Internet Architecture

Basics of Internet Architecture

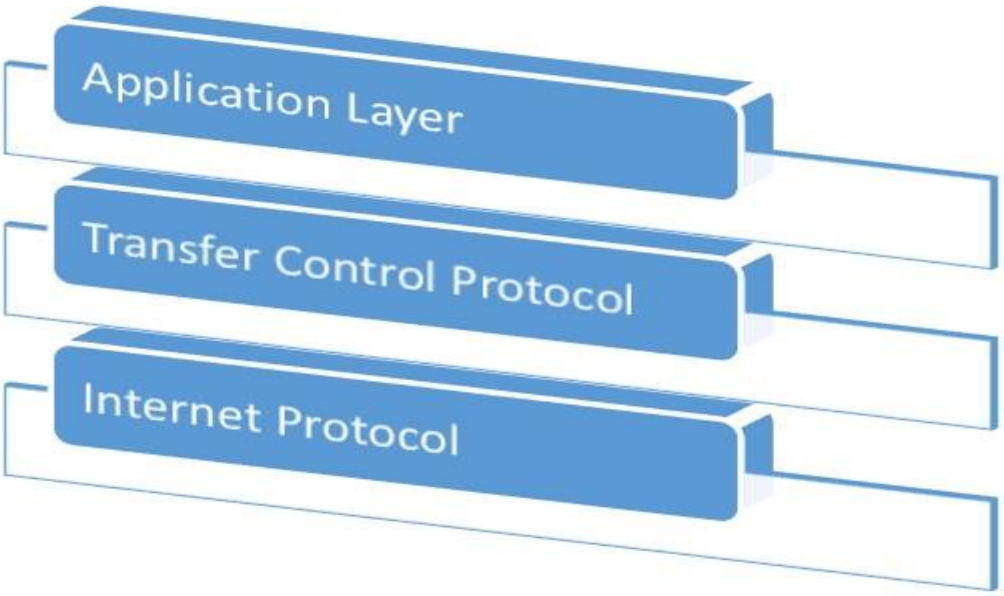
Internet architecture is a meta-network, which refers to a congregation of thousands of distinct networks interacting with a common protocol. In simple terms, it is referred as an internetwork that is connected using protocols. Protocol used is TCP/IP. This protocol connects any two networks that differ in hardware, software and design.

Process

TCP/IP provides end to end transmission, i.e., each and every node on one network has the ability to communicate with any other node on the network.

Layers of Internet Architecture

Internet architecture consists of three layers −



The three layers of internet

IP

In order to communicate, we need our data to be encapsulated as Internet Protocol (IP) packets. These IP packets travel across number of hosts in a network through routing to reach the destination. However IP does not support error detection and error recovery, and is incapable of detecting loss of packets.

TCP

TCP stands for "Transmission Control Protocol". It provides end to end transmission of data, i.e., from source to destination. It is a very complex protocol as it supports recovery of lost packets.

Application Protocol

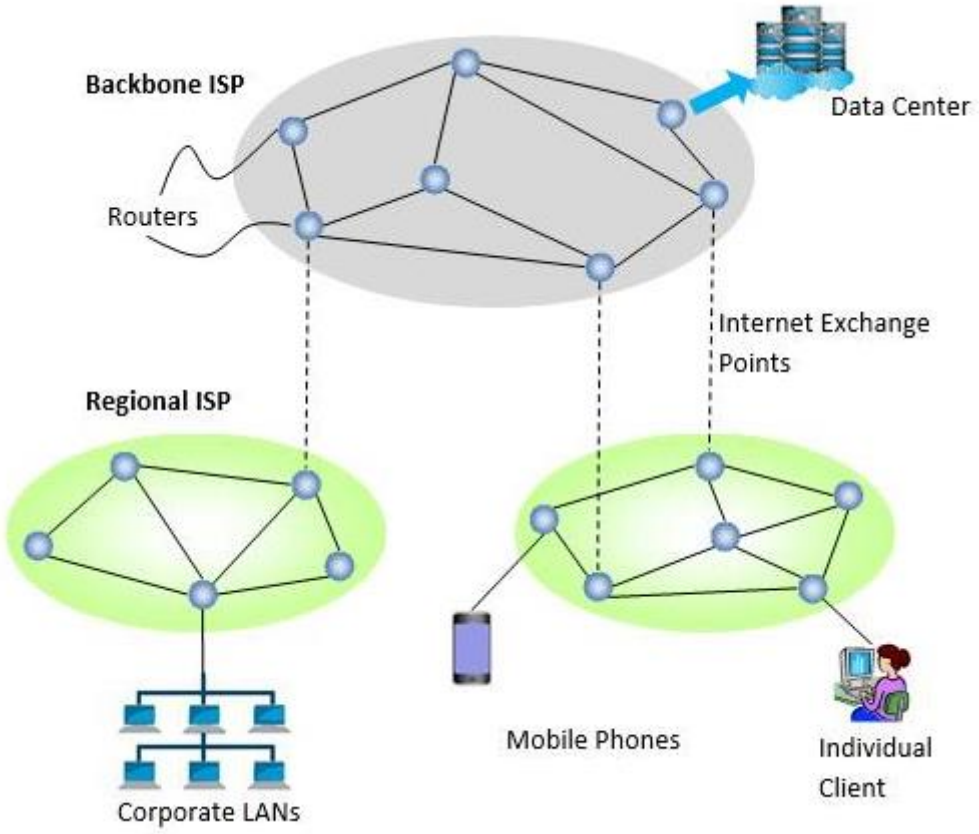
Third layer in internet architecture is the application layer which has different protocols on which the internet services are built. Some of the examples of internet services include email (SMTP facilitates email feature), file transfer (FTP facilitates file transfer feature), etc.

The architecture of the Internet is ever-changing due to continuous changes in the technologies as well as the nature of the service provided. The heterogeneity and vastness of the Internet make it difficult to describe every aspect of its architecture.

The overall architecture can be described in three levels −

1. Backbone ISP (Internet Service Provider)
2. Regional ISPs
3. Clients

The following diagram shows the three levels −



Backbone ISP (Internet Service Provider) − Backbone ISPs are large international backbone networks. They are equipped with thousands of routers and store enormous amounts of information in data centers, connected through high bandwidth fiber optic links. Everyone needs to connect with a backbone ISP to access the entire Internet.

There are different ways through which a client can connect to the ISP. A commonly used way is DSL (Digital Subscriber Line) which reuses the telephone connection of the user for transmission of digital data. The user uses a dial-up connection instead of the telephone call. Connectivity is also done by sending signals over cable TV system that reuses unused cable TV channels for data transmission. For high-speed Internet access, the connectivity can be done through FTTH (Fiber to the Home), that uses optical fibers for transmitting data. Nowadays, most Internet access is done through the wireless connection to mobile phones from fixed subscribers, who transmit data within their coverage area.