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Installing, Configuring And Upgrading

Installation Types:

-Upgrade Install: Absorbs as much information as it can about the current Operating System (OS), regarding installed hardware and software, user preferences, and other settings.

- Clean install *when an OS is already installed:* A clean install will ignore any previous settings of the current installed OS and information about installed hardware or software. Upgrade is faster as compared to clean install.

-**Repair Install:** Rectifies problems with an already installed OS.

-**Parallel Install:** Installs an alternate secondary OS that resides on the same drive or a different drive from the primary installed OS.

-**Windows XP:**

Minimum hardware requirements:

Pentium 233-megahertz (MHz) processor or faster (300 MHz is recommended)

At least 64 megabytes (MB) of RAM (128 MB is recommended)

At least 1.5 gigabytes (GB) of available space on the hard disk .

Windows XP Clean install when an OS is already installed:

-Close all applications.

-Insert Windows XP CD.

-From the Windows XP Professional Setup screen that appears, press enter to select the option for install Windows XP and for installation type select New Installation.

Windows XP Clean install when no OS is installed:

-Boot from the Windows XP CD or from the command prompt

-Setup provides you with list of partitions and free space, which you can modify.

-If a new partition is created then setup asks you for the formatting option for the partition with a file system and then formats accordingly.

-When it restarts you will have to specify your geographical location, your name and product key.

-Also specify computer name and administrator password and set the time and date and time zone, after this the system reboots to configure all the settings.

-If you are connected to a network then you can use either custom or typical configuration. *Custom Settings* allows you to configure networking based on your choice and *Typical Settings* installs *Client for Microsoft Networks*.

Boot options: The same as Windows 2000.

-**Windows 2000 Professional:**

Minimum hardware requirements:

CPU: 133 MHz Pentium compatible, 650 MB free space on hard drive, 64 MB of RAM.

Clean install when no OS is installed: Is performed using the installation CD. Similar to Windows XP installation.

Clean install when an OS is already installed:

- Run antivirus software and scan all storage space.
- Insert Windows 2000 CD and if the cd gets detected, a message asks you whether you want to upgrade or not. Select the No option for performing a clean install.
- Click on the *Install Windows 2000* option and select the *Install a New Copy of Windows 2000* option.
- Accept the license agreement and enter the product key. The system will reboot after copying temporary setup files and the installation will proceed.

Boot options: Press F8 on the boot screen for accessing the Windows Advanced Options menu. Safe Mode, Safe mode with networking, Safe mode command prompt, Enable boot logging, Enable VGA mode, Last known good configuration, Directory service restore mode, Recovery console.

-**Windows 9X:**

Minimum hardware requirements for Windows 95 are 486 dx 25 MHz processor, 4 MB of RAM, 40 to 45 MB of hard disk storage.

Minimum hardware requirements for Windows 98 are 486DX, 66 MHz processor, 24 MB of RAM, 140 to 315 MB of hard disk storage.

It can be clean installed or upgrade installed depending on the requirement.

-**Windows Me:**

2 different CDs are used for installation. One for upgrading and another for installing a new copy.

Boot options:

Safe mode: Load into Windows with only important drivers loaded.

MSDOS mode: Load into DOS with DOS drivers loaded.

Boot options:

Logged mode, Safe mode with networking, step by step confirmation, command prompt only.

-Windows NT:

Boot options: Last known good configuration, Windows NT VGA mode.

Installation Methods

- Bootable CD: Installed from a CD.
- Bootable floppy: Installed from a floppy drive.
- Network installation: Installed through the network.
- Drive imaging: Partitioning the storage drive for backup of system data. A hard drive can be regenerated copied exactly to another hard drive of a PC by using drive imaging software.

Conceptual Disk Preparation:

- Starting the installation process: Before installing the Windows OS, it has to be decided that how is the hard drive going to be partitioned and what type of file system will be used.
- Partitioning: Some portion on the hard disk has to be freed for the operating system.

Before installation of the OS a primary partition on the hard disk has to be created. Then you have to format the file system for that partition which is known as the *system partition*. A separate partition can also be created on the hard disk for the OS, which is known as the startup partition.

Formatting: It is done so that the OS can store and access data on a specific logical drive (volume). A volume is a portion of a physical disk that functions as a physically separate disk. When a volume is formatted a file system gets created on it.

Restore data: *Automated system recovery process (ASR)* provides the user with an option of restoring the whole hard drive volume or logical drive to a state when its backup was taken.

Booting: The process of loading an operating system into the computer's main memory or random access memory (RAM) It Is done by a computer to bring itself to a level where it can operate without outside intervention and run applications for users.

Hard Boot: Starting the computer by pressing the power button.

Soft Boot: Turning on a computer by pressing *Ctrl+Alt+Del* when a computer is turned on.

Dual booting: Installing more than one OS on one computer. There are many boot loaders, which help you install and manage more than one OS like NTLDR.

Files required for booting Windows 9X are: **Io.sys, Msdos.sys** and **Command.com**

Steps of booting process:

1. BIOS checks the hardware: *By Power On Self Test (POST)* .The ROM BIOS startup process checks the hardware needs, the resource needs and assigns the required resources.
2. The OS gets loaded: ROM BIOS locates the OS and loads it.
3. The OS initializes itself: Completes loading itself and then verifies memory resources and loads software for peripheral devices.
4. An application is loaded and executed: The OS locates the application and passes on the control to it.

For Windows 2000 and NT another 3 files are required for booting: NTLDR, Boot.ini, NTDETECT.com

Other booting methods include: Using a startup disk, safe VGA mode, command prompt mode system restore point booting, recovery console and boot.ini switches.

Emergency Disks: These are used to boot a computer if it fails to boot from the hard drive. A floppy drive, which has all the software to load an OS is called bootable/system disk. Emergency startup disk is a bootable disk that has utility programs on it to facilitate the troubleshooting of the failed hard drive. In XP for an NTFS or FAT Partition the system disk can be created by:

1. Formatting the Floppy.
2. Copying needed files Ntldr, Ntdetect.com, and the boot.ini. Copy them from a system running Windows XP that is virus free and/or a Windows XP setup CD-ROM.
3. Editing the boot.ini file you copied to floppy.

The boot sector contains the code that starts Ntldr that is the bootstrap loader for Windows XP. Ntldr must be located in the root folder of the active partition along with Ntdetect.com, boot.ini, bootsect.dos for dual booting and Ntbootdd.sys needed with some SCSI adapters.

Device Driver Installation

Plug And Play (PnP)

Prerequisites:

- System BIOS must be PnP
- Expansion devices and hardware cards should be PnP compatible
- OS should be Windows 9x or above. A 32 bit device driver should be present

Components of Windows 9x used for enabling the PnP architecture: - Configuration Manager: Handles all configuration processes and informs devices about these configurations.

- Hardware Tree: Database that stores a list of all installed components and their resources.
- Bus Enumerator: Searches all devices on a bus and notes the resource allocated to them.
- Resource Arbitrator: Handles resource allocation for devices.

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Non Plug and Play Devices:
If the BIOS is a plug and play BIOS it will enable first the non PnP devices and then allocate the remaining resources to the PnP devices.
Installation and Upgrading Steps: 1. Go to *Add/Remove Hardware* in *Control Panel* and add the device driver for the specific device.
2. Double click the *system* icon in *control panel*. Select the *hardware* tab from the *System Properties* Windows that opens.
3. Click on the *Device Manager* button and expand its tree to locate the device driver to be updated.
4. Right click on the Device Driver and select the *Properties* option from the menu.
5. Select the *Driver* tab and click on the *Update Driver* button. It will launch the Update Device Driver Wizard to complete the process.

Installing Programs:
1-Installing additional Windows components through the *add/remove programs* in *control panel*.
2-Installing 3rd party programs through opening setup file or the *add/remove programs* in *control panel* (system requirements and compatibility will be an important issue to check in this case).
3-Uninstalling programs through *add/remove programs* in *control panel*.
4-Installing printers is very easy through the *add printer* wizard (check for latest drivers).

Optimizing the OS

Virtual Memory Management: It is automated in Windows 9x. The virtual memory is stored in a swap file. Following steps explain how to modify the virtual memory setup:
1. Open *Control Panel* and select *System* and then select the *Performance* Tab.
2. Click the *Virtual Memory*; a dialog box will appear which allows you to modify the virtual memory according to your needs.
Virtual Machine Manager (VMM) handles the memory paging in which the blocks of memory stored in the RAM are swapped with hard drive. The VMM manages the page table facilitating pages to move in and out of the RAM.
Disk Defragmentation: It is done to rearrange the scattered files in your hard disk into continuous blocks. The performance improves because the files are stored close to each other. To use the disk defragmenter tool go to *System Tools* in *Accessories* and click on *Disk Defragmenter*. Select the drive you want to defrag, click on Ok and then click Yes.
Caches: Windows 9x has an integrated, 32 bit protected mode software cache known as the VCACHE. It is automatically loaded and does not take up a lot of space. Windows NT/2000/XP use automated disk caching.
Buffer: It is a memory space where data that has to be read is written and stored temporarily. Buffering is done to increase disk access speed.

System Files

Windows 9x Files
- *Io.sys*: input output system file which used in initial booting stages.
- *Msdos.sys*: text file that contains some parameters and switches that can be set to affect the way the OS boots.
- *Autoexec.bat*- automatically executed batch file which contains programs and environment settings.
- *Command.com*: makes the command prompt available and interprets command.
- *Congig.sys*: used in conjunction with autoexec.bat but it is responsible for loading device drivers.
- *Himem.sys*: Extended memory driver which make the memory area above 1MB available for use by the O.S.
- *EMM386.exe*: Memory manager.
- *Win.com*: startup file for Windows 9x.
- *System.ini*: stores data about the system hardware.
- Registry data files: Database at which software and hardware settings are saved. Constitutes of two main files system.dat and user.dat.

Windows NT Files:
BOOT.INI, NTLDR, NTDETECT.COM and NTBOOTDD.SYS are all located in the system partition and are required for initial system startup.
NTUSER.DAT Hive: Is a registry. It is modified to allow all newly created users to inherit certain properties and settings.
- *Win.ini*: Configuration file used for implementing backward compatibility contains information about user settings.
Note: system.ini and win.ini are not used by win2000

Utilities

Command Line Functions and Utilities:
-Command \CMD: Command interpreter for MS-DOS
-DIR: Allows us to see the available files in the current or parent directories.
-ATTRIB: Allows a user to change the properties of a file. hidden(h), system(s), archive(a), Read-only(r)
-MEM: Provides information about the free, used and available memory.
-SCANDISK: Is a utility which checks the integrity issues involved in the hard drive.
-DEFRAG: Is a software utility, which facilitates the ordering of data on the hard drive.
-EDIT: Allows creating, viewing and modifying files. It is an external command.
-COPY: Allows copying one or more files to another location.
-XCOPY: Superior version of the COPY command that allows moving of complete files, directories and even drives.
-FORMAT: Allows erasing all the data from the computer drive. It is an external command.
-FDISK: Allows deletion, creation of partitions of the hard drive.
-SETVER: Intimates the dos version that an application was unable to run because of the specific MS DOS version.-VER: shows the dos or Windows version.
-SCANREG: Utility which allows users to create backup for registry manually or allow Windows to do it on a daily basis.
-DELTREE: Allows permanent deletion of files and directories.
-TYPE: Allows users to see the contents of a file. It is an internal command.
-ECHO: Allows the text that has been typed to be displayed on the screen .It is an external command.
-SET: Allows changing of one string or variable to another. It is an internal command.
-PING: TCP/IP utility used to check the connectivity between the computers on a network. It is an external command.
-DELETE: Allows files to be deleted from the computer. It is an internal command.
-RENAME: Allows changing the original name of files to some other name.
-MD: Allows creation of directories in MS-DOS.
-CD: used to change to different directory.
-RD: Removes a directory.

Disk Management Tools:
-Defrag.exe: Checks a hard drive or disk for clustered files and rewrites these files to the disk or drive in a continuous block of memory.
-Fdisk.exe: Partitions the hard drive
-Scandisk: Scans a hard drive for errors and tries to repair them wherever possible.
-Chkdsk: Provides information about a disk.
-Format: Format command is used to format the drive. Formatting makes the hard disk ready for initial use.
-Disk cleanup: searches for unimportant and temporary files which can be deleted without any harm.
-Backup:
Full backup: saves all directory and files on the hard disks.
Incremental backup: saves only those files which have been modified since the last full or incremental backup.
Differential backup: only backup changed files from the last full backup process.

System Management Tools:
-*Device Manager*: Provides a view of the devices configured, the resources that they utilize and the drivers that they use.
- *System Monitor*: Tracks the performance of the important system components.
- *Event Viewer*: Displays information about important events that occur in Windows or in applications. It has three main types of logs: application log, system log and security log.
- *Task Manager*: Allows to run, switch, end applications, processes and access the shutdown menu. The file name is taskman.exe.
-Computer Management: In win2000/XP pro management of the computer is done using computer manager that can be found at control panel, administrative tools.
-Msconfig.exe: allows modifying legacy Windows files.
-Regedit.exe: allows modifying registry values directly.
-Regedt32: the same as regedit.exe but found in with Windows NT4/2000.
-Sysedit.exe: allows editing many legacy Windows files
-ScanReg: repair, backup, restore the registry.
File Management Tools:
-Windows Explorer: Displays files in the form of a hierarchical tree. Presents data in the form of two panes, which is easier and faster to navigate.
- My Documents: Displays the important files and folders created by user.
- My Computer: Allows users to manage hard drives, network drives, folders, files and peripheral devices.
-Attrib.exe: Changes file attributes.
-Extract.exe: Extracts files from a cabinet file.
-Edit.com: Quick method of editing text files through command prompt.

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Directories

Structure: A directory is like a table. It contains information and links of the files that are stored in it which are called the sub directories. It has a hierarchical tree structure. Every entry in the directory is 32 bytes long and it contains information about file names and its extension, file attribute, last change date or time, file size and link to starting cluster.

Creating Folder: A folder is another name for directory in Windows which can be created by right clicking and choosing the *Folder* option under *New* menu on the desktop, inside a directory or inside any drive. The computer creates a new folder at the specified location and you can name the folder. The length of the name can be up to 255 characters, including spaces. Press Enter key to assign the new name.
Or you can choose file then new then folder from the top toolbar.

Directory Partition: A contiguous sub tree of the directory that forms a unit of replication. A directory will always have a minimum of three directory partitions. The schema, which defines the object classes and attributes contained in the Active Directory. It also refers to the configuration, which identifies the domain controllers, replication topology and other related information about the domain controllers within a specific implementation of Active Directory. One or more domains that contain the actual directory object data.

Files

File Type: Indication of designation of the operational or structural characteristics of a file. It identifies the program that is used to open the file. File types are associated with the file name extension. Like files that have the .txt or .log extension are of the Text Document type and can be opened using any text editor.
System Files: Used by Windows to load, configure, and run the operating system. They should never be deleted or moved.
So file types are text files or binary files.

File Control Block (FCB): A small portion of memory is temporarily assigned by the operating system to store information about a file that has been opened for use. It contains information about the file's identification, its location on disk, and a pointer that marks the user's current (or last) position in the file.

Custom File Type: Have extensions that have been created for special kinds of files. The system registry does not track them.

File Compression: Can be used in Windows 2000/NT/XP on NTFS partition, this saves more disk space.

File Encryption: Files are encoded so only intended users see them, in Windows 2000 this can be done by EFS.

File Permissions: With NTFS there are some file permissions, which can be created like: Full control, modify, Read& execute, list folder contents, read, write.

Diagnosing And Troubleshooting

Steps to Troubleshoot the Booting Process:
-Look out and address the error messages that occur during a normal booting.
-If normal booting is not possible then try booting in the *safe mode* and troubleshoot accordingly.
-If *safe mode* does not work then try booting the computer using command prompt through the *startup* menu.
-If *startup* menu is not functioning then try to use the *emergency startup disk*.
-If none of these options work that means the hard drive is not accessible.

-Boot Failure And Probable Error Messages:
-*MS-DOS Compatibility mode*: Implies that Windows is using real mode drivers to access the hard drive and not the preferred drivers.
-*Bad or Missing file*: Check if config.sys, autoexec.bat and system.ini are in the right location.
-*Cannot open file*: Occurs due to lack of memory.
- *Invalid system disk*: A boot sector virus might be present or hard disk isn't the first boot device or boot files corrupted or may be the hard disk damaged.
-*Bad or missing command.com*: Io.sys may be corrupted or missing or even the command.com itself, so you can copy a new one from a Windows directory.
-*Missing system files*: Run the SYS C: command
-*System registry file missing*: system.dat or user.dat may be missing or corrupted.
-Himem.sys error: Himem corrupted or not loaded.
-VxD error: VxD file may be missing or corrupted.
-*Invalid VxD dynamic link call from IFSMGR*: msdos.sys file may be corrupted or missing.
-*Error in config.sys line xx*: check the win.ini file

Tools and Utilities for Troubleshooting:
-System configuration utility (Msconfig): It limits and controls what has to be loaded during the boot process.
-Device manager: It is used to disable any device that may be causing problems during booting.
-Automatic Skip Driver Agent (ASD.exe): Stops and checks Windows from installing a driver that might be corrupted.
-Windows 9x startup menu includes many options for troubleshooting.
-Windows task manager will help you monitor system performance and running processes.
-Dr. Watson: shows why a process making problems
-Manuals and online help.

Operational And Usability Problems

Virus: Is an infestation, an unwanted program that is harmful for the data and the software in the computer. It attaches to another programs and spreads. The infected program has to be executed for the virus to spread. The other main types of infestations are the Trojan horses, worms, spy wares and logic bombs.
A worm is mainly found in a network and spreads copies of itself without a host program.
Trojan horses do not need a host program to spread it simply replaces the correct program with itself.
They generally do not replicate on their own.
Spy wares are pieces of code, which are downloaded from the Internet, and they send client computers information to a remote server.
A logic bomb is a code, which remains dormant for a specific amount of time and then gets activated to cause the damage. The various infestations can occur in combination and can cause destruction.

Types of Viruses:
- Boot sector viruses: Hides in the boot sector program .It can hide in the program code on the hard drive or in the boot record program in the active partition of the hard drive.
- File viruses: Hide in an executable program or in the macro present in a word processing file. Also called macro viruses.
- Multipartite viruses: A combination of the boot sector virus and the file virus.
- Polymorphic viruses: Changes its signature, its distinguishing features as it goes on replicating.
- Encrypting viruses: Transforms itself into a non-replicating program, which makes it difficult to get detected.
- Stealth virus: Actively hides itself by manipulating the size of the file it is hiding in. It keeps track of the opening of the file it is hiding in and as the file is about to be opened it generates an uninfected copy of the same file so that the virus remains undetected.

How Do Viruses Spread:
- Exchanging floppy disks containing program files
- Connecting to an unprotected network
- Buying unreliable software
- Downloading programs from the internet
- Using shared network programs
- Using used and preformatted disks
- E-mails with embedded macros or programs that automatically read attached files
- Not write protecting original program disks
You can remove a virus using antivirus software such as Norton Antivirus 2005.

Management of Print Jobs by Windows:
- For a non post script printer the data for print job is converted into Enhanced Metafile Format (EMF).
- For a post script printer the data for print job is converted into a post script language format.
- Text data, which has no embedded control data, is directly forwarded to the printer not to the printing queue.
The process of placing the printing jobs in a queue and then printing them is called spooling.

Troubleshooting Common Printing Problems:
- For checking a printer try to print a test page locally first not from the network.
- For a spooling problem when the print spool gets stuck, try to delete all the printing jobs in the printer's queue.
- Try to remove and reinstall the printer driver.
- Verify the configuration of the USB, serial, parallel port in the CMOS setting that the printer is using.
- Use another printer driver and if it works that means the original driver is malfunctioning.
- Try not to use the bidirectional support communication and check how the printer works then.
- Verify through the device manager that the printer has been assigned correct resources and there is no conflict in the resources.
- Check if the printer works by disabling the "check port state before printing "property.
- Check the printer properties.
- If you are able to print through DOS and not Windows then try to disable printer spooling and check if it works.
-Try reconnecting the printer to the network.
-Try to decrease print file size in case of memory errors.
-Try to test the printer using its keypad.

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Windows Networking

Protocol Configuration:

-**Transmission Control Protocol/Internet Protocol (TCP\IP):** Used on the Internet and allows you to connect your network to the internet thus enabling Internetwork connectivity. Allows computers with different types of hardware architectures and various operating systems to get connected to one another through the Internet.

Gateway: A device or a computer, which facilitates a computer on one network to communicate with a computer on another network. A computer uses a default gateway when it does not have a better option for connecting to another computer.

Subnet Mask: Is used on TCP/IP network to filter the network address from the IP address. It is a combination of four dot separated numbers. It specifies whether the remote computer is on the same or a different network.

Domain Name Server (DNS): It is a computer with DNS service database to store domain names to IP address mappings on a network. The DNS service is used for name resolution on a TCP/IP network.

Windows Internet Naming Service (WINS): Performs the task of name resolution on a NetBEUI network. It stores NETBIOS names to IP address mappings on a network.

Static Addressing: Permanent IP addresses are allocated to the workstations in a network. It does not require a Dynamic Host Configuration Protocol (DHCP), which is otherwise required to assign addresses.

Dynamic Addressing: Assigning non-permanent IP addresses to the workstations on a network using DHCP server. It requires a lesser number of total addresses as compared to the number of workstations that have to be addressed.

Internetwork Packet Exchange/Sequenced Packet Exchange (IPX\SPX): It is a proprietary protocol for Novell networks. IPX operates at the Network layer of the OSI model and SPX operates at the transport layer. It is similar to TCP\IP but is not supported by the Internet.

Appletalk: It is a proprietary and default protocol for Apple Macintosh machines, however today many apple computers use TCP/IP.

NetBIOS Extended User Interface (NetBEUI): A Windows protocol that is applicable in case your network is isolated from the Internet. It is faster than TCP/IP and is not supported by internet because it does not allow routing to other networks.

Tools:

-Ipconfig: Command used for displaying a machines IP address.

-Winipcfg: Command used to display the MAC address of the Network Interface Card (NIC).

-Ping: Command used to transmit a signal to a remote computer and test connectivity with that computer.

-Tracert (Trace Route): Command used to verify the route to a remote system by giving a report on every step on the route.

Types Of Permissions on Shared Files and Folders:

Sharing: You can share any resource on the network or any drive or directory.

-No access: Unauthorized users have no permission to access the resource.

-Read: Allows to view and list but not to change.

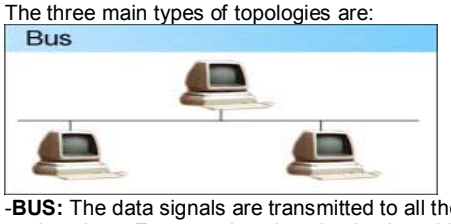
-Change: View, list, change and rename ----

-Full control: Complete permission to control the resource and change permissions for the resource as well.

Topology

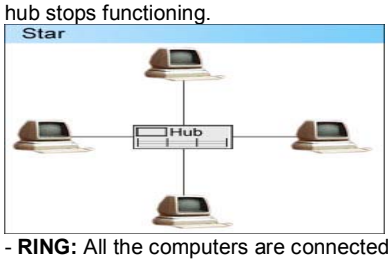
It is the physical configuration of the devices on a network, how the cables connect to the various devices and workstations on a network.

The three main types of topologies are:



-**BUS:** The data signals are transmitted to all the workstations. Every workstation checks the address on the data frame and if it is addressed to that specific computer then it processes it, otherwise it passes it on the bus. Only one computer can interact with the network at a given point of time. The computers on the bus are not responsible for moving the data signal they just wait and check the data signal. It is implemented through a coaxial cable. A regular bus topology connects each computer through a backbone drop cable. A local bus topology connects each computer directly to the backbone in a daisy chain layout. If one system fails it does not affect the topology.

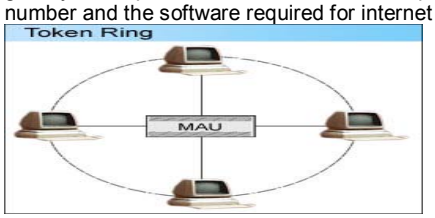
- **STAR:** A central unit called Hub is connected to all the computers. Hub offers a common connectivity to all the computers. It is implemented through an unshielded twisted pair cable. It is easy to manage and troubleshoot. All the computers stop working if the hub stops functioning.



- **RING:** All the computers are connected serially in a ring through a cable. The data signal passes on in a clockwise direction and there are no terminal computers. Each computer has equal access rights but only one system can communicate at one time. Each computer repeats the data signal to pass it on the ring to the next computer. It is implemented through a twisted fiber or fiber optic cable. It is complex and the most expensive topology to implement.

Terminologies:

- **Internet Service Provider (ISP):** A company that provides internet connectivity on monthly basis and gives you the password, username, access phone number and the software required for internet usage.



Post Office Protocol (POP): Used to take out the e-mail from the mail server. It has two versions pop2 and pop3.

Simple Mail Transfer Protocol (SMTP): Used for sending e-mail messages between servers.

- **Internet Message Access Protocol (IMAP):** Used for retrieving e-mail messages.- **Hyper Text Markup Language (HTML):** Used to create documents on the world wide web. It specifies the structure and layout of the web page by defining it in terms of tags and attributes.

- **Hyper Text Transfer Protocol (HTTP):** Defines the basic functioning of the world wide web. It specifies how messages are formatted, transmitted, what actions should be taken in response to specific commands.

- **Hyper Text Transfer Protocol Secure (HTTPS):** Used for accessing a secure web server.

- **Secure Sockets Layer (SSL):** Developed by Netscape it is a protocol used for transmitting private documents over the internet in a secure manner. It works on the concept of a secret key encryption for data transfer. Netscape Navigator and Internet Explorer support SSL.

- **Terminal Emulation Program (TELNET)**: The Telnet program runs on your computer and connects your PC to a server on the network. You can then enter commands through the Telnet program and they will be executed as if you were entering them directly on the server console. Drawback of using telnet is that it sends passwords as clear text.

- **File Transfer Protocol (FTP):** Used to exchange files over the Internet. It is used to upload and download web pages.

- **Local Area Network (LAN):** It covers a small geographical area like an office building. It connects workstations and personal computers.

- **Metropolitan Area Network (MAN):** It covers the area of a city or a town. A MAN is smaller than a WAN but bigger than a LAN.

- **Wide Area Network (WAN):** Group of LANs that are connected to each other through telephone lines or radio waves. Covers more area than a LAN.

Windows Operating Systems

Operating System Interfaces:

- **Windows Explorer:** Presents a hierarchical structure of all the documents. Helps in storing and managing them.

- **My Computer:** Displays the files and folders on the computer.

- **Control Panel:** Customizes the appearance of the desktop and configures the computer, and associated hardware and software.

- **Computer Management Tools:** Option available in the *administrative tools* in the *control panel.* It helps you in managing local or remote computers using a single, consolidated desktop tool. It combines several Windows administration utilities into a single console tree, providing easy access to a specific computer's administrative properties and tools.

- **Accessories:** Provides access to all the additional utility features in the Windows like *calculator, paint, games,* and *notepad.*

- **Network Neighborhood:** Displays computers in the workgroup and lists computers, printers and other resources connected to your Local Area Network (LAN).

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- Task Bar: Contains the Start button and appears by default at the bottom of the desktop. You can click the taskbar buttons to switch between running programs. You can also hide the taskbar, move it to the sides or top of the desktop, and customize it in other ways.
- **Start Menu:** Provides access to the main components of Windows, the programs, documents, settings and access to functionalities like *shutdown*, *finding files*, folders etc and help files.
- Device Manager: An administrative tool that lists all the hardware devices installed on your computer. It is used for changing the properties, installing, uninstalling and configuring devices.
- **Event Viewer:** Used to view and manage logs of system, program, and security events on your computer. It gathers information about hardware and software problems, and monitors Windows security events.

Major Operating System Components:

- **Registry:** A database maintained by Windows OS. It consisting of information regarding the hardware and software configuration. The information stored is continually referred by Windows OS while performing various operations. The registry is organized hierarchically as a tree and is made up of keys and their sub keys, hives, and value entries.
- **Virtual Memory:** Temporary storage used by a computer to run programs that need more memory than it has. Programs could have access to more virtual memory on a computer's hard drive, even if the computer has very less memory space in the RAM. The program data that does not currently fit in the computer's memory is saved into paging files.

File Systems:

-**File Allocation Table (FAT16):** It is allocated as clusters .The cluster size is decided by the size of the partition. It is most efficient when used with a volume size of 256 MB or less. There is no back up for boot sector partitions .No encryption or compression options are available.
- **FAT 32:** Supports smaller cluster sizes than FAT, which results in more efficient space allocation on FAT32 drives. No encryption or file security feature is available .It is capable of relocating the root directory and uses backup copy of FAT not the default copy.
- **NTFS 5:** Used on Windows 2000 and Windows XP ATTRIBUTES: Information that indicates whether a file is read-only, hidden, ready for archiving (backing up), compressed, or encrypted, and whether the file contents should be indexed for fast file searching.
- **New Technology File System (NTFS):** Advanced file system, which supports file system recovery and provides very large storage media and long file names. It also supports object-oriented applications by treating all files as objects. It provides features like *File and Folder Permissions, Encryption, Disk Quotas, File Compression, Mounted Drives, Hard Links, Distributed Link Tracking, Sparse Files, Multiple Data Streams, POSIX Compliance, NTFS Change Journal* **and** *Indexing Service*.

OS	NTFS	FAT 32	FAT	Max Partition (FAT)
XP Professional	Yes	Yes	Yes	4 GB
XP Home	Yes	Yes	Yes	4 GB
2000 Professional	Yes	Yes	Yes	4 GB
ME Edition	No	Yes	Yes	2 GB
98 and Second Edition	No	Yes	Yes	2 GB
NT	NT4, NT5	NT5 only	Yes	4 GB
NT3.5X	Yes	No	Yes	4 GB

Disk Partitions:

Active partition: The partition from which the computer starts up. The active partition must be a primary partition on a basic disk. If you use Windows 2000 exclusively, the active partition can be the same as the system volume. If you use Windows 2000 and either Windows 98 or earlier or MS-DOS, the active partition must contain the startup files for both operating systems.
Primary partition: A volume you create using unallocated space on a basic disk. Windows 2000 and other operating systems can start from a primary partition. You can create up to four primary partitions on a basic disk, or three primary partitions and an extended partition. Primary partitions can be created only on basic disks and cannot be sub partitioned.
Extended partition: A portion of a basic disk that can contain logical drives. Use an extended partition if you want to have more than four volumes on your basic disk. Only one extended partition can be created on a physical disc and no primary partition needs to be present to create an extended partition. Extended partitions can be created only on basic disks.
Logical partition: Logical partitions are created within an extended partition on the basic disk. A logical drive can be formatted and assigned a drive letter. Only basic disks can contain logical drives, and a logical drive cannot span on multiple physical disks.
Web Browser: Software application present on a computer, which is used to view, read, and request web pages from the Internet.
Firewall: Facilitates the security features in a network. It monitors the type of communication and data that is exchanged between networks to make sure that no unauthorized access takes place and no security breach happens.
Proxy server: Provide the computers on a network an alias IP address, their own address so that they can retrieve information from the Internet. It has two network cards installed on it .It is present between the private network and the Internet. It can also cache frequently accessed web pages and restrict certain websites in a network.

Features	Win 2000 Professional	Win XP Professional
SYSTEM RESTORE	NO	YES
DEVICE DRIVER ROLLBACK	NO	YES
WINDOWS FILE PROTECTION	YES	YES
WINDOWS FIREWALL	NO	YES
IP SECURITY	YES	YES
WINDOWS SECURITY CENTRE	NO	YES
SUPPORT FOR LATEST HARDWARE	SOME STANDARDS	YES
MMC	YES	YES
RECOVERY CONSOLE	YES	YES
SAFE MODE STARTUP OPTION	YES	YES
SYNCHRONIZATION MANAGER	YES	YES

Features	Win 95/98/ME	Win NT 4.0
SYSTEM RESTORE	Only ME supports partially	NO
DEVICE DRIVER ROLLBACK	NO	NO
WINDOWS FILE PROTECTION	NO	NO
WINDOWS FIREWALL	NO	NO
IP SECURITY	NO	NO
WINDOWS SECURITY CENTRE	NO	NO
SUPPORT FOR LATEST HARDWARE	SOME STANDARDS	NO
MMC	NO	NO
RECOVERY CONSOLE	NO	NO
SAFE MODE STARTUP OPTION	YES	NO
SYNCHRONIZATION MANAGER	NO	NO