



Configuring Windows 8



Exam Ref

70-687

Mike Halsey
Andrew Bettany

Exam Ref 70-687



Prepare for Microsoft Exam 70-687—and help demonstrate your real-world mastery of Windows 8 setup and support. Designed for experienced IT professionals ready to advance their status—*Exam Ref* focuses on the critical-thinking and decision-making acumen needed for success at the MCSA level.

Focus on the expertise measured by these objectives:

- Install and Upgrade to Windows 8
- Configure Hardware and Applications
- Configure Network Connectivity
- Configure Access to Resources
- Configure Remote Access and Mobility
- Monitor and Maintain Windows Clients
- Configure Backup and Recovery Options

Exam Ref features:

- Organized by exam objectives
- Strategic, what-if scenarios
- 15% exam discount from Microsoft. Offer expires 12/31/2017. Details inside.

Configuring Windows 8

About the Exam

Exam 70-687 is one of two Microsoft exams focused on the skills and knowledge necessary to set up and support Windows 8 computers, devices, users, and associated network and security resources.

About Microsoft Certification

The new **Microsoft Certified Solutions Associate (MCSA)** certifications validate the core technical skills required to build a sustainable career in IT.

Exams 70-687 and 70-688 are required for the MCSA: Windows 8 certification.

See full details at:
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About the Authors

Mike Halsey is a Microsoft MVP for Windows Expert-Consumer and the author of many Windows books including *Troubleshoot and Optimize Windows 8 Inside Out*.

Andrew Bettany is a Microsoft MVP for Windows Expert-IT Pro, Microsoft Springboard Technical Expert Panel member, and Microsoft Certified Trainer.

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Exam Ref 70-687: Configuring Windows 8

**Mike Halsey
Andrew Bettany**

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For Zeshan Sattar, I couldn't have done it without you.

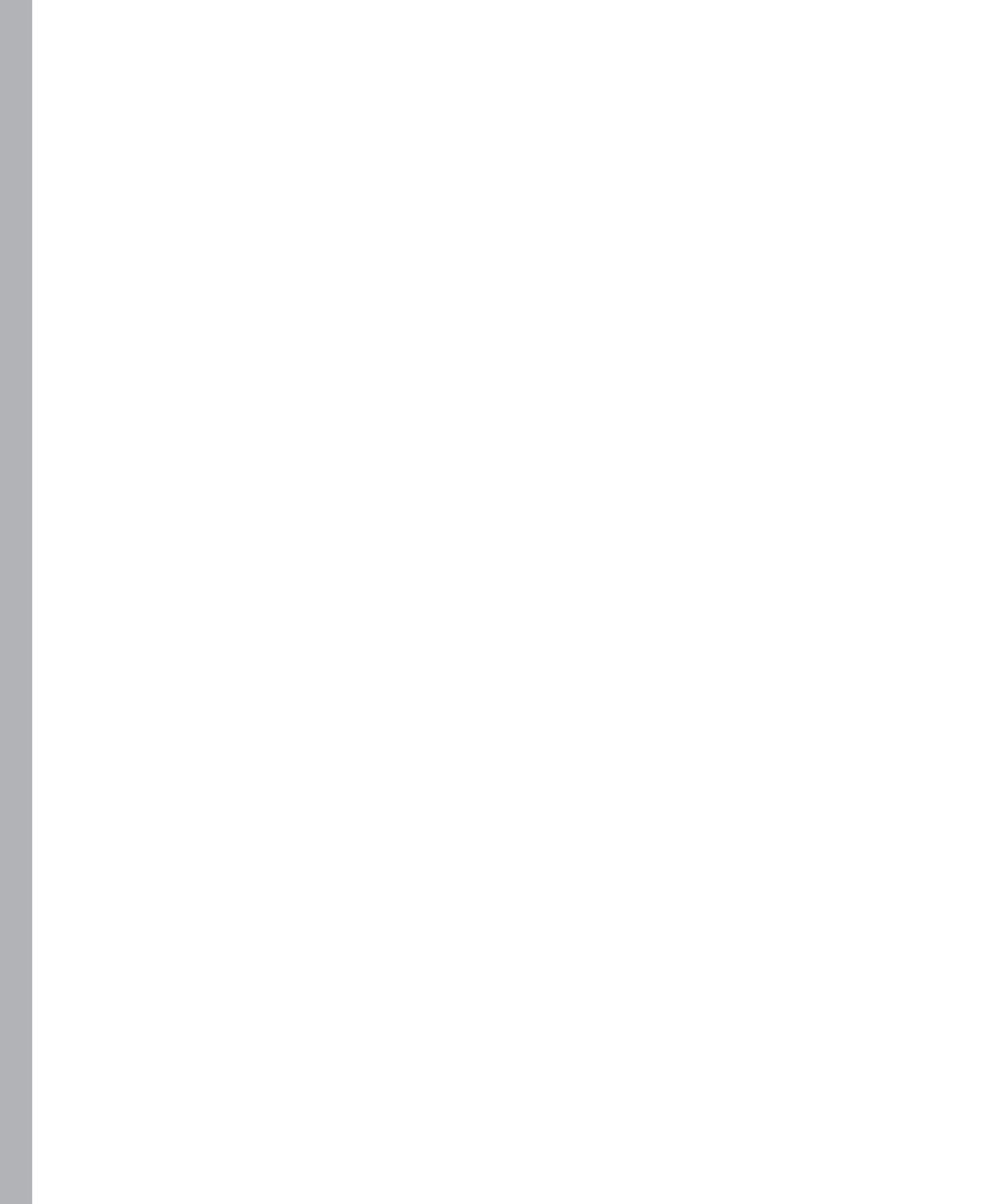
—MIKE HALSEY

*I would like to dedicate this book to Tommy and Netty. You
continue to be awesome.*

—ANDREW BETTANY

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Introduction

Microsoft's flagship operating system, Windows 8, includes significant changes to the user interface compared to previous versions and is intended to unify the user experience across desktops, laptops, and mobile devices such as tablets. Windows 8 replaces the familiar Start menu with an all-new Start screen—but that's just one of dozens of exciting new features that offer challenges for users moving from earlier versions of Windows but also showcases how Microsoft Windows continues to evolve.

This book focuses on describing and explaining the new material in Windows 8. Throughout the book, we have broken down each of the key examination domains, following the specific exam objectives that Microsoft has provided. Although readers of the this Exam Ref guide might have already earned a Microsoft certification in a previous version of Windows, this guide should be useful for both those experienced with certification exams and people who are new to certification.

By using this book as your companion guide to learning the skills and knowledge required, our belief is that you will significantly increase the likelihood of succeeding at the exam 70-687: Configuring Windows 8. Although we don't want to heap additional expectations on you, success at passing the 70-687 examination could open the opportunity for you to continue your skills development and to set your targets on the Microsoft Certified Solutions Associate (MCSA): Windows 8.

In addition to your study of this book, you should also seek and obtain real-world experience. As you read the book, if you encounter an area that you are unfamiliar with, consider seeking additional knowledge from other sources such as Microsoft TechNet, forums, and hands-on experience. After you believe that you've thoroughly studied, researched, and practiced the topics covered in this book, you should be sufficiently prepared to attempt the 70-687 exam.

Over the last couple of years, Microsoft has quietly made substantial changes to its certification program to improve the rigor of the certifications, preserve exam integrity, and build the relevance and value that Microsoft certifications bring to candidates who earn the certifications.

To you, these changes might make the exams "feel" a lot harder to pass than in previous years. This increase in subjective difficulty could be solely in the authors' perceptions—but it could also be because of the changes Microsoft has made. The bottom line is that you need to be fully prepared. The revised certification program ensures that holders of Microsoft certifications have the knowledge, skills, abilities, and experience required—and that being Microsoft Certified sets you apart from the rest.

This book covers every exam objective, but it does not cover every exam question. Only the Microsoft exam team has access to the exam questions themselves and Microsoft regularly adds new questions to the exam, making it impossible to cover specific questions. You should consider this book a supplement to your relevant real-world experience and other study materials. If you encounter a topic in this book that you do not feel completely comfortable with, use the links you'll find in text to find more information and take the time to research and study the topic. Great information is available on MSDN, TechNet, and in blogs and forums.

Microsoft certifications

Microsoft certifications distinguish you by proving your command of a broad set of skills and experience with current Microsoft products and technologies. The exams and corresponding certifications are developed to validate your mastery of critical competencies as you design and develop, or implement and support, solutions with Microsoft products and technologies both on-premise and in the cloud. Certification brings a variety of benefits to the individual and to employers and organizations.

MORE INFO ALL MICROSOFT CERTIFICATIONS

For information about Microsoft certifications, including a full list of available certifications, go to <http://www.microsoft.com/learning/en/us/certification/cert-default.aspx>.

Who should read this book

This book is intended for IT professionals who want to achieve certification on the Windows 8 operating system. Specifically, this book prepares readers to take and pass exam 70-687: Configuring Windows 8. Successfully passing the 70-687 also counts as credit toward the Microsoft Certified Solutions Associate (MCSA): Windows 8 certification.

IT professionals reading this book should have hands-on experience installing, configuring, and supporting Windows 8 computers, devices, users, and the networking environment in which they can be found. As an IT professional, you might be a consultant, a full-time desktop support technician, or an IT generalist who has experience administering Windows 8 in addition to other duties.

Assumptions

You should have at least a working understanding of administering Microsoft Windows 8 and configuring common Internet technologies. As you progress with your learning through this book and other study resources, you will become proficient at configuring, supporting, and troubleshooting Windows 8. This book is focused on helping those of you whose goal is to become certified on Windows 8 configuration.

You can find information about the audience for the 70-687: Configuring Windows 8 exam in the exam preparation guide, available at <http://www.microsoft.com/learning/en/us/exam.aspx?id=70-687>.

Who should not read this book

Readers who need a fundamental understanding of the Windows 8 operating system should instead consider reading the book *Training Guide: Configuring Windows 8* published by Microsoft Press.

Organization of this book

This book is divided into seven chapters. Each chapter focuses on a different exam domain related to the exam 70-687: Configuring Windows 8. Each chapter is further broken down into specific exam objectives that have been published by Microsoft and can be found in the “Skills Being Measured” section of the *Exam 70-687: Configuring Windows 8* website available at <http://aka.ms/ER70-687/details>.

The material covered by the exam domain and the objectives has been incorporated into this book so that you have concise, objective-by-objective content together with strategic real-world scenarios, thought experiments, and end-of-chapter review questions to provide readers with professional-level preparation for the exam.

Conventions and features in this book

This book presents information using conventions designed to make the information readable and easy to follow:

- Each exercise consists of a series of tasks, presented as numbered steps listing each action you must take to complete the exercise.
- Boxed elements with labels such as “Note” provide additional information or alternative methods for completing a step successfully.

- Boxed elements with “Exam Tip” labels provide additional information which might offer helpful hints or additional information on what to expect on the exam.
- Text that you type (apart from code blocks) appears in bold.
- A plus sign (+) between two key names means that you must press those keys at the same time. For example, “Press Alt+Tab” means that you hold down the Alt key while you press the Tab key.
- A vertical bar between two or more menu items (for example, File | Close), means that you should select the first menu or menu item, then the next, and so on.

System requirements

Where you are unfamiliar with a topic cover in this book, you should practice the concept on your study PC. You will need the following hardware and software to complete the practice exercises in this book:

- One study PC that can be installed with Windows 8 (see hardware specification below) or a PC that can allow the installation of Windows 8 within a virtualized environment.
- Windows 8 requires the following minimum hardware requirements: 1 GHz processor, 512 MB RAM, network card, video card, DVD-ROM drive, and at least 25 GB of available disk space available on each computer.
- If you plan to install Windows 8 in a virtualized environment, you should consider using Hyper-V and ensure that the minimum hardware requirements are as follows: x64-based processor, which includes both hardware-assisted virtualization (AMD-V or Inter VT) and hardware data execution protection; 4 GB RAM (more is recommended); network card; video card; DVD-ROM drive; and at least 100 GB of available disk space available to allow for the storage of multiple virtual machines.
- If you don’t own Windows 8, you can download a 90-day evaluation of Windows 8 Enterprise from the Microsoft Springboard Series website available at <http://technet.microsoft.com/en-us/springboard.aspx>.

Errata & book support

We’ve made every effort to ensure the accuracy of this book and its companion content. Any errors that have been reported since this book was published are listed on our Microsoft Press site:

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Preparing for the exam

Microsoft certification exams are a great way to build your resume and let the world know about your level of expertise. Certification exams validate your on-the-job experience and product knowledge. While there is no substitution for on-the-job experience, preparation through study and hands-on practice can help you prepare for the exam. We recommend that you round out your exam preparation plan by using a combination of available study materials and courses. For example, you might use the Exam Ref and another study guide for your "at home" preparation, and take a Microsoft Official Curriculum course for the classroom experience. Choose the combination that you think works best for you.

Note that this Exam Ref is based on publically available information about the exam and the author's experience. To safeguard the integrity of the exam, authors do not have access to the live exam.

Install and upgrade Windows 8

You might have heard the phrase “if a job is worth doing, it’s worth doing well.” Personally, I prefer to say “if a job’s worth doing, it’s worth doing only *once*.” This is especially true when installing or migrating to a new operating system, which can be time-consuming, especially if you have many machines onto which you need to install the Windows operating system, software, and updates—a process that can be tricky in places and is rarely as simple as it might first appear. With Windows 8, for example, the basic hardware requirements of the operating system are effectively *lower* than they were with Windows 7; however, this doesn’t mean that Windows 8 will work properly on every computer that Windows 7 ran on.

important
***Have you read
page xxiii?***

It contains valuable
information regarding
the skills you need to
pass the exam.

If you want to upgrade their existing copy of the operating system to the new version, you face a different set of issues with Windows 8. Windows 8, Windows 7, and Windows Vista are all very similar “under the hood,” but some upgrade paths that were previously blocked are now open, whereas others that were simple and straightforward are now much more complex.

Finally, you have the issue of software compatibility. In theory, all software that works in Windows 7 and Windows Vista will work in Windows 8. In reality, the sheer number of software packages available for the platform and the complexity of the operating system mean that complete software compatibility can’t be guaranteed. In addition, there are many scenarios in which you or a computer user might prefer—or when a situation might demand—a new-style app instead.

This chapter shows how to plan effectively for installing or migrating to Windows 8, how to install the operating system in a trouble-free manner, and how to migrate user files, settings, and programs to the new operating system.

Objectives in this chapter:

- Objective 1.1: Evaluate hardware readiness and compatibility
- Objective 1.2: Install Windows 8
- Objective 1.3: Migrate and configure user data

Objective 1.1: Evaluate hardware readiness and compatibility

The following are primary considerations when installing or upgrading a computer to Windows 8:

- Windows 8 edition required
- 64-bit hardware support
- 64-bit software support
- 64-bit device driver availability

In addition, you need to be aware of common application compatibility problems and how to manage them.

This objective covers how to:

- Identify the correct version of Windows 8 for your needs
- Manage hardware and software compatibility in Windows 8
- Understand common application compatibility problems
- Manage application compatibility

Identifying the correct version of Windows 8

When you set out to install Windows 8 in any environment, you need to consider whether the hardware onto which you will be installing the operating system is suitable for running both Windows 8 and the version of Windows 8 you want to install. This means breaking the various Windows 8 editions down so that you can see, at a glance, what hardware and edition you require to use the features you want and need on a particular computer. The base hardware requirements of Windows 8 are shown in Table 1-1.

TABLE 1-1 Windows 8 hardware requirements

	32-bit (x86)	64-bit (x64)
Processor	1 GHz	1 GHz
Memory	1 GB	2 GB

	32-bit (x86)	64-bit (x64)
Graphics	DirectX 9 with WDDM 1.0	DirectX 9 with WDDM 1.0
HDD	16 GB	20 GB
Secure boot	UEFI-based BIOS	UEFI-based BIOS

In addition to these requirements, each edition of Windows 8 has its own limitations, such as the maximum amount of memory that it can access and the location from which it is available. These are shown in Table 1-2.

TABLE 1-2 Memory and availability limits

	32-bit memory limit	64-bit memory limit	availability
Windows 8	4 GB*	16 GB	Retail/OEMs
Windows 8 Pro	4 GB*	192 GB	Retail/OEMs
Windows 8 Enterprise	4 GB*	192 GB	Volume licensing

*including graphics card memory

NOTE SCREEN RESOLUTION ISSUES

If users want to use side-by-side apps, they need a minimum screen resolution of 1,366 × 768 pixels. If the screen has a vertical resolution of less than 768 pixels, which is common on some netbooks, the Start screen won't display at all.

The editions also have feature differences, as shown in Table 1-3.

TABLE 1-3 Feature differences among versions

	Windows 8	Windows 8 Pro	Windows 8 Enterprise
Bitlocker and bitlocker to go	No	Yes	Yes
Boot from virtual hard disk (VHD)	No	Yes	Yes
Client hyper-V	No	Yes	Yes
Domain join	No	Yes	Yes
Encrypting file system	No	Yes	Yes
Group policy	No	Yes	Yes
Applocker	No	No	Yes
Branchcache	No	No	Yes

	Windows 8	Windows 8 Pro	Windows 8 Enterprise
Directaccess	No	No	Yes
Side-load apps	No	No	Yes
Virtualization through remotefx	No	No	Yes
Windows to go	No	No	Yes

If you know that you will need to use BranchCache or Group Policy on a system, the base edition of Windows 8 won't be suitable. Indeed, the standard edition of Windows 8 is aimed primarily at consumers and will unlikely support any features a business will usually require.



EXAM TIP

Ensure that you have learned the Windows 8 system requirements for both x86 and x64, key feature differences between the versions.

Hardware support: differences between 32-bit and 64-bit Windows 8

What about the 32-bit/64-bit question? Determining which to use isn't simply a case of installing the best available edition of Windows 8 because you might find that the hardware and even software you require won't work with that edition.

The 32-bit and 64-bit operating systems have the following differences:

- A 64-bit processor can process more data in each clock cycle, enabling applications to run more quickly.
- A 64-bit operating system can access significantly more memory than its 32-bit counterpart. For a 32-bit operating system, the maximum memory ceiling is 4 GB, which includes the memory on the graphics card. Also, memory can be seen by the Windows operating system only in discrete memory card units, meaning that if a computer has 4×1 GB memory cards and a graphics card with 1.5 GB of its own memory, only two of the motherboard memory cards will be seen (2×1 GB + 1.5 GB graphics = 3.5 GB seen). Each 64-bit processor has a memory ceiling so high that if you work on a computer that has reached that ceiling, you should consider yourself very lucky indeed.
- A 64-bit processor supports additional security features, such as Kernel Patch Protection (KPP), kernel-mode driver signing, and Data Execution Prevention (DEP).
- As shown in Table 1-3, the Hyper-V virtualization client is supported only in the 64-bit editions of Windows 8 Pro and Enterprise. But Hyper-V also requires a processor

that supports Second Level Address Translation (SLAT), which reduces the overhead incurred with virtual-to-physical address mapping.

- A 64-bit operating system can be installed only on hardware with 64-bit architecture support, whereas a 32-bit operating system can be installed on 32-bit and 64-bit architecture.
- A 64-bit version of Windows 8 doesn't support older 16-bit Windows software. That software will need to be installed on a 32-bit version of Windows 8 or within a Hyper-V virtualized environment.

NOTE MIGRATING BETWEEN 32-BIT AND 64-BIT WINDOWS

If you want to perform an in-place upgrade of any 32-bit Windows version, you can't upgrade to a 64-bit version of Windows 8. Upgrading from Windows XP or Windows Vista doesn't migrate any software, and upgrading from Windows XP doesn't allow you to migrate any operating system settings. The Windows 8 installer doesn't support any move between 32-bit and 64-bit operating systems. As a result, you need to perform a clean installation of Windows 8.

Software compatibility and Windows 8

Assume that you will install Windows 8 in an accounting or financial business where the staff needs to work on extremely large Excel spreadsheets that have in excess of 256 columns or 65,536 rows. The 64-bit edition of Excel allows for up to 16,384 columns and 1 million rows.

Suppose also that the company needs to use specific 64-bit software, which could include such programs as AutoCAD or Adobe Photoshop, where the 64-bit version is required either due to nature of the work the staff does, or because the company doesn't have a 32-bit license for the software.

No 64-bit software will run on a 32-bit Windows version. Therefore, if your company is moving from the 32-bit version of software such as Microsoft Office or Adobe Photoshop to the 64-bit version as part of a planned upgrade, you should first ensure that 64-bit versions of the plug-ins for the software exist. Many plug-ins have yet to be rewritten for the 64-bit architecture.

Also consider support for Hyper-V. If the business requires client virtualization, remember that only the 64-bit editions of Windows 8 Pro and Windows 8 Enterprise include this feature.

Hardware compatibility in Windows 8

After identifying any software compatibility issues, you need to identify any hardware compatibility issues such as problems with drivers. You should check the manufacturer's website for the latest compatible versions of hardware drivers before migrating to Windows 8. Indeed, you should download and store all of these. Check that a 64-bit version of the driver is available for any hardware the client uses, including any external peripherals such as printers, scanners, and biometric devices.

MORE INFO WINDOWS 8 DEVICE COMPATIBILITY

You can read more about Windows 8 device compatibility at <http://www.microsoft.com/en-us/windows/compatibility/en-us/compatcenter/home>.

Common application compatibility problems

As mentioned previously in this objective, not all existing software will run (or run happily) on Windows 8. The two most common reasons for this problem are:

- **Changes to the underlying architecture that Microsoft implemented with Windows Vista** This new architecture removed some components that earlier Windows versions required to operate fully and changed other components in significant ways, also resulting in incompatibilities with older software.
- **Workarounds that software authors occasionally employed before User Account Control was introduced** These workarounds would often use the blanket administrator privileges of Windows users to provide quick workarounds for programming issues that otherwise would have required more complex coding.

Some older software won't run or will produce errors in the operating system for other reasons as well.

User Account Control

Considering the problems just discussed, some legacy and older software was written by programmers who designed software that included tasks that require administrator rights. This was done primarily to simplify the programmer's life because writing code to perform the same tasks using standard user rights is more complex. The User Account Control (UAC) program will prompt you for your credentials when it encounters a program that requires administrator rights. If the user does not have the required administrator rights, UAC will block the program and the program will not run.

Other software types might be blocked by UAC for a variety of reasons. These include the following:

- Poorly written installers, updaters, and uninstallers might not be automatically elevated to have administrator rights by Windows 8.

- Standard application events, as detailed previously, that require elevated privileges might not be able to obtain them.
- Applications to be run specifically by administrators can fail when used by people on standard user accounts.
- Dynamic Link Library (DLL) applications using the RunDLL32.exe program might not function properly if they try to perform global operations that affect other user accounts or core Windows 8 settings.
- Everyday applications that attempt to make file-level changes to Windows operating system areas or those of other user accounts will be blocked.

Windows Resource Protection

Windows Resource Protection (WRP) is a system that maintains critical Windows resources, files, folders, and registry entries in a read-only state. Access to these resources is permitted only to trusted software and hardware installers. These kinds of problems can occur:

- Any installers that attempt to overwrite, modify, or delete registry keys, files, or folders protected by WRP can fail with a message informing users that the resource can't be updated.
- Installers that attempt to create new registry keys or values in protected registry keys can fail with a message saying that access is denied.
- Any application that attempts to write to protected resources can fail if it relies on the use of protected registry keys.

Incompatibilities of 64-bit

The 64-bit version of Windows 8 can run all 32-bit Windows 8 software, thanks to the Windows 32-bit on Windows 64-bit (WOW64) emulator. However, software can fail on a 64-bit installation of Windows 8 under some circumstances:

- Older 16-bit software won't run on the 64-bit version of Windows 8. To use such legacy software, you need a 32-bit version of Windows installed on a Hyper-V virtualization client.
- All 32-bit hardware and kernel drivers will fail to work or will malfunction in the 64-bit version of Windows 8. You need 64-bit versions of all your drivers.
- Attempting to install unsigned 64-bit drivers will fail on Windows 8, including drivers added manually by editing the Windows registry.

Windows Filtering Platform

The Windows Filtering Platform (WFP) includes application program interfaces (APIs) that allow developers to write code that interacts with the data packet processing and filtering that occurs in the Windows 8 networking stack and elsewhere in the operating system. Problems can occur if software uses an earlier version of the API, resulting in errors when applications such as firewalls, anti-malware programs, and other security software are running.

Kernel-mode drivers

Any kernel-mode hardware drivers in Windows 8 need to be written or recoded to follow the Microsoft Windows User Mode Driver Framework (UMDF), a device-driver platform first introduced with Windows Vista. Incompatible drivers will fail to install or will cause errors in operation.

Operating system version number changes

Occasionally when older software looks for a Windows version number, it might not recognize Windows 8 as a new version of the operating system. This can happen if the software is poorly coded. Should this happen, the software will return an Incompatible Version of Windows error.

Managing application compatibility in Windows 8

If you are performing a stand-alone installation of Windows 8, the installer will inform you of any local hardware and software incompatibilities. However, this last-minute approach to determining application and hardware compatibility isn't ideal because if you encounter a significant problem, you have to decide whether to continue with an installation that's already partly underway or to abandon it and try again later. The best way to determine application compatibility in Windows has always been and continues to be to download the free Application Compatibility Toolkit (ACT) from <http://technet.microsoft.com/en-US/windows//aa905066.aspx>.

Using ACT is advantageous for multiple reasons. The ACT allows you to verify compatibility with Windows 8 for any software. (Note that this will apply only to desktop programs, because Windows Store apps will already be written to be compatible.) Another benefit of the ACT is that it allows you to test web applications with the latest version of the Internet Explorer web browser. Many compatibility problems in business are caused by older web applications originally written for the non-standards-compliant IE6 browser.

MORE INFO WINDOWS 8 APPLICATION COMPATIBILITY

You can read more about Windows 8 application compatibility at <http://technet.microsoft.com/en-us/windows/aa905066.aspx>.

If you encounter an application that has compatibility problems with Windows 8, you can rectify the situation by following several possible courses of action—although some will require some software recoding:

- Update the software so that stored file locations, registry entries, or file and folder permissions can be changed.
- Change the security configuration for the software. Remember that the UAC displays an alert if software tries to perform an action that changes a setting or perform a

modification in folder locations that affects other computer users, even if no other user accounts currently exist.

- Find fixes, updates, and service packs for the software that will rectify the problems and issues that cause incompatibilities. If you are using off-the-shelf software, finding these items is reasonably likely unless all development on the product has ceased.
- Upgrade the software to a newer and compatible version. If a newer version of the software exists, investigate whether the company can migrate to that version while also moving to Windows 8.
- Use Hyper-V in Windows 8 to run the application in a virtualized environment. This will require installing an earlier Windows version into the Hyper-V client software. You will see more about this topic shortly.
- Migrate to a different software package that is compatible with Windows 8. Sometimes moving to a different software package can be a good thing, because it can introduce new features and other enhancements while maintaining file compatibility.
- Use the application compatibility features in Windows 8 to run the software in compatibility mode (more information about this shortly).

Running earlier Windows versions in Hyper-V: What to look for

You see how to set up and configure an operating system in Hyper-V in Chapter 2, “Configure hardware and applications,” but here you need to look at the issue of security and stability when using earlier versions of the operating system. Consider some of the potential problems and pitfalls involved with using an earlier Windows version:

- **When will support for security and stability updates end?** Extended product support for Windows 7 won’t end until 2020. However, with Windows 7 and Windows 8 sharing much of the same core architecture, any software that works properly in Windows 7 will likely also run in Windows 8, so using Windows 7 in Hyper-V really isn’t necessary. With Windows XP, however, you more than likely need to run a copy in the virtual machine. All support for Windows XP with Service Pack 3 installed (the final service pack for the operating system) ends in April 2014. After that date, Microsoft will no longer support that operating system.
- **Does the application need access to the Internet?** If you can completely isolate the operating system by denying it access to the Internet and to files held on local computers (which have a risk of malware infection), it is highly unlikely that the copy of Windows XP will ever be exposed to malware itself. Indeed, Hyper-V can be set up so that a virtual machine can get network access only to other virtual machines, so that data can be shared between them.
- **Will the virtualized operating system also require maintenance by the systems team?** If the virtualized operating system requires access to the local file system on your Windows 8 computers, you will need to maintain the security on those virtualized copies of Windows XP, which adds an extra layer of complexity to your overall

systems support role. Most importantly, if network access is granted, Internet access is automatically granted with it. One way around this is on computers that connect to the Internet via Wi-Fi. On such systems, the virtual machine's networking can be set to use the physical Ethernet system. If no cable is plugged into this on the host computer, the virtual machine will have local file access but no Internet access.

Regarding the final support date of April 2014, any remaining security problems left unrepaired on this date will likely be exploited by malware writers extensively because Windows XP is still widely used in some emerging economies.

Setting application compatibility in Windows 8

You can manually set compatibility for desktop programs that are installed in Windows 8 but were written either for an earlier version of the operating system or aren't included with the operating system as it ships from Microsoft. These compatibility settings run the program with parameters that tell the operating system how to modify its interaction with the program to ensure it runs smoothly and properly.

To access the program compatibility settings, follow these steps:

1. From the Start screen or the All Apps view, right-click the program you want to set compatibility for and click Open File Location.
2. File Explorer opens on the desktop, displaying the link to the program. Right-click the program and click Properties from the options that appear.
3. In the dialog box that appears for the program, click the Compatibility tab (see Figure 1-1).

Here, you can choose from several options. If you aren't sure which compatibility options to set for the program, you can run the compatibility troubleshooter program. This troubleshooter will ask you a series of questions about the circumstances under which the program ran previously, and will then automatically set compatibility options based on the answers you provide.

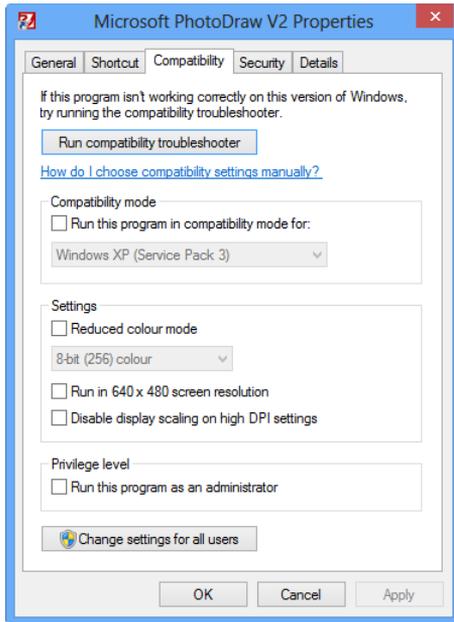


FIGURE 1-1 Setting program compatibility in Windows 8

If you choose to set compatibility manually, you can choose from the following main options:

- **Compatibility mode** This option sets general, overall compatibility for the program for a previous Windows version (including service pack builds) going all the way back to Windows 95. Service pack builds are included for Windows XP and Windows Vista because some service packs included significant changes that can alter how software works in the operating system.
- **Reduced Color mode** If an older program isn't displaying correctly onscreen, you can set it to work in either 8-bit (256 color) or 16-bit (65,536 color) mode.
- **Run in 640 x 480 screen resolution** If an older program isn't displaying correctly, this setting locks the program into 640×480 pixel resolution.

- **Run this program as an administrator** Some older software might not work correctly if it was coded using what shortcuts and workarounds that require administrator-level access to system files and folders—and these were blocked with the introduction of User Account Control (UAC) in Windows Vista. If a program requires administrator rights to function correctly, you can enable this setting, but keep in mind that the program will *always* open a UAC dialog box when it is run, and some users might not have password access to authorize this action.
- **Change settings for all users** Setting program compatibility changes the registry settings for that program, but each user has her own registry file, so setting compatibility will make the changes only for the user who is logged in at that time. Clicking this button will set program compatibility for all users on the computer.



Thought experiment

Upgrading a branch office

In the following thought experiment, apply what you've learned about this objective. You can find answers to these questions in the "Answers" section at the end of this chapter.

You are upgrading a small branch office of computers from the 32-bit version of Windows XP to Windows 8. Staff members don't need to use any 64-bit software and their computers all have less than 3 TB of installed RAM. You also have to set up a connection to the servers of their parent company using BranchCache.

1. Describe what you will need before upgrading these computers.
2. Make a recommendation for which edition of Windows 8 should be deployed in the office.

Objective summary

- Not all editions of Windows 8 support the features required in the workplace, such as Group Policy or BitLocker.
- No migration path exists between 32-bit and 64-bit Windows editions.
- Windows 8 allows you to upgrade from Windows XP while keeping your files and folders intact.
- The Application Compatibility Toolkit (ACT) can help you to determine the readiness of your software and hardware for Windows 8.
- You can manually set compatibility for older software.

Objective review

Answer the following questions to test your knowledge of the information in this objective. You can find the answers to these questions and explanations of why each answer choice is correct or incorrect in the “Answers” section at the end of this chapter.

- 1.** A business is upgrading its copy of Microsoft Office alongside its Windows 8 installations, and the accounting department has said it needs to work with Excel files in excess of 256 columns. That department also has several third-party Excel plug-in apps that it needs to continue using. What does this mean for your deployment plans?
 - A.** The accounting department needs the 64-bit version of Windows 8 installed.
 - B.** The accounting department needs 64-bit Windows 8 and 64-bit Microsoft Office.
 - C.** The accounting department can install 64-bit Excel in compatibility mode in 32-bit Windows 8.
 - D.** The accounting department needs 64-bit Windows 8, 64-bit Office, and also compatible 64-bit third-party plug-ins.

- 2.** A business is upgrading several computers from the 64-bit version of Windows Vista to Windows 8. Which one of these statements is true?
 - A.** You can perform a straight upgrade, keeping the existing software.
 - B.** You have to perform a clean installation on each workstation.
 - C.** The company’s existing software won’t work with Windows 8.
 - D.** You can upgrade the company computers, keeping files and settings, but will need to reinstall all software afterward.

- 3.** You are planning to upgrade several computers running Windows XP to Windows 8. Which of the following factors do you need to consider? Select all that apply.
 - A.** You need updated drivers for all the hardware, including external devices.
 - B.** You need new drivers for the internal hardware, but USB devices will be fine.
 - C.** You can check your hardware on the Microsoft website to determine Windows 8 compatibility.
 - D.** You might need to install some software in a Hyper-V environment running Windows XP.

- 4.** Some older software a company has been using doesn’t work properly in Windows 8 and keeps reporting a Cannot Write To File error. What is the cause of this?
 - A.** The file the software is attempting to write to is protected by User Account Control (UAC).
 - B.** The software isn’t being run in compatibility mode.

- C. The software is attempting to write to a system file or folder location that is protected by Windows Resource Protection (WRP).
- D. The software is being run inside Hyper-V.

Objective 1.2: Install Windows 8

Installing Windows 8 isn't a simple matter of running Setup.exe from a DVD or USB flash drive and entering a product key. Objective 1.1 detailed some of the obstacles facing users who are migrating to Windows 8—for example, moving from a 32-bit version of Windows XP to the 64-bit version of Windows 8 on the same hardware.

This objective covers how to:

- Choose the best method for you to install Windows 8
- Create a custom Windows 8 installation
- Install Windows 8 into a Virtual Hard Disk
- Deploy Windows 8 using Windows To Go
- Understand common installation errors

What are the installation methods?

So how should you install Windows 8, and what media can you use to do so? How can you migrate user files and software on the computers in such a way to provide as seamless and trouble-free an experience for users as possible?

First, look at the different ways you can move computers to Windows 8:

- **Clean Installation** is how many IT professionals recommend migrating from one operating system to another. A clean install completely wipes away any traces of the old operating system, and with that wipes away any problems that could be brought into the new installation. Performing a clean installation has definite advantages, one being that since Windows Vista, the operating system has created a 100 MB System Reserved partition at the beginning of drive 0 in the computer that contains startup and rescue files. With Windows 8, the size of this partition has grown to 350 MB, so an upgrade might not bring all the startup benefits Windows 8 offers because it won't change the size of this partition. You can perform a clean installation from a DVD, a USB flash drive, and a network share.
- **In-Place Upgrade** is an excellent solution, especially if you need to keep user files, settings, and programs. Although all versions of the operating system from Windows XP onward support upgrading, not all files, settings, and software can be migrated. You can run an in-place upgrade from a DVD, a USB flash drive, or a download.

- **Automated Installation** is the method of choice in enterprise environments, using tools such as the Microsoft Deployment Toolkit (MDT) and Windows Deployment Services. You can create answer files that will lead the Windows 8 installer to configure the operating system as you require.
- **Migration** is the process of moving files, settings, and software from an older computer running Windows 7 to a new machine running Windows 8, known as a *side-by-side* migration, or where you perform a clean installation of Windows 8 on a Windows 7 computer but put back all user files, settings, and programs as they were previously, a process known as a *wipe-and-load* migration.

Following a pre-installation checklist

Before you upgrade to or clean install a copy of Windows 8, ensure that all the items on this list have been completed:

- All user files and settings have been backed up.
- You are installing the correct edition of Windows 8 for the features that will be required in the business.
- You have compatible hardware drivers for the edition of Windows 8 you are going to install.
- You have versions of your software that are Windows 8 compatible (as much as possible, anyway).
- You have Windows 8 compatible plug-ins required for software, such as Microsoft Office, additions.

These are all important, because they will help ensure that the installation will go smoothly and that you will have access to the assets you need.

Choosing between an upgrade or a clean installation

It can be argued that it's always a good idea to perform a clean installation of any operating system. The primary reason is that you won't carry over any problems with the existing operating system, software, or drivers to the new operating system. You can also be much more certain that any hardware drivers you install in the new operating system are the correct ones.

In the past, a clean install typically resulted in a faster operating system than an upgrade did. However, this does not apply. With Windows 8, things aren't quite that simple because the upgrade process for this operating system is very different. Table 1-4 shows the differences between the last few Windows versions with respect to what can be migrated from an existing Windows installation to Windows 8.

TABLE 1-4 Migration differences

	Windows XP	Windows Vista	Windows 7	Windows 8
Windows 98, Windows Me	Files, Settings, Software	None	None	None
Windows XP		None	None	Files
Windows Vista			Files, Settings, Software	Files, Settings
Windows 7				Files, Settings, Software

By looking at Table 1-4, you might think that people have preferred a clean installation in recent years because upgrade paths have been blocked. For example, in no way could you upgrade Windows XP to either Windows Vista or Windows 7.

For Windows 8, the only full upgrade path available is from Windows 7. If you are upgrading from Windows Vista, you can migrate only your files and settings; if you are upgrading from Windows XP, you can migrate only your files.

What is the difference, then, between an upgrade from Windows XP or Windows Vista and a clean install? If Windows 8 is wiping the earlier operating system and hardware drivers, it's still a clean installation, right? You have two considerations here: Carry forward any problems with the partition formatting or use the System Reserved partition.



EXAM TIP

Questions may focus on your understanding of the upgrade process and migration differences to ensure that you are able to accurately recommend the most appropriate course of action.

The System Reserved partition

The System Reserved partition was first introduced with Windows Vista as a 100 MB hidden drive but is now expanded to 350 MB in Windows 8. It contains the boot files for the operating system and the system re-imaging and rescue tools. The installer places this small partition just ahead of your Windows installation on drive 0 (zero).

The benefit to having this partition is that the Windows system rescue tools can operate from startup without requiring a Windows installation DVD or restore drive. If this partition is missing or too small, you could experience one or more of the following scenarios:

- Windows Startup Repair won't run from the hard disk.
- Windows System Image Backup won't function.

These are important considerations because any PC that malfunctions can commonly be fixed simply and automatically using Windows Startup Repair, and also because you

might require the Windows 8 in-built System Imaging Tool to create backup copies of your installations.

When to perform a clean install

You will always want to perform a clean installation of Windows 8 under certain circumstances:

- The computer currently has no operating system.
- You are migrating a user from one computer to a different computer.
- The existing operating system is Windows 2000, Windows ME, Windows 98, or earlier.
- The computer is currently running a non-Windows operating system.

Methods for performing a clean installation

You can perform a clean installation of Windows 8 in three ways:

- By running Setup.exe from an installation DVD or USB flash drive
- By running Setup.exe from a network share
- By installing using an image

First look at creating an installable DVD or USB flash drive, because these are very common. Installable USB flash drives will likely be a tool you will want to create.

To create an installation DVD or USB flash drive, you need a copy of the correct Windows 8 ISO disc image file. You might have downloaded this as part of your volume licensing program or through a program such as Software Assurance. In both Windows 7 and Windows 8, you can easily burn a disc image of this file to a blank DVD, because you need just to double-click the file to open the Disc Image Burner tool.

To create a bootable USB flash drive (you need a drive of 4 GB or more in size), you need to download the Microsoft Windows USB/DVD download tool. By using this tool, you can select the ISO file and USB flash drive to use, and the tool then creates the media for you. You can also use this tool in Windows XP and Windows Vista to create a bootable installation DVD of Windows 8.

MORE INFO DOWNLOAD THE WINDOWS USB/DVD TOOL

You can find the Microsoft Windows USB/DVD tool at http://www.microsoftstore.com/store/msstore/html/pbpage.help_win7_usbdvd_dwntool.

To install Windows 8 from a network share, how you begin the installation will vary depending on whether you already have an operating system installed on the destination computer. You can, for example, create a Windows Preinstallation Environment (Windows PE) drive and start the computer from that, or you can use a network Pre-boot Execution Environment (PXE) boot.

Creating a custom Windows 8 installation

You will often find that you want to create a custom Windows 8 installation to include specific hard drivers, software, or updates. You might want something as simple as the company desktop wallpaper on all machines by default. The following steps show how to create a custom install image of Windows 8.

Step 1: Create a Windows PE drive

To start the Windows installer from a network share, you can create Windows PE bootable media, but you will also need the following:

- A *technician computer* on which to install the Windows Assessment and Deployment Kit (Windows ADK). Having the 32-bit Windows version running on the technician computer is best because you can use that version to create media that supports both the 32-bit and 64-bit versions of the operating system.

MORE INFO WINDOWS ADK

You can download the Windows Assessment and Deployment Kit from <http://technet.microsoft.com/library/hh824947.aspx>.

- A *reference computer* that represents a typical computer in the organization. This computer shouldn't require any special hardware drivers, but it must have at least one free USB port.
- A *test computer* on which you can make sure everything works afterward.
- A Windows 8 installation DVD and valid product key.
- An empty USB Flash drive with at least 4 GB of free space, if you want to run Windows PE from a USB flash drive.
- An external storage device with at least 8 GB of free space. This can be a network location that you create using the **net use e: \\server\share** command.

When you have these items available, as well as the Windows ADK, you can begin the process of creating your Windows PE bootable media. Follow these steps:

1. On the technician computer, run the Deployment and Imaging Tools environment as an administrator.
2. At the command prompt, type **copype amd64 C:\winpe_amd64** (you can also use **copype amd64 C:\winpe_x86** to create a 32-bit Windows PE disc only). You don't need to create the destination folder in advance.
3. Mount the Windows PE base-image file by typing **dism /mount-image /imagefile:c:\winpe_amd64\media\sources\boot.wim /index:1 /mountdir:C:\winpe_amd64\mount**. This command unpacks its contents to a folder so that you can make changes, such as adding boot-specific drivers.

4. Add required drivers by typing the command **dism /image:C:\winpe_amd64\mount /Add-Driver /Driver:C:\Drivers\network.inf**.
5. Add any required packages to the base image file, such as service packs, by using the /Add-Package command in this format:

```
Dism /Image:C:\winpe_amd64\mount /Add-Package /PackagePath:"C:\Program Files (x86)\Windows Kits\8.0\Assessment and Deployment Kit\Windows Preinstallation Environment\amd64\WinPE_OCs\WinPE-WinReCfg.cab"
```

Also use the following, because when you add a package, you must also add its corresponding language packs:

```
Dism /Image:C:\winpe_amd64\mount /Add-Package /PackagePath:"C:\Program Files (x86)\Windows Kits\8.0\Assessment and Deployment Kit\Windows Preinstallation Environment\amd64\WinPE_OCs\en-us\WinPE-WinReCfg_en-us.cab"
```

6. Commit your changes and unmount the image by typing **Dism /unmount-image /mountdir:C:\winpe_amd64\mount /commit**.
7. To copy your Windows PE image to a USB flash drive, type **MakeWinPEMedia /UFD C:\winpe_amd64 F:**, where *F* represents the drive letter of the destination USB flash drive. You can also use the command **MakeWinPEMedia /ISO C:\winpe_amd64 c:\winpe_amd64\winpe.iso** to create a Windows PE DVD.

MORE INFO DISM TECHNICAL REFERENCE

The Deployment Image Servicing and Management (DISM) tool is used to service offline images. The Technical Reference can be found here: <http://technet.microsoft.com/en-us/library/hh824821.aspx>.

Step 2: Create an unattended answer file

You can optionally create an unattended answer file for your Windows 8 installation. This can include information such as a product key and configuration information for software and/or Windows 8 system components. Follow these steps:

1. On the technician computer, copy the file \Sources\Install.wim to the desktop.
2. Start the Windows System Image Manager from the Windows ADK.
3. From the File menu, click Select Windows Image.
4. Select the correct Install.wim file.
5. From the File menu, click Open Answer File, and then select a sample file from the folder C:\Program Files (x86)\Windows Kits\8.0\Assessment and Deployment Kit\Deployment Tools\Samples\Unattend on the technician computer. Notice in Figure 1-2 that different files are available depending on the computer's BIOS and processor type.

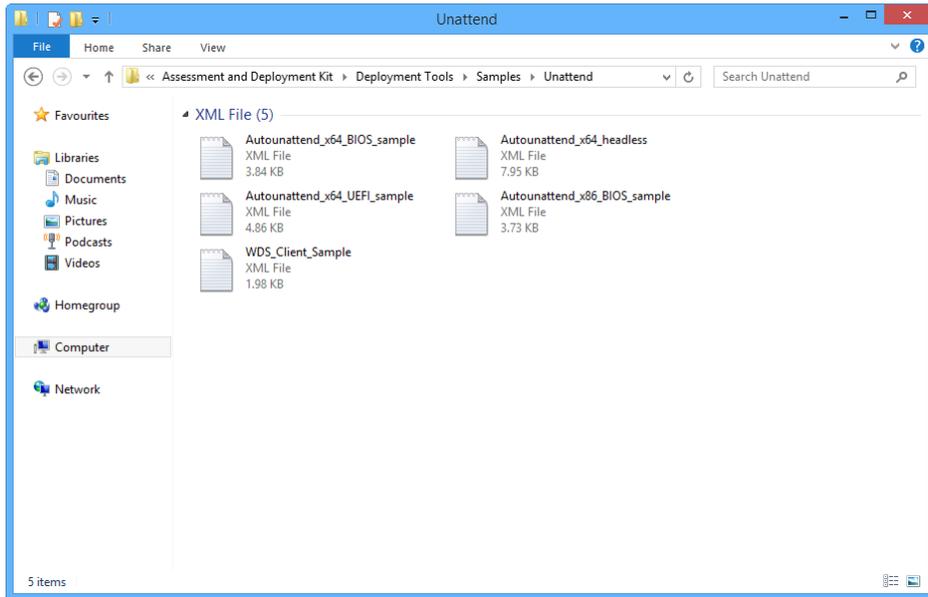


FIGURE 1-2 The different default unattend.txt files available in the Windows ADK

The different components of the Answer File now appear in the Answer File pane and can be easily modified (see Figure 1-3).

MORE INFO CREATING UNATTENDED INSTALLATION FILES

You can read more about creating unattended installation files at <http://technet.microsoft.com/en-us/library/ff699038.aspx>.

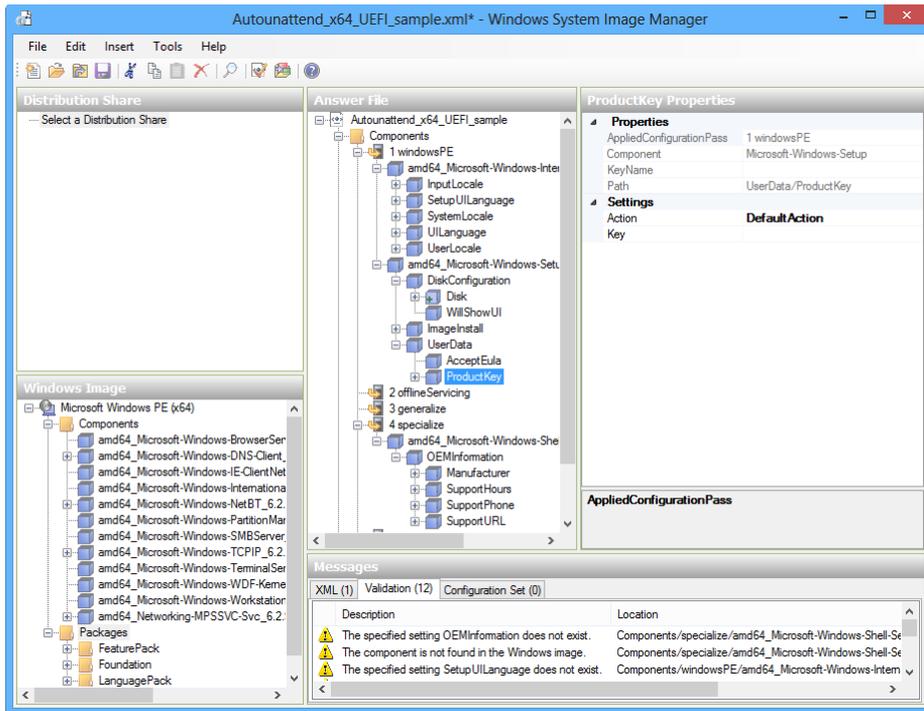


FIGURE 1-3 Modifying an unattended installation file

6. When you have finished making changes to your answer file, choose **Save Answer File As** from the **File** menu and save the file as **CopyProfileunattend.xml** on the USB flash drive.

NOTE ADDING DRIVERS AND PACKAGES

You can add a driver to the unattended installation file by choosing **Driver Path** from the **Insert** menu, and then **Pass 1 Windows PE**. To add packages such as updates of service packs to the unattended installation file, from the **Insert** menu select **Package**.

Step 3: Install Windows 8

You now need to install Windows 8 so that you can perform tests and check that the installation file you have created works as required. Follow these steps:

1. Start the reference computer from the Windows 8 installation DVD (the simplest option) or from your newly created Windows PE drive, as follows:
 - A. If you are installing from a Windows 8 installation DVD, follow the installation instructions as they are presented.

3. Type **list volume** and write down the drive letters and names that are reported.
4. Type **exit** to leave Diskpart.
5. To capture the Windows partition as an image, type the **dism /Capture-Image / CaptureDir:D:\ /ImageFile: E:\ThinImage.wim /Name:"Contoso"** command, where *D* is the drive letter for the Windows drive and *E* is the drive letter your external hard disk will use later, usually the first unused drive letter after *C* that is available.
6. Connect your external USB hard disk to the computer and create an Images folder by typing the command **md E:\Images**.
7. Type **copy D:\ThinImage.wim E:\Images** to copy the newly created image to the drive.
8. Turn off the reference computer.

You can also use the command-line tool ImageX to capture a Windows image. It is used in the following format:

```
ImageX [/flags "EditionID"] [{/dir | /info | /capture | /apply | /append | /delete | /export | /mount | /mountrw | /unmount | /split} [Parameters]
```

The switches you can use with the ImageX command are as follows:

- */flags "EditionID"* specifies the Windows version you want to capture. This switch is required (including the quotation marks) if you want to deploy a custom image.
- */dir* displays a list of files and folders inside the image.
- */info* displays information about the .wim image file, including its size and image index number.
- */capture* captures a volume image from a drive into a new .wim file. This includes all subfolders and files.
- */apply* applies a volume image to a specified drive. All hard disk partitions must be created before starting this process, and then you can run this option from Windows PE.

- */append* adds a volume image to an existing .wim file.
- */delete* removes a specified volume from a .wim file.
- */export* exports the contents of a .wim file to another .wim file.
- */mount* mounts a .wim file.
- */mountw* mounts a .wim file with read/write permission.
- */unmount* unmounts a .wim file.
- */split* breaks large .wim files into smaller, multiple files.

Step 5: Deploy the image to the test computer

You still have some steps to go through to complete your installation image:

1. Start your technician computer and attach your USB hard disk to it.
2. Create an E:\CreatePartitions.txt file in Notepad, where *E* is the location of the USB hard disk.
 - A. For Unified Extensible Firmware Interface (UEFI) computers, create a script based on the following, which creates five partitions: Windows RE Tools, System, Windows, Microsoft Reserved (MSR), and Recovery Image.

```
rem These commands are used with DiskPart to
rem erase the drive and create five partitions
rem for a UEFI/GPT-based computer.
rem Adjust the partition sizes to fill the drive as necessary.
select disk 0
clean
convert gpt
rem === 1. Windows RE tools partition =====
create partition primary size=300
format quick fs=ntfs label="Windows RE tools"
set id="de94bba4-06d1-4d40-a16a-bfd50179d6ac"
assign letter="T"
rem === 2. System partition =====
create partition efi size=100
format quick fs=fat32 label="System"
assign letter="S"
rem === 3. Microsoft Reserved (MSR) partition ===
create partition msr size=128
rem === 4. Windows partition =====
rem == a. Create Windows partition =====
create partition primary
rem == b. Create space for recovery image ====
shrink minimum=15000
rem == c. Prepare the Windows partition =====
format quick fs=ntfs label="Windows"
assign letter="W"
rem === 5. Recovery image partition =====
create partition primary
format quick fs=ntfs label="Recovery image"
gpt attributes=0x8000000000000001
assign letter="R"
```

A. For older BIOS computers that don't run the UEFI system, create a script that creates three partitions: System, Windows, and Recovery Image.

```
rem These commands are used with DiskPart to
rem erase the drive and create three partitions
rem for a BIOS/MBR-based computer.
rem Adjust the partition sizes to fill the drive as necessary.
select disk 0
clean
rem === 1. System partition =====
create partition primary size=350
format quick fs=ntfs label="System"
assign letter="S"
active
rem === 2. Windows partition =====
rem == a. Create Windows partition =====
create partition primary
rem == b. Create space for recovery image ====
shrink minimum=15000
rem == c. Prepare the Windows partition =====
format quick fs=ntfs label="Windows"
assign letter="W"
rem === 3. Recovery image partition =====
create partition primary
format quick fs=ntfs label="Recovery"
assign letter="R"
attributes volume set nodelaultdriveletter
exit
```

3. Create a deployment script called *E:\ApplyImage.bat*. This script creates the partitions, applies the Windows 8 image, copies the Windows Recovery Environment (Windows RE) tools, along with the System Partition, and then configures the partitions.

A. For UEFI computers, use this script as your baseline:

```
rem These commands use the specified Windows image file
rem to deploy Windows, system, and recovery tools
rem to a UEFI-based computer.
rem Usage: ApplyImage WimFileName
rem Example: ApplyImage E:\Images\ThinImage.wim
rem === Apply the image to the Windows partition =====
dism /Apply-Image /ImageFile:%1 /Index:1 /ApplyDir:W:\
rem === Copy tools to the Windows RE Tools partition ====
md T:\Recovery\WindowsRE
copy W:\windows\system32\recovery\winre.wim T:\Recovery\WindowsRE\winre.wim
rem === Copy boot files to the System partition =====
W:\Windows\System32\bcdboot W:\Windows /s S:
rem === Set the location of the WinRE tools =====
W:\Windows\System32\reagentc /setreimage /path T:\Recovery\WindowsRE /target
W:\Windows
rem === Create the recovery image =====
Mkdir R:\RecoveryImage
Copy %1 R:\RecoveryImage
W:\Windows\System32\reagentc /setosimage /path T:\RecoveryImage /target W:\Windows
/index 1
```

B. For BIOS computers, use this script as your baseline:

```
rem These commands use the specified Windows image file
rem to deploy Windows, system, and recovery tools
rem to a BIOS-based computer.
rem Usage: ApplyImage WimFileName
rem Example: ApplyImage E:\Images\ThinImage.wim
rem === Apply the image to the Windows partition =====
dism /Apply-Image /ImageFile:%1 /Index:1 /ApplyDir:W:\
rem === Copy the Windows RE Tools to the system partition =====
md S:\Recovery\WindowsRE
copy W:\windows\system32\recovery\winre.wim S:\Recovery\WindowsRE\winre.wim
rem === Copy boot files from the Windows partition to the System partition ===
W:\Windows\System32\bcdboot W:\Windows /s S:
rem === In the System partition, set the location of the Windows RE tools
=====
W:\Windows\System32\reagentc /setreimage /path S:\Recovery\WindowsRE /target
W:\Windows
rem === Create the recovery image =====
Mkdir R:\RecoveryImage
copy %1 R:\RecoveryImage
W:\Windows\System32\reagentc /setosimage /path R:\RecoveryImage /target W:\Windows
/index 1
```

MORE INFO DOWNLOAD THESE SCRIPTS

You can get copies of the scripts detailed here at <http://technet.microsoft.com/en-gb/library/hh825212.aspx>.

4. Boot the Test Computer into Windows PE from your USB flash drive.
5. At the command line, type **diskpart /s E:\CreatePartitions.txt**.
6. To verify that the script worked successfully, type **diskpart**.
7. At the Diskpart prompt, type **list volume**. This displays the list of partitions that have been created by Windows PE, such as *E* for External USB Hard Disk, *F* for USB Flash Drive, *R* for Recovery Image, *S* for System, *T* for Windows RE Tools, and *W* for Windows.
8. Type **exit** to return to the command prompt.
9. To test your deployment script, type **E:\ApplyImage E:\Images\ThinImage.wim**, where *E* is the drive letter for your USB hard disk.
10. After the image is applied, restart the computer. You should have a working Windows 8 installation.



EXAM TIP

Ensure that you have a good understanding of what the key Windows 8 automation tools for installation are, including sysprep, DISM, WinPE, unattended answer files and the Windows SIM.

Installing Windows 8 into a Virtual Hard Disk (VHD)

Quite possibly one of the most useful features that's ever been built into Windows from the perspective of an IT support and deployment professional is the ability to boot natively into a VHD. Although this might on the face of things sound like a rather odd idea, let's look at some scenarios to see what this actually means and just how useful this actually is in practice.

On a typical computer where you boot from a VHD you will have a standard installation of Windows 8, installed onto the hard disk in the usual way (and presumably backed up as an image as well) and then you will have a separate VHD file, which does not need to be on its own partition and can reside on the C: drive with Windows 8.

When you boot your computer from a VHD you'd never know that you're not using an operating system that's installed on the hard disk in the usual way. You still have full access to the computer's hardware resources and everything seems normal, except crucially that you're isolated from the main installation of Windows 8 on the hard drive that now can't be interfered with. Additionally you can use 64-bit editions of Windows 8 with this feature, there is no limitation to 32-bit only.

This is useful in many ways. If you run an internet café, library, or training provider for example the VHD is very simple to restore as and when it is needed. All that is required is that you boot into the standard copy of Windows 8 and copy your master VHD (because you obviously made a copy of it!) back, overwriting the current VHD.

In business the applications for booting from a VHD are even more useful because it means you can very quickly and simply repurpose any computer, laptop, or tablet. Let's say, for example, that you have different Windows 8 installations for management, accounts, sales, design, administration, and development departments, each containing different software packages and settings, and privileges unique to the role for which they will be used.

In this scenario you might need to repurpose a laptop from the accounts department for the sales team, because one on-the-go laptop has failed and needs replacing. In the usual scenario you'd re-image the entire computer, but this would wipe out the full installation on the machine.

With a VHD you simply boot into that installation and either copy an already configured and purposed VHD over to the computer or, rename a couple files if you already have multiple VHDs on the computer just in case.

NOTE MAKE SURE YOU HAVE APPROPRIATE WINDOWS LICENSES

Each copy of Windows 8 you install onto a computer, whether in a VHD or not, will require its own valid product key and activation. You should ensure that you have an adequate number of product keys to cover the VHDs that you use in your organization.

So let's look at how you can install Windows 8 into a VHD.

1. Boot your computer from your Windows 8 installation media. Note that you cannot install to a VHD from within an already running copy of Windows 8.

2. Select your installation language.
3. At the install screen, press Shift+F10 to open the DOS command window.
4. Type **diskpart** and press Enter.

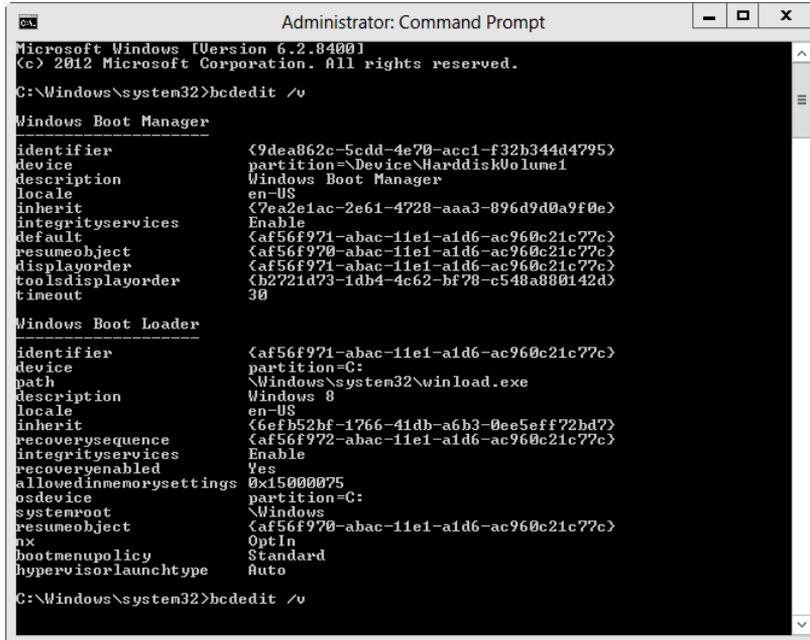
Using an Existing VHD

1. Type **select vdisk file=C:\path1\path2\disk.vhd**, substituting the drive letter, path, and file name of the VHD you wish to use.
2. Type **attach vdisk**.

Creating a new VHD

1. Type **create vdisk file=C:\path1\path2\disk.vhd maximum=40000 type=fixed** and press Enter, substituting the drive letter, path, and file name of the VHD you wish to create and changing the VHD size (20480, for example, would create a drive 20GB in size) and swapping fixed for expandable if you want a dynamically expanding disk size.
2. Type **select vdisk file=C:\path1\path2\disk.vhd** to select the disk you have just created and press Enter.
3. Type **attach vdisk** and press Enter.
4. Type **exit** and press Enter.
5. Type **exit** again and press Enter.
6. Click Install and then select Custom: Install Windows 8 Only (Advanced).
7. Click the VHD you have created and select Drive Options (Advanced).
8. Create a new partition inside the VHD using all the space available.
9. Format this new drive.
10. Ensure that the VHD drive is highlighted as the drive on which you wish to install Windows 8 and click Next to begin the installation.
11. Windows 8 will now install the OS and automatically configure the boot loader; however, you will now have two copies of Windows 8 in that boot loader, both of which will be called "Windows 8." Thus you might want to edit the boot menu and change the name of one of these to something else. To do this follow these instructions after Windows 8 starts.
12. Open the Win+X menu and run Command Prompt (Admin).
13. Type **bcdedit /v** and press Enter.
14. Locate the VHD copy of Windows in the list of operating systems that appears and copy its GUID code. This is a long string of numbers and letters that appears as its identifier parameter.

15. Type **bcdedit /set {GUID} description "OS Name"** and press Enter, substituting GUID for the string you copied in step 3 and with the name you wish for the VHD to have (see Figure 1-4).



```
Administrator: Command Prompt
Microsoft Windows [Version 6.2.8400]
(c) 2012 Microsoft Corporation. All rights reserved.

C:\Windows\system32>bcdedit /v

Windows Boot Manager
-----
identifier           <9dea862c-5cdd-4e70-acc1-f32b344d4795>
device               partition=\Device\HarddiskVolume1
description          Windows Boot Manager
locale               en-US
inherit              <7ea2e1ac-2e61-4728-aaa3-896d9d0a9f0e>
integrityservices   Enable
default              <af56f971-abac-11e1-a1d6-ac960c21c77c>
resumeobject        <af56f970-abac-11e1-a1d6-ac960c21c77c>
displayorder        <af56f971-abac-11e1-a1d6-ac960c21c77c>
tooldisplayorder    <b2721d73-1db4-4c62-bf78-c548a808142d>
timeout             30

Windows Boot Loader
-----
identifier           <af56f971-abac-11e1-a1d6-ac960c21c77c>
device               partition=C:
path                 \Windows\system32\winload.exe
description          Windows 8
locale               en-US
inherit              <6efb52bf-1766-41db-a6b3-0ea5eff72bd7>
recoverysequence    <af56f972-abac-11e1-a1d6-ac960c21c77c>
integrityservices   Enable
recoveryenabled      Yes
allowedinmemorysettings 0x15000075
osdevice             partition=C:
systemroot           \Windows
resumeobject        <af56f970-abac-11e1-a1d6-ac960c21c77c>
nx                   OptIn
bootmenupolicy       Standard
hypervisorlaunchtype Auto

C:\Windows\system32>bcdedit /v
```

FIGURE 1-4 A command prompt window showing the GUIDs for several Windows installations

16. Optionally you might want to set your VHD to boot by default when the computer starts. You can do this with the command **bcdedit /default {GUID}**.

Deploying via Windows To Go

You might want to give some users a Windows To Go USB flash drive that they can use to run an Windows 8 Enterprise edition installation on computers when they are away from the office. You can create this flash drive complete with a user's profile, software, and even files intact. The Windows To Go USB flash drive is usable on any computer that can boot from USB.

NOTE TO GIVE OR NOT TO GIVE?

You really don't want to give users their own Windows To Go devices solely, unless you have a very good reason why they shouldn't get a laptop or desktop computer. However, a Windows To Go device can help people who work out of the office or even at home.

Keep in mind some considerations for Windows To Go:

- Windows To Go drives can be created only from Windows 8 Enterprise edition.

- Hibernate and sleep are disabled by default.
- Windows To Go blocks access to the local drives on the host computer to help maintain the security of that computer.
- If you use BitLocker to encrypt a Windows To Go drive, you will need a password to unlock the drive, because USB flash drives don't have TPM chips as of this writing.
- The Windows RE isn't available, so if the Windows To Go drive becomes corrupt, it will be need to be re-created.
- You need a compatible USB flash drive with a 32 GB capacity or larger. Note, however, that not all flash drives are compatible. In Figure 1-5, notice the 64 GB USB3 flash drive that won't run Windows To Go.

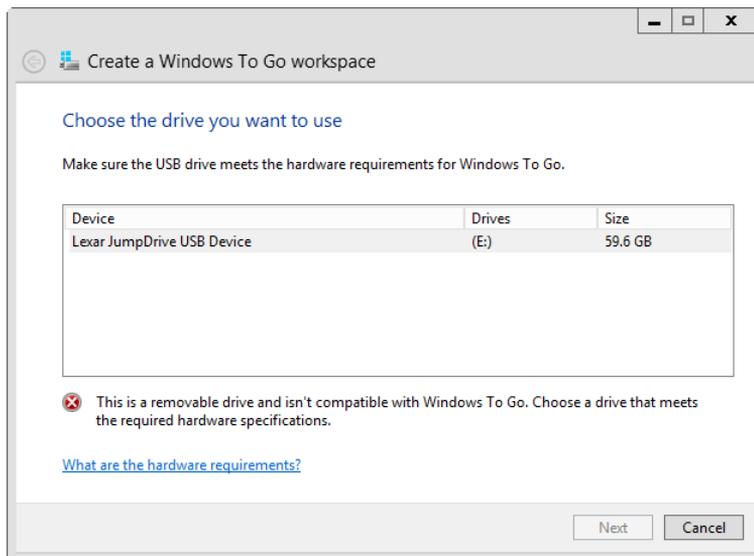


FIGURE 1-5 Compatibility issues with some USB flash drives

When you use Windows To Go on a computer for the first time, it will detect and install the hardware drivers for that computer. As a result, the first run can take some time to start up, although it will be much faster for subsequent uses on that same computer. You should make users aware of this first-time delay if they plan to use the drive on many different computers.

MORE INFO COMPATIBLE USB FLASH DRIVES

You can find out more details about compatible USB flash drives at http://technet.microsoft.com/en-us/library/hh831833.aspx#wtg_hardware.

Understanding common Windows 8 installation errors

So far, the methods for installing Windows 8 detailed in this chapter assume that nothing will go wrong during the installation. However, you sometimes might encounter a problem, such as the following:

- Not being able to read from the installation DVD doesn't necessarily mean that it is faulty. Try reading the disc on another computer to see whether you need to use a lens cleaner on the optical drive. Alternatively, you can try cleaning the disc itself with a small amount of glass cleaner and a soft cloth.
- On some older computers, the BIOS firmware might need updating. You might find, for example, that the firmware won't allow you to boot the computer from a USB device.
- When starting from a USB device, you might find at computer startup that you need to press the key that displays the boot options menu. If your computer doesn't boot from a USB drive, you can select a one-time boot option here.
- If hardware isn't properly installed, you can have trouble installing drivers. Some hardware, such as RAID cards, requires a driver to be loaded at startup. You need to make sure such drivers are included in your Windows 8 image.
- If you're upgrading older computers, you might find that their hardware doesn't meet the minimum hardware requirements for Windows 8. Performing a hardware audit of your computers is a good idea before rolling out any new operating system.
- Any error messages that you see during the process can be checked at the Microsoft knowledge base online at <http://support.microsoft.com>. Carefully write down, in full, any error messages that you receive.

If you need to troubleshoot a problem, first determine what it is that might have changed. Problems are commonly caused by recent changes to software, drivers, or updates. You might find that reversing any recent changes might rectify the problem.

Activating Windows 8

You can use the Volume Activation Management Tool (VAMT), included within the Windows 8 WDK, to manage the activation of a group of computers in an enterprise environment based on their Active Directory Domain Services (AD DS), workgroup names, IP addresses, or computer names.

Each computer requires only a single activation connection with Microsoft, after which no further connection to Microsoft is made. This system uses a product key that is permitted to activate a certain number of computers.

In larger enterprise environments, activation can be managed by the Key Management Services (KMS) without connecting to Microsoft at all. To use this, you need a KMS server within the enterprise that manages your licensing. You can then activate the Windows installation from the command line by typing **cscript C:\windows\system32\slmgr.vbs -ipk <KmsKey>**.

However, computers activated through a KMS server must reactivate via that server once every 180 days. This consideration must be made if remote work is required, where the computer can be mobile or out of touch with the server for long periods of time.

To check the activation status of a Windows 8 client at any time, use the System item in Control Panel or type the **slmgr.vbs -dli** command. If a copy of Windows 8 isn't activated, an activation option will also appear in PC Settings.

Upgrading to Windows 8

If you now use Windows Vista or Windows 7 and are moving to Windows 8, an in-place upgrade of the operating system might be a good option. You can perform an in-place upgrade from the Windows 8 installation media. If you are upgrading from Windows 7, you can keep all your settings, accounts, and files. If you are upgrading from Windows Vista, you can keep your user account and settings, but you will have to reinstall your software.

You can still use an answer file to automate an upgrade, although the overall interaction required from the user is minimal.

IMPORTANT A CRUCIAL CONSIDERATION FOR ANY UPGRADE

The most important consideration when upgrading a computer to Windows 8, or any operating system, is to ensure that you have a full and up-to-date backup of all your data.

You will find that some software will need to be removed (such as your anti-virus software, if you want to use the in-built anti-virus protection of Windows 8 or a server-based solution such as InTune). Other software might need updating, and hardware drivers might also need updating.

The final consideration is that if you are upgrading to the Standard edition of Windows 8, rather than Windows 8 Pro, you can't upgrade from the Professional or Ultimate editions of Windows 7.

If you want to upgrade from Windows XP, the computer's user accounts and files will be retained but all the computer's settings and installed software will need to be redone.



EXAM TIP

Because Microsoft certification exams often focus on the command-line aspect of tools and utilities, you should consider this when preparing for your final exam.



Thought experiment

Upgrading a small business

In the following thought experiment, apply what you've learned about this objective. You can find answers to these questions in the "Answers" section at the end of this chapter.

The business has ten computers to upgrade, all of which are running Windows Vista, and the user files and data are stored on a separate file server that doesn't need upgrading. With this in mind, complete the following exercises:

1. How do you propose it is best to keep a bespoke software package required for all the computers but unlikely to need upgrading in the future?
2. You need to create a custom installation image for the computers. Describe the tools and utilities you will need to create this.
3. Describe how you would activate each copy of Windows 8 used in the business.

Objective summary

- You can perform a clean installation of Windows 8, upgrade an existing installation, or migrate user data to a new Windows 8 computer.
- Only an upgrade from Windows 7 will permit migration of installed desktop software.
- You can create a custom or automated Windows 8 installation by downloading and installing the Windows 8 Assessment and Deployment Kit (ADK) onto a technician computer.
- You can create an unattended answer file to automate much of the Windows 8 installation process.
- You can use SysPrep, the System Preparation tool, to customize a Windows 8 default installation before an installation image is captured.
- You can use Windows To Go to provide users with mobile, USB-based Windows 8 installations.
- The Windows 8 ADK includes tools to aid the automation of Windows 8 product activation.

Objective review

Answer the following questions to test your knowledge of the information in this objective. You can find the answers to these questions and explanations of why each answer choice is correct or incorrect in the "Answers" section at the end of this chapter.

1. You need to upgrade a few computers in an office running Windows 7 and a few slightly older Windows XP computers to Windows 8. What is the best method to deploying the new operating system?
 - A. Performing clean installations
 - B. Upgrading each machine in place
 - C. Upgrading the Windows 7 computers and performing a clean installation on the Windows XP computers
 - D. Migrating user data on each machine to a new computer
2. You need to install both 32-bit and 64-bit versions of Windows 8. Which sections of the Deployment and Imaging Tools do you need?
 - A. Just the x86 tools
 - B. The x86 tools and the x64 tools
 - C. The x86 tools and the amd64 tools
 - D. Just the amd64 tools
3. You are using the SysPrep command to configure a custom installation before you capture the image and need to restart the computer after installing an update before you can continue configuring it. Which SysPrep command-line switch do you use?
 - A. /audit
 - B. /restart
 - C. /generalize
 - D. /oobe
4. Which command-line tool can you use to capture a custom Windows 8 image?
 - A. Dism /capture
 - B. SysPrep /capture
 - C. ImageX /capture
 - D. DiskPart /capture
5. Which method can you use to check the activation status of any computer?
 - A. Type **slmgr.vbs -dli** at the command prompt.
 - B. Type **vlmgr.vbs /license** at the command prompt.
 - C. Open the System panel from the Control panel and type **vlmgr.vbs /license** at a command prompt.
 - D. Open the System panel from the Control Panel and type **slmgr.vbs -dli** at a command prompt.

Objective 1.3: Migrate and configure user data

An installation solution that commonly best suits businesses is called *migration*. This involves saving portions of the current installation, such as the user account and data and files, by backing them up to a temporary store while you reimage the computer. This saved state data can later be returned to the computer.

This objective covers how to:

- Choose how best to migrate user data to Windows 8
- Migrate files and settings using Windows Easy Transfer
- Migrate user files and settings using the User State Migration Tool
- Set up folder redirection

Choosing to migrate

Migration to Windows 8 is recommended for many reasons, especially for Windows XP installations. For example, you can ensure that no problems associated with the previous Windows installation, including malware and viruses, carry over to the new Windows 8 installation. You can also easily restore user accounts with not just the main enterprise-set account permissions but also a user's individual preferences.

IMPORTANT BACKUP, BACKUP, BACKUP!

You probably don't need to be reminded of two things: that you can try turning the computer off and on again if a problem occurs, and that you should keep current backups. Because backups are absolutely essential, they are mentioned here because, although the tools available to migrate a user's settings and files from one computer to another are excellent, Murphy's law dictates that whatever can go wrong, will go wrong. It's therefore during this essential transition that you can reasonably guarantee that it will.

Before migrating user data, you should create a complete backup of the computer's entire hard disk. You might need this in case the Windows 8 installation fails or encounters a problem, and you find that you need to restore the older operating system until you can rectify the error. Alternatively, you could experience something catastrophic such as a power outage during the installation or migration.

You can perform a data migration from one computer to another in two ways: by using Windows Easy Transfer, a feature built into Windows 8, and by using the User State Migration Tool (USMT), which is provided as part of the Microsoft Deployment Toolkit (MDT).

Migration using Windows Easy Transfer

Don't think of Windows Easy Transfer as a basic tool to help consumers switch to another computer at home because it's much more useful and full featured than you might imagine. For example, you can use it to migrate files, settings, and accounts from one computer to another over a network and in a secure manner. Follow these steps to perform a migration with Windows Easy Transfer:

1. Start Windows Easy Transfer on the host and target PCs. On the target (Windows 8) PC, search for Windows Easy Transfer from the Start screen. On the host PC, run Windows Easy Transfer from a Windows 8 installation DVD or flash drive; you can find it in the E:\support\migwiz folder (assuming E is the letter associated with the installation media). You need to run the program Migwiz.exe (see Figure 1-6).

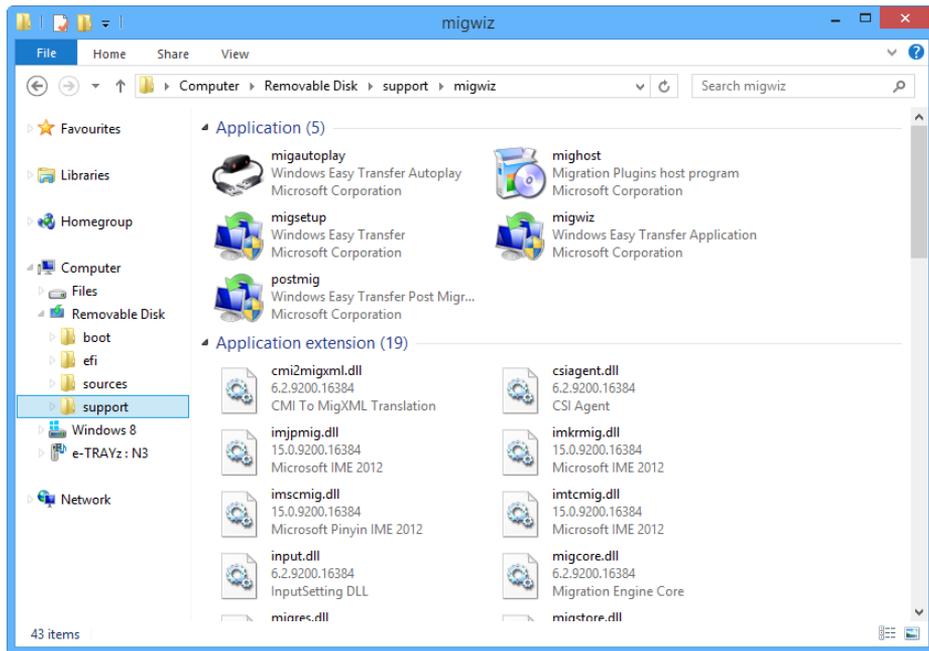


FIGURE 1-6 Launching Windows Easy Transfer on the host PC

On startup, Windows Easy Transfer tells you what it can transfer (see Figure 1-7). This, frankly, is anything and everything from the host PC except the operating system. This makes Windows Easy Transfer a very powerful tool.



FIGURE 1-7 Starting Windows Easy Transfer

2. Decide how you want to transfer the user accounts and data (see Figure 1-8). You can perform this transfer using an external USB hard disk or, if you have one large enough, a USB flash drive. You can also perform the transfer over a wired or wireless network, although using a wireless network isn't recommended in case the signal is lost during the transfer.

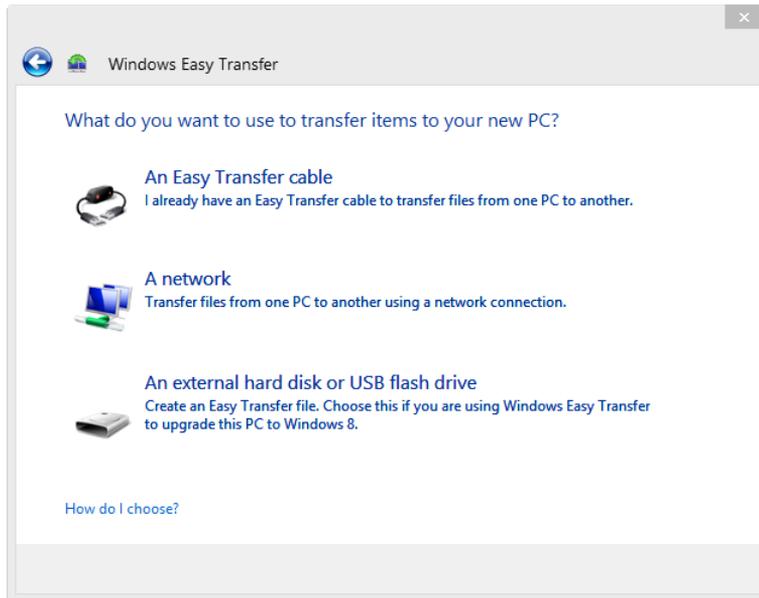


FIGURE 1-8 Choosing how to transfer the user data

Until now, you have been selecting the same options on both host and target PCs.

3. Specify which is the host (old) PC and which is the target (new) PC (see Figure 1-9).

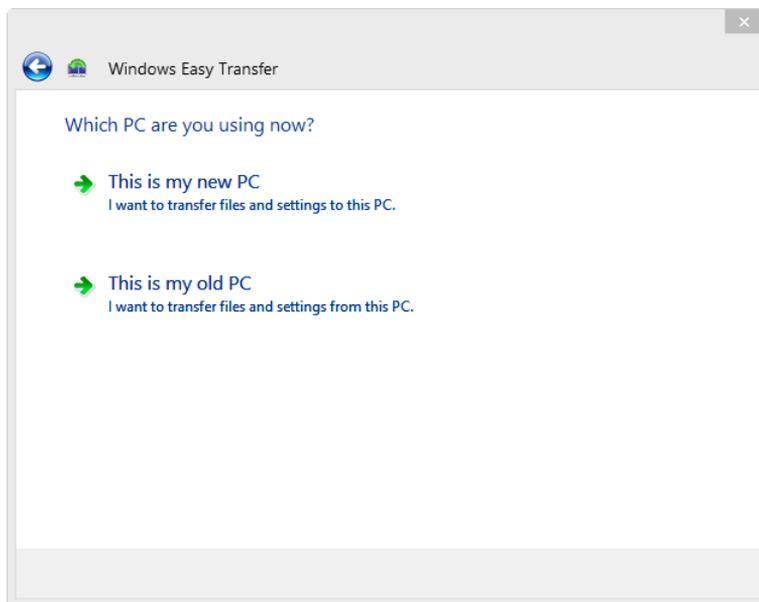


FIGURE 1-9 Choosing which is the target PC

If you are transferring files over a network, Windows Easy Transfer will give you a security code on the host PC that needs to be typed into the target PC to make the connection (see Figure 1-10).

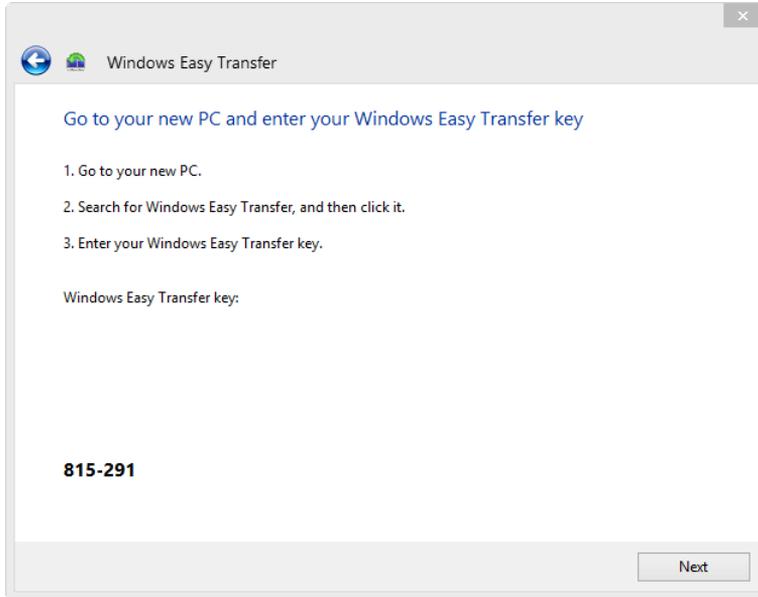


FIGURE 1-10 Security code from Windows Easy Transfer

4. Select what to transfer from the host PC while the target PC waits for the transfer to begin. The choices screen is simply laid out and easy to use, with Customize and Advanced links available to help you choose which aspects of a user's account and what else on the computer's hard drive to transfer (see Figure 1-11).

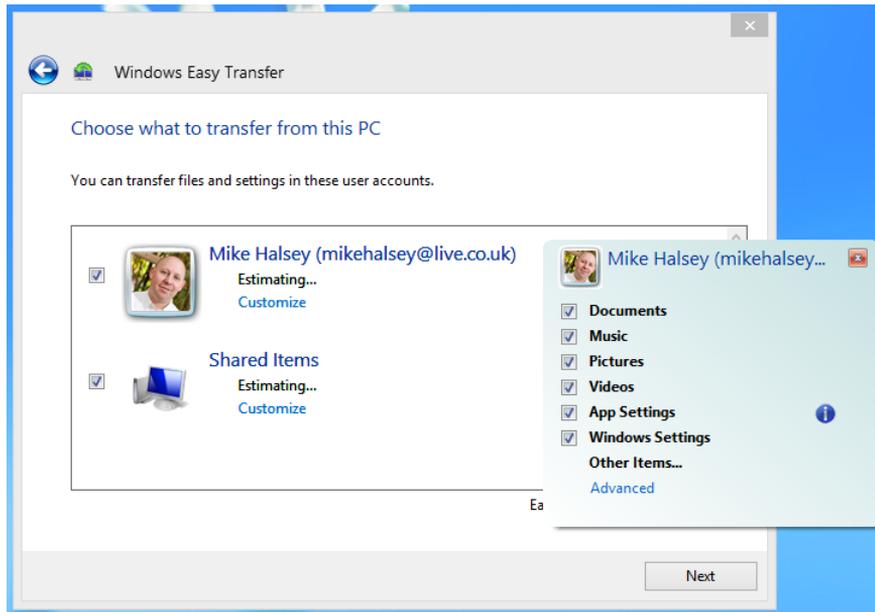


FIGURE 1-11 Choosing what to migrate in Windows Easy Transfer

Migration using the User State Migration Tool (USMT)

You can find the command-line User State Migration Tool in the `C:\Program Files (x86)\Windows Kits\8.0\Assessment and Deployment Kit\User State Migration Tool` folder of your hard disk after you install the ADK. Here, you will see different x86 and amd64 versions of the tool; you should use the one that matches the operating system you are using. (On 32-bit Windows versions, this path will read `C:\Program Files\Windows Kit...` and so on, because the x86 part of the folder address isn't used.)

The main tools in this folder, for which you will need to open a command prompt, are as follows:

- **ScanState.exe** The migration tool for files, settings, and accounts from the host computer.
- **LoadState.exe** The migration import tool for the target computer.
- **MigApp.xml** This tool contains details of software that migrates from a Windows 7 computer to a Windows 8 computer.
- **MigUser.xml** This tool contains details of the user accounts to migrate.
- **MigDocs.xml** This tool contains details of the documents and files to migrate.
- **Custom.xml** This tool enables you to create custom XML files that can migrate additional files and data, such as a line-of-business (LOB) application, or to modify the default migration behavior.
- **Config.xml** This tool can be used to exclude certain items from migration. You can create this file using the `/genconfig` option in the `scanstate` tool.

You run the ScanState command-line tool on the host computer with the following format:

```
scanstate [StorePath] [/i:[path\]FileName] [Options]
```

The `/i[path\]FileName` option specifies an XML file that contains rules determining what's to be migrated. You can specify this option multiple times to include all your necessary .xml files.

With those options is a great menu to choose from, and you can find descriptions of them by using the `/?` switch with the ScanState.exe command. Another switch that you certainly want to know about is `/hardlink`, which you can use to create hard links to the migration store location. If you use this switch, you must also use the `/nocompress` switch.

On the target PC, you would use the LoadState command with this format:

```
Loadstate [StorePath] [/i:[path\]FileName] [Options]
```

Again, you can read about many command-line switches with the `/?` switch, but the most important is `/lac:[password]` (local account create), which specifies that a local user account is to be created on the target computer. By default, the account will be disabled if it doesn't already exist on the target computer, and you should use the `/lae` (local account enable) switch to enable it.



EXAM TIP

Because LoadState.exe and ScanState.exe offer the administrator the ability to migrate to Windows 8 securely, efficiently and importantly at scale, you should ensure that your exam preparation includes these two commands.

Using folder redirection

You might want to consider redirecting a user's files, or all users' files, to a central server when you migrate the user files to a new Windows 8 computer. This isn't the same as users having a roaming profile where their files and documents are always kept on the server as well as on their own computer and synched whenever they log in. This method uses either a server in the office or one of the computers as a file server.

All files and documents for all users will always be stored solely on this central server and nowhere else. Doing so has certain advantages, not the least of which is file security if anybody uses a laptop, because files stored on this computer won't be available outside the immediate network.

REAL WORLD CREATING A BACKUP FOR A LOCAL AREA NETWORK OR VPN

When I was working in a small training center with five staff members who were part of a national education charity, we had huge amounts of resources (teaching and paperwork) that everybody wanted access to. We each had our own PC but no server.

I moved all files to one computer—the one the administrator used that was most commonly going to be switched on all the time—and updated the documents folders (this was Windows XP, pre-libraries) to point to the shared folder that contained all the resources. Then, on another computer I created a hidden backup folder and used a free backup tool to ensure that a second copy of all the files was kept up-to-date.

Nobody outside the office could access these files because they were available only on the local network. This suited us for security, however, because the files contained personal data about learners in the center.

If we had a small server in the office, however, I could have set up a virtual private network (VPN) to allow access to these files for staff when they were out and about on their laptops or when they were working at home. Today you can also set this up on Windows To Go drives.

You can add the central storage, which can be per user or shared between users, to the main libraries in Windows 8 as follows:

1. Create a folder on the target computer for the network share—for example, C:\Shared.
2. Create another folder within that folder—for example, C:\Shared\Documents.
3. Select the subfolder that you just created. On the Home tab on the ribbon, click Easy Access, and then click Include In Library.
4. Delete the folder.
5. Press Win+X to open the Administration menu and then click Command Prompt (Admin).
6. Type **mklink /d** followed by the path of the folder you just deleted and the path of the network folder—for example, `mklink /d C:\Share\Documents\\Server\SharedDocs`—to create a symbolic link between the two folders.

Doing so adds the network files to your library, something that can't be done from within File Explorer itself.

You can also use the Sync Center in Windows 8 to maintain a synchronized copy of the server files on the local computer—useful if the user is working on a laptop—by right-clicking the folder you want to make available and clicking Always Available Offline from the options that appear (see Figure 1-12).

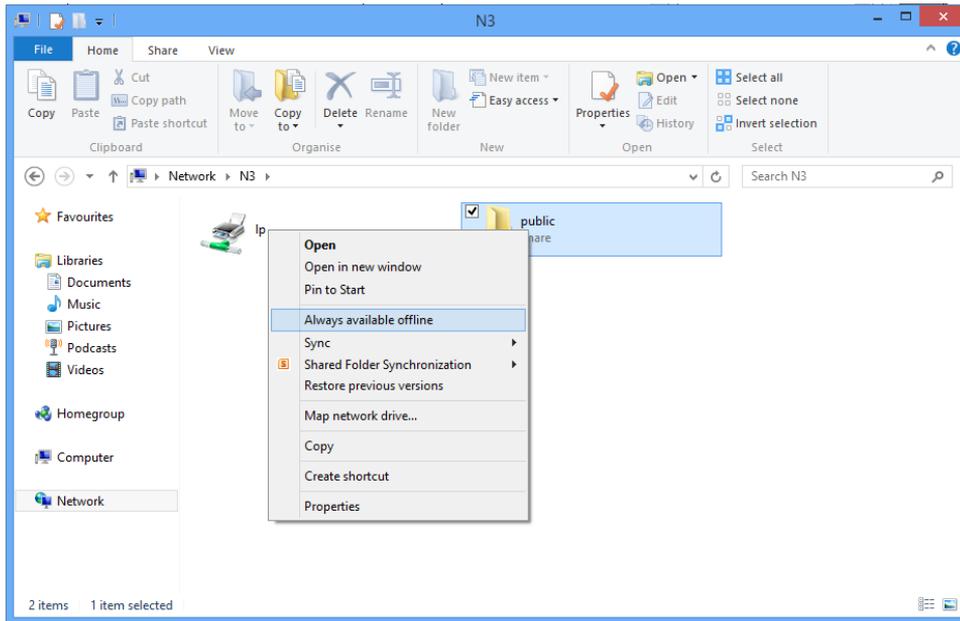


FIGURE 1-12 Syncing a network folder

The first synchronization will then take place, which can take some time if you have many files, and a copy of the network files will then be kept on the local computer.

To manage this sync partnership, open the Sync Center by searching for it at the Start screen. You will want to use two main options most of all:

- To manage the schedule when the files are synced with the server, double-click the sync relationship in the main Sync Center view and then click the Schedule link that appears on the toolbar. Figure 1-13 shows how you can set the frequency or specific times when synchronization takes place.

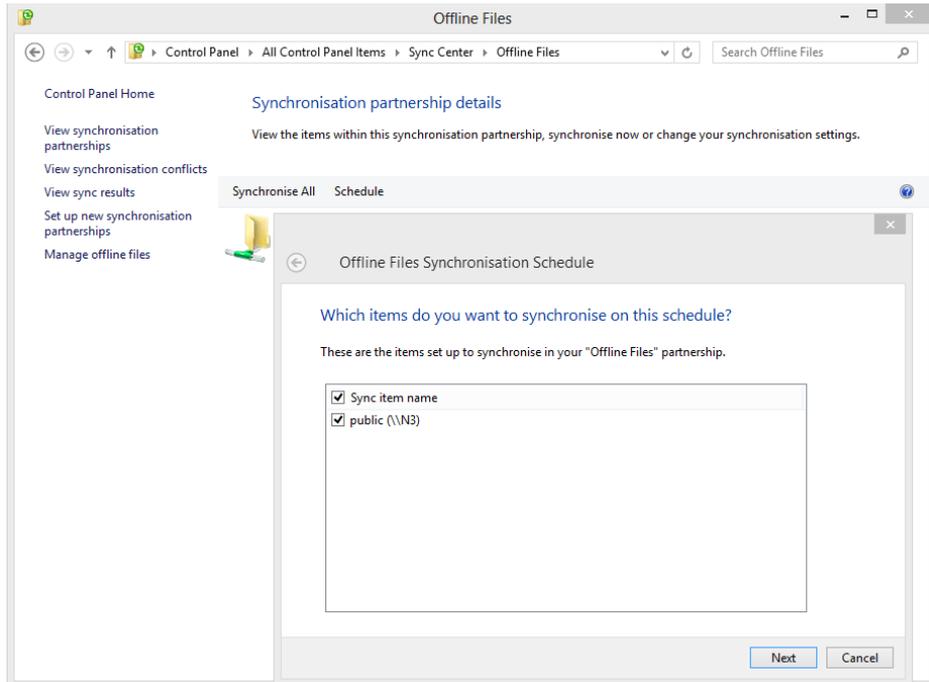


FIGURE 1-13 Changing the synch schedule for offline files

- The other aspect of synchronization over which you might want finer control is the offline copy of the server files. To access these controls, click the Manage Offline Files link. Here you can enable and disable synchronization, but on the Disk Usage tab you can change the amount of local disk space allocated for synchronized files, which is useful for laptops with small hard disks. You can also remove any temporary files that might not have been cleaned up (see Figure 1-14). On the Encryption tab you can also force encryption of the offline files, which can be useful if those files include anything that would be covered by data protection legislation, such as personal details of individuals.

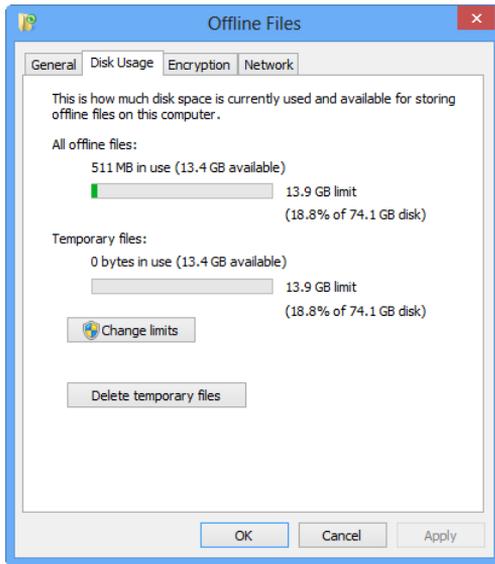


FIGURE 1-14 Managing offline files



Thought experiment

Upgrading for mobile workers

In the following thought experiment, apply what you've learned about this objective. You can find answers to these questions in the "Answers" section at the end of this chapter.

A small office doesn't have a server but requires mobile workers to have access to files at all times when out on the road. Which of the following statements is true and why?

1. You can set the encryption status of files in the office by using Encrypting File System (EFS) and then open them on local PCs using the correct EFS decryption key.
2. You can use the Windows 8 Sync Center to encrypt files that are synched from the office.
3. Secure encrypted access to files from a remote location can be gained only by logging on to the server via a VPN.

Objective summary

- To migrate user accounts and files from one computer to another, use either the Windows Easy Transfer tool or the User State Migration Tool.
- The ScanState command offers many more configurability options than Windows Easy Transfer but requires some knowledge of XML.
- You can relocate user files to a server or central file store and still maintain access to them in Windows 8 libraries.

Objective review

Answer the following questions to test your knowledge in this objective. You can find the correct answers to these questions and explanations of why each answer choice is correct or incorrect in the “Answers” section at the end of this chapter.

1. In which folder on the Windows 8 installation media will you find the Windows Easy Transfer tool?
 - A. \support\wet
 - B. \support\migwiz
 - C. \support\migration
 - D. \sources\migwiz
2. Which .xml file should you use to specify items to exclude from a migration?
 - A. Custom.xml
 - B. Exclude.xml
 - C. Config.xml
 - D. MigDocs.xml
3. Which LoadState command-line switch or switches are required to create a user account on a new computer?
 - A. /createuser
 - B. /lua and /lae
 - C. /lac and /lae
 - D. /lac
4. How can you make server files available on a local computer?
 - A. By applying them to a local library
 - B. By setting their offline availability status
 - C. By setting up a new sync partnership
 - D. Server files are available only when connected to the local network

5. Setting a sync partnership between server files and a local PC stores how many of the server files locally?
- A. All shared server files
 - B. All server files up to a maximum specified local storage amount
 - C. The most recently accessed server files
 - D. Server files that don't have their archive switch activated

Chapter summary

- Not all editions of Windows 8 support the features required in the workplace, such as Group Policy or BitLocker.
- No migration path exists between 32-bit and 64-bit Windows editions.
- Windows 8 allows you to upgrade from Windows XP while keeping your files and folders intact.
- The Application Compatibility Toolkit (ACT) can help you to determine the readiness of your software and hardware for Windows 8.
- You can manually set compatibility for older software.
- You can perform a clean installation of Windows 8, upgrade an existing installation, or migrate user data to a new Windows 8 computer.
- Only an upgrade from Windows 7 will permit migration of installed desktop software.
- You can create a custom or automated Windows 8 installation by downloading and installing the Windows 8 Assessment and Deployment Kit (ADK) onto a technician computer.
- To automate much of the Windows 8 installation process, you can create an unattended answer file.
- You can use SysPrep, the System Preparation tool, to customize a Windows 8 default installation before an installation image is captured.
- You can use Windows To Go to provide users with mobile, USB-based Windows 8 installations.
- The Windows 8 ADK includes tools to aid the automation of Windows 8 product activation.

- You can migrate user accounts and files from one computer to another using either the Windows Easy Transfer tool or the User State Migration Tool (USMT).
- The ScanState command offers many more configurability options than Windows Easy Transfer (but requires some knowledge of XML).
- You can relocate user files to a server or central file store and still maintain access to them in Windows 8 libraries.

Answers

This section contains the solutions to the thought experiments and answers to the objective review questions in this chapter.

Objective 1.1: Thought experiment

1. Because you don't need the 64-bit Windows version, you need only the 32-bit (x86) Windows 8 installation media—unless, of course, you will want to upgrade the computers to 4 GB or more of memory in the future. You also need Windows 8 compatible drivers for all your hardware and software installers that are compatible with Windows 8.
2. You need to install Windows 8 Enterprise because only this edition of the operating system supports BranchCache.

Objective 1.1: Review

1. **Correct answer:** D
 - A. Incorrect:** Although the 64-bit version of Windows 8 can handle numbers larger than 65,536 on its own and memory addressing above 4 GB, you also need to have 64-bit software installed to take advantage of this extra functionality. Using 32-bit software still can address only the same memory and perform the same calculations as a 32-bit version of the Windows operating system.
 - B. Incorrect:** Although the 64-bit version of Excel, when paired with the 64-bit version of Windows 8, can handle more than 256 columns required, the plug-ins won't work if they're not coded specifically to work with the 64-bit version of Microsoft Office.
 - C. Incorrect:** You can't install any 64-bit application in the 32-bit Windows version, not even in compatibility mode. Attempting to install 64-bit software in a 32-bit operating system will report an error that the software is incompatible.
 - D. Correct:** The workers in the accounting department will have the facilities they need only if the operating system, version of Microsoft Office, and all required Office plug-ins are all coded for 64-bit processors.

2. Correct answer: D

- A. Incorrect:** Although many software packages that run on Windows Vista will run on Windows 8 without incident, the Windows 8 installer doesn't support migration of any software from Windows Vista. It will allow you to migrate only user settings, accounts, and files.
- B. Incorrect:** Although you *can* perform a clean installation on each workstation, doing so isn't absolutely necessary because upgrading to Windows 8 from Windows Vista supports all user accounts, settings, and documents and only your software will need reinstalling.
- C. Incorrect:** Although a few changes that have been made to the Windows operating system since Windows Vista means some software won't work with Windows 8, this situation will arise very rarely. Almost every piece of software that runs on Windows Vista will run on Windows 8.
- D. Correct:** The Windows 8 installer allows you to migrate your user accounts, settings, and files from Windows Vista. It is only your software that needs reinstalling afterward when performing an in-place upgrade.

3. Correct answers: A, C, and D

- A. Correct:** No hardware drivers that worked with Windows XP will work with Windows 8 because the hardware driver model was changed completely with Windows Vista. Thus, you will need new drivers for all your hardware.
- B. Incorrect:** When the hardware driver model changed with Windows Vista, this change included all drivers, including those attached to a computer via USB. The USB attachment doesn't guarantee that all external devices operate the same way. While this might be generally true for some devices such as external hard disks, so many different device types can be attached via USB that the USB driver system itself can't provide hardware compatibility with all devices.
- C. Correct:** Microsoft provides an online device compatibility database that you can access at <http://www.microsoft.com/en-us/windows/compatibility/win8/CompatCenter/Home?Language=en-US>. This database details every device that is certified for use on a Windows computer. If your device doesn't appear in this list, it doesn't necessarily mean that it won't work; it simply might not have been submitted for compatibility testing.

D. Correct: Although many software packages that worked in Windows XP will also work in Windows 8, much of the core operating system architecture has changed between the two operating systems and many functions called by software in Windows XP no longer exist or have changed radically since. This means that some software will need to be run in a virtualized Windows XP environment because Windows 8 compatibility mode can't maintain full compatibility where Windows features are missing or have changed.

4. Correct answer: C

A. Incorrect: The User Account Control is activated when software is installed, at which time its UAC permissions are set. If a user permits software to install, the UAC will give it the appropriate permissions in Windows 8.

B. Incorrect: A Cannot Write to File error means that the software is trying to access a protected part of the Windows file system. Running the program in compatibility mode won't rectify this problem because allowing older software to access protected Windows files in this way would compromise the operating system's security.

C. Correct: Windows Resource Protection (WRP) is a security feature designed specifically to protect write access to critical operating system files and folders. This error is the only one ever generated by WRP.

D. Incorrect: Technically, you can get this error inside Hyper-V if you install a copy of Windows 8 into a virtual machine and then install legacy software into that. This is unlikely, however, and not the answer sought for this question.

Objective 1.2: Thought experiment

1. If the software is bespoke and doesn't get upgraded, when computers come to be reinstalled or when new computers are bought, the software won't have changed. The best way to deploy this software, then—assuming it's not too large—is by using SysPrep so that it is already installed on any new Windows 8 systems installed from a custom image.

1. To create a custom image, you need three computers: a technician computer; a target computer, which is a typical computer broadly representing the computers in the office; and a test computer. You also need a USB flash drive for your Windows PE boot loader and an external USB hard disk or network storage location for the image storage.
2. You need to use the Volume Activation Management Tool (VAMT) provided in the Windows 8 ADK. If you use the Key Management Services (KMS), each computer will need to be activated (and reactivated every 180 days) through a server. The only available server is only a file server, which might not have the installed software you need to run the KMS service.

Objective 1.2: Review

1. **Correct answer:** B
 - A. **Incorrect:** You can perform clean installations, but you also can upgrade each computer so that the ones running Windows 7 will keep all their current software. On the Windows XP computers, the software, operating system, and hardware drivers are all replaced during an upgrade, effectively making this a clean install anyway, but performing the same installation method on every machine simplifies the overall process.
 - B. **Correct:** This is the best option because it will keep any Windows 7 software in place and effectively perform a clean installation on the XP computers. Performing the same installation method on all computers simplifies the overall process.
 - C. **Incorrect:** Like with answer A, you can perform clean installations but you also can upgrade each computer so that the ones running Windows 7 will keep all their current software. On the Windows XP computers, the software, operating system, and hardware drivers are all replaced during an upgrade, effectively making this a clean install anyway, but performing the same installation method on every machine simplifies the overall process.
 - D. **Incorrect:** This can't be done. Because you need to upgrade existing computers, you can't migrate the user data to any new computers.
2. **Correct answer:** D

- A. Incorrect:** The 32-bit (x86) tools support creation of only a 32-bit Windows PE disc.
 - B. Incorrect:** You can use the 64-bit tools to create a Windows PE disc compatible with both 64-bit and 32-bit operating systems. Creating a second Windows PE disc isn't necessary.
 - C. Incorrect:** No x64 tools are supplied; the tools for 64-bit operating systems are all labeled amd64.
 - D. Correct:** The x64 tools support installations of both the 32-bit and 64-bit Windows 8 editions.
- 3. Correct answer: A**
- A. Correct:** `/audit` is the correct command-line switch to restart the computer in a mode in which you can continue modifying the installation before sealing it for capture.
 - B. Incorrect:** No `/restart` switch is available for use with the SysPrep tool.
 - C. Incorrect:** The `/generalize` switch seals the current configuration and prepares it for capture. You would need to open SysPrep again after the reboot if this switch is used accidentally.
 - D. Incorrect:** The `/oobe` switch restarts the computer in Out of Box Experience mode, which is what users see when they first turn on a new computer. You can't capture the image if you use this switch.
- 4. Correct answer: C**
- A. Incorrect:** The Deployment Image Servicing and Management (DISM) tool is used to service offline images that already exist. It can't be used to create new images.
 - B. Incorrect:** You can use the SysPrep tool to make changes to the default Windows installation before capture. It can't be used to capture the image itself.
 - C. Correct:** ImageX is the command-line tool used to capture disc images.
 - D. Incorrect:** The DiskPart tool configures the hard disks and other storage on a computer before deployment of the operating system.
- 5. Correct answer: D**
- A. Incorrect:** While this is the correct command-line tool to use to check the activation status of the Windows operating system, you can also see the activation status from the System panel in the main control panel.
 - B. Incorrect:** This is an incorrect format for the command; the `/license` switch doesn't exist. You can also check the activation status from the System panel in the main control panel.
 - C. Incorrect:** This format is incorrect for the command; the `/license` switch doesn't exist.

- D. **Correct:** This is the correct use of the command-line tool. You can also check activation status in the Control Panel.

Objective 1.3: Thought experiment

1. This statement is true because you can use the Encrypting File System (EFS) to encrypt files on the server and then read them on a remote computer if the user has a copy of the correct EFS key to decrypt them. Unlike BitLocker, EFS encryption is an encryption method tied to the file rather than the drive.
2. This statement is also true. You can have the Sync Center automatically encrypt offline files synced with the target computer using EFS by clicking the Manage Offline Files option in the Sync Center.

Objective 1.3: Review

1. **Correct answer:** B
 - A. **Incorrect:** The `\support\wet` folder doesn't exist on the Windows 8 installation media.
 - B. **Correct:** The `\support\migwiz` folder on the Windows 8 installation media includes the Windows Easy Transfer tool.
 - C. **Incorrect:** The `\support\migration` folder doesn't exist on the Windows 8 installation media.
 - D. **Incorrect:** The `\sources\migwiz` folder doesn't exist on the Windows 8 installation media.
2. **Correct answer:** C
 - A. **Incorrect:** The `custom.xml` file allows you to create custom XML files that can migrate additional files and data, such as a line-of-business (LOB) application, or to modify the default migration behavior.
 - B. **Incorrect:** No `exclude.xml` file exists.
 - C. **Correct:** The `config.xml` file specifies items to exclude from a migration.
 - D. **Incorrect:** The `migdocs.xml` specifies which documents are migrated. Although not all document locations need to be included, it can't be used specifically to exclude items from a migration.
3. **Correct answer:** C
 - A. **Incorrect:** The `LoadState` command doesn't have a `/createuser` switch.
 - B. **Incorrect:** The `LoadState` command doesn't have a `/lua` switch.
 - C. **Correct:** You need to use `/lac` (local account create) and `/lae` (local account enable) to successfully create a new user account using the `LoadState` command-line tool.

D. Incorrect: Although the `/lac` switch will create a user account, you also need to enable the account by using the `/lae` switch.

4. Correct answer: B

A. Incorrect: In a way, this was a trick answer. To best see the files you have synched with a server, it's best to add them to a library. If you said this answer was necessary, you have identified an important part of the process.

B. Correct: You need to make the networked files available offline by right-clicking the network folder and selecting Make Available Offline from the options that appear.

C. Incorrect: Performing the action described in answer B automatically creates a new Sync Partnership. Although it is possible to create the sync partnership, you first need to make the folder available offline.

D. Incorrect: You have several options available to make server files available offline on computers taken away from the office.

5. Correct answer: B

A. Incorrect: Again, this is a trick answer. By default, all files in the synched folder will be copied to the target computer, so this part is correct. You can manage the amount of space available on the target computer, however, making B the most technically accurate answer.

B. Correct: You can manage the amount of space available on the target computer for offline files in the Sync Center.

C. Incorrect: The sync relationship doesn't distinguish between the most recently accessed and least commonly accessed files; it assumed that you will need them all.

D. Incorrect: The archive switch on a file or folder has no bearing on what files or folders are synched with offline files.

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About the authors



ANDREW BETTANY is a Microsoft Most Valuable Professional (MVP), recognized for his Windows expertise, and a member of the Microsoft Springboard Technical Expert Panel.

As leader of the IT Academy at the University of York, UK and Microsoft Certified Trainer, Andrew delivers learning and consultancy to businesses on a number of technical areas including Windows deployment and troubleshooting.

He has created and manages the “IT Masterclasses” series of short intensive technical courses, www.itmasterclasses.com, run through his own training company Deliver IT Training Ltd.

Passionate about learning and helping others, he frequently donates his time to work with Microsoft. He is a frequent speaker and proctor at TechEd conferences worldwide. In 2011 he delivered a “train the trainer” class in earthquake-hit Haiti to help the community rebuild their technology skills.

Very active on social media, Andrew can be found on LinkedIn, Facebook, and Twitter. He lives in a village just outside of the beautiful city of York in Yorkshire (UK).



MIKE HALSEY is the author of several books on Microsoft's operating system, including *Troubleshoot and Optimize Windows 8 Inside Out* (Microsoft Press, 2012), *Beginning Windows 8* (Apress, 2012), the best sellers *Troubleshooting Windows 7 Inside Out* (Microsoft Press, 2010), and *Windows 8: Out of the Box* (O'Reilly, 2012).

An English and math teacher by trade, he also holds a Microsoft Most Valuable Professional (MVP) award (2011, 2012, 2013) and is a recognized Windows expert. Mike has an open mailbag at mike@MVPs.org and can also be found on Facebook, Twitter, and YouTube as HalseyMike. He lives in Yorkshire (UK) with his rescue border collie, Jed.

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