

# 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**.