**L2 :**

**What is the Internet ?**

The origin of the Internet dates back to the 1960s, with it starting out as a way to connect computers across the United States. Today, billions of devices are **interconnected** over the Internet.

In the following video, Vint Cerf, one of the *fathers of the internet* explains the history of the net and how no one person or organization is really in charge of it.

**Client & Server**

When you're browsing the Internet, you usually start by typing in an address into the browser's address bar, or by initiating a search.

This means that information needs to flow from a machine (somewhere in the world) connected to the Internet, to your computer, which is also connected to the Internet.

* The machine that requests some info (your PC, for example) is called **the client**.
* The machine that stores the information is called **the server**.

For example, if you want to know the current weather in your city today, you might start by opening up a web browser. Next, you type in the web address that provides weather. https://weather.com, for example, and press *Enter*.

In that moment your computer starts talking to another computer over Internet, called a server, usually thousands of miles away. And in milliseconds your computer asks that server for a web document (in our case, weather.com) and the server starts to talk back to your computer using a couple of different languages, the most important of which is HTML - **H**yper **T**ext **M**arkup **L**anguage - which is used to tell a web browser how a page looks.

All of a web document's contents are transferred over the Internet using a set of rules called [**HTTP (HyperText Transfer Protocol)**](https://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol). Such rules are often called *protocols*, and there are a few different kinds used in the Internet. HTTP is the most common one.

**Hops**

If you've watched the earlier video about how the Internet works, then you probably noticed that machines connected to the Internet don't talk to each other directly. Instead, *packets* of information sent across the internet might *hop* across many machines on their journey from the *client* to the *server*. This makes the Internet resilient to failures. Even if one path from a client to a server fails, another can still be taken by the packets that are sent out.

However, this introduces a big problem. Every machine that a packet *hops through* gets to keep that *packet* for a short time, during which it can be *read*.

**Security**

You might have noticed that web addresses often start with https://. The HTTPS is the *Secure* version of the HyperText Transfer Protocol, and is used by almost all websites and web applications - the protocol guarantees that only the client and the server can understand the information that is sent from one side to the other.

Watch the following video to learn more about how the Internet is used to send information securely from you to the server and back.

**IP Address**

Just as every house is assigned a specific and unique postal address, all computers connected to the Internet are also assigned an *IP Address*. IP stands for **I**nternet **P**rotocol.

There are two kinds of IP addresses: *IPv4* and *IPv6*.

An example of an IPV4 address looks like a combination of 4 numbers:

142.250.76.46

**IPv4** is the older version which allows for a maximum of around *4.3 billion* IP addresses. Each of those four numbers (segment) represents 8 *bits* of information. That means one segment can count as high as 255.

While 4.3 billion might sound like a lot of addresses, it isn't anywhere near enough to satisfy today's numbers of devices connected to the internet. To satisfy the need for *addressing* the ever-growing number internet users and devices, a new **IPv6** version was created that can provide *many more* addresses.

An example of a *full* IPv6 IP address would be:

2001:0db8:0000:0000:0000:ff00:0042:8329

Notice how the IPv6 address is much longer than IPv4? It greatly increases the available address space.

How much more?

340,282,366,920,938,463,463,374,607,431,768,211,456 addresses

That's approximately 3.4×1038. That's a lot - we're not going to need another version of IP addresses for a long while (if ever).

**Do you want to know what your IP address is?**

**The simplest way to discover your current IP address is by typing "What is my IP" in Google search. Google will display your IP address at the top of the search results page.**

**Domain Names**

Since IP addresses are unique, they are useful for computers to connect with each other, but we humans have a difficult time reading them, or remembering them.

**Domains** associate an IP address like 142.250.76.46 with a string of text like google.com. Thanks to the [**Domain Name System**](https://www.cloudflare.com/learning/dns/what-is-dns/) (DNS), both are interchangeable. You can go to [**http://142.250.76.46**](http://142.250.76.46/) or [**http://google.com**](http://google.com/) and end up on the exact same website.

When you type in a domain name into your browser's address bar, your browser contacts the DNS to figure out its IP address, and then uses *that* to actually contact the server that belongs to the domain.

In short, a domain name is a unique, easy-to-remember address used to access websites.

**What's a URL?**

**URL** stands for *Uniform Resource Locator*, it's simply a web address that uniquely identifies a specific resource in the computer network or the Internet.

For example, the current page’s URL is https://www.pupilfirst.school/targets/12078, and it can be divided in 3 parts:

* https:// is the protocol.
* www.pupilfirst.school is the domain.
* /targets/12078 is the path to a *resource*.

Watch the video below to learn more about how networks talk to each other, and how the Internet works.

**Web Browsers**

Learn

We all use web browsers like Google Chrome, Mozilla Firefox and Microsoft Edge every day, but do we understand what they are?

Let's find out, what made the web browsers, one of the most used software application in today's world.

**What is web browser?**

A **Web Browser** is nothing but a software application, which is used to access the information available on the internet. When a user like you and me requests some information, the web browser fetches the data from a web server and then displays the response on your desktop or mobile device. The information is transferred using the **Hypertext Transfer Protocol (HTTP)**, which defines how text, images and video are transmitted on the web.

**How does a web browser work?**

Every webpage, image and video available on the internet, has its own unique Uniform Resource Locator (URL). You've already learned about **URL** in the previous video. It's like a street address that tells your browser where to go on the Internet.

When you type a URL into the browser's address bar and press Enter on your keyboard, the browser will load the page associated with that URL.

It uses a piece of software called a **rendering engine** to translate that data into text and images. This data is written in **Hypertext Markup Language** (HTML) and web browsers read this code to create what we see, hear and experience on the internet.

**History of the web browser**

The first web browser, **WorldWideWeb** was created in the year of 1990 by Tim Berners-Lee. Though, it was completely different from the World Wide Web we use today.

In 1993, a new browser Mosaic was revealed by Mark Andressen and their team. It was the first browser to display text and images at a time on the device screen. Later in 1994, he also created another browser called, **Netscape**.

Microsoft launched their Internet Explorer in 1995, and soon it became the most popular web browser.

In later years, modern browsers like Mozilla Firefox, Google Chrome, Apple Safari came to market.

**Website Cookies**

Websites save information about you in certain files called **cookies**. Cookie gets saved on your computer for the next time you visit that site. Upon your return, the website code will read that cookie to see that it’s you.

For example, when you go to a website, the page remembers your username and password – that’s made possible by a cookie. Some cookies are used to remember our interests, our browsing patterns, etc. Websites show us ads based on our interests, using cookies.

**Conclusion**

Browsers also does other things like, it keeps your personal information secure and check sites for viruses. It also keeps tracks of sites you've visited and keeps relevant information in its cache. So, the next time you request those same websites, they will load up faster because there's fewer data to download and update the cached version.

That's it for this lesson, see you in the next one

**The Web**

The World Wide Web is commonly shortened to *WWW*, or simply called *the Web*.

A broader definition comes from the organization that Web inventor Tim Berners-Lee helped found, the [**World Wide Web Consortium (W3C)**](https://www.w3.org/).

**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 network of public webpages connected to one another so that information is exchanged between computers on the Internet.

**Note: The *Internet* and the *Web* are different things: The *Web* uses the *Internet* to pass through information.**

**Webpage**

A *webpage* is a document on the World Wide Web, created using HTML, that can be viewed in a web browser.

To access a webpage you can either:

* Type its URL, like http://google.com in your Web browser...
* ...or click on a link, like [**this one**](http://google.com/).

**What's a website?  
A *webpage* is a single HTML document. A collection of such documents, usually linked to each other under the same domain is called a *website*.**

**Web browser**

A web browser, or simply *browser* is an application used to access websites.

Popular web browsers include Microsoft Edge, Google Chrome and Mozilla Firefox.

**In this course, we're using *Google Chrome* in all of our video demonstrations. You can**[**install Google Chrome by visiting this link**](https://www.google.com/intl/en_in/chrome/)**.**

There are a few ways to access Google Chrome Inspect Element:

* Right-click anywhere on the webpage, and at the very bottom of the menu that pops up, you will see *Inspect*. Click that.
* Click the hamburger menu (the icon with 3 stacked dots) on the far right of your Google Chrome toolbar, click *More Tools*, then select *Developer Tools*. Alternately, in the file menu, click *View > Developer > Developer Tools*.
* Prefer keyboard shortcuts? Press ⌘+⌥+I on macOS, or F12 on Windows to open *Inspect Elements* without clicking anything.

***L3***

HTML and CSS tags based on the topics you mentioned:

| **Topic** | **Tags/Concepts** |
| --- | --- |
| **Introduction to HTML Elements** | <html>, <head>, <title>, <body>, <h1> to <h6>, <p>, <div>, <span>, <ul>, <ol>, <li>, <a> |
| **HTML and Semantics** | <header>, <footer>, <article>, <section>, <nav>, <aside>, <main> |
| **Linking Pages** | <a href="URL">, <link> |
| **Learn more about HTML** | Semantic tags, forms (<form>, <input>, <button>, <textarea>) |
| **Basics of CSS** | Inline styles (style="..."), CSS properties like color, font-size, background-color |
| **CSS and Styling Structure** | CSS syntax (selector { property: value; }), external stylesheets |
| **CSS Classes and Selectors** | .class, #id, element, \*, descendant selectors, combinators (>, +, ~) |
| **CSS Styling Overrides** | Specificity, !important, cascading rules |
| **Styling HTML using CSS Files** | External CSS (<link rel="stylesheet" href="styles.css">) |
| **Learn more about CSS** | Pseudo-classes (:hover, :nth-child()), media queries, animations, transitions |

**L 4**