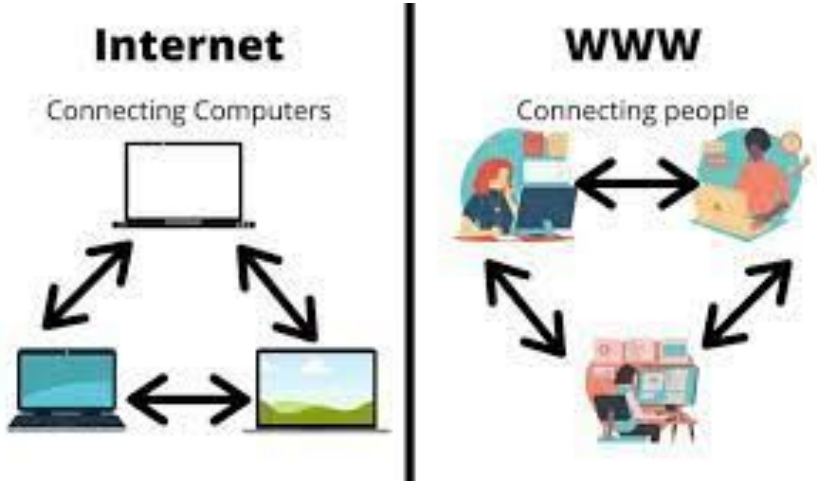
Chapter 1
Basic Concept

Introduction to Internet

- short for "interconnected network," is a global network of computers and other electronic devices connected together.
- allows for the transfer and sharing of information across vast distances.
- operates through a set of protocols known as the Internet Protocol Suite (TCP/IP), which enables different devices to communicate and exchange data with each other.

Introduction to WWW(World Wide Web)

- system of interconnected websites and web pages that are accessible over the internet.
- created by British computer scientist Sir Tim Berners-Lee in 1989
- operates through the use of hyperlinks, which allow users to navigate between different web pages and websites

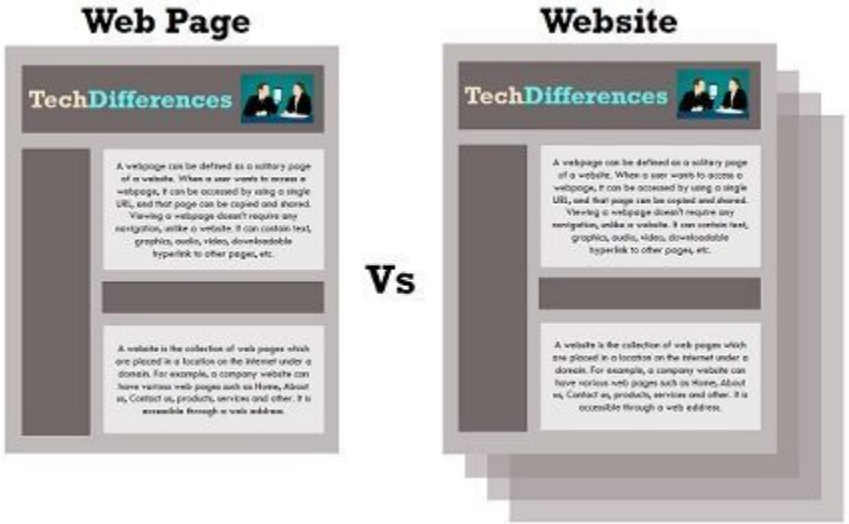


Webpage

- a single document or file displayed on the World Wide Web (WWW).
- building blocks of websites
- contain various elements such as text, images, videos, forms, and interactive features.

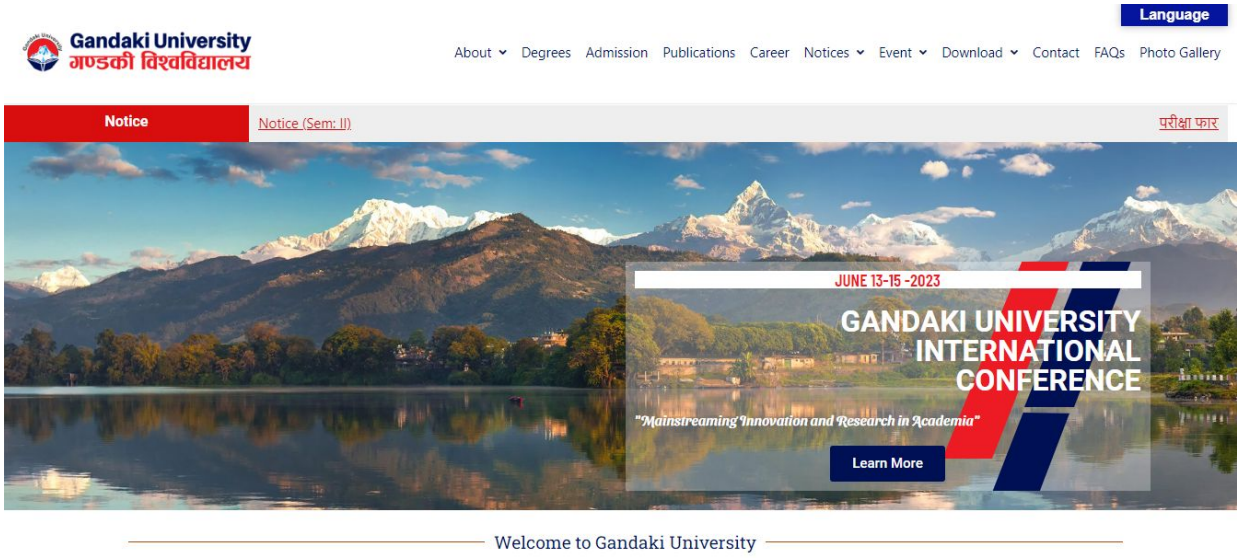
Website

- a collection of related webpages and other digital content that is hosted on a web server and accessible over the internet.
- represents a virtual location or presence where individuals, organizations, businesses, or other entities can share information, provide services, or engage with users.



Homepage

- also known as a home page or main page
- the introductory or default webpage of a website.
- serves as the starting point or entry point to a website and is typically the first page that users see when they visit a site.

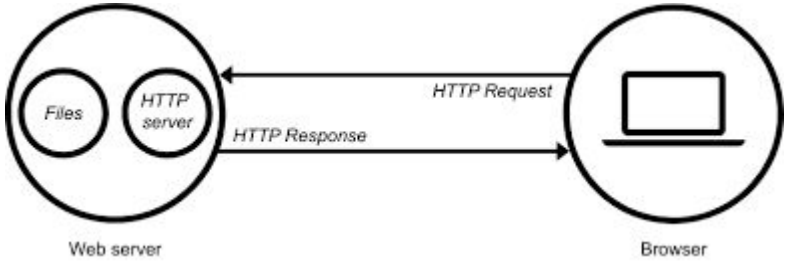


Web Browser

- A software application used to access information on the World Wide Web
- When a user requests some information, the web browser fetches the data from a web server and then displays the webpage on the user's screen

Web Server

- Is a computer that stores, processes, and delivers website files to web browsers.
- consist of hardware and software that use Hypertext Transfer Protocol (HTTP) to respond to web users' requests made via the World Wide Web
- Through this process, web servers load and deliver the requested page to the user's browser – Google Chrome, for example.
- use Simple Mail Transfer Protocol (SMTP) and File Transfer Protocol (FTP) to process files for email or storage.



URL(aka Web Address)

- URL (Uniform Resource Locator) is a unique identifier
- used to locate a resource on the Internet. *
- A URL typically includes the protocol, domain name (or IP address), path, and optional query parameters.
- Example URL: "https://www.example.com/blog/article?id=123".
    - In this URL, "https://" is the protocol, "www.example.com" is the domain name, "/blog/article" is the path, and "?id=123" is the query parameter.
- End users use URLs by typing them directly into the address bar of a browser or by clicking a hyperlink found on a webpage, bookmark list, in an email or from another application.

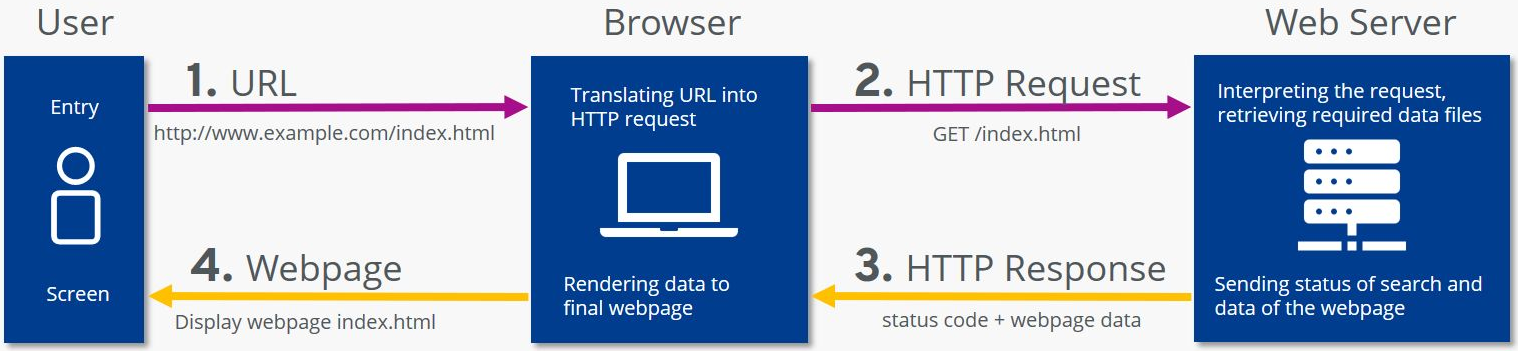
1.2 Overview of different protocols

HTTP, HTTPS,POP, SMTP, FTP, WAP

HTTP

- HTTP (Hypertext Transfer Protocol) is a protocol used for exchanging information over the internet.
- HTTP is like the delivery system for information on the internet.

Communication process according to HTTP



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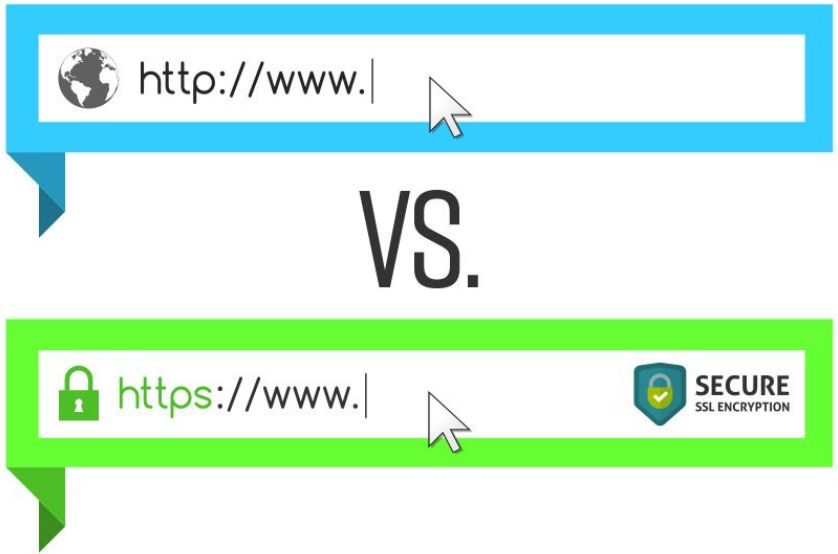
HTTPS

- Extension of HTTP
- encrypts nearly all information sent between a client and a web service.



Helen

HTTP

http://www.example.com

password: abc123

Without password encryption

Hacker see "abc123"

Carol

HTTPS

https://www.example.com

password: abc123

With password encryption

Hacker see "xyaerXzabc"

	HTTP	HTTPS
URL	http://	https://
Security	Unsecure	Enhanced security
Port	PORT 80	PORT 443
OSI Layer	Application Layer	Transport Layer
TLS Certificates	No	Yes
Domain Validation	Not required	Domain validation
Encryption	No	Yes

SMTP

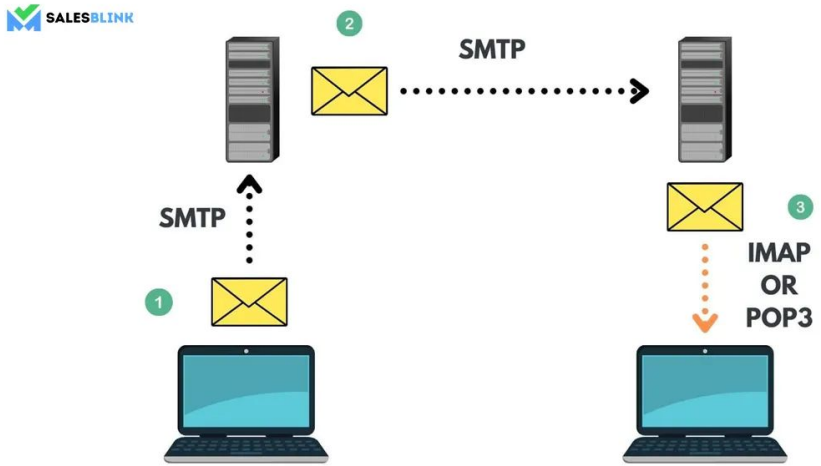
- SMTP stands for Simple Mail Transfer Protocol.
- used for sending email messages from a client to a mail server and for transferring messages between mail servers.

POP(Post Office Protocol)

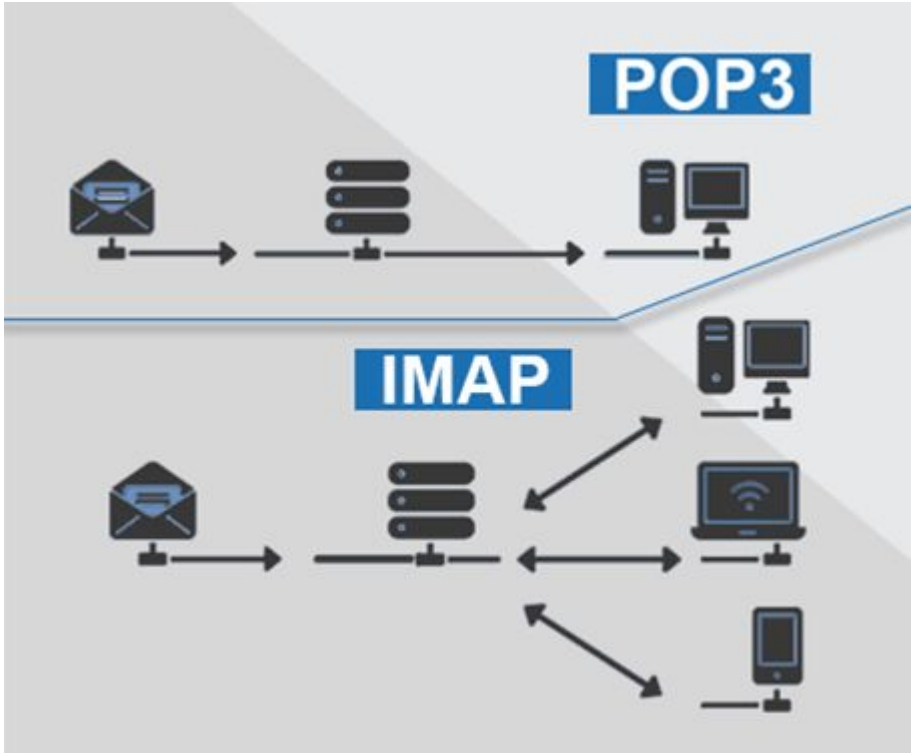
- used for retrieving email messages from a mail server to a client device
- All the incoming messages are stored on the POP server until the user login by using an email client and downloads the message to their computer. After the message is downloaded by the user it gets deleted from the server.
- POP3 is third version of POP

IMAP

- IMAP (Internet Message Access Protocol) is an internet standard protocol for email retrieval and storage.
- It is an alternative to POP (Post Office Protocol)



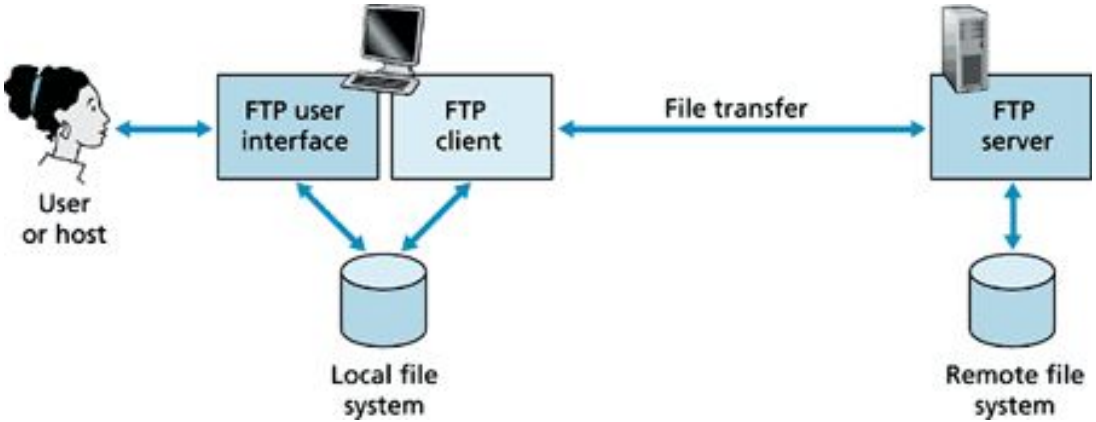
POP vs IMAP



POP	IMAP
Have to download first to read an email	Don't have to download to read an email (user can partially check their emails even before downloading)
Users can only use one system to check their emails	With two-way protocol, users can uses multiple systems to check their emails
You emails and sent emails are stored on your local PC	Emails and sent emails get stored on the server. Which makes it easier for users to access it anywhere
User doesn't have the power to organize emails in their server	Can organize emails in the mailbox stored in the server
Cannot create mailboxes on a mail server	Can create mailboxes stored on a mail server
Cannot edit mailboxes on a mail server	Can edit mailboxes stored on a mail server
Cannot delete mailboxes on a mail server	Can delete mailboxes stored on a mail server
Doesn't allow users to search emails prior to downloading	IMAP provide users with the facility to search specific files before downloading it
Faster downloading of all email messages on the server	Slow downloading if compared with POP3
Simple with limited functions	Complicated but with more features and functionalities than POP3

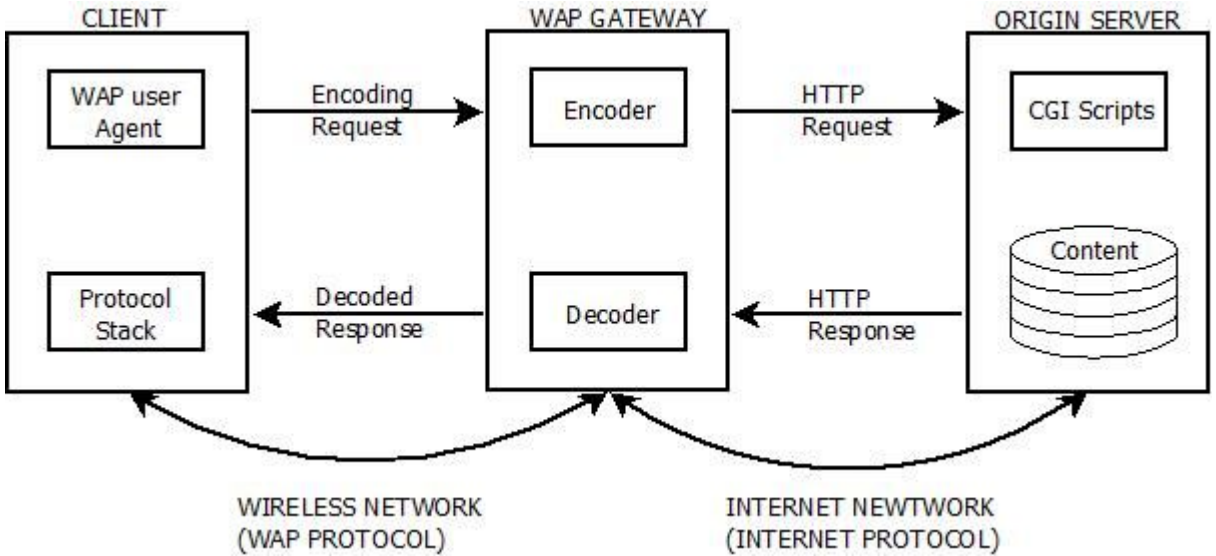
FTP

- FTP (File Transfer Protocol)
- used for transferring files between a client and a server over a computer network
- provides methods for uploading, downloading, and managing files on a remote server.



WAP

- stands for Wireless Application Protocol.
- enables access to the internet and other information services using wireless devices such as mobile phones, smartphones, and other wireless-enabled devices.
- provide a standardized way of delivering web content and services to mobile devices with limited resources and smaller screens.



IP Address

- They are like the postal addresses of devices on the internet.
- An IP address is a unique numerical label assigned to each device on a network.
- It serves two primary functions:
  - identifying the host or network interface and
  - providing the location of the host in the network.
- Are of 2 types:
  - IPV4
    - Consists of 32 bits (e.g., 192.168.0.1).
  - IPV6
    - Consists of 128 bits (e.g., 2001:0db8:85a3:0000:0000:8a2e:0370:7334).

Domain Name

- A domain name is a unique text-based identifier for a website or online service.
- They serve as a human-readable alternative to IP addresses.
  Eg: google.com , its corresponding ip address is 2404:6800:4007:822::200e
- Domain Name Service(DNS)
  - The DNS is like the internet's phone book.
  - It translates domain names into IP addresses.

DNS Hierarchy

https://www.educative.io/answers/what-is-dns-hierarchy

Domain Name Registration Process

- Choose a domain name that reflects your brand or content and is easy to remember.
- Check the availability of the chosen domain name through a domain registrar.
- Pay an annual fee to the registrar to maintain ownership of the domain.
- Provide accurate contact information during the registration process.
- Optionally, consider additional services offered by the registrar, such as WHOIS privacy protection or email hosting.
- Receive confirmation of ownership, granting you the rights to use the domain.
- Access a domain control panel to manage settings and renew the domain as needed.

Web Hosting

- Web hosting refers to the service of providing the infrastructure and resources necessary to make a website or web application accessible on the internet.
- When you create a website, you need a place to store all the files, databases, and other components that make up your site, and that place is typically provided by a web hosting provider.
- Here are some key aspects of web hosting:
  - **Server Space:** Web hosting providers offer server space where you can store your website's files, such as HTML, CSS, JavaScript, images, videos, and more. This server space is often located in data centers with high-speed internet connections and backup power supplies to ensure reliability.
  - **Domain Name**: In addition to server space, you need a domain name (e.g., www.example.com) that people can use to access your website. Most web hosting providers allow you to register or connect a domain name to your hosting account.

Types of web hosting

Free Hosting:

- Limited resources and features.
- Cost-effective but often comes with limitations.
- May include advertisements on your website.
- Limited customer support.

Colocation Hosting:

- Rent server space in a data center.
- Responsible for managing and maintaining your server hardware and software.
- Offers high bandwidth and security.
- Complex configuration and management.

Types of web hosting

Dedicated Hosting:

- Entire physical server dedicated to your website or application.
- Offers maximum control, performance, and security.
- Ideal for large websites, e-commerce, and high-traffic businesses.
- Expensive and requires advanced technical skills.

Shared Hosting:

- Multiple websites share server resources.
- Budget-friendly option.
- Suitable for small personal websites or small businesses with low traffic.
- Limited in terms of resource allocation and control.

Types of Web Hosting

Virtual Private Server (VPS) Hosting:

- Multiple websites on a single server with dedicated resources.
- More isolated and customizable compared to shared hosting.
- Suitable for websites with moderate traffic and resource needs.
- Offers a balance between cost and performance.

Web Hosting Process

- **Choose a Hosting Provider and Plan:**
  - Select a reputable hosting provider and a suitable hosting plan based on your website's needs and budget.
- **Register a Domain Name:**
  - Either register a new domain or transfer an existing one to your hosting account.
- **Set Up Hosting Environment:**
  - Create an account, configure server settings, and set up domain-related configurations.
- **Build and Upload Website:**
  - Design and develop your website, then upload its files to the hosting server.
- **Secure, Optimize, and Monitor:**
  - Implement security measures, optimize website performance, and regularly monitor and maintain the website for security and functionality.