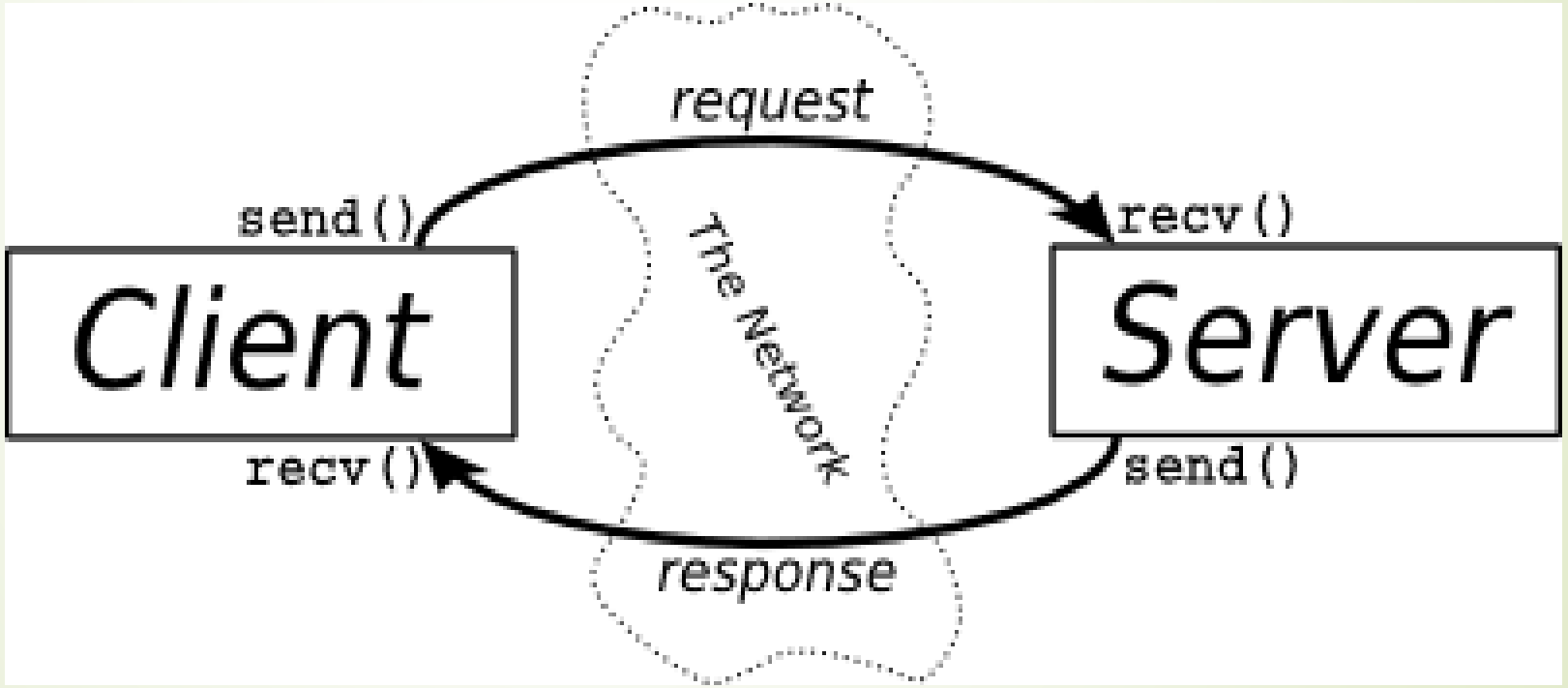
Network Software

Lecture 10

Client-Server Model

- A **distributed application structure** that partitions tasks or workloads between servers and clients.
- **Often** clients and servers **communicate** over a **computer network** on **separate hardware**, but both client and server may reside in the **same system**.
- **Servers** :the providers of a resource or service
- **Clients**: service requesters

Client-Server Model



Server vs. client software

- **Client software**: Software that **resides in a user's** desktop or laptop computer or mobile device.
  - Example: web browser, mail client, media streaming player

- **Server Software**: Software that **resides in a server** and provides services to multiple users on the network. Might be part of the operating system or a special software to function as a Server Role.
  - **Part of the operating system**: DNS, DHCP, File server
  - **Special software**: Apache web server, MS Exchange (mail server)

Client operating system

- The Client Operating System is the system that **works within computer desktops and various portable devices.** This system is different from centralized servers because it only **supports a single user**.
- Most popular Client Workstation Operating Systems are listed below.
  - Windows XP (Legacy)
  - Windows 7 (Legacy)
  - Windows 8 / Windows 8.1
  - Windows 10
  - RedHat Enterprise Linux Desktop
  - SuSE Desktop
  - Ubuntu Desktop
  - LinuxMint
  - Fedora

Server OS / Network OS

- Operating system **specifically designed to run on servers** and has **more features and processing capabilities** compared with the client computer's operating System.
- Most popular **Network Operating Systems** are listed below.
  - Windows Server 2000 (obsolete)
  - Windows Server 2003 (Legacy)
  - Windows Server 2008 / Windows 2008 R2
  - Windows Server 2012 / Windows 2012 R2 / Windows 2016.
  - Unix (Oracle Solaris, IBM AIX, HP UX, FreeBSD, NetBSD, OpenBSD, SCO Unix etc)
  - GNU/Linux (RedHat Enterprise Linux, Debian Linux, SUSE Enterprise, Ubuntu Server, CentOS Server, Oracle Linux, mageia

Different Server Types

1. Web
2. File
3. Database
4. Virtualization
5. terminal services server.(VDI Server)
6. Mail
7. Infrastructure servers
8. Combination
9. Others..

Web server

- **Web server** refers to server software that can serve contents to the World Wide Web.
- A web server processes incoming network requests over the HTTP protocol (and several other related protocols).
- Sample URL: ***http://www.example.com/path/file.html***
- Could be deployed as front-end back-end
- Might be deployed with NLB (Network Load Balancer).

Web servers main vendors (market share 2017)

Product	Vendor	January 2017	Percent
IIS	Microsoft	821,905,283	45.66%
Apache	Apache	387,211,503	21.51%
Nginx	NGINX, Inc.	317,398,317	17.63%
GWS	Google	17,933,762	1.00%

File server

- A computer attached to a network that **provides a location** for shared disk access, i.e. **shared storage** of **files** (such as text, image, sound, video) that can be accessed by the workstations that are able to reach the computer that shares the access through a computer network.
- A file server may be **dedicated or non-dedicated**.
- Usually accessed by **FTP**, **SMB/CIFS** *(Common Internet File System)* **protocols** (Windows and Unix-like) or **NFS protocol** (Unix-like systems).
- Usually makes use **of RAID configuration** to **increase reliability** of disk systems.

Demand factors in file servers

1. storage space,
2. access speed,
3. recoverability,
4. ease of administration,
5. security,
6. and budget.

Database Server

- A database is a **collection of information that is organized** so that it can be easily **accessed**, **managed** and **updated**.
- A DB server houses a database application that provides database services to other computer programs.
- Usually used as **back-end** in front-end back-end deployments.

- DB: https://www.youtube.com/watch?v=t8jgX1f8kc4

DB server protocols

- **ODBC : Open DataBase Connectivity**
  - The **most common** general database **protocol**
  - Developed jointly by IBM, Microsoft, and others.
  - has the **widest support** of both databases and applications that can use ODBC to access a database.
  - **Slower** than new technologies like OLE-DB
- **OLE-DB:** *(Object Linking and Embedding, Database)*
  - Developed by Microsoft
  - the **highest performance** method for accessing a database outside of the native database drivers
  - it's also currently **limited to the Windows NT platform.**
- **JDBC**, the **Java** equivalent of ODBC,
  - Used to **connect with Java applications**,
  - Developed by SUN

Major Data Base Management Systems vendors

- Oracle
- Microsoft SQL Server
- IBM DB2
- PostgreSQL
- MariaDB Enterprise
- MySQL

Virtualization Server

- **Server virtualization:** is the **partitioning** of a **physical** server into **smaller virtual servers.**
  - help **maximize your server resources.** In server virtualization the resources of the server itself are hidden, or masked, from users, and
  - software is used to di**vide the physical server into multiple virtual environments**, called virtual or private servers.
- The server **administrator** uses a **software application** to divide one physical server into multiple isolated virtual environments.

Major vendors in server virtualization

- VMWare
- Microsoft
- Nutanix
- Citrix
- RedHat
- Oracle

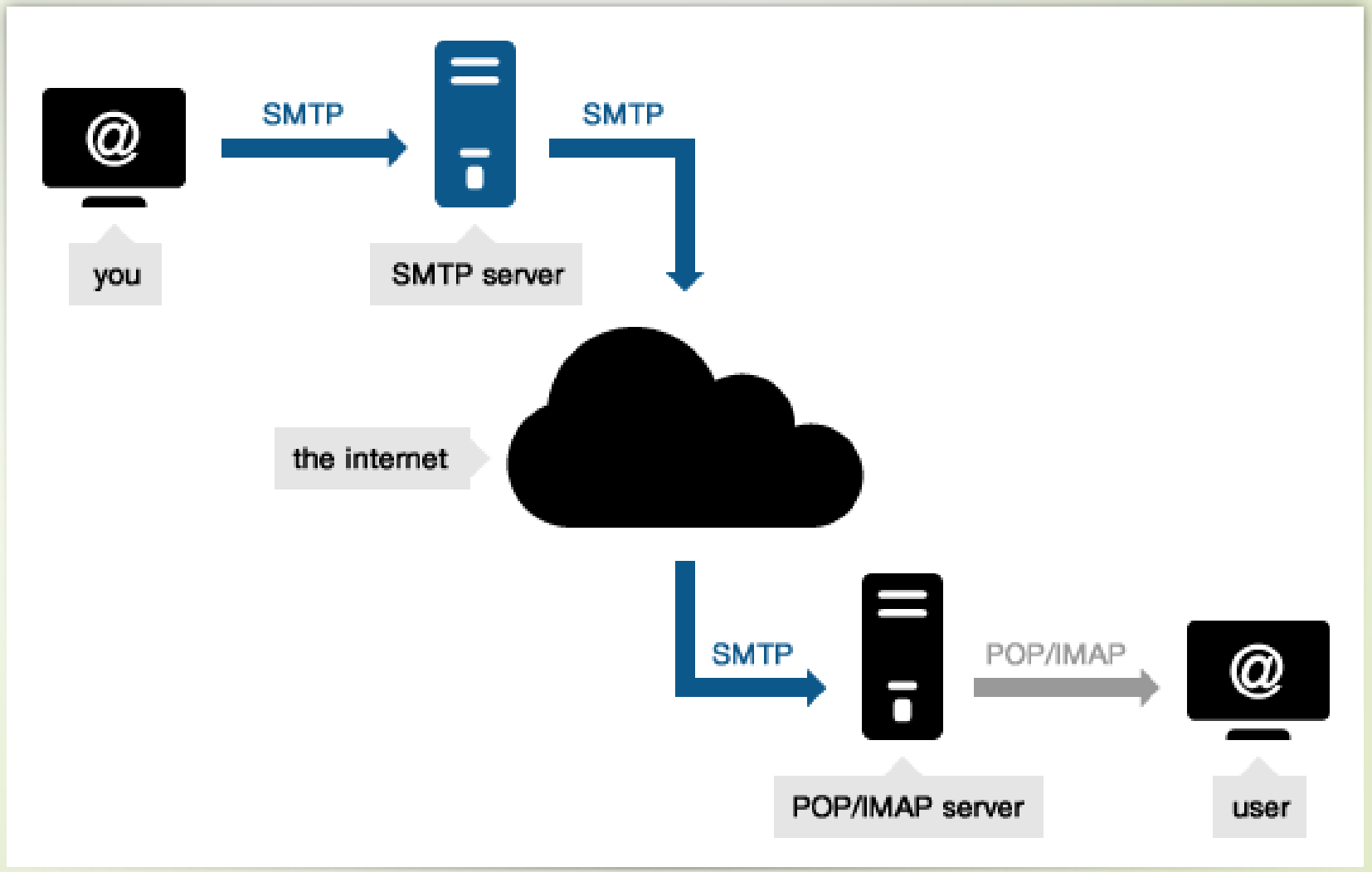
Terminal Services server

- Also called **Remote Desktop Services (RDS)**
- Allows a **user to take control of a remote computer** or virtual machine over a network connection.
- The user uses a device called **Thin client** or **Zero client** just to connect with the TSS.
- Mainly thin clients provides connectivity to the server through certain application like Remote Desktop Protocol (**RDP**). All of the **software execution** takes place on the **server side**

Mail Server

- An **application** that **receives** incoming e-mail from local users (people within the same domain) and remote senders **and forwards** outgoing **e-mail** for delivery.
- Mail server uses:
  - **SMTP** (Simple Mail Transfer Protocol) or
  - **ESMTP** (extended SMTP) for sending e-mail,
  - **POP3** (Post Office Protocol 3) or **IMAP** (Internet Message Access Protocol) for receiving e-mail.
- Usually used in conjunction with other servers like web server.

Mail protocols



Combination

Questions so far?
See you after the break ;)