

IG CS Topic 5.1-5.3 Internet and WWW

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Internet and WWW

Concepts

Internet

World Wide Web

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Internet and WWW

Concepts

Internet

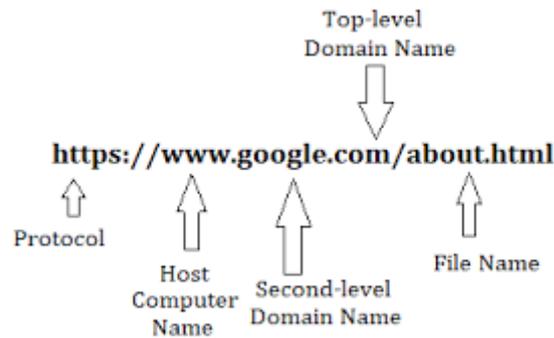
- the internet is the **infrastructure** (it is a physical structure)
- a very large **global network** that allows users to access the *World Wide Web*
 - all the components and cables that are used to connect one device to another

World Wide Web

- a **collection** of **websites and webpages** accessed using the *internet*.

Uniform Resource Locator (URL)

- a **text-based** address for a web page
- can contain the **protocol**, the **domain name**, and the **web page/file name**



Hypertext Transfer Protocol (HTTP)

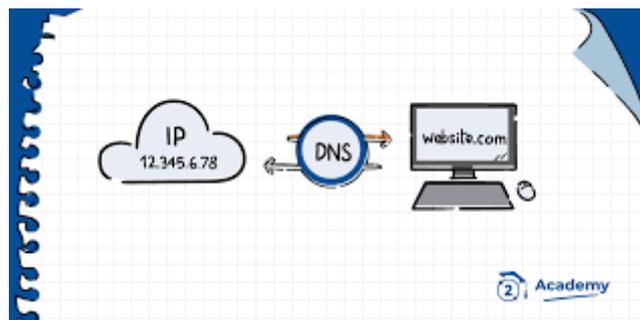
- a **protocol** that is used for the transmission of web pages and related data across the internet

Hypertext Transfer Protocol Secure (HTTPS)

- a **secured** version of HTTP that encrypts data for transmission
- comparing to HTTP
 - HTTPS has an **additional layer of security** that **encrypts** any data that is transferred
 - HTTPS has a **digital certificate**
 - the owners of the website need to apply for from a **certificate authority**
 - an organization that checks whether a website is authentic and trustworthy
 - HTTPS works as
 1. before the browser sends a request to the webserver to ask for the web pages, it sends a request to the web server asking for a **digital certificate**
 2. the server sends a copy of the **digital certificate** to the browser
 3. the browser checks if the digital certificate is authentic
 4. if the certificate is authentic, the browser would allow communication, and any data transmitted between the browser and the server is **encrypted**
 5. if the certificate is not authentic, the browser will report that the website is **not secure**
 - HTTPS: 证书+加密
 - 证书要向certificate authority申请
 - browser向server要证书 如果证书是真的就开始加密传递信息 不然就断开连接

Domain Name Server (DNS)

- a special server that contains a database of **domain names** and their **corresponding IP address**



- We can only access a webserver through its **IP address**, but not the **domain name** (like google.com)

- so the DNS is used to tell your browser about the IP address of a website given its domain name
 - like inputting Google.com it will output 172.217.163.46

Web Browser

- a piece of software that retrieves and displays web pages

purpose

- to **render** Hypertext Markup Language (HTML) and **display** webpages
 - render: process HTML to be a displayable webpage

functions

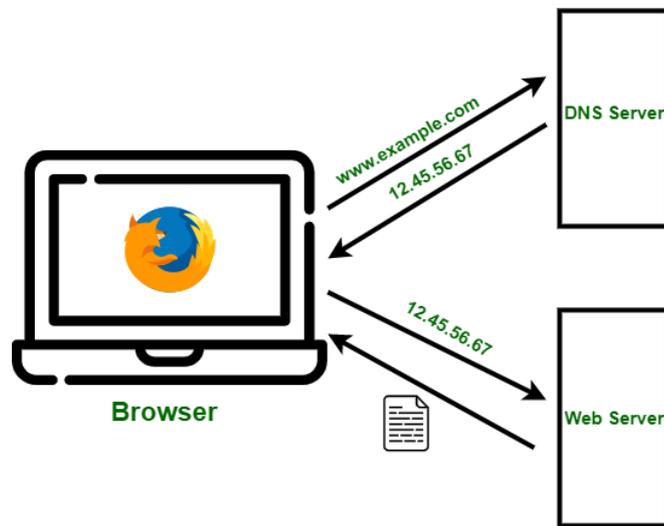
- storing bookmarks and favorites
- recording user history
- allowing the use of multiple tabs
- storing cookies
- providing navigation tools
- providing an address bar

Retrieving Web Pages

- the browser needs to retrieve a web page from the server to be displayed

Process

1. User types in the **URL** in the **Address Bar**
 2. Browser sends the URL to the **Domain name server** (DNS)
 3. DNS looks into its database to find the corresponding **IP address** of the webserver that stores the website and sends it back to the **Browser**
 - if the equivalent IP of a domain name is not found, DNS will say that the website is not found
 4. Browser sends a request to the **web server** through the IP address to ask for the web page from the website
 - the browser uses HTTP/HTTPS protocol to send the request to the web server
 5. Web server sends the **HTML** content of the webpage to the **Browser**
 - Each web page is created using **Hypertext Markup Language (HTML)**
 6. Browser renders the HTML and displays it to the user
- URL -> DNS -> IP -> Webpage (HTML) -> Browser Renders



Cookies

- **small text file** that is used to store **personal data**, by the **web browser**
 - since cookies record your personal data, they can cause privacy leakage

Types of Cookies

Session Cookies

- a type of cookie that is **deleted** when the browser is closed

Persistent cookies

- a type of cookie that is stored by the web browser **until it is deleted by the user** or because **it is expired**

Functions of cookies

- Saving personal details
 - so you don't need to reset the theme of a website when you reenter it
- Tracking user preferences
- Holding items in an online shopping cart
 - when you are doing online shopping, cookies store what you have put in your cart so once you access other items' webpages the items in the cart are not lost
- Storing login details
 - so you don't need to reenter your password and username every time you access a website