“Library as a service in Digital Era” – Preparing academic campuses in Indian scenario

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-Where every one strives to attain his potential

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Presentation outline

- Library resources – historical and current perspective
- Computer networks
- Servers
- Storage
- Virtualization and cloud
- Cloud services publicly available
- Conclusion

Library history

Library – what it contains?

- Text books
- Reference books
- Research books
- Journals
- CDROM volumes/ soft volumes
- Institutional publications
- Institutional theses
- Institutional resources/ reports etc

Academic resources perspective

- Books
- Journals
- Theses
- Slides
- VHS records
- Miscrofiche
- CDROMs
- DVDs

Library – 1990 scenario

- Books
- Reference books
- Journals
- Back volumes of Journals
- CD ROM database
- Dataset and reference data base (in CDs)
- Microfiche
- VHS videos
- Theses and repository

Library – current scenario

- Books
- Reference books
- Other types resources like microfiche, VHS, CDROMs no more available

Large volume of resources through computer network and internet service

Library on desktop

From Physical library resource

to virtual library resource on desktop

Driven by: strong IT infrastructure

How to enable it?

Core requirement

- A campus computer network
- Server infrastructure
- Storage infrastructure
- Internet services for accessing information from outside
- Internet services to deliver information, to showcase our own scholastic output.

Network infrastructure

What is a computer network

A **computer network** or **data network** is a communication link which allows computers to exchange data. In computer networks, networked computing devices pass data to each other along data connections (network links). Data is transferred in the form of packets. The connections between nodes are established using either cable media or wireless media.

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Computer Networks

- Computer network connects two or more autonomous computers.
- The computers can be geographically located anywhere across the globe.

LAN, MAN and WAN

- Network in small geographical Area (Room, Building or a Campus) is called LAN (Local Area Network)
- Network in a City is call MAN (Metropolitan Area Network)
- Network spread geographically (Country or across Globe) is called WAN (Wide Area Network)

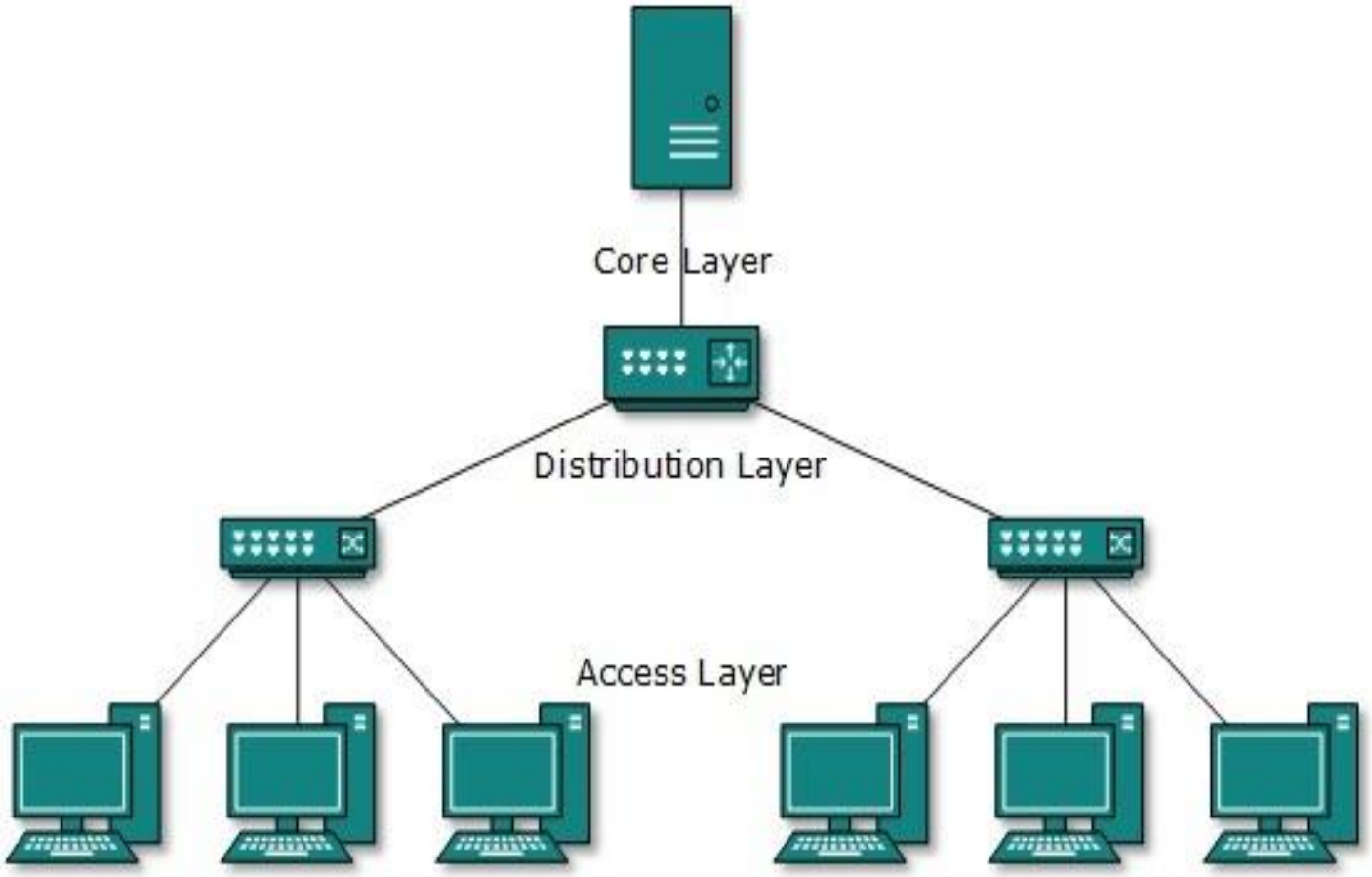
Uses of a computer network

- **Resource Sharing**
  - Hardware (computing resources, disks, printers)
  - Software (application software)
- **Information Sharing**
  - Easy accessibility from anywhere (files, databases)
  - Search Capability (WWW)
- **Communication**
  - Email
  - Message broadcast
- **Remote computing**
- **Distributed processing (GRID Computing)**

Network Topologies

- Bus topology
- Ring topology
- Star topology
- Mesh
- Extended star

Tree topology



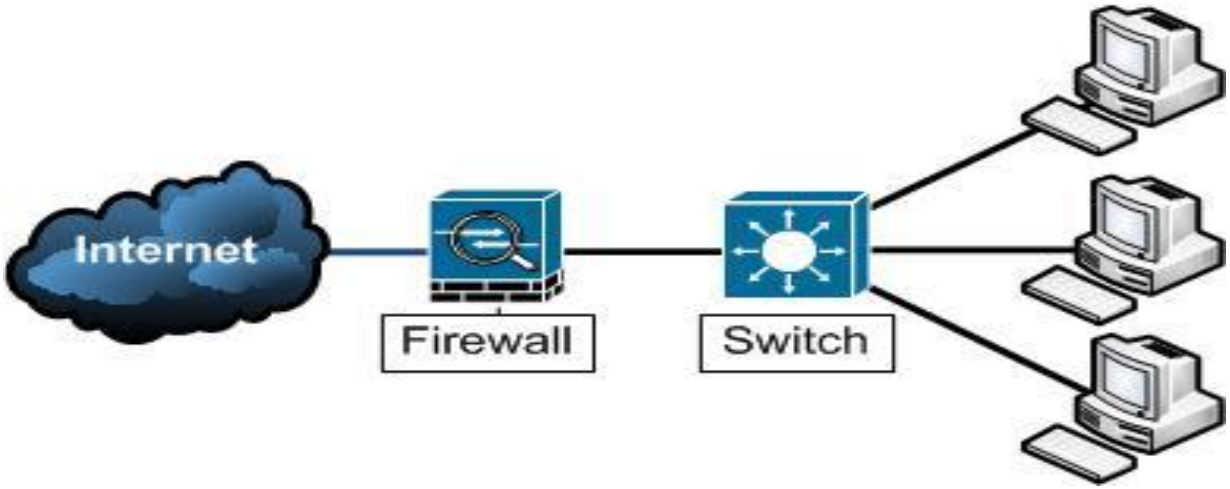
Network Components

Physical media

Interconnecting devices

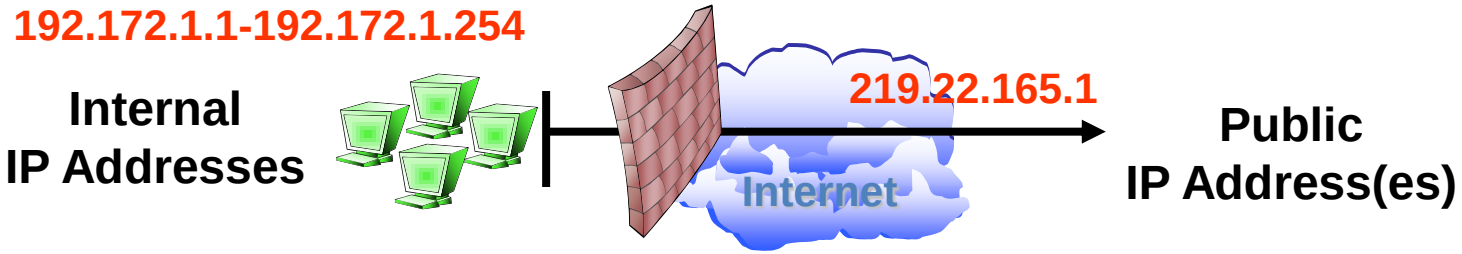
- Switches, wireless access, modem

- Firewall/ UTM



Network Address Translation

Converts a network's Private LAN IP addresses to Public IP addresses



- Hides the true addresses of individual hosts, protecting them from attack
- Allows more devices to be connected to the network

Network Applications

- E-mail
- Searchable Data (Web Sites)
- E-Commerce
- News Groups
- Internet Telephony (VoIP)
- Video Conferencing
- Chat Groups
- Instant Messengers
- Internet Radio

Server and storage Infrastructure

Server infrastructure

what is the difference between desktop computer and server

A desktop computer system typically runs a user-friendly operating system and desktop applications to facilitate desktop-oriented tasks.
A server manages all network resources. Servers are often dedicated (meaning it performs no other task besides server tasks). it has to be more reliable than a desktop computer .

Network Resources Manage by Sever

Server structure by generation

WorkStation

Rack Server

Blade Centre

- Blade Server is Fourth generation architecture with high configuration
- Blade Centre is an enclosure based architecture with common PSU, network switch, SAN etc.
- Each Blade can have
  - 4 Nos of CPU
  - each CPU is of 12 core
  - beyond 256 GB RAM can use
  - support SAN Storage, Network Attached Storage, Tape Library

Storage

SAN

NAS

LTO

- **Storage Area Network (SAN)** - is a high-speed network of storage devices that provides block-level storage which can be accessed by the applications running on any networked servers.
- **Network Area Storage (NAS)** - is file-level computer data storage server connected to a computer network providing data access to a heterogeneous group of clients.
- **Linear Tape-Open (LTO) -** is an open-format tape storage technology.

How to use High End Resources

VMware is a virtualization and cloud computing software. VMware virtualization is based on the ESX/ ESXi bare metal hypervisor, supporting virtual machines.

VM, which stands for "Virtual Machine" is a widely-installed operating system for computers and servers that can host other operating systems in such a way that each operating system behaves as if it were installed on a self-contained computer with its own set of programs and hardware resources.

Top Virtualization Solution provider companies

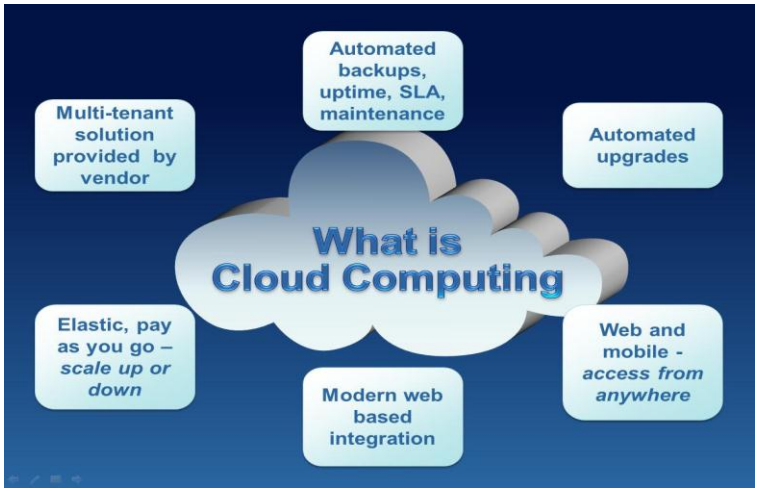
VMWare Vsphare servers

Red Hat Enterprise Virtulization

Microsoft Hyper-V Virtualization

CITRIX Xen Virtualization

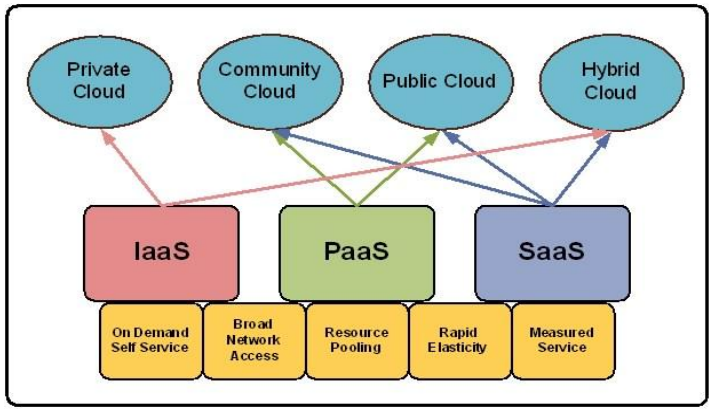
Cloud Computing



Cloud computing is typically defined as a type of computing that relies on *sharing computing resources* rather than having local servers or personal devices to handle applications.

In cloud computing, the word “cloud” is used as a metaphor for "*the Internet*," so the phrase *cloud computing* means "a type of Internet-based computing," where different services — such as servers, storage and applications — are delivered to an organization's computers and devices through the Internet.

Cloud Deployment Models

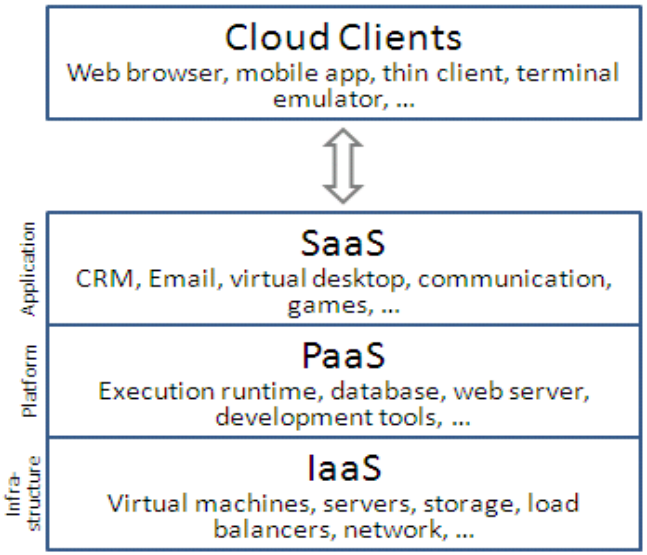


The four primary types of cloud models are:

- Public
- Private
- Hybrid
- Community

Public Cloud : A public cloud is a cloud computing model in which services, such as applications and storage, are available for general use over the Internet.
Private Cloud: A private cloud is a virtualized data centre that operates within a firewall. Private clouds are highly virtualized, joined together by mass quantities of IT infrastructure into resource pools, and privately owned and managed.
Hybrid Cloud: A hybrid cloud is a mix of public and private clouds.
Community Cloud: A community cloud is an infrastructure shared by several organizations which supports a specific community.

Cloud Computing services



- **Software As A Service (SaaS):** Users are provided access to application software and databases. Cloud providers manage the infrastructure and platforms that run the applications.
- **Platform as a service (PaaS) :** Cloud providers deliver a computing platform, typically including operating system, programming language execution environment, database, and web server.
- **Infrastructure as a service (IaaS) :** providers of IaaS offer computers – physical or (more often) virtual machines. To deploy their applications, cloud users install operating-system images and their application software on the cloud infrastructure.

Cloud services available

Google Cloud

Google Docs

Google Drive

Google Scholar

Microsoft

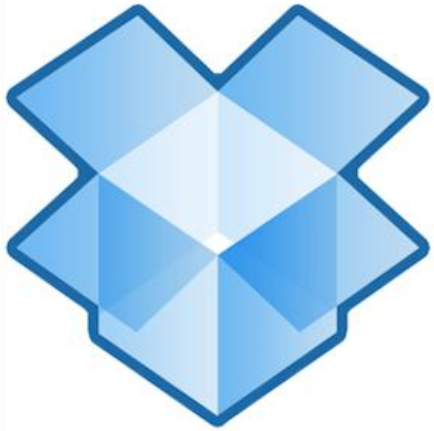
Microsoft Office 365

OneDrive

Outlook.com

Other cloud storage

SugarSync



MediaFire

Reference Manager

MENDELEY

Docear

RefWorks

zotero

JabRef reference manager

Qiqqa

Thank you