**Internet Protocol Suite**

* It is the conceptual model and set of communication protocols used in the internet
* Similar to computer networks
* Commonly known as TCP/IP, Transmission Control Protocol/Internet Protocol
* Provides end-to-end data communication
* Four layers of abstraction: link, internet, transport, and application
* Originally developed by the US department of defense and then various universities + other parties got involved
* Uses existing protocols, like ethernet
* RFC 1122

**Link Layer**

* Contains communication data for layers that remains in a single network segment (link)
* Lowest layer of the suite
* Includes all hosts possible without traversing a router
* Size determined by network hardware design
* Used to move packets between the internet layer interfaces of two different hosts on the same link
* Includes protocols used to describe the local network topology and the interfaces needed to affect the transmission of internet layer datagrams to next-neighbor hosts
* Provides a physical mechanism to two computing devices to allow them to send digital data to each other
* Data communication uses electromagnetic signals over a wire/wireless connection where they are interpreted as bits
* Common examples of link layers: Ethernet, Wireless LAN

**Internet Layer**

* Provides internetworking between independent networks
* Provides addressing protocols to uniquely identify computers over a network
* Essentially, it establishes the internet
* The identification is called an IP address
* Data communication between two computers over the internet passes from router to router (not a straight line), which is a strategy from the internet routing protocol
* Common examples of internet layers: IP (v4, v6)

**Transport Layer**

* Handles host-to-host communication
* Provides reliable transportation of data packets over the internet using sequences, acknowledgement, and retries
* Common examples of transport layers: TCP, UDP (latter better than former)

**Application Layer**

* Provides process-to-process data exchange for applications
* Does things like convert domain names (URL) to IP addresses (DNS)
* Makes possible the World Wide Web (HTTP)
* Allows encryption of private data (TLS)
* Common examples of application layers: HTTP, TLS, DNS

**How the layer stack works together?**

* Application layer makes a DNS request, transportation layer uses UDP to transport data packets, network layer uses IP to identify destination, and the link layer uses wireless LAN for communication
* Application layer can then fetch the webpage via a HTTP request, transport layer uses TCP to transport data, network layer uses IP, and link layer uses wireless LAN

**Comparison to OSI model**

* Application layer is split into application, presentation, and session in OSI
  + Application: HTTP, FTP, etc.
  + Presentation: SSL, SSH, JPEG, etc.
  + Session: APIs
* Link layer is split into data link and physical
  + Data link: Ethernet, etc.
  + Physical: Fibers, Wireless, etc.

**Implementation**

* Doesn’t need any hardware or software environment but requires a layer (hardware or software) that can facilitate sending and receiving data over a computer network.
* Makes it easy to be established on every computing platform