Windows Server Administration

Tutorial on Module-IV
of
CS 244: Systems Programming Lab
Indian Institute of Technology Guwahati


by
Md Shakeel Iqbal Saikia & Subrata Tikadar

Outline

- Introduction to client server networks
- Peer to Peer networks
- Server roles
- Types of servers
- Critical Components of Server
- Software
- Virtualization
- Windows Server History
- Windows Server Administration

Server

- **Server** is a computer which dedicatedly provides service
- **Client** is a computer that requests service
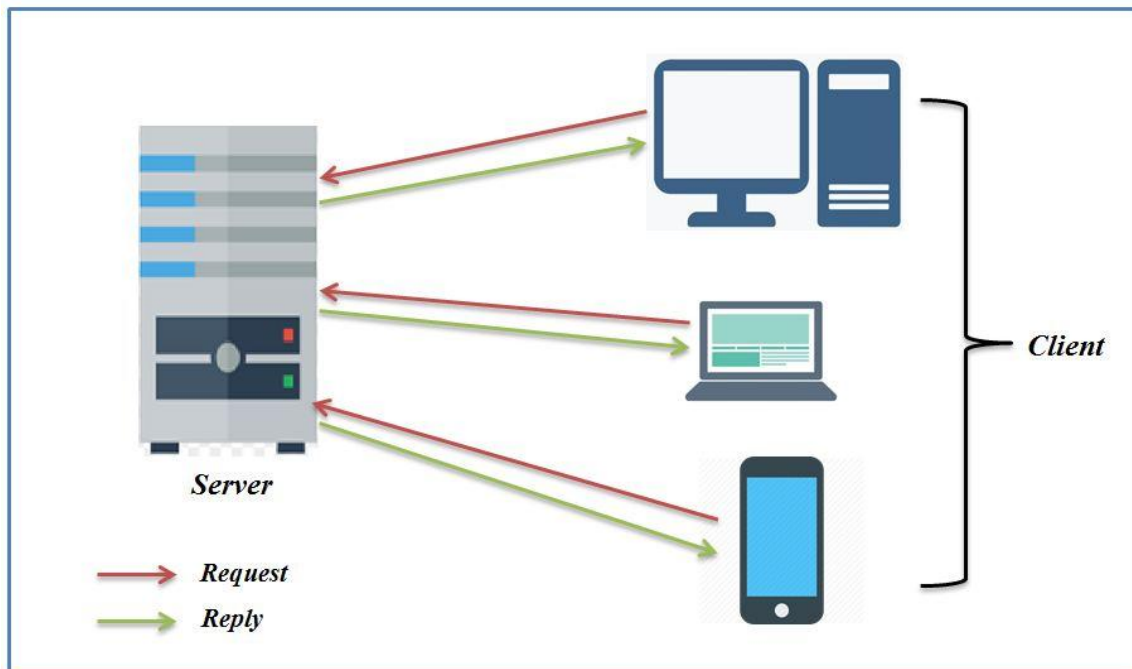
Server

- A network made up of dedicated servers and clients is known as a **client-server network**
- Server-based network is used for sharing resources and data, while providing centralized network security for those resources and data
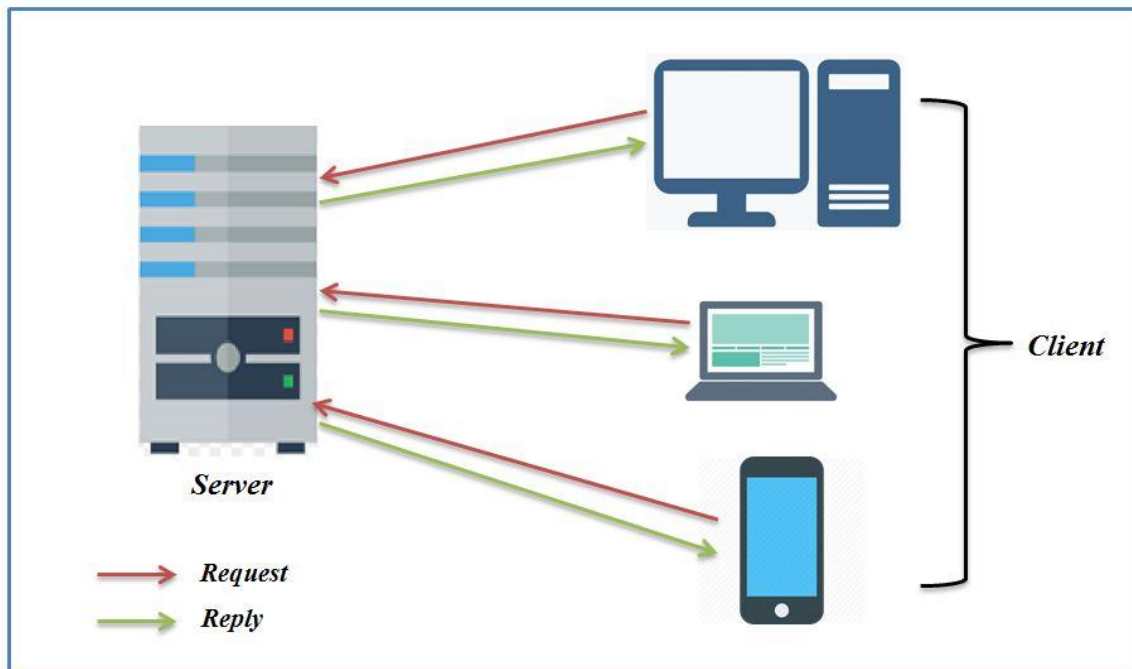
Peer to Peer(P2P) Network

- In a P2P network, each computer can act as a **client** or **server**
  - Each computer can process the requests of another computer or send requests to another computer
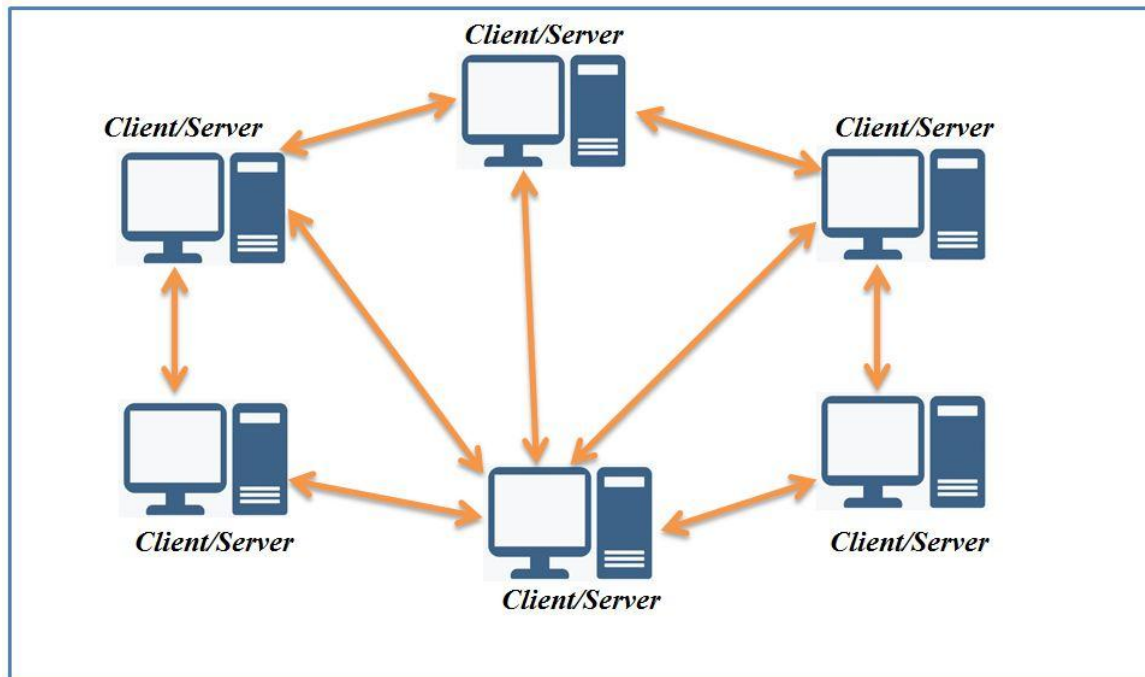
Peer to Peer (P2P) Network

- Advantages:
  - Easy to set up
  - Does not rely on a dedicated server for an operation
- Disadvantages:
  - Slower than client-server networks
  - Difficult to manage

    [as each user becomes a network administrator]
  - Not as scalable as client-server networks
 - Relatively less secure
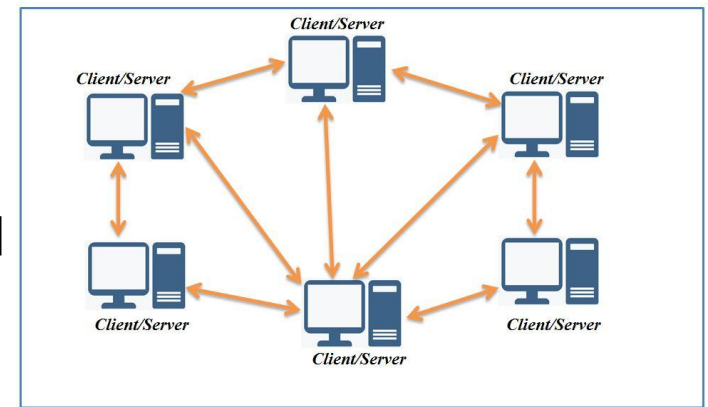
Client-Server Network

- Advantages:
  - Centralized management
  - Less intrusive
  - Faster
  - Scalable
- Disadvantages:
  - Set-up cost
  - Requires at least one administrator
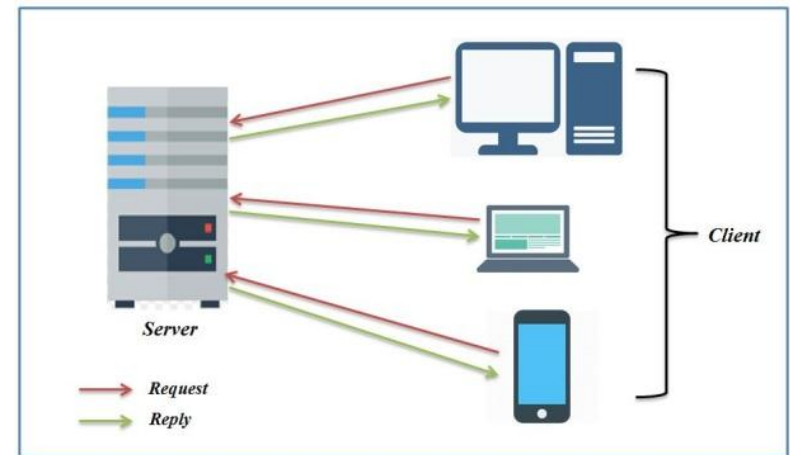
Cloud

- On demand availability of computer system resources
  - data storage and computing power
- Often have functions distributed over multiple locations
- User does not bother about active management
- Advantages
  - Immediate access to a broad range of resources and applications
  - Only operating cost
- Example

Image source: https://en.wikipedia.org/wiki/Cloud_computing
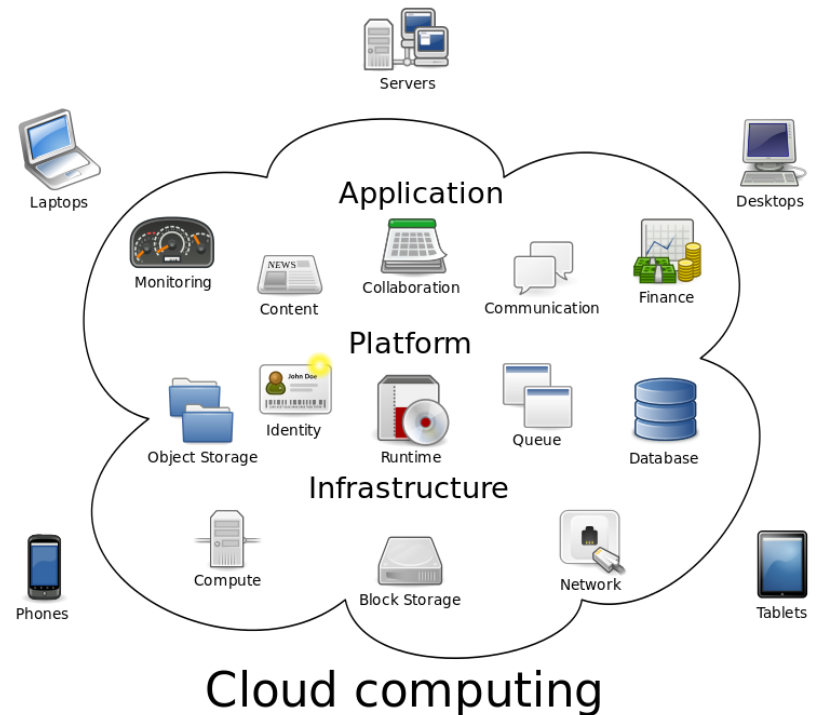
Server Roles

- Server Role is the primary duty that a server performs
- Common server roles:

Server Roles

- Server Role is the primary duty that a server performs
- Common server roles:

- **File Server** allows files to be centrally located which is accessible by multiple users
- Generally does not perform any computational tasks, and does not run programs on behalf of its clients

Server Roles

- Server Role is the primary duty that a server performs
- Common server roles:

  - Multiple users can access a centrally located printer using print services
  - The printer service is managed centrally in the **print server**
  - An expensive heavy-duty, or fast, printer can be shared that supports advanced options

Server Roles

- Server Role is the primary duty that a server performs
- Common server roles:

  - A **web server** hosts web pages and their related multimedia contents (web elements)
  - It accepts requests from clients for web contents and responds back

Server Roles

- Server Role is the primary duty that a server performs

- Common server roles:

  - The **application server** role provides an integrated environment for deploying and running server-based business applications

Server Roles

- Server Role is the primary duty that a server performs

- Common server roles:

  - A central computer that holds e-mail messages for clients on a network is called a **mail server**

  - When the user requests his/her e-mail, connection is established with the mail server, which then delivers it to the client's computer

Server Roles

- Server Role is the primary duty that a server performs
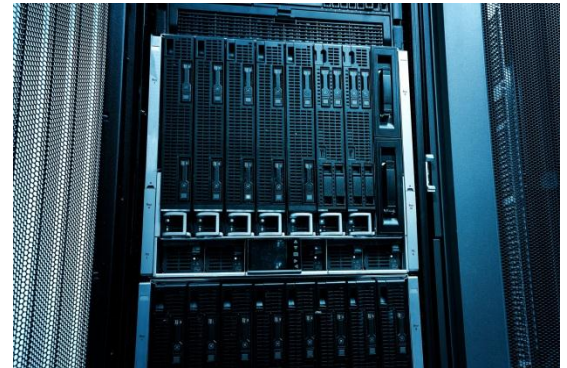- Common server roles:

  - A **database server** is dedicated to database storage and retrieval
  - The database server holds the Database Management System (DBMS) and the databases
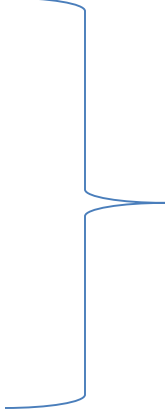
Server: Types

- General Purpose Server
- Specialized Server

Server: Types (Hardware Organization)

- Tower Server
- Rack Mounted Server
- Blade Server

Critical Components

- Processor

- Memory

- Storage

- Network

- Failure of any one of these can cause the entire system to fail

- Anyone of these can cause bottleneck
  - Affect system's performance

Critical Components

- Processor
- Memory
- Storage
- Network

- Types
  - 32 bit → 4 GB of RAM
  - 64 bit → 4 TB of RAM
  * Multicore
- Special organization of cache
- Additional instruction sets (e.g., Advanced Vector Extensions)

Critical Components

- Processor
- Memory
- Storage
- Network

- Having sufficient RAM can be one of the main factors in the server's overall performance

Critical Components

- Processor

- Memory

- **Storage**

- Network

- Local storage (Hard disk)

- Additional external storage
  - SAN (Storage Area Network)
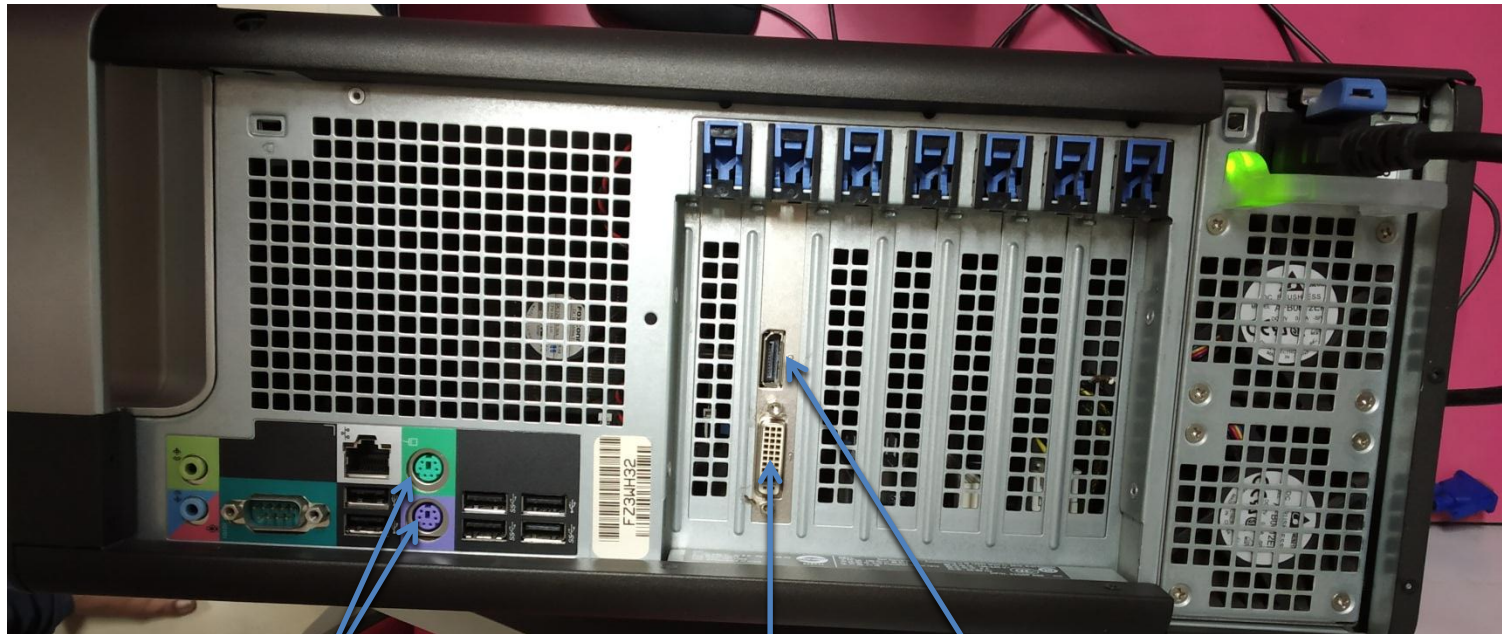 - NAS (Network Attached Storage)

Critical Components

- Processor
- Memory
- Storage
- Network

- Most servers include one or more network interface cards or NIC
- Typical speed for servers is 1Gbps or faster

Ports
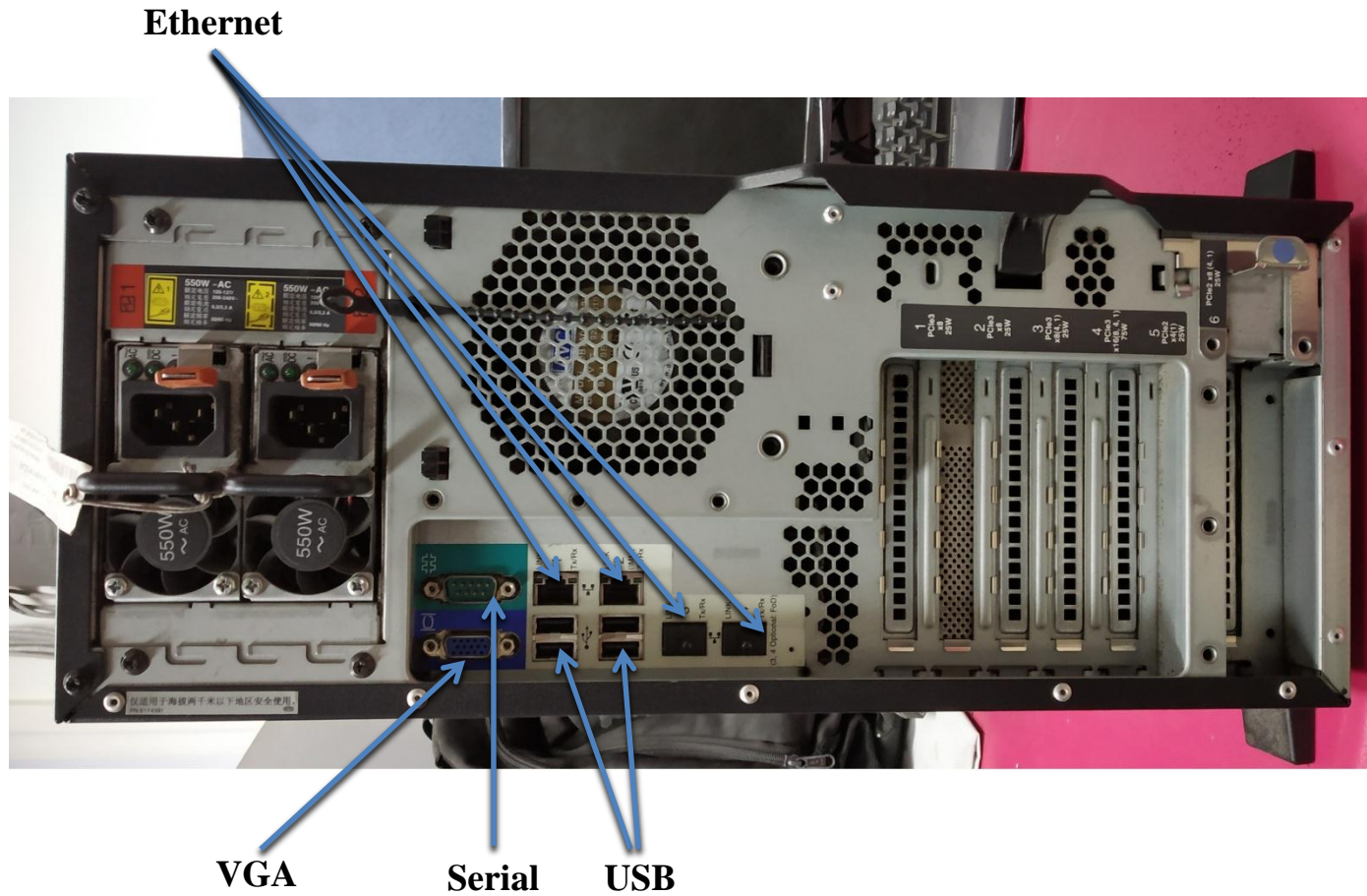
Ports

PS/2   **DVI**   **HDMI**

Software

- Software contains the instructions that the hardware follows
- It provides an interface to configure and manage the server
- For a server:
  - Choose the operating system
  - Choose the roles that the operating system provides
  - Install additional software

Virtualization

- Virtual machines or **virtual server technology** enables multiple operating systems to run concurrently on a single machine

- Allows separation of services so that changes on one virtual server do not affect the other virtual servers

- Offers better utilization of hardware minimizing the cost

- One leader of virtualization is **VMware**

- Microsoft includes its own virtualization tool - **Hyper-V**

Windows Server: History

- Windows NT (first released in 1993) – Parent version
- Windows 2000 Server
- Windows Server 2003
- Windows Server 2003 R2
- Windows Server 2008
- Windows Server 2008 R2
- Windows Server 2012
- Windows Server 2012 R2
- Windows Server 2016
- Windows Server 2019

Windows Server: History

- Windows NT (first released in 1993) – Parent version
- Windows 2000 Server
- Windows Server 2003
- Windows Server 2003 R2
- Windows Server 2008
- Windows Server 2008 R2
- Windows Server 2012
- **Windows Server 2012 R2**
- Windows Server 2016
- Windows Server 2019

Windows Server Administration

- Installation
- Configuration
- Assigning roles and policies
- Managing server(s) and associated resources
- Monitoring and Troubleshooting
- Deployment services

Suggested Reading

- Windows Server Administration Fundamentals

    https://docentinrete.files.wordpress.com/2012/05/manuale-2008-98-365-windowsserver.pdf

Next

- Hands on tutorial on Windows Server 2012 R2

thank you!