Brief History of the Internet

by Sophia

1. Introduction to Web Development

Introduction to Web Development will provide you with a comprehensive overview of the fundamental concepts of web development. Throughout the rest of this course, you will explore what it means to be a web developer through real-world examples and hands-on practice. The course was designed for learners with little to no previous background in programming. You will gain a foundational understanding of web development and programming, and you may even find that other programming languages are easier to learn once you've completed this course.

Topics will be covered in the order of traditional project development methods, from initial conceptualization and design through front- and back-end development. Essential concepts like accessibility, security, and responsive design will broaden your new web development skills. Finally, a comprehensive glossary of terms is provided to help you gain an understanding of common acronyms and terminology used in the field.

HINT

You will be introduced to standard tools used in the industry and are encouraged to build a personalized "toolbox" adapted to your preferences along the way. Taking time to build your personalized toolbox will help

you successfully complete the final course project. You can use any platform you are familiar with to gather resources together such as Google Docs, OneNote, or simply create browser bookmarks.

2. A Brief History of the Internet

The history of web technologies—from the rapid growth of the Internet to the technological advancements that followed—has shaped the way websites evolved from simple, early web pages to complex, modern web applications. As websites grew more complex, new methodologies and best practices emerged to help engineers handle that complexity. So, in order to understand web development today, we need to start at its humble beginnings.

▶ WATCH

View this video to discover how the Internet grew to connect billions of people worldwide.

As far back as the early stirrings of the Cold War, the concept of network-connected computers was under development. Both government and university researchers were interested in developing a better means to communicate and share research. The military at that time relied in part on **microwave transmission technology** for communications which was unreliable and susceptible to attack.

⊘ DID YOU KNOW

An unexpected attack on some of these microwave transmission towers demonstrated how susceptible the technology was to failure if even a small portion of the transmission path was damaged. This led the military to seek a method of communicating that could withstand attack. At the same time, university researchers were struggling to share their work between campuses because their transmissions experienced signal drops. Parties from both groups ended up as presenters at the same conference and decided to collaborate in order to further their work.

▤ TERM TO KNOW

Microwave Transmission Technology
Technology that uses electromagnetic waves that fall within the microwave family to transmit information wirelessly over long distances with direct line of sight.

2a. Arpanet

As cold war tensions grew with the launch of **Sputnik**, the United States Department of Defense (DoD) began to research additional methods of transmitting information reliably to supplement existing methods. They sought a solution that was decentralized, where damage at one point would not necessarily disrupt communication, allowing better resiliency in case of attack. Their network, **Arpanet**, connected the DoD and participating universities together for the first time.

✐ KEY CONCEPT

In order to standardize the way networked systems communicated, the **Transfer Control Protocol/Internetwork Protocol (TCP/IP)** was created. Network systems that migrated to this new standard could easily communicate with any other network using the same protocol. It is here that the **Internet** was born. You will learn more about the TCP/IP protocol in an upcoming lesson.

📄 **TERMS TO KNOW**

Sputnik
The world's first satellite developed by the Soviet Union in 1957.

Arpanet
A network created by the United States Department of Defense used to connect participating universities together.

Transfer Control Protocol/Internetwork Protocol (TCP/IP)
A collection of protocols designed to standardize the way networked computer systems communicate.
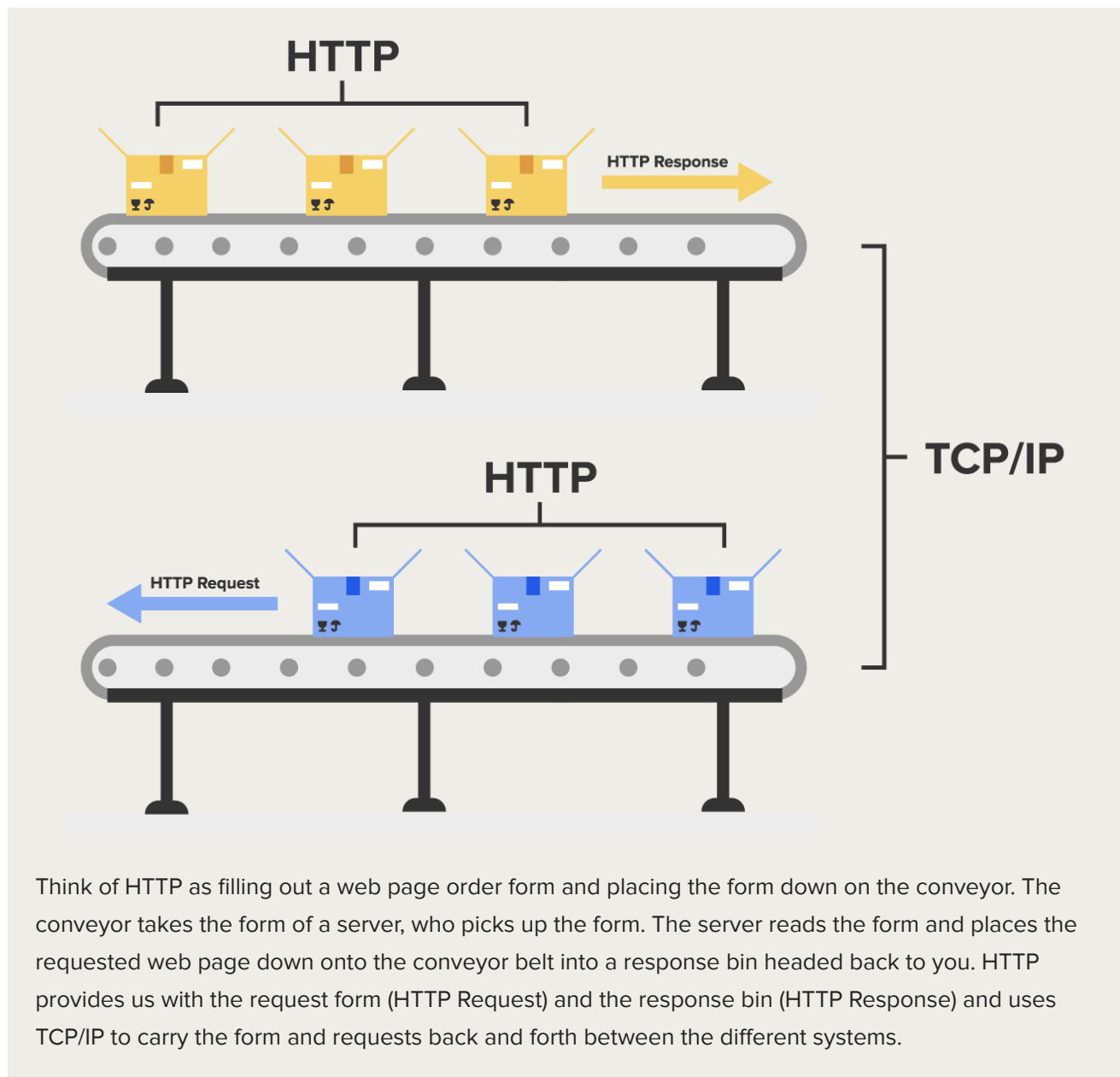
Internet
The Internet is a global computer network that relies upon the TCP/IP protocol suite to communicate information and data between each other.

2b. The Internet, Web 1.0, Email, and Beyond

Sir Tim Berners-Lee invented the World Wide Web in 1989 while he was a researcher at the European Organization for Nuclear Research, better known as CERN. The **World Wide Web (WWW)**, or the web, is a collection of information and resources that are accessible over the Internet. In the early days, the World Wide Web—retroactively referred to as Web 1.0—was primarily used to post information within collections of markup pages, called a website. These markup pages contain text-based content and code. The code instructs a computer software application, called a **web browser**, as to how the text content should be organized on the page and how it should look. Markup pages are delivered using the **HTTP (HyperText Transfer Protocol)**, a communication protocol for transferring files between systems.

IN CONTEXT

HTTP is the system of requests and responses. TCP/IP is the platform on which the HTTP messages are transmitted. Think of TCP/IP as a system of conveyor belts that run continuously in all directions. This is the technology that moves messages across the internet to and from different systems. The conveyor belts can be used to transmit a lot of different kinds of items just as TCP/IP is used to transmit lots of different types of data.

Think of HTTP as filling out a web page order form and placing the form down on the conveyor. The conveyor takes the form of a server, who picks up the form. The server reads the form and places the requested web page down onto the conveyor belt into a response bin headed back to you. HTTP provides us with the request form (HTTP Request) and the response bin (HTTP Response) and uses TCP/IP to carry the form and requests back and forth between the different systems.

Email quickly followed as users of the networks were interested in the timely transmission and notification of messages. This form of messaging fit one of the DoD's initial goals and provided a contemporary means of communicating.

By the mid-1990s, the web was no longer a niche technology for academics and tech-savvy early adopters. People began to see it not just as a source of entertainment but also as a new, lucrative space for commerce. With more and more websites popping up online, web developers wanted to create web pages that looked unique to make their websites visually distinct from others.

As time progressed, additional protocols were developed to address particular tasks, such as easily transferring files between systems and low-overhead, high-speed transmission for time-sensitive, error-tolerant tasks such as media streaming. Ongoing improvements in our ability to move more information and move it faster between systems progressed at a rate similar to the calculative power of computers, similar to what was predicted by

Moore's Law. This brings us to where we are today: able to watch full-length movies streamed in high quality right to our phones and computers, even while riding in a car.

<div style="border:1px solid #ccc;padding:4px;">⊘ **DID YOU KNOW**</div>

You may have heard of Moore's Law, commonly defined as the tendency for the capability of a technology to double every 2 years. Moore's actual prediction was that this would apply to transistors, an element of circuits, and that it would continue for 10 years after seeing its trend from 1958 to 1964. His prediction has proved to be applicable to memory capacity, speed, storage space, as well as other factors and is commonly used as a benchmark for future growth.

📄 **TERMS TO KNOW**

World Wide Web (WWW)
A collection of information and resources that are accessible over the Internet. Also called *Web*, *WWW*, and *W3*.

Web Browser
The software application used to access and interact with the World Wide Web.

HyperText Transfer Protocol (HTTP)
A communication protocol designed for the World Wide Web for transferring data files and assets between computer systems.

Moore's Law
Described by Gordon Moore, an observation and prediction that the number of transistors on a microchip doubles every 2 years.

2c. Web 2.0 and Web 3.0

Web 2.0 was the next step in the evolution of the Internet and the WWW. Web 2.0 websites started using code and data sources to customize pages for the individual user.

⇨ EXAMPLE
When you shop for a product online, a site can use persistent data to generate ads for sites selling that particular product. Additionally, users create an account with a site that allows the site to greet them by name, keep track of their previous searches, and review their purchase history.

Additionally, site users were now able to create and share their own content and stay in touch with family and friends **asynchronously**.

⇨ EXAMPLE
Consider social networking sites where users can post photos and videos and have them appear on their friend's accounts even when they are offline. Users can typically create a photo gallery on the site and customize how it is organized and shared with their friends. They can like and comment on each other's posts and keep each other updated on life by posting content to the site.

This evolution was spurred on by the introduction of social network portals, such as Myspace and Facebook, and made possible with **web server** scripting technology coupled with web-connected databases. We will explore these topics further in Unit 2.

⊘ DID YOU KNOW

The web was never designed to stream movies, support social networking, or become a place for e-commerce. Tim Berners-Lee's motivation for inventing the World Wide Web wasn't to create an all-in-one platform generic and powerful enough to become the birthplace of entirely new industries. He was just frustrated with the difficult task of finding information stored on different computers and wanted to invent a system that would make it easier to locate and organize resources.

Web 3.0 is the current iteration of the Internet and the WWW and is a new way of using the Internet. It uses smarter algorithms to enhance how we search, organize, and categorize information. The computer programs that run on Web 3.0 are designed to understand human language, so they are better at helping us find what we are looking for. Now we can access applications and software through a web browser, like Google Chrome or Safari, using a special kind of code that connects to different online **web services**.

🗎 TERMS TO KNOW

Asynchronously
Actions or operations that are not coordinated in time.

Web Server
A combination of software and hardware that performs the basic operations needed to host resources and sites on the web.

Web Service
Software that supports machine-to-machine interactions over a network.

☑ SUMMARY

In this lesson, you learned about the **Introduction to Web Development** course with regards to what you will learn and how. Then you learned about a **brief history of the Internet's** origins and how the Department of Defense's **Arpanet** project was the precursor to the **Internet**. You also learned about what was considered **Web 1.0** and its various uses including **email**, file transfers, and data streaming. Lastly, you learned about how the Internet and the World Wide Web began to evolve into **Web 2.0** and ultimately where it is now as **Web 3.0**.

Source: This Tutorial has been adapted from "The Missing Link: An Introduction to Web Development and Programming " by Michael Mendez. Access for free at **https://open.umn.edu/opentextbooks/textbooks/the-missing-link-an-introduction-to-web-development-and-programming**. License: **Creative Commons attribution: CC BY-NC-SA**

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Internet

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Microwave Transmission Technology

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