

# Windows Server 2016

## Server OS

- A server operating system, is specifically designed to run on servers, which are specialized computers that operate within a client/server architecture to serve the requests of client computers on the network.
- The latest windows Server OS is **Windows Server 2022**

- Windows Server is a group of operating systems designed by Microsoft that supports enterprise-level management, data storage, applications, and communications management.
- Windows Server have focused on stability, security, networking, and to offer a centralized administration to enterprise companies.
- A Client will request for service and server will offer services to other systems

## Some of the server services

- Web service
- Email service
- DNS service
- DHCP service
- File service
- Application service
- Print service
- Database service
- VPN service etc...

# Windows Server 2016 Capabilities

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

Windows Server Editions
Windows Server 2016
Windows Server 2012 R2
Windows Server 2012
Windows Server 2008 R2
Windows Server 2008
Windows Server 2003 R2
Windows Server 2003
Windows Server 2000
Windows NT 4.0
Windows NT 3.51

# Windows Server 2016

Edition	Purpose
Windows Server 2016 Essentials	Designed for small businesses
Windows Server 2016 Standard Edition	Designed for physical server environments with little to no virtualization
Windows Server 2016 Datacenter Edition	Designed for highly virtualized environments – including cloud and hybrid cloud environments
Microsoft Hyper-V Server 2016	Acts as a stand-alone virtualization server for virtual machines
Windows Storage Server 2016 – Workgroup Edition	Allows 50 users, one processor core, and 32 GB of RAM. Supports domain joining
Windows Storage Server 2016 – Standard Edition	Supports up to 64 sockets but is licensed on a two-socket, incrementing basis

install new os in corporate :

- through LAN
- through pxebootrom
- wts server
- (unattend method)

## Windows Server 2016 Installation Requirements

### Hardware Requirements

Component	Requirement
Processor architecture	64-bit
Processor speed	1.4 gigahertz (GHz)
RAM	512 MB / 2GB
Hard drive space	32 GB

Note: VM Setup will fail if only 512 MB:

To resolve:

- (1) Allocate > 800 MB RAM or
- (2a) Use Diskpart.exe create a partition
- (2b) Run createpagefile command



### Additional Recommendations

- UEFI 2.3.1c for Secure Boot

# Windows 2016 Features

- PowerShell 5.0 5.1
- PowerShell is the new Command Prompt. More than that, PowerShell is arguably the most powerful configuration tool for every aspect within Windows Server.
- In fact, some features in Windows cannot even be performed without PowerShell; it is becoming that integral.
- Windows Server 2016 will see a significant number of new PowerShell cmdlets focused on specific functionality.

## Windows Defender

- Built-in malware protection
- Microsoft has been including its own malware protection in the client operating systems since Windows 8, but never before on a server platform.
- Windows Defender has been improved, and it now runs by default in Windows Server 2016

- Soft restart
- In an effort to speed up reboots, there is an optional reboot setting now called soft restart.
- So what is a soft restart? It is a restart without hardware initialization. In other words, it restarts the operating system without restarting the whole machine.

## Soft Start

- Using the shutdown command:
- shutdown /r /soft /t 0 /r = restart
- Using the Restart-Computer cmdlet:
- **Restart-Computer -Soft**

- Nano Server
- Unfortunately, the previous version's Server Core is going largely unused, but Microsoft expects this to change completely with the release of Nano Server in Windows Server 2016.
- Nano Server has a greatly decreased security footprint, and incredibly small hardware requirements.
- In the next few years, it is expected that many companies will swing a lot of their workloads from traditional servers over to Nano Servers.

- Nano is the end result of Microsoft refactoring the core pieces of Windows Server to its minimally functional state.
- It's so minimal, in fact, that it doesn't have any direct user interface besides the new Emergency Management console.
- A Nano instance is managed remotely using Windows PowerShell, or other tools, to include the process of adding new roles.

dns role etc...

## Storage Replica

- Microsoft has supported replication in the world of Hyper-V, but it has been limited up to this point to asynchronous replication of virtual hard disks.
- That changes with Windows Server 2016, as you now have the ability to replicate entire volumes at the block level.
- Further, you can choose between synchronous and asynchronous replication.

## Hyper-V hot add NICs and memory

- Previous versions of Hyper-V did not allow you to **add a network interface or more memory to a running virtual machine.**
- Downtime is always bad but change is sometimes good.
- Microsoft now allows you to make some critical machine configuration changes without taking the virtual machine offline. The two most important changes involve networking and memory.

## Nested Virtualization

- Nested virtualization refers to the capability of a virtual machine to itself host virtual machines.
- This has historically been a "no go" in Windows Server Hyper-V, but we finally have that ability in Windows Server 2016.
- Nested virtualization makes sense when a business wants to deploy additional Hyper-V hosts and needs to minimize hardware costs.

## Secure Boot

only in server os

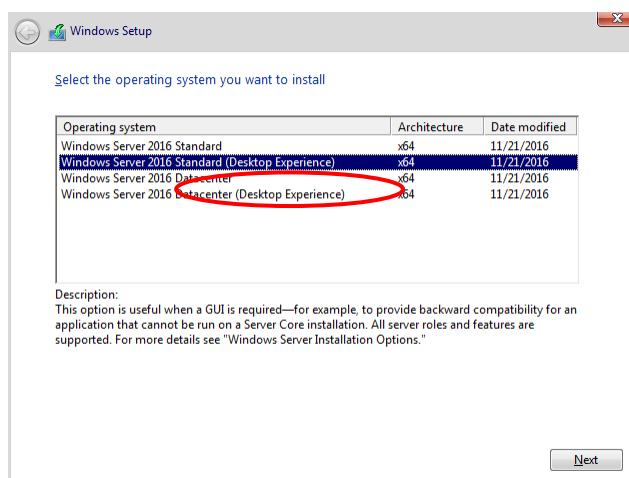
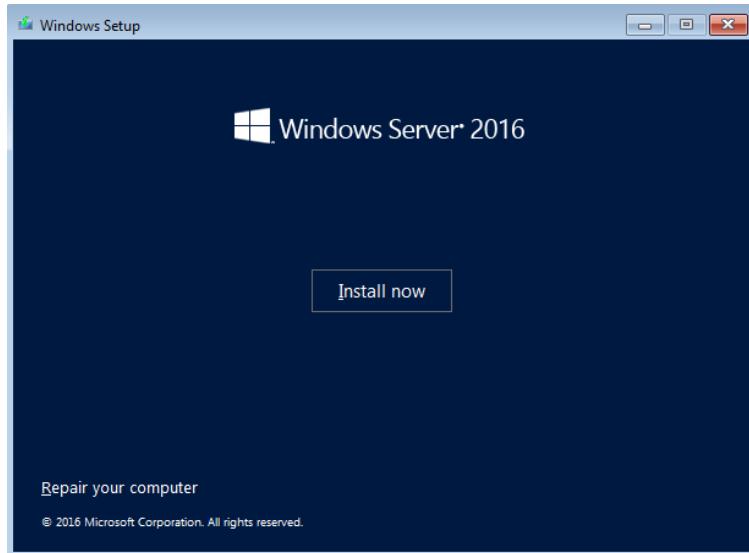
- Secure Boot is part of the Unified Extensible Firmware Interface (UEFI) specification that **protects a server's startup** environment against the injection of rootkits or other assorted boot-time **malware**.
- **ReFS**
- The Resilient File System (ReFS) has been a long time coming in Windows Server. In Windows Server 2016, we finally get a stable version. ReFS is intended as a high-performance, high-resiliency file system intended for use with **Storage Spaces Direct and Hyper-V workloads**.

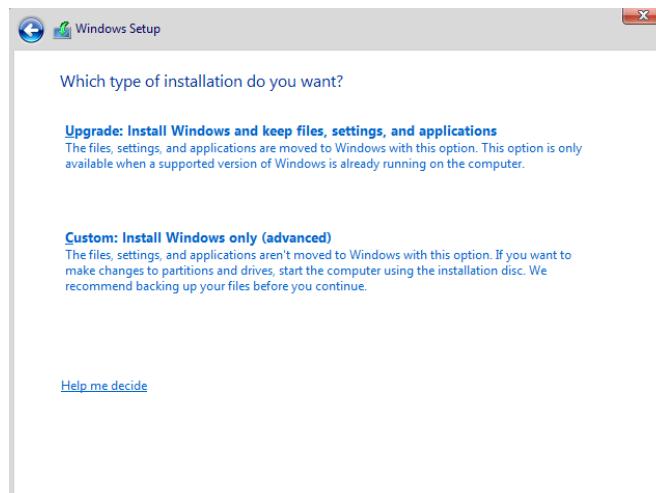
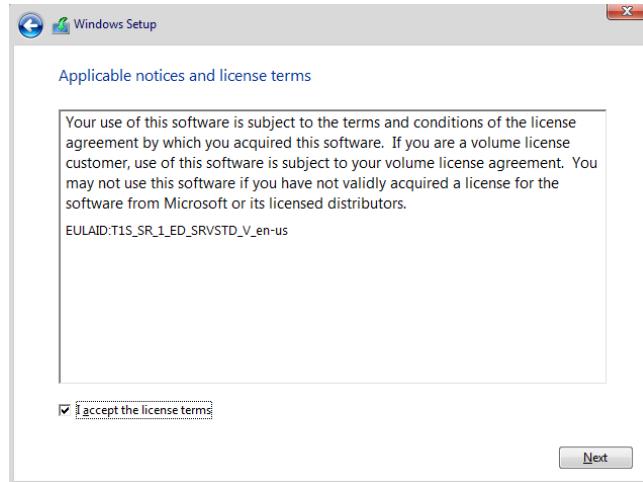
- Web Application Proxy
- Web Application Proxy (WAP) is a role that was introduced in Windows Server 2012 R2 and provides us with the ability to **reverse proxy web applications**.
- Number of new functions have been provided with the Server 2016 version, on **remote access technology**.

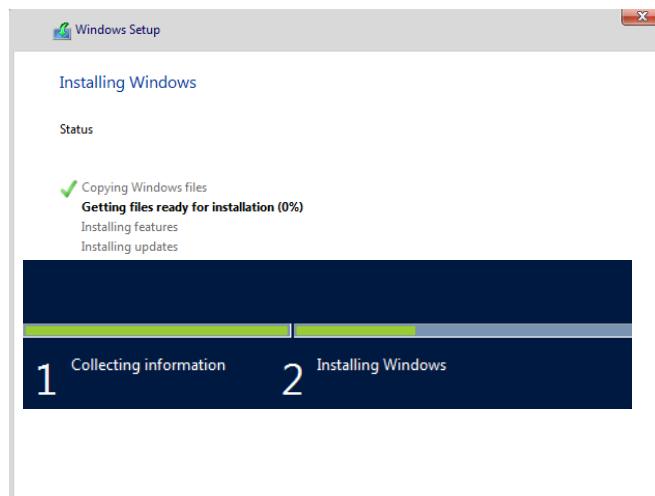
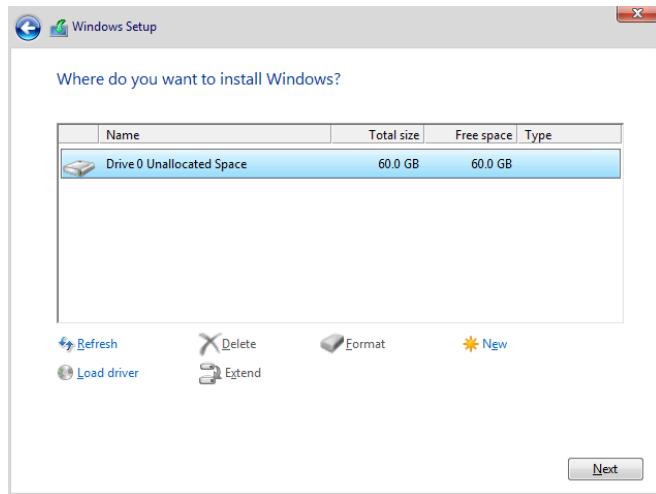
- Shielded virtual machines
- So many companies are running a majority of their servers as virtual machines today. One of the big problems with this is that there are **some inherent security loopholes that exist in the virtualization host platforms of today.**
- One of those holes is **backdoor access to the hard disk files** of your virtual machines.
- It is quite easy for anyone with administrative rights on the virtual host to be able to see, modify, or break any virtual machine that is running within that host.

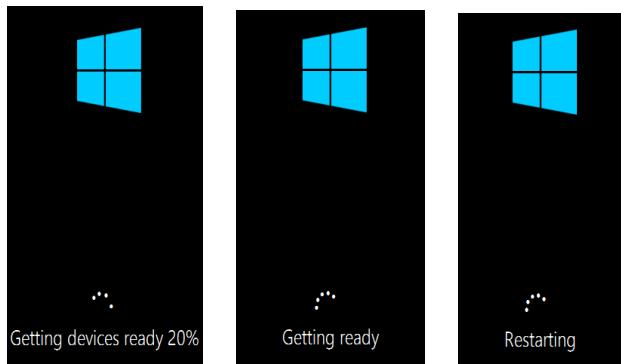
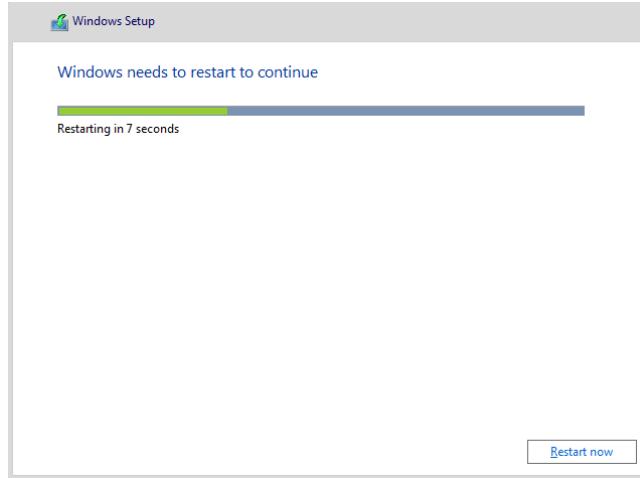
## Windows Server 2016 Installation

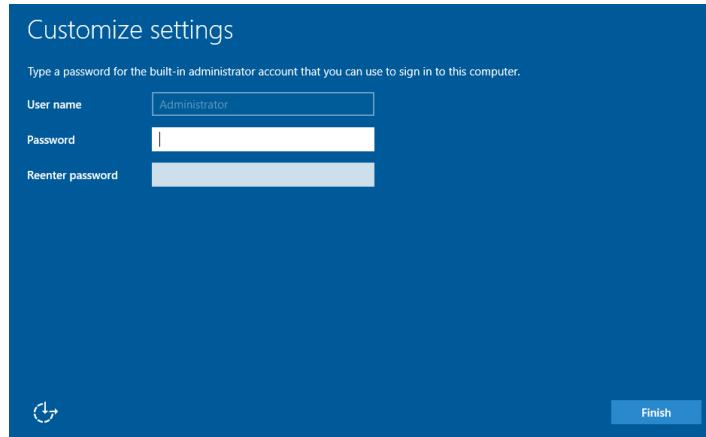






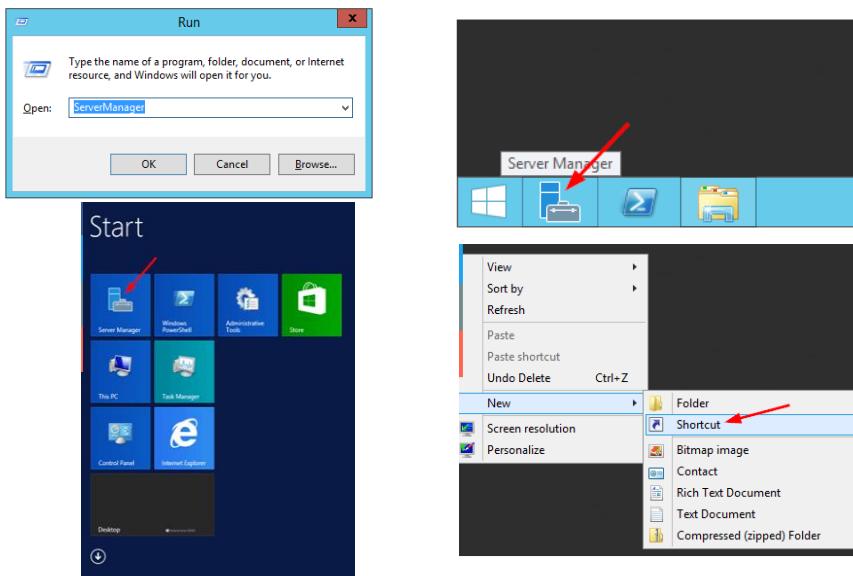


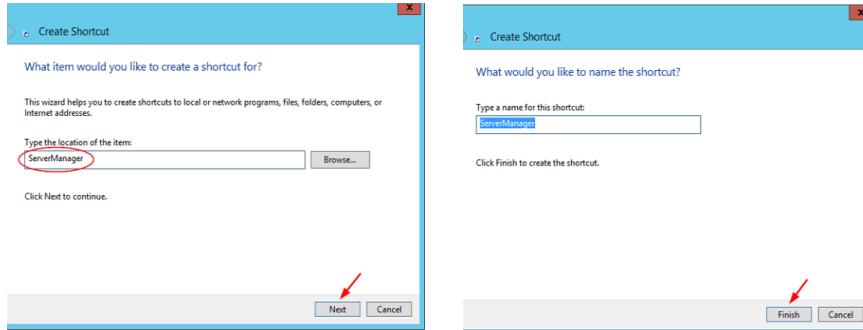




## Windows Server 2016 Management

### Windows Server 2016 Initial setup

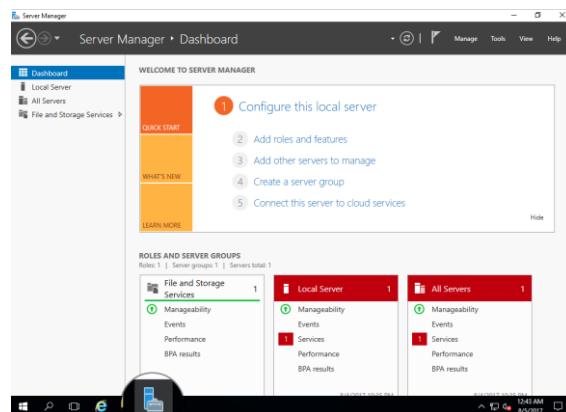




You should now see a new desktop shortcut on the desktop. Double-click it and you can launch Server Manager quickly.

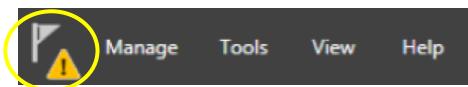


The Server Manager Dashboard screen provides, at a glance, all roles installed on the server, and will notify you of any errors or concerns. It also offers a Quick Start menu of hyperlink options.





- The Notifications Area:
- The flag icon represents the Notifications Area and will display Task Details that are in progress, pending, or require additional actions. A number beside this icon indicates there are pending messages.
- If a Warning Triangle appears this means there are pending tasks that require your immediate attention.



**Manage Tools View Help**

Add Roles and Features

Remove Roles and Features

Add Servers

Create Server Group

Server Manager Properties

**Manage Tools View Help**

Component Services

Computer Management

Defragment and Optimize Drives

Disk Cleanup

Event Viewer

iSCSI Initiator

Local Security Policy

Microsoft Azure Services

ODBC Data Sources (32-bit)

ODBC Data Sources (64-bit)

Performance Monitor

Print Management

Resource Monitor

Services

System Configuration

System Information

Task Scheduler

Windows Firewall with Advanced Security

Windows Memory Diagnostic

Windows PowerShell

Windows PowerShell (x86)

Windows PowerShell ISE

Windows PowerShell ISE (x86)

Windows Server Backup

**Manage Tools View Help**

75%

100%

Ctrl+0

125%

150%

Zoom In Ctrl +

Zoom Out Ctrl -

Hide Welcome Tile

**Manage Tools View Help**

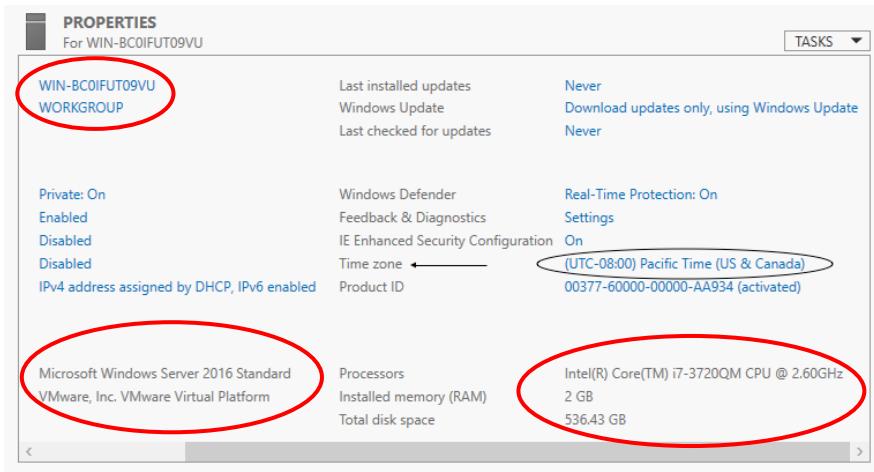
Server Manager Help F1

Windows Server Marketplace

Windows Server TechCenter

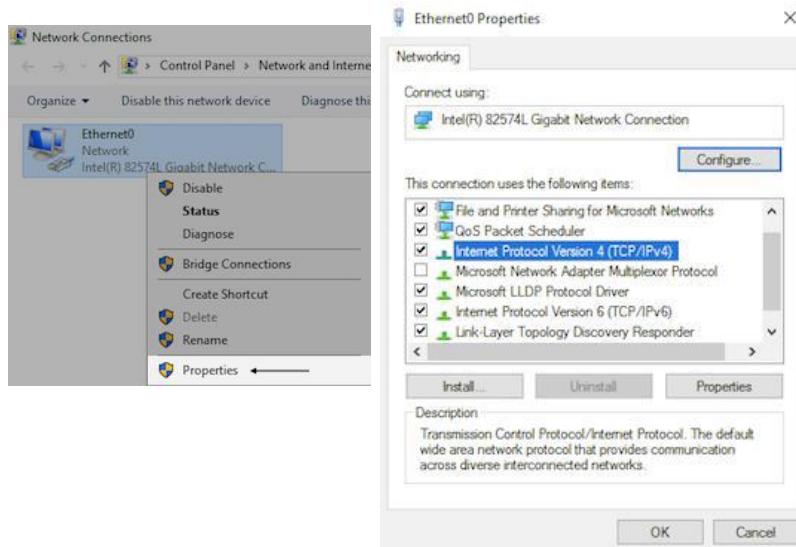
Server Manager Forums

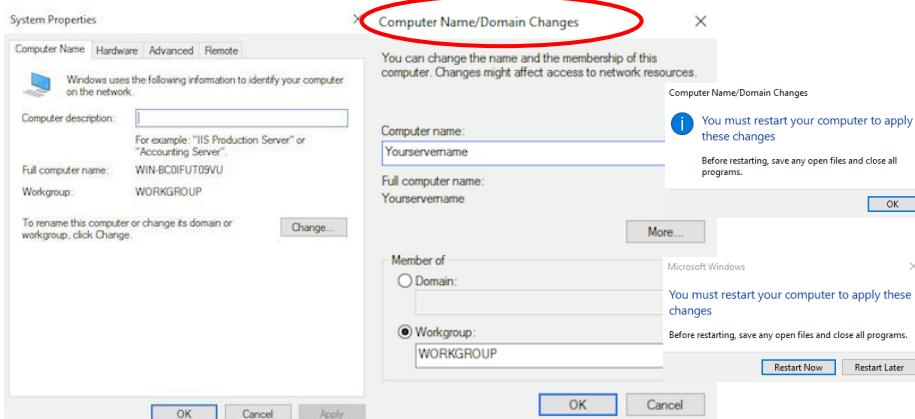
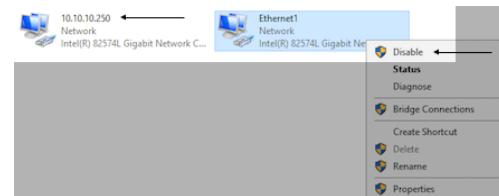
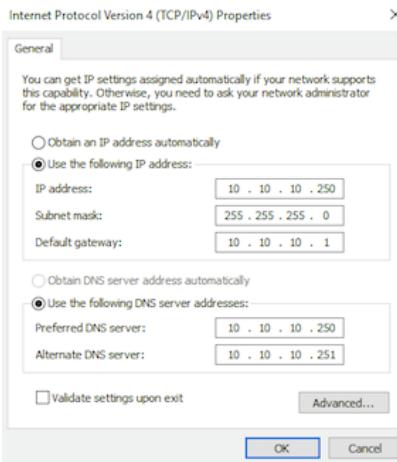
About Server Manager



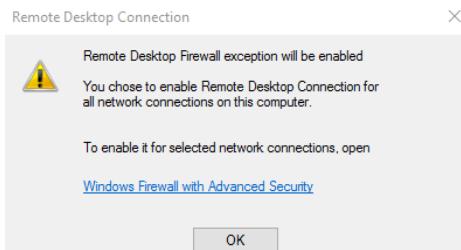
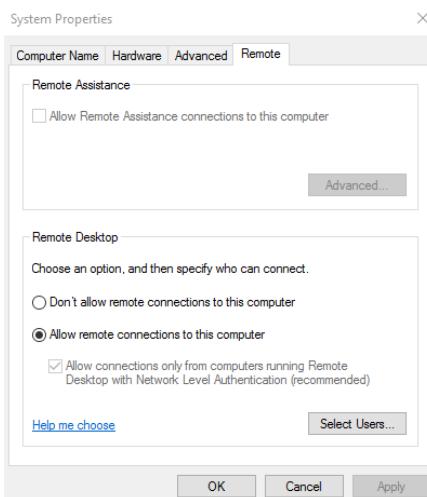
through cmd change ip address :  
ncpa.cpl

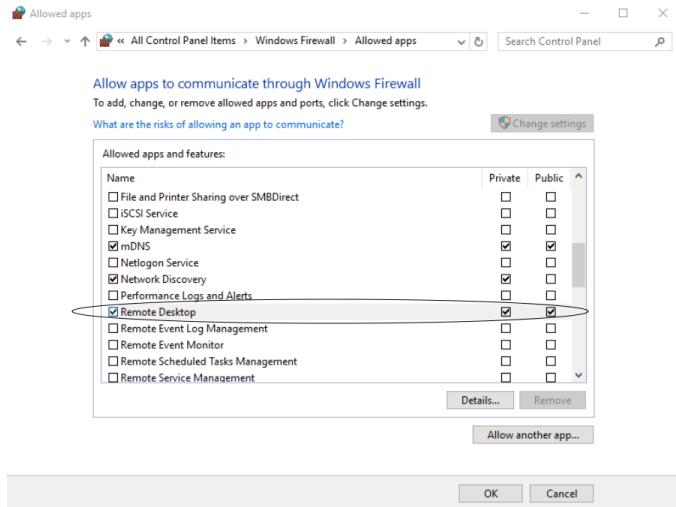
through cli:  
netsh





PROPERTIES			
For WIN-BC0IFUT09VU			
Computer name		WIN-BC0IFUT09VU	Last installed updates
Workgroup		WORKGROUP	Never Download updates Never
Windows Firewall		Private: On	Windows Defender
Remote management		Enabled	Real-Time Protection Feedback & Diagnostics Settings
Remote Desktop		Disabled	IE Enhanced Security Configuration On
NIC Teaming		Disabled	Time zone (UTC-08:00) Pacific
Ethernet0		IPv4 address assigned by DHCP, IPv6 enabled	Product ID 00377-60000-0000
Operating system version		Microsoft Windows Server 2016 Standard	Processors Intel(R) Core(TM) i7
Hardware information		VMware, Inc. VMware Virtual Platform	Installed memory (RAM) 2 GB Total disk space 536.43 GB





- Roles - Roles are sets of software programs that when installed and configured properly, function automatically to provide multiple users and/or computers with access to resources within a network.
- Examples: DHCP, Active Directory & DNS, File Services, Print Server Services, etc. Roles typically include their own databases, can queue requests or record information about the network participants.
- One or more roles can be installed on a server depending on the capabilities of the hardware.

- Role Services – **Role Services** are software programs that **add functionality to the role**. Some Roles only have one specific function and do not have additional Role Services to choose from. Other Roles require a certain set of Role Services, which are installed without selection options.
- Features – Features are optional software programs that can be installed without direct correlation to available and regardless selected Roles.

- Functions - Functions are secondary or supporting features to the primary Roles that can be installed. Defining the Server management or administrative management functions (MMC), backing up files.
- **AD DS** – Active Directory Domain Services is the **directory services database** for Windows Server, used to **process logons, authentication and directory searches**. Installed on a domain controller, it manages communications across users and domains.

## Active Directory Domain Services(ADDS)

- ADDS is a database and service.
- AD DS – Active Directory Domain Services is the directory services database for Windows Server, used to process logons, authentication and directory searches.
- Installed on a domain controller, it manages communications across users and domains.

- Active directory service store all the information needed to use and manage objects in a centralized location, simplifying the process of locating and managing these resources.
- Like telephone directory Active directory stores all objects information for effective and efficient centralized management.

## ADDS

- Centralized data store – All the data in Active directory resides in a single distributed data repository(ntds.dit), allowing users easy access to the information from any location.
- A single distributed data store requires less administration and improves the availability and organization of data.
- Scalability – Active directory enables you to scale the directory to meet business and network requirements.
- ADDS allows millions of objects per domain and uses indexing technology and advanced replication techniques to speed the performance.

## ADDS

- Extensibility – The structure of Active Directory database(schema) can be expanded to allow customized type of information.
- Manageability – Since it is a centralized single database, AD can be managed with less administrative efforts.
- AD is integrated with DNS. Active directory and DNS uses same hierarchical structure. AD clients use DNS to locate domain controllers.
- AD provides Policy based administration
- Flexible secure authentication and authorization
- Security integration

## ADDS Features

- ✓ ADDS is a database and service.
- ✓ ADDS stores all its object information's, like users, groups, computers, printers, shared folders, Ous, contacts etc...
- ✓ ADDS provides centralized network administration
- ✓ ADDS offers domain model networking
- ✓ Easy to manage a large network
- ✓ Highly secured environment
- ✓ It is scalable as per business requirement
- ✓ ADDS provides log on authentication, security policies
- ✓ Since it maintains a single centralized database, objects searching and management is very easy
- ✓ ADDS is integrated with DNS. Active directory and DNS uses same hierarchical structure. AD clients use DNS to locate domain controllers.

## Active Directory

### ► It is a database.

- It contains objects such as ( User, Group, Computer , Printer , Domain, etc)
- It provides Directory Service.
- DS contains information's about objects and using DS we can easily manage objects in our own network.
- AD is developed by Microsoft for Windows based domain networks

## Active Directory

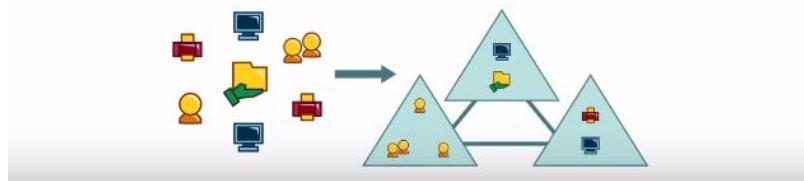
### ► How Directory Service works?

- AD uses LDAP (Open Source), Kerberos and DNS

LDAP	It is a standard application protocol. It help us to access and maintain directory information service via network
Kerberos	It is computer network authentication protocol. It provides authentication service over network
DNS	Domain name service . It helps to translate IP to name or name to IP.

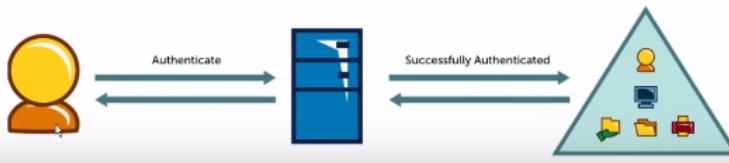
### What is Active Directory?

- Is similar to a telephone directory
- It is a software to arrange, store information; provides access and permissions based on those information



## What is Active Directory?

- Arranges all the Network's Users, Computers and other Objects into Logical, Hierarchical groupings
- Active Directory information is used to authenticate/ authorize the Users, Computers, Resources which are part of a network



## What is Active Directory?

- Has information about all the objects - Users, Computers, Resources like Printers, Shared Files/ Folders - in an organization's network.

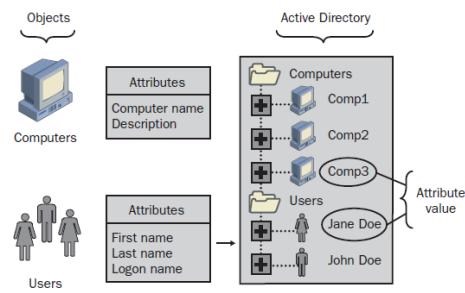


## Active Directory Objects

- Physical entities of a network
- Can be described by a subset of attributes
- Objects
  - Forest
  - Domain
  - Organizational Unit
  - User
  - Group
  - Contact
  - Computer
  - Shared folder
  - Printer
  - Site
  - Subnet

## ADDS Objects and Attributes

- The data stored in Active Directory, such as information about users, printers, servers, databases, groups, computers, and security policies, is organized into objects.
- An *object* is a distinct named set of attributes that represents a network resource. Object attributes are characteristics of objects in the directory.



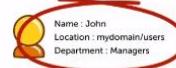
## Active Directory Schema

- The Active Directory schema defines objects that can be stored in Active Directory. The *schema* is a list of definitions that determines the kinds of objects and the types of information about those objects that can be stored in Active Directory.
- The schema is defined by two types of objects: schema class objects (also referred to as schema classes) and schema attribute objects (also referred to as schema attributes).
- Schema class objects and attribute objects are collectively referred to as schema objects or metadata.

- *Schema class objects* describe the possible Active Directory objects that can be created.
- *Schema attribute objects* define the schema class objects with which they are associated.

## Active Directory Objects

- Objects are explained by their attributes like Name, Location, Department etc.



- Container object



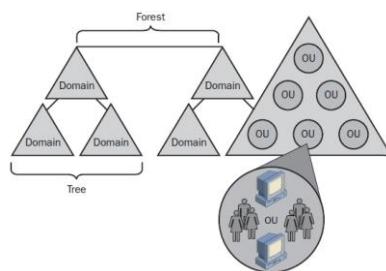
## Active Directory Objects

- Security Principal Object - objects that can be authenticated and assigned permissions
- Each object has
  - GUID - 128 bit Globally Unique Identifier
  - SID - Security identifier for each Security Principal Object



## Logical Structures

- In Active Directory, you organize resources in a logical structure—a structure that mirrors organizational models—using domains, OUs, trees, and forests. Grouping resources logically allows you to easily find a resource by its name rather than by remembering its physical location.



## ADDS - Domain

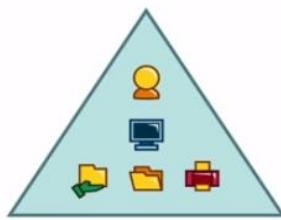
- Domain – The core unit of logical structure in Active Directory is the domain, which store millions of objects. Objects stored in a domain are considered vital to the network.
- Active Directory is made up of one or more domains. A domain can span more than one physical location. All network objects exists within a domain, and each domain stores information only about the objects that it contains.

## ADDS-Domain

- A domain is a security boundary. Access to domain objects is governed by access control lists(ACLs), which contains the permissions associated with the objects.
- None of the security policies and settings-such as administrative rights, security policies and ACLs can cross from one domain to another domain.
- A domain administrator has absolute rights to set policies only within their domain.

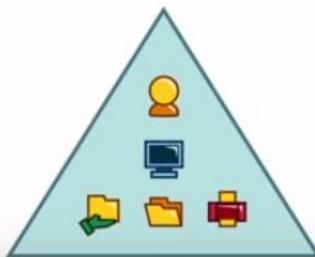
## Domain

- If a user has access to a domain, he can logon from anywhere and any computer in that domain.



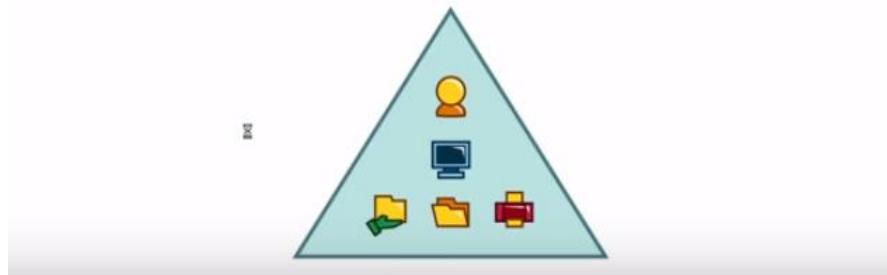
## Domain

- Domain controller is responsible for all the authentications, authorizations, additions, deletions, edits, modifications inside a domain.



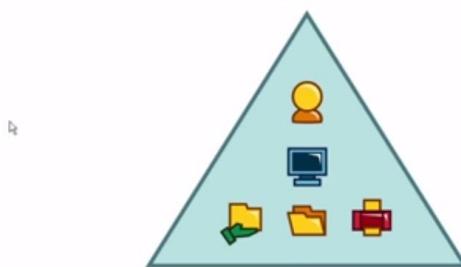
## Domain

- If a user has access to a domain, he can logon from anywhere and any computer in that domain.



## Domain

- The permissions, policies and rights can be set for all the objects at the domain level or at the individual object level as well.



## Domain - summary

- In short, a Domain has 4 components:
  - A hierarchical structure of Containers, Objects
  - A unique Domain Name
  - A security mechanism to Authenticate and Authorize access to Domain's resources
  - Policies that show how functionality is allowed or restricted for users, computers in a Domain.

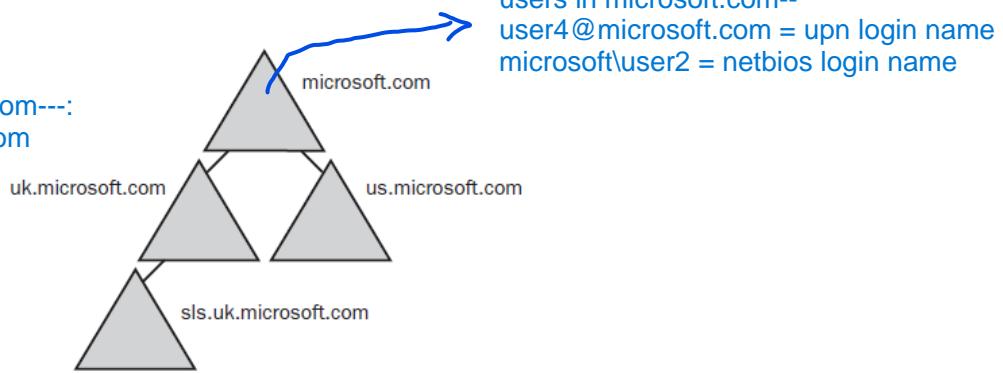
## Domain - TREE

- Tree is a grouping or hierarchical arrangement of one or more domains that you can create by adding one or more child domains to an existing parent domain.
- Domains in a tree shares a contiguous name space and hierarchical name structure. By creating hierarchy domains in a tree you can retain security and allow administration within OU or within a single domain of a tree.

## Domain - TREE

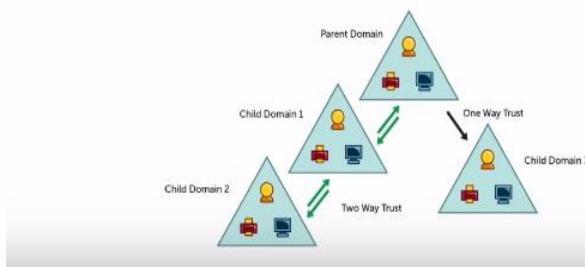
- Following DNS structure the domain name of a child domain is the relative name of that child domain appended with the name of the parent domain.

users in uk.microsoft.com---:  
user2@uk.micrsoft.com



### Domain Tree

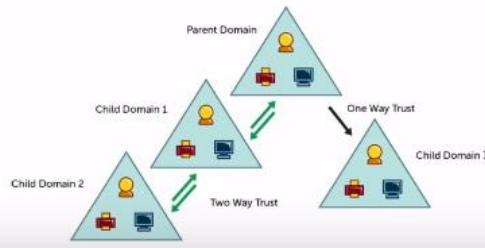
- Domain tree: Parent Domain - Child Domain(s) tree structure or Nested Domains



user in child dom 3 to communicate with  
user in child dom 2...  
--step dns

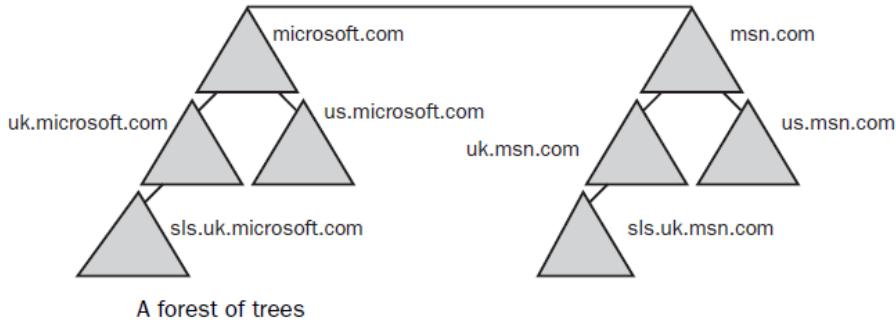
## Domain Tree

- Objects in different domains communicate through 'Trusts' which are Transitive, Non-Transitive, Two Way and One Way.



## ADDS - FOREST

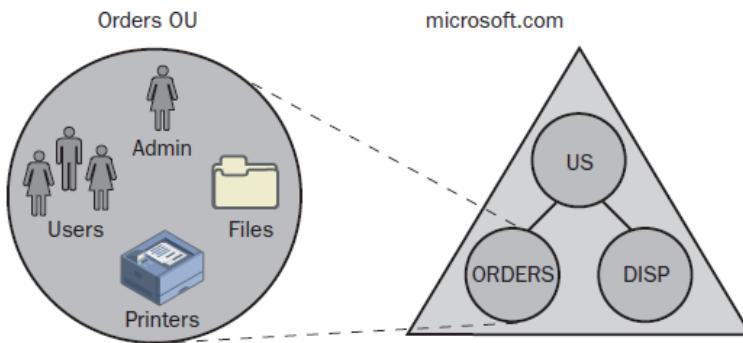
- A forest is a grouping or hierarchical arrangements of one or more separate, completely independent domain trees.
- All domains in forest share a common schema
- All domains in a forest share a **common Global Catalog**
- All domains in a forest are linked by implicit two-way transitive trust
- Trees in a forest have different naming structure according to their domains.
- Domains in a forest operate independently, but the forest enables communication across the entire organization.



## ADDS - Organizational Unit (OU)

- An **OU** is a container used to organize objects within a domain into logical administrative groups. An OU can contain objects such as user accounts, groups, computers, printers, applications, file shares and other OUs from the same domain.
- An OU can have many sub-OUs
- An OU can be delegated with separate administrative authority, by adding OUs to other OUs or nesting, you can provide administrative control in hierarchical fashion.
- An OU is the smallest administrative unit in an AD domain

## ADDS - OU



**Organizational Unit (OU)**

- Organizational Units can appear only inside a Domain

```

graph TD
    Ous[Ous] --> Partner[Partner]
    Ous --> Reseller[Reseller]
    Ous --> HR[HR]
    Ous --> Finance[Finance]
    Partner --> Customers[Customers]
    Partner --> Users[Users]
    Finance --> John((John))
    Finance --> Computer[Computer]
  
```

**Organizational Unit (OU)**

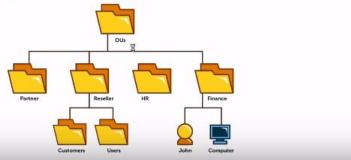
- OUs are unique inside a Domain.

```

graph TD
    Ous[Ous] --> Partner[Partner]
    Ous --> Reseller[Reseller]
    Ous --> HR[HR]
    Ous --> Finance[Finance]
    Partner --> Customers[Customers]
    Partner --> Users[Users]
    Finance --> John((John))
    Finance --> Computer[Computer]
  
```

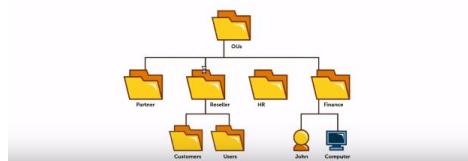
## Organizational Unit (OU)

- Contains other objects like Users, Groups, Contacts, Computers, Printers, Shared folders etc.



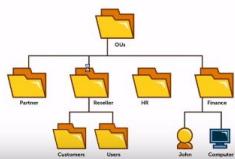
## Organizational Unit (OU)

- An OU can contain another OU(s).



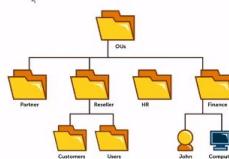
## Organizational Unit (OU)

- Nested OUs have Parent-Child relationship.



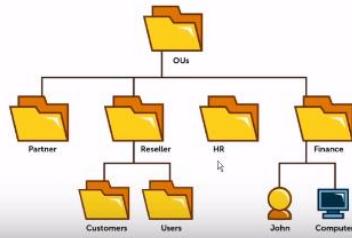
## Organizational Unit (OU)

- Group Policy Settings can be set at the OU level.



### Organizational Unit (OU)

➤ Delegation of Administrative Control is possible in OU.



## ADDS – Physical Components

- Physical components of Active Directory are **Domain Controllers and Sites**.
- Domain Controller (DC) – DC is a computer running windows server OS added active directory domain services, that stores a replica of the domain directory (Database).
- A domain can have one or more domain controllers. A domain controller can serve only one domain.
- A domain controller can authenticates user logon attempts and maintains the security policy for a domain.

## ADDS – Physical Components

- Each DC stores complete copy of all Active Directory information for that domain, manages changes to that information and replicates those changes to other DCs in the same domain.
- DCs in a domain automatically and immediately replicate directory information for all objects in the domain to each other.
- ADDS uses multi master replication, in which no one DC is the master , instead all DCs within a domain are peers.

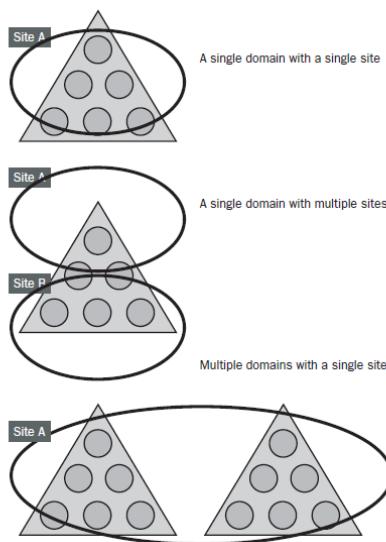
## ADDS – Physical Components

- Having more than one DC provides fault tolerance in a domain.
- DC manages all aspects of users domain interactions such as locating domain objects, user logon attempts and security policy settings for domain objects.

## ADDS - SITE

- **Sites** - A *site* is a combination of one or more IP subnets connected by a highly reliable and fast link to localize as much network traffic as possible. Typically, a site has the same boundaries as a local area network (LAN).
- When you group subnets on your network, you should combine only subnets that have fast, cheap, and reliable network connections with one another.

## SITE



## ADDS – Global Catalog

- ADDS allows users and administrators to find objects such as users, groups, printers, file, folders in their own domain. However finding objects outside the domain and across the enterprise requires a separate mechanism that allows the domains to act as one entity.
- A catalog service contains selected information about **every object in all domains in the directory**, which is useful in performing searches across an enterprise.
- The global catalog is the catalog service provided by Active Directory.

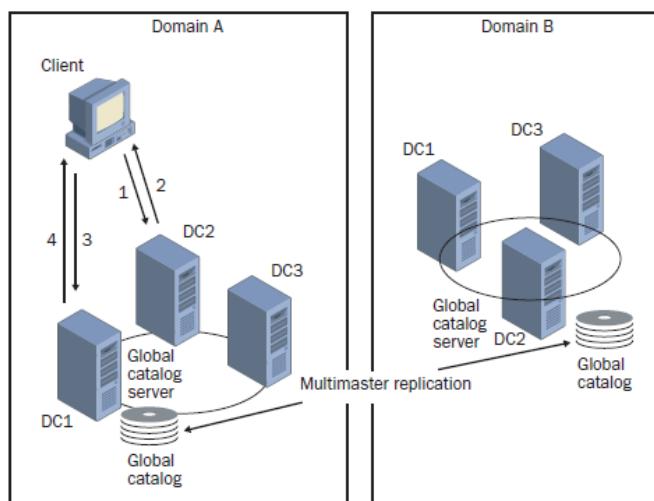
## ADDS – Global Catalog

- A **global catalog is the central repository of information about all objects in a tree or forest**. By default global catalog is created in the first domain controller in a forest.
- A domain controller holds a copy of the catalog is called global catalog server. You can delegate any DC in a forest as a global catalog server.

## ADDS – Global Catalog

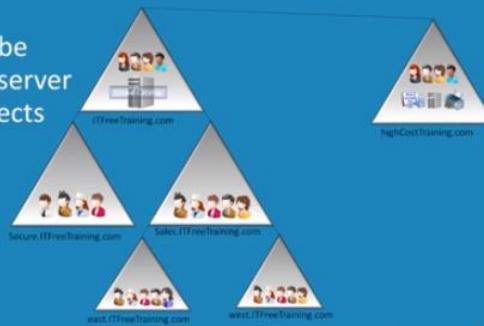
- Global catalog stores a full replica of all objects attributes in the directory for its host domain and a partial replica of all objects attributes contained in the directory for every other domain in the forest.
- Main services of GC - 1. GC enables a user to log on to a network by providing universal group membership information to a domain controller when a logon process initiated.
- 2. GC enables finding directory information regardless of which domain in the forest actually contains the data.

## Global Catalog



## Global Catalog (GC)

Each domain has separate database  
Acts as an index  
Any domain controller can be made into a global catalog server  
Contains a subset of all objects  
All objects in the forest  
Holds multi domain groups



## Global Catalog Facts

Any domain controller can be a Global Catalog (GC)  
Must have one GC per domain  
Should have more than one for redundancy  
Windows Server 2008 all DC's are GC's by default  
Requires more disk space  
Requires more bandwidth

## Active Directory User

- Part of the organization
- Unique identity in the domain
- Accesses the domain's resources
- Authorization based access
- Has a unique SID
- Account is unique and is secured by a password



## Active Directory Computer

- Individual Computers/ Workstations, Servers which are part of a network.
- Each computer has a unique computer account.
- Computer account allows each computer to be authenticated and authorized for access to the domain and domain resources.
- A server could be a Domain Controller or Global Catalog Server or a Member Server.



## Active Directory Contact

- An individual who is not part of the organization but related to the organization.  
Example: Customer, Supplier, Vendor, etc.
- Unlike a user, a Contact cannot logon or access the domain or network.
- Cannot be assigned permissions or authorizations or restrictions.



## Active Directory Group

- Contains Users and Computers who are called members of the group.
- All permissions, authorizations and restrictions placed on the groups apply to all the members of the group.
- Two types of groups



Security groups



Mail groups

## Active Directory Group

### ➤ Group scopes

- **Domain local** - To give access to resources in the same domain as the group, users can be from different domains.
- **Global group** - To give access to resources that are in different domains to users from a specific domain.
- **Universal group** - Used to give access to resources located in different domains to a group of users from different domains.



## Why should we use Active Directory Services?

- Highly secure - Possible to have *layered security*. That is, have policies and permissions for security at different levels.
- Objects can be *located anywhere* physically, yet can securely access domain/network's resources.
- Millions of users can be added to a single domain. Highly scalable and readily extensible.
- Easy and efficient search mechanism to locate an object.

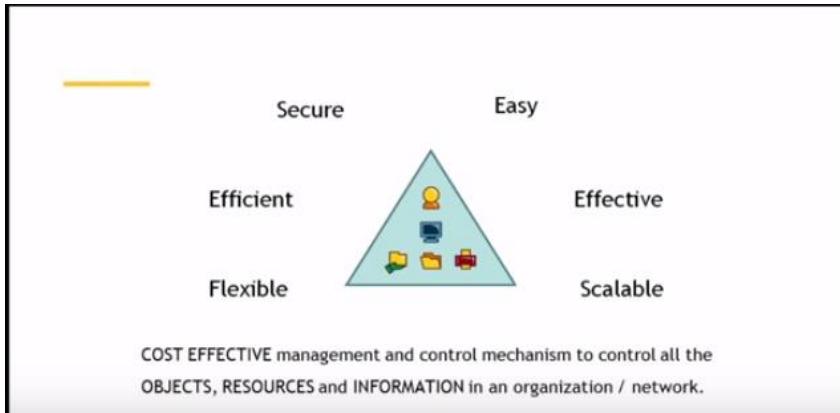
local profile  
roaming profile  
mandatory profile  
temporary profile

## Why should we use Active Directory Services?

- **Centralized storage** for user information. This makes the process of backup and restore a lot more efficient.
- Serves as a platform for services like Exchange, Office365, SharePoint, etc.
- **Individual Profiles** - Users can have the same environmental settings immaterial of which computer or location they logon from.
- **Mandatory Profiles** - It is also possible to restrict/allow a specific set of applications and services to a set of users/groups.
- **Centralized Auditing** - makes it easier to track important security events.

## Where can Active Directory Services be used?

- Any organization that has a network setup.
- Organizations which require 24\*7 uptime.
- Any organization where the number of users, computers, or resources will keep changing.
- Any organization where information/ data security is vital.
- Any organization that operates in multiple locations.

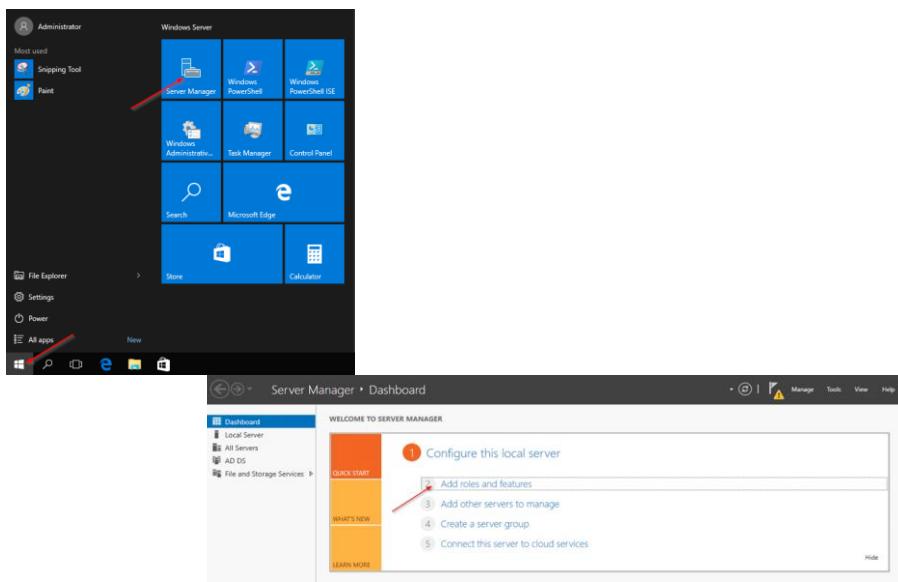


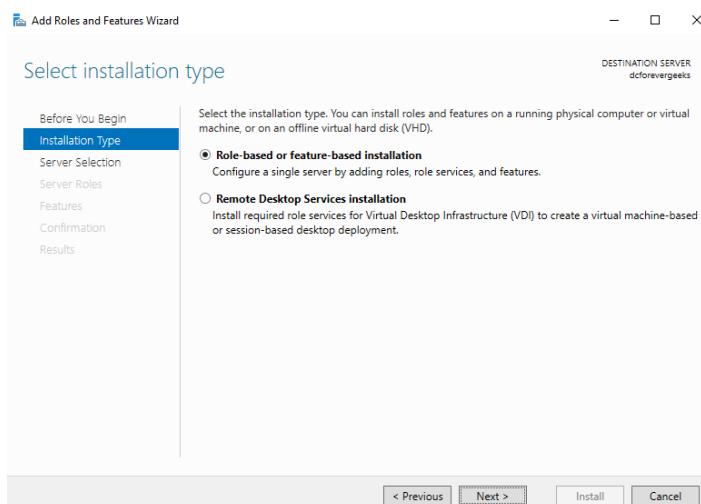
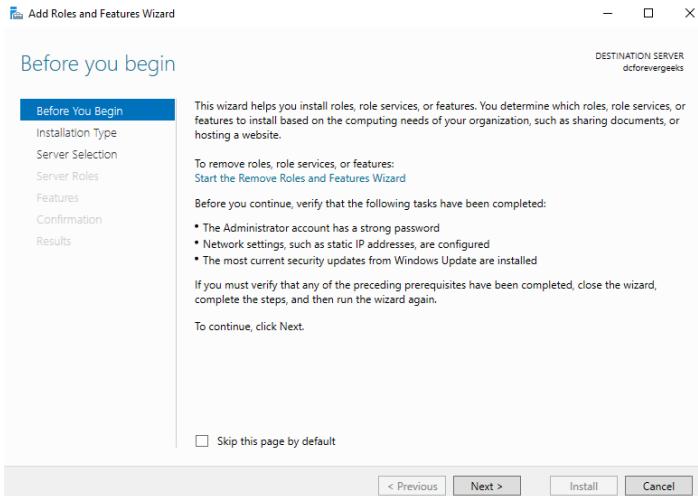
## ADDS – Directory (NTDS.DIT)

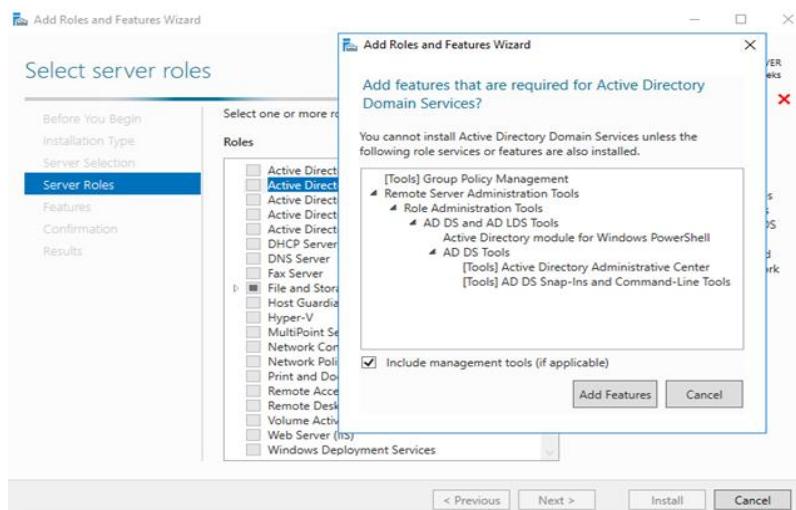
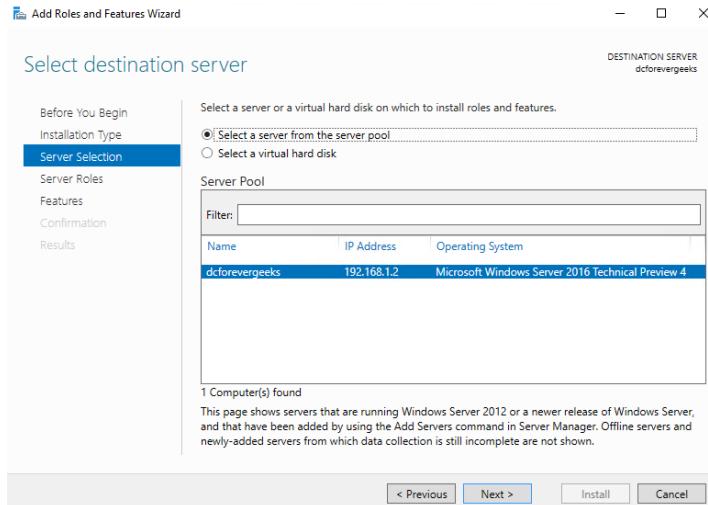
these file available in only dc computer  
c\windows\ntds

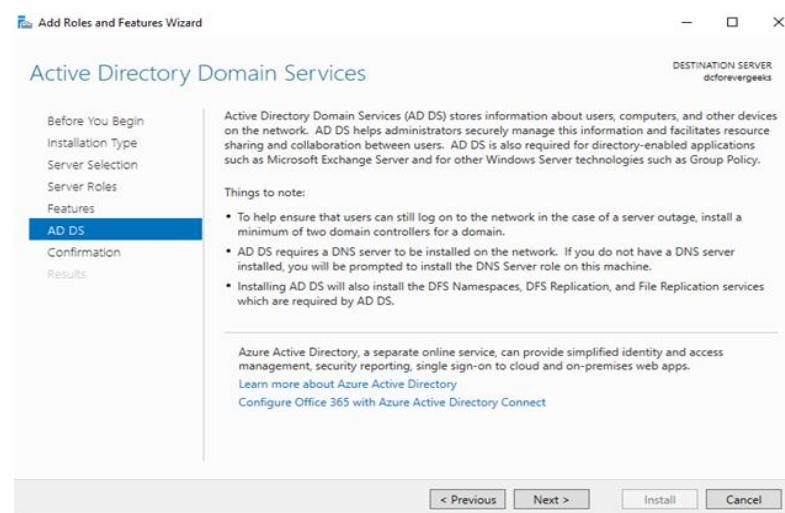
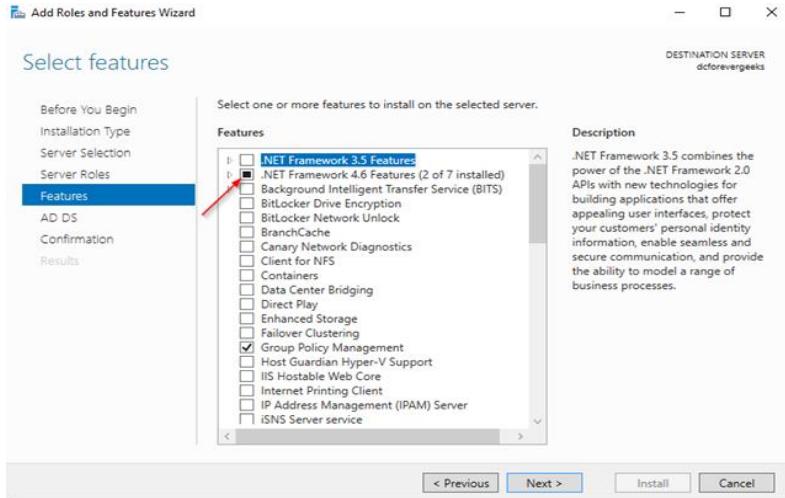
- The information stored in Ntds.dit file is logically partitioned into four categories. Each of these information categories is referred as a directory partition.
- Schema partition - This partition defines the objects that can be created in the directory and the attributes those objects can have. This data is common to all domains in a forest and is replicated to all domain controllers in a forest.

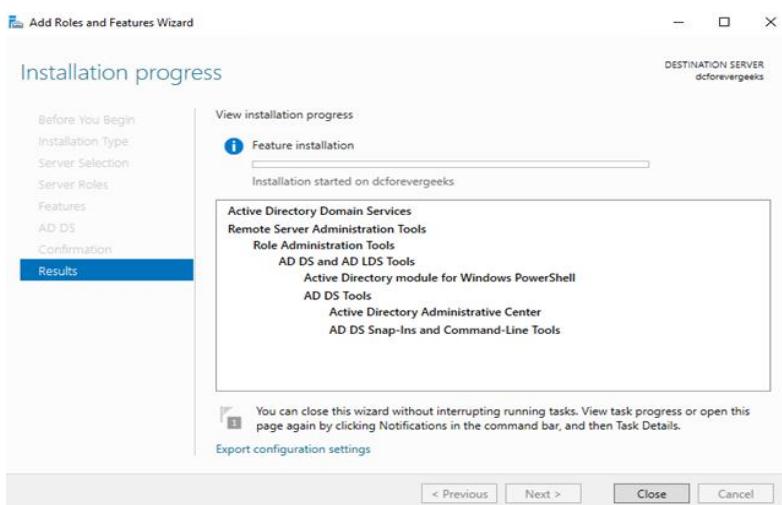
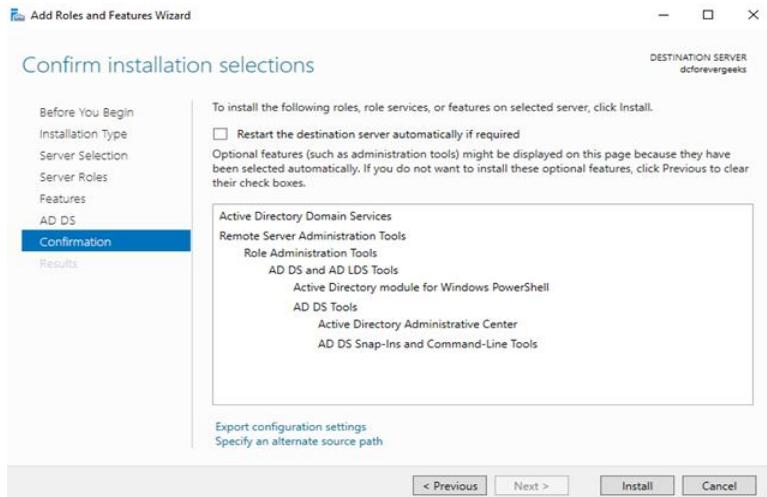
# ADDS Installation

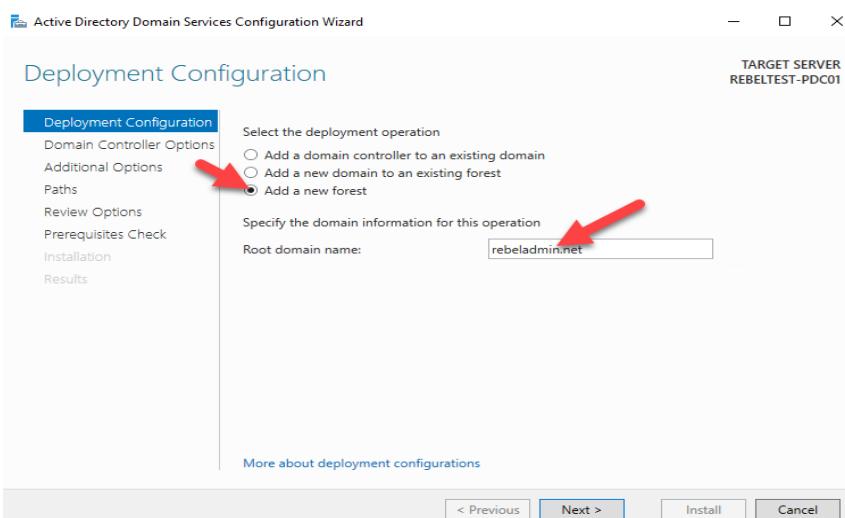
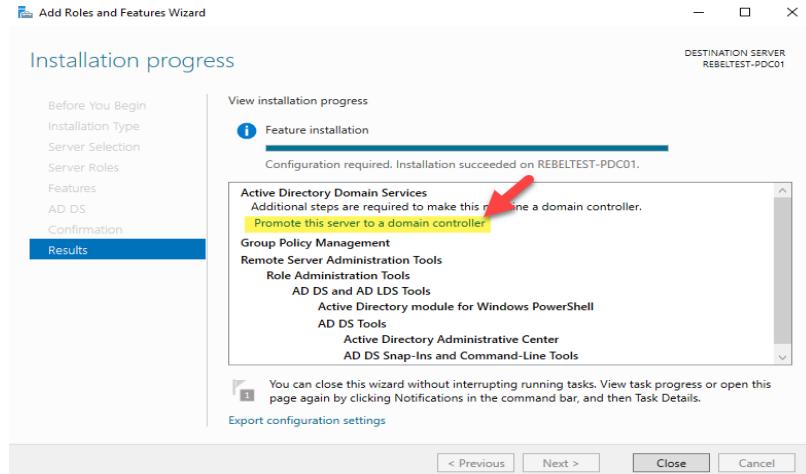


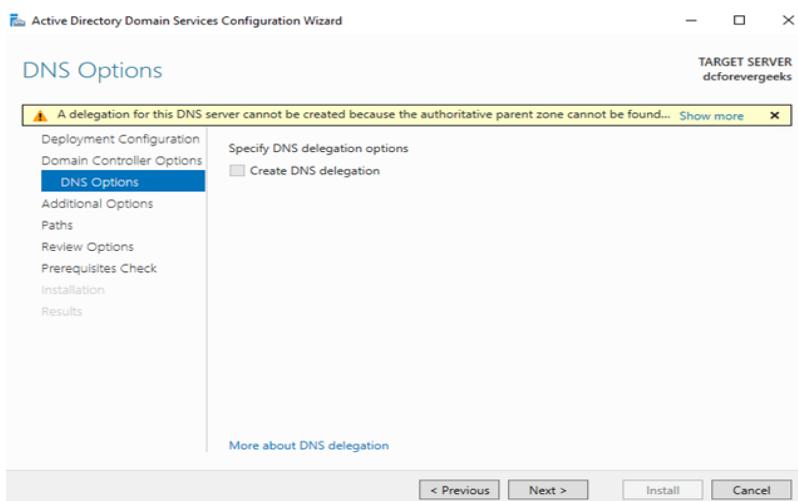
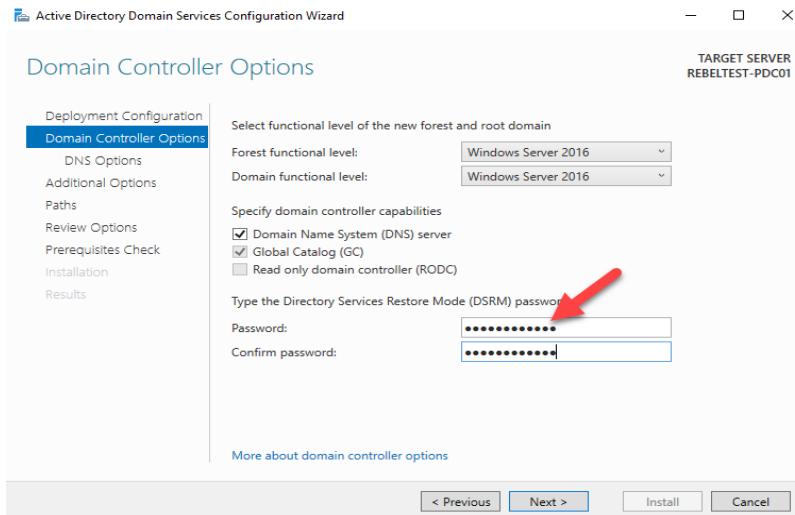


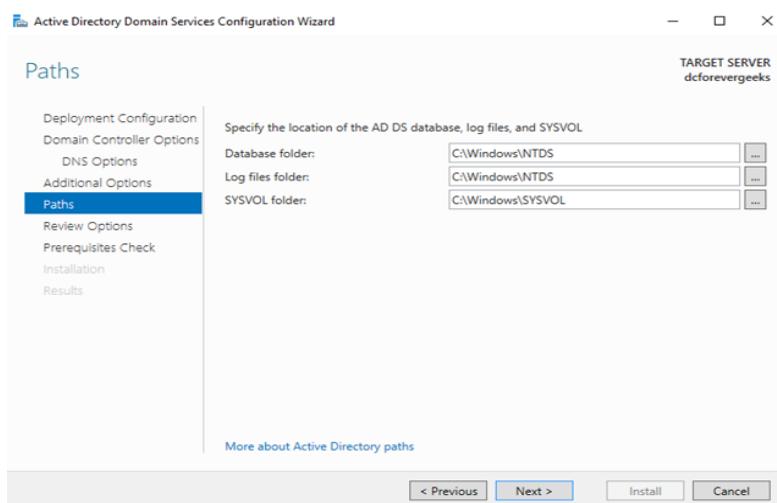
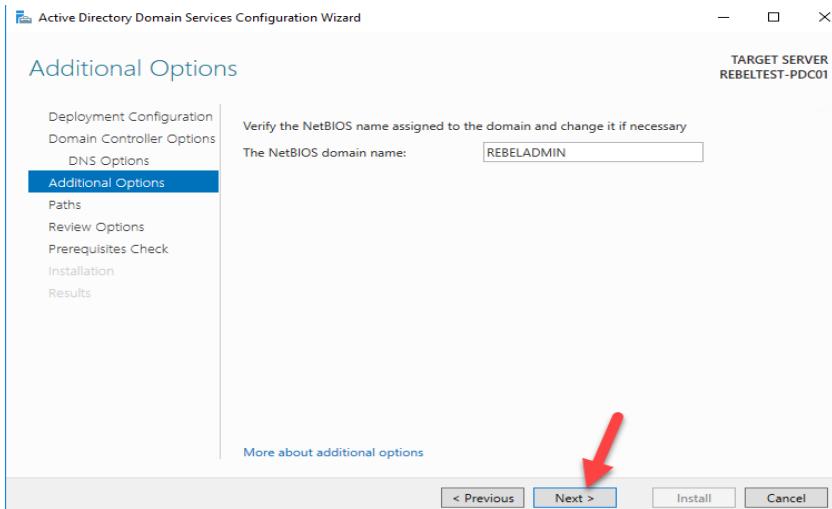


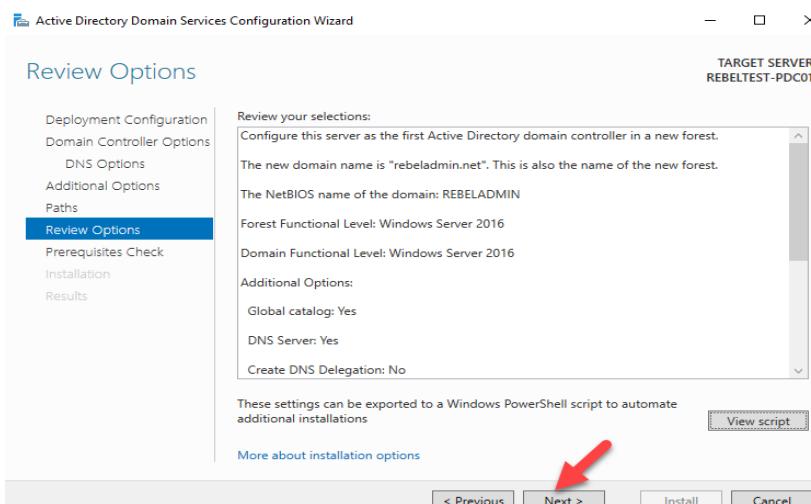
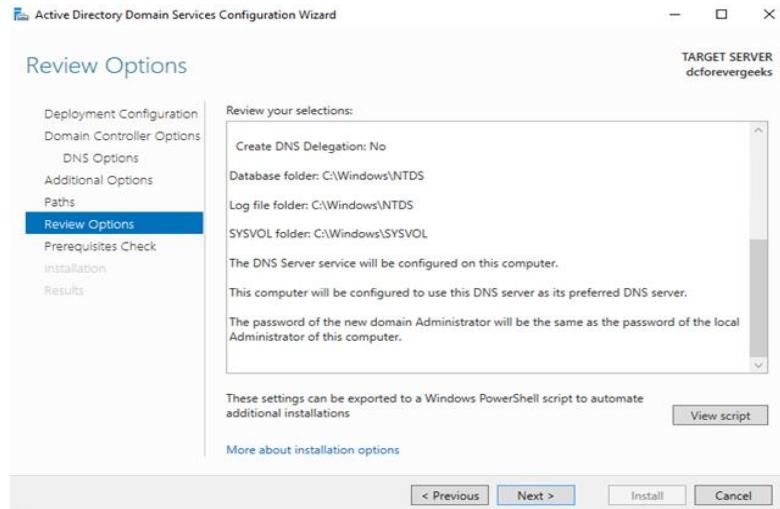


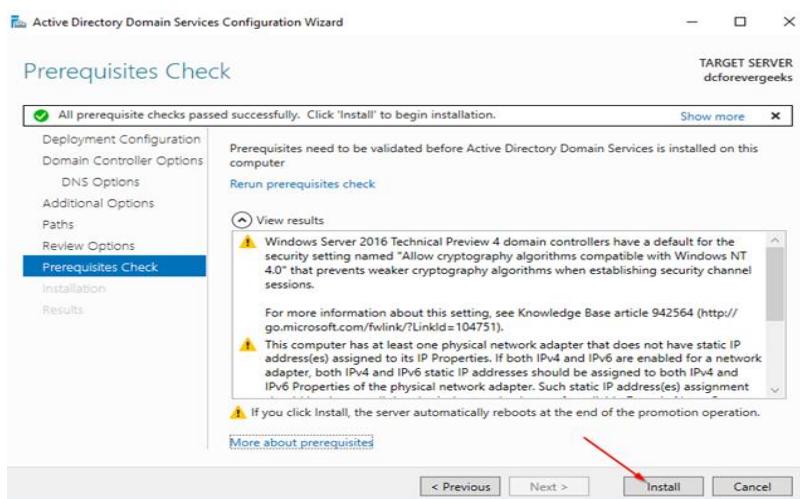
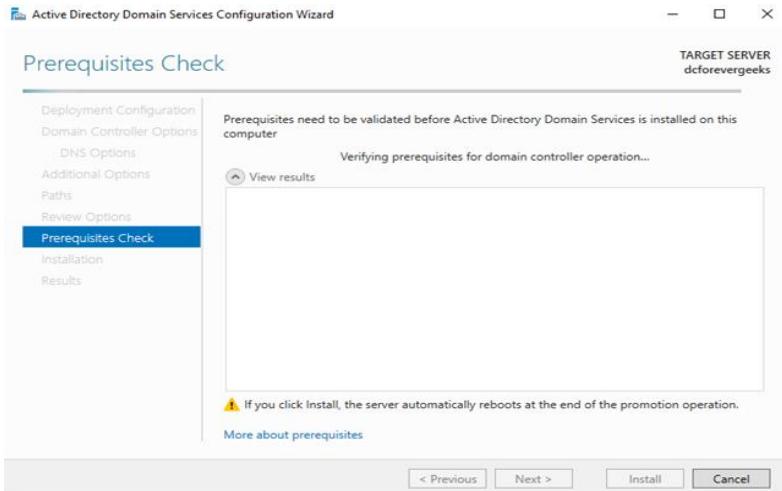


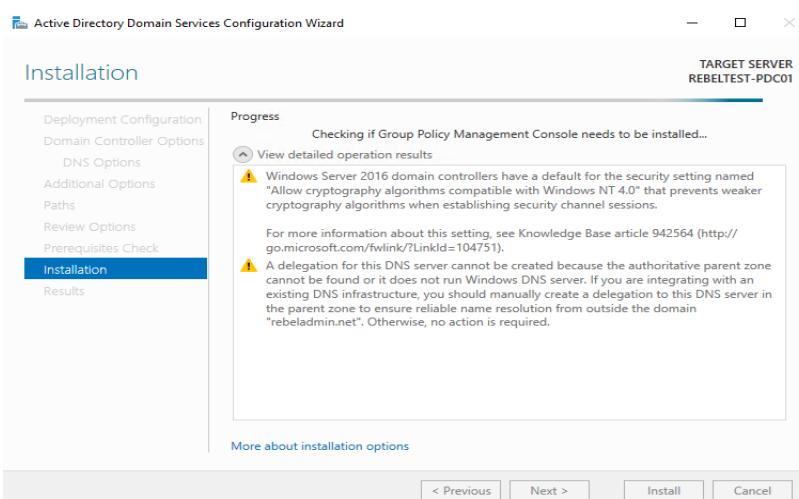
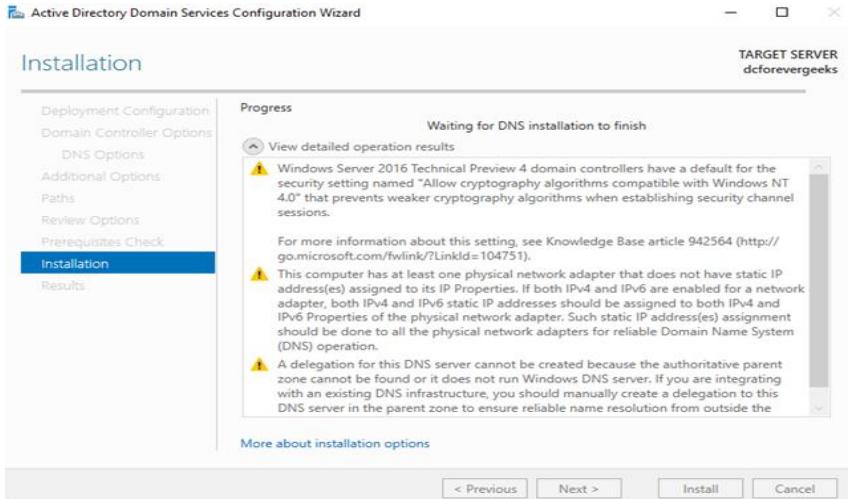


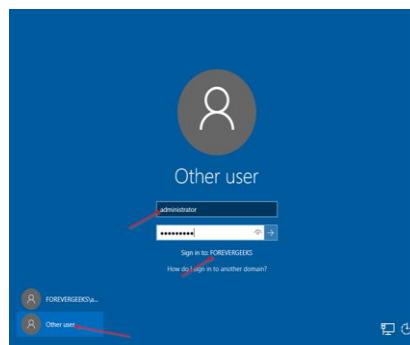
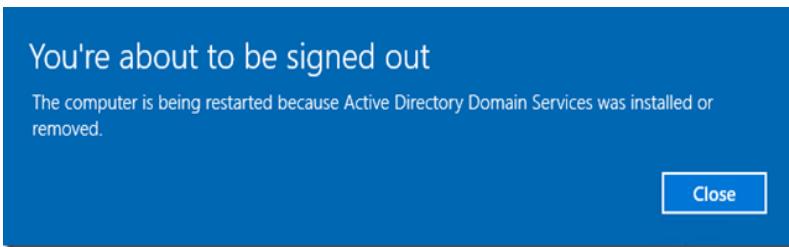




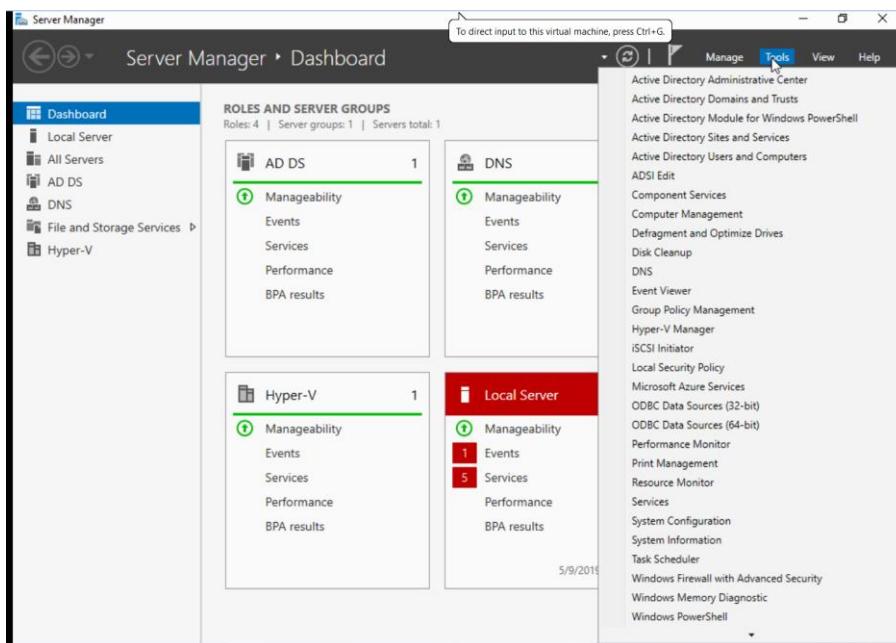








After the installation system will restart automatically. Once it comes back log in to the server as domain admin.



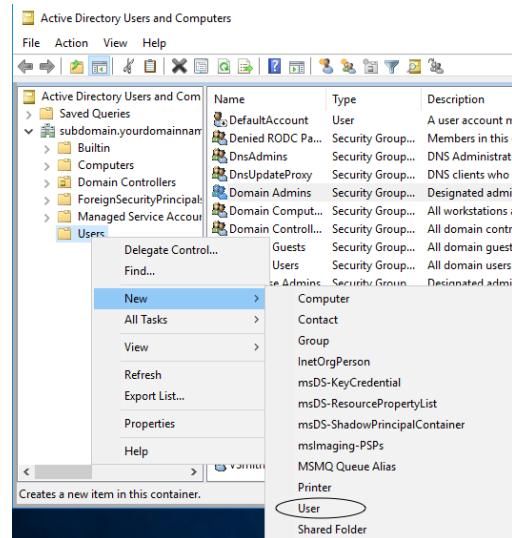
# User Account Management

Active Directory Users and Computers

Name	Type	Description
Administrator	User	Built-in account for ad...
Allowed RODC Password Replication...	Security Group...	Members in this group c...
Cert Publishers	Security Group...	Members of this group ...
Cloneable Domain Controllers	Security Group...	Members of this group t...
Denied Account	User	A user account manage...
Denied RODC Password Replicatio...	Security Group...	Members in this group c...
DnsAdmins	Security Group...	DNS Administrators Gro...
DnsUpdateProxy	Security Group...	DNS clients who are pe...
Domain Admins	Security Group...	Designated administrato...
Domain Computers	Security Group...	All workstations and se...
Domain Controllers	Security Group...	All domain controllers i...
Domain Guests	Security Group...	All domain guests
Domain Users	Security Group...	All domain users
Enterprise Admins	Security Group...	Designated administrato...
Enterprise Key Admins	Security Group...	Members of this group ...
Enterprise Read-only Domain Contro...	Security Group...	Members of this group ...
Group Policy Creator Owners	Security Group...	Members in this group c...
Guest	User	Built-in account for gue...
Key Admins	Security Group...	Members of this group ...
nelson	User	this account is for a tut...
Protected Users	Security Group...	Members of this group ...
RAS and IAS Servers	Security Group...	Servers in this group ca...
Read-only Domain Controllers	Security Group...	Members of this group ...
Schema Admins	Security Group...	Designated administrato...

DNS Manager

Name	Type	Data	Timestamp
msdc	Start of Authority (SOA)	[33], dcforevergeeks.forever...	static
sites	Name Server (NS)	dcforevergeeks.foreverge...	static
tcp			
udp			
DomainDnsZones			
ForestDnsZones			
(same as parent folder)	Start of Authority (SOA)	[33], dcforevergeeks.forever...	static
(same as parent folder)	Name Server (NS)	dcforevergeeks.foreverge...	static
(same as parent folder)	Host (A)	192.168.1.201	2/8/2016 9:00:00 PM
dcforevergeeks	Host (A)	192.168.1.201	static



**New Object - User (Step 1)**

Create in: subdomain.yourdomainname.org/Users

First name:	Jane	Initials:	<input type="text"/>
Last name:	Citizen		
Full name:	Jane Citizen		
User logon name:	jancit	@subdomain.yourdomainname.c	
User logon name (pre-Windows 2000):	SUBDOMAIN\	jancit	

< Back Next > Cancel

**New Object - User (Step 2)**

Create in: subdomain.yourdomainname.org/Users

Password:	<input type="password"/> (redacted)
Confirm password:	<input type="password"/> (redacted)
<input type="checkbox"/> User must change password at next logon <input checked="" type="checkbox"/> User cannot change password <input checked="" type="checkbox"/> Password never expires <input type="checkbox"/> Account is disabled	

< Back Next > Cancel

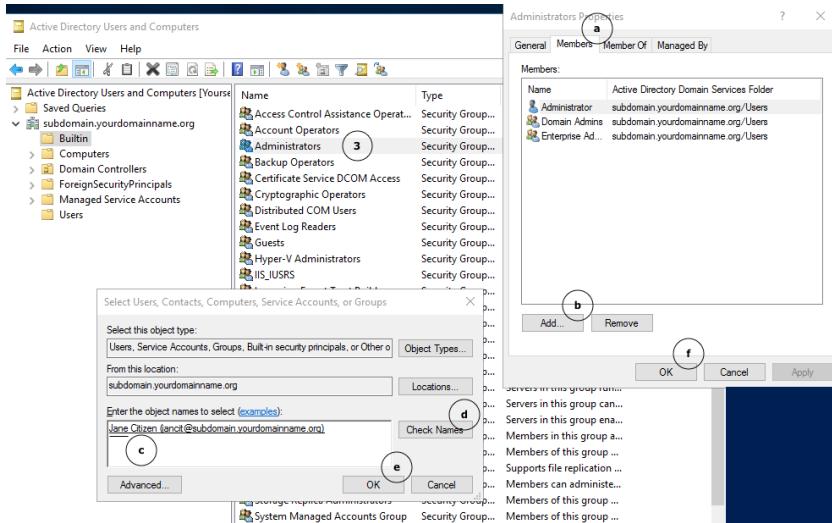
**New Object - User (Step 3)**

Create in: subdomain.yourdomainname.org/Users

When you click Finish, the following object will be created:

Full name: Jane Citizen  
 User logon name: jancit@subdomain.yourdomainname.org  
 The user cannot change the password.  
 The password never expires.

< Back Finish Cancel



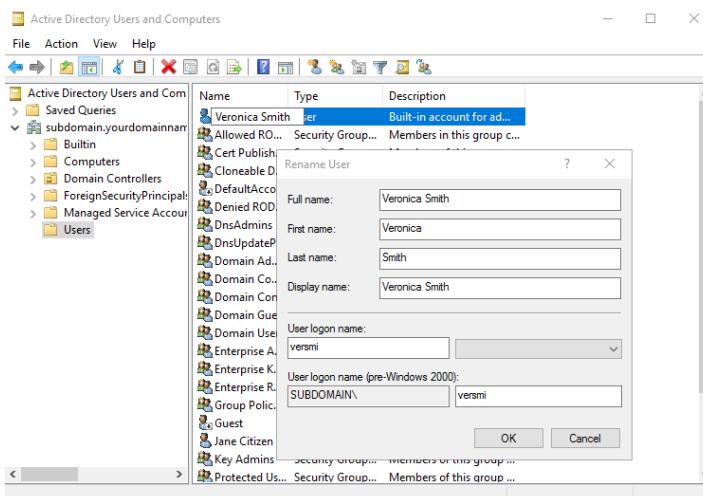
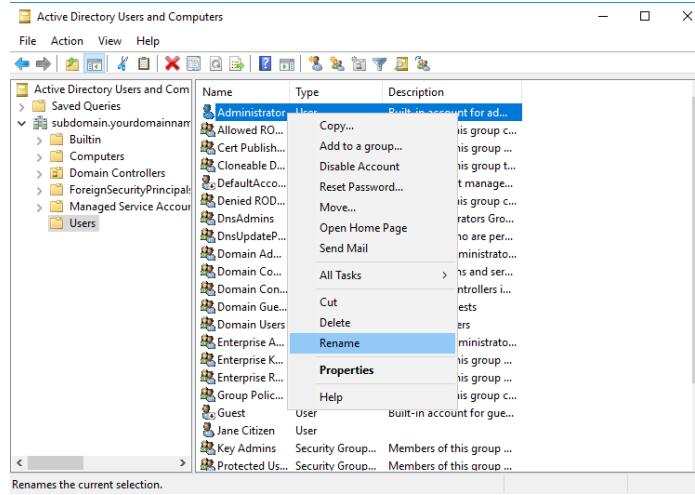
The image contains two side-by-side 'Administrator Properties' dialog boxes. Both dialogs have tabs for 'Member Of', 'Dial-in', 'Environment', and 'Sessions'. The 'General' tab is selected in both.

**Left Dialog (Step 4):**

- 4: A red circle highlights the 'Address' field, which contains the value 'Administrator'.
- a: A red circle highlights the 'Last name' field, which contains the value 'Smith'.
- b: A red circle highlights the 'Apply' button at the bottom of the dialog.

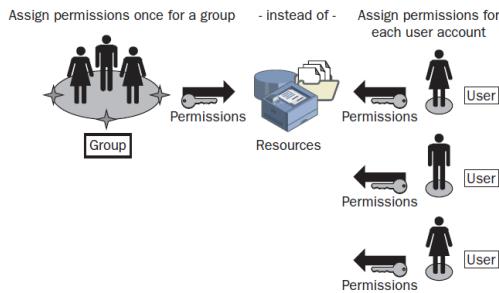
**Right Dialog (Step 5):**

- 5: A red circle highlights the 'Account' tab.
- a: A red circle highlights the 'User logon name' field, which contains the value 'versmi'.
- b: A red circle highlights the 'Log On To...' button next to the 'User logon name' field.



## ADDS - Groups

- A group is a collection of user accounts. Groups simplify administration by allowing you to assign permissions and rights to a group of users rather than having to assign permissions to each individual user account.



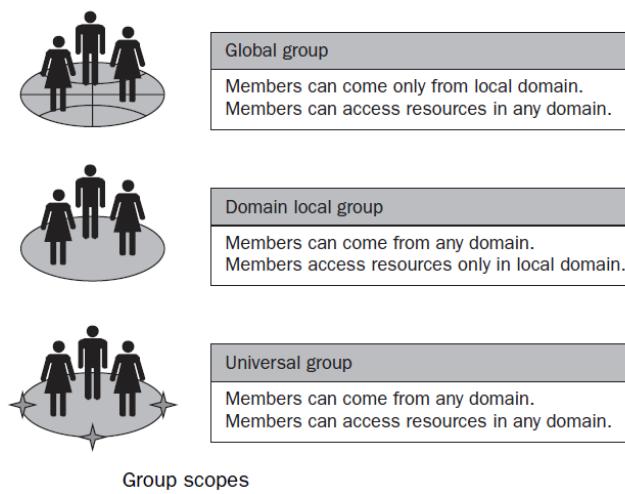
## ADDS - Groups

- You can create groups for security-related purposes, such as assigning permissions, or for non-security purposes, such as sending e-mail messages.
- To facilitate this, Active Directory service provides two group types: *security* and *distribution*.
- Security Groups** -Windows Server uses only security groups, which you use to assign permissions to gain access to resources.

## ADDS - Groups

- Distribution Groups - Applications use *distribution groups* as lists for non-security related functions, such as sending e-mail messages to a group of users at the same time.
- You cannot use distribution groups to assign permissions.

## ADDS - Groups



## ADDS - Groups

### Global Groups

*Global security groups* are most often used to organize users who share similar network access requirements. A global group has the following characteristics:

- **Limited membership** You can add members only from the domain in which you create the global group.
- **Access to resources in any domain** You can use a global group to assign permissions to gain access to resources that are located in any domain in the tree or forest.

## ADDS - Groups

### Domain Local Groups

*Domain local security groups* are most often used to assign permissions to resources. A domain local group has the following characteristics:

- **Open membership** You can add members from any domain.
- **Access to resources in one domain** You can use a domain local group to assign permissions to gain access to resources that are located only in the same domain where you create the domain local group.

## ADDS - Groups

### Universal Groups

The universal group is a new feature beginning in Microsoft Windows 2000. *Universal security groups* are most often used to assign permissions to related resources in multiple domains. A universal security group has the following characteristics:

- **Open membership** You can add members from any domain in the forest.
- **Access to resources in any domain** You can use a universal group to assign permissions to gain access to resources that are located in any domain in the forest.

## ADDS - Groups

Global	User accounts and computer accounts from the same domain	User accounts, computer accounts, and global groups from the same domain
Domain local	User accounts, computer accounts, and global groups from any domain	User accounts, computer accounts, global groups, and universal groups from any domain; domain local groups from the same domain
Universal	Not available in domains with a domain functional level set to Windows 2000 mixed	User accounts, computer accounts, global groups, and other universal groups from any domain in the forest

## Default Groups in the Builtin

Group Name	Description
Account Operators	This group exists only on domain controllers. By default, the group has no members. By default, members can create, modify, and delete accounts for users, groups, and computers in all containers and OUs of Active Directory except the Builtin folder and the Domain Controllers OU. Members do not have permission to modify the Administrators and Domain Admins groups, nor do they have permission to modify the accounts for members of those groups.
Administrators	Members have complete and unrestricted access to the computer or domain controller, including the right to change their own permissions. If the Administrator account resides on the first domain controller configured for the domain, the Administrator account is automatically added to the Domain Admins group and complete access to the domain is granted.
Backup Operators	By default, this group has no members. Members can back up and restore all files on a computer, regardless of the permissions that protect those files. Members can also log on to the computer and shut it down.

## Default Groups in the Builtin

Print Operators	This group exists only on domain controllers. Members can manage printers and document queues.
Remote Desktop Users	Members can log on to a computer from a remote location.
Replicator	This group supports directory replication functions and is used by the file replication service on domain controllers. By default, the group has no members. The only member should be a domain user account used to log on to the Replicator services of the domain controller. Do not add users to this group.
Server Operators	This group exists only on domain controllers. By default, the group has no members. Members can log on to a server interactively, create and delete network shares, start and stop services, back up and restore files, format the hard disk of the computer, and shut down the computer.

## •ADDS management commands

- **Dsquery \*** Finds any object in Active Directory by using a generic LDAP query
- **Dsquery computer** Finds computers in the directory
- **Dsquery contact** Finds contacts in the directory
- **Dsquery subnet** Finds subnets in the directory
- **Dsquery group** Finds groups in the directory
- **Dsquery ou** Finds OUs in the directory
- **Dsquery partition** Finds partition objects in the directory
- **Dsquery quota** Finds quota specifications in the directory
- **Dsquery site** Finds sites in the directory
- **Dsquery server** Finds servers in the directory
- **Dsquery user** Finds users in the directory

- To find all computers that have been inactive for the last four weeks, type:  
**dsquery computer -inactive 4**
- To find all users in the Marketing OU in the domain *microsoft.com*, type:  
**dsquery user OU=Marketing,DC=Microsoft,DC=Com**
- To find all users with names starting with “Mike,” type:  
**dsquery user -name Mike\***
- To read all attributes of the object whose distinguished name is OU=Test,DC=Microsoft,DC=Com, type:  
**dsquery \* OU=Test,DC=Microsoft,DC=Com -scope base -attr \***

- Csvde, Dsadd, Dsget, Dsmod, Dsmove, Dsquery, Dsrm, Ldifde, and Ntdsutil
- **dsadd ou OU=newOName,OU=parentOU,DC=domain,DC=com.**
- **Distinguished Name**
- Every object in Active Directory has a *distinguished name (DN)* that uniquely identifies the object and contains sufficient information
- CN=Scott Cooper,OU=Promotions,OU=Marketing,DC=Microsoft,DC=Com

Tool	Description
DSAdd	<b>Creates an object in the directory</b>
DSGet	<b>Return specified attributes of an object</b>
DSMod	<b>Modifies specified attributes of an object</b>
DSRM	<b>Removes an object and all sub trees</b>
DSQuery	<b>Performs Active Directory query</b>

- **DSADD** Adds objects to the directory.
- **DSGET** Displays (“gets”) properties of objects in the directory.
- **DSMOD** Modifies select attributes of an existing object in the directory.
- **DSMOVE** Moves an object from its current container to a new location.
- **DSRM** Removes an object, the complete subtree under an object, or both.
- **DSQUERY** Queries Active Directory for objects that match a specified search criteria. This command is often used to create a list of objects, which are then piped to the other command-line tools for management or modification.

```
C:\>DSAdd user "cn=Simth,cn=users,dc=ITFreeTraining,dc=local" -fn John -ln Simth
-pwd P@ssw0rd -mustchpwd yes
dsadd succeeded:cn=Simth,cn=users,dc=ITFreeTraining,dc=local
```

```
C:\>DSAdd computer "cn=pc1,cn=computers,dc=ITFreeTraining,dc=local"
```

```
C:\>dsadd group "cn=GSales,ou=Users,ou>New York,dc=ITFreeTraining,dc=local" -sco
pe g
```

```
C:\>dsrm "OU=Testing,dc=ITFreeTraining,dc=local" -subtree
```

```
C:\>DSGet user "cn=John Doe,ou=Users,ou>New York,dc=ITFreeTraining,dc=local" -fn
-ln -email
  fn      ln      email
  John    Doe   DoeJ@ITFreeTraining.local
dsget succeeded
```

```
C:\>dsmod user "cn=Simth,cn=users,dc=ITFreeTraining,dc=local" -pwd P@ssw0rd2 -mu
stchpwd yes
```

```
C:\>dsrm "OU=Testing,dc=ITFreeTraining,dc=local" -subtree -c
Are you sure you wish to delete OU=Testing,dc=ITFreeTraining,dc=local (Y/N)? n
```

```
C:\>dsquery ou DC=ITFreeTraining,DC=Local
"OU=Domain Controllers,DC=ITFreeTraining,DC=local"
"OU=New York,DC=ITFreeTraining,DC=local"
"OU=Computers,OU=New York,DC=ITFreeTraining,DC=local"
"OU=Users,OU=New York,DC=ITFreeTraining,DC=local"
"OU=Marketing,OU=Users,OU=New York,DC=ITFreeTraining,DC=local"
"OU=Sales,OU=Users,OU=New York,DC=ITFreeTraining,DC=local"
"OU=test,OU=Computers,OU=New York,DC=ITFreeTraining,DC=local"
"OU=London,DC=ITFreeTraining,DC=local"
"OU=Users,OU=London,DC=ITFreeTraining,DC=local"
"OU=Computers,OU=London,DC=ITFreeTraining,DC=local"
"OU=Testing,DC=ITFreeTraining,DC=local"
```

- **dsquery user "OU=Employees, DC=Contoso,DC=Com" -stalepwd 7**
- The command, which finds user objects that have not changed their password in seven days
- **dsquery user "OU=Employees, DC=Contoso,DC=Com" -stalepwd 7 | dsmod user -mustchpwd yes**
- The command used the results of DSQUERY as the input for the DSMOD command. The DSMOD command configured the option “User must change password at next logon” for each object. Confirm your success by examining the Account tab of the affected objects.

## Operations master roles - FSMOs

- Operations master roles (also known as flexible single master operations, or FSMO) are **special roles assigned to one or more domain controllers in an Active Directory domain.**
- The domain controllers assigned these roles perform single-master replication.

## Operations master roles - FSMO

- Active Directory supports multimaster replication of the Active Directory database between all domain controllers in the domain.
- However, some changes are impractical to perform in multimaster fashion, so one or more domain controllers can be assigned to perform operations that are single-master (not permitted to occur at different places in a network at the same time).
- Operations master roles are assigned to domain controllers to perform single-master operations.

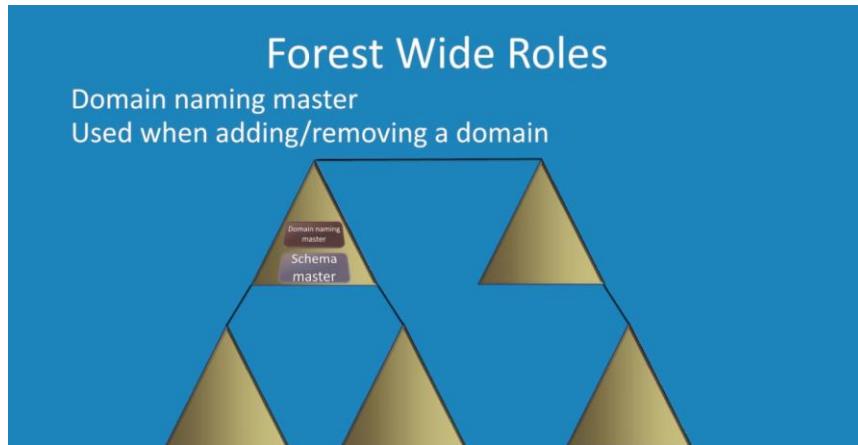
## Operations master roles - FSMO

- Forest-Wide Operations Master Roles –
  - Schema master
  - Domain naming master
- Domain-Wide Operations Master Roles - Every domain in the forest must have the following roles:
  - Relative identifier (RID), or relative ID, master
  - Primary domain controller (PDC) emulator
  - Infrastructure master

## Operations master roles - FSMO

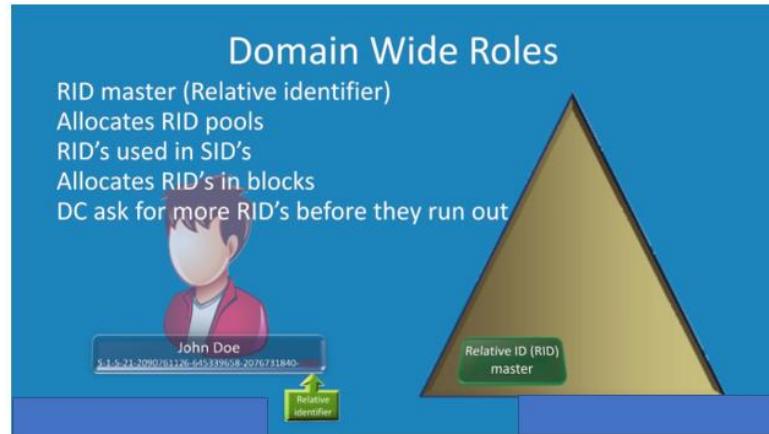
- Schema Master Role
  - The domain controller assigned the *schema master* role controls all **updates and modifications to the schema**. To update the schema of a forest, you must have access to the schema master. At any time, there can be **only one schema master in the entire forest**.
- Domain Naming Master Role
  - The domain controller holding the domain naming master role controls the **addition or removal of domains in the forest**. There can be **only one domain naming master in the entire forest at any time**.





## Operations master roles - FSMO

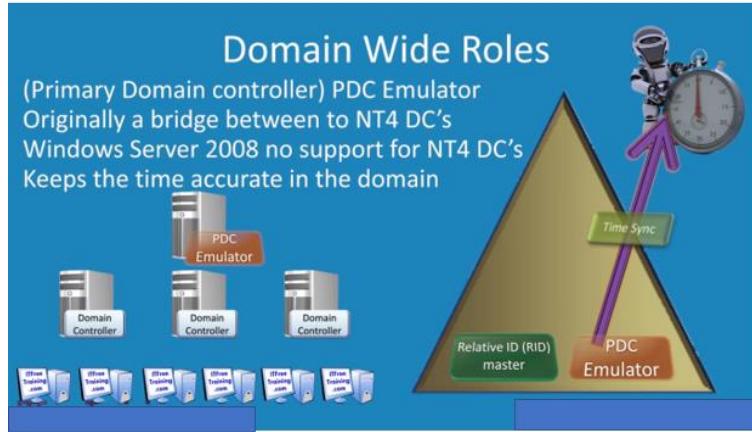
- RID Master Role
- The domain controller assigned the *RID master* role allocates sequences of relative IDs to each of the various domain controllers in its domain. At any time, there can be **only one domain controller acting as the RID master in each domain in the forest.**
- Whenever a domain controller creates a user, group, or computer object, it assigns the object a unique security ID. The security ID consists of a domain security ID (that is the same for all security IDs created in the domain) and a relative ID that is unique for each security ID created in the domain.
- To move an object between domains (using Movetree.exe: Active Directory Object Manager), you must initiate the move on the domain controller acting as the RID master of the domain that currently contains the object.



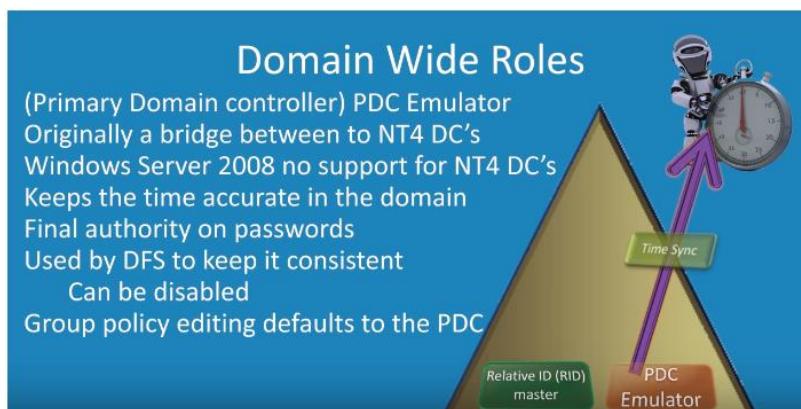
```
C:\Administrator: Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright <c> 2009 Microsoft Corporation. All rights reserved.

C:\>Users\Administrator>cd \
C:\>dsquery * -attr objectsid -filter objectcategory=user
objectsid
$-1-5-21-1360534905-3080357849-769326100-500
$-1-5-21-1360534905-3080357849-769326100-501
$-1-5-21-1360534905-3080357849-769326100-502
C:\>_
```

## PDC Emulator

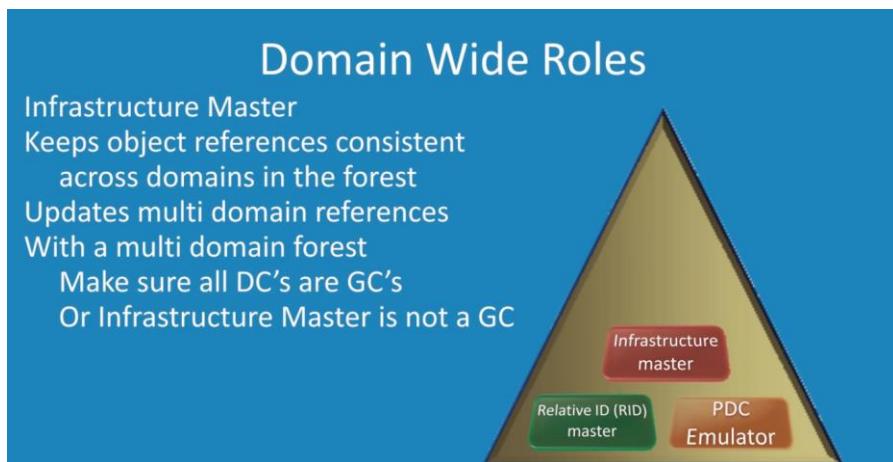


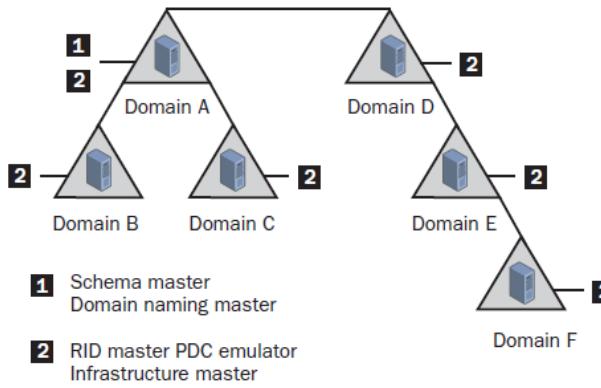
## PDC Emulator



## Operations master roles - FSMO

- Infrastructure Master Role
- The domain controller assigned the *infrastructure master* role is responsible for updating the group-to-user references whenever the members of groups are renamed or changed. At any time, there can be only one domain controller acting as the infrastructure master in each domain.





## Operations Master Roles

- Transferring Operations Master Roles
- To transfer an operations master role is to move it with the cooperation of its current owner. You transfer an operations master role when you want to move a role from one server to another.
- Seizing Operations Master Roles
- To seize an operations master role is to move it without the cooperation of its current owner. You seize an operations master role assignment when a server that is holding a role fails and you do not intend to restore it.

- Before seizing the operations master role, determine the cause and expected duration of the computer or network failure. If the cause is a networking problem or a server failure that will be resolved soon, wait for the role holder to become available again.
- If the domain controller that currently holds the role has failed, you must determine if it can be recovered and brought back online. In general, seizing an operations master role is a drastic step that should be considered only if the current operations master will never be available again.
- The decision depends upon the role and how long the particular role holder will be unavailable. The impact of various role holder failures is discussed in the following topics.

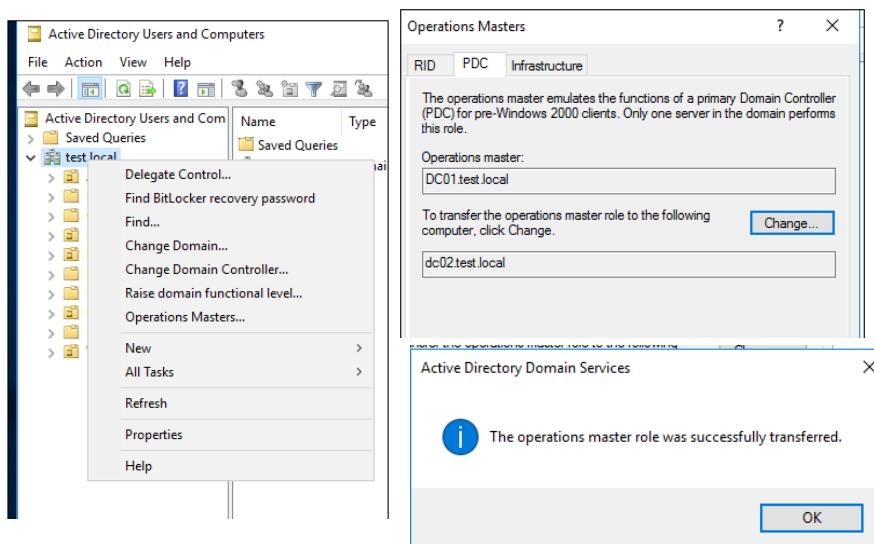
```
C:\Windows\system32>netdom query fsmo
Schema master           SRT-DC01.mylab.local
Domain naming master    SRT-DC01.mylab.local
PDC                   SRT-DC01.mylab.local
RID pool manager       SRT-DC01.mylab.local
Infrastructure master   SRT-DC01.mylab.local
The command completed successfully.
```

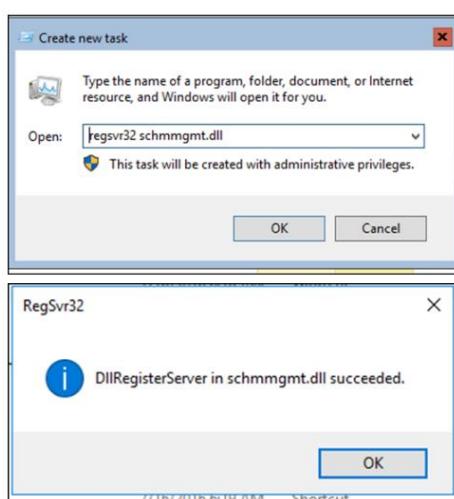
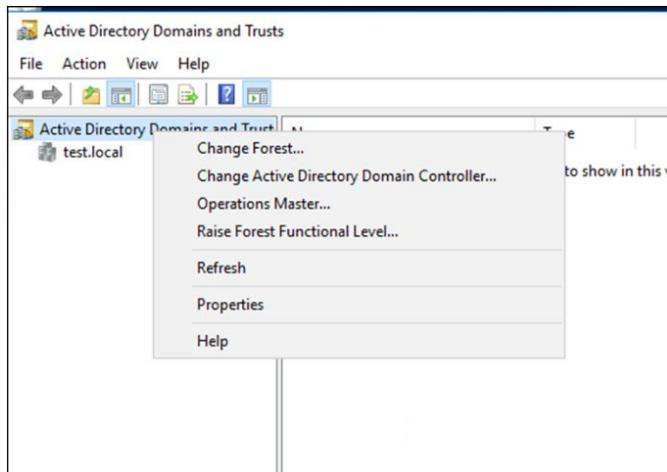
```
C:\Windows\system32>ntdsutil
ntdsutil: roles
fsmo maintenance: connections
server connections: connect to server ws2016.mylab.local
Binding to ws2016.mylab.local ...
Connected to ws2016.mylab.local using credentials of locally logged on user.
server connections: quit
fsmo maintenance: ■
```

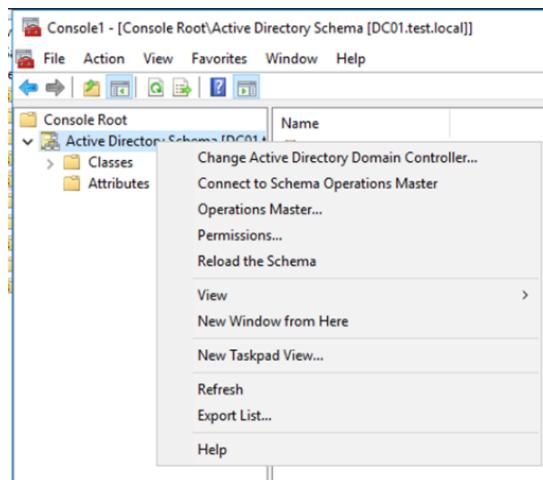
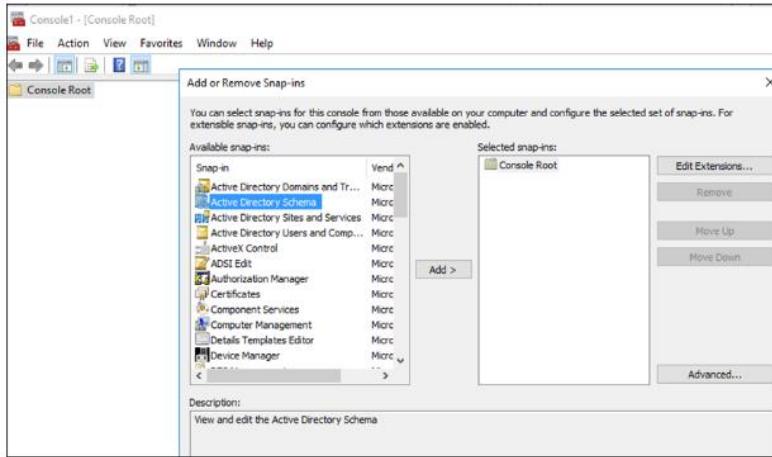
```
fsmo maintenance: ?

?
Connections
Help
Quit
Seize infrastructure master
Seize naming master
Seize PDC
Seize RID master
Seize schema master
Select operation target
Transfer infrastructure master
Transfer naming master
Transfer PDC
Transfer RID master
Transfer schema master

?                               - Show this help information
Connections                   - Connect to a specific AD DC/LDS instance
Help                          - Show this help information
Quit                         - Return to the prior menu
Seize infrastructure master   - Overwrite infrastructure role on connected server
Seize naming master           - Overwrite Naming Master role on connected server
Seize PDC                      - Overwrite PDC role on connected server
Seize RID master               - Overwrite RID role on connected server
Seize schema master            - Overwrite schema role on connected server
Select operation target        - Select sites, servers, domains, roles and
                                naming contexts
Transfer infrastructure master - Make connected server the infrastructure master
Transfer naming master         - Make connected server the naming master
Transfer PDC                   - Make connected server the PDC
Transfer RID master             - Make connected server the RID master
Transfer schema master          - Make connected server the schema master
```







- DSA.MSC: Active Directory Users and Computers
- DSSITE.MSC: Active Directory Sites and Services
- DNSMGMT.MSC: DNS Manager
- GPEDIT.MSC: Local Group Policy Editor
- GPMC.MSC: Group Policy Management Console
- CERTSRV.MSC: Certification Authority Management
- CERTTmpl.MSC: Certificate Template Management
- CERTLM.MSC: Local Computer Certificates Store
- COMPPMGMT.MSC: Computer Management
- DEVMGMT.MSC: Device Manager
- DHCPMGMT.MSC: DHCP Manager
- DISKMGMT.MSC: Disk Management
- EVENTVWR.MSC: Event Viewer
- PERFMON.MSC: Performance Monitor
- SECPOL.MSC: Local Security Policy Console
- FSMGMT.MSC: Shared Folders
- WF.MSC: Windows Firewall with Advanced Security

This is a list of the most common active directory mmc console run command that is really useful in my opinion :

CERTMGR.MSC	Certificates snap-in
CERTSRV.MSC	Certification Services
CMD.EXE	Command Prompt
COMPPMGMT.MSC	Computer Management
DCPOL.MSC	Domain Controller Security Policy
DEVMGMT.MSC	Device Manager
DFRG.MSC	Disk Defragmenter
DFSGUI.MSC	Distributed File System
DHCPMGMT.MSC	DHCP Manager
DISKMGMT.MSC	Disk Management
DNSMGMT.MSC	DNS Manager
DOMAIN.MSC	Active Directory Domains & Trust
DOMPOL.MSC	Domain Security Policy
DSA.MSC	Active Directory Users & Computers
DSA.MSC /DOMAIN=domainname	
DSA.MSC /SERVER=servername	
DSSITE.MSC	Active Directory Sites & Services
EVENTVWR.MSC	Event Viewer
FSMGMT.MSC	Shared Folders

EVENTVWR.MSC	Event Viewer
FSMGMT.MSC	Shared Folders
GPEDIT.MSC	local Group Policy Editor
IAS.MSC	Internet Authentication Service
INETMGR	Internet Information Service (\Windows\system32\inetsrv)
LUSRMGR.MSC	Local Users and Groups
MMC.EXE	Microsoft Management Console
MSINFO32.EXE	Hardware and software configuration information
PERFMON.MSC	Performance Monitor
REGEDIT.EXE	Run Registry Editor
RRASMGMT.MSC	Routing and Remote Access
RSOP.MSC	Resultant Set of Policy
SECPOL.MSC	Local Security Policy
SERVICES.MSC	Service Configuration
TSCC.MSC	Terminal Services
MSTSC	Remote Desktop

## Active Directory

Item	Command
Active Directory Rights Management Services	AdRmsAdmin.msc
ADSI Edit	adsiedit.msc
Active Directory Certificate Services	certsrv.msc
DFS Management	dfsmgmt.msc
DHCP Console	dhcpmgmt.msc
Disk Management	diskmgmt.msc
DNS Console	dnsmgmt.msc
Active Directory Domains and Trust	domain.msc
Active Directory Users and Computers	dsa.msc
Active Directory Site and Subnets	dssite.msc
Event Viewer	eventvwr.msc
Group Policy Management Console	gpmc.msc
Group Policy Management Editor	gpme.msc
LDAP	ldp.exe
PKI - Enterprise PKI	pkiview.msc
Resultant Set of Policy	rsop.msc
Server Manager	ServerManager.msc
WINS	winsmgmt.msc
WMI	WmiMgmt.msc

## Windows Server

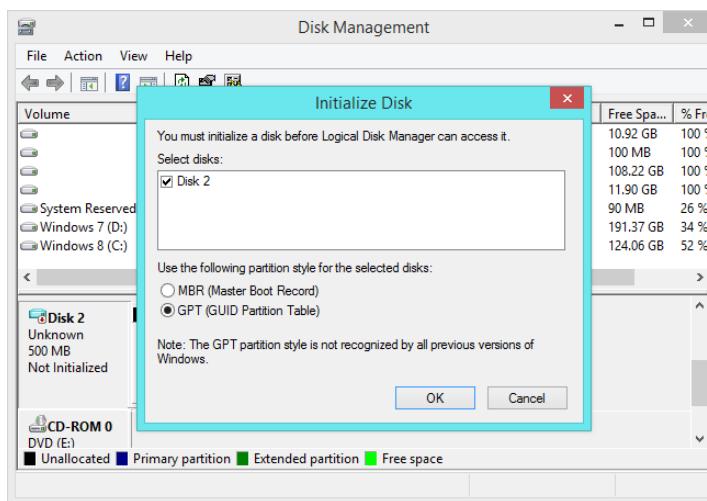
Item	Command
Active Directory Rights Management Services	AdRmsAdmin.msc
ADSI Edit	adsedit.msc
Authorization Manager	azman.msc
Certificates	certmgr.msc
Active Directory Certificate Services	certsrv.msc
Certificate Templates Console	certtmpl.msc
Cluster Admin	CluAdmin.msc
Component Services	comexp.msc
Computer Manager	compmgmt.msc
Device Manager	devmgmt.msc
DFS Management	dfsmgmt.msc
DHCP Console	dhcpmgmt.msc
Disk Management	diskmgmt.msc
DNS Console	dnsmgmt.msc
Active Directory Domains and Trust	domain.msc
Active Directory Users and Computers	dsa.msc
Active Directory Site and Subnets	dssite.msc
Event Viewer	eventvwr.msc
Failover Cluster Manager	FailoverClusters.SnapInHelper.msc
Shared Folders Console	fsmgmt.msc
File Server Resource Manager	fsm.msc
Fax Service Manager	fxsadmin.msc
Local Group Policy Editor	gpedit.msc
Group Policy Management Console	gpmc.msc

Group Policy Management Editor	gpme.msc
GPO Editor	gpredit.msc
Local Users and Groups	lusrmgr.msc
NAP Client Configuration	NAPCLCFG.MSC
Services for Network File System	nfsmgmt.msc
Performance Monitor	perfmon.msc
PKI - Enterprise PKI	pkview.msc
Print Management	printmanagement.msc
Remote App Manager	remoteprograms.msc
Resultant Set of Policy	rsop.msc
Remote Desktop Connection Manager	smbmgr.msc
Local Security Policy	secpol.msc
Server Manager	ServerManager.msc
Services	services.msc
SQL Server Configuration Manager	SQLServerManager10.msc
Share and Storage Management	StorageMgmt.msc
Storage Explorer	StorExpl.msc
Telephony	tapimgmt.msc
Task Scheduler	taskschd.msc
TPM Management Console	tpm.msc
Remote Desktop Services Manager	tsadmin.msc
Remote Desktops Session Host Configuration	tsconfig.msc
RD Gateway Manager	tsgateway.msc
Remote Desktops - Console Root\Remote Desktops	tsmmc.msc
Windows Server Backup	wbadmin.msc
Windows Deployment Services	WdsMgmt.msc
Windows Firewall and Advanced Security	WF.msc
WINS	winsmgmt.msc
WMI	WmiMgmt.msc

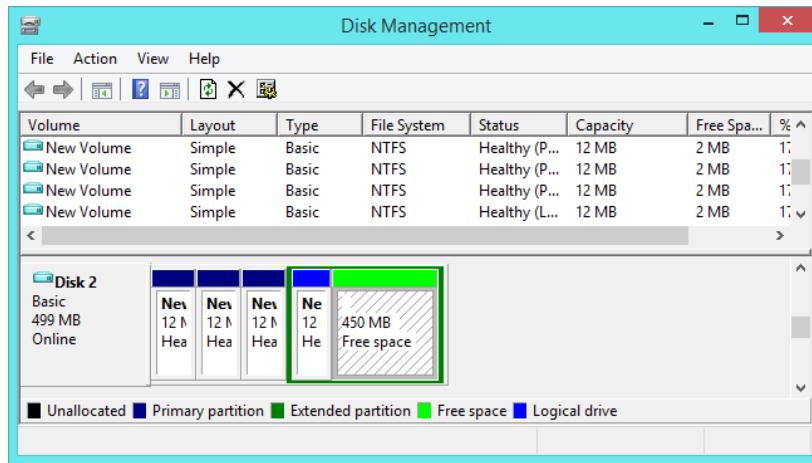
# Overview of Storage

- Primary Memory
- Secondary Memory (Auxiliary Memory)
- Storage Devices – PATA(IDE), SATA, SSD

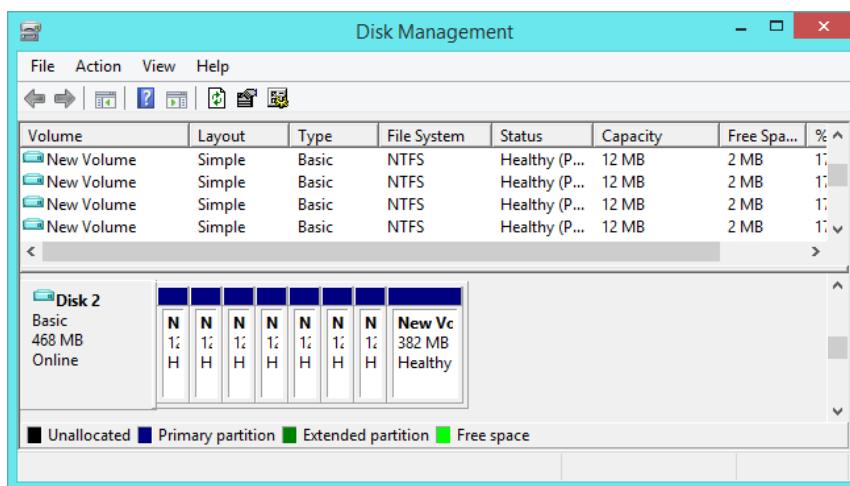
## Managing Disks and Volumes



# Disk Management



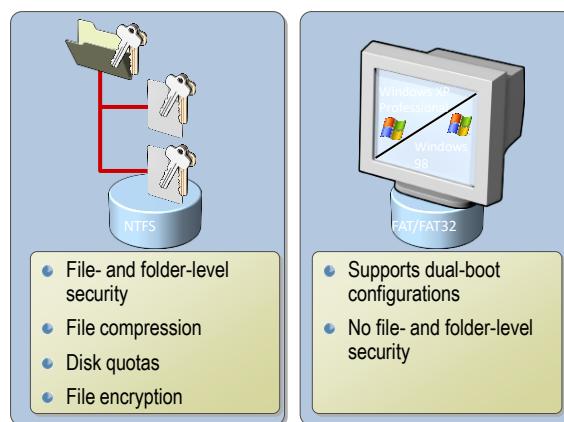
# Disk Management



# Securing Files and Folders

## Configuring and managing file access Securing Files and Folders

### Security Permissions(NTFS)



Choosing the Appropriate File System: FAT, FAT32, or the NTFS File System

## Security Permissions(NTFS)

NTFS Standard Permissions	
List folder content	Allows the file in a folder to be displayed
Read	Allows the file or folder to read
Read & Execute	Allows reading and application execution
Write	Write but can't delete any files
Modify	Can read, write and delete. The most common permissions assigned to end user
Full control	All of the above plus changing permissions, owner.

## Configuring and managing file access

**Allow & Deny**  
Allows permissions are accumulatively  
Deny override all other permissions

## Copying and moving files

Moving to same volume permissions are retained  
All other combinations permissions are inherited

## Configuring and managing file access

### Explicit and Inherited Permissions

#### Explicit

Assigned directly to the file or folder

#### Inherited permissions

Assigned from the folder above

New files receive these permissions

Changes applied to hierarchy from single point

## Work Folders

- In Server Manager, click File and Storage Services, and then click Servers. Right-click the sync server, and then click **Work Folders Settings**. The **Work Folders Settings** window appears.
- With **Work Folders** users can store and access work files on personal computers and devices, often referred to as **bring-your-own device (BYOD)**, in addition to corporate PCs. Users gain a convenient location to store work files, and they can access them from anywhere.

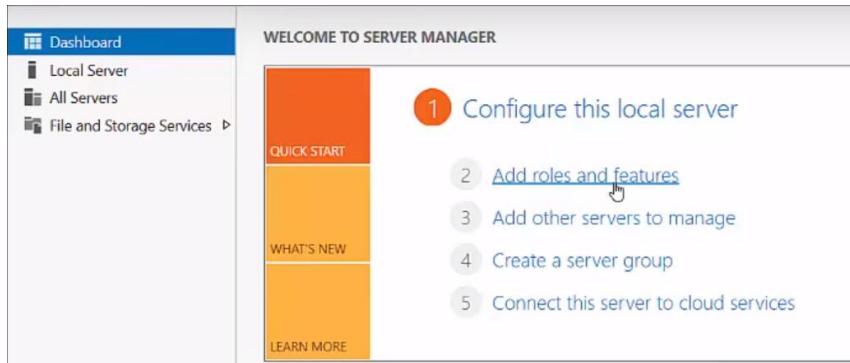
## Work Folders – Offline Files

- Organizations maintain control over corporate data by storing the files on centrally managed file servers, and optionally specifying user device policies such as encryption and lock-screen passwords.
- Work Folders can be deployed with existing deployments of Folder Redirection, Offline Files, and home folders. Work Folders stores user files in a folder on the server called a *sync share*. You can specify a folder that already contains user data, which enables you to adopt Work Folders without migrating servers and data or immediately phasing out your existing solution.

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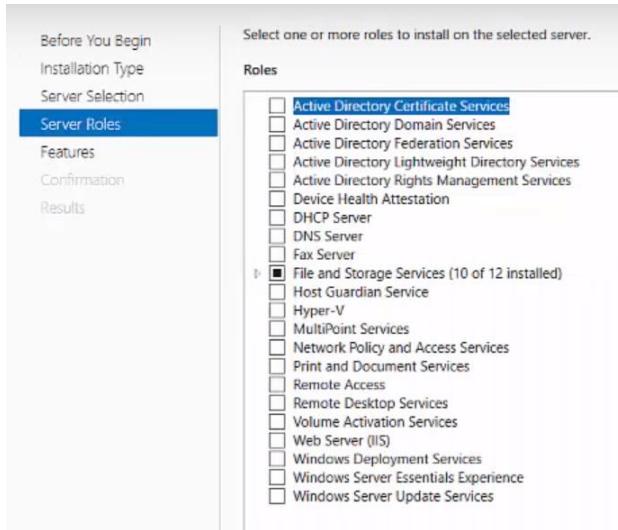
## Work Folders



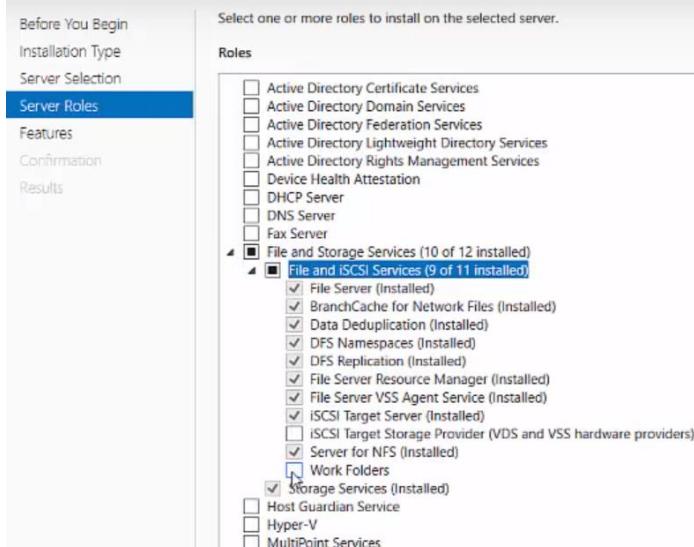
## Work Folders



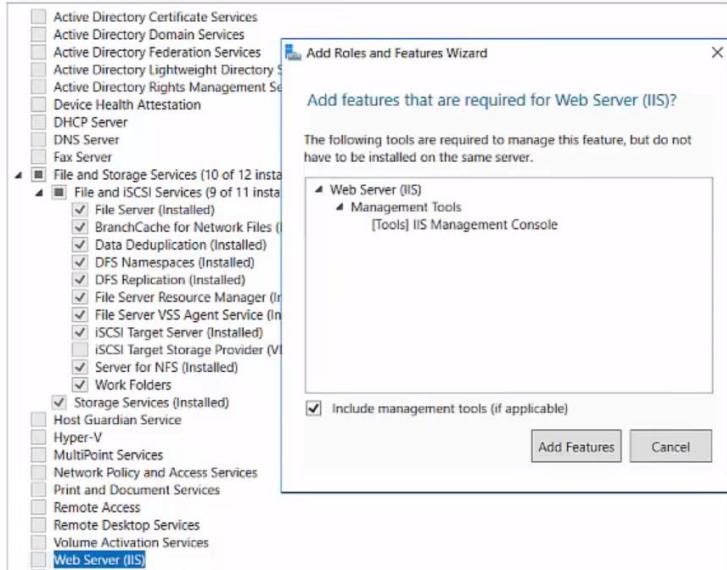
## Work Folders



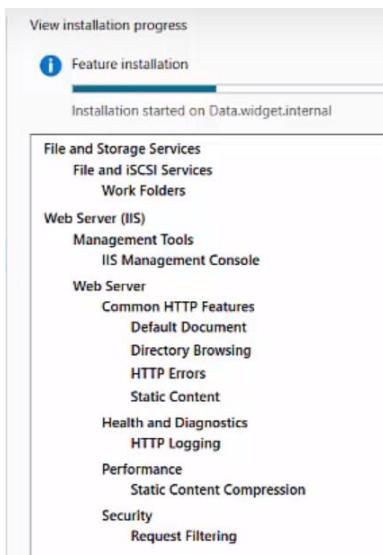
## Work Folders



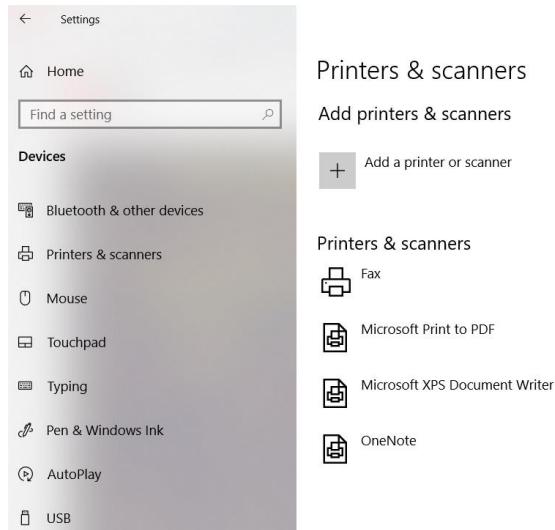
## Work Folders



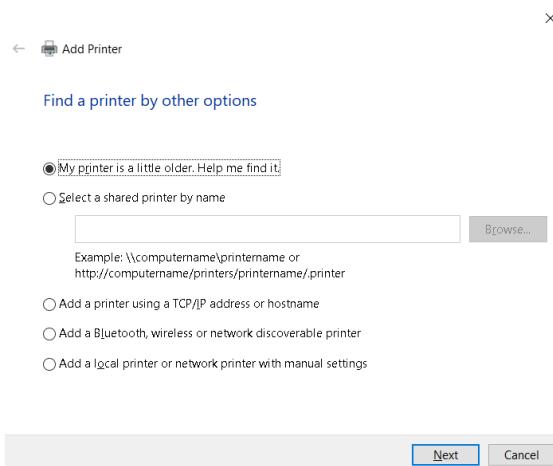
## Work Folders



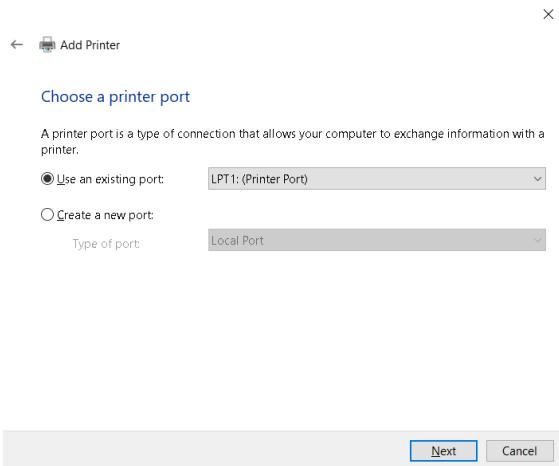
# Printer Management



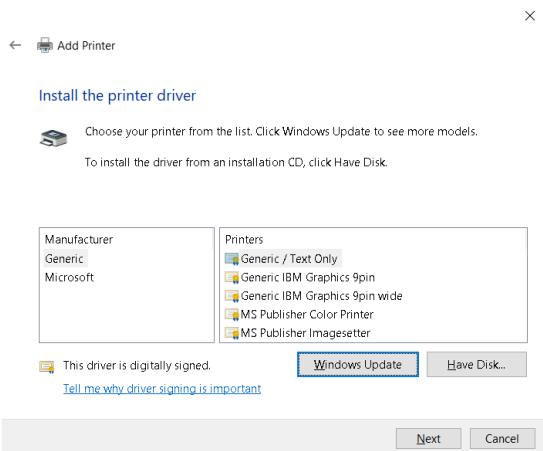
# Printer Management



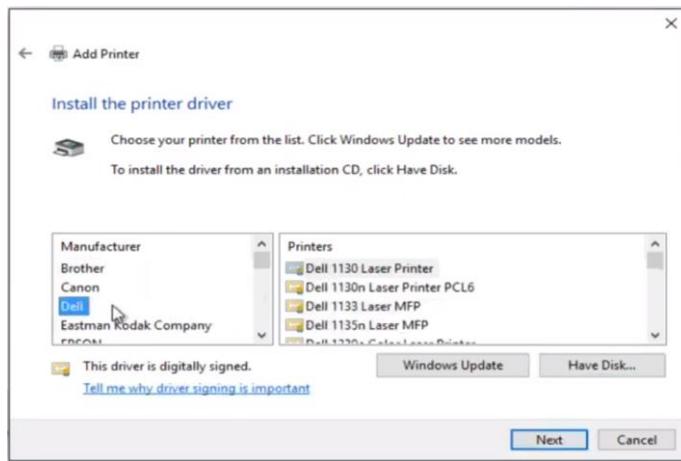
# Printer Management



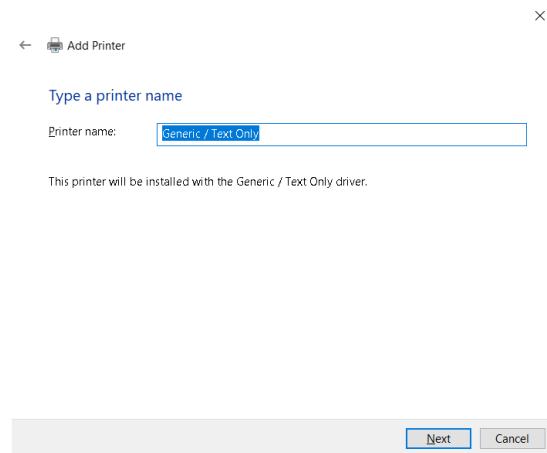
# Printer Management



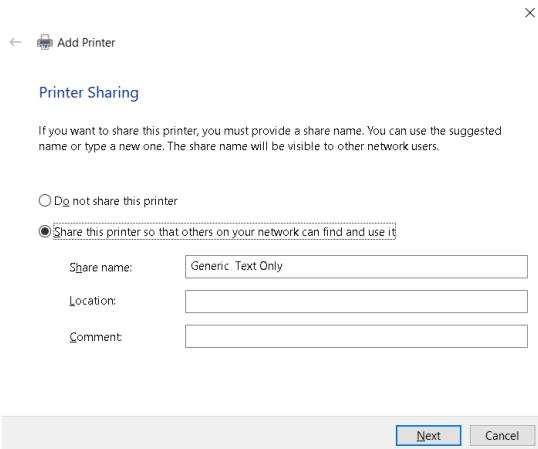
## Printer Management



## Printer Management



# Printer Management



# Printer Management

