

Unit - 1

Internet Standards:

- * Internet standards refer to all the documented requirements both in technology as well as methodology pertaining to the Internet.

- * The standardization process has three steps. The documentation laid down in a step is called the maturity level.

- * There were previously three maturity levels but are merged to form only two maturity levels now which are:

(1) Proposed Standards: These are the standards that are ready for implementation. However, they can be revised according to circumstances of deployment.

(2) Draft Standards: When a proposed standard has been meticulously tested by at least two sites for at least 6 months and is considered as a draft standard. Draft standard has been merged with Internet standard to form the future Internet standard.

(3) Internet Standards: These are technically matured standards that define the protocols and formats of messages. The fundamental standards are those which form the Internet Protocol (IP).

The organizations of Internet Standards are

(1) Internet Engineering Task Force (IETF)

IETF formulates, publishes and regulates Internet standards, particularly those related to TCP/IP. The organization is an open standard, with no formal memberships. Development of

IETF Standards is open to all. any interested person can participate for their development. IETF documents are free and easily available over the Internet. IETF Specifications are on individual Protocols that may be used in different Systems.

12) Internet Society (ISOC)

* ISOC was founded in the US in 1992 as a non-profit organization to provide support on technical development of the Internet.

* It presently conducts a range of activities on

- Standards
- Education
- access, and
- Policies

13) Internet Architecture Board (IAB)

* IAB is a Committee of IETF and an advisory body of ISOC. The board comprises researchers and professionals for developing technical aspects of the Internet.

* The responsibilities of IAB are-

- Supervise architectural standards of different networks and IP
- Review issues related to Internet Standards

- Provide guidance to IETF and ISO

14) Internet Research Task Force (IRTF)

- * IRTF is composed of a number of research groups whose overall objective is focused on the long-term development of the Internet.

- * It is a parallel organization to IETF. The participants are individual contributors who have long-term memberships.

- * The research groups work on Internet protocols, applications, technology and overall architecture.

15) World Wide Web Consortium (W3C)

- * It is the foremost international standards organization for the World Wide Web (WWW).

- * It is a community of a large number of member organizations, who work together to develop web standards and improve web services.

- * Some of the popular standards developed by W3C are HTML, HTTP, XML, CSS, etc.

Introduction to WWW

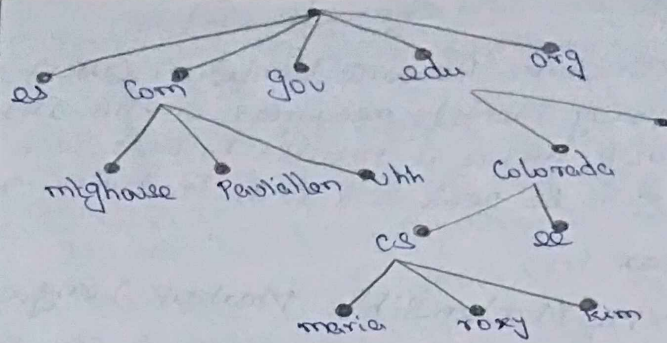
WWW stands for World Wide Web. A technical definition of the World Wide Web is all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).

A broader definition comes from the organization that Web inventor Tim Berners-Lee helped found, the World Wide Web Consortium (W3C).

The world wide web is the universe of network-accessible information, an embodiment of human knowledge.

In simple terms, the world wide web is a way of exchanging information between computers on the Internet, tying them together into a vast collection of interactive multimedia resources.

Internet and web is not the same thing: web uses internet to pass over the information.

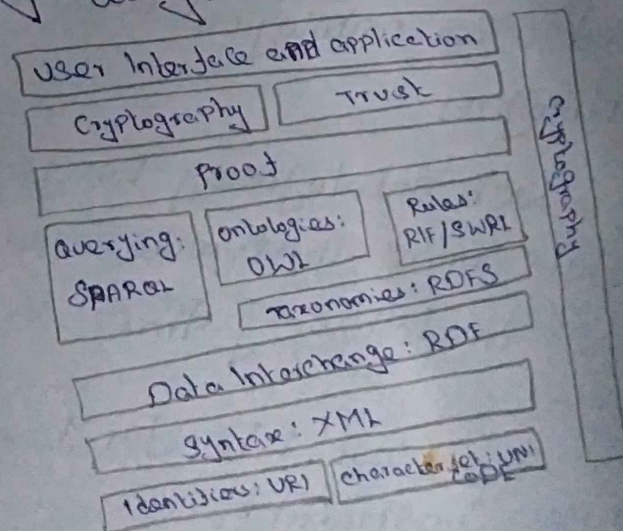


Evolution:

World wide web was created by Timoth³ Berners Lee in 1989 at CERN in Geneva. WWW came into existence as a Proposal to work together effectively and efficiently at CERN. Eventually it become WWW

WWW Architecture:

WWW architecture is divided into several layers as shown in the following diagram.



Identifiers and character set:

- * Uniform Resource Identifier (URI) is used to uniquely identify resources on the web and UNICODE makes it possible to build web pages that can be read and write in human language.

Syntax:

- * XML (Extensible Markup Language) helps to define common syntax in semantic web.

Data Interchange

- * Resource Description Framework (RDF) framework helps in defining core representation of data for web.

- * RDF represents data about resource in graph form.

Taxonomies:

- * RDF Schema (RDFS) allows more standardized description of taxonomies and other ontological constructs.

Ontologies:

- * Web Ontology Language (OWL) offers more constructs over RDFS. It comes in following three versions.

- * OWL Lite for taxonomies and simple constraints.

- ~~OWL is for use~~
- OWL DL for full description logic support
 - OWL for more syntactic freedom of RDF

Rules:

- * RIF and SWRL offers rules beyond the constructs that are available from RDFs and OWL. Simple Protocol and RDF Query Language (SPARQL) is SQL like language used for querying RDF data and OWL Ontologies.

Proof:

- * All semantic and rules that are executed at layers below Proof and their result will be used to prove deductions.

Cryptography:

- * Cryptography means such as digital signature for verification of the origin of sources is used.

~~user interface and applications~~

User Interface and Applications:

On the top of Layer user interface and Applications layer is built for user interaction

Email Protocols:

E-mail protocols are set of rules that help the client to properly transmit the information to or from the mail server. Here in this tutorial, we will discuss various protocols such as SMTP, POP and IMAP.

SMTP :

* SMTP stands for Simple Mail Transfer Protocol. It was first proposed in 1982. It is standard protocol used for sending e-mail efficiently and reliably over the internet.

Key Points :

- * SMTP is application level protocol
- * SMTP is connection oriented protocol
- * SMTP is text based protocol
- * It handles exchange of messages between e-mail servers over TCP/IP n/w.
- * Apart from transferring email, SMTP also provides notification regarding incoming mail
- * When you send e-mail, your e-mail client server which further contacts the recipient mail server using SMTP client
- * These SMTP commands specify the sender's and receiver's e-mail address, along with the message to be send.
- * The exchange of commands between servers is carried out without intervention of any user
- * In case message cannot be delivered, an error report is sent to the sender which makes SMTP a reliable protocol

IMAP

* IMAP stands for Internet Message Access Protocol. It was first proposed in 1986. There exist five versions of IMAP as follows:

- (1) Original IMAP
- (2) IMAP2
- (3) IMAP3
- (4) IMAP2bis
- (5) IMAP4

Key points:

* IMAP allows the client program to manipulate the e-mail message on the server without downloading them on the local computer.

* The e-mail is held and maintained by the remote server.

* It enables us to take any action such as downloading, delete the mail without reading the mail. It enables us to create, manipulate and delete remote message folders called mail boxes.

* IMAP enables the users to search the e-mails.

* It allows concurrent access to multiple mailboxes on multiple mail servers.

POP :

POP stands for Post Office Protocol. It is generally used to support a single client. There are several versions of POP but the POP 3 is the current standard.

Key Points :

- * POP is an application layer internet standard protocol.

- * Since POP supports offline access to the messages, thus requires less internet usage time.

- * POP ~~does~~ does not allow search facility.

- * In order to access the messages, it is not suitable for accessing non email data.

- * POP commands are generally abbreviated into codes of three or four letters eg: STAT.

File Transfer Protocol (FTP)

- * FTP is used to copy files from one host to another.

~~FTP is used to copy files from one~~

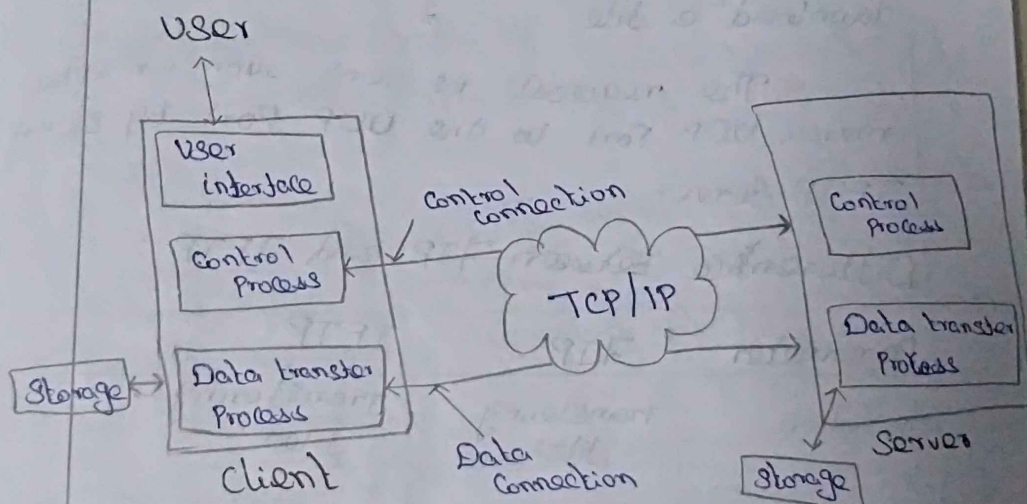
- * FTP offers the ~~same~~ mechanism for the same in following manner:

- * FTP creates two processes such as Control Process and data transfer Process at both ends i.e. at client as well as at server.

- * FTP establishes two different connections: One is for data transfer and other is for control information

- * Control Connection is made between Control Processes while Data Connection is made between

- * FTP used Port 21 for the Control Connection and Port 20 for the data Connection



Trivial File Transfer Protocol (TFTP)

- * Trivial File Transfer Protocol is also used to transfer the files but it transfers the files without authentication.

- * Unlike FTP, TFTP does not separate control and data information. Since there is

No authentication exists TFTP lacks in security features therefore it is not recommended to use TFTP.

Key Points:

- * TFTP makes use of UDP for data transfer. Each TFTP message is carried in separate UDP datagram.

- * The first two bytes of a TFTP message specify the type of message.

- * The TFTP session is initiated when a TFTP client sends a request to upload or download a file.

- * The request is sent from an ephemeral UDP port to the UDP port 69 of an TFTP server.

Differences between FTP and TFTP :-

Parameter	FTP	TFTP
Operation	Transferring files	Transferring files
Authentication	Yes	No
Protocol	TCP	UDP
Ports	21 - Control, 20 - Data	Port 3214, 69, 4012
Control and Data	Separated	Separated
Data transfer	Reliable	Unreliable

HTTP Overview:

* The Hypertext Transfer Protocol HTTP is an application-level Protocol for distributed, collaborative hypermedia information systems. This is the foundation for data communication for the world wide web i.e. internet since 1990.

HTTP is generic and stateless Protocol which can be used for other purposes as well using extension of its request methods, error codes and headers.

Basically, HTTP is a TCP/IP based Communication Protocol, that is used to deliver data HTML files, image files, query result, etc.

On the world wide web. The default port is TCP 80, but other ports can be used as well. It provides a standardized way for computers to communicate with each other. HTTP specifies how clients request data will be constructed and sent to the server, and how the servers respond to these requests.

Basic Features:-

* There are three basic features that make HTTP a simple but powerful protocol:

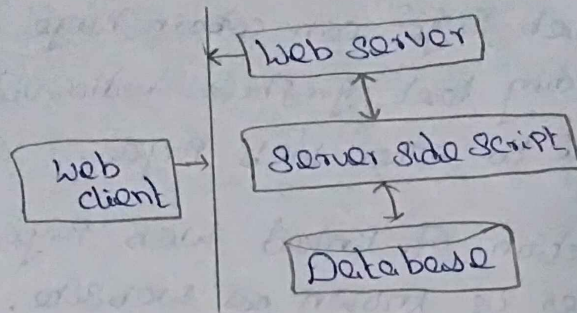
HTTP is connectionless: The HTTP client, i.e., a browser initiates an HTTP request and after a request is made, the client disconnects from the server and waits for a response. The server processes the request and re-establishes the connection with client to send a response back.

HTTP is media independent: It means, any type of data can be sent by HTTP as long as both the client and server know how to handle the data content. It is required for the client as well as the server to specify the ~~type~~ content type using appropriate MIME-type.

HTTP is stateless: As mentioned above HTTP is connectionless and it is a direct result of HTTP being a stateless protocol. The server and client are aware of each other only during a current request. Afterwards, both of them forget about each other. Due to this nature of the protocol, neither the client nor the browser can retain information between different requests across the web pages.

Basic Architecture :

* The following diagram shows a very basic architecture of a web application and depicts where HTTP sits:



HTTP
Protocol

* HTTP is a client server based Protocol

Client :

* client sending request to the server and wait for the response

Server :-

* Server is accepting the request from the client and response to the client

* client asks any kinds of data to be request such as text, audio, video such as MIME type data.

✓ MIME - Multiple Internet Mail Extension

Web Page:

- * Web page is a document available on World Wide Web. Web pages are stored on web server and can be viewed using a web browser.

- * A web page can contain huge information including text, graphics, audio, video and hyper links to other web pages.

- * Collection of linked web pages on a web server is known as website.

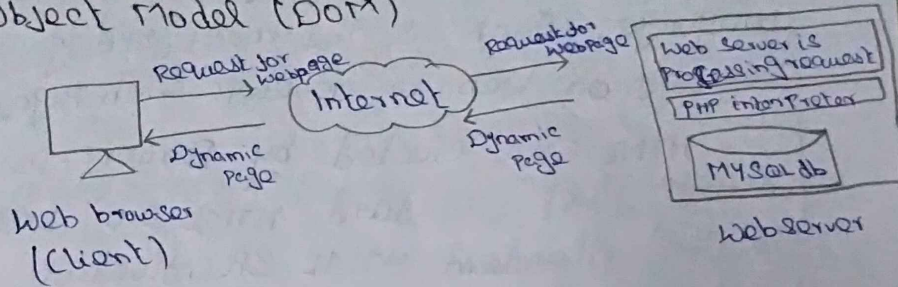
- * There is unique uniform Resource Locator (URL) is associated with each web page.

Dynamic Web Page:

Dynamic web page shows different information at different point of time. It is possible to change a portion of a web page without loading the entire web page. It has been made possible using Ajax technology.

Server-side dynamic web page it is created by using server-side scripting. There are server-side scripting parameters that determine how to assemble a new web page which also include saving up of more client-side processing.

Client-side dynamic web page it is processed using client side scripting such as JavaScript. and then passed in to Document Object Model (DOM)



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