Windows Server Introduction

Lesson 1: Introduction to Servers

Network Administration Definition

- Network administration aims to manage, monitor, maintain, secure, and service an organization's network. However, the specific tasks and procedures may vary depending on the size and type of an organization.

What does network administration consist of?

Network administration primarily consists of, but isn't limited to, network monitoring, network management, and maintaining network quality and security.

- **Network monitoring** is essential to monitor unusual traffic patterns, the health of the network infrastructure, and devices connected to the network. It helps detect abnormal activity, network issues, or excessive bandwidth consumption early on and take preventative and remedial actions to uphold the network quality and security.
- **Network management** encompasses multiple administrative functions, including network planning, implementation, and configuration. It involves:

What does network administration consist of?

1. Re-planning the network based on changing organizational requirements
2. implementing the network for maximum efficiency
3. configuring various networking and security protocols
4. applying security patches and updating the firmware of the networking infrastructure, such as routers, hubs, switches, and firewalls
5. assessing the network for weaknesses
6. evaluating quality and capacity to increase or decrease network capacity and manage resource wastage

Network security employs various techniques to ensure a network is secure. For example, it uses multiple tools such as firewalls, intrusion detection or prevention systems, and anti-malware software to prevent or detect malicious activity in the network.

Network administration Goals

Network administration aims to ensure a reliable, secure network conducive to business operations.

Generally, network administration goals include:

- maintain a resilient, high-quality network
- plan and improve network capacity to enable seamless network access and operations
- leverage networking tools for network systems administration and better network administration control
- track and document relevant changes
- evaluate possible risks and orchestrate effective mitigations
- prevent activities compromising or using the network as an attack vector
- identify and mitigate intrusions to avoid security breaches

Network administration key areas

- **Fault management:** Monitors the network infrastructure to identify and address issues potentially affecting the network. It uses standard protocols such as Simple Network Management Protocol (SNMP) to monitor network infrastructure.
- **Configuration management:** Tracks configuration and related changes of network components, including switches, firewalls, hubs, and routers. As unplanned changes can affect the network drastically and potentially cause downtime, it's essential to streamline, track, and manage configuration changes.
- **Account management:** Tracks network utilization to bill and estimate the usage of various departments of an organization. In smaller organizations, billing may be irrelevant. However, monitoring utilization helps spot specific trends and inefficiencies.

Network administration key areas

- **Performance management:** Focuses on maintaining service levels needed for efficient operations. It collects various metrics and analytical data to continually assess network performance, including response times, packet loss, and link utilization.
- **Security management:** Aims to ensure only authorized activity and authenticated devices and users can access the network. It employs several disciplines such as threat management, intrusion detection, and firewall management. It also collects and analyzes relevant network information to detect and block malicious or suspicious activity.

Windows Server Definition

To answer the question of **what is Windows Server**, it must be said that Microsoft's Windows Server operating system is designed as a series of enterprise-class server operating systems that share multi-user services and extensive control over data storage, applications, and shared networks.

Windows servers use for enterprise purposes, covering an extensive network and virtually unlimited connections.

What does a Windows Server do?

A network administrator typically manages an organization's network and is responsible for:

- installing, monitoring, troubleshooting, and upgrading network infrastructure, including both hardware and software components
- monitoring network activity
- implementing optimization techniques to improve network efficiency and utilization
- managing and granting network access to users and endpoint devices

Windows Server History

Server Version	Release Year	Editions	Currently Supported	Details
Windows NT 3.1	1993	–	No	First Server version. 32-bit.
Windows NT 3.5	1994	–	No	Supports Unix and Novell Netware connectivity. Can be used with existing networks.
Windows NT 3.51	1995	–	No	Support for Windows 95 with remote software license management.
Windows NT 4.0	1996	–	No	With IIS, Server-edition Terminal, UI similar to Windows 95

Windows Server History

Server Version	Release Year	Editions	Currently Supported	Details
Server 2000	2000	Server, Advanced Server, Datacenter Server	No	Integration with Active Directory for user authentication and support for Extensible Market Language.
Server 2003	2003	Web, Standard, Enterprise, Datacenter	No	Define Server roles and features, inclusion of .NET.
Server 2003 R2	2005	Web, Standard, Enterprise, Datacenter	No	With Active Directory Federation Services (ADFS), a Security configuration wizard, and improved data compression capabilities.

Windows Server History

Server Version	Release Year	Editions	Currently Supported	Details
Server 2008	2008	Web, Foundation, Standard, Enterprise, Datacenter	No	Introduced Hyper-Virtualization, Event Viewer, and Server Manager.
Server 2008 R2	2009	Web, Foundation, Standard, Enterprise, Datacenter	No	64-bit OS, enhanced Group Policy implementation, with Remote Desktop Services.
Server 2012	2012	Foundation, Essentials, Standard, Datacenter	Mainstream ended, extended ending October 2023	Improved Hyper-V functionality and support added for cloud integration

Windows Server History

Server Version	Release Year	Editions	Currently Supported	Details
Server 2012 R2	2013	Foundation, Essentials, Standard, Datacenter	Mainstream ended, extended ending October 2023	Windows PowerShell updated and improved storage management.
Server 2016	2016	Essentials, Standard, Datacenter	Mainstream ended, extended ending January 2027	Inclusion of Network Controller and Nano Server, support for containers added.
Server 2019	2018	Essentials, Standard, Datacenter	Yes	With Hyper-converged infrastructure, Advanced Threat Protection, and Windows Admin Center.

Windows Server History

Server Version	Release Year	Editions	Currently Supported	Details
Server 2012 R2	2013	Foundation, Essentials, Standard, Datacenter	Mainstream ended, extended ending October 2023	Windows PowerShell updated and improved storage management.
Server 2016	2016	Essentials, Standard, Datacenter	Mainstream ended, extended ending January 2027	Inclusion of Network Controller and Nano Server, support for containers added.
Server 2019	2018	Essentials, Standard, Datacenter	Yes	With Hyper-converged infrastructure, Advanced Threat Protection, and Windows Admin Center.
Server 2022	2021	Essentials, Standard, Datacenter, Azure edition	Yes	With Azure Arc, Storage Migration Service, support for hot-patching.

Windows Server 2016 Eiditions

Windows Server 2016):[1]

- Essentials
- Standard
- Datacenter

The editions are suitable for the following application areas:

Windows Server 2016 Eiditions

Edition	Ideal for...	Virtualization rights	Licensing model	Client Access Licenses	RAM Limit	CPU Limit
Essentials	Small businesses with basic IT requirements; very small or no IT department	no, one physical **or** one virtual installation	CPU-based	CALs not required * (limited to 25 users / 50 devices)	64 GB RAM	max. 2 CPUs
Standard	For all companies that require advanced features and virtualize to a lesser extent	2 virtual machines ** **or** 2 Hyper-V Container	Core-based	CALs required ***	24 TB RAM	512 Cores
Datacenter	For all companies with high requirements on IT workloads with large number of virtual systems	unlimited virtual machines and Hyper-V Container				

Minimal System Requirements for Windows Server 2016

The following table shows the minimum requirements for Windows Server 2016. The actual requirements depend on the system configuration and the installed applications and features.

Description	Minimal System Requirements
CPU architecture	x64
CPU clock rate	1.4 GHz
RAM	512 MB* with (ECC (Error Correcting Code) type or similar technology)
Disk space	32 GB**
Network adapter	1x Ethernet (at least gigabit throughput)

(*) 2 GB for Server with Desktop Experience installation option.
(**) Computers with more than 16 GB of RAM will require more disk space for paging, hibernation, and dump files

Edition comparison by physical / virtual instances

Windows Server 2016 instances can be operated in either a physical operating system environment (POSE) or a virtual operating system environment (VOSE):

Edition	Running instances in POSE	Running instances in VOSE
Essentials	1**	1**
Standard	1*	2
Datacenter	1	unlimited

(*) When a customer runs all the allowed virtual instances, the physical instance can only be used to manage and maintain the virtual instances.
(**) Essentials can be run in a physical or virtual operating system environme

Edition comparison by server roles

The Windows Server 2016 editions differ in the following server roles:

Serverrolle	Datacenter/Standard	Essentials
AD Certificate Services	✓	✓ automatically installed/configured (1)
AD Domain Services	✓	✓ automatically installed/configured (2)
AD Federation Services	✓	✓
AD Lightweight Directory Services	✓	✓
AD Rights Management Services (3)	✓	✓
Application Server	✓	✓
DHCP Server	✓	✓
DNS Server	✓	✓ automatically installed/configured
Fax Server	✓	✓
File Services	✓	✓ automatically installed/configured (4)
Hyper-V	✓	-
Network Policy & Access Services	✓	✓ automatically installed/configured
Print & Document Services	✓	✓
Remote Access	✓	✓ automatically installed/configured (5)
Remote Desktop Services (6)	✓	_ (7)
UDDI Services	✓	✓
Web Server (IIS)	✓	✓ automatically installed/configured
Windows Deployment Services	✓	✓
Windows Server Update Services	✓	-

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Hyper-V	✓	-
Network Policy & Access Services	✓	✓ automatically installed/configured
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UDDI Services	✓	✓
Web Server (IIS)	✓	✓ automatically installed/configured
Windows Deployment Services	✓	✓
Windows Server Update Services	✓	-

Edition comparison by server new feature

The Windows Server 2016 editions differ in the following server roles:

Feature	Essentials	Standard	Datacenter
Core functionality of Windows Server	-	✔	✔
OSEs / Hyper-V containers	-	✔ 2	✔ unlimited
Windows Server containers	-	✔ unlimited	✔ unlimited
Host Guardian Service	-	✔	✔
Nano Server	-	✔ *	✔ *
Storage features including Storage Spaces Direct and Storage Replica	-	-	✔
Shielded Virtual Machines	-	-	✔
Networking stack	-	-	✔

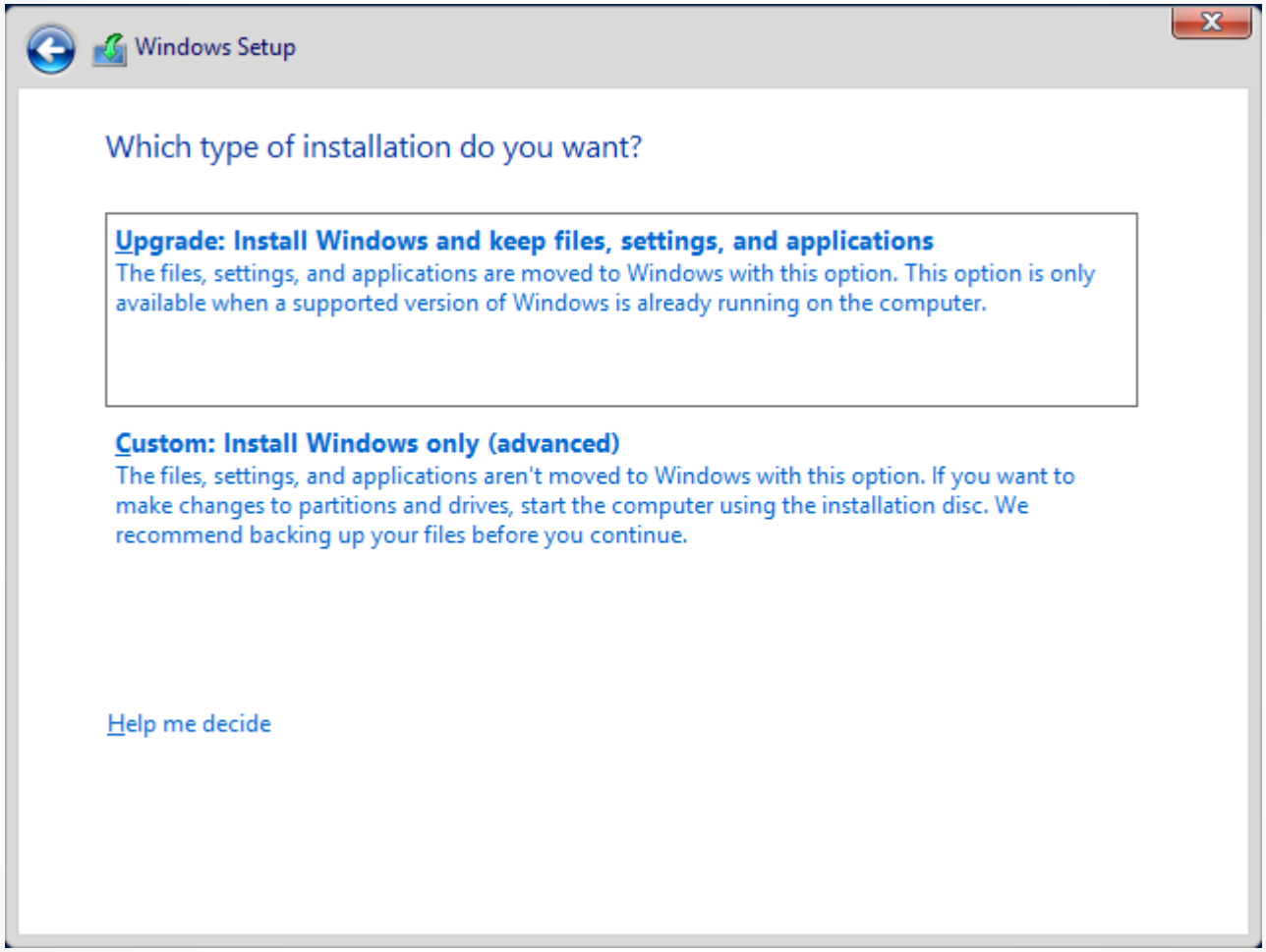
Installing Windows Server 2016

Lesson 1: Installing Servers

Performing a Clean Installation

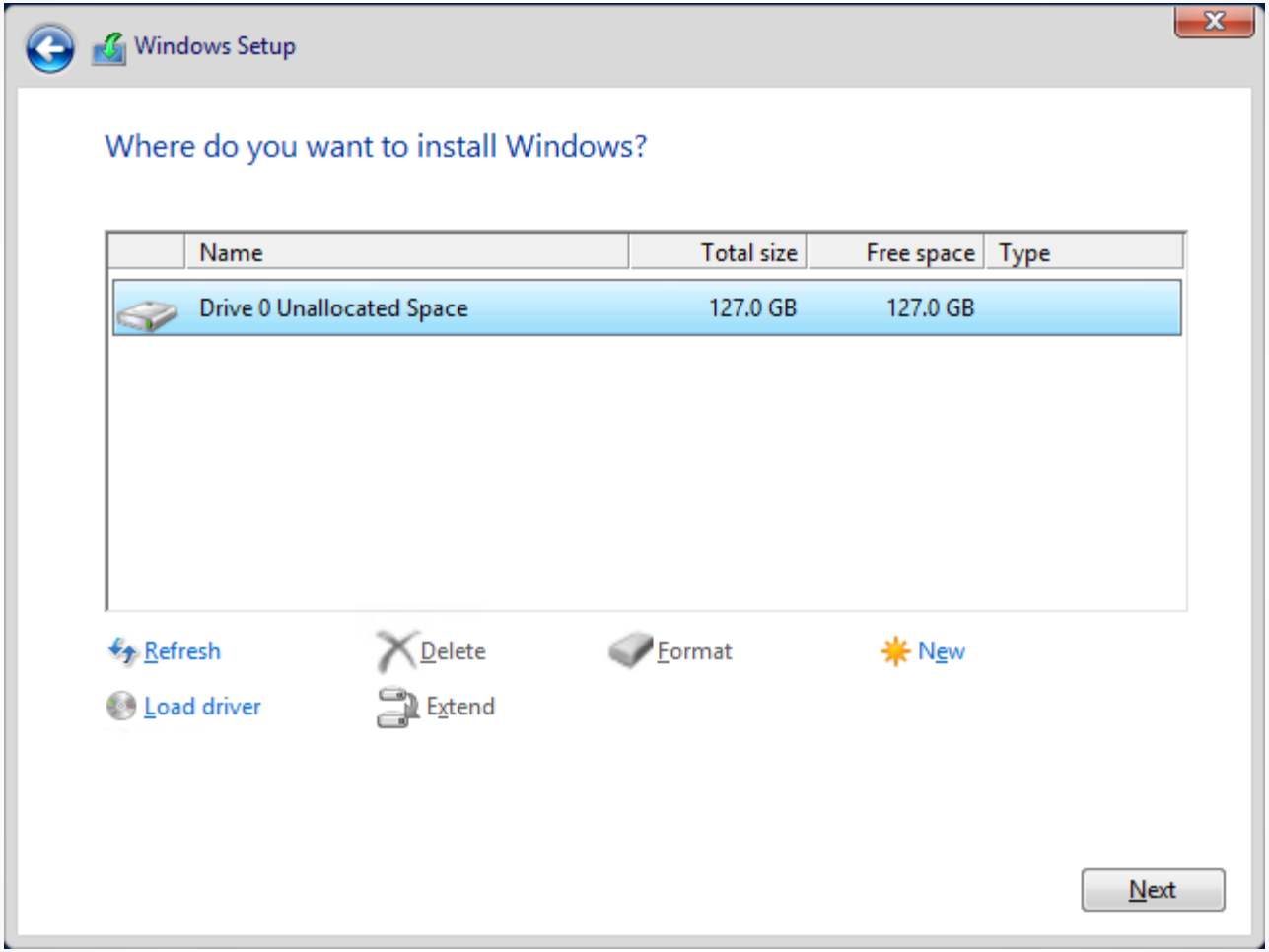
Select Your Preferences

Performing a Clean Installation



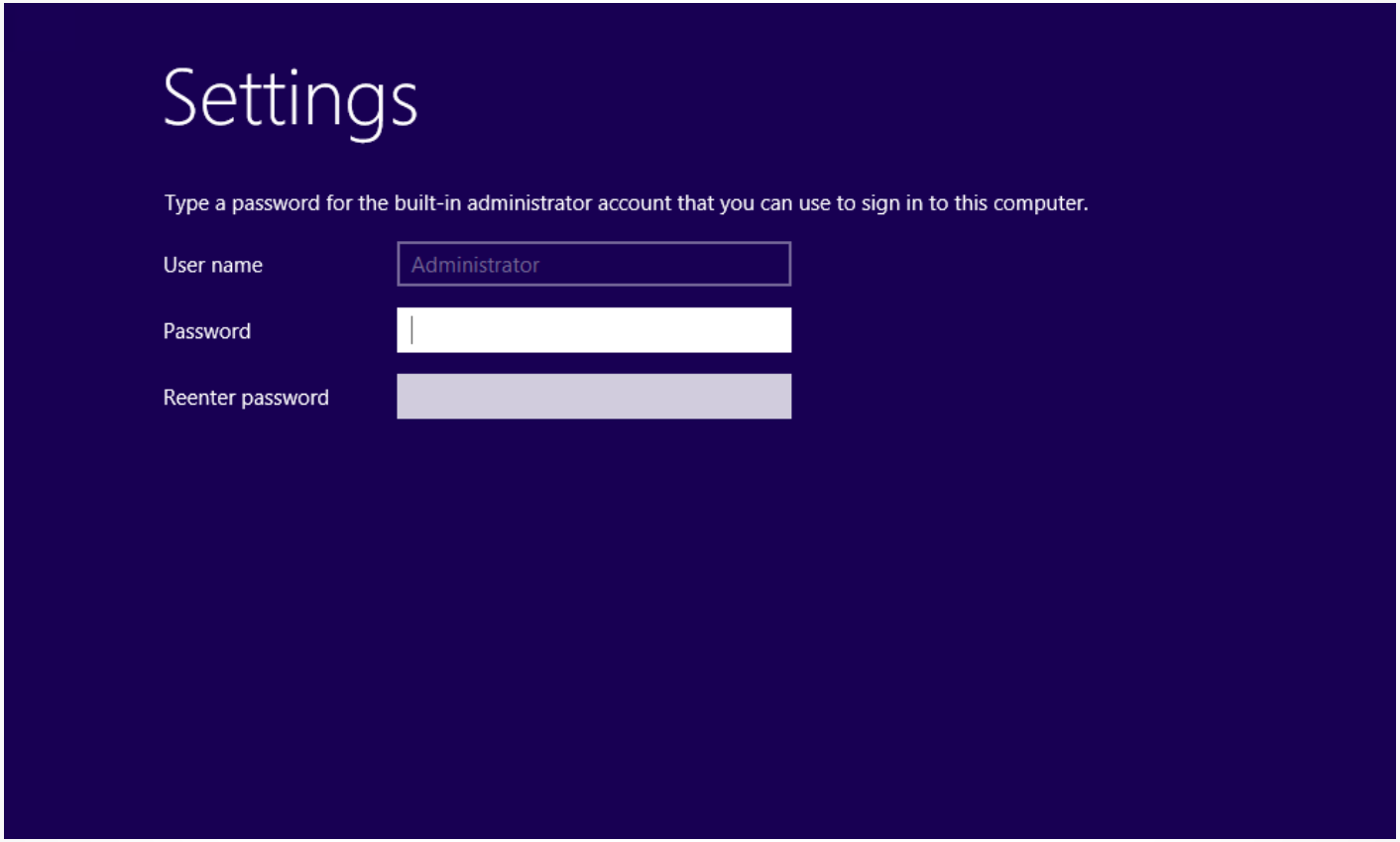
Select Custom: Install Windows only (advanced)

Performing a Clean Installation



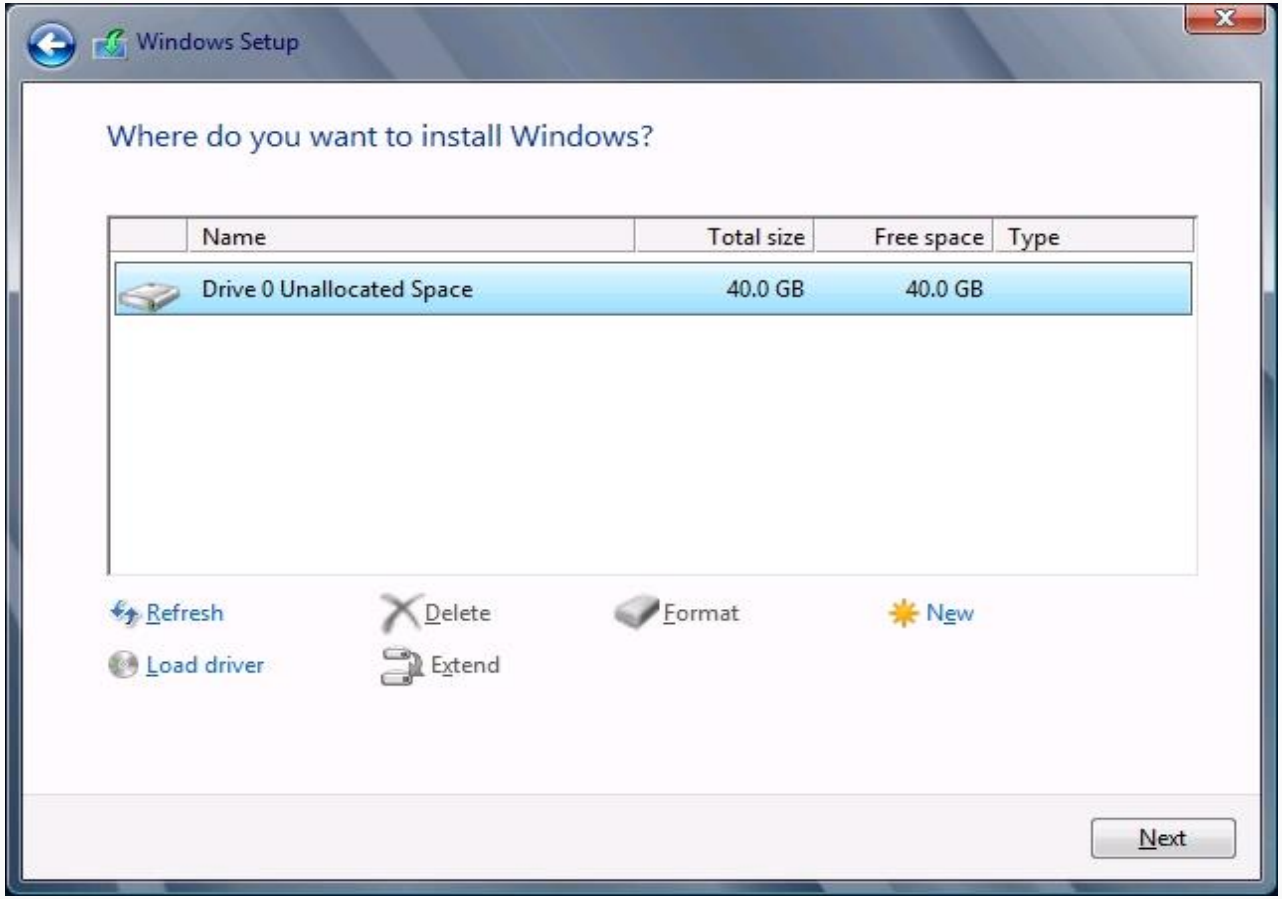
Select the Partition/Drive on which to Install Windows Server

Performing a Clean Installation



Set the Administrator Password

Working with Installation Partitions



Advanced Drive Options Buttons

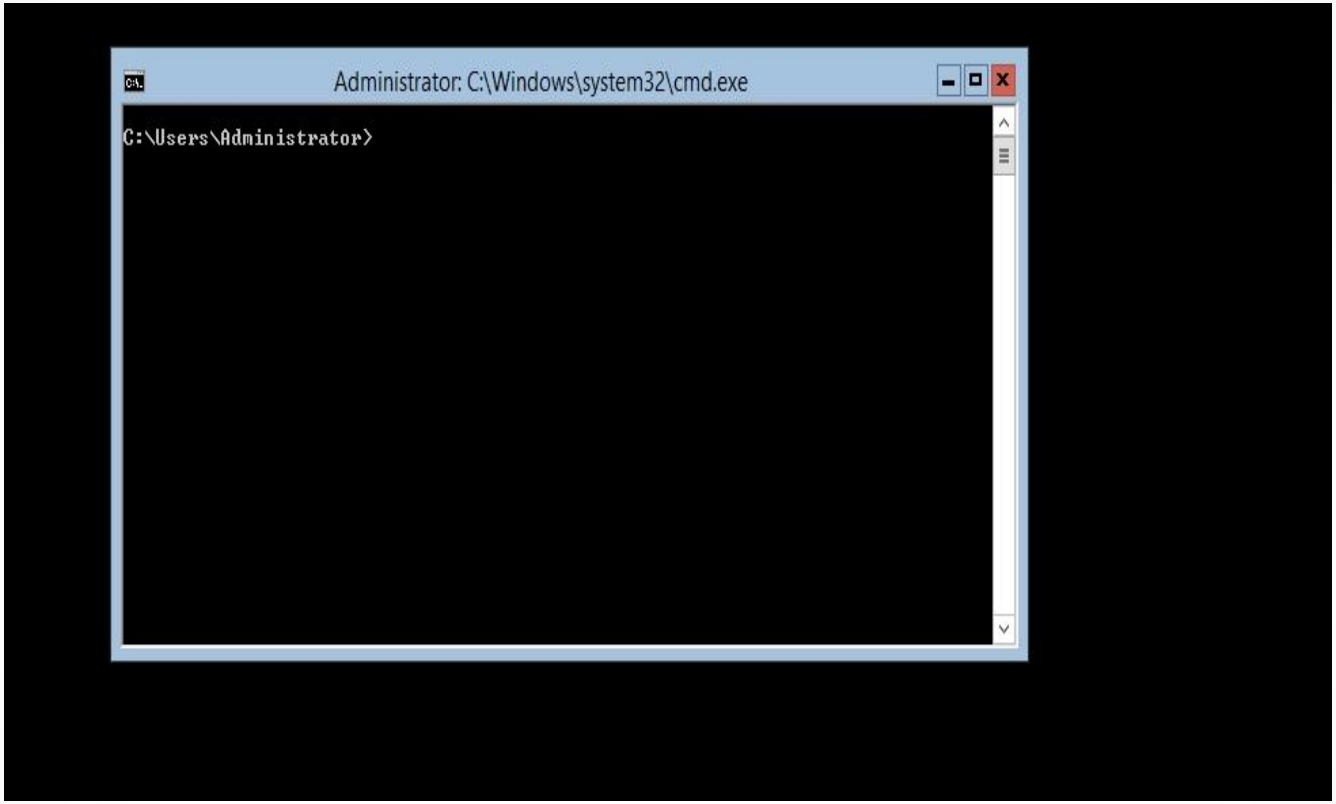
Choosing Installation Options

Lesson 1: Installing Servers

Using Server Core

- Stripped-down version of the operating system
- Takes you to a Graphical User Interface (GUI)
- Type commands at the command prompt

Server Core



Server Core's Command Line Interface

Advantages of Server Core

- Hardware resource conservation
- Reduced disk space
- Reduced patch frequency
- Reduced attack surface

Server Core Defaults

- Server Core is now the default installation option.
- GUI tools can be added and removed using Windows PowerShell commands.
- New Server Manager includes comprehensive remote administration tools.