

Define the Internet and describe its hierarchical structure

Tags: Internet, Free Internet, Starlink, Accessible Internet, Arpanet, Backbone, Internet2, Computer Network, Packet Switching, Internet Service Provider(ISP), Transmission Control Protocol, Internet Protocol

The Internet

The world's largest computer network

- a distributed packet-switched network

The **Internet** is international in scope with users on every continent.

Impact is beyond technology:

- Internet sites have a profound impact on world politics
- "Access to internet is considered a human right" President of Estonia
- Internet censorship. Some countries try to control Internet content and services.

Use and Functioning of the Internet

Arpanet

- Ancestor of the Internet
- Project started by the U. S. Department of Defense (DoD) in 1969
- Started with a project: "How you make sure that in extremal situations any data you send over network would reach its destination"

Backbone

one of the Internet's high-speed, long-distance communications links

Internet2 (I2)

is a faster alternative Internet

Internet2 is a not-for-profit networking consortium representing over 350 U.S universities, private businesses and agencies working with 66000 institutions across the US and international networking partners from more than 50 countries (since 1997).

Free Internet

In 2013, Facebook's founder and CEO Mark Zuckerberg released a ten-page whitepaper where he had written elaborating on the vision that asserts that **connectivity** is a **"human right"**

- As an initial step, the **Internet.org** idea was created. In 2014, Internet.org project announced projects focused on education in **Rwanda** and **India**.

The initiative has been criticized for **violating net neutrality**, and by handpicking internet services that are included, for **discriminating against companies not in the list**. This critics led to banning the service by regulators of some countries.

Accessible Internet

Starlink is a satellite internet constellation being constructed by **SpaceX** providing satellite Internet access.

Internet Backbones

Internet data traffic is carried over transcontinental high-speed **backbone networks** that generally operate in the range of 45 Mbps to 2.5 Gbps.

- These trunk lines are typically owned by long-distance telephone companies(called **network service providers**) or by national governments.
- **Local connection lines** are owned by regional telephone and cable television companies that lease access to ISPs, private companies, government institutions, and retail users.
- **Internet Backbones ExcaliDraw**

The Internet

- **The Internet** is the global system of interconnected computer networks that use the Internet protocol suite(TCP/IP) to link devices worldwide.
- We connect to this **global network** using **Internet Service Provider**(ISP)
- Connection to the Internet is organized in a **hierarchical** way:
 - the companies that carry the top layer of the interconnection are called **Tier 1 companies**. They do not provide connectivity to end users.

Note:

IP - internet Protocol.

TCP - Transmission Control Protocol

Tiers of Internet Service Provides(ISPs)

Tier 1 ISPs

are large national or international ISPs. They are directly connected to the Internet backbone and can be considered as part of the backbone itself.

- have the **highest** speed connections and very reliable networks
- their customers are either **lower-tiered** ISPs or **large** companies that are looking for a very **reliable** and **fast** access to the Internet.

Tier 1 Companies

- AT&T
- Deutsche Telecom
- Orange
- Tata Communication
and more!

Tier 2

ISPs purchase their Internet service from a Tier 1 ISP.

- tend to cover a **specific region**.
- focus on business **customers** and have **lower** quality network and **slower** access than tier 1 ISPs.

Tier 3

ISPs tend to focus on the **retail market**, and they also tend to cover a **specific region**.

- Network **quality** and access **speed** are relatively **low**.
- **Prices** are much **lower** than for **Tier 2 or Tier 1 ISPs**.