class.</p>	
6.	<p>The task sequence step will now only execute if the WMI query returns true. This allows for a single task sequence to be deployed to multiple hardware models and for additional drivers to only be applied to the relevant model. This strategy can also be used when applying drivers that need to be installed as part of a software package.</p>	

Table 30: Using the Apply Driver Package Task

## 6 STABILISE

The Stabilise phase involves testing the solution components whose features are complete, resolving and prioritising any issues that are found. Testing during this phase emphasises usage and operation of the solution components under realistic environmental conditions.

This involves testing and acceptance of the application prior to production deployment

Figure 7 acts as a high-level checklist, illustrating the areas of the System Center Configuration Manager 2007 operating system deployment design that an IT Professional is responsible for stabilising:

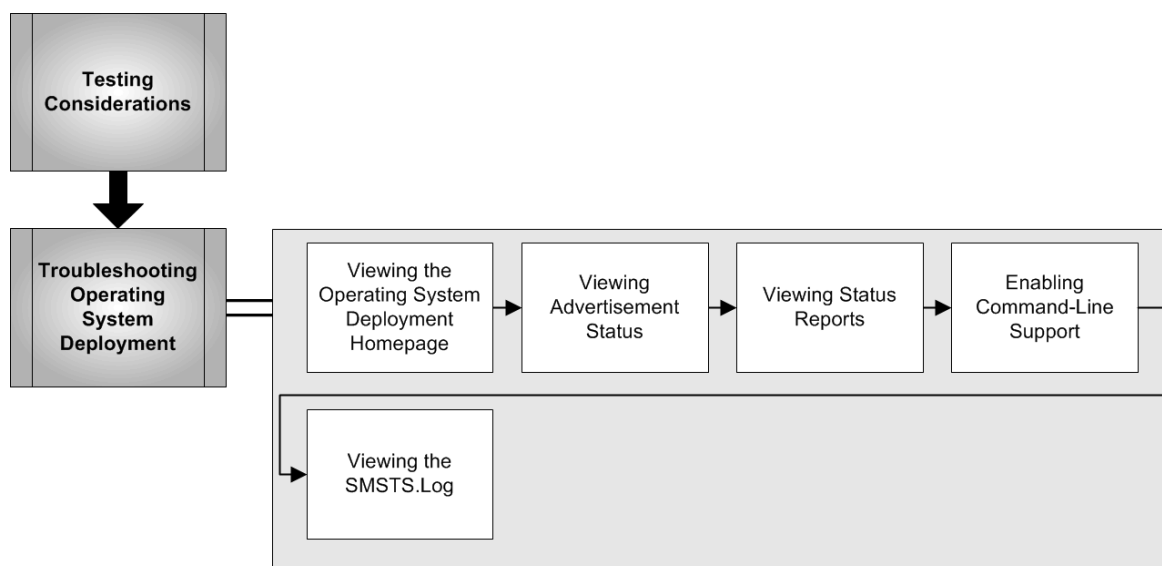


Figure 7: Sequence for Stabilising Configuration Manager Operating System Deployment

### 6.1 Testing Considerations

Any software deployment should be thoroughly tested before being rolled out into production and this is critical when performing operating system deployments. The damage that can be caused by incorrectly triggering an operating system deployment is substantial. It is strongly recommended that the healthcare IT Administrator implements an isolated test environment for Configuration Manager and operating system deployment because this will remove the risk of accidentally deploying an operating system to the production environment. Once the operating system deployment task sequences have been completed in test, they should be deployed to as many of the target hardware platforms as possible, to ensure the driver installation works as expected before being implemented in production. In practice, this will likely involve using a pilot group in the production environment, but the healthcare IT Administrator should take special care to ensure that only pilot users are able to receive the operating system deployment task sequence.

### 6.2 Troubleshooting Operating System Deployment

If issues occur during operating system deployment, the healthcare IT Administrator can look in the following places for information on what may be causing the issue:

- Operating System Deployment Homepage
- Advertisement Status
- Status Reports
- SMSTS.log

## 6.2.1 Viewing the Operating System Deployment Homepage

The Operating System Deployment Homepage in the Configuration Manager Console provides information on running advertisements, including running, and success and failure counts. It also provides links to relevant Web reports and content in the help system. Figure 8 shows the Operating System Deployment Homepage:

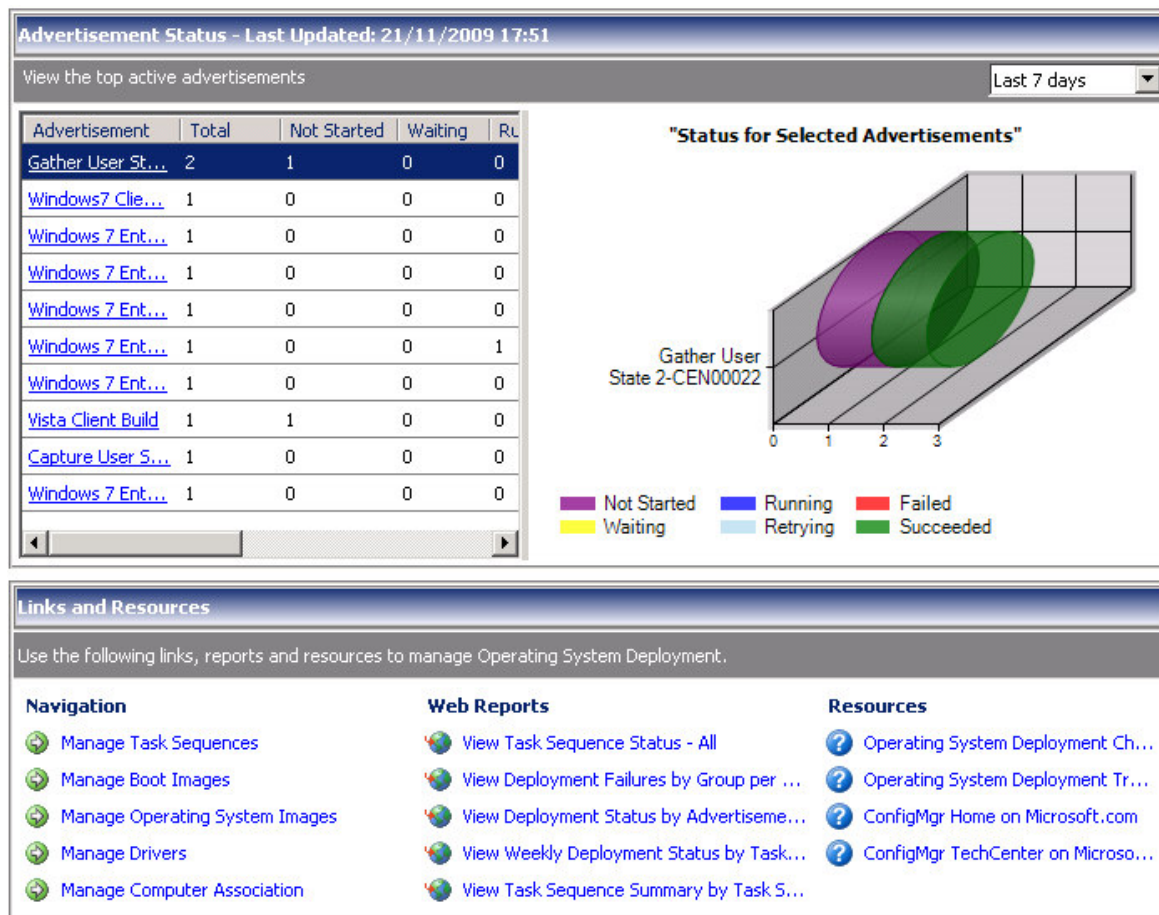


Figure 8: Operating System Deployment Homepage

## 6.2.2 Viewing Advertisement Status

Advertisement status can be used to view any status messages received from a particular task sequence advertisement by selecting the relevant advertisement and selecting **Show Messages**. The messages displayed will contain any error data returned by the client during the task sequence execution. Status messages are returned by an installed client, so if errors occur during the Windows PE stage of deployment, they will not be shown. Figure 9 shows how to obtain the advertisement status for a specific advertisement.

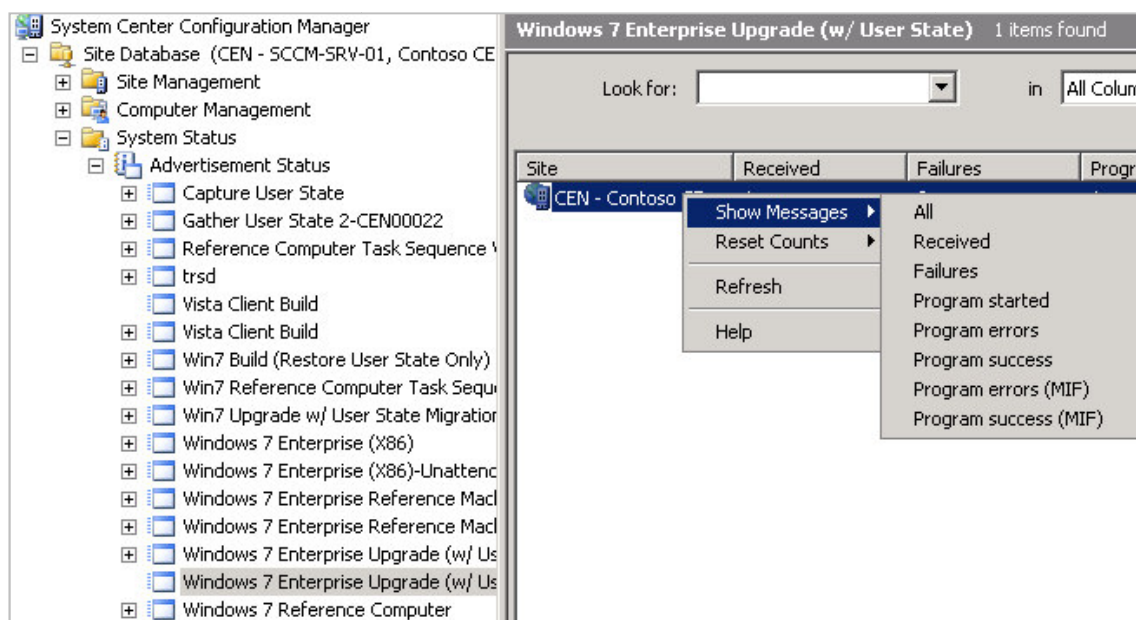


Figure 9: Viewing Advertisement Status

## 6.2.3 Viewing Status Reports

Status reports use state messages that are returned by the client during each step of task sequence execution. These messages are useful especially if the task sequence is failing during the Windows PE stage of execution. Status reports can be viewed using the **Reports** node of the Configuration Manager Console and running the report called **History – Specific task sequence advertisements run on a specific computer**.

Figure 10 shows an example status report:

Copy || Export || Print || Add to Favorites || E-mail

Report Name: History - Specific task sequence advertisements run on a specific computer

Category: Task Sequence - Advertisement Status

Comment: This report shows the status for each step of a task sequence. If no record is returned, it means the task sequence has not yet started.

Parameters:

Advertisement ID	CEN20016
Computer Name	NHSCCLIENT1

21/11/2009 18:27:27

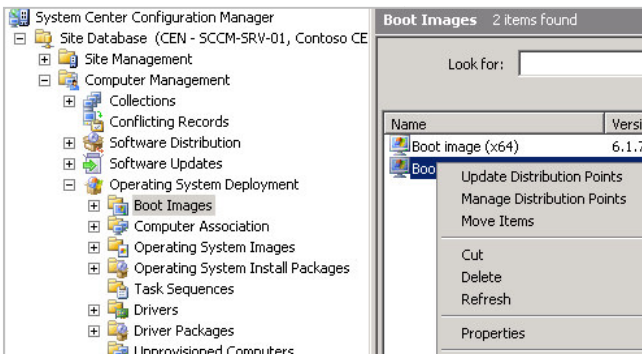
(Number of Records: 51)

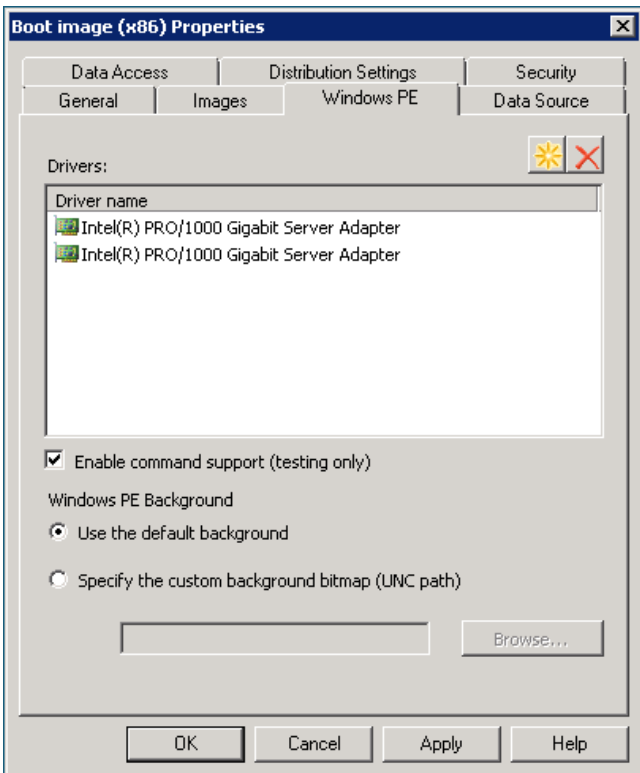
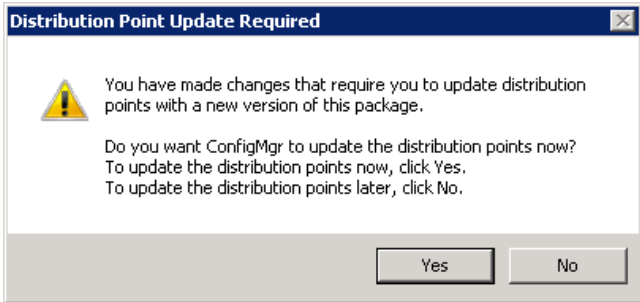
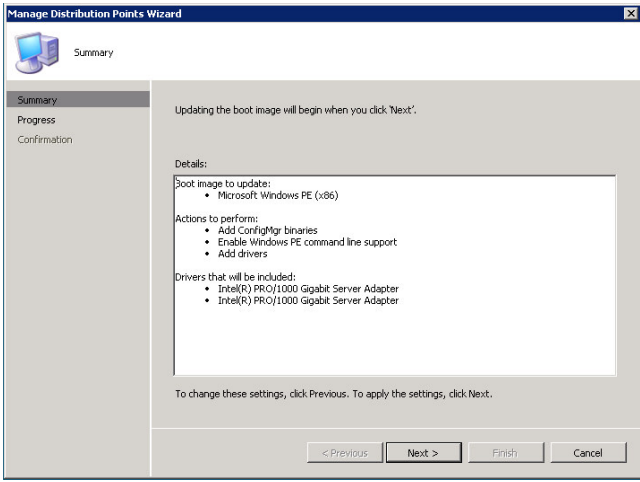
Execution Time	Last Step	Last Action	Last Group	Last Status Message ID	Last Status Message Name	Exit Code	
20/11/2009 14:41:24				10002	Program received	0	
20/11/2009 15:05:04				10005	Program started	0	
20/11/2009 15:05:08				11140	The task sequence execution engine started execution of a task sequence	0	
20/11/2009 15:05:08	1		Capture Files and Settings	11124	The task sequence execution engine started a group	0	
20/11/2009 15:05:08	2	Capture Windows Settings	Capture Files and Settings	11134	The task sequence execution engine successfully completed an action	0	Command line: "osdwi Registered Organizati Found matching stan
20/11/2009 15:05:09	3	Capture Network Settings	Capture Files and Settings	11134	The task sequence execution engine successfully completed an action	0	Command line: "osdne DNS domain name ass
20/11/2009 15:05:09	4		Capture User Files and Settings	11124	The task sequence execution engine started a group	0	
20/11/2009 15:05:10	5	Request User State Storage	Capture User Files and Settings	11135	The task sequence execution engine failed executing an action	16389	B577-DB6DB2FE8C35 User List is empty in N Contacting available s ( ), HRESULT=800040 (migInfoFromMP, sa2N (migInfoFromMP), HR (e\ints_sms_frel\sm) ExecuteCaptureRequ
20/11/2009 15:05:10				11141	The task sequence execution engine failed execution of a task sequence	16389	
20/11/2009 15:23:21				10005	Program started	0	
20/11/2009 15:23:25				11140	The task sequence execution engine started execution of a task sequence	0	
20/11/2009 15:23:25	1		Capture Files and Settings	11124	The task sequence execution engine started a group	0	
20/11/2009 15:23:25	2	Capture Windows Settings	Capture Files and Settings	11134	The task sequence execution engine successfully completed an action	0	Command line: "osdwi Registered Organizati Found matching stan

Figure 10: Task Sequence Status Report

## 6.2.4 Enabling Command-Line Support

In order to troubleshoot operating system deployment failures, it can sometimes be useful to be able to run commands, in order to perform tasks such as copying log files. Table 31 shows the steps required to enable command-line support in a boot image. Once enabled, the healthcare IT Administrator can use the F8 key at any time to open a command prompt in Windows PE.

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , select the <b>Boot Images</b> node, then right-click on the boot image in the right pane and select <b>Properties</b> .	

Step	Description	Screenshot
2.	On the <b>Windows PE</b> tab, select <b>Enable command support (testing only)</b> and click <b>OK</b> .	
3.	Click <b>Yes</b> to update the boot image on the DPs.	
4.	Click <b>Next</b> .	

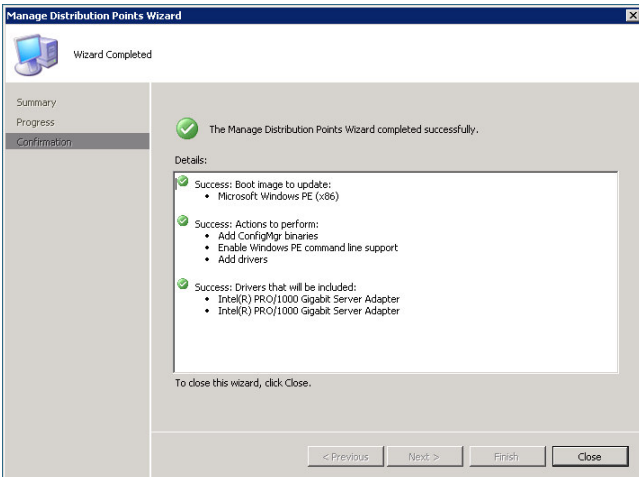
Step	Description	Screenshot
5.	Click <b>Close</b> .	

Table 31: Enabling Command-Line Support

## 6.2.5 Viewing the SMSTS.Log

The SMSTS.log contains detailed information on all steps of the task sequence execution. If the status messages and status reports are not providing the cause of the issue, the healthcare IT Administrator should review this log file for further information. The log file can be stored in different locations depending on what stage the task sequence has reached before failing. Table 32 shows the locations of the SMSTS.log during different staged of deployment.

Stage of Deployment	SMSTS.log Location
Deployment stopped running Windows PE	Temp folder on Windows PE RAM Disk – usually X:\windows\temp\smsts.log
Deployment finished but still running Windows PE	SMSTSLOG folder on largest available drive
Deployed OS running but no Configuration Manager client installed	Windows temp folder
Deployed OS running and Configuration Manager client installed	%windir%\system32\ccm\logs – 32-bit OS %windir%\SysWOW64\ccm\logs – 64-bit OS

Table 32: SMSTS.log File Locations

The TechNet article *Troubleshooting Operating System Deployment*<sup>10</sup> includes detailed information on all the log files that are relevant to operating system deployment, as well as error codes and descriptions, and common issues.

<sup>10</sup> Microsoft TechNet: Troubleshooting Operating System Deployment {R12}:  
<http://technet.microsoft.com/en-us/library/bb632813.aspx>



## 7 DEPLOY

The Deploy phase is used to manage the deployment of core solution components for widespread adoption in a controlled environment. During the managed deployment, the solution is tested and validated through on-going monitoring and evaluation. A well-planned deployment of solution components as an end-to-end system will enable the delivery of a quality service that meets or exceeds customer expectations.

Figure 11 acts as a high-level checklist, illustrating the critical tasks that an IT Professional responsible for Configuration Manager operating system deployment needs to perform:

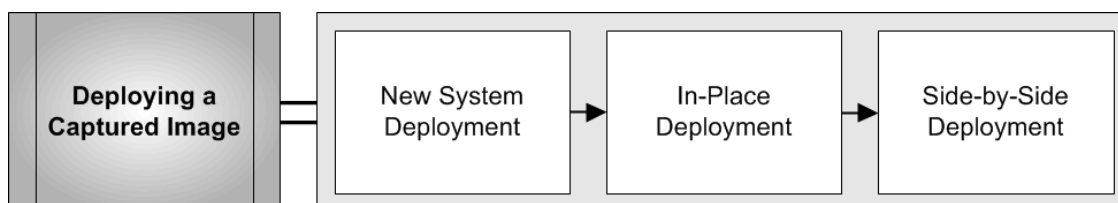


Figure 11: Sequence for Configuration Manager Operating System Deployment

### 7.1 Deploying a Captured Image

As discussed in section 4.2, the healthcare IT Administrator will likely have different deployment requirements based on the machines that will receive the image. The following sections show the process for creating task sequences for the following scenarios:

- New System Deployment (No user state capture is required)
- In-place Deployment (User state is captured and restored)
- Side-by-side Deployment (User state is captured from the old machine and restored to the new machine)

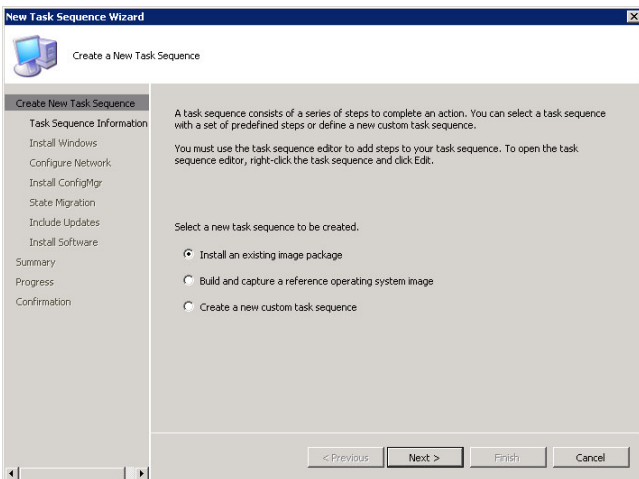
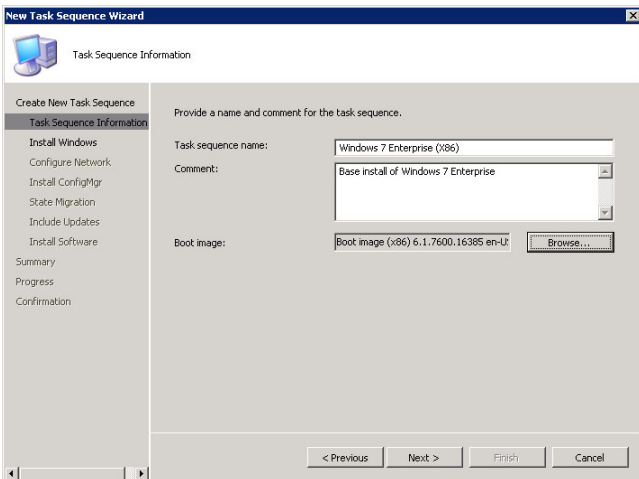
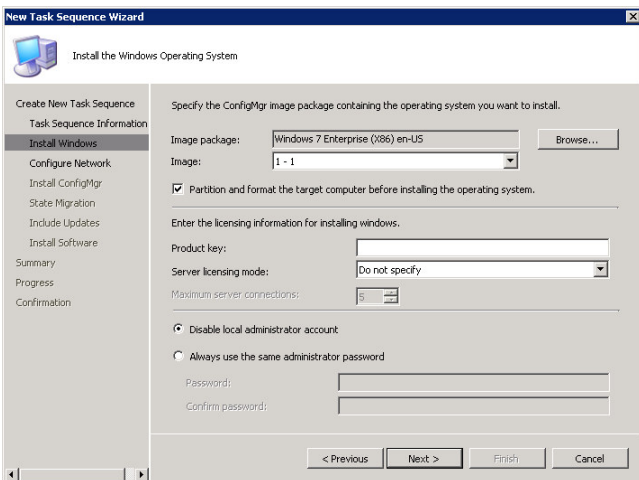
#### 7.1.1 New System Deployment

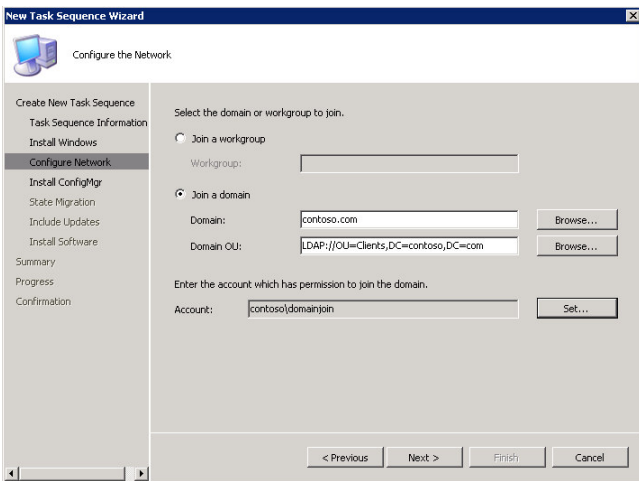
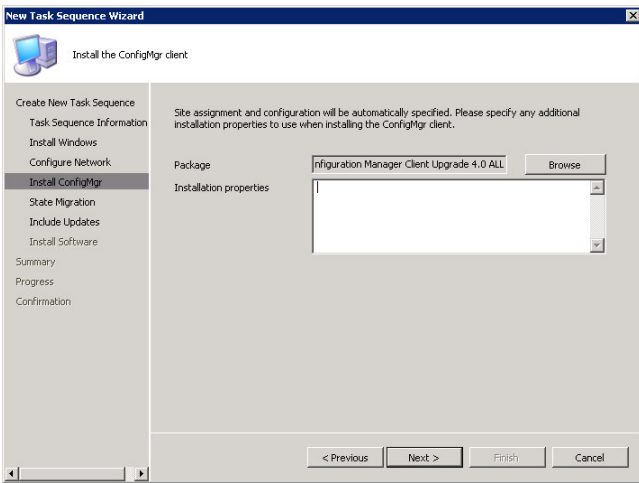
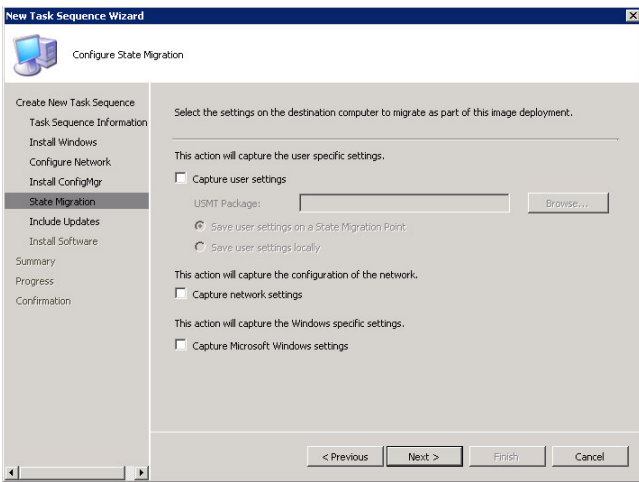
When deploying an image to a new system the healthcare IT Administrator can either use a network service boot (PXE deployment) or create task sequence media that can be stored on a bootable USB device or DVD.


##### 7.1.1.1 Create an Operating System Image Task Sequence

Table 33 shows the steps to create an operating system image task sequence for a new system deployment:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Task Sequences</b> node and select <b>New &gt; Task Sequence</b> .	

Step	Description	Screenshot
2.	Click <b>Install an existing image package</b> and click <b>Next</b> .	
3.	Enter a <b>Task sequence name</b> , a <b>Comment</b> , and select a <b>Boot Image</b> using the <b>Browse</b> button. Click <b>Next</b> .	
4.	<p>Select the operating system image using the <b>Browse</b> button and select the <b>required image</b> from the <b>Image</b> drop down list.</p> <p>If the healthcare organisation is using a Key Management Service (KMS), no <b>Product key</b> is required. If no KMS is being used, a Multiple Activation Key (MAK) will need to be entered. The MAK can be obtained by contacting the organisation's Large Account Reseller (LAR).</p> <p>Click <b>Disable local administrator account</b>.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>Disabling the local administrator account is optional but is current best practice. If there is a specific reason to leave the local administrator account enabled, configure the password as required.</p> </div> <p>Click <b>Next</b>.</p>	

Step	Description	Screenshot
5.	<p>Enter the details of the <b>Domain</b> that the newly built client should join and select the <b>Domain OU</b> in which the client should be created. Click the <b>Set</b> button to specify an <b>Account</b> with permissions to join the client to the network and click <b>Next</b>.</p> <p><b>Note</b></p> <p>The account specified should be in the 'domain admins' group. By default, domain user accounts can only join ten machines to a domain.</p>	
6.	<p>Click <b>Browse</b> and select the Configuration Manager client package created in section 5.1.2.1.</p> <p>Click <b>Next</b>.</p>	
7.	<p>On the <b>Configure State Migration</b> page, clear all check boxes (no user state migration is required for a new machine deployment) and click <b>Next</b>.</p>	

Step	Description	Screenshot
8.	<p>Click <b>Don't install any software updates</b> and click <b>Next</b>.</p> <p><b>Note</b></p> <p>If the healthcare organisation is using software update management in Configuration Manager, software updates should be installed at this stage. For more information on using the software update management features of Configuration Manager, see the <i>System Center Configuration Manager 2007 Software Update Management Guide</i> {R10}.</p>	
9.	<p>Use the Add package button  to add any required software distribution packages that should be installed using this task sequence. This will be software that is not included in the image but that should be installed once the image is deployed. More information on creating software distribution packages is available in the <i>System Center Configuration Manager 2007 Software Distribution Guide</i> {R11}.</p> <p>Click <b>Next</b>.</p>	
10.	<p>Click <b>Next</b>.</p>	

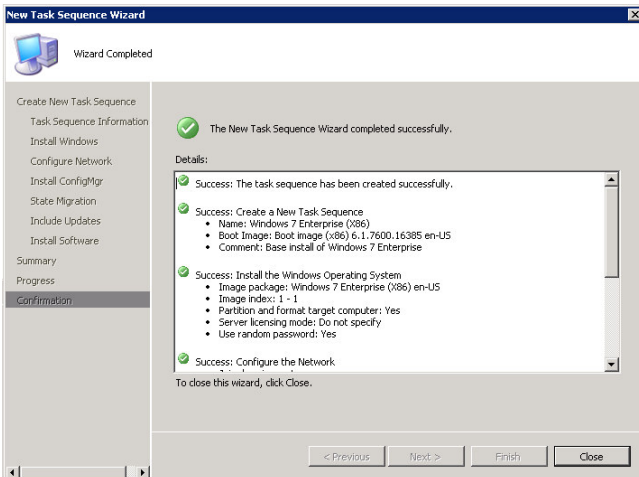
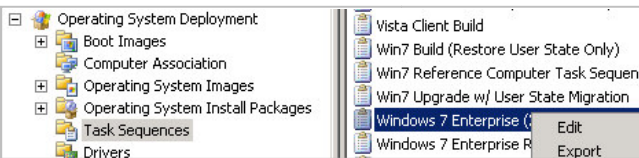

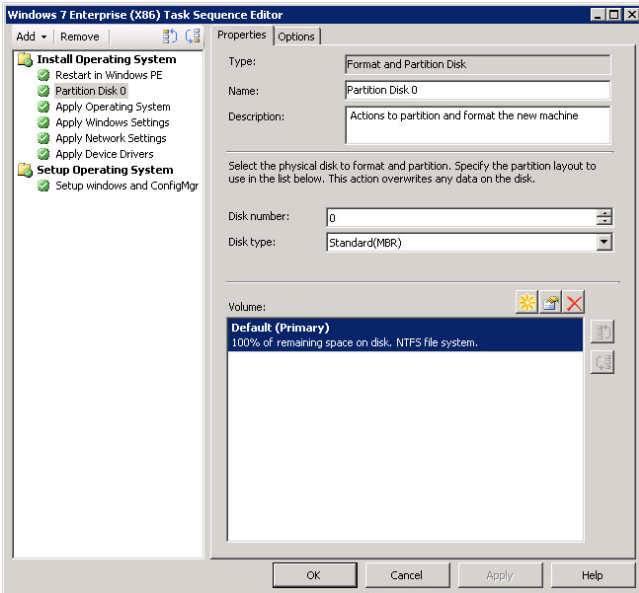
Step	Description	Screenshot
11.	Click <b>Close</b> .	

Table 33: Create an Operating System Image Task Sequence (New System Deployment)

The steps in Table 33 create a basic task sequence that will deploy the operating system image. It is likely that the healthcare IT Administrator will need to modify the task sequence by adding additional steps to achieve the operating system deployment goals of the healthcare organisation. Table 34 shows some limited customisation of the task sequence, as an example:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , select <b>Task Sequences</b> and in the right pane, right-click on the task sequence to be customised and select <b>Edit</b> .	
2.	Select <b>Default (Primary)</b> under <b>Volume</b> and click the properties button  .	

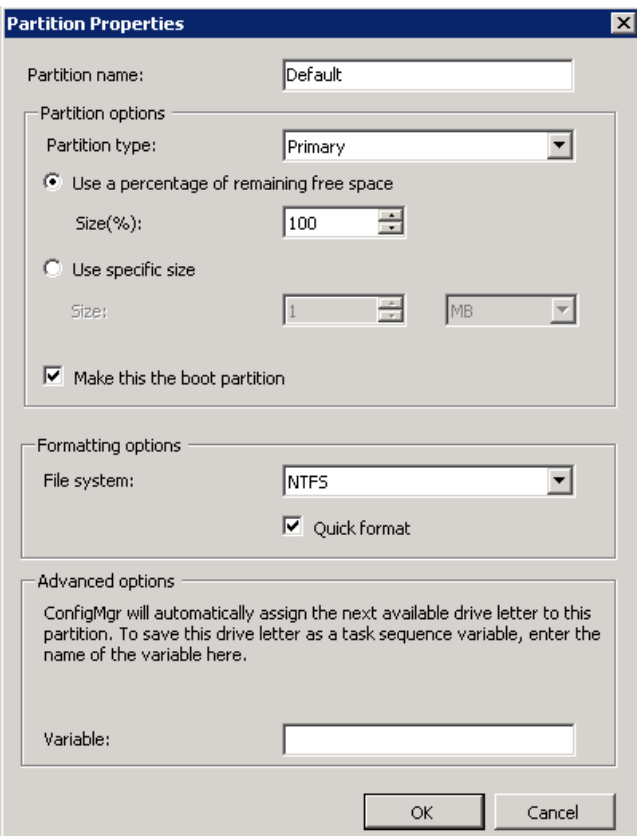
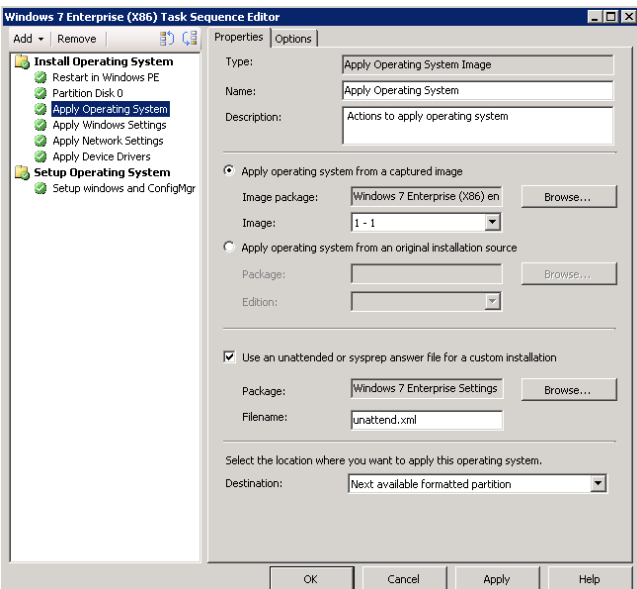
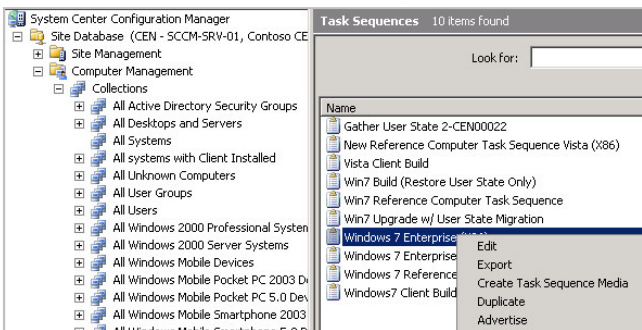
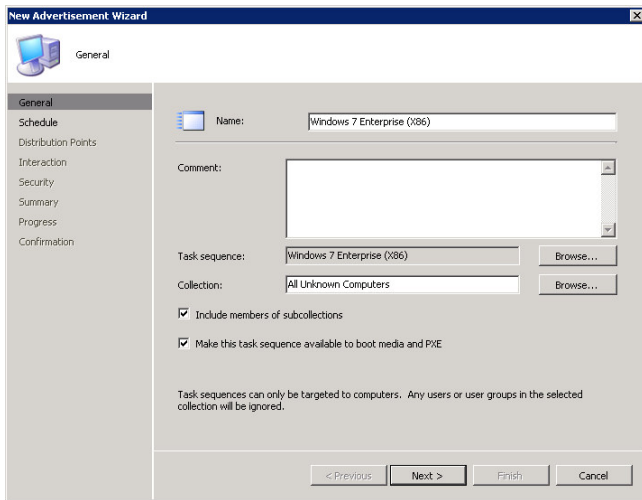
Step	Description	Screenshot
3.	<p>Select the <b>Quick format</b> check box and click <b>OK</b>.</p> <p><b>Tip</b> Unless there is a specific requirement to perform a full format, this option should be selected on all operating system deployment task sequences because it will significantly reduce the time taken to deploy the image.</p> <p>Click <b>OK</b>.</p>	
4.	<p>In the left pane, select <b>Apply Operating System</b> and select <b>Use an unattended or Sysprep answer file for a custom installation</b> on the <b>Properties</b> tab. Specify a <b>Package</b> that contains the unattended answer file such as Unattend.xml and specify the <b>Filename</b>.</p> <p><b>Note</b> An Unattend.xml file can be created using Windows System Image Manager or Healthcare MDT 2010. Once created, a Configuration Manager package must be created and deployed to DPs.</p> <p>Click <b>OK</b>.</p>	

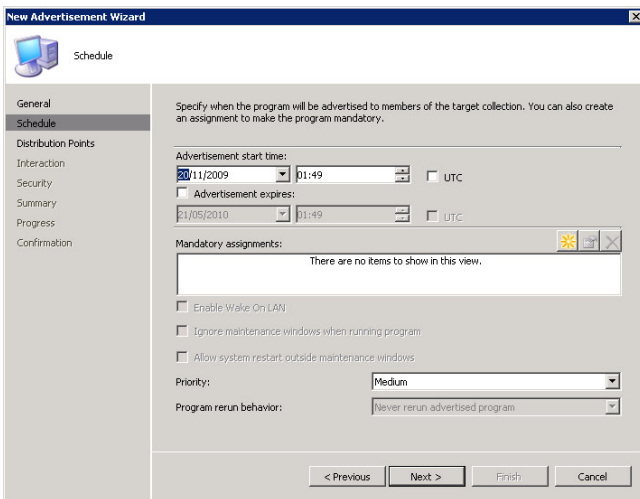
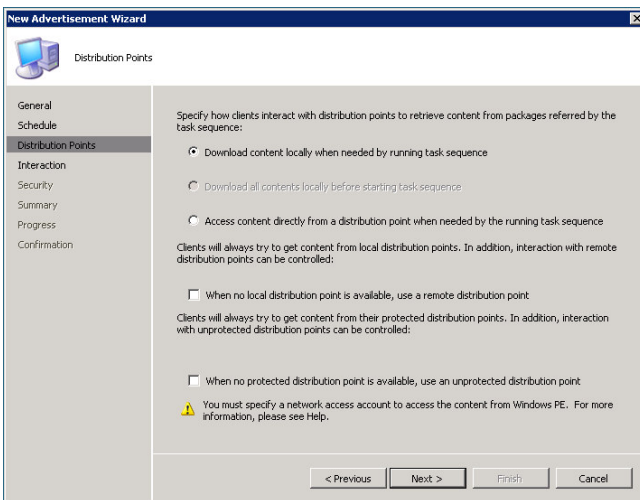
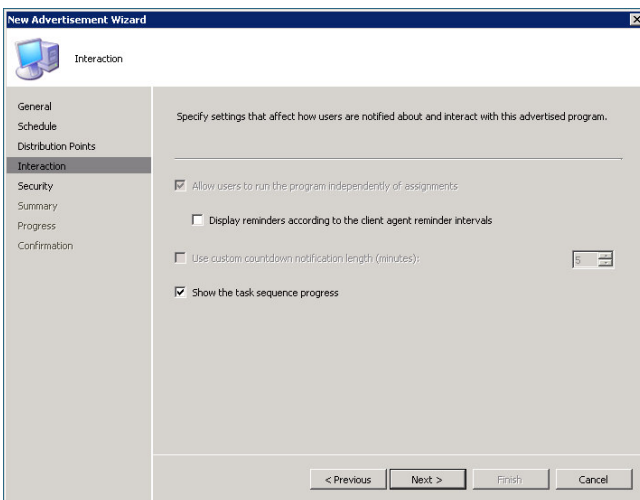
Table 34: Customising the Operating System Image Task Sequence

### 7.1.1.2 Advertising the Operating System Image Task Sequence

As described in section 5.3.5, a task sequence can be deployed either to the 'Unknown Computers' collection (allowing any machine that is unknown to Configuration Manager to access the task sequence) or to a specific collection that contains client machines imported into Configuration Manager in advance. In order to import multiple machines, the healthcare IT Administrator will need a spreadsheet with one column for names and another column for MAC addresses. This information can usually be provided by the healthcare organisation's hardware supplier. The **Import Computer Information Wizard** described in section 5.3.5 will read the file and import all the specified machines, and then add them to a collection. The task sequence can then be deployed only to that collection if required. An advantage of importing client computers in advance is that when the new operating system is installed, the computer will be assigned the computer name specified when it was imported. If the computer is not imported in advance, the healthcare IT Administrator will need to automate the computer name selection as part of the task sequence customisation. Table 35 shows the steps for advertising the operating system image deployment task sequence to a collection:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and select <b>Task Sequences</b> , and in the right pane, right-click on the task sequence created in section 7.1.1.1 and select <b>Advertise</b> .	
2.	Enter a <b>Name</b> and use the <b>Browse</b> button to select a <b>Collection</b> . If computer information has already been imported, select the collection that contains the machines. If computer information has not been imported, select the Unknown Computer collection.  Ensure the <b>Make this task sequence available to boot media and PXE</b> check box is selected and click <b>Next</b> .	



Step	Description	Screenshot
3.	<p>Click <b>Next</b>.</p> <p><b>Note</b></p> <p><b>Mandatory assignments</b> can be created that will trigger the task sequence to be executed without being selected, if required.</p>	 <p>The screenshot shows the 'New Advertisement Wizard' dialog box with the 'Schedule' tab selected. The 'Advertisement start time' is set to 20/11/2009 at 01:49. The 'Advertisement expires' is set to 21/05/2010 at 01:49. The 'Mandatory assignments' section is empty, showing 'There are no items to show in this view.' The 'Priority' is set to 'Medium' and the 'Program rerun behavior' is set to 'Never rerun advertised program'.</p>
4.	<p>Click <b>Next</b>.</p>	 <p>The screenshot shows the 'New Advertisement Wizard' dialog box with the 'Distribution Points' tab selected. The 'Download content locally when needed by running task sequence' option is selected. The 'When no local distribution point is available, use a remote distribution point' option is also selected. A warning message states: 'You must specify a network access account to access the content from Windows PE. For more information, please see Help.'</p>
5.	<p>Click <b>Next</b>.</p>	 <p>The screenshot shows the 'New Advertisement Wizard' dialog box with the 'Interaction' tab selected. The 'Allow users to run the program independently of assignments' option is checked. The 'Display reminders according to the client agent reminder intervals' option is unchecked. The 'Show the task sequence progress' option is checked.</p>




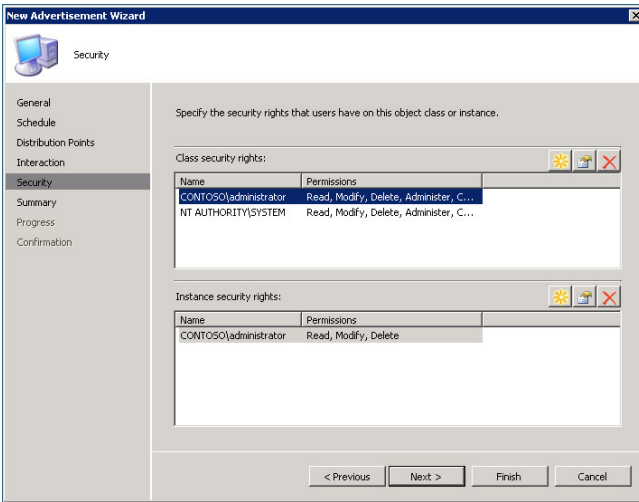
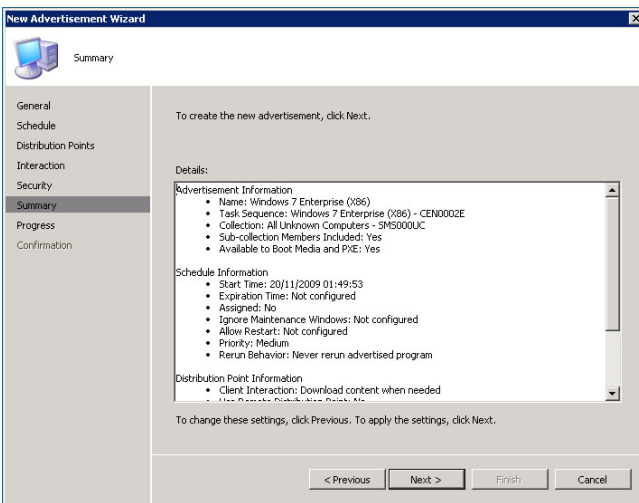
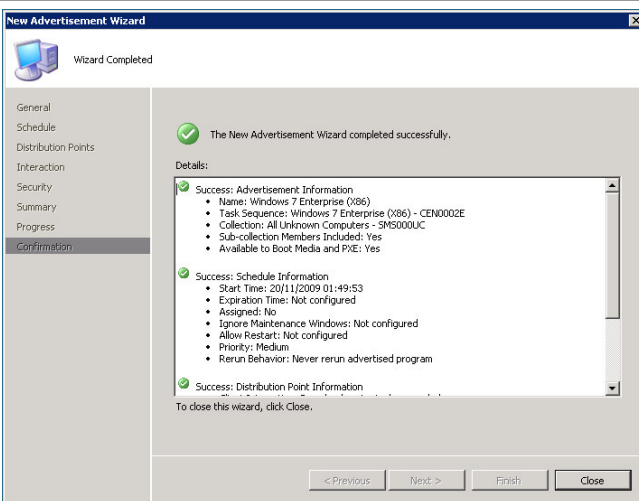
Step	Description	Screenshot
6.	If specific users or groups need to be able to modify the advertisement's properties, click  in the <b>Instance security rights</b> section to modify the rights and add the required users or groups. Click <b>Next</b> .	
7.	Click <b>Next</b> .	
8.	Click <b>Close</b> .	

Table 35: Advertising the Operating System Image to the Unknown Computers Collection

### 7.1.1.1 Creating Task Sequence Media

If the healthcare organisation has not deployed a PXE Service Point, the deployment must be initiated using task sequence media. The task sequence media created in Table 21 can be used to deploy any task sequence.

### 7.1.1.2 Operating System Image Deployment (New System)

The healthcare IT Administrator can now deploy the operating system image to new computers using a PXE service point or bootable task sequence media. Table 36 shows the image being applied using a PXE service point installation:


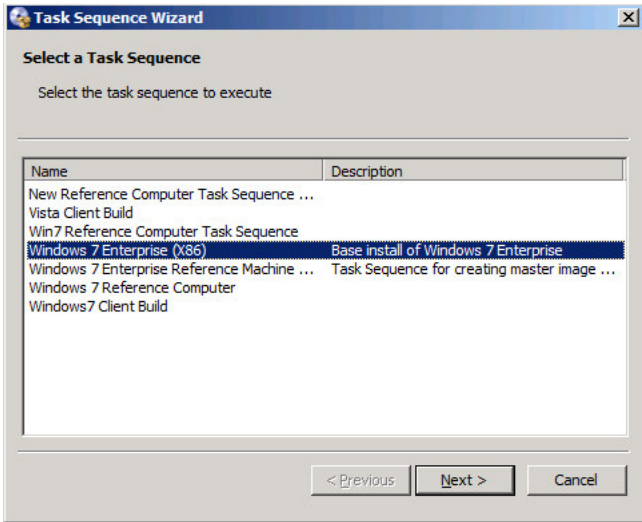
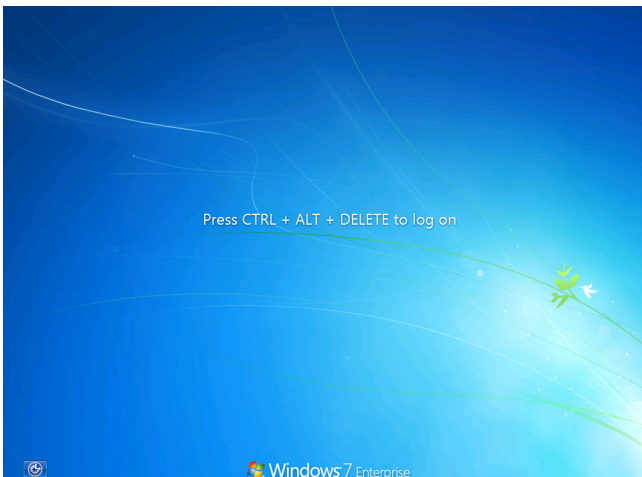
Step	Description	Screenshot
1.	Start a client machine using either the Task Sequence Bootable Media or by Network Service Boot.	
2.	The <b>Task Sequence Wizard</b> displays. Select the task sequence created for client deployment and click <b>Next</b> .  The task sequence will now execute all of the steps required to build the new client machine.	
3.	Once the log-in screen for Windows 7 Enterprise appears, the task sequence is complete.	

Table 36: Deploying the Operating System Using PXE Service Point

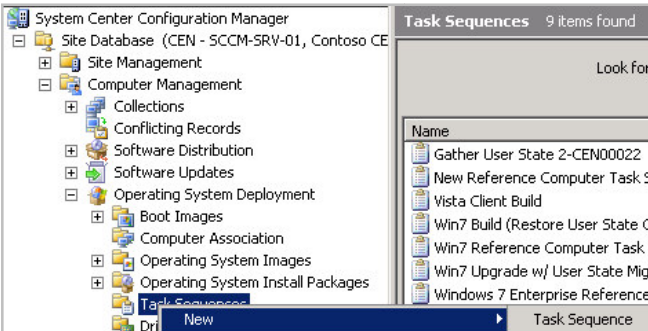
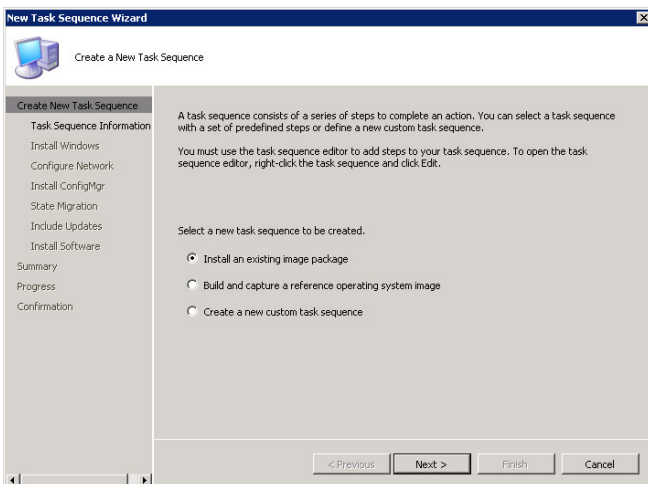
## 7.1.2 In-Place Deployment

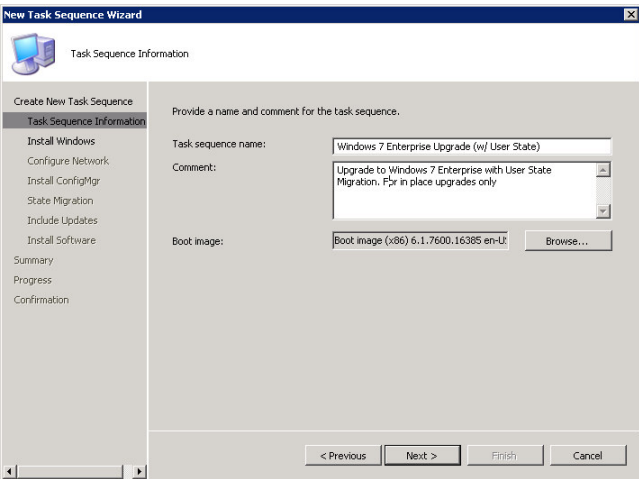
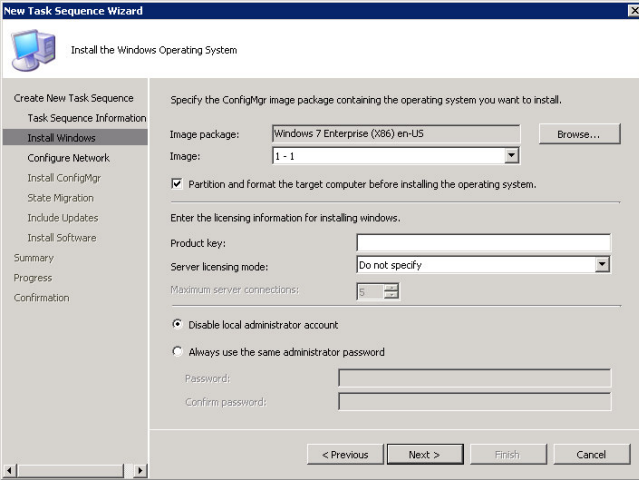
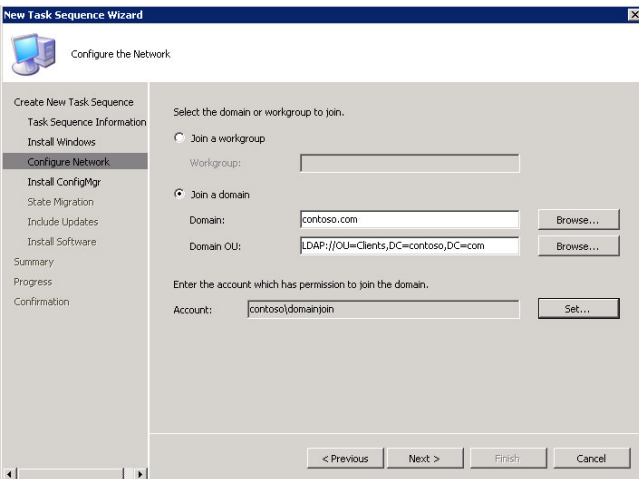
In-place deployment works in much the same way as a new computer deployment, with the exception that the task sequence will be advertised to an existing computer, and the user state of the machine will need to be gathered and restored during the build process. Configuration Manager does this by using the state migration point to store user data while the machine is being rebuilt.

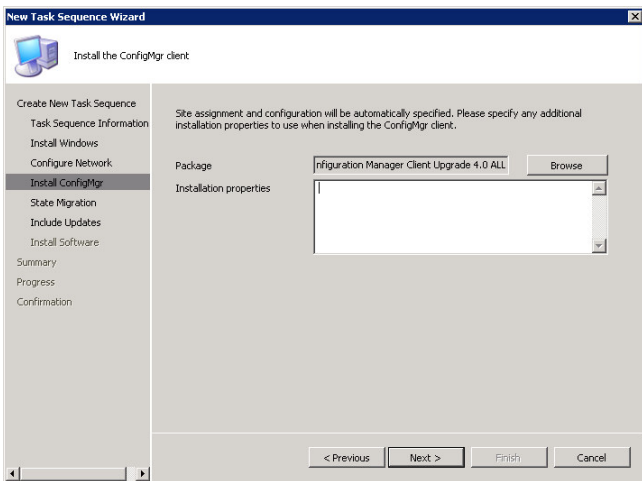
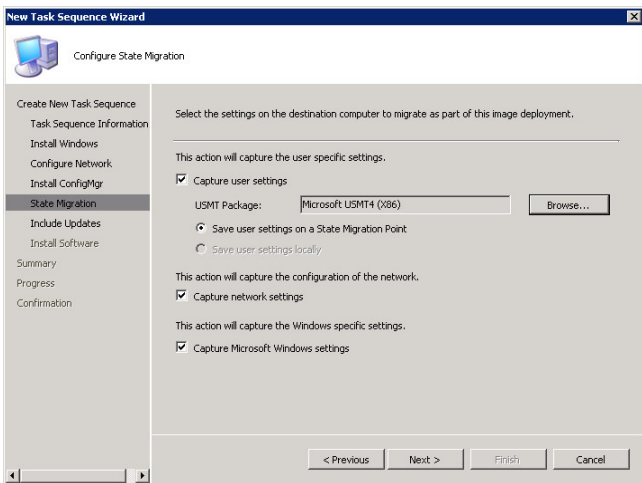
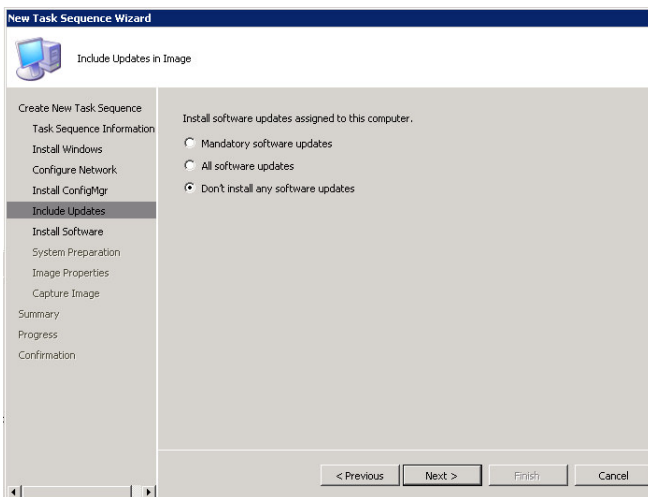
USMT can be configured to collect as much or as little user data as required, and complex rules can be configured to perform actions such as file redirection (for example, scan all hard drives for .doc files and collect them, but when replacing the files, move them all to the user's documents folder). More information on customising USMT configuration files can be found in the *Healthcare Desktop User State Migration Guide {R4}*.

### 7.1.2.1 Create an Operating System Image Task Sequence

Table 37 shows the steps required to create a task sequence to perform an in-place deployment of Windows 7. As with all the task sequences created in this guidance, it represents the most basic tasks that are required and will likely require additional customisation prior to being deployed in a healthcare organisation.

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Task Sequences</b> node and select <b>New &gt; Task Sequence</b>	
2.	Click <b>Install an existing image package</b> and click <b>Next</b> .	

Step	Description	Screenshot
3.	Enter a <b>Task sequence name</b> , a <b>Comment</b> and select a <b>Boot Image</b> using the <b>Browse</b> button. Click <b>Next</b> .	
4.	<p>Select the operating system image using the <b>Browse</b> button and select the required image from the <b>Image</b> drop-down list.</p> <p>If the healthcare organisation is using a KMS, no <b>Product key</b> is required. If no KMS is being used, a MAK will need to be entered. The MAK can be obtained by contacting the healthcare organisation's LAR.</p> <p>Click <b>Disable local administrator account</b>.</p> <p><b>Note</b></p> <p>Disabling the local administrator account is optional but is current best practice. If there is a specific reason to leave the local administrator account enabled, configure the password as required.</p> <p>Click <b>Next</b>.</p>	
5.	<p>Enter the details of the <b>Domain</b> that the newly built client should join and select the <b>Domain OU</b> in which the client should be created. Click <b>Set</b> to specify an <b>Account</b> with permissions to join the client to the network and click <b>Next</b>.</p> <p><b>Note</b></p> <p>The account specified should be in the 'domain admins' group. By default, domain user accounts can only join ten machines to a domain.</p>	

Step	Description	Screenshot
6.	Click <b>Browse</b> and select the Configuration Manager client package created in section 5.1.2.1. Click <b>Next</b> .	
7.	Select <b>Capture user settings</b> and use the <b>Browse</b> button to select the <b>USMT Package</b> created in section 5.1.2.2. Select <b>Capture network settings</b> and <b>Capture Microsoft Windows settings</b> , and then click <b>Next</b> .	
8.	Click <b>Don't install any software updates</b> and click <b>Next</b> .  <b>Note</b> If the healthcare organisation is using software update management in Configuration Manager, software updates should be installed at this stage. For more information on using the software update management features of Configuration Manager, see the <i>System Center Configuration Manager 2007 Software Update Management Guide {R10}</i> .	


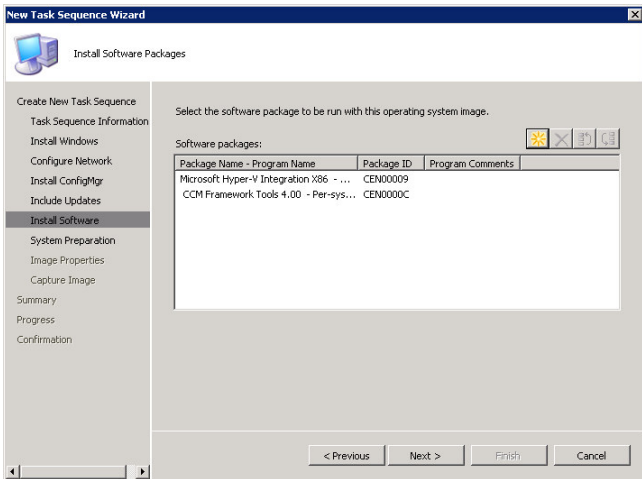
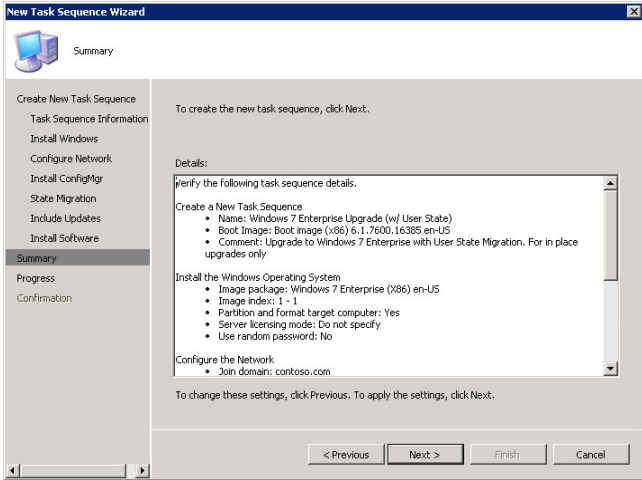
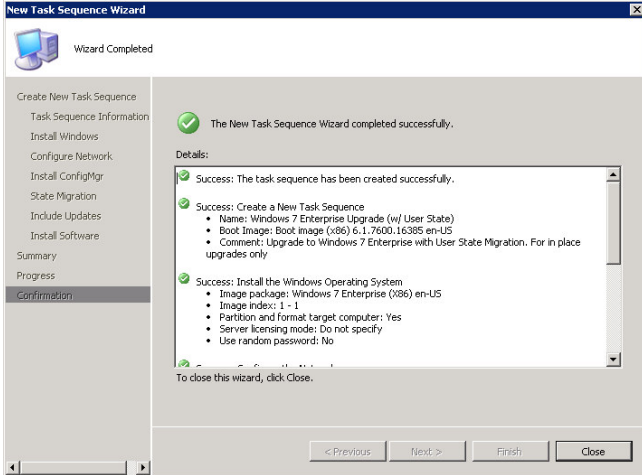
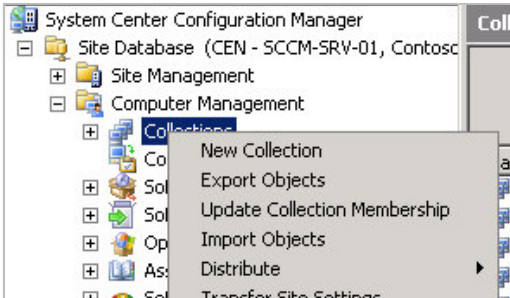
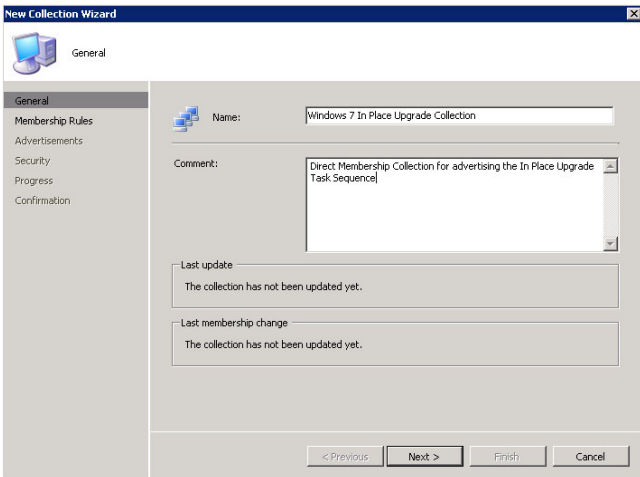

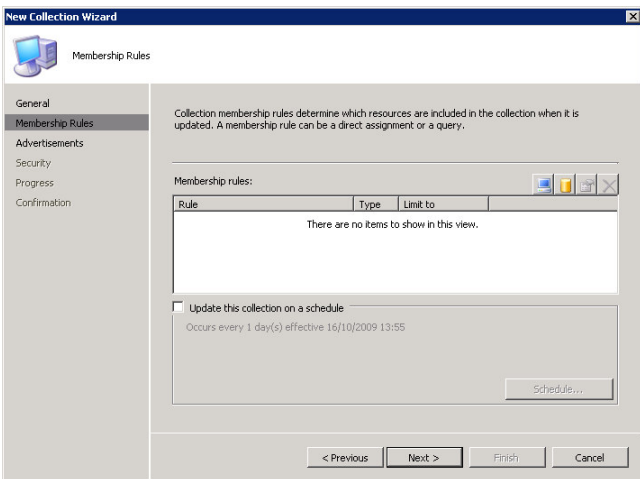
Step	Description	Screenshot
9.	Use the Add package button  to add any required software distribution packages that should be installed using this task sequence. This will be software that is not included in the image but that should be installed once the image is deployed. More information on creating software distribution packages is available in the <i>System Center Configuration Manager 2007 Software Distribution Guide</i> {R11}. Click <b>Next</b> .	
10.	Click <b>Next</b> .	
11.	Click <b>Close</b> .	

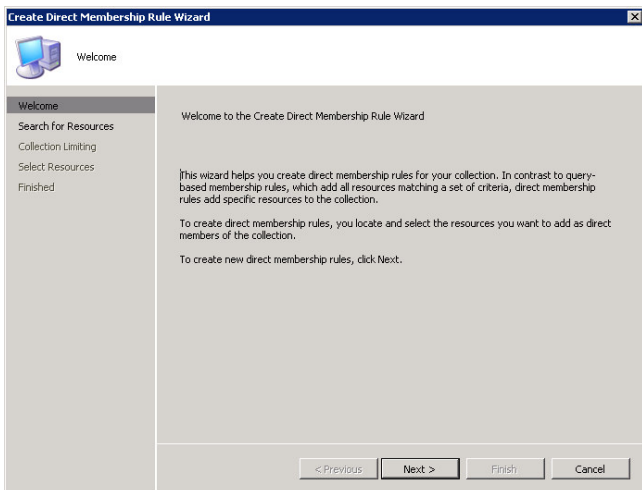
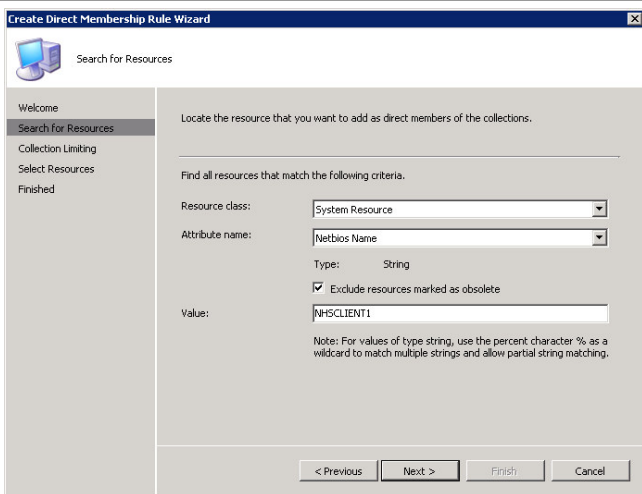
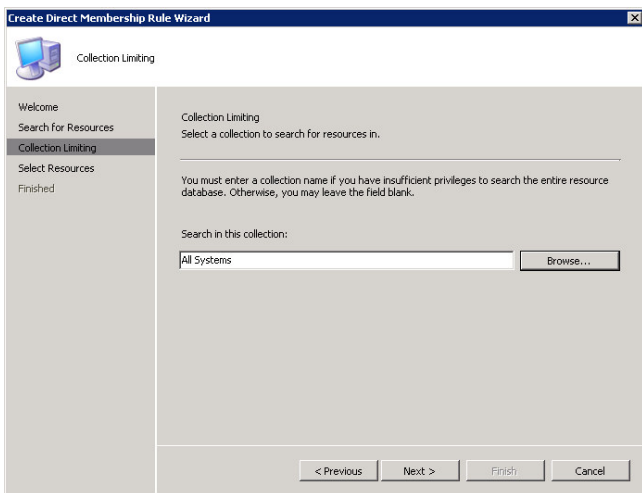
Table 37: Creating a Task Sequence for an In-Place Deployment

### 7.1.2.2 Creating a Collection to Target the In-Place Deployment

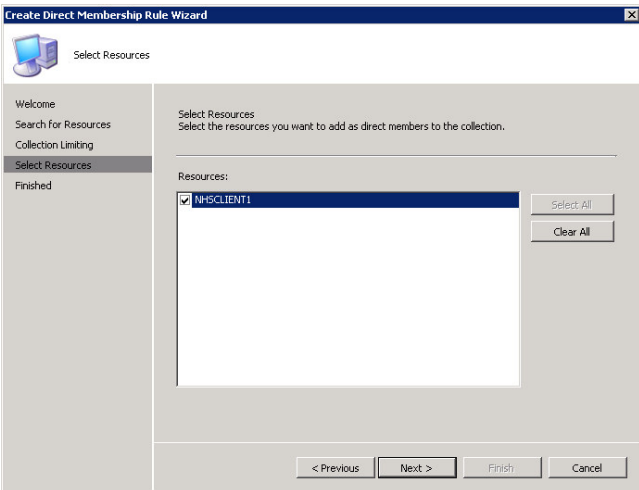
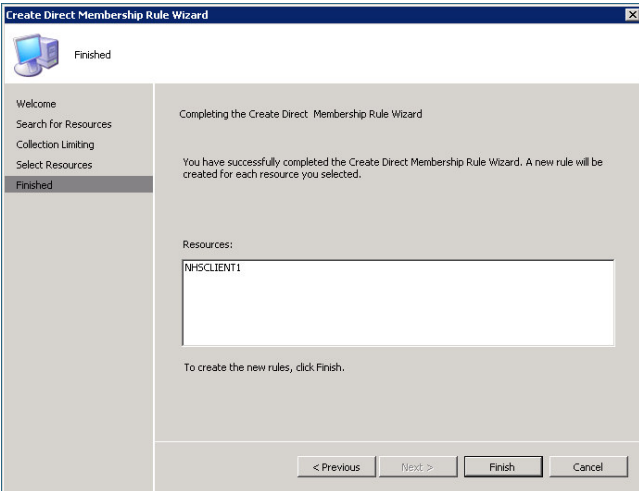
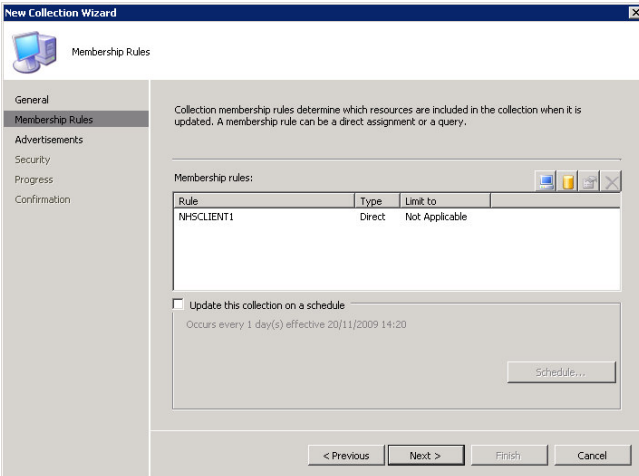
When deploying an upgrade task sequence to existing machines, the healthcare IT Administrator will need to create a collection that contains the machines. The collection can be a dynamic collection if a full production rollout is taking place, such as 'All Windows Vista Computers', or a direct membership collection where specific computers are added to the collection. The *System Center Configuration Manager 2007 Software Distribution Guide {R11}* contains information on creating dynamic and direct membership collections. Table 38 shows the steps required to create a direct membership collection containing a Windows Vista test computer:

Step	Description	Screenshot
1.	<p>Open the <b>Configuration Manager Console</b> and navigate to the <b>Computer Management &gt; Collections</b> node.</p> <p>Right-click on the <b>Collections</b> node and select <b>New &gt; Collection</b>.</p>	
2.	<p>In <b>Name</b>, enter an appropriate name for the collection, and if required, enter a <b>Comment</b> and click <b>Next</b>.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>It is good practice to decide on a collection naming strategy so that collections can be easily identified by their purpose.</p> </div>	
3.	<p>For Direct Membership collections, ensure that the <b>Update this collection on a schedule</b> check box is clear.</p> <p>Click the  button to add a new direct membership rule.</p>	



Step	Description	Screenshot
4.	Click <b>Next</b> .	
5.	<p>Select <b>System Resource</b> from the <b>Resource class</b> drop-down list.</p> <p>Select <b>Netbios Name</b> from the <b>Attribute name</b> drop-down list.</p> <p>Select <b>Exclude resources marked as obsolete</b> to ensure the client being added is active.</p> <p>In <b>Value</b>, enter the name of the system to be added to the collection.</p> <p><b>Tip</b> The wildcard '%' can be entered in the <b>Value</b> text box to return all systems, or it can be used for partial matching.</p> <p>Click <b>Next</b>.</p>	
6.	<p>In <b>Search in this collection</b>, enter the name of a collection of which the system is already a member, or click <b>Browse</b> to locate a collection.</p> <p><b>All Systems</b> will contain all computers that have been discovered by Configuration Manager.</p> <p><b>Tip</b> Leaving <b>Search in this collection</b> blank will search all collections, providing the administrator has Read access to all collections.</p> <p>Click <b>Next</b>.</p>	



Step	Description	Screenshot
7.	<p>Select the system from the list displayed and click <b>Next</b>.</p> <p><b>Note</b> If the wildcard '%' was used previously, all matching results will be returned.</p>	
8.	Click <b>Finish</b> .	
9.	On the <b>Membership Rules</b> page, click <b>Next</b> .	

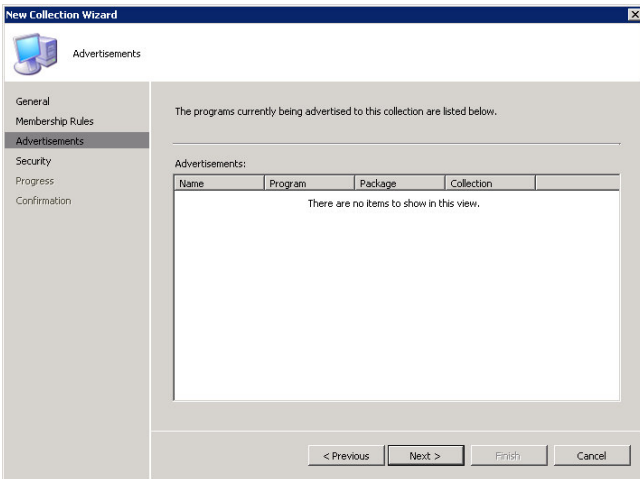

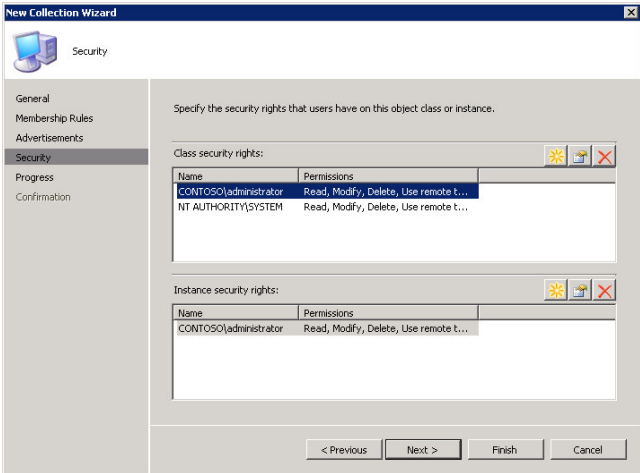
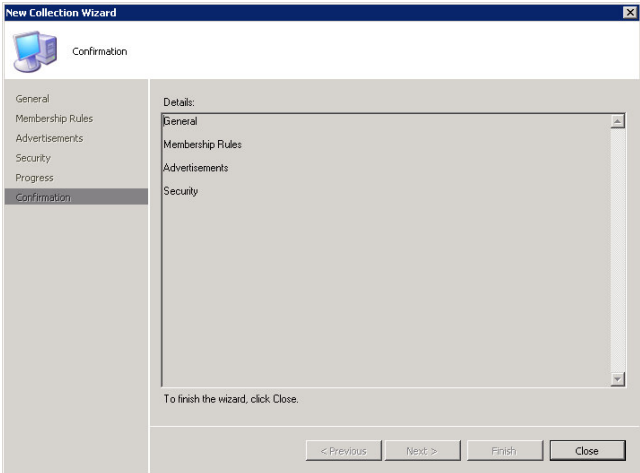
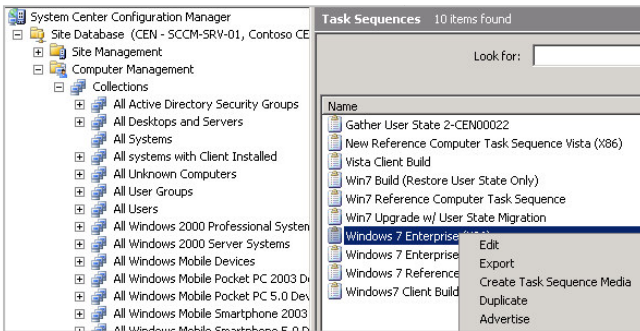
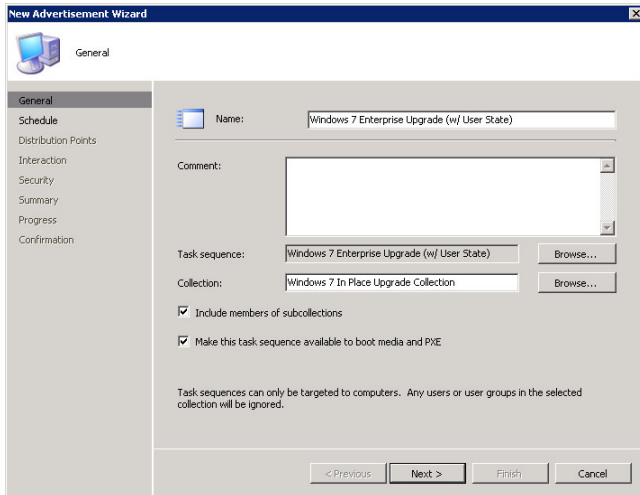
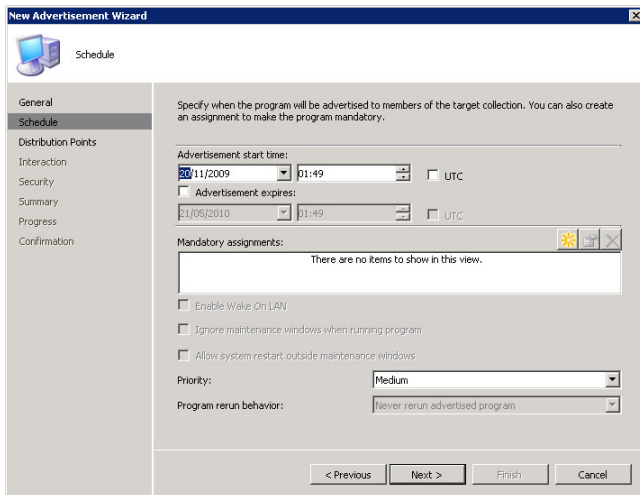
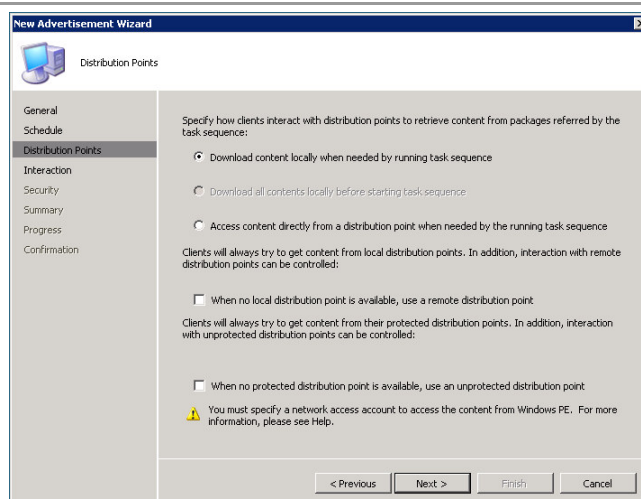
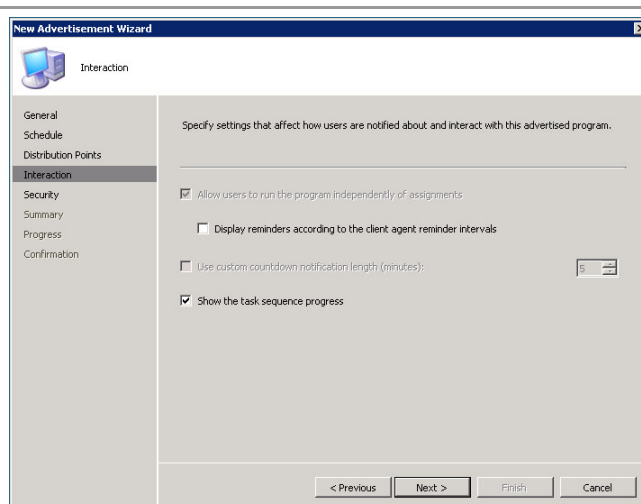
Step	Description	Screenshot
10.	Click <b>Next</b> .	
11.	If additional users or groups need to be able to administer this collection, click  in the <b>Instance security rights</b> section to modify the rights and add the required users or groups. Click <b>Next</b> .	
12.	Click <b>Close</b> .	


Table 38: Creating a Direct Membership Collection for an In-place Deployment Task Sequence

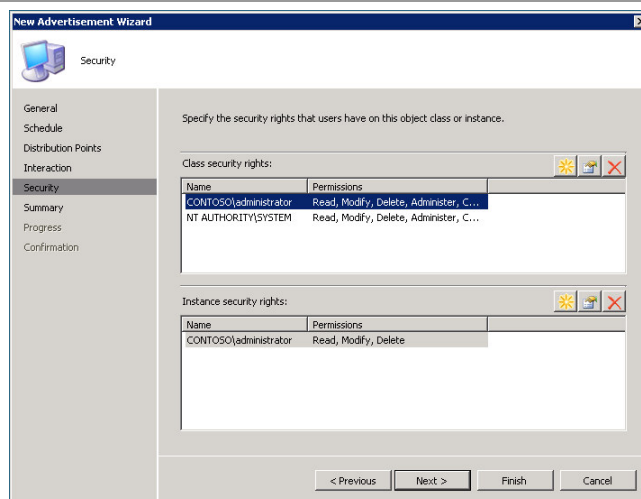
### 7.1.2.3 Advertising the Operating System Image Task Sequence

Table 39 shows the steps required to advertise the operating system task sequence for an in-place upgrade:

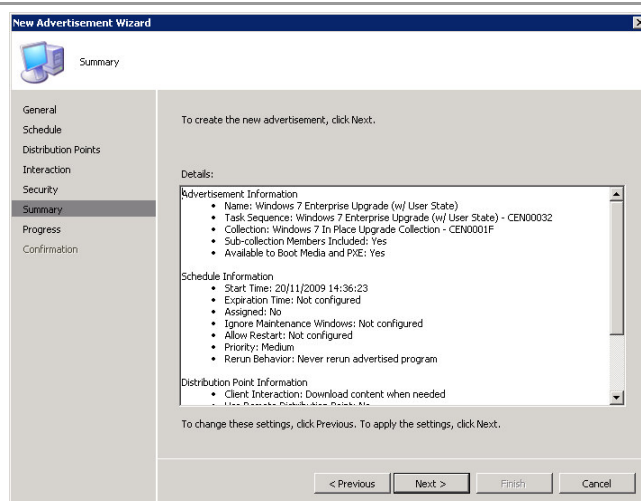
Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and <b>select Task Sequences</b> . In the right pane, right-click on the task sequence created in section 7.1.2.1 and select <b>Advertise</b> .	
2.	Enter a <b>Name</b> and use the <b>Browse</b> button next to the <b>Collection</b> box to select the collection created in section 7.1.2.2. Ensure the <b>Make this task sequence available to boot media and PXE</b> check box is selected and click <b>Next</b> .	
3.	Click <b>Next</b> .	<p><b>Note</b></p> <p><b>Mandatory assignments</b> can be created that will trigger the task sequence to be executed without being selected, if required. If no mandatory assignment is specified, the user will be notified that a new operating system deployment is available. It is likely that mandatory assignments will be used in a production environment so that the operating system installation can be scheduled and enforced.</p> 

4. Click **Next**.5. Click **Next**.

6. If specific users or groups need to be able to modify the advertisement's properties, click  in the **Instance security rights** section to modify the rights and add the required users or groups. Click **Next**.



7. Click **Next**.



8. Click **Close**.

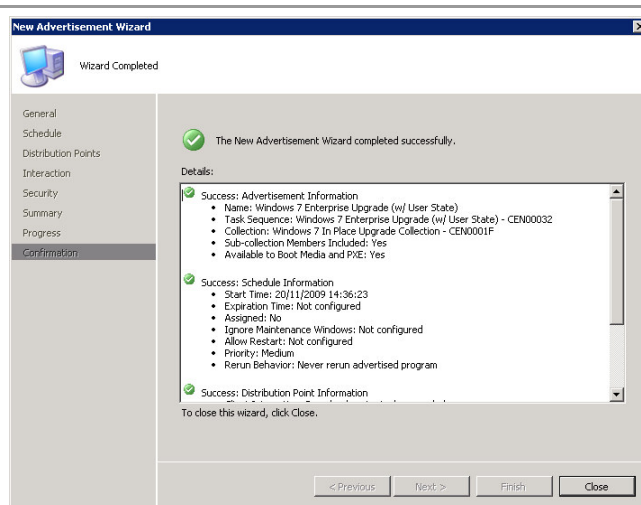
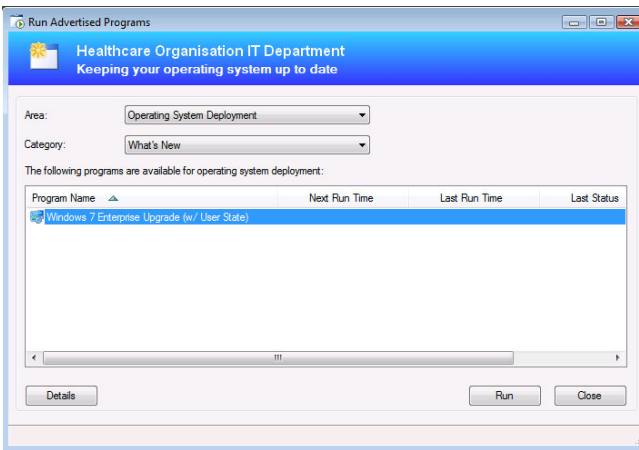
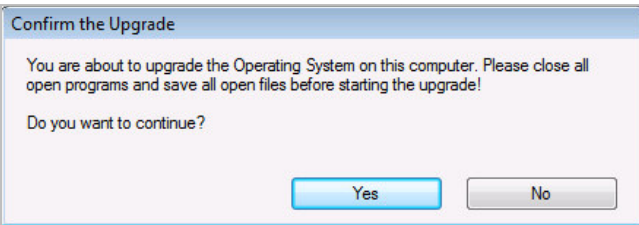
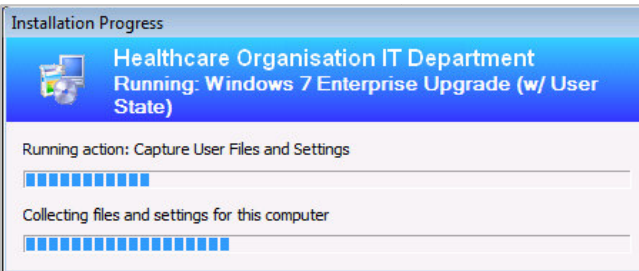



Table 39: Advertising the Operating System Image Task Sequence (In-Place)

#### 7.1.2.4 Operating System Image Deployment (In-Place)

The Operating System task sequence will now be made available to the end user. If a mandatory assignment has been created, the task sequence will notify the user that the operating system deployment is going to begin and display a countdown. After this countdown, the upgrade will begin. If no mandatory assignment is created, the Configuration Manager client will notify the user that an operating system deployment is available and the user can choose whether or not to run the upgrade. Table 40 shows the operating system upgrade process on a user's machine:

Step	Description	Screenshot
1.	The logged-on user receives the advertisement and has the option to start the upgrade. Click the balloon tip to open <b>Run Advertised Programs</b> .	

Step	Description	Screenshot
2.	<p>Select the operating system upgrade advertisement under <b>Program Name</b> and click <b>Run</b>.</p> <p><b>Note</b></p> <p>If the advertisement had a mandatory assignment, the advertisement will inform the user and begin a countdown. After the countdown, the upgrade will begin and no user interaction will be required.</p>	
3.	Click <b>Yes</b> to confirm the upgrade.	
4.	The task sequence wizard begins and performs the user state capture, saving the user state data to the state migration point.	
5.	The boot image is downloaded from the DP, then the computer restarts in Windows PE and installs the new operating system image.	

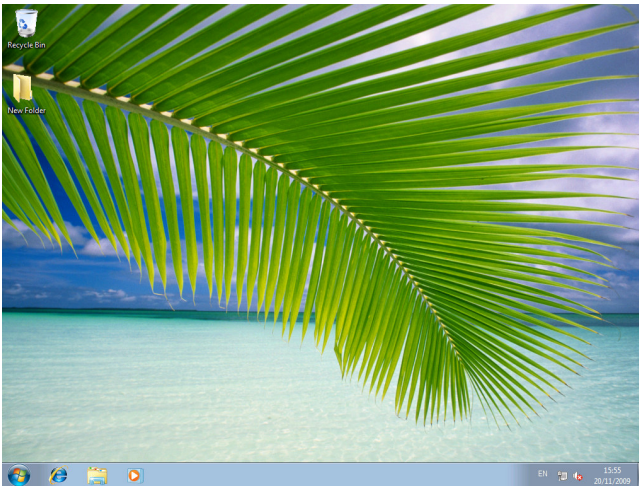
Step	Description	Screenshot
6.	The migration completes and the user's settings and data, such as files and wallpaper, and so on, are preserved.	

Table 40: Deploying the Operating System Using Non-Mandatory Assignment

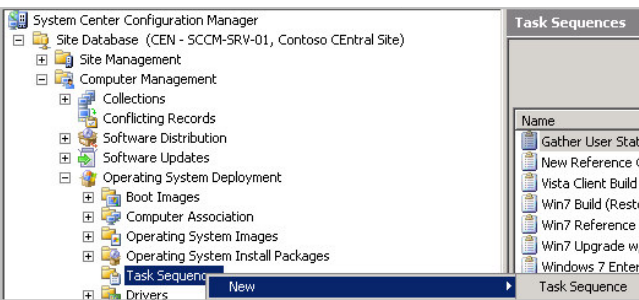
### 7.1.3 Side-by-Side Deployment

Side-by-side deployment is used when a user's machine is being replaced and the user data and settings must be migrated from the old machine to the new one. This may be due to a hardware upgrade, where the new and old operating systems will be the same, or a hardware and operating system refresh, where the operating system on the new machine will also be upgraded. This process involves the following stages:

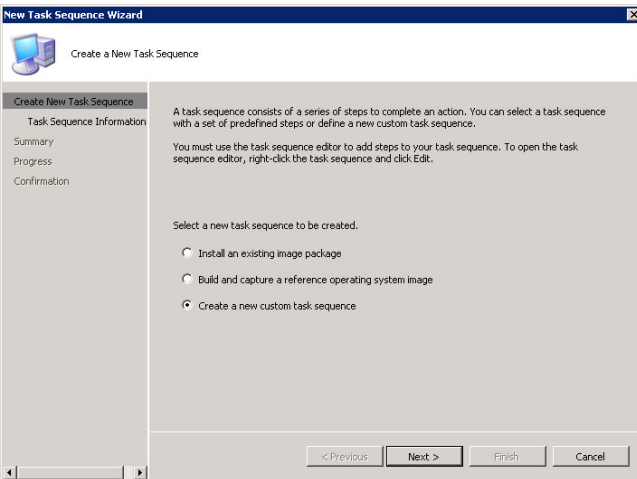
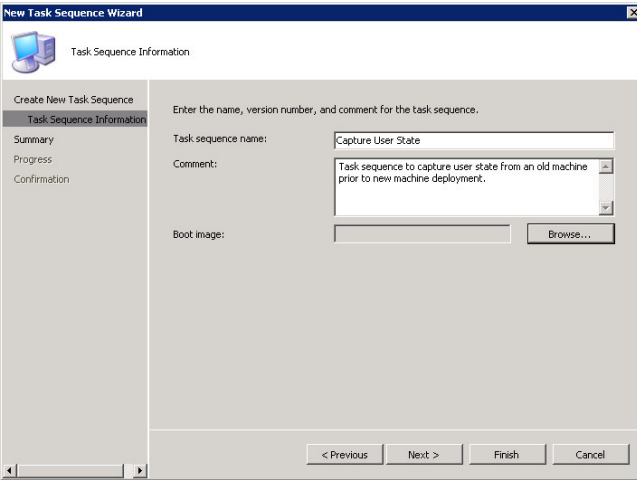
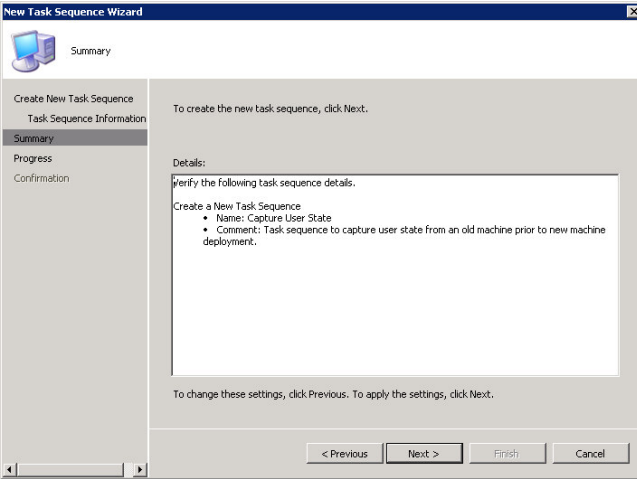
- Creating a computer association between the old and new machines
- Deploying a task sequence to the old machine to capture user state
- Deploying a task sequence to the new machine to build the new operating system and import the user state

#### 7.1.3.1 Creating the User State Capture Task Sequence

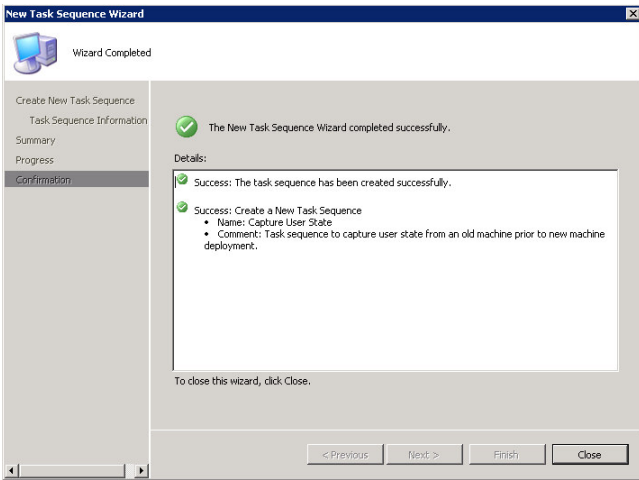
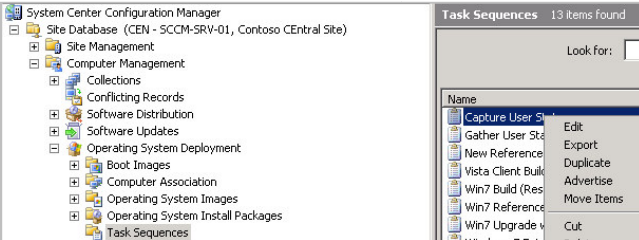
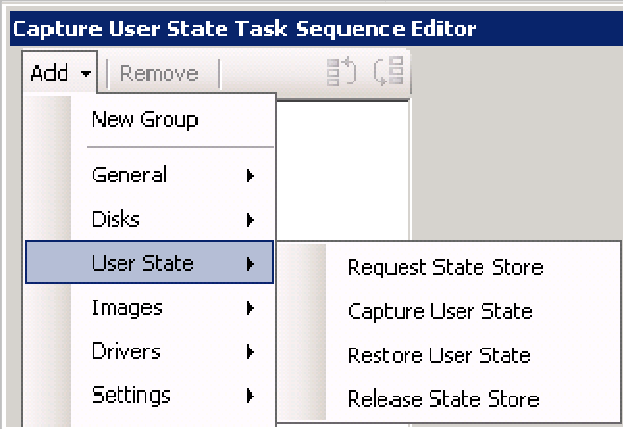
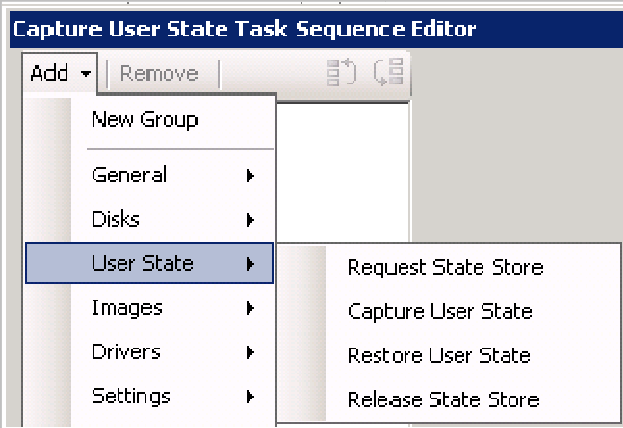
Table 41 shows the steps required to create a custom task sequence that will capture the user state from the old machine and store it on the state migration point:

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Task Sequences</b> node and select <b>New &gt; Task Sequence</b> .	



Step	Description	Screenshot
2.	Click <b>Create a new custom task sequence</b> and click <b>Next</b> .	
3.	Enter a <b>Task sequence name</b> and <b>Comment</b> , and then click <b>Next</b> .	
4.	Click <b>Next</b> .	



Step	Description	Screenshot
5.	Click <b>Close</b> .	
6.	Right-click on the newly created task sequence and click <b>Edit</b> .	
7.	In the Task Sequence Editor, click <b>Add</b> and select <b>User State &gt; Request State Store</b> .	
8.	Click <b>Add</b> and select <b>User State &gt; Capture User State</b> .	

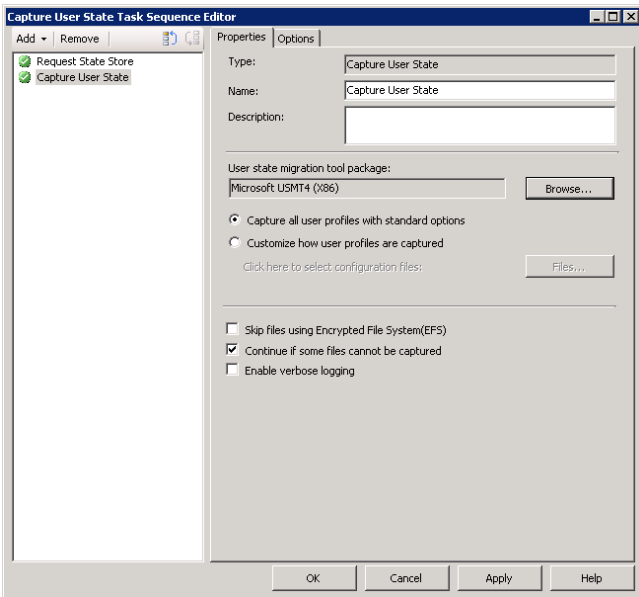
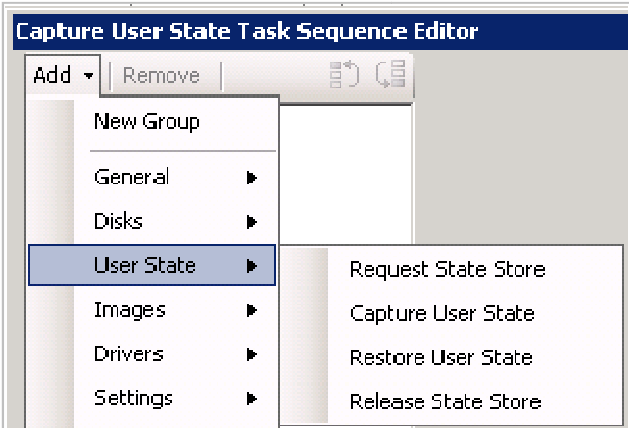
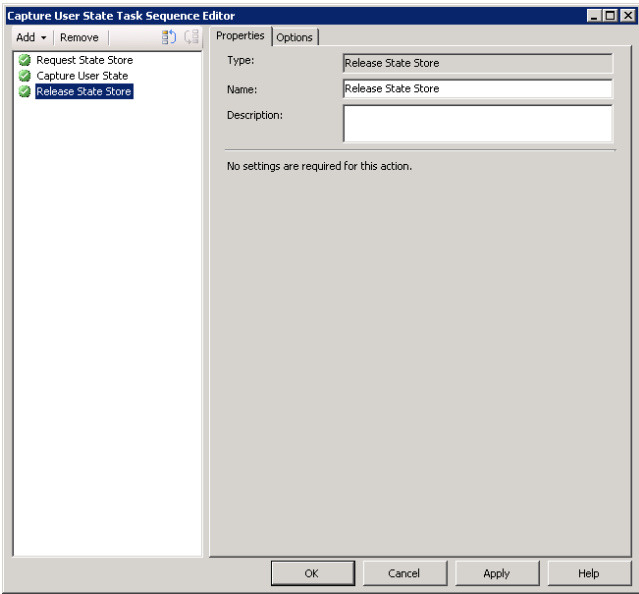
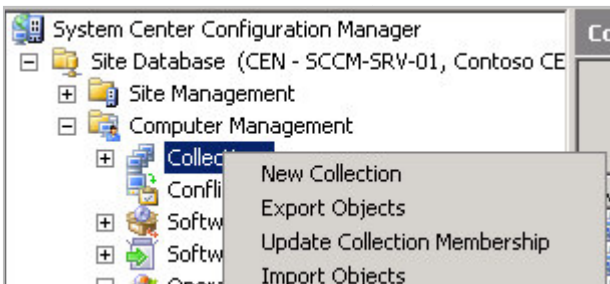
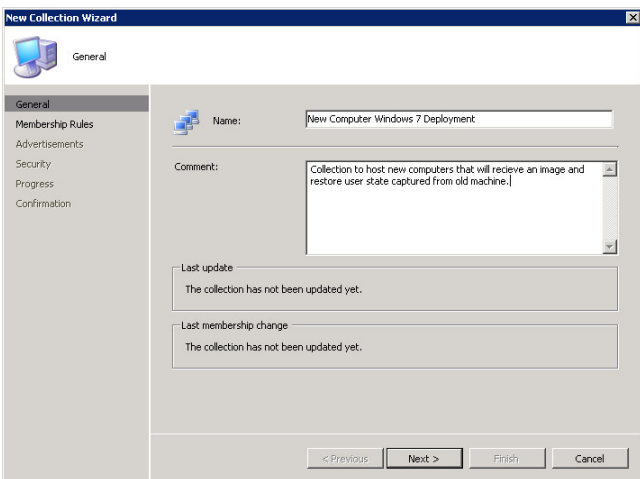
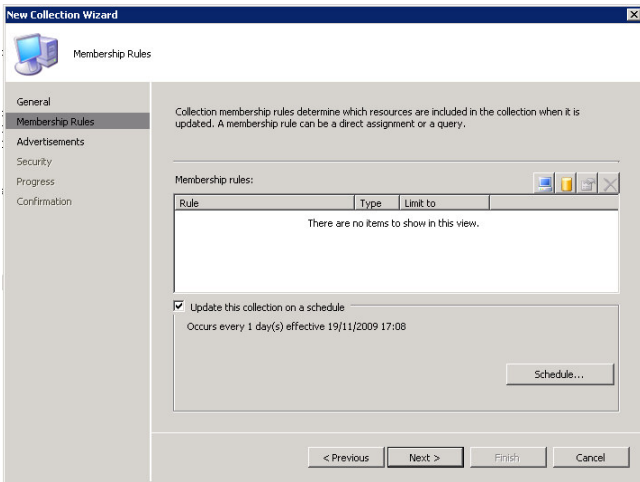
Step	Description	Screenshot
9.	Click <b>Browse</b> and select the USMT package created in section 5.1.2.2.	
10.	Click <b>Add</b> and select <b>User State &gt; Release State Store</b> .	
11.	Click <b>OK</b> .	

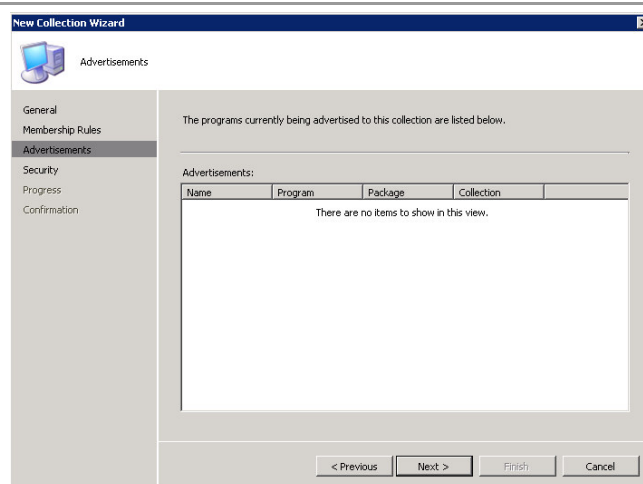
Table 41: Creating the User State Capture Task Sequence

### 7.1.3.2 Creating the Computer Association

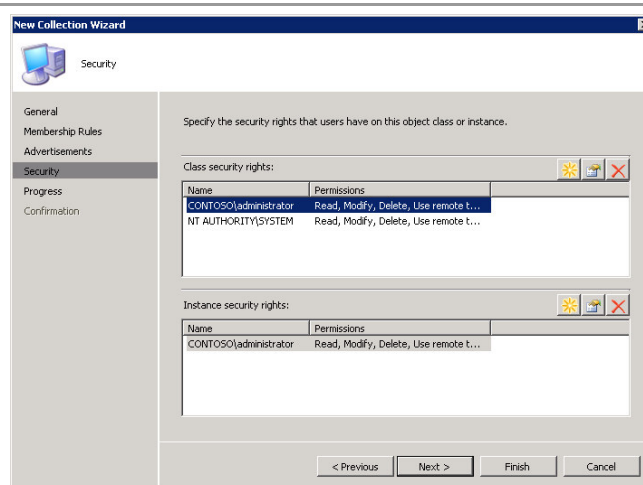
Table 42 shows the steps required to import the new machine and associate it with the old machine. Creating the computer association allows the Configuration Manager client to restore the user's data and settings once the operating system image has been installed on the new machine.

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> , right-click on the <b>Collections</b> node and select <b>New Collection</b> .	
2.	Enter a <b>Name</b> for the collection and click <b>Next</b> .	
3.	Click <b>Next</b> .  <b>Note</b> When prompted, click <b>OK</b> to acknowledge that no membership rules have been defined.	

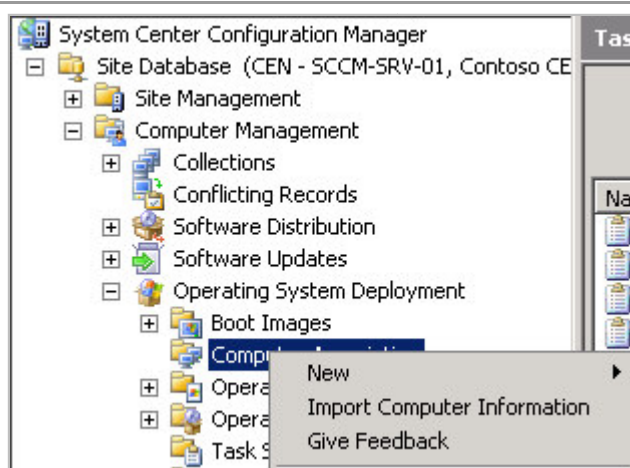
4. Click **Next**.



5. Click **Finish**.



6. Right-click on **Computer Associations** and select **Import Computer Information**.



7. Click **Import single computer** and click **Next**.

**Import Computer Information Wizard**

Select Source

This wizard imports new computer information into the ConfigMgr database. Select Import computers using a file to specify a file that contains the computer information to import. Select Import a single computer to specify information relating to that one computer.

☐ Import computers using a file  
☒ Import single computer

< Previous   Next >   Finish   Cancel

8. Enter a **Computer name** and a **MAC address** for the new computer. In **Source computer**, enter the name of the old client machine from which the user state will be captured. Click **Next**.

**Import Computer Information Wizard**

Single Computer

Specify information relating to the computer you are importing in the fields below.

Computer name: NEWNHSCLINE1

MAC address (12 hex characters): 00:15:5D:02:0B:12

SMBIOS GUID (32 hex characters):

Optionally create a computer association by entering the name of a reference computer from which the user state and settings will be migrated to the new computer

Source computer : OLDNHSCCLIENT   Search

< Previous   Next >   Finish   Cancel

9. Click **Next**.

**Import Computer Information Wizard**

Data Preview

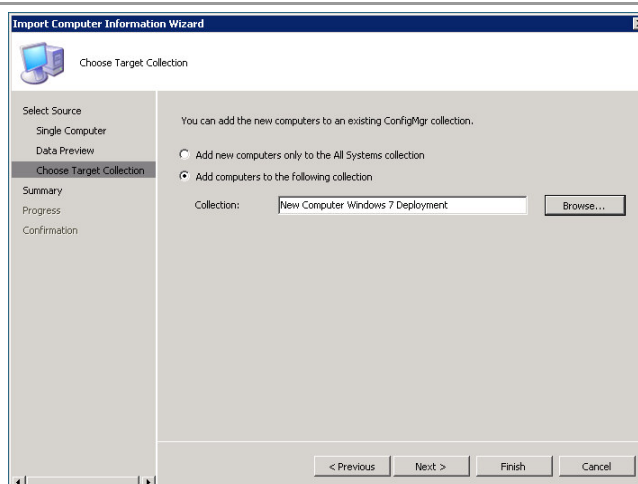
The following data will be mapped to a ConfigMgr property.

Data preview:

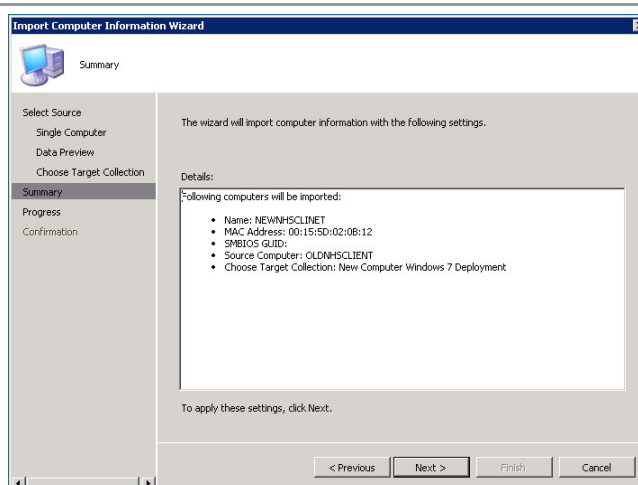
Name	SMBIOS GUID	MAC Address	Source Computer
NEWNHSCLINE1	00:15:5D:02:0B:12		OLDNHSCCLIENT

< Previous   Next >   Finish   Cancel

10. Click **Browse** to select the newly created **Collection**, and then click **Next**.



11. Click **Next**.



12. Click **Close**.

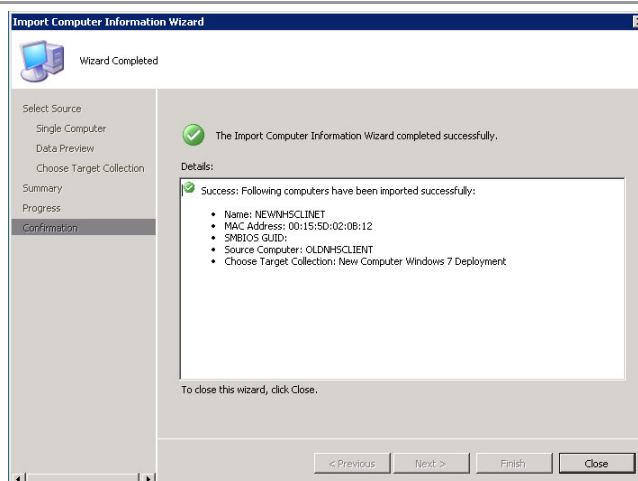


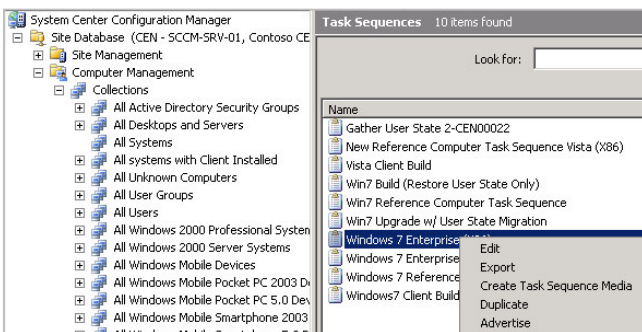
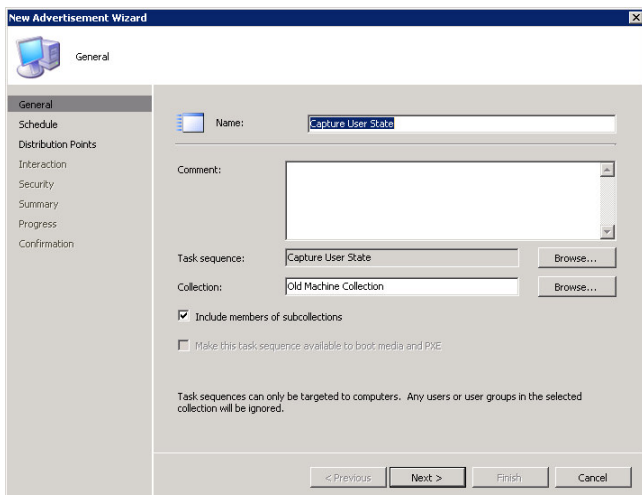
Table 42: Creating a Computer Association


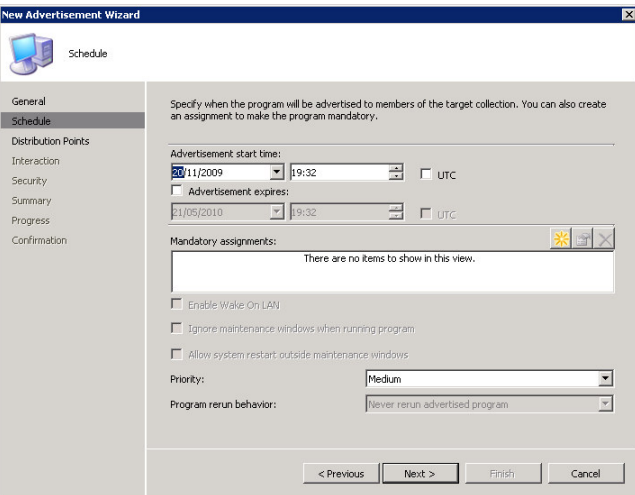
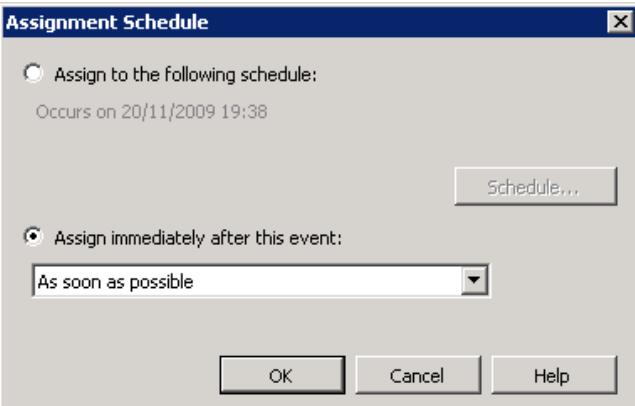
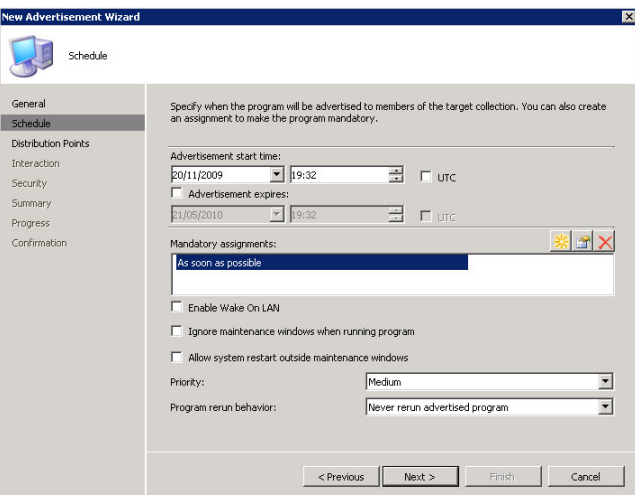
### 7.1.3.3 Advertising the User State Capture Task Sequence

The User State Capture task sequence must be advertised to a collection that contains the machine that will be replaced. The task sequence should only be executed once the computer association has been created. Table 43 shows the steps required to create a mandatory advertisement that will capture the user state from the old machine.


#### Note

Once the user state capture has been performed on the old machine, any changes made will not be migrated to the new machine. The healthcare IT Administrator should take steps to prevent the user continuing to work on the old machine once the task sequence has been run. This could be achieved by communicating the fact to users, or by modifying the capture task sequence to present a message to the user and shutting down the machine.

Step	Description	Screenshot
1.	Open the <b>Configuration Manager Console</b> and select <b>Task Sequences</b> . In the right pane, right-click on the task sequence created in section 7.1.3.1 and select <b>Advertise</b> .	
2.	Enter a <b>Name</b> for the advertisement and click the <b>Browse</b> button next to the <b>Collection</b> box to select the collection that contains the old machine from which user state will be captured. Click <b>Next</b> .	

Step	Description	Screenshot
3.	Click  to create a new mandatory assignment.	 <p>The screenshot shows the 'New Advertisement Wizard' dialog box, 'Schedule' tab. The 'Advertisement start time' is set to 20/11/2009 19:32. The 'Advertisement expires' date is 21/05/2010. The 'Mandatory assignments' section is empty, with a message 'There are no items to show in this view.' Below this, there are checkboxes for 'Enable Wake On LAN', 'Ignore maintenance windows when running program', and 'Allow system restart outside maintenance windows'. The 'Priority' is set to 'Medium' and 'Program rerun behavior' is 'Never rerun advertised program'.</p>
4.	<p>Click <b>Assign immediately after this event</b>, select <b>As soon as possible</b> from the drop-down list and click <b>OK</b>.</p> <p><b>Note</b> A specific time can be selected by selecting <b>Assign to the following schedule</b> and clicking <b>Schedule</b> or next user logon or logoff by selecting <b>Assign immediately after this event</b> and selecting from the drop-down list.</p>	 <p>The screenshot shows the 'Assignment Schedule' dialog box. The 'Assign to the following schedule' option is selected, showing 'Occurs on 20/11/2009 19:38'. The 'Assign immediately after this event' option is also visible, with a dropdown menu set to 'As soon as possible'. Buttons for 'Schedule...', 'OK', 'Cancel', and 'Help' are present.</p>
5.	Click <b>Next</b> .	 <p>The screenshot shows the 'New Advertisement Wizard' dialog box, 'Schedule' tab, after clicking 'Next'. The 'Mandatory assignments' section now shows 'As soon as possible' in the list. The rest of the settings remain the same as in the previous screenshot.</p>



Step	Description	Screenshot
6.	Click <b>Next</b> .	
7.	Select <b>Use custom countdown notification length (minutes)</b> and <b>Show the task sequence progress</b> , if required. Click <b>Next</b> .	
8.	If specific users or groups need to be able to modify the advertisement's properties, click  in the <b>Instance security rights</b> section to modify the rights and add the required users or groups. Click <b>Next</b> .	

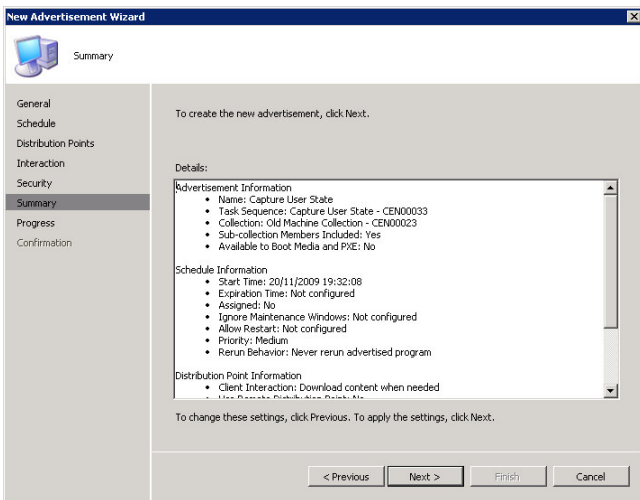
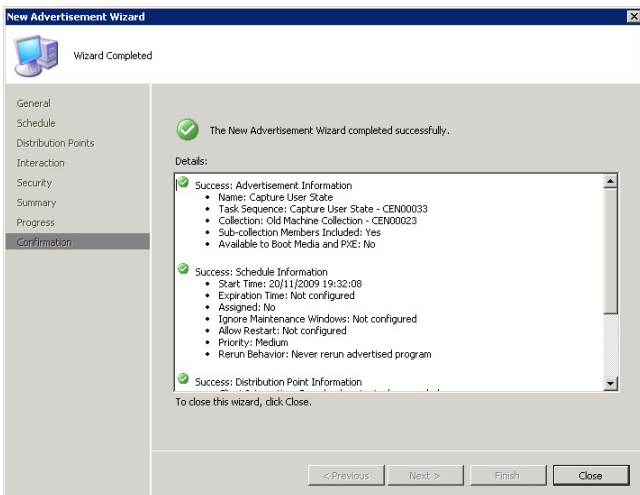
Step	Description	Screenshot
9.	Click <b>Next</b> .	
10.	Click <b>Close</b> .	

Table 43: Advertise the User State Capture Task Sequence

### 7.1.3.4 User State Capture Deployment

Table 44 shows the task sequence executing on the old machine. If the advertisement did not have a mandatory assignment, the user will be notified that the task sequence is available to run and can choose when to run the advertisement. A mandatory assignment can be configured to run in the future. This would allow the user to run the task sequence at a time that suited them but would force the task sequence to run once the mandatory assignment time was reached.

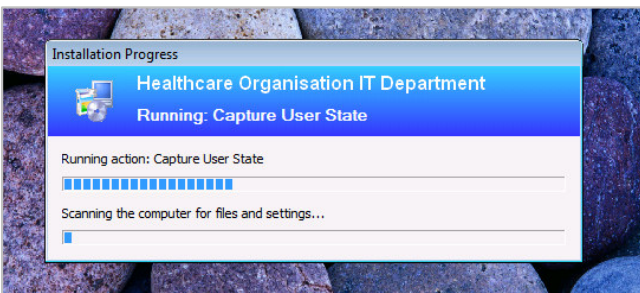
Step	Description	Screenshot
1.	The task sequence will execute on the user's machine as soon as the policy refresh cycle occurs. Once completed, the new machine task sequence needs to be run on the replacement machine.	

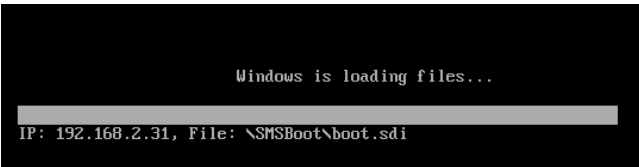

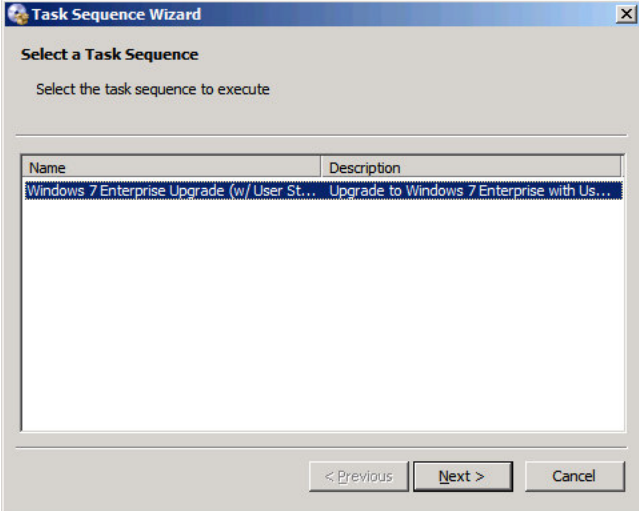
Table 44: User State Capture Deployment

### 7.1.3.5 Advertising the Operating System Image Task Sequence

The operating system task sequence used for in-place deployment and created in section 7.1.2.3 contains all the steps necessary to build the new machine and import the user state data, so it can be re-used for side-by-side deployments. When the task sequence is executed, it will ignore the user state capture phase because there is no user state to capture (because the machine has no operating system). Using the steps in section 7.1.2.2, the task sequence can be advertised to the collection containing the new client computer.

### 7.1.3.6 Operating System Image Deployment (Side-by-Side)

Table 45 shows the new operating system being deployed using a PXE service point and network service boot. It can also be triggered using the bootable task sequence media created in section 7.1.1.1.

Step	Description	Screenshot
1.	The new machine is started and F12 is used to network service boot. The machine downloads the necessary boot image from the PXE service point and starts Windows PE.	
2.	If the PXE service point was configured to require a password to be entered, the <b>Task Sequence Wizard</b> requests the password. Enter the <b>Password</b> and click <b>Next</b> .	
3.	Select the task sequence and click <b>Next</b> .	

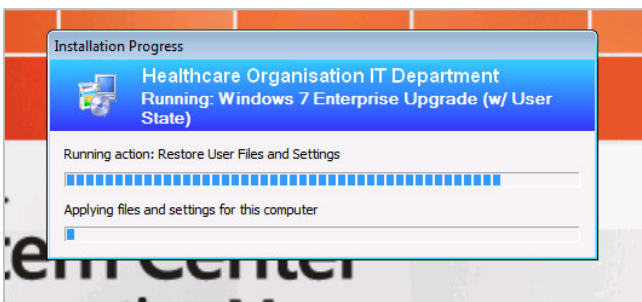
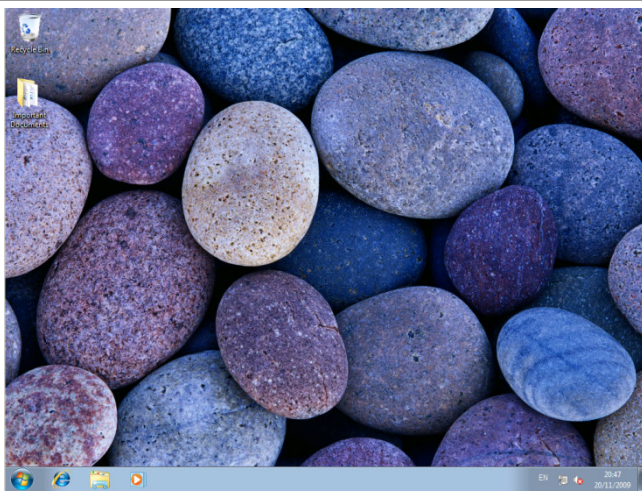
Step	Description	Screenshot
4.	The operating system is installed on the new machine and user state data is requested from the state migration point. User state data that matches the computer association is restored to the new operating system.	
5.	The new operating system completes its installation and when the user logs in, the user data and settings, such as wallpaper and so on, have been migrated from the old computer.	

Table 45: Deploying the New Operating System (Side-by-Side)

## APPENDIX A SKILLS AND TRAINING RESOURCES

The tables in PART I and PART II of this appendix list the suggested training and skill assessment resources available. This list is not exhaustive; there are many third-party providers of such skills. The resources listed are those provided by Microsoft. PART III lists additional training resources that might be useful.

### PART I TRAINING RESOURCES

For further information on System Center Configuration Manager, see <http://www.microsoft.com/sccm>

Skill or Technology Area	Resource Location	Description
SCCM Training	<a href="http://www.microsoft.com/systemcenter/configurationmanager/en/us/learning-resources.aspx">http://www.microsoft.com/systemcenter/configurationmanager/en/us/learning-resources.aspx</a>	Links to learning resources available from Microsoft and Microsoft Learning Partners
SCCM Product Documentation	<a href="http://www.microsoft.com/systemcenter/configurationmanager/en/us/product-documentation.aspx">http://www.microsoft.com/systemcenter/configurationmanager/en/us/product-documentation.aspx</a>	Links to product documentation and whitepapers

Table 46: Microsoft System Center Configuration Manager 2007 Training Resources

### PART II OPERATING SYSTEM DEPLOYMENT

Table 47 details operating system deployment specific resources:

Skill or Technology Area	Resource Location	Description
System Center Configuration Manager Team Blog	<a href="http://blogs.technet.com/configmgrteam/default.aspx">http://blogs.technet.com/configmgrteam/default.aspx</a>	Official blog of the System Center Configuration Manager team
Operating System Deployment in Configuration Manager	<a href="http://technet.microsoft.com/en-us/library/bb632767.aspx">http://technet.microsoft.com/en-us/library/bb632767.aspx</a>	Overview of operating system deployment in Configuration Manager
Operating System Deployment Task Sequence Variables	<a href="http://technet.microsoft.com/en-us/library/bb632442.aspx">http://technet.microsoft.com/en-us/library/bb632442.aspx</a>	Detailed description of all task sequence action and built-in variables that can be used to build complex task sequences
Configuration Manager Operating System Deployment	<a href="http://msdn.microsoft.com/en-us/library/cc145545.aspx">http://msdn.microsoft.com/en-us/library/cc145545.aspx</a>	MSDN library content on Configuration Manager operating system deployment

Table 47: Operating System Specific Resources

## PART III SUPPLEMENTAL TRAINING RESOURCES

Title	Link
Operating System Deployment	<a href="http://www.microsoft.com/systemcenter/configurationmanager/en/us/operating-system-deployment.aspx">http://www.microsoft.com/systemcenter/configurationmanager/en/us/operating-system-deployment.aspx</a>
System Center Configuration Manager TechCenter	<a href="http://technet.microsoft.com/en-gb/configmgr/default.aspx">http://technet.microsoft.com/en-gb/configmgr/default.aspx</a>
MyITforum System Center Configuration Manager Forum	<a href="http://www.myitforum.com/forums/System_Center_Configuration_Manager/for-umid_144/tt.htm">http://www.myitforum.com/forums/System_Center_Configuration_Manager/for-umid_144/tt.htm</a>

Table 48: Supplemental Training Resources

## APPENDIX B DOCUMENT INFORMATION

### PART I TERMS AND ABBREVIATIONS

Abbreviation	Definition
BOOTP	Bootstrap Protocol
Configuration Manager	System Center Configuration Manager 2007 R2
CUI	Common User Interface
DHCP	Dynamic Host Control Protocol
DNS	Domain Name System
DP	Distribution Point
GUID	Global Unique Identifier
IIS	Internet Information Services
KMS	Key Management Service
LAR	Large Account Reseller
MAC	Media Access Control
MAK	Multiple Activation Key
MDT	Microsoft Deployment Toolkit
NAT	Network Address Translation
PXE	Pre-Boot Execution Environment
SP	Service Pack
USMT	User State Migration Tool
WAIK	Windows Automated Installation Kit
WDS	Windows Deployment Services
Windows PE	Windows Pre-Execution Environment

Table 49: Terms and Abbreviations

## PART II REFERENCES

Reference	Document	Version
R1.	System Center Configuration Manager 2007 Deployment Guide <a href="http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx">http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx</a>	1.0.0.0
R2.	Microsoft TechNet: System Center Configuration Manager TechCenter: <a href="http://technet.microsoft.com/en-gb/configmgr/default.aspx">http://technet.microsoft.com/en-gb/configmgr/default.aspx</a>	
R3.	Microsoft Web Site: Microsoft System Center Configuration Manager Product Homepage: <a href="http://www.microsoft.com/systemcenter/configurationmanager/en/us/default.aspx">http://www.microsoft.com/systemcenter/configurationmanager/en/us/default.aspx</a>	
R4.	Healthcare Desktop User State Migration Guide: <a href="http://www.microsoft.com/industry/healthcare/technology/hpo/desktop/desktop.aspx">http://www.microsoft.com/industry/healthcare/technology/hpo/desktop/desktop.aspx</a>	3.0.0.0
R5.	Microsoft Download Center: Windows User State Migration Tool (USMT) Version 3.0.1: <a href="http://www.microsoft.com/downloads/details.aspx?FamilyID=799ab28c-691b-4b36-b7ad-6c604be4c595&amp;displaylang=en">http://www.microsoft.com/downloads/details.aspx?FamilyID=799ab28c-691b-4b36-b7ad-6c604be4c595&amp;displaylang=en</a>	
R6.	Microsoft Download Center: The Windows® Automated Installation Kit (AIK) for Windows® 7: <a href="http://www.microsoft.com/downloads/details.aspx?familyid=696DD665-9F76-4177-A811-39C26D3B3B34&amp;displaylang=en">http://www.microsoft.com/downloads/details.aspx?familyid=696DD665-9F76-4177-A811-39C26D3B3B34&amp;displaylang=en</a>	
R7.	Microsoft Download Center: Windows XP Service Pack 3 Deployment Tools: <a href="http://www.microsoft.com/downloads/details.aspx?familyid=673A1019-8E3E-4BE0-AC31-70DD21B5AFA7&amp;displaylang=en">http://www.microsoft.com/downloads/details.aspx?familyid=673A1019-8E3E-4BE0-AC31-70DD21B5AFA7&amp;displaylang=en</a>	
R8.	Microsoft TechNet: Planning for PXE Initiated Operating System Deployments: <a href="http://technet.microsoft.com/en-us/library/bb680753.aspx">http://technet.microsoft.com/en-us/library/bb680753.aspx</a>	
R9.	Healthcare MDT 2010 : <a href="http://www.microsoft.com/industry/healthcare/technology/hpo/desktop/mdt.aspx">http://www.microsoft.com/industry/healthcare/technology/hpo/desktop/mdt.aspx</a>	
R10.	System Center Configuration Manager 2007 Software Update Management Guide: <a href="http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx">http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx</a>	1.0.0.0
R11.	System Center Configuration Manager 2007 Software Distribution Guide: <a href="http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx">http://www.microsoft.com/industry/healthcare/technology/hpo/serverbuild/sms.aspx</a>	1.0.0.0
R12.	Microsoft TechNet: Troubleshooting Operating System Deployment: <a href="http://technet.microsoft.com/en-us/library/bb632813.aspx">http://technet.microsoft.com/en-us/library/bb632813.aspx</a>	

Table 50: References