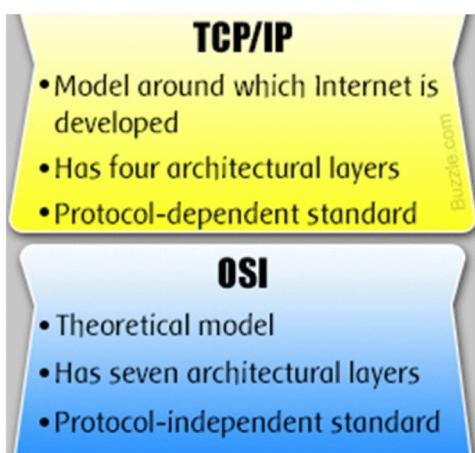


OSI Model & TCP/IP

OSI Model & TCP/IP



Buzzle.com

7 Application
6 Presentation
5 Session
4 Transport
3 Network
2 Data Link
1 Physical

OSI Reference Model

Application
Transport
Internet
Network Interface

TCP/IP

OSI Model

- ▶ Introduced around 1980.
- ▶ developed by the International Organization for Standardization (ISO)
- ▶ It is a layered architecture (consists of seven layers) which explains how the communication happens in between two or more network devices within the organization or internet.
- ▶ Each layer defines a set of functions in data communication.



Application Layer (Layer 7)

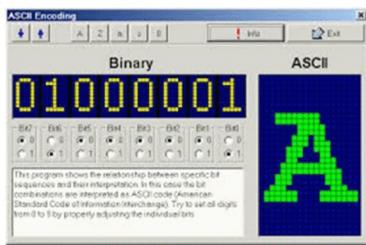
Provides a user interface for the users to interact with application services or Networking Services.

Ex: Web browser etc.



Presentation Layer (Layer 6)

- ▶ responsible for defining a standard format for the data.
- ▶ It deals with data presentation.



Encoding – Decoding

- Ex: ASCII, EBCDIC (Text)
- JPEG,GIF,TIFF (Graphics)
- MIDI,WAV (Voice)
- MPEG,DAT,AVI (Video)

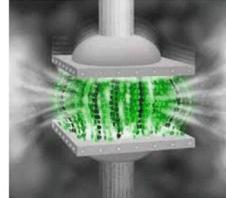


Encryption – Decryption

- Ex: DES, 3-DES, AES

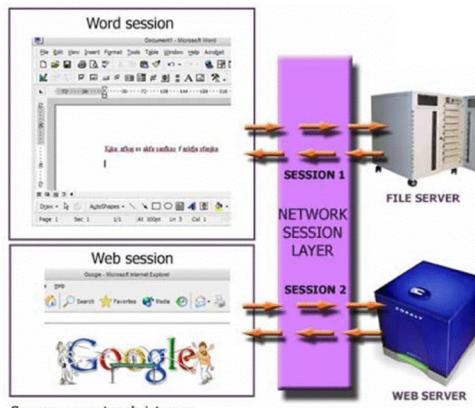
Compression – Decompression

- Ex: Predictor, Stacker, MPPC



Session Layer (Layer 5)

- ▶ It is responsible for establishing, maintaining and terminating the sessions.
- ▶ It deals with sessions or Interactions between the applications.
- ▶ Session ID is used to identify a session or interaction
 - Ex: RPC, SQL, NFS



Application layer protocols inside TCP/IP

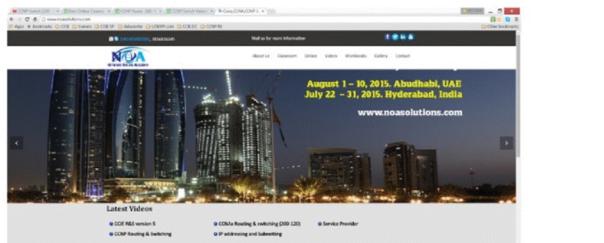


application layer provides an interface between software running on a computer and the network itself Examples for this layer are:

Telnet, FTP, TFTP, SMTP, SNMP, DNS, DHCP etc.

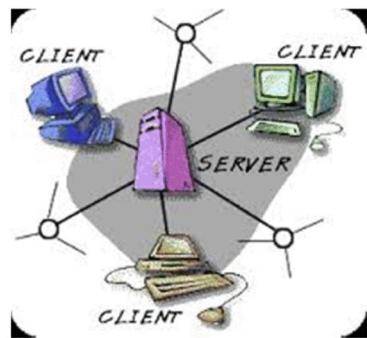
HTTP

- ▶ Allow to access Webpages.
- ▶ <http://noasolutions.com/>



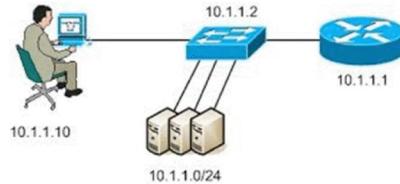
FTP (File Transfer Protocol)

- ▶ It allows you to transfer files from one machine to another.
- ▶ It also allows access to both directories and files.
- ▶ It uses TCP for data transfer and hence slow but reliable.



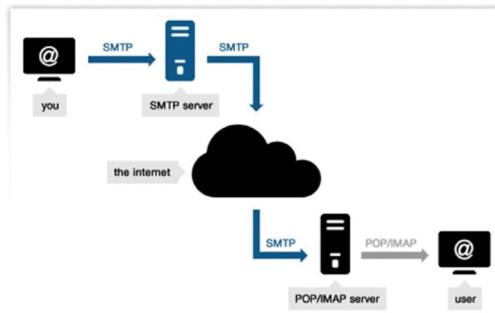
Telnet

- ▶ Telnet is used for Terminal Emulation.
- ▶ It allows a user sitting on a remote machine to access the resources of another machine.



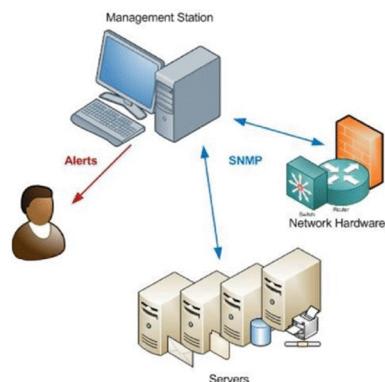
SMTP

- ▶ Allow you to send and receive emails messages



TFTP (Trivial File Transfer Protocol)

- This is stripped down version of FTP.
- It has no directory browsing abilities.
- It can only send and receive files.
- It uses UDP for data transfer and hence faster but not reliable.

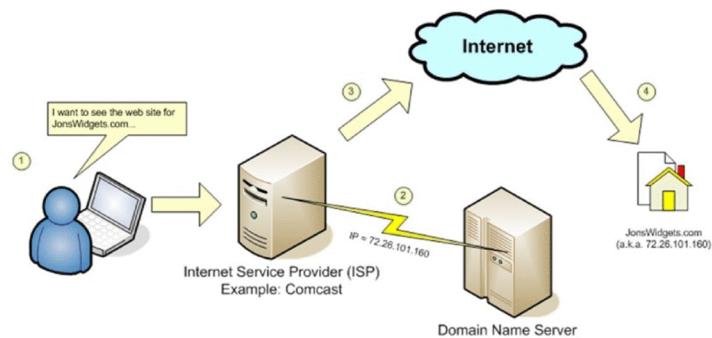


Simple Network Management Protocol

- SNMP enable a central management of Network.
- Using SNMP an administrator can watch the entire network.
- SNMP works with TCP/IP.
- IT uses UDP for transportation of the data.

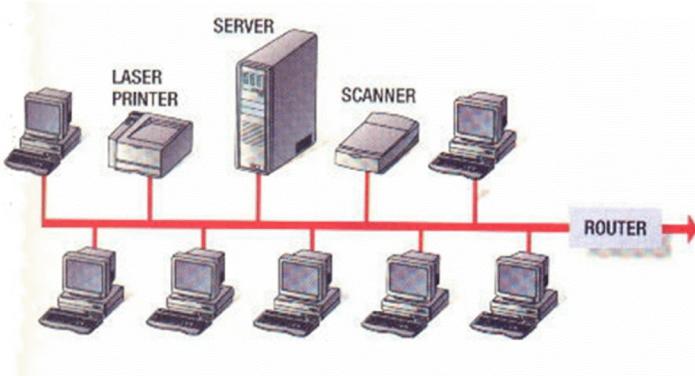
DNS (Domain Name Service)

- DNS resolves FQDN with IP address.
- DNS allows you to use a domain name to specify and IP address.
- It maintains a database for IP address and Hostnames.



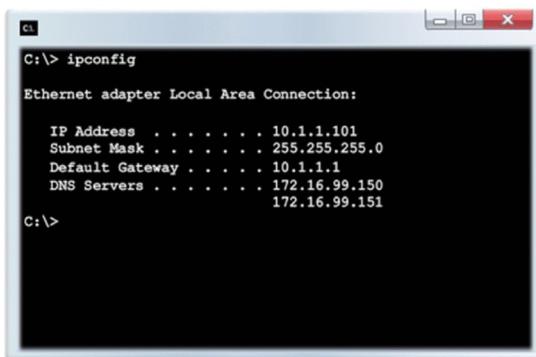
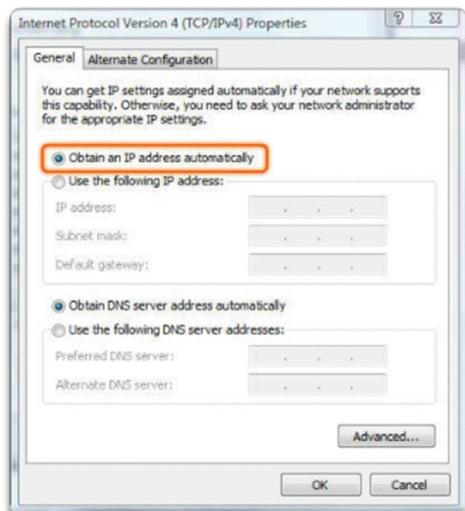
DHCP (Dynamic Host Configuration Protocol)

- Dynamically assigns IP address to hosts.
- Also provide DNS and Gateway information if needed



Assigning a Dynamic IPv4 Address to a Host

Assigning a Dynamic IPv4 Address



DHCP - preferred method of “leasing” IPv4 addresses to hosts on large networks, reduces the burden on network support staff and virtually eliminates entry errors

Transport Layer (Layer 4)

Responsible for end-to-end transportation of data between the applications.

The major functions described at the Transport Layer are...

- Identifying Service
- Multiplexing & De-multiplexing
- Segmentation
- Sequencing & Reassembling
- Error Correction
- Flow Control

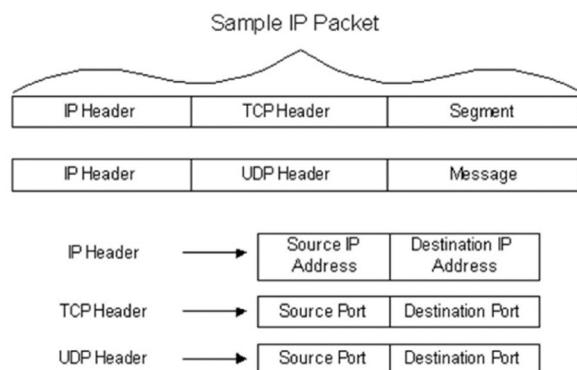
- Identification of Services is done using Port Numbers.

- Port is a logical communication Channel

- Port number is a 16 bit identifier.

- Total No. Ports 0 – 65535
- Reserved Ports 1 - 1023
- Unreserved Ports 1024 – 65535

Service	Port No.
HTTP	80
FTP	21
SMTP	25
TELNET	23
TFTP	69



- Services are identified at this layer with the help of Port No's.
- The major protocols which takes care of Data Transportation at Transport layer are...TCP, UDP

TCP	UDP
<ul style="list-style-type: none"> Transmission Control Protocol Connection Oriented Reliable communication(with Ack's) Slower data Transportation Protocol No is 6 Eg: HTTP, FTP, SMTP 	<ul style="list-style-type: none"> User Datagram Protocol Connection Less Unreliable communication(no Ack's) Faster data Transportation Protocol No is 17 Eg: DNS, DHCP, TFTP

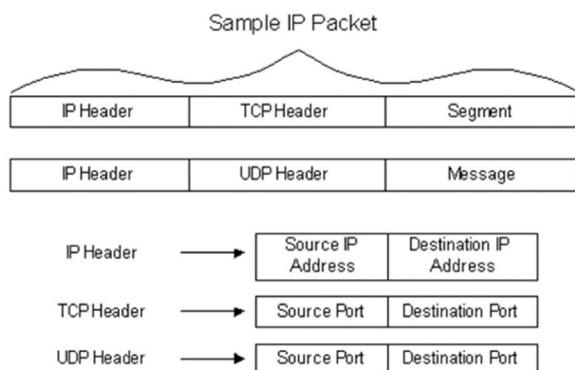
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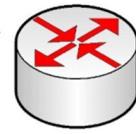
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Network Layer (Layer 3)

- ▶ It is responsible for end-to end Transportation of data across multiple networks.
- ▶ Logical addressing & Path determination (Routing) are described at this layer.
- ▶ The protocols works at Network layer are

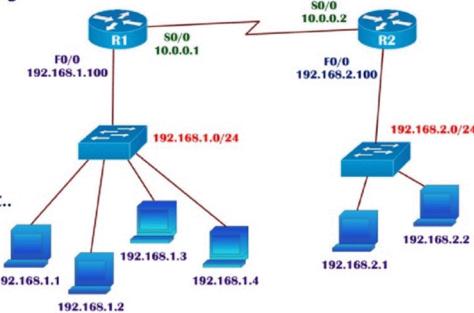


Routed Protocols:

- Routed protocols acts as data carriers and defines logical addressing.
- IP, IPX, AppleTalk... Etc

Routing Protocols:

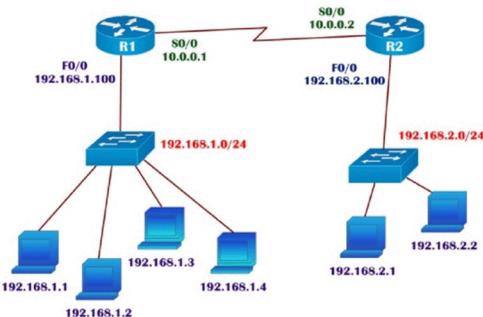
- Routing protocols performs Path determination (Routing).
- RIP, IGRP, EIGRP, OSPF.. Etc
- Devices works at Network Layer are Router, Multilayer switch etc..



Data-link Layer (Layer 2)

It is responsible for end-to-end delivery of data between the devices on a LAN Network segment. Data link layer comprises of two sub-layers.

- ▶ It deals with hardware addresses (MAC addresses).
- ▶ Devices works at Data link layer are Switches.



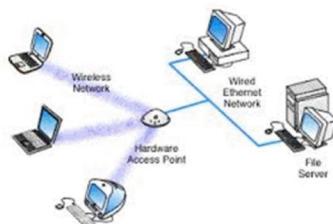
Physical Layer (Layer 1)

- It deals with physical transmission of Binary data on the given media (copper, Fiber, wireless...).

- Copper media : Electrical signals of different voltages
- Fiber media : Light pulses of different wavelengths
- Wireless media : Radio frequency waves



Devices works at physical layer are
Hub, Modems, Repeater, and Transmission Media



OSI Model Format

