O Level : Web Designing & Publishing



Infomax Computer Academy

Chapter 1 : Introduction to Web Design



Objective:

After completing this unit, Learner will be able to

- Know the types of web site.
- Know the role of front end and back-end application.
- Understand the concept of client-side scripting and server-side scripting.

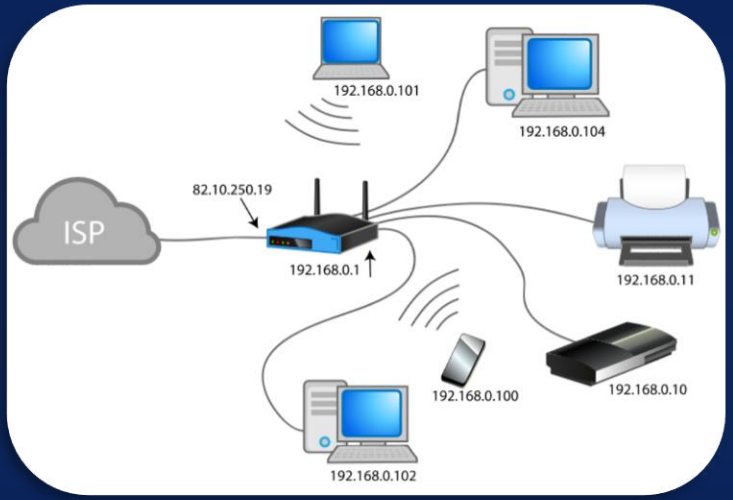
Introduction

- Web designing is the process of publishing content on the internet.
- It includes creating and uploading websites, updating the associated Web Pages, and posting content to these web pages Online.
- Web publishing is also known as Online publishing.



Computer Network

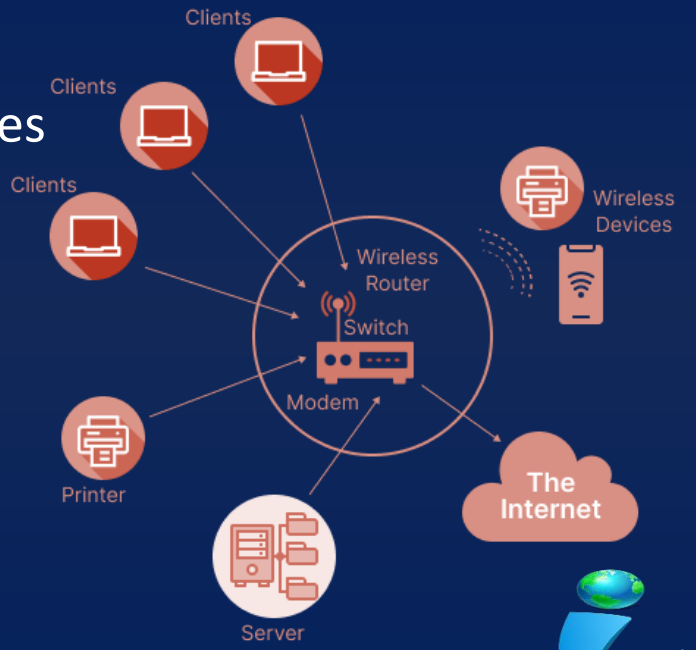
- A computer network is a set of computers connected together for the purpose of sharing resources.
- These resources can be data files, any application software or hardware devices, such as printer, modems, antivirus software etc.



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Advantages of Computer network

- Hardware Sharing
- Software Sharing
- Efficiency of hardware and software resources
- Reduce Redundancy
- Save Paper and Time
- Internet Sharing
- Security



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Types of Computer Network

- Based on Size and Geographic Area:
  - LAN
  - WAN
  - MAN
  - PAN
  - CAN
  - BAN

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Type of Computer Network

LAN : Local Area Network

- **Coverage Area :** Small (Room, Building, Campus)
- **Examples :** Office Networks, Schools, Homes
- **Usage :** File sharing, local communication

WAN : Wide Area Network

- **Coverage Area :** Large (Country, Global)
- **Examples :** Internet, Corporate Networks
- Usage : Global communication, remote access

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Based on Size and Geographic Area:

MAN : Metropolitan Area Network

- **Coverage Area :** City-wide
- **Examples :** Cable TV Networks, University Campuses
- Usage : High-speed city-wide connectivity

PAN : Personal Area Network

- **Coverage Area :** Very Small (Few meters)
- **Examples :** Bluetooth, Smartwatches, Wireless Peripherals
- Usage : Personal device communication

Based on Size and Geographic Area:

CAN : Campus Area Network

- **Coverage Area :** Medium (Campus, University)
- **Examples :** University, Business Campuses
- Usage : High-speed internal connectivity

BAN : Body Area Network

- **Coverage Area :** Around a Human Body
- **Examples :** Wearable Health Devices, Smart Implants
- Usage : Health monitoring, medical applications

Based on Geographic Area

Type	Full Form	Coverage Area	Examples	Usage
LAN	Local Area Network	Small (Room, Building, Campus)	Office Networks, Schools, Homes	File sharing, local communication
WAN	Wide Area Network	Large (Country, Global)	Internet, Corporate Networks	Global communication, remote access
MAN	Metropolitan Area Network	City-wide	Cable TV Networks, University Campuses	High-speed city-wide connectivity
PAN	Personal Area Network	Very Small (Few meters)	Bluetooth, Smartwatches, Wireless Peripherals	Personal device communication
CAN	Campus Area Network	Medium (Campus, University)	University, Business Campuses	High-speed internal connectivity
BAN	Body Area Network	Around a Human Body	Wearable Health Devices, Smart Implants	Health monitoring, medical applications

Network Architecture

- Network architecture is the **design and structure of a computer network** that defines:
  - How computers are connected
  - How data is shared
  - How services are provided
- Two main types:
  - **Client–Server Architecture**
  - **Peer-to-Peer (P2P) Architecture**

Client–Server Architecture

A network model where **Clients** request services and a **central server** provides services

Key Features:

- One or more **dedicated servers**
- Clients depend on the server for:
  - Files
  - Applications
  - Internet access
  - Database services
- Centralized control and management

Peer-to-Peer (P2P) Architecture

A network model were **all computers (peers) are equal and e**ach computer can act as both **client and server**

Key Features:

- No central server
- Each peer shares its own resources
- Suitable for small networks

Network Topologies

- Network topology refers to the **arrangement of devices (nodes) and connections (links)** in a network. It defines how computers, routers, switches, and other devices communicate with each other.
- Types of Network Topologies
  - **Bus**
  - **Ring**
  - **Star**
  - **Mesh**
  - **Hybrid**

Common Network Topologies

Topology	Description	Advantages	Disadvantages
Star	Devices connect to a central hub/switch.	Easy troubleshooting, scalable.	Single point of failure (hub).
Bus	All devices share a single communication line.	Easy to set up, low cost.	Collisions and limited scalability.
Ring	Devices form a circular data path.	Equal data distribution.	Failure of one device affects the entire network.
Mesh	Devices are interconnected for multiple pathways.	High redundancy and reliability.	Expensive and complex setup.
Hybrid	Combination of two or more topologies.	Flexible and scalable.	Complex configuration.

Networking Devices

Device	Description	Function
Router	Connects multiple networks and directs data packets between them.	Routing traffic between networks.
Switch	Connects devices within the same network and enables data exchange.	Communication within a network.
Hub	Broadcasts data to all connected devices in a network (less intelligent than switches).	Simple data broadcasting.
Access Point	Extends wireless network coverage by allowing more devices to connect wirelessly.	Wi-Fi connectivity extension.
Modem	Converts analog signals to digital and vice versa for internet connectivity.	Internet access via ISPs.

What is Internet ?

- Internet is an interconnection between several computers of different types belonging to various network across the world.
- It is a network of networks.
- Internet stands for International Network of Computer.
- Millions of people use the internet to search and share information and ideas, etc.
- These different computers and networks are united with the common thread of two protocols i.e., Internet protocol (IP) and Transmission Control protocol (TCP).

History of Internet

- The internet started as a U.S. government project in the year 1969 called the **ARPANET** (Advance Research Project Administration Network) which supervised it in the beginning.

Growth and Development of ARPANET

- In 1971 Ray Tomlinson invented email, a significant application for ARPANET.
- In 1974 Vint Cerf and Bob Kahn developed the Transmission Control Protocol (TCP), which later became TCP/IP.

Services of Internet

- **Communication Services:**
  - **Email:** Electronic mail for sending messages and files.
  - **Instant Messaging:** Real-time text or multimedia communication.
  - **VoIP (Voice over Internet Protocol):** Services like Skype, Zoom, and others enable voice and video calls over the internet.
- **Information Retrieval:**
  - **Search Engines:** Google, Bing, and others help users find information on the web.
  - **Online Encyclopedias:** Websites like Wikipedia provide a wealth of information.

Services of Internet (Conti)

- **Social Networking:**
  - Platforms like Facebook, Twitter, Instagram, and LinkedIn facilitate social interactions, content sharing, and networking.
- **Online Banking and Finance:**
  - Internet banking allows users to manage their accounts, transfer funds, and pay bills online.
  - Stock trading and financial management services are available through various online platforms.
- **E-commerce:**
  - Websites like Amazon, eBay, and others enable online shopping.
  - Digital payment services (e.g., PayPal, Stripe) facilitate secure online transactions.

Services of Internet (Conti)

- **Streaming Services:**
  - Video streaming services like Netflix, YouTube, Hulu, and music streaming platforms like Spotify offer on-demand content.
- **Cloud Services:**
  - Cloud storage (Google Drive, Dropbox) for storing and accessing files from anywhere.
  - Cloud computing services (AWS, Azure) for scalable and flexible computing resources.
- **Online Education:**
  - E-learning platforms (Coursera, edX) offer courses and degrees online.
  - Virtual classrooms and webinars facilitate remote learning.

Services of Internet (Conti)

- **News and Media:**
  - Online news websites and media outlets provide real-time information and updates.
- **File Sharing:**
  - Peer-to-peer file-sharing services like BitTorrent.
  - Cloud-based file-sharing services for collaborative work.
- **Remote Services:**
  - Remote desktop services for accessing and controlling computers over the internet.
  - Telecommuting tools for virtual meetings and collaboration.

Services of Internet (Conti)

- **Entertainment:**
  - Online gaming platforms, multiplayer games, and virtual reality experiences.
  - Internet radio and podcasts for entertainment and information.
- **Security and Privacy Services:**
  - Virtual Private Networks (VPNs) for secure and private internet access.
  - Antivirus and cybersecurity services.

Service Type	Description	Examples
World Wide Web (WWW)	Accessing websites and web pages via browsers	Google, Wikipedia, Facebook
Email	Sending and receiving electronic messages	Gmail, Outlook, Yahoo Mail
File Transfer (FTP)	Uploading and downloading files online	FileZilla, Google Drive, WeTransfer
Cloud Computing	Storing and processing data remotely	AWS, Google Cloud, Microsoft Azure
Online Streaming	Watching or listening to content online	YouTube, Netflix, Spotify
Social Networking	Connecting with people and sharing content	Facebook, Twitter, Instagram
E-Commerce	Buying and selling goods online	Amazon, eBay, Flipkart
Online Banking	Managing financial transactions online	PayPal, Net Banking, Google Pay
VoIP (Voice over IP)	Making voice and video calls over the Internet	Zoom, Skype, WhatsApp Call
Instant Messaging	Sending real-time text messages	WhatsApp, Telegram, Signal
E-Learning	Online education and learning platforms	Udemy, Coursera, Khan Academy
Remote Access	Connecting to another computer remotely	TeamViewer, AnyDesk, VPN Services
IoT (Internet of Things)	Connecting smart devices via the internet	Smart Homes, Smart Watches, IoT Devices

Disadvantages of Internet

- Virus Threat
- Privacy and Security Risks:
- Theft of Personal Information
- Cyber Terrorism
- Time Wasting

WWW (World Wide Web)

- The World Wide Web (WWW), commonly known as the Web, is an information system that enables documents and other web resources to be accessed over the Internet.
- It was invented by Sir Tim Berners-Lee in 1989.
- Tim Berners-Lee, a British scientist at CERN, proposed the idea of the World Wide Web to facilitate information-sharing among scientists.
- In 1990 Berners-Lee developed the first web browser (WorldWideWeb, later renamed **Nexus**) and the first web server (**info.cern.ch**).
- **In 1991,** The World Wide Web was made publicly available.

Web Browser

- Web Browser is a software, which is used to view web sites (web pages).
- It is an interface between a user and the world wide web.

Browser	Owned By	Introduced in
Google Chrome	Google	June 2013
Internet explorer	Microsoft	1994 released in 1995
Mozilla Firefox	Mozilla Corporation	Feb 2004
Opera	Opera Software	1996
Apple Safari	Apple Inc.	07 Jan 2--3
Microsoft Edge	Microsoft	29 July 2015

Networking Protocols

Protocol	Description	Port Number	Use Case
HTTP	HyperText Transfer Protocol for web communication.	80	Browsing websites.
HTTPS	Secure version of HTTP using encryption.	443	Secure web browsing.
FTP	File Transfer Protocol for transferring files.	21	File upload/download.
SMTP	Simple Mail Transfer Protocol for sending emails.	25	Email delivery.
DNS	Domain Name System resolves domain names to IP addresses.	53	Website access via domains.

Popular Search Engine

Search Engine	Developer/Owner	Launch Year	Market Share (approx.)
Google	Google	1998	92%+
Bing	Microsoft	2009	2.5%+
Yahoo!	Verizon Communications	1994	1.5%+
Baidu	Baidu, Inc.	2000	1%+
DuckDuckGo	DuckDuckGo, Inc.	2008	0.5%+
Yandex	Yandex N.V.	1997	0.5%+
Ecosia	Ecosia	2009	0.3%+
Ask.com	IAC (InterActiveCorp)	1996	< 0.5%
AOL Search	AOL	1999	< 0.5%
StartPage	StartPage, Inc.	2006	< 0.5%

IP Addresses

Type	Description	Range	Example
IPv4	32-bit address format.	192.168.0.1 - 192.168.255.255	192.168.1.1
IPv6	128-bit address format for modern networks.	2001:db8::/32	2001:0db8:85a3::8a2e
Public IP	Globally unique IP assigned to devices by ISPs.	Assigned by IANA	203.0.113.1
Private IP	Reserved for internal networks.	192.168.x.x, 10.x.x.x	10.0.0.1
Static IP	Manually assigned and doesn't change.	N/A	203.0.113.10
Dynamic IP	Automatically assigned by DHCP.	N/A	Assigned temporarily.

Network Port

- A **network port** is a virtual communication endpoint used to identify specific services running on a device within a network. Ports help direct network traffic to the correct application or service.
- Each port is associated with a **port number** (ranging from **0 to 65535**) and a specific protocol (**TCP or UDP**).

Common Network Ports

Port Number	Protocol	Description	Use Case
20/21	FTP	File Transfer Protocol.	File transfers.
22	SSH	Secure Shell for remote logins.	Secure remote access.
23	Telnet	Unsecure remote login protocol.	Legacy remote management.
25	SMTP	Simple Mail Transfer Protocol.	Sending emails.
53	DNS	Resolves domain names to IP addresses.	Browsing websites.
80	HTTP	Web communication.	Browsing standard websites.
443	HTTPS	Secure web communication.	Browsing secure websites.

OSI Model Layers

Layer	Number	Description	Example Protocols
Application	7	End-user layer for network services.	HTTP, FTP, SMTP
Presentation	6	Data translation, encryption, and compression.	SSL, TLS
Session	5	Establishes, manages, and terminates sessions.	NetBIOS, PPTP
Transport	4	Ensures reliable data transfer.	TCP, UDP
Network	3	Handles data routing and addressing.	IP, ICMP
Data Link	2	Transfers data between adjacent network nodes.	Ethernet, PPP
Physical	1	Deals with hardware and raw data transmission.	Ethernet cables, Hubs

Web Page

A **web page** or **webpage is** a document commonly written in HTML (Hypertext Markup Language) that is accessible through the Internet or other networks using an Internet browser.

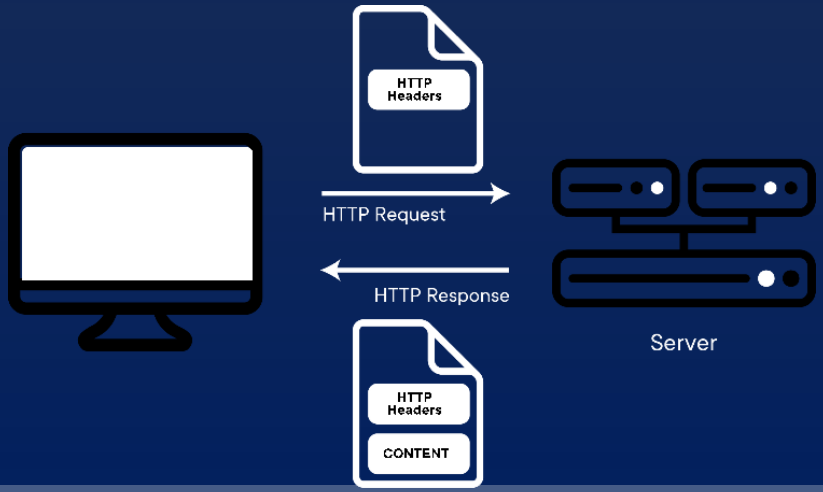
A **web page is** accessed by entering a URL address and may contain text, graphics, and hyperlinks to other **web pages** and files.

What is website

- A website is a collection of publicly accessible, interlinked Web pages that share a single domain name.
- Websites can be created and maintained by an individual, group, business or organization to serve a variety of purposes.
- Together, all publicly accessible websites constitute the World Wide Web.
- A website is also known as a web presence.

How the Website Works

A **website** is simply a collection of **web** pages of codes – codes that describes the layout, format and content on a page.
The **web** server is a internet-connected computer that receives the request for a **web** page sent by your browser. The browser connects your computer to the server through an IP address.



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Front End, Back End

- The term "**front-end**" refers to the user interface, while "**back-end**" means the server, application and database that work behind the scenes to deliver information to the user.
- **Frontend** refers to the client-side, whereas **backend** refers to the server-side **of** the application. Both are crucial to web development, but their roles, responsibilities and the environments they work in are totally different. **Frontend** is basically what users see whereas **backend** is how everything works.

Scripting Language

A scripting language or script language is a programming language for a runtime system that automates the execution of tasks that would otherwise be performed individually by a human operator.

Type of Scripting Language:

- Client-Side Scripting Language
- Server-Side Scripting Language

Client–side Scripting Languages

Client-side scripting involves code that is executed in the user's web browser rather than on the web server. This type of scripting is used to create dynamic and interactive web pages.

Key Characteristics:

- **Execution:** Runs on the client's machine (i.e., the web browser).
- **Interaction:** Primarily used for user interface behavior and interaction.
- **Speed:** Can reduce server load and provide a faster user experience by processing locally.
- **Security:** Limited in access to server resources for security reasons.

- Common Client-Side Scripting Languages: Java Script, VB Script



Server-side Scripting

Server-side scripting involves code that runs on the web server. This type of scripting is used to manage data, perform calculations, and generate dynamic web pages before they are sent to the client.

Key Characteristics:

- **Execution:** Runs on the server before the content is sent to the client's browser.
- **Interaction:** Used for database operations, processing form submissions, and generating HTML.
- **Speed:** Can handle complex processing tasks that are too resource-intensive for client-side execution.
- **Security:** More secure as it can handle sensitive operations and data manipulation.

Example of Server side Scripts are : PHP, JSP, ASP, PYTHON,RUBY

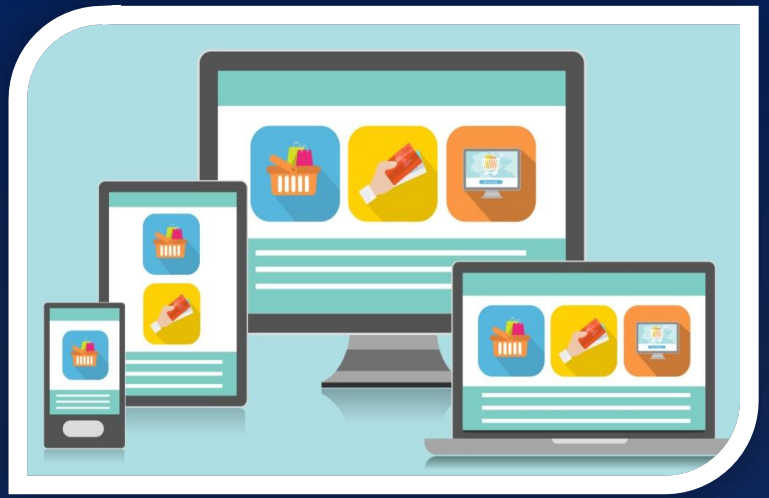


Client-side Script vs Server-side Script

Aspect	Client-Side Scripting	Server-Side Scripting
Execution	Client's browser	Web server
Languages	JavaScript, HTML, CSS	PHP, Python, Ruby, Node.js, ASP.NET
Speed	Faster interaction, no server delay	Dependent on server processing
Security	Less secure, visible to users	More secure, hidden from users
Use Cases	UI interactions, form validation	Database operations, authentication
Access	Limited to client environment	Full access to server resources
Examples	Dynamic content updates	Content generation, business logic

Responsive Web Designing

- **Responsive Web design** is the approach that suggests that **design** and development should respond to the user's behavior and environment based on screen size, platform and orientation. The practice consists of a mix of flexible grids and layouts, images and an intelligent use of CSS media queries.



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Types of Websites

- There are basically two main types of **website** - **static and dynamic**.
- A **static** site is one that is usually written in plain HTML and what is in the code of the page is what is displayed to the user.
- A **dynamic** site is one that is written using a server-side scripting language such as PHP, ASP, JSP, or ColdFusion.



Thank You

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