Internet and World Wide Web (WWW)

History of the Internet

- The Internet is a global network of networks that enables computers of all kinds to directly and transparently communicate and share services throughout the world.
- In 1969 the precursor of Internet is born: ARPA net.
- ARPA = Advanced Research Projects Agency sponsored by the American Department of Defense (DOD).
- Designed to connect military research centers.
- Distributed computer system able to survive a nuclear attack.
- Problem: ARPAnet could connect only networks of the same type.

In late 1970's US National science foundation designed a successor to Arpanet called NSFnet which was open for all university research groups, libraries and museums.

Internet grew exponentially when ARPANET interconnected with NSFNET.

In 1980's many internet application like electronic mail, newsgroups, file transfer facility and remote login were developed.

In 1990's new application WWW (World Wide Web) changed the way in which internet was used. WWW is a system of creating, organizing and linking documents and was created by British scientist Tim Berners lee.

Internet

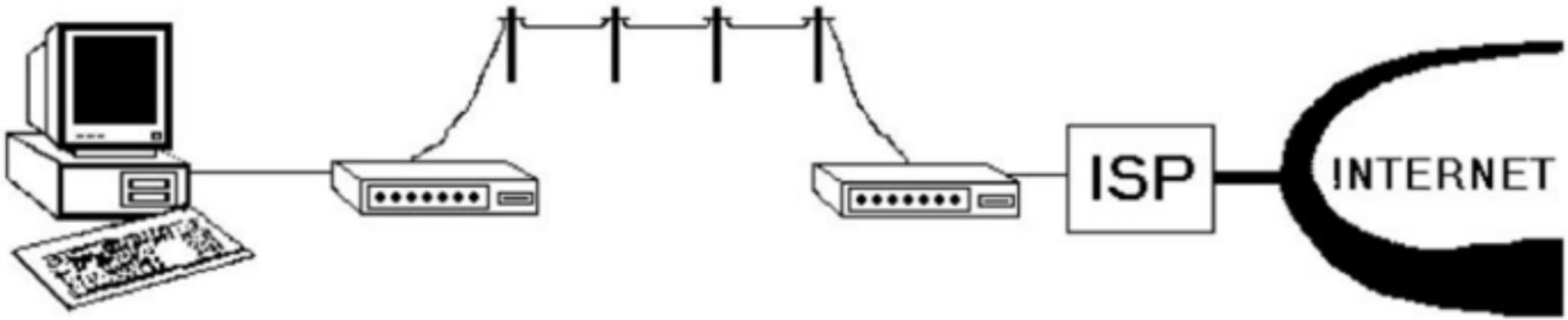
- The internet is the largest computer network in the world, connecting millions of computers so that users can share resources and communicate with each other.
- A network is a group of two or more computers systems linked together.
- Internet is defined as international network that integrates the computer to form a global network structure so it is called the network of global network.
- Now a day it is very essential for all type of Business, Academic Institution, Hospitals, and Banks etc.

Key Layers of Internet.

CONTENT
SEARCH ENGINE
BROWSERS
WORLD WIDE WEB (WWW)
INTERNET
NETWORKS
COMPUTERS

Basic Requirements for Internet Connection

- Computer
- Web Browser
- Modem
- Router
- Internet Service Provider (ISP)



ISPs are the companies that provide access to the internet.

Modem is a device that converts a computer's outgoing data to a format that can be transformed via telephone lines. It also convert incoming data so that computer can read it.

- A **router** is a hardware device that allows you to connect several computers and other devices to a single Internet connection, which is known as a home network. Many routers are wireless, which allows you to create a home wireless network, commonly known as a Wi-Fi network.
- You don't necessarily need to buy a router to connect to the Internet. It's possible to connect your computer directly to your modem using an Ethernet cable. Also, many modems include a built-in router, so you have the option of creating a Wi-Fi network without buying extra hardware.

Advantages of the Internet

- **Access to Information**:

  - Provides vast resources like articles, videos, and online courses for learning and knowledge sharing.

- **Communication**:

  - Enables instant global communication through email, chat, video calls, and social media.

- **Convenience in Daily Life**

  - Facilitates online banking, shopping, and navigation with tools like GPS.

➢**Entertainment**:

- Offers unlimited access to movies, music, games, and streaming platforms like YouTube.

➢**Business Opportunities**:

- Supports global e-commerce, advertising, and remote work, reducing operational costs.

➢**Healthcare Access**:

- Enables telemedicine and online pharmacies for easy healthcare solutions.

Disadvantages of the Internet

- **Cyber security Threats**:

  - Vulnerable to hacking, phishing, and identity theft.

- **Spread of Misinformation**:

  - False information can mislead users and cause confusion.

- **Privacy Concerns**:

  - Personal data collected online can be misused or compromised.

➢ **Addiction and Time Wastage**:

- Overuse of social media, gaming, or entertainment leads to inefficiency.

➢ **Immoral Content**:

- Explicit or harmful material online can negatively influence users.

➢ **Health Issues**:

- Prolonged screen time causes physical strain and promotes a sedentary lifestyle.

Applications of Internet

➢ **Communication**

- Email services (e.g., Gmail, Outlook) for instant messaging and file sharing.
- Social media platforms (e.g., Facebook, Instagram) for connecting globally.
- Video conferencing tools (e.g., Zoom, Microsoft Teams) for virtual meetings.

➢ **Education**

- Access to e-learning platforms (e.g., Coursera, Udemy).
- Online libraries and research databases for academic resources.
- Virtual classrooms and webinars for remote learning.

Applications of Internet

➢ **Entertainment**

- Streaming services (e.g., Netflix, YouTube) for movies and shows.
- Social media platforms (e.g. Facebook, Instagram, TikTok) offer endless entertainment through videos, reels, and interactive content
- Online gaming platforms for interactive and multiplayer experiences.
- Music and podcast services (e.g., Spotify, Apple Music).

Applications of Internet

➢ **Business and E-Commerce**

- Online shopping platforms (e.g., Amazon, eBay, Daraz) for convenience and variety.
- Digital marketplaces for buying, selling, and advertising products.
- Advertising and selling products globally through websites and social media.
- Online banking for secure financial transactions and bill payments.

E-Commerce can be defined as:

Any transaction completed over a computer-mediated network that involves the transfer of ownership or rights to use goods or services.

Some type of e-commerce are as follows:

1. Business to Business (B2B)
2. Business to Consumer(B2C)
3. Consumer to consumer (C2C)
4. Government to Consumer (G2C)

Tag	Full Name	Example
B2B	Business to Business	Car manufacturer ordering tires from supplier
B2C	Business to Consumer	Ordering books online
C2C	Consumer to Consumer	Auctioning second hand products online
G2C	Government to Consumer	Government distributing tax forms electronically

Applications of Internet

➢ **Banking and Finance**

- Online banking services (Mobile Banking, Internet Banking , QR) for fund transfers, account management, and payments.
- Stock market trading through online platforms.
- Digital wallets (e.g., PayPal, Google Pay, Esewa ,Khalti) for secure transactions.

Applications of Internet

➢ **Healthcare**

- Telemedicine services for remote consultations and diagnosis.
- Online pharmacies for ordering medications and healthcare products.
- Health tracking apps and websites for fitness and wellness.
- Social media and websites provide valuable information on disease prevention, mental health, and healthy lifestyles.

Applications of Internet

➢**Government Services**

- E-governance platforms for accessing public services and information.
- utility bill payment ,Online tax filing and bill payment systems.
- Platforms for applying for documents like passports and licenses.

➢**Social and Cultural Exchange**

- Platforms for global discussions and community building.
- Sharing of diverse cultures and traditions through multimedia content.
- Virtual events and online exhibitions.

Applications of Internet

➢ **Navigation and Travel**

- GPS and mapping tools (e.g., Google Maps) for route planning and directions.
- Online booking systems for flights, hotels, and transportation.
- Travel blogs and review websites for destination planning.

The World Wide Web (WWW)

The World Wide Web is a system of interlinked hypertext documents accessed via the Internet .Websites are stored on servers on the internet so WWW is a part of the internet.

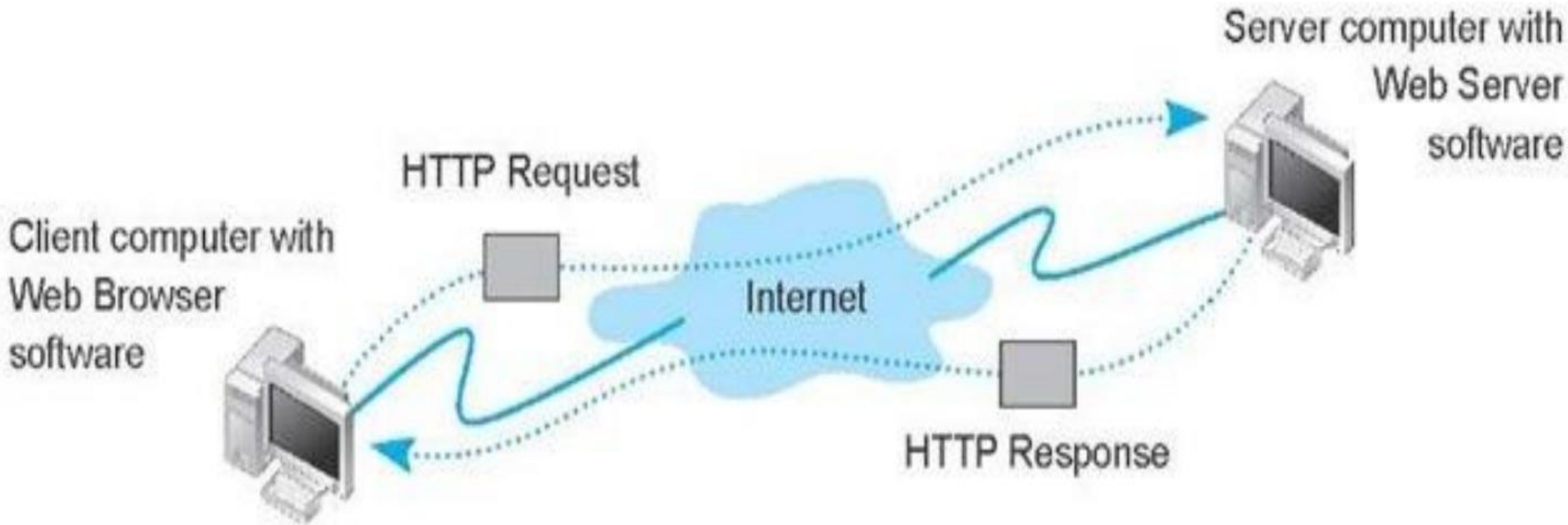
With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them via hyperlinks

The backbone of the World Wide Web is made of HTML files, which are specially formatted documents that can contain links as well as other media and images. All we browser can read HTML files. In addition to HTML, it’s also very common for websites to use technologies like cascading style sheets and java scripts to do more advance things.

It use a protocol called HTTP – Hypertext Transfer Protocol

HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

How World Wide Web (WWW) work?



- A client sends a HTTP request (entering the URL of web page in web browser) to a web server for a specific file or pages.
- A web server contains web pages and files.
- The web server send the requested file/ pages (HTTP response) back to the client.
- The web pages of file is displayed via the web browsers.
- The web browsers display the information based on the HTML code in the pages.

URL (Uniform Resource Locator)

URL is the address of a document you'll find on the WWW.

The elements in a URL: Protocol://server's address/filename
Example: http://www.google.com/index.html

Search Engine

- A search engine is designed to search for information on the internet.
- Search engine presents the search results in the form of a search results list.
- The search results can be web pages, images, videos, and other type of files.
- Example: – Google – Bing

Type of Search Engines

1. Crawler based search engine
2. Human power directories
3. Hybrid search engines.

Web Browsers

Web browsers is the software which is used to access the World Wide Web. The browser's main job is to display web pages.

A web browser provides many advanced features that help achieve easy access to the WWW and internet such as you can create bookmarks for sites you like so that you can easily find them again later.

Google Chrome, Internet Explorer, Mozilla Firefox are common example of browsers.

Electronic Mail (Email)

- The transmission of messages over communications networks.
- It is a fast and efficient way to communicate with friends or colleagues.
- You can communicate with one person at a time or thousands; you can receive and send files and other information

Basic email functions:

- Send and receive mail messages
- Save your messages in a file
- Print mail messages
- Reply to mail messages –
- Attach a file to a mail message

Email address are always written in a standard format that includes username, at(@) and a domain.

• Email address: username @mail server

Example : someone@gmail.com

a. Username

Username is the name you choose to identify yourself. It is located to the left of the @ symbol.

b. At(@)

‘at’ separates your account name and the name of the mail server.

c. Domain name

Domain name usually consist of two parts. The first part is the name of the email server and is located to the right of the @symbol. The second part, usually a three letter extension, indicates the top level domain. They are separated by “dots” like .com.

Extension	Meaning
.com	For Company or business
.org	For Non-profit organization
.gov	For government agency
.mil	For Military
.edu	For education Institution
.net	ISP or Network Provider.

Type of Email Accounts:

1. **Web Based Email**

Web based email is an e-mail service intended to be primarily accessed via a web browser

• Very popular webmail providers:

– Gmail

– Yahoo! Mail

– Hotmail

• Web mail is popular as it allows you to send or receive e-mail from anywhere

2. **Email account provided by the Internet service Provider (ISP)**
3. **Email Account from your Company**

- **Advantage of Email**

- The delivery of message is very fast.
- The cost of emailing is almost free.
- Multiple copies of the same message can be sent to different people.
- Picture, files and other multimedia data can be attached with email.
- It helps to enhance the communication system of users.
- Find a particular message in your list of old mail.

Disadvantages of Email:

Internet is required .Users should stay online to read and write emails.

Failure of network may discontinue the email services.

It is knowledge based applications so that all user are not able to use this system.

Sometimes some unnecessary mails called junk mails may mislead the users.

Protocols used in email

1. Simple mail transfer protocol (SMTP)

SMTP is used for the transmission of emails.

2. Post office protocol (POP)

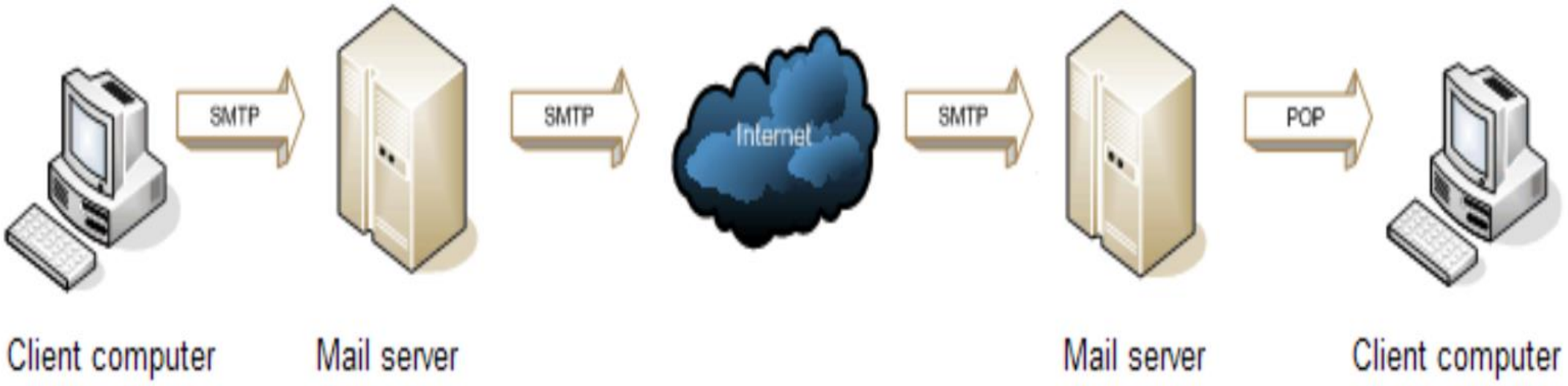
Pop is used for downloading emails from server.

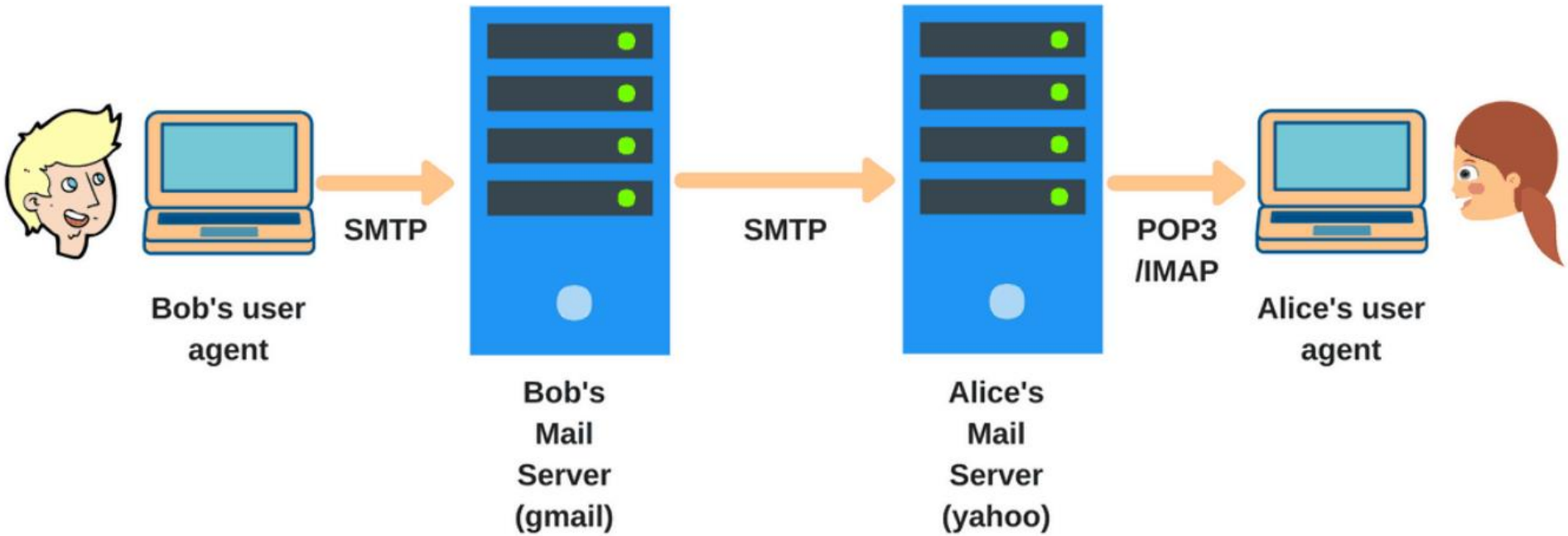
3. IMAP (Internet message access protocol)

IMAP is used for viewing emails that are on email server.

What Is Mail Server and How Does it Work?

A mail server (sometimes also referred to an e-mail server) is a server that handles and delivers e-mail over a network, usually over the Internet. A mail server can receive e-mails from client computers and deliver them to other mail servers. A mail server can also deliver e-mails to client computers. A client computer is normally the computer where you read your e-mails, for example your computer at home or in your office.





Here Bob send an email message through Gmail. Gmail program forward the message to the Gmail server and Gmail server forwards it to the yahoo mail server (Alice's mail server). Alice received emails from yahoo mail server. As a rule system uses SMTP, IMAP, and POP3 protocol.

- **Internet Protocols**

- In networking, a protocol is a standardized set of rules for formatting and processing data. Protocols enable computers to communicate with one another.

1. **Transmission Control Protocol (TCP)**

TCP transmits data from application layer to network Layer. It is responsible for breaking down IP packets before they are sent and also for assembling the packets when they arrived. IP packets: formatted units of data carried by a packed switched networked.

2. Internet protocol (IP)

IP is responsible for communication between two computers and sending and receiving data packets over the internet.

3. Hypertext transfer protocol (HTTP)

HTTP is an application protocol that takes care of communication between a web server and a web browser. It is responsible for sending request from web client (or browser) to web server and returning the response from the server to the web client.

4. Hypertext transfer protocol secure(HTTPS)

HTTPS is an extension of HTTP protocol with additional security related capabilities of secure socket layer (SSL). It is responsible for secure communication between web servers and web clients.

5. File transfer protocol (FTP)

The protocol for exchanging files over the Internet.
Used for moving files between two hosts on a TCP/IP network.

FTP is most commonly used to download a file from a server using the Internet or to upload a file to a server.

To do FTP, a user invokes one of two commands:

– **get** - the command for transferring a file from another server to your own computer.

– **put -** the command for moving a file from your computer to another one.

6. Address resolution protocol (ARP)

ARP is used to find the hardware address of a computer from its IP address.

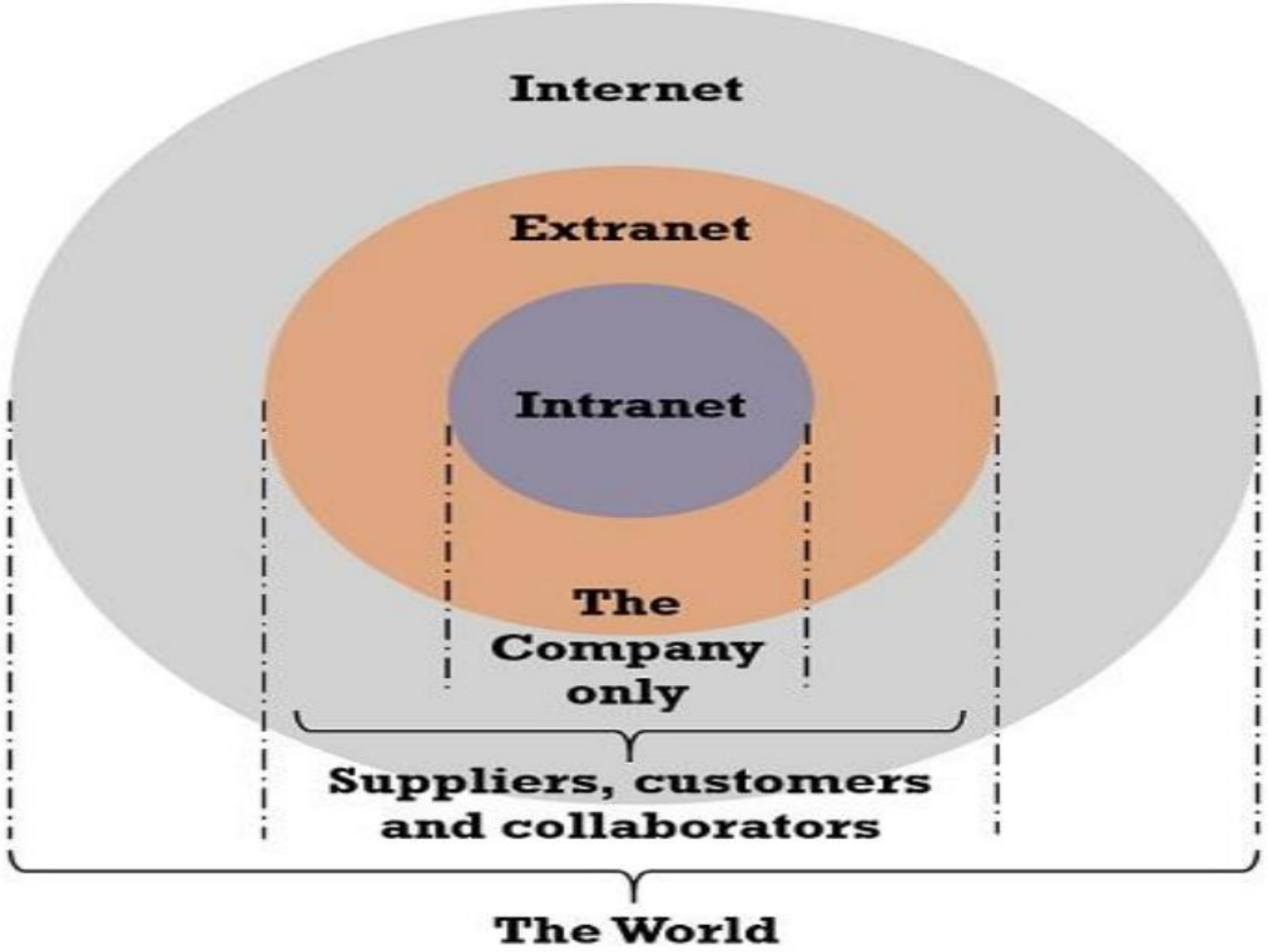
7. Reverse address resolution protocol (RARP)

RARP is used to find the IP address of a computer from its hardware address.

Difference between Internet and World Wide Web (WWW)

Internet	WWW
The internet is the largest computer network in the world, connecting millions of computers so that users can share resources and communicate with each other	The World Wide Web is a system of interlinked hypertext documents accessed via the Internet .Websites are stored on servers on the internet so WWW is a part of the internet.
Forming a network in which any computer can communicate with any other computer as long as they are both connect to the internet.	WWW is a way of accessing information over the medium of the internet.
It doesn't utilize web browsers. It is the structure on which WWW is based.	It utilize browsers to access web documents called web pages that are linked via hyperlinked.
Information travels over the internet using different internet protocols.	The web uses HTTP protocol.

Internet, Intranet and Extranet



Intranet

Intranet is a private computer network system in which a specific organizational system share information, computing services and operational system with each other by using an internet technology.

Intranets increase communication within an organization by allowing employees to easily access important information, links, applications and forms as well as databases that can provide company records.

Security can also be increased within the intranet by establishing a database that maintains all of the usernames of people who are allowed access to the network.

The benefit of the intranet is low development and maintenance cost.

The internal IT system of an organization is the best example of intranet.

- **Extranet**

Extranet is a kind of computer network that allows the outside users to access the intranet of organization.

These type of network system is basically used for business to business process. System basically allows the outside users of an organization like partners, suppliers, vendors and other stake holders to remain in touch with the activities of organization.

Key Points:

Intranet and extranet both are private network

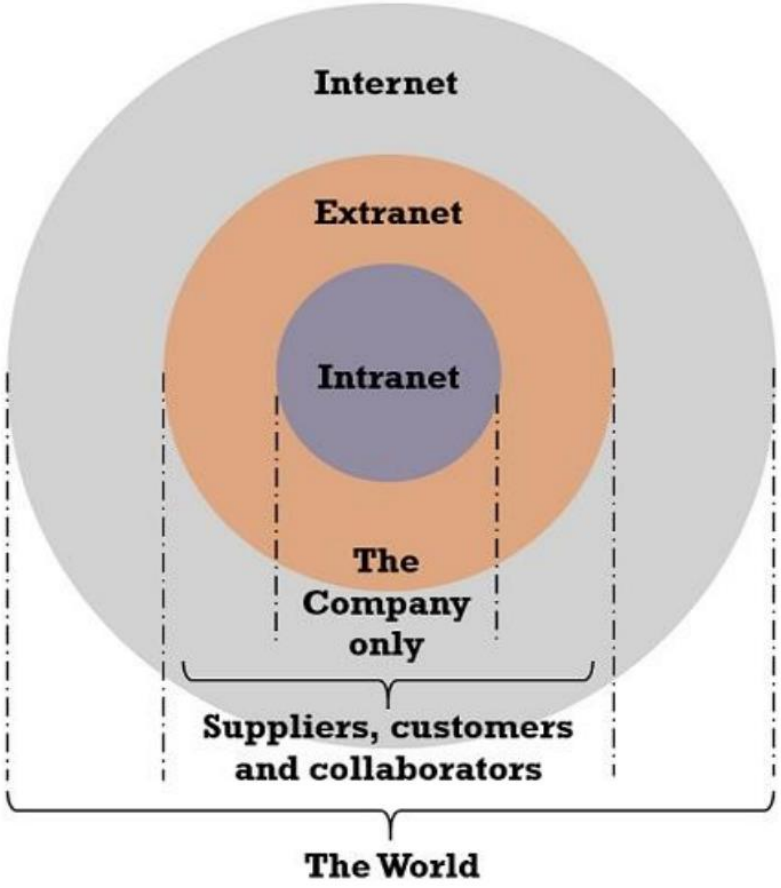
User account is necessary to access intranet and extranet

Both intranet and extranet are depends on the internet.

Internet is the global network system which is available to all while intranet and extranet are available to inside and limited outside users of the organization.

Intranet and extranet are more secured internet.

Difference between Internet, Intranet and Extranet



Internet	Intranet	Extranet
The internet is the largest computer network in the world, connecting millions of computers so that users can share resources and communicate with each other. It is the network of global network.	Intranet is a private computer network system in which a specific organizational system share information, computing services and operational system with each other by using an internet technology	Extranet is a kind of computer network that allows the outside users to access the intranet of organization.
It is public network	It is private network	It is private network
Internet can be access without user account.	user account is necessary to access intranet	User account is necessary to access extranet.
Internet is less secure than intranet and extranet	It is more secure than Internet.	It is less secure than intranet.
It is complete itself	It depends on the internet	It depends on the internet