70-697: Configuring Windows Devices

Chapter 2 – Windows 10 Deployment

WORKBOOK

Slide 1

Chapter 2 – Windows 10 Deployment

- Standard Windows 10 Deployment
- Enterprise Deployment Strategies

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Slide 2

Topic A - Standard Windows 10 Deployment

- ◆ Preparing for Installation
- ◆ Installation Options
- ◆ Upgrading and Migrating

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Preparing for Installation

- ◆ The first choice when installing Windows 10 is the choice of edition
- ◆ Windows 10 comes in 4 separate editions all in x86 or x64
  - ○ Home
  - ○ Professional
  - ○ Enterprise
  - ○ Education

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Slide 4

Preparing for Installation

- ◆ Benefits of using x64 include
  - ◆ Improved performance
  - ◆ Larger memory availability
  - ◆ Improved device support
  - ◆ Support for client Hyper-V
- ◆ Considerations for choosing between 32-bit and 64-bit
  - ◆ 64-bit operating system requires a 64-bit compatible CPU
  - ◆ Installing a 32-bit version of Windows on a 64-bit CPU is possible but does not take advantage of the additional features and should not be done
  - ◆ 32-bit drivers will not work on a 64-bit version so hardware must come with 64-bit drivers in order to use a 64-bit version of Windows
  - ◆ 32-bit applications are supported on 64-bit versions
  - ◆ If application support becomes a problem 64-bit systems can run client Hyper-V

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Preparing for Installation

◆ Prior to installing Windows 10 you must ensure computers meet specific requirements in order to ensure successful deployment and ongoing use!

◆ Hardware Requirements
- 1 GHz CPU (x86 or x64)
- 1 GB of RAM (x86) or 2 GB of RAM (x64)
- 16 GB hard disk space (x86) or 20 GB (x64)
- DirectX 9 graphics drivers with WDDM 1.0 or higher driver

◆ Additional Options
- BIOS based on Unified Extensible Firmware Interface (UEFI)
- x64 CPU architecture that supports SLAT for Client Hyper-V
- Trusted Platform Module for BitLocker

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Preparing for Installation

◆ You should ensure compatibility with Windows 10 for all devices on the system and check for the existence of device drivers
◆ Device drivers
  ○ Critical for system stability
  ○ Tens of thousands of drivers already included in Windows 10
  ○ Additional drivers can be added at installation
  ○ Considerations
    • Windows 10 requires digitally signed drivers which increase security
    • 32 bit and 64 bit architecture use different drivers

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Slide 7

Preparing for Installation

◆ Considerations
- ○ Compatibility Center can check hardware compatibility for all devices and applications
- ○ Application compatibility problems
  - • Setup and installation
  - • User account control
  - • x64 architecture
  - • Operating system version changes
  - • Removed or deprecated components

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Preparing for Installation

◆ As part of the planning process for Windows 10 in enterprise environments you can use the Application Compatibility Toolkit (ACT) to identify and resolve application compatibility issues

- ○ Verify application, device and computer compatibility centrally
- ○ Verify Windows update compatibility
- ○ Mitigate compatibility issues
  - Modifying configuration of existing applications
  - Applying updates and/or service packs
  - Upgrading applications to a compatible version
  - Modifying security configurations
  - Using compatibility features or client Hyper-V

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Installation Options

◆ Administrators have multiple installation options and deployment methods for Windows 10 in all types of environments

◆ The choice will be based on scenario and preference

◆ Install Options
- Clean install
- Upgrade
- Migrate

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Installation Options

◆ Clean Installation
  ◆ No operating system exists on hard disk
  ◆ Run setup.exe from a network share or removable media
  ◆ Images are also considered clean installations

◆ Upgrade Installation
  ◆ Replaces current version of Windows with Windows 10
  ◆ In-place upgrade retains applications, settings, and data
  ◆ Available from Windows 7, Windows 8, and Windows 8.1

◆ Migrate Installation
  ◆ Performs clean installation after backing up user data and settings
  ◆ User settings are migrated to new operating system

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Installation Options

◆ Manual Installations
  ◆ Run setup from the DVD
    ○ Requires local interaction
    ○ Cannot be automated
  ◆ Run setup from a network share
    ○ Access from current operating system or Windows PE
    ○ Requires local interaction
  ◆ Install from image
    ○ Additional planning required
    ○ Can install Windows and applications
    ○ Utilizes multiple components

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Installation Options

- ◆ Windows to Go
- ◆ Option which allows for the installation of Windows on a removable USB storage device making the OS, user data and settings highly portable
- ◆ Uses the same drive image that desktops and laptops would use providing the same management capabilities
- ◆ Considerations
  - ○ Not meant as a desktop replacement; more of a mobility alternative
  - ○ Hibernate and sleep are disabled by default
  - ○ Internal disks are offline by default
  - ○ TPM and Windows RE are not available

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Installation Options

◆ Booting to a Native VHD
  - ○ Computers can start from locally configured VHD and VHDX files
  - ○ Requires Windows 10 Pro or Enterprise
  - ○ VHD must fit on the hard disk
  - ○ Can be used to configure multi-boot

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Installation Options

◆ Native Boot process
- Create a virtual disk using Diskpart or Disk Management
- Deploy an image to a virtual disk
  - DISM /Apply-Image /ImageFile:Install.wim /Index:1 /ApplyDir:F:\
- Configure the system to boot to the VHD
  - CD F:\Windows\System32
  - Bcdboot F:\Windows

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Upgrading and Migrating

◆ In-place upgrades install Windows 10 over a previous operating system while retaining users settings, data, and applications

◆ Advantages
  ◆ Retains users data and settings automatically
  ◆ Preserves installed applications
  ◆ Does not require additional storage for user data
  ◆ Simple setup and minimal impact on productivity

◆ Disadvantages
  ◆ Cannot start fresh with a standard configuration
  ◆ Only supported on some operating systems
  ◆ Cannot change versions

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Upgrading and Migrating

- ◆ Process for Upgrading
  - ◆ Evaluate
  - ◆ Back up
  - ◆ Upgrade
  - ◆ Verify
  - ◆ Update

- ◆ Real-World Tips
  - ◆ Disable anti-virus and other malware programs
  - ◆ Shut down running programs
  - ◆ Thoroughly assess application compatibility

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Upgrading and Migrating

◆ Migration replaces the current operating system on a machine while migrating selective information from the old to the new system

  ◆ Side by side migration
    o Different source and destination computers
  ◆ In-place (Refresh)
    o Same computer
  ◆ Intermediate store – the location used to store user state data

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Upgrading and Migrating

◆ Advantages
  - ◆ Provides a fresh start which results in cleaner installations
  - ◆ Avoids performance degradation from old files and settings
  - ◆ Install any edition
  - ◆ Security problems are mitigated

◆ Disadvantages
  - ◆ Requires the use of migration tools
  - ◆ Requires reinstallation of applications
  - ◆ Requires storage space for user state data
  - ◆ Larger impact on user productivity

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Upgrading and Migrating

◆ Performing the Migration
  ◆ Backup hard drive
  ◆ Capture user state data
    ○ PC Mover Express
    ○ User State Migration Tool (USMT) for multiple computers
  ◆ Clean install Windows 10
  ◆ Reinstall applications
  ◆ Restore user state data

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Upgrading and Migrating

◆ Migration Tools

  ◆ Windows Easy Transfer is no longer available

  ◆ Microsoft partnered with LapLink to provide a free utility called PCMover Express to move data and applications seamlessly

  ◆ The ability to upgrade from multiple operating systems appears to be the reason for this change

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Upgrading and Migrating

◆ Migration Tools
- ◆ User State Migration Tool (USMT)
  - ○ Scriptable command line tool
  - ○ Highly customizable and intended for use by IT personnel
  - ○ Scanstate.exe
  - ○ Loadstate.exe
  - ○ Config and Migration xml files
  - ○ Hard-link migration store

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Upgrading and Migrating

- ◆ What if the upgrade fails?
  - ○ Windows 10 will revert to previous operating system automatically
- ◆ What if the user wants to revert?
  - ○ Optionally revert for one month

Go back to Windows 8.1

This option is only available for a month after you upgrade to Windows 10.

Get started

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Topic B - Enterprise Deployment Strategies

- Overview of Image Based Deployment
- Automating Installations
- Understanding Windows Activation

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Overview of Image Based Deployment

◆ Enterprise networks often require automated installations for increased efficiency and standardization in the deployment process

◆ Advantages
- o Provide mass deployment of standard configurations
- o Repeatable deployment
- o Quick recovery of failed computers
- o Tools provided at no cost

◆ Disadvantages
- o Requires extra planning and software
- o Storage space for images and server roles

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Overview of Image Based Deployment

◆ Windows Image file format (wim)
- o File based disk image format that contains compressed files used to install the operating system
- o Single image multiple hardware configurations
- o Multiple images in a single file
- o Single instance storage
- o Compression
- o Offline servicing
- o Installable on partitions of any size
- o Non-destructive installations
- o Bootable images with Windows PE

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Overview of Image Based Deployment

◆ Tools for Automated Installations
- Windows setup
- Answer files
- Catalog
- Windows Assessment and Deployment Toolkit (Windows ADK)
  - Windows SIM
  - Windows PE
  - USMT
  - DISM
  - Windows Imaging and Configuration Designer
- Sysprep
- Windows Deployment Services
- Diskpart and VHD files

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Overview of Image Based Deployment

◆ The most common type of automated installation is one that utilizes images that either come from Windows product DVD or are created by support personnel

- ○ Build an answer file
- ○ Build a reference computer
- ○ Create a bootable Windows PE media
- ○ Capture the installation image
- ○ Modify the installation image
- ○ Deploy the installation image

◆ Windows ADK and Windows Deployment Services provide all the utilities that are required

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Automating Installations

◆ Answer files are used to provide the Windows setup with information while not requiring user interaction

◆ Two types of installations
  ○ Attended – must provide answers to Setup questions
  ○ Unattended – answers are provided in an XML file

◆ Answer files provide additional options
  ○ Hard drive partitions
  ○ Additional out of the box drivers
  ○ Post installation modifications

◆ Answer files are created using Windows SIM

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Automating Installations

◆ Answer File Components
- o Components
  - • All settings applied during setup
  - • Organized in configuration passes
    - • Windows PE
    - • Offline servicing
    - • Specialize
    - • oobeSystem
- o Packages
  - • Windows features
  - • Software updates and service packs

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Automating Installations

◆ A reference computer is a system that contains a standard installation which you will clone to deploy additional systems with the same configuration

◆ Using reference systems have multiple advantages
  ○ Easily deploy a consistent configuration
  ○ Include service packs and updates
  ○ Include pre-installed and configured applications
  ○ Refresh computers quickly and easily
  ○ Additional settings can be applied using policies

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Automating Installations

◆ System Preparation (SYSPREP)
- o Cloned systems would contain identical names and security IDs (SIDs)
- o Sysprep tool
  - Wipes system-specific data from the operating system
  - Resets product activation
  - Restarts to a mini-setup
- o Final step prior to capturing the image

◆ Sysprep /oobe /audit /generalize /reboot /shutdown /quit /quiet /unattend:*answerfile*

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Automating Installations

◆ Windows PE
  ○ Compact special version of the OS
  ○ Prepares the system for installation, imaging, and recovery
  ○ Can be started from removable media or network boot image
  ○ Replaces MS-DOS startup disks
    • Native support for NTFS
    • Native support for TCP/IP network and file sharing
    • Includes Hyper-V drivers
    • Native support for x86 and x64 device drivers

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Automating Installations

◆ Windows PE is used in the imaging process
- ○ Capture and apply Windows images
- ○ Partition and format hard disks
- ○ Access network shares
- ○ Customizable
  - • copyPE.cmd to build a Windows PE environment
  - • DISM to mount and manage the image
  - • MakeWinPEMedia.cmd to create startup media
  - • Many optional components including Windows PowerShell and scripting

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Automating Installations

◆ Once reference system is booted into Windows PE the image is captured using the DISM command line utility
  - ○ DISM included in Windows 10 and the ADK
  - ○ Boot to PE and use Diskpart and Format to prepare the disk
  - ○ DISM /Capture-Image /ImageFile:D:\Custom.wim /CaptureDir:C:\ /Name:"Captured Image"
  - ○ DISM /Apply-Image /ImageFile:D:\Custom.wim /index:1 /ApplyDir:C:\

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Automating Installations

◆ Offline Management of Images using DISM
  - ○ Add and remove images to WIM files
  - ○ Add and remove packages
  - ○ Add and remove drivers
  - ○ Enable or disable Windows features
  - ○ Add OS updates
  - ○ Configure Windows Settings

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Windows Activation

- ◆ All editions of Windows 10 require activation
- ◆ Activation methods
  - ○ Retail
  - ○ OEM
  - ○ Volume Licensing

- ◆ To view activation status use
  - ○ Slmgr – Software License Manager tool

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Windows Activation

◆ Volume Activation Technologies provide a simple and security enhanced method of activation for enterprise organizations

- o VAS is a Server role in Windows Server 2012 and 2012 R2 providing
  - KMS activation
    - Clients are activated without accessing Microsoft directly
    - Targeted towards organizations with greater than 25 systems to activate
  - Active Directory activation is a role that allows AD DS joined systems to store activation objects in AD
    - Any Windows 8 or later domain joined system with a generic VLK will automatically activate
- o MAK activation uses product keys that may be activated a specific number of times

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Windows Activation

◆ How KMS activation works
- KMS host is installed and activated
- KMS host publishes its information in DNS using SRV records
- Client computers locate KMS server
- Client computers contact the KMS host
  - Anonymous connection using TCP port 1688
  - KMS returns activation count
  - Client evaluates and activates if threshold is met
- Inactivated computers contact KMS every two hours
- Systems must contact KMS at least every 180 days and attempt to renew every 7 days

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Windows Activation

◆ How Active Directory based activation works
- o AD DS schema is extended
- o Volume Activation Services role is installed
  - KMS host is activated
- o Computers activate when they join the domain
  - Windows 8 and Windows Server 2012 only
  - Installed with generic VLK
  - Activation is automatic and valid for 180 days
- o No threshold limits like standard KMS
- o If AD activation is not available KMS activation is attempted
- o Only available for domain joined systems and systems are inactivated if removed from the domain

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Summary

- ◆ Standard Windows 10 Deployment
- ◆ Enterprise Deployment Strategies

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Questions

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Answers

Review Questions:

1. You are examining the steps to perform a deployment across multiple computers to install the Windows 10 operating system. You have determined that you will use Windows Deployment Services in order to deploy an image to client systems. You must first copy user profile data to a network location in order to retain that data after upgrading systems to Windows 10. Which of the following programs allows you to copy user profile data for migration?
   A. Imagex
   B. USMT
   C. Scanstate
   D. Loadstate

2. You are explaining some of the new features of the Windows 10 operating system to a user in your organization. Which of the following is a feature of the Enterprise version of Windows 10 that will provide a mobile version of Windows?
   A. Remote Desktop Services
   B. DirectAccess
   C. Windows To Go
   D. Client Hyper-V

3. You are looking at upgrading a machine to Windows 10. You want to be sure and check all the applicable settings and best practices prior to the upgrade to ensure that it functions successfully. Which of the following is a best practice only applicable in an in-place upgrade scenario?
   A. Disable anti-virus and malware programs
   B. Verify hardware requirements
   C. Check application compatibility
   D. Ensure sufficient disk space exists

4. You are looking to perform an installation that retains the settings and applications from a previous installation of Windows 7 to Windows 10. Which of the following installations should you perform?
   A. Clean installation
   B. Image-based installation
   C. Upgrade installation
   D. Migrate installation

5. Which of the following upgrades will not be allowed to Windows 10?
   A. Windows 7 Home Premium > Windows 10
   B. Windows 7 Enterprise > Windows 10 Enterprise
   C. Windows Vista Home Premium > Windows 10
   D. Windows 7 Professional > Windows 10 Professional

6. You are planning to configure a native boot scenario using Windows 10. Which of the following will you perform first to configure a native boot installation?
   A. Create a virtual disk using Disk Management
   B. Use DISM to apply an image to the VHD
   C. Use the BCDBoot utility to configure the boot files
   D. Use the BCDEdit to configure the boot configuration data store

7. Which of the following is not available on a computer running Windows 10 Home?
   A. BitLocker
   B. Remote Assistance
   C. Media Center
   D. Libraries

8. Which is not a method that you can use to perform a clean installation of Windows 10?
   A. Windows Deployment Services
   B. Boot to the product DVD
   C. Boot to a floppy disk
   D. Access the setup media over the network

9. Which of the following types of installations will require additional planning and tools?
   A. Clean installation
   B. Migration
   C. Upgrade
   D. Image-based installation

10. Which utility was formerly available in Windows 10 for the migration of user profiles in smaller environments and is no longer available in Windows 10?
    A. Easy Transfer
    B. File and Settings Transfer wizard
    C. USMT
    D. DISM

11. Which of the following is required if you plan to use Client Hyper-V on a newly deployed Windows 10 system?
    A. 32-bit CPU
    B. 64-bit CPU
    C. Windows 10 Professional
    D. Windows 10 Enterprise

12. Which of the following aspects of a local client configuration running Windows 7 would prevent the ability to use some new features of Windows 10?
    A. BIOS firmware
    B. UEFI firmware
    C. 64-bit CPU
    D. Trusted platform module

13. Which of the following utilities available in Windows 10 and in the Windows ADK is used to apply disk images and configure a native boot scenario?
    A. ImageX
    B. DISM
    C. BCDBOOT
    D. Disk Management

14. You would like to use the "Wipe and Load" approach to installation for Windows 10. Which of the following installation methods will you choose?
    A. Migration
    B. Upgrade
    C. Clean install
    D. Image-based deployment

15. Which of the following options is new in Windows 10 and is only available for a month following installation of the operating system?
    A. Migrating user data with USMT
    B. Migrating user data with Easy Transfer
    C. Rolling back the operating system installation to the previous version
    D. Restoring applications that were installed in the previous operating system

Answer Key:

1. C

   Scanstate.exe is a part of the User State Migration Tool, and the utility that you would use to capture user state data (or profile information) and store it in a network location or hard link store on the hard drive of the computer to be imaged. You would then use Loadstate.exe to actually load the profile information on the destination computer.

2. C

   Windows To Go provides the ability to install the Windows 10 operating system onto removable storage which provides a portable or mobile version of the OS that users could take to alternate locations.

3. A

   In an upgrade, the installer must make changes to the boot files and boot sector. Running anti-virus and malware programs can prevent this if they are not disabled. The other things need to be checked but are applicable in all installation scenarios.

4. C

   An upgrade installation will retain the settings and applications from a previous version of Windows.

5. C

   You cannot perform upgrade installations from Windows Vista to Windows 10. The only allowed operating systems for an upgrade are Windows 7, 8, and 8.1.

6. A

   In order to configure the native VHD the first step is to create the virtual disk. This can be done using Disk Management or Diskpart.

7. A

   The BitLocker program and capability is only included in the business versions of Windows 10 - Professional, Enterprise, and Education.

8. C

   You cannot boot to a floppy disk and install Windows 10.

9. D

An image-based installation requires additional planning and tools in order to ensure that this efficient method of deploying multiple systems simultaneously is successful.

10. A

The Easy Transfer utility is not available in Windows 10 largely because upgrades are available from the majority of currently supported operating systems.

11. B

In order to configure Client Hyper-V you must have a supported 64-bit CPU and a supported version of the operating system (Professional, Enterprise, or Education).

12. A

If you have a system that contains BIOS firmware it will be supported but will not support all the new features, such as Trusted Boot, in Windows 10.

13. B

The DISM (Deployment Image and Service Management) utility has replaced ImageX and represents the ability to apply and create disk images along with management of those images. It is used to apply an image to a VHD for the native boot scenario.

14. A

In the wipe and load scenario, also known as the In-Place refresh, you replace the current operating system after copying user profiles to an alternate location and then replacing once the installation is complete.

15. C

Windows 10 provides the ability to roll back the installation to the previous version of Windows. However, this option is only available for 30 days following installation.