

TCP/IP PART-III

Introduction:

- In TCP/IP, the transport layer consists of two different protocols.
 - ❖ TCP
 - ❖ UDP
- Basic Idea: -
 - ❖ User process (applications) interacts with the TCP/IP protocol suite by sending/receiving TCP or UDP data.
 - ❖ Both TCP and UDP in turn use the IP layer for delivery of packets.

Role of TCP:

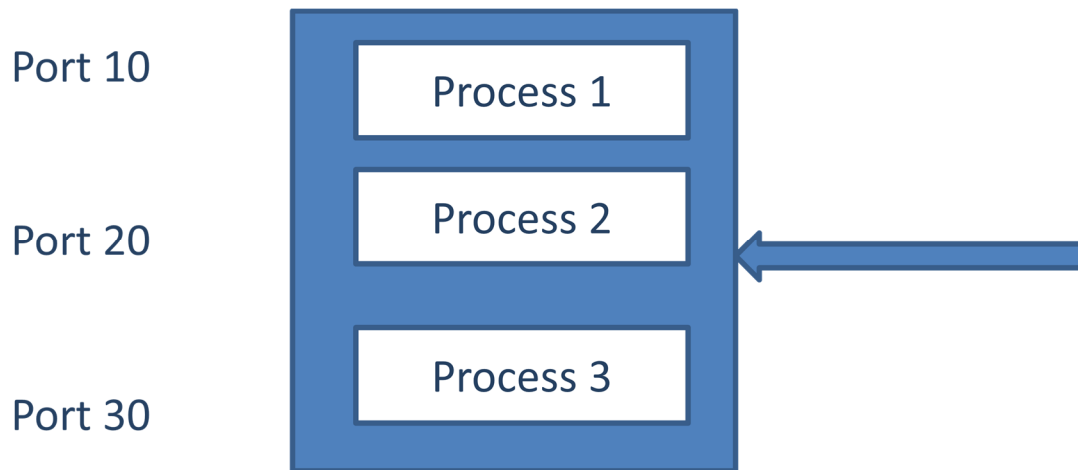
- Provides a connection oriented, reliable, full duplexed, byte stream service.
 - ❖ Underlying IP layer is unreliable and provides connectionless delivery service.
 - ❖ TCP provides end to end reliability using
 - Checksum
 - Positive acknowledgements
 - Timeouts
 - End to end flow control
- Establishment and termination of connections between processes.
- Sequencing of data that might reach the destination in any arbitrary order.

Role of UDP:

- UDP provides a connectionless and unreliable data gram service.
 - ❖ Very similar to IP in this respect.
 - ❖ Provides two features that are not there in IP: -
 - A checksum to verify the integrity of UDP packet
 - Port numbers to identify the processes at the two ends.

PORT NUMBERS:

- Multiple user processes on a machine may use TCP or UDP at the same time.
- There is need for a mechanism to uniquely indentify the data packets associated with each process.



- How this is done?
 - ❖ Both TCP and UDP uses 16 bit integer port number
 - ❖ Different applications are identified by different port numbers.
 - ❖ Port numbers are stored in the headers of TCP or UDP packets.

Client server scenario: -

- ❖ By knowing the 32 bit IP address of the server host a client host can connect to the server.
- ❖ To identify a particular process running on the server host, the client must also know the corresponding port number.
- ❖ Well known port numbers
 - ❖ Predefined and publicly known.
 - ❖ FTP uses port 21 , SMTP uses port 25, http uses port 80.
- ❖ Well known port numbers are stored in a particular file on the host machine
 - ❖ UNIX:: /etc/services.
 - ❖ XP:: c:\WINDOWS\system32\drivers\etc.

- ❖ Each line has the format

<Service name><port number>/<protocol>

[aliases.....]

[#<comment>]

Few lines of the file are shown next.

Ephemeral Port Numbers:

- A typical scenario:
 - ❖ A client process sends a message to a server process located on some host at port 1534.
 - ❖ How will the server know where to respond?
 - Client process requests an unused port number from the TCP/UDP module on its local host.
 - There are temporary port numbers , called ephemeral port numbers.
 - Send along with the TCP or UDP header.
- How are the port numbers assigned ?
 - ❖ Port numbers from 1 to 1023 are reserved for well known ports.
 - has been extended to 4095.
 - Numbers beyond this range and upto 65535 are used as ephemeral port numbers.

Connection Establishment:

- A hierarchal addressing scheme is used to define a connection path between two hosts .
 - ❖ IP address
 - Identifies the communicating hosts.
 - Protocol Identifier.
 - Identifies the transport layer protocol being used (TCP , UDP or anything else.)
 - Port number.
 - Identifies the communicating processes in the two hosts.

Association:

- A set of five values that describe a unique process to process connection is called an association.
 - ❖ The protocol (TCP or UDP)
 - ❖ Local host IP address (32 bits)
 - ❖ Local port number (16 bits)
 - ❖ Remote host IP address (32 bits)
 - ❖ Remote port number (16 bits)
 - ❖ Example of an association:

TCP , 144.16.192.5 , 1785 , 144.16.202.57 , 21