Microsoft Official Academic Course

Managing and Maintaining Windows 8

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Microsoft® Official Academic Course

Managing and Maintaining Windows 8
Exam 70-688

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WILEY

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Foreword from the Publisher

Wiley's publishing vision for the Microsoft Official Academic Course series is to provide students and instructors with the skills and knowledge they need to use Microsoft technology effectively in all aspects of their personal and professional lives. Quality instruction is required to help both educators and students get the most from Microsoft's software tools and to become more productive. Thus, our mission is to make our instructional programs trusted educational companions for life.

To accomplish this mission, Wiley and Microsoft have partnered to develop the highest-quality educational programs for information workers, IT professionals, and developers. Materials created by this partnership carry the brand name "Microsoft Official Academic Course," assuring instructors and students alike that the content of these textbooks is fully endorsed by Microsoft, and that they provide the highest-quality information and instruction on Microsoft products. The Microsoft Official Academic Course textbooks are "Official" in still one more way—they are the officially sanctioned courseware for Microsoft IT Academy members.

The Microsoft Official Academic Course series focuses on *workforce development*. These programs are aimed at those students seeking to enter the workforce, change jobs, or embark on new careers as information workers, IT professionals, and developers. Microsoft Official Academic Course programs address their needs by emphasizing authentic workplace scenarios with an abundance of projects, exercises, cases, and assessments.

The Microsoft Official Academic Courses are mapped to Microsoft's extensive research and job-task analysis, the same research and analysis used to create the Microsoft Certified Solutions Associate (MCSA) exam. The textbooks focus on real skills for real jobs. As students work through the projects and exercises in the textbooks and labs, they enhance their level of knowledge and their ability to apply the latest Microsoft technology to everyday tasks. These students also gain resume-building credentials that can assist them in finding a job, keeping their current job, or in furthering their education.

The concept of life-long learning is today an utmost necessity. Job roles, and even whole job categories, are changing so quickly that none of us can stay competitive and productive without continuously updating our skills and capabilities. The Microsoft Official Academic Course offerings, and their focus on Microsoft certification exam preparation, provide a means for people to acquire and effectively update their skills and knowledge. Wiley supports students in this endeavor through the development and distribution of these courses as Microsoft's official academic publisher.

Today educational publishing requires attention to providing quality print and robust electronic content. By integrating Microsoft Official Academic Course products, MOAC Labs Online, and Microsoft certifications, we are better able to deliver efficient learning solutions for students and teachers alike.

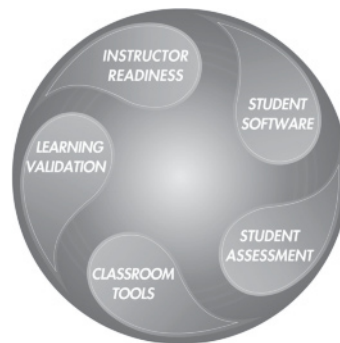**Joseph Heider**

General Manager and Senior Vice President

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Preface

Welcome to the Microsoft Official Academic Course (MOAC) program for becoming a Microsoft Certified Solutions Associate for Windows 8. MOAC represents the collaboration between Microsoft Learning and John Wiley & Sons, Inc. Microsoft and Wiley teamed up to produce a series of textbooks that deliver compelling and innovative teaching solutions to instructors and superior learning experiences for students. Infused and informed by in-depth knowledge from the creators of Windows 8, and crafted by a publisher known worldwide for the pedagogical quality of its products, these textbooks maximize skills transfer in minimum time. Students are challenged to reach their potential by using their new technical skills as highly productive members of the workforce.

Because this knowledgebase comes directly from Microsoft, architect of Windows 8 and creator of the Microsoft Certified Solutions Associate exams, you are sure to receive the topical coverage that is most relevant to students' personal and professional success. Microsoft's direct participation not only assures you that MOAC textbook content is accurate and current; it also means that students will receive the best instruction possible to enable their success on certification exams and in the workplace.

■ The Microsoft Official Academic Course Program

The Microsoft Official Academic Course series is a complete program for instructors and institutions to prepare and deliver great courses on Microsoft software technologies. With MOAC, we recognize that because of the rapid pace of change in the technology and curriculum developed by Microsoft, there is an ongoing set of needs beyond classroom instruction tools for an instructor to be ready to teach the course. The MOAC program endeavors to provide solutions for all these needs in a systematic manner in order to ensure a successful and rewarding course experience for both instructor and student—including technical and curriculum training for instructor readiness with new software releases; the software itself for student use at home for building hands-on skills, assessment, and validation of skill development; and a great set of tools for delivering instruction in the classroom and lab. All are important to the smooth delivery of an interesting course on Microsoft software, and all are provided with the MOAC program. We think about the model below as a gauge for ensuring that we completely support you in your goal of teaching a great course. As you evaluate your instructional materials options, you may wish to use the model for comparison purposes with available products.

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Illustrated Book Tour

▪ Textbook Organization

This textbook is organized in sixteen lessons, with each lesson corresponding to a particular exam objective for the 70-688 Managing and Maintaining Windows 8 exam. This MOAC textbook covers all the learning objectives for the 70-688 certification exam, which is the second of two exams needed in order to obtain a Microsoft Certified Solutions Associate (MCSA) certification. The exam objectives are highlighted throughout the textbook.

▪ Pedagogical Features

Many pedagogical features have been developed specifically for Microsoft Official Academic Course programs.

Presenting the extensive procedural information and technical concepts woven throughout the textbook raises challenges for the student and instructor alike. The Illustrated Book Tour that follows provides a guide to the rich features contributing to Microsoft Official Academic Course program's pedagogical plan. Following is a list of key features in each lesson designed to prepare students for success on the certification exams and in the workplace:

- Each lesson begins with an overview of the skills covered in the lesson. More than a standard list of learning objectives, the overview correlates skills to the certification exam objective.
- Illustrations: Screen images provide visual feedback as students work through the exercises. The images reinforce key concepts, provide visual clues about the steps, and allow students to check their progress.
- Key Terms: Important technical vocabulary is listed at the beginning of the lesson. When these terms are used later in the lesson, they appear in bold italic type and are defined.
- Engaging point-of-use reader aids, located throughout the lessons, tell students why this topic is relevant (*The Bottom Line*), provide students with helpful hints (*Take Note*), or show cross-references to where content is covered in greater detail (*X Ref*). Reader aids also provide additional relevant or background information that adds value to the lesson.
- Certification Ready features throughout the text signal students where a specific certification objective is covered. They provide students with a chance to check their understanding of that particular exam objective and, if necessary, review the section of the lesson where it is covered.
- Knowledge Assessments provide lesson-ending activities that test students' comprehension and retention of the material taught, presented using some of the question types that they'll see on the certification exam.
- An important supplement to this textbook is the accompanying lab work. Labs are available via a Lab Manual, and also by MOAC Labs Online. MOAC Labs Online provides students with the ability to work on the actual software simply by connecting through their Internet Explorer web browser. Either way, the labs use real-world scenarios to help students learn workplace skills associated with managing and maintaining Windows 8 in an enterprise environment.

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▪ Lesson Features

11 LESSON

Managing Mobile Devices

70-688 EXAM OBJECTIVE ——————— **Exam Objective**

Objective 3.2 – Manage mobile devices. This objective may include but is not limited to the following: Resolve mobility issues; manage mobile device policies, including security policies, NFC, secure SIM, and remote access; manage mobile access; manage Microsoft Exchange ActiveSync in mobile devices.

LESSON HEADING	EXAM OBJECTIVE
Managing Mobile Access to Your Network	
Exploring Exchange Active Sync/Mobile Device Policies in Exchange Server 2013	Manage Microsoft Exchange ActiveSync in mobile devices
Exploring Mobile Policy Settings in Exchange Server 2013	Remote access
Securing Your Communications Using SSL	
Exploring System Center Configuration Manager (SCCM) 2012 Mobile Device Management	Manage mobile access
Managing Mobile Device Policies	Manage mobile device policies NFC Secure SIM
Resolving Mobility Issues	Resolve mobility issues
Using Near Field Communication (NFC) Using Secure SIMs Using the Windows Phone 8 Wallet	

KEY TERMS ——————— **Key Terms**

Active Directory Certificate Services (AD CS)	Exchange Server connector	Secure Sockets Layer (SSL)
Bring Your Own Device (BYOD)	near field communication (NFC)	subscriber identity module (SIM)
card emulation mode	peer-to-peer mode	System Center Configuration Manager (SCCM) 2012
Certification Authority (CA)	public key infrastructure (PKI)	Tap and Do
Exchange ActiveSync	reader/writer mode remote wipe command	Windows Phone 8 wallet

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KEY TERMS

App-V Management server	Hyper-V Virtual Machine Connection	sequencing
App-V Publishing server	malware	System Center 2012 Configuration Manager (SCCM)
App-V Reporting server	Microsoft Silverlight	Windows Internet Explorer Administration Kit (IEAK) 10
App-V Reporting database server	phishing attacks	
Client Hyper-V	Remote Desktop Services	Windows Intune
Compatibility Monitor tool	RD Session Host	Windows SmartScreen
group policies	RD Virtualization Host	
Hyper-V Manager	RD Web Access	

Bottom Line Reader Aid

▪ Working With Client Hyper-V

↓ THE BOTTOM LINE
Client Hyper-V enables you to create and manage virtual machines (VMs) using a virtual switch. These VMs can be used to test your applications for compatibility with new operating systems.

Certification Ready Alert

CERTIFICATION READY
Application Compatibility Using Client Hyper-V
Objective 1.2

Client Hyper-V, a Microsoft replacement for Windows Virtual PC, provides the same virtualization capabilities as Hyper-V in Windows Server 2012. Although it does not include all the advanced features available on the server version, it does utilize the same interface and underlying technology. This feature is disabled by default on Windows 8 Enterprise (64-bit) machines.

Although Client Hyper-V runs only on Windows 8 (64-bit) machines running the Windows 8 Enterprise (64-bit) operating system, it enables you to run 32- and 64-bit VMs simultaneously, connect to a Hyper-V machine running on another computer, and move machines between Client Hyper-V and Hyper-V running on the server.

Using this feature, you can build a test lab that runs entirely on a single computer. For example, if you need to test an application's compatibility with several different configurations of Windows 8, you can create a VM for each configuration. After your testing is complete you can easily remove the VMs or export them to your production network.

To run Hyper-V, you need the following:
• Windows 8 Enterprise (64-bit) version
• A 64-bit processor that incorporates second level address translation (SLAT) technology
• A minimum of 4 GB of memory (running more than one VM at a time requires more)

⊕ ENABLE THE HYPER-V FEATURE

GET READY. To enable the Hyper-V feature, log in to the computer running Windows 8 Enterprise (64-bit) with Administrator privileges and perform the following steps:

1. Press the **Windows logo key + w**.
2. Type **Features**; from the Results list, click **Turn Windows features on and off**.
3. Click the **+** displayed next to the *Hyper-V* folder.
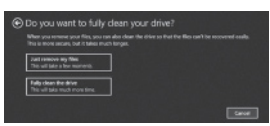   This action expands the folder to show the components included (see Figure 2-1).

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4. On the *Reset your* PC screen, click **Next**.
5. Click **Just remove my files** (see Figure 12-1).
   This process formats the drive; if the drive contains sensitive information, click **Fully clean the drive**. It writes random patterns to each sector on the drive, adding an additional level of protection.

Figure 12-1
Removing files

⊖ Do you want to fully clean your drive?
When you remove your files, you can also clean the drive so that the files can't be recovered easily. This is more secure, but it takes a few hours.

Just remove my files
This will take a few moments.

Fully clean the drive
This will take much more time.

Cancel

6. On the *Ready to reset your PC* screen, read the information and click **Reset**.
   The computer restarts.
7. Read and select **I accept the license terms for using Windows** and then click **Accept**.
8. On the *Personalize* screen, drag the slider to choose a color scheme, type a name for your PC, and then click **Next**.
9. Click **Use express settings**.
10. On the *Sign in to your PC* screen, type the e-mail address to use for your Microsoft account in the field provided and then click **Next**.
11. Type the password for your Microsoft account and click **Next**.
12. On the *Add security info* screen, type a phone number and an alternate e-mail address and then click **Next**.
    Your account is now created on the Windows 8 computer. When the reset finishes, you are automatically logged in and taken to the Windows 8 Start menu.

Using PC Refresh

A *PC Refresh* is a little less intrusive than a PC Reset. It enables you to keep your personal data, Windows Store apps, and basic settings: drive letter assignments (mapped drives), personalization settings, BitLocker or BitLocker To Go settings, and wireless network settings.

A PC Refresh does not preserve your PC settings, display settings, Windows firewall settings, or *traditional desktop applications* that were installed from a disc or website. In the case of traditional desktop applications, an HTML file is placed on your desktop to assist you with reinstalling those apps after the refresh is complete.

⊕ PERFORM A PC REFRESH

⚠ WARNING A PC Refresh removes any traditional applications installed from a disc or website. You must reinstall them after the refresh has completed.

GET READY. To perform a PC Refresh, log in with local Administrative privileges and then perform the following steps:

1. Insert your Windows 8 installation media.
2. Press the **Windows logo key + w** and then type **Refresh**.

Warning Reader Aid

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Easy-to-Read Tables

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Table 5-3
(continued)

STANDARD	DESCRIPTION
802.11g	Supports bandwidth up to 54 Mbps; uses the 2.5 Ghz frequency; backward-compatible with 802.11b; 802.11g was designed to use the best features of both 802.11b and 802.11a; WEP and WPA-supported.
802.11i	Improved encryption for networks using the 802.11a, 802.11b, and 802.11g standards; introduces new encryption key protocols: Temporal Key Integrity Protocol (TKIP) and Advanced Encryption Standard (AES).
802.11n	Supports bandwidth approximately 300 Mbps; uses 2.5 and 5 Ghz frequencies; uses four spatial streams to simultaneously transfer data by using a channel width of 40 Hz designed to replace 802.11a, b, and g; backward-compatible with 802.11g; supports Wi-Fi Protected Access version 2 (WPA v2).
802.1x	Security standard for 802.11 networks that use RADIUS for authentication; provides key management; RADIUS provides centralized authentication, authorization, and accounting for remote connections.

REVIEWING ENCRYPTION PROTOCOLS

In each of the standards, encryption is provided to protect your wireless traffic. The following list represents the most common encryption protocols you will encounter on a wireless network:

- **Wireless Equivalent Privacy (WEP)** was designed to provide the same level of security found on wired networks. Over the years, WEP has proven to be very insecure, permitting a successful brute force password attack in seconds. WEP uses a data encryption scheme called RC4 with a shared key, which is used to encrypt and decrypt data. Because this key does not change automatically over time, anyone who can capture the wireless traffic can break the key and then gain access to your network.
- **Wi-Fi Protected Access (WPA)** was created to improve upon the encrypting and authentication features of WEP while WPA v2 was under development. It did this through the use of the TKIP to provide integrity, the AES protocol to provide encryption, and EAP to improve authentication capabilities.
- **Wi-Fi Protected Access (WPA) v2:** In 2006, WPA v2 replaced WPA. WPA v2 requires the use of stronger encryption (a new AES mode) and does not use TKIP, which introduced security limitations within the WPA implementation. Using WPA v2, the keys are changed regularly rather than staying the same, as they were in WEP implementations. WPA is compatible with 802.11a, 802.11b, 802.11g, and 802.11n.

WPA devices can operate in the following modes:

- **Personal mode:** This mode uses a preshared key or password. The master key is set on the access point (AP) and then all wireless clients are configured to use the key. The master key is then used by the client to generate a session key that changes on a regular basis.
- **Enterprise mode:** This mode uses two sets of keys: a session key, changed each time the client communicates with the AP, and a master key. The master key is shared with all clients connected to the AP. Both keys are generated automatically and are changed on a regular basis. Enterprise mode uses IEEE 802.1x and EAP.

Take Note Reader Aid

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6. Detach the virtual disk:
```
C:\.diskpart
   .select vdisk file=c:\windows.vhdx
   detach vdisk
   exit
```

7. Connect to a network share, create a directory, and copy the VHD file to the share. The following command uses a server named GE0, a file share named ITShares, and creates a CorpVHDs directory:
```
Net use i: \\GE0\ITShares
Md i:\CorpVHDs
Copy c:\windows.vhd i:\CorpVHDs
```

This virtual hard disk, with the Windows image included, can be copied to one or more systems to run as a virtual machine or for native boot purposes.

TAKE NOTE When creating an image for deployment to multiple computers, the image must be generalized. During this configuration pass, computer-specific information is removed from the Windows installation, enabling you to capture and reapply the Windows image to different computers. For example, unique Security Identifier (SID) and unique device drivers are removed from the image.

INSTALL THE VHD WITH THE WINDOWS 8 ENTERPRISE IMAGE ON A BIOS-BASED COMPUTER WITHOUT AN OPERATING SYSTEM

TAKE NOTE
You will need a Windows PE bootable media to complete the exercise.

GET READY. To install the VHD with the Windows 8 Enterprise image on a BIOS-based computer without an operating system, select a target computer that does not have an operating system installed and then perform the following steps:

1. Boot into the computer using your Windows PE bootable media.
2. Execute the **Diskpart** command clean the hard disk. This ensures no data is left on the system from previous installations.
```
Diskpart
select disk 0
clean
```
3. Create a system partition:
```
Diskpart
create partition primary size=300
format quick fs=ntfs
assign letters=s
active
```
4. Create a primary partition:
```
Diskpart
create partition primary
format quick fs=ntfs
assign letter=c
exit
```
5. Copy the VHD to the target computer:
```
Copy i:\CorpVHDs\windows.vhd C:
```

Step-by-step Exercises

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designed to target a specific area such as security or a component of a specific product.
- **Updates:** Fixes a specific problem that addresses a noncritical, nonsecurity issue.

REVIEW PRODUCT CATEGORIES AND CLASSIFICATIONS

GET READY. To review products and classifications, perform the following steps:

1. Log in to the **Windows Intune Administrator** console at https://admin.manage.microsoft.com.
2. In the *left* pane, click **Administration**.
3. Click **Updates** (see Figure 14-9).

Figure 14-9
Reviewing product categories and update classifications
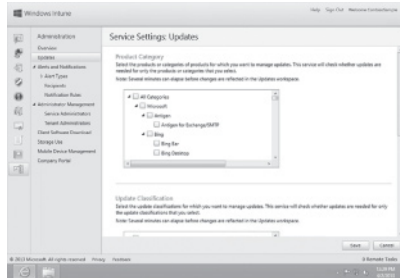
4. Review the product categories that you can filter on, and then review the update classifications you can filter on.
5. Scroll all the way down to the bottom until you see the *Automatic Approval Rules* section.

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Screen Images

Figure 13-16

Viewing the Local Group Policy settings for Windows Defender

⊕ **SCHEDULE A WINDOWS DEFENDER SCAN**

GET READY. To schedule a Windows Defender scan, log in with Administrative privileges, and perform the following steps:

1. Press the **Windows logo key + r** and in the *Run* dialog box, type **taskschd.msc**.
2. In the left pane, expand the **Task Scheduler Library > Microsoft > Windows > Windows Defender.**
3. Double-click the **Windows Defender Scheduled Scan** (see Figure 13-17).

Figure 13-17

Opening the Windows Defender Scheduled Scan

Informative Diagrams

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Exchange ActiveSync is a client synchronization protocol based on XML that enables you to connect your mobile device to your Exchange mailbox.

Exchange ActiveSync enables communications from ActiveSync–compliant mobile devices such as the Windows Phone, Apple iPhone, iPad, iPod, and Google Android phones. The features available with ActiveSync differ from device to device because it is up to the manufacturers to determine what features they want to support with the protocol. Exchange ActiveSync works over HTTP and HTTPS (see Figure 11-1), and supports offline access to messages, contacts, and calendar information.

CERTIFICATION READY
Manage Microsoft
Exchange ActiveSync in mobile devices
Objective 3.2

Figure 11-1

Using Exchange ActiveSync over HTTP/HTTPS

TAKE NOTE
Exchange ActiveSync is enabled by default on Exchange Server 2013. If you have an Exchange mailbox, you can sync your mobile device with it.

Exchange ActiveSync provides you with tools to control policies and manage and secure your mobile devices. Here are just a few of the tasks you can perform with Exchange ActiveSync:

- Issue remote wipe commands in case the mobile device is lost or stolen. A *remote wipe command* clears all corporate and user information that is stored on the device.
- Specify the length and complexity of the password for the mobile device (4–18 character alphanumeric passwords), device locking, and number of password attempts.
- Require encryption on the mobile device and/or the devices removable storage card.
- Control which types of mobile devices/users are allowed to connect to your Exchange Server.
- Run, view, and export reports.

More Information Reader Aid

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✚ **MORE INFORMATION**
You can remotely manage printers from your Windows 8 computer by downloading the Remote Server Administration Tools (RSAT) for Windows 8. You can find the tools on the Microsoft website by searching for "RSAT for Windows 8."

⊕ **ADD A PRINTER TO THE LOCAL PRINT SERVER**

GET READY. To add a printer to the local print server, perform the following steps:

TAKE NOTE
The following should be performed on the same Windows Server 2012 computer you set up Print Management for in the previous activity.

1. Log on to your domain controller with administrative privileges. The Server Manager starts automatically. If it does not start, go to the task bar and click the **Server Manager** icon.
2. Click **Tools > Print Management.**
3. Expand the Print Servers node and locate the server on which you installed Print and Document Services.
4. Right-click the server and then choose **Add Printer** (see Figure 10-8).

Figure 10-8
Adding a printer

5. Select **Add a new printer using an existing port: LPT1: (Printer Port)** and then click **Next.**
6. To accept the default settings, click **Next.**

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Skill Summary

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(.ins) file is created and stored in the *INS* folder. If you need to make a change, you can run the IEAK Wizard again, import the .ins file by selecting the **Advanced** button and type the path to the .ins file. By default, this is located in the *c:\build\<date>\INS\<os-version>\<language code>* folder. You can then make changes or additions to the package on the *Feature Selection* screen. After the package is updated, it can be redeployed using Group Policy or SCCM.

To maintain Internet Explorer in Active Directory environments after deployment, consider using the new Internet Explorer 10 settings in Group Policy.

✚ MORE INFORMATION
There are more than 1,500 Group Policy settings for Internet Explorer 10 that can be used to manage and control the configuration of your Internet Explorer browsers. To learn more about the settings that can be managed visit the Microsoft website and search for *Group Policy settings in Internet Explorer 10*.

SKILL SUMMARY

IN THIS LESSON YOU LEARNED:

- Client Hyper-V, which runs on Windows 8 Enterprise (64-bit) systems, enables you to build a test lab that runs entirely on a single computer. Using Hyper-V and VMs, you can test an application's compatibility with several different configurations of Windows 8. These VMs can then be moved to production. Client Hyper-V enables you to avoid the costs of purchasing additional computers or setting up dual boot systems to test for application compatibility.

- There are three types of virtual switches that you can configure with Client Hyper-V: external, internal, and private. External switches bind to the network card on the host, allowing the VMs to access your physical network; internal switches limit communication to between VMs and the host only; and private switches are used only by the VMs.

- RDS describes several of the features of the Windows Server role that enables users to remotely connect to virtual desktops, session-based desktops, and RemoteApp programs over RDP.

- The purpose behind the ACT 6.0 and how it can be used to not only collect inventory information from your network computers but also to perform runtime analysis to test for application compatibility.

- The process for creating App-V programs through a process called sequencing. This process involves launching a traditional application and then using tools to monitor the changes the application executes on the local computer during the installation process.

- The tools available to manage and deploy applications and updates. These tools include Group Policy, Windows Intune, and SCCM 2012. Group Policy can be used to assign or publish applications and subsequent upgrades to users/computers. Windows Intune, the Microsoft integrated, cloud-based client management solution, can be used to deploy the software updates and to manage software licenses on your network without the need to build a new server infrastructure. SCCM 2012 provides similar capabilities, but requires an infrastructure in place to support deployment.

- The role that SmartScreen plays in application reputation by protecting against malware and phishing attacks. SmartScreen uses reputation criteria to determine whether it is safe to download software or open a file. The criteria are based on download traffic, history, past antivirus results, and URL reputation.

- The purpose of the Internet Explorer 10 Administration Kit (IEAK). It enables you to customize, distribute, and deploy Internet Explorer 10 to maintain a standardized look and feel across your organization. You also learned that you can deploy the package manually or by using Group Policy or SCCM.

Knowledge Assessment

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- The Print Management snap-in, included as part of the Print and Document Services/Print Server role, is used to manage multiple printers or print servers across your organization. Server Manager is designed to manage only the local print server.

- You understand the process needed to add/remove print servers, view printers, list printers in Active Directory; and how to install a network printer on a Windows 8 client.

■ Knowledge Assessment

Multiple Choice

Select the correct answer for each of the following questions.

1. Which of the following can be used to roll back a faulty print driver?
   a. Print Management Console
   b. Device Manager
   c. Activity Center
   d. Rollback.exe

2. Driver signing ensures that the driver files provided for Windows 8 are compatible, reliable, and function appropriately with the operating system. What is responsible for managing how unsigned drivers are handled?
   a. Windows Hardware Quality Labs (WHQLs)
   b. Network administrators
   c. Windows Device Quality Labs (WDQLs)
   d. Windows Device Signature Labs (WDSLs)

3. Which of the following are options for how the computer will respond when a user tries to install device drivers that are not digitally signed? (Select all that apply.)
   a. Block
   b. Ignore
   c. Warn
   d. Alert

4. When a device has been disabled, which of the following symbols appear?
   a. Blue "I" on a white field
   b. Red "X"
   c. Black exclamation point on a yellow field
   d. Blue "X"

5. Which information can be synced on an untrusted PC? (Select all that apply.)
   a. Lock screen and your account picture
   b. Local password, passwords used on websites via Internet Explorer
   c. Browser history, bookmarks, and favorites
   d. App settings

6. Which of the following are ways in which Sync Center syncs your mobile devices and offline files? (Select all that apply.)
   a. One-way
   b. Peer-to-peer
   c. Three-way
   d. Two-way

Business Case Scenarios

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_____ Click **Create** to format the drive.
_____ Type **Windows To Go** and select it from the *Results List*.
_____ Connect a Windows To Go workspace drive to the host.
_____ (optional) Select **Use BitLocker with my Windows To Go workspace** and then click **Next**.
_____ Click the Windows image that appears or click **Add search location** to locate one. Click **Next** to continue.
_____ Select the USB drive connected earlier and then click **Next**.
_____ Click **Yes** to automatically boot from the USB drive when you restart the host.

3. Specify the correct order of the steps that must be completed to create a VHD boot file using the Disk Management console.
   _____ Click **Action > Create VHD**.
   _____ In the *File name* field, type a name for the VHD file and then click **Save**.
   _____ In the *Virtual hard disk format* section, leave the default setting of **Fixed size (recommended)**.
   _____ Click **Browse** to navigate to the folder where you want to store the VHD file.
   _____ Click **Start** and, in the *Search* field, type **Disk Management**.
   _____ For the *Virtual hard disk size* setting, type **20**, click the drop-down arrow, and then select **GB**.
   _____ Click **OK**.

■ Business Case Scenarios

Scenario 1-1: Migrating Using ScanState and LoadState

After determining the information that needs to be migrated from a source computer, Elliot, the network administrator for Contoso, creates a new config.xml file and runs the following **scanstate** command to collect the information:

```
scanstate \\server\migration\mystore /config:config.xml /i:migdocs.xml
/i:migapp.xml /v:13 /l:scan.log
```

After setting up the destination computer, he runs the **LoadState** command to migrate the files and settings from the source computer. After logging off the machine and then back on, he notices his modifications did not migrate. What might have caused the problem? He is certain the modifications in the config.xml file were not entered incorrectly in the file.

Scenario 1-2: Using Windows To Go

Elliot receives a call from one of his support staff that Mary, one of Contoso's account managers, is having trouble booting into a Windows To Go workspace drive from her home office. You know she is running a Windows 7 Professional computer and has a USB drive that is certified to work with Windows To Go. You also sent a tech to her house last week to configure the computer to boot from a USB drive when it's present. What could be the problem?

Scenario 1-3: Testing Windows 8 on New Hardware

Elliot would like to install and test Windows 8 Enterprise on his existing Windows 7 Professional computer. He does not want to create a new partition to hold the operating system nor does he want to run Windows 8 Enterprise in a fully virtualized environment. He specifically wants to see how Windows 8 Enterprise performs on his actual hardware (the memory, the video card, the processor, and so on). Which operating system installation strategy would you recommend and why?

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Conventions and Features Used in This Book

This book uses particular fonts, symbols, and heading conventions to highlight important information or to call your attention to special steps. For more information about the features in each lesson, refer to the Illustrated Book Tour section.

CONVENTION	MEANING
↓ THE BOTTOM LINE	This feature provides a brief summary of the material to be covered in the section that follows.
CERTIFICATION READY	This feature signals the point in the text where a specific certification objective is covered. It provides you with a chance to check your understanding of that particular exam objective and, if necessary, review the section of the lesson where it is covered.
TAKE NOTE * ✚ MORE INFORMATION	Reader aids appear in shaded boxes found in your text. *Take Note and More Information* provide helpful hints related to particular tasks or topics.
⚠ WARNING	*Warning* points out instances when error or misuse could cause damage to the computer or network.
X REF	These *X Ref* notes provide pointers to information discussed elsewhere in the textbook or describe interesting features of Windows 8 that are not directly addressed in the current topic or exercise.
A ***shared printer*** can be used by many individuals on a network.	Key terms appear in bold italic.
cd\windows\system32\ ServerMigrationTools	Commands that are to be typed are shown in a special font.
Click Install Now.	Any button on the screen you are supposed to click on or select will appear in blue.

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- **DreamSpark Premium** is designed to provide the easiest and most inexpensive developer tools, products, and technologies available to faculty and students in labs, classrooms, and on student PCs. A free three-year membership is available to qualified MOAC adopters.

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- **Instructor's Guide.** The Instructor's Guide contains solutions to all the textbook exercises as well as chapter summaries and lecture notes. The Instructor's Guide and Syllabi for various term lengths are available from the Instructor's Book Companion site.

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The Microsoft Certified Solutions Associate (MCSA) certification is for students preparing to get their first jobs in Microsoft technology. Whether in the cloud or on-premise, this certification validates the core platform skills needed in an IT environment. Earning an MCSA: Windows 8 certification will qualify you for a position as a computer support specialist.

The MCSA Windows 8 certification shows that you have the primary set of Windows 8 skills that are relevant across multiple solution areas in a business environment. Candidates for the 70-688 exam will show their knowledge in configuring and supporting Windows 8 computers, devices, users, and associated network and security resources. These networks are configured as a domain-based or peer-to-peer environment with access to the Internet and cloud services. This exam will validate the skills necessary to administer Windows 8-based computers and devices as a portion of broader technical responsibilities.

If you are a student new to IT who may not yet be ready for MCSA, the Microsoft Technology Associate (MTA) certification is an optional starting point that may be available through your school.

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Unless you are a very experienced user, you will need to use test preparation materials to prepare to complete the test correctly and within the time allowed. The Microsoft Official Academic Course series is designed to prepare you with a strong knowledge of all exam topics, and with some additional review and practice on your own, you should feel confident in your ability to pass the appropriate exam.

After you decide which exam to take, review the list of objectives for the exam. You can easily identify tasks that are included in the objective list by locating the exam objective overview at the start of each lesson and the Certification Ready sidebars in the margin of the lessons in this book.

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To register for the 70-688 exam, visit Microsoft Training & Certifications Registration webpage for directions on how to register with Prometric, the company that delivers the MCSA exams. Keep in mind these important items about the testing procedure:

- **What to expect.** Microsoft Certification testing labs typically have multiple workstations, which may or may not be occupied by other candidates. Test center administrators strive to provide a quiet and comfortable environment for all test takers.

- **Plan to arrive early.** It is recommended that you arrive at the test center at least 30 minutes before the test is scheduled to begin.

- **Bring your identification.** To take your exam, you must bring the identification (ID) that was specified when you registered for the exam. If you are unclear about which forms of ID are required, contact the exam sponsor identified in your registration information. Although requirements vary, you typically must show two valid forms of ID, one with a photo, both with your signature.

- **Leave personal items at home.** The only item allowed into the testing area is your identification, so leave any backpacks, laptops, briefcases, and other personal items at home. If you have items that cannot be left behind (such as purses), the testing center might have small lockers available for use.

- **Nondisclosure agreement.** At the testing center, Microsoft requires that you accept the terms of a nondisclosure agreement (NDA) and complete a brief demographic survey before taking your certification exam.

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Acknowledgements

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Designing an Operating System Installation Strategy

70-688 EXAM OBJECTIVE

Objective 1.1 – Design an operating system installation strategy. This objective may include but is not limited to the following design considerations: Windows To Go; operating system virtualization; native VHD boot; multi-boot; upgrade vs. migration.

LESSON HEADING	EXAM OBJECTIVE
Creating a Windows To Go Workspace	Windows To Go
Creating and Deploying a Windows To Go Workspace Drive	
Booting into a Windows To Go Workspace	
Virtualizing Operating Systems	Operating system virtualization
Exploring Operating System Virtualization	
Exploring User State Virtualization	
Exploring Application Virtualization (App-V)	
Configuring a Native VHD Boot File	Native VHD boot
Understanding VHD Formats	
Installing Windows 8 on a VHD with an Operating System Present	
Using BCDEdit and BDCBoot	
Configuring a Multi-Boot System	Multi-boot
Setting Up a Multi-Boot System	
Upgrading Versus Migrating to Windows 8	Upgrade vs. migration
Exploring the Application Compatibility Toolkit (ACT)	
Exploring the User State Migration Tool (USMT)	

KEY TERMS

ACT Log Processing Service (LPS)

ACT database

ACT LPS share

Application Compatibility Manager (ACM)

Application Compatibility Toolkit (ACT), 6.0

Application Virtualization (App-V)

Boot Configuration Data (BCD) store

BCDboot (bcdboot.exe)

BCD Editor (bcdedit.exe) or bcdedit

BitLocker To Go

Client Hyper-V

Deployment Image Services and Management (DISM)

Disk Management console (diskmgmt.msc)

Diskpart

Dynamically Expanding

Fixed Size

Group Policy Object (GPO)

Group Policy Management console (gpmc.msc)

guest operating system

hardlink folder

Hyper-V

hypervisor (or virtual machine manager)

inventory-collector package

Microsoft Compatibility Exchange

Microsoft Desktop Optimization Pack (MDOP)

Microsoft Enterprise Desktop Virtualization (MED-V)

MED-V workspace

multi-boot (dual boot)

native VHD boot

operating system virtualization

personal virtual desktop

RD Connection Broker servers

RD Gateway servers

RD Licensing servers

RD Session Host servers

RD Web Access servers

RemoteApps

Remote Desktop Protocol (RDP)

Remote Desktop Services (RDS)

runtime-analysis package

session virtualization

thin client

User State Virtualization (USV)

User State Migration Tool (USMT) 5.0

User Experience Virtualization (UE-V)

virtual hard disk (VHD)

virtual machine

virtual machine manager (or hypervisor)

VHD format

VHDX format

Virtual Desktop Infrastructure (VDI)

virtual desktop pool

Windows Easy Transfer

Windows 8 Pre-installation Environment (PE) disk

Windows To Go workspace

Workspace to Go Creator (pwcreator.exe)

■ Creating A Windows To Go Workspace

THE BOTTOM LINE

Windows To Go is a feature available with Windows 8 Enterprise clients that allows you to boot a full version of Windows 8 Enterprise from an external USB drive on a host computer.

CERTIFICATION READY
Windows to Go
Objective 1.1

Windows To Go is a feature in Windows 8 Enterprise edition that allows you to create a *Windows To Go workspace* on an external USB 3.0 drive. This enables your users to boot a full version of Windows 8 from removable media. The drive uses the same image installed on a corporate desktop and laptop; therefore, you can manage them in the same manner and use the same tools. The drive itself must be connected to a host computer running on a Windows 7 or later certified operating system to function.

Creating and Deploying a Windows To Go Workspace Drive

> You can create a Windows to Go workspace drive for employees working from home, contractors on temporary assignment and for employees who travel between sites and need access to corporate resources and applications. This provides them with mobility while also allowing you to manage the devices as part of your corporate policies.

The ***Workspace to Go Creator (pwcreator.exe)*** is used to create Windows To Go workspaces. You can also use a USB duplicator product but that will require you to duplicate the drive before it is booted and initialized.

To create a Windows To Go workspace, you will need:

- A USB drive that supports Windows To Go (32GB or larger).
- A computer running Windows 8 Enterprise edition.
- A Windows 8 Enterprise ISO, Windows 8 Enterprise installation media, or a corporate Windows image (.wim) created from Windows 8 Enterprise media.
- Local administrator access on the computer.

To protect the drive in case it is lost or stolen, you have the option to configure ***BitLocker To Go*** during the setup of the workspace. BitLocker To Go allows you to encrypt a removable drive and restrict access with a password or a smart card.

Once your removable drive is setup, you can deploy the Windows To Go workspace centrally or by allowing individual users to create their own workspaces. Central management and deployment requires System Center Configuration Manager 2012 Service Pack 1.

➔ CREATE A WINDOWS TO GO WORKSPACE

GET READY. To create a Windows to Go workspace, log on as an administrator to a computer running Windows 8 Enterprise edition and then perform the following steps:

1. Connect a Windows To Go USB certified device to the host.
2. Press the **Windows logo key + w**.
3. Type **Windows To Go** and then select it from the *Results* list.
4. Select the USB drive you connected earlier and then click **Next**.
5. Click the Windows image that appears or click **Add search location** to locate one. Click **Next** to continue.
6. Click **Create** to format the drive.
7. (Optional) Select the **Use BitLocker with my Windows To Go workspace** checkbox and then type a password. Click **Next**.

> **TAKE NOTE***
>
> Enabling BitLocker on the Windows To Go workspace will protect the drive if it is lost or stolen. Using this feature will require you to type a password each time you use the workspace.

8. Click **Create** to setup the Windows To Go workspace.
9. Click Yes to automatically boot from the USB drive when you restart the host or click No if you want to change the PC's firmware settings to use the workspace.

Figure 1-1

Selecting the Windows To Go
Startup Option
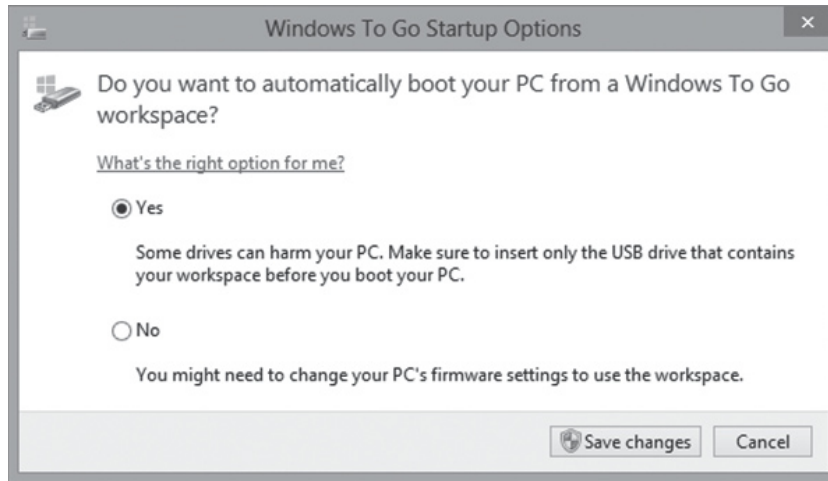
If you click Yes, your computer will automatically boot to the Windows To Go workspace every time a USB drive is detected. If you click No, you will need to change startup options in your computer's firmware. You do this by entering your firmware setup using the appropriate function key for your specific type of BIOS. This is usually the F12 key but you may need to check the manufacturer's website to determine the appropriate key.

If you decide to modify this setting later or want to use the Windows To Go workspace drive on another computer and need to make sure it is configured appropriately, access the Windows To Go control panel using the steps in the following exercise.

CHANGE WINDOWS TO GO STARTUP OPTIONS

GET READY. To change Windows to Go startup options, perform the following steps:

1. Log in to your Windows 8 client device with administrative privileges.
2. Press the **Windows log key + r**.
3. In the *Run* dialog box, type **control panel**.
4. Click the **Hardware and Sound** category.
5. In the *Devices and Printers* category, click **Change Windows To Go startup options**.
6. Click **Yes** to automatically boot from an attached USB drive or click **No** to configure the settings manually.

Booting into a Windows To Go Workspace

To take full advantage of the Windows To Go Workspace, you need to have a good understanding of what the requirements for the host computer are and the resources that can and cannot be accessed on the host.

When deciding on the host to use for a Windows To Go workspace drive, you should make sure it has been certified for use with Windows 7 or Windows 8.

Table 1-1 lists the hardware requirements for Windows To Go workspace hosts.

Table 1-1

Hardware Requirements for
Windows To Go Workspace
Hosts

HARDWARE	REQUIREMENT
Firmware	Must support booting from USB.
Processor architecture	Must support the image on the Windows To Go drive.
External USB hubs	USB hubs are not supported; you must connect the drive directly to the host computer.
Processor	1 Ghz or faster.
Memory	2 GB or greater.
Graphics	DirectX 9 graphics device with a WDDM 1.2 or greater driver.
USB ports	USB 2.0 or greater. Using a USB 3.0 port will result in increased performance in both drive provisioning and when the drive is used as a workspace.

In addition to the information listed Table 1-1, the Windows To Go image on the USB drive must be compatible with the processor architecture and the firmware on the host PC.

Table 1-2 lists the processor/firmware types and Windows To Go image requirements for Windows To Go workspace hosts.

Table 1-2

Windows To Go compatibility
with Host firmware and
processor types

HOST PC FIRMWARE	HOST PROCESSOR	WINDOWS TO GO IMAGE THAT CAN BE USED
32-bit Legacy BIOS 64-bit Legacy BIOS	32-bit 64-bit	32-bit image only
32-bit UEFI BIOS 64-bit UEFI BIOS	32-bit 64-bit	32-bit image only 64-bit image only

Once you have identified a suitable host for your Windows To Go workspace drive, insert the drive and power on the computer. If you configured a BitLocker to Go password, you will need to enter it before you can access the drive. The first time you boot a host from the Windows To Go workspace, it will scan for hardware devices and then install the appropriate drivers. The information it finds is cached; therefore, the next time you boot from the same computer the process will be faster because drivers are loaded automatically. Windows To Go workspace operates just like any other installation of Windows but there are a few differences you will need to be aware of.

Once you log in, you will notice the internal disks on the host system are offline to protect against accidental exposure of data. If you insert the USB drive into a system that is already running, you will also notice that it will not be listed in File Explorer. The Hibernate feature is disabled to prevent data corruption during roaming and the Windows Store is disabled by

default. The Windows Store application is disabled because applications licensed through the store are linked to your hardware.

MANAGING WINDOWS TO GO WORKSPACES USING GROUP POLICY

A ***Group Policy Object (GPO)*** that controls the behavior of Windows To Go workspaces can be created and managed at the enterprise level using the ***Group Policy Management console (gpmc.msc)*** and Active Directory. A GPO is a collection of settings that determine how the system for a group of users and/or computers will function. The GPO is then associated with Active Directory containers such as sites, domains, or organizational units.

The settings that are applicable to Windows To Go workspace can be found in the following section of a GPO:

Computer Configuration\Policies\Administrative Templates\Windows Components\Portable Operating System

- *Allow hibernate (S4) when starting from a Windows To Go workspace*: Specifies whether the PC can go into hibernation mode when started from a Windows To Go workspace.
- *Windows To Go Default Startup Options*: This policy controls whether the PC will boot to Windows To Go if a USB device containing a Windows To Go workspace is connected and also controls whether users can make changes to the startup options in the Windows To Go Startup Options Control Panel.
- *Disallow standby sleep states (S1-S3) when starting from a Windows To Go workspace*: Determines if the PC can use standby sleep states (S1-S3) when starting from a Windows To Go workspace. S1 through S4 are sleeping states. When your Windows 8 client computer is in one of these states it is not performing computational tasks and will appear to be off. With each successive sleep state (S1-S4), more of the computer is shut down.

The Windows Store application is disabled by default when booting into a Windows 8 client computer using a Windows To Go workspace. You should enable this policy setting when the workspace will only be used with a single Windows 8 computer.

■ Virtualizing Operating Systems

↓
THE BOTTOM LINE
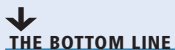
Developing a strategy to virtualize your desktops, isolate legacy applications and maintain user settings and data will require that you have a good understanding of the tools provided along with their capabilities.

Microsoft solutions in the area of desktop virtualization are designed to allow you to access your applications and Windows environment from anywhere while at the same time, keeping your personal settings when changing to another device. Desktop virtualization focuses on three key deployment models:

- Operating system virtualization (VDI, Client Hyper V, and MED-V)
- Application virtualization (App-V and Remote App)
- User State virtualization (UE-V)

Operating system virtualization is designed to provide your users with the ability to use a single computer to run one or more virtual operating systems. These virtual operating systems can be delivered locally or from a centralized data center. Application virtualization (App-V) provides your users with the ability to run applications side-by-side that would normally cause conflicts or run multiple versions of the same application on the same computer. It also

provides end users with access to virtually any application anywhere without having to install the application directly on their computers. User State virtualization (UE-V) allows your user's data and personal settings to follow them as they login to Windows 7 and Windows 8 client computers.

Exploring Operating System Virtualization

When determining the appropriate strategy to use for virtualizing your operating systems, you will need to take into consideration hardware, bandwidth, network latency, and costs. You will also need to determine if you want your users to be able to customize their personal desktops and how you will handle application incompatibility issues when moving to Windows 8.

When it comes to operating system virtualization, Microsoft categorizes operating system virtualization according to Virtual Desktop Infrastructure (VDI), Session Virtualization, and Microsoft Enterprise Desktop Virtualization (MED-V).

VIRTUAL DESKTOP INFRASTRUCTURE (VDI)

Virtual Desktop Infrastructure (VDI) is desktop delivery model that allows users to access centrally managed desktops running in a data center.

With VDI, the user has access to a virtualized instance of a client operating system such as Windows 8 that is running on a back-end server instead of on the user's computer. VDI can be deployed by in the form of a *personal virtual desktop (PVD)* or a *virtual desktop pool (VDP)*. In a PVD deployment, each of your users, within Active Directory, will be assigned their own dedicated virtual desktop. The user can customize this desktop and it is for their exclusive use. The means there is a one-to-one relationship between VDI users and PVDs on server running Hyper-V. PVDs can be managed using the same tools used for physical computers and users can have full administrative control over their PVD. In a VDP deployment, users share a pool of virtual desktops that identical in configuration. These are located on servers running Hyper-V in a data center. VDP are dynamically assigned from the pool to users when they log on. Since all of these virtual desktops are the same, the user will see the same desktop regardless of which one they use. When they log off, the virtual desktop is reset to its original state. This represents a many-to-one relationship between VDI users and virtual desktops.

VDI works by virtualizing an entire desktop environment (operating system, user data and applications) on a server that can be accessed by multiple users. VDI then presents the user interface to users' devices by using the *Remote Desktop Protocol (RDP)*. RDP is a set of rules that specify how the image on the screen of one computer is encoded and sent over a network connection to be displayed on another. The protocol also encrypts data being sent across the connection and increases performance over slow or unreliable connections by only sending data when something on the screen changes.

When combined with App-V and User State Virtualization (USV), users can connect to any available VDI session and access the applications, files, and folders they need while still maintaining their familiar desktop settings.

The typical components of an enterprise VDI include the following:

- A Windows Server running the *Hyper-V* role. Hyper-V is a role that provides the tools and services needed to create virtual machines which run multiple operating systems that are isolated from each other on a single physical server.
- A library/repository that contains the virtual machines, the *virtual hard disks (VHD)*, and the hardware and software profiles. A virtual hard disk is an image format that

allows you to encapsulate the hard disk into an individual file for use by the operating system as a virtual disk.

- A vehicle to deploy applications (App-V) based on user profiles. App-V provides access to applications from any device without the need to install or configure the application on the local device.
- A tool to help manage the VDI, such as **Microsoft Desktop Optimization Pack (MDOP)**. MDOP is a suite of monitoring, perform emergency recovery, application and desktop virtualization tools.
- The **Remote Desktop Services (RDS)**. Remote Desktop Services (RDS), formerly known as Terminal Services, allow a Windows 2008/2012 server to host multiple, simultaneous client sessions.

The are several advantages to implementing the VDI model:

- It allows your users to access the virtual desktop environment from several different devices such as a desktop PC, a laptop, or a **thin client**. A thin client is a computer that relies heavily on another computer to process data, save files and in itself does not perform the tasks normally handled by a computer.
- If the device the user is working on fails, the desktop will continue to run and the user can reconnect from another device providing business continuity.
- The virtual desktops are maintained on a server in the central data center instead of on each of your users' computers providing enhanced security and centralized backup capabilities.

Although there are several advantages to designing and implementing a VDI strategy, you will need to keep in mind the cost of the high-end hardware needed to build the infrastructure, the bandwidth (capacity of connection) available and network latency (time it takes for the packets to traverse WAN links). If you have slow WAN links to branch offices and/or a large number of mobile workers, VDI may not be the solution for your organization. In that case, you might want to consider session virtualization as an alternate strategy.

SESSION VIRTUALIZATION

With **session virtualization**, your users can access individual applications (RemoteApps) or entire desktops (remote desktops or "sessions"). **RemoteApps** are programs that are accessed through Remote Desktop Services (RDS) and appear as if they are running on the client's local computer. RemoteApps removes the need to deliver the entire desktop to the remote system in order to launch an application. Instead, you can launch individual applications from your local computer. Each application will appear in its own window just like a locally running application would. You can also run RemoteApps side by side with local apps; they can be integrated into the Start menu to make it easier for your users to find them. These resources (applications/remote desktops) are running on a server located in a central data center.

The typical components of a session-based deployment include the following:

- **RD Session Host servers:** Servers running this role host RemoteApp programs or session-based desktops. Users connect a RD Session Host server to run programs, save their files and use other resources on those servers.
- **RD Licensing servers:** Servers running this role manage the licenses required to connect ot the RD Session Host server or a virtual desktop.
- **RD Connection Broker servers:** Servers running this role are used to distribute the load across multiple RD Session Host servers and allow users to reconnect to their RemoteApp programs, session-based desktops, and virtual desktops.
- **RD Gateway servers:** Servers running this role allow authorized users connecting from the Internet to gain access to their virtual desktops, RemoteApp programs, and session-based desktops located on the internal network.

- *RD Web Access servers:* Servers running this role provide the ability for users to access RemoteApp and desktop connection through the Start menu on Windows 7/8 or through a web browser. Both RemoteApp and Desktop Connection provide a custom view of the RemoteApp programs and session-based desktops.

Compared to VDI, session-based virtualization requires fewer resources to implement and is lower in cost to implement. It does not allow users to personalize their environments and in most implementations does not allow users to install their own applications.

MICROSOFT ENTERPRISE DESKTOP VIRTUALIZATION (MED-V)

Microsoft Enterprise Desktop Virtualization (MED-V), another desktop delivery model, is designed to remove barriers from upgrading to a newer version of the Windows operating system due to incompatible or legacy applications. By creating a virtual environment called a MED-V workspace you can run a legacy application that has not been supported or tested on Windows 8. A **MED-V workspace** is the desktop environment your user interacts with and consists of both an image and a policy which defines the rules and how the workspace functions. From an administrator perspective, using a MED-V workspace will allow you to move forward with a rollout of Windows 8 instead of getting sidetracked addressing application-compatibility issues.

For example, if you have a user who needs to run an earlier version of an application that is not supported on Windows 8, you can use MED-V to deploy the earlier version as part of a virtual image. The user will then have two copies of the application running simultaneously on her Windows 8 client computer. The current version runs on her host computer and the legacy version runs in the MED-V workspace. To the user, it will appear as if both are running on the local computer. She accesses the legacy application from the desktop of the virtual desktop or by using an application window that is integrated into the local desktop of their host computer.

The typical components of Med-V include:

- MED-V Management Server associates virtual images (located in the Image Repository) with administrator usage policies to Active Directory users and groups. It also stores event information for reporting and monitoring purposes.
- MED-V Management console is used by administrators to control the management server and the image repository.
- MED-V Image Repository stores the virtual images on a standard Internet Information Server (IIS) and handles virtual image version management and requests from authenticated MED-V clients for images.
- MED-V Client allows you to start, stop and lock virtual machines and runs seamlessly on the desktop, making applications appear as if they are running on the local desktop's operating system.

With the MED-V client installed on a desktop computer, the user connects to the MED-V Management Server. The MED-V Management Server queries Active Directory for security settings and access control information. Once approved, the client retrieves the MED-V workspace image from the MED-V Image Repository server.

Administrators use the MED-V Management console to connect to the Management Server where they can update policies; create, manage, and update virtual machines; and provision workspaces to users. The image delivered to the client uses a seamless mode to present the application to the user.

HYPER-V AND CLIENT HYPER-V

The Hyper-V role in Windows Server 2012 provides you with the tools needed to create a virtualized environment. By virtualizing hardware, you can create and manage virtual