Class 4

How the INTERNET Works?

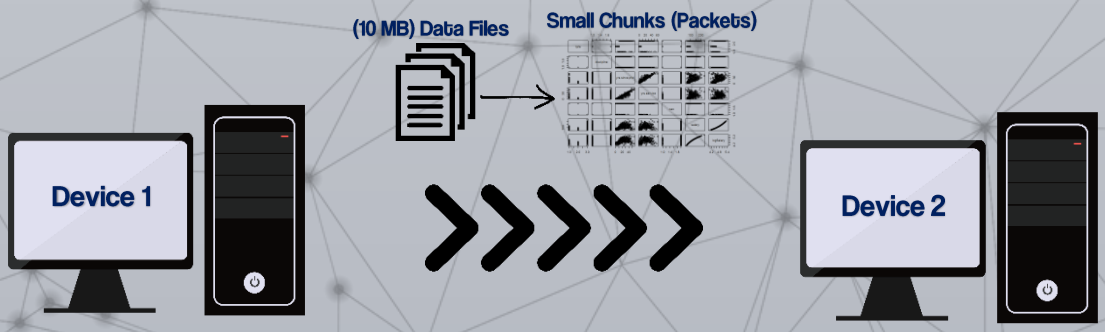
What is INTERNET?

It consists of two terms “Inter” and “Net”. Inter refers to “Interconnected” and “Net” refers to “Network”. Internet is a global network also it is network of networks LAN, MAN and WAN.

History of INTERNET

1960s - The Birth of Networking Concepts

- In 1960s, a project was initiated with the goal of transferring data from one device to another.
- Funded by the U.S. Department of Defense's Advanced Research Projects Agency (ARPA), the ARPANET was the precursor to the Internet.
- Designed to enable computers to share data over a network, ARPANET connected the first nodes between UCLA and Stanford Research Institute in 1969.



1970s - The Foundations of Internet Protocols

- This is Expansion of ARPANET and grew to include more nodes and institutions, including universities and research centers.
- Here the term internet is introduced. By the late 1970s, the term "Internet" began to describe interconnected networks using TCP/IP.

1980s - From Academic Networks to the Public

- The Domain Name System (DNS)/www was introduced in 1984, replacing numeric IP addresses with user-friendly domain names (e.g., .com, .edu).

1990s - The Internet Goes Public

- In 1989-1991 introduced World Wide Web (www), Tim Berners-Lee invented the World Wide Web at CERN, introducing HTML, HTTP, and the first web browser.
- In 1991 road to Commercialization, the U.S. government lifted restrictions on commercial Internet use.

- Internet Service Providers (ISPs) like AOL and CompuServe emerged, making Internet access widely available.
- Companies like Amazon (1994) and eBay (1995) pioneered online shopping, transforming global markets.

2000s - The Social Media Era

- High-speed broadband replaced dial-up, improving connectivity and multimedia experiences.
- Platforms like MySpace (2003), Facebook (2004), YouTube (2005), and Twitter (2006) transformed how people interact online.
- The rise of Mobile Internet and launch of iPhone in 2007 made the Internet portable, leading to rapid growth in mobile applications and web usage.

2010s – Ubiquity and IoT

- Here's the smartphones dominate on societies. Mobile Internet usage surpassed desktop usage, driving app ecosystems like Instagram, WhatsApp, and Snapchat.
- Platforms like Netflix, Spotify, and Twitch redefined entertainment and content delivery.
- The Internet of Things (IoT)/Smart devices connected everyday devices, from thermostats to cars, to the Internet.
- Artificial intelligence and machine learning leveraged massive Internet data to create smarter systems and services.

2020s: The Internet Today and Tomorrow

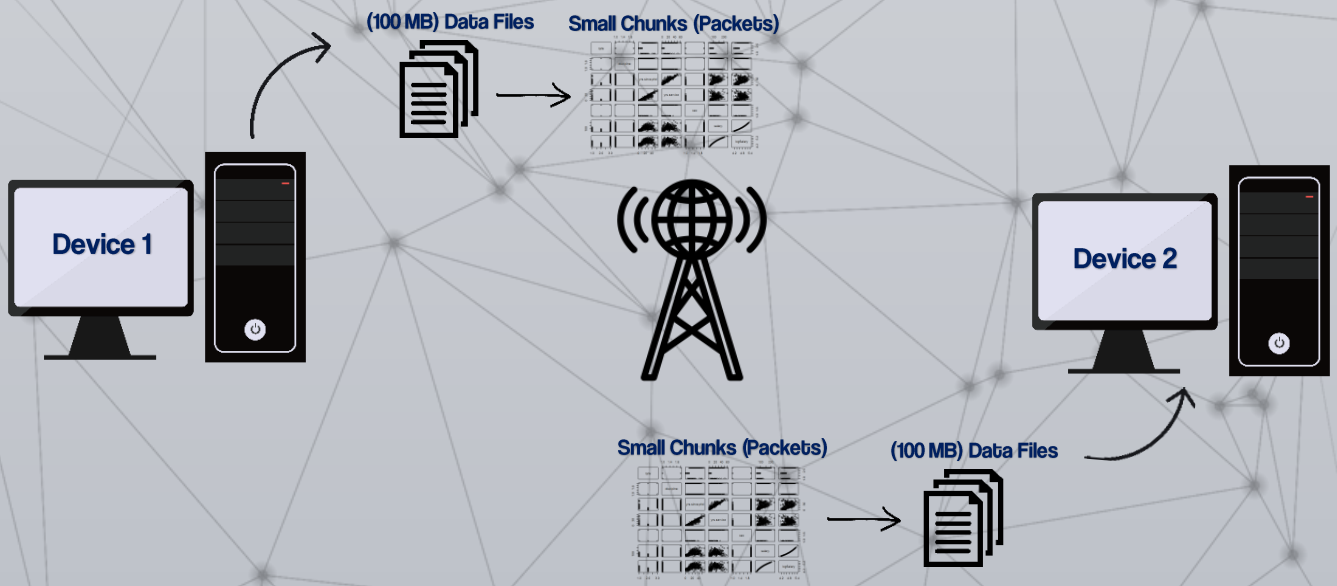
- The rollout of 5G significantly increased Internet speed and reduced latency, supporting technologies like VR and autonomous vehicles.
- Efforts like Starlink (SpaceX) aim to bring Internet access to remote areas.
- Issues like cybersecurity, misinformation, and Internet regulation are at the forefront of public and governmental discourse.
- Tools like ChatGPT and other AI-powered applications are reshaping industries and human interactions online.

Communicating between two devices with client-server model

Our request goes to the ISP and this ISP plays an important role in giving us internet access.

What are Packets?

In networking, packets are small units of data that are sent over a network. When you send or receive information (like an email or a video), it is broken into packets, transmitted individually, and then reassembled at the destination. Each packet contains a portion of the data along with addressing information to ensure it reaches the right place

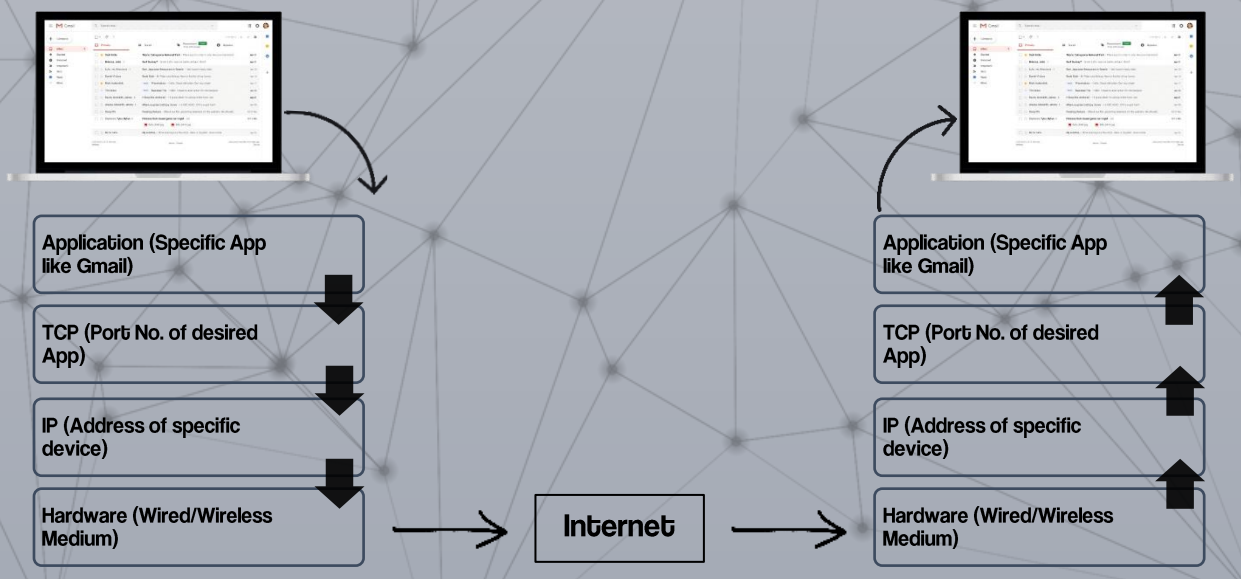


Protocols and Protocol Stack

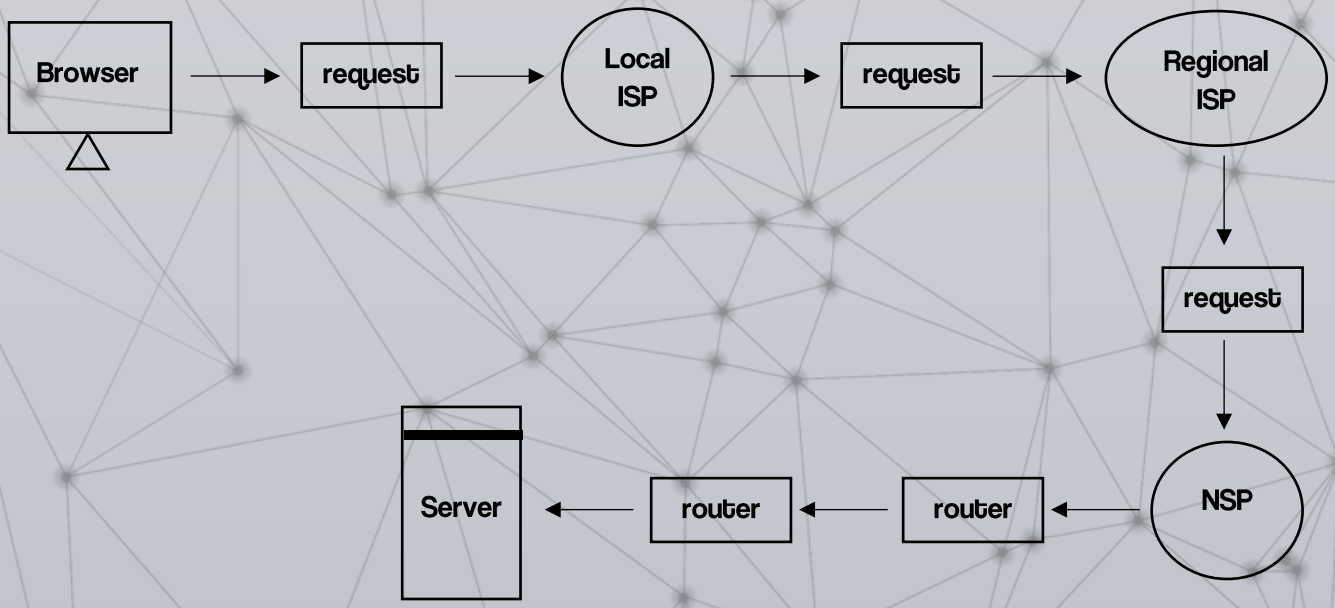
Protocols

In networking, protocols are rules and standards that devices use to communicate with each other. They define how data is formatted, transmitted, and received, ensuring that devices from different manufacturers can work together. Examples include HTTP (used for websites), FTP (for file transfers), and TCP/IP (the foundation of the Internet).

Protocol Stack



How a Packet travels over Internet?



Understand Request for www.google.com