Internet Architecture And Protocol

① Roles of Communication Protocol

1- Data Sequencing ⟹ to detect loss or duplicate packets.
2- Data Routing ⟹ To find the most efficient path between source and a destination.
3- Data Formatting ⟹ Defines group of bits within a packet which constitutes data.
4- Flow Control ⟹ Ensures resource sharing and Protection against traffic Congestion by regulating flow of data on Communication lines.
5- Error Control ⟹ Method of correcting errors is to retransmit their data ~~and~~ message block.
6- Connection Establishment and termination
7- Data Security ⇒ Prevents access of Data by ~~o~~ unauthorized users.

Communication Protocol

A Communication Protocol is a system of rules that allow two or more entities of a Communications system to transmit data/information via any kind of variation of a Physical Quantity.

The Protocol defines the rule, Syntax Semantics and Synchronization of communication and Possible error recovery methods.

Internet is?

Internet is Packatized form of network. It is stored and forward network. Internet is shared network and Public network.

Reference Models

1 OSI
2 Internet
3 TCP\IP

① What is OSI Model?

Commonly refered to as the OSI reference Model. OSI model is a framework for defining standards for linking heterogenous computer systems located anywhere. The OSI is theoretical blueprint that helps us understand how data gets from one user to another. Contains 7 different layers that interact with each model.

7 - Application => Network Process to Application
6 - Presentation => Data Representation
5 - Session => Interhost - Communication
4 - Transport => End - to - End ~~Communicat~~ Connections.
3 - Network => Address and Best Path.
2 - Data link => Access to Media \MAC, LLC
1 - Physical => Binary Transmission \ ~~PDU~~

② TCP/IP Model

Another Model is TCP/IP model.

We use the four layers structure that incorporates the Presentation and session layers with the application layer.

① Application => Interacts with user Processes
② Transport => TCP guarantees data is Recieved
③ Internet => Manages the Connection Accross Networks.
~~④ Physical layer~~ => Interporates Network and Physical layers.
④ Network Access layer

Q Why are Protocols important in Networks communication?

TCP => HTTP, SMTP POP FTP
UDP = RTP (Real time Protocol)
] Application layer

UDP (User Datagram Protocol)

It is an alternative to TCP. UDP does not guarantee delivery, Preservation of Sequence or Protection against duplication.

Used with (SNMP) Simple network Managment Protocol.

TCP IP Protocols

IP → TCP, UDP, ICMP, IGMP, RSVP
TCP → HTTP, SMTP, FTP, TELNET, BGP
UDP → SNMP
SMTP → MIME
] Application layers

Q Key Features of a Protocol?

A Protocol is a set of rules or conventions that allow Peer layers to communicate.

They key Features of Protocol is

Syntax :- Format of data block.

Semantic :- Control Information for coordination and error handling.

Timing :- Speed of Matching and sequencing.

Q Functions of Protocol Architecture?

* Breaks into subtask modules which are implemented Separately.
* Modules are arranged in a vertical stack
  - each layer in the stack Performs a subset of functions.
  - Relies on next lower layer.

TCP (Transmision Control Protocol)

TCP is the transport layer Protocol for most applications

TCP Provides a reliable Connection for transfer of data between applications. A TCP segment is the Basic Protocol unit TCP tracks segments between entities for duration of each connection.

Application layer on top of TCP → FTP, SMTP, SSH

Standards

A standard Provides a model for development that makes it Possible for Product to work regardless of the individual manfuctrue.

Types of Standard

* De Jure → By law and regulation standard.

* De Facto → By Fact or by Convention

Standerization Process

There are three steps of standerization

1- Specification
2- Identification of choices
3- Acceptance

Jitter

Time delay between one Packet to another Packet Basically Called Jitter.

MOS (mean opinion Score)

User opinion	MOS Score
Maximum obtainable	4.4
very satisfied	4.3 to 5
Satisfied	4 to 4.3
Some user satisfied	3.6 to 4
Many user dissatisfied	3.1 to 3.6
Not recommended	1.0 to 3.1

Difference B/w IPv4 and IPv6

	IPv4	IPv6
1	32 bit	128 bit
2	IPv4 by billion	340 trillion unique address granted
3	IPv4 has 4 classes	It is class less
4	Range 0-255	Range 0-FFFF
	IPv4 has 8 bits	It consists 8 octects

Layers Division

7 Application
6 Presentation
5 Session
→ Application layer

4 Transport
3 Network
→ Internet layer

Data link
Physical
→ Physical / Hardware layer

Network Criteria

A Network must be able to meet Certain number of Criteria.

There are Three Most important Criteria.

① Performance :- Performance of network depends on number of users, type of transmission Medium of Network

② Reliability :- Reliability is measured by ~~number~~ frequency of failure.

③ Security :- Protecting data from unauthorized data access and virus.

Internetworking

Internetworking is the Process or technique of Connecting different networks by using Intermidiary devices such as router or gateway devices.

There are Three types of internetworking.

① Data link layer
② Media Access Control (MAC)
③ Network layer address

Network layer :- The network layer is the Part of internet communications Process where these connections occur by sending Packets of Data between different Networks.

Data-Link layer :- responsibilities of Data link layer is Framing, Physical addressing, flow Control, error control and access control.

Define ARQ (Automatic Repeat Query)

Error control in the data link layer is based on ARQ. which means retransmission of data in 3 case. Damaged frame, lost frame, lost acknowledge.

To ensure a sequence of information Packets is delivered in order and without error or duplications despite transmission error or loses

Define HDLC (High Level Data link Control)

It is bit-Oriented data link Protocol designed By support Internation orgingation of Standerzation. ISO.

It is group of Protocols or rules for transmitting data between Networks.

Types of Stations in HDLC

There are 3 Station types in HDLC

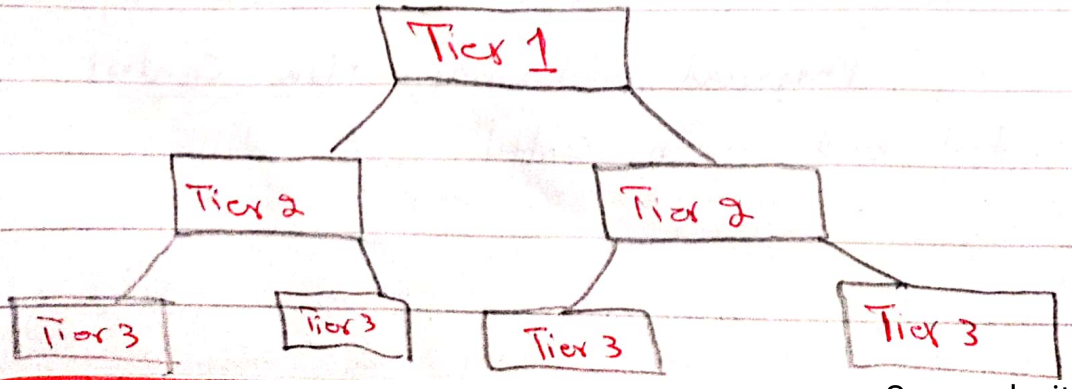
a) Primary b) Sccandory c) Combined

ISP, Hierarichal orgnization

Internet service Provider (ISP) is a Company which Provides internet connection to end user.

There are Basically 3 levels of ISP.

Tier 1 ISP, Tier 2, Tier 3



Data Center Tiers

Data Center tiers are standardized ranking system that indicates the reliability of data center inferastructure. This classification ranks facilities from 1 to 4, with 1 being the worst and 4 is the best Performing level.