Citrix XenDesktop 2.1 with Microsoft Hyper-V and System Center Virtual Machine Manager 2008

Evaluation Guide

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Introduction

How to Use This Document

This document is for administrators responsible for installing and configuring XenDesktop with Microsoft's Hyper-V product. Step-by-step procedures for creating an evaluation deployment to deliver virtual desktops are provided.

To achieve the objective of getting your XenDesktop evaluation environment up and running in the shortest possible time, the installation procedure detailed here helps you to set up a basic deployment. To find out more about the components included in XenDesktop and for information about advanced configuration, see the *Citrix XenDesktop Administrator's Guide* and the documentation for the individual components.

This document assumes experience of basic Windows server administration and knowledge of Active Directory. For more information about Active Directory, visit https://www.microsoft.com/windowsserver2008/en/us/active-directory.aspx.

Finding More Information

This document is part of the Citrix XenDesktop documentation set. You can access more documentation for XenDesktop and its components from the XenDesktop product information page on the Citrix Web site http://support.citrix.com/product/xd/v3.0/#tab-doc. Information available for each component includes administrator's guides, release notes, readmes, technical articles, and white papers.

The Citrix Knowledge Center Web site, http://support.citrix.com/, contains links to all product documentation, organized by component. Select the component you want to access and click the **Documentation** tab on the product information page.

To provide feedback about the documentation, click the **Article Feedback** link located on the right side of the product documentation page.

Getting Support and Training

For additional support with XenDesktop, visit the XenDesktop Support forum at http://forums.citrix.com/forum.jspa?forumID=187. This forum contains up-to-date information for Citrix customers and partners. Note that on Citrix forums, you can set up a *forum watch* to receive email updates about the latest postings.

The Citrix Knowledge Center (http://support.citrix.com) offers a variety of technical support services, tools, and developer resources.

Information about Citrix training is available at http://www.citrixtraining.com/.

Overview

Citrix XenDesktop is a desktop virtualization system that centralizes and delivers virtual desktops as a service to users, significantly reducing cost of ownership and improving data security by centralizing desktop life-cycle management in the data center. The open architecture of XenDesktop offers a choice of virtualization platforms and endpoint devices. Unlike other desktop virtualization alternatives, XenDesktop simplifies desktop management by using a single image to deliver virtual desktops to users and enables administrators to manage service levels with built-in desktop performance monitoring.

Citrix XenDesktop delivers Microsoft Windows Vista or Windows XP virtual desktops to users anywhere on a wide variety of endpoint devices. Virtual desktops are dynamically assembled on demand, providing users with pristine, yet personalized, desktops each time they log on. This ensures that performance never degrades, while the high speed delivery protocol provides unparalleled responsiveness over any connection, including high latency wide area networks.
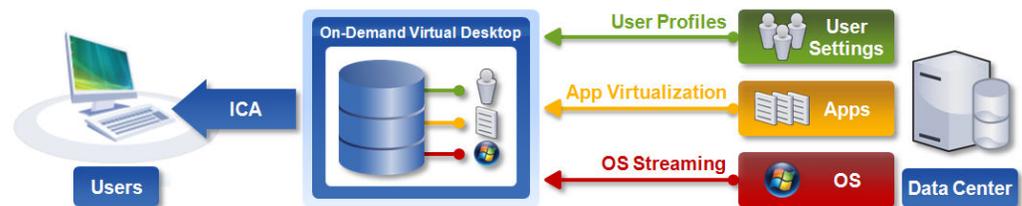
The figure shows the XenDesktop virtual desktop delivery model.

XenDesktop deployments comprise a number of core components that work together to provide the virtual desktops delivered to users. This document provides step-by-step instructions on how to set up a simplified XenDesktop deployment that includes all these core components. You can use this evaluation environment to experience virtual desktops, to try out the features of XenDesktop, and to gain a greater understanding of the core components and how they interact before moving to a full scale production deployment.

Product Features and Benefits

Our features have been grouped in 8 major categories in order to clearly communicate product value proposition as well as competitive differentiation.

1. **Best desktop TCO.** Centralizing and simplifying desktop lifecycle management, dramatically reduces storage and endpoint costs, and provides the lowest TCO for desktops.

2. **Single image desktop management.** Maintaining a single master desktop image in the datacenter provides users with an up-to-date, pristine desktop at each logon, drastically reduces patch and upgrade maintenance efforts, and cuts storage costs by up to 90 percent.

3. **Real-time desktop assembly.** Users are instantly provisioned with a pristine desktop that incorporates the user's personal settings and applications, regardless of the access device.

4. **High definition user experience.** The ability to access a personalized, well-managed and high performance desktop from any device or location makes virtual desktops better than a PC for end users.

5. **Built-in virtual applications.** Virtual applications enable fewer, simpler desktop images and eliminate system conflicts. This can reduce application regression testing and increase virtual desktop density by up to two times.

6. **Secure by design.** Centralized data, encrypted delivery, a SSL VPN appliance and multi-factor authentication ensure that only the correct users connect to their desktops and that intellectual property is protected and in compliance with regulations.

7. **Service level assurance.** Pro-active monitoring identifies performance issues at the user level and enables reallocation of resources in real-time to ensure optimal performance, high availability and failover. This ensures high user satisfaction and enables IT to meet service level targets.

8. **Open architecture**. XenDesktop integrates with XenServer, Hyper-V and ESX, and works out-of-the-box with desktop appliances. This ensures no vendor lock-in for virtualization or endpoint devices.

Evaluation Environment

This section describes the installation and configuration of an evaluation deployment using XenDesktop and Microsoft components, in which all systems are installed in a single domain.

This evaluation deployment makes use only of features found in the XenDesktop Advanced Edition. Although the evaluation deployment is possible with both the Enterprise and Platinum editions, features that are unique to either or both of those editions are not used.

With the experience gained in this deployment, you can extend your installation over multiple domains and then add the additional features that are supplied only with Enterprise and Platinum editions.

This document describes an evaluation scenario that focuses on the provision of full-screen-only desktops. This enables users to experience virtual desktops that are indistinguishable from a local desktop.

The evaluation environment includes the following hardware:
- **pServerOne**. A physical server that runs Windows Server 2008 with Hyper-V and hosts the XenDesktop infrastructure components.
- **pServerTwo**. A physical server that runs Windows Server 2008 with Hyper-V that hosts the virtual desktops. This server also host a VM running SCVMM.
- **Endpoint device(s)**. One or more computers running Windows Vista or Windows XP.

In a production environment, you could distribute the infrastructure components to other physical devices as necessary, and create multiple servers running Hyper-V to support large numbers of virtual desktops.
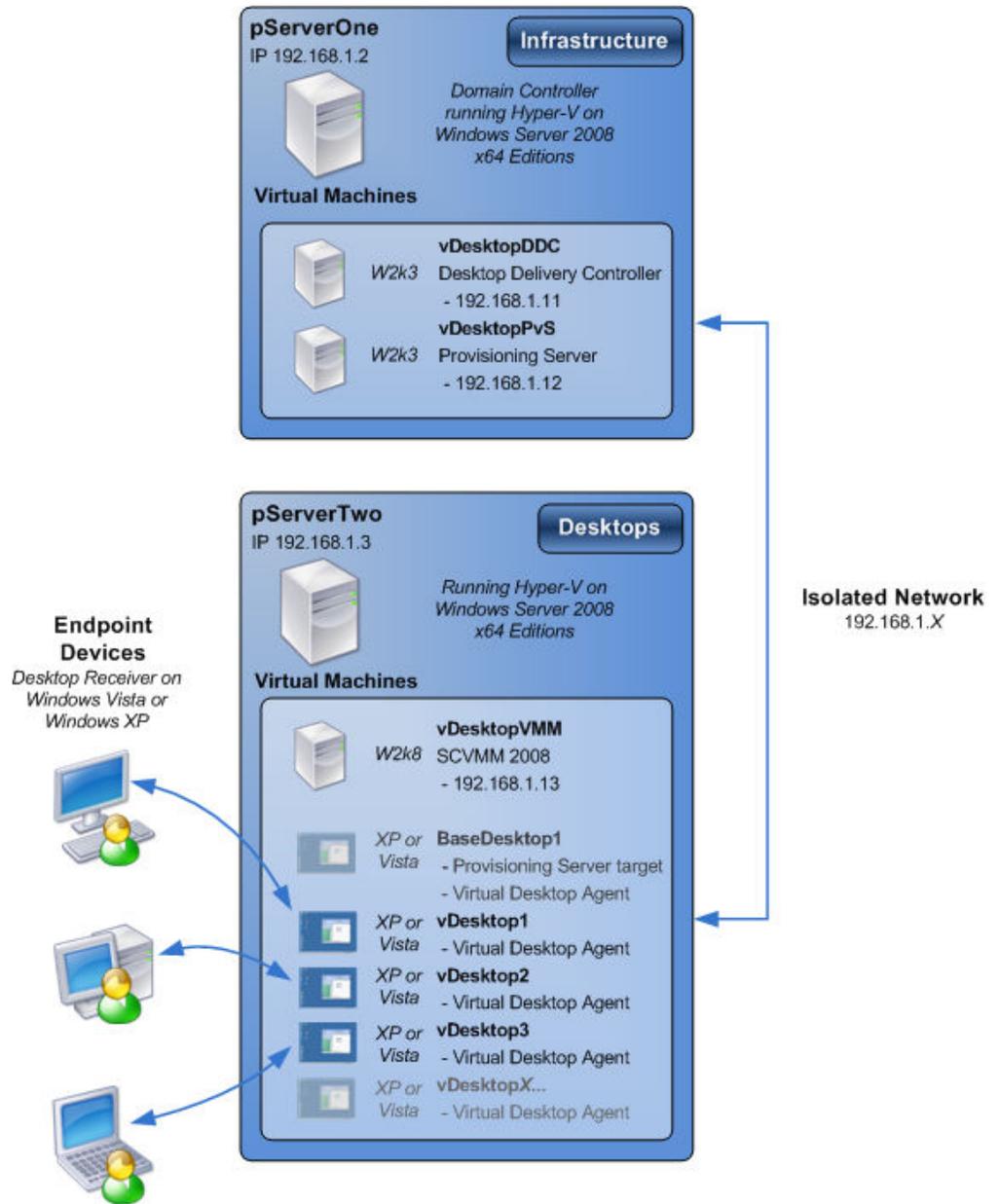
The figure shows the XenDesktop evaluation environment with Microsoft's Hyper-V and System Center Virtual Machine Manager providing the VM infrastructure.

Physical Components

The physical components of the XenDesktop evaluation environment are listed in the following table. Physical servers are denoted by the prefix 'p' and the virtual machines running on those physical servers are denoted by the prefix 'v'.

Component	VMs and Installed Software
pServerOne	- A server running the VM infrastructure software, in this case, Windows Server 2008 x64 Edition configured with Hyper-V. You assign the name pServerOne during the installation. - In this evaluation environment, this server collectively provides the XenDesktop delivery infrastructure as follows: **Locally installed** – the domain controller running Windows Server 2008 with: - Active Directory - DNS - DHCP **Virtual Machines** **vDesktopDDC** – runs Citrix Desktop Delivery Controller on Windows Server 2003, and includes: - Citrix Desktop Delivery Controller - Access Management Console - License Server Console **vDesktopPvS** – runs the Citrix Provisioning Server on Windows Server 2003, and includes: - Provisioning Server - Provisioning Server SDK - Hyper-V guest tools (Integration Services)
pServerTwo	- A second server running the same VM infrastructure software as pServerOne. You assign the name pServerTwo during the installation. **Virtual Machines** **vDesktopVMM** – runs Microsoft System Center Virtual Machine Manager on Windows Server 2008 x64 Edition - This server hosts the VMs on which the virtual desktops reside. During the installation, you create the five XP VM desktops with names **vDesktop_1** through **vDesktop_3** that endpoints can access.
Endpoint Device	A computer running Windows XP or Windows Vista and the Desktop Receiver.

XenDesktop Components

The XenDesktop evaluation environment makes use of the following components:

Component	Description
Microsoft Hyper-V	The Hyper-V role enables you to create a virtualized computing environment using a technology that is part of Windows Server 2008. This virtualized computing environment creates the foundation for delivering virtual desktops and offers advance management features.
Microsoft SCVMM	System Center Virtual Machine Manager 2008 provides centralized administration of virtual machine infrastructure and enables increased physical server utilization and rapid provisioning of new virtual machines by the administrator and authorized users.
Citrix Desktop Delivery Controller	A component that manages the connections between users' endpoint devices and the virtual desktops.
Citrix Provisioning Server	A component that enables you to stream a single desktop image to create multiple virtual desktops on one or more servers in a data center. This facility greatly reduces the amount of storage required compared to other methods of creating virtual desktops.
XenDesktop Setup Wizard	A tool that automates parts of the creation and delivery of large installations of virtual desktops. This wizard integrates Citrix components so that system administrators can quickly create multiple desktops.
Virtual Desktop	A desktop operation system (for example, Vista) running on a virtual machine that runs on a VM.
Virtual Desktop Agent	Software running on a VM that enables the operating system to make its desktop available to another computer (or endpoint device).
Citrix Desktop Receiver	Software running on an endpoint that provides toolbar functionality, allowing users to pan and scale virtual desktops inside their local desktop. Users can work with more than one desktop by using multiple Desktop Receiver connections on the same endpoint device.
Desktop Receiver Embedded Edition.	Software that repurposes computers running Windows XP into XenDesktop-ready desktop appliances that can display virtual desktops in full-screen-only mode.

ICA	A communications protocol used between users' endpoint devices and virtual desktops. With ICA, all desktop logic executes on the desktop host. Only screen updates, mouse clicks, and keystrokes are transmitted to the endpoints. For more information about the features of ICA, see the *XenApp Plugin for Hosted Apps for Windows Administrator's Guide*.
License server	A component that validates licenses for Desktop Delivery Controller and Provisioning Server. You install this component when you install Desktop Delivery Controller.

IP Addressing

For simplicity, the evaluation scenario specifies an isolated LAN environment with an IP addressing scheme based on the following assumptions:

- A simple Ethernet switch is used to connect the hardware.
- The VMs on pServerOne have manually assigned IP addresses. For reference, these IP addresses are listed in the step-by-step procedures.
- The VMs on pServerTwo providing the virtual desktops are named vDesktop1 through vDesktop5. These desktops have IP addresses assigned by DHCP.

You can define your own IP addresses based on the local environment into which you are installing XenDesktop. In this case, replace the IP addresses specified in "XenDesktop Administration" on page 17 with addresses appropriate to your own environment.

System Requirements

The hardware requirements described in this section relate to the evaluation environment as described in "Evaluation Environment" on page 9.

Recommendations

- Citrix strongly recommends that you isolate the evaluation environment from your production environment.

- All server-side components must be installed on virtual machines using one of the supported virtualization infrastructure types.

Software Requirements

This evaluation environment works properly only if the correct versions of the software components are installed. This section lists the mandatory versions of the major Citrix products and components plus the third-party products, all of which are required to create the XenDesktop evaluation environment.

Citrix Products and Components

The Citrix XenDesktop components include the following.

Important: Use only the versions supplied on the installation media and not versions that you may have previously acquired. You may download these components at www.mycitrix.com.

- Citrix Desktop Delivery Controller 2.1

- Citrix Provisioning Server 5.0
- Citrix XenDesktop Setup Wizard
- Citrix Desktop Receiver 10.251 (available on the installation media and from the Citrix Web site at http://www.citrix.com/English/ss/downloads.
  Important: Use only the versions supplied on the installation media and not versions that you might have previously acquired.

Products

You are responsible for sourcing and licensing all non-Citrix products, except for Microsoft .NET Framework 3.5.

Domain Controller (pServerOne)
- Microsoft Windows Server 2008 x64 Editions

Provisioning Server (vDesktopDDC)
- Microsoft Windows Server 2003 with Service Pack 2

Provisioning Server (vDesktopPvS)
- Microsoft Windows Server 2008 x64 Editions
- Microsoft .NET Framework 3.5

Virtual desktops (vDesktop*XX*)
- **Windows Vista**
  - Windows Vista with or with Service Pack 1
  - Microsoft .NET Framework 3.5 required

- **Windows XP**
  - Microsoft Windows XP Professional 32-bit, with Service Pack 3.
  - Microsoft .NET Framework 3.5 required.

Endpoint devices
- **Windows Vista**
  - Microsoft Windows Vista 64-bit Editions with Service Pack 1 Microsoft .NET
  - Microsoft Windows Vista 32-bit Editions with Service Pack 1 Microsoft .NET

- **Windows XP**
  - Microsoft Windows XP Professional 64-bit with Service Pack 2 (or higher)
  - Microsoft Windows XP Professional 32-bit with Service Pack 2 (or higher)

Third-Party VM Infrastructure

- **Microsoft Windows Server 2008 x64 for Hyper-V**

  - Can be downloaded here: http://technet.microsoft.com/en-us/evalcenter/cc137123.aspx

- **Microsoft System Center Virtual Machine Manager 2008**

  - Can be downloaded here: http://www.microsoft.com/systemcenter/virtualmachinemanager/en/us/trial-software.aspx

- **Microsoft Hyper-V Integration Services**

  - Hyper-V includes a software package that improves integration between the physical computer and the virtual machine. This package contains integration services and virtual machine drivers.

Installation Time

You need to allocate sufficient time to install all the components of XenDesktop. Allow approximately two days to perform the complete installation.

Hardware Requirements

The procedures described in this document assume the following hardware:

Components	Specifications	
pServerOne pServerTwo	CPU	**Note:** Hyper-V is a 64-bit only technology and requires a 64-bit capable hardware with Intel VT or AMD-V technology enabled. **Processor**: Intel Pentium 4, Xeon, Core 2 DUO processor; AMD Opteron, Athlon 64, Athlon X2, . Hardware Data Execution Protection (DEP) must be available and be enabled. Specifically, you must enable Intel XD bit (execute disable bit) or AMD NX bit (no execute bit). **Minimum CPU speed**: 1 GHz; **Recommended:** 2 GHz or faster **Important:** If your CPUs do not support hardware virtualization, you cannot start the VMs..
	Memory	Minimum 8 GB RAM total (4 GB per server).
	Hard Disk	100 GB locally attached storage (for example PATA, SATA, or SCSI)
	NIC	100 Mbps (megabits per second) or faster network interface card (NIC).
Endpoint devices	Computers capable of running Windows Vista or Windows XP	

Hyper-V supports a broad range of x64 capable hardware devices. Please refer to the www.windowsservercatalog.com for the list of supported hardware platforms. An update to the latest available BIOS version for your server hardware might be required. Use of other hardware platforms could result in some incompatibilities.

For more information regarding Microsoft's Hyper-V: http://www.microsoft.com/windowsserver2008/en/us/hyperv-install.aspx#RecommendedHardwareDevices

For more information regarding Citrix specific requirements, see the relevant documentation for the particular XenDesktop component.

Installing and Configuring the Evaluation

This section is written explicitly for creating an evaluation environment for the delivery of virtual desktops with XenDesktop in which Hyper-V provides the VM hosting infrastructure.

Overview

This deployment is a set of sequential tasks, which are numbered in the order in which you have to perform them.

XenDesktop Administration

Task 1. Installing the VM Infrastructure

Task 2. Configuring Active Directory for XenDesktop

Task 3 Creating the Virtual Machines

Task 4. Installing and Configuring Microsoft SCVMM 2008

Task 5. Installing Desktop Delivery Controller

Task 6. Installing and Configuring Provisioning Server

Task 7. Preparing the Virtual Desktop Image

Task 8. Preparing and Provisioning Virtual Desktops

Task 9. Creating Multiple Virtual Desktops

XenDesktop Endpoint Devices

Task 1. Preparing the Endpoint Device

Task 2. Converting the Endpoint Device to Full-Screen-Only Mode

Task 3. Connecting to a Virtual Desktop from a Thin Client Device

Task 4. Monitoring Virtual Desktop Usage

XenDesktop Administration

This section describes the procedures you need to perform to create an infrastructure that supports virtual desktop delivery using XenDesktop components including Hyper-V.

Task 1. Installing the VM Infrastructure

In this task, you install the VM Infrastructure software on the two physical servers (pServerOne and pServerTwo).

To Install Hyper-V on pServerOne (and pServerTwo)

Microsoft's Hyper-V is installed as a role on top of Windows Server 2008 x64. The procedures for installing the Hyper-V are almost identical on the two servers, except that you must specify different IP parameters in each case.

Prerequisites

Hyper-V is only available for x64 editions of Windows Server 2008. If you are using a version of Windows Server 2008 that is pre-RTM, you will need to perform a clean install of Windows Server 2008 RTM x64 edition on your host system. Hyper-V cannot be enabled on systems running inside virtual machines or on x86 versions of Windows Server 2008.

The RTM update of Hyper-V is available for Windows Server 2008 x64 editions. Hyper-V requires an x64-based processor, hardware-assisted virtualization, and hardware data execution protection.

Note: Any Computer on which you install Hyper-V must have a CPU that supports hardware virtualization; see "Hardware Requirements" on page 15.

1. Install **Microsoft Server 2008** (x64 Edition) on pServerOne.
2. Configure pServerOne with the following static network settings:

Network Settings	pServerOne	pServerTwo
IP Address	192.168.1.2	192.168.1.3
Subnet mask	255.255.255.0	255.255.255.0
Default gateway	192.168.1.1	192.168.1.1
Preferred DNS server	192.168.1.2	192.168.1.2

3. Install the latest **Windows Updates** including **Hyper-V** (**KB950050**).
4. Start Server Manager and add server role **Hyper-V**

When you have completed the installation of pServerOne, repeat the procedure for pServerTwo, taking into account the differences in networking information.

Task 2. Configuring Active Directory for XenDesktop

Desktop Delivery Controller uses Active Directory to store configuration information and to manage the assignment of virtual desktops to users. This section describes how to configure Active Directory specifically for XenDesktop.

In this task, you do the following:

- Create and configure Active Directory on the Domain Controller
- Create an organizational unit named XenDesktop
- Create user accounts

To create and configure Active Directory on the Domain Controller (pServerOne)

Configure Active Directory on pServerOne, using the following guidelines:

Domain Controller	▪ In Windows Server 2008, create an Active Directory Domain named XenDT.net with a single domain controller. ▪ When creating the new AD forest, set the forest and domain functional levels to Windows Server 2003.
DNS Server	▪ Configure Active Directory to include DNS server, which must be configured to have both forward and reverse look-up zones
DHCP Server	▪ **DHCP Scope**. Specify a DHCP scope named XenDesktop with an address range of 192.168.1.20 to 192.168.1.200. This enables DHCP to dynamically assign IP addresses to the new virtual desktops, while protecting the IP Addresses that you have already assigned as static. ▪ **DHCP Boot options**. You must configure the DHCP boot options after installing Citrix Provisioning Server

For more information about Active Directory, DNS, and DHCP, refer to the relevant Microsoft documentation.

Add pServerTwo to the domain

- On pServerTwo, join the newly created Active Directory Domain.

To create an organizational unit named XenDesktop

At the root level, create an organizational unit (OU) named **XenDesktop**. This OU is used to store Desktop Delivery Controller farm configuration.

For more information about Active Directory and creating an OU, refer to the relevant Microsoft documentation.

To create user accounts

Create five test user accounts named User_1 through User_3, with or without passwords, as required. These accounts enable different users to log on to the virtual desktops.

Task 3. Creating the Virtual Machines

In this task, you create the three VMs for your evaluation environment. You configure each of these components in later steps.

In this task, you do the following:
- Create the System Center Virtual Machine Manager VM
- Create the Desktop Delivery Controller VM
- Create the Provisioning Server VM
- Create the BaseDesktop1 VM
- Add the VMs to the Active Directory Domain
- Create a Provisioning Server VM template
- Add virtual machines to the XenDT.net domain

To create the Desktop Delivery Controller VM on pServerOne

1. Open Hyper-V Manager on pServerOne
2. Insert the disk containing Windows Server 2003 R2 (x86 edition) in the drive or an ISO file can be used.
3. Right click on pServerOne, select **New, Virtual Machine.** The New Virtual Machine Wizard should appear, specify the following values for this VM:

OS Type	Windows Server 2003 R2 x86 Edition
Specify Name	Name: vDesktopDDC
Assign Memory	768 MB
Configure Network	Select the appropriate (or only) network interface card.
Virtual Hard Disks	8 GB
Installation Options	Install an operation system from a boot CD/DVD-ROM or Image file (.iso)

4. On the **Completing the New Virtual Machine Wizard** page, select **Start the virtual machine after it is created** and click **Finish**.
5. The VM should power-on, connect, and present a console window to install the OS.

   Note: If not the console for the VM does not open, then in Hyper-V Manager, select the new VM, click **Connect** and install the OS.

6. Once the OS is installed, login to vDesktopDDC.
7. From the **Action** menu, select **Insert Integration Services Setup Disk** and restart when prompted.
8. Configure a static IP address with the following values:

IP Address	192.168.1.11 The IP address that you reserved for the Desktop Delivery Controller VM
Subnet Mask	255.255.255.0
DNS	192.168.1.2 The IP address of the DNS server for your environment

To create the Provisioning Server VM on pServerOne

1. Open Hyper-V Manager on pServerOne
2. Insert the disk containing Windows Server 2003 R2 (x86 edition) in the drive or an ISO file can be used.
3. Right click on pServerOne, select **New, Virtual Machine.** The New Virtual Machine Wizard should appear, specify the following values for this VM:

OS Type	Windows Server 2003 R2 x86 Edition
Specify Name	Name: vDesktopPvS
Assign Memory	1024 MB
Configure Network	Select the appropriate (or only) network interface card.
Virtual Hard Disks	On Windows XP, at least 20 GB On Windows Vista, at least 30 GB This disk must be large enough to accommodate the virtual disk (vDisk) for this VM.
Installation Options	Install an operation system from a boot CD/DVD-ROM or Image file (.iso)

4. On the **Completing the New Virtual Machine Wizard** page, select **Start the virtual machine after it is created** and click **Finish**.
5. The VM should power-on, connect, and present a console window to install the OS.

   Note: If not the console for the VM does not open, then in Hyper-V Manager, select the new VM, click **Connect** and install the OS.

6. Once the OS is installed, login to vDesktopPvS.

7. From the **Action** menu, select **Insert Integration Services Setup Disk** and restart when prompted.
8. Configure a static IP address with the following values:

IP Address	192.168.1.12 The IP address that you reserved for the Desktop Delivery Controller VM
Subnet Mask	255.255.255.0
DNS	192.168.1.2 The IP address of the DNS server for your environment

To create the System Center Virtual Machine Manager VM on pServerTwo

1. Open Hyper-V Manager on pServerTwo
2. Insert the disk containing Windows Server 2008 x64 Edition in the drive or an ISO file can be used.
3. Right click on pServerTwo, select **New, Virtual Machine.** The New Virtual Machine Wizard should appear, specify the following values for this VM:

OS Type	Windows Server 2008 x64 Edition
Specify Name	Name: vDesktopVMM
Assign Memory	1024 MB
Configure Network	Select the appropriate (or only) network interface card.
Virtual Hard Disks	20 GB
Installation Options	Install an operation system from a boot CD/DVD-ROM or Image file (.iso)

4. On the **Completing the New Virtual Machine Wizard** page, select **Start the virtual machine after it is created** and click **Finish**.
5. The VM should power-on, connect, and present a console window to install the OS.

   Note: If not the console for the VM does not open, then in Hyper-V Manager, select the new VM, click **Connect** and install the OS.

6. Once the OS is installed, login to vDesktopVMM.
7. From the **Action** menu of the VM, select **Insert Integration Services Setup Disk**
8. In the **Upgrade Hyper-V Integration Services** window, click **OK** and restart when prompted.

9. Configure a static IP address with the following values:

IP Address	192.168.1.10 The IP address that you reserved for the System Center Virtual Machine Manager VM
Subnet Mask	255.255.255.0
DNS	192.168.1.2 The IP address of the DNS server for your environment

To create the BaseDesktop1 VM on pServerTwo

1. Open Hyper-V Manager on pServerTwo
2. Insert the Windows XP or Windows Vista installation disc in the drive or an ISO file can be used.
3. Right click on pServerTwo, select **New, Virtual Machine.** The New Virtual Machine Wizard should appear, specify the following values for this VM:

OS Type	Windows XP with SP3 (x86) or Windows Vista with SP1 (x86)
Specify Name	Name: BaseDesktop1
Assign Memory	512 MB for Windows XP 768 MB for Vista
Configure Network	Select the appropriate (or only) network interface card.
Virtual Hard Disks	8 GB for Windows XP 16 GB for Vista
Installation Options	Install an operating system from a boot CD/DVD-ROM or Image file (.iso)

4. On the **Completing the New Virtual Machine Wizard** page, do not select **Start the virtual machine after it is created** and click **Finish**.

5. In Hyper-V Manager, right click on **PvS VM Template** and click **Settings**.

    Note: Be sure the VM is turned off.

6. Under **Hardware**, select **Network Adapter** and then click **Remove**.
7. Under **Hardware**, select **Add Hardware**, then select **Legacy Network Adapter**, and click **Add**
8. Under **Legacy Network Adapter, Network:**, select the appropriate NIC from the drop down box.
9. Click **OK** to accept the changes.
10. In Hyper-V Manager, power-on and connect to the virtual machine (BaseDesktop1) console.
11. Using the VM console, install the OS.
12. From the **Action** menu, select **Insert Integration Services Setup Disk** and restart when prompted.
13. Use a DHCP provided IP address.
14. Apply Windows Updates
    a. If Windows XP was installed, be sure that **Service Pack 3** is installed.
    b. If Windows Vista was installed, be sure that **Service Pack 1** is installed.

Add virtual machines to the XenDT.net domain
Add the following VMs as members of the domain XenDT.net.
- vDesktopDDC
- vDesktopPvS
- vDesktopVMM
- BaseDesktop1

Task 4. Installing and Configuring Microsoft System Center Virtual Machine Manager 2008

In this task, you will install SCVMM on vDesktopVMM located on pServerTwo

To install SCVMM 2008 on vDesktopVMM

The download for SCVMM 2008 is available here:
http://www.microsoft.com/systemcenter/virtualmachinemanager/en/us/trial-software.aspx

1. Be sure that vDesktopVMM is added to the domain.
2. Log into vDesktopVMM using a domain administrator account.
3. Insert the disk containing installation media for SCVMM 2008 in the drive or an ISO file can be used. Using the VM console, attach the physical CD/DVD drive, or optional ISO file, by clicking on the **File** menu and **Settings**. Select **DVD Drive** and choose the desired option under Media.
4. Run the **Setup.exe** to start the installation process.
5. Under **SETUP**, select **VMM Server**.
6. On the **License Terms** page, read and accept the Microsoft license terms, click **Next**.
7. On the **Microsoft Update** page, accept the default setting and click **Next**.
8. On the **Customer Experience Improvement Program** page, select your preference and click **Next**.
9. On the **Product Registration** page, enter your user name and company information and click **Next**.
10. On the **Perquisites Check** page, the following should be displayed **All required software and hardware components are present**. If so, then click **Next**.
11. On the **Installation Location** page, accept the default installation path and click **Next**.

12. On the **SQL Server Settings** page, change to **Install SQL Server 2005 Express Edition SP2**, accept the default database location path and click **Next**.
13. Accept the default settings for the remaining pages and click **Install**.
14. Upon completion, the status should state **Virtual Machine Manger Server installation has completed successfully.** If so, then click **Close**.

Task 5. Installing Desktop Delivery Controller

The Desktop Delivery Controller installation automatically installs all the prerequisite Desktop Delivery Controller components. For installing Terminal Server and Internet Information Services (IIS), the installation program prompts you to insert the Windows Server 2003 installation disc at the appropriate time.

In this task, you do the following:

- Install SCVMM Administrative Console
- Configure the SCVMM Administrative Console
- Install Desktop Delivery Controller
- Run the XenDesktop Active Directory configuration wizard
- Configure the Access Management Console
- Install the XenDesktop license

To install SCVMM Administrative Console
1. Be sure that vDesktopDDC is added to the domain.
2. Log into vDesktopDDC using a domain administrator account.
3. Download and install Powershell 1.0 from here:
   http://www.microsoft.com/downloadS/details.aspx?familyid=10EE29AF-7C3A-4057-8367-C9C1DAB6E2BF&displaylang=en

   Note: Powershell is a requirement for SCVMM 2008.

   Tip: If you experience an error while attempting to install Powershell, try logging into vDesktopDDC using a local administrator account and reattempt the installation. - Remember to log back into the system using a domain administrator account before proceeding.

4. Insert the disk containing installation media for SCVMM 2008 in the drive or an ISO file can be used.
5. Run the **Setup.exe** to start the installation process.
6. Under **SETUP**, select **VMM Administrator Console**.
7. If .NET Framework 2.0 is not installed, then click **OK** and install it. If not prompted to install it, then continue to the next step.
8. On the **License Terms** page, read and accept the Microsoft license terms, click **Next**.
9. On the **Microsoft Update** page, accept the default setting and click **Next**.
10. On the **Customer Experience Improvement Program** page, click **Next**.
11. On the **Perquisites Check** page, the following should be displayed **All required software and hardware components are present**. Click **Next**.
12. On the **Installation Location** page, accept the default installation path and click **Next**.
13. On the **Port Assignment** page, accept the default port and click **Next**.
14. On the **Summary of Settings** page, click **Install**.
15. Upon completion, the status should state **Virtual Machine Manger Administrator Console installation has completed successfully.** If so, then click **Close**.

To configure SCVMM Administrative Console
1. On vDesktopDDC, open the SCVMM Admin Console, click **Start** > **All Programs** > **Microsoft System Center > Virtual Machine Manager 2008 > Virtual Machine Manager Administrator Console**.

2. In the **Connect to Server** window, change the server name to **vDesktopVMM:8100** and click **Connect**.
3. Under **Actions, Virtual Machine Manager**, click **Add host**.
4. On the **Select Host Location** page, leave the default setting and enter the domain administrator password. Click **Next** to continue.
5. On the **Select Host Servers** page, enter **pServerTwo** and click **Add.** Click **Next** to continue.
6. In the **Virtual Machine Manager** window, click **Yes**.
7. On the **Configuration Settings** page, leave the default setting and click **Next** to continue.
8. On the **Virtual Machine Paths** page, leave the default setting and click **Next** to continue.
9. On the **Summary** page, click **Add Hosts**.
10. After the host is added, close the SCVMM Admin Console.

To install Desktop Delivery Controller software

Note: The SCVMM Administrator Console needs to be installed prior to this task.

1. Log into vDesktopDDC using a domain administrator account.
2. On pServerOne, insert the Desktop Delivery Controller installation disc or an ISO file can be used. Using the VM console, attach the physical CD/DVD drive, or optional ISO file, by clicking on the **File** menu and **Settings**. Select **DVD Drive** and choose the desired option under Media.

   Note: If auto run is not enabled and the installation window does not appear, run **autorun.exe** from the disc.

3. In the **Citrix Desktop Delivery Controller 2.1** installation window, select **Install Server Components**.
4. Read and accept the license agreement, and click **Next**.
5. On the **Select Components** page, leave all options selected and click **Next**.
6. On the **Create or Join a Farm** page, select **Create new farm**, type **XenDtFarm** and click **Next**.
   A farm name can have up to 32 characters, including spaces. The following characters are not allowed: \/ ; : .* ? = < > | [ ] ( ) ' " #
7. On the **Specify Farm Edition** page, select the XenDesktop edition that you are using, such as **Platinum** and click **Next**
8. On the **Optional Server Configuration** page, click **Next**.
9. On the **Start Installation** page, click **Next**.
10. Follow the on-screen prompts. When prompted, provide the Windows Server 2003 R2 x86 installation media.

   Note: When the installation program prompts you to restart the server, you must log on with the same user ID and password that you used to start the installation.

11. On the **Setup Complete** page, leave both check boxes selected and click **Finish**. Both the Active Directory configuration wizard and the License Management Console start up. Follow the instructions in the next two sections to configure these components.

To run the XenDesktop Active Directory configuration wizard
Use this wizard to configure the default population of the Active Directory organizational unit-specifically for running the Desktop Delivery Controller. This wizard starts automatically after you complete the previous procedure.

1. On the **Active Directory Configuration Wizard** page, click **Next**.
2. On the **Configure Farm OU in Active Directory** page, click **Browse** and navigate to the **XenDesktop** OU that was created in Task 4. Click **OK** to close the navigation window. Click **Next**.
3. On the next page, click **Finish** and then, on the **Summary** page, click **Close**.

4. When prompted to start the **Access Management Console**, click **Yes**.

Leave the console running for the next procedure.

To configure the Access Management Console
When the Access Management Console starts for the first time, the Configure and run discovery wizard opens.
1. On the **Welcome** page, click **Next**.
2. On the **Select Product or Components** page, ensure that all the check boxes are selected and click **Next**
3. On the **Select Controllers** page, click **Add Local Computer** and click **Next**.
4. On the **Preview Discovery** page, click **Next**..
5. On the **Discovery Progress** page, wait until the discovery is complete and click **Finish**.
    In the Access Management Console, the vDesktopDDC VM is added to the navigation pane under **Citrix Resources** > **Desktop Delivery Controllers** > **XenDtFarm** > **Controllers** > **vDesktopDDC**.
6. Close the Access Management Console window.

Tip: To reopen the **Access Management Console** at any time from the Windows Start menu, click **Start** > **All Programs** > **Citrix** > **Management Consoles** > **Access Management Console.**

To install the XenDesktop license
To be able to use either Desktop Delivery Controller or Provisioning Server, you must install and activate the XenDesktop license. The License Management Console should still be open from an earlier procedure. XenDesktop evaluation licenses can obtained from www.mycitrix.com.
1. In the **License Management Console**, click the **Configuration** tab, and then click **Step 2 Copy license file to this license server**.
2. On the **Upload license File** page, click **Browse** and navigate to the location of your XenDesktop license file. <Use the license file downloaded from MyCitrix.com>
3. Click **Open** to select the required license file.
4. Click **Upload** to add the license file to the License Management Console.
5. Close the **License Management Console** window.

Tip: To reopen the License Management Console at any time from the Windows Start menu, click **Start** > **All Programs** > **Citrix** > **Management Consoles** > **License Management Console**.

Task 6. Installing and Configuring Provisioning Server
In this task, you install and configure the Provisioning Server and its related components, including the XenDesktop Setup Wizard.
In this task, you do the following:
*   Install Microsoft .NET Framework 3.5
*   Install SQL Server 2005 Express
*   Install SCVMM Administrative Console
*   Configure the SCVMM Administrative Console
*   Install Provisioning Server
*   Configure Provisioning Server
*   Install the XenDesktop Setup Wizard
*   Create the Provisioning Server virtual disk (vDisk)
*   Configure DHCP boot options 66 and 67 on the pServerOne

To install Microsoft .NET Framework 3.5
1. Log into vDesktopPvS using a domain administrator account.
2. On pServerOne, insert the Desktop Delivery Controller disc or an ISO file can be used.
3. On the Provisioning Server VM (vDesktopPvS), navigate to the folder **win2k3\en\Support\DotNet35**, and run **dotnetfx35.exe** from this location.
4. Follow the on-screen instructions to complete the installation.

To install SQL Server 2005 Express
This procedure installs SQL Server 2005 Express on the vDesktopPvS VM located on pServerOne.

Note: Although it is possible to install the Provisioning Server database on vDesktopPvS alongside Provisioning Server, Citrix does not recommended doing so as this configuration can cause poor distribution during load balancing. However, for this evaluation, installing SQL Server Express on vDesktopPvS is acceptable.

1. Log into vDesktopPvS using a domain administrator account.
2. On pServerOne, insert the Provisioning Server for Desktops disc or an ISO file can be used.
3. On the Provisioning Server VM (vDesktopPvS), navigate to the folder **SQL Server 2005 Express**, and run **SQLEXPR32.EXE** from this location.
4. On the **End User License Agreement** page, read the terms and select **I accept the licensing terms and conditions**, click **Next**.
5. On the **Installing Prerequisites** page, select **Next**.
6. On the **Welcome to the Microsoft SQL Server Installation Wizard** page, click **Next**.

   Note: You should receive 13 total success results with no errors or warnings.

7. On the **System Configuration Check** page, click **Next**.
8. On the **Registration Information** page, click **Next**.
9. On the **Feature Selection** page, accept the default settings and click **Next**.
10. On the **Authentication Mode** page, accept the default setting and click **Next**.
11. On the **Configuration Options** page, accept the default setting and click **Next**.
12. On the **Error and Usage Report Settings** page, accept the default settings and click **Next**.
13. On the **Ready to Install** page, click **Install**.
14. On the **Setup Progress** page, click **Next**.
15. On the **Completing Microsoft SQL Server 2005 Setup** page, click **Finish**.
16. Restart **vDesktopPvS** before continuing.

To install SCVMM Administrative Console
1. Be sure that vDesktopPvS is added to the domain.
2. Log into vDesktopPvS using a domain administrator account.
3. Download and install Powershell 1.0 from here:
   http://www.microsoft.com/downloadS/details.aspx?familyid=10EE29AF-7C3A-4057-8367-C9C1DAB6E2BF&displaylang=en
   Powershell is a requirement for SCVMM 2008.

   Tip: If you experience an error while attempting to install Powershell, try using a local administrator account and reattempt the installation. Remember to log back into the system using a domain administrator account before proceeding.

4. Insert the disk containing installation media for SCVMM 2008 in the drive or an ISO file can be used.
5. Run the **Setup.exe** to start the installation process.
6. Under **SETUP**, select **VMM Administrator Console**.
7. If .NET Framework 2.0 is not installed, then click **OK** and install it. If not prompted to install it, then continue to the next step.
8. On the **License Terms** page, read and accept the Microsoft license terms, click **Next**.
9. On the **Microsoft Update** page, accept the default setting and click **Next**.
10. On the **Customer Experience Improvement Program** page, click **Next**.
11. On the **Perquisites Check** page, the following should be displayed **All required software and hardware components are present**. Click **Next**.
12. On the **Installation Location** page, accept the default installation path and click **Next**.

13. On the **Port Assignment** page, accept the default port and click **Next**.
14. On the **Summary of Settings** page, click **Install.**
15. Upon completion, the status should state **Virtual Machine Manager Administrator Console installation has completed successfully**. If so, then click **Close**.

To configure SCVMM Administrative Console
1. On vDesktopPvS, open the SCVMM Admin Console, click **Start** > **All Programs** > **Microsoft System Center > Virtual Machine Manager 2008 > Virtual Machine Manager Administrator Console**.
2. In the **Connect to Server** window, change the server name to **vDesktopVMM:8100** and click **Connect**.
3. Verify that **pServerTwo** is added, close the SCVMM Admin Console.

To install Provisioning Server
This procedure installs Provisioning Server on the vDesktopPvS virtual machine located on pServerOne.
1. Log into vDesktopPvS using a domain administrator account.
2. On pServerOne, insert the Provisioning Server for Desktops installation disc or an ISO file can be used.
3. On the startup window, click **Install Server for 32 bit Platform**.
4. On the **Welcome to the Installation Wizard for Citrix Provisioning Server** page, click **Next**.
5. Read and accept the license agreement, and click **Next**.
6. On the **Customer Information** page, type your customer information, accept the default option **Anyone who uses this computer (all users)** and click **Next**.
7. On the **Destination Folder** page, accept the default location, and click **Next**.
8. On the **Setup Type** page, select Complete and click **Next**.
9. On the **Ready to Install the Program** page, click **Install**.
10. On the **Installation Wizard Completed** page, click **Finish**.
The Provisioning Server Configuration wizard starts automatically following installation. The next section takes you through this wizard.

Note: Although Provisioning Server does not require that you restart the server after installing the product software, in some instances a Microsoft message may appear requesting a restart. If this message appears, complete the task "To configure Provisioning Server" before restarting the server.

To configure Provisioning Server
1. On the **Provisioning Server Configuration Wizard** page, click **Next**.
2. On the **DHCP services** page, select **The service that runs on another computer** and click **Next**.
3. On the **PXE Services** page, accept the default setting **The service that runs on this computer** and click **Next**.
4. On the **Farm Configuration** page, accept the default setting **Create farm** and click **Next**.
5. On the **Database Server** page, click **Browse**, select **VDESKTOPPVS**, click **OK**, and click **Next**.
6. On the **New Farm** page, accept the default settings and click **Next**.
7. On the **User account** page, accept the default settings and click **Next**.
8. On the **License server** page, specify the license server name **vDesktopDDC**, accept the default value for the port (**27000**), and click **Next**.
9. On the **Streaming Services** page, if you have more than one network interface card (NIC), select the appropriate card, otherwise, accept the defaults. Click **Next**.
10. On the **TFTP Option and Bootstrap location** page, select **Use the Provisioning Server TFTP service**, accept the default location, and click **Next**.
11. On the **Stream Servers Boot List** page, ensure the IP address of the Provisioning Server VM is displayed, and click **Next**.

Note: DHCP automatically provides the subnet mask and gateway information.

12. On the **Finish** page, confirm your configuration selections, ensure that **Automatically Start Services** is selected, and click **Finish**.
13. Click Done when the configuration process completes.

To install the XenDesktop Setup Wizard

1. Log into vDesktopPvS using a domain administrator account.
2. On pServerOne, insert the XenDesktop Component disc or an ISO file can be used.
3. On the Provisioning Server VM (vDesktopPvS), navigate to the folder **D:\XenDesktop Setup Tool** and run **Setup.exe** from this location
4. On the **Welcome** page, click **Next**.
5. On the **End-User Agreement** page, read and accept the terms. Click **Next**.
6. On the **Destination Folder** page, accept the default path. Click **Next**.
7. On the **Ready to Install XenDesktop Setup Wizard** page, click **Install**.
8. On the **Completed XenDesktop Setup Wizard Installer** page, click **Finish**.

To create the Provisioning Server virtual disk (vDisk)

1. Log into vDesktopPvS using a domain administrator account.
2. Create a folder on the root of the C drive of vDesktopPvS named **vDisk**.
3. On the vDesktopPvS VM, click **Start** > **All Programs** > **Citrix** > **Provisioning Server** > **Provisioning Server Console**. The console opens.
4. In the **Provisioning Server Console**, click **Action** and **Connect to Farm**.
5. In the **Server Information** window, enter **vDesktopPvS** for the name and click **Connect**.
6. In the left pane of the console, right-click the **Stores** folder and select **Create store**.
7. In the **Store Properties** window, select the **General** tab and enter **XDStore** for the Name.
8. In the **Store Properties** window, select the **Paths** tab and enter **C:\vDisk** for the Default store path. Click **Add**, enter **C:\vDisk** for the Cache path and click **OK**.
9. In the **Store Properties** window, select the **Servers** tab and select **XENDESKTOPPVS** for the **Servers that provide this store** setting. Click **OK**.
10. In the left pane of the console, right-click the new store you just created and select **Create vDisk**.
11. On the **Create vDisk** window, specify the following values and click **OK**:

Filename	vDisk1
Description	Master Virtual Desktop Disk
Disk Size	8192 MB (Windows XP) 16384 MB (Windows Vista)
VHD format	Dynamic

Note: In the **Disk name** and **Description** fields you must use only standard printable ANSII characters. If you use any extended characters (for example, Euro sign) or DBCS characters (for example, Hiragana characters) in these fields, the Setup Wizard will be unable to create the vDisk.

12. In the details pane of the console, right-click **vDisk1**, select **Properties**, and click the **Edit file properties** button.
13. In the **vDisk File Properties** window, click the **Options** tab, select **Active Directory machine account password management**, and click **OK**. The click **OK** again.

14. In the left pane of the console, navigate to the **Servers** folder for the site, right-click **VDESKTOPPVS**, and select **Properties**.
15. In the **Server Properties** window, click on the **Options** tab, select **Enable automatic password support**, accept the default value for the number of days, and click **OK**. When prompted t restart the Provisioning Server Streaming Service, click **OK**.
16. In the details pane of the console, right-click **vDisk1** and select **Mount vDisk**.
   a. On the Provisioning Server VM (vDesktopPvS), open **My Computer**.

   b. Under **Devices with Removable Storage**, right-click the **Removable Disk (E:)** that is displayed, and click **Format**.
   c. Format the vDisk as an NTFS disk.

   Caution: Format only the removable disk. Do not format any drive listed in the **Hard Disk Drives** section.

17. In the details pane of the console, right-click **vDisk1** and select **Unmount vDisk**.

To configure DHCP boot options 66 and 67 on the pServerOne
1. Log into pServerOne using a domain administrator account.
2. On the Domain Controller, click **Start** > **All Programs** > **Administrative Tools** > **DHCP** to open the DHCP Management Console on the domain controller.
3. In the navigation pane, expand the server tree and select **Server Options**.
4. From the **Action** menu, select **Configure Options**.
5. In the **Server Options** dialog box, click the **General** tab.
6. Enable the option **066 Boot Server Host Name**, and type **192.168.1.12** (the IP address of vDesktopPvS). Click **Apply**.
7. Enable the option **067 Bootfile Name**, specify the corresponding value as **ARDBP32.bin**, and click **OK**.

Your DHCP configuration now looks like this:

Task 7. Preparing the Virtual Desktop Image

You must install a Virtual Desktop Agent on all virtual desktops to which users connect. This agent enables users to make an ICA connection to their virtual desktops. To prepare for this, you install the agent on the BaseDesktop1 VM so that later on, when you image BaseDesktop1 to the Provisioning Server vDisk, the agent is copied to the vDisk at the same time.

In this task, you do the following:
- Install the Virtual Desktop Agent on the BaseDesktop1 VM
- Customize the Desktop for Your Users
- Configure Automatic Access to XenApp Provided Applications

To install the Virtual Desktop Agent on the BaseDesktop1 VM

1. In Hyper-V Manager, connect to **BaseDesktop1**. A new window should appear with the BaseDesktop1 VM console.
2. Verify that BaseDesktop1 is running. The VM must be running to complete this procedure.
3. Log into BaseDesktop1 using a domain administrator account.
4. On pServerOne, insert the Desktop Delivery Controller installation disc or an ISO file can be used.
5. In the startup window, click **Install Virtual Desktop Components**.

    Note: The installation program prompts you to install .NET 3.5 Framework if it is not already installed.

6. On the **Welcome to the Citrix Virtual Desktop Agent Setup Wizard** page, click **Next**.
7. Read and accept the license agreement, and click **Next**.
8. On the **Port Number** page, accept the default port number, **8080**, and click **Next**.

    Note: The standard session reliability and ICA ports are used by the client device to connect to the Virtual desktop; you cannot configure these ports as part of the virtual desktop installation process.

9. If the Windows firewall is switched on, the **Windows Firewall Configuration** page appears; in this case, select **Automatically configure Windows firewall** and click **Next**.
10. On the **Farm selection** page, select the check box **Select farm now**, and choose **XenDtFarm** from the list of farms.
11. On the **Ready to Install** page, click **Install**.
12. When the installation is complete, click **Finish**. Restart the virtual desktop for the configuration changes to take effect.

Customizing the Desktop for Your Users

At this stage of the installation process you can optionally perform additional customizations to the virtual desktop image, depending on your users' requirements.

Configuring Automatic Access to XenApp-Provided Applications

If you have either the Enterprise or the Platinum editions of XenDesktop, you can install XenApp and configure it to provide applications for delivery to a user's desktop.

If virtual desktops have **App Receiver** installed, a user can automatically log into XenApp and use its hosted applications. To do this, you have to add App Receiver to the virtual desktop image so that it gets built into the vDisk that is used for the virtual desktops.

For more information, refer to the XenApp (Presentation Server) documentation, available on http://support.citrix.com.

Configuring Microsoft Application Virtualization (App-V) with XenDesktop

If virtual desktops have **Microsoft Application Virtualization Desktop Client** installed, a user can automatically log into the App-V Streaming Server and use its streamed applications. To do this, you have to add App-V Desktop Client to the virtual desktop image (BaseImage1) so that it gets built into the vDisk that is used for the virtual desktops.

For more information about App-V, go to:
http://www.microsoft.com/systemcenter/appv/default.mspx

http://download.microsoft.com/download/f/7/8/f784a197-73be-48ff-83da-4102c05a6d44/MSAppVirt45Trial_Guide_Final.docx

Task 8. Preparing and Provisioning Virtual Desktops

In this task, you do the following:
- Add BaseDesktop1 to the Provisioning Server database
- Install a target device for the 32 bit platform on the BaseDesktop1 VM
- Image BaseDesktop1 to the Provisioning Server virtual disk
- Set Virtual Disk Access Mode to Standard Image

To add BaseDesktop1 to the Provisioning Server database
1. Power off the VM BaseDesktop1
2. In Hyper-V Manager, right-click on **BaseDesktop1** and click **Settings.**
3. In the left pane of the **Settings for Base Desktop1** window, select **BIOS** and move **Legacy Network Adapter** to the top of the **Startup Order** list.
4. In the left pane of the **Settings for BaseDesktop1** window, click **Legacy Network Adapter** and make a note of the MAC address for the BaseDesktop1.
5. Restart the BaseDesktop1 VM.
6. In the VM console, press any key to boot to the OS.
7. On the Provisioning Server VM (vDesktopPvS), click **Start** > **All Programs** > **Citrix** > **Provisioning Server** > **Provisioning Server Console.**
8. In the left pane of the console, navigate to the **Device Collections** folder for the site, right-click the **Collection**, and select **Create Device**.
9. Specify the device name **BaseDesktop1** and the description **Master virtual desktop image**.
10. Type the MAC address of BaseDesktop1 that was noted in step 4 and click **OK**.
11. In the left pane of the console, navigate to **Collection** folder right-click the new device (BaseDesktop1) and select **Properties**.
12. In the **Target Devices Properties** window, select **Hard Drive** from the **Boot from** dropdown list.
13. In the **Target Devices Properties** window, select the **vDisks** tab, under **vDisks for this Device** click **Add**, and select **XDStore\vDisk1**. Click **OK** and then click **OK** again.

   Note: You can confirm that the vDisk has been successfully created at the end of the next procedure.

To install a target device for the 32 bit platform on the BaseDesktop1 VM
1. Log into BaseDesktop1 using a domain administrator account.
2. On pServerTwo, insert the Provisioning Server disc or an ISO file can be used.
3. On the Provisioning Server start-up window, click **Install Target Device for 32 bit Platform**.
4. On the **Welcome to the Installation Wizard for Citrix Provisioning Server Target Device** page, click **Next**.
5. Read and accept the license agreement, and click **Next**.
6. On the **Customer Information** page, enter your information, accept the default option, **Anyone who uses this computer (all users)**, and click **Next**.
7. On the **Destination Folder** page, accept the default location and click **Next**.

8. On the **Ready to install the program** page, click **Install**.
9. Restart BaseDesktop1 when prompted.
10. On the I**nstallation Wizard completed** page, click **Finish** and restart BaseDesktop1 when prompted.
11. Once restarted, log into BaseDesktop1.
    The vDisk is now mapped to BaseDesktop1, and a vDisk icon appears in the Windows notification area.

12. Double-click the **vDisk** icon and confirm that the vDisk status is **Active**.
13. In **My Computer**, make a note of the new drive letter (typically, the letter is **E**.)

To image BaseDesktop1 to the Provisioning Server virtual disk
1. On the BaseDesktop1 VM, click **Start** > **All Programs** > **Citrix Provisioning Server** > **Provisioning Server Image Builder**. The Provisioning Server Image Builder wizard opens.
2. On the **Device Image Builder** page, click **Optimize**. The Provisioning Server Device Optimization Tool dialog box opens.
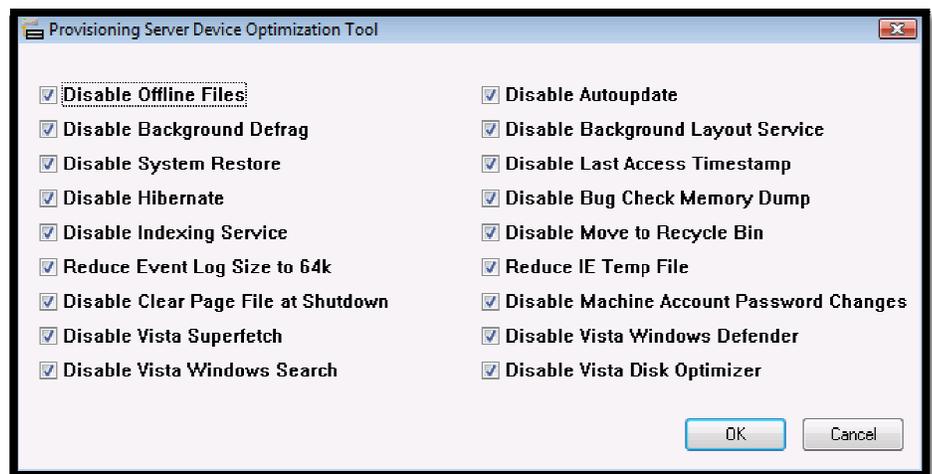
3. Leave all check boxes selected and click **OK**.
4. On the **Device Image Builder** page, use the **Browse** button to set the destination drive to the drive letter of the new hard disk drive and click **OK**.

    The destination drive maps to the vDisk you created in your Provisioning Server VM.

    Note: In My Computer on BaseDesktop1, the vDisk appears as a disk under **Hard Disk Drives** in **My Computer**, and as a device under Devices with Removable Storage.

5. Ensure that the checkbox **Delete all files and folders in destination path before building image** is selected and click **Build**.
6. On the **Confirm Build** details page, click **Yes**.
7. When the client image build is complete, click **OK**.
8. Click **Close**. Disregard this step if the VM restarts after the imaging build process is complete.
9. Shutdown the BaseDesktop1 VM.

    Note: You can restart the BaseDesktop1 VM at any time, for example, to add new patches or software, and rebuild your vDisk in the same way.

To set Virtual Disk Access Mode to Virtual Image
1. On the vDesktopPvS VM, click **Start** > **All Programs** > **Citrix Provisioning Server** > **Provisioning Server Console**.
2. In the left pane of the console, navigate to the **vDisk Pool** folder for the site, right-click **vDisk1** in the details pane, and select **Properties**, and click **Edit file properties**.
3. In the **vDisk File Properties** window, select the **Mode** tab and, under **Access Mode**, select **Standard Image.** Click **OK** and then click **OK** again.

Tip: If the disk is locked, right-click **vDisk1** in the details pane of the console, select **Manage Locks**, click **Remove Locks** and then click **Close**.

Task 9. Creating Multiple Virtual Desktops

Create the desktop VMs from a single VM image.
In this task, you do the following:
- Create multiple virtual desktops
- Modify the idle desktop count

To create multiple virtual desktops on pServerTwo

1. On the vDesktopPvS VM, click **Start** > **All Programs** > **Citrix Provisioning Server** > **XenDesktop Setup Wizard**.
2. On the **Welcome to the XenDesktop Setup Wizard** page, click **Next**.
3. On the **Desktop Farm** page, select **XenDTFarm** from the list and click **Next**.
4. On the **Hosting Infrastructure** page, select **Microsoft virtualization**, specify the server **vDesktopVMM.XenDT.net**, and click **Next**.
5. Specify credentials appropriate to the VM infrastructure (XenDT\administrator) and click **OK**.
6. On the **Virtual Machine Template** page, select **BaseDesktop1** and click **Next**.
7. On the **Virtual Disk (vDisk)** page, select **vDisk1** and click **Next**.
8. On the **Virtual Desktops** page, type the following values and click **Next**.

Number of desktops	3
Common name	vDesktop
Start from	1

These values create five desktops, named vDesktop1 to vDesktop3.
9. On the **Organizational Unit Location** page, select **Use default OU**. Click **Next**.
10. On the **Desktop Group** page, click **Create new desktop group** and type the name **XDgroup** for the new desktop group. Ensure that the **Allow immediate access** check box is selected and click **Next**.
11. On the **Desktop Creation** page, ensure the details that you entered are correct and click **Next** to create the desktops.
12. Wait until the **Summary** page appears and then click **Finish.**

The following changes have been made to your systems:
- The VMs vDesktop1 through vDesktop3 are visible in both Hyper-V Manager and the Provisioning Server Console
- The VMs are added to the domain and appear under the **Computers** container in Active Directory
- A desktop group named XDGroup has been created and appears in the Access Management Console on the Desktop Delivery Controller

To modify the idle desktop count
Desktop Delivery Controller manages the number of virtual desktops that are idle, based on the time of day. The idle settings enable administrators to control the number of virtual desktops that are started and ready for access at any given time.

The XenDesktop Setup Wizard automatically configures and optimizes the idle pool setting in the desktop group based on the number of virtual desktops you created. However, you may want to change the default settings.

1. In the vDesktopDDC VM, click S**tart > All Programs > Citrix > Management Consoles > Access Management Console.**
2. In the left pane, navigate to **Citrix Resources > Desktop Delivery Controller > XenDtFarm > Desktop Groups**, and right-click the XenDesktop group (XDgroup).
3. Click **Properties**. The Desktop Group Properties page appears.
4. Click **Idle Pool Settings** in the left pane.
5. In the **Idle Desktop Count** section, modify the settings as follows:

Business hours	3
Peak time	3
Out of hours	1

6. Click **Apply** to save your settings and then click **OK**.

   Note: You can use Hyper-V Manager to see which VMs are started. If your local time is within the business hours, you see that three VMs (vDesktop_1, vDesktop_2, and vDesktop_3) have been started. If you are outside business hours, only one VM is started.

XenDesktop Endpoint Devices

You can configure user access to virtual desktops in two ways, depending on the needs of your users:

- **Window view mode.** Users log on to their local desktops and view virtual desktops using the Desktop Receiver user interface. Virtual desktops appear as windows with toolbars, so that users have full control of their virtual desktop windows.
  This configuration is suitable for users who need local access to multiple desktops or remote access to desktops. Typically, these users are knowledge workers performing complex, non-repetitive tasks who need the flexibility that this mode brings.
- **Full-screen-only mode.** Users log on to their local computers as normal, but see only a virtual desktop as a full-screen, seamless window. In this mode, the user experience is indistinguishable from that of a local desktop. In contrast to the window view mode, there is no virtual desktop window to control.
  This configuration offers less control to users and is suited to office-based task workers performing repetitive tasks in standardized environments. These users need access only to a single virtual desktop.

This section guides you through the setting up of both modes, and includes the following tasks:

- Task 1. Preparing the Endpoint Device
- Task 2. Convert the Endpoint Device to Full-Screen-Only Mode
- Task 3. Connect to a Virtual Desktop from a Thin Client Device
- Task 4. Observing Virtual Desktop Usage

Task 1. Preparing the Endpoint Device

This task describes how to configure an endpoint device so users can access virtual desktops in firstly in window-view mode from within a local desktop session.

This task includes the following procedures:
- Configure the endpoint to receive virtual desktops
- Experience a virtual desktop in a window-view mode

To configure the endpoint to receive virtual desktops
This procedure applies only to Windows XP endpoint devices.

1. Check that the endpoint is a member of the domain **XenDT.net**. If it is not, add the endpoint to domain.
2. Log in to the endpoint device and insert the XenDesktop Components disk.
3. Locate and run **DesktopReceiverEmbedded-1.msi**

   Note: Some text in the Citrix Desktop Receiver Embedded Edition user interface, including the Help, refers to the "Citrix Presentation Server Clients for Windows" and to "Citrix Presentation Server Client (XenDesktop)".

4. On the **Select Language** dialog box, select your language from the drop-down list and click **OK**.
5. On the **Welcome** page, click **Next**.
6. Read and accept the license agreement, and click **Next**.
7. On the **Select Client** page, accept the defaults and click **Next**.
8. On the **Server Address** page, type the value of the IP address (**192.168.1.11**) of the Desktop Delivery Controller VM (vDesktopDDC) on pServerOne, and click **Next**.
9. On the **Select Program Folder** page, accept the defaults and click **Next**.
10. On the **Client Name** page, accept the defaults and click **Next**.
11. On the **Use Local Name and Password** page, select **Yes** and click **Next**.

12. On the **Program Neighborhood Options** page, verify that all check boxes are selected and change the setting to **Yes** to enable access to virtual desktops on this computer. Click **Next**.
13. On the **Ready to Install** page, review the summary and click **Next**.
14. Click **Finish**.
    A shortcut to **Citrix Program Neighborhood Agent** appears on the desktop.

To experience a virtual desktop in window-view mode
1. On the endpoint's desktop, double-click the newly installed shortcut to open the **Citrix Program Neighborhood Agent** logon-dialog box. Type you name and password using the credentials you created in "To create user accounts" on page 18.
   The **Citrix Program Neighborhood Agent** icon appears in the Windows notification area
2. Click this icon to open the popup menu and navigate to the **Desktops** submenu to view the virtual desktop(s) that are available for connection.
3. Click a virtual desktop to open it. The virtual desktop appears in window-view mode with a toolbar for full user control of the window, as shown below.

Task 2. Converting the Endpoint Device to Full-Screen-Only Mode

This task describes how to configure an endpoint device so users experience a seamless virtual desktop in full-screen-only mode.

This task includes the following steps:
- Enable the full-screen-only mode on the endpoint device
- Experience a seamless virtual desktop

To enable the full-screen-only mode on the endpoint device

Full-screen-only desktops require a second installation (in addition to the Desktop Receiver Embedded Edition installation) as follows:
1. On the same endpoint device that you configured in Task 1, run **DesktopReceiverEmbedded-2_en.msi**, which installs the full-screen-only client, from the XenDesktop Components installation media.
2. On the **License Agreement** page, read and accept the terms of the license agreement, and click **Install**.
3. Wait until the **Installation Completed** dialog box appears, and then click **Close**.
4. Click **Yes** to restart the computer and complete installation

To experience a seamless virtual desktop

When the computer restarts, a Windows start-up dialog box appears, followed by the standard **Log On to Windows** dialog box.

1. Log into the computer as one of the authorized users that you created in "To create user accounts" on page 18.

   Note: To experience the virtual desktop in full-screen-only mode, you must log on as a *domain user*, not as an *administrator*. If you log on as a local or domain administrator, you log on to the local computer.

   Citrix startup messages appear while the connection to the virtual desktop is being established.
2. You are now connected and able to use the virtual desktop. When users work in this environment, they are unaware that the desktop is being hosted remotely.
3. Log off. The standard **Welcome to Windows** dialog box appears.

Task 3. Connecting to a Virtual Desktop from a Thin Client Device

Connection from a thin client depends on the type of thin client and whether the client supports a Web browser or, alternatively, the Citrix XenApp plugin.

To connect to a virtual desktop from a thin client device

There are two main options:

- **Option 1: Thin client supports a Web browser**

  Specify the following start-up URL for the thin-client Web browser:
  http://vDesktopDDC.
- **Option 2: Thin client supports Citrix XenApp plugin**

  Specify the following start-up URL for the PNAgent
  http://vDesktopDDC/Citrix/PNAgent/config.xml.

In this deployment, **vDesktopDDC** is the name of the server VM on which Desktop Delivery Controller runs.

Note: These options are not explicitly supported in this release because of differences in the thin client manufacturer's configuration tools. Check the documentation of your thin client for details on how to setup these options.

Task 4. Observing Virtual Desktop Usage

As an administrator, you can use the administration consoles to observe the changes that take place in the evaluation environment both before and after a user logs on.

Access Management Console	The connection state of the virtual desktop changes In Use. Right-click the desktop in use, and click Shutdown/Suspend. Note that you can administer the VMs directory from the Access Management Console without having to go to the hypervisor's console.
SCVMM Admin Console or Hyper-V Manager	Additional VMs has been started to maintain a larger pool count of three, as specified in Task10.
Provisioning Server Console	Right-click vDisk1, and click Show Connections. Note that all the computers that are currently running are using the same vDisk.