

Web Technology

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Marks

- Assignment :5
- Attendance:5
- Assessment :15
- Presentation:5

Theory: 30

Practical:20

What is
Inter-
net?



Internet



- A global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.

What is
Web?



World Wide Web(WWW)



- An information system on the Internet which allows documents to be connected to other documents by hypertext links, enabling the user to search for information by moving from one document to another.

Do you think Internet and
Web are **same**?

BIG **no** !!

Difference

Internet

- Platform that connects computer together.

Web

- It is a layer built over the internet. It uses protocols of the internet to organized link and give access to content.

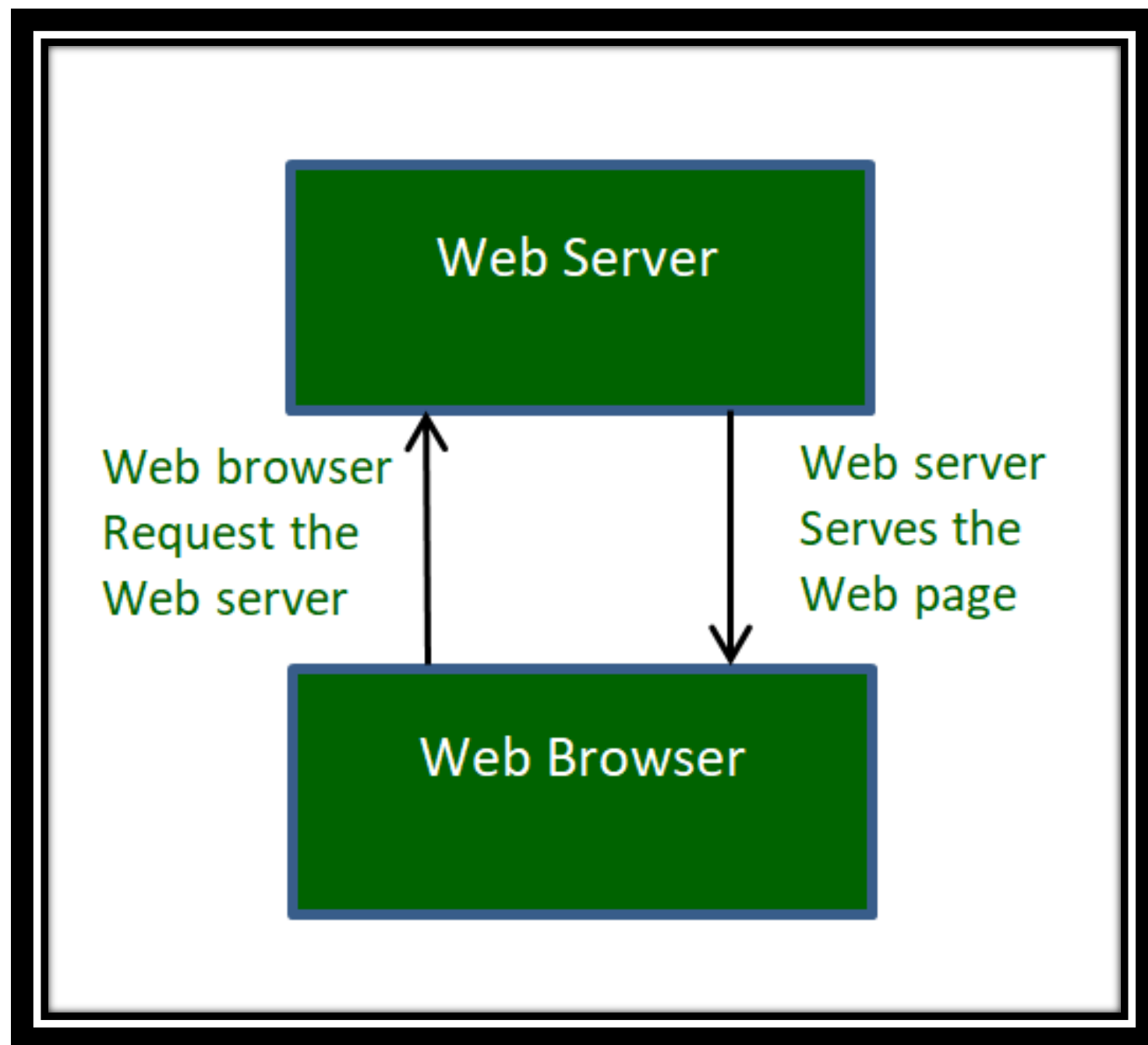
Web servers

A **web server** is [server software](#), or hardware dedicated to running said software, that can satisfy [World Wide Web](#) client requests. A web server can, in general, contain one or more [websites](#). A web server processes incoming [network](#) requests over [HTTP](#) and several other related [protocols](#).

Web Browser

- A **web browser** (commonly referred to as a **browser**) is a [software application](#) for accessing information on the [World Wide Web](#).

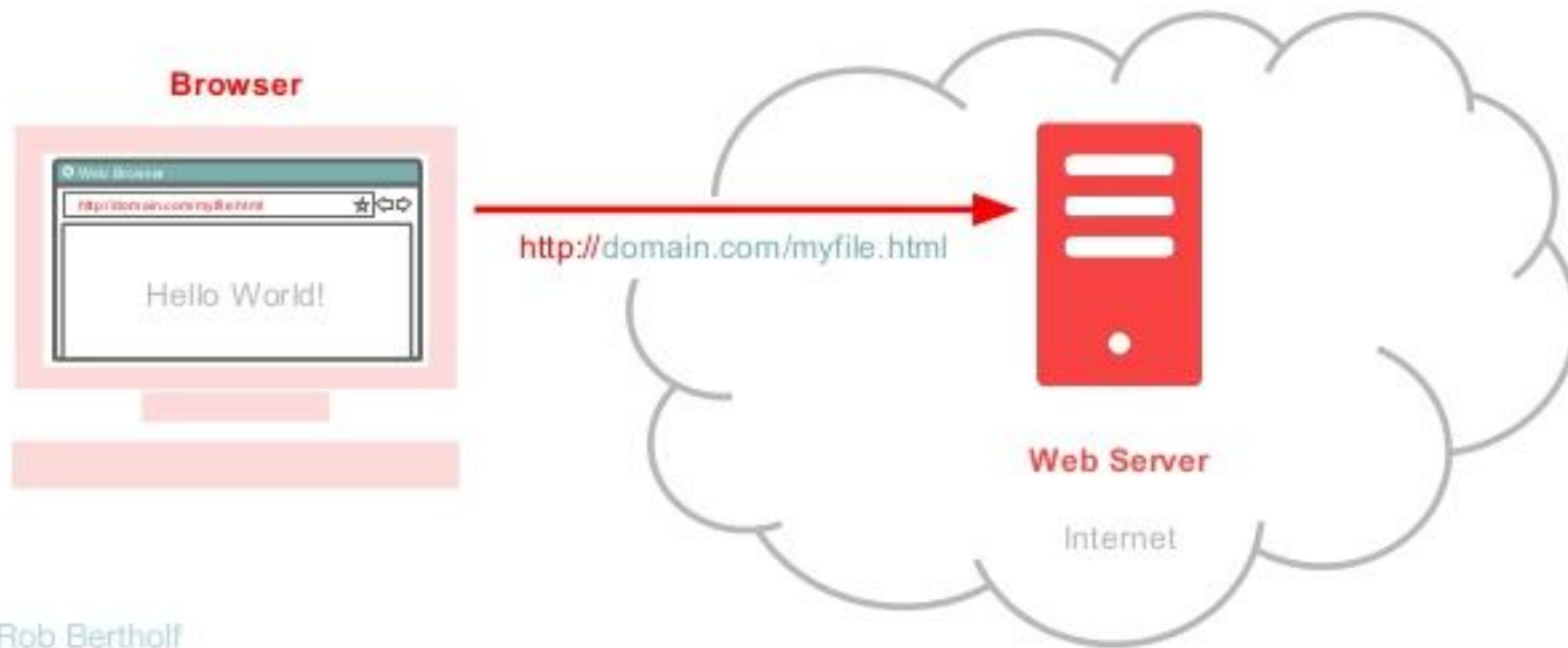




The files stored on **web servers** are read by **browsers** (such as Firefox, Safari, Chrome or Internet Explorer) which convert these files into images and text for you to view. Your browser communicates with web servers to bring you information from the internet.

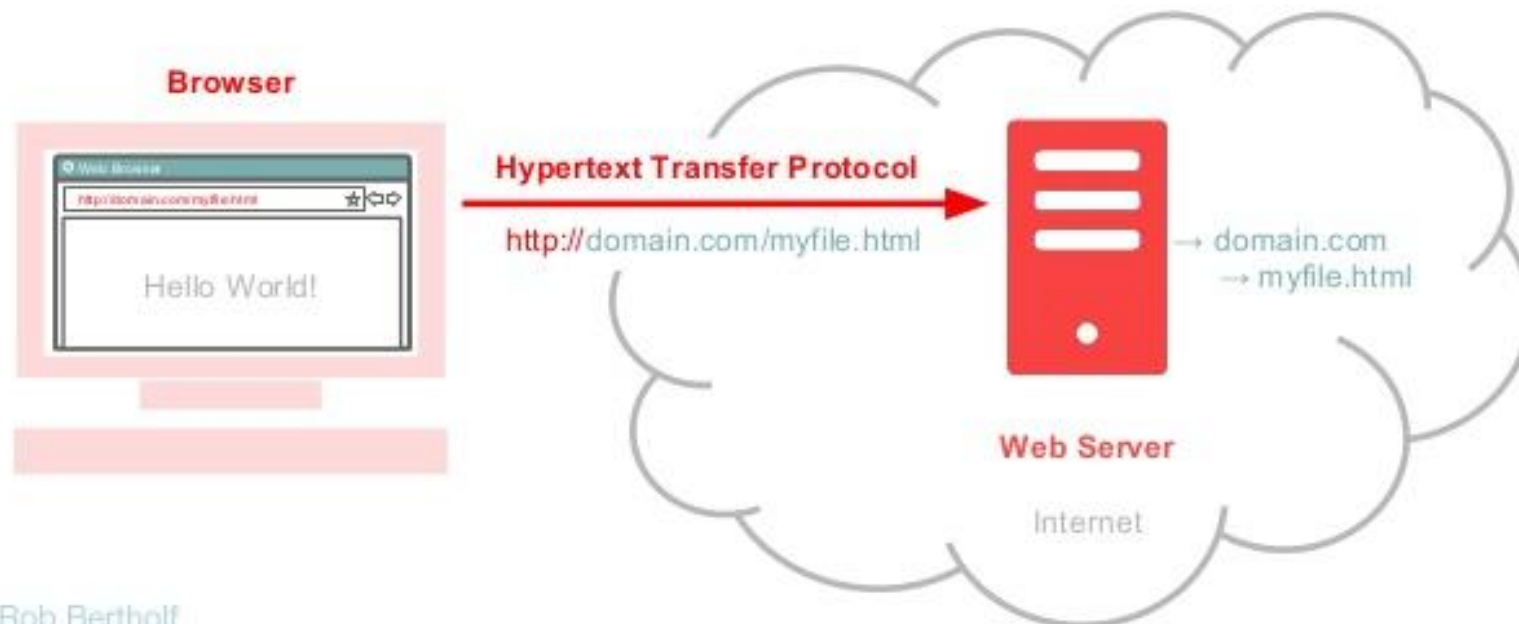


Accessing the World Wide Web

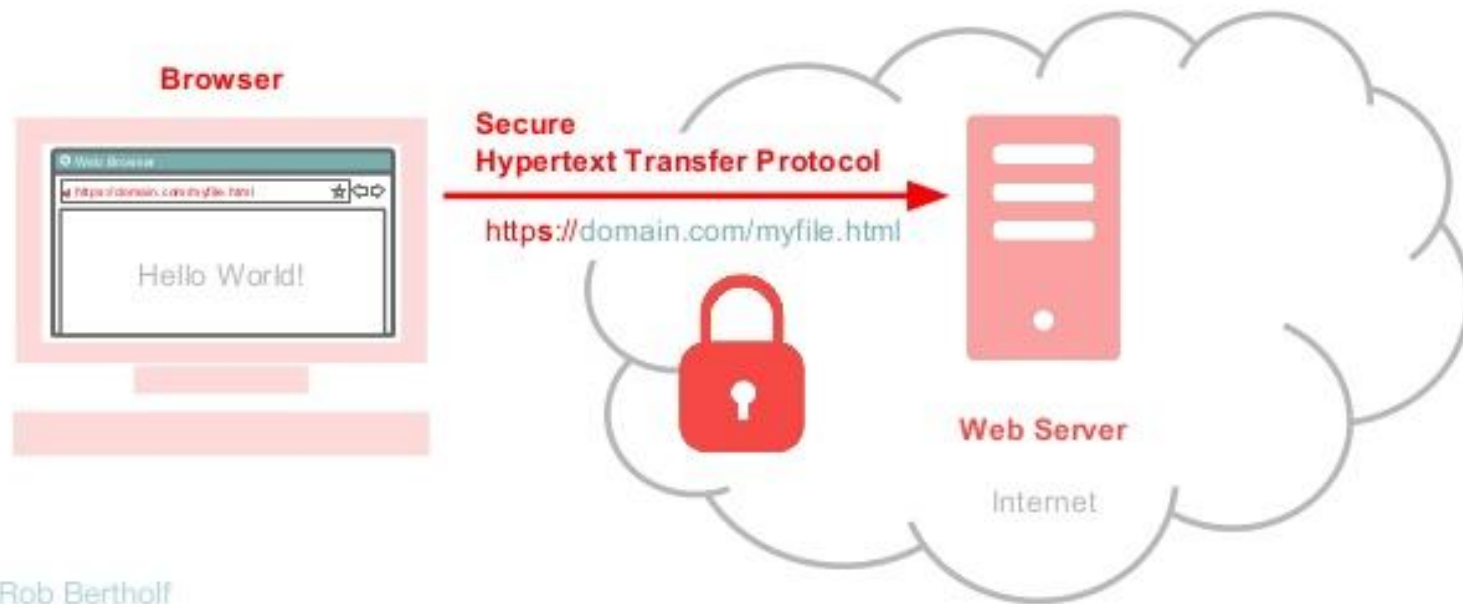


@Rob Bertholf

HTTP



HTTPS (Secure)



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Secure Sockets Layer (SSL) Certificate



What is a Protocol?

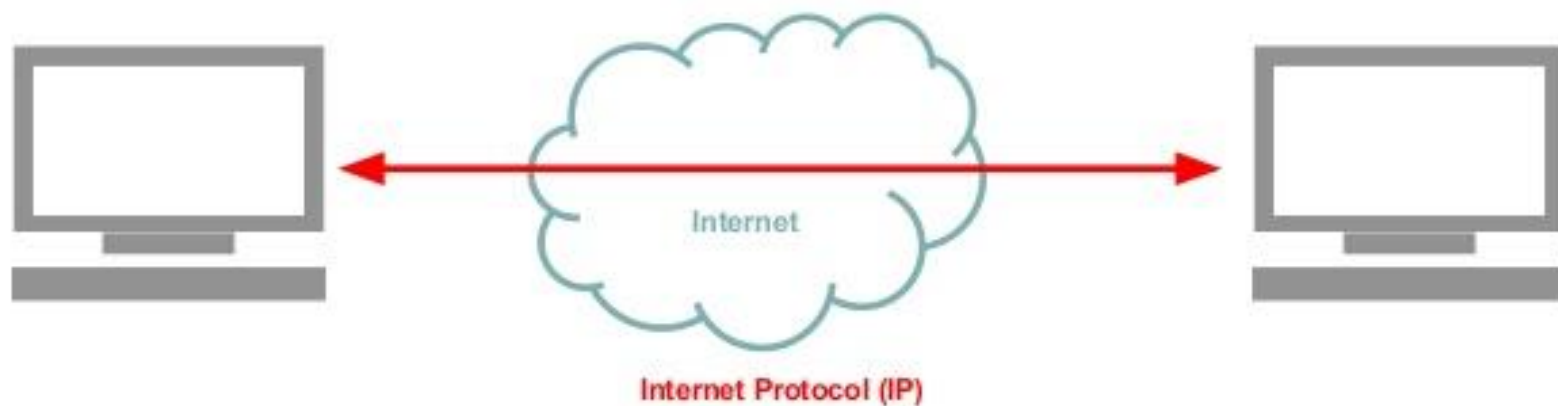
protocol

[**proh**-tuh-kawl, -kol, -kohl]

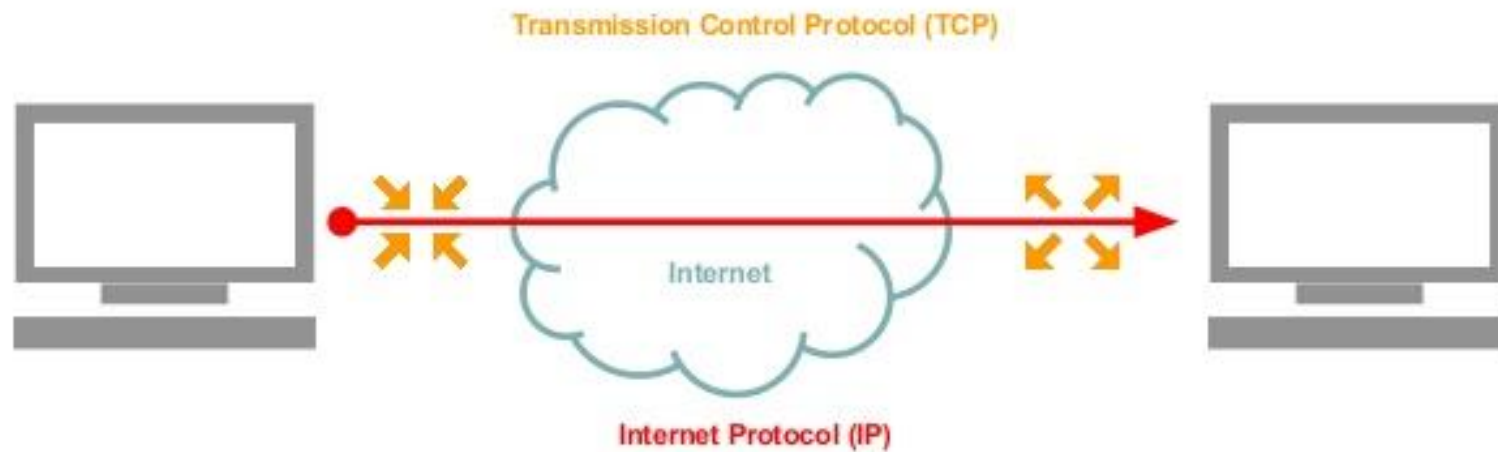
noun

1. set of rules that allow two electronic items to connect to and exchange information with one another.

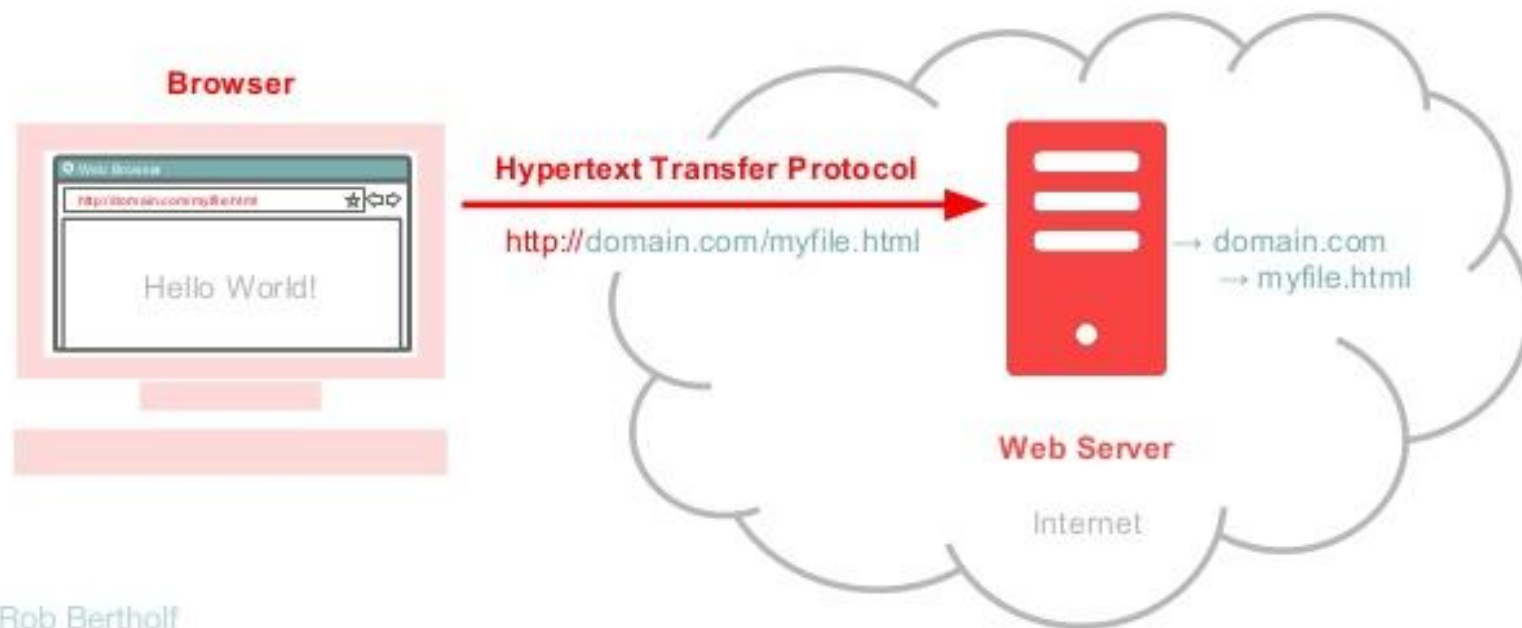
Internet Protocol (IP)



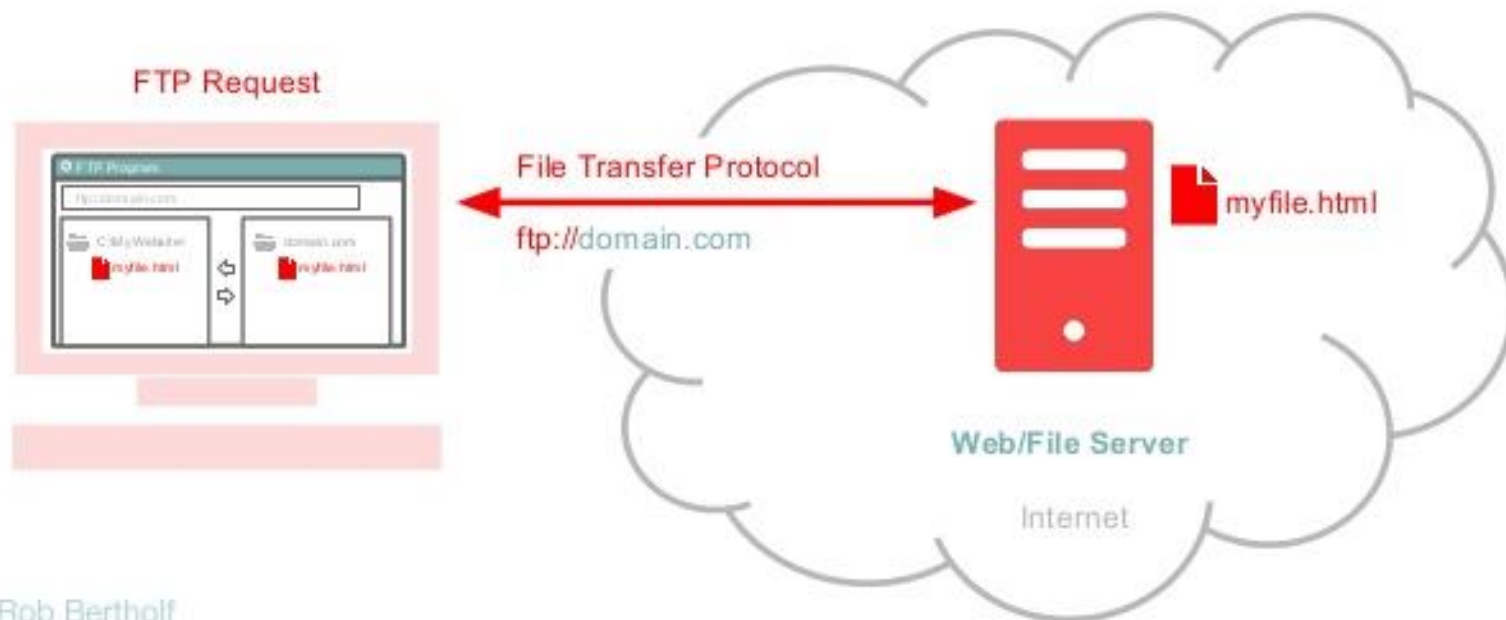
Transmission Control Protocol (TCP)



Hypertext Transfer Protocol (HTTP)



File Transfer Protocol (FTP)



Protocol Recap

- We use Hypertext Transfer Protocol (<http://>) to access websites.
- We use File Transfer Protocol (<ftp://>) to store and retrieve files from the internet.
- SSL Certificates secure the HTTP protocol (<https://>) to guard data passed through.

Web Technology

- Communication between computers using markup language and multimedia packages

Browser

```
<html>
<head>
  <title>My Page</title>
</head>
<body>
  <h1>Hello World</h1>
</body>
</html>
```

mypage.html



My Page - Browser

myfile.html



Hello World!

View Source

What it sees



What we see



What is HTML?

Hypertext Markup Language

noun

1. HTML stands for Hypertext Markup Language, a standardized system for tagging text files to achieve font, color, graphic, and hyperlink effects on World Wide Web pages.

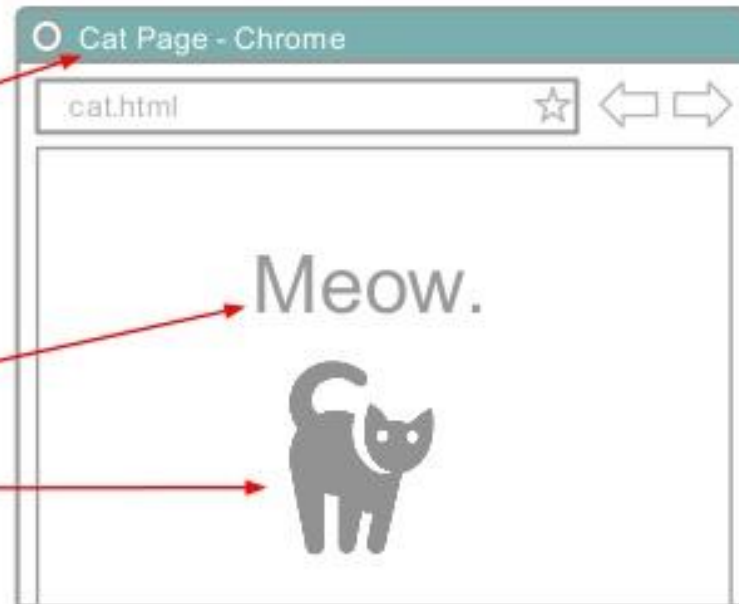
Hypertext Markup Language (HTML)



myfile.html

Anatomy of an HTML Document

```
<!DOCTYPE>
<html>
<head>
  <title>Cat Page</title>
  <meta />
  <script></script>
</head>
<body>
  <h1>Meow.</h1>
  
</body>
</html>
```



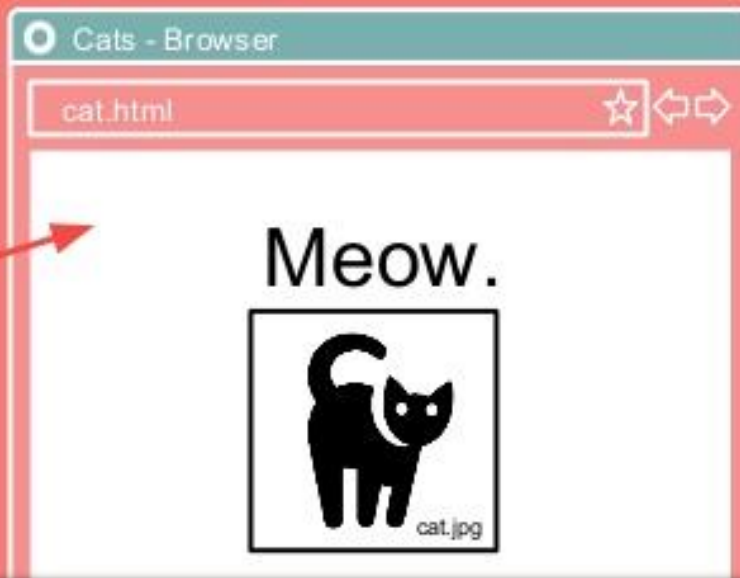
What is a Hyperlink?

Hyperlink

noun

1. A link from a hypertext file or document to another location or file, typically activated by clicking on a highlighted word or image on the screen.

Hyperlink



Hyperlink, Anchor Tag & Hypertext

```
<a href="somefile.html">
```

Click Here (Hypertext)

```
</a>
```



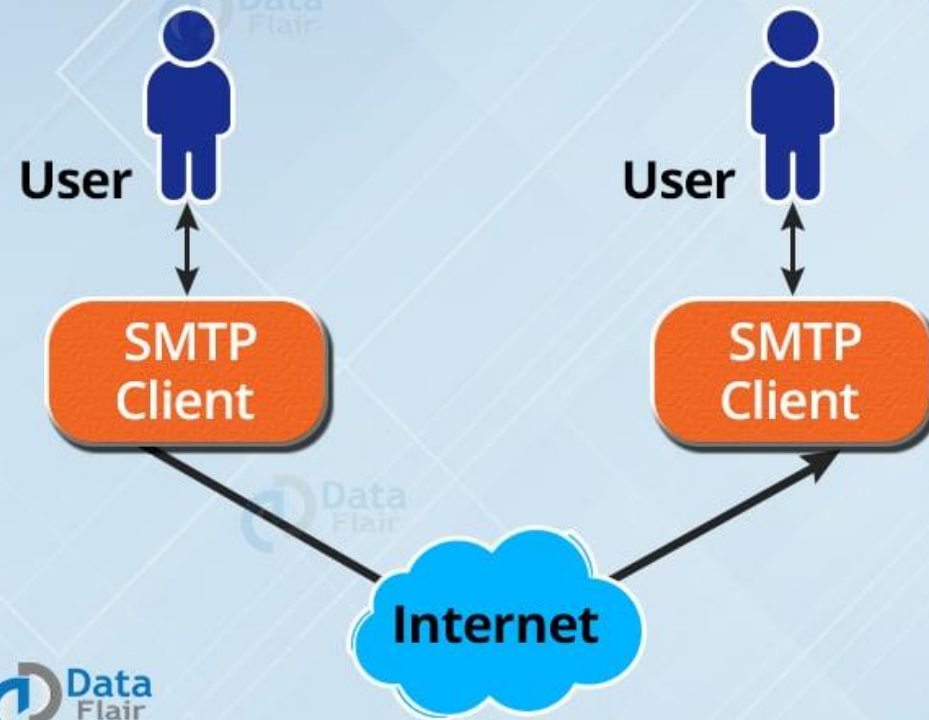
Any queries?

Internet protocols

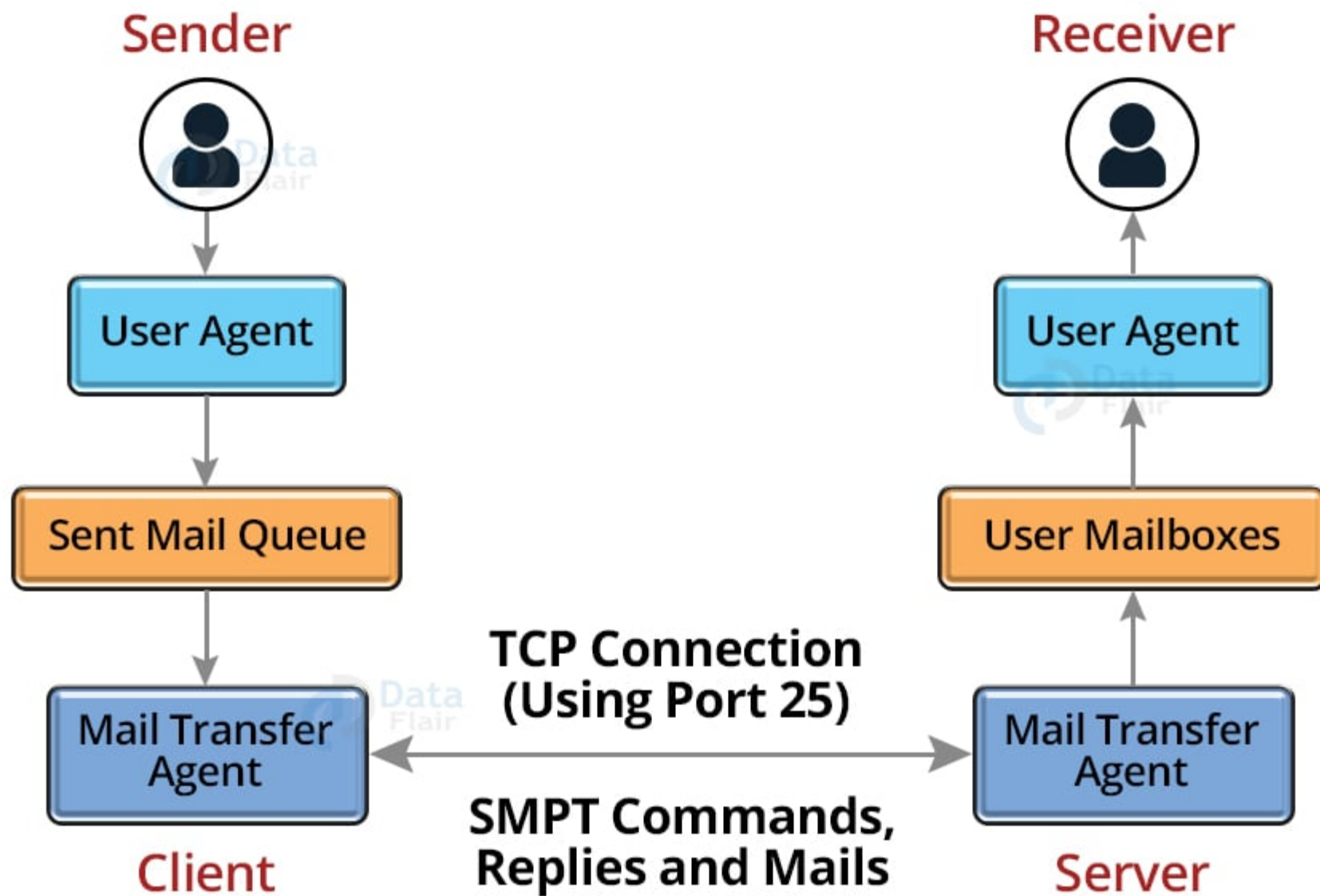
Prepared by: Er. Simanta Kasaju

SMTP

Simple Mail Transfer Protocol (SMTP)



Working of SMTP



- **1. Mail Composition:**

- A user sends an e-mail by creating an electronic mail message with the help of a Mail User Agent (MUA). A Mail User Agent is software that allows you to send and receive emails. The message is divided into two parts: the body and the header. The body of the message is the most important section, whereas the header contains information such as the sender and recipient addresses. The header also provides descriptive information such as the message's topic.
- In this example, the message content is analogous to a letter, and the header is analogous to an envelope with the recipient's address.

- **2. Mail Submission:**

- After drafting an email, the mail client sends the finished email to the SMTP server through SMTP on TCP port 25.

- **3. Mail Delivery:**

- E-mail addresses are made up of two parts: the recipient's username and the domain name. For instance, xyz@gmail.com, where "xyz" is the recipient's username and "gmail.com" is the domain name.
- If the domain name of the recipient's email address differs from the domain name of the sender, MSA will route the message to the Mail Transfer Agent (MTA).
- The MTA will locate the destination domain in order to transmit the email. It looks up the destination domain using the Domain Name System's MX record.
- The MX record comprises the recipient's domain name and IP address. After locating the record, MTA connects to the exchange server to transmit the message.

- **4. Receipt and Processing of Mail:**

- When an incoming message is received, the exchange server sends it to the incoming server (Mail Delivery Agent), which holds the email until the user retrieves it.

- **5. Mail Access and Retrieval:**

- MUA may be used to retrieve email saved in MDA (Mail User Agent). Login and password are required to access MUA.

Communication between receiver and sender:

- **1. Sending Email:**
 - Mail is sent via a sequence of request and answer messages exchanged between the client and the server.
 - The message is made up of two parts: a header and a body. The mail header is terminated with a null line, and everything following the null line is considered the message's body, which is a sequence of ASCII characters. The real information read by the receipt is included in the message body.
- **2. Receiving Email:**
 - The server-side user agent scans the mailboxes at regular intervals. If any information is received, it notifies the user of the mail.
 - When the user attempts to view the mail, a list of emails with a brief description of each mail in the inbox is displayed. Any of the mails may be seen on the terminal by choosing it.
- **SMTP Commands:**
 - HELO — Identifies the client to the server using a fully qualified domain name that is only transmitted once per session.
 - MAIL — Specifies the origin of the email.
 - RCPT — Follows MAIL, identifies an addressee, and uses one RCPT for each addressee if there is more than one addressee.
 - DATA — transmit data one line at a time.

- **SMTP Methods:**

- Store and Forward method: Within an organization, the store and forward approach is utilized.
- End-to-End Method: The end-to-end technique is mostly used to communicate across companies.
- An SMTP client is the one who wishes to send the email and will undoubtedly make direct contact with the destination's host SMTP in order to deliver the email to the destination.
- The SMTP server, on the other hand, will retain the email to itself until it is successfully duplicated to the SMTP at the receiver. The SMTP server mostly responds to session requests.
- Thus, the client-SMTP initiates the session, and the server-SMTP responds to the sender's request.

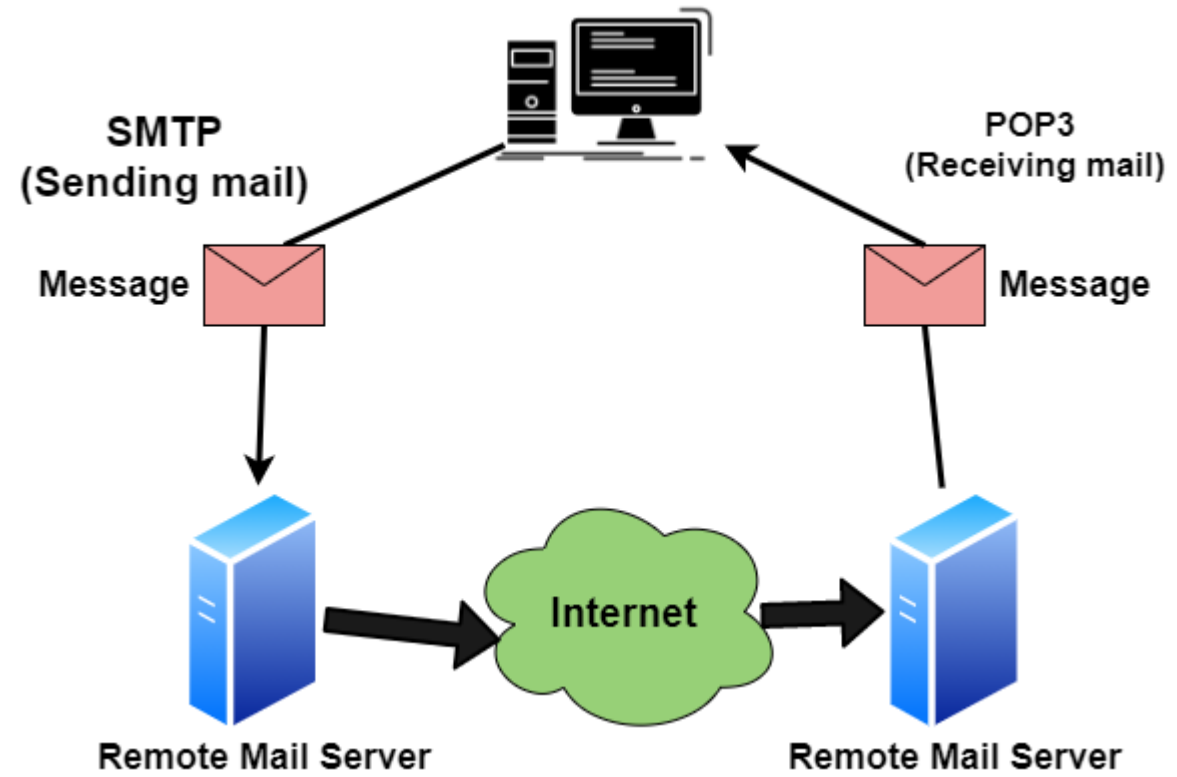
- **Advantages of SMTP:**

- In terms of outgoing email messages, SMTP provides dependability.
- Email is the most basic method of communication between computers in a network.
- In the event that a message is not successfully delivered, the SMTP server will constantly attempt to re-send the message until the transmission is successful.

- **Disadvantages of SMTP:**

- SMTP does not offer adequate security.
- It only supports 7-bit ASCII characters.
- SMTP servers reject email messages that exceed a certain length.
- The simplicity of SMTP limits its utility.
- Transmission of executable and binary files is not feasible via SMTP unless they are transformed into text files.

POP



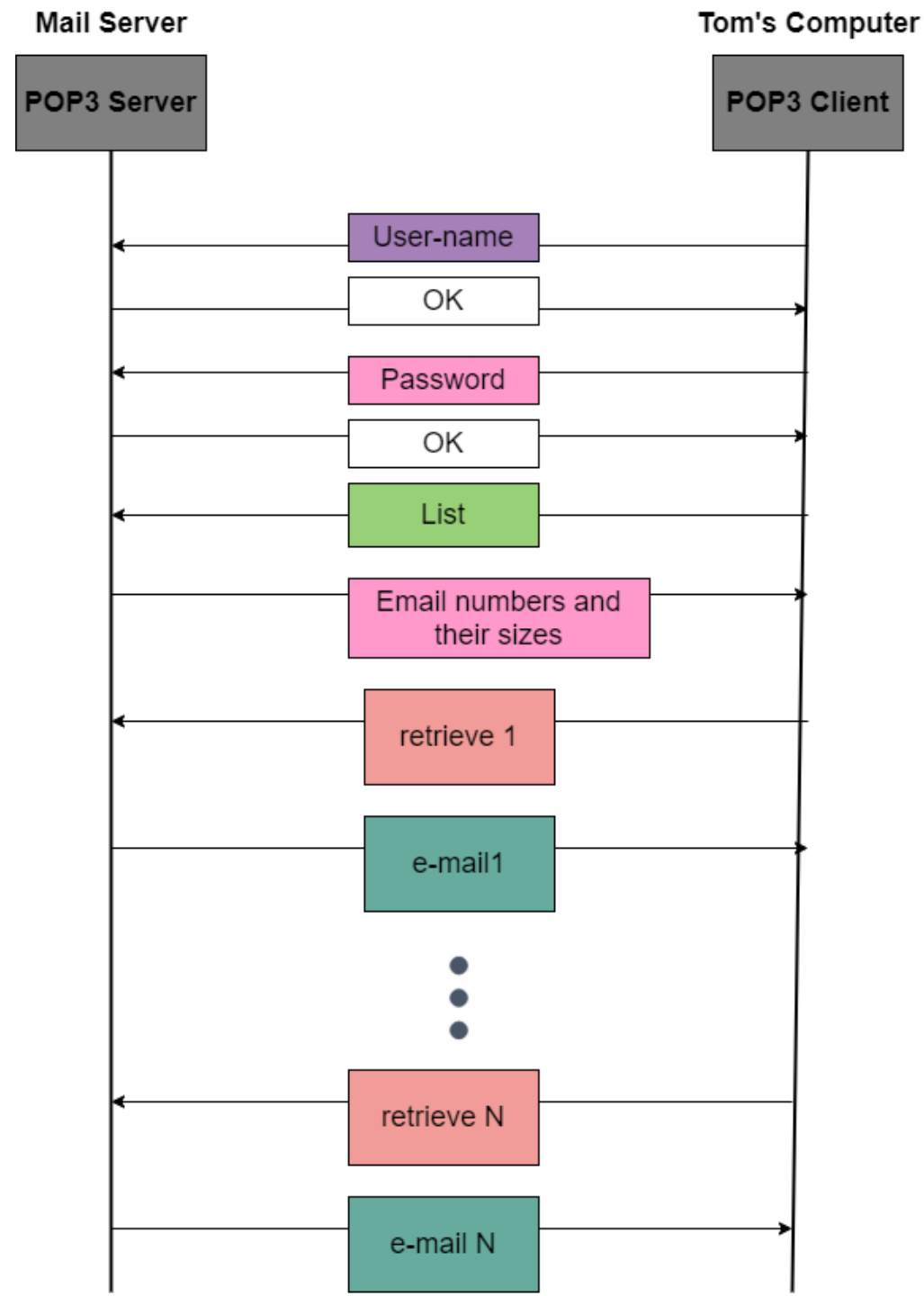
Introduction

- POP is a short form of Post Office Protocol. It is another protocol present at the Application Layer of the OSI reference model.
- POP is mainly a message access protocol.
- POP is basically an internet standard protocol and as we already told you it works on the application layer and is used by the local email software in order to retrieve emails from the remote email server over the TCP/IP connection.
- The Post office Protocol (POP) does not allow any search facility.
- This protocol mainly allows one protocol to be created on the server.
- As this protocol supports offline access to the messages and so less internet usage time is required by this.
- Non-email data is not accessed by this protocol.
- Some of the common clients that make use of POP3 are Gmail, Netscape, Internet Explorer, Eudora.

Working of POP

- All the incoming messages are stored on the POP server until the user login by using an email client and downloads the message to their computer. After the message is downloaded by the user it gets deleted from the server.
- As we know that the SMTP is used to transfer the email message from the server to the server, basically POP is used to collect the email with an email client from the server and it does not include means to send messages.

- If any user tries to check all the recent emails then they will establish a connection with the **POP3** at the server-side. The user sends the username and password to the server machine for getting the proper authentication. After getting the connection, users can receive all text-based emails and store them on their local terminal (machine), then finally discard all server copies and then breaks the connection from the server machine.
- In order to retrieve a message from the server following steps are taken;
- Firstly a TCP connection is established by the client using port 110.
- The client identifies itself to the server.
- After that client issues a series of POP3 commands.



Features of POP protocol

- Given below are some of the features provided by the POP protocol:
- The POP protocol uses PORT 110.
- It makes the use of a Persistent TCP connection.
- It is a Pull protocol.
- It is a connection-oriented protocol.
- The POP protocol is a stateful protocol until the mail is downloaded and across the sessions, it is a stateless protocol.

POP commands

Commands	Description
LOGIN	This command is used to open a connection
STAT	This command is used to display the messages that are currently in the mailbox.
DELE	This command is used to delete a message.
RSET	This command is mainly used to reset the session to its initial state.
QUIT	This command is used to log off the session.
LIST	This command is mainly used to get the summary of each message where each message summary is shown.
RETR	This command is mainly used to select a mailbox in order to access the messages.

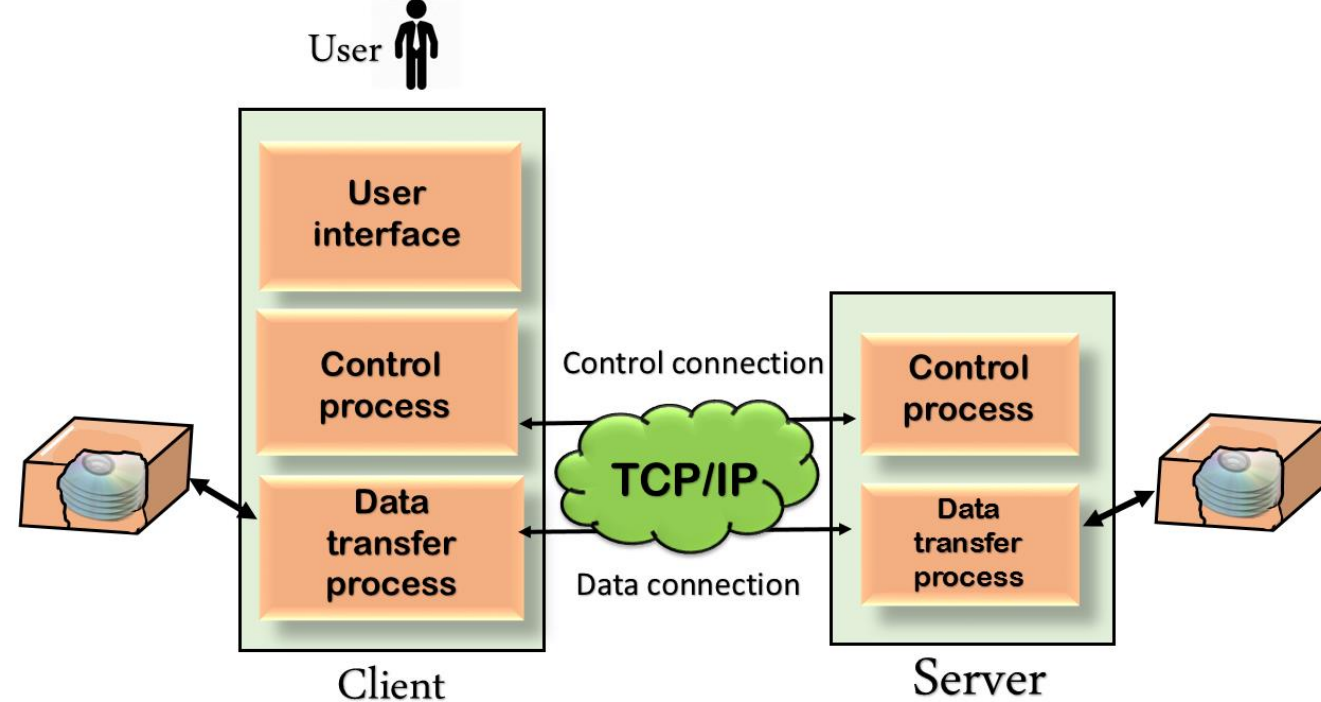
Advantages of POP

- This protocol does not require any internet connection in order to access the downloaded emails.
- In order to receive emails on a single device, POP3 is very useful.
- The Configuration of this protocol is simple and it is easy to use.
- Less storage space is needed in order to store emails on the hard disk.
- This protocol is much better for the ones who hardly check their email on any other computer.

Disadvantages of POP

- The same email account cannot be accessed from multiple computers or devices.
- The spread of the virus is easily using this protocol because it is possible that the file attached with the email contains the virus.
- The transfer of the local email folder to another email client terminal point is a difficult task.

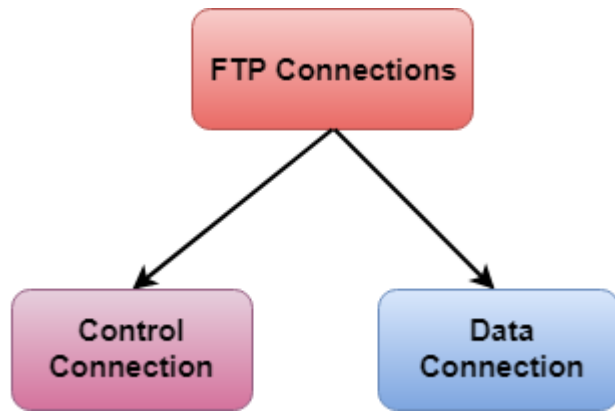
FTP



- 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.



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. FTP is one of the fastest ways to transfer files from one computer to another.
- 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 log in 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 FTP transmissions should be encrypted. However, not all FTP providers are equal, and not all the providers offer encryption. So, we will have to look for FTP providers that provide 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 which 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, allowing 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.

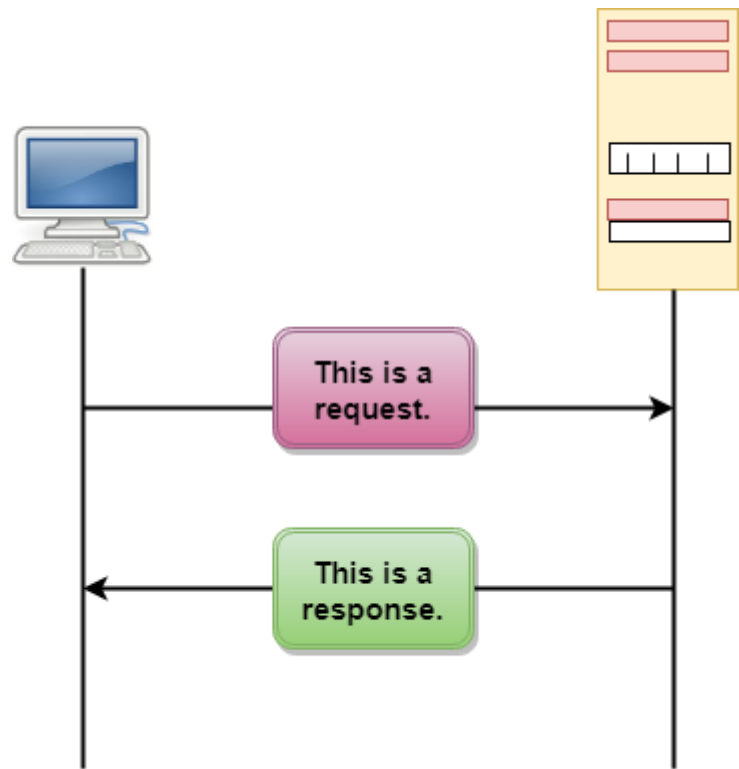
HTTP

- HTTP stands for **HyperText Transfer Protocol**.
- It is a protocol used to access the data on the World Wide Web (www).
- The HTTP protocol can be used to transfer data in the form of plain text, hypertext, audio, video, and so on.
- This protocol is known as HyperText Transfer Protocol because of its efficiency which allows us to use in a hypertext environment where there are rapid jumps from one document to another document.
- HTTP is similar to FTP as it also transfers files from one host to another host. But, HTTP is simpler than FTP as HTTP uses only one connection, i.e., no control connection to transfer the files.
- HTTP is used to carry the data in the form of MIME(Multipurpose Internet Mail Extensions)-like format.
- HTTP is similar to SMTP as the data is transferred between the client and server. The HTTP differs from the SMTP in the way the messages are sent from the client to the server and from the server to the client. SMTP messages are stored and forwarded while HTTP messages are delivered immediately.

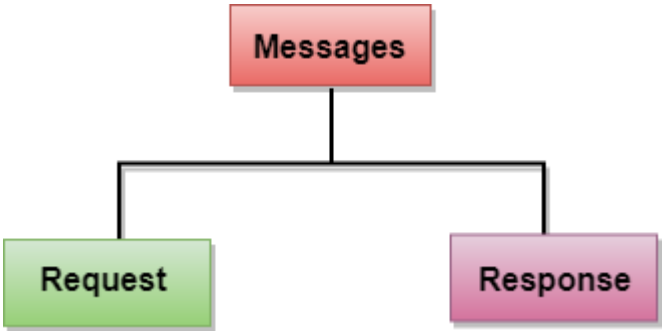
Features of HTTP:

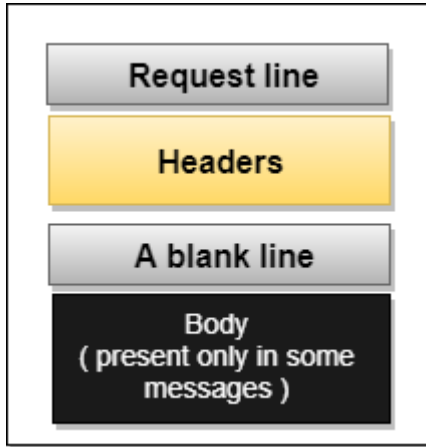
- Connectionless protocol:** HTTP is a connectionless protocol. HTTP client initiates a request and waits for a response from the server. When the server receives the request, the server processes the request and sends back the response to the HTTP client after which the client disconnects the connection. The connection between the client and server exists only during the current request and response time only.
- Media independent:** HTTP protocol is media independent as data can be sent as long as both the client and server know how to handle the data content. It is required for both the client and server to specify the content type in the MIME-type header.
- Stateless:** HTTP is a stateless protocol as both the client and server know each other only during the current request. Due to this nature of the protocol, both the client and server do not retain the information between various requests of the web pages.

HTTP Transactions

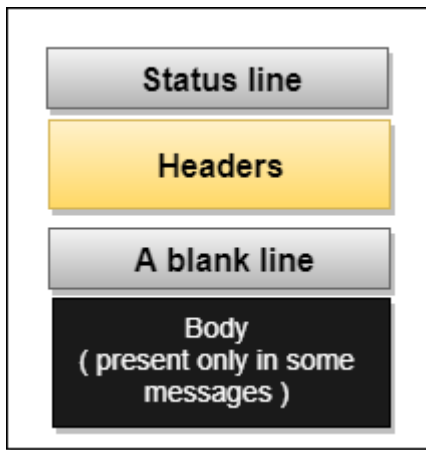


HTTP Message





Request Message: The request message is sent by the client that consists of a request line, headers, and sometimes a body.

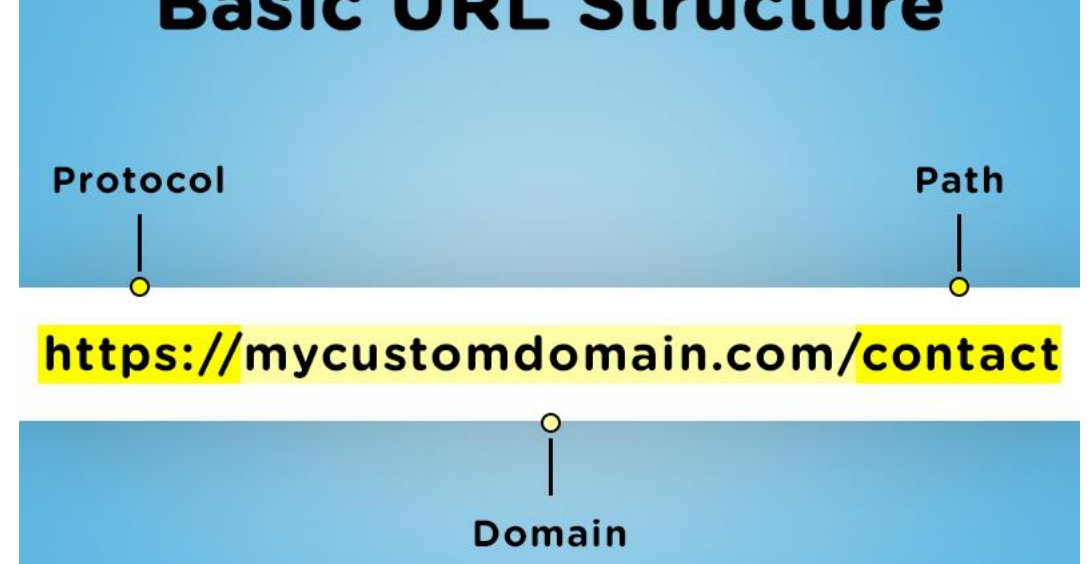


Response Message: The response message is sent by the server to the client that consists of a status line, headers, and sometimes a body.

Uniform Resource Locator (URL)

- A client that wants to access the document in an internet needs an address and to facilitate the access of documents, the HTTP uses the concept of Uniform Resource Locator (URL).
- The Uniform Resource Locator (URL) is a standard way of specifying any kind of information on the internet.
- The URL defines four parts: method, host computer, port, and path.

- Method:** The method is the protocol used to retrieve the document from a server. For example, HTTP.
- Host:** The host is the computer where the information is stored, and the computer is given an alias name. Web pages are mainly stored in computers and the computers are given an alias name that begins with the character "www". This field is not mandatory.
- Port:** The URL can also contain the port number of the server, but it's an optional field. If the port number is included, then it must come between the host and path and it should be separated from the host by a colon.
- Path:** Path is the pathname of the file where the information is stored. The path itself contain slashes that separate the directories from the subdirectories and files.



URL Examples (Domain Name Bold)

- <https://www.harvard.edu/about-harvard/harvard-glance>
- https://en.wikipedia.org/wiki/World_Wide_Web
- <https://www.jal.co.jp/en/information/>
- <https://dublin.ie/whats-on/>
- <https://www.leadpages.net/templates>

Domain vs Website

A **website** is a collection of web pages grouped together under one name: the **domain name**.

So a website is like your house and (again) the domain name is its address. Domain names get associated with a website through a **registration process**; you'll need to register a domain name before anyone can use it to get to your site.

Domain vs Hosting

If your domain is the address, and your website is your house, then web hosting is the plot of land on which your house is built.

Websites are hosted on computers called **web servers**, which run special software (Apache and Nginx are two popular examples) that lets them find the website's data and send it to your web browser when you try to visit the site.

[WAP is] the de facto worldwide standard for providing Internet communications and advanced telephony services on digital mobile phones, pagers, personal digital assistants, and other wireless terminals –WAP Forum

WAP stands for **W**ireless **A**pplication **P**rotocol. The dictionary definition of these terms are as follows –

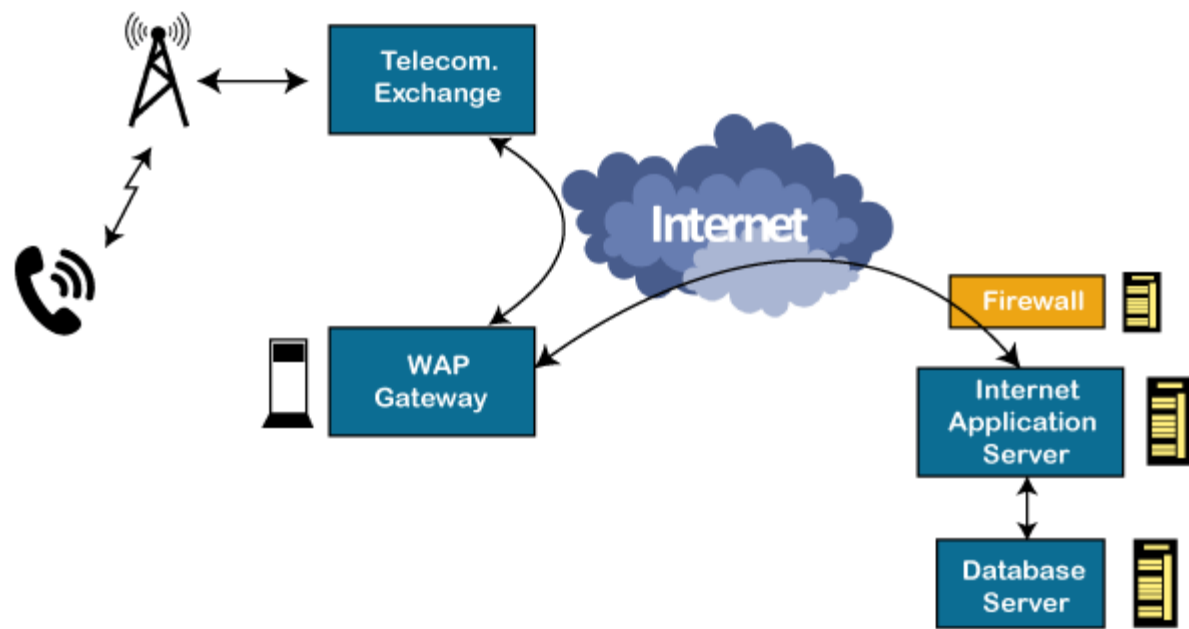
- Wireless** – Lacking or not requiring a wire or wires pertaining to radio transmission.
- Application** – A computer program or piece of computer software that is designed to do a specific task.
- Protocol** – A set of technical rules about how information should be transmitted and received using computers.

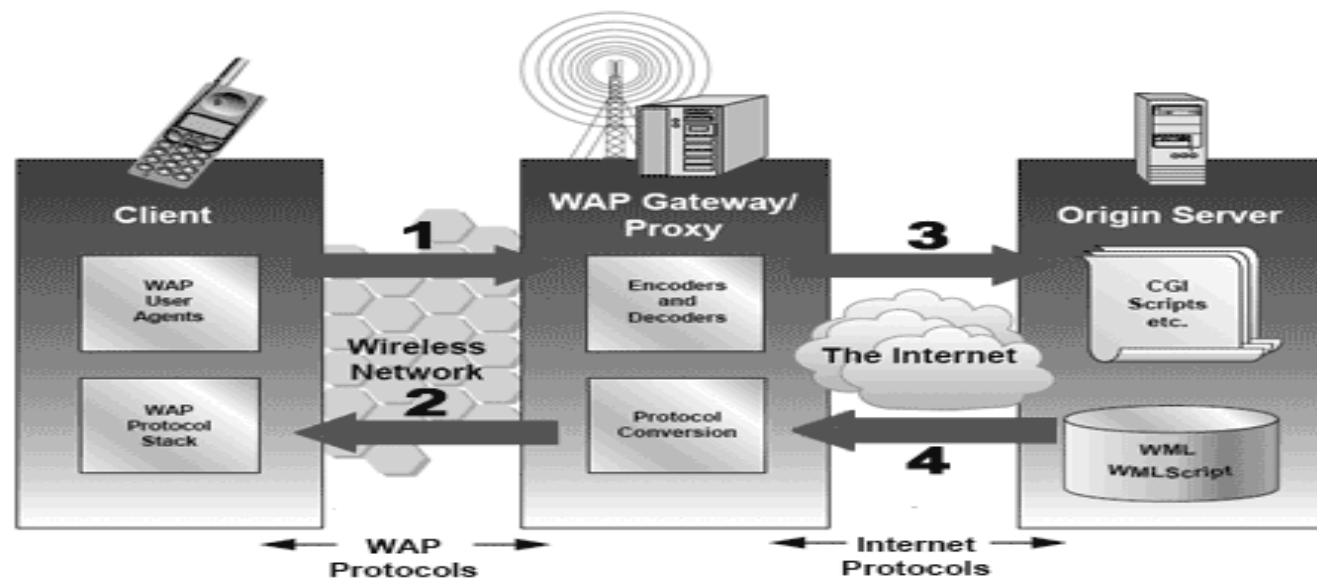
WAP is the set of rules governing the transmission and reception of data by computer applications on or via wireless devices like mobile phones. WAP allows wireless devices to view specifically designed pages from the Internet using only plain text and very simple black-and-white pictures.

WAP is a standardized technology for cross-platform, distributed computing very similar to the Internet's combination of Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP), except that it is optimized for:

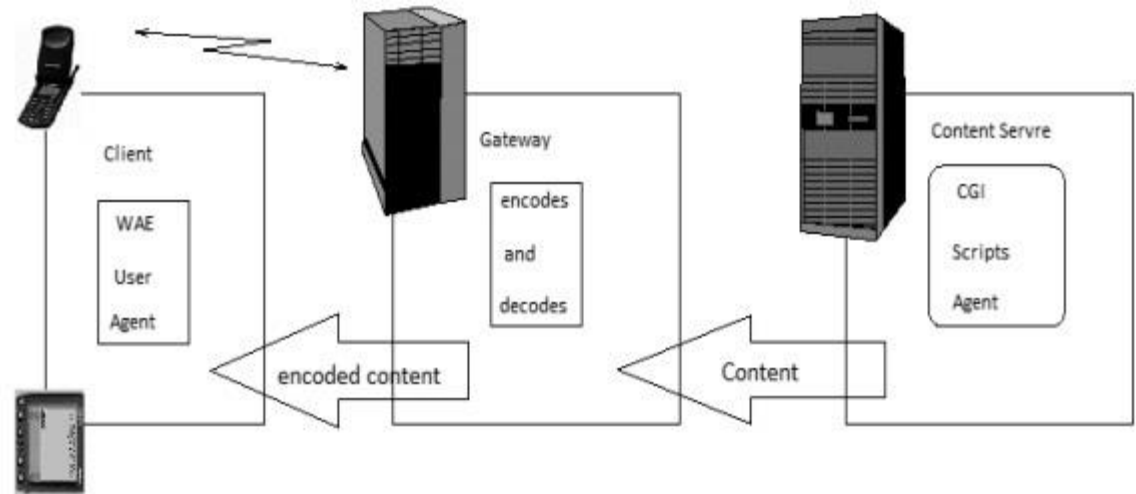
- low-display capability
- low-memory
- low-bandwidth devices, such as personal digital assistants (PDAs), wireless phones, and pagers.

WAP is designed to scale across a broad range of wireless networks like GSM, IS-95, IS-136, and PDC.





- 1 -- WSP Request (URL)**
2 -- WSP Response (Binary WML)
3 -- HTTP Request (URL)
3 -- HTTP Response (WML)



Working mechanism

- The user selects an option on their mobile device that has a URL with Wireless Markup language (WML) content assigned to it.
- The phone sends the URL request via the phone network to a WAP gateway using the binary encoded WAP protocol.
- The gateway translates this WAP request into a conventional HTTP request for the specified URL and sends it on to the Internet.
- The appropriate Web server picks up the HTTP request.
- The server processes the request just as it would any other request. If the URL refers to a static WML file, the server delivers it. If a CGI script is requested, it is processed and the content returned as usual.
- The Web server adds the HTTP header to the WML content and returns it to the gateway.
- The WAP gateway compiles the WML into binary form.
- The gateway then sends the WML response back to the phone.
- The phone receives the WML via the WAP protocol.
- The micro-browser processes the WML and displays the content on the screen.

Advantages of Wireless Application Protocol (WAP)

Following is a list of some advantages of Wireless Application Protocol or WAP:

- WAP is a very fast-paced technology.
- It is an open-source technology and completely free of cost.
- It can be implemented on multiple platforms.
- It is independent of network standards.
- It provides higher controlling options.
- It is implemented near to Internet model.
- By using WAP, you can send/receive real-time data.
- Nowadays, most modern mobile phones and devices support WAP.

Disadvantages of Wireless Application Protocol (WAP)

Following is a list of some disadvantages of Wireless Application Protocol or WAP:

- The connection speed in WAP is slow, and there is limited availability also.
- In some areas, the ability to connect to the Internet is very sparse, and in some other areas, Internet access is entirely unavailable.
- It is less secured.
- WAP provides a small User interface (UI).

Applications of Wireless Application Protocol (WAP)

The following are some most used applications of Wireless Application Protocol or WAP:

- WAP facilitates you to access the Internet from your mobile devices.
- You can play games on mobile devices over wireless devices.
- It facilitates you to access E-mails over the mobile Internet.
- Mobile handsets can be used to access timesheets and fill expense claims.
- Online mobile banking is very popular nowadays.
- It can also be used in multiple Internet-based services such as geographical location, Weather forecasting, Flight information, Movie & cinema information, Traffic updates, etc. All are possible due to WAP technology.

What is Domain

Domain names are (ideally) easy to remember words that are used to find and go to websites. In simple terms, a domain name is like **an address for your website**.

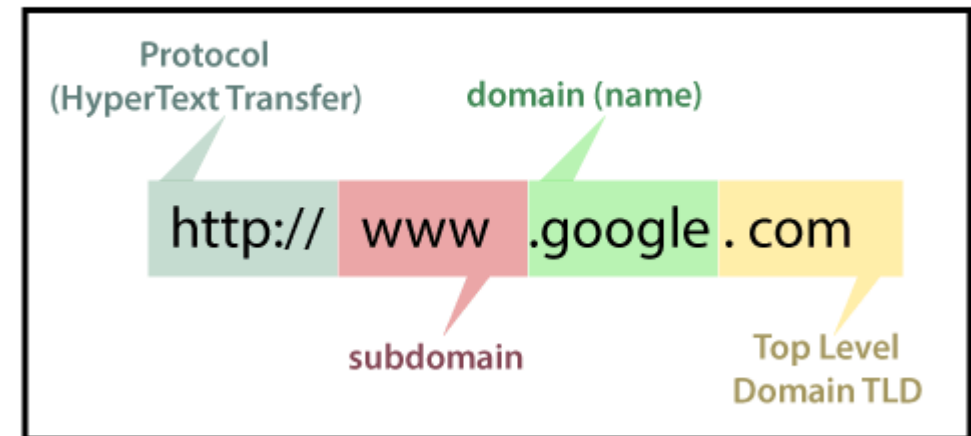
A domain name is the identity of one or more IP addresses; for example, the domain name google.com points to the IP address "74.125.127.147".

Domain names are invented as a name is easy to remember rather than a long string of numbers. It would be easy to enter a domain name in the search bar than a long sequence of numbers.

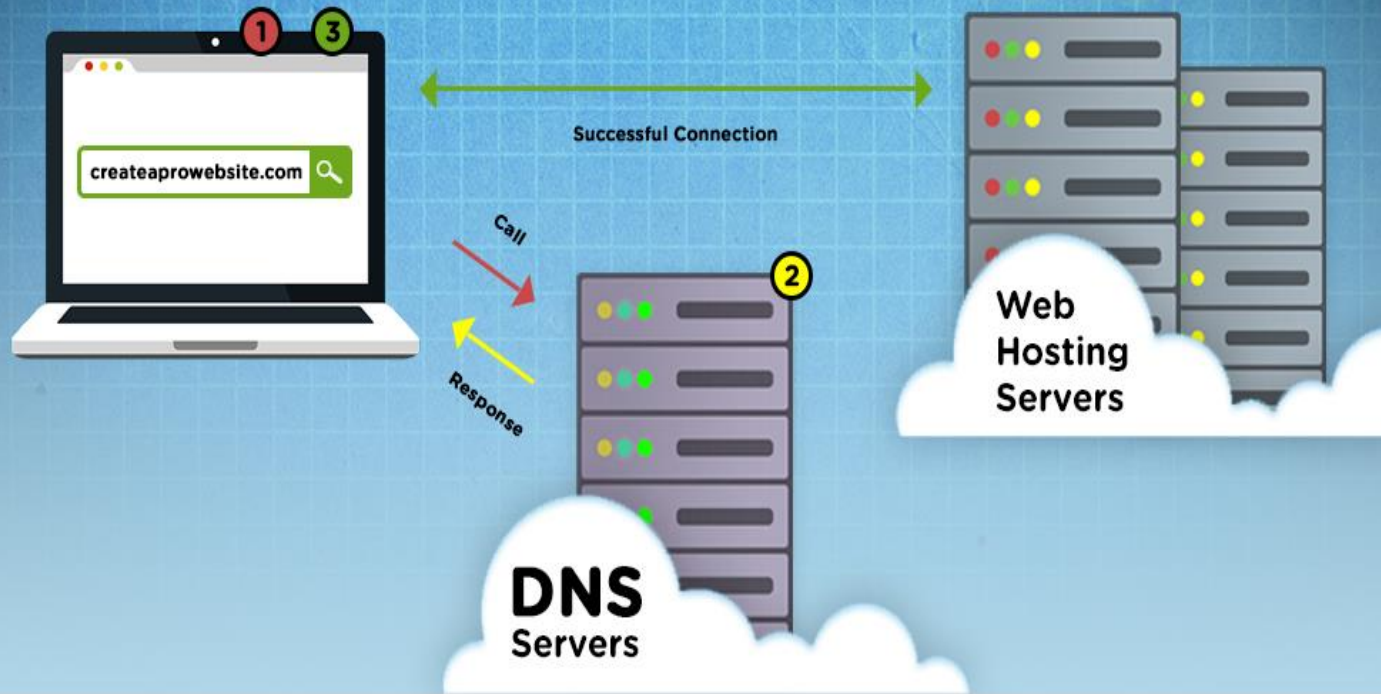
So, it is the web address of your website that people need to type in the browser URL bar to visit your website. In simple words, suppose your website is a house, then the domain name is its address.

A domain name cannot have more than sixty-three characters excluding .com, .net, .org, .edu, etc. The minimum length of a domain is one character excluding the extensions. It is entered in the URL after the protocol and subdomain as shown in the following example and the image:

Uniform Resource Locator(URL)



HOW DOMAIN NAMES WORK



-When you enter a domain name into your browser to find a website, your computer sends a “**lookup request**” to a [global network of servers](#) called the **Domain Name System (DNS)**.

-The DNS is a massive database of millions of registered domain names, each associated with a particular website’s nameserver and IP address.

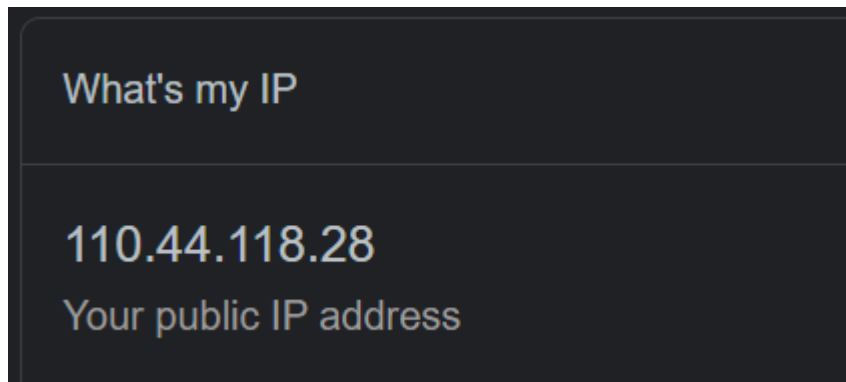
-When the DNS gets your lookup request, it finds the nameserver associated with the domain name you’re using; this is usually managed by your **hosting company**.

- 1 I need directions to createaprowebsite.com
- 2 That’s in my cache! It maps to IP address 50.28.56.78
- 3 Thanks! Now to learn more about making websites.

How Do Domain Names Work?

To get a little more technical (not too much we promise), the computers on the internet, from that laptop your reader is using to the servers that host your website has an **IP address**, which is a series of 4-12 numbers separated by dots (.) that let's computers identify and find each other.

For example, here's the IP address for my computer

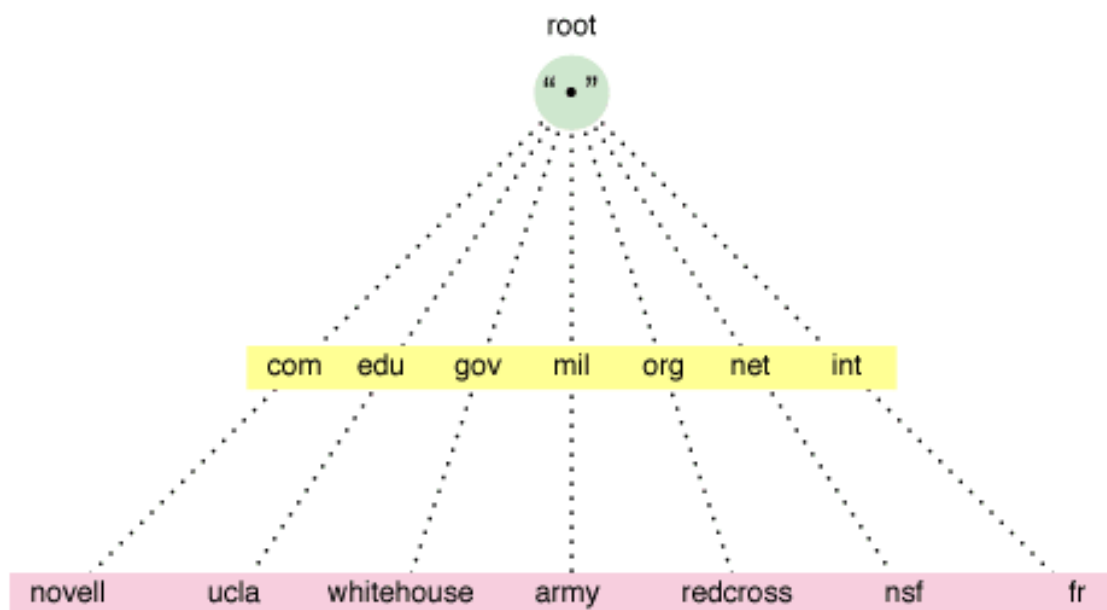
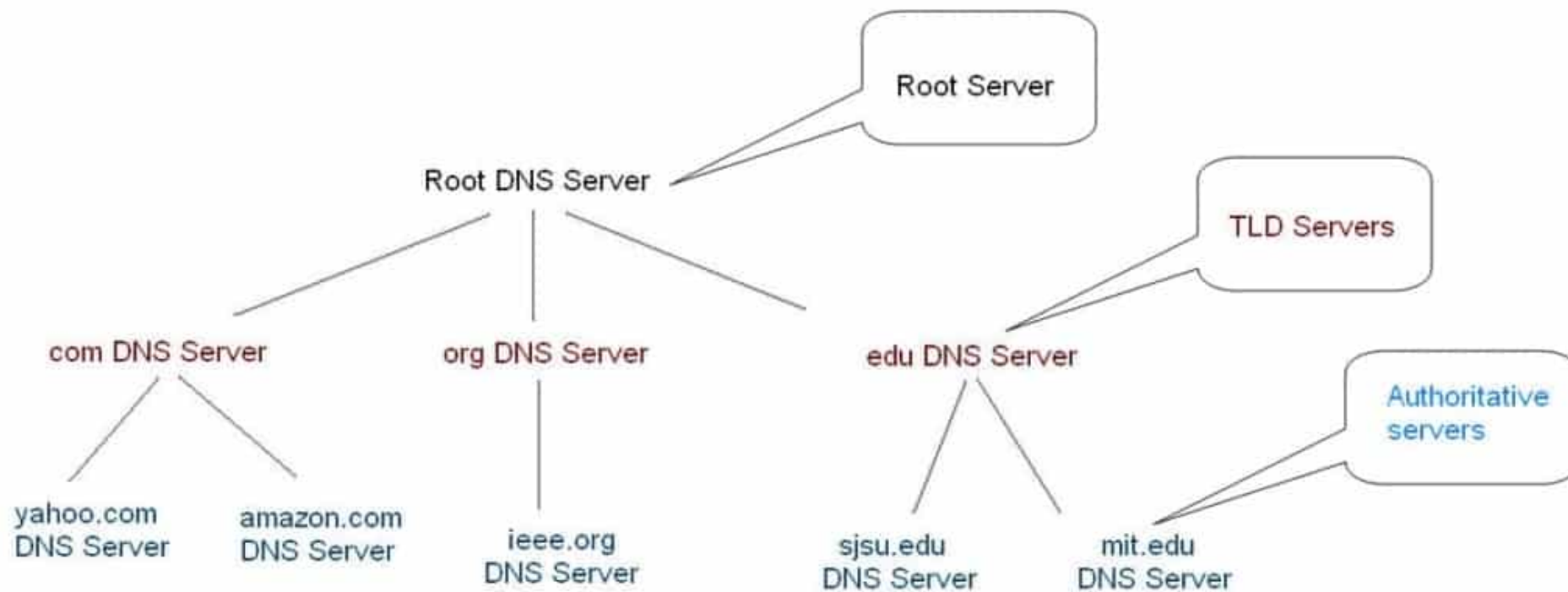


While these numbers are great for machines, it'd be hard to remember 12 digits for every website you want to go to. That's where domain names come in.

With a domain name, you can visit a website by typing in an easy-to-remember word or phrase, like **ncit.edu.np**

Domain Name system(DNS)

- The **Domain Name System (DNS)** can be thought of as the directory of the Internet.
- We find an online page or website by typing in the URL – like *acme.com* or *some-site.com*.
- Our web browsers, on the other hand, need to translate the URL to Internet Protocol (IP) addresses to find the correct site.
- **It is a DNS that translates domain names to IP addresses** so our browsers can resolve, or connect to, requested Internet resources.
- **Every single device on the Internet has a unique IP address** by which it can be **uniquely identified** by the other online devices.
- A DNS server eliminates the need for us to memorize these IP addresses every time we want to visit a site or connect to a device. It is much easier for us to type in a URL than IPv4 IP addresses (E.g. 192.168.1.1) or, worse, the more complex IPv6 addresses (E.g. 2400:cb00:2048:1::c629:d7a2).
- **The DNS architecture consists of a hierarchical and decentralized name resolution system** for computers, services or any other resources connected to the Internet or a private network. It stores the various associated information of the domain names assigned to each of the resources.



Domain	Used by
.com	Commercial organizations, as in novell.com
.edu	Educational organizations, as in ucla.edu
.gov	Governmental agencies, as in whitehouse.gov
.mil	Military organizations, as in army.mil
.org	Nonprofit organizations, as in redcross.org
.net	Networking entities, as in nsf.net
.int	International organizations, as in nato.int

Fully Qualified Domain Name or FQDN?

It is:

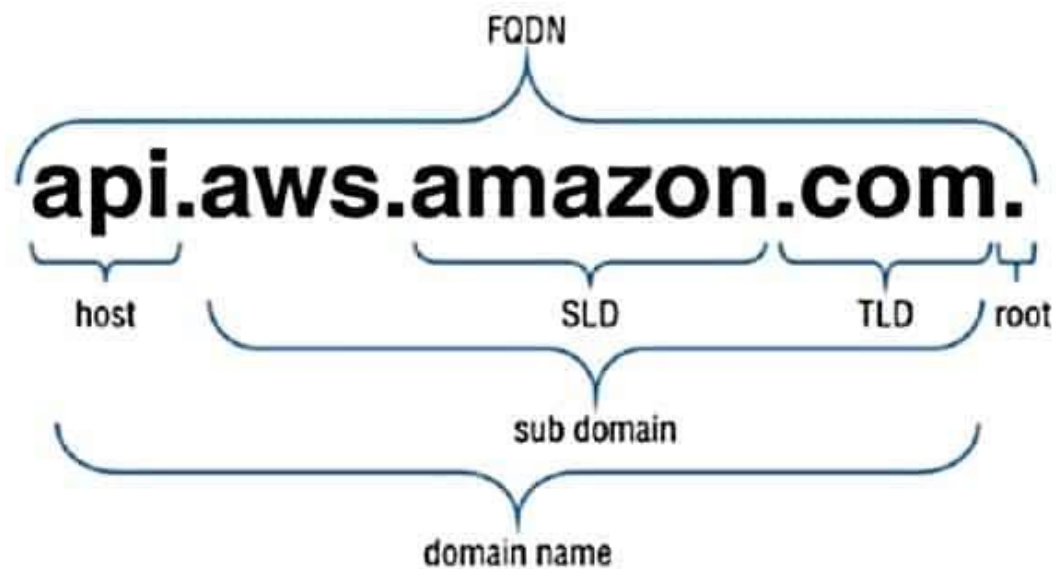
- **The most complete domain name** that identifies a page, host, server or any other online resource.
- **A domain name that specifies its exact location in the DNS hierarchy tree**; it specifies all domain levels, including the Top-Level Domain and the Root Level.

The DNS hierarchy, also called the **domain name space**, is an inverted tree structure. The DNS hierarchy tree has a single domain at the top of the structure called the root domain – indicated by the “.” as we have mentioned above. Below the root domain are the top-level domains that divide the DNS hierarchy into segments containing second-level domains, sub-domains, and hosts.

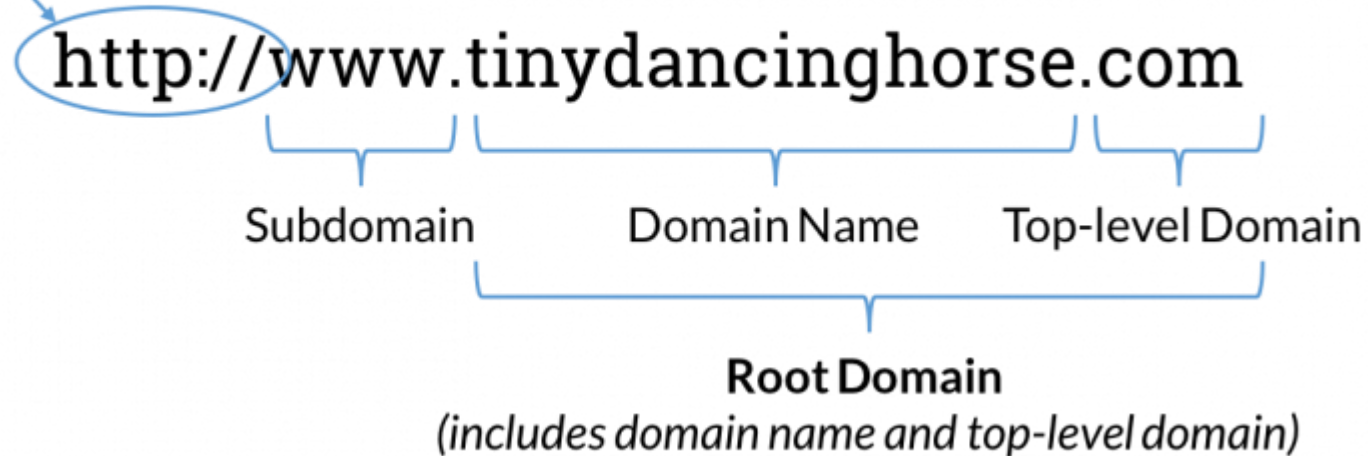
Hence, the DNS hierarchy is comprised of the following five levels:

- **Root Level Domain**
- **Top Level Domains (TLD)**
- **Second Level Domains (SLD)**
- **Subdomains**
- **Hosts**

FQDN components



Protocol



Root Level Domains

- The DNS root level is the highest in the DNS hierarchy tree because it is the first step in resolving a domain name. The root DNS server is the DNS for the root zone. It handles requests for records in the root zone and answers other requests by providing lists of authoritative name servers for the appropriate TLD (top-level domain). These are the authoritative nameservers that serve the DNS root zone. These servers contain the global list of the top-level domains. The root zone contains the following:
 - Organizational hierarchy – such as .com, .net, .org, .edu.
 - Geographic hierarchy – such as .ca, .uk, .fr, .pe.
- Currently, there are 13 root name servers specified, with logical names in the form “letter.root-servers.net”, where letter ranges from “A” to “M” and represent companies like Verisign, University of Maryland, NASA, and The Internet Corporation for Assigned Names and Numbers (ICANN).

Top-Level Domains

- The next level in the DNS hierarchy is Top-Level Domains or TLDs, for short. There are over 1000 TLDs covering everything from “.abb” to “.zw” and still growing. As we have seen, the TLDs are classified into two subcategories: **organizational hierarchy** and **geographic hierarchy**.
- The organizational hierarchy is divided into domains for the likes of commercial enterprises (“.com”), government entities (“.gov”), educational institutions (“.edu”), and nonprofit organizations (“.org”).
- The geographic hierarchy, meanwhile, represents the country where the domain is hosted. Examples include “.ca” for Canada, “.uk” for the United Kingdom, “.au” for Australia, and even “.aq” for Antarctica.
- Organizations that want to cater to their local customers can opt for TLDs that use both organizational and geographical hierarchies. Examples would be: “.com.et” for an Ethiopian business, “.org.al” for an organization in Albania, and “.gov.it” for the Italian government.

Second-Level Domains

- A domain is a second-level domain if it is contained within a top-level domain. A second-level domain is a label – usually, a name related to the website or the business that owns it – immediately to the left of the top-level domain, and separated by a dot.
- In the Domain Name System (DNS) hierarchy, a second-level domain (SLD or 2LD) is a domain that is directly below a top-level domain (TLD). For example, in “*myexample.com*”, “*myexample*” is the second-level domain of the “.com” TLD.

Subdomains

- A subdomain – sometimes referred to as “third-level domains.” – is related to the root domain and is denoted on the left as a second-level domain. In the URL “blog.myexample.com” the subdomain address would be “blog.”
- Trivia: the “WWW” in www.example.com is also a sub-domain, although it isn't always necessary to type it in a domain name.

Hosts

- The host part of an FQDN is used to identify an individual device – usually a server. In the FQDN “*myserver.example.com*” the hostname would be “*myserver.*”

Why are there only 13 DNS root server addresses?

- A common misconception is that there are only 13 root servers in the world.
- In reality there are many more, but still only 13 IP addresses used to query the different root server networks.
- Limitations in the original architecture of DNS require there to be a maximum of 13 server addresses in the root zone.
- In the early days of the Internet, there was only one server for each of the 13 IP addresses, most of which were located in the United States.
- Today each of the 13 IP addresses has several servers, which use Anycast routing to distribute requests based on load and proximity. Right now there are over 600 different DNS root servers distributed across every populated continent on earth.

Who operates DNS root servers?

- The Internet Corporation for Assigned Names and Numbers (ICANN) operates servers for one of the 13 IP addresses in the root zone and delegated operation of the other 12 IP addresses to various organizations including NASA, the University of Maryland, and Verisign, which is the only organization that operates two of the root IP addresses.
- Cloudflare actually helps provide DNS Anycast services to one of the root servers known as the F-Root; Cloudflare supplies additional F-Root instances under contract with ISC (the F-Root operator).

What is a domain registration?

A domain registration is a way to **capture your unique "online identity" on the Web**. The domain registration process consists of several steps:

- 1.Think** of a good domain name
- 2.Check** the availability of the domain name.
- 3.Register the domain** at a internet service provider such as ACTIVE 24.
- 4.Pay** the outstanding invoice for domain name registration.
- 5.Confirm** the link from the ASCIO Email about your domain registration.

How to register a domain name?

- 1.Find a domain name registrar.
- 2.Search for your domain name.
- 3.Finalize your domain name choice.
- 4.Choose a domain name suffix, such as .com or .net.
- 5.Purchase the domain name.
- 6.Add Domain ID protection.

1. Find a domain name registrar.

The non-profit [Internet Corporation for Assigned Names and Numbers \(ICANN\)](#) oversees the entire system of domain names, and it allows outside companies, called domain registrars, to sell and manage domain names. You will need to register your domain name through a registrar.

Some of the most popular domain registrars include [GoDaddy](#), [Bluehost](#), and [Domain.com](#), although there are many more to choose from. Be sure to carefully consider pricing and policies for each one before [choosing your domain registrar](#), as it will be managing your domain name.

2. Search for your domain name's availability.

Once you have found the right domain registrar for you, you'll need to search for your domain name using the registrar's search bar. There are millions of domain names out there, with thousands more added daily.

If you have your heart set on a domain name before doing a search, you might be disappointed to find it is already taken. Keep an open mind and incorporate important keywords into your domain when appropriate.

3. Finalize your domain name choice.

Once you've brainstormed several domain options, consider which ones are available and choose the one that fits your brand best and will also be easy for users to find.

4. Choose a domain name suffix, such as .com or .net.

After settling on the domain name, consider the suffix. The most popular suffix is .com, although .net and .org are also popular. These are considered to be top-level domains, or the highest-level domain suffixes in the domain naming system.

There are also other varieties to consider, such as country code top-level domains. These domain names end in a suffix that is particular to a specific country. A website in Germany might end in .de, for example.

Finally, there is another class of domain name suffixes called "sponsored, top-level domains," which are sponsored by a specific community related to the domain name. For example, .gov is for the U.S. government and .edu is for education organizations.

For most websites, .com is the best suffix for its ease of use, but if you have a specialized website, you might consider a country code or sponsored top-level domain.

5. Purchase the domain name.

When you have settled on the domain name and a suffix, you will pay to register the domain name with the domain registrar.

This is not a one-time purchase, however. Typically, you will pay to own the domain name for one year, after which you can renew your registration for a fee. You can expect a registration fee of about \$10 to \$15.



Your Groovy Site
yourgroovydomain.com



yourgroovydomain.com

Domain Registration

\$18

Renew Now

Replaces your site's free address, yourgroovysite.wordpress.com, with the domain, making it easier to remember and easier to share.

[Domain Settings](#)

[Domain Registration Agreement](#)

Owner



Price

\$18 USD / year

Domain renews on

September 13, 2019

Payment method



6. Add domain ID protection.

When you register a domain name with ICANN, you must provide your contact information including your name, phone number, physical address, and email address.

As soon as your domain name is registered, this contact information becomes available to the public — unless you pay for domain privacy through your domain registrar. This domain privacy will shield your information from view, keeping your personal information safe from spammers or worse, identity thieves.



Domain WHOIS Privacy

Did you know that when you register a domain, your personal information is available to everyone? This includes your name, address, phone number and email.

HostUpon offers Whois **Domain Privacy** from PrivacyProtect.org so that your personal information is protected if someone does a whois search on your domain. This means no solicitation from unwanted companies and spambots.

Without Domain Privacy

Registrant:

John Smith

123 Your Street

Your City, Your State 12345

Your Country

555-555-5555

With Domain Privacy

Registrant:

PrivacyProtect.org

PO Box 16

Queensland, QLD 4218

Australia

45+36946676

Note:WHOIS is a query and response protocol that is widely used for querying databases that store the registered users or assignees of an Internet resource, such as a domain name, an IP address block or an autonomous system, but is also used for a wider range of other information.

Domain Registration Process

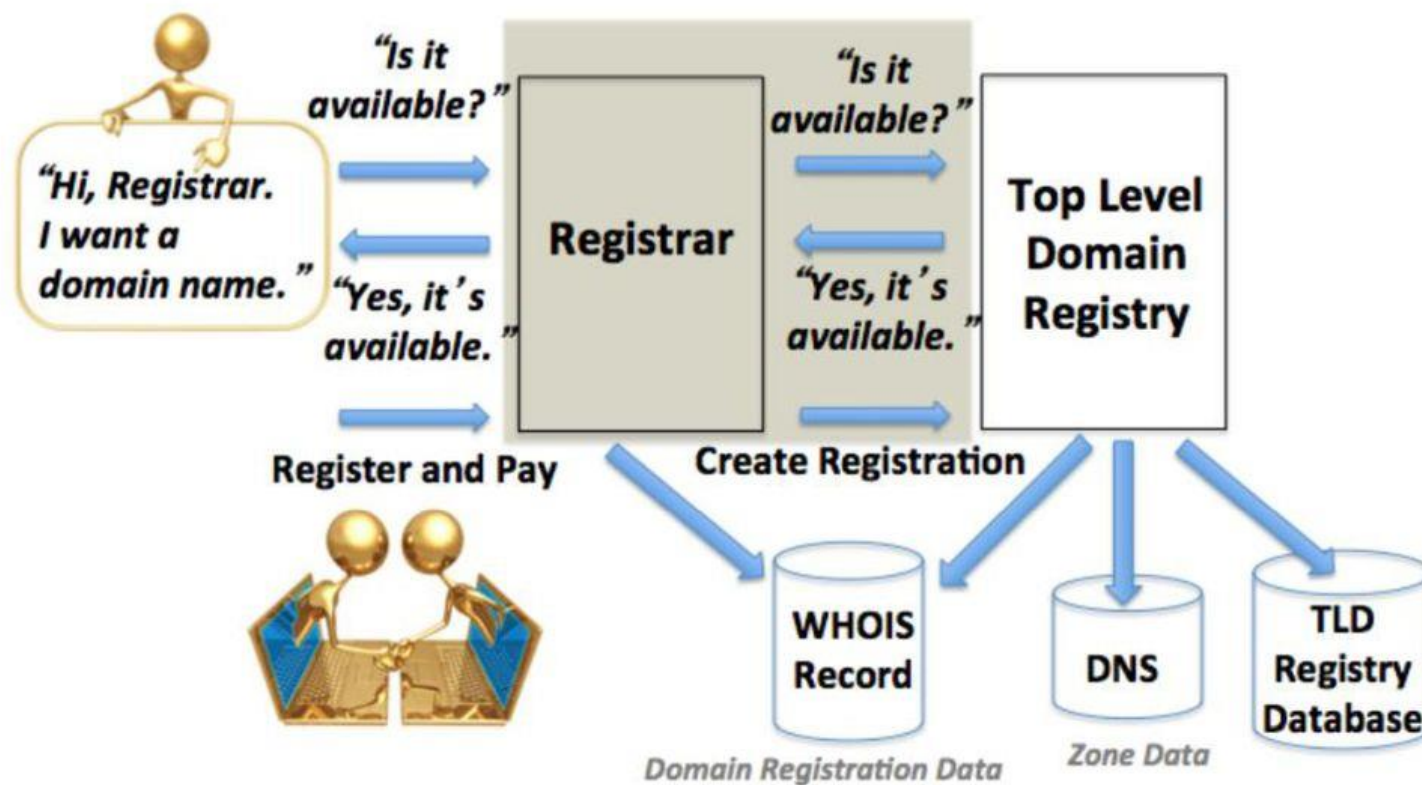


Figure 2: Conceptual illustration of registering a domain name in the domain name life cycle

Note, in current deployments, multiple of the conceptual databases referenced in this illustration (WHOIS record, DNS, TLD registry Database) could be implemented as a single database.

Web hosting is a process and service through which web application or website files are stored in a Web server to publish to the Internet via World Wide Web. These files are primarily hosted to be publicly available around the world at any time.

A Web server is a high-configuration computer system that stores, processes, and serves website files and other media content (for example, HTML documents, images, CSS stylesheets, and JavaScript files) requested by the client (web browser).

Web hosting requires computers that can offer 24x7 uptime and serve multiple client requests simultaneously. Thus, if multiple clients request access to webpage files simultaneously, the server will be able to respond to them without any downtime.

It is also possible to set up your PC as a web server and run web applications or websites from it. But since web servers require 100% uptime, you have to keep your PC running at all times, and this is not a practical and cheap way of doing web hosting. On the other hand, hosting companies also provide many additional features with all these services, saving our time and effort.

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](http://Lindo.com).

•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

•**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

•**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