**CCNA Notes (Book 1)**

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**CCENT/CCNA Chapter 1**

Exam focuses heavily on TCP/IP

* **Enterprise network** – IT world refers to a network created by one corporation, or enterprise, for the purpose of allowing its employees to communicate.
* Purpose move data from one device to another.
* **Networking model** – (network architecture or networking blueprint) – refers to a comprehensive set of documents.
  + IBM SNA (Systems Network Architecture)
  + **ISO (International Organization for Standardization**) created OSI to standardize data networking protocols to allow communication among all computers across the entire planet.
  + **IEEE (Institute of Electrical and Electronic Engineers)** – defines Ethernet LAN’s
    - Ethernet card built in to the computer implements some LAN standards by the TCP/IP model.
  + OSI model
    - **Application** – provides an interface from the application to the network by supplying a protocol with actions meaningful to the application (Telne, HTTP, FTP, SMTP, POP3, VoIP, SNMP)
      * PDU (Protocol Data Unit) – represents the bits that include the headers and trailers for that layer as well as encapsulated data. LxPDU)
    - **Presentation** – This layer negotiates data formats, such as ASCII test, or image types like JPEG.
    - **Session** – This layer provides methods to group multiple bidirectional messages into a workflow for easier management and easier back out of work that happened if the entire workflow fails.
    - **Transport** – In function, much like TCP/IP’s transport layer. This layer focuses on data delivery between the two endpoint hosts. (TCP, UDP)
    - **Network** – Like the TCP/IP network, this layer defines logical addressing, routing (forwarding), and the routing protocols used to learn routes
    - **Data Link** – Like the TCP/IP data link layer, this layer defines the protocols for delivering data over a particular single type of physical network. (Ethernet, HDLC)
    - **Physical** – This layer defines the physical characteristics of the transmission medium, including connectors, pins, use of pins, electrical currents, encoding, light modulation, and so on. (RJ-45, Ethernet)
  + DOD helped build the TCP/IP architecture
    - TCP/IP avoids repeating work already done by others
    - 1 Architecture – TCP/IP Original
      * **Application** – HTTP, POP3, SMTP
        + **HTTP** – subsequent HTTP messages omit the header
        + **URL (Uniform Resource Locators)** – HTTP is used to transfer the web pages.
      * **Transport** – TCP/UDP
        + **TCP** – provides error recovery for Application layer. Guarantees delivery

**Segment** – TCP message with sequence number

Has each header and sequence number sent with each message.

* + - * **Internet** – IP
        + **IP** – defines that each host computer should have a different IP address

Routers act like the post office forwarding packets of data to the correct destination. Helps to be identified in the network.

Packet – message with an IP header

**Routers** - are networking devices that connect the parts of the TCP/IP network together for the purpose of routing IP packets to the correct destination.

**DDN (Dotted**-decimal notation) – 1.1.1.1

**Host** – refers to any device, regardless of size or power and has an IP address and connects to any TCP/IP network.

**IP Header** – includes a source IP address and a destination IP address of Bob’s IP

**IP Routing** – process of forwarding an IP packet.

**Data** – everything after the IP header

* + - * **Link (network access or network interface layer**) – Ethernet, PPP, Frame Relay, T1
        + Refers to physical connections, between two devices and the protocols used to control those links.
        + **Frame** – encapsulated IP packet between an Ethernet header and Ethernet trailer
    - 2 Architecture – TCP/IP Updated
      * **Application** – provide services to the application software running on a computer. Provides an interface between software running on a computer and the network itself. Defines services the application needs.
      * **Transport -** provides error recovery for Application layer. Guarantees delivery
      * **Network –** provides addressing and routing to the Transport layer. Upper layers ask lower layers to deliver a message. Provides a service for forwarding IP packets from one device to another.
      * **Data Link –** physical transmission of data and those indirectly related to the physical transmission of data.
        + **Encapsulation –** process of putting headers around some data.

Create and encapsulate the application data with any required application layer headers

Encapsulate the data supplied by the application layer inside a transport layer header

Encapsulate the data supplied by the transport layer inside a network layer IP header

Encapsulate the data supplied by the network layer inside a data link layer header and trailer

Transmit the bits.

* + - * **Physical -** physical transmission of data and those indirectly related to the physical transmission of data.
  + **Layers** – small number of categories broken down into functions
    - Each layer provides a service to the layer above it
    - **Adjacent-layer interaction** – refers to the concepts of how adjacent layers in a networking mode on the same computer work together.
    - **Same-layer interaction** – particular layer on one computer wants to communicate with the same layer on another computer.
* **Protocol** – set of logical rules that devices must follow to communicate.
  + RFC (Requests For Comments)
  + Use headers as a place to put information used by that protocol
* **SOHO** – smaller networks at home, when used for business purposes, often go by the name small office/home office
* **Cloud** – part of a network whose details are not important to the purpose of the diagram.