

Web development introduction:

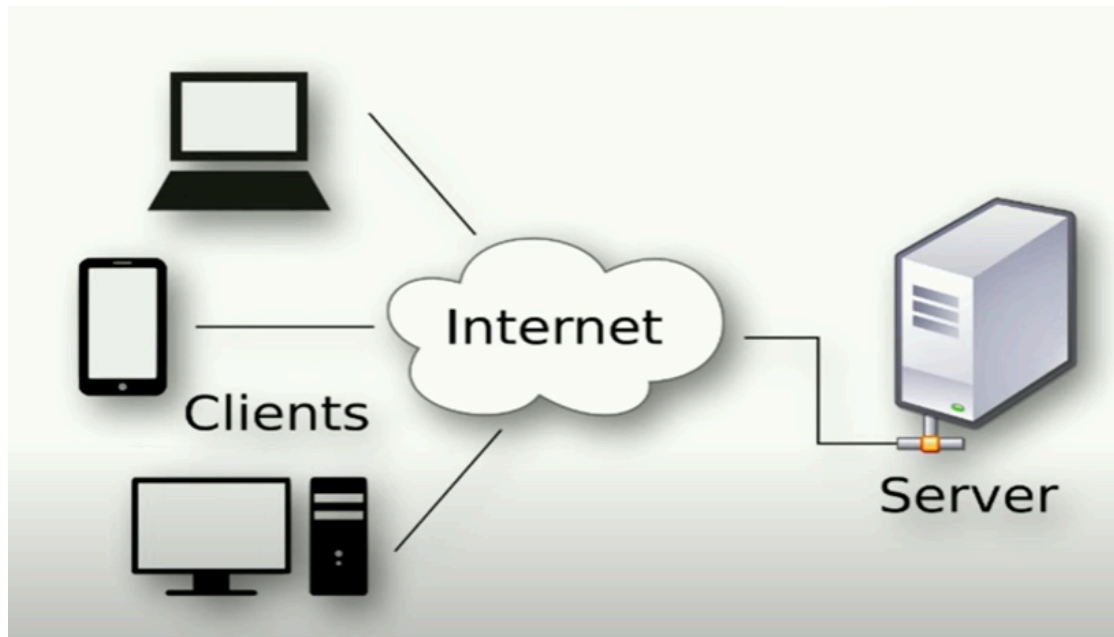
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Website:

- Collection of webpages grouped and connected using hyperlinks.
- Consists of Address (URL /URI), Webpage and Hyperlink.
- Hyperlink :
 - A pointer to a new URL.
 - Can point to documents, videos, images, etc.
 - To use a hyperlink, the developer has to know the resource's URL.
- Address :
 - An identifier used to open a webpage.
 - Types : URI, URL and URN.
 - A URI uniquely identifies the resource by using a string of characters.
 - A URL is a string of characters which has the location of a particular resource which in turn also identifies it.
 - URL and URN is a subset of URI.
 - URN is similar to the URI which uses a special naming scheme to identify a resource.
 - W3C documentation has removed the URN scheme and has clarified that URL and URI are the same.
- Webpage :
 - A document for web browsers.
 - Written using HTML language.
 - Consists of HTML language, Style information and Scripting Language.
 - HTML provides structure, CSS provides styling and Scripting provides interactivity to a webpage.

The Client-Server Model:

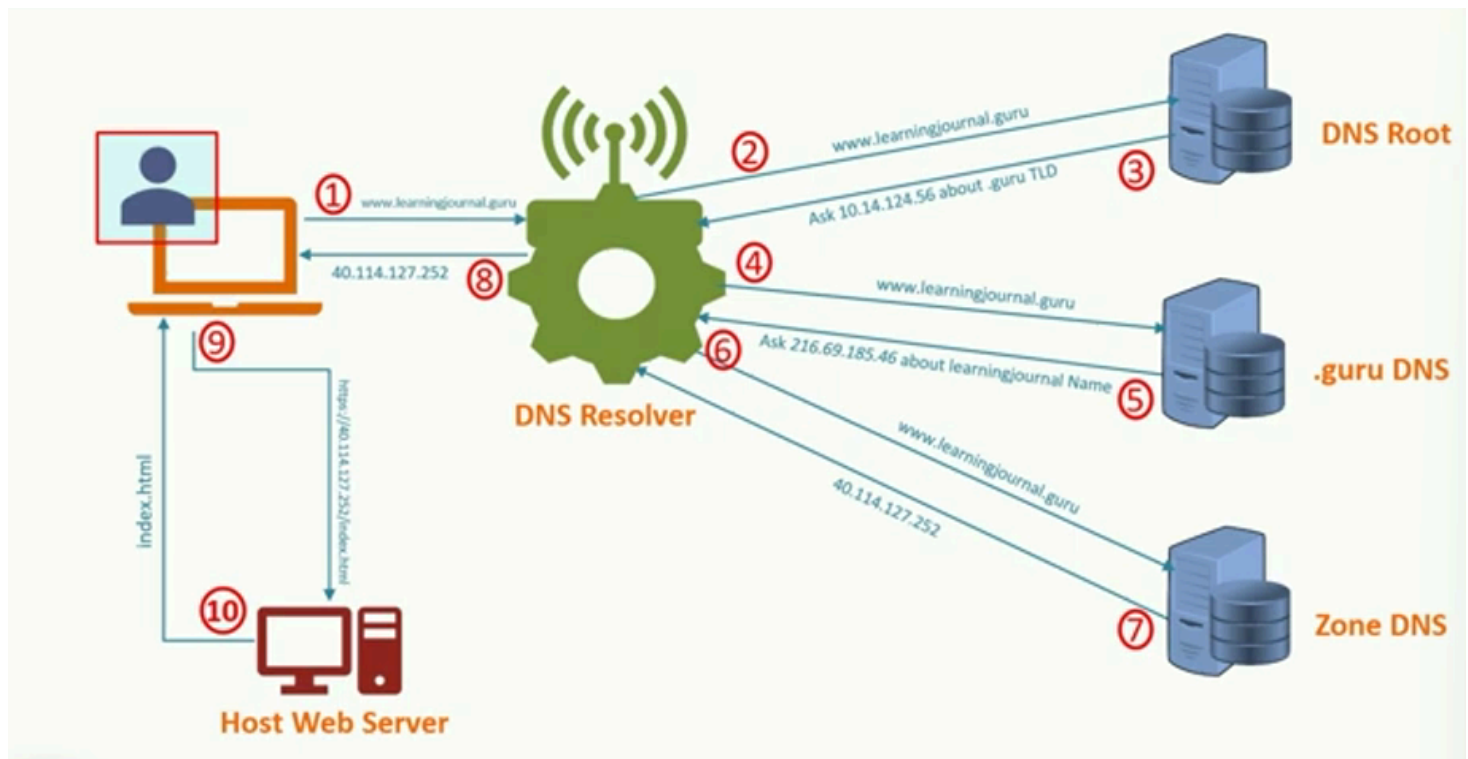


- Web server :
 - A software that listens on a port and responds to the end users through the Internet via a transfer protocol.
 - Requires constant high speed internet connection, continuous power supply and a static IP address.
 - To host our own website, we can use website hosting services which already have the required resources in order to run our website.
- The client's browser sends a request by sending the URL for the required webpage to the server.
- The server then responds back to the client by sending the required webpage to the client's browser.

Clean URL:

- A standard followed for URLs for easy use in the search engine.
- Consists a proper domain name which is well recognisable.
- A URL is composed of :
 - A scheme or protocol
 - Host or Port
 - Path
 - Query string

Domain Name System:



- Domain name registration - need to set a name which is unique across the internet.
- To solve the issue of unique domain names across the internet, we use a hierarchical naming system separated by the dot symbol and extensions (gTLD or ccTLD) maintained by ICANN.
- Domain name server : a program that holds information about domain names.
- DNS Resolver helps in providing the IP address for the requested URL from the client's browser.
- The Resolver communicates with the necessary servers based on the priority order mentioned in the URL and obtains the required IP address and sends it back to the user.
- This IP address received by the client's browser uses it to communicate with the server having that IP address to obtain the required webpage.

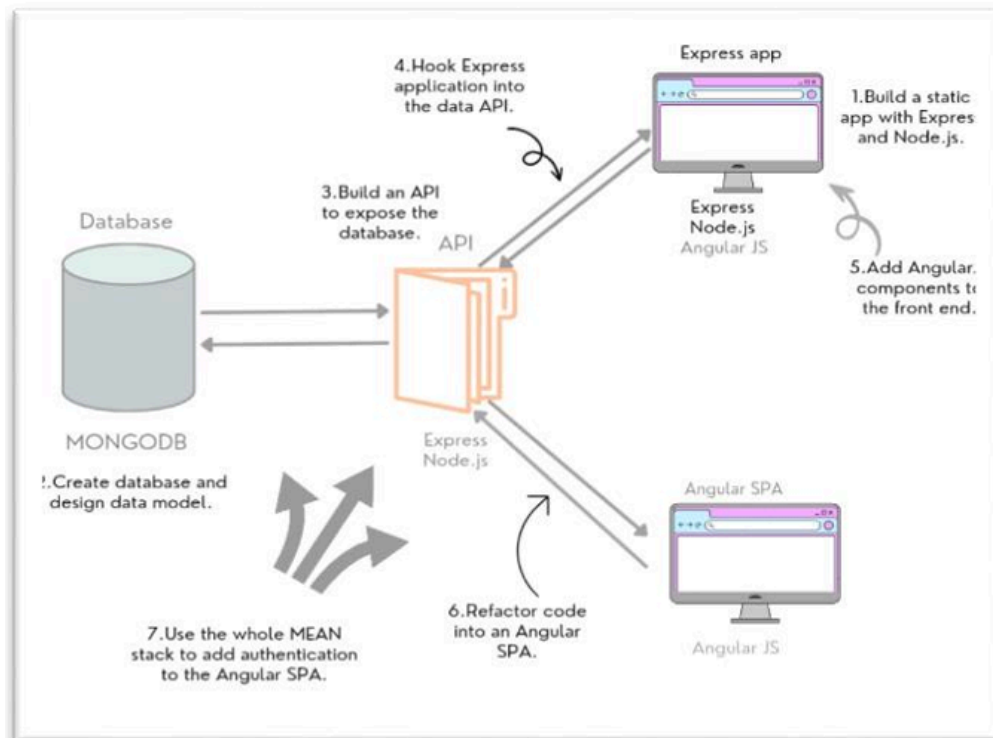
HTTPS and HTTP:

- A protocol in general is the service used by a website in order to communicate.
- HTTPS protocol is used between the client and server to keep the communication encrypted and uses the port number 443.
- It makes use of public key, private key and SSL certificates for secure communication.
- HTTP protocol is used for communication between client and server without any encryption and uses the port 80.

Softwares used in web development:

- Front-End:
 - HTML
 - CSS
 - React.js
 - JavaScript
 - TypeScript
- Back-End:
 - C
 - C++
 - Java
 - Python
 - JavaScript
 - Node.js
- Database:
 - Bigtable (Google)
 - MariaDB (forked from MySQL)
 - MySQL
 - HBase (Apache)
 - Cassandra (Apache)
 - Vitess

Case study - Full Stack MEAN development for Web Application Design and Development:



- Aim : Developing a web application to support project based learning activities.
- Coding :
 - Node.js used to establish the framework for the application.
 - Express.js used to provide server-side applications by providing easy to use API functionalities.
 - App.js used to:
 - Start up the application
 - Implementing route paths and handling
 - Implementing frontend view template engine
 - Implementing public and model directories and,
 - Connection to MongoDB
 - MongoDB is used to create the database.
 - Angular.js used for application development, providing dynamic view support for web applications.
- Reference :
<https://journaleet.in/articles/enhancing-university-education-through-project-based-learning-a-case-study-on-full-stack-mean-development-for-web-application-design-and-development>