

# **E4-E5 (CM)**

# **IT Infrastructure**

# WELCOME

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- This is a presentation for the E4-E5 CM Technical Module for the Topic: IT Infrastructure.
- Eligibility: Those who have got the Up-gradation from E2 to E3.
- This presentation is last updated on 15-3-2011.
- You can also visit the Digital library of BSNL to see this topic.

# Agenda

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- Introduction about IT Infrastructure
- Components of IT infrastructure
- Types and components of computer Network
- Different Software's used

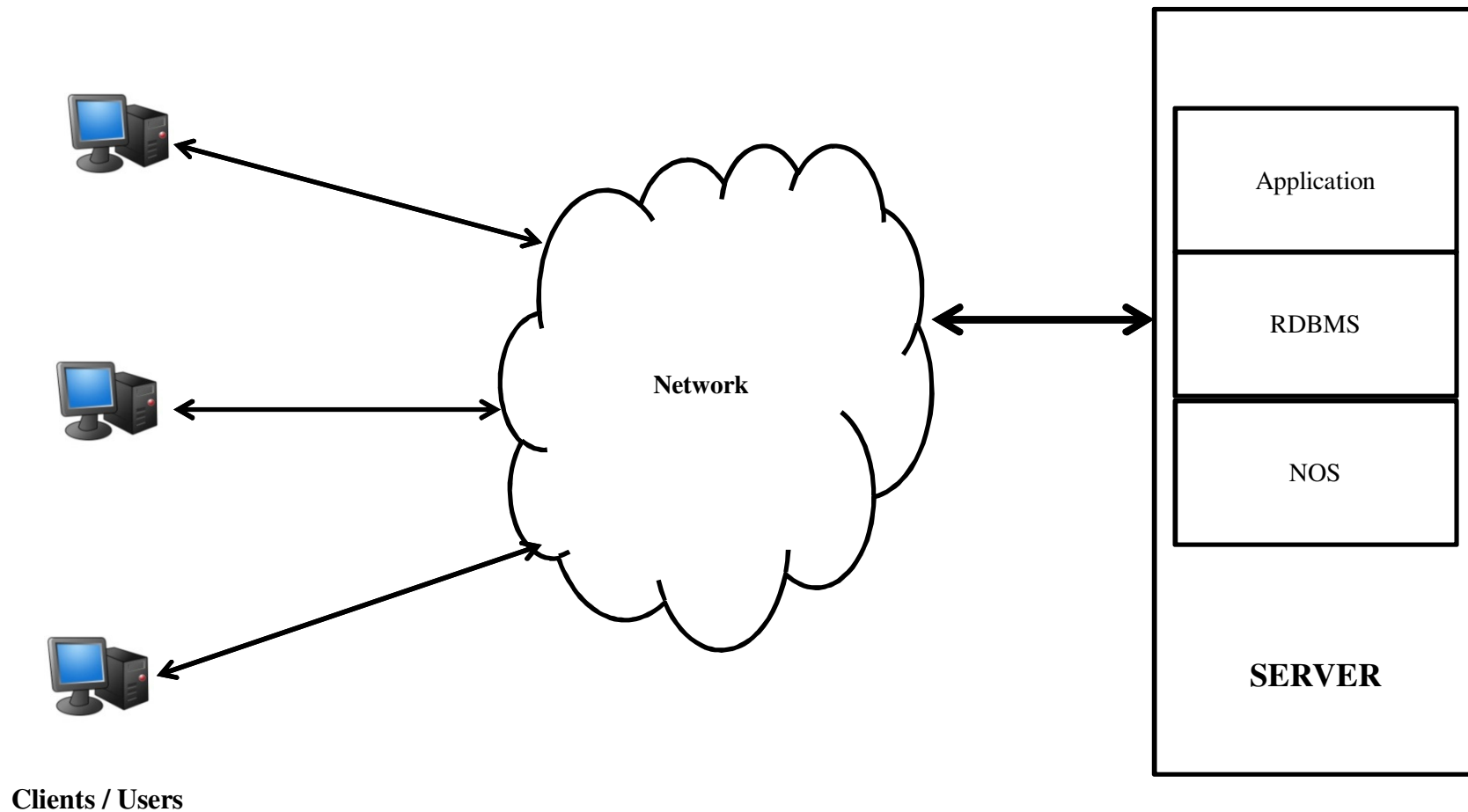
# IT Infrastructure

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- For implementing any IT application each SSA/Circle need to build up and maintain IT Infrastructure.
- Consists of the equipment, systems, software, and services used in common across an organization.
- Serves as the foundation upon which mission/program/project-specific systems and capabilities are built.
- Typically consist of Server(s) connected to number of User PCs through some network.

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# IT Infrastructure



# Components of IT Infrastructure

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- Three primary components of IT Infrastructure:
  - Servers
  - Desktop PCs
  - Computer network
  
- Servers are different from Desktop PCs in two aspects
  - they have more hardware resources and they are loaded with Network Operating System.

# Servers

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- Servers are the computers that provide some service to the network, to be shared by the network users/ clients.
- Servers are typically powerful computers that run with network operating system.
- Servers are often specialized for a single purpose. This is not to say that a single server cannot do many jobs but more often we get a better performance if we dedicate a server to a single task.

# Services provided by Servers

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## ■ DNS

- Domain Name System
- Like a directory service used to resolve URL to IP Address and vice versa

## ■ DHCP

- Dynamic Host Configuration Protocol
- It is used to allocate IP address and configure other parameters like Gateway Address, DNS address, Alternate DNS Address, dynamically on lease basis.



# Services provided by Servers...

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## ■ Mail

- Consists of different types of agents like
  - MUA (Mail user agent),
  - MDA (Mail Delivery agents) and
  - MTA (Mail Transfer Agents)
- It sorts dispatches and delivers electronic mails.

## ■ Web Hosting

- It hosts website(s).
- Multiple websites can be hosted on single physical server

# Services provided by Servers...

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## ■ Proxy

- It controls and restricts outgoing and incoming traffic.

## ■ Database

- It will have some RDBMS package like Oracle, MySQL and will manage data.
- This data can be populated or retrieved through some application.

# Requirements of server

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- Better & Faster CPU
- More RAM ( > 2 GB )
- Higher Bus Width & Speed
- More CACHE (>512 K b )
- Higher Capacity Hard Disk (160 GB x 2 or so..)
- Better Hard Disk Controllers
- Fault Tolerance
- Backup Devices
- Better Cooling

# Computer Network

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- A Computer Network describes two or more connected computers that can share resources such as data, a printer, an Internet connection, applications, or a combination of these.

# Need of Computer Networking

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- To Share Hardware resources
- To share Software Resources
- To share Information or Databases
- For Communications:
  - e-mail
  - e-commerce
  - video conferencing
  - chatting, etc.

# Types of Computer Network

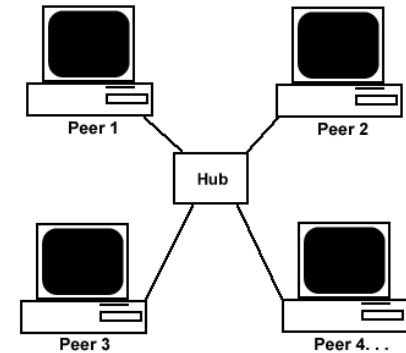
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- Depending on Geographical Coverage:
  - LAN - Local Area Network
  - MAN - Metropolitan Area Network
  - WAN - Wide Area Network
  
- Depending on the architecture of the network:
  - Peer to peer (Workgroup)
  - Client – Server
  - Domain

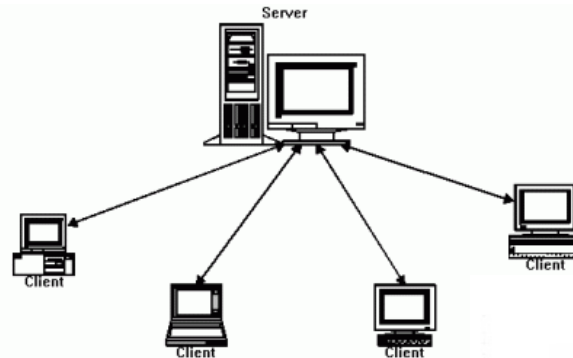
# Types of Computer Network

■ Depending on the architecture of the network:

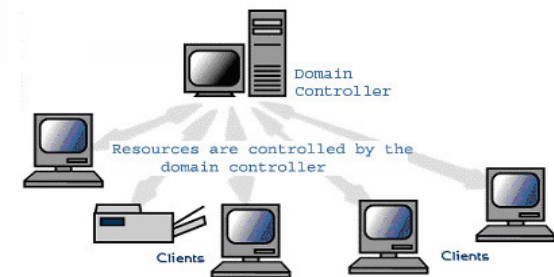
- Peer to peer (Workgroup)



- Client – Server



- Domain



# Components of LAN / WAN

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- A network has three types of components:
  - Data Terminal Equipment (DTE)
  - Data Communication Equipment (DCE)
  - Media.



# Data Terminal Equipment's

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- Data Terminal Equipment's are the devices like
  - PCs
  - Servers
  - Printers etc.
- These are either source or destination of information or data.
- DTEs must have an interface like Network Interface Card (NIC) to be connected to DCEs.

# Network Interface Cards

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- Workstations and servers are linked by NIC.
- NIC implements the MAC Protocol which determine how workstations/servers share access to network.
- The MAC (media access control) address is a 48 bit (6 bytes) unique hard coded address.
- NIC has memory for buffering in and outgoing data packets.

# Data Communications Equipment's

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- Devices which help us to connect different DTEs and they themselves are neither the source nor destination of information. Like,
  - Modems
  - Switches
  - Routers etc.
  
- DCEs are of two types
  - Intra Networking Devices: Modem, Hub, Switch etc.
  - Inter Networking Devices: Routers, Gateways etc.

# Media

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- Media is the path by which traffic is flowing from source to destination.
- It can be Cu cable (Ethernet cable, DSL tech etc.), OFC Cable and Wireless media.

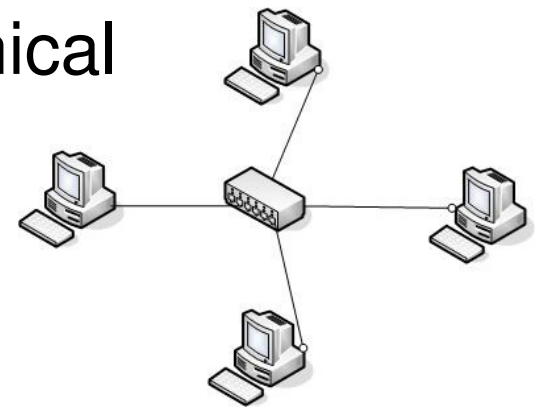
# Networking Devices

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- HUB
- LAN Switches
- Routers

# Hubs

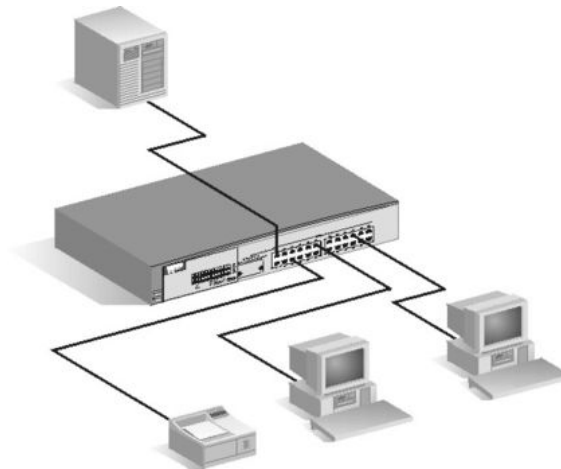
- The active central element of the star layout.
- When a single station transmits, the hub repeats the signal on the outgoing line to each station.
- Hub physically a star topology but logically a bus topology.
- Hubs can be cascaded in a hierarchical configuration



# LAN Switches

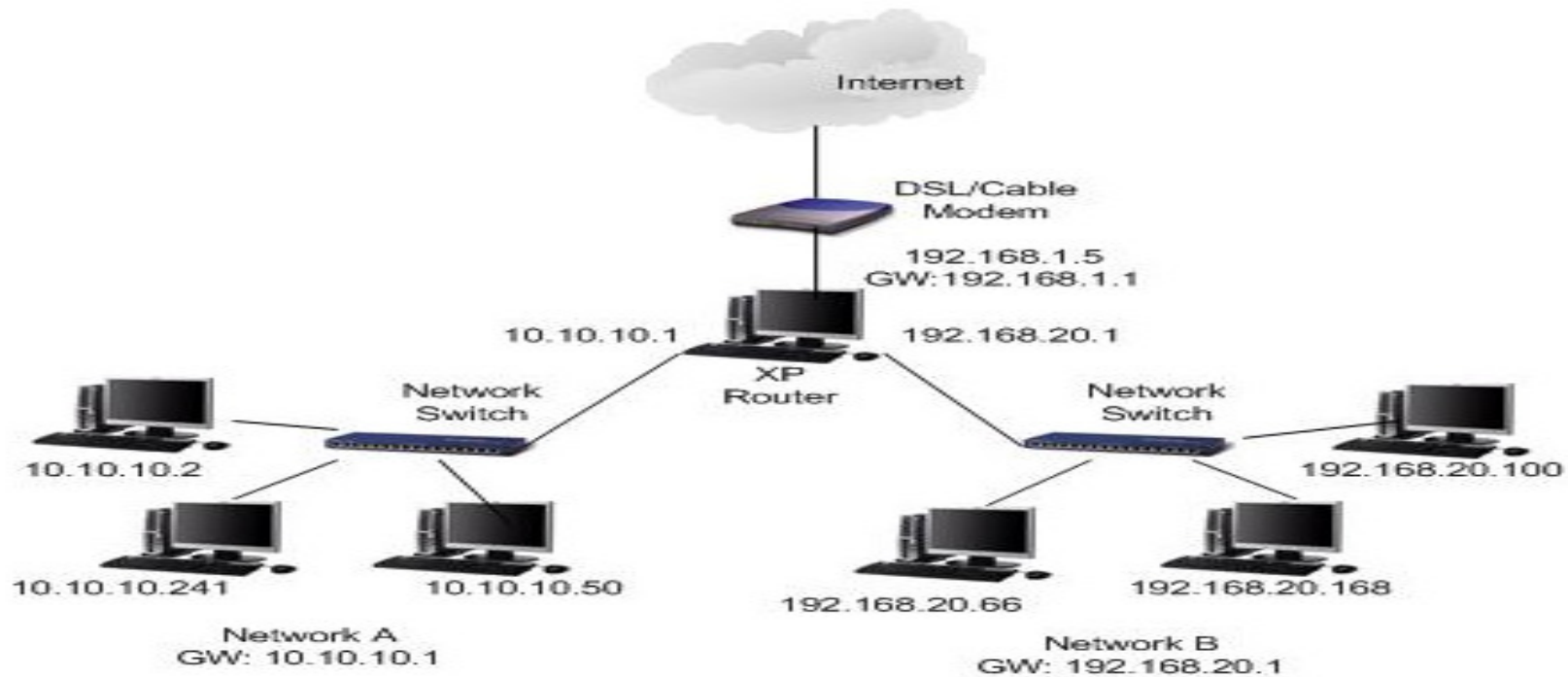
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- A switch has a switch table in which following entry is there like MAC Address, Interfaces etc.



# Routers

- Number of LANs can be inter-connected with the help of router



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# Working of LAN

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- LAN is basically a numbers of DTEs and DCEs which are connected together with the help of Intra Networking DCEs like switches.
- Information is exchanged between different DTEs in a LAN by sending packets, which are called Ethernet packet.
- Individual Computers in a LAN are identified by a unique address associated with each NIC.

# Software's

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- System Software : Operating Systems, Device Drivers, Utilities etc.
- Application Software: Word-Processor, Spread-sheet, Database, Presentation, Graphic, Multimedia etc.

# Operating System

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## ■ Desktop Operating System:

- Operates Desktop Computers
- MS Windows XP, Vista, Macintosh etc.

## ■ Network Operating System:

- Operates Servers
- MS Windows Server, Unix, Linux, Sun-Solaris etc.

# System Architecture

