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CCNA: OSI TCP/IP CHEAT SHEET

Packet Types

It is model to sub-divide the communication system into smaller parts called layers

A layer is a collection of similar functions that provide services to the layer above it and receives services from the layer below it.

There are seven OSI layers

Layer-1 or Physical Layer: defines the physical and electrical specification for the devices. Data unit is in Bits

Layer-2 or Data Link Layer: provides the functional and procedural means to transfer the data between nodes on the network. The data unit at this layer is called Frames. Also provides the error correction that may occurred at layer-1. Data link layer is subdivided into:

1. Media Access Control (MAC) layer: defines the addressing schemes at layer-2
2. Logical Link Control (LLC): defines the flow control and acknowledgment methods

Layer-3 or Network Layer: defines the (end-to-end) logical address, traffic forwarding and path determination. The data unit at the layer is called Packet.

Layer-4 or Transport Layer: ensures transparent transfer of data between end users by providing reliable (or unreliable) transfer services. Reliable delivery is ensured by means error correction and flow control. The data unit is called Datagram.

Layer-5 or Session Layer: responsible for connection setup, maintenance and tear down between network entities.

Layer-6 or Presentation Layer: responsible for inter-host communication. Receives data from application layer and converts to suitable format. For example: character conversion, encryption/decryption, compress and terminal emulation

Layer-7 or Application Layer: responsible for application-to-application communication

TCP/IP Model

TCP/IP is framework for computer network protocols created by DARPA in 1970s. TCP/IP was designed to be hardware independent hence implemented on the top of the virtually any hardware networking device. It has four layers:

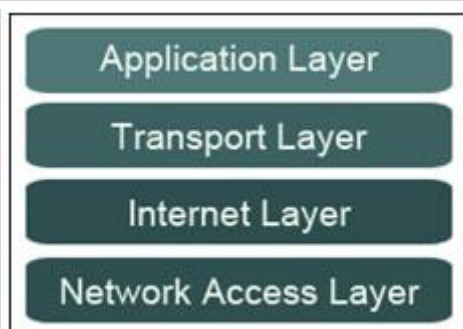
Network Access Layer: is analogous to Data Link layer of the OSI model.

Internet Layer: has two functions

1. Host Addressing and Identification
2. Packet Routing

Transport Layer: responsible for end-to-end delivery of traffic along with error control segmentation, congestion control, flow control and application addressing (in term of port numbers)

Application Layer: It refer to the session, presentation and application layers of the OSI reference hmodel



OSI Model and Troubleshooting

OSI uses a bottom up approach to isolate and troubleshoot a problem. For example: let us consider and example for DNS troubleshooting

1. Is the network cable plugged-in?
2. Is there a link light on Ethernet Switch and NIC?
3. Is there an IP address configured?
4. Can other hosts be reachable?
5. Is the DNS server can be pinged?
6. Is there a firewall configured?

Let us consider another example of a user accessing a web page with JPEG images:

1. Is the network cable plugged-in?
2. Is there a link light on Ethernet Switch and NIC?
3. Is there an IP address configured?
4. Are there routes available for web server and DNS server in the IP routing table?
5. Can the web server be pinged?
6. Can the DNS server be pinged?
7. Is there a firewall configured?
8. Is there a web browser installed?
9. What graphic format is supported? Is there a JPEG viewer installed?

OSI and TCP/IP Model and Protocols

Application	Application	DHCP, DNS, FTP, NTP, SNMP, Telnet, NTP, SMTP, HTTP, RTP, SIP
Presentation		SSL, TLS, MIME
Session		SAP, SIP, H.323, NetBIOS
Transport (segment)	Transport	TCP, UDP
Network (packets)	Internet	IPv4, IPv6, ICMP, ICMPv6
Data Link (frames)	Link	ARP, PPP, Ethernet, CDP, HDLC, Frame Relay
Physical (bits)		RJ-45, V.35