

Chapter 4 Web Technologies and Applications

4.1 World Wide Web

4.2 Client Server Model

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4.1 World Wide Web

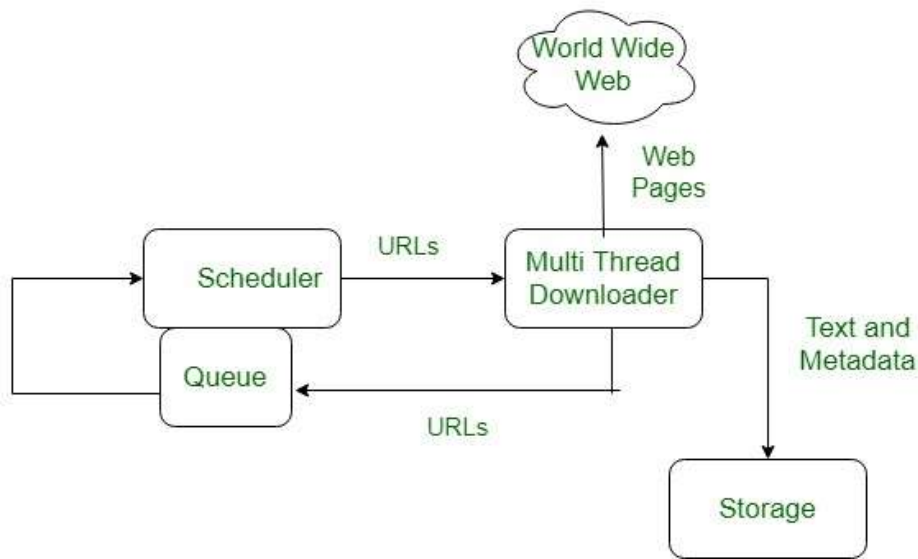
WWW is defined as the collection of different websites around the world, containing different information shared via local servers(or computers).

Web pages are linked together using hyperlinks which are HTML-formatted and, also referred to as hypertext, these are the fundamental units of the Internet and are accessed through Hypertext Transfer Protocol(HTTP). Such digital connections, or links, allow users to easily access desired information by connecting relevant pieces of information. The benefit of hypertext is it allows you to pick a word or phrase from the text and click on other sites that have more information about it.

System Architecture

From the user's point of view, the web consists of a vast, worldwide connection of documents or web pages. Each page may contain links to other pages anywhere in the world. The pages can be retrieved and viewed by using browsers of which internet explorer, Netscape Navigator, Google Chrome, etc are the popular ones. The browser fetches the page requested interprets the text and formatting commands on it, and displays the page, properly formatted, on the screen.

The basic model of how the web works are shown in the figure below. Here the browser is displaying a web page on the client machine. When the user clicks on a line of text that is linked to a page on the abd.com server, the browser follows the hyperlink by sending a message to the abd.com server asking it for the page.



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Working of WWW

A Web browser is used to access web pages. Web browsers can be defined as programs which display text, data, pictures, animation and video on the Internet. Hyperlinked resources on the World Wide Web can be accessed using software interfaces provided by Web browsers. Initially, Web browsers were used only for surfing the Web but now they have become more universal.

The below diagram indicates how the Web operates just like client-server architecture of the internet. When users request web pages or other information, then the web browser of your system request to the server for the information and then the web server provide requested services to web browser back and finally the requested service is utilized by the user who made the request.



Features of WWW

- 1) WWW is open source.
- 2) It is a distributed system spread across various websites.
- 3) It is a Hypertext Information System.
- 4) It is Cross-Platform.
- 5) Uses Web Browsers to provide a single interface for many services.
- 6) Dynamic, Interactive and Evolving.

Components of the Web

There are 3 components of the web:

Uniform Resource Locator (URL): URL serves as a system for resources on the web.

Hyper Text Transfer Protocol (HTTP): HTTP specifies communication of browser and server.

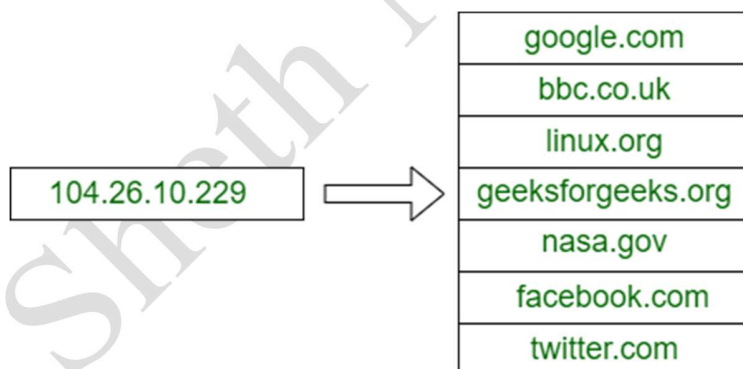
Hyper Text Markup Language (HTML): HTML defines the structure, organisation and content of a web page.

DNS

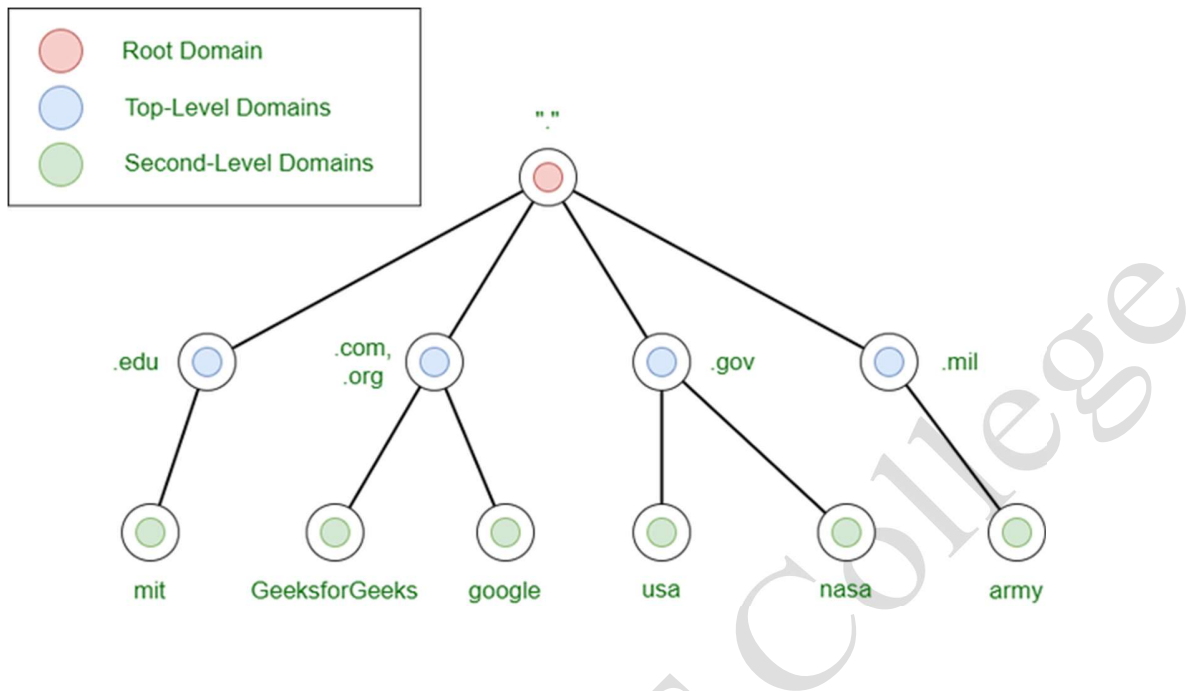
DNS (Domain Name System) allows you to interact with devices on the Internet without having to remember long strings of numbers. Each computer on the Internet has its own unique address, known as an IP address, just like every home has a unique address for sending direct mail.

104.26.10.228 is an IP address consisting of four sets of numbers extending from 0 to 255 separated by a period. It's not easy having to remember this complicated collection of numbers every time you want to access a website, which is where DNS comes in handy.

<https://nktdegreecollege.org> can be remembered instead of 104.26.10.228.



Domain Hierarchy:



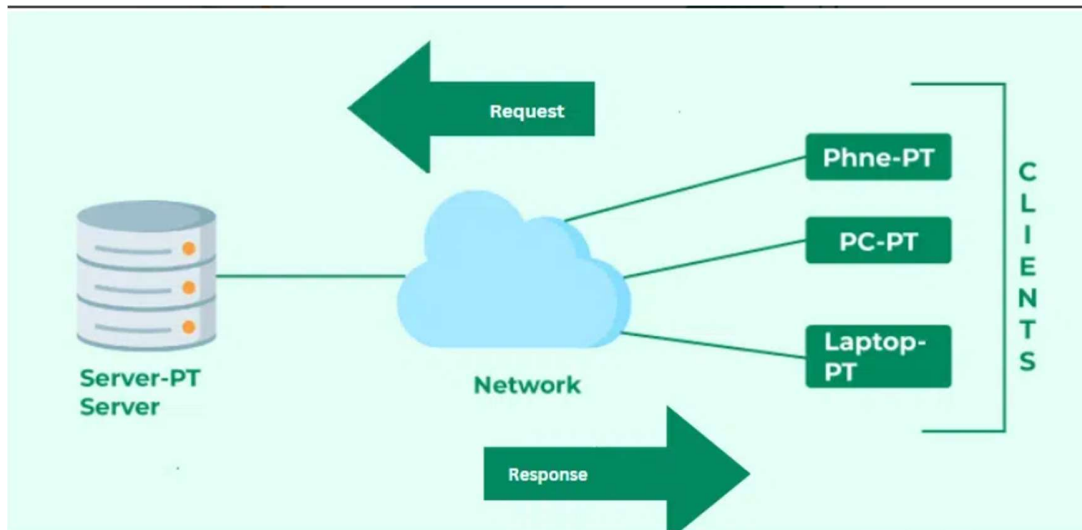
4.2 Client-Server Model

The Client-server model is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters called clients. In the client-server architecture, when the client computer sends a request for data to the server through the internet, the server accepts the requested process and delivers the data packets requested back to the client. Clients do not share any of their resources. Examples of the Client-Server Model are Email, World Wide Web, etc.

Client: When we say the word Client, it means to talk of a person or an organization using a particular service. Similarly in the digital world, a Client is a computer (Host) i.e. capable of receiving information or using a particular service from the service providers (Servers).

Servers: Similarly, when we talk about the word Servers, It means a person or medium that serves something. Similarly in this digital world, a Server is a remote computer that provides information (data) or access to particular services.

So, it is the Client requesting something and the Server serving it as long as it is in the database.



Advantages of Client-Server Model

- 1) Centralized system with all data in a single place.
- 2) Cost efficient requires less maintenance cost and Data recovery is possible.
- 3) The capacity of the Client and Servers can be changed separately.

Disadvantages of Client-Server Model

- 1) Clients are prone to viruses, Trojans, and worms if present in the Server or uploaded into the Server.
- 2) Servers are prone to Denial of Service (DOS) attacks.
- 3) Data packets may be spoofed or modified during transmission.
- 4) Phishing or capturing login credentials or other useful information of the user are common and MITM(Man in the Middle) attacks are common.

4.3 Ecommerce, M-commerce and online businesses

4.3.1 E- Commerce Introduction :

E-commerce, or electronic commerce, refers to the buying and selling of goods and services over the internet. It involves the use of electronic platforms, such as websites, mobile applications, and social media, to conduct transactions between businesses and consumers or between businesses. E-commerce has revolutionized the way businesses operate and has created new opportunities for entrepreneurs and consumers alike.

One of the primary benefits of e-commerce is that it offers a more convenient and efficient way to conduct business. Consumers can browse and purchase products from the comfort of their own homes, while businesses can reach a global audience without the need for a physical storefront. E-commerce has also enabled businesses to streamline their operations by automating

many of the tasks involved in the sales process, such as inventory management, order processing, and shipping.

Types of E-commerce model:

There are types of e-commerce models that can describe almost every transaction that takes place between consumers and businesses.

- 1) **Business to Consumer (B2C):** When a good or service is sold to an individual consumer by a business, e.g., we buy a pair of shoes from an online retailer, Amazon, Flipkart, Jabong etc.
- 2) **Business to Business (B2B):** When a good or service is sold by a business to another business, e.g., a software-as-a-service is sold by a business for other businesses to use.
- 3) **Consumer to Consumer (C2C):** When a good or service is sold by a consumer to another consumer, e.g., we sell our old furniture on eBay to another consumer, OLX, Quikr
- 4) **Consumer to Business (C2B):** When a consumer's own products or services is sold to a business or organization, e.g., an authority offers exposure to their online audience in exchange for a fee or a photographer licenses their photo for a business to use, an IT freelancer who demos and sells his software to a company.
- 5) **Business-to-government (B2G):** In this model, businesses sell products or services to government agencies through online portals or marketplaces.
- 6) **Government-to-business (G2B):** In this model, government agencies sell products or services to businesses through online portals or marketplaces.
- 7) **Government-to-consumer (G2C):** In this model, government agencies provide products or services directly to consumers through online portals or marketplaces.

Advantages of E-commerce:

- 1) E-commerce enables fast and secure shopping.
- 2) It is making digitalized world.
- 3) E-commerce also enables to choose different goods and services according to your choice.
- 4) It is a simple way of selling and buying products and services.
- 5) E-commerce replaced the paper work as all transactions are through internet today.
- 6) It provides better management system, as it has a centralized database.
- 7) E-commerce via internet covers a large number of customers worldwide.
- 8) E-commerce has several payment modes.

Disadvantages of E-commerce:

- 1) E-commerce has no universal standard for quality and reliability.
- 2) E-commerce works through internet, it is possible that navigation on internet itself may be slow.
- 3) Strong security is required in e-commerce as all transactions are through internet.

- 4) There is high risk of buying unsatisfactory products through e-commerce.
- 5) It uses public key infrastructure which is not safe.
- 6) Customers also trap in banking fraud which is quite frequent.
- 7) Hackers also try to get access of data or to destroy data in e-commerce.

Uses of E-commerce :

- 1) **Online retail:** One of the most well-known uses of e-commerce is online retail, where businesses sell products directly to consumers through their online store, website, or mobile app.
- 2) **Digital products and services:** E-commerce is also commonly used for the sale of digital products and services, such as music, e-books, software, and online courses.
- 3) **Business-to-business transactions:** E-commerce can be used for B2B transactions, where businesses sell products or services to other businesses.
- 4) **Online marketplaces:** E-commerce marketplaces, such as Amazon and eBay, provide a platform for businesses and individuals to sell their products to a large audience.
- 5) **Auction sites:** Online auction sites, such as eBay, allow users to bid on and purchase items from other users.
- 6) **Online banking and financial services:** E-commerce is used extensively for online banking and financial services, including payment processing, bill payment, and money transfers.
- 7) **Online booking and reservations:** E-commerce is used for booking and reservations of flights, hotels, rental cars, and other travel-related services.
- 8) **Food delivery:** E-commerce platforms are used for online ordering and delivery of food from restaurants.
- 9) **Online advertising:** E-commerce is also used for online advertising, where businesses can advertise their products and services to a large audience.

4.3.2 M-Commerce

M-commerce entails the e-commerce transactions done with a mobile phone. So M-commerce is the use of mobile phones to conduct any type of business transaction. It takes the help of the e-commerce background and WAP technology.

The use of wireless technology (WAP) to conduct sales of goods, provide services, make payments and other financial transactions, the exchange of information etc. is the basis of mobile commerce.

M-commerce is actually a rapidly growing sector of e-commerce. Nearly 70% of the online transactions that occur in India happen from mobile phones. Globally it is a 700 billion dollar industry.

M-commerce is about exploiting new opportunities made available to us thanks to e-commerce. So it involves the advent of new technologies, services, business models and marketing strategies. It differentiates itself in many ways from e-commerce. This is because mobile phones have very different characteristics than desktop computers. And it opens so many windows of opportunities for businesses to exploit.

Applications of M-commerce

Other than the straightforward m-commerce transactions of buying and selling of goods and services, they have so many applications. Let us take a look at a few examples,

- 1) **Mobile Banking:** Using a mobile website or application to perform all your banking functions. It is one step ahead of online banking and has become commonplace these days. For example, in India, the majority of banking transactions happen on mobile phones.
- 2) **Mobile Ticketing and Booking:** Making bookings and receiving your tickets on the mobile. The digital ticket or boarding pass is sent directly to your phone after you make the payment from it. Even in India now IRTC and other services provide m-ticketing services.
- 3) **E-bills:** This includes mobile vouchers, mobile coupons to be redeemed and even loyalty points or cards system.
- 4) **Auctions:** Online auctions having now been developed to be made available via mobile phones as well.
- 5) **Stock Market Reports** and even stock market trading over mobile applications.

Advantages of M-commerce

- 1) It provides a very convenient and easy to use the system to conduct business transactions.
- 2) Mobile commerce has a very wide reach. A huge part of the world's population has a mobile phone in their pocket. So the sheer size of the market is tremendous.
- 3) M-commerce also helps businesses target customers according to their location, service provider, the type of device they use and various other criteria. This can be a good marketing tool.
- 4) The costs of the company also reduced. This is due to the streamlined processes, now transaction cost, low carrying cost and low order processing cost as well.

Disadvantages of M-commerce

- 1) The existing technology to set up an m-commerce business is very expensive. It has great start-up costs and many complications arise.

- 2) In developing countries, the networks and service providers are not reliable. It is not most suitable for data transfer.
- 3) Then there is the issue of security. There are many concerns about the safety of the customer's private information. And the possibility of a data leak is very daunting.

Difference between E-commerce and M-commerce :

S.No.	E-commerce	M-commerce
01.	Electronic Commerce in short it is called as e-commerce.	Mobile Commerce in short it is called as m-commerce.
02.	In general, e-commerce activities are performed with the help of desktop computers and laptops.	M-commerce activities are performed with the help of mobile devices like smartphones, tablets, PDA's (Personal Digital Assistant) etc.
03.	E-commerce is an older concept.	M-commerce is an newer concept.
04.	It is broad term which refers doing shopping and making payments online with help of electronic devices like Laptop and computers.	It is subcategory of ecommerce which does the same this via mobile devices.
05.	In e-commerce the use of internet is mandatory	But in case of m-commerce some activities can be performed without internet also.
06.	E-commerce devices are not easy to carry and portability point of view it is not so good.	M-commerce devices are easy to carry and portability point of view it is good.
07.	E-commerce developed in 1970's.	M-commerce developed in 1990's.
08.	Its reachability is comparatively low than the m-commerce as it is not so good in portability.	Its reachability is more than that of e-commerce only due to the use of mobile devices.
09.	In e-commerce location tracking capabilities are limited due to the non-portability of devices.	In m-commerce location tracking capabilities is so good as mobile apps track and identify user locations with the help of GPS technology, Wi-Fi, and so on.
10.	E-commerce fails in push notification.	In m-commerce push notification can be achieved.

11.	E-commerce is conducted using desktop or laptop computers.	M-commerce is conducted using mobile devices such as smartphones and tablets.
12.	E-commerce typically requires a stable internet connection and a computer.	M-commerce allows consumers to shop and make purchases from anywhere
13	E-commerce transactions typically rely on credit cards and other traditional payment methods.	M-commerce offers a wider range of payment options, including mobile wallets and contactless payments.
14.	Examples of E-commerce includes Amazon, Flipkart, Quikr, Olx websites.	Examples of M-commerce includes mobile banking like paytm, in-app purchasing Amazon mobile app.

Self Assessment Question :

Reference:

- 1) <https://www.geeksforgeeks.org/>
- 2) <https://www.toppr.com/>
- 3)