The DoD Model

Internet protocol suite

A conceptual model that sets a variety of communication protocols that are used by the internet and similar computer networks

This model is commonly known as TCP/IP because these two (TCP and IP) are the foundational proto -cols of the model.

During its development the model was known as the DoD model (Department of Defense) since the DARPA (United States Department of Defense) funded the networking method used in the model.

The Models specifies how data should be.

• Packetized   • transmited   • Addressed   • routed   • recieved

All this functionality is organized into four layers which classifies all the involved protocols according to the scope of networking involved.
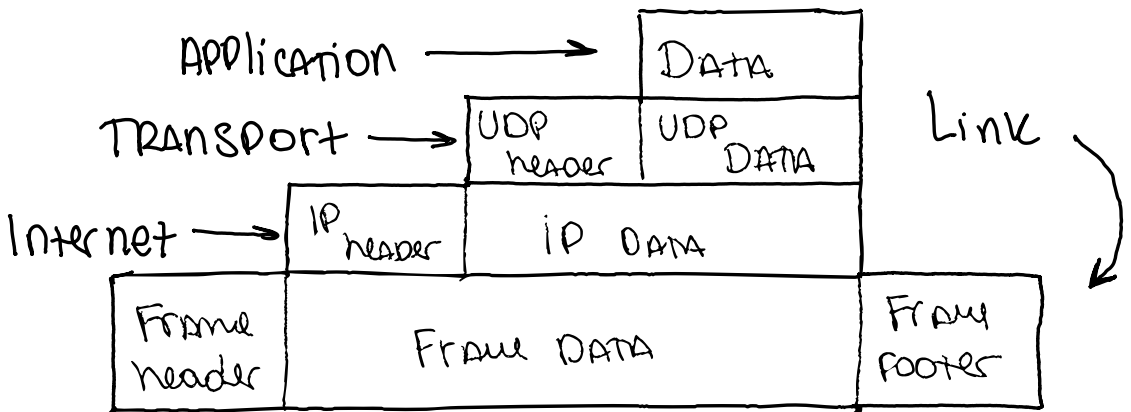
From lowest to highest, the 4 layers are.
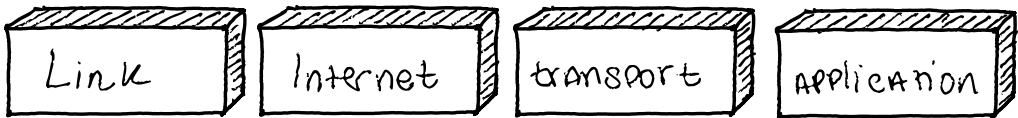
Link	Internet	transport	Application
1. communic. methods for data that remains in a single net.	2. internetwor -king between ≠ networks	3. handles host to host communications	4. process to process data exchange for applications.

Key Architectural Principles

o The end-to-end Principle is a designed framework in computer networking where application specific features resides in the communicating end nodes of the net rather that in intermediate nodes such as Gateway and routers.

o The robustness principle. "In general, an implementation must be conservative in its sending behavior and liberal in its receiving behavior", "software on other hosts may contain deficiencies that make unwise to exploit legal but obscure protocol features.

o The Encapsulation is used to provide abstraction of protocols and services. Usually aligned in the division of Protocol suits into Layers. The App Layer uses a set of protocols to send data to the rest of the Layers. Then, data is also encapsulated by the other Layers.

RFC-1122 emphosize these Arch. Principles over Layering.

APPLICATION ——→ Data

TRANSPORT ——→ UDP header | UDP DATA   Link

Internet ——→ IP header | IP DATA

Frame header | Frame DATA | Frame footer

Encapsulation of DATA descending through the layers described

The 4 Layers

The APPLICATION layer is where ,app or processes creates the data and communicate this DATA to other apps on the same host. This layer makes use of services provided by the underlaying lower layers, specially the transport layer which provides pipes to other processes. In this layer the following protocols operates SMTP, SSH, FTP, HTTP Process are addressed via port which represents services.

The transport layer performs Host-to-Host communications on either the local net or a remote one separated by routers. It provides a channel for the communication needs of the application. UDP is the basic transport layer protocol, providing a unreliable conection less datagram service. TCP, (transmission Control Protocol), on the other hand, offers a Flow-control, conection establishment and reliable transmission of data

The Internet layer exchanges diagram accross network bandaries. It provides a uniform networking interface that hides the actual topology (layout) of the underlaying network connections. This layer defines the addressing And routing structures of the TCP/IP protocol suite. The primary protocol here is the Internet Protocol (IP), which defines IP addresses

The link layer defines the networking methods within the scope of the local network link on which host communicate without intervening routers.

Data Flow
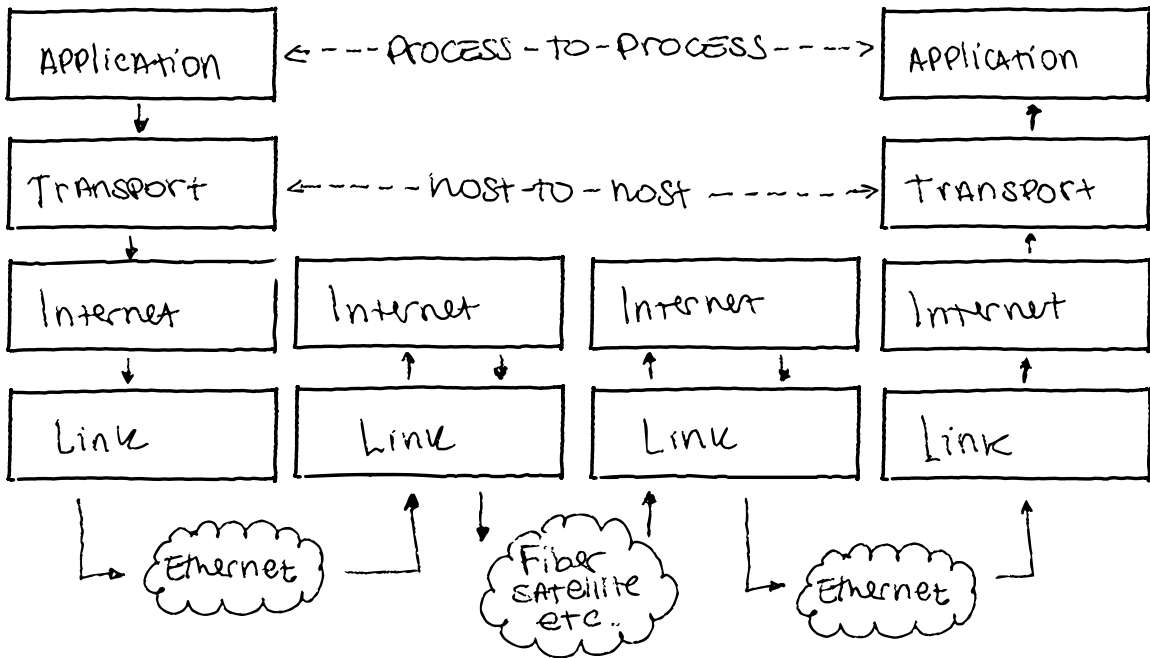
Conceptual flow in a simple network topology of two host (A and B) connected by a link between their respective routers.

Both Apps reads and writes operations as if the processes where directly connected to eachother by some king of data pipe. As a result at the transport layer the communication appears as host-to-host without knowing the App. Data structure and connecting routers.