



MCSE

Microsoft Certified
Solutions Expert



Course Presentation

Windows Server 2012

MCSE

(Microsoft Certified Solutions Expert)

Server Infrastructure

Course Presentation

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**INTRODUCTION TO MICROSOFT
CERTIFICATIONS**



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Exam Reference Guide – MS Press

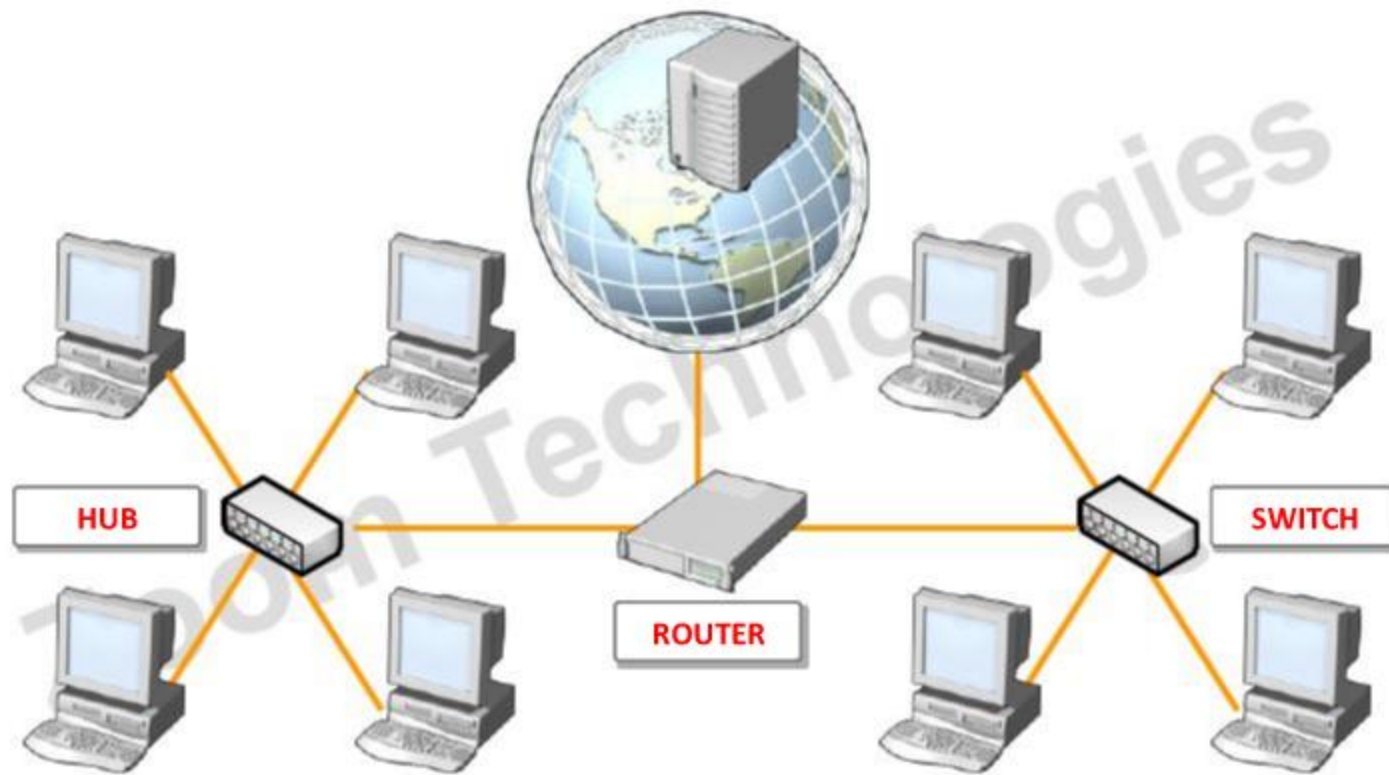
- 70 – 410 – Installing and Configuring Windows Server 2012.
- 70 – 411 – Administering Windows Server 2012.
- 70 – 412 – Configuring Advanced Windows Server 2012 Services.
- 70 – 413 – Designing and Implementing a Server Infrastructure.
- 70 – 414 – Implementing an Advanced Server Infrastructure.

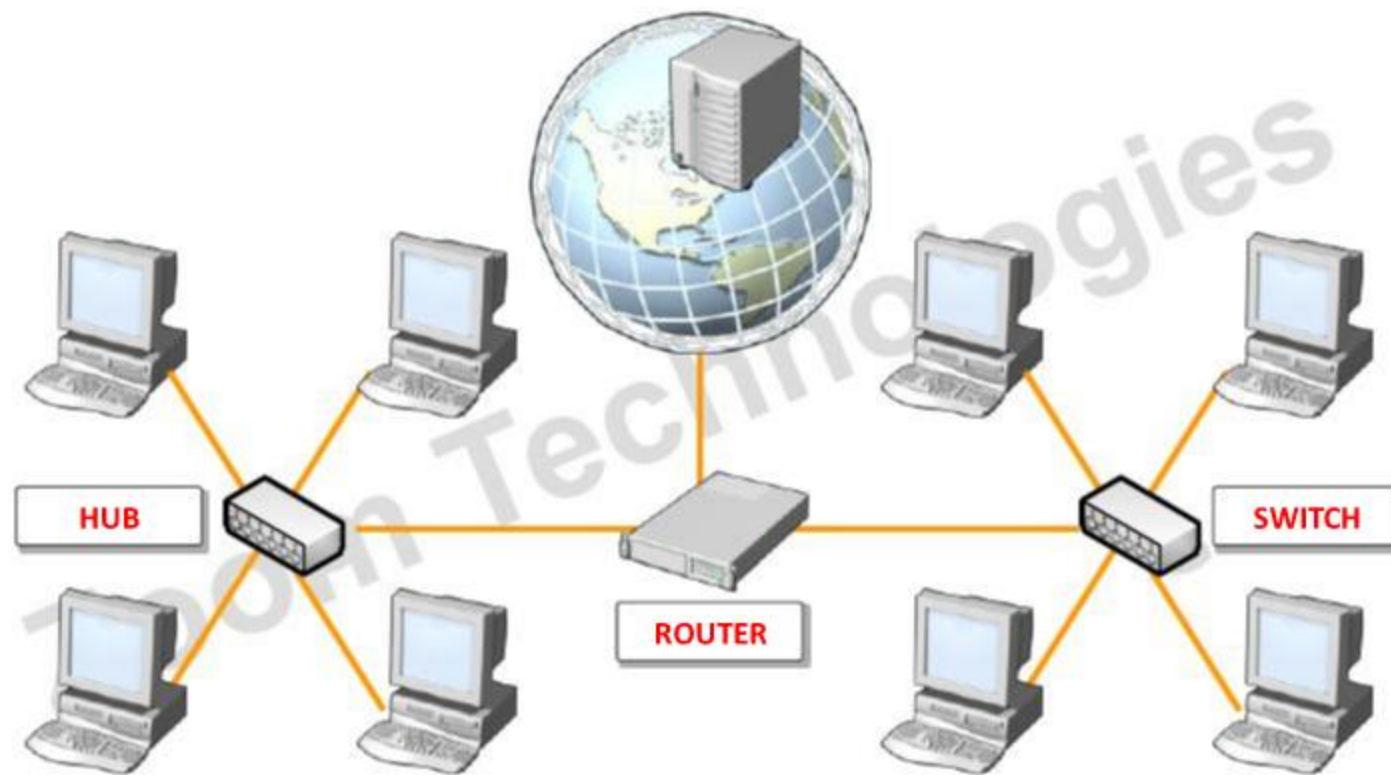


- **Network**
 - A Network is an Interconnection of devices
- **Networking**
 - Networking is the communication between the interconnected devices

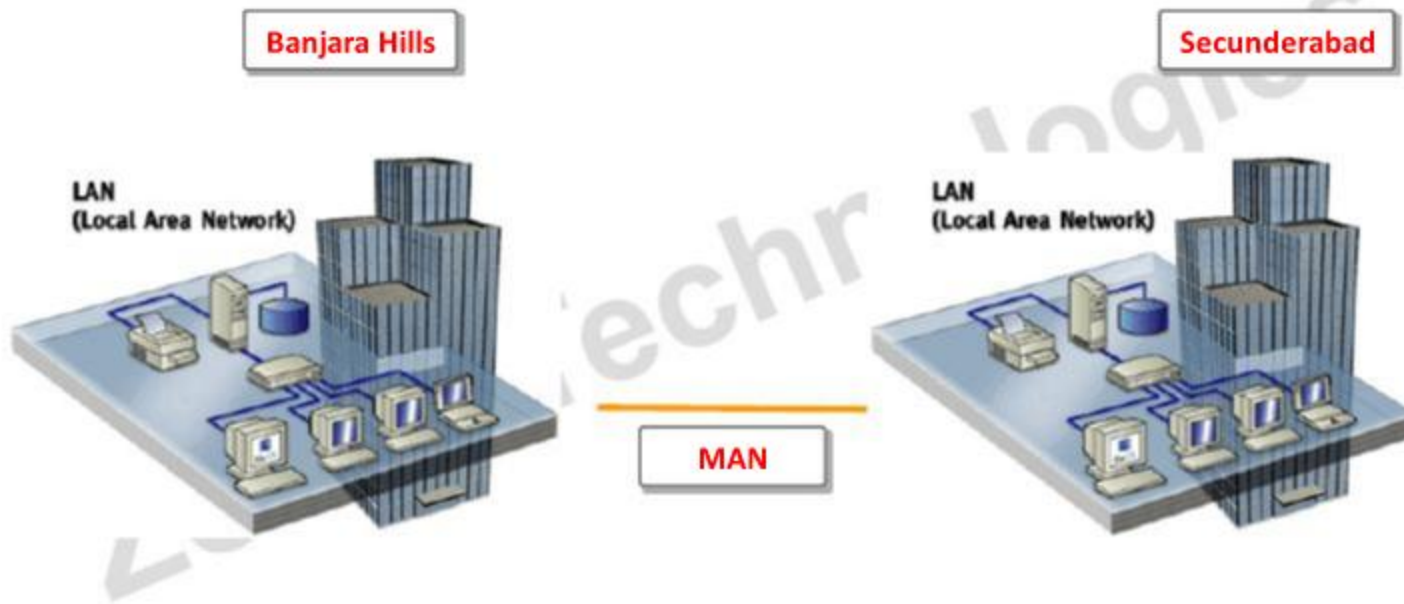
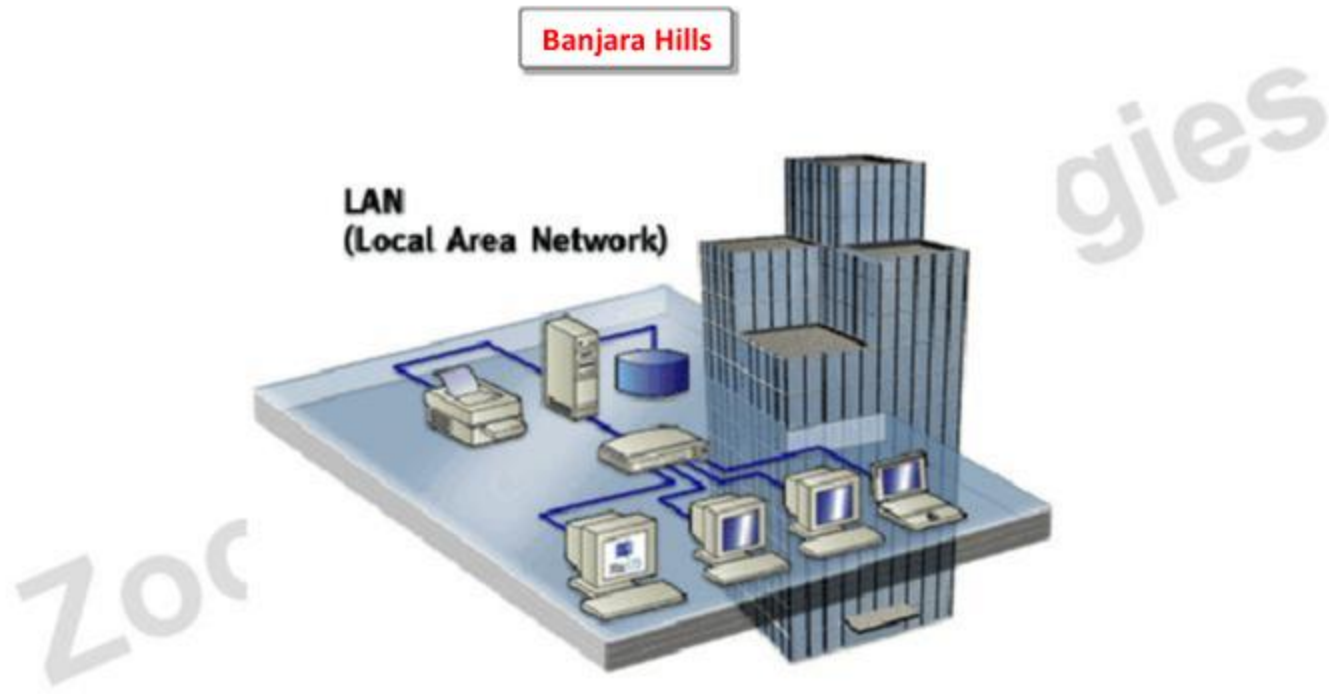
Zoom Technologies

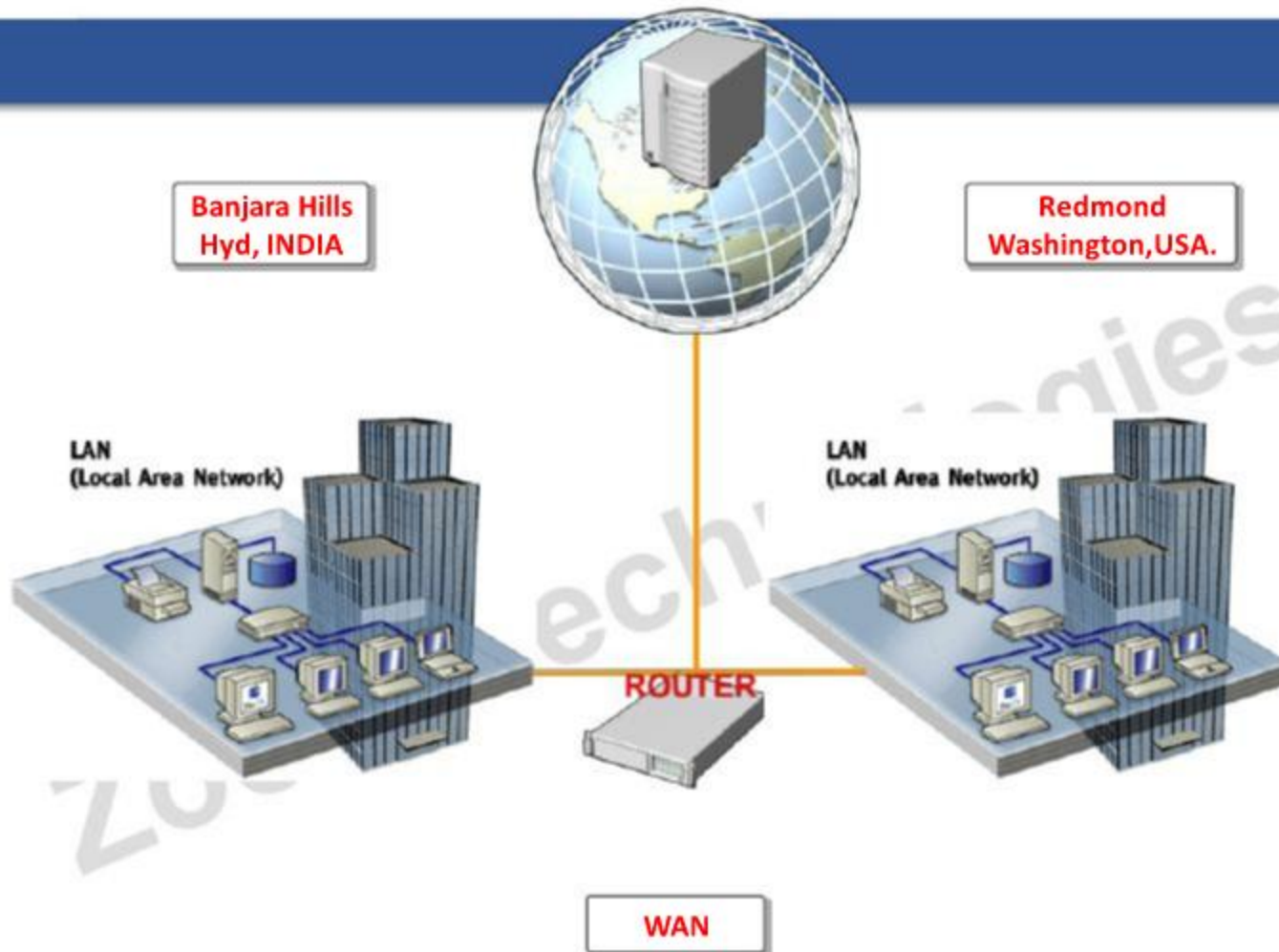
What is Network ?





- **Local Area Network**
 - Operate within a limited geographical location
 - Provides full-time connectivity to local services
- **Metropolitan Area Network**
 - Spans within a city
 - Provides full-time & part-time connectivity
- **Wide Area Network**
 - Operate over a large geographical location
 - Provides full-time & part-time connectivity





- **NIC**

The Network interface card is frequently called a NIC. It forms an interface between the networked device (Computer) and the Ethernet (LAN).

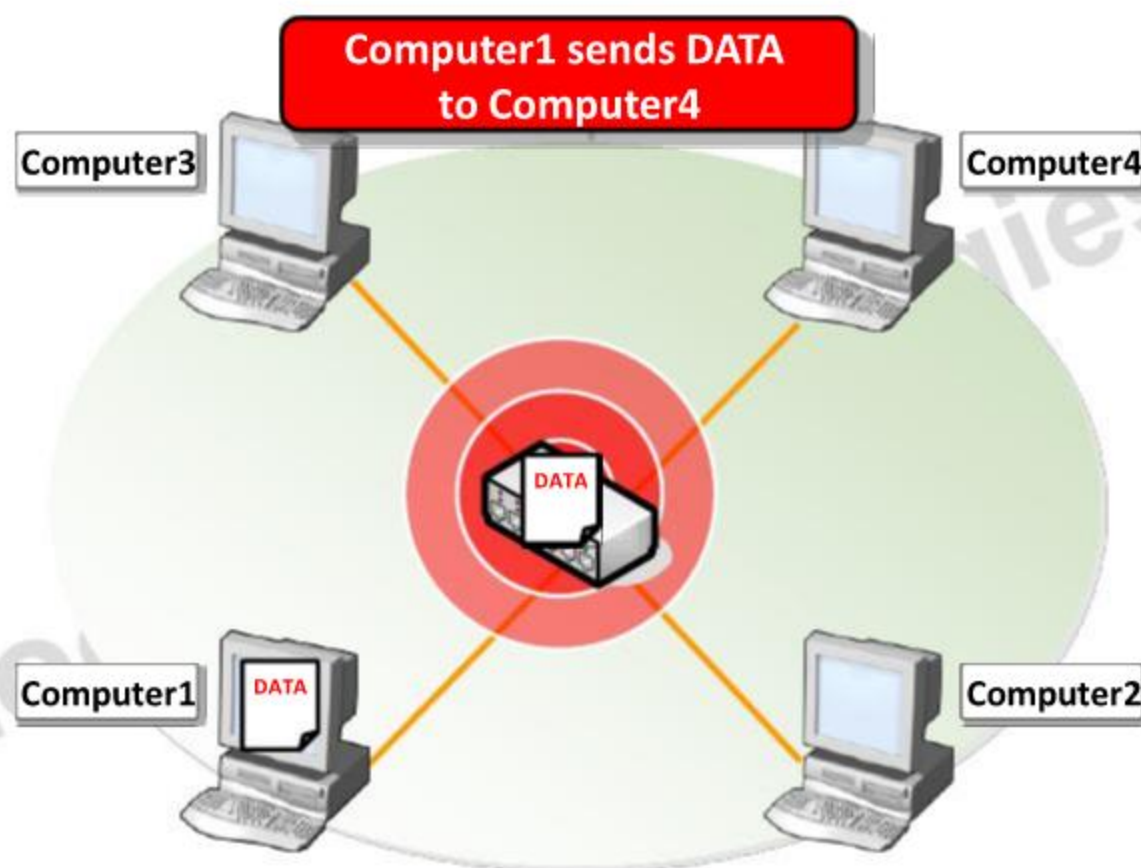
- **MAC ADDRESS**

A Media Access Control address (MAC address) is a unique identifier assigned to network interfaces for communications on the physical network segment.

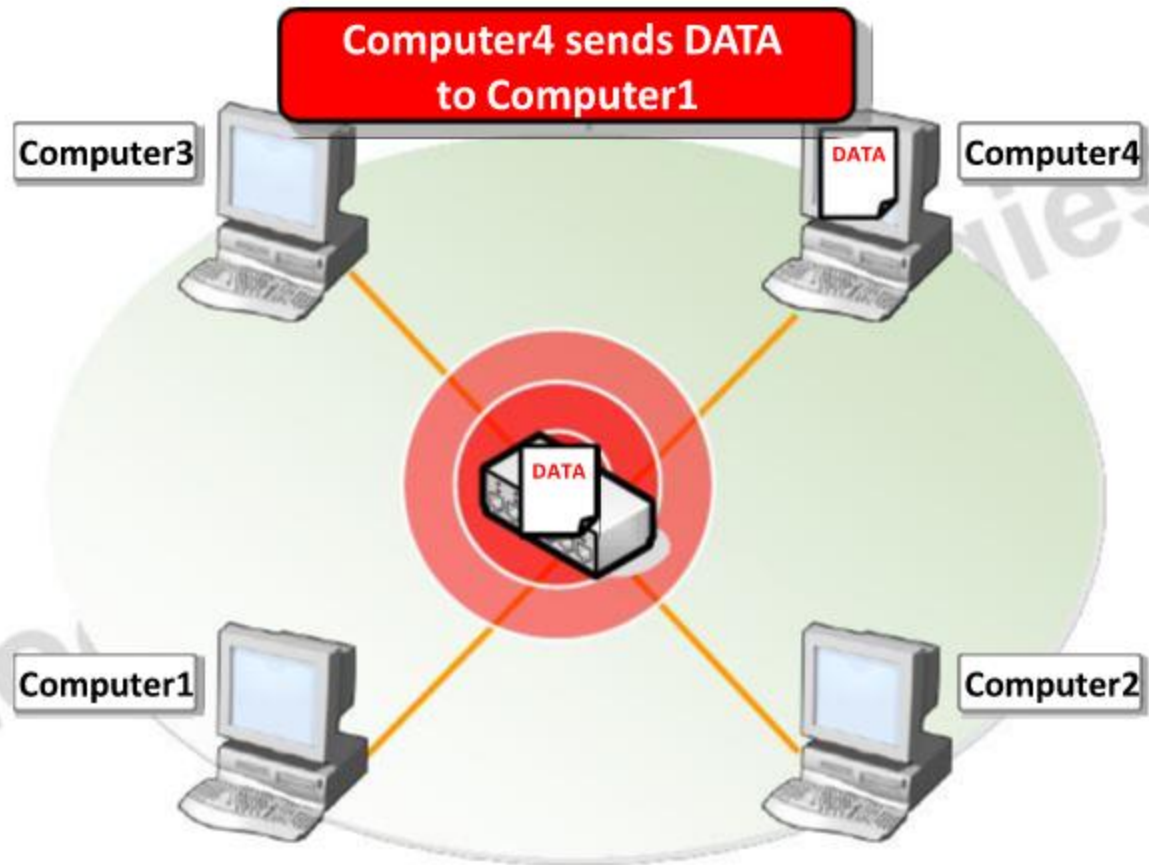
Example - 01-23-45-67-89-ab

- **Hub**
 - It is generally used to connect all devices on a network so that they can communicate with each other. It always do broadcasting
- **Switch**
 - Like Hub, it is also used to connect all devices on a network so that they can communicate with each other. But first time it will do flooding and from second time onwards it will do unicast.
- **Router**
 - Router is device which allows communication between two or more different networks present in different geographical locations.

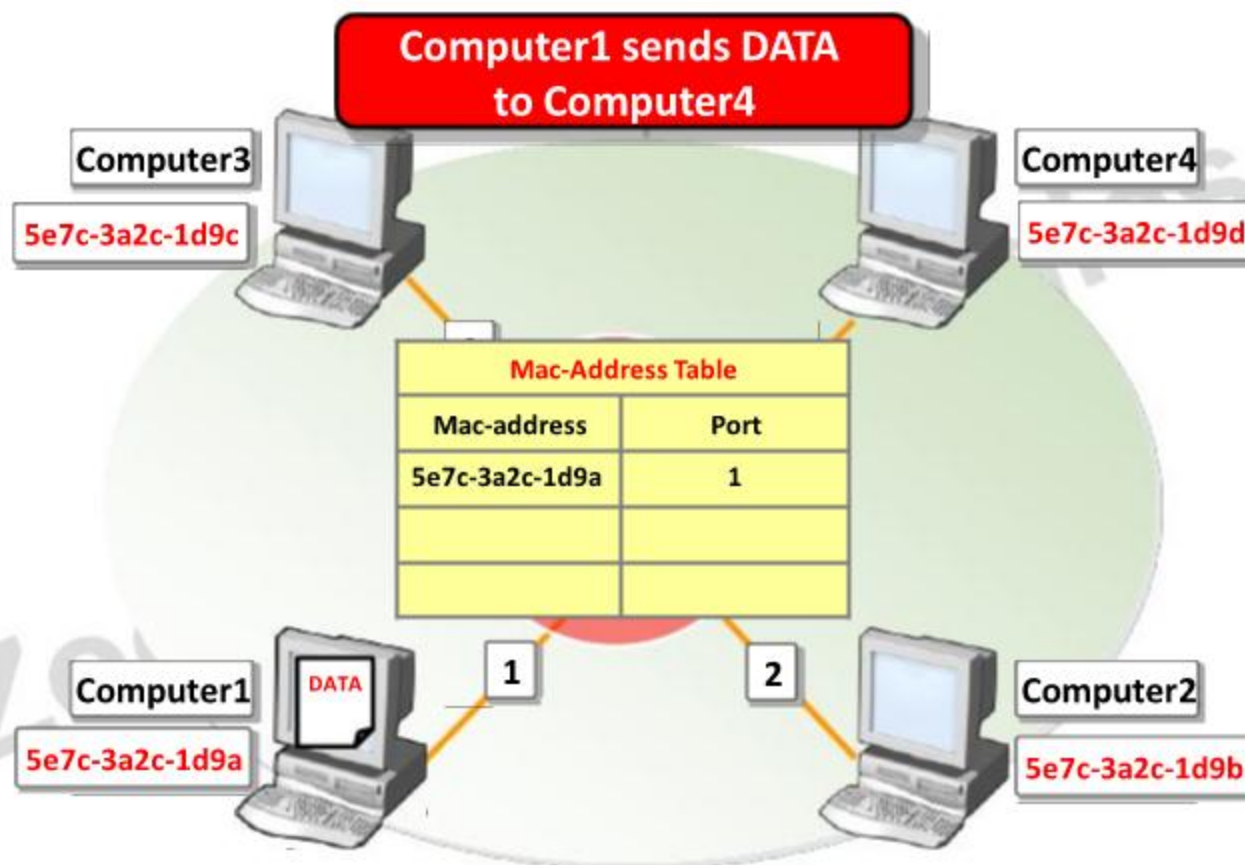
How Hub works ?



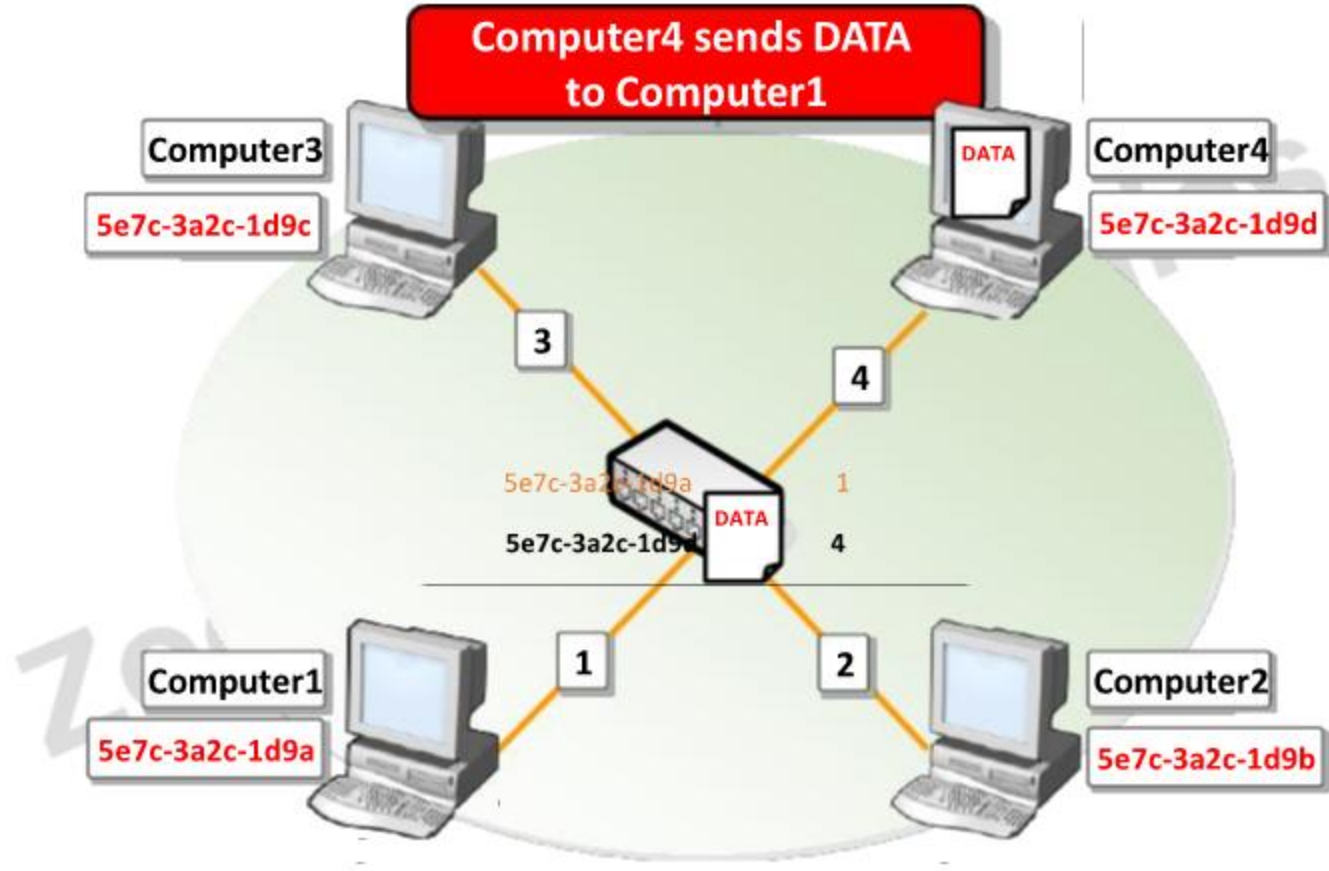
How Hub works ?



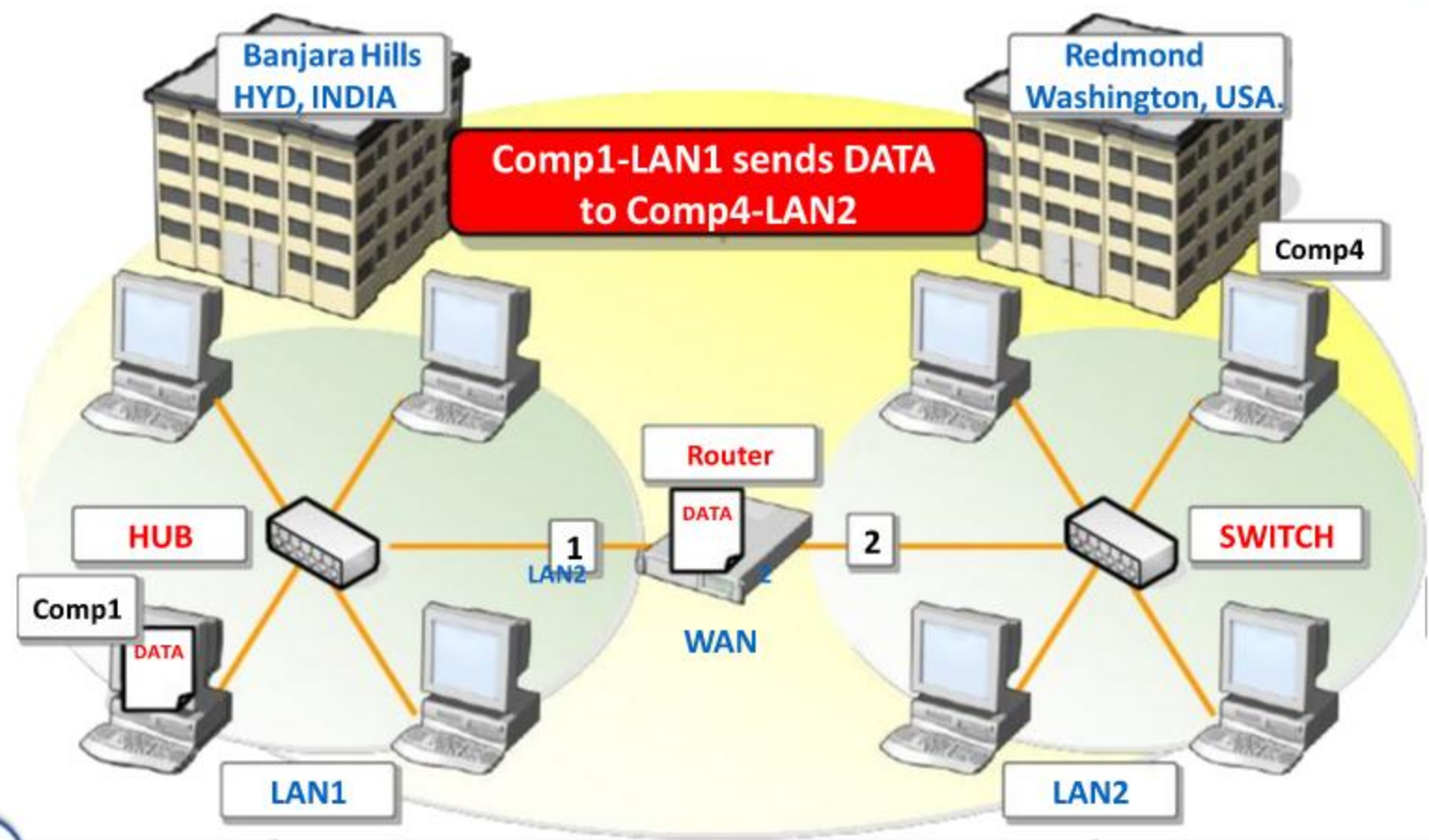
How Switch works ?

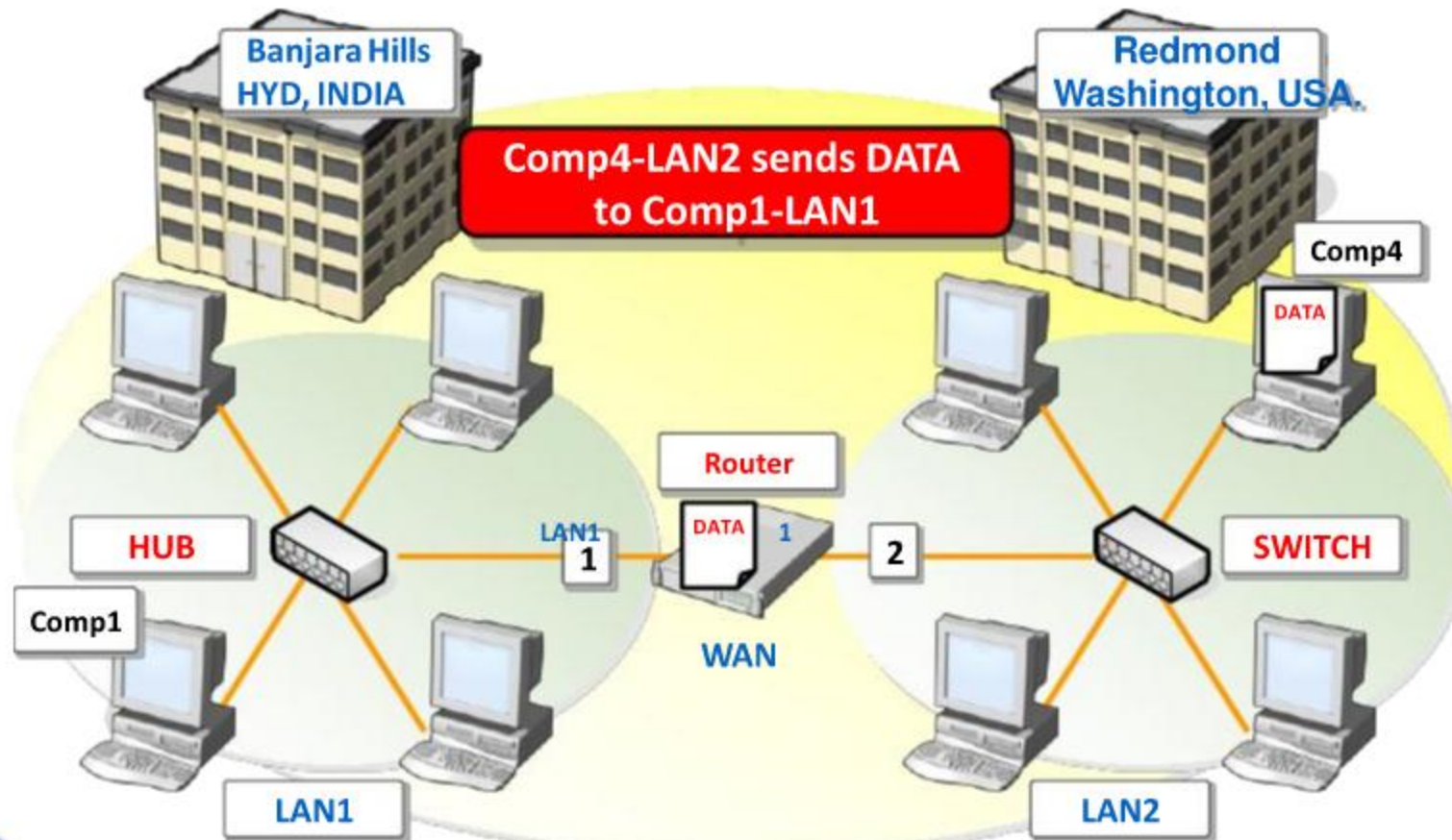


How Switch works ?



How Router works ?





- Windows NT 3.1 released in 1993
- Windows NT 3.5 released in 1994
- Windows NT 4.0 released in 1996
- Windows NT 5.0 was renamed as Windows 2000
- Windows .NET Server was renamed as Windows 2003
- Windows Server 2008
- Windows Server 2012



Operating System



- An operating system is a software program that enables the computer hardware to communicate and operate with the computer software.
- Two types of Operating Systems

Client OS

Example-Windows Xp, Vista, Windows 7, Windows 8

Server OS

Example-Windows 2003, 2008, 2012





Tower Server



Rack Server



Blade Server



MICROSOFT WINDOWS SERVER 2008



Microsoft 
Windows Server 2008
Standard Edition

Microsoft 
Windows Server 2008
Enterprise Edition

Microsoft 
Windows Server 2008
Data Center Edition

CLOUD
EXCHANGE
M C S E



MICROSOFT WINDOWS SERVER 2012





- **Foundation Edition:**
 - Available only for OEM
 - License limited to 15 user accounts .
- **Essentials Edition:**
 - License limited to 25 user accounts.
- **Standard Edition:**
 - Full Windows Server functionality with two virtual instances .
- **Data Centre Edition:**
 - Full Windows Server functionality with unlimited virtual instances.

Component	Requirement
Processor	Minimum: 1 processor with 1.4 GHz. {(X64) 64bit processor} Maximum: 64 processors. Note: Hyper -V Compatible Processor is recommended for Standard and Data Center Editions. Intel VT or AMD - V.
Memory	Minimum: 512 MB RAM Maximum: 4 TB RAM
Available Disk Space	Minimum: 10 GB Recommended: 80 GB or greater
Drive	DVD-ROM drive



- **64 Bit operating System**
- **Easy Installation**
- **Cloud Infrastructure**
- **Improved Server Manager**
 - Customized Dash Board.
 - Remote Management of Server Core and Full.
- **Active Directory**
 - Administrative Center and Recycle Bin.
 - Domain Services.
 - Federation Services and Lightweight Directory Services.
 - Certificate Services and Rights Management Services.



Features of Windows Server 2012

- In-built GPMC
- Centralized deployment of applications
- Disk Quotas
- Distributed File System
- Windows Server Backup
- DNS Dependency
- Internet Information services
- Improved Virtualization Features
 - Live Migrations of Virtual Machines and Storage.
 - Hyper – V Replica.
 - Dynamic Memory.

Features of Windows Server 2012

- Enhanced Windows Deployment Services
 - Deploy OS with or without Active Directory.
- Windows Server Core
 - Anytime Conversion from Core to Full and Vice – Versa.
- Network Access protection
- Improved DHCP Server
 - Failover DHCP Server
 - Split Scope
- Improved Security
 - Kerberos Version5
 - Internet Protocol Security.

- **Benefits of Server Core**

- **Greater stability**
- **Simplified management**
- **Reduced maintenance**
- **Reduced memory and disk requirements**
- **Reduced attack surface**

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- **Two Versions of Addressing Scheme**

- IP version 4 – 32 bit addressing
- IP version 6 – 128 bit addressing

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- **Total IP Addressing Scheme is divided into 5 Classes**

- CLASS A
 - CLASS B
 - CLASS C
 - CLASS D
 - CLASS E
- LAN & WAN
- Multicasting
- Research & Development

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- **CLASS A Range**
 - 0.0.0.0 - 127.255.255.255
- **CLASS B Range**
 - 128.0.0.0 - 191.255.255.255
- **CLASS C Range**
 - 192.0.0.0 - 223.255.255.255
- **CLASS D Range**
 - 224.0.0.0 - 239.255.255.255
- **CLASS E Range**
 - 240.0.0.0 - 255.255.255.255

- **IP address is divided into Network & Host Portion**
 - CLASS A is written as **N.H.H.H**
 - CLASS B is written as **N.N.H.H**
 - CLASS C is written as **N.N.N.H**

- **Private IP Address**

- CLASS A **10.0.0.0** - **10.255.255.255**
- CLASS B **172.16.0.0** - **172.31.255.255**
- CLASS C **192.168.0.0** - **192.168.255.255**

- **Public IP Address**

- Apart from the above specified IP addresses all other IP addresses are Public IP's

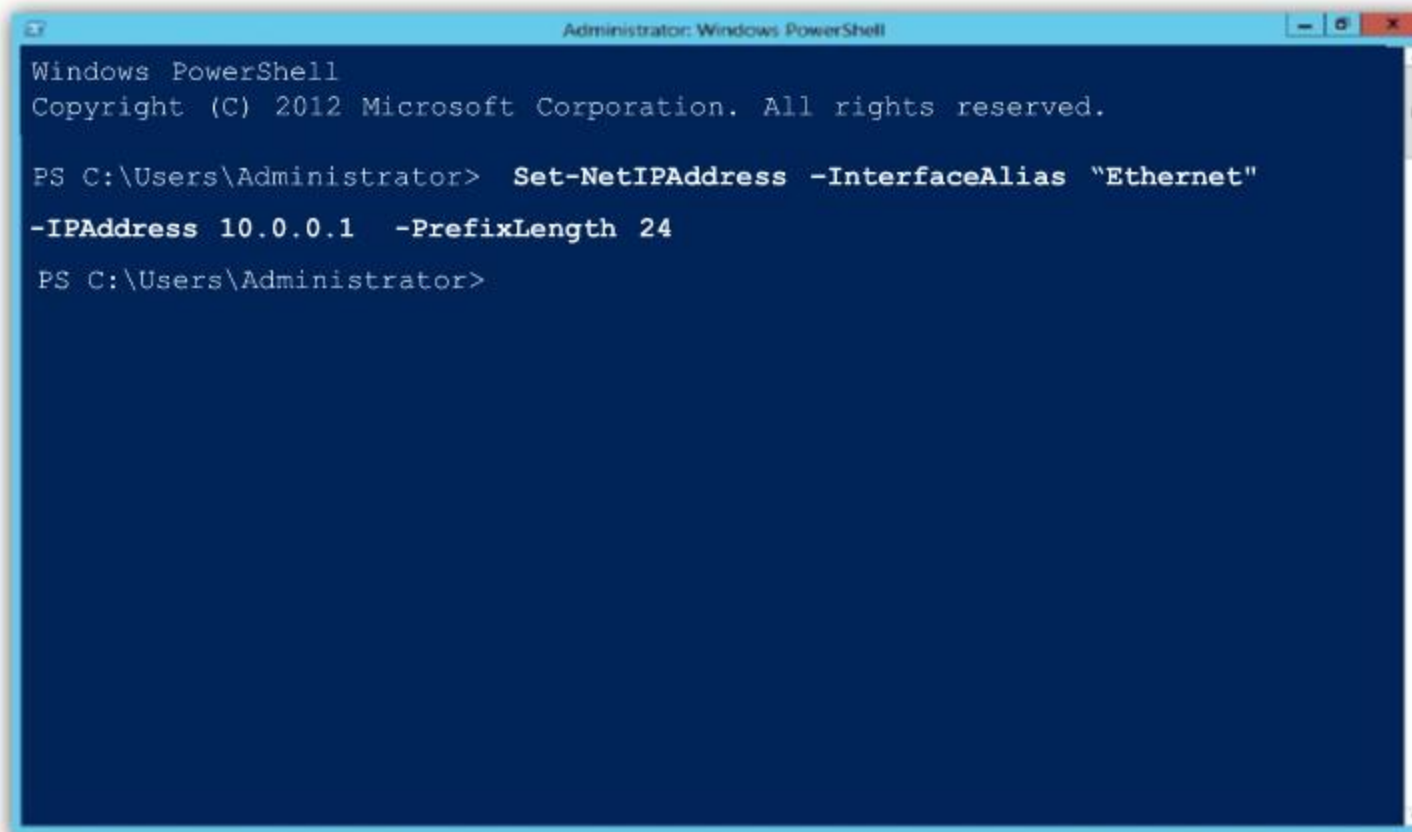
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```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.2.9200]
(C) 2012 Microsoft Corporation. All rights reserved.

C:\Users\Administrator> Netsh interface ipv4 set address name="Ethernet"
source=static addr=10.0.0.1 mask=255.0.0.0
C:\Users\Administrator>
```





```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) 2012 Microsoft Corporation. All rights reserved.

PS C:\Users\Administrator> Set-NetIPAddress -InterfaceAlias "Ethernet"
-IPAddress 10.0.0.1 -PrefixLength 24
PS C:\Users\Administrator>
```

- Workgroup Model or Peer-To-Peer Model
- Domain Model or Client/Server Model

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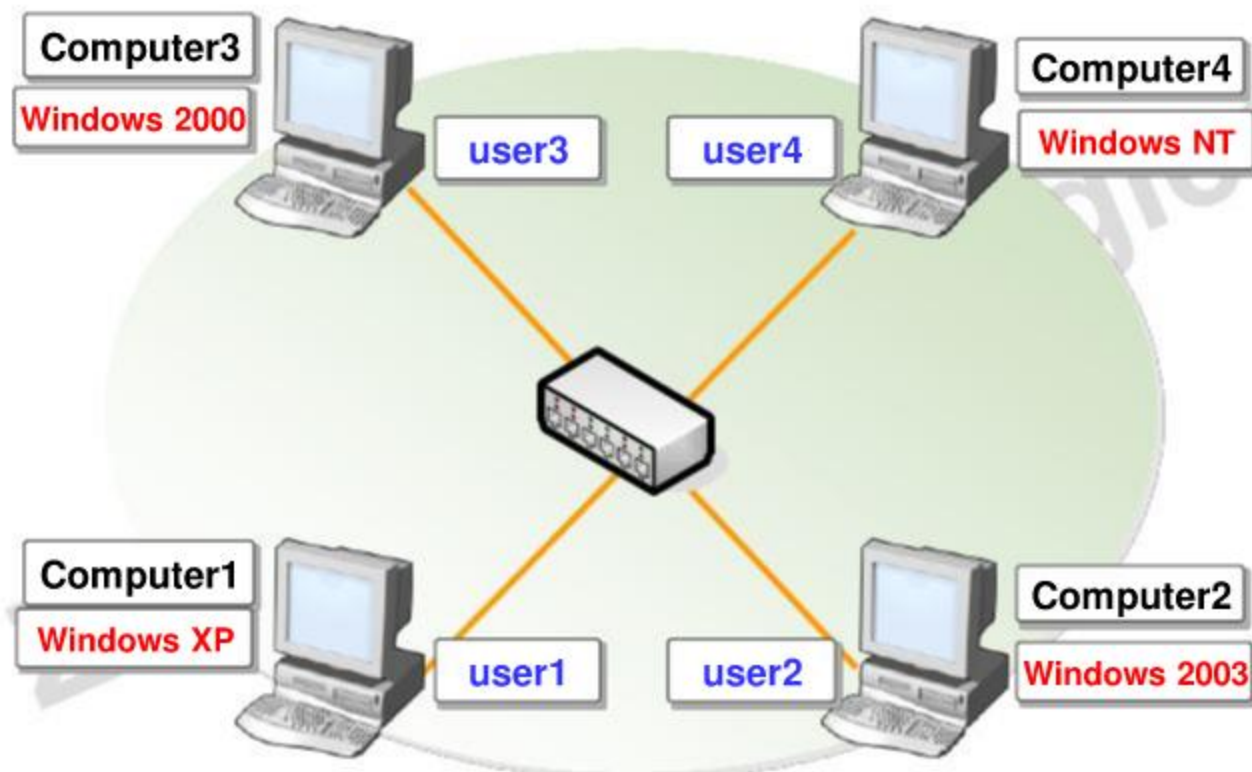
IN A WORKGROUP MODEL

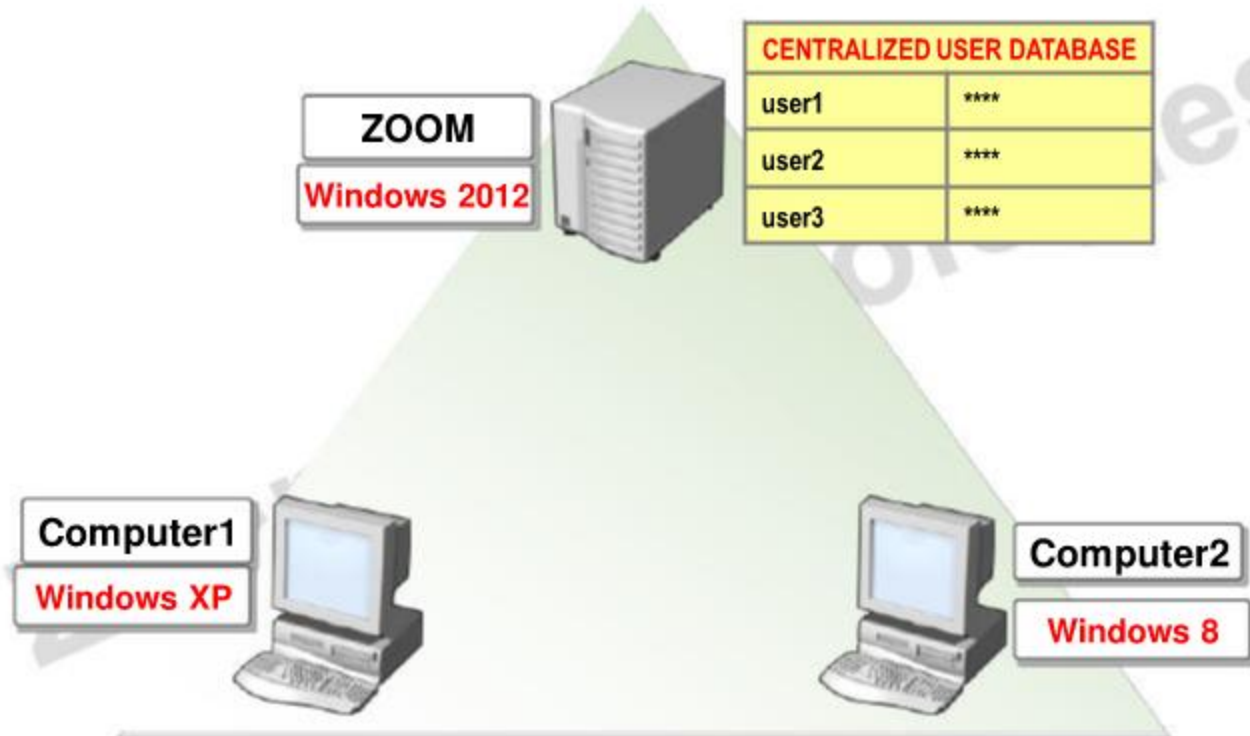
- All computers are peers; no computer has control over another computer.
- Each computer has a set of user accounts. To use any computer in the workgroup, you must have an account on that computer

IN A DOMAIN MODEL

- One or more computers are servers. Network administrators use servers to control the security and permissions for all computers on the domain. This makes it easy to make changes because the changes are automatically made to all computers.

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What Is Active Directory Domain Services ?

- The AD DS database stores information on user identity, computers, groups, services and resources.
- AD DS domain controllers also host the service that authenticates user and computer accounts when they log on to the domain



Purpose of Active Directory

- Provides User Logon and Authentication Services using Kerberos protocol.
- To Centralize and Decentralize the resource management.
- To centrally organize and manage:
 - User Accounts, Computers, Groups, Network Resources.
- Enables authorized Users to easily locate Network Resources.

- Domain is a logical grouping of user, computer, and group objects for the purpose of management and security.
- Creating the initial domain controller in a network also creates the domain—you cannot have a domain without at least one domain controller.
- Each domain is identified by a DNS domain name.



- A domain controller is a server that is configured to store a copy of the AD DS directory database (NTDS.DIT) and a copy of the SYSVOL folder.
- All domain controllers except RODCs store a read/write copy of both NTDS.DIT and the SYSVOL folder.
- NTDS.DIT is the database itself, and the SYSVOL folder contains all the template settings for GPOs.



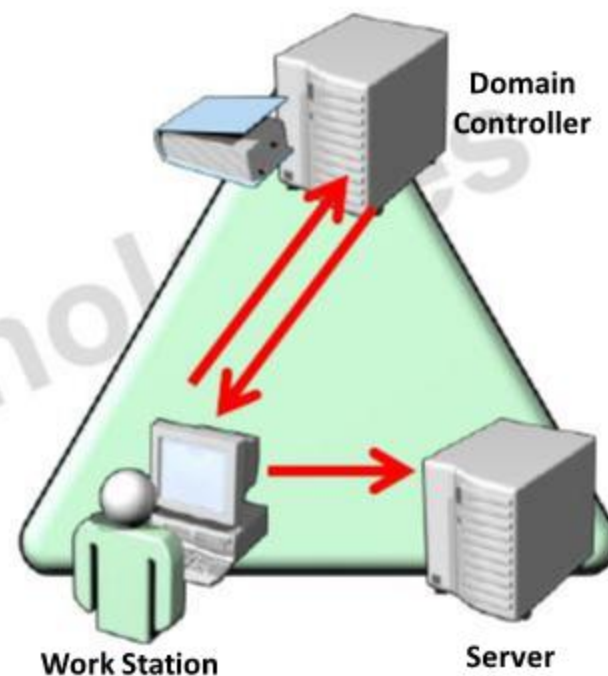
What is a Domain Controller ?

- Domain controllers host several other Active Directory–related services, including the Kerberos authentication service and the Key Distribution Center (KDC).
- Kerberos authentication service is used by User and Computer accounts for logon authentication
- KDC is the service that issues the ticket-granting ticket (TGT) to an account that logs on to the AD DS domain.



AD DS Logon Process

1. User Account is authenticated to Domain Controller
2. Domain Controller returns TGT back to Client
3. Client uses TGT to apply for access to Workstation
4. Domain Controller grants access to Workstation
5. Client uses TGT to apply for access to Server
6. Domain Controller returns access to Server





Clients & Member Servers



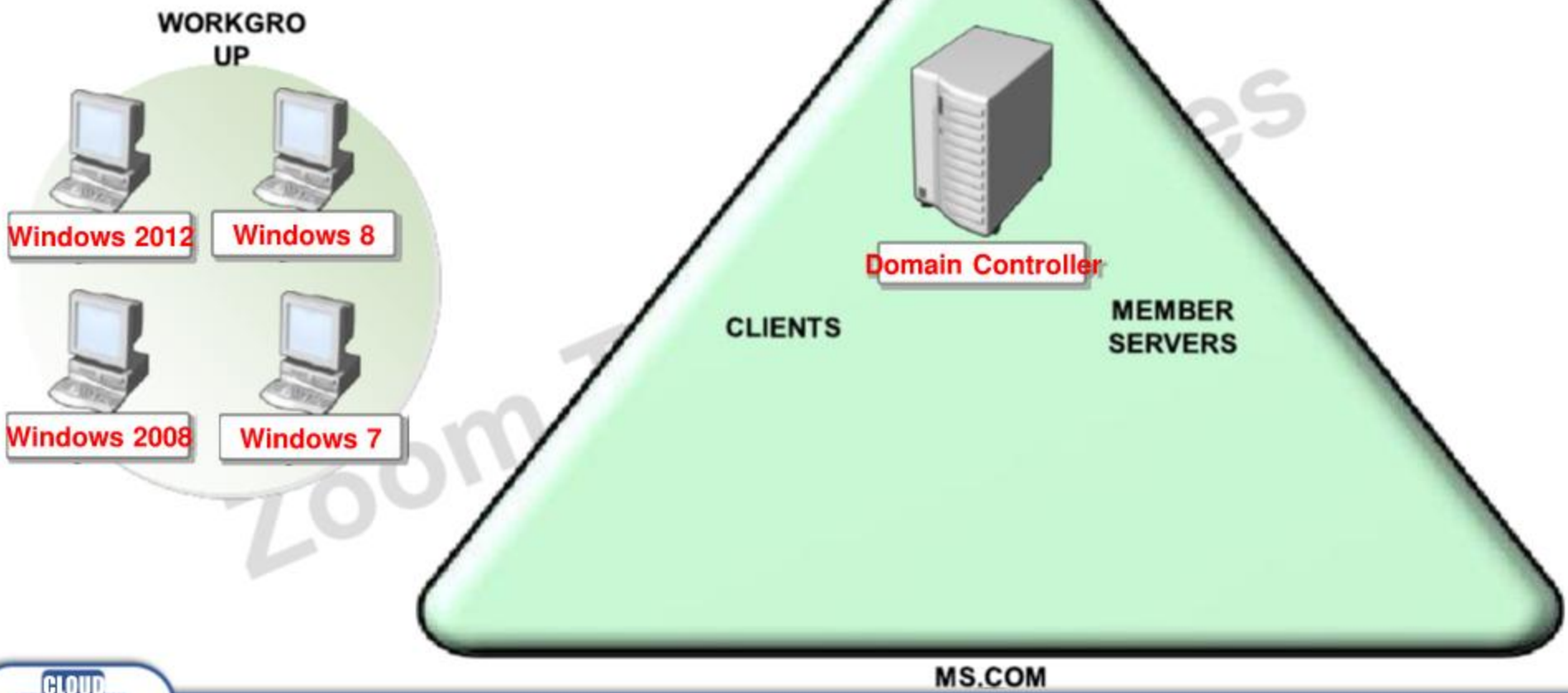
CLIENTS

- A computer joined in the domain with Client Operating system.
- Client Operating systems like
 - Windows 8, Windows 7, Windows XP professional . . .

MEMBER SERVERS

- A computer joined in the domain with Server Operating system.
- Server Operating systems like
 - Windows server 2012, Windows server 2008, Windows server 2003....





Local User

- A user account created in local database of a computer.
- Local users are generally used in WORKGROUP model.
- Local users can login only on the respective computer.

Domain User

- A user account created in ACTIVE DIRECTORY database.
- Domain users are used in DOMAIN model.
- Domain users can logon to any computer in the DOMAIN.

Command	Description
DSadd	Creates AD DS objects
Dsget	Displays properties of AD DS objects
Dsquery	Searches for AD DS objects.
DSmod	Modifies AD DS objects
DSrm	Removes AD DS objects
Dsmove	Moves AD DS objects

- **To modify the department of a user account, type:**
`Dsmod user "cn=vijay kumar, ou=users, dc=zoom, dc=com" -dept IT`
- **To display the email of a user account, type:**
`Dsget user "cn=vijay kumar, ou=users, dc=zoom, dc=com" -email`
- **To delete a user account, type:**
`Dsrm "cn=vijay kumar, ou=users, dc=zoom, dc=com"`
- **To create a new user account, type:**
`Dsadd user "cn=vijay kumar, ou=users, dc=zoom,dc=com"`

Cmdlet	Description
New-ADUser	Creates user accounts
Set-ADUser	Modifies properties of user accounts
Remove-ADUser	Deletes user accounts
Set-ADAccountPassword	Resets the password of a user account
Set-ADAccountExpiration	Modifies the expiration date of a user account
Unlock-ADAccount	Unlocks a user account after it has become locked after too many incorrect login attempts

- To create a new user account with Department IT, type:
New-ADUser "Vijay Kumar" -AccountPassword (Read-Host
-AsSecureString "Enter password") -Department IT

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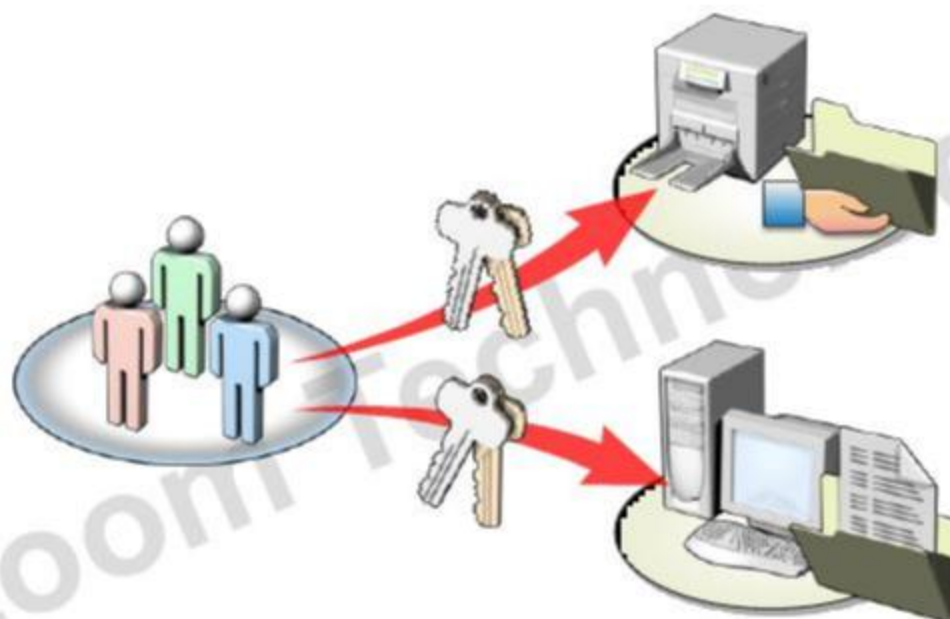


What are Permissions?

- Permissions define the type of access granted to a user, group, or computer to access resources.
- Permissions can be applied to resources such as files, folders, and printers.
 - Like: Privilege to read a file, delete a file, or to create a new file in folder.

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What are Permissions?



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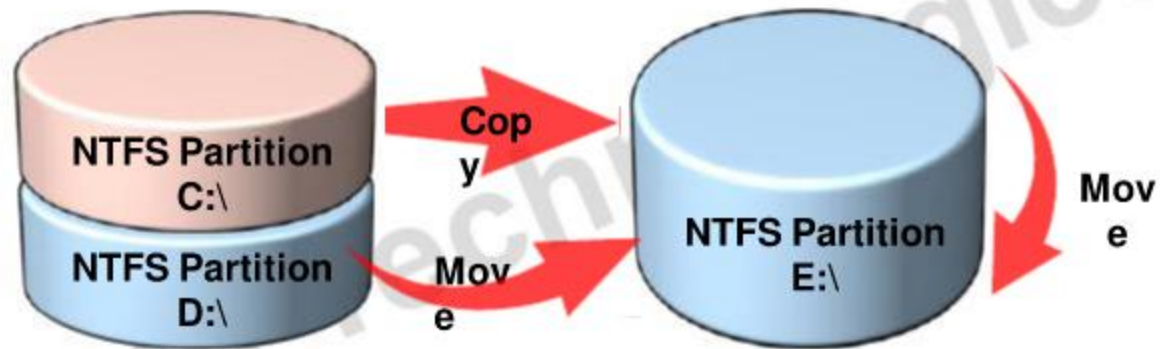
- Security Level Permissions
- Share Level Permissions

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- Can be Implemented Only on NTFS partitions.
- Security or NTFS Permissions can be set on Drives, Folders and Files.
- By default, Security permissions will be inherited from its parent drive or folder.
- File permissions override folder permissions.
- Creators of files and folders are their owners.
- Different Security Permissions are
 - Full Control, Modify, Read & Execute, Write, Read, List Folder Contents.

- It can be implemented on NTFS and FAT partitions.
- It can be set on Drives and Shared Folders but not files.
- What are shared folders?
 - Shared folders can be accessed from network.
 - When you copy or move a shared folder, the folder will no longer be shared.
 - To hide a shared folder, include a \$ after the name of the shared folder & users access hidden shared folders by typing the UNC path.
- Different Share Permissions are
 - Read, Read/Write.

- When you copy files and folders within the same partition or different partition they inherit the permissions of the destination folder.
- When you move files and folders to a different partition, they inherit the permissions of the destination folder
- When you move files and folders within the same partition, they retain their previous permissions.



Access Based Enumeration (ABE)

- Access Based Enumeration displays only the files and folders that a user has permissions to access.
- If a user does not have read permissions for a folder, windows hides the folder from the users view.



Profiles



- Profile is a User-State Environment.
- Profile contains Personal Settings of the User like
 - Documents
 - Desktop Settings
 - Start Menu Icons
 - Shortcuts
 - Application Data
 - Downloads
 - Pictures, Music, Videos
 - Contacts
 - Favorites, etc

- Local Profile
- Roaming Profile

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- A local user profile is created the first time you log on to a computer and is stored on a computer's local hard disk.
- Any changes made to your local user profile are specific to the computer on which you made the changes.

Location of Local Profile

- In 2012, 2008, Windows 8, Windows 7, Windows Vista is C:\Users
- In 2003, 2000, NT, XP, 2000 Professional is C:\Documents & Settings.

- A roaming user profile is created by your system administrator and is stored on a server.
- This profile is available every time you log on to any computer on the network.
- Changes made to your roaming user profile are updated on the server.

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- Home Folder is a centralized location of the users files (data)
- Home Folder make it easier for an administrator to back up user files by collecting all user's files in one location
- Whenever the user logs on to any computer in a domain, Home Folder will be available in the form of Network Drive / Network Location.

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What Is FSRM?



- FSRM is intended to act as a capacity management solution for your Windows Server 2012 server.
- It provides a robust set of tools and capabilities that allow you to effectively manage and monitor your server's storage capacity.
- FSRM contains five components that work together to provide a capacity management solution

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- Storage quota management
- File screening management
- Storage reports management

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- Quota management is a component that allows you to create, manage, and obtain information about quotas that are used to set storage limits on volumes or folders (and its contents).
- By defining notification thresholds, you can send email notifications, log an event, run a command or script, or generate reports when users approach or exceed a quota.
- Quota management also allows you to create and manage quota templates to simplify the quota management process.

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- Quota management is used to limit disk space usage and provides notifications when thresholds are reached.
- Quota notifications can do any of the following:
 - Send email notifications
 - Log an event in Event Viewer
 - Run a command or script
 - Generate storage reports

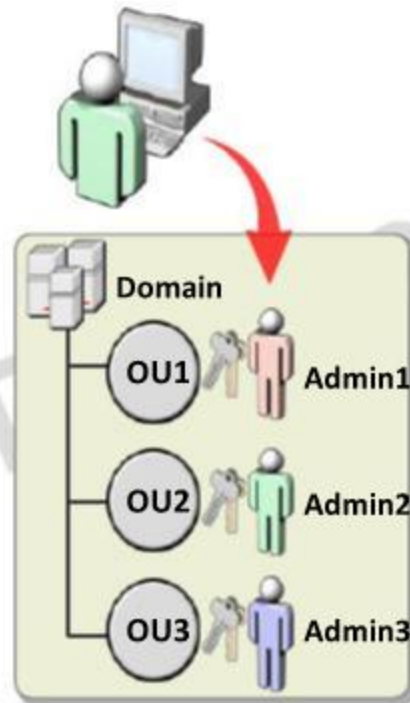
- File screen management provides a method for controlling the types of files that can be saved on file servers.
- When users attempt to save unauthorized files, file screening can block the process and notify the administrators to allow for proactive management.

- Storage reports management is a component that allows you to schedule and configure storage reports about file usage on a file server.
- These reports provide information regarding following :
 - Quota usage.
 - File screening activity.
 - Files that may negatively affect capacity management, such as large files, duplicate files, or unused files.
 - List and filter files according to owner, file group, or a specific file property



- It is a logical container which contain active directory objects (Users, Groups, OU & other objects)
- It is also called as SUBTREE
- It is used for Minimizing administrative tasks
- It is used for organizing and managing the active directory objects
- It is used for delegating the control to one or more users.

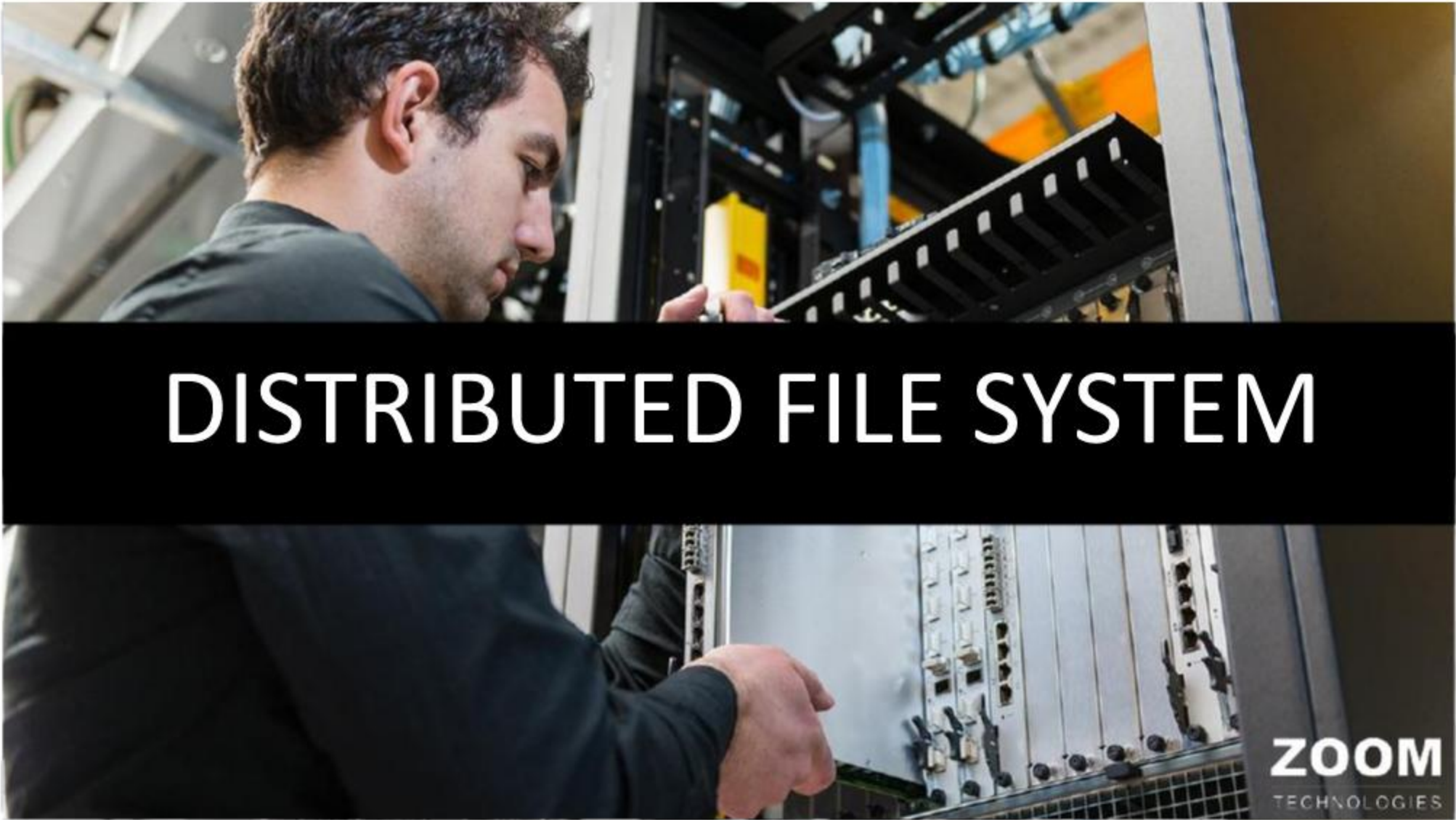
- The process of decentralizing management of organizational units.
- Assigning management of an organizational unit to another user or group
- Eases administration by distributing routine administrative tasks to another user or group.



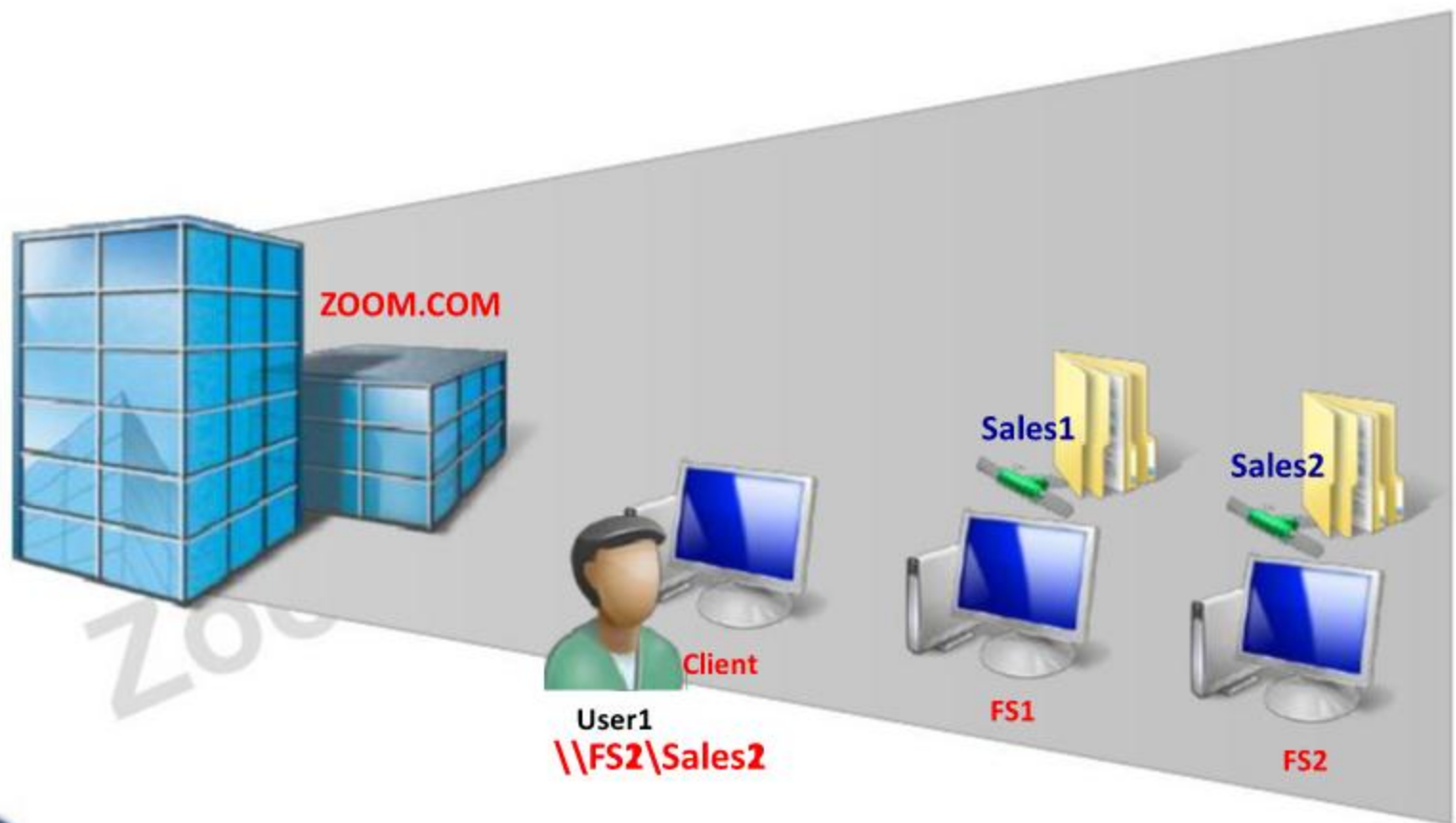
- It is an object of Active Directory used for applying Permissions and Distribution of emails to its members.

Two types of Groups

- Security Group
- Distribution Group



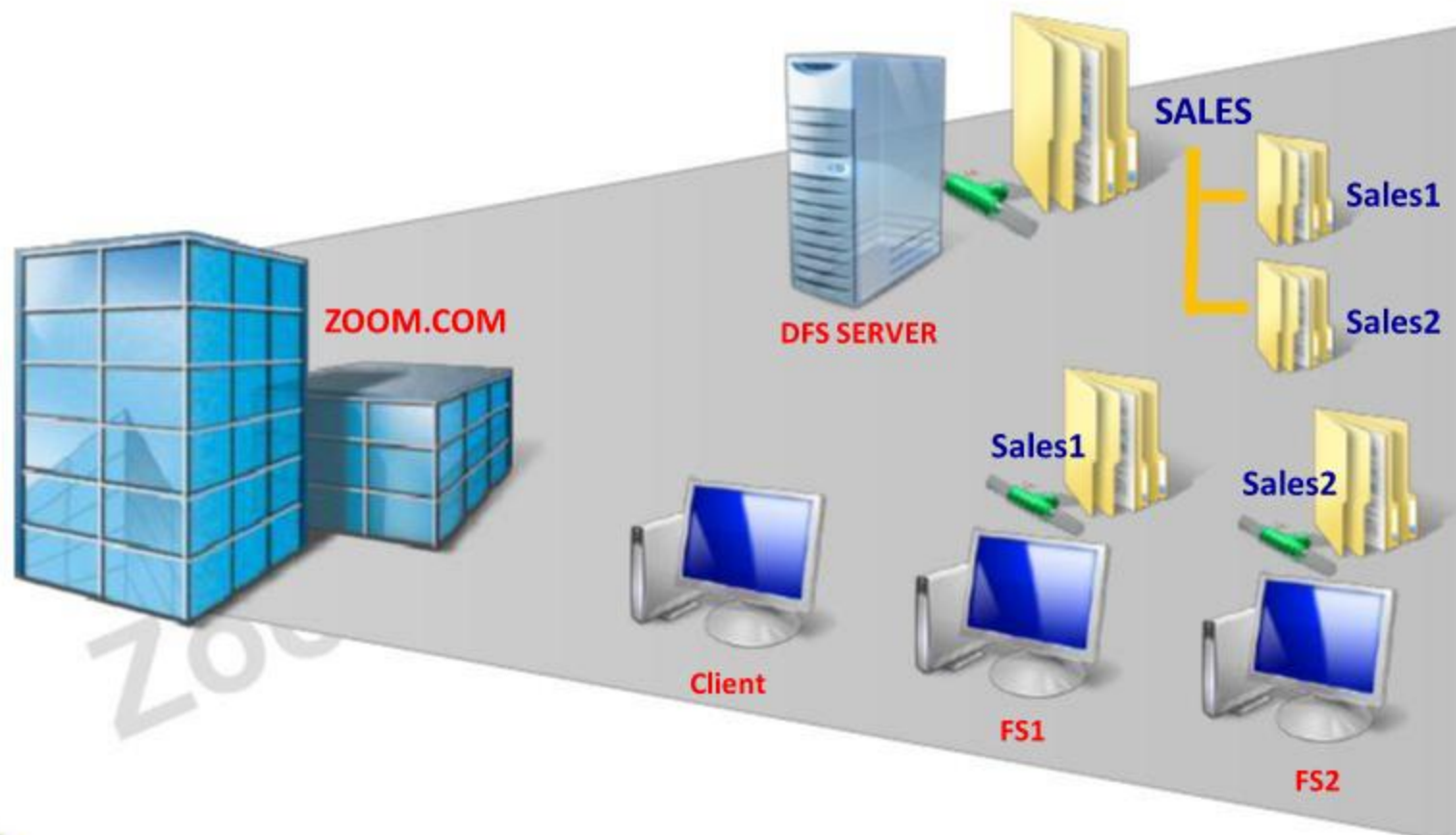
How Users access Shared Folders ? 



- DFS incorporates technologies that provide fault-tolerant access to geographically dispersed files.
- DFS namespaces enable a virtual representation of shared folder structures.

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How DFS works?





- Allows administrators to group shared folders that are located on different servers into one or more logically structured namespaces.
- Each namespace appears to users as a single shared folder with a series of subfolders. The subfolders typically point to shared folders that are located on various servers in multiple geographical sites throughout the organization.

- A multimaster replication engine that synchronizes files between servers for local and WAN network connections.
- DFS Replication supports replication scheduling, bandwidth throttling, and uses remote differential compression (RDC) to update only the portions of files that have changed since the last replication.
- You can use DFS Replication in conjunction with DFS namespaces or as a standalone file replication mechanism.



Additional Domain Controllers



- If you already have one domain controller in a domain, you can add additional domain controllers to the domain to improve the availability and reliability of network services.
- Adding additional domain controllers can help provide fault tolerance, balance the load of existing domain controllers, and provide additional infrastructure support to sites.
- The replication type between two read/write dc's is multi master replication.

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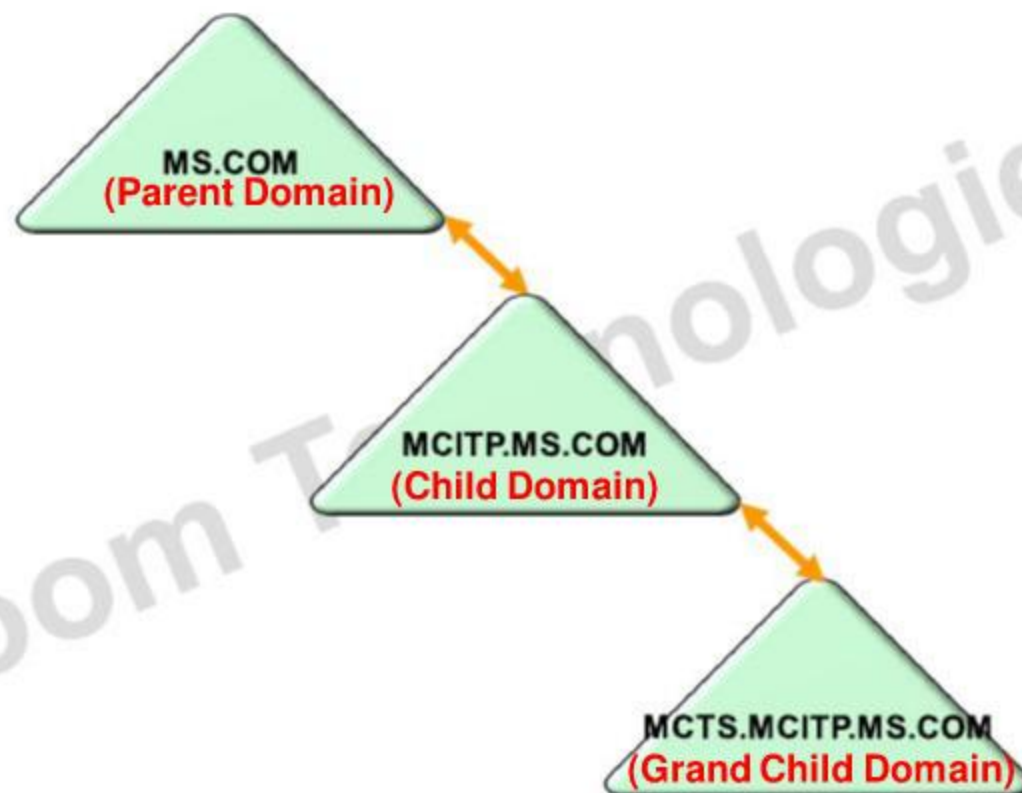
Tree



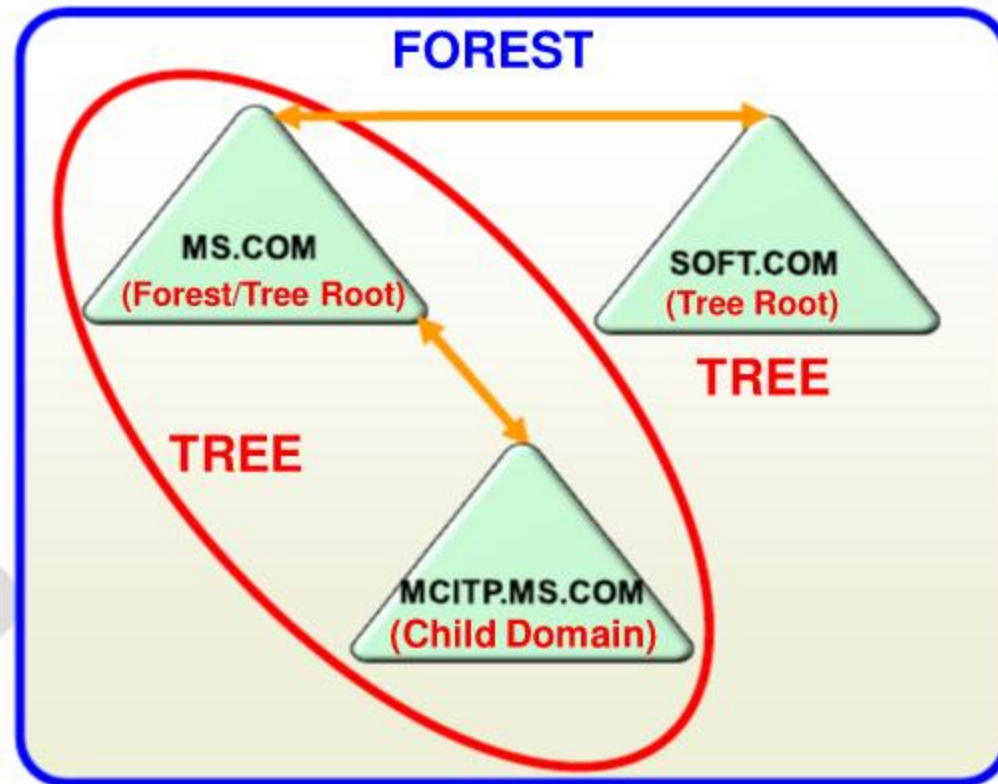
- Tree is a set of one or more domains with contiguous names.
- If more than one domain exists, you can combine the multiple domains into hierarchical tree structures.
- The first domain created is the root domain of the first tree.
- Other domains in the same domain tree are child domains.
- A domain immediately above another domain in the same domain tree is its parent.

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- Multiple domain trees within a single forest do not form a contiguous namespace.
- Although trees in a forest do not share a namespace, a forest will have a single root domain, called the forest root domain.
- The forest root domain is the first domain created in the forest.
- These two forest-wide predefined groups reside in forest root domain.
 - Enterprise Admins
 - Schema Admins



OPERATION MASTERS

- Naming Master
- Schema Master
- RID Master
- PDC Emulator
- Infrastructure Master
- Global Catalog

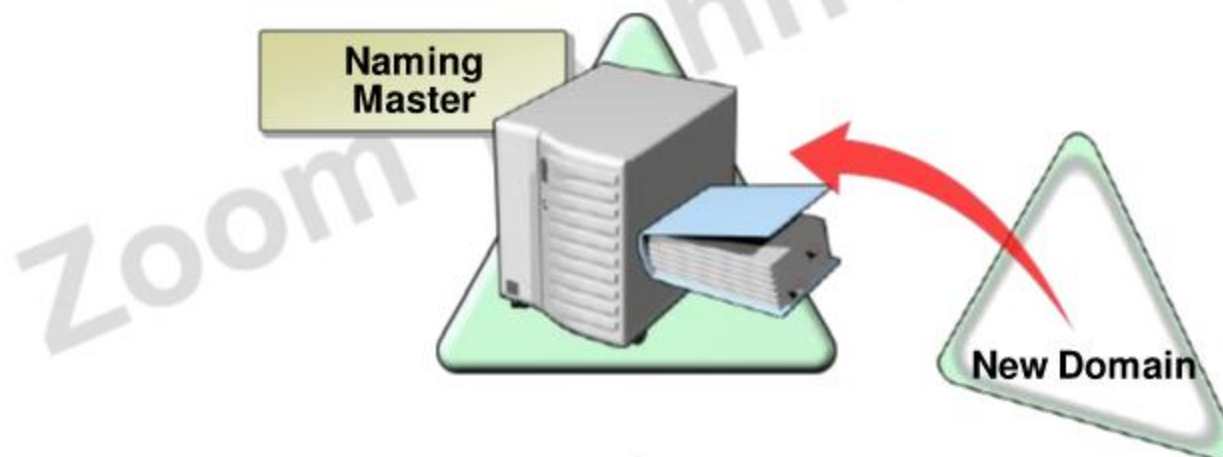
Flexible Single Master Operation Roles
(FSMO Roles)

Multi Master Operations Role

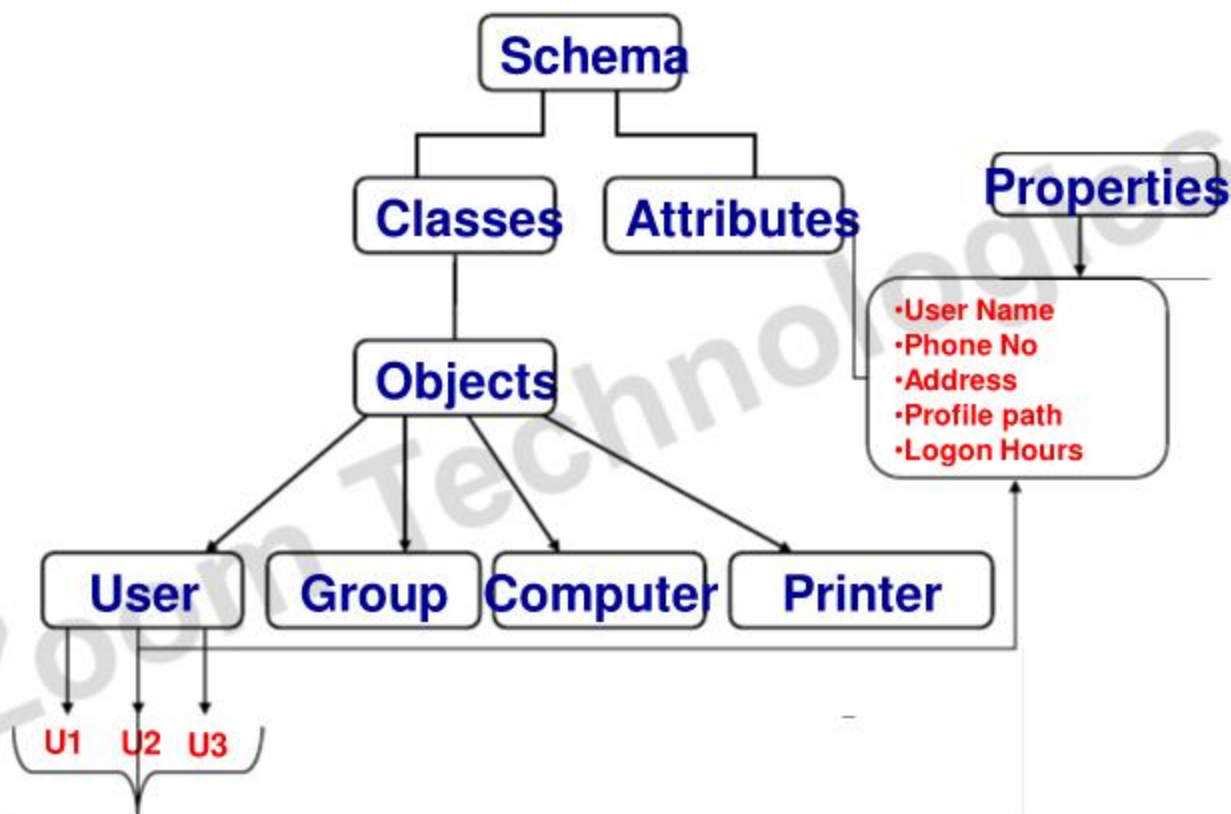


Naming Master

- Checks and Maintains the Uniqueness of the Domain Names in the Whole Forest.
- It is Responsible for Adding, Removing and Renaming the domain names in the whole Forest.



- Schema is a Set of Rules which is used to define the Structure of AD
- Schema contains Definitions of all the Objects which are stored in AD.
- Schema is further classified into:
 - **Classes**
 - Class is a Template which is used to Create an Object
 - **Attributes**
 - Attributes are Properties of an Object



- The Schema Master role owner is the DC responsible for performing updates to the directory schema.
- This DC is the only one that can process updates to the directory schema. Once the schema update is complete, it is replicated from the Schema Master FSMO role owner to all other DCs in the directory.
- There is only one Schema Master per forest.

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OPERATION MASTERS

- Naming Master
- Schema Master

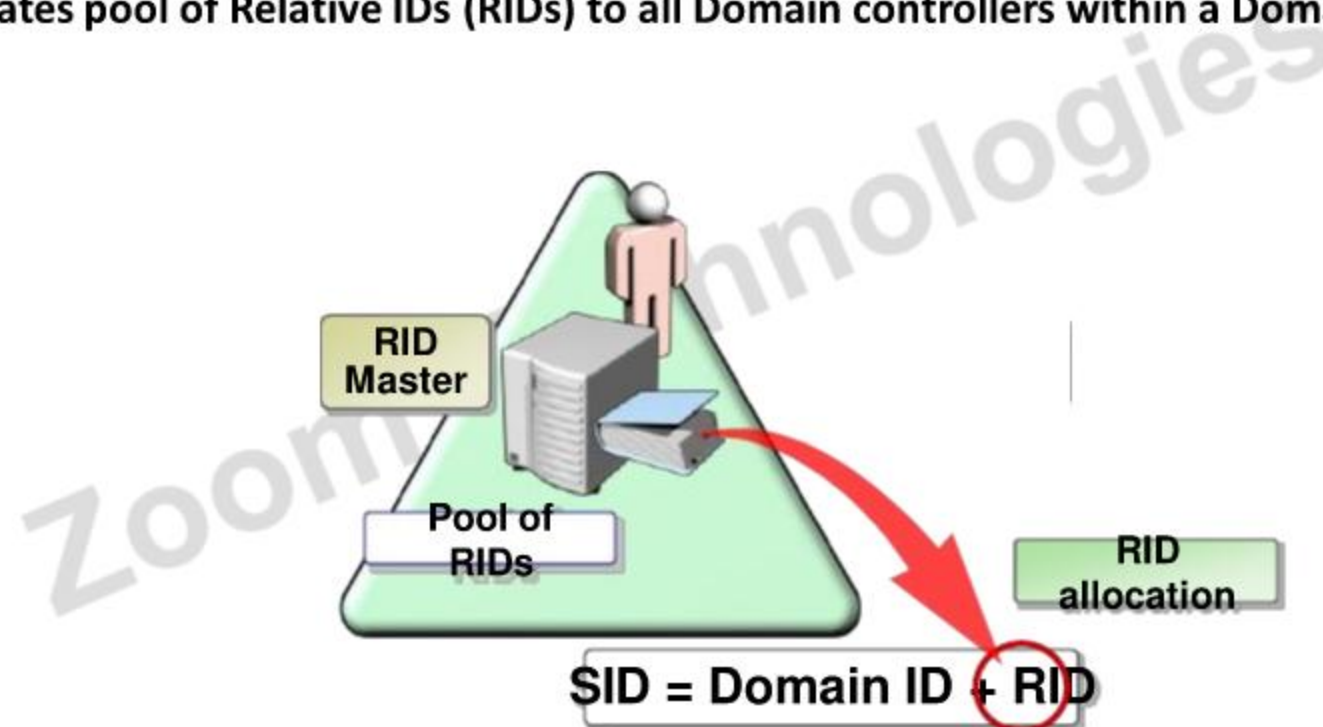


Forest Wide Roles

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- It assigns unique IDs (RIDs) to the objects which are created in the domain
- Allocates pool of Relative IDs (RIDs) to all Domain controllers within a Domain.



- Acts as a PDC for Windows NT 4.0 BDC's in the domain
- Processes all password updates for clients
- Receives immediate updates from other domain controllers when a user's password is changed
- It Synchronizes time between the Domain controllers with in the domain.

- Infrastructure Master Maintains and Updates the Universal Group Membership information
- It is Used for Inter-Domain Operations

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OPERATION MASTERS

- Naming Master
 - Schema Master
 - RID Master
 - PDC Emulator
 - Infrastructure Master
- } Forest Wide Roles
- } Domain Wide Roles

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Group Policy



- Group policy is a collection of settings which can be applied on computers and users.
- With group policy administrator can centrally manage the computers and users.
- Eases administration using group policy.

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Desktop Settings

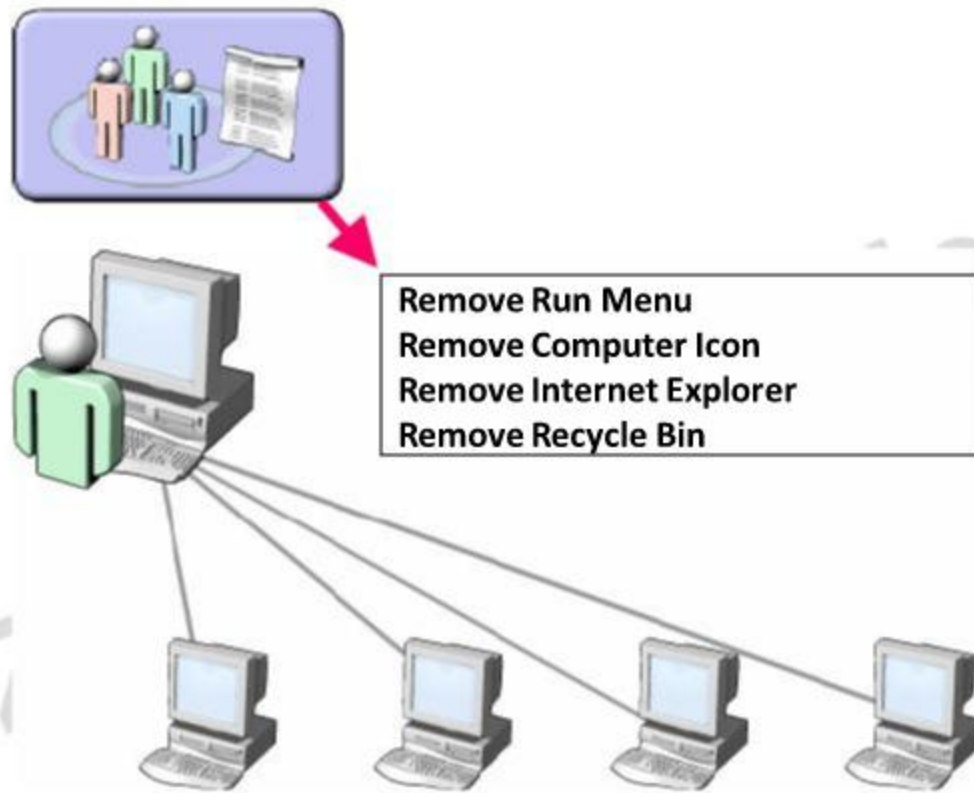
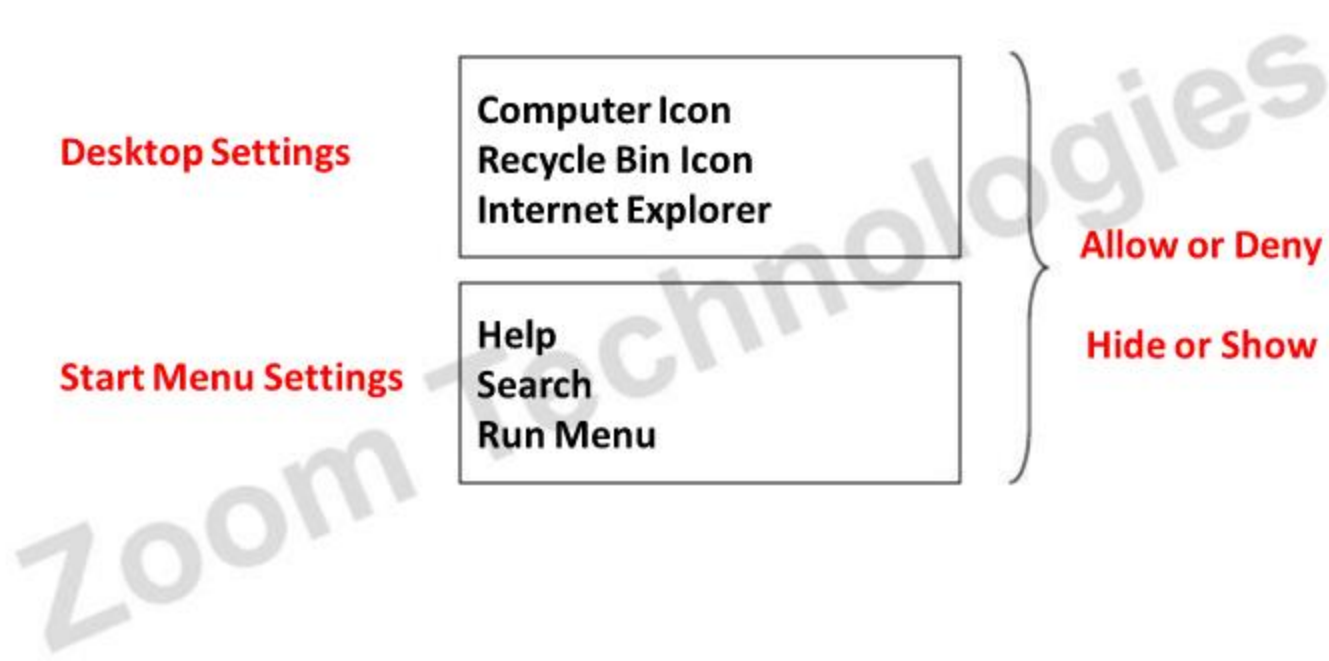
Computer Icon
Recycle Bin Icon
Internet Explorer

Allow or Deny

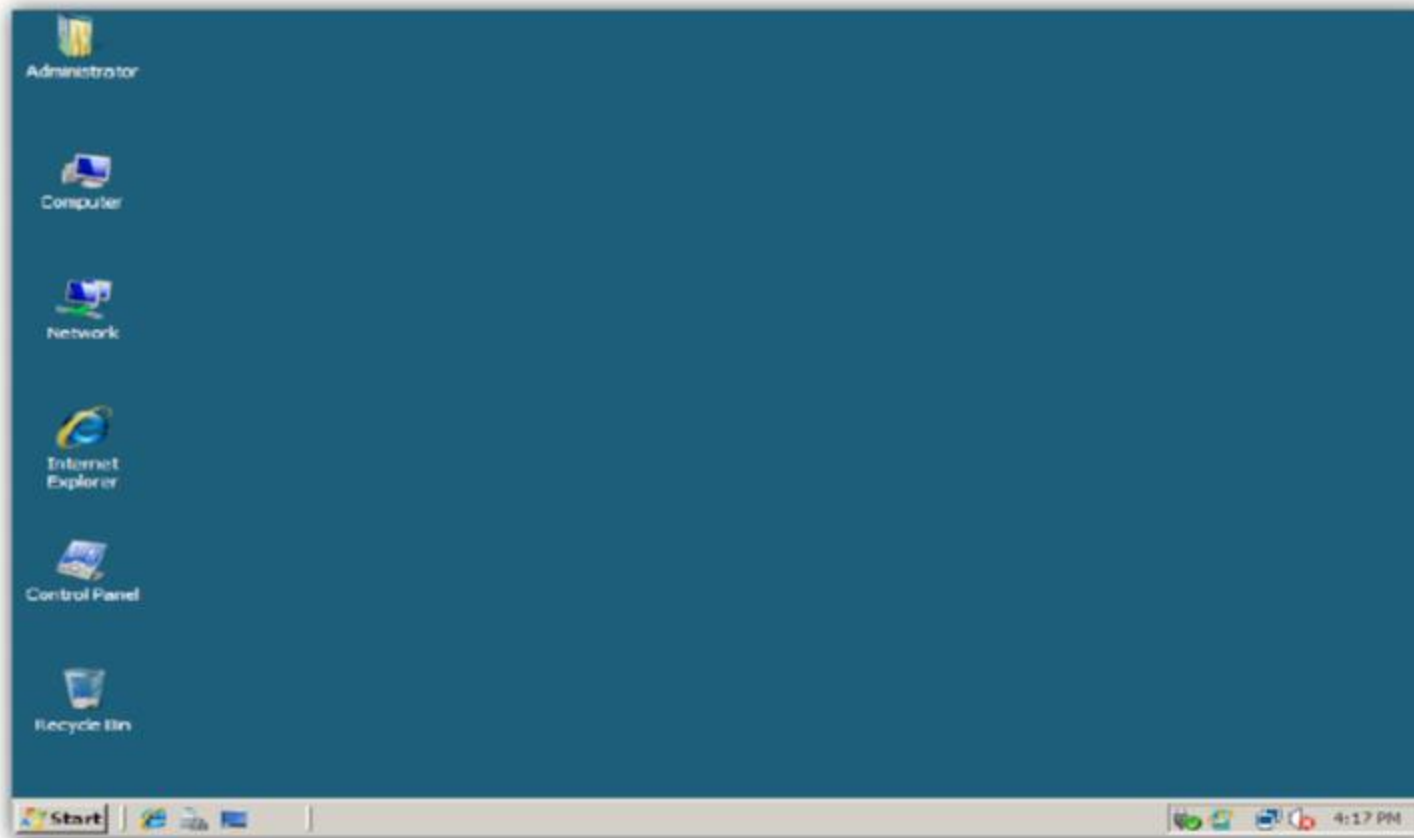
Start Menu Settings

Help
Search
Run Menu

Hide or Show

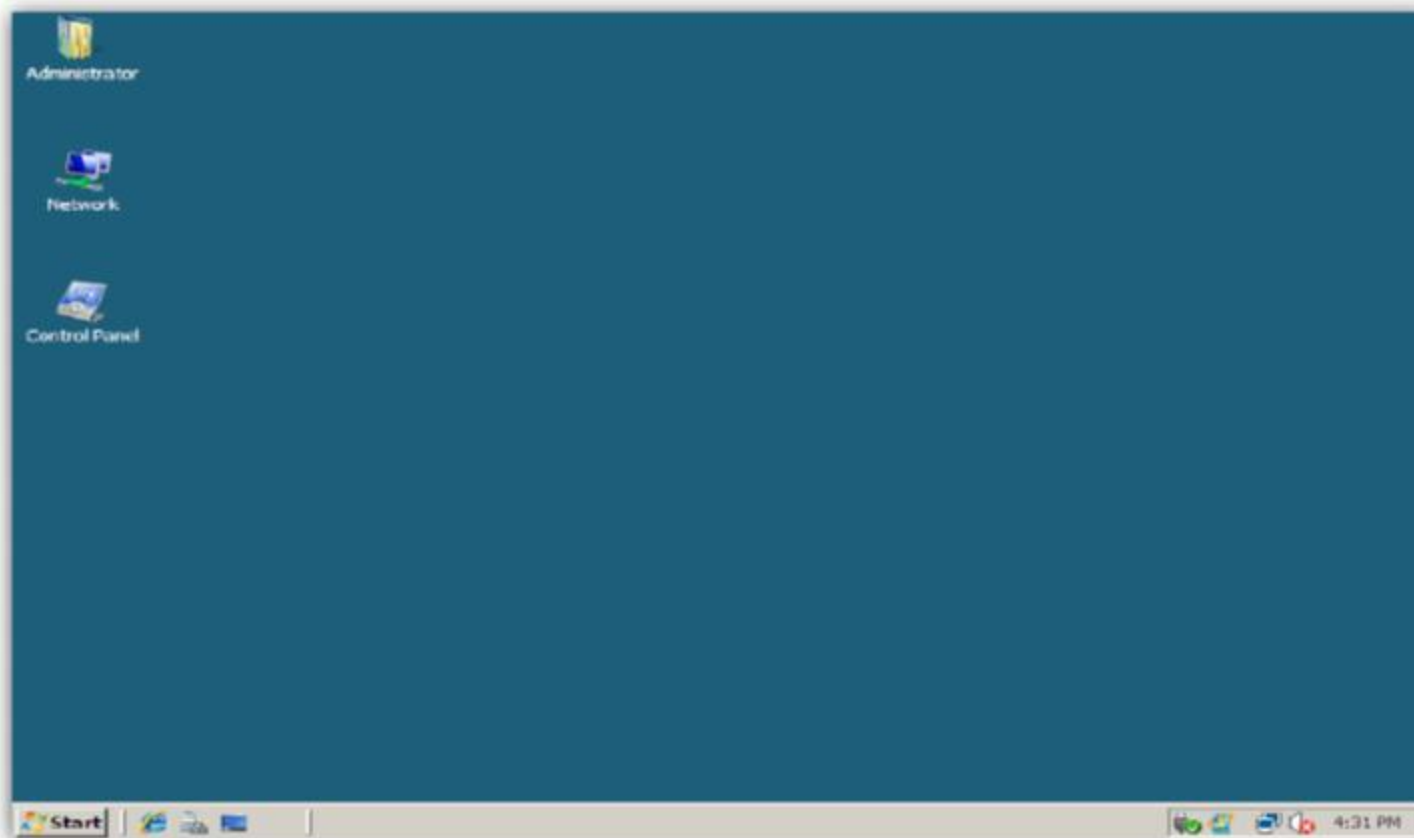


Before Group Policy

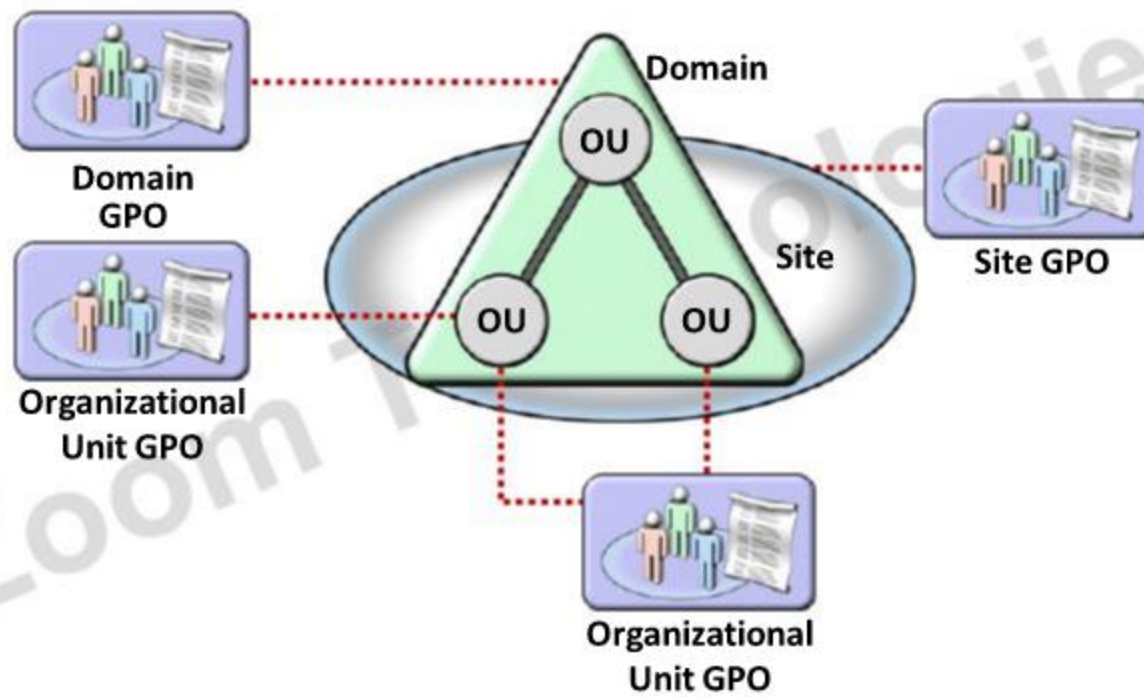


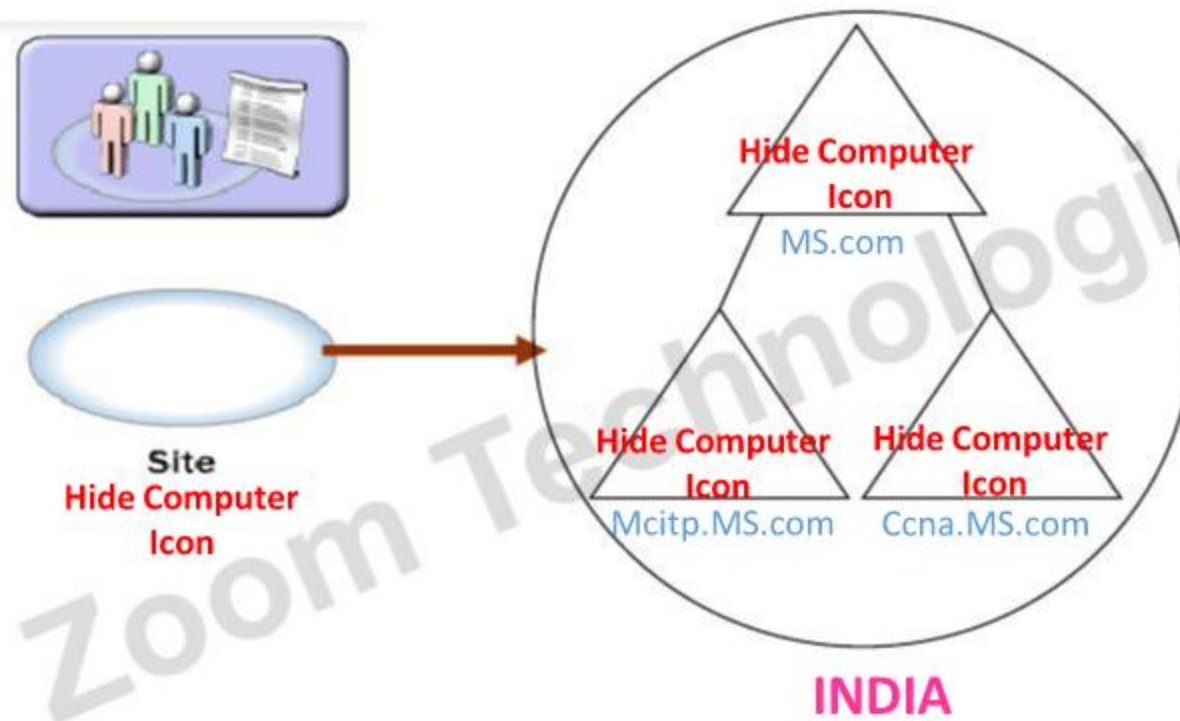
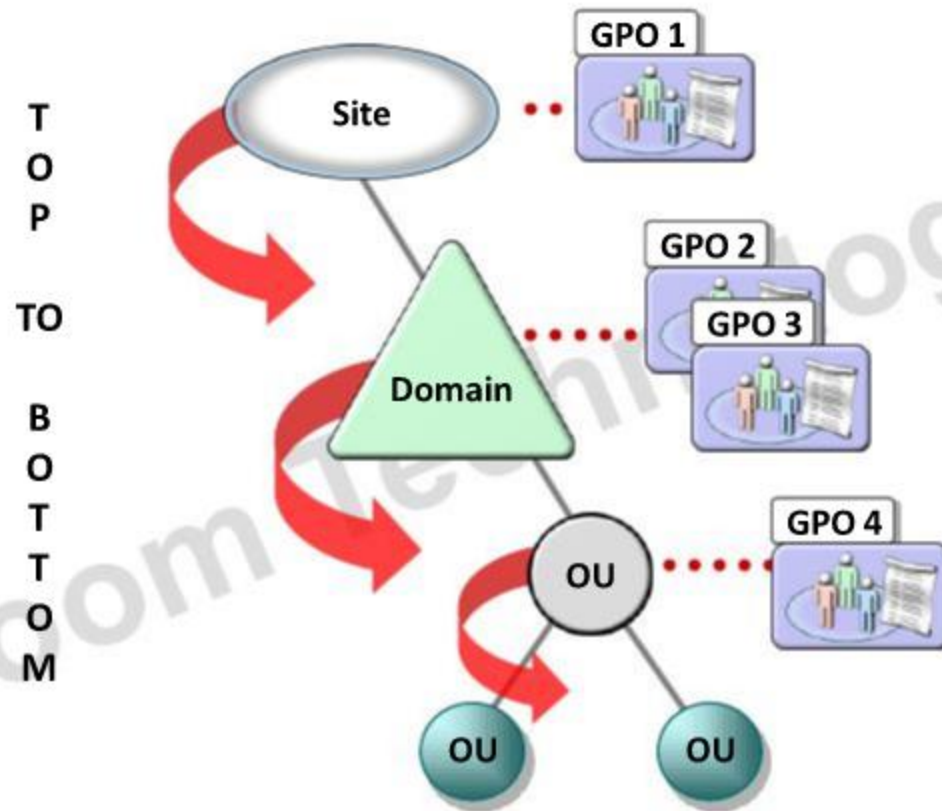
CLOUD
EXCHANGE
M C S E

After Group Policy

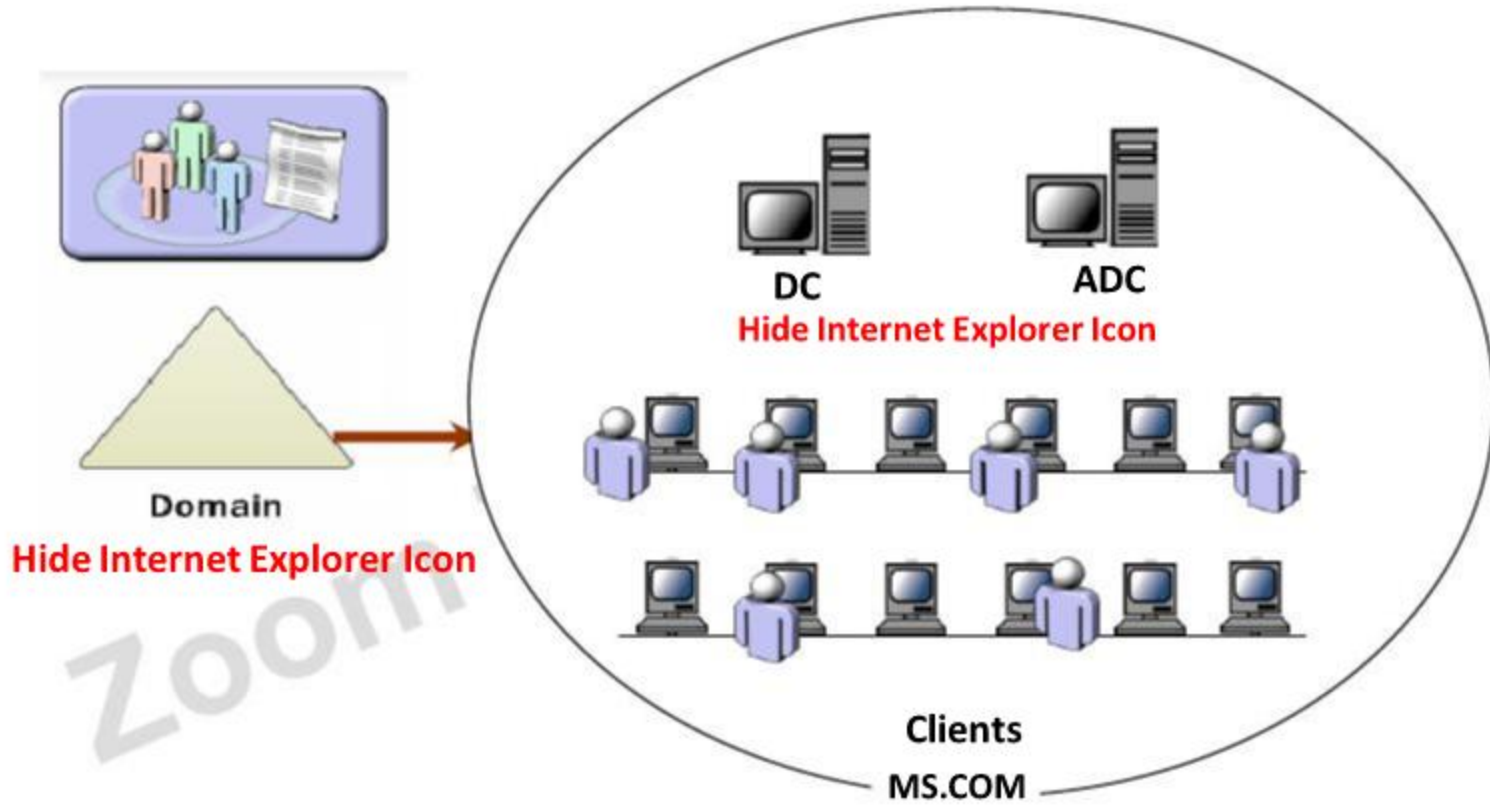


CLOUD
EXCHANGE
M C S E

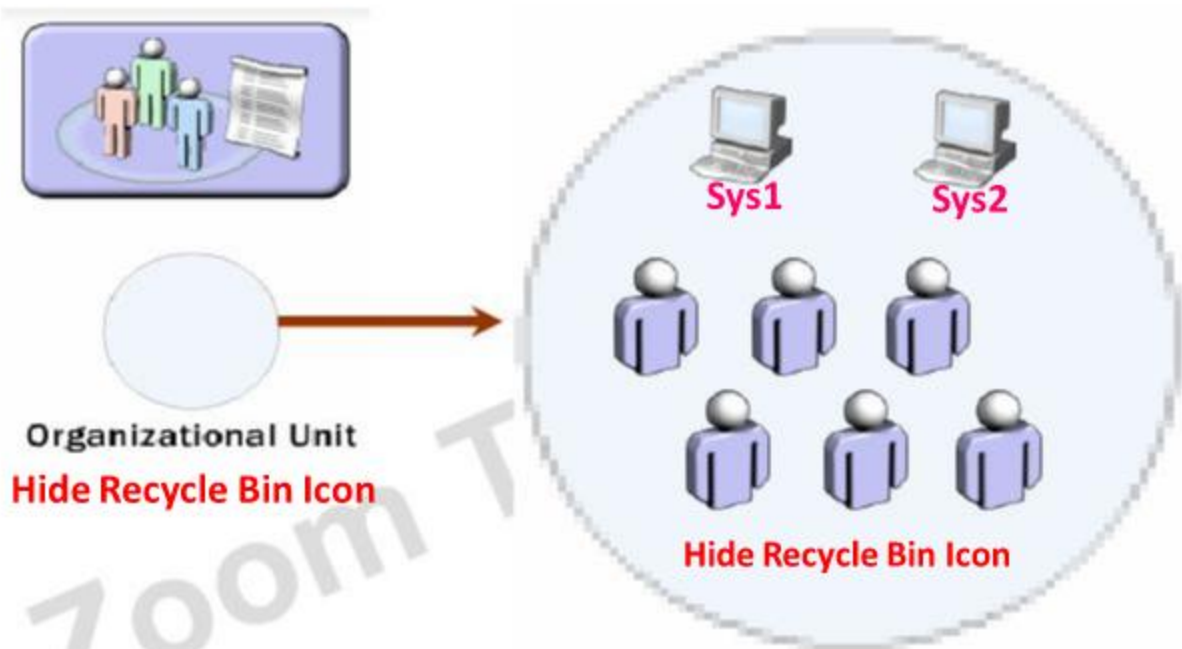




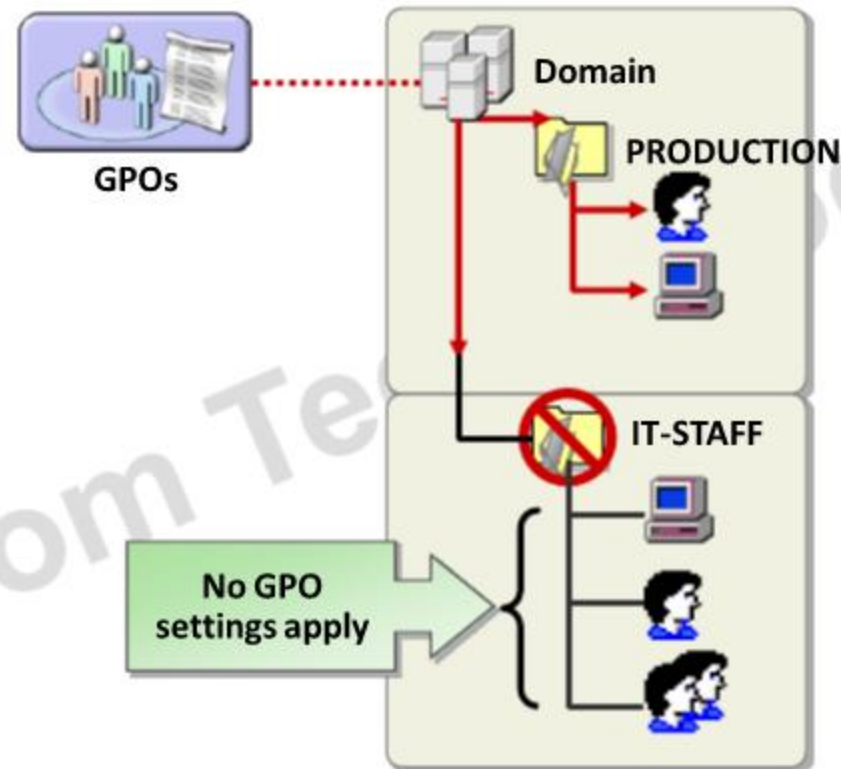
Site Group Policy



Domain Group Policy



OU Group Policy



- It is to deploy software (Applications) on all the computers in the domain from one central location by applying the Group Policies.
- Supports the deployment of ".MSI" but not ".EXE" applications.

- Redirection of folders on the local computer or on a Shared folder.
- Folders on a server appear as if they are located on the local drive.
- Fastens the User logon process in case if the profile is large.

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- Audit policy configures a system to audit categories of activities. If audit policy is not enabled, a server will not audit those activities
- Audit events categories are as below :
 - Access to NTFS files and folders
 - Account or object changes in AD DS
 - Logon
 - Assignment of use of user rights

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- Group Policy preferences provide better targeting, through item-level targeting and action modes.
- Additionally, rich user interfaces and standards-based XML configurations provide you with more power and flexibility over managed computers when you administer GPOs.
- Examples of the new Group Policy preference extensions include folder options, mapped drives, printers, scheduled tasks, services, and Start menu settings.

Zoom Technologies



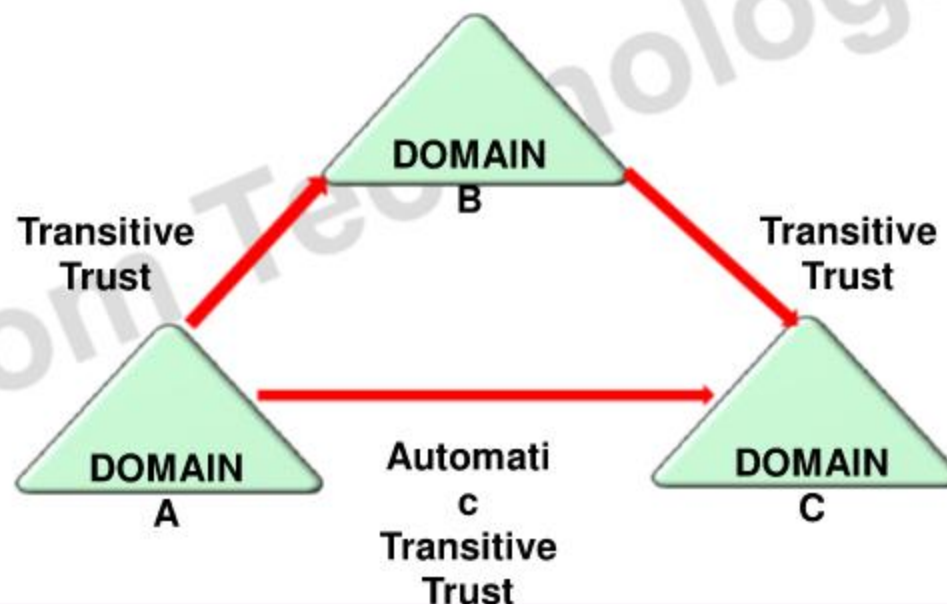
- Secure communication paths that allow objects in one domain to be authenticated and accepted in other domains
- Some trusts are automatically created.
 - Parent-child domains trust each other
 - Tree root domains trust forest root domain
- Other trusts are manually created
- Forest-to-Forest transitive trust relationships can be created in Windows Server 2003, 2008 and Windows server 2012 forests only.

Trust categories	<ul style="list-style-type: none">• Transitive trusts• Nontransitive trusts
Trust directions	<ul style="list-style-type: none">• One-way incoming trust• One-way outgoing trust• Two-way trust
Trust types	<ul style="list-style-type: none">• Five types of trusts: Default, Shortcut, External, Forest and Realm

- DEFAULT** : Two-way- transitive Kerberos trusts (Intraforest)
- SHORTCUT** : One or two-way transitive Kerberos trusts (Intraforest) Reduce authentication requests
- EXTERNAL** : One way non-transitive NTLM trusts. Used to connect to/from Windows NT or external 2000 domains Manually created
- FOREST** : One or two-way transitive Kerberos trusts. Only between 2003,2008 or 2012 Forest Roots, Creates transitive domain relationship
- REALM** : One or two-way – non-transitive Kerberos trusts Connect to/from UNIX Kerberos realms

In this category,

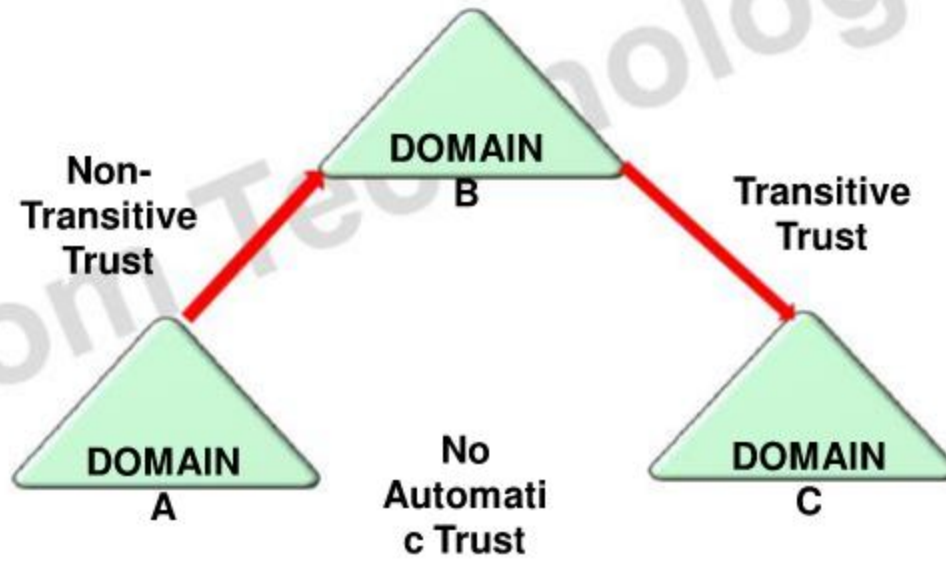
If Domain A trust Domain B and Domain B trust Domain C then Domain A automatically trust Domain C



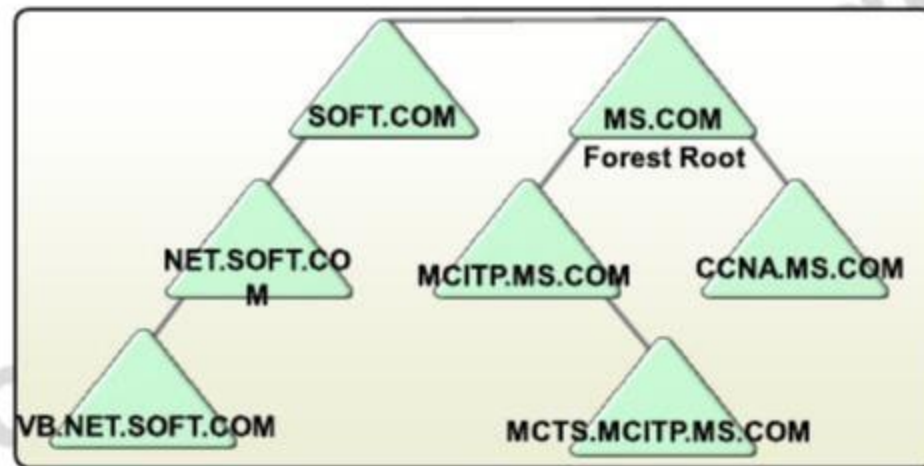
Non-Transitive Trust

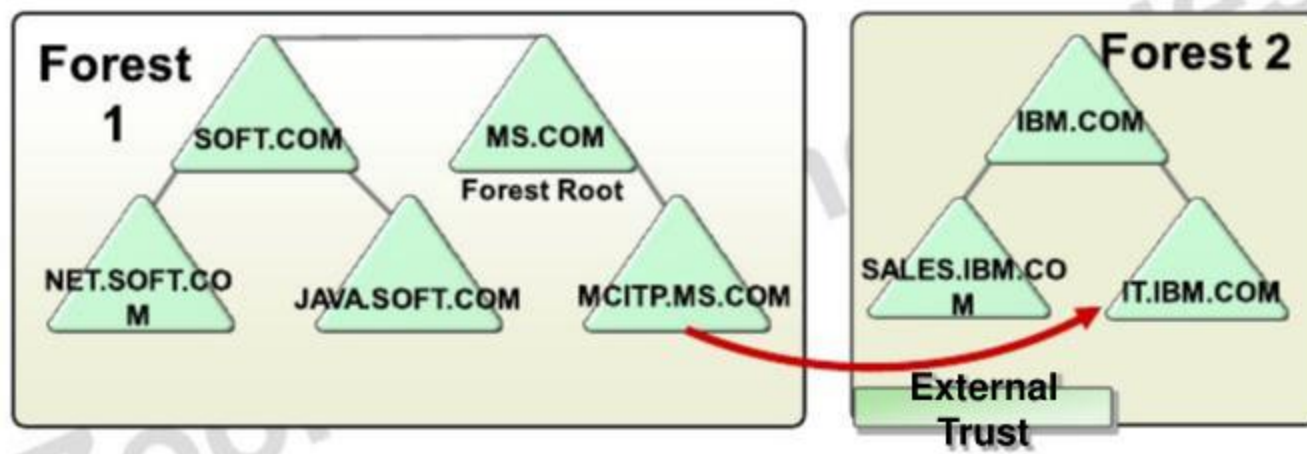
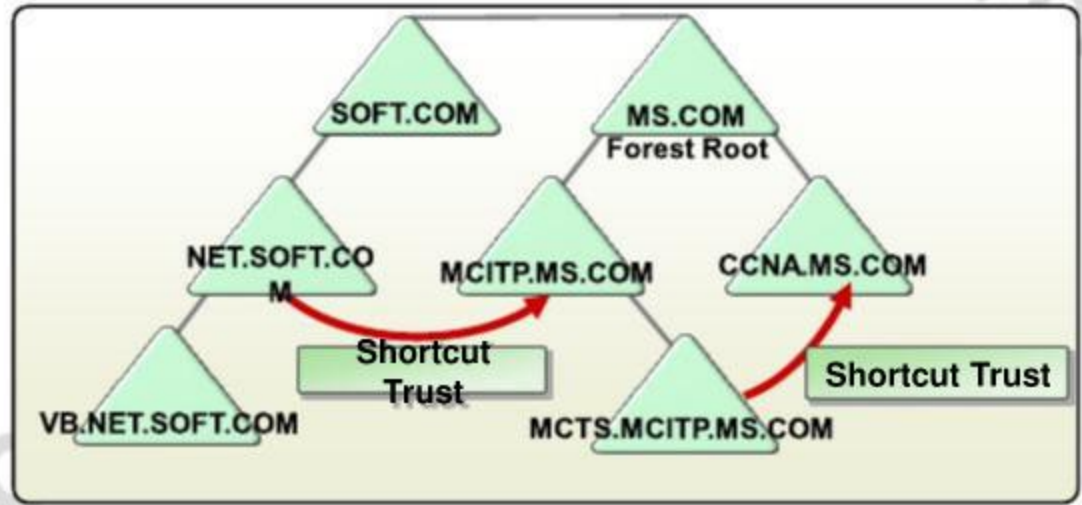
In this category,

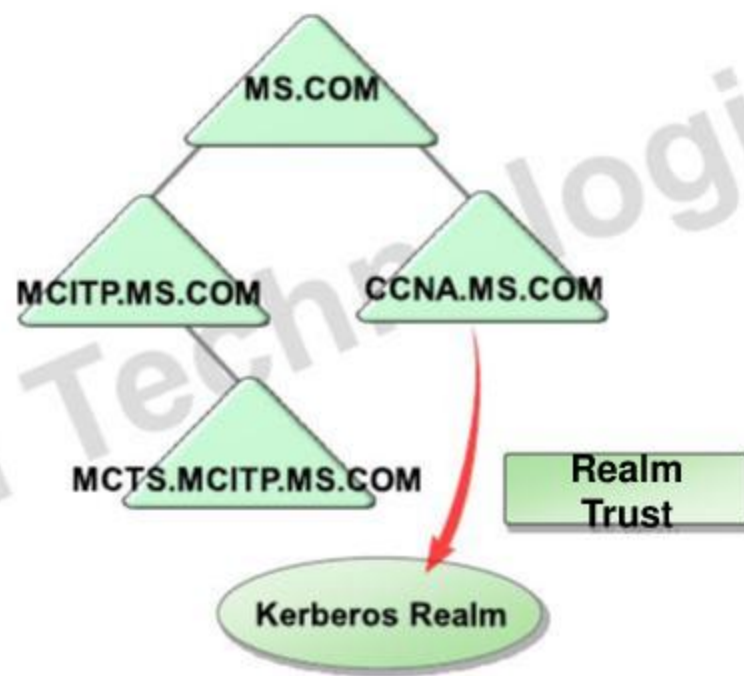
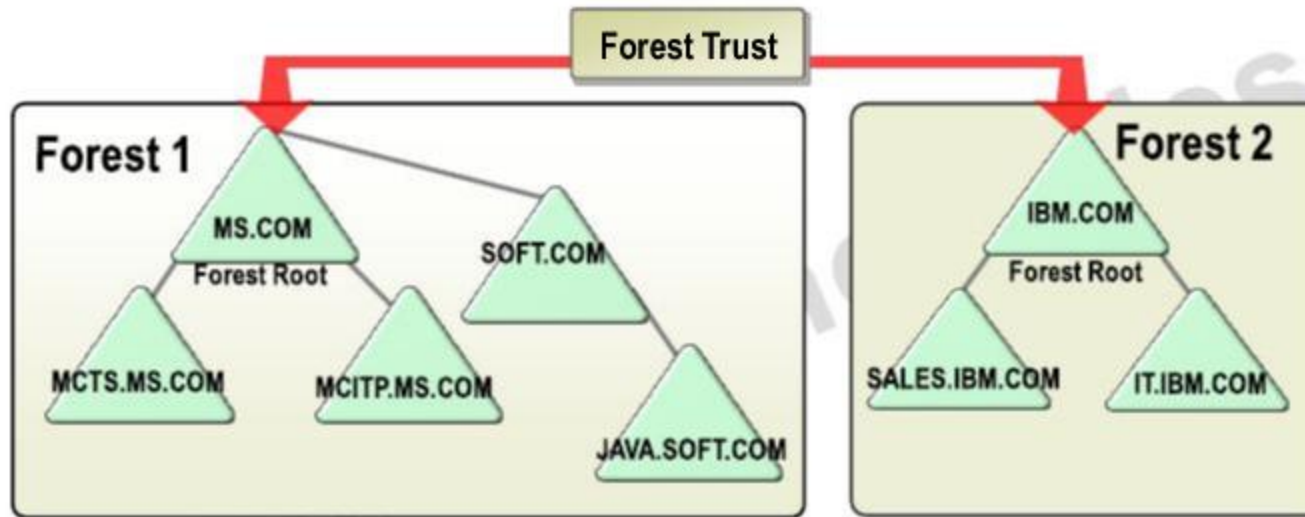
If Domain A trust Domain B and Domain B trust Domain C then Domain A does not trust Domain C



Default









Functional Levels

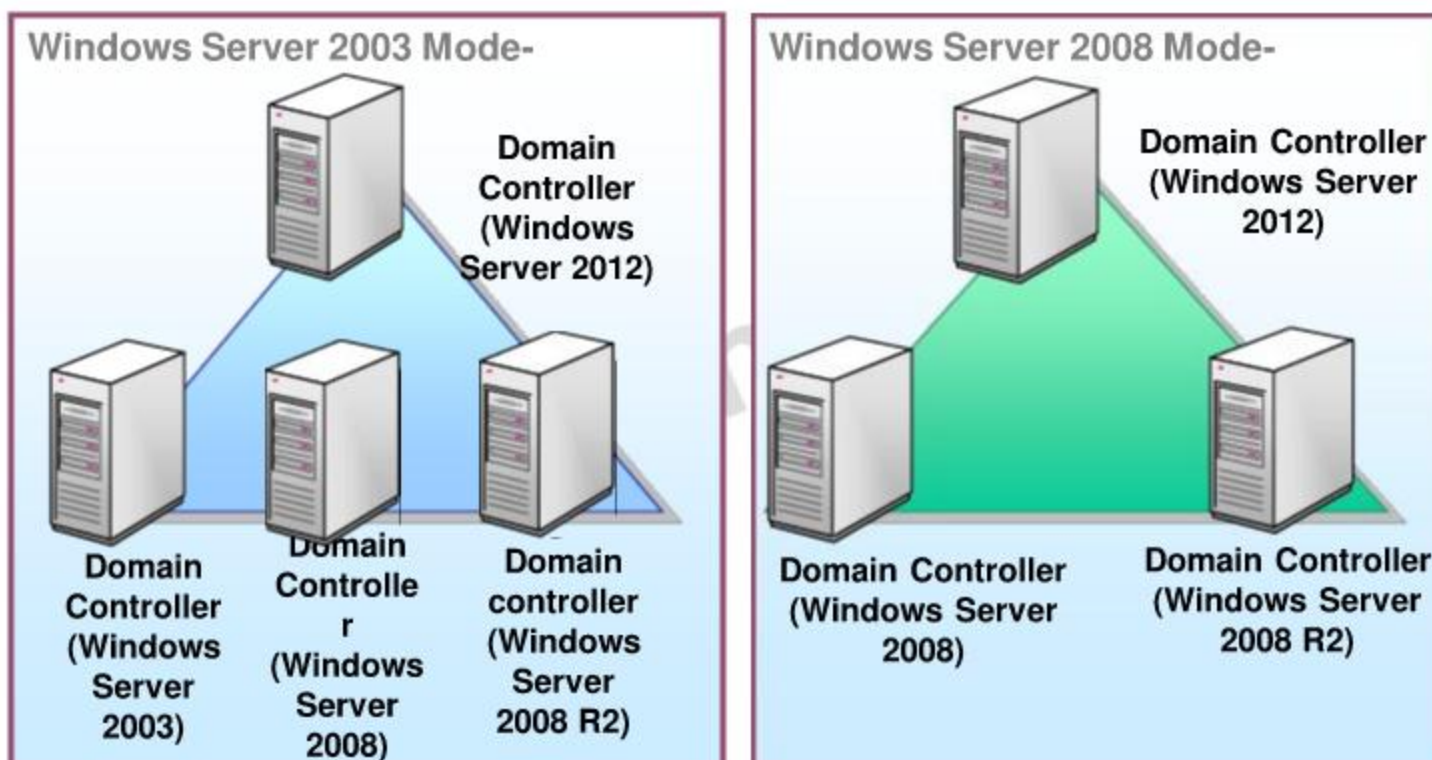


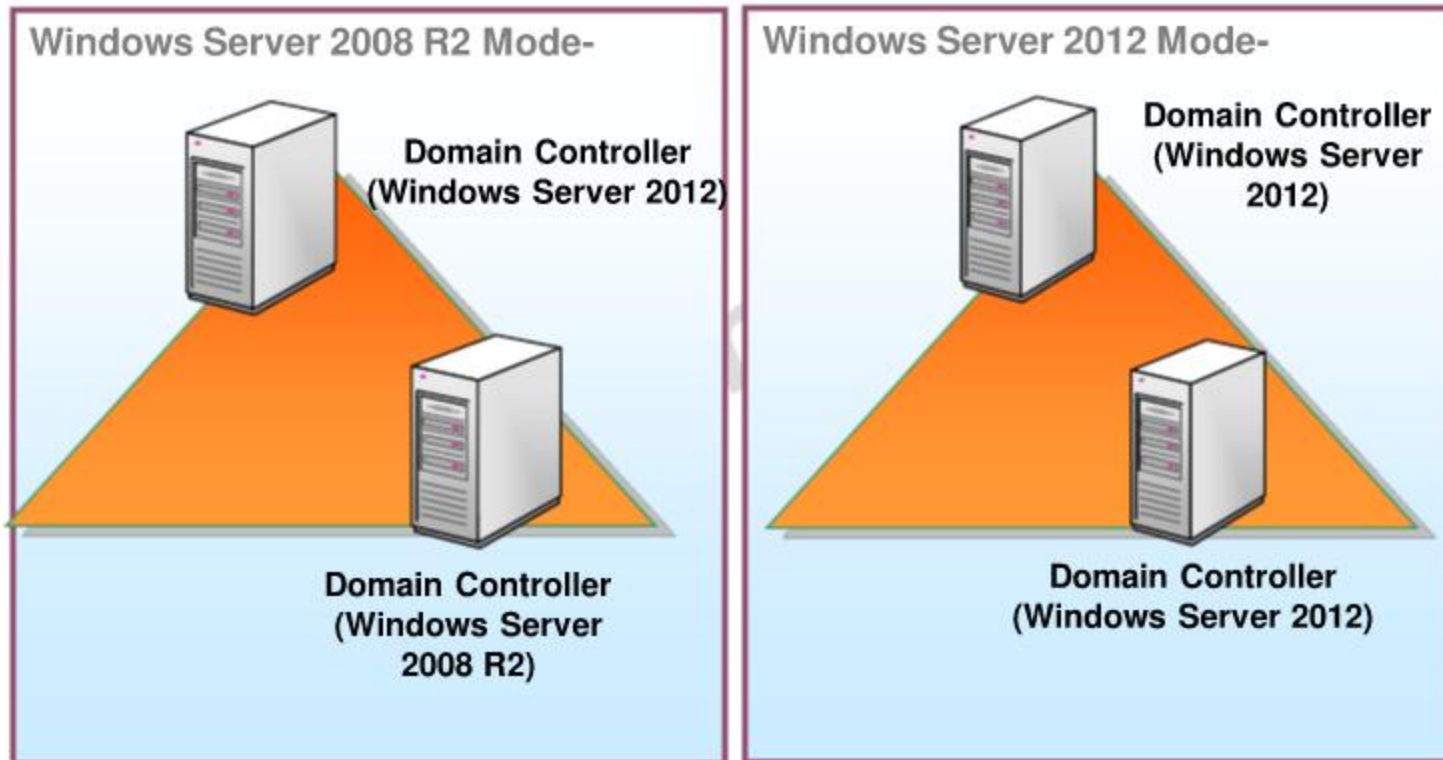
- **Functional levels determine**
 - Supported domain controller operating system
 - Active Directory features will be available

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Domain Functional Levels	Operating systems Supported on Domain controllers
Windows Server 2003	Windows Server 2003 OS, Windows Server 2008 OS, Windows Server 2008 R2 OS, Windows Server 2012 OS
Windows Server 2008	Windows Server 2008 OS, Windows Server 2008 R2 OS, Windows Server 2012 OS
Windows Server 2008 R2	Windows Server 2008 R2 OS, Windows Server 2012 OS
Windows Server 2012	Only Windows Server 2012 OS



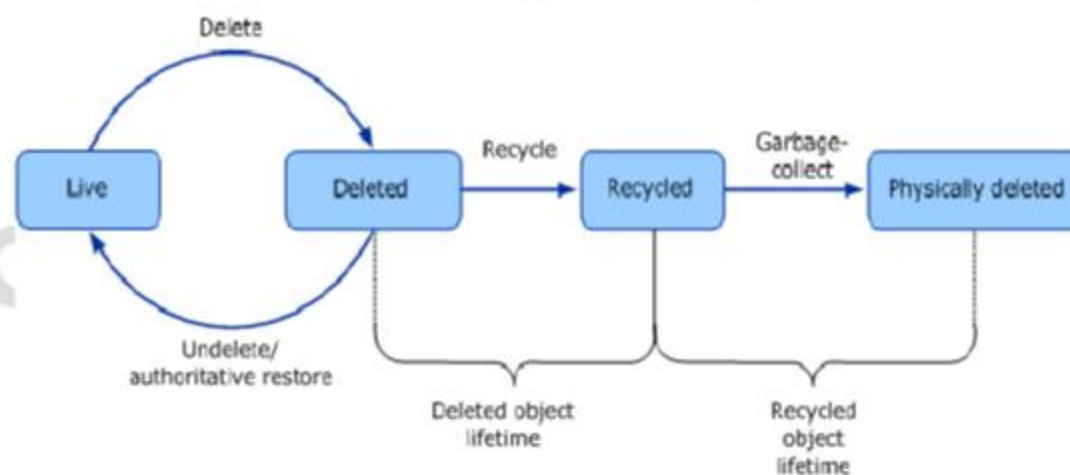


Forest Functional Levels	Supported Domain Functional Levels
Windows Server 2003	Windows Server 2003 Windows Server 2008 Windows Server 2008 R2 Windows Server 2012
Windows Server 2008	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012
Windows Server 2008 R2	Windows Server 2008 R2 Windows Server 2012
Windows Server 2012	Only Windows Server 2012

- Domain functional levels can be raised independently of other Domains
- Raising forest functional level is performed by Enterprise Admin
 - Requires all Domain Functional levels to be at Windows Server 2003 or Windows Server 2008 functional levels

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- Active Directory Recycle Bin provides a way to restore deleted objects without AD DS downtime
- Uses Windows PowerShell with Active Directory Module or the Active Directory Administrative Center to restore objects



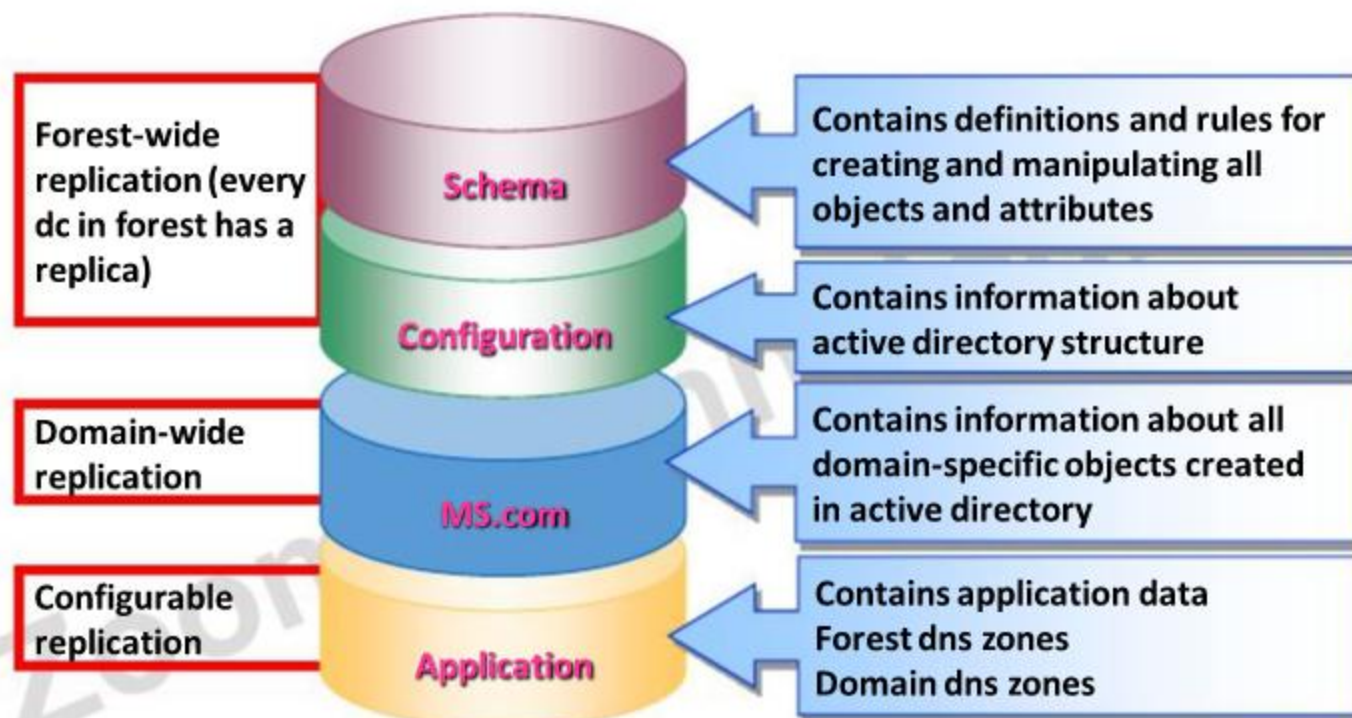


ACTIVE DIRECTORY

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TECHNOLOGIES

Directory Partitions

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All partitions together comprise the active directory database

CLOUD
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M C S E

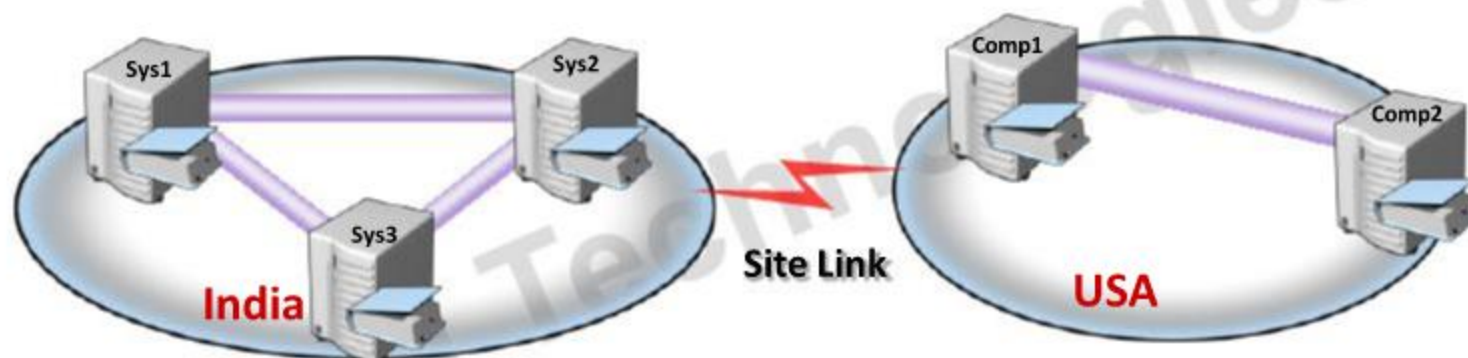
- The global catalog contains Complete information of Host Domain & partial information of other domains in a forest.
- By searching against the GC, individual domains do not have to be queried in most cases- GC can resolve
- Servers that hold a copy of the global catalog are called global catalog servers.

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- Physical Structure
 - Domain Controllers
 - Sites

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- A set of well-connected IP subnets.
- Site can be generally used for locating services (E.g. Logon), replication, group policy application.
- Sites are connected with site links.
- A site can span multiple domains.
- A domain can span multiple sites.



- RODC addresses some of the problems that are commonly found in branch offices.
- These locations might not have a DC, Or they might have a writable DC but no physical security to that DC, low network bandwidth, or inadequate expertise to support that DC.

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- Read-only AD DS database
- Uni-directional replication
- Credential caching
- Administrator role separation

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- Except for account passwords, an RODC holds all the Active Directory objects and attributes that a writable domain controller holds.
- However, changes cannot be made to the database that is stored on the RODC. Changes must be made on a writable domain controller and then replicated back to the RODC.

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- Because no changes are written directly to the RODC, no changes originate at the RODC. Accordingly, writable DCs do not have to pull changes from the RODC. This means that any changes or corruption that a malicious user might make at branch locations cannot replicate from the RODC to the rest of the forest.

Zoom Technologies

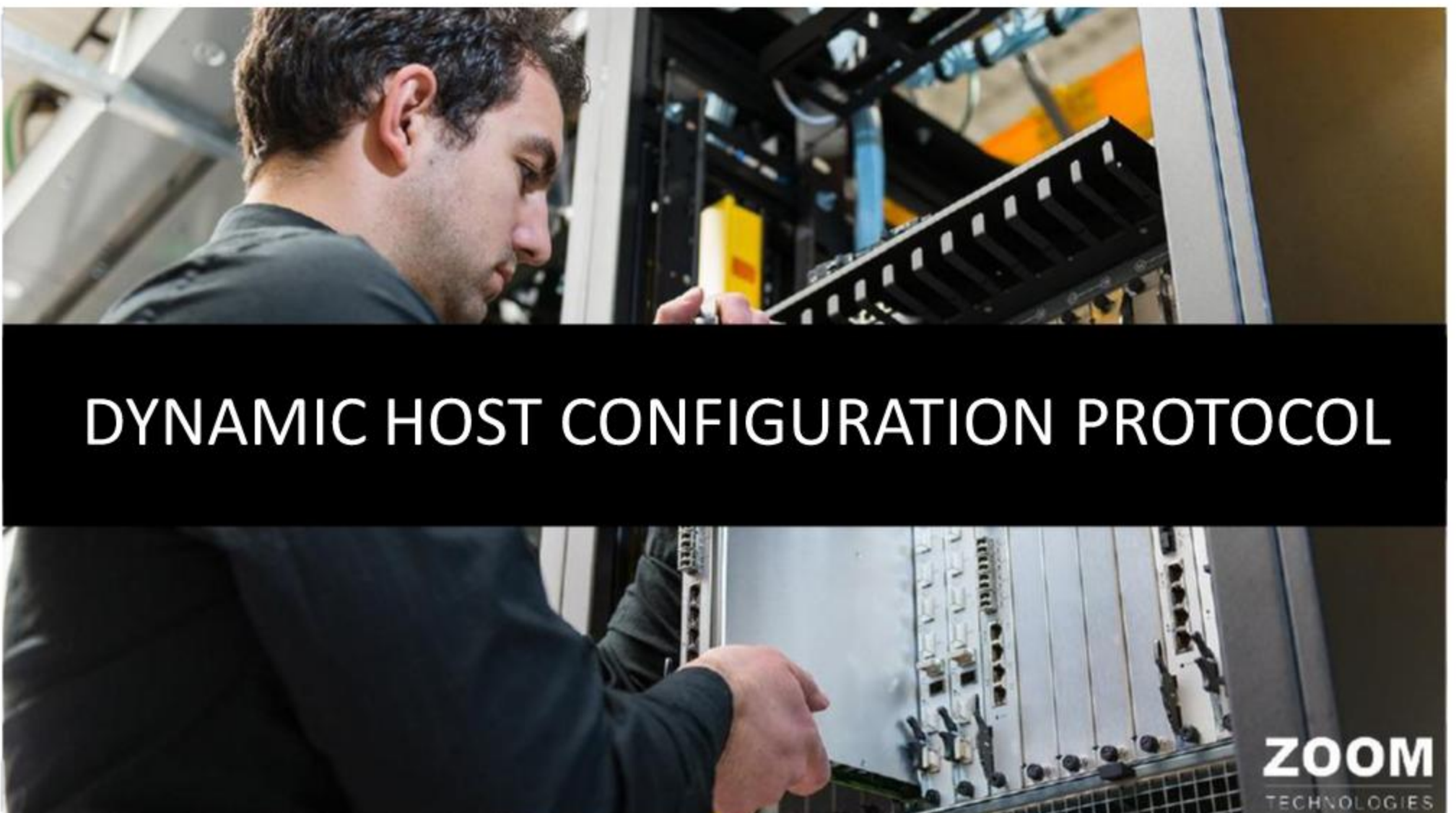
- By default, an RODC does not store any user credentials.
- You must explicitly allow any credential to be cached on an RODC.

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- You can delegate local administrative permissions for an RODC to any domain user without granting that user any user rights for the domain or other domain controllers.
- In this way, the branch user can be delegated the ability to effectively manage and perform maintenance work on the server, such as upgrading a driver in the branch office RODC only, without compromising the security of the rest of the domain

Zoom Technologies

- If you have a network that is slow, unreliable, or costly, you might find it necessary to add another domain controller at a remote location or branch office.
- IFM process must take place over a potentially unreliable WAN connection. As an alternative, and to significantly reduce the amount of traffic copied over the WAN link
- Most of the copying is then done locally (perhaps from a USB drive), and the WAN link is used only for security traffic and to ensure that the new domain controller receives any changes that are made after you create the IFM backup



IP addresses can be

- **Static IP address**
 - Addresses that are manually assigned and do not change over time
- **Dynamic IP address**
 - Addresses that are automatically assigned for a specific period of time and might change

- It gives IP Addresses automatically to the clients who is requesting for an IP Address
- Centralized IP Address management
- DHCP prevents IP address conflicts and helps conserve the use of client IP Address on the network
- DHCP reduces the complexity and amount of administrative work by assigning TCP/IP configuration automatically to the Clients.

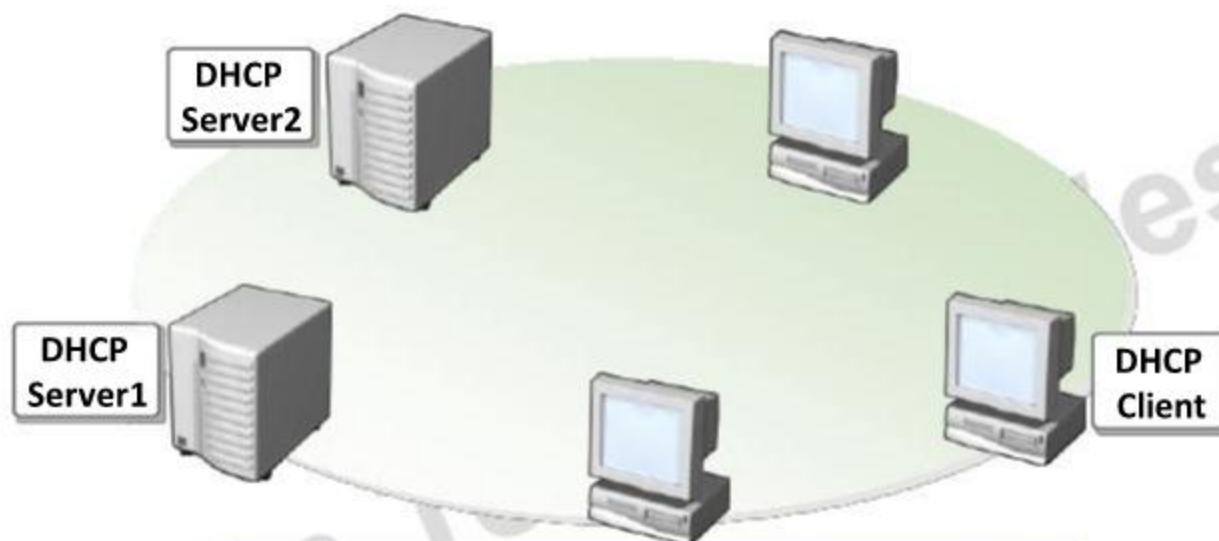
AUTHORIZATION

- In Domain model the DHCP server should be authorized to assign the IP Addresses to clients.
- It is a security precaution that ensures that only authorized DHCP servers can run in the network. To avoid computers running illegal DHCP servers in the network.

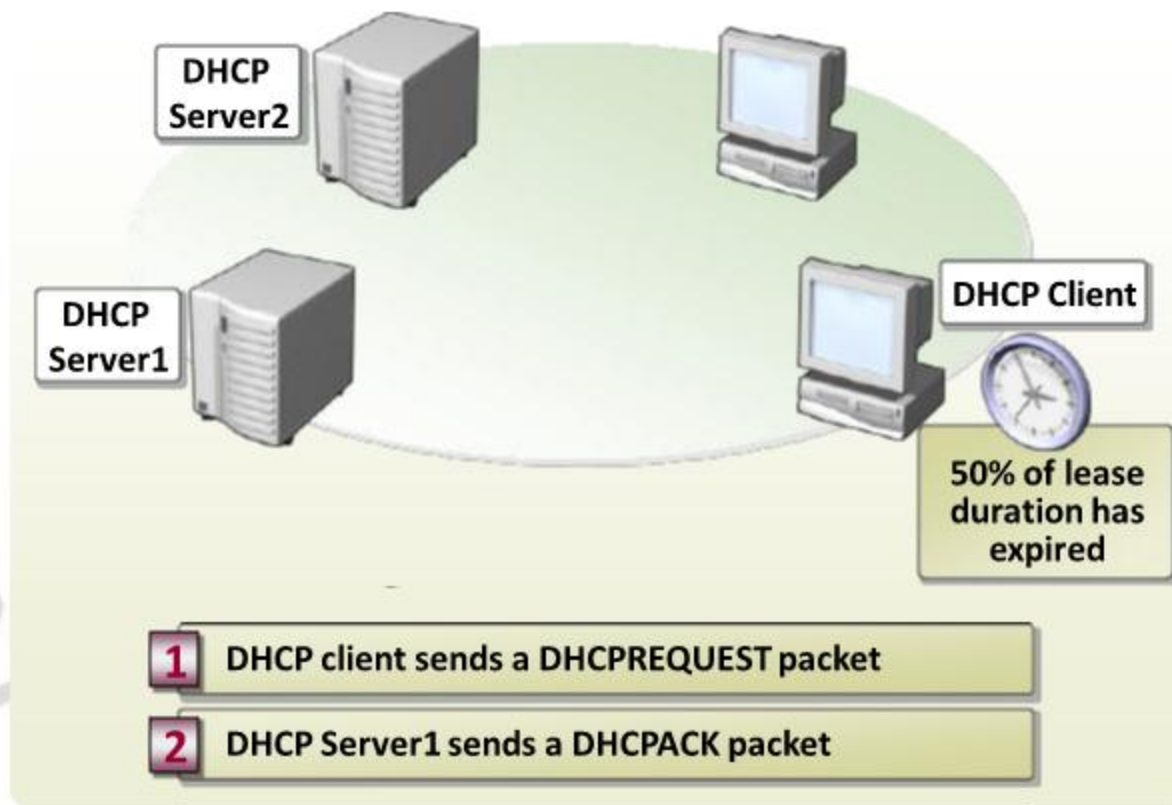
SCOPE

- A scope is a range of IP addresses that are available to be leased to clients.

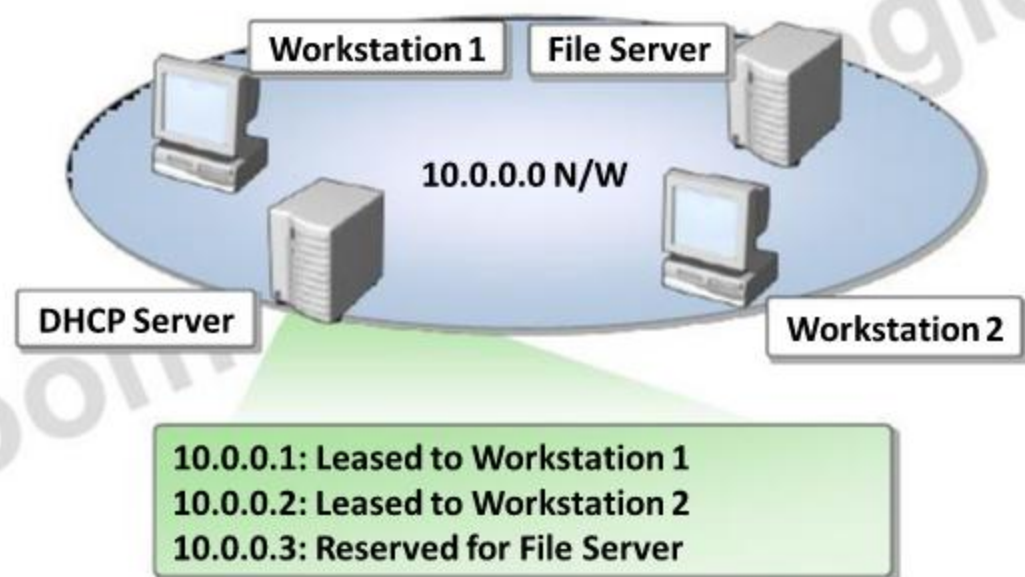
DHCP Lease Generation Process



- 1 DHCP client broadcasts a DHCPDISCOVER packet
- 2 DHCP servers broadcast a DHCPOFFER packet
- 3 DHCP client broadcasts a DHCPREQUEST packet
- 4 DHCP Server1 broadcasts a DHCPACK packet

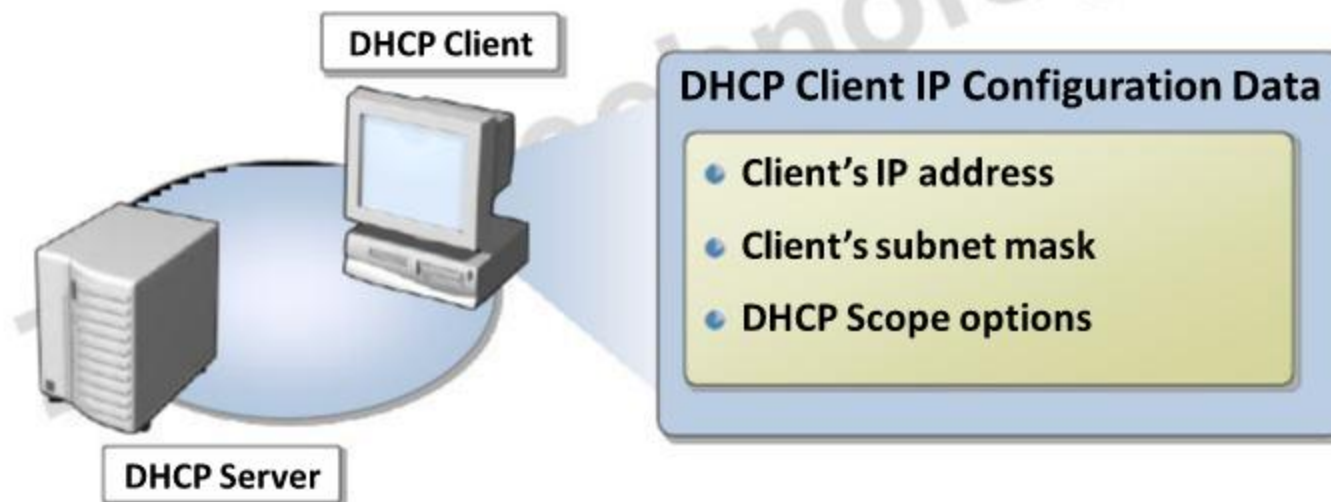


- A reservation is a specific IP address, within a scope, that is permanently reserved to a specific DHCP client



What are DHCP options?

- DHCP Scope options are other server addresses given to clients along with IP Configuration.



DHCP Failover

- DHCP failover is a new feature available in Windows Server® 2012 ensuring continuous availability of DHCP service to clients.
- With DHCP failover, two DHCP servers share DHCP scope and lease information, enabling one server to provide DHCP leases to DHCP clients if the other server is unavailable
- Hot stand-by mode: This mode provides redundancy for DHCP services.
- Load balance mode: This mode allocates DHCP client leases across two servers.



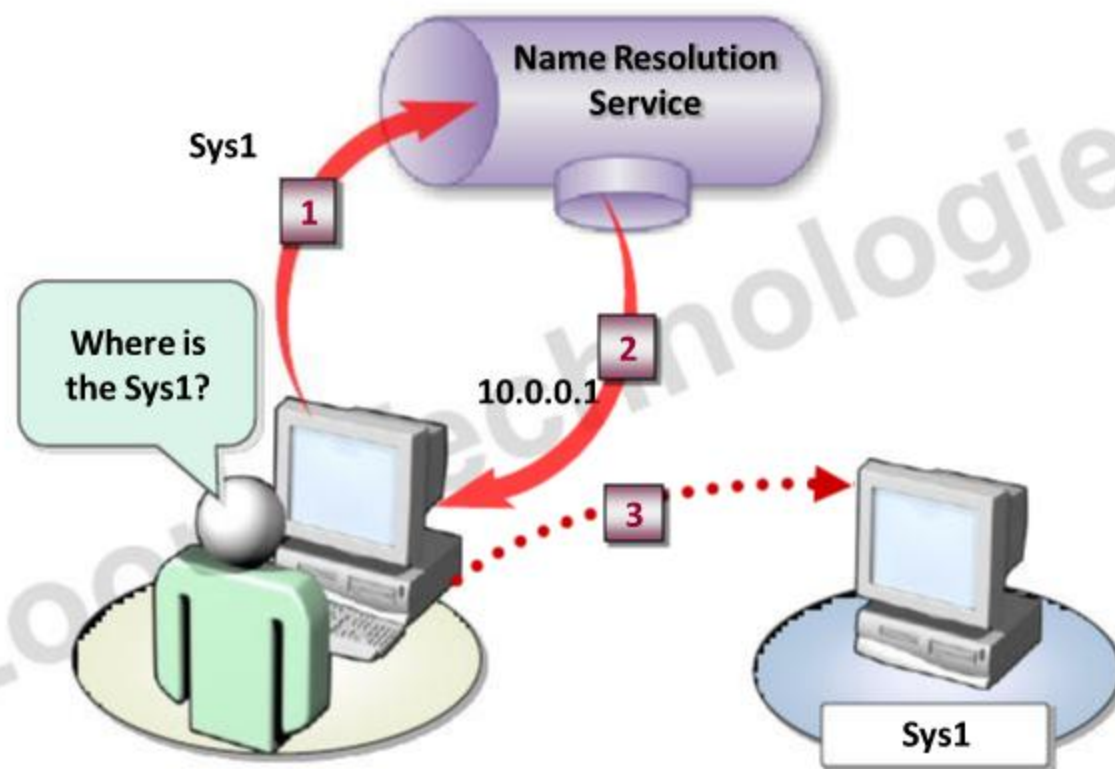
What is DNS



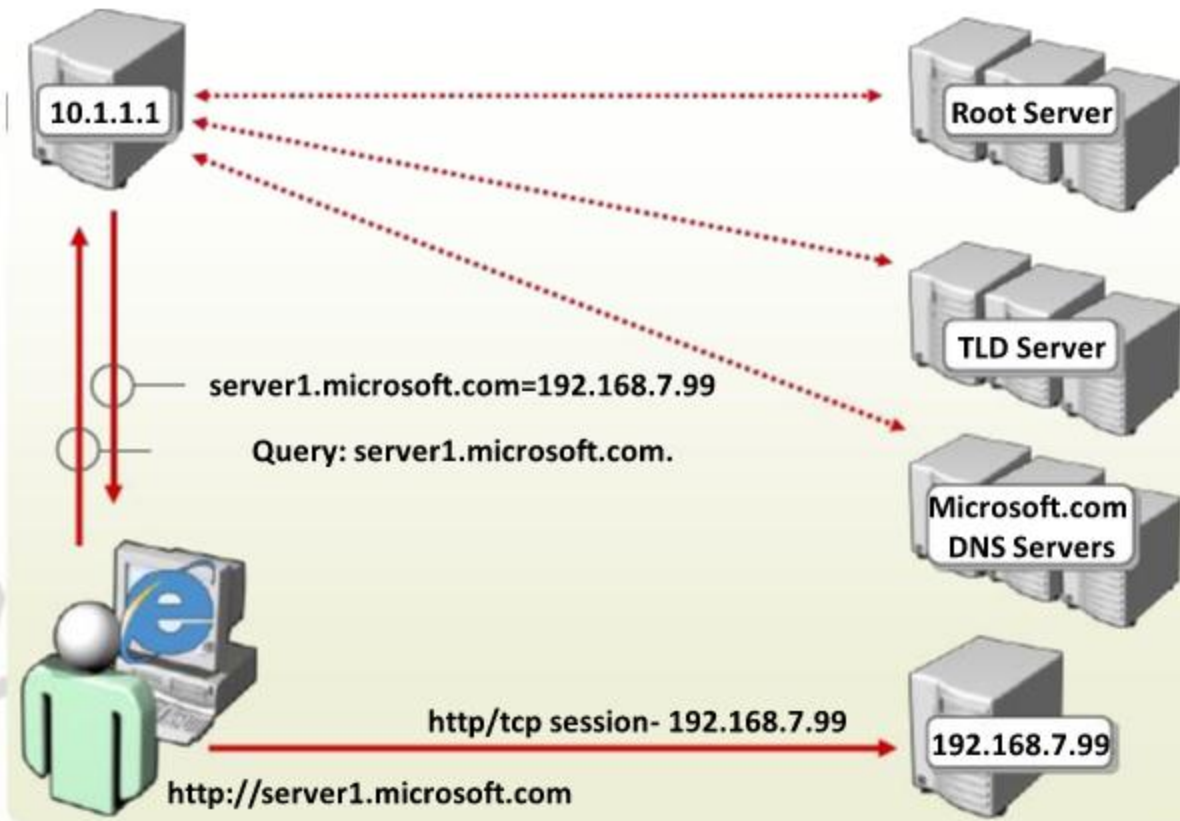
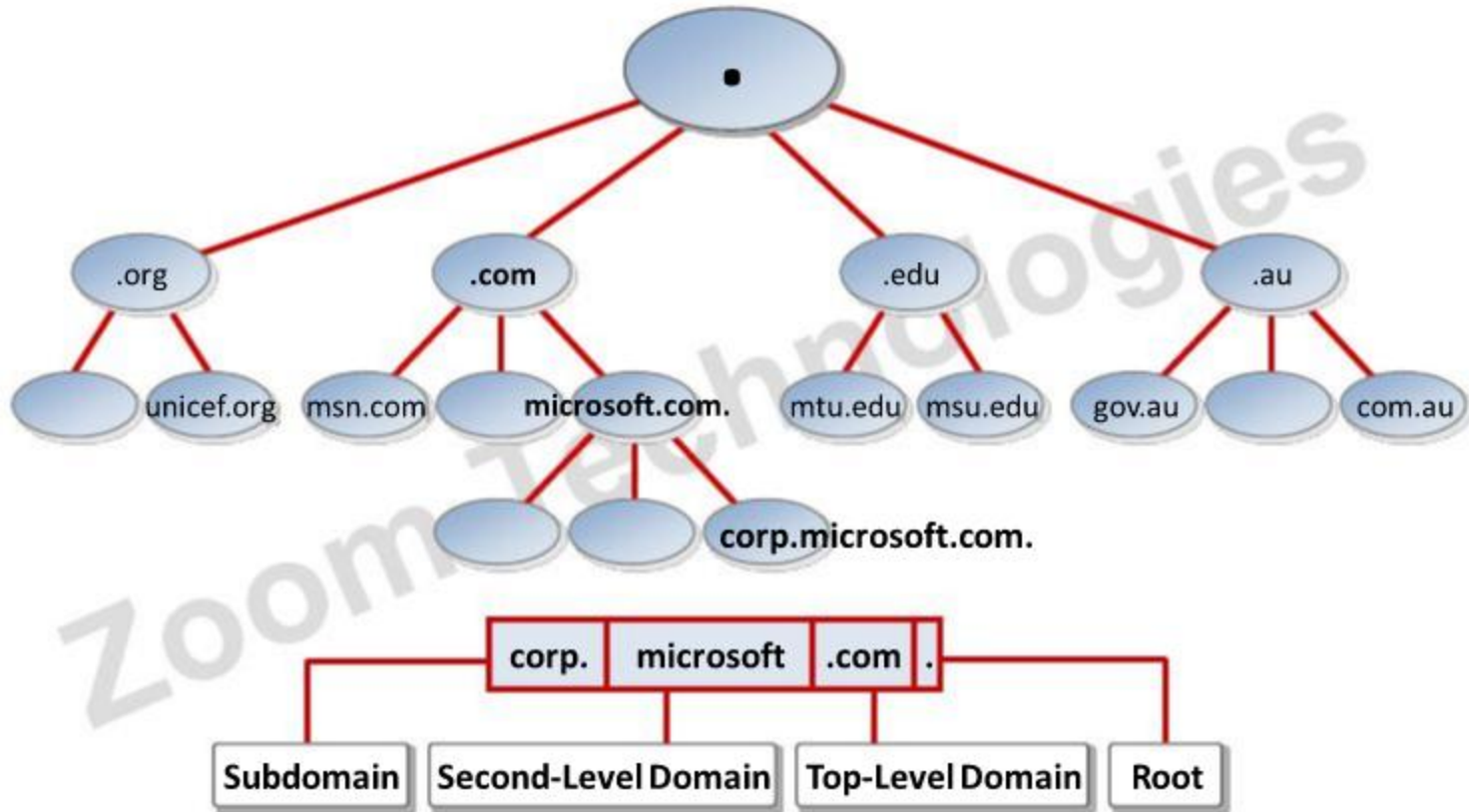
- Domain Name Service/Domain Name System
- Provides resolution of names to IP addresses and resolution of IP addresses to names
- Defines a hierarchical namespace where each level of the namespace is separated by a
“.”

Zoom Technologies





- Computer running DNS service can be:
 - Microsoft® Windows® Server 2012
 - Microsoft® Windows® Server 2008
 - Microsoft® Windows® Server 2003
 - Microsoft® Windows® 2000 Server
 - Microsoft® Windows® NT 4
 - UNIX
 - Linux
 - NetWare Etc.



- **An authoritative DNS server will either:**
 - Return the requested IP address
 - Return an authoritative “No”
- **An Non-authoritative DNS server will either:**
 - Check its cache
 - Use forwarders
 - Use root hints

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- Identifies a host's name within the DNS namespace hierarchy
- Host name + DNS domain name = FQDN
- Example:
 - Host name: Sys1 & Domain name: MS.com
 - Then FQDN = Sys1.MS.com

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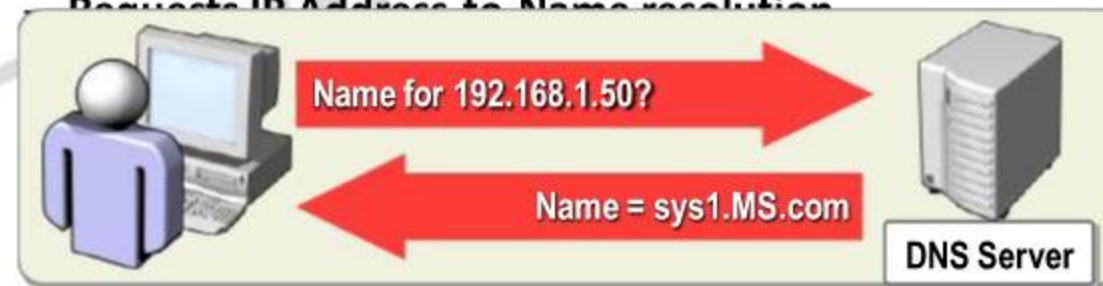
- **Forward Lookup**

- Requests Name-to-IP Address resolution



- **Reverse Lookup**

- Requests IP Address to Name resolution



Zone is a storage database which contains all zone Records

- **Forward Lookup Zone**

- Used for Resolving Host Names to IP-Address
 - It maintains Host to IP Address Mapping Information

- **Reverse Lookup Zone**

- Used for Resolving IP-Address to Host Names
 - It maintains IP Address to Host Mapping Information

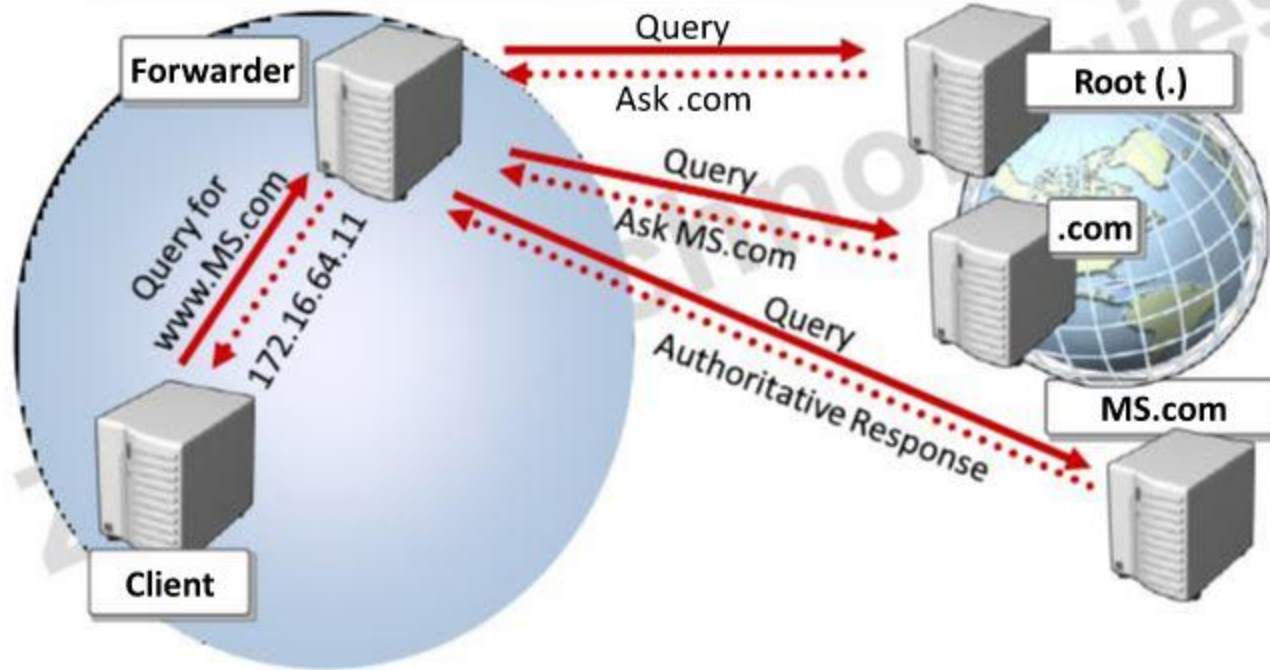
- **SOA Record**
 - The first record in any zone file
- **NS Record**
 - Identifies the DNS server for each zone
- **Host Record**
 - Resolves a host name to an IP address
- **Alias Record**
 - Resolves an alias name to a host name

- **Pointer Record**
 - Resolves an IP address to a host name
- **MX Record**
 - Used by the mail server
- **SRV Records (Service Records)**
 - Resolves names of servers providing services

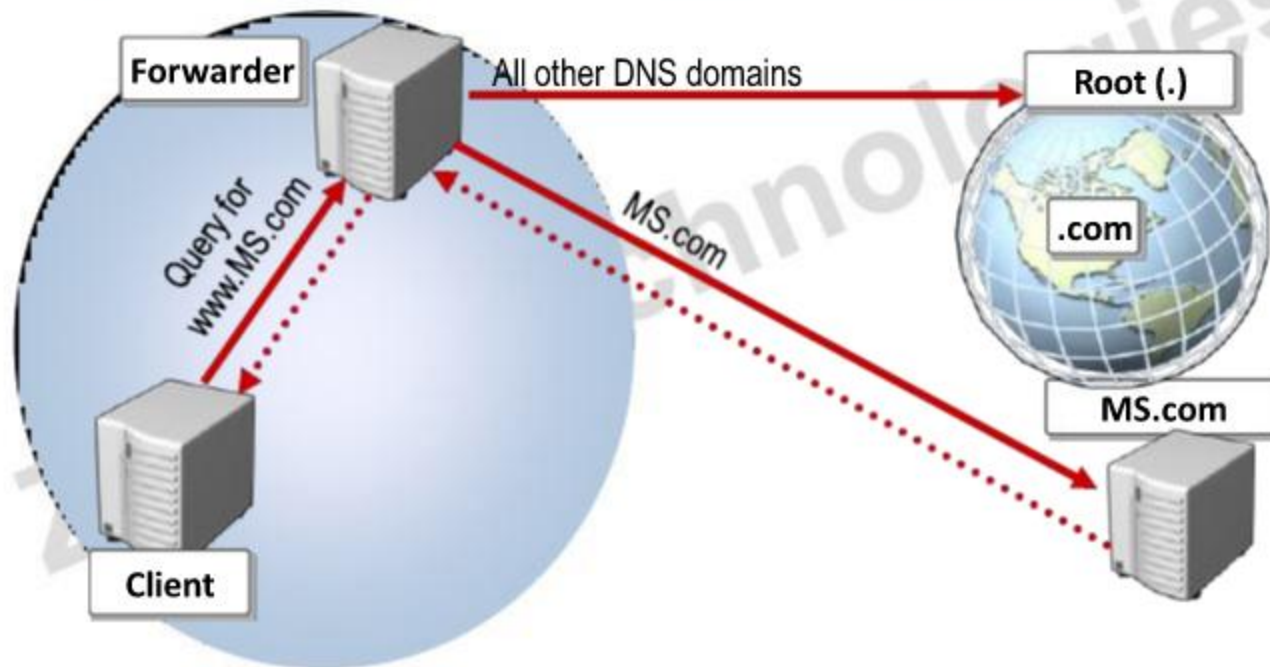
- **Standard Primary**
 - It is the Master Copy of all Zone Information. It is Read/Write copy
- **Standard Secondary**
 - It is Backup to Primary zone. It is Read Only
- **Stub Zone**
 - It contains only NS ,SOA & possibly Glue (A) Records which are used to locate name servers
- **Active Directory Integrated**
 - It stores the information of Zone in ACTIVE DIRECTORY DATABASE

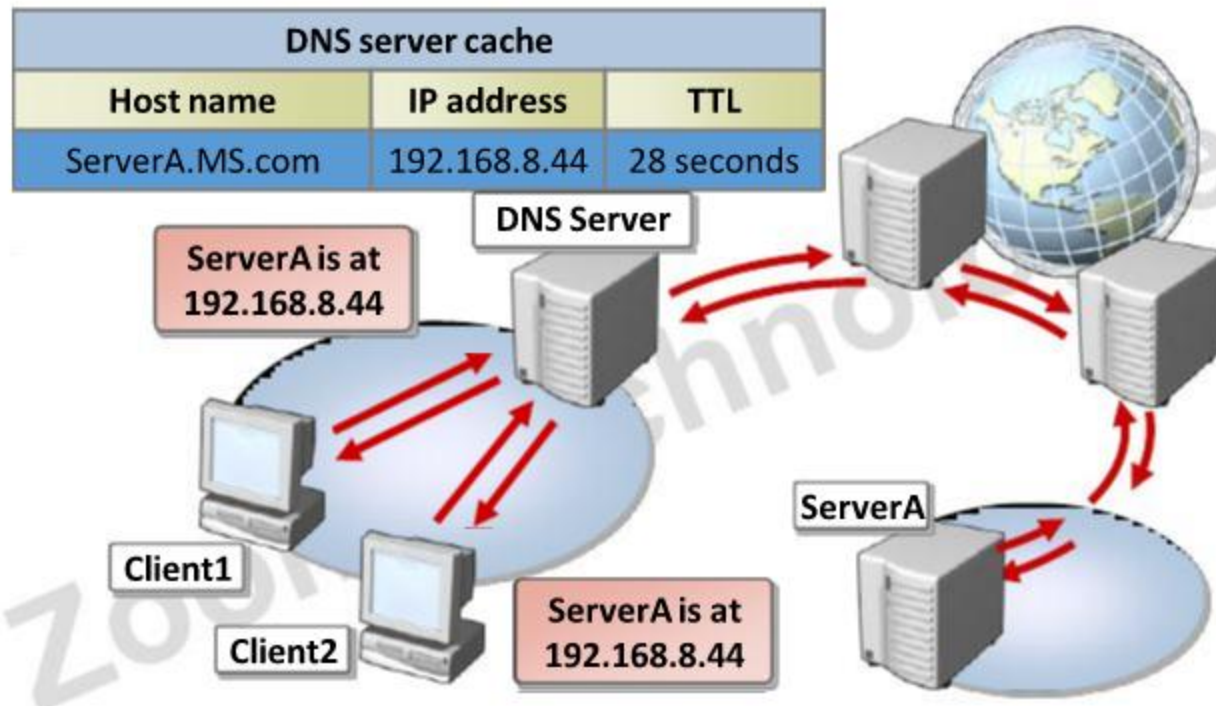
- SRV records allow DNS clients to locate TCP/IP-based Services.
- SRV records are used when:
 - A domain controller needs to replicate
 - A client searches Active Directory
 - A user attempts to change her password
 - An administrator modifies Active Directory

A forwarder is a DNS server designated to resolve external DNS domain names



Conditional forwarding forwards requests using a domain name condition





- IIS is a service which is used to host the information over internet.
- It provides integrated, reliable, scalable and manageable Web server capabilities over an intranet / internet.

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- IIS 2.0 in Windows NT 4.0 Operating System
- IIS 5.0 in Windows 2000 Operating System
- IIS 6.0 in Windows 2003 Operating System
- IIS 7.0 in Windows 2008 Operating System
- IIS 8.0 in Windows 2012 Operating System

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Features Of IIS 8.0

- Supports IPv6
- Backup & Restoration of website configuration is automatic.
- Isolation of Users
- Support for Application Developers & Programmers

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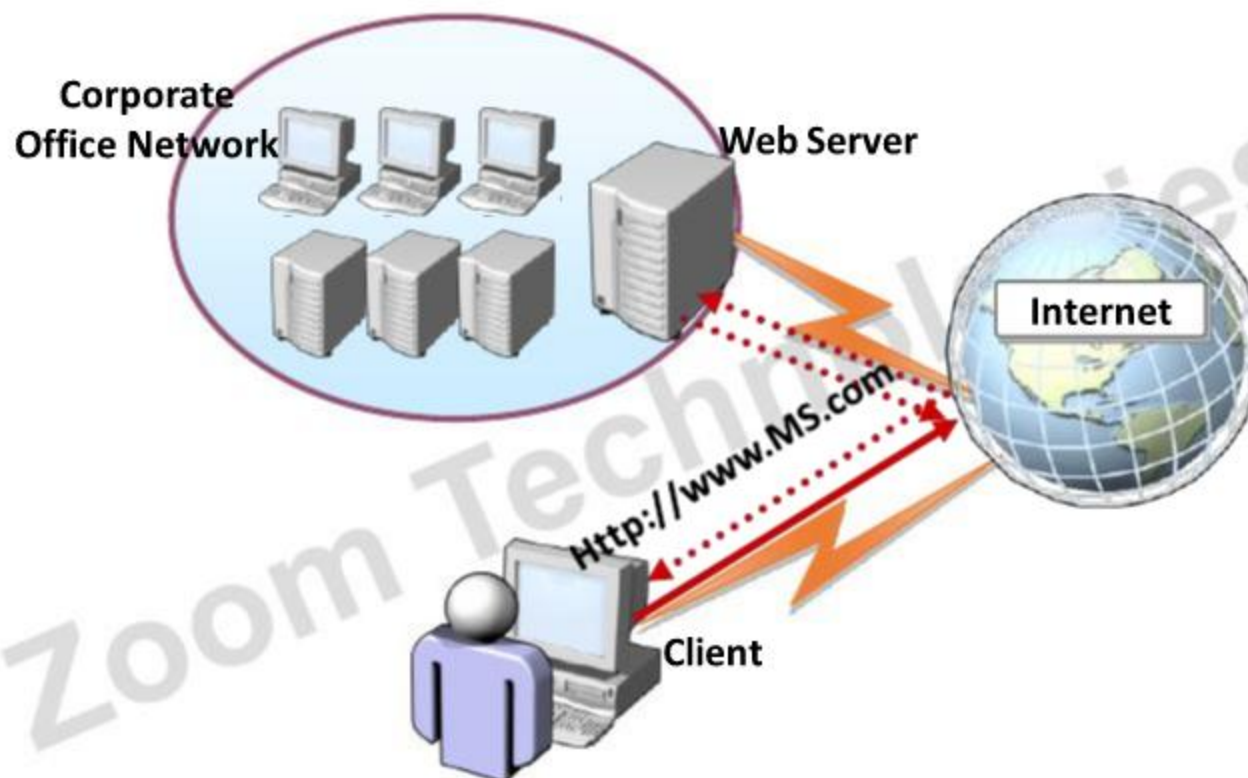
IIS 7.0 Services

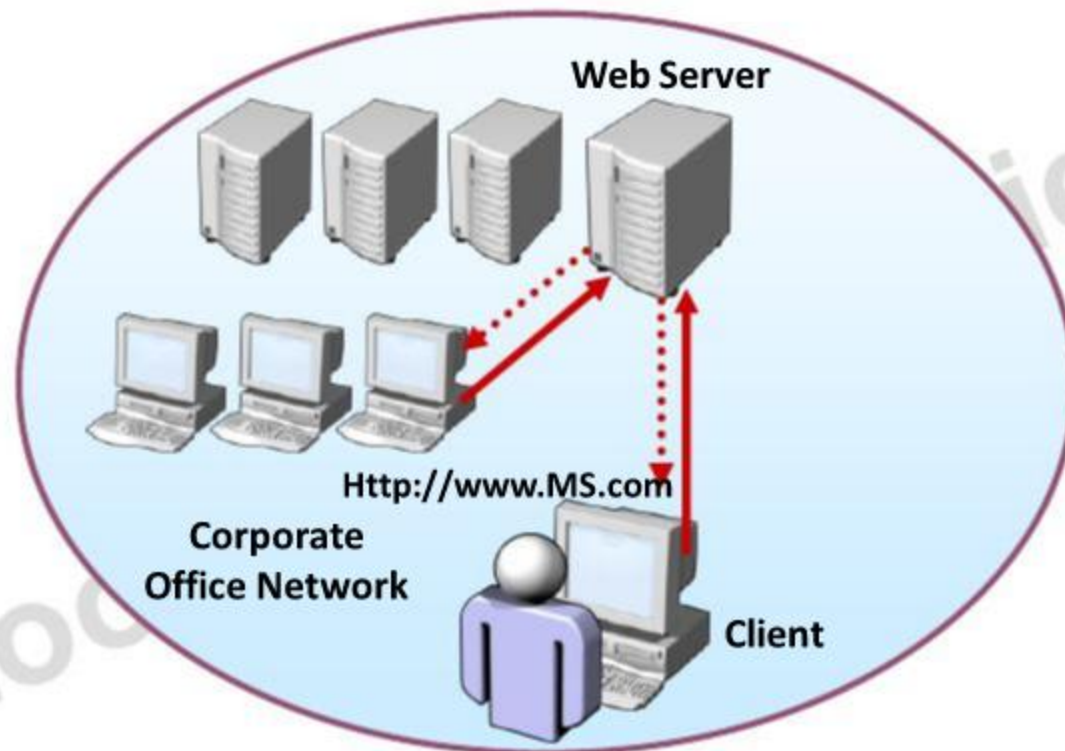
- World Wide Web (WWW) publishing service (HTTP)
- File Transfer Protocol (FTP) service

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World Wide Web (WWW) publishing service (HTTP)

- Http service is used to publish data to World Wide Web quickly & easily.
- This protocol is easily configurable and it supports security and encryption to protect sensitive data.
- Default Port No is 80





Requirements to Host WEB SERVER

- Static IP Address (Public IP if published over Internet)
- Domain name (Registered Domain name if Published over Internet)
- Name Resolution Service like DNS
- Home Directory
 - Required for each Web site
 - Central location of published pages

- Virtual Directories are sub directories of the root of the web site.
- By using Virtual directories we can create alias or pointer to a directory somewhere else in the same system or another system on the network.

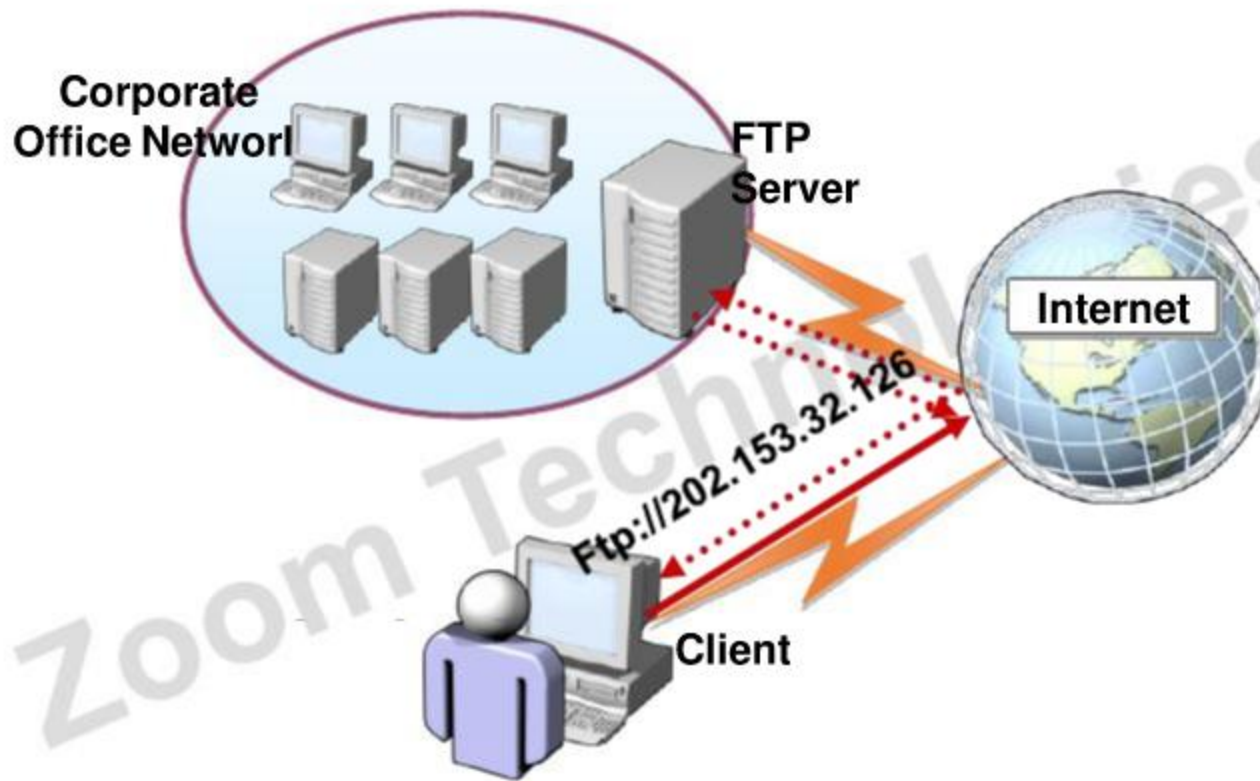
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File Transfer Protocol (FTP) service

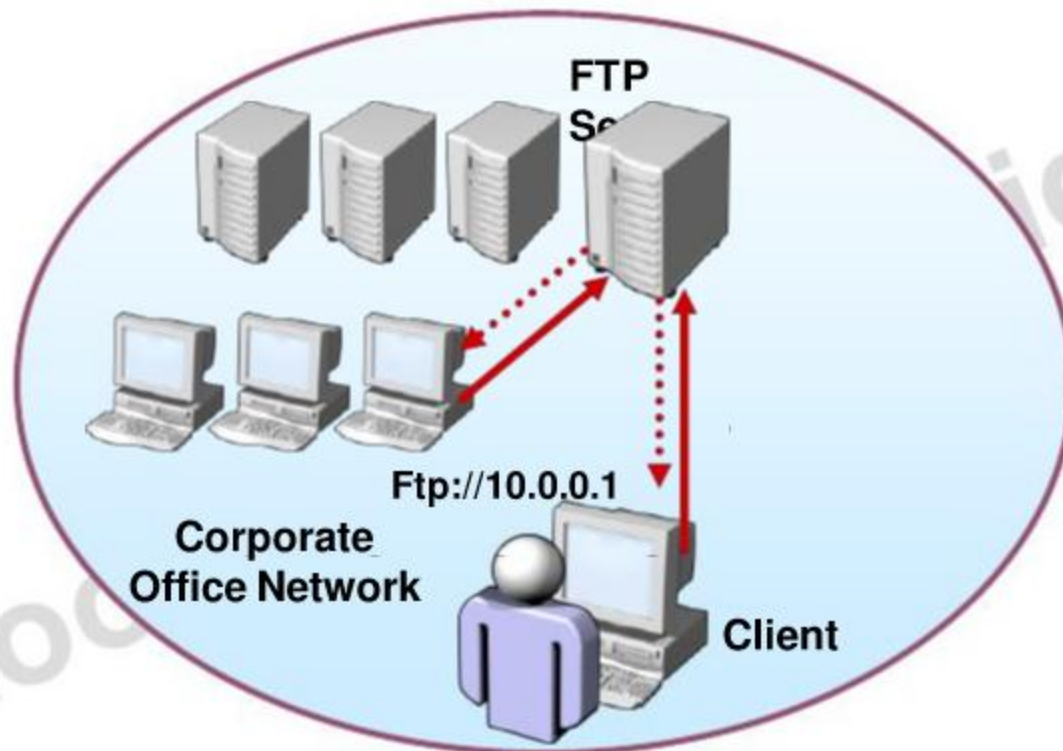
- It is a protocol used to download and upload the files over the internet.
- Default Port No is 21

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Internet FTP Server



Intranet FTP Server



- Static IP Address (Public IP if published over Internet)
- Home Directory
 - Required for each FTP site
 - Central location of published pages

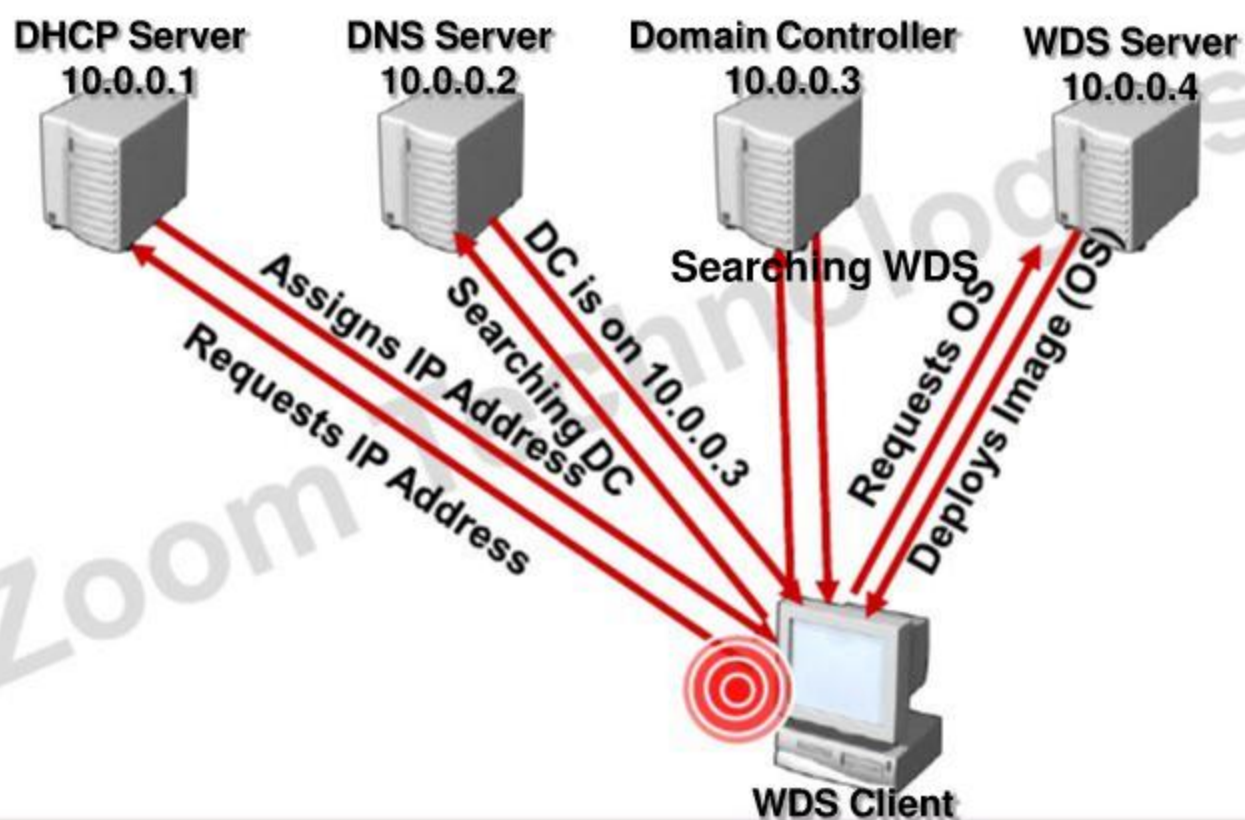
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- DHCP Server
- DNS Server
- Active Directory – Domain Services
- An NTFS Partition to Store Images

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How WDS Works?

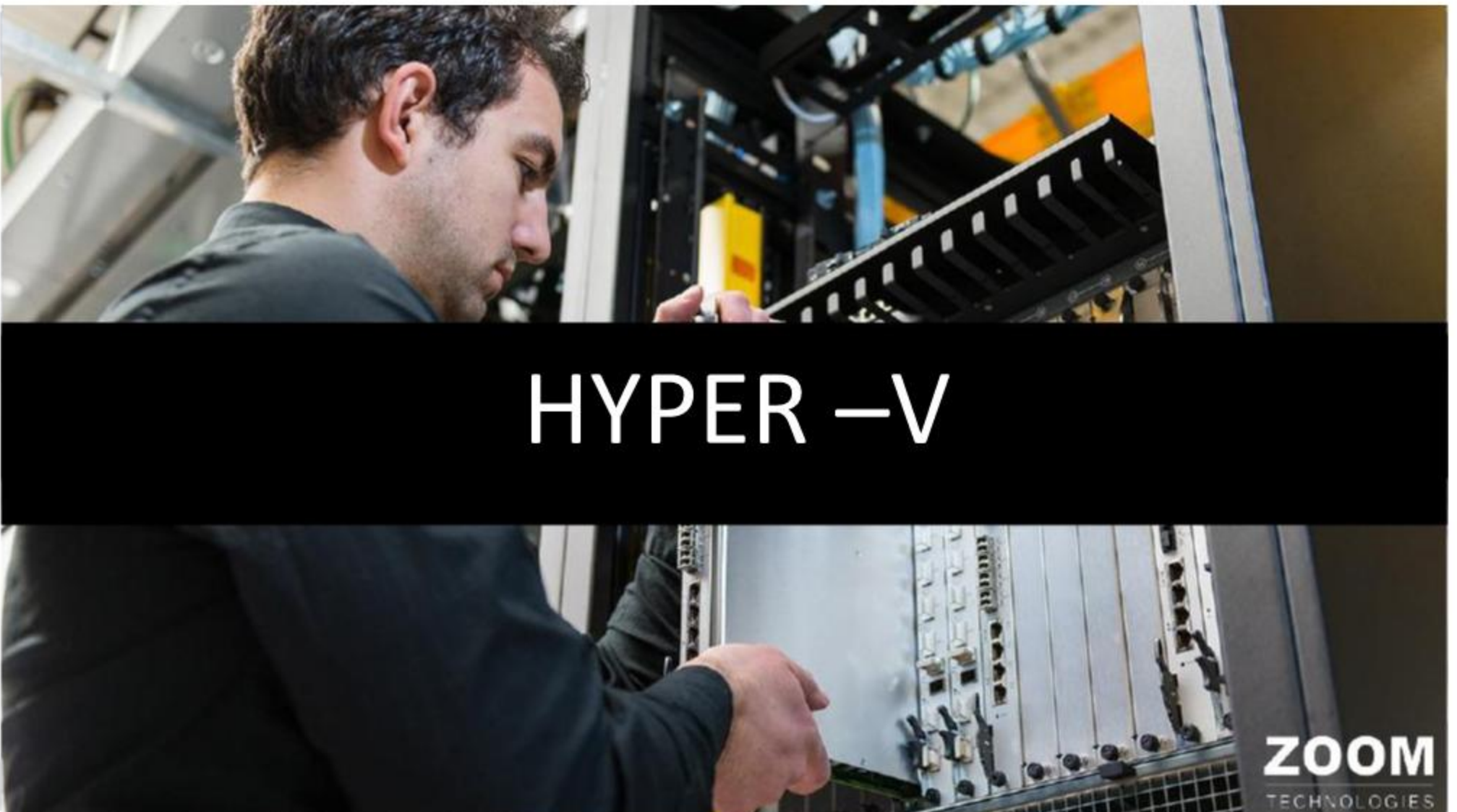


- **Known Clients**
 - A Known Client Computer is one whose computer account has been pre-created (Pre-Staged) in Active directory.
- **Un-Known Clients**
 - An un-known Client Computer is one whose computer account has not been pre-staged in Active directory.

- **Boot Image**
 - It is a WIM file you can use to boot a computer to begin the deployment of an O.S to the computer.
- **Install Image**
 - It is a image of Windows Vista or Windows server 2008 O.S itself that you want to deploy onto the client computer.

- **Capture Image**
 - It is a special boot image that you use to boot a master computer and upload an image to a WDS server.
- **Discover Image**
 - It is a boot image that you use to deploy an install image onto a computer that is not PXE enabled.

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- Hyper-V is the hardware virtualization role that is available in Windows Server 2012.
- Hardware virtualization provides virtual machines with direct access to the virtualization server's hardware.
- This is in contrast to software virtualization products such as Microsoft Virtual Server 2005 R2, that use the virtualization server's operating system to provide indirect access to the server's hardware.

- Also called as bare metal virtualization.
- Hypervisor is directly installed on hardware.
- Robust
- Used in production environment.

Company Name	Hypervisor Name
Microsoft	Hyper-V
Vmware	Esxi
Citrix	Xen Server

- Hosted virtualization.
- Slow
- Testing and lab.

Company Name	Hypervisor Name
Microsoft	Virtual Server
VM Ware	Workstation
Oracle	Oracle Virtual Box

- The server must have an x64 platform that supports hardware assisted virtualization and Data Execution Prevention.
- The server must have enough CPU capacity to meet the requirements of the guest virtual machines.
 - A virtual machine hosted on Hyper-V in Windows Server 2012 can support up to 64 virtual processor

- The server must have enough memory to support all of the virtual machines that must run concurrently, plus enough memory to run the host Windows Server 2012 operating system.
 - The server must have at least 4 GB of RAM.
 - A virtual machine hosted on Hyper-V in Windows Server 2012 can support a maximum of 1 terabytes (TB) of RAM

- The storage subsystem performance must meet the input/output (I/O) needs of the guest virtual machines. Whether deployed locally or on storage area networks (SANs), you may have to place different virtual machines on separate physical disks, or you may have to deploy a high performance redundant array of independent disks (RAID), solid-state drives (SSD), hybrid-SSD, or a combination of all

- The virtualization server's network adapters must be able to support the network throughput needs of the guest virtual machines. You can improve network performance by installing multiple network adapters and using multiple Network Interface Cards (NICs).

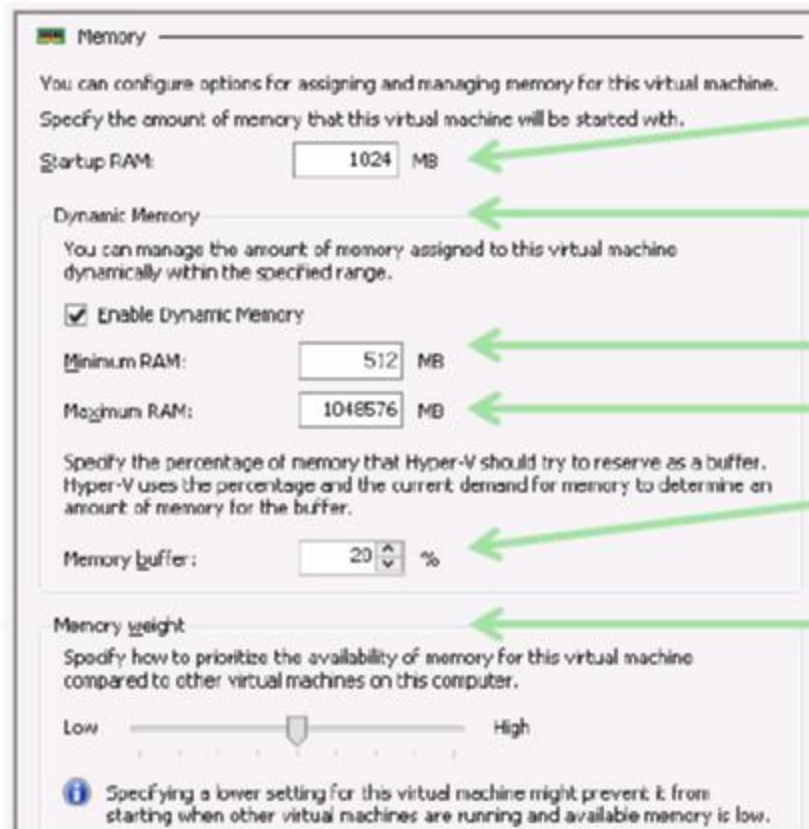
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Virtual machines have the following simulated hardware by default:

- BIOS
- Memory
- Processor
- IDE Controller 0 and 1
- SCSI Controller
- Synthetic Network Adapter
- COM 1 and 2
- Diskette Drive

You can add the following hardware to a virtual machine:

- SCSI Controller (up to 4)
- Network Adapter
- Legacy Network Adapter
- Fibre Channel adapter
- RemoteFX 3D video adapter



Startup RAM
 Dynamic Memory
 Minimum RAM
 Maximum RAM
 Memory buffer
 Memory weight

- A virtual hard disk is a file that represents a traditional hard disk drive
- VHDX format has the following benefits over the VHD format:
 - The disks can be larger (64 TB versus 2 TB)
 - The disk is less likely to become corrupted
 - The format supports better alignment when deployed to a large sector disk
 - The format supports larger block size for dynamic and differencing disks

- Dynamically expanding VHDs
- Fixed-size VHDs
- Direct-attached storage

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- Hyper-V allows virtual machines to access storage mapped directly to the Hyper-V server without requiring the volume be configured.
- The storage can either be a physical disk internal to the Hyper-V server or it can be a Storage Area Network (SAN) Logical Unit (LUN) mapped to the Hyper-V server.
- To ensure the Guest has exclusive access to the storage, it must be placed in an Offline state from the Hyper-V server perspective.

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- Differencing disks reduce space used by storage at the cost of performance
- You can link multiple differencing disks to a single parent disk
- You cannot modify parent disk
- You can use Inspect Disk tool to reconnect a differencing disk to a missing parent

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- **External**
Used to map a network to a specific network adapter or network adapter team
- **Internal**
Used to communicate between the virtual machines on the host and between the virtual machines and the host itself
- **Private**
Used to communicate between virtual machines, but not between the virtual machines and the host itself

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Definition



ROUTER

It is a device used to communicate between two different networks.

ROUTING

It is a process of sending the data packets through the best path to reach the destination.

DEFAULT GATEWAY

It gives the exit point (or) entry point to reach the destination.

Static Routing

Routes should be added manually on the router by the administrator.

Dynamic Routing

Routes will be added automatically by the router with the help of routing protocols

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Software Router

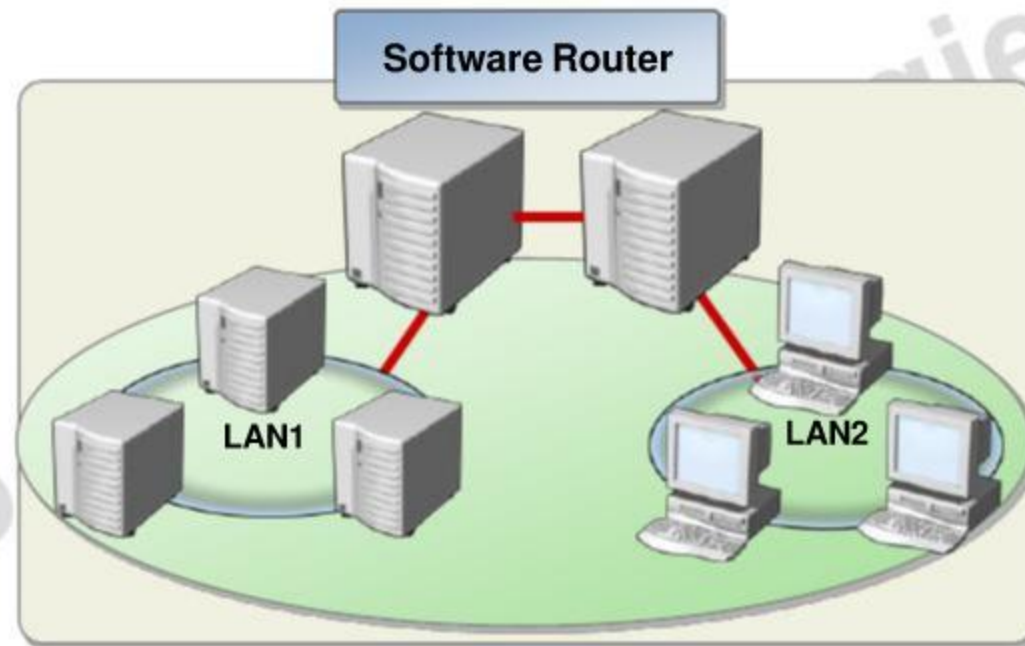
It is a computer which performs routing task as one of its multiple tasks.

Hardware Router

It is a Dedicated HARDWARE DEVICE which works only as a router.

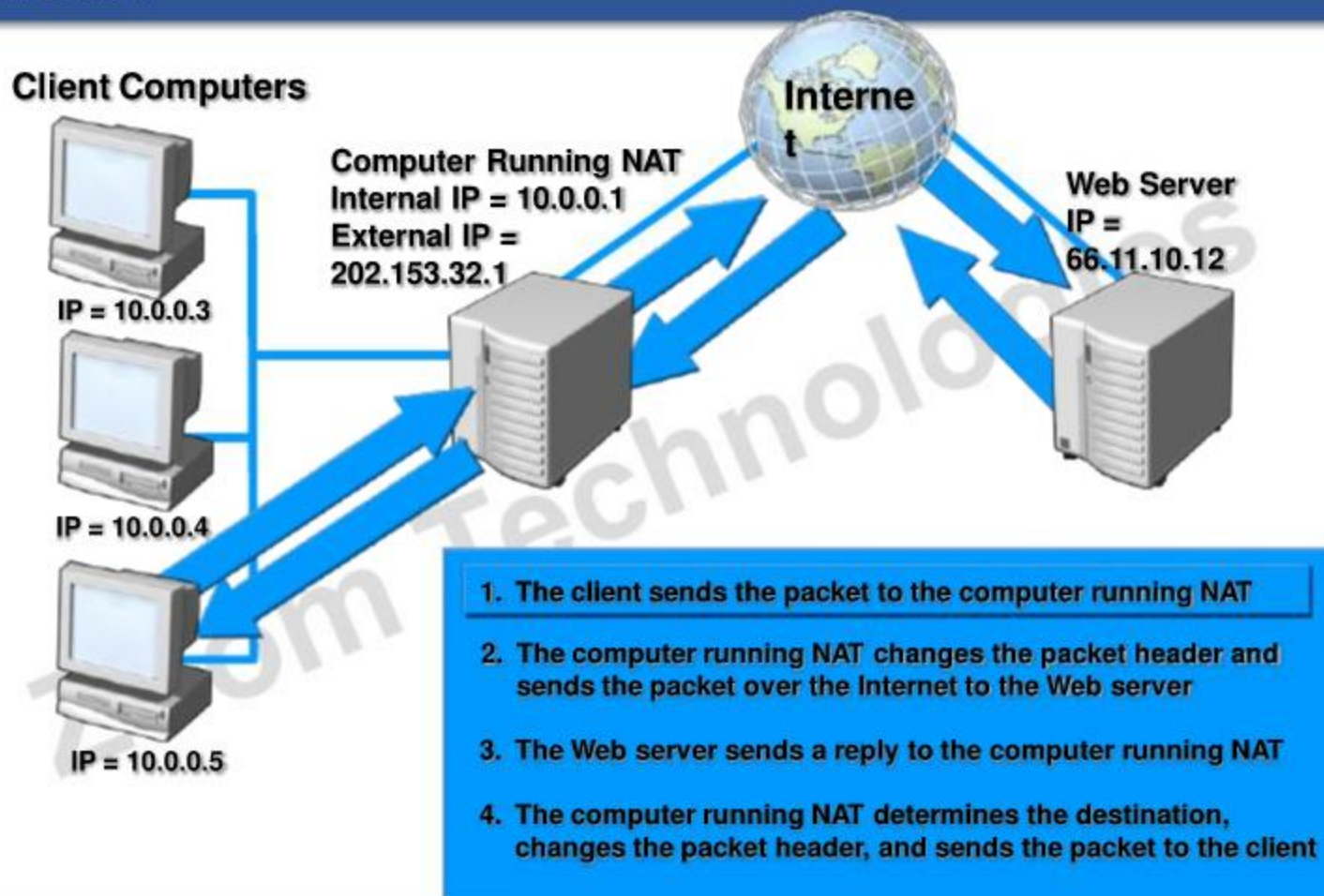
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- Routing and Remote Access is a service that performs routing as one of its multiple processes.



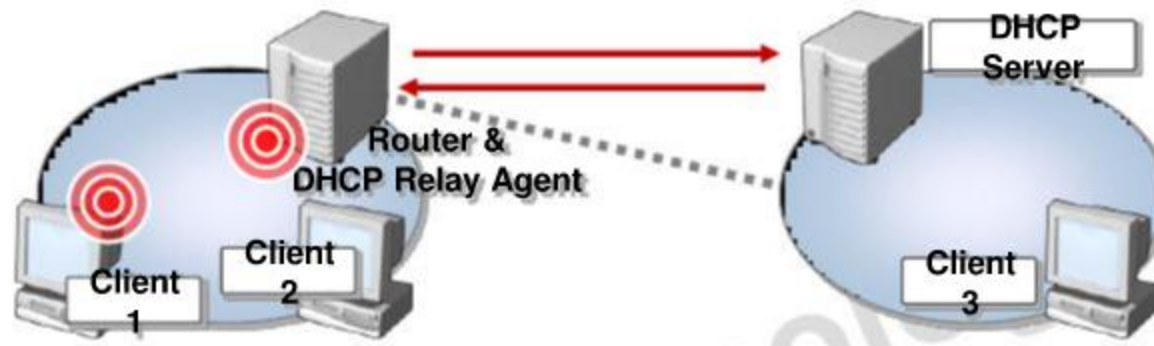
NETWORK ADDRESS TRANSLATION

- Provides access to Internet from a protected private address range
- Translates Private IP's to Public IP's & vice-versa for outgoing and incoming traffic
- Hides private IP address range from the Internet
- Can be used with DHCP or can be configured to assign IP to Client

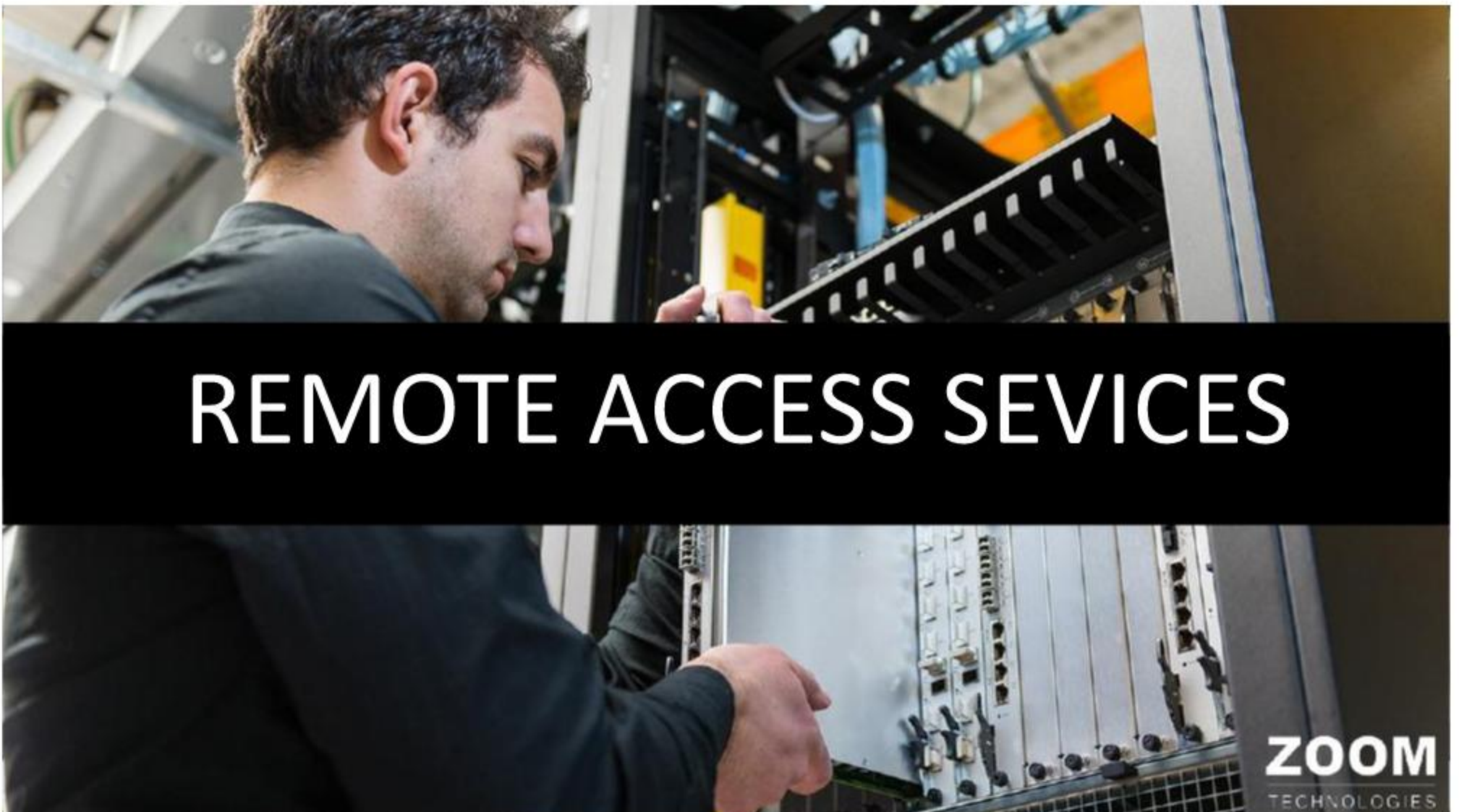


- A DHCP Relay agent is a computer or router that listens for DHCP Broadcasts from DHCP clients and then relays(sends) those messages to DHCP Servers on the another network.

How a DHCP Relay Agent Works?

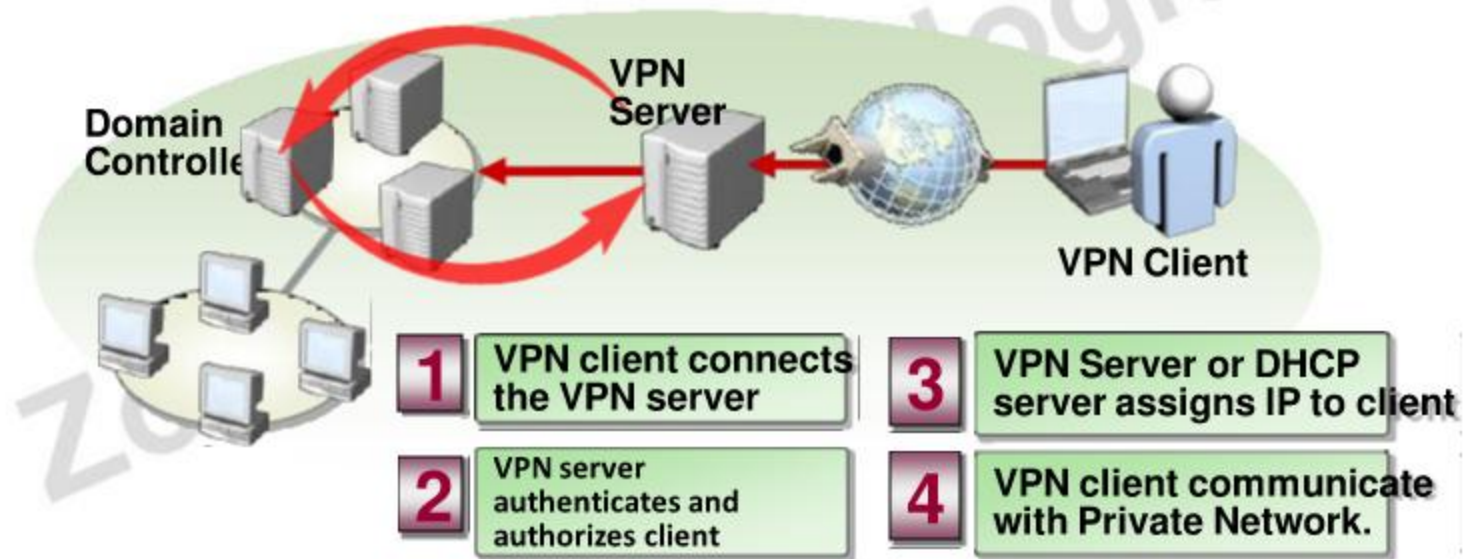


- 1 Client1 broadcasts a DHCPDISCOVER packet
- 2 Relay agent forwards the DHCPDISCOVER message to the DHCP server
- 3 Server sends a DHCPOFFER message to the DHCP relay agent
- 4 Relay agent broadcasts the DHCPOFFER packet
- 5 Client1 broadcasts a DHCPREQUEST packet
- 6 Relay agent forwards the DHCPREQUEST message to the DHCP server
- 7 Server sends a DHCPACK message to the DHCP relay agent
- 8 Relay agent broadcasts the DHCPACK packet

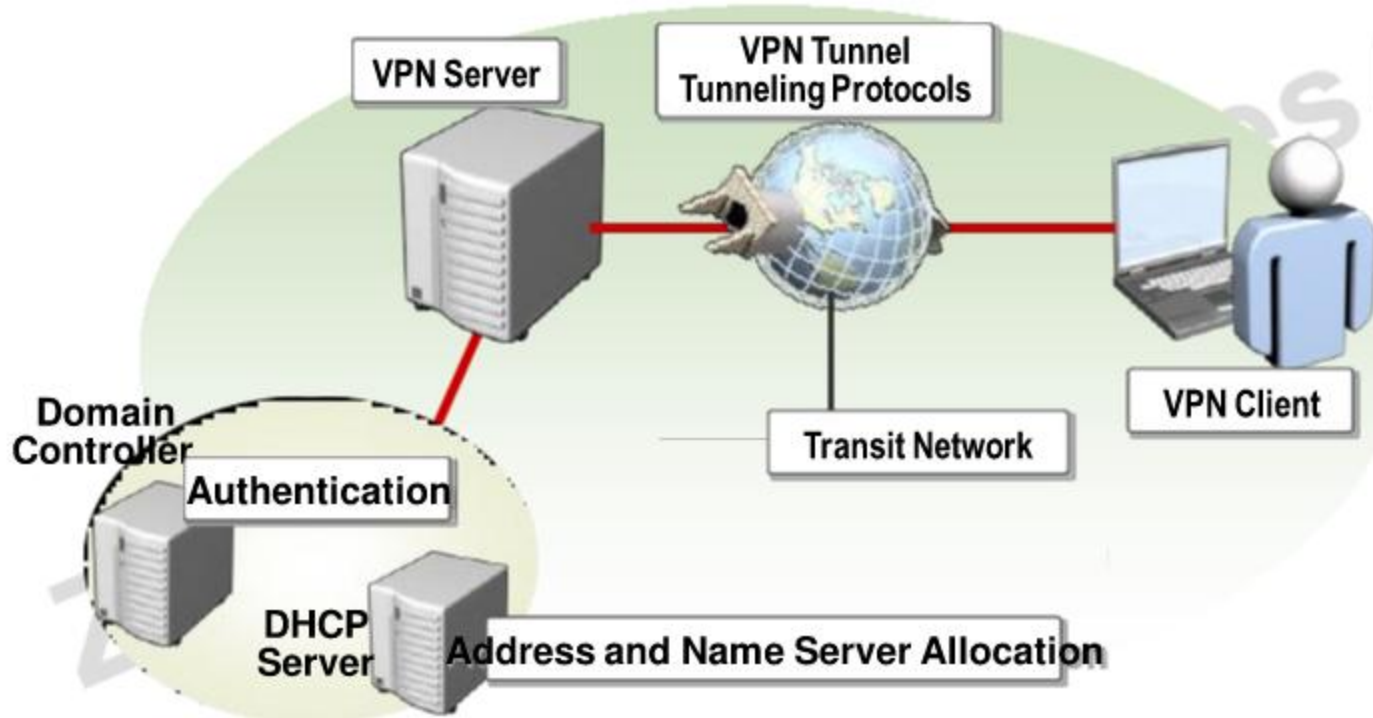


How a VPN Connection Works

- A VPN extends a private network across shared or public networks such as the Internet.



Components of a VPN Connection



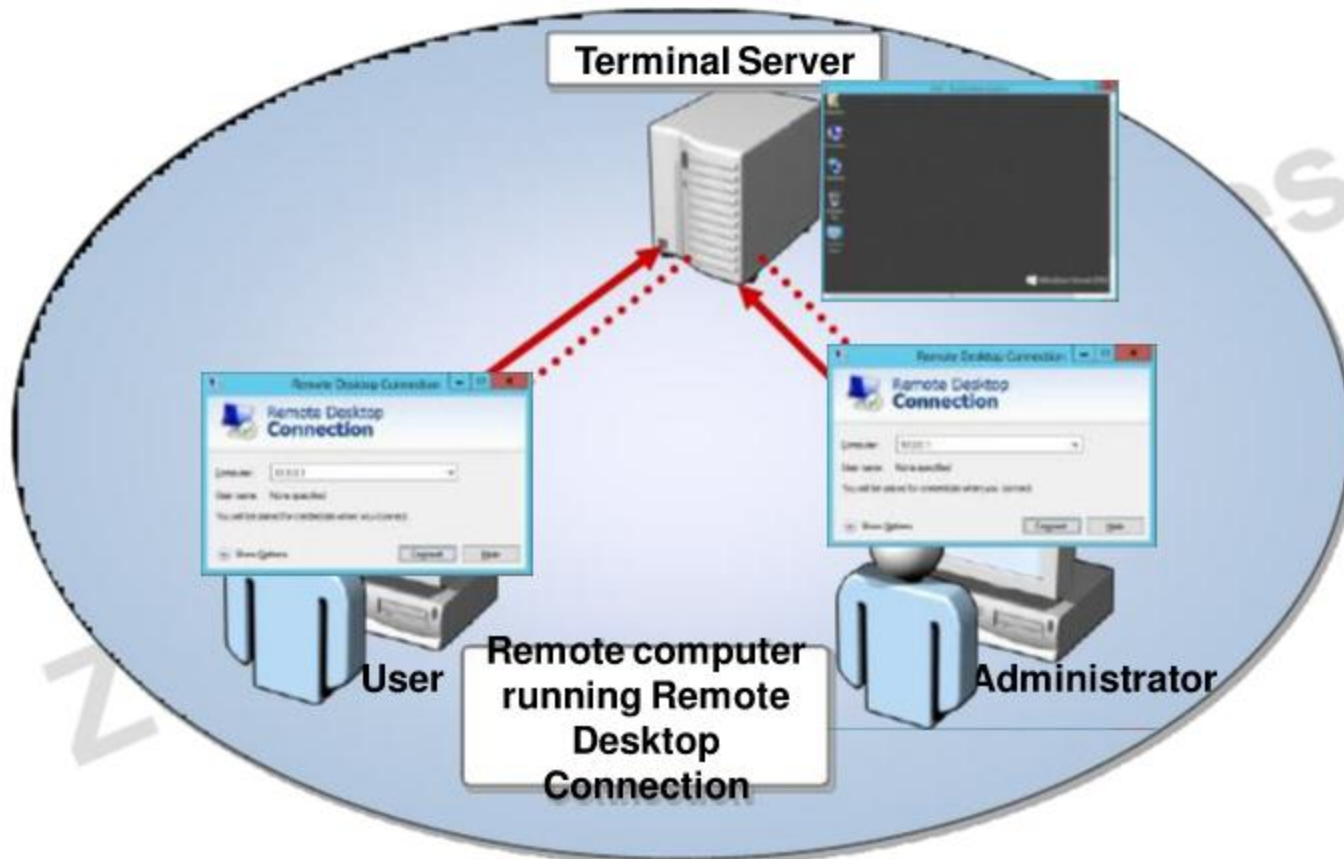


REMOTE DESKTOP SERVICES

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What is Remote Desktop Service?

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CLOUD
EXCHANGE
M C S E

- **Remote Administration Mode**
 - Specially designed for remote management of server.
 - Only two connections are Supported.
 - License is not required.

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- **Disconnect Session**
 - If the Session is disconnected all the programs will continue to run in the background & the user can reconnect to same session
- **Logoff Session**
 - If the Session is logged off then all programs will be closed and next time new session will be established.

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HTTPS



Hypertext Transfer Protocol over Secure Socket Layer (SSL)

- HTTPS encrypts and decrypts the information between the client browser and the web server using a secure Socket Layer (SSL).
- SSL transactions are encrypted between the client and the server, this is usually 40 or 128 bit encryption (the higher the number of bits the more secure the transaction).

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- SSL Certificate is issued by a trusted source, known as the Certification Authority (CA).
- CAs verifies the existence of your business, the ownership of your domain name, and your authority to apply for the certificate.

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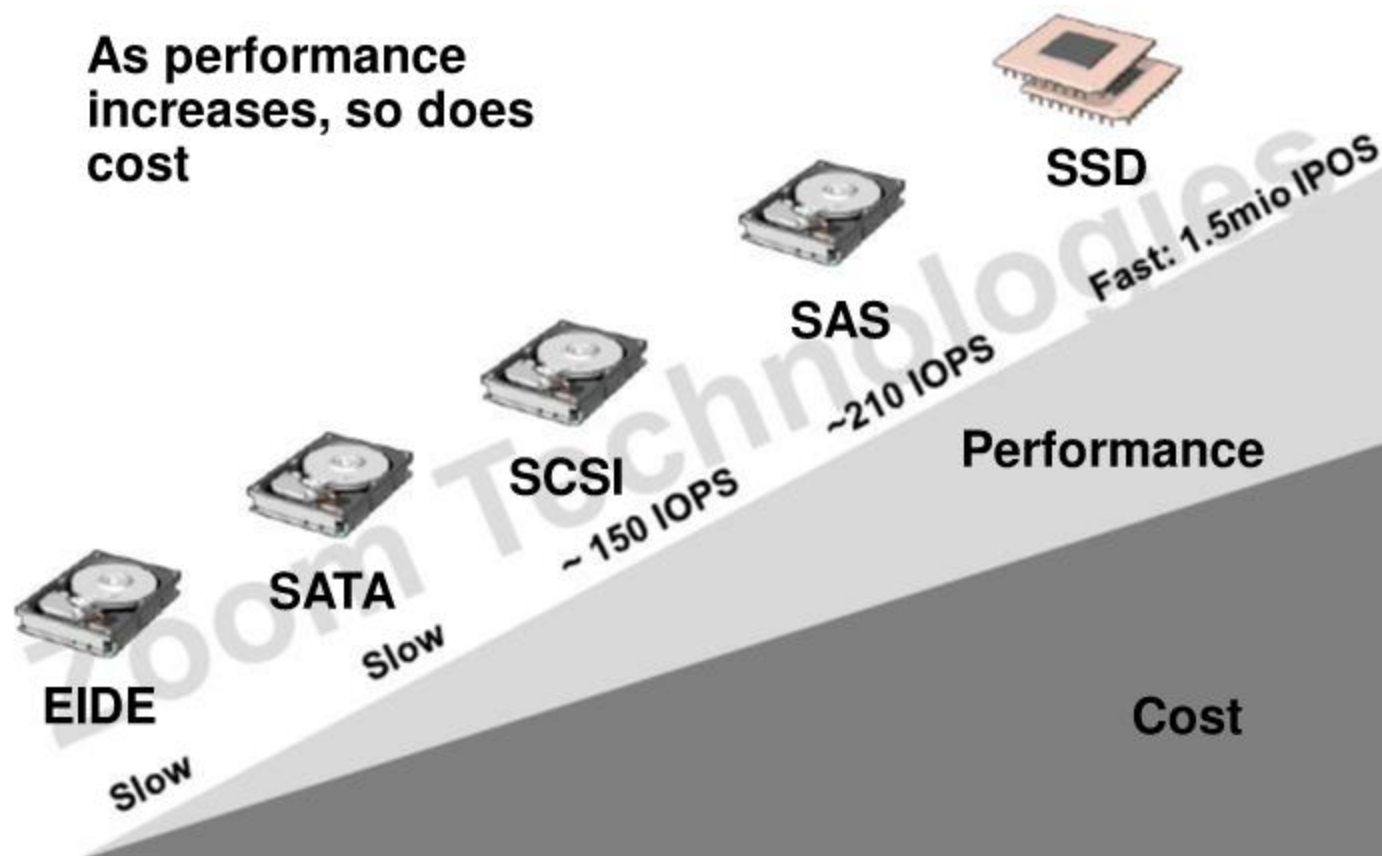
- An SSL Certificate enables encryption of sensitive information during online transactions.
- Each SSL Certificate contains unique, authenticated information about the certificate owner.
- A Certification Authority verifies the identity of the Certification owner when it is issued.

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- You have an online store or accept online orders and credit cards
- You offer a login or sign-in on your site
- You process sensitive data such as address, date of birth, license etc
- You value privacy and expect others to trust you

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- **Built-in Disk Management Tools in Windows**

Windows Server 2012

- Storage pools.
- Disk Management.

MBR

- Standard Partition table format since early 1980s
- Supports a maximum of 4 primary partitions per drive
- Can partition a disk up to 2 TB

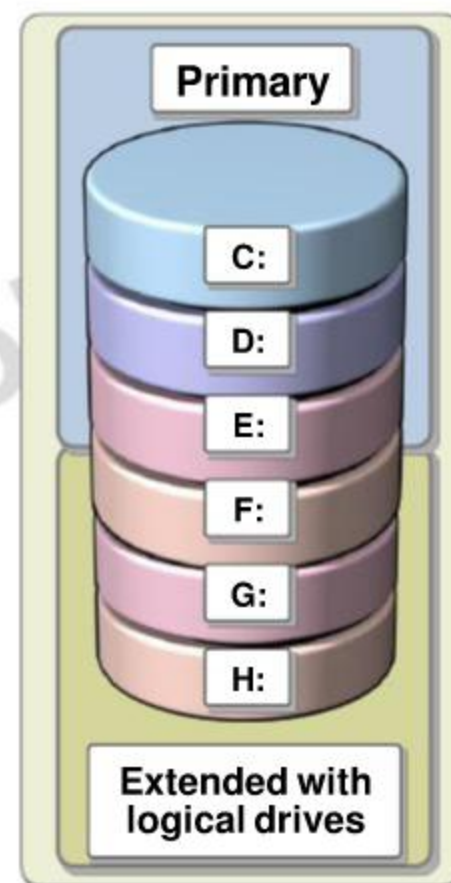
GPT

- GPT is the successor of MBR partition table format
- Supports a maximum of 128 partitions per drive
- Can partition a disk up to 18 EB

- ✓ Use MBR for disks smaller than 2 TB
- ✓ Use GPT for disks larger than 2 TB

What is a Partition?

- A physical disk is sectioned into separate partitions
- A physical disk can have up to three primary partitions and one extended partition
- Extended partitions are subdivided into logical drives



When selecting a file system, consider the differences between FAT, NTFS, and ReFS

FAT provides:

- Basic file system
- Partition size limitations
- FAT32 to enable larger disks
- exFAT developed for flash drives

NTFS provides:

- Metadata
- Auditing and journaling
- Security (ACLs and encryption)

ReFS provides:

- Backward compatibility support for NTFS
- Enhanced data verification and error correction
- Support for larger files, directories, volumes, etc.

DAS disks are physically attached to the server

Advantages:

- Easy to configure
- Inexpensive solution

Disadvantages:

- Isolated because it attaches only to a single server
- Slower



Server with attached disks

What Is Network Attached Storage?

NAS is storage that is attached to a dedicated storage device and accessed through network shares

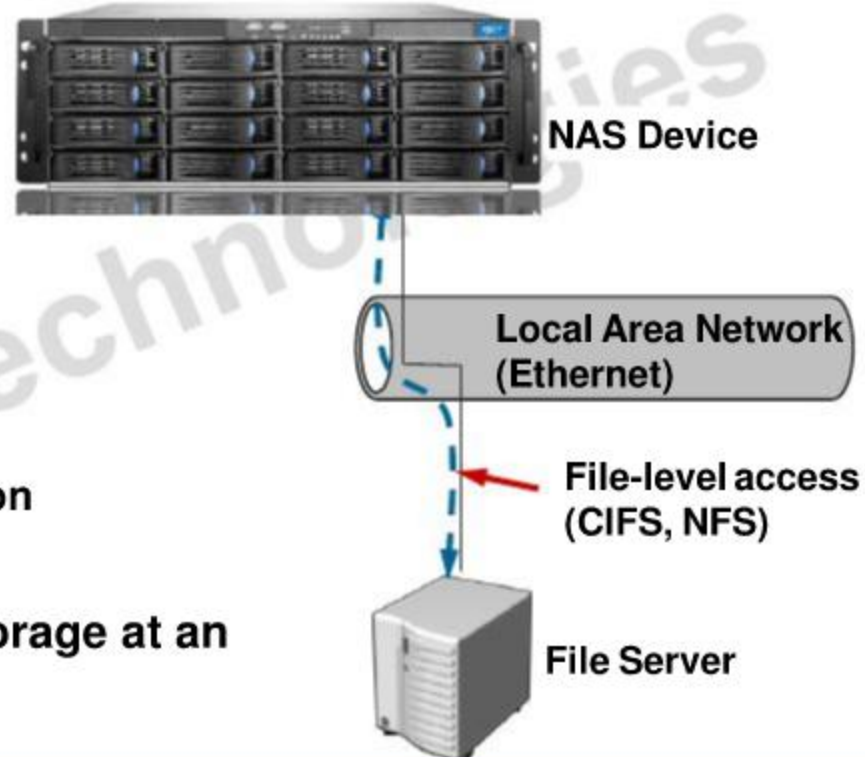
Advantages:

- Relatively inexpensive
- Easy to configure

Disadvantages:

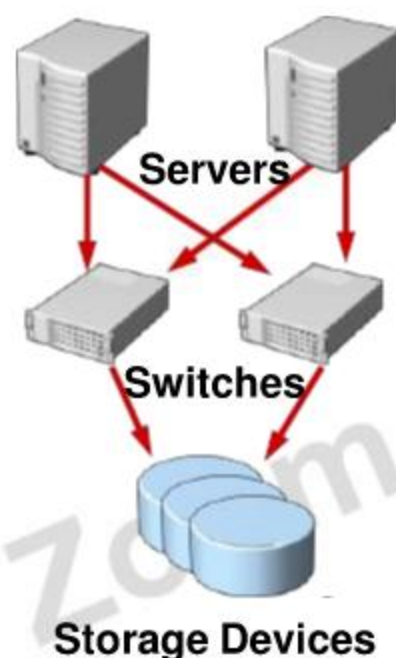
- Slower access times
- Not an enterprise solution

NAS offers centralized storage at an affordable price



What Is a SAN?

SANs offers higher availability with the most flexibility



Advantages:

- Fastest access times
- Easily expandable
- Centralized storage
- High level of redundancy

Disadvantages:

- More expensive
- Requires specialized skills

SANs can be implemented using Fibre Channel or iSCSI



What is iSCSI storage ?



- iSCSI storage is an inexpensive and simple way to configure a connection to remote disks. Many application requirements dictate that remote storage connections must be redundant in nature for fault tolerance or high availability.

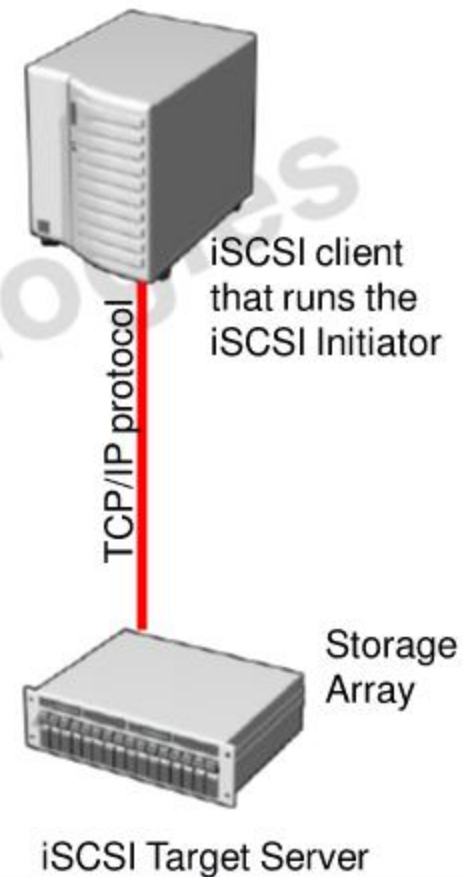
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What is iSCSI storage ?

- iSCSI transmits SCSI commands over IP networks

Component	Description
IP network	Provides high performance and redundancy
iSCSI targets	Run on the storage device and enable access to the disks
iSCSI initiators	A software component or host adapter on the server that provides access to iSCSI targets
IQN	A globally unique identifier used to address initiators and targets on an iSCSI network



iSCSI Target Server and iSCSI Initiator

The iSCSI target server	The iSCSI initiator
<p>Is available as a role service in Windows Server 2012</p> <p>Provides the following features:</p> <ul style="list-style-type: none"> - Network/diskless boot - Server application storage - Heterogeneous storage - Lab environments 	<p>Runs as a service in the operating system</p> <p>Is installed by default on Windows 8 and Windows Server 2012</p>

- RAID combines multiple disks into a single logical unit to provide fault tolerance and performance
- RAID provides fault tolerance by using:
 - Disk mirroring
 - Parity information
- RAID can provide performance benefits by spreading disk I/O across multiple disks
- RAID can be configured using several different levels
- RAID should not replace server backups

Use storage spaces to add physical disks of any type and size to a storage pool, and then create highly-available virtual disks from the storage pool

To create a virtual disk, you need the following:

- One or more physical disks
- Storage pool that includes the disks
- Virtual drives that are created with disks from the storage pool
- Disk drives that are based on virtual drives



Virtual drives are not virtual hard disks (VHDs); they should be considered a drive in Disk Manager

What Is Fault Tolerance?

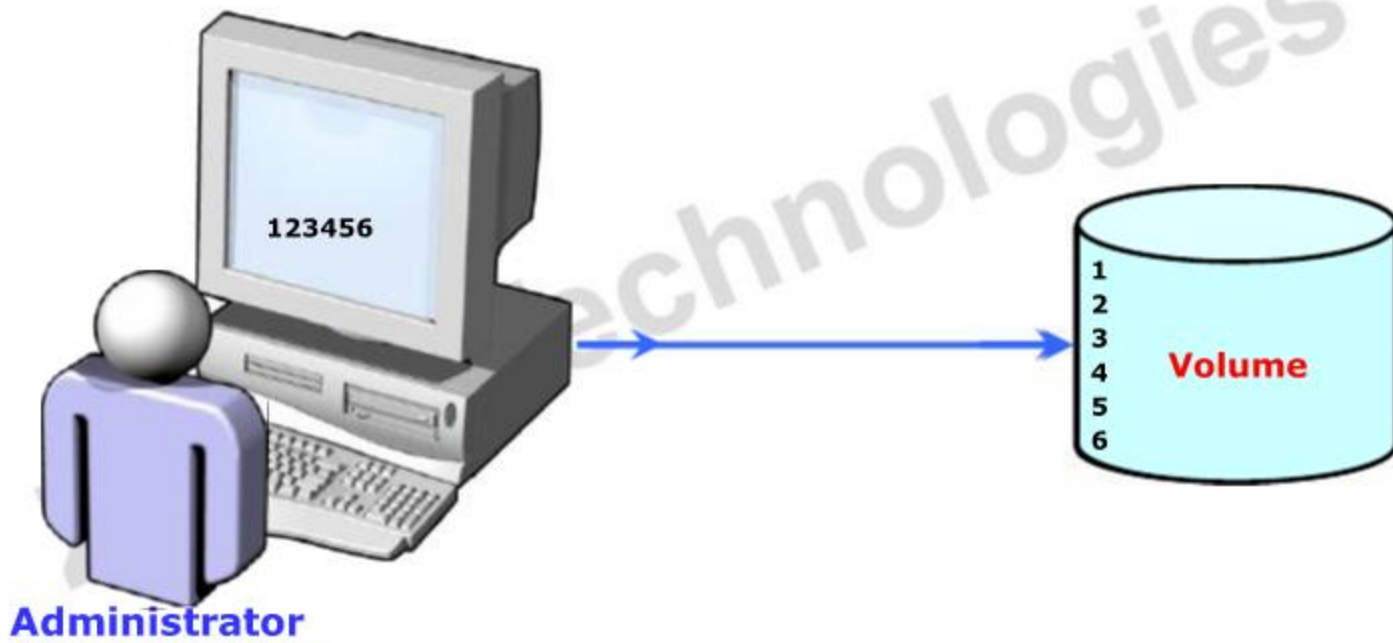
- The ability to survive hardware failure
- Fault-tolerant volumes provide data redundancy
- Fault-tolerant volumes are not a replacement for backup

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What Is a Simple Volume?

- Contains space on a single disk
- Can be extended if formatted with NTFS
- Spanning is not available
- Fault tolerance is not available
- Read & write speed is normal

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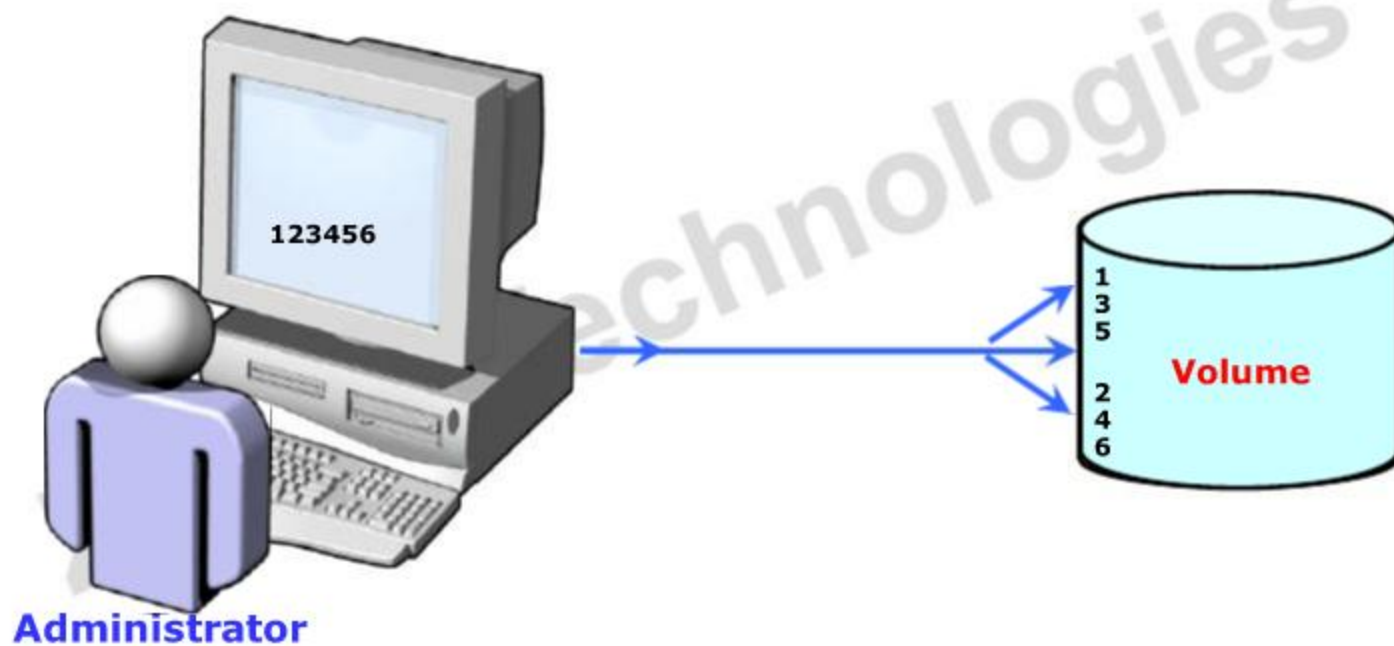
- Simple Volume (RAID-0)
- Mirrored Volume (RAID-1)
- RAID-5 Volume (Striped With Parity)

What Is a Simple Volume (RAID-0)?

- Minimum - 2 Hard Disks
- Data is written alternately and evenly to two or more disks
- Spanning is available
- Fault Tolerance is not available
- Read & Write Speed is Fast

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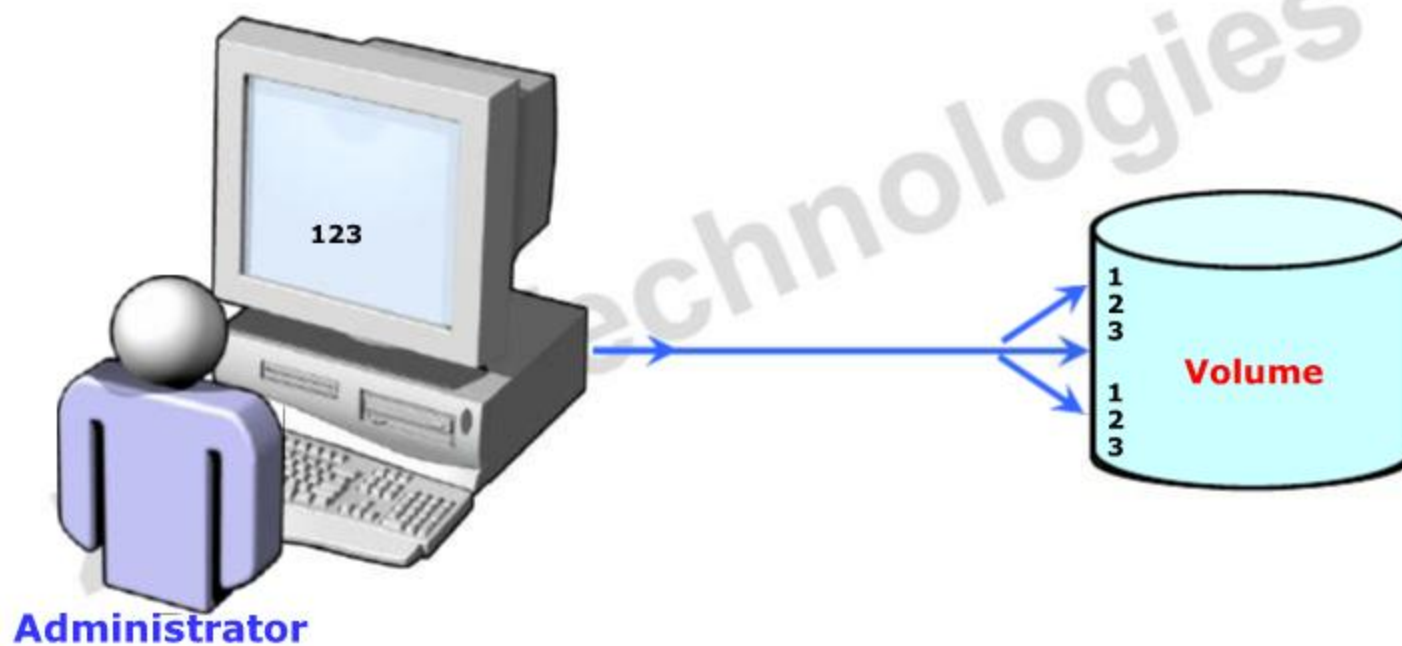
How RAID-0 works?



What Is a Mirrored Volume (RAID-1)?

- Minimum - 2 Hard Disks
- Simultaneously data will be written to two volumes on two different disks
- Any volume can be mirrored including the system and boot volumes
- Fault Tolerance is available
- Read Speed is Fast & Write Speed is Slow
- 50% overhead

How RAID-1 works?

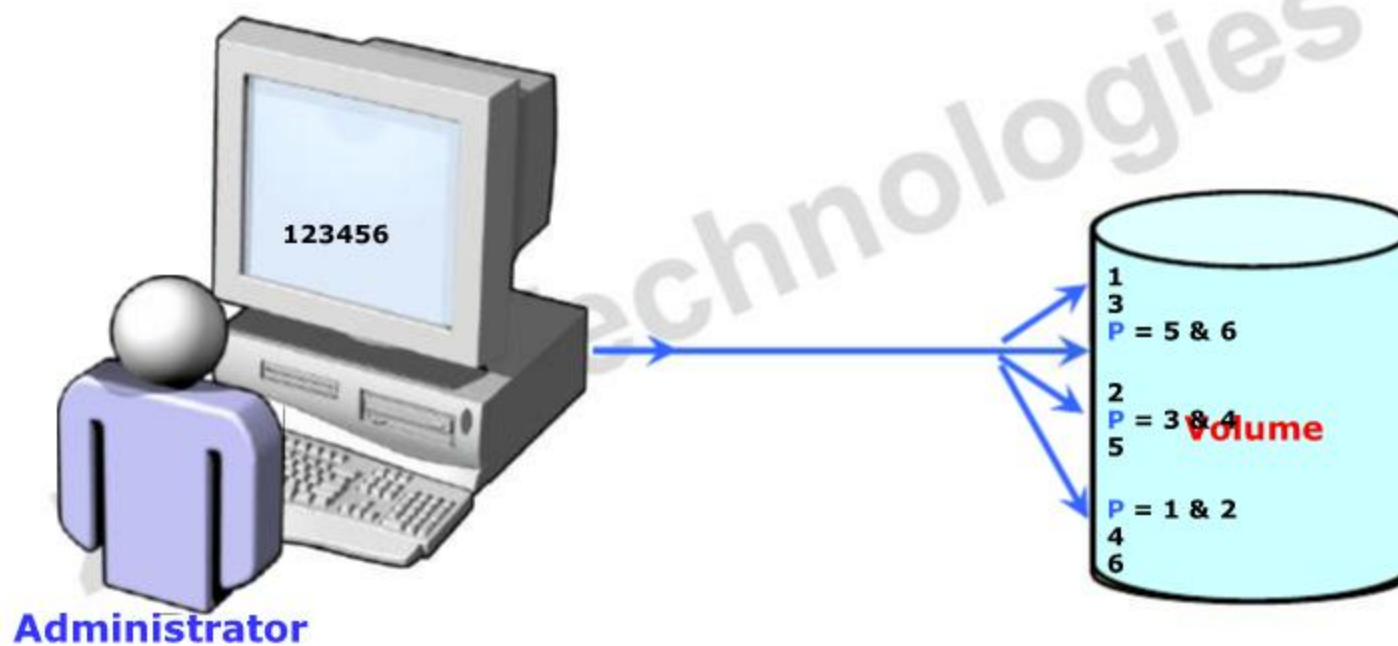


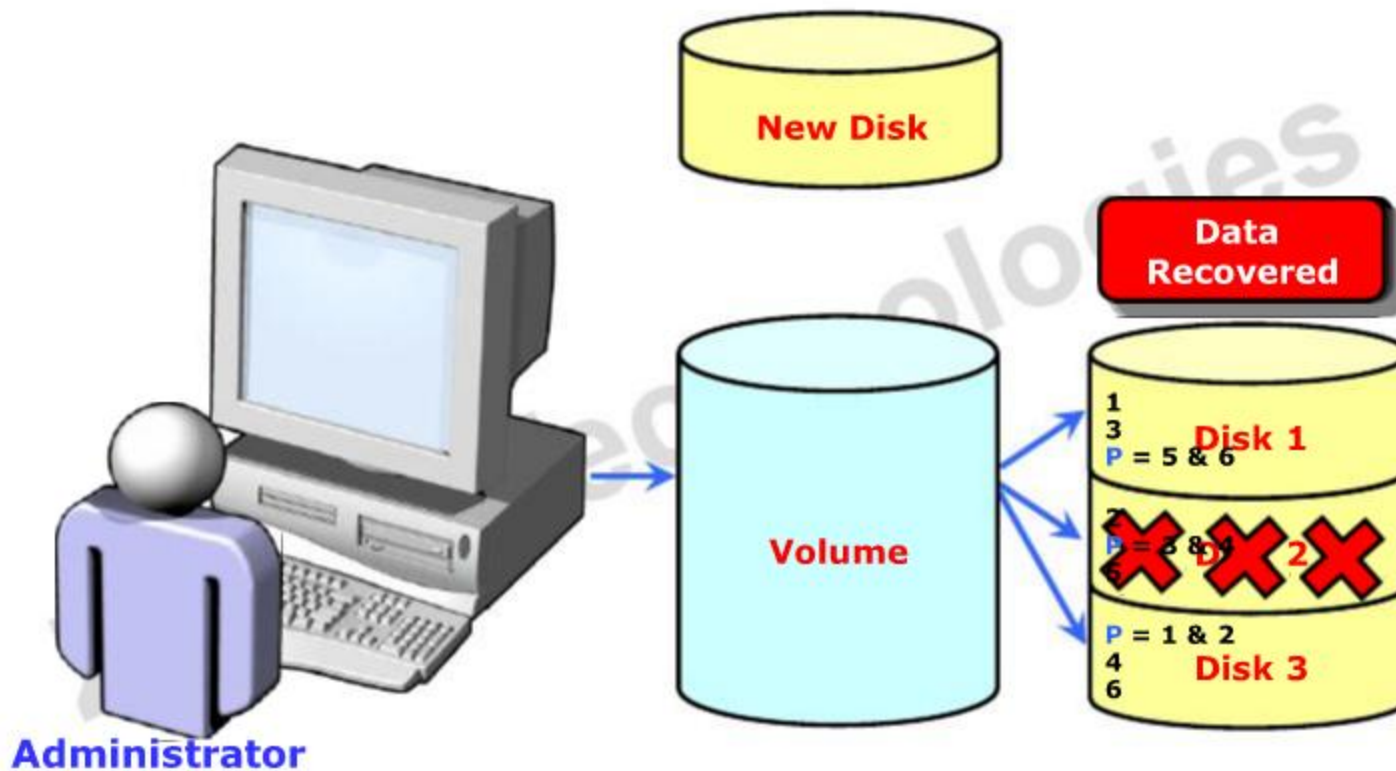
What Is a Parity (RAID-5) Volume?

- Minimum - 3 Hard Disks
- Data is written alternately and evenly to two or more disks and a parity is written on one disk
- Fault Tolerance is available
- Read & Write Speed is Fast,

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How RAID-5 works?





A mount point is a reference to a location on a disk that enables Windows operating system access to disk resources

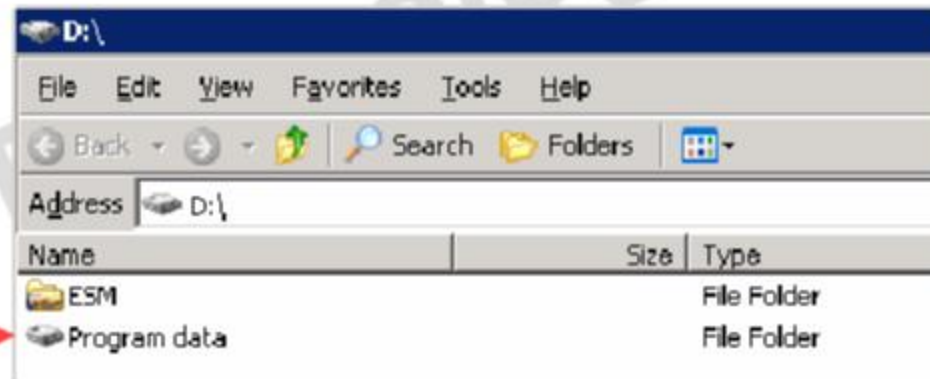
- **Use volume mount points:**
 - To mount volumes or disks as folders instead of using drive letters
 - When you do not have drive letters available for creating new volumes
 - To add disk space without changing the folder structure

A link file contains a reference to another file or directory

- **Link options:**
 - Symbolic file link (or, soft link)
 - Symbolic directory link (or, directory junctions)

What Is a Mounted Drive?

- Is assigned a path rather than a drive letter
- Allows you to add more drives without using up drive letters
- Adds volumes to systems without adding separate drive letters for each new volume

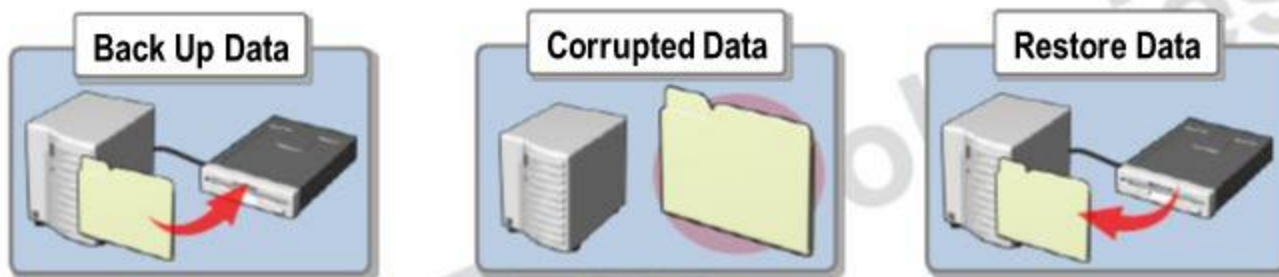


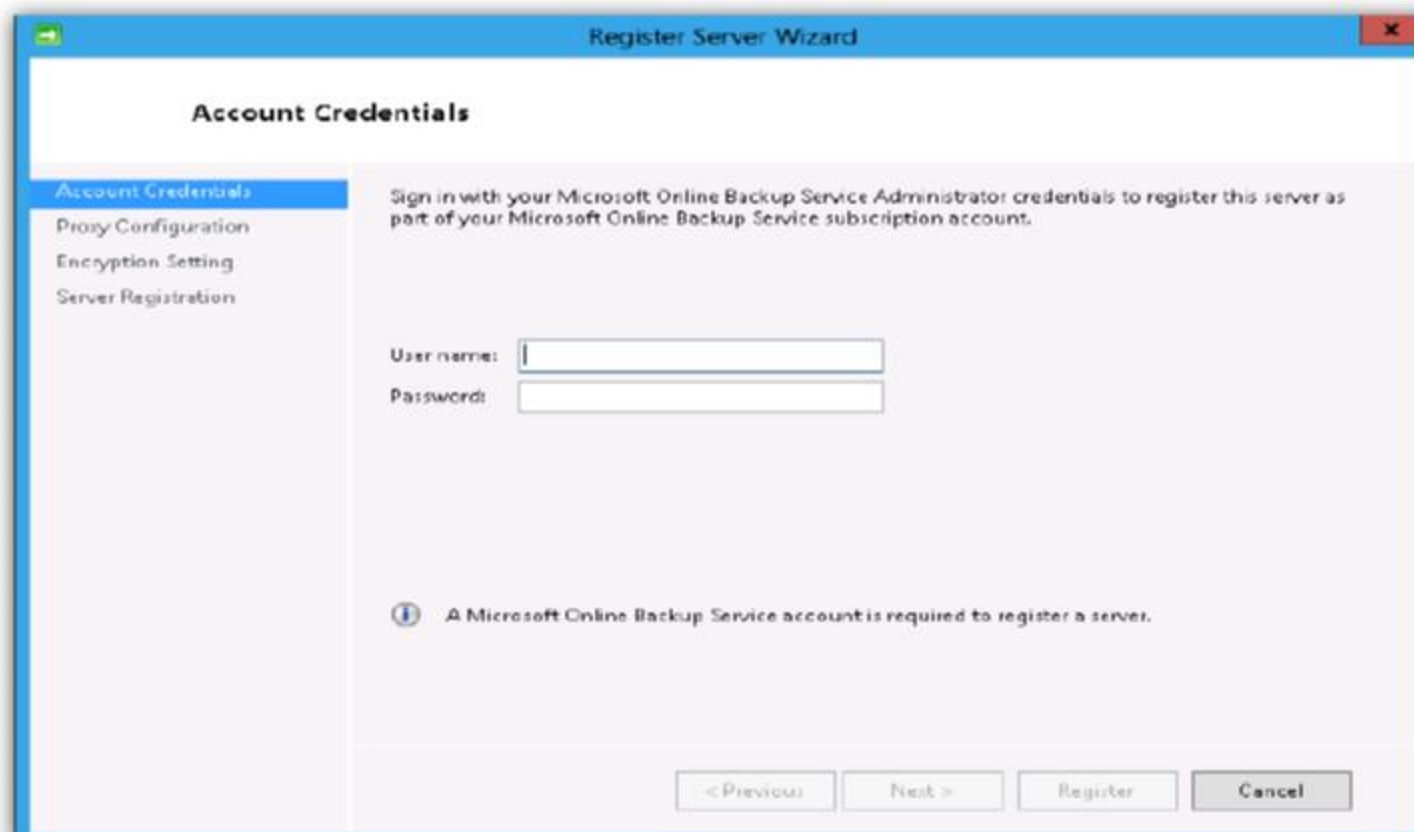
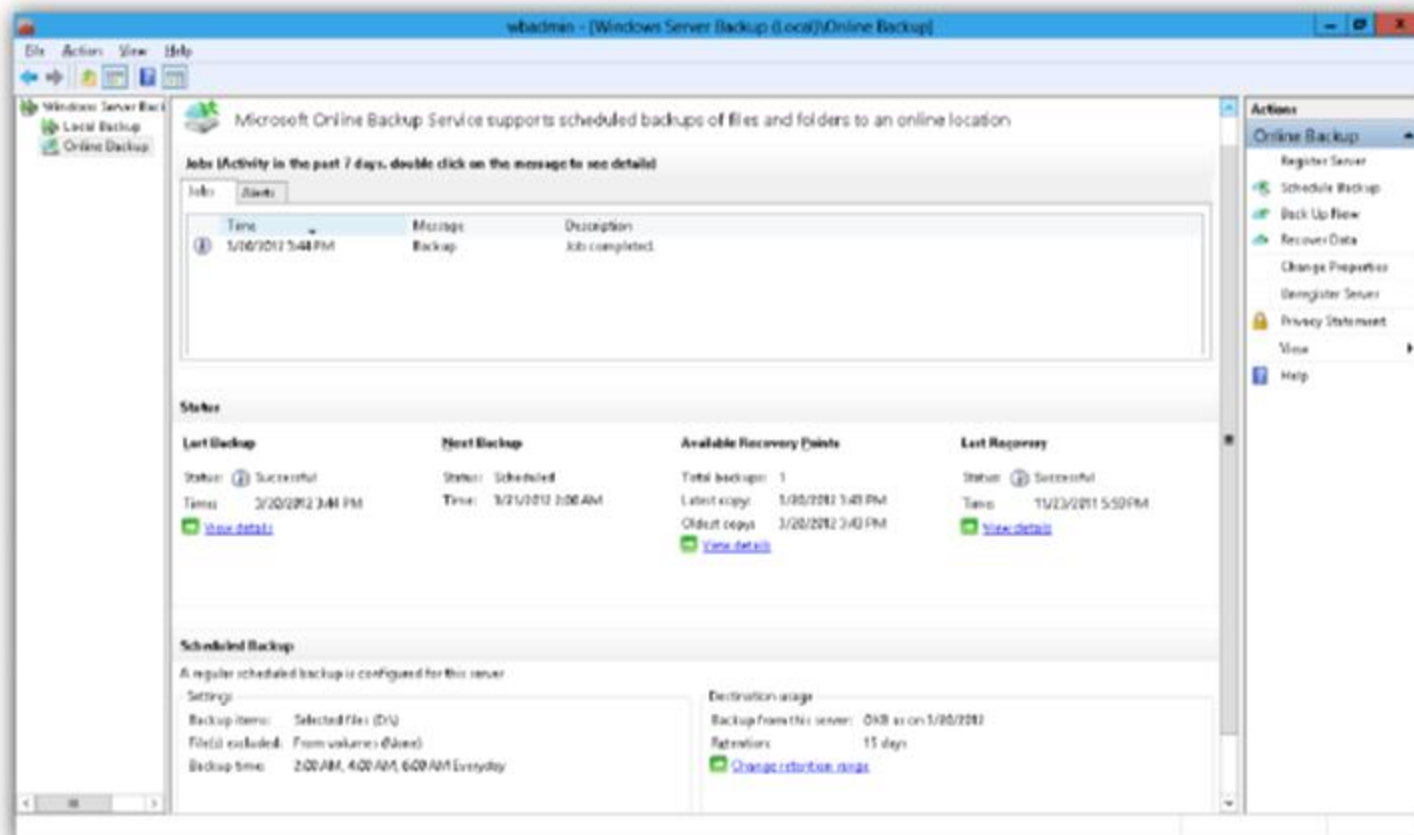
What is Backup?

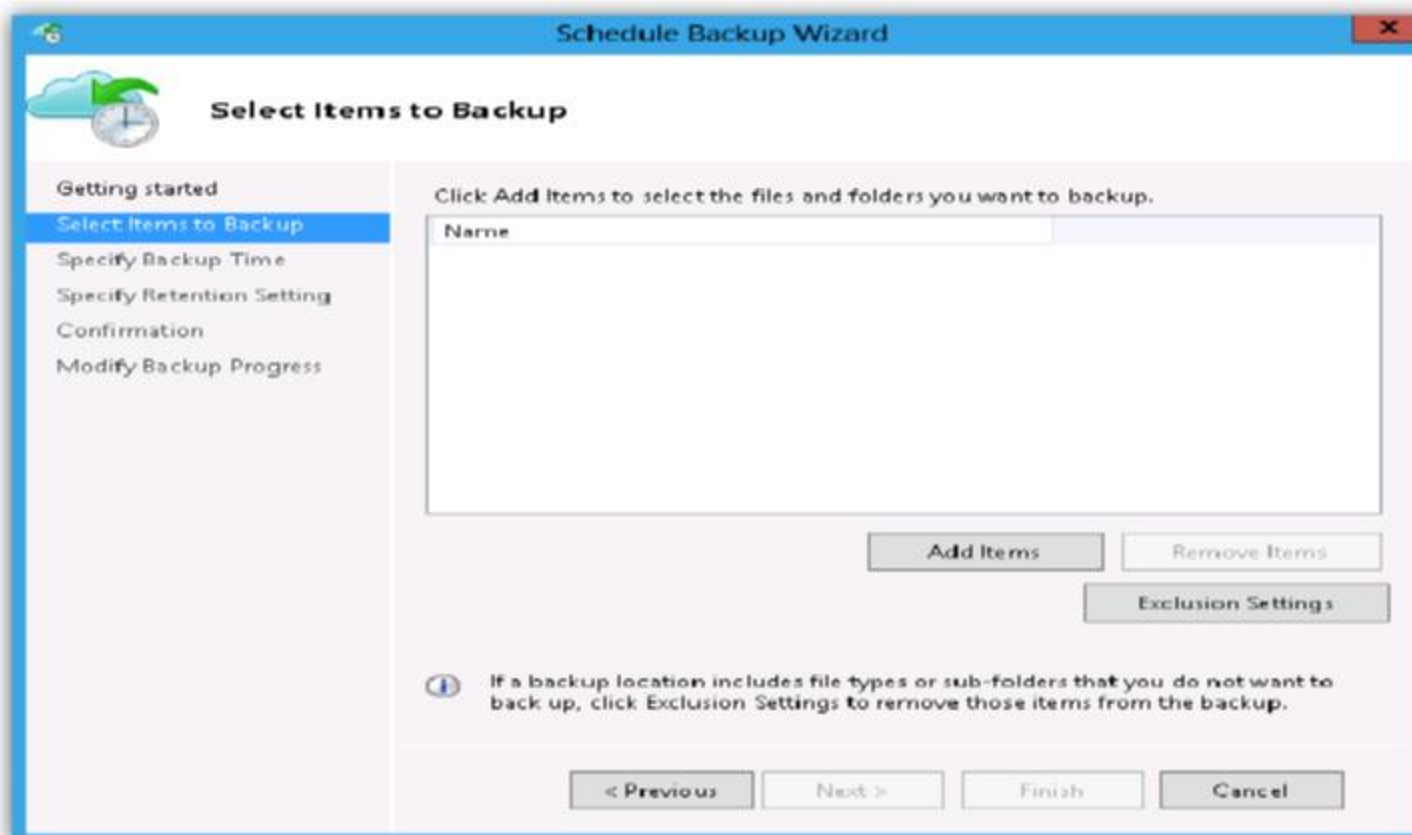
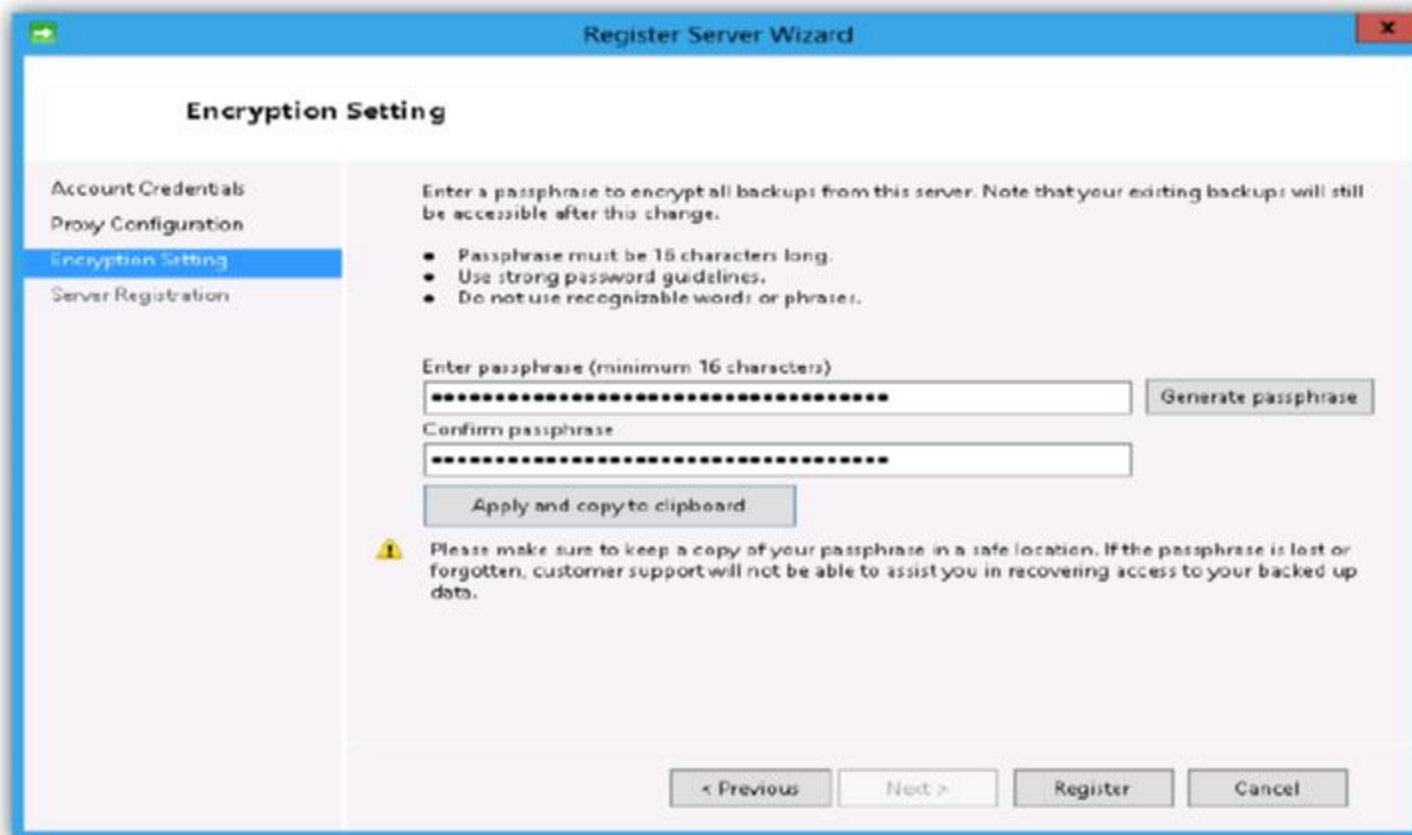
- Copy data to alternate media
- Prevent data loss
- Only Administrators can backup the data

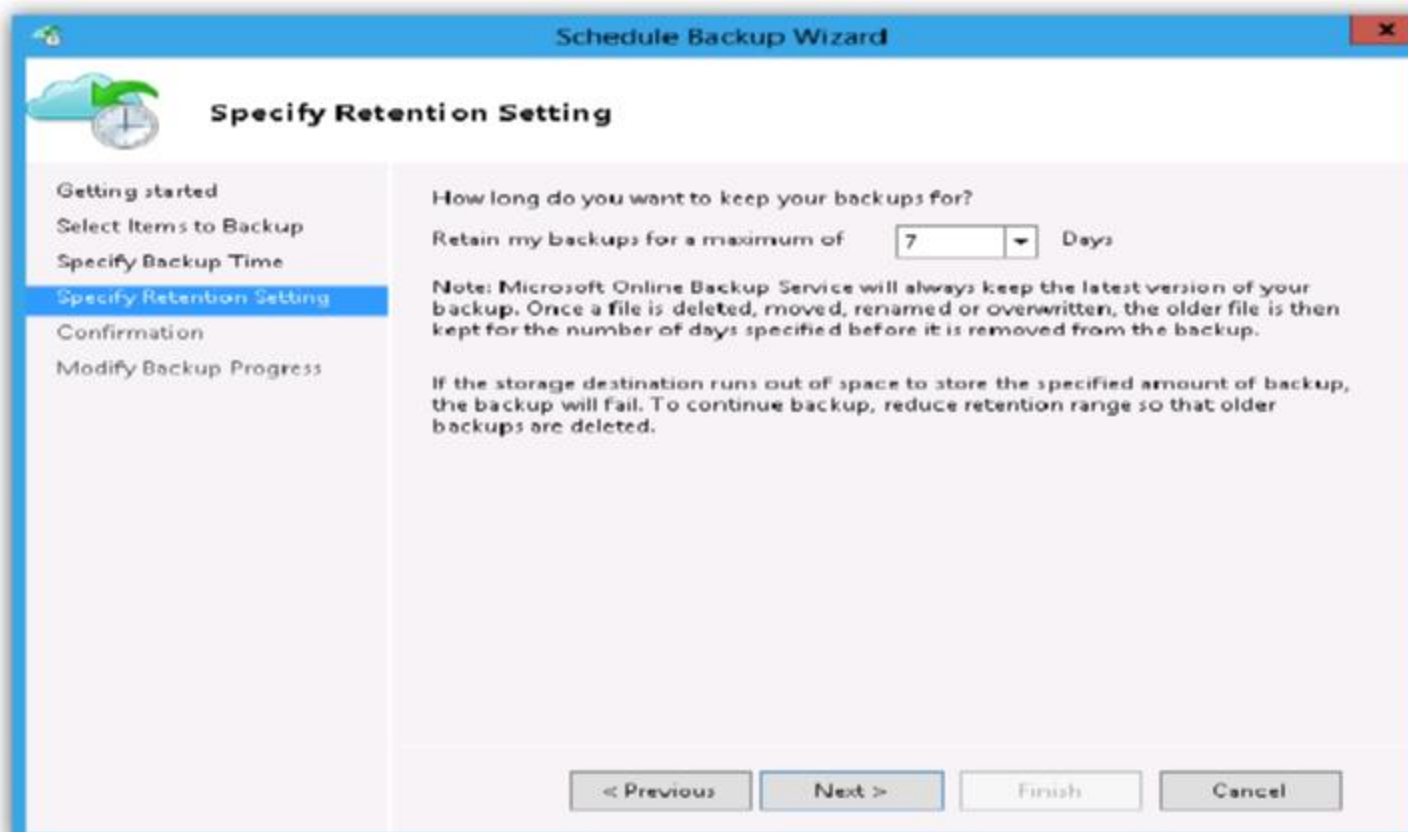
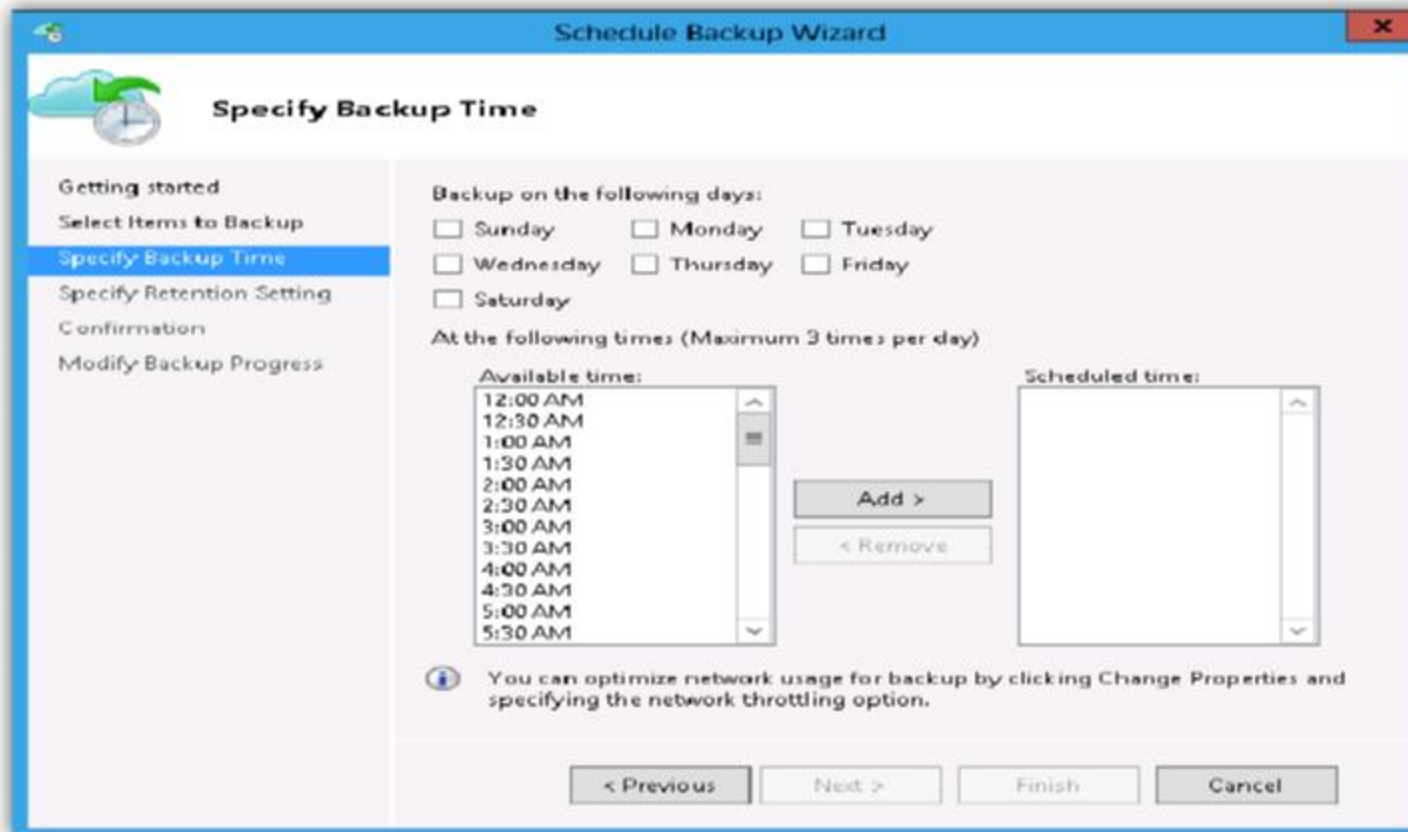


Backup

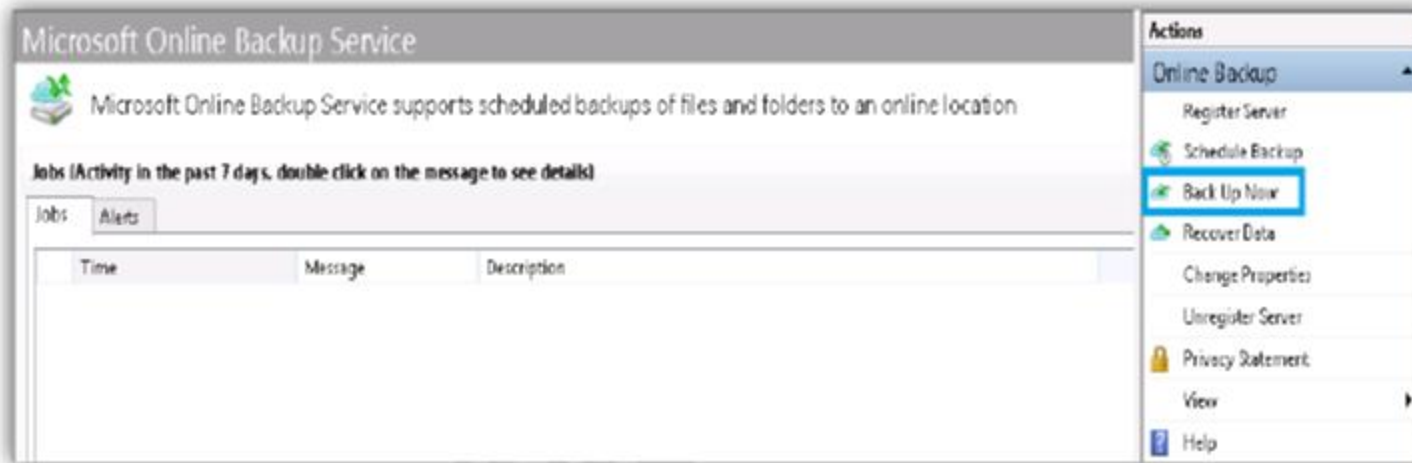






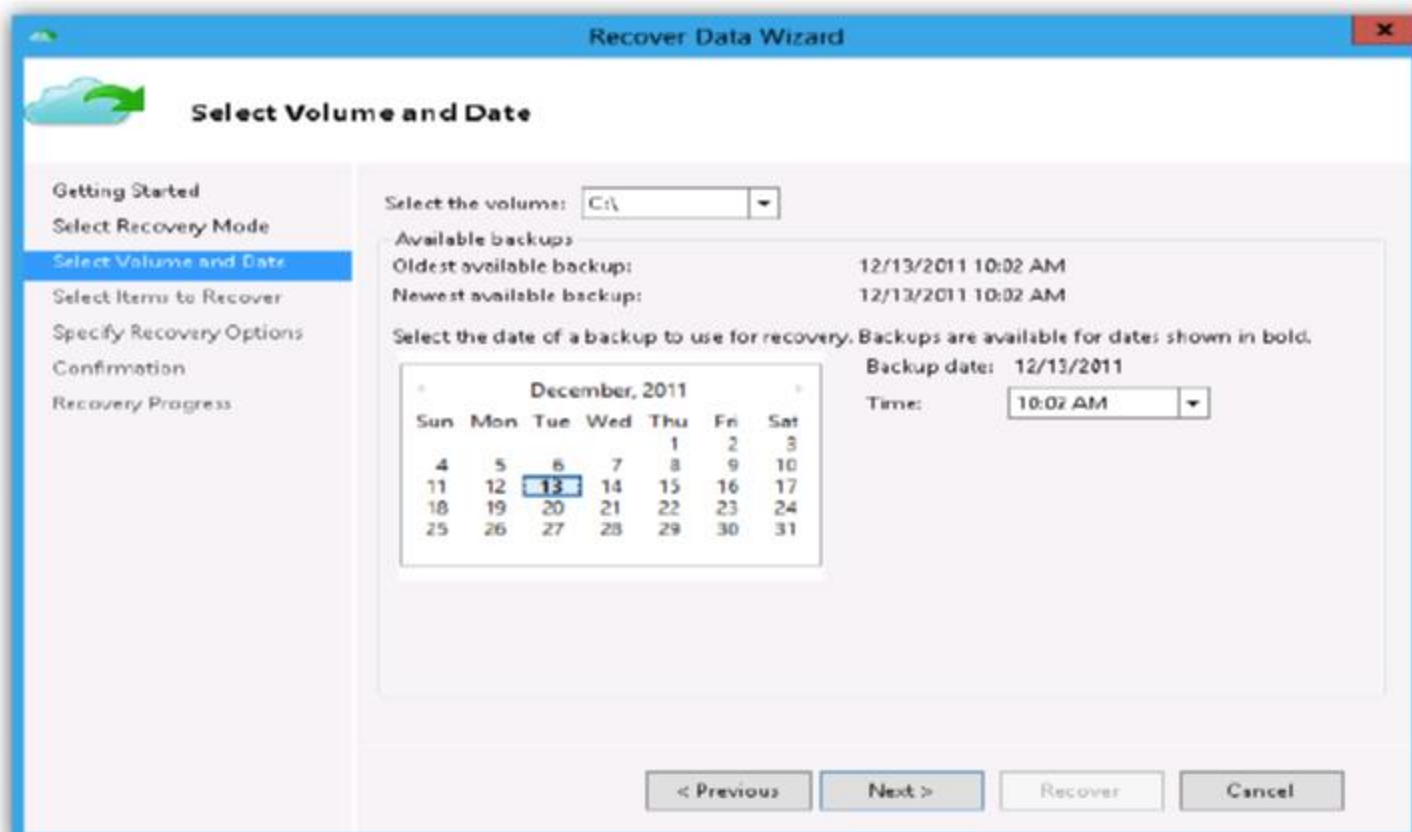


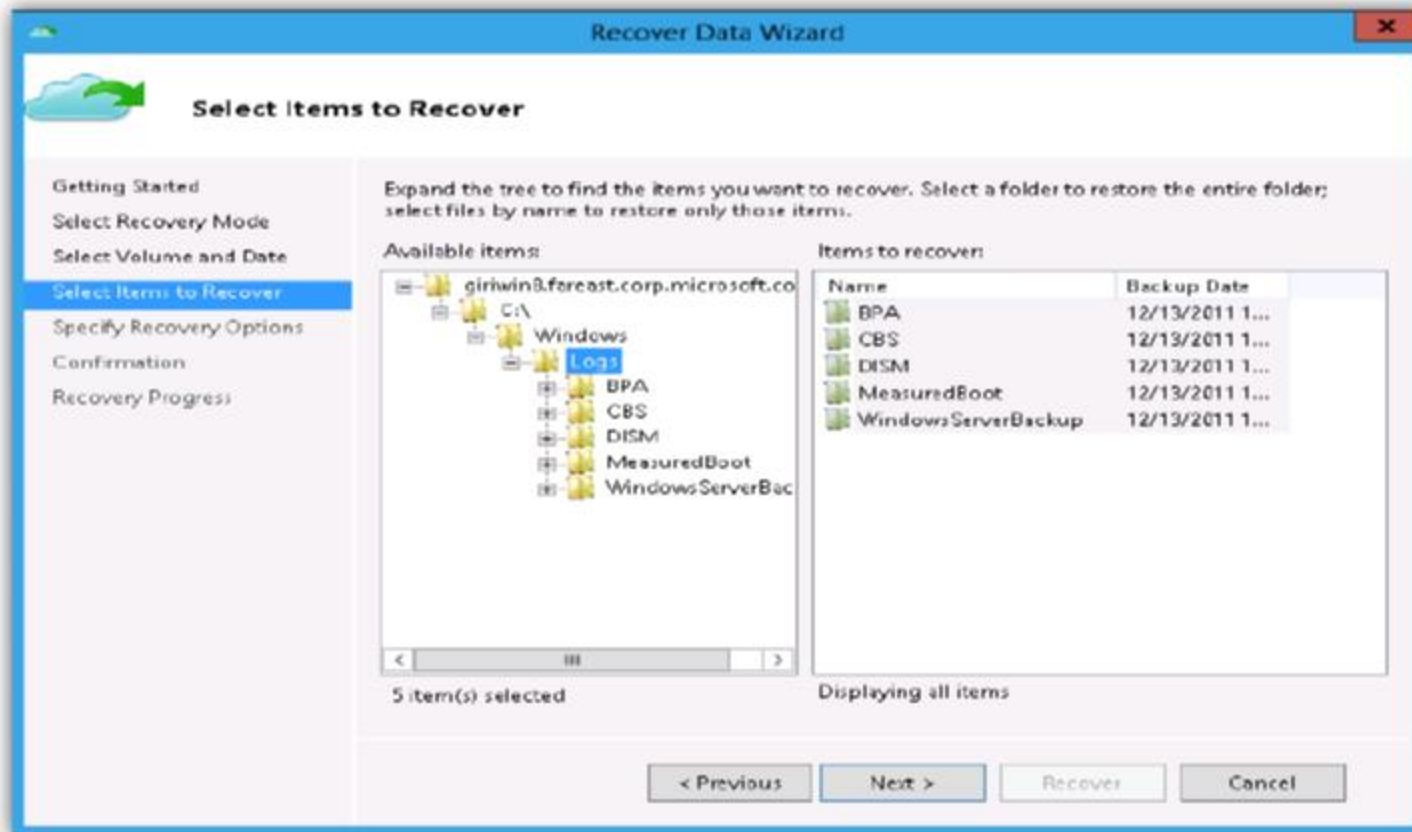
Online Backup - Backup Now



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Online Backup - Recover Data





ADVANCED TOPICS

- Domain Services (AD-DS)
- Lightweight Directory Services (AD-LDS)
- Rights Management Services (AD-RMS)
- Federation Services (AD-FS)
- Certificate Services (AD-CS)

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- AD LDS Provides an LDAP accessible directory service that supports identity management scenarios
- Removes all other AD DS features
 - No Kerberos authentication
 - No forests, domains, DC, GC, sites, group policies
 - No dependency on DNS
- Each AD LDS server can host multiple directory stores (i.e. instances)

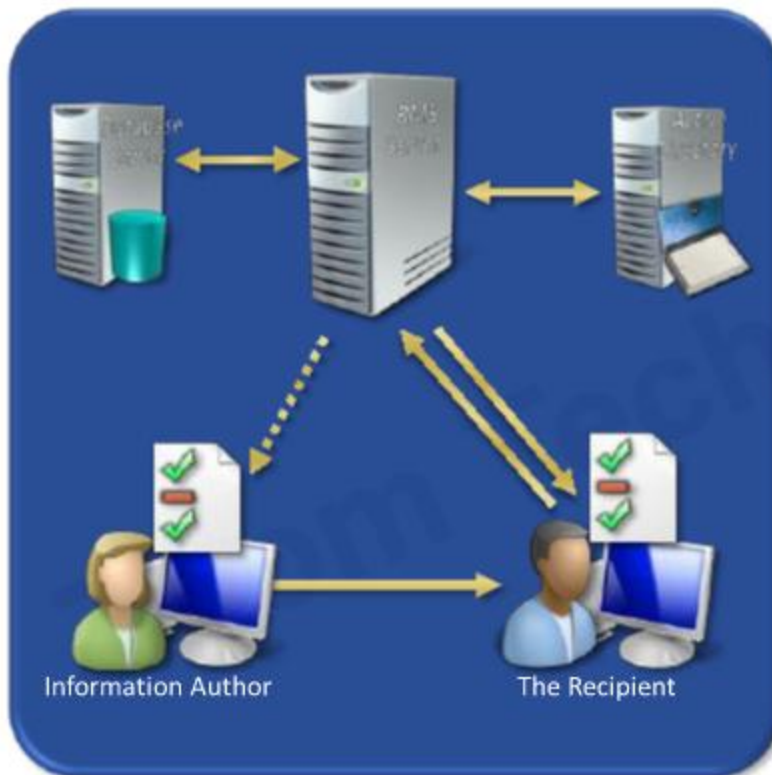
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- **Within each instance**
 - Schema partition
 - Configuration partition
 - Zero or more application partitions

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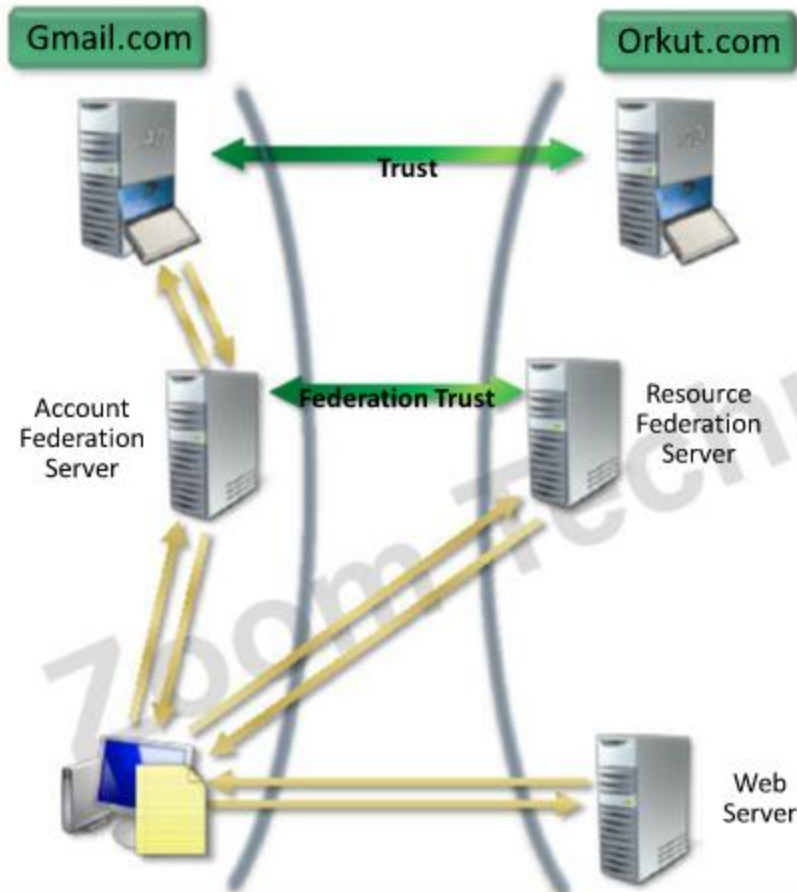
- **RMS enables customers to keep internal information internal**
 - Confidential files protection
 - E-mail forwarding
 - Web applications
- **Benefits:**
 - Safeguards sensitive internal information
 - Digitally enforces organization policies
 - Persistently protects information

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- Author receives a client license certificate the “first time” they right-protect the information.
- Author defines a set of usage rights and rules for their file & creates a “publishing license” to encrypt file.
- Author distributes file.
- Recipient opens the file, the application calls the RMS server which validates the user and issues a “use license.”
- Application opens the file and enforces rights.

- AD FS provides an identity access solution
- AD FS is a service that allows for the creation of federated relationships between organizations for web application authentication
- Deploy federation servers in multiple organizations to facilitate business-to-business (B2B) transactions
- AD FS provides a Web-based Single Sign-On (SSO) solution
- AD FS improved in Windows Server 2008



- Client contacts Web server to access web page
- Web SSO agent intercepts request
- Client is redirected to FS-R for discovering the resource
- Client is redirected to FS-A for authentication
- FS-A sends the request to Domain Controller and authenticates user
- Client is redirected back to FS-R
- Web SSO agent intercepts request, checks authentication, and sends request to Web server

- AD CS Provides PKI certificate issuance and management services
- Not significantly different than CS in 2003
- Provides a certificate issuance and Certification Authority (CA) service
- Issues Digital certificates to web server for Secure data transfer (HTTPS)



NETWORK ACCESS PROTECTION

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Network Access Protection

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What is Network Access Protection?

Health Policy Validation

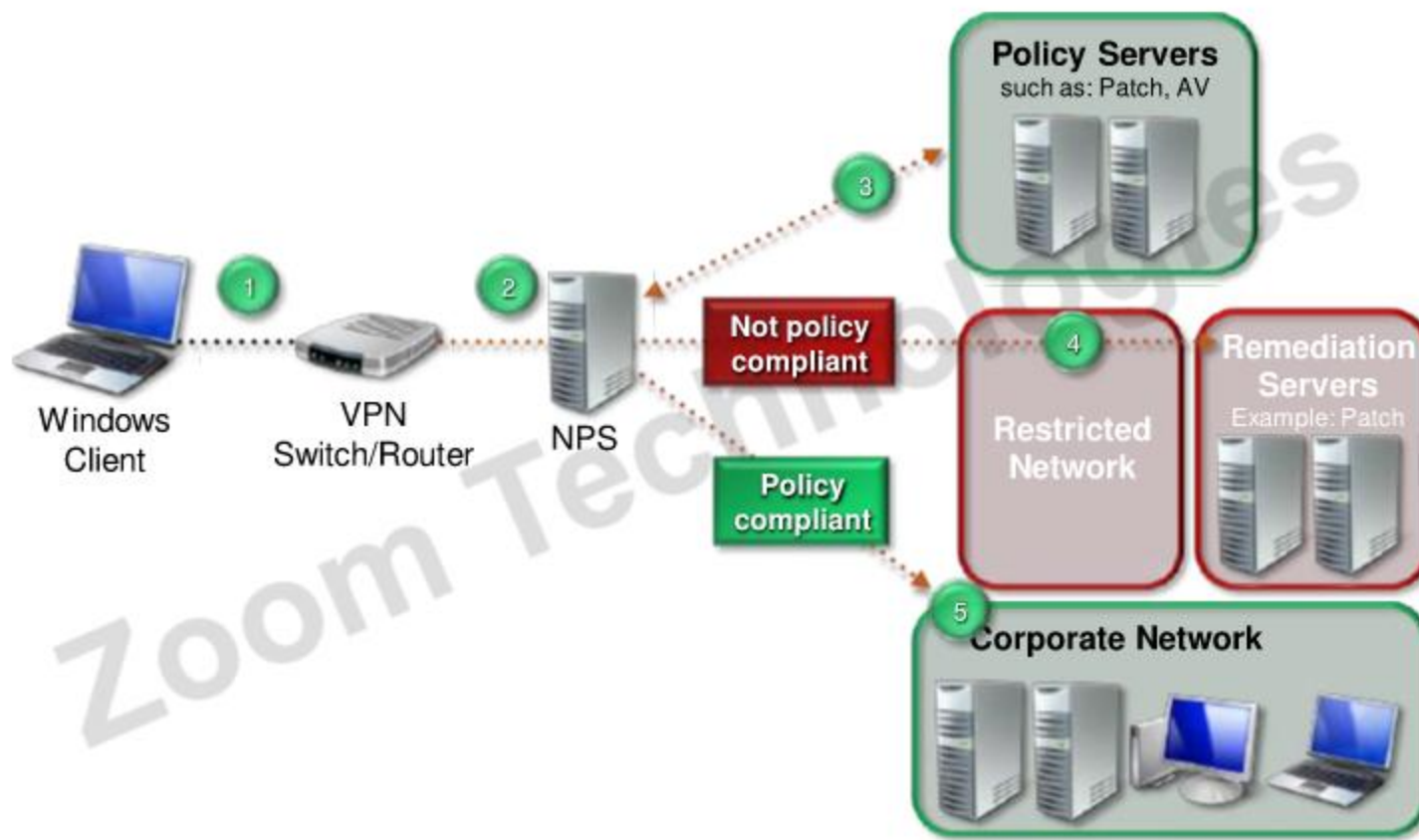
Health Policy Compliance

Ability to Provide Limited Access

Enhanced Security

CLOUD
EXCHANGE
M C S E

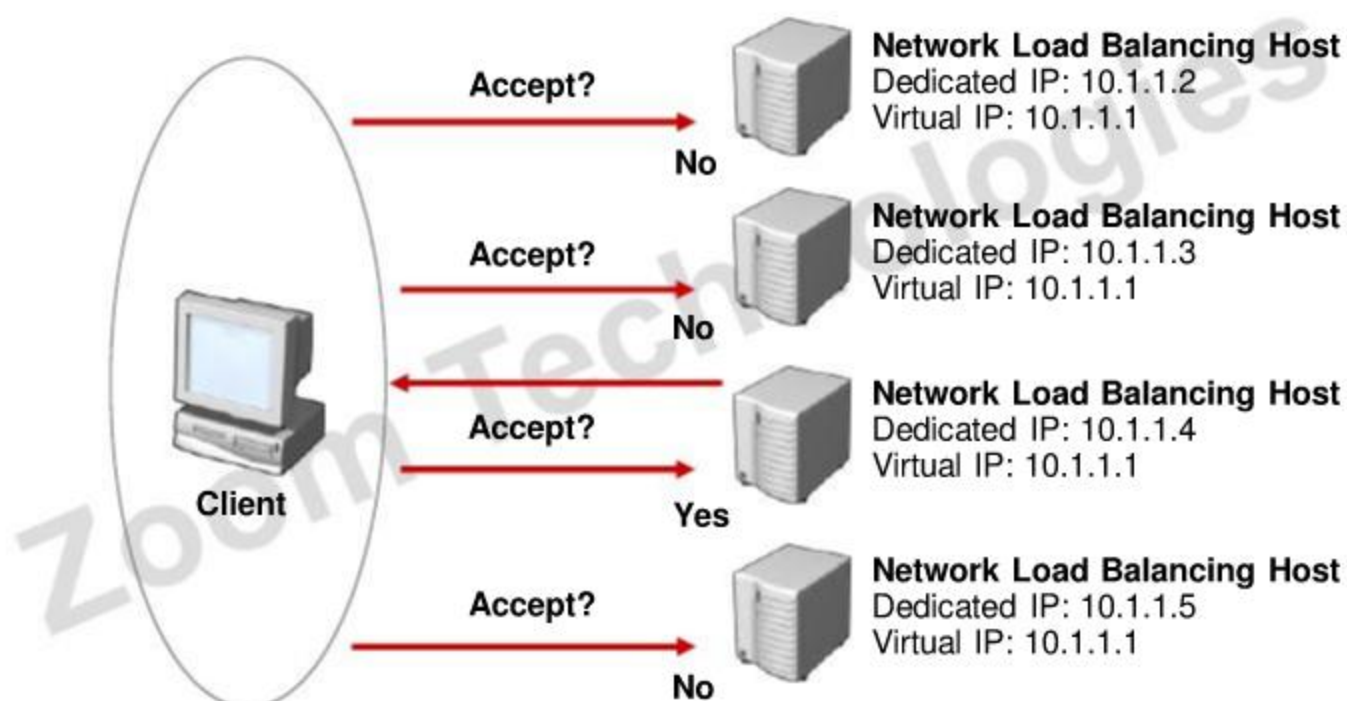
How Network Access Protection works?



NETWORK LOAD BALANCER



- Network Load Balancing (NLB) uses a distributed algorithm to balance IP traffic load across multiple hosts. It helps to improve the scalability and availability of business-critical, IP-based services.
- NLB also provides high availability, because it detects host failures and automatically redistributes traffic to surviving hosts.
- Windows Server 2012 NLB clusters can have between 2 and 32 nodes.
- Balances traffic based on node utilization
 - New traffic will be directed to the node that is being utilized the least
 - You can configure NLB to preference some nodes over others



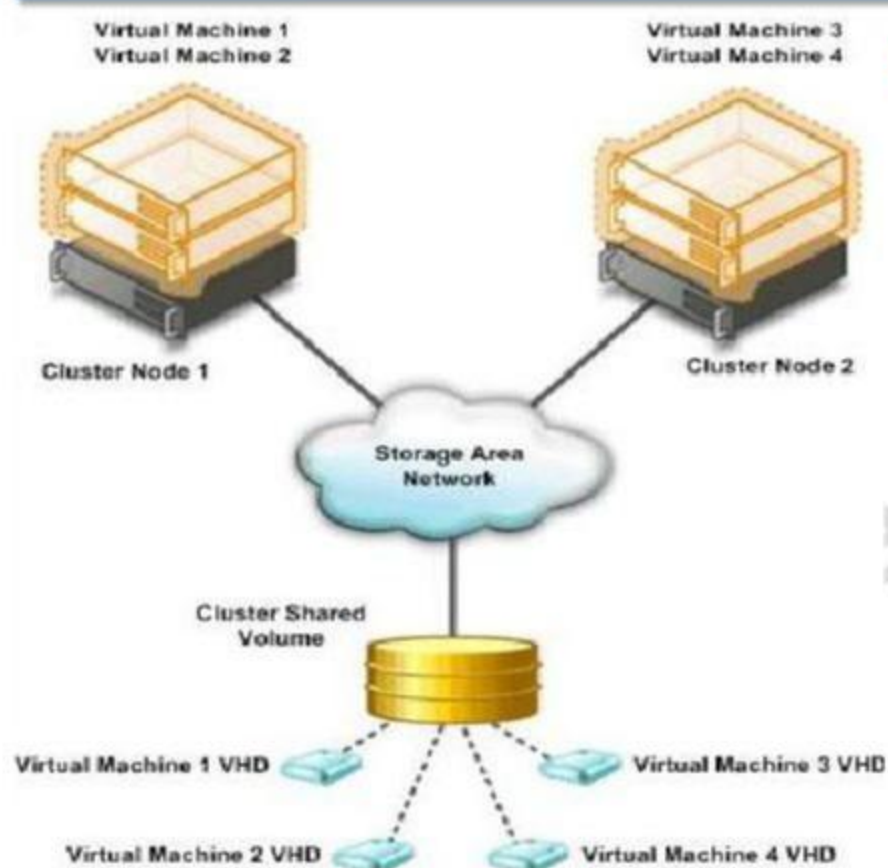
- NLB cluster heartbeats are transmitted every second between nodes in a cluster
- Convergence occurs when:
 - A node misses five consecutive heartbeats, at which time it is automatically removed from an NLB cluster
 - A node that was member of a cluster returns to functionality
 - An administrator adds or removes a node manually

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- Failover clusters in Windows Server 2012 provide a high-availability solution for many server roles and applications.
- By implementing failover clusters, you can maintain application or service availability if one or more computers in the failover cluster fails.
- A failover cluster is a group of independent computers that work together to increase the availability of applications and services.
- Physical cables and software connect the clustered servers, known as nodes.
- If one of the cluster nodes fails, another node begins to provide service. This process is known as failover. With failover, service disruptions are minimized.

Failover cluster



What Is High Availability?

- One of the most important characteristics of any Information Technology (IT) system is availability. Availability refers to a level of service that applications, services, or systems provide.
- Availability is expressed as the percentage of time that a service or system is available. Highly available systems have minimal downtime, whether planned or unplanned, and they usually need to be available on a 24-hour-a-day basis.
- These systems are typically available more than 99 percent of the time, depending on the organization's needs and budget

- Increased scalability. In Windows Server 2012, a failover cluster can have 64 physical nodes and can run 8,000 virtual machines on each cluster

What Are CSVs?

- In a classic failover cluster deployment, only a single node at a time controls a LUN or a volume on the shared storage.
- This means that the other nodes cannot see shared storage until each node becomes an active node. CSV is a technology introduced in Windows Server 2008 R2 that enables multiple nodes to share a single LUN concurrently.
- Each node obtains exclusive access to individual files on the LUN instead of the entire LUN.
- In other words, CSVs provide a distributed file access solution so that multiple nodes in the cluster can simultaneously access the same NTFS file system

Quorum

- Quorum is the number of elements that must be online for a cluster to continue running. In effect, each element can cast one vote to determine whether the cluster continues to run.
- Each cluster node is an element that has one vote.
- In case there is an even number of nodes, then an additional element, which is known as a witness, is assigned to the cluster.
- The witness element can be either a disk or a file share. Each voting element contains a copy of the cluster configuration; and the Cluster service works to keep all copies synchronized at all times

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+ 14% Service Tax

CCNA SECURITY

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CISCO CERTIFIED NETWORK ASSOCIATE - SECURITY
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CCNP SECURITY

(Pre requisite is CCNA Security at ZOOM)
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Batches: (Contact the Counselors for the next available batch)

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(Pre requisite is MCSE)
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Batches: Morning: 7.30 and Evening: 7.30

Fees: ₹ 4,950/-
+ 14% Service Tax

VMware vCloud

(Pre requisite is VMware vSphere)
Duration: 1 Week | 4 Hrs Per Day (starts on 15th of every month)
Batches: Morning: 9.30 to 11.30

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+ 14% Service Tax

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Batches: (Contact the Counselors for the next available batch)

Fees: ₹ 5,500/-
+ 14% Service Tax

We also offer the following courses (Contact the Counselors for the next available batch)

- › CCNA Voice @ ₹7,500/-
- › CCNP Voice @ ₹9,500/-
- › CCIE Collaboration @ ₹15,500/-
- › IPv6 Migration @ ₹5,500/-
- › CCNA Data Center @ ₹7,500/-
- › CCNP Data Center @ ₹9,500/-
- › CCIE Data Center @ ₹15,500/-

FACULTY

- › All Senior Engineers of Zoom working on Live projects
- › Training Engineers of British Army, CISCO, CMC, GE, BSNL, Tata Teleservices and Several Corporates etc for 18 Years.

FREE Training

Zoom Technologies offers a number of free resources for the professional development of network engineers.

Register on our website to get access to the video recordings of live sessions on:

- MCSE – Windows Server 2012
 - Cisco – CCNA
 - Cisco – CCNP
 - Cisco – CCIE
 - Exchange Server 2013
 - Linux
 - Advanced Linux
 - Ethical Hacking and Countermeasure Expert (www.us-council.com)
- } All Tracks (R & S, Security and Voice)
- } All Flavors

Find us at: www.zoomgroup.com

Like us on Facebook and get access to free online webinars as well as special offers and discounts.
<https://www.facebook.com/ZoomTechnologies>

Online Training

Online Training at Zoom is a cost effective method of learning new networking skills from the convenience of your home or workplace.

Taking an online training course has many advantages for everyone (Freshers / Working Professionals). Zoom offers online training for the highly coveted CCNA, CCNP and CCIE courses as well as MCSE, Linux, VMware, Ethical Hacking and Firewalls, IPv6 with more courses planned for the near future. These are live instructor led courses, using Cisco WebEX. Check out our online course offerings at: http://zoomgroup.com/online_course

Job Opportunities

There is a high demand for network and security professionals at all times. Apart from job opportunities in India and the Middle East, network and security administrators are also sought-after in the US and Europe.

If you do not have the right skills, then get them now! Choose the experts in network and security training, an organization which has already trained over one hundred thousand engineers.

For the latest job openings in networking and security, register and upload your resume on: <http://zoomgroup.com/careers> or visit zoom to choose job offering from several multinational companies.

ABOUT US

ZOOM Technologies India Pvt. Ltd. is a pioneering leader in network and security training, having trained over a hundred thousand engineers over the last two decades.

We offer a world class learning environment, with state-of-the-art labs which are fully equipped with high-end routers, firewalls, servers and switches. All our courses are hands-on so you'll get much needed practical experience.

The difference between us and the competition can be summed up in one simple sentence. Our instructors are real-time network professionals who also teach.

Zoom has designed, developed and provided network and security solutions as well as training to all the big names in the Indian industry, for the public sector as well as corporate leaders. Some of our clients are:

TATA
BSNL
VSNL
Indian Railways
National Police Academy
Air Force Academy
IPCL- Reliance Corporation
CMC
British Army

No other training institute can boast of a customer base like this. This is the reason for the resounding success of our networking courses. If you do not have the right skills, then get them now. Come, join the experts!

Training Centers in Hyderabad, India.

Banjara Hills

HDFC Bank Building, 2nd Floor,
Road # 12, Banjara Hills,
Hyderabad - 500 034
Telangana,
India.

Phone: +91 40 23394150
Email: banjara@zoomgroup.com

Ameerpet

203, 2nd Floor,
HUDA Maitrivanam, Ameerpet,
Hyderabad - 500 016
Telangana,
India.

Phone: +91 40 39185252
Email: ameerpet@zoomgroup.com

Secunderabad

Navketan Building,
5 Floor, # 501
Secunderabad - 500 003
Telangana,
India.

Phone: +91 40 27802461
Email: mktg@zoomgroup.com

Dilsukhnagar

Ist Floor, # 16-11-477/B/1&B/2,
Shlivahana Nagar, Dilsukhnagar,
Hyderabad - 500 060
Telangana,
India.

Phone: +91-40-24140011
Email: dsnr@zoomgroup.com

website: www.zoomgroup.com

<https://t.me/learningnets>