UNIT 1

Static vs Dynamic Website

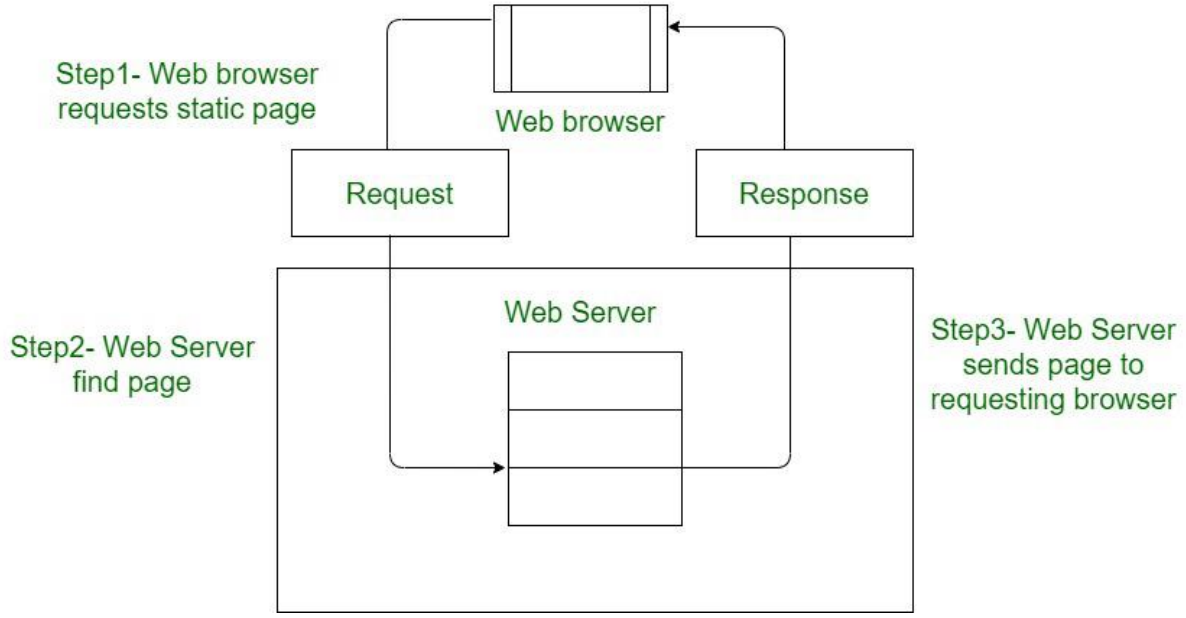
What is Website?
Website is the collection of web pages, different multimedia content such as text, images, and videos which can be accessed by the URL which you can see in the address bar of the browser. For example: https://www.sangamuniversity.ac.in

How to access Websites?
When we type a certain URL in a browser search bar, the browser requests the page from the Web server and the Web server returns the required web page and its content to the browser. Now, it differs how the server returns the information required in the case of static and dynamic websites.

Types of Website:

- Static Website
- Dynamic Website

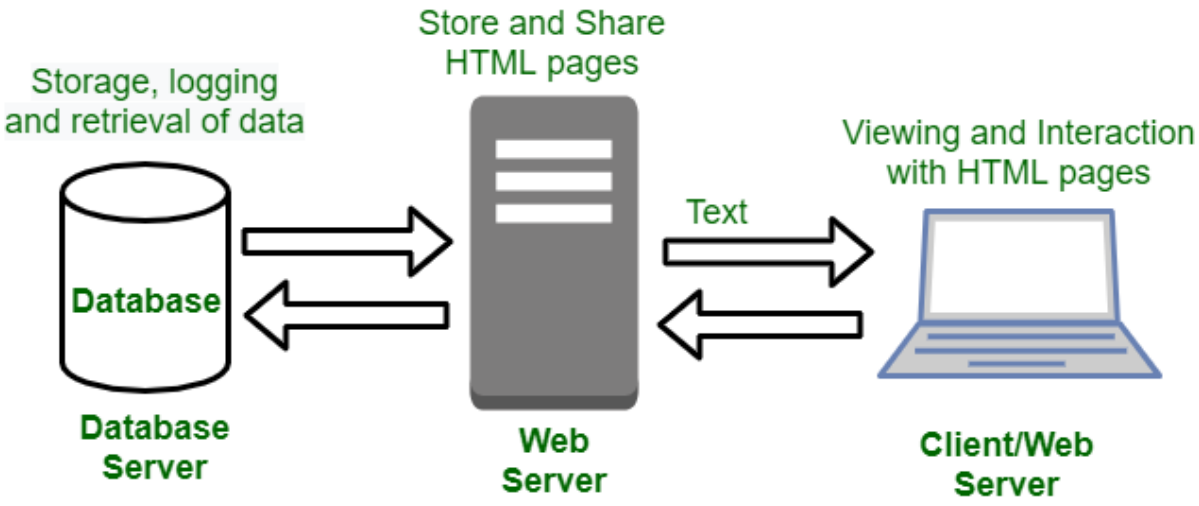
Static Website: In Static Websites, Web pages are returned by the server which are prebuilt source code files built using simple languages such as HTML, CSS, or JavaScript. There is no processing of content on the server (according to the user) in Static Websites. Web pages are returned by the server with no change therefore, static Websites are fast. There is no interaction with databases. Also, they are less costly as the host does not need to support server-side processing with different languages.



Note: Static does not mean that it will not respond to user actions, These Websites are called static because these cannot be manipulated on the server or interact with databases (which is the case in Dynamic Websites).

Dynamic Website: In Dynamic Websites, Web pages are returned by the server which are processed during runtime means they are not prebuilt web pages but they are built during runtime according to the user's demand with the help of server-side scripting languages such as PHP, Node.js, ASP.NET and many more supported by the server. So, they are slower than static websites but updates and interaction with databases are possible.

Dynamic Websites are used over Static Websites as updates can be done very easily as compared to static websites (Where altering in every page is required) but in Dynamic Websites, it is possible to do a common change once and it will reflect in all the web pages.



Difference Between Static and Dynamic Websites:

Static Website	Dynamic Website
Content of Web pages can not be change at runtime.	Content of Web pages can be changed.
No interaction with database possible.	Interaction with database is possible
It is faster to load as compared to dynamic website.	It is slower than static website.
Cheaper Development costs.	More Development costs.
No feature of Content Management.	Feature of Content Management System.
HTML, CSS, Javascript is used for developing the website.	Server side languages such as PHP, Node.js are used.
Same content is delivered everytime the page is loaded.	Content may change everytime the page is loaded.

Difference between Server Side Scripting and Client Side Scripting

1. Client-side scripting :
Web browsers execute client-side scripting. It is used when browsers have all code. Source code is used to transfer from webserver to user's computer over the internet and run directly on browsers. It is also used for validations and functionality for user events.

It allows for more interactivity. It usually performs several actions without going to the user. It cannot be basically used to connect to databases on a web server. These scripts cannot access the file system that resides in the web browser. Pages are altered on basis of the user's choice. It can also be used to create "cookies" that store data on the user's computer.

2. Server-side scripting :
Web servers are used to execute server-side scripting. They are basically used to create dynamic pages. It can also access the file system residing at the webserver. A server-side environment that runs on a scripting language is a web server.

Scripts can be written in any of a number of server-side scripting languages available. It is used to retrieve and generate content for dynamic pages. It is used to require to download plugins. In this load times are generally faster than client-side scripting. When you need to store and retrieve information a database will be used to contain data. It can use huge resources of the server. It reduces client-side computation overhead. The server sends pages to the request of the user/client.

Difference between client-side scripting and server-side scripting :

Client-side scripting	Server-side scripting
Source code is visible to the user.	Source code is not visible to the user because its output of server-sideside is an HTML page.
Its main function is to provide the requested output to the end user.	Its primary function is to manipulate and provide access to the respective database as per the request.
It usually depends on the browser and its version.	In this any server-side technology can be used and it does not depend on the client.
It runs on the user's computer.	It runs on the webserver.
There are many advantages linked with this like faster. response times, a more interactive application.	The primary advantage is its ability to highly customize, response requirements, access rights based on user.
It does not provide security for data.	It provides more security for data.
It is a technique used in web development in which scripts run on the client's browser.	It is a technique that uses scripts on the webserver to produce a response that is customized for each client's request.

Client-side scripting	Server-side scripting
HTML, CSS, and javascript are used.	PHP, Python, Java, Ruby are used.
No need of interaction with the server.	It is all about interacting with the servers.
It reduces load on processing unit of the server.	It surge the processing load on the server.

Server-side Scripting Languages for Web Development

Server-side scripting languages are a type of programming language that runs on the server instead of the client. They can create dynamic websites and web applications, perform scheduling and data mining tasks, automate processes such as compilation, and send emails. There are many popular programming languages, but this article will cover the seven most popular ones: PHP, Node.js, Python, Ruby on Rails (Ruby), and Java.

PHP

It is a popular server-side scripting language in use today. Danish-Canadian programmer Rasmus Lerdorf developed it in 1995. Since then, PHP has been steadily gaining popularity as a platform for building dynamic websites and applications.

The PHP interpreter is found on more than 20 million websites. The flexibility of PHP makes it easy to integrate with many different databases, including SQL and MySQL, and independent of any particular database system.

In addition to its flexibility, PHP is notable for being open-source software. Most web servers use PHP to implement the Basic and Configuration Directives (known as Apache mod_php). Because of its popularity, the demand for PHP programmers is high. PHP also has several high-profile users, including Facebook and Wikipedia.

Node.js

This is a prevalent server-side scripting language because of its high performance and scalability. So, it’s not surprising that Node.js is one of the top 7 server-side scripting languages, as software professionals can use it to create websites and services for browsers and mobile devices (including smartwatches).

Node.js is a server-side scripting language and a runtime environment that runs scripts written in various programming languages, including JavaScript and CoffeeScript. This means it can run any type of software with the help of external libraries or frameworks.

Those who want to learn Node.js should consider taking advantage of its extensive library of modules, including Connect and Express.

The downside of Node.js is that its ecosystem is mainly composed of custom modules, meaning programmers can be restricted by pre-built modules when developing software. Additionally, some programmers working on large projects may find the language's syntax too rigid or confusing.

Python

It is a general-purpose language, but it is often used as a server-side scripting language. Why? It's quick and easy to code in, easily readable, has a vast library of functions that you can use for free, and lots of web frameworks are designed for Python that speed up development tremendously. In addition, it is widely considered to be an easy programming language to learn and read due to its clear syntax and use of indentation to delimit blocks.

Python can run on any operating system as a server-side language, but it's often used for web applications. In fact, many people claim that it is the best programming language to use when developing websites and servers.

We have seen a rise in the Python programming language in web development in the past few years. For example, websites such as Pinterest and Instagram (which Facebook bought for a billion dollars) were written in Python.

Ruby

This is one of the server-side scripting languages with a focus on simplicity and productivity. Ruby, an object-oriented language, can be used by new programmers or experienced developers looking to write code more efficiently. With a syntax similar to other dynamic languages like Python and Perl, Ruby has elements of functional programming as well.

The goal of Ruby is to make programming fun again for software developers who had become disillusioned with the more popular languages of the day. Ruby is designed to help programmers efficiently address common programming tasks, including memory management and concurrency, which are problematic in other languages. In addition to its use as a general-purpose programming language, Ruby is used for server-side scripting in web applications.

Also, Ruby has many of the same features that developers enjoy in Python, Perl, and PHP. However, it also has unique benefits that make it worth learning, even if you use another scripting language regularly.

Java

This is one of the server-side scripting languages and a general-purpose programming language. Java is concurrent, class-based, object-oriented, and specifically designed to have as few implementation dependencies as possible. In addition, it is intended to let application developers “write once, run anywhere” (WORA), meaning that codes that run on one platform do not need to be recompiled to run on others.

Java is very stable, and it can do real-time sharing with other computers on a network (known as having ‘multithreading’). Java can also handle massive amounts of data which makes it ideal for managing large databases. The programming code for Java often uses English-like keywords which are easier to remember.

Java is a potent language, but it can sometimes be too complex. Also, if the programmer makes mistakes when writing the code, the program could crash in some situations. Large organizations like IBM and Sun Microsystems help maintain this language with software updates.

Golang

GoLang is a fresh programming language that Google developed. It is meant for lightweight web services that are designed to run on mobile devices easily. This makes it very unique compared with other server-side scripting languages - many of which were designed to be completed on large-scale projects, but GoLang was created in the opposite direction.

The unique thing about GoLang is that you can deploy it one way to have a light web service, but then when the need arises, you can reuse your code in any other way. The language was created with portability in mind - you don’t always need to make everything work on everything else.

For instance, if you want to write in C# for your Android app, in GoLang, you can deploy it in a lightweight way on the server. But when you need to make something more complex or work with Java language, then you can take that same code and use it again according to what you are implementing.

ASP.NET/C#

This is a server-side scripting language created by Microsoft. It was used to create web applications with HTML, CSS, and JavaScript in mind. The programming code can be designed with multiple different tools. However, the most powerful one is Visual Studio (a

software program), which helps make creating interactive programs easier than ever before. This has allowed ASP.NET/C# to work with other improved web languages such as HTML5, CSS3, and JavaScript.

ASP.NET/C# has many benefits, but one of the biggest is that it can be used with other languages. It means you are not limited to C# when designing your program - there are easy ways for you to use ASP.NET/C# with different languages. You can then decide later if you want to change it.

It is used greatly in the business world, but there are certain limitations to it as well. The language can be hard to learn for beginners (especially with C++ or Java experience), and it also has issues with memory management; however, overall, ASP.NET/C# is a powerful server-side scripting language that can be used for almost any need.

ASP.NET/C# also has the largest amount of community support, making it easier to find answers if you're stuck. Although this may not matter to many businesses because they have an IT department, small companies or people working solo may appreciate this aspect of ASP.NET/C#.

What is: Apache

Apache is open source software and available for free.

It's fast, reliable, and secure. And Apache can be highly customized to meet the needs of many different environments by using extensions and modules.

Most WordPress hosting providers use Apache as their webserver software. However, WordPress can run on other webserver software as well.

What Is a Webserver?

A webserver is software run by your website hosting provider so that visitors can view the web pages on your site. Many WordPress hosting providers use Apache.

The software performs a similar role to a restaurant host. When you arrive at a restaurant, the host greets you, checks your booking information, and takes you to your table. In a similar way, the webserver checks for the web page you have requested.

Differences between HTTP and HTTPS

- HTTP stands for HyperText Transfer Protocol and HTTPS stands for HyperText Transfer Protocol Secure.
- In HTTP, URL begins with “http://” whereas URL starts with “https://”
- HTTP uses port number 80 for communication and HTTPS uses 443
- HTTP is considered to be insecure and HTTPS is secure
- HTTP Works at Application Layer and HTTPS works at Transport Layer
- In HTTP, Encryption is absent and Encryption is present in HTTPS as discussed above
- HTTP does not require any certificates and HTTPS needs SSL Certificates
- HTTP speed is faster than HTTPS and HTTPS speed is slower than HTTP
- HTTP does not improve search ranking while HTTPS improves search ranking.
- HTTP does not use data hashtags to secure data, while HTTPS will have the data before sending it and return it to its original state on the receiver side.
- HTTP used to transfer the text, video, images via web pages while HTTPS used to transfer data securely via network.
- HTTP is unreliable while HTTPS is reliable.
- HTTP can be Hacked but HTTPS cannot be hacked.

FTP

- FTP stands for File transfer protocol.
- FTP is a standard internet protocol provided by TCP/IP used for transmitting the files from one host to another.
- It is mainly used for transferring the web page files from their creator to the computer that acts as a server for other computers on the internet.
- It is also used for downloading the files to computer from other servers.

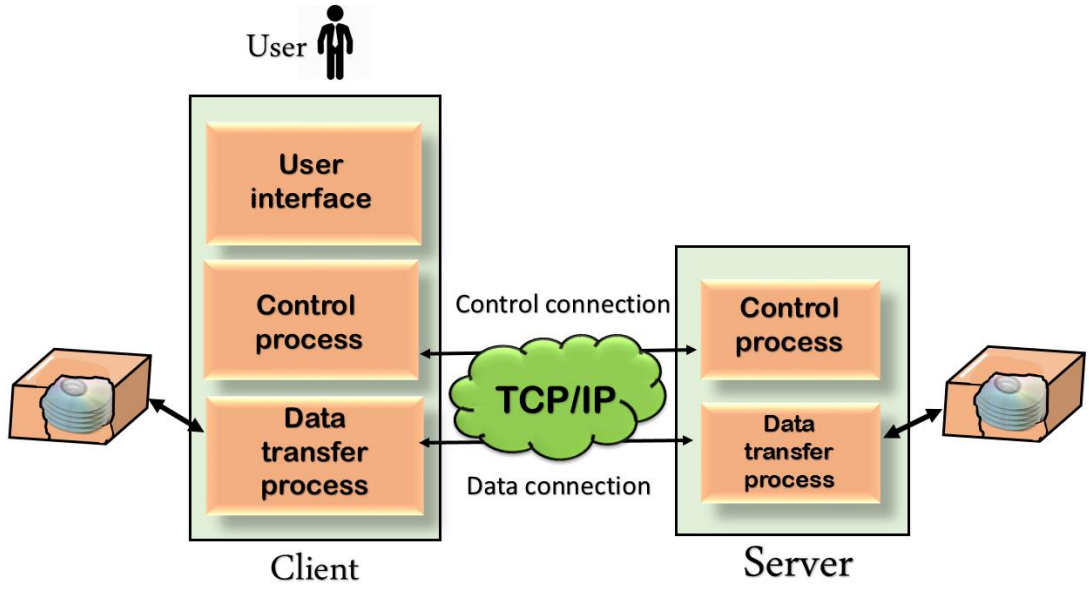
Objectives of FTP

- It provides the sharing of files.
- It is used to encourage the use of remote computers.
- It transfers the data more reliably and efficiently.

Why FTP?

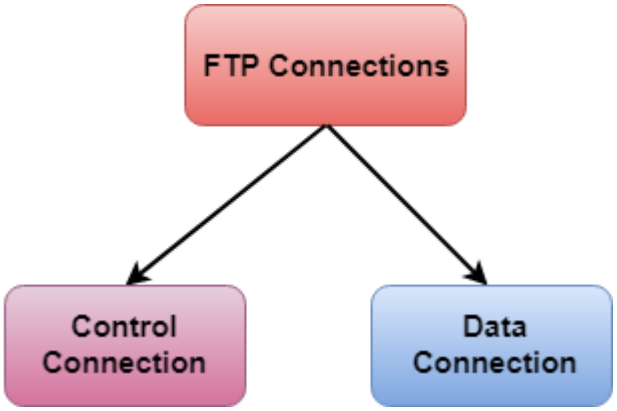
Although transferring files from one system to another is very simple and straightforward, but sometimes it can cause problems. For example, two systems may have different file conventions. Two systems may have different ways to represent text and data. Two systems may have different directory structures. FTP protocol overcomes these problems by establishing two connections between hosts. One connection is used for data transfer, and another connection is used for the control connection.

Mechanism of FTP



The above figure shows the basic model of the FTP. The FTP client has three components: the user interface, control process, and data transfer process. The server has two components: the server control process and the server data transfer process.

There are two types of connections in FTP:



- **Control Connection:** The control connection uses very simple rules for communication. Through control connection, we can transfer a line of command or line of response at a time. The control connection is made between the control processes. The control connection remains connected during the entire interactive FTP session.
- **Data Connection:** The Data Connection uses very complex rules as data types may vary. The data connection is made between data transfer processes. The data connection opens when a command comes for transferring the files and closes when the file is transferred.

FTP Clients

- FTP client is a program that implements a file transfer protocol which allows you to transfer files between two hosts on the internet.
- It allows a user to connect to a remote host and upload or download the files.
- It has a set of commands that we can use to connect to a host, transfer the files between you and your host and close the connection.
- The FTP program is also available as a built-in component in a Web browser. This GUI based FTP client makes the file transfer very easy and also does not require to remember the FTP commands.

Advantages of FTP:

- **Speed:** One of the biggest advantages of FTP is speed. The FTP is one of the fastest way to transfer the files from one computer to another computer.
- **Efficient:** It is more efficient as we do not need to complete all the operations to get the entire file.
- **Security:** To access the FTP server, we need to login with the username and password. Therefore, we can say that FTP is more secure.
- **Back & forth movement:** FTP allows us to transfer the files back and forth. Suppose you are a manager of the company, you send some information to all the employees, and they all send information back on the same server.

Disadvantages of FTP:

- The standard requirement of the industry is that all the FTP transmissions should be encrypted. However, not all the FTP providers are equal and not all the providers offer encryption. So, we will have to look out for the FTP providers that provides encryption.
- FTP serves two operations, i.e., to send and receive large files on a network. However, the size limit of the file is 2GB that can be sent. It also doesn't allow you to run simultaneous transfers to multiple receivers.
- Passwords and file contents are sent in clear text that allows unwanted eavesdropping. So, it is quite possible that attackers can carry out the brute force attack by trying to guess the FTP password.
- It is not compatible with every system.

Web Hosting

Web Hosting is a service that allows hosting/post-web-server applications(website or web page) on a computer system through which web-browser clients can have easy access to electronic content on the Internet.

Web Server or **Web Host** is a computer system that provide web hosting. When Internet user's want to view your website, all they need to do is type your website address or domain into their browser. The user's computer will then connect to your server and your web pages will be delivered to them through the browser. Basically, the web hosts allow the customers

to place documents, such as HTML pages, graphics, and other multimedia files, etc. onto a special type of computer called a web server. It provides a constant and high-speed connection to the backbone of the Internet.

Different types of Web hosting services are listed below:

- Free Hosting
- Virtual or Shared Hosting
- Dedicated Hosting
- Co-location Hosting

Free Hosting:

This is a free non-paid web hosting service. This type of hosting is available with many prominent sites that offer to host some web pages for no cost, like Hostinger.

Advantages :

- Free of cost
- Use websites to place advertisements. banners and other forms of advertising media

Disadvantages:

- Customer support is missing
- Low bandwidth and lesser data transfer
- No control over your website

Shared/Virtual Hosting:

It's a web hosting service where many websites reside on one web server connected to the internet. This type of hosting is provided under one's own domain name, www.yourname.com. With a hosting plan with the web hosting company, one can present oneself as a fully independent identity to his/her web audience, like Lindo.

Advantages:

- Easy and affordable
- Secured by hosting provider
- 24/7 Technical support

Disadvantages:

- Shared resources can slow down the whole server
- Less flexible than dedicated hosting

Dedicated Hosting:

Hosted on a dedicated server, this type of hosting is best suited for large websites with high traffic. In this, the company wishing to go online rents an entire web server from a hosting

company. This is suitable for companies hosting larger websites, maintaining others' sites or managing a big online mall, etc like Google Cloud.

Advantages:

- Ideal for large business
- Strong database support
- Unlimited software support
- Powerful e-mail solutions
- Complete root access to your servers

Disadvantages:

- Its very expensive
- Requires superior skill sets

Co-located Hosting:

This hosting lets you place your own web server on the premises of a service provider. It is similar to that of dedicated hosting except for the fact that the server is now provided by the user-company itself and its physical needs are met by the hosting company like AWS.

Advantages:

- Greater Bandwidth High Up-Time
- Unlimited Software Options
- High Security

Disadvantages:

- Difficult to configure and debug
- Its expensive
- Require high skills