Server Administration

Module Number: 01

Module Name: Installing and Configuring Windows Server 2012

Version Code: SA1_Updated
Released Date: 5-FEB-2024

AIM:

Explores the method to install, upgrade, and deploy the Windows Server.

Objectives:

The Objectives of this module are:

- Explain the key concepts of Windows server 2012, its types and other versions.
- Explain the roles and features of windows server 2012.
- Describe the system requirement for installation and configuration.
- Describe the Server Core and its functionalities.
- Explain upgrade path, Server migration tools, NIC teaming.

Outcome:

At the end of this module, you are expected to:

- Elaborate the different types of windows servers and its versions.
- Understand the categorization of Server 2012 and its roles and features.
- Install and configure windows server 2012 and Server core.
- Understand the migration tools, system requirements, upgrade path.
- Understand the configuration of local storage and WDS

Contents

Introduction and Selection of Windows Server 2012 Edition

Introduction- windows server 2012

- Windows Server 2012 is probably the most significant release of the Windows Server platform ever.
- With an innovative new user interface, powerful new management tools, enhanced Windows PowerShell support, and hundreds of new features in the areas of networking, storage, and virtualization.
- Windows Server 2012 can help IT deliver more while reducing costs.
- Windows Server 2012 also was designed for the cloud from the ground up and provides a foundation for building both public and private cloud solutions to enable businesses to take advantage of the many benefits of cloud computing

Introduction- windows server 2012

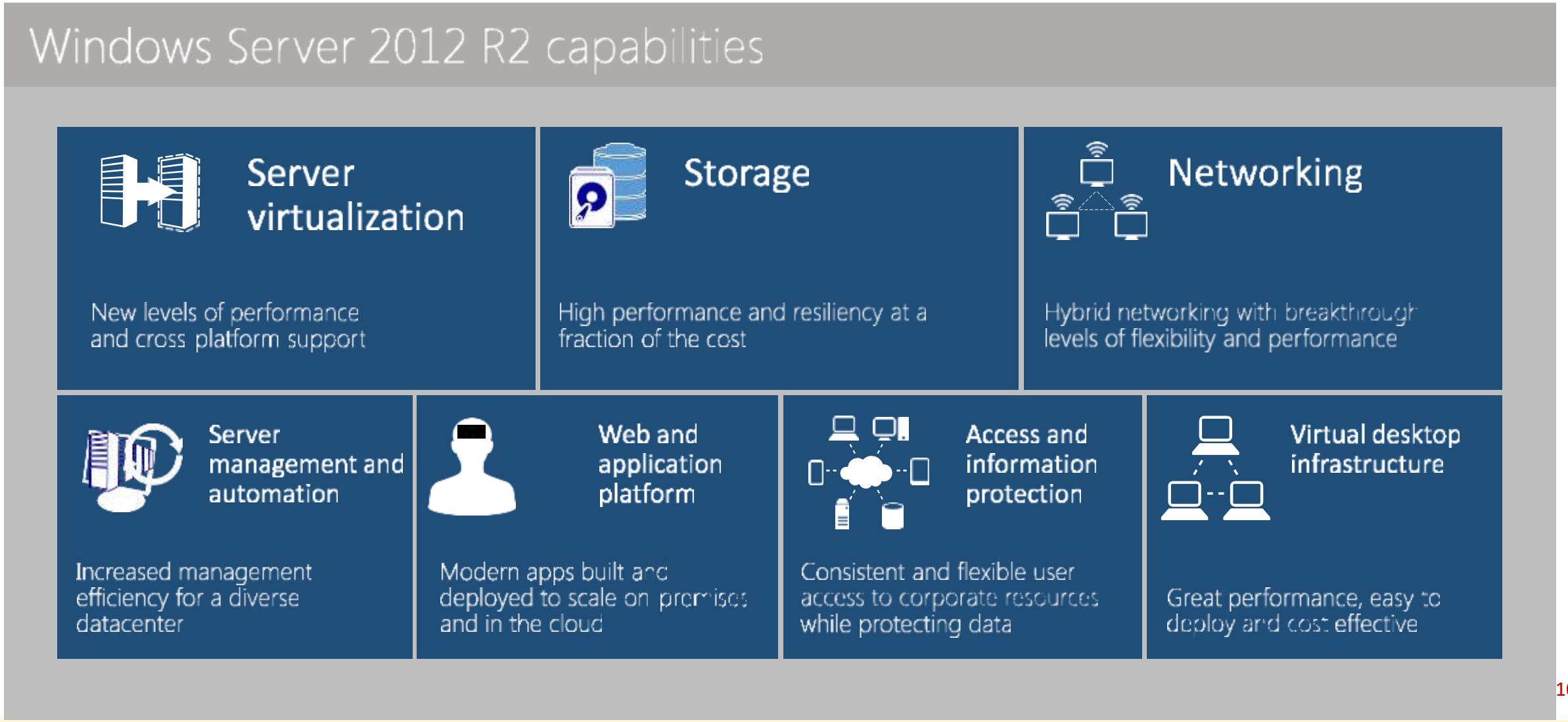
- Windows Server 2012 and Hyper-V provide significant improvements in scalability and availability, which enables much higher consolidation ratios.
- With Windows Server 2012 and Hyper-V supporting clusters up to 64 nodes running up to 4,000 VMs and up to 1,024 active VMs per host, a relatively small amount of physical hardware can support a large amount of IT capability.

Introduction- windows server 2012

Windows Server 2012 can now support-

- Up to 64 virtual processors per VM (with a maximum of 2,048 virtual processors per host)
- Up to 1 terabyte (TB) of random access memory (RAM) per VM (with up to 4 TB RAM per host)
- Virtual hard disks (VHDs) up to 64 TB in size

Windows Server 2012 R2: Overview



Windows server2012

Windows Server 2012 R2 delivers significant value around the following seven key capabilities:

- **Server virtualization**. Windows Server 2012 R2 is a virtualization platform that has helped organizations of all sizes realize considerable cost savings and operational efficiencies. With industry-leading size and scale, Hyper-V is the platform of choice for you to run your mission-critical workloads. Hyper-V in Windows Server 2012 R2 greatly expands support for host processors and memory. Using Windows Server 2012 R2, you can take advantage of new hardware technology, while still utilizing the servers you already have. This way you can virtualize today, and be ready for the future.

Windows server2012

- **Storage**. Windows Server 2012 R2 was designed with a strong focus on storage, from the foundation of the storage stack up, with improvements ranging from provisioning storage to how data is clustered, transferred across the network, and ultimately accessed and managed. Windows Server 2012 R2 offers a wide variety of high-performance, highly available storage features and capabilities, while taking advantage of industry-standard hardware for dramatically lower cost.

- **Networking**. Windows Server 2012 R2 makes it as straightforward to manage an entire network as a single server, giving you the reliability and scalability of multiple servers at a lower cost. Automatic rerouting around storage, server, and network failures enable file services to remain online with minimal noticeable downtime. What's more, Windows Server 2012 R2 – together with System Center 2012 R2 – provides an end-to-end Software Defined Networking solution across public, private, and hybrid cloud implementations.

Windows server 2012

- **Server management and automation**. Windows Server 2012 R2 enables IT professionals to meet the need for fast, continuous and reliable service within their data centers by offering an integrated platform to automate and manage the increasing data center ecosystem. Windows Server 2012 R2 delivers capabilities to manage and automate many servers and the devices connecting them, whether they are physical or virtual, on-premises or off, and using standards-based technologies.

- **Web and application platform**. Windows Server 2012 R2 builds on the tradition of the Windows Server family as a proven application platform, with thousands of applications already built and deployed and a community of millions of knowledgeable and skilled developers already in place. Windows Server 2012 R2 can offer your organization even greater application flexibility. You can build and deploy applications either on-premises or in the cloud—or both at once, with hybrid solutions that work in both environments.

Windows server2012

- **Access and information protection**. With the new capabilities in Windows Server 2012 R2, you will be able to better manage and protect data access, simplify deployment and management of your identity infrastructure on-premises and across clouds, and provide your users with more secure remote access to applications data from virtually anywhere and any device.

- **Virtual desktop infrastructure**. With Windows Server 2012 R2, Microsoft is making it even easier to deploy and deliver virtual resources across workers' devices. VDI technologies in Windows Server 2012 R2 offer easy access to a rich, full-fidelity Windows environment running in the data center, from virtually any device. Through Hyper-V and Remote Desktop Services, Microsoft offers three flexible VDI deployment options in a single solution: Pooled Desktops, Personal Desktops, and Remote Desktop Sessions (formerly Terminal Services).

Selecting a Windows Server 2012 Editions

- **Windows Server 2012** is an operating system built by Microsoft and is the successor of Windows Server 2008 R2. Windows Server 2012 is the server edition of Windows 8 and is available since September 2012. Its minor update (Windows Server 2012 R2) is available since October 2013.
- Windows Server 2012 is available in 4 editions:
  - Foundation
  - Essentials
  - Standard
  - Datacenter

Selecting a Windows Server 2012 Editions

- The editions are suitable for the following application areas:-

Edition	Ideal for...	High level feature-comparision	Licensing model	Memory limits	Pricing
Foundation	Cost-efficient all round server	Essential server functionality without virtualization rights	Server (Limited to 15 users)	32 GB RAM	OEM only
Essentials	Environments in small companies	Essential server functionality without virtualization rights	Server (Limited to 25 users)	64 GB RAM	$425
Standard	Non-virtualized or lightly virtualized environments	All features, with two virtual instances	Processor + CAL*	4 TB RAM	$882per 2 procs
Datacenter	Highly-virtualized private cloud environments	All features, with unlimited virtual instances	Processor + CAL*	4 TB RAM	$4,809 per 2 procs

(*) CALs are required for each user or device, who directly or indirectly accesses a server.

Selecting a Windows Server 2012 Editions

- **Minimal System Requirements for Windows Server 2012**

*Servers with more than 60GB of RAM will require more disk space for

Paging hibernation and dump files

Description	Requirements
CPU architecture	x64
CPU clock rate	1,4 GHz
RAM	512 MB
Disc capacity	32 GB *

Selecting a Windows Server 2012 Editions

- **Edition comparison by server roles**

Server role	Datacentre/Standard	Essentials	Foundation
AD Certificate Services	X	Automatically Installed/Configured (1)	Partial/Limited (1)
AD Domain Services	X	Automatically Installed/Configured (2)	X (3)
AD Federation Services	X	X	X
AD Lightweight Directory Services	X	X	X
AD Rights Management Services (4)	X (4)	X (4)	X (4)
Application Server	X	X	X
DHCP Server	X	X	X
DNS Server	X	Automatically Installed/Configured	X
Fax Server	X	X	X
File Services	X	Automatically Installed/Configured (5)	Partial/Limited (5)
Hyper-V	X	-	-
Network Policy & Access Services	X	Automatically Installed/Configured	Partial/Limited
Print & Document Services	X	X	X
Remote Access	X	Automatically Installed/Configured (6)	limitiert (6)
Remote Desktop Services (7)	X (7)	- (7)(8)	Partial/Limited (7)(9)
UDDI Services	X	X	X
Web Server (IIS)	X	Automatically Installed/Configured	X
Windows Deploy Services	X	X	X
Windows Server Update Services	X	-	-

Selecting a Windows Server 2012 Editions

1. Limited to creating Certificate Authorities – there are no other Active Directory Certificate Services features (Network Device Enrollment Services, Online Responder Service
2. Must be the root of ADDS forest and domain and have all FSMO roles.
3. If ADDS role is installed, must be the root of forest and domain and have all FSMO roles.
4. Requires an incremental AD RMS CAL for access.
5. The data de-duplication feature is not available.
6. Limited to 50 RRAS connections, 10 IAS connections; Direct Access and VPN are supported.
7. Requires an incremental RDS CAL for access, with the exception of using the Remote Web Access feature of the Essentials edition.
8. Only the RD Gateway role service is installed and configured, other RDS role services including RD Session Host are not supported.
9. Limited to 50 Remote Desktop Services connections.

Server Roles and Features

Windows Server 2012 Roles and Features

Windows server supports following roles-

Roles:

1. Active Directory Certificate Services
2. Active Directory Domain Services
3. Active Directory Federation Services
4. Active Directory Lightweight Directory Services
5. Active Directory Rights Management Services
6. Application Server
7. DHCP Server
8. DNS Server
9. Fax Server
10. File and Storage Services
    a. File and iSCSI Services
        i. File Server
        ii. BranchCache for Network Files
        iii. Data Deduplication

Windows Server 2012 Roles

iv. DFS Namespaces

v. DFS Replication

vi. File Server Resource Manager

vii. File Server VSS Agent Services

viii. iSCSI Target Server

ix. iSCSI Target Storage Provider

x. Server for NFS

- b. Storage Services

11. Hyper-V

12. Network Policy and Access Services

13. Print and Document Services

14. Remote Access

15. Remote Desktop Services

16. Volume Activation Services

17. Web Server (IIS)

Windows Server 2012 Features

Features:

- 1. .NET Framework 3.5 Features
- a. .NET Framework 3.5 (includes .NET 2.0 and 3.0)
- b. HTTP Activation
- c. Non-HTTP Activation
- 2. .NET Framework 4.5 Features
- a. .NET Framework 4.5
- b. ASP.NET 4.5
- c. WCF Services
- i. HTTP Activation
- ii. Message Queuing (MSMQ) Activation)
- iii. Named Pipe Activation
- iv. TCP Activation
- v. TCP Port Sharing

3. Background Intelligent Transfer Service (BITS)
a. IIS Server Extension
b. Compact Server
4. BitLocker Drive Encryption
5. BitLocker Network Unlock
6. BranchCache
7. Client for NFT
8. Data Center Bridging
9. Enhanced Storage
10. Failover Clustering
11. Group Policy Management
12. Ink and Handwriting Services
13. Internet Printing Client
14. IP Address Management (IPAM) Server
15. iSNS Server Service
16. LPR Port Monitor
17. Management OData IIS Extension

Windows Server 2012 Features

18. Media Foundation
19. Message Queuing
a. Message Queuing Services
b. Message Queuing DCOM Proxy
20. Multipath I/O
21. Network Load Balancing
22. Peer Name Resolution Protocol
23. Quality Windows Audio Video Experience
24. RAS Connection Manager Administration Kit (CMAK)
25. Remote Assistance
26. Remote Differential Compression
27. Remote Server Administration Tools
28. RPC over HTTP Proxy
29. Simple TCP/IP Services
30. SMTP Server
31. SNMP Server
    a. SNMP WMI Provider
32. Subsystem for UNIX-based Applications (Deprecated)
33. Telnet Client
34. Telnet Server
35. TFTP Client
36. User Interfaces and Infrastructure
a. Graphical Management Tools and Infrastructure
b. Desktop Experience
c. Server Graphical Shell
37. Windows Biometric Framework
38. Windows Feedback Forwarder
39. Windows Identity Foundation 3.5
40. Windows Internal Database
41. Windows PowerShell
a. Windows PowerShell 3.0
b. Windows PowerShell 2.0
c. Windows PowerShell ISE
d. Windows PowerShell Web Access

Windows Server 2012 Features

- 42. Windows Process Activation Service
- a. Process Model
- b. .NET Environment 3.5
- c. Configuration APIs
- 43. Windows Search Service
- 44. Windows Server Backup
- 45. Windows Server Migration Tools
- 46. Windows Standards-Based Storage Management
- 47. Windows System Resource Manager (Deprecated)
- 48. Windows TIFF IFilter
- 49. WinRM IIS Extension
- 50. WINS Server
- 51. Wireless LAN Service
- 52. WoW64 Support
- 53. XPS Viewer

Server Licencing

Server Licensing(CAL)

- Windows Server (WS) 2012 will be available in two general purpose editions: Standard and Datacenter. These editions will have the same technical capabilities and be licensed by the same paired-processor model. The only differences between the editions will be virtualization use rights and license price. Even with the elimination of the Enterprise edition, many organizations may have slightly lower licensing costs. Client Access Licenses (CALs) and reassignment rights remain largely unchanged, and the addition of even one WS 2012 server in an organization could trigger the need for new CALs throughout the organization.

Server Licensing

Three Editions Eliminated-

WS 2012 will not offer the following editions, which were present in WS 2008 R2:

- **Enterprise** is replaced by WS 2012 Standard. Enterprise was targeted at servers dedicated to a single heavy-duty workload, such as a database management system, or servers hosting a light virtualization workload—four or fewer virtual machines (VMs). Customers will be able to license additional servers to run WS 2008 R2 Enterprise by purchasing WS 2012 Standard and exercising downgrade rights.
- **Windows Web Server** is replaced by WS 2012 Standard. Web Server was targeted at servers dedicated to a single-purpose Internet-facing Web site, Web application, or Web service. Because Web Server did not require CALs when used in this manner, WS 2012 Standard will not require CALs when used for Web workloads. Windows Azure will also offer several options for Microsoft hosting of Windows Server—based Web sites.
- **Windows HPC Server** has been eliminated as a separate edition. Windows HPC Server was targeted at high-performance computing (HPC) applications that use multiple processors or computers working in parallel for compute-intensive calculations. Instead, Microsoft has indicated that an "HPC pack" will be available in the future as a free download for WS 2012 customers, and this pack will likely provide the head node services of Windows HPC Server and run on WS 2012 Standard or Datacenter edition. As with Web Server, Windows Azure is also playing an expanded HPC role.

Server Licensing-Licensing Model Changes

- As with previous versions of Windows Server, licensing WS 2012 Standard and Datacenter editions still generally require licenses for servers as well as for the client users or devices that access servers. But how editions are licensed for each server is changing.

1. Server Licenses Cover Two Physical Processors

- Each WS 2012 Standard and Datacenter server license covers two physical processors. For example, a server with four processors must have two WS 2012 Standard or Datacenter edition licenses. The number of processor cores in a physical processor has no impact on licensing rules or costs, in contrast to the rules for the recently released SQL Server 2012. This is a change from WS 2008 R2, where a single Standard edition license covers a server with up to four processors, an Enterprise edition license covers up to eight processors (in both cases reflecting technical limits of the product), and a WS 2008 R2 Datacenter license covers a single processor only. Microsoft indicates that most of the installed base of WS 2008 R2 servers have one or two processors.

Server Licensing-Licensing Model Changes

- The new WS 2012 licensing model is consistent with the licensing model for System Center 2012, Microsoft's management tools for managing Windows servers and server applications, and the latest model for the Enrollment for Core Infrastructure (ECI). The ECI is an Enterprise Agreement enrollment that licenses servers for the Windows Server OS with management by System Center products.

2. Virtualization Usage Rights Change for Standard

- WS 2012 Standard includes the right to run up to two VMs per license. This is a change from WS 2008 R2 Standard, which only allowed running a single VM. (The discontinued Enterprise edition allowed up to four VMs). WS 2012 Standard licenses may be stacked to accommodate more VMs. For example, if a server has two processors and the organization wants to run eight VMs simultaneously on this server, the organization may assign the server four WS Standard 2012 licenses.

Server Licensing-Licensing Model Changes

- **Downgrade Rights**

  Many organizations purchase a license for a current version of Windows Server and then exercise downgrade rights to deploy a previous version, typically because a critical application is not yet supported on the current version. Not only does Windows Server offer version downgrade rights but it also includes "down-edition" rights as well. (Not all Microsoft products offer down-edition rights.) Customers who purchase WS 2012 Datacenter may downgrade to any previous version of Datacenter, Enterprise, or Standard edition. For example, an organization may license a server for WS 2012 Datacenter but run WS 2012 Standard in VMs.

Server Licensing-Some Licensing Rules Unchanged

As previously stated, the rules regarding CALs remain mostly unchanged:

1. CALs are still required for employees or their devices accessing Windows Server, and External Connectors are still an option (instead of CALs) for licensing access by external users, which Microsoft defines as users who are not either your or your affiliates' employees, or your or your affiliates' onsite contractors or onsite agents
2. Windows Server CALs can be bought for either users or devices (same price but different part numbers)
3. Use of Remote Desktop Services (RDS) and Rights Management Services (RMS) requires additive CALs; that is, the right to use those features is not included in the Windows Server CAL.

Server Licensing-License Reassignment Unchanged

- The rules for reassigning licenses are unchanged. Windows Server licenses purchased through Volume Licensing may not be reassigned from one server to another within 90 days of the last assignment, except in the event of permanent server hardware failure. The attachment of SA to the server license does not change the reassignment count-down clock.
- Although SA includes license mobility that allows customers to move Microsoft server-based applications into off-premises hosted data centers, it is important to keep in mind that customers cannot reassign a Windows Server license to a hoster's server that's being used in a multi-tenant scenario. Instead, use of Windows Server on hosters' servers must be licensed by the Service Provider under existing Services Provider License Agreement (SPLA) rules.

Server Licensing-2012 Edition Pricing

- The price for WS 2012 Standard edition (which can be used with two processors) is US$882. In comparison, WS 2008 R2 Standard edition is US$726 per server and Enterprise is US$2,358 per server. (Prices given here are for the U.S. Open License program list prices, which are generally the highest prices a U.S. customer will pay in volume licensing.)
- The price for WS 2012 Datacenter edition is US$4,809. (The effective price is the same as WS 2008 R2, but unit prices are different—WS 2008 R2 Datacenter covers one processor and costs half as much as the WS 2012 Datacenter license, which covers two processors.)
- Given the new pricing, stacking WS 2012 Standard licenses is more cost-effective for small or moderate virtualization loads; otherwise, Datacenter is the better choice. On a server with two processors, Datacenter is less expensive if the organization plans on running 11 or more VMs on the server. On a server with four processors, Datacenter is more cost-effective at 21 VMs or more.
- Microsoft has indicated the price of the WS 2008 R2 CAL (US$30), RDS CAL (US$85), and RMS CAL (US$37) will remain the same for WS 2012.

Installing Windows Server 2012

Installing Windows Server 2012

System requirements-

First of all, Windows Server 2012 R2 requires a 64-bit processor; Microsoft has discontinued 32-bit software with this release of Windows Server. Given table outlines the minimum and recommended hardware requirements for Windows Server 2012 R2 as provided by Microsoft:

Component	Minimum Requirement	Microsoft Recommended
Processor	1.4 GHz	2 GHz or faster
Memory	512 MB RAM	2 GB RAM or greater
Available Disk Space	32 GB	40 GB or greater
Optical Drive	DVD-ROM drive	DVD-ROM drive
Display	Super VGA (800x600) monitor	XGA (1024x768) monitor

Installing Windows Server 2012

- In addition, you must have the usual I/O peripherals, including a keyboard and mouse or compatible pointing device and a wired or wireless network interface card (NIC). If you can connect to a network location on which you have copied the contents of the Windows Server 2012 R2 DVD-ROM, you are not required to have a DVD-ROM drive on your computer. As with any other operating system installation, you will receive improved performance if you have a faster processor and additional memory on your system.
- Further, when you install Windows Server 2012 R2 on an Itanium-based computer, you must have an Intel Itanium 2 processor and additional hard disk space. Computers with more than 16 GB RAM require additional disk space for paging, hibernation, and dump files. With disk space at an all-time minimum cost, it is easy to acquire a high-capacity hard disk. You will certainly need plenty of disk space on a server that will be a domain controller in a large domain.

Installing Windows Server 2012

Performing a Clean Installation

1. Download Windows Server 2012

2. configure BIOS

3. Press **ENTER** to boot from DVD.

File starts loading

Installing Windows Server 2012

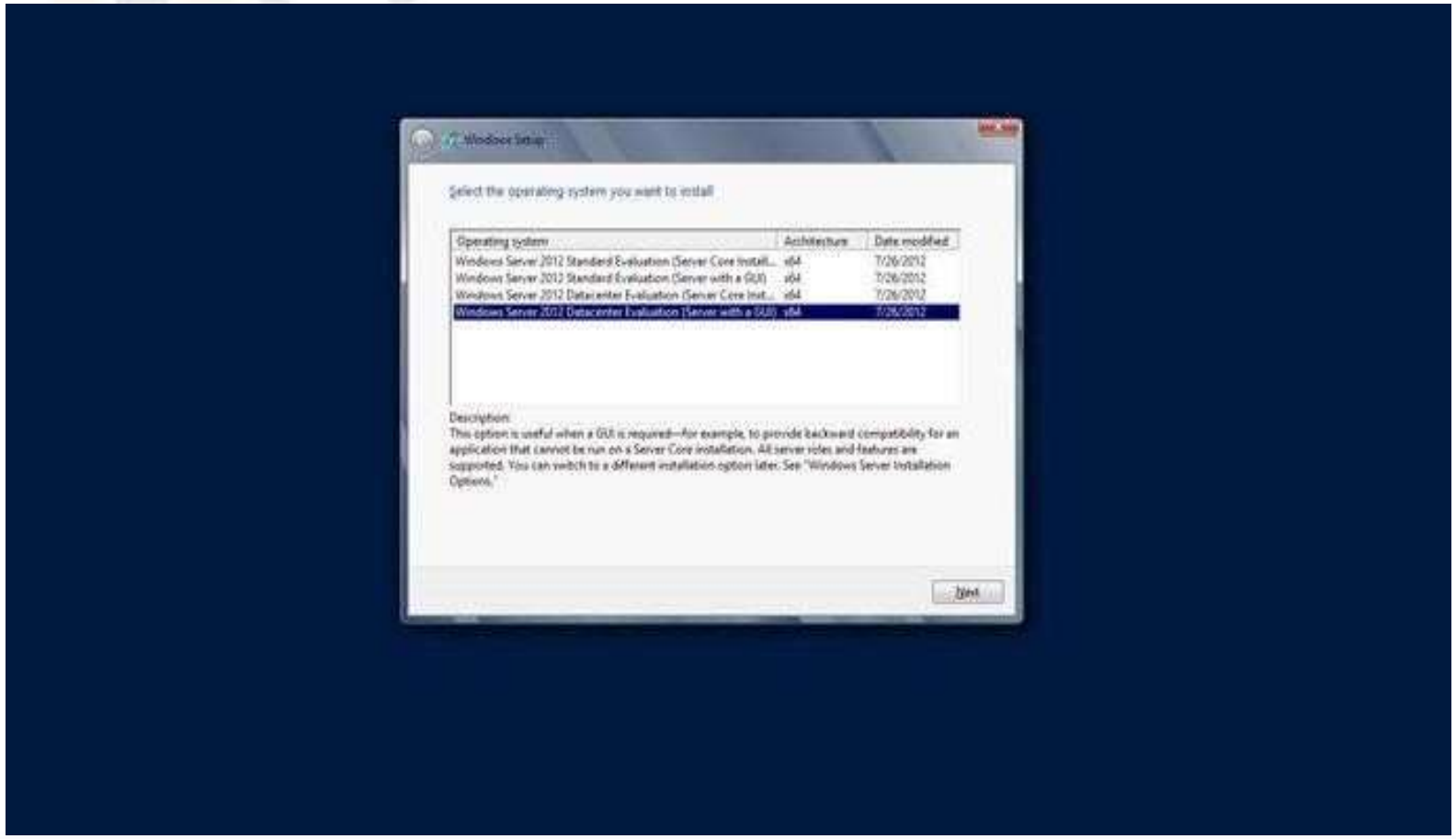
4. Take the defaults on the Language screen, and click **Next**.

Installing Windows Server 2012

5. Click **Install now** on the install screen.

Installing Windows Server 2012

6. Select Windows Server 2012 DataCenter Evaluation (Server With GUI).

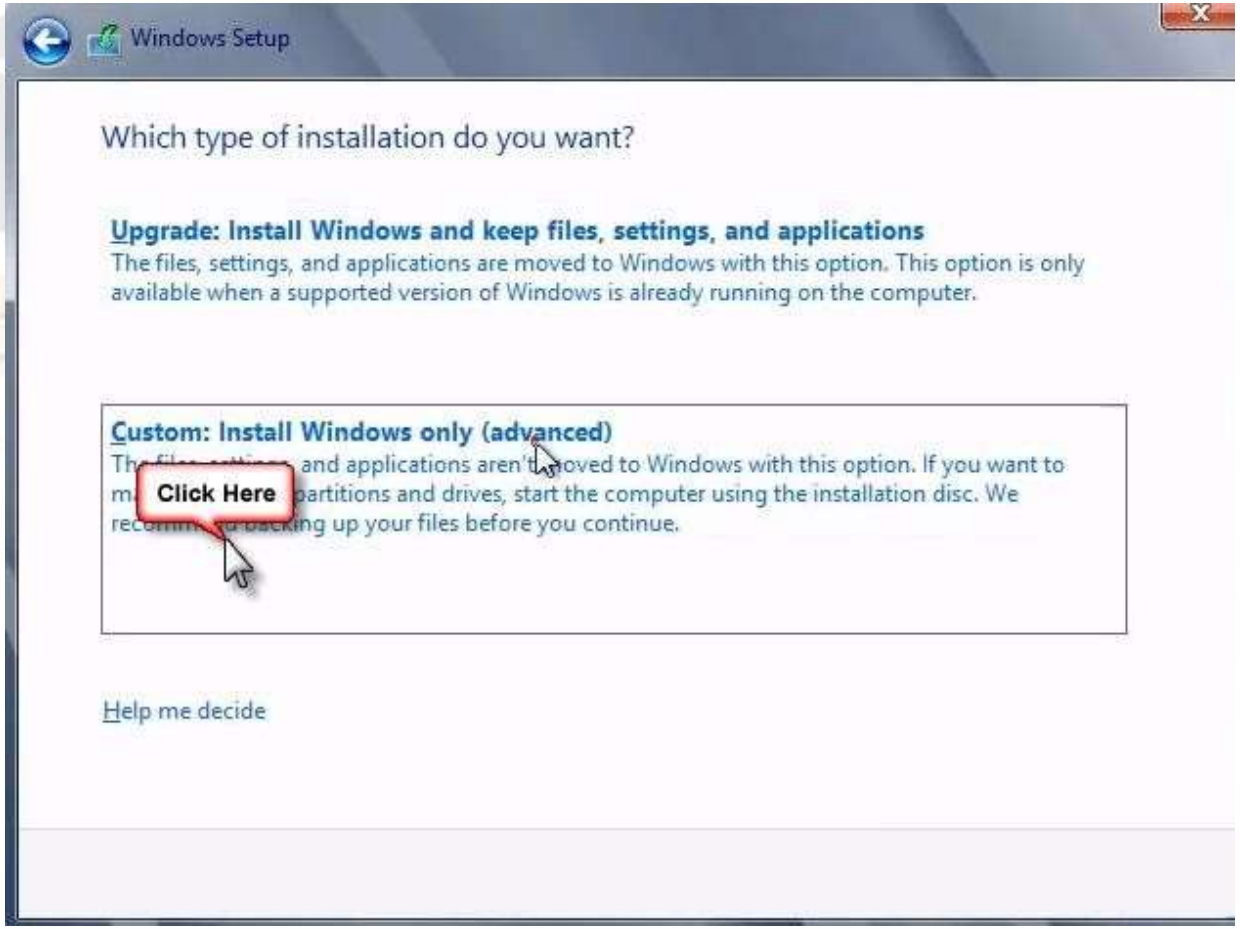


Installing Windows Server 2012

7. After you click Next from previous screen, Read the License terms, tick the "I accept the license terms" and click **Next**

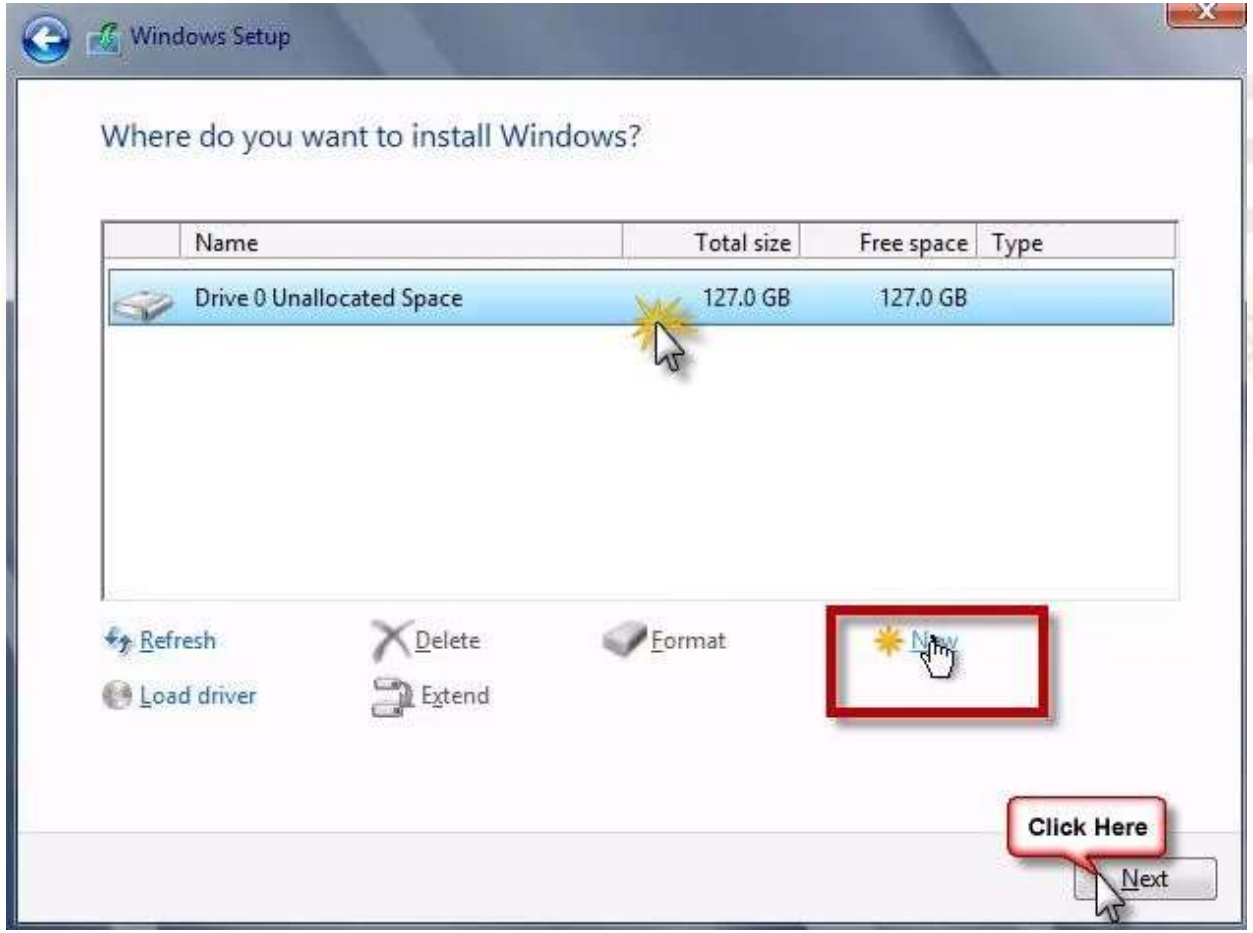
Installing Windows Server 2012

8. Click **Custom: Install Windows only (Advanced).**



Installing Windows Server 2012

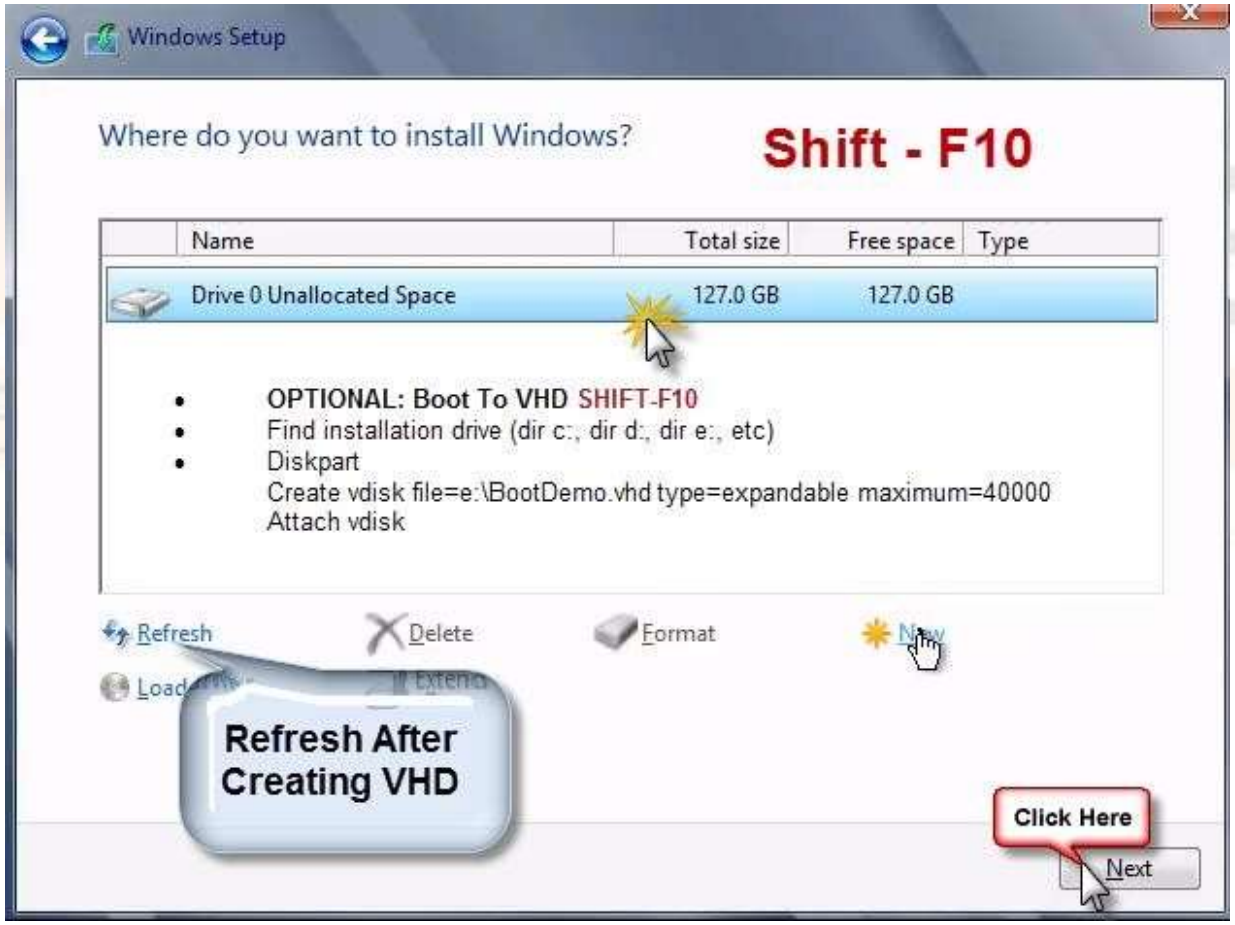
9. [Optional:] Click **drive options**; then you can create custom partitions.



Installing Windows Server 2012

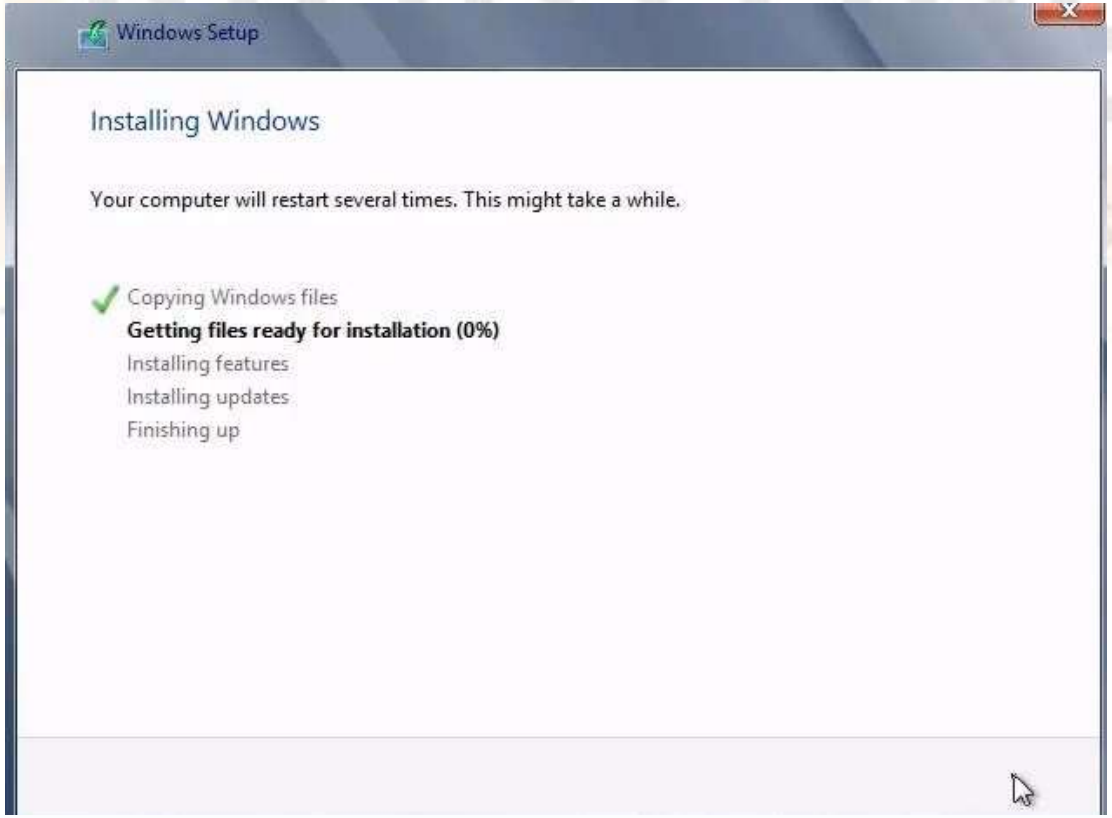
10. [Optional:] Add a drive using Native Boot To Vhd: **SHIFT-F10** to open a command prompt window; Find installation drive (dir c:, dir d:, dir e:, etc). **Diskpart** to open the Disk Partition Utility (the first four lines below are all the same command and must run on the same line, separated here to make it easier to read).Create vdisk file=e:\BootDemo.vhd type=expandable maximum=40000. Attach disk. Exit. Then **Refresh**.

Installing Windows Server 2012



Installing Windows Server 2012

11. It will then start copying files. This will take a while (could be 20 mins or so depending on hardware performance). It will reboot a couple times (automatically). After the first reboot, it will no longer be running off of the DVD.



Installing Windows Server 2012

12. Once the setup is done, it will restart and start your Windows Server 2012 for the first time. It will ask you then to set up a password for the Administrator user.

Installing Windows Server 2012

13. Once the setup is done, you can log in for the first time to your Windows Server, as the screen says, press Ctrl+Alt+Delete to log in, and use the password you set in the setup process

Installing Windows Server 2012

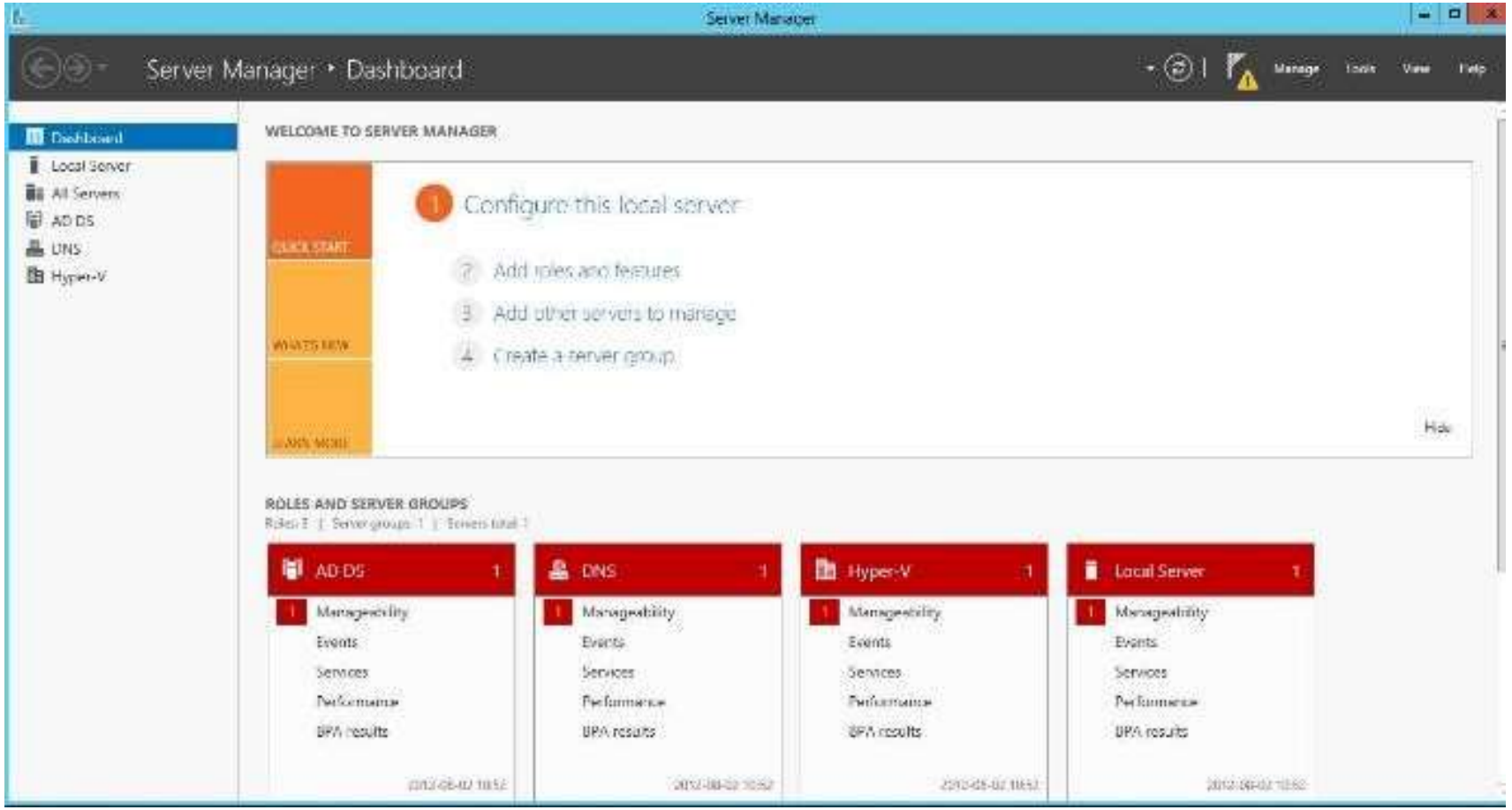
14. Enter password and press enter.

Installing Windows Server 2012

15. The Desktop will be displayed and Server Manager will be opened automatically or you can open from Administrative Tools option.

Installing Windows Server 2012

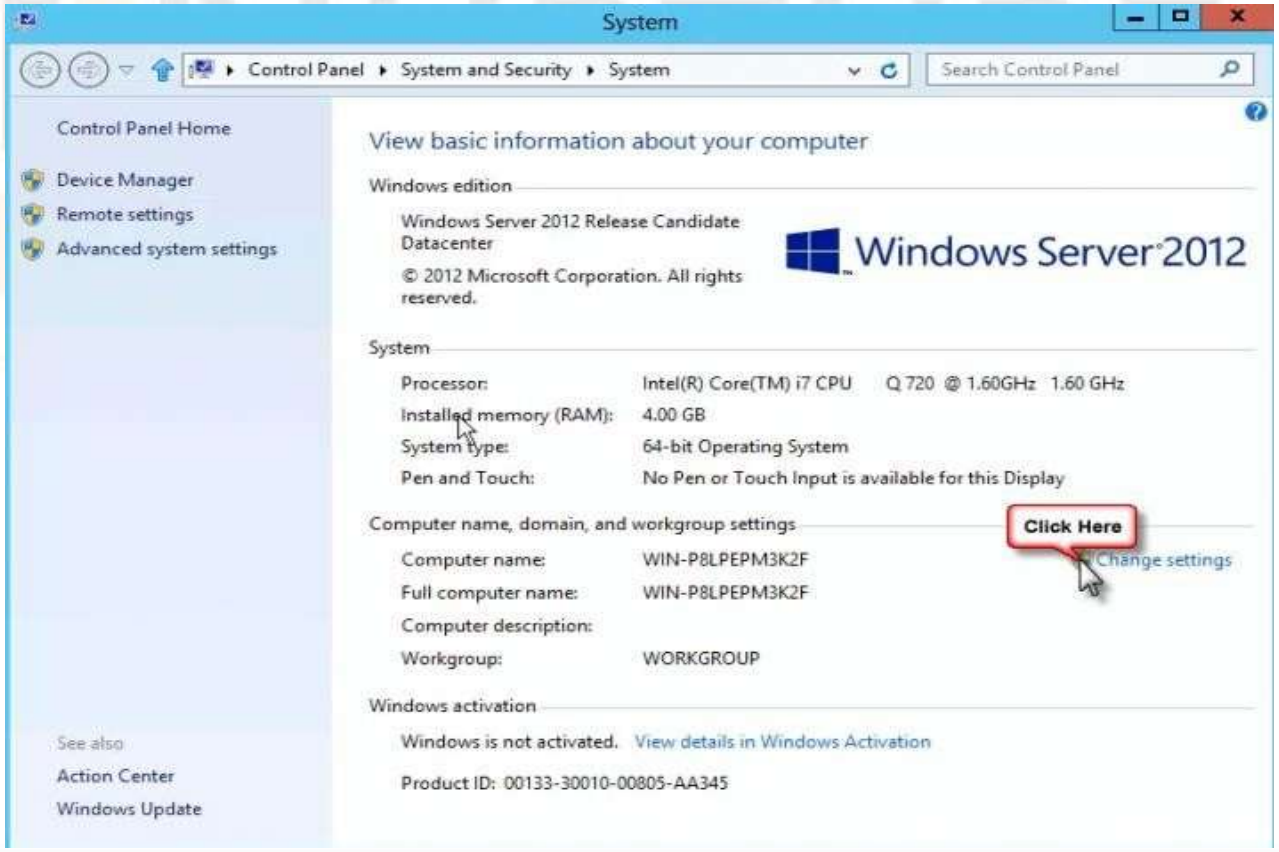
16. Once you Log in, Windows Server 2012 will show the Server Manager



Installing Windows Server 2012

17. You will see that the System Properties screen looks almost identical to prior versions of windows.

    We can now change the computer name by clicking on **Change Settings**.



Installing Windows Server 2012

18. Type new computer name you would like to use and click **OK**.

19. Click **OK** on the information box. Click **OK** to allow a restart.

Installing Windows Server 2012

Working with Installation Partitions

You can add a partition in Windows Server 2008 R2 by following these steps:

- Click 'Start' then 'Administrative Tools' and 'Computer Management'.
- Go to 'Disk Management'.
- Check to see if there's free disk space available.
- Right-click on the 'Unallocated' space and Select 'New Simple Volume'.
- Click 'Next'.
- Choose what size the partition should be and click 'next'.
- Choose a drive letter and click 'next'.
- Here you can choose to format the new partition with either FAT32 or NTFS. We advise you choose NTFS as this is the better filesystem. The allocation unit size can be set to default or a custom unit size. You can enter a name for the partition under 'Volume label'.
- Check the 'Perform a quick format' box and click 'next'.
- Review the configuration and click 'finish' to complete the wizard.

Installing Windows Server 2012

Working with Installation Partitions

Server Core Default

Server Core Defaults

- Server Core is a minimal server installation option for Windows Server that provides a low-maintenance server environment with limited functionality. Starting with Windows Server 2012, it is possible to transition between Full Server and Server Core without reinstalling the operating system.
- Server Core is designed for use by network and file service infrastructure developers, server management tool and utility developers, and IT planners
- Server Core is designed to provide an environment that reduces:

Server Core Defaults

1. Servicing requirements
2. Management requirements
3. Attack surface
4. Disk space usage
5. Memory (RAM) usage

You can manage server core in the following ways:

1. Locally and remotely using PowerShell
2. A terminal server connection from a command line
3. Remotely using Microsoft Management Console (MMC)
4. Remotely with other command line tools that support remote management

Server Core Defaults

A fresh Server Core installation of Windows Server 2012 is an image-based installation, with the following default settings:

1. Its hostname is a random name, beginning with **WIN-** followed by 11 random characters to form the maximum allowed 15-character NetBIOS name.
2. It is a member of the WORKGROUP workgroup.
3. Its network interface cards are set to request an IPv4 IP address from a DHCP server. If it does not receive an IP address from a server, it will configure a 169.254.x.y Automatic Private IP Address with the 16-bit subnet mask, as defined in RFC 3927. IPv6, by default, is enabled with a fe80 site local link. 6to4 is disabled.
4. Remote Management through both WINRS and WINRM is enabled by default for the local network. Remote Desktop is disabled by default.
5. Windows Update is set to manual by default.
6. Its default time zone is (UTC -8:00) Pacific Time (U.S. and Canada) and is set to synchronize with time.windows.com. By default, you will be notified when the clock changes.
7. The Customer Experience Improvement Program (CEIP) is not joined.

Server Core Defaults

Since the release of Windows Server 2012 the Windows Server Core version is now the default installation option but It would also say preferred option, here are some reasons why:

1. Reduced attack surface (Fewer system services running, Internet Explorer removed)
2. Reduced memory and disk requirements (Allot smaller footprint)
3. Reduced maintenance (Less Hotfixes that need to be applied)
4. Greater stability (Server Core installation has fewer running processes and services than a Full installation)

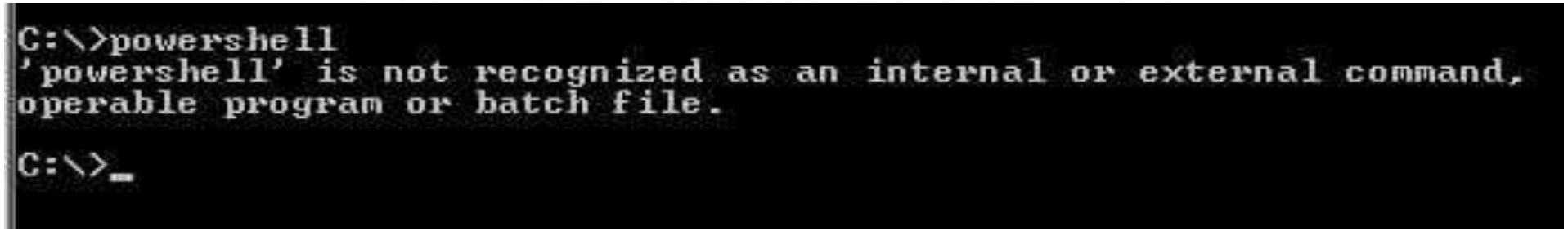
Server Core Defaults

Server core provides some roles and features as-

1. Here are some of the Server roles that are supported in Windows Server 2012 R2 Core edition:
2. Active Directory (AD)
3. Active Directory Certificate Services
4. Active Directory Lightweight Directory Services (AD LDS)
5. Active Directory Rights Management Server
6. DHCP Server
7. DNS Server
8. File Services
9. BITS Server
10. BranchCache
11. HyperV
12. Web Server IIS (including a subset of ASP.NET)
13. Windows Server Update Server
14. Print and Document Services
15. Streaming Media Services
16. Routing and Remote Access Server
17. iSCSI
18. Load Balancing
19. MPIO
20. Telnet
21. SQL Server 2012 Database Engine, Analysis Services and Integration Services

Server Core Defaults

- If SQL Server setup reports that Windows PowerShell 2.0 is not present, you can install or enable it by below instructions on Windows Server 2008 R2 Server Core Edition.
- **Step 1 -** Type "powershell" at the command prompt to find out if PowerShell is enabled or not. If PowerShell is enabled it will route you to the PS root directory. If PowerShell is not installed/enabled then Windows will not recognize this command.



Server Core Defaults

Step 2. Run the "sconfig.cmd" command on your command prompt and press enter. Once you will press enter, it will open all of the options of system configuration as shown in the image below. The "sconfig.cmd" command is the Server Configuration Tool to configure and manage several common aspects of the Windows Server 2008 R2 Server Core installation. You must be a member of the Administrators group to use the tool.

Server Core Defaults

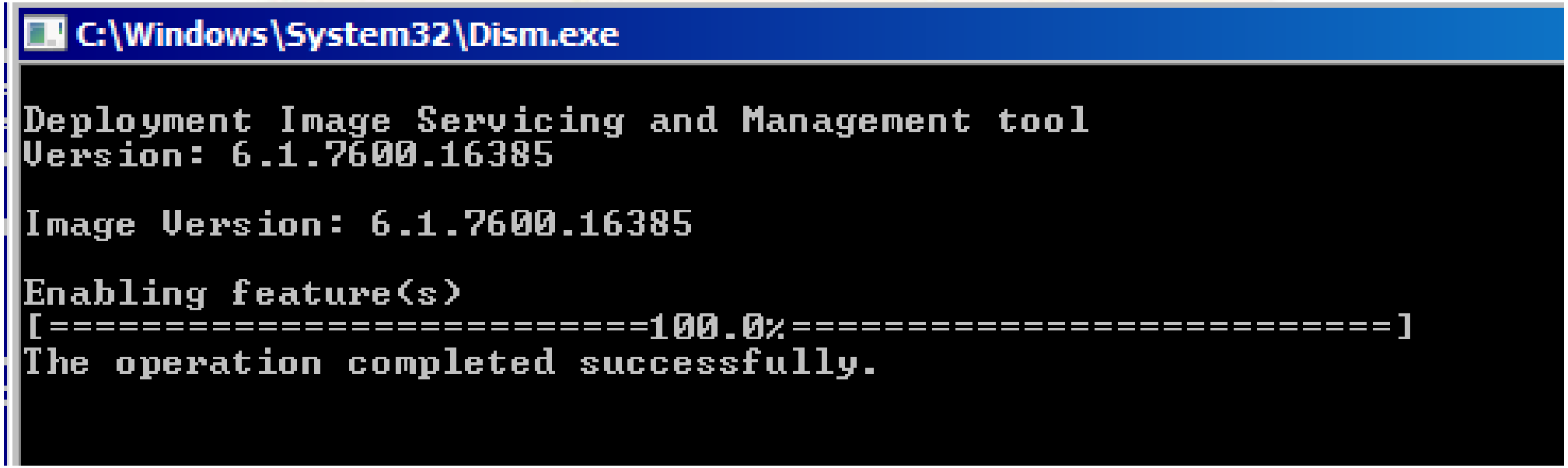
- **Step 3 -** Once you have pressed "4" then press enter to see all of the options under the "Configure Remote Management" interface.

Server Core Defaults

- **Step 4.** After you type "2" and press enter, the PowerShell configuration will start and the configuration process will look like the below screenshot.

Server Core Defaults

- **Step 5.** Once PowerShell has been successfully enabled, a separate command prompt screen will be pop-up and closed after the process reaches 100% completion. This is the deployment of features using the Dism.exe (Deployment Image Servicing and Management) tool. DISM enumerates, installs, uninstalls, configures and updates the features and packages in Windows images. See the screenshot below.

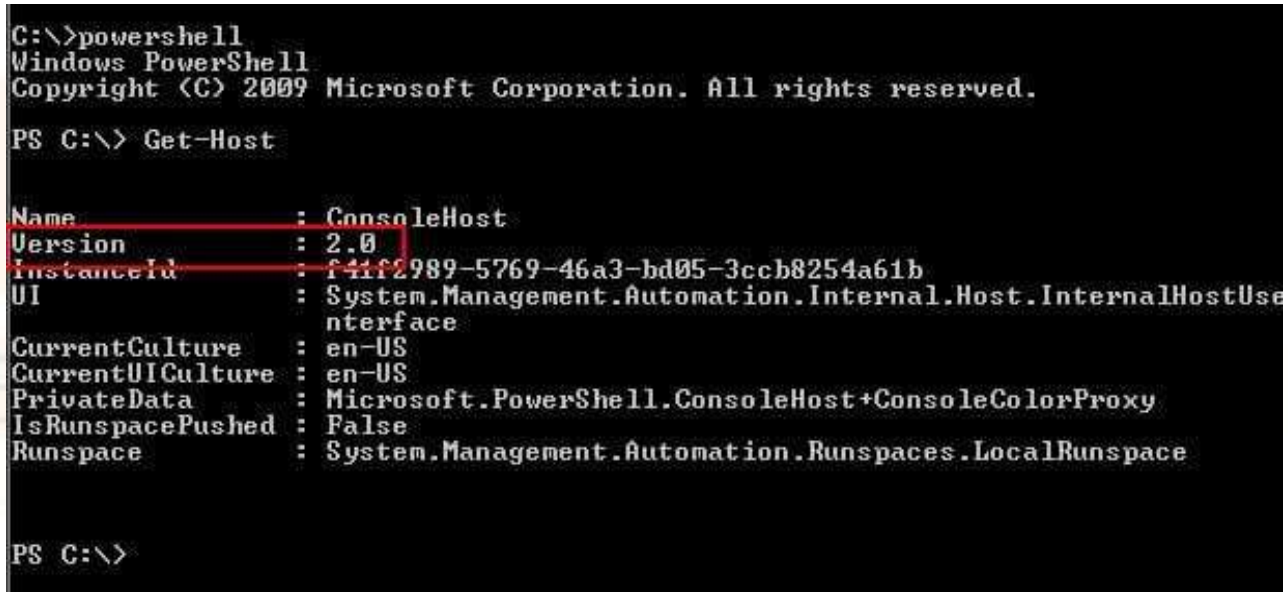


Server Core Defaults

- **Step 6 -** After all of the processes have completed, a restart window will appear and ask you to restart the machine in order for all of the changes to be committed. Click the "Yes" button to restart the machine.

- **Step 7 -** Once the has been rebooted, type "powershell" on the command prompt. This time it will take few seconds to load then route you to a PS command prompt. You can run the "Get-Host" cmdlet to check the PowerShell version as shown in the screenshot below.

Server Core Defaults



- **Command to install .Net Framework 4.0**
- Dism /Online /Enable-Feature /FeatureName:NetFx4 /All

OR

- Dism /Online /Enable-Feature /FeatureName:NetFx4 /All /LimitAccess /Source:X:\sources\sxs

Server Core Defaults

- **Command to install PowerShell**
  - Dism /Online /Enable-Feature /FeatureName:MicrosoftWindowsPowerShell /All
- **Configuring server core**
  - sconfig.cmd
- **Changing the Server Core Administrator's Password**
  - Net user administrator *
- **Changing the Server Core Machine Name**
  - netdom renamecomputer <CurrentComputerName> /newname:<NewComputerName>

Server Core Defaults

- **The same function can be performed using PowerShell with the following command:**
  - Rename-computer –NewName ABCDC2
- **Assigning a Static IPV4 IP Address and DNS Settings**
  - netsh interface ipv4 show interfaces
- **use the following syntax to change the IP address for a desired interface:**
  - netsh interface ipv4 set address name="<ID>" source=static address=<StaticIP>mask=<SubnetMask> gateway=<DefaultGateway>

Server Core Defaults

- **The same function can be performed using PowerShell with the following commands:**
  - Get-NETIPInterface
  - Set-NetIPAddress –InterfaceIndex 12 –IPv4Address 192.168.115.10 –PrefixLength 24– DefaultGateway 192.168.115.1
  - Set-DNSClientServerAddress –InterfaceIndex 12 –ServerAddresses "DNSIP1","DNSIP2“
- **Adding the Server Core System to a Domain**
  - Add-Computer -domainname <domain> -OUPath "OU=OU,=Domain,DC=com"

Core Capabilities

- When you finish installing Server Core on a system and sign in for the first time, you're in for a bit of a surprise. The main difference between the Server with Desktop Experience installation option and Server Core is that Server Core does not include the following GUI shell packages:
    1. Microsoft-Windows-Server-Shell-Package
    2. Microsoft-Windows-Server-Gui-Mgmt-Package
    3. Microsoft-Windows-Server-Gui-RSAT-Package
    4. Microsoft-Windows-Cortana-PAL-Desktop-Package
- In other words, there is **no desktop** in Server Core, by design. While maintaining the capabilities required to support traditional business applications and role-based workloads, Server Core does not have a traditional desktop interface. Instead, Server Core is designed to be managed remotely through the command line, PowerShell, or a GUI tool (like RSAT or Windows Admin Center).

Core Capabilities

- In addition to no UI, Server Core also differs from the Server with Desktop Experience in the following ways:
  1. Server Core does not have any accessibility tools
  2. No OOBE (out-of-box-experience) for setting up Server Core
  3. No audio support
- The following table shows which applications are available *locally* on Server Core vs Server with Desktop Experience

Application	Server Core	Server with Desktop Experience
Command prompt	available	available
Windows PowerShell/ Microsoft .NET	available	available
Perfmon.exe	not available	available

Core Capabilities

Windbg (GUI)	supported	supported
Resmon.exe	not available	available
Regedit	available	available
Fsutil.exe	available	available
Disksnapshot.exe	not available	available
Diskpart.exe	available	available
Diskmgmt.msc	not available	available
Devmgmt.msc	not available	available
Server Manager	not available	available
Mmc.exe	not available	available
Eventvwr	not available	available
Wevtutil (Event queries)	available	available
Services.msc	not available	available
Control Panel	not available	available
Windows Update (GUI)	not available	available

Core Capabilities

Windows Explorer	not available	available
Taskbar	not available	available
Taskbar notifications	not available	available
Taskmgr	available	available
Internet Explorer or Edge	not available	available
Built-in help system	not available	available
Windows 10 Shell	not available	available
Windows Media Player	not available	available
PowerShell	available	available
PowerShell ISE	not available	available
PowerShell IME	available	available
Mstsc.exe	not available	available
Remote Desktop Services	available	available
Hyper-V Manager	not available	available

Core Capabilities

- **System requirements for a Server Core installation**
- **CPU:** Windows Server 2016 needs a 1.4 GHz 64-bit processor with an x64 instruction set
- **the processor must support:**
    1. the CMPXCHG16B instruction for high-performance data operations;
    2. Load AH from Flags and Store AH to Flags commands, which load and store instructions for virtualization and floating-point conditions; and
    3. the PrefetchW instruction, which carries data closer to the CPU before a write.

Core Capabilities

- **Memory:** Windows Server 2016 requires a minimum of 512 MB with error-correcting code or a similar technology. To create a VM, designate at least 800 MB or the setup will fail.
- **Network adapter:** Network adapters must support a minimum of 1 Gigabit Ethernet bandwidth and the pre-boot execution environment feature.
- **Storage and storage controllers:** Windows Server 2016 requires at least 32 GB of disk storage but will need more space if the installation occurs over a network.

Completing Post Installation Tasks

Completing Post-Installation Tasks

- Server Core is installed, and the command prompt is up, but where do you go from here? How do you make the necessary configuration changes to the system?
- The answer is-: First, it may be comforting to know that there are some GUI tools you might be able to use. For example, type taskmgr, and you see the familiar Task Manager, which tells you how your server is doing. You can also use Notepad, although you might prefer to use one of the two Control Panel applets that are still available to you in GUI format. Type timedate.cpl (for the Date and Time applet) or intl.cpl (for the Regional and Language Options applet). These were allowed to stay in Server Core because they do not interfere with security, and they make configuring certain aspects of the OS easier.

Completing Post-Installation Tasks

- Configuration Commands Now, what would you normally need to do to configure a traditional server? Most likely, the following would come to mind:

1. Changing the computer name.
2. Configuring network interfaces.
3. Joining the domain.
4. Installing (and activating) the license key.
5. Enabling the firewall.
6. Installing roles and/or features.
7. Adding hardware.
8. Configuring Windows Update.

Completing Post-Installation Tasks

- To perform these tasks, you need to become familiar (or re-familiarize yourself) with the following commands:
    1. **Netsh:** For many IP configuration settings.
    2. **Net User:** To change the administrative password.
    3. **Netdom:** To change the server name and/or join a domain.
    4. **Shutdown:** For after a configuration change, when you need to restart your system.
    5. **Slmgr:** The Software License Management tool, for installing and activating the license for the system.
    6. **Pnputil:** To help you install device drivers that aren't automatically included with Windows Server 2008.
    7. **SCRegEdit.wsf:** Enable Remote Desktop, automatic updates, terminal server client connections, and more.

Completing Post-Installation Tasks

- To change the computer name, you would perform the following steps:

    1. Locate the current name of the server by typing hostname or ipconfig.
    2. Type netdom renamecomputer /NewName .
    3. Restart the computer, which you can do by using the shutdown command. To make changes to the static IP settings on the server, you first need to identify your network interfaces-

Completing Post-Installation Tasks

- netsh interface ipv4 show interfaces
- Make a note of the number in the Idx column for your network adapter(s). Then type the following:
- Netsh interface ipv4 set address name=”” source=static address=

  <the static IP you are setting> mask==<the subnet mask for that address> gateway==<the default gateway for that address>
- If you want to use DHCP, you can type source=dhcp.
- To configure your DNS settings, you need to perform an additional step with Netsh and type the following:
- Netsh interface ipv4 add dnsserver name=<interfacename>address=<DNS Server IP Address> index=1

Completing Post-Installation Tasks

- To join your domain you would type this:

  Netdom join <Name of Your Computer> /domain:<Name of Your Domain> /userd:<UserName> /passwordd:*

- Before you activate, you are going to want to make sure you put in a license key. You may have done this during the installation process, but if you didn't, you need to now type the following:

  Slmgr.vbs -ipk <License Key>

If you want to activate the server, you type the following:

Slmgr.vbs –ato

- To configure the firewall, you use the netsh advfirewall command, although this takes a bit of work. A better method may be to take the Firewall snap-in from a system running Windows Vista or Windows Server 2008 and configure the settings remotely.However, you first need to enable remote management of the firewall by typing the following:

  Netsh advfirewall set currentprofile settings remotemanagement enable

Completing Post-Installation Tasks

Moving on to the installation of hardware, you may find that simply plugging it in will work because the driver may be included with Windows Server 2008. If that is the case, you can install the hardware, and you are all set. If that is not the case, perform the following:

1. Copy the driver files to the Server Core system. To do this, from the command prompt type the following:

   pnputil -i -a <Name of the INF file for the driver>

2. If you want to see a list of drivers on the system, type the following:

   sc query type=driver

3. While there are many other configuration commands you might want to investigate and use, for now, use the following to enable automatic updates:

   cscript scregedit.wsf /AU /4

Completing Post-Installation Tasks

Install Roles and Features-

1. The first thing you might want to do is see a list of the roles and features that are currently installed. To do this, simply type oclist.exe at the command prompt.
2. Using this list, you can now use the ocsetup.exe command to install roles and/or features by typing the following:

Start /w ocsetup "role/feature name"

Eg: For example, if you want to install the DNS Server role, you type the following:

Start /w ocsetup DNS-Server-Core-Role

Completing Post-Installation Tasks

When you install Server Core, the Server service is installed by default, but there are additional file service features you might want to add, such as the following:

1. File Replication Service (FRS-Infrastructure)
2. Distributed File System service (DFSN-Server)
3. Distributed File System Replication (DFSR-Infrastructure-ServerEdition)
4. Services for Network File System (both ServerforNFS-Base and
5. ClientForNFS-Base)

In addition to the roles you can install, Server Core supports the following optional features:

1. Failover clustering (FailoverCluster-Core)
2. Network load balancing (NetworkLoadBalancingHeadlessServer)
3. system for UNIX-based applications (SUACore)
4. Backup (WindowsServerBackup)
5. Multipath I/O (MultipathIo)
6. Removable storage (Microsoft-Windows-RemovableStorageManagementCore)
7. BitLocker drive encryption (BitLocker)
8. . Simple Network Management Protocol (SNMP) (SNMP-SC)
9. . Windows Internet Name Service (WINS) (WINS-SC)
10. . Telnet client (TelnetClient)

Converting Between GUI And Server Core

Converting Between GUI and Server Core

- Windows Server 2012 comes with a couple of new features that can be used to make your life as a System Administrator much better. One of these cool features is the ability to convert a server with full installation into a core edition and vice versa. You can perform this action because each full installation is composed of two items:

    1. **Graphical Management Tools and Infrastructure** (Server-Gui-Mgmt-Infra) – this component provides that MMC (Microsoft Management Console) and Server Manager Console.
    2. **Server Graphical Shell** (Server-Gui-Shell) – provides the rest of the full installation experience such as Windows Explorer.

Converting Between GUI and Server Core

1. **Switch from Core Version to GUI Mode**

Step 1: Launch Powershell

:\> powershell

PS C:\>

Step 2: Import Server Modules

PS C:\> import-module serverManager

Step 3: Change User Interface Mode

3.1 For full GUI mode:

Install-windowsfeature Server-Gui-Mgmt-Infra, Server-Gui-Shell -Restart

Converting Between GUI and Server Core

3.2- For graphical management tools and infrastructure:

Install-Windowsfeature Server-Gui-Mgmt-Infra –Restart

- To change user interface from GUI mode to command mode:

For full command (core) mode:

Uninstall-Windowsfeature Server-Gui-Mgmt-Infra, Server-Gui-Shell -Restart

For graphical management tools and infrastructure:

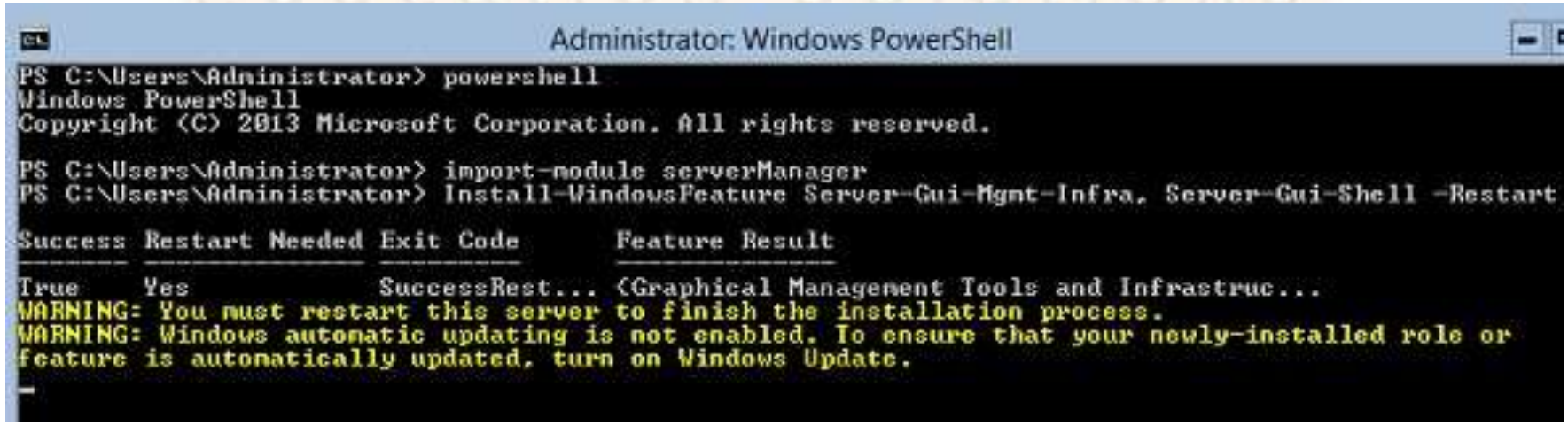
Uninstall-Windowsfeature Server-Gui-Shell -Restart

Converting Between GUI and Server Core

- Example

PS C:\> install-WindowsFeature Server-Gui-Mgmt-Infra, Server- Gui-Shell –Restart

Step 4: After entering the above command, it will extract all binary files and start the installation. After completing installation server will reboot automatically. When the system starts, Windows will be running in the new mode.

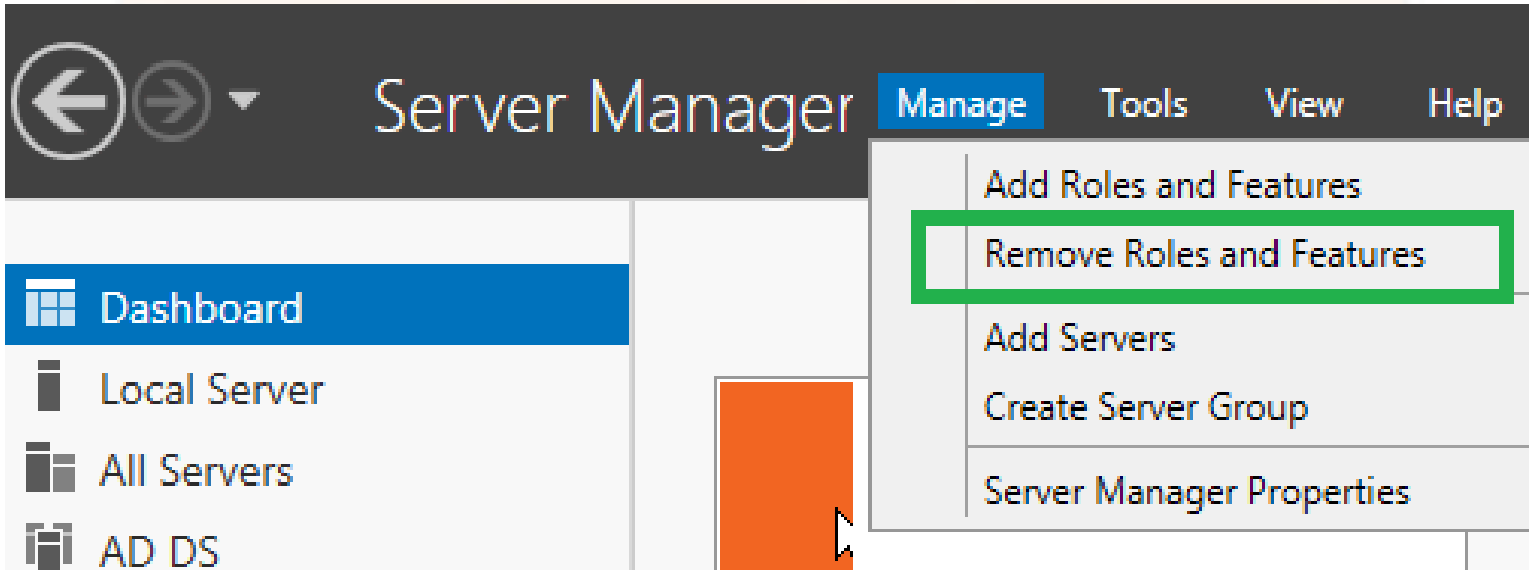


Converting Between GUI and Server Core

2. Switch from GUI to Core Command Mode

Step 1: Launch "Remove Roles and Features"

Open server manager -> Select "Manage" from the menu -> Select "Remove Roles and Features" as shown below.



Converting Between GUI and Server Core

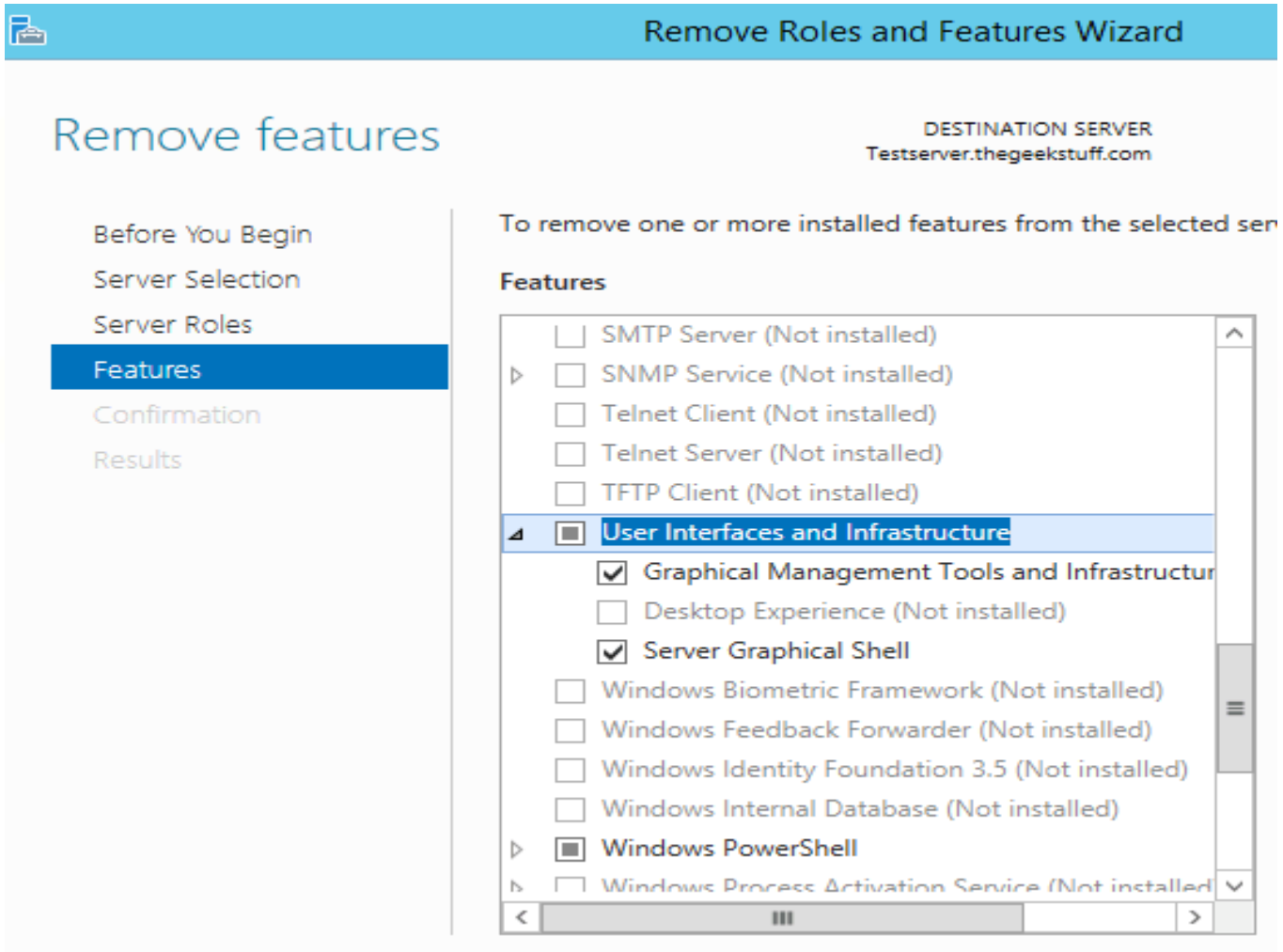
Step 2: Press next on the welcome page.

Step 3: In the next screen, select the server from the server pool. By default our local server is selected, but we can perform add/remove feature task to remove server by adding server IP in server pool.

Step 4: Select User Interface Features

- You can select or unselect the options under user interface and infrastructure features option as per your requirement.
- To change user interface from GUI mode to Command mode:
- For full command (core) mode: Uncheck both “Graphical Management and infrastructure” and “Server Graphical shell”.
- For graphical management tools and infrastructure: Uncheck only “Server Graphical shell” option

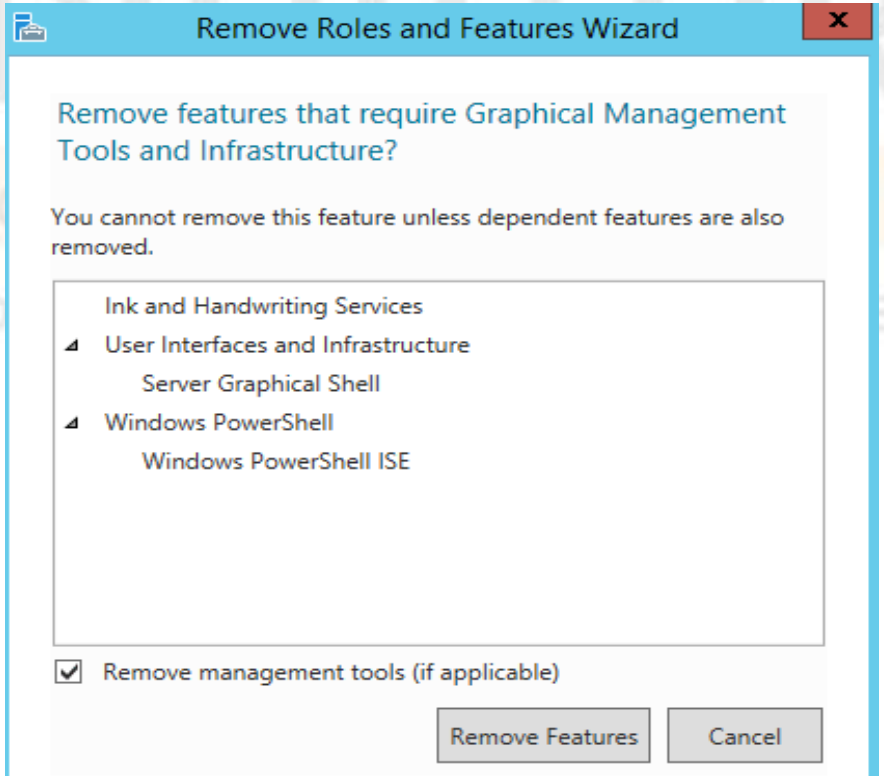
Converting Between GUI and Server Core



Converting Between GUI and Server Core

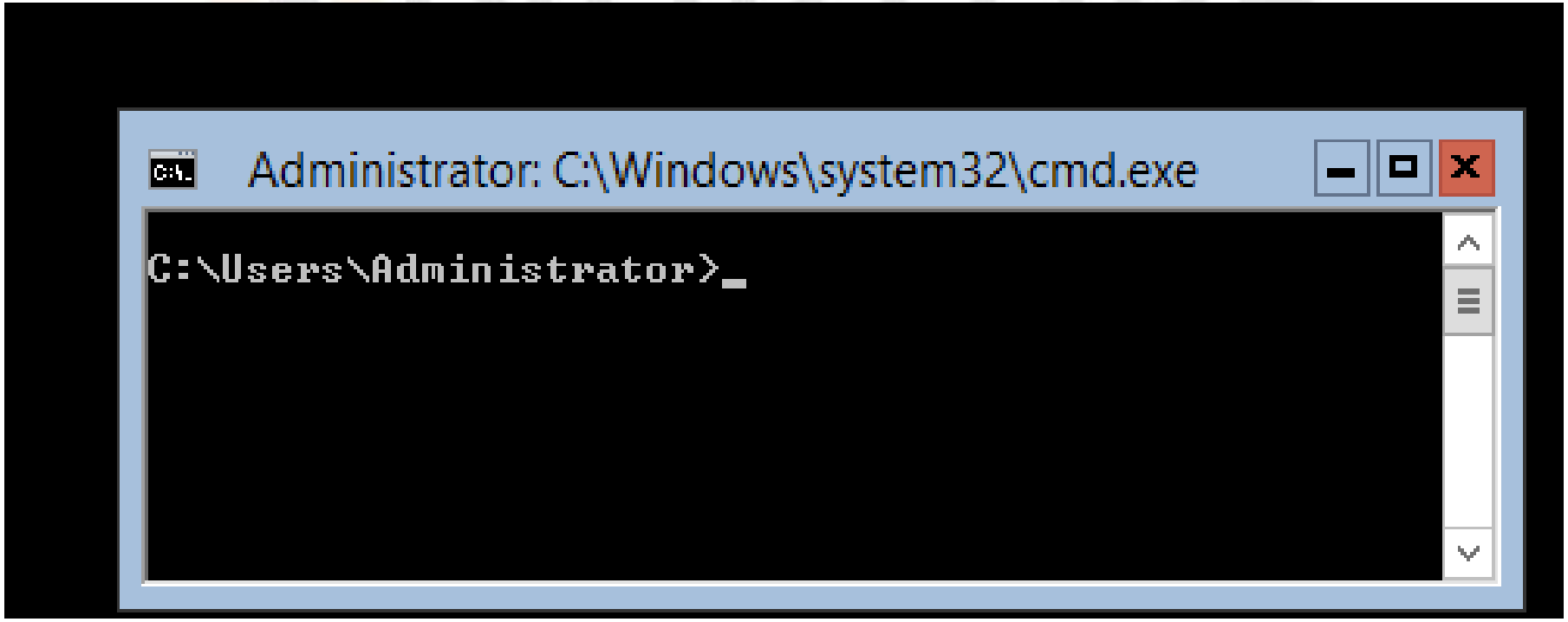
Step 5: Remove GUI Features

- Select the features that you like to remove. This will also automatically select any dependent features that need to be removed.



Converting Between GUI and Server Core

Step 6: After the above step, the server will reboot. After the reboot, when the system comes back up, you'll see not see GUI anymore. You'll get only the command prompt with powershell.



Upgrade Paths

Upgrade paths

- As new versions are released, older versions are retired and dropped from support. During this process, you may have servers that you need to rebuild or upgrade. My recommendation is to perform a clean install whenever possible. I have never been a fan of in-place upgrades. While upgrades are supported, it is common to run into issues during or after the operating system upgrade, especially if the operating system you are upgrading has been installed and maintained for quite a bit of time. However, there are some special circumstances where a clean install is not an option, or the level of risk to perform an in-place upgrade is acceptable. The table below provides a summary for the Windows operating systems that can be upgraded to Windows Server 2012. You should note the following guidelines for supported paths.

Upgrade paths

1. In-place upgrades from 32-bit to 64-bit editions are not supported. Server 2012 is only available in 64-bit versions.
2. In-place upgrades from one build type are not supported. For example, to checked build (debug) vs. free build (retail).
3. If the server has certain roles, such as AD DS, additional steps may need consideration.
4. Upgrades from pre-release versions (Release Candidate) are not supported.
5. Upgrades from Server Core to GUI is not supported in one step. Server 2012 allows the switch once Server 2012 is upgraded successfully.

Upgrade paths

Upgrade From	Upgrade To
Windows Server 2008 Standard with SP2	Windows Server 2012 Standard, Windows Server 2012 Datacenter
Windows Server 2008 Enterprise with SP2	Windows Server 2012 Standard, Windows Server 2012 Datacenter
Windows Server 2008 Datacenter with SP2	Windows Server 2012 Datacenter
Windows Web Server 2008	Windows Server 2012 Standard
Windows Server 2008 R2 Standard with SP1	Windows Server 2012 Standard, Windows Server 2012 Datacenter
Windows Server 2008 R2 Enterprise with SP1	Windows Server 2012 Standard, Windows Server 2012 Datacenter
Windows Server 2008 R2 Datacenter with SP1	Windows Server 2012 Datacenter
Windows Web Server 2008 R2	Windows Server 2012 Standard

If you do decide to upgrade your server operating system rather than performing a clean install, make absolutely sure that you have a good recoverable backup prior to the upgrade.

Upgrade Path Considerations

- There are upgrade paths to Windows Server 2012 from both Windows Server 2008 SP2 and Windows Server 2008 R2. The following table summarizes the available upgrade paths.

Upgrade Options	Windows Server 2012 Standard	Windows Server 2012 Datacenter
Windows 2008 Standard/Enterprise with SP2 (x64)	Yes	Yes
Windows 2008 Datacenter with SP2 (x64)	No	Yes
Windows Web Server 2008	Yes	No
Windows 2008 R2 Standard or Enterprise with Sp1	Yes	Yes
Windows 2008 R2 Datacenter with Sp1	No	Yes
Windows Web Server 2008 R2	Yes	No

Installing Windows Server Migration Tools

Installing Windows Server Migration Tools

- The Use of migrating tools to migrate from Windows Server 2003, either SP2, or R2. We can also migrate from Windows Server 2008, either the full edition, or the full edition running R2. We can't migrate from Windows Server 2008 Core edition because it doesn't have .NET framework which is necessary for migration. We can also transfer features from Windows Server 2012, either full or core edition.
- It can migrate from physical machine to virtual machine, and can also transfer from virtual machine to the physical machine. Actually, it can go in any direction and can do a physical to physical, virtual to virtual, physical to virtual, and virtual to physical migration. It doesn't matter if the system is physical or virtual.
- When transferring to the Win Server 2012, it only transfer to the same user interface language. For example, a Server installed in Croatian language, and if you want a migrate to the Server which is using English language, it's not going to work.
- User which is performing the migration has to have administrative rights on both machines. By using PowerShell scripts it can migrate features, shares, data, system settings, roles, etc.

Installing Windows Server Migration Tools

There are 4 overall steps in getting your environment ready.

1. Installing Windows Server Migration Tools on destination servers that run Windows Server 2012 R2 Preview or Windows Server 2012.
2. Creating deployment folders on migration destination servers, for copying to source servers.
3. Copying deployment folders from destination servers to source servers.
4. Registering Windows Server Migration Tools on source servers.

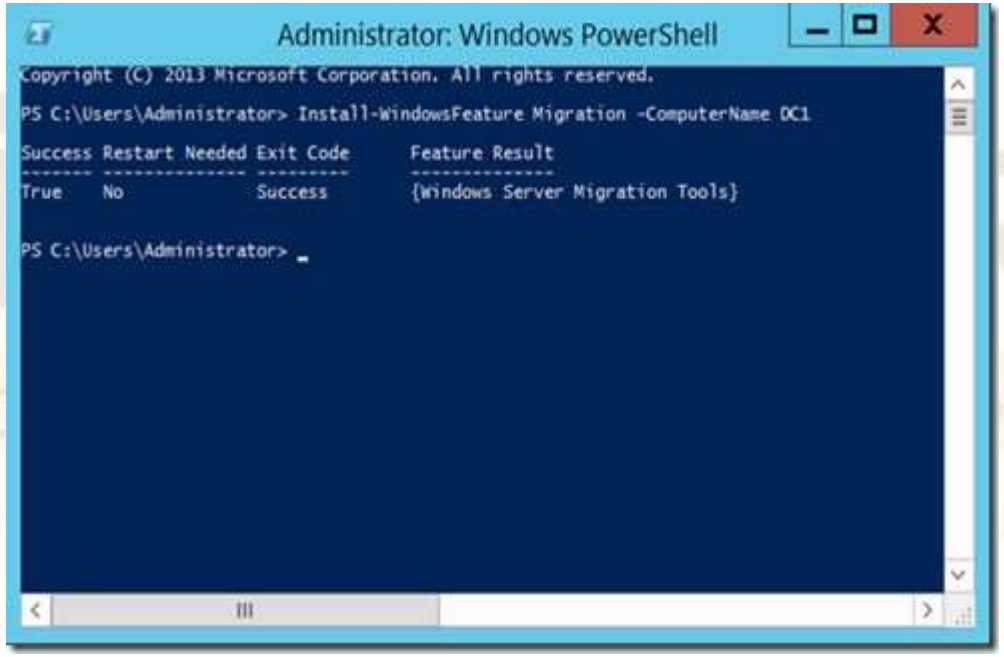
There are 2 way of installing these tools on your Windows Server 2012 server.

1. Use PowerShell by opening a Windows PowerShell command window the administrator.

   Type the following command (we are installing the files on our LAB DC called DC1

   Install-WindowsFeature Migration –ComputerName DC1

Installing Windows Server Migration Tools



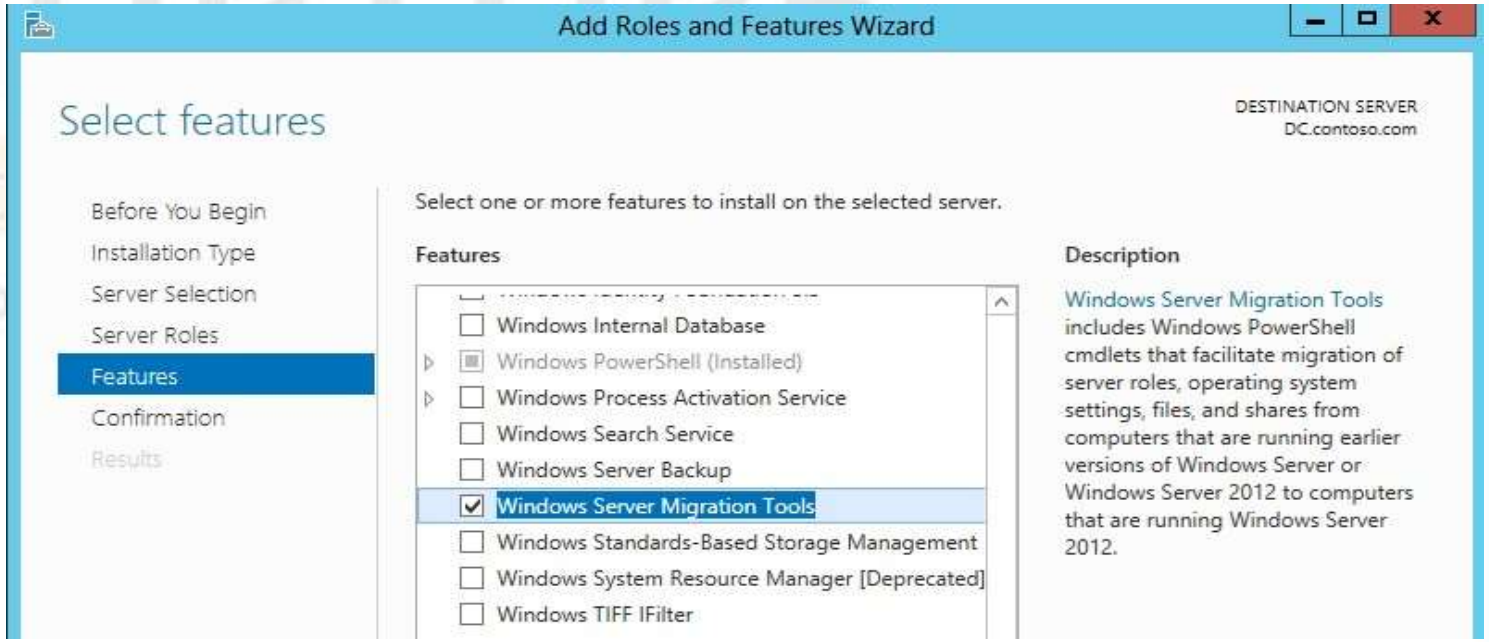
2. Use the "Add Roles and Features Wizard" to add the **Windows Server Migration Tools** to your destination machine

Installing Windows Server Migration Tools

3. Creating deployment folders

   Once you have installed the Tools you need to prepare a deployment share that you will use to install the tools on your source servers.

   Source servers can be the following:



https://blogs.technet.microsoft.com/matthewms/2013/02/13/migration-and-deployment-installing-the-migration-tools-part-8-of-19/

Installing Windows Server Migration Tools

- Windows Server 2003 with Service Pack 2
- Windows Server 2003 R2
- Windows Server 2008 (full installation option)
- Windows Server 2008 R2 (full install and Core installation)
- Windows Server 2012 (full install and Core installation)
- Windows Server 2012 R2 Preview (full install and Core installation)

1. Open a Command Prompt window with elevated user rights. In Windows Server 2012 Type cmd on the **Start screen**, right-click the Command Prompt tile, and then click Run as administrator.

   At the command prompt, change to the directory in which the **smigdeploy.exe** tool is located. The default location is "**C:\Windows\System32\ServerMigrationTools**"

Installing Windows Server Migration Tools

- Based on the source server you want to prep for you would issue the following command:
- Windows Server 2012

  SmigDeploy.exe /package /architecture amd64 /os WS12 /path <deployment folder path>
- Windows Server 2008 R2

  SmigDeploy.exe /package /architecture amd64 /os WS08R2 /path <deployment folder path>
- Windows Server 2008

  SmigDeploy.exe /package /architecture amd64 /os WS08 /path <deployment folder path>
- Windows Server 2008 32bit

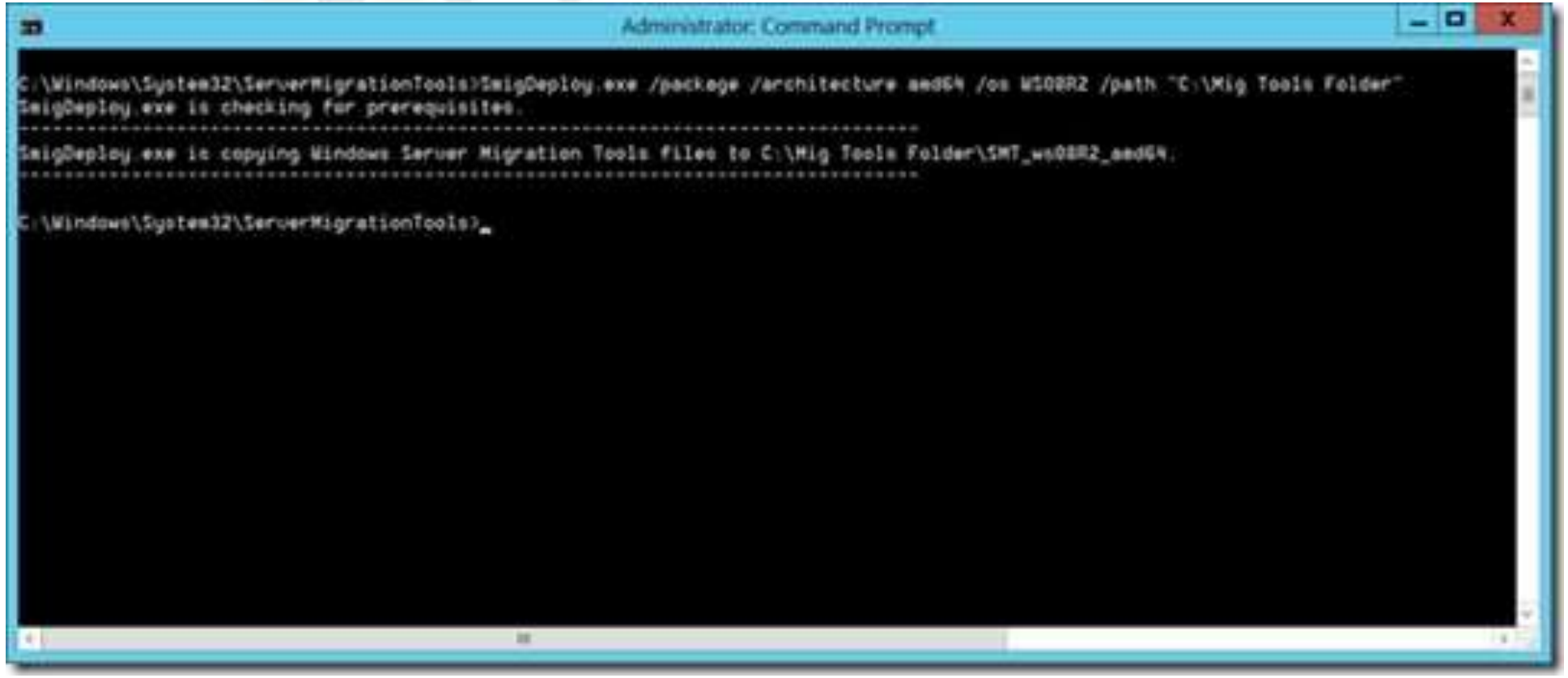
  SmigDeploy.exe /package /architecture X86 /os WS08 /path <deployment folder path>
- Windows Server 2003 64bit

  SmigDeploy.exe /package /architecture amd64 /os WS03 /path <deployment folder path>
- Windows Server 2003 32bit

  SmigDeploy.exe /package /architecture X86 /os WS03 /path <deployment folder path>

Installing Windows Server Migration Tools

- In our case we're planning to use a 64 bit Windows 2008 R2 source server.



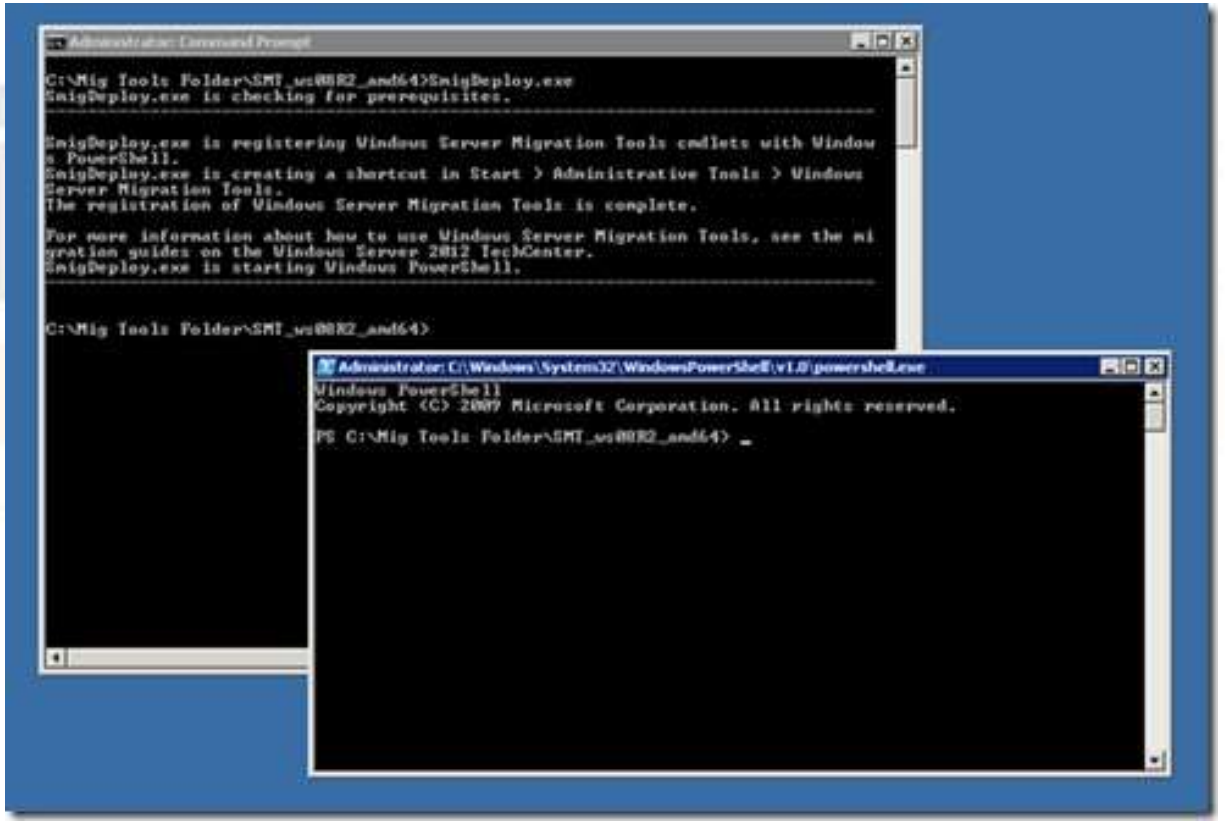
Installing Windows Server Migration Tools

- We end up with a directory called "C:\Mig Tools Folder\SMT_ws08R2_amd64".
- 2- Share "C:\Mig Tools Folder" so that is accessible from the other machines.
- **Copying deployment folders to source servers**
- On our Windows 2012 R2 machine, I created a directory on the local C: drive called **"C:\Mig Tools Folder"** to be consistent
- 2- Copy the content of **\\DC1\Mig Tools Folder** to the "**c:\mig tools folder"** we just created.
- Registering Windows Server Migration Tools on source servers
- Before being able to use the Migration Tools you must register them with the source server operating system. Before you start that procedure, verify the following.
- Microsoft .NET Framework 2.0 is installed on computers that are running Windows Server 2003.
- Windows PowerShell 1.0 or a later version is installed on source computers

1- On our source computer (in our case **W2K12R2-1**) open a command window with elevated privileges,

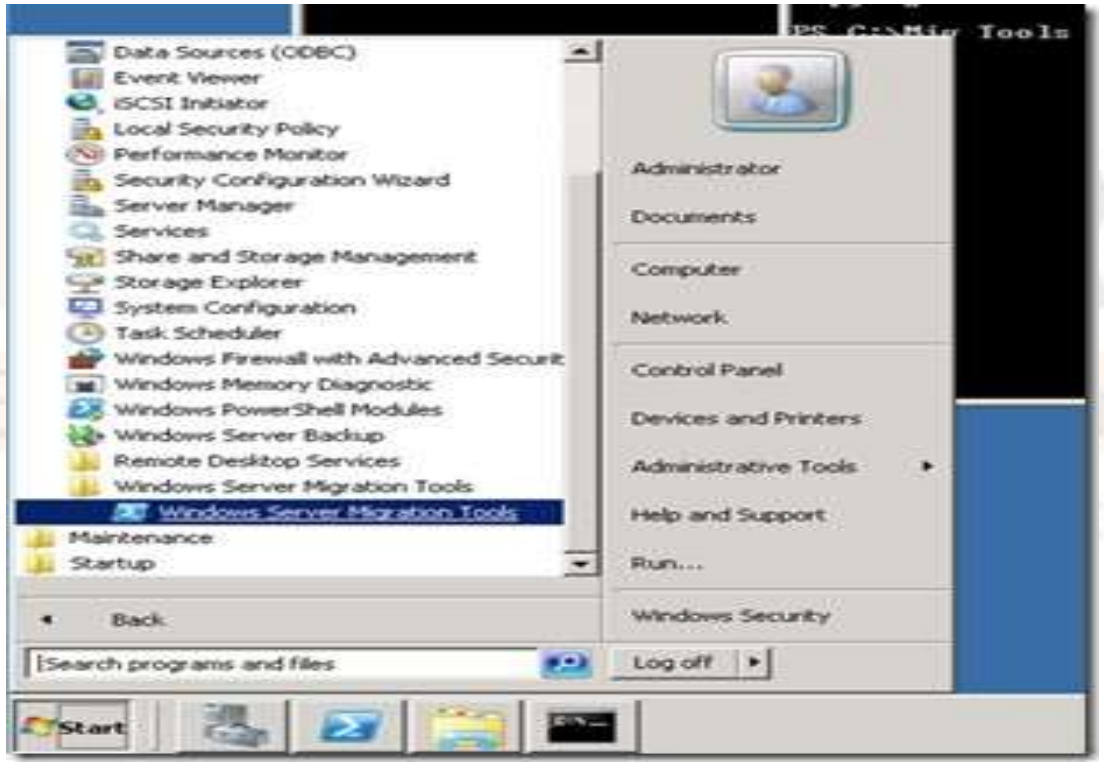
2- Change to "**C:\Mig Tools Folder\SMT_ws12R2_amd64**" and type **"SMIGDEPLOY.EXE"**

Installing Windows Server Migration Tools



3. The registration process also created the start menu option on our source machine

Installing Windows Server Migration Tools



That's it. We are ready to go. Our next steps will be to start transferring our workloads, roles, settings… to our target Windows Server 2012 environment.

Installing Windows Server Migration Tools

Installing Migration Tools Using Wizard

- **Step 1:** When we log on to the Win Server 2012, we will see a Dashboard. On this window we can click on the "**Add roles and features**" option. We can also click on the Manage option in the upper right-hand corner. Notice that here we also have options to remove roles and features, add servers, and create server groups.
- **Step 2:** When we click on the "**Add roles and features**" option the wizard will appear. We will click Next on the introduction page, the first thing we have to do is select the installation type.
- **Step 3:** In our case we will select Role-based or feature-based installation. On the next screen we have to select the destination server. In our case we will select the server from the server pool and select the only available server which is the server on which we are working on.

Installing Windows Server Migration Tools

- **Step 4:** On the next screen we can select server roles. Our feature is not listed here, so we will simply click on the Next button.
- **Step 5:** On the features window we have to check the “Windows Server Migration Tools” option.
- **Step 6:** On the next screen we simply confirm our selection by clicking the Install button. So, this is one way of installing migration tools on our server.
- Let’s see how to install Migration Tools by using PowerShell.
- **Step 1:** We have to run PowerShell as administrator. To do that, right-click on the PowerShell icon and select the “Run as administrator” option.

Installing Windows Server Migration Tools

- **Step 2:** So, now we have to enter the command to install Migration tools. The whole command to do just that is: "**Install-WindowsFeature Migration**".
- **Step 3:** If we have to install this feature remotely, we also have to add the computer name to the command. For example, the command to install Migration Tools on a computer named "cicnavi" would be: "Install-WindowsFeature Migration – ComputerName cicnavi".
- Once the installation is complete, we will see the result of our action. The exit code should be Success as in our case

NIC Teaming

Configuring NIC Teaming

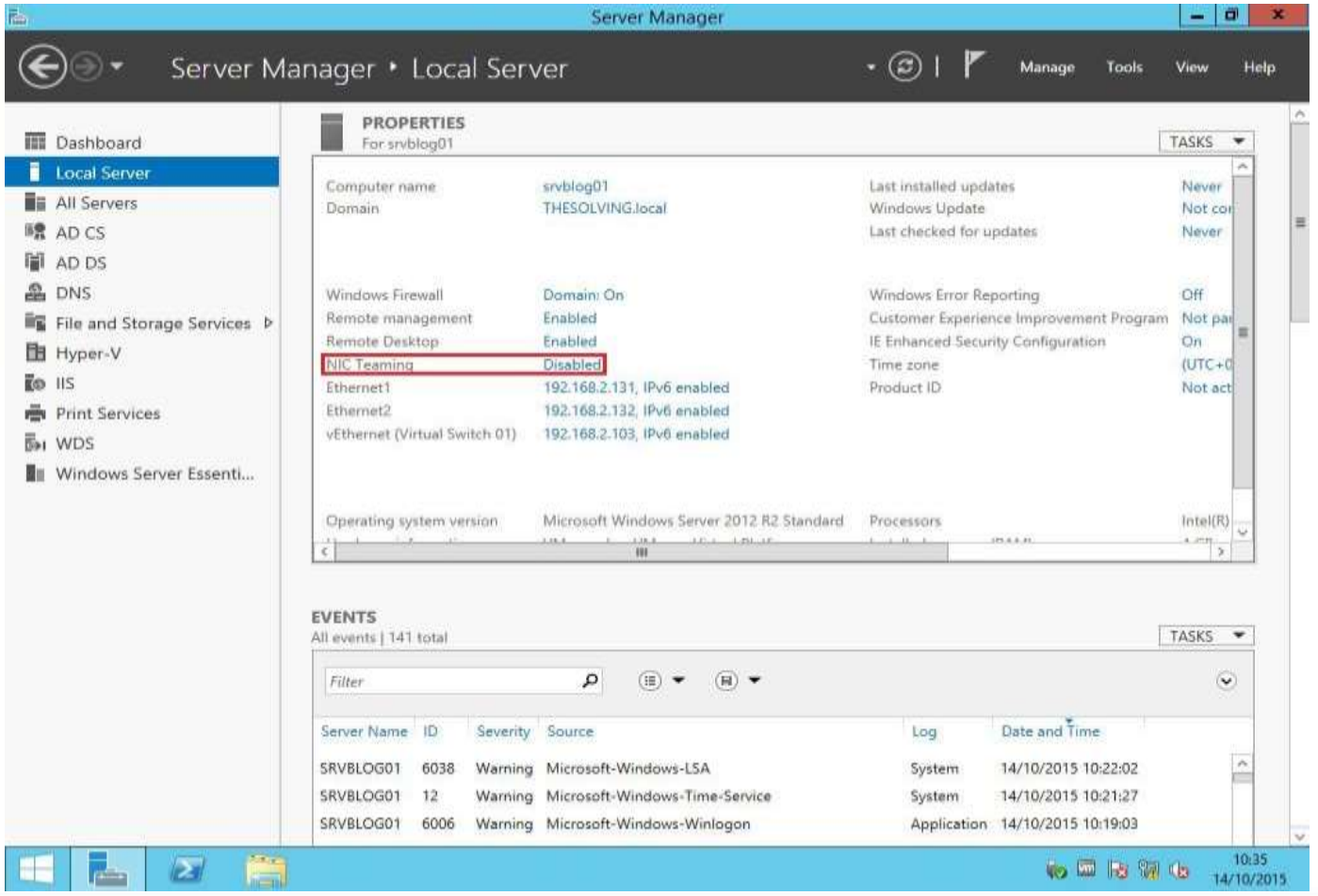
There are the following reasons to user NIC teaming in windows server 2012.

1. Built-in support
2. Work with any windows server 2012 supported NIC
3. Adding a NIC increases available bandwidth
4. NIC Teaming provides fault tolerance
5. Use GUI and Powershell

- **NIC Teaming** allows an administrator to place in a team multiple network adapters being part of the same machine.
- Working as a team, the network adapters improve bandwidth and protect from failures, sharing the same IP and network configuration.
- The reason is pretty straightforward, if one of the adapters breaks, the others will take care of the local connectivity. Windows supports up to 32 adapters placed in a single team.

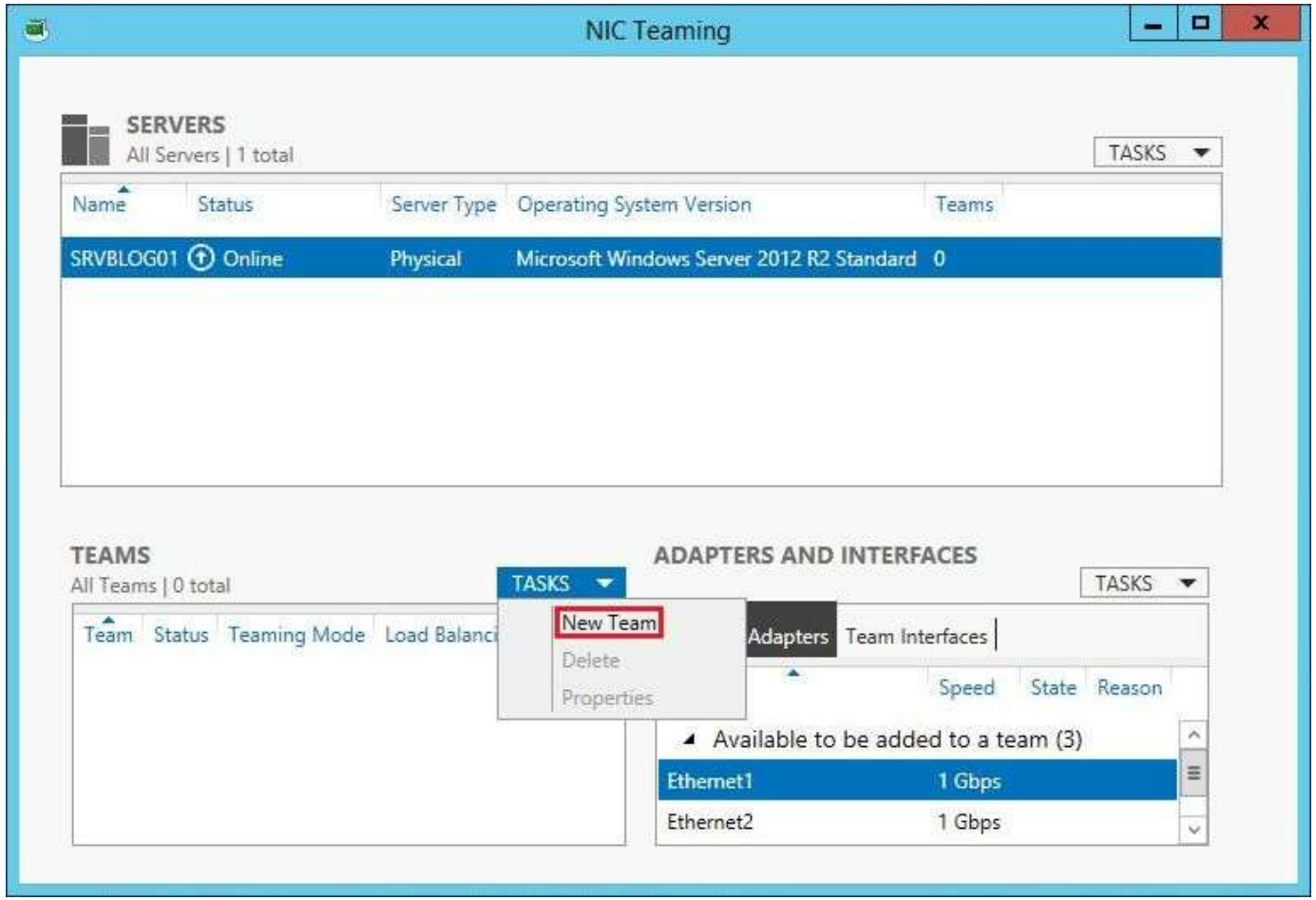
Configuring NIC Teaming

Step 1: To create a **NIC Team**, open the Server Manager and look for the NIC Teaming field. Click on Disabled:



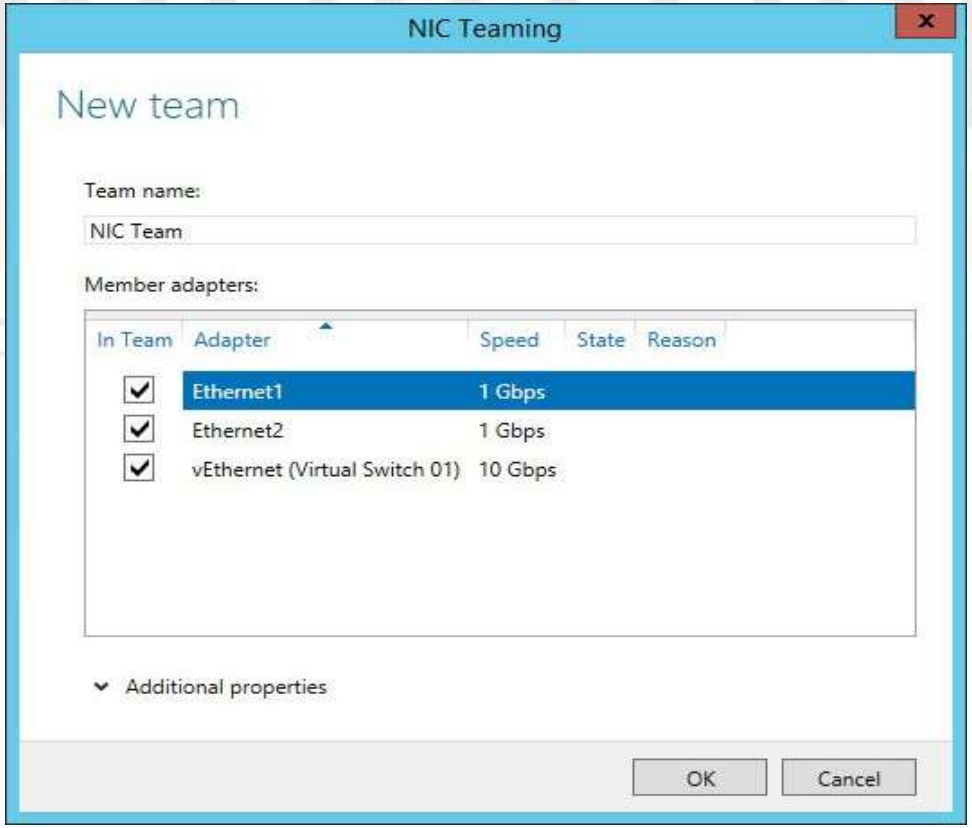
Configuring NIC Teaming

Step 2: Select New Team from the TASKS dropdown menu:



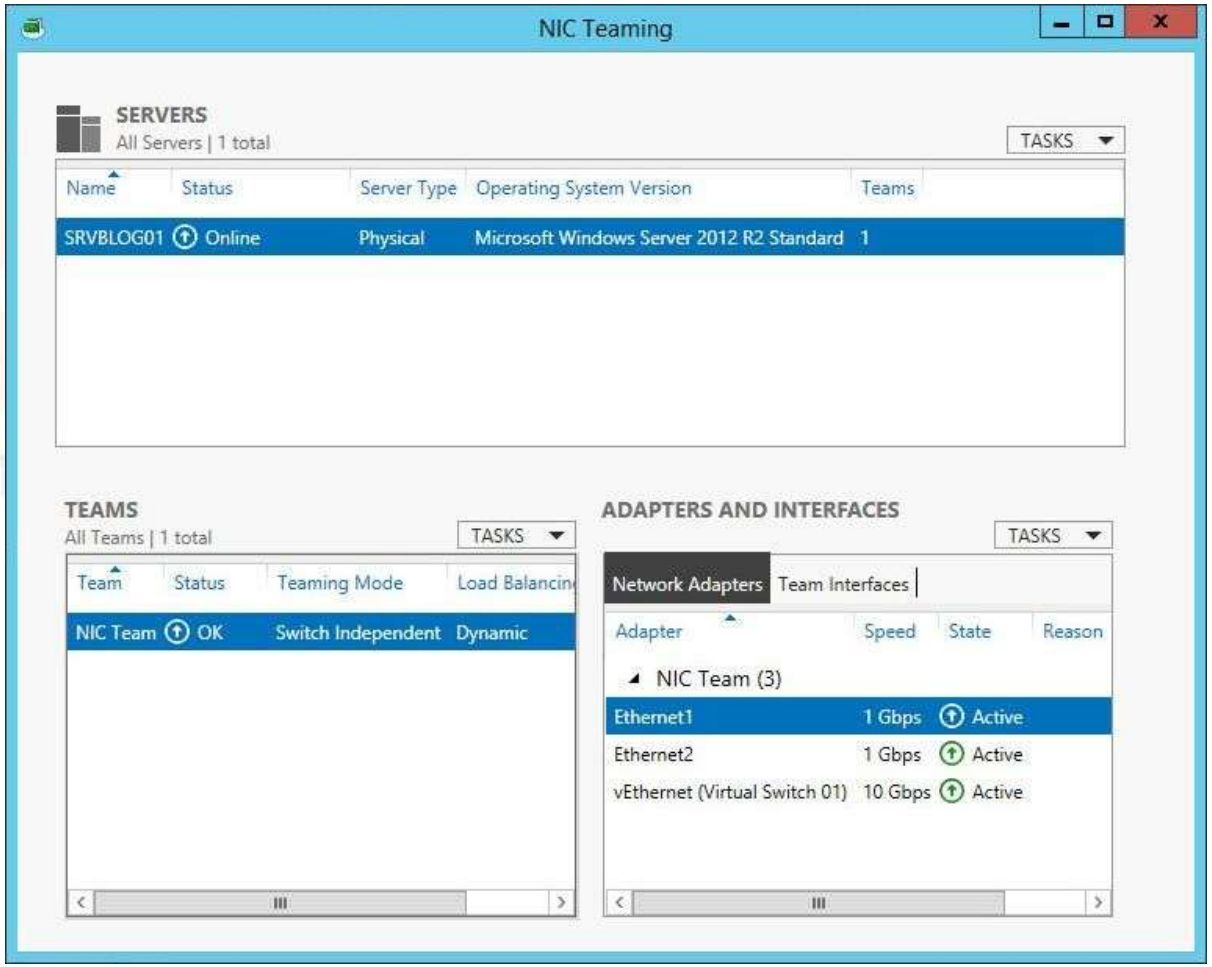
Configuring NIC Teaming

Step 3: Select the adapters you want to include in the team and click Ok. The team will be created (Note: it will be created a new adapter with the NIC Team name, you may be unable to reach the machine through RDPdepending upon the network configuration)



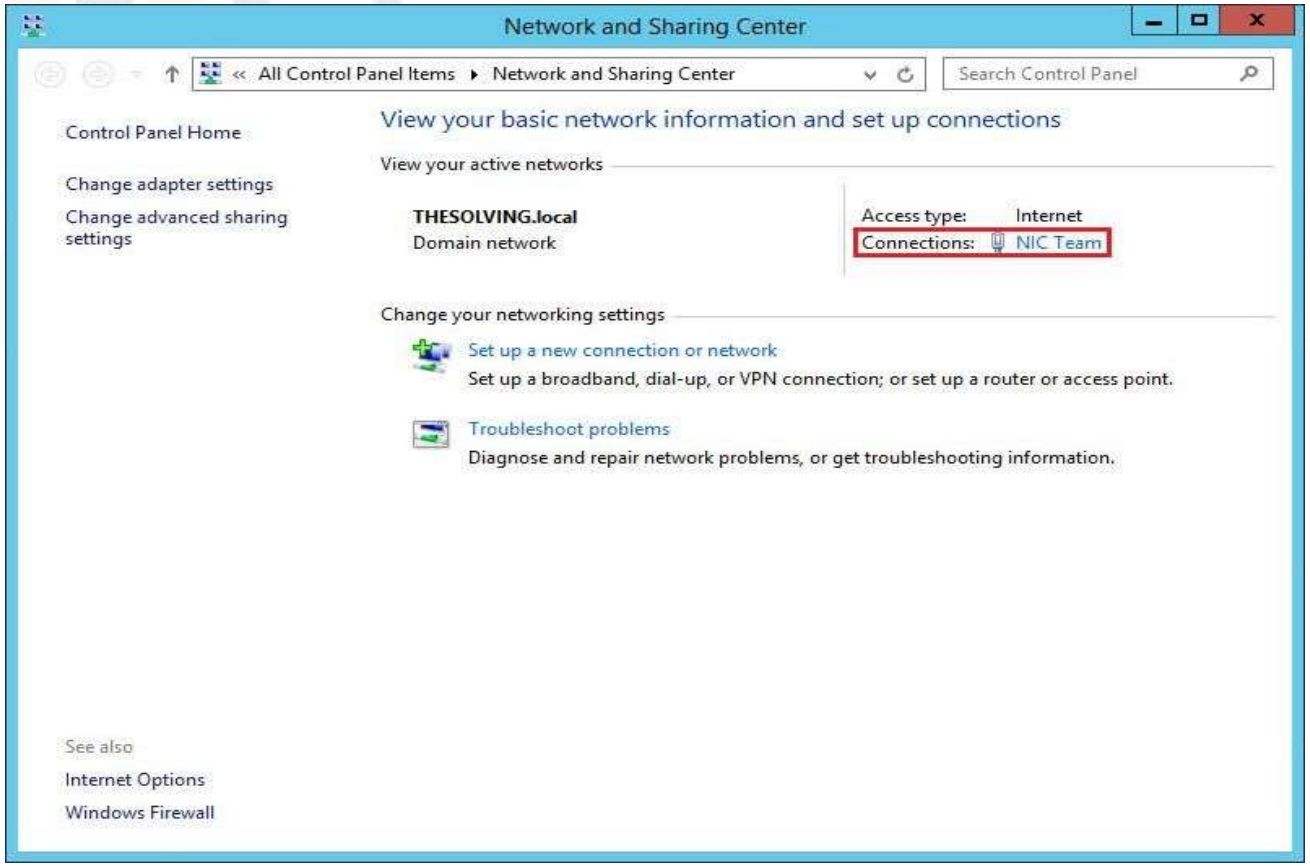
Configuring NIC Teaming

Step 4: The team is ready:



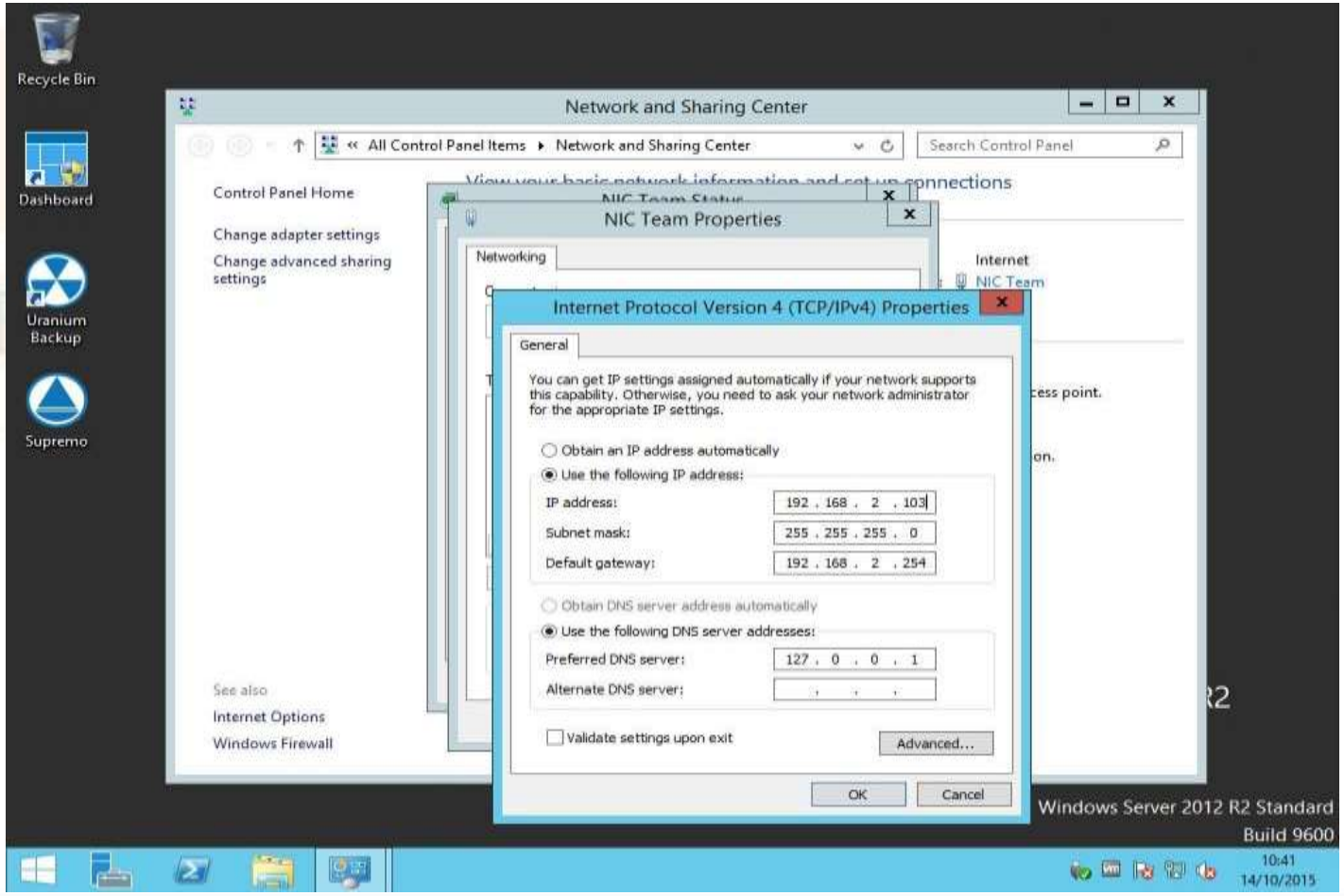
Configuring NIC Teaming

Step 5: to configure the team, open the Network and Sharing Center and click the team name:



Configuring NIC Teaming

Step 6: Configure the team and enjoy it:



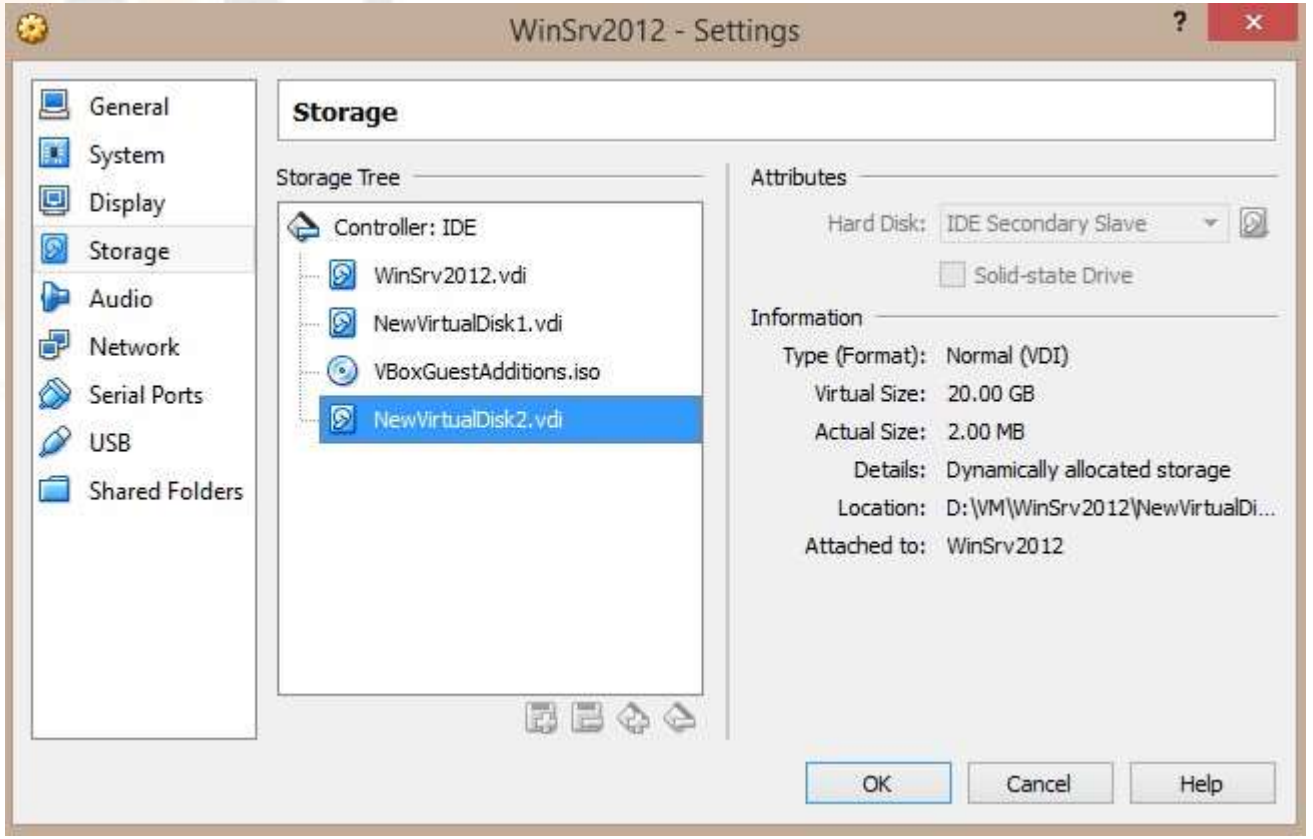
Configuring Local Storage

Configuring Local Storage

- With Storage Spaces you can utilize physical inexpensive disks that once configured react just like a SAN (storage area network) device. In small enterprises that don't require dedicated devices for storage space or high I/O operations, Storage Spaces provides a good alternative in achieving similar results.
- To configure Storage Spaces you'll need one or multiple unpartitioned physical disks (two for mirroring, three for mirroring with parity). Note that this technology offers support for SCSI, SATA, SAS and USB so it will suit you well for most configurations. Disks may be provided either externally or internally and can even be used in JBOD configuration. Storage spaces is a feature that will be installed by default on all Windows Server 2012 machines because it's part of the File and Storage Services role, so you'll not need to cover the installation part.

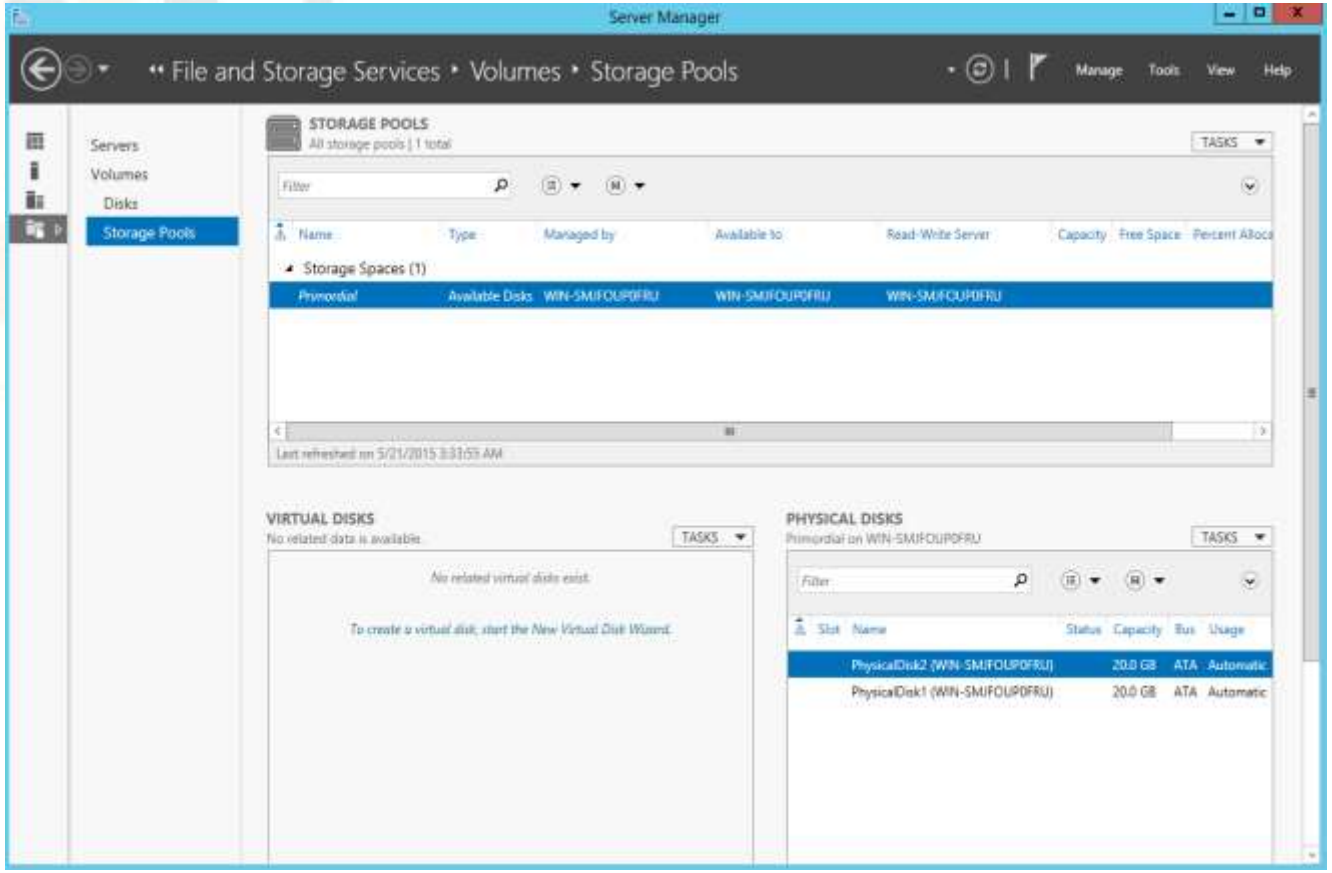
Configuring Local Storage

Step 1: Create a testing VM on VirtualBox environment and attached two extra disks to be able to show how to configure Storage Spaces.



Configuring Local Storage

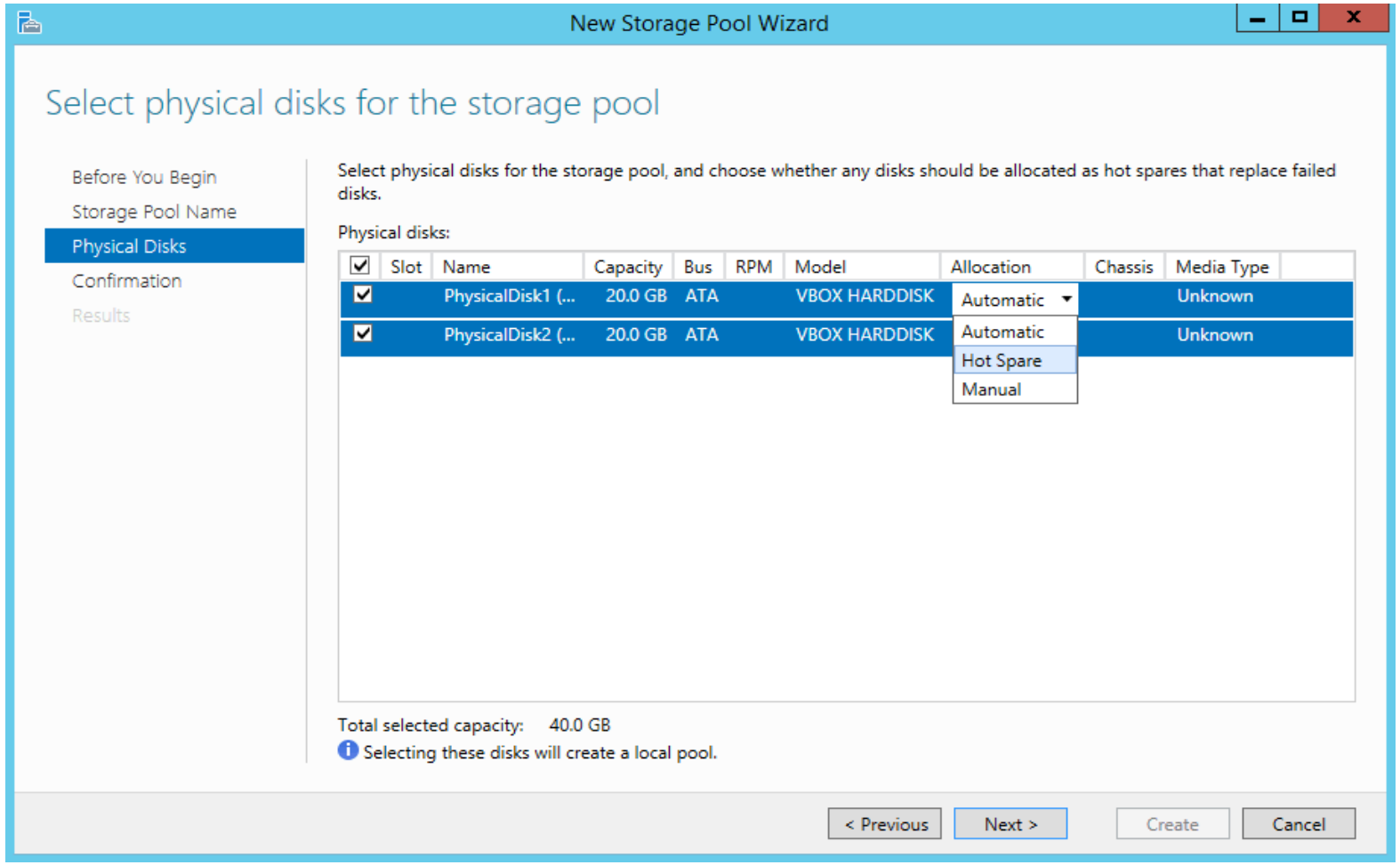
Step 2: Once you login on the machine, open the Server Manager console and navigate to the File and Storage Services/Storage Pools Section:



Configuring Local Storage

Step 3: In the bottom right section of the window, see the physical disks attached on the machine. Note that in order to be able to create a storage pool, the disk must be at least 10 GB in size. All disks will be automatically added to the Primordial pool which contains all storage available on the server from which you can create storage pools. Use Ctrl to select multiple disks, right click and select New Storage Pool or use the Tasks menu in the upper right corner of the panel. When the wizard starts, enter a name for the storage pool and then make sure that the desired disks are selected:

Configuring Local Storage



Configuring Local Storage

Step 4: There are three options available in the allocation section:

- **Automatic** – disk drives capacity is configured automatically
- **Hot Spare** – the disk will not be part of the active pool, it will act as a replacement if one of the active disks fails. A hot spare will automatically be activated if one physical disk is not available anymore
- **Manual** – the admin will configure manually the storage allocation.

- You can also use Powershell to configure Storage Pools much faster by using the New-StoragePoolcmdlet just like in the following example:

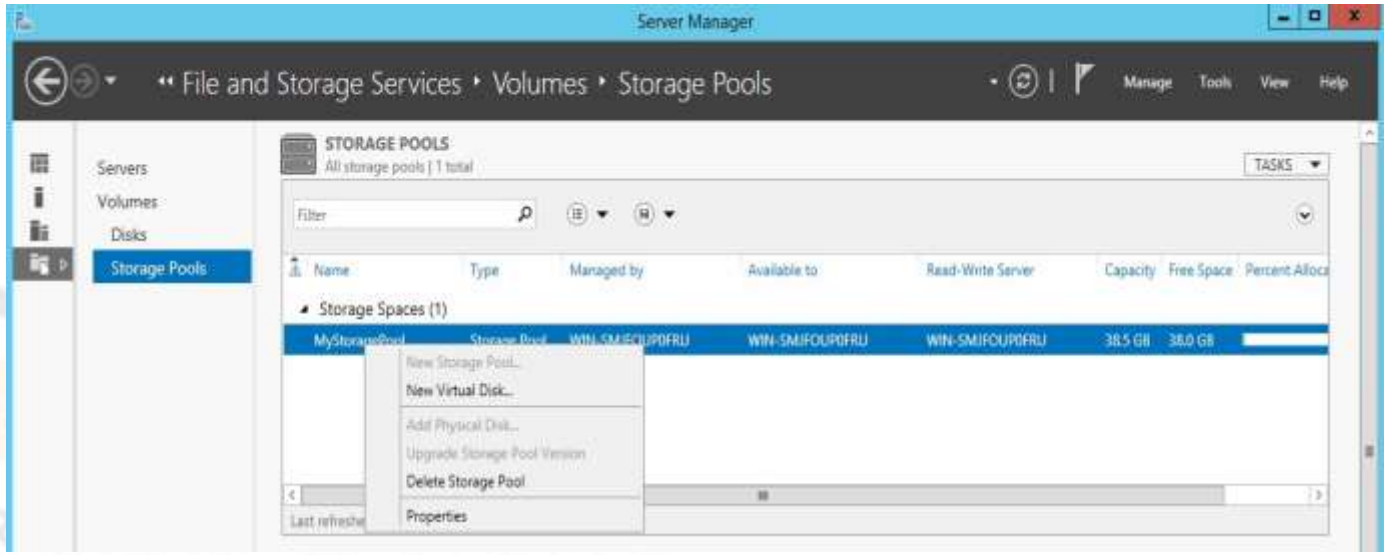
Configuring Local Storage

- New-StoragePool –FriendlyName MyNewPool –StorageSubsystemFriendlyName “Storage Spaces*” –PhysicalDisks (Get-PhysicalDisk PhysicalDisk1, PhysicalDisk2)
- With the Get-StoragePool -IsPrimordial $true | Get-PhysicalDisk | Where-Object CanPool -eq $True you can get the physical disks available in the Primordial pool.
- Once the storage pool has been created, we can create a virtual disk by right-clicking on the pool and selecting New Virtual Disk:

Configuring Local Storage

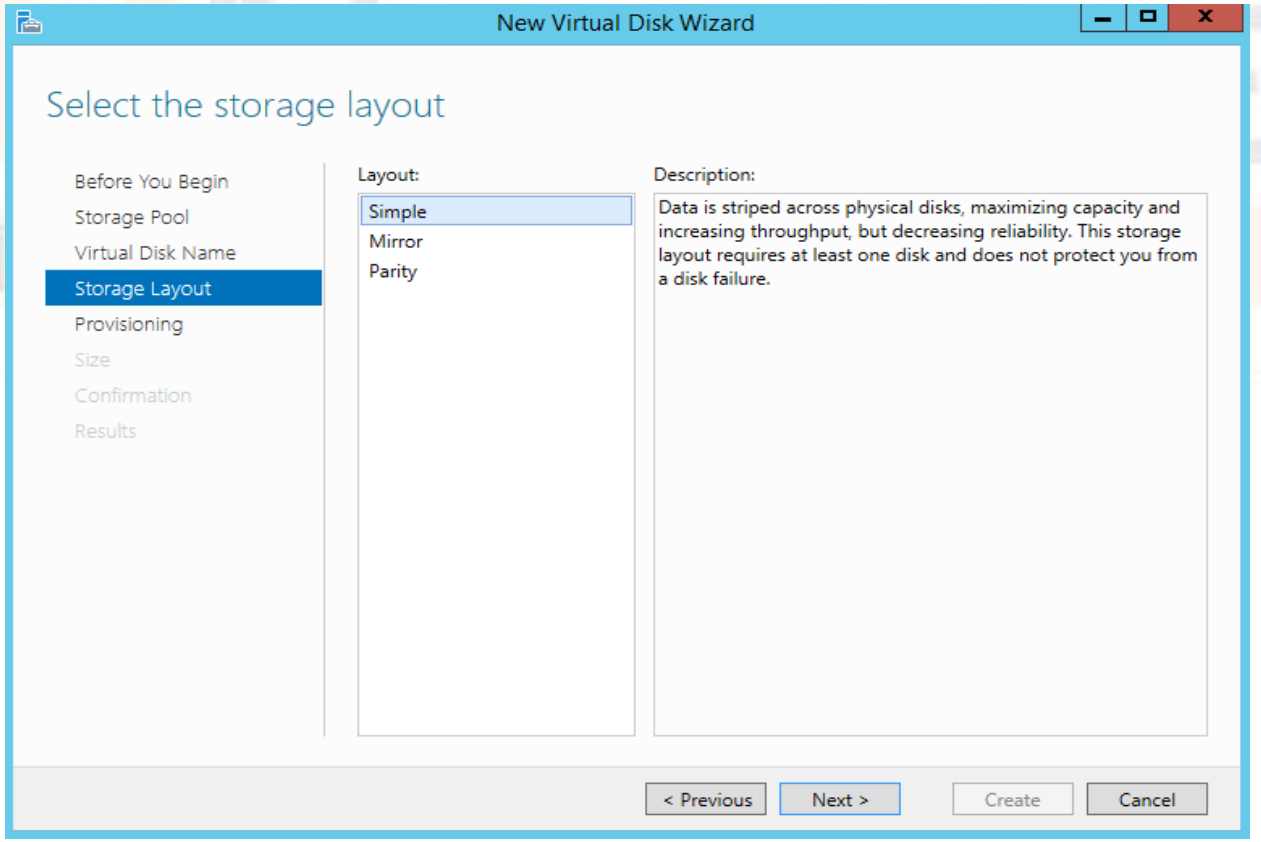
Choose the storage pool that will host the VHD, set the name and description for your new VHD and set the provisioning method that you desire, there are three options available:

- **Simple**
- **Mirror**
- **Parity**



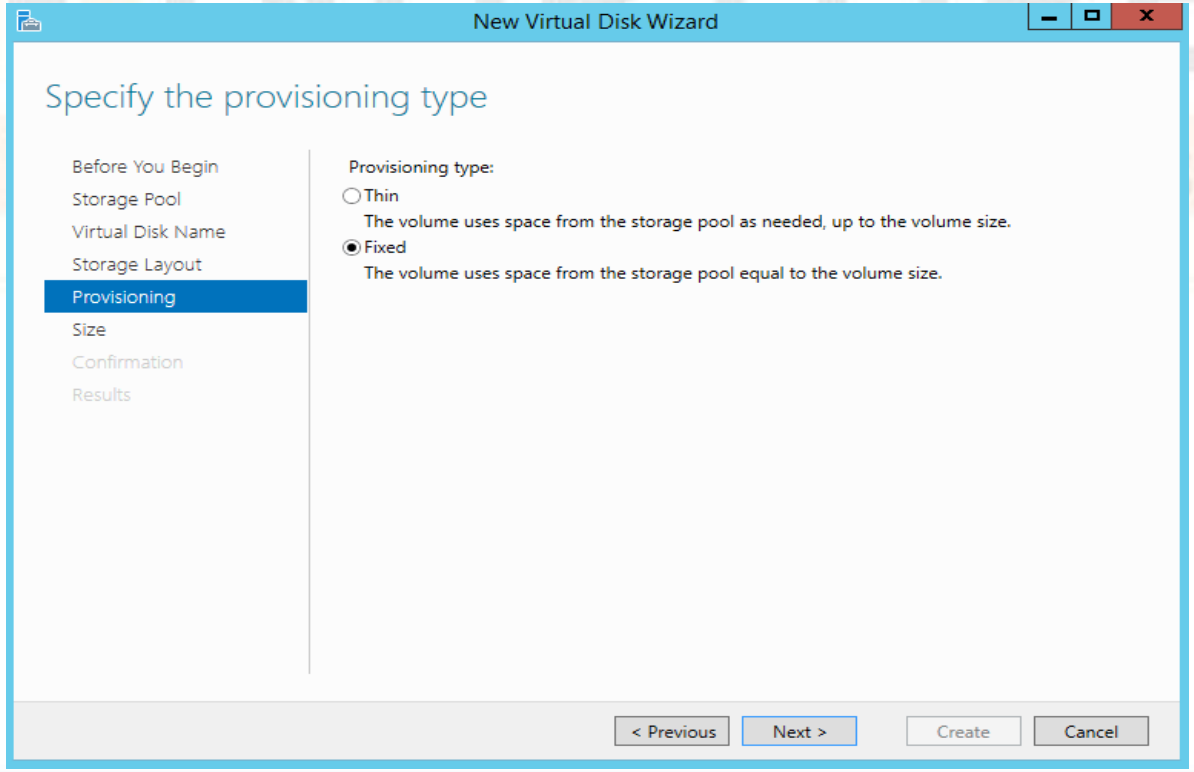
Configuring Local Storage

- If you want to find out more about SAN technologies available with Windows Server and more about provisioning method.



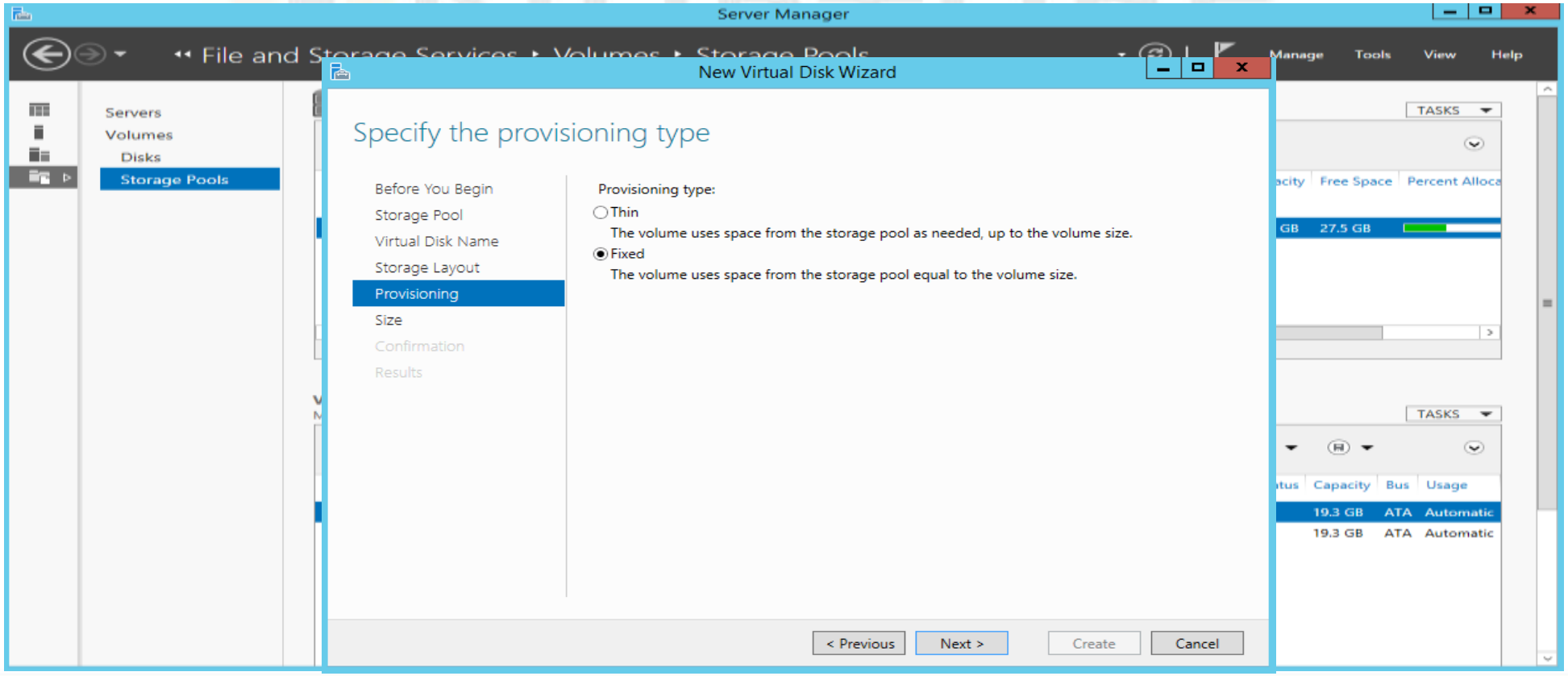
Configuring Local Storage

- In the provisioning tab select the type that suits best for your environment:
  - **Thin** – uses storage space from the pool as written on the VHD
  - **Fixed** – allocates all disk space from the beginning



Configuring Local Storage

- All that's left to do is to set the VHD size and finish the configuration. Once the VHD is ready, it will appear in the Virtual Disks section on the selected Storage Pool. Now you can use this VHD and allocate it to a server within your network:



Configuring WDS to Install OS

Configuring WDS to install OS through networking

Server 2012 WDS is a service of Microsoft through which it can deploy an operating system to other computers over a network using PXE boot. It doesn't required to proximate near computers to install the Operating system on them. It can simply boot the Server from the network and it would start deploying OS on the Server.

Pre-requisites to install and configure WDS Server

Domain Controller for authentication

- **DHCP Server**: It would provide dynamic IPs to Computers, it is also required to assign IP address while server is booting.
- **PXE Boot**: Option on client machine to boot from network.
- **Boot Image**: This would boot the client machine from Network.
- **Install Image**: This would provide the images that we would install on the client machine.
- **DNS Server**: It is required for name resolution.

Configuring WDS to install OS

- **Configuring WDS to install OS**

Step 1: Open the console of Windows Deployment Service 2012. Right click on "**Boot Image**" and click "**Add Boot Image**". Please ensure that OS bootable DVD is inserted in DVD drive.

Step 2: A wizard to add boot image would be started, click on "Browse" and select the DVD drive.

Step 3: Browse to DVD and then **source folder** and select "**Boot.wim**" file. It contains bootable files required by client machine to boot the computer. Click on Open to add the file.

Step 4: Ensure that the path of "**Boot.wim**" file is correct. It is used to boot the client computer while **deploying OS using WDS 2012**. Click on next to continue.

Configuring WDS to install OS

Step 5: Type the name of image and add the description of image. Click on next to continue.

Step 6. Review the information and if you are good with that, click on next.

Step 7. It would start uploading the image to the **WDS server 2012** under boot image folder.

Step 8. Once the boot image is uploaded successfully, click on finish to close the wizard.

Step 9. In "**Windows Deployment Services 2012**" console, under "Boot Images" we can see boot file.

Configuring WDS to install OS

Step 10: Next step is to add the install image from the DVD. Click on "**Add Install Image**".

Step 11: Create a group for install images. It can be used to classify different types of Operating systems. Click on next to continue.

Step 12: Browse to the DVD, open source folder and select Install.wim file.

Step 13: Exact path of "**install.wim**" file is **D:\sources\install.wim**, where D is the DVD drive.

Step 14: Install.wim file contains information of all the versions of Operating systems that we have in the DVD. Select all the versions that you want to add, for this practical we will add Standard edition of OS to **WDS Server 2012**. However you can add all of them if required. Click on next.

Configuring WDS to install OS

Step 15: In summary window, review all the options that you have selected. In case of any changes, click on back to make the changes.

Step 16: OS Image will start uploading to **WDS Server 2012**.

Step 17: Click on finish, once the file is uploaded successfully.

Step 18: In the "**Windows Deployment Services**" console, under install images, you can able to see the uploaded image.

Step 19: The **WDS 2012 R2 Server** is ready to **deploy OS** remotely. At the client side, go to the BIOS setup option. Change the boot option to "**Network**". Press F10 to save and exit.

Step 20: Once the client would boot from network. It would pick IP address from DHCP. In this example, we can see that IP address 192.168.1.81 is assigned to client machine. Press F12 from keyboard for network boot.

Configuring WDS to install OS

Step 21: Client machine would load the "**Boot.wim**" file from the **WDS Server 2012** and start booting the client machine. Successful booting confirm the first phase of **deploy OS using WDS Server 2012** is complete

Step 22: Select the location and Keyboard settings and click on next.

Step 23: Type credential of user, who has access to add the computers in domain.

Step 24: Second phase to **deploy OS using WDS Server 2012** is to select and install OS. Select "**Operating System**" console would list all the Operating systems that we added in the **WDS Server 2012**.

Step 25: To create partitions click on "Drive options", else click on next to continue.

Step 26: Once the installation is completed, computer would restart automatically.

Configuring WDS to install OS

Step 27: Select the country, language and keyboard settings and click on next to continue.

Step 28: Type Administrator password and then reenter password and click on finish.

Step 29: After settings are finalized, installation of Operation system would be completed.

- WDS 2012 R2 is the best tool used to Capture WDS image and for OS Image deployment.

Self Assessment Question

1. What is/are the drawback(s) of the new IP Address Management tool in Windows Server 2012?.

    a. It can only manage servers that belong to designated Windows domains Non-volatile device.

    b. It requires a centralized deployment, which induces network latency.

    c. It cannot manage DHCP appliances.

    d. A and C

Answer: A and C

Self Assessment Question

2. In June 2012, Microsoft revealed that one of its key products was running on Windows Server 2012. This was:

   a. Bing

   b. Office365.

   c. SkyDrive

   d. Xbox

Answer: Bing

Self Assessment Question

3. You have decided to install Windows Server 2012 by choosing the Service Core Installation option. If you want to install, configure or uninstall server roles remotely, what tool would you use?

    a. Windows PowerShell
    b. Any of these.
    c. Server Manager
    d. Remote Server Administration Tools (RSAT)

Answer: Any of these.

Self Assessment Question

4. Which of the following features is available when Windows Server 2012 is installed using the GUI option but without the desktop experience feature installed?

   a. Metro-style Start screen.

   b. Built-in help system

   c. All of these

   d. Windows media player

Answer: Built-in help system

Self Assessment Question

5. You have just finished installing Windows Server 2012 on a new server. Your colleague has informed you that its essential that you must activate Windows Server. Which of the following command line tools can be used to Activate Windows Server?

   a. Cscript C:\windows\system32\slmgr.vbs –ato

   b. Netdom C:\windows\system32\slmgr.vbs –ato

   c. Ocsetup C:\windows\system32\slmgr.vbs –ato

   d. Netsh C:\windows\system32\slmgr.vbs –ato

Answer: Cscript C:\windows\system32\slmgr.vbs –ato

Self Assessment Question

6. Which of the following Windows PowerShell cmdlets can you use to list the existing Windows Firewall rules on a computer running Windows Server 2012 R2? (Choose all that apply.)

   a. Get-NetFirewallRule

   b. Set-NetFirewallRule

   c. Show-NetFirewallRules

   d. New-NetFirewallRule

Answer: Get-NetFirewallRule

Self Assessment Question

7. When you install the Hyper-V role on a server running Windows Server 2012 R2, the instance of the OS on which you installed the role is converted to what system element?

   a. The hypervisor

   b. The Virtual Machine Monitor

   c. The parent partition

   d. A child partition

Answer: The parent partition

Self Assessment Question

8. Which of the following volume types supported by Windows Server 2012 R2 provide fault tolerance? (Choose all that apply.)

   a. Stripped
   b. Spanned
   c. Mirrored
   d. RAID 5

Answer: a, c

Self Assessment Question

9. What is the maximum number of shadow copies a Windows Server 2012 R2 system can maintain for each volume?

   a. 8

   b. 16

   c. 64

   d. 128

Answer: 64

Self Assessment Question

10. Which of the following command-line tools are used to join a computer to a domain?

a. Net.exe

b. Netsh.exe

c. Netdom.exe

d. Ipconfig.exe

Answer: Netdom.exe

Self Assessment Question

11. You need to confirm which server roles and features are present on a computer running the Server Core version of Windows Server 2012 R2. What command should you run?

    a. oclist

    b. Get-WindowsFeature

    c. ServerManagerCmd

    d. sconfig.cmd

Answer: Get-WindowsFeature

Self Assessment Question

12. Which Windows PowerShell module includes the command-line options for installing domain controllers?

    a. AD DS Administration cmdlets

    b. AD DS Deployment amdlets

    c. AD CS Deployment cmdlets

    d. AD DS Administration amdlets

Answer: AD DS Deployment cmdlets

Self Assessment Question

13. ACL stands for:

a. Access control list

b. Account control list

c. Access configuration list

d. Access control loop

Answer: Access control list

Self Assessment Question

14. You want to ensure that a server running Windows Server 2012 R2 boots into Safe Mode the next time it starts. Which commands can you use to achieve this goal? (Choose all that apply.)

    a. Bootrec

    b. Bcdedit

    c. startrep

    d. Msconfig

Answer: b and d

Self Assessment Question

16. Which of the following editions of Windows Server 2012 R2 can be configured in a failover cluster? (Choose all that apply.)

    a. Windows Server 2012 R2 Hyper-V edition

    b. Windows Server 2012 R2 Standard edition

    c. Windows Server 2012 R2 foundation edition

    d. Windows Server 2012 R2 datacentre edition

Answer: a, b and d

Assignment

You need to answer below sets of problem. These sets of questions are meant for the testing unit I.

1. What is the functionality of windows server? Brief about its different additions.
2. What are server roles and features?
3. What do you understand by server Licencing?
4. Explain about server core default.
5. What is the system requirement for performing the clean installation of server 2012?
6. Explain the capabilities of server core.
7. What is upgrade paths?
8. Explain server migration tools.
9. How you can configure NIC Teaming.
10. How you can configure WDS to install OS?

Summary

- Windows Server 2016 requires a minimum of 512 MB with error-correcting code or a similar technology.
- Network adapters must support a minimum of 1 Gigabit Ethernet bandwidth and the pre-boot execution environment feature.
- Windows Server 2016 requires at least 32 GB of disk storage but will need more space if the installation occurs over a network.
- Server Core is designed for use by network and file service infrastructure developers, server management tool and utility developers, and IT planners.
- Windows Server 2012 comes with a couple of new features that can be used to make your life as a System Administrator much better. One of these cool features is the ability to convert a server with full installation into a core edition and vice versa.

Document Links

Topics	URL
Introduction and Selecting a Windows Server 2012 Edition	https://www.thomas-krenn.com/en/wiki/Windows_Server_2012_Editions_comparison https://www.techrepublic.com/blog/data-center/microsoft-announces-four-windows-server-2012-editions-what-you-need-to-know/ https://redmondmag.com/articles/2012/07/05/windows-server-2012-editions-revealed.aspx https://mantralogix.com/news/windows-server-2012-r2-products-editions-comparison/ https://garvis.ca/2013/04/16/windows-server-2012-roles-features/ https://blogs.technet.microsoft.com/canitpro/2013/04/23/windows-server-2012-roles-features/ https://en.wikiversity.org/wiki/Windows_Server_Administration/Roles_and_Features
Server Roles and Features	https://www.itprotoday.com/windows-8/top-5-roles-deploying-windows-server-2012 https://www.veeam.com/blog/new-features-in-windows-server-2012-r2.html https://www.supinfo.com/articles/single/4413-windows-server-2012-features-and-roles https://www.directionsonmicrosoft.com/licensing/2012/07/windows-server-2012-editions-and-licensing-changes

Document Links

Topics	URL
Installation of windows server 2012 and server licencing	http://www.pearsonitcertification.com/articles/article.aspx?p=2248808&seqNum=2 https://blogs.technet.microsoft.com/bobh/2013/02/11/requirements-for-a-fresh-windows-server-2012-installation-part-6-of-19/ https://www.servethehome.com/microsoft-windows-server-2012-hardware-requirements-recommendations/ https://www.virtualizationhowto.com/2013/06/windows-server-2012-r2-installation-screenshots-step-by-step/ https://blogs.msdn.microsoft.com/msgulfcommunity/2013/03/06/installing-windows-server-2012-step-by-step/ https://www.petri.com/installing-windows-server-2012-rc https://www.faqforge.com/windows/install-windows-server-2012-r2/ https://www.microsoftpressstore.com/articles/article.aspx?p=2201312&seqNum=3 https://serverfault.com/questions/766154/installaling-window-server-2012-r2-under-partitioning-disk-option https://www.petri.com/install-windows-server-2012-r2
Installation of windows server 2012 and server licencing	https://www.transip.eu/knowledgebase/entry/144-create-partition-windows-server-2012/ https://4sysops.com/archives/windows-server-2012-server-core-part-6-configuration/ https://blogs.technet.microsoft.com/tommypatterson/2012/11/29/installing-windows-server-2012-in-core-mode-step-by-step-part-ii/ https://richardjgreen.net/setting-powershell-default-shell-server-core/

Document Links

Topics	URL
Server core Default	https://penetrateit.wordpress.com/2013/10/10/start-powershell-as-default-in-windows-server-core/ https://msdn.microsoft.com/en-us/library/hh846323(v=vs.85).aspx https://docs.microsoft.com/en-us/windows-server/administration/server-core/what-is-server-core https://msdn.microsoft.com/en-us/library/hh846313(v=vs.85).aspx https://www.mssqltips.com/sqlservertip/2526/enable-powershell-on-windows-server-2008-r2-core-edition/ http://www.informit.com/articles/article.aspx?p=1947698&seqNum=5 https://docs.microsoft.com/en-us/windows-server/administration/server-core/server-core-roles-and-services https://searchwindowsserver.techtarget.com/feature/Server-Core-installation-offers-perks-challenges-for-IT http://www.academia.edu/28563038/Lab_2_Configuring_Servers_This_lab_contains_the_following_exercises_and_activities_Exercise_2.1_Exercise_2.2_Exercise_2.3_BEFORE_YOU_BEGIN https://nkdagility.com/windows-server-2012-core-for-dummies/
Server core Default	https://cdn.ttgtmedia.com/searchSystemsChannel/downloads/Windows_Server_2008_How-To_Chp2.pdf https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-server-2008-R2-and-2008/cc770416(v=ws.11) https://docs.microsoft.com/en-us/windows-server/administration/server-core/server-core-manage https://docs.microsoft.com/en-us/windows-server/administration/server-core/server-core-administer

Document Links

Topics	URL
Conversion Between GUI and Server Core	https://www.techrepublic.com/article/how-to-switch-between-gui-and-core-in-windows-server-2012-using-powershell/ https://blogs.technet.microsoft.com/gbanin/2012/12/11/converting-a-server-with-a-gui-to-or-from-server-core/ https://www.poweradmin.com/blog/converting-a-windows-server-with-gui-to-server-core-and-vice-versa/ https://www.technig.com/convert-server-core-to-full-gui-and-vice-versa/ https://www.thegeekstuff.com/2014/07/switch-windows-gui-mode/ https://www.fastvue.co/sophos/blog/switch-between-windows-server-core-and-full-gui-the-easy-way/ https://mizitechinfo.wordpress.com/2014/07/25/simple-step-convert-server-core-to-gui-in-windows-server-2012-r2/ http://www.itgeared.com/articles/1498-windows-server-2012-upgrade-paths/
Upgrade paths and migration	https://blogs.technet.microsoft.com/askcore/2012/10/23/upgrading-to-windows-server-2012-part-1/ https://blogs.technet.microsoft.com/uspartner_ts2team/2013/11/19/quick-reference-for-upgrading-to-windows-server-2012-r2/ https://blogs.technet.microsoft.com/askperf/2012/10/22/windows-8-windows-server-2012-upgrade-paths-and-editions/ https://docs.microsoft.com/en-us/windows-server/get-started/installation-and-upgrade

Document Links

Topics	URL
NIC teaming and local storage	https://blog.workinghardinit.work/2013/05/15/installing-using-the-windows-server-migration-tools-to-migrate-local-users-groups/ https://github.com/MicrosoftDocs/windowsserverdocs/blob/master/WindowsServerDocs/get-started/Migrate-Roles-and-Features.md https://www.utilizewindows.com/preparing-tools-for-migration-to-windows-server-2012/ http://techgenix.com/nic-teaming-windows-server-2012/ https://thesolving.com/server-room/how-to-configure-nic-teaming-on-windows-server-2012/ https://www.intel.in/content/www/in/en/support/articles/000022706/network-and-i-o/ethernet-products.html https://www.pluralsight.com/blog/it-ops/nic-teaming-windows-server-2012 https://www.poweradmin.com/blog/how-to-create-local-storage-with-windows-server-2012/ https://quizlet.com/118591224/70-410-configuring-local-storage-in-windows-server-2012-r2-flash-cards/ https://www.techveze.com/configure-local-storage/
Configuring WDS to install OS	https://www.windows-server-2012-r2.com/local-storage.html https://blogs.technet.microsoft.com/keithmayer/2013/01/23/step-by-step-building-a-windows-server-2012-storage-server-in-the-cloud-with-windows-azure/ https://www.lynda.com/Windows-Server-tutorials/Windows-Server-2012-R2-Configure-File-Storage-Solutions/445429-2.html

Document Links

Topics	URL
Memory Management in Operating System	http://www.enterprisedaddy.com/2015/10/exam-70-410-objective-1-3-configure-local-storage/ https://www.itprotoday.com/mobile-management-and-security/configuring-windows-deployment-services-server-2012-r2-dhcp-running http://www.itingredients.com/deploy-os-using-wds-in-windows-server-2012-r2/ http://www.itingredients.com/install-and-configure-wds-in-windows-server-2012-r2/ https://www.faqforge.com/windows-server-2012-r2/setup-windows-deployment-services-separate-dhcp-windows-server-2012-r2/ https://www.faqforge.com/windows/configure-windows-deployment-services-windows-server-2012-r2/
Memory Management in Operating System	https://www.technig.com/how-to-install-and-configure-wds-in-windows-server-2012-r2/ https://prajwaldesai.com/installing-and-configuring-windows-deployment-services/ https://newhelptech.wordpress.com/2017/07/13/step-by-step-how-to-windows-deployment-services-wds-in-windows-server-2016/ https://thesolving.com/server-room/configuring-and-using-windows-deployment-services-wds/

Video Links 

Topics	URL
Introduction, selecting editions roles and features , installation of server 2012	https://www.youtube.com/watch?v=8YSxBcLUIjw https://www.youtube.com/watch?v=OlUhfSRolIw https://www.youtube.com/watch?v=pE6L9HkyEzE https://www.youtube.com/watch?v=dQMvpXjngdU https://www.youtube.com/watch?v=5QDe-HTZtMY
Server core defaults	https://www.youtube.com/watch?v=XK_U9UVCVnk https://www.youtube.com/watch?v=ekw8PIyo7zo https://www.youtube.com/watch?v=u9I2H1hGVqo
Upgrades path, migration tools, NIC Teaming, configuring local storage and configure WDS to install OS	https://www.youtube.com/watch?v=eREoyNhvIbw https://www.youtube.com/watch?v=JWq-VAQSXos https://www.youtube.com/watch?v=sOrOPAwS5wQ https://www.youtube.com/watch?v=VYfvwMGQxW0 https://www.youtube.com/watch?v=jX6EyoYfGro https://www.youtube.com/watch?v=-D59eaKkVPI https://www.youtube.com/watch?v=GDrZQjg-EDg https://www.youtube.com/watch?v=2t1V34P-ly0

E-Book Links

Topics	URL
Introduction, installation ,roles and features, system requirements, server core, licencing, upgrade path, installing OS through WDS	http://download.microsoft.com/download/3/0/C/30CA8C9B-E99D-49A6-8B30-8344416B1F54/01-WS2012-R2-intro%20to%20R2.pptx
Introduction, installation ,roles and features, system requirements, server core,Migration tools	http://download.microsoft.com/download/0/C/B/0CB33133-C6F7-48A6-B7CC-D927988FCB32/Microsoft_Press_ebook_Introducing_Windows_Server_2012_PDF.pdf
Introduction, installation ,roles and features, system requirements, server core	https://ptgmedia.pearsoncmg.com/images/9780735684249/samplepages/9780735684249.pdf
List of different e-books on server 2012 with different topics	https://blogs.technet.microsoft.com/keithmayer/2014/02/11/12-free-ebooks-on-windows-server-2012-r2-windows-8-1-system-center-2012-r2-windows-azure-and-more/