

Understanding TCP/IP

By:

Engr. Joseph Ronald Cañedo

Outline

- Overview
- TCP / IP
- TCP / IP Suite
- TCP / IP Stack vs. OSI Model
- Internet Protocol
- UDP
- TCP
- TCP/IP Applications

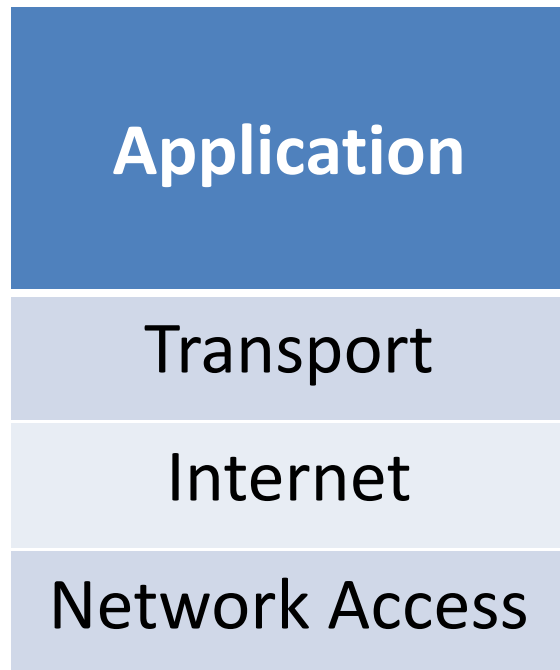
Evolution of TCP/IP

- ARPANET or DARPA (Defense Advanced Research Projects Administration (DARPA) Network)
- TCP/IP used as protocol system in ARPANET or DARPA.
- National Science Foundation network based on ARPANET or DARPA: Evolved into Internet
- TCP/IP: Protocol for Internet

TCP / IP Popularity

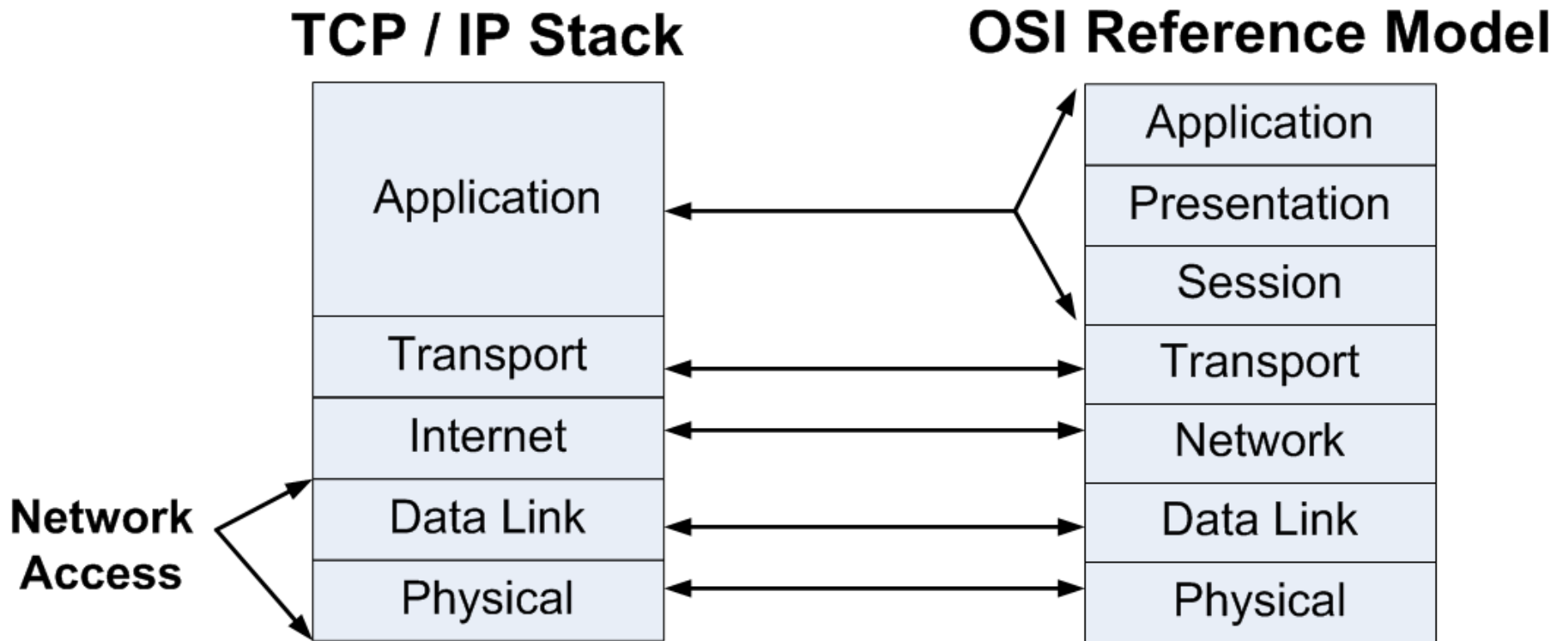
- Allows data to be routed over large network
- Used by virtually all operating systems and platforms
- Large number of utilities and tools
- Required for connection to the internet

TCP / IP Stack



- Defines four layers
- Uses different names for layers 1 through 3
- Combines layers 5 through 7 into single application layer

TCP / IP Stack vs. the OSI Model



Internet Protocol Characteristics

- Operates at network layer of OSI
- Connectionless protocol
- Packets treated independently
- Hierarchical addressing
- Best-effort delivery
- No data recovery features

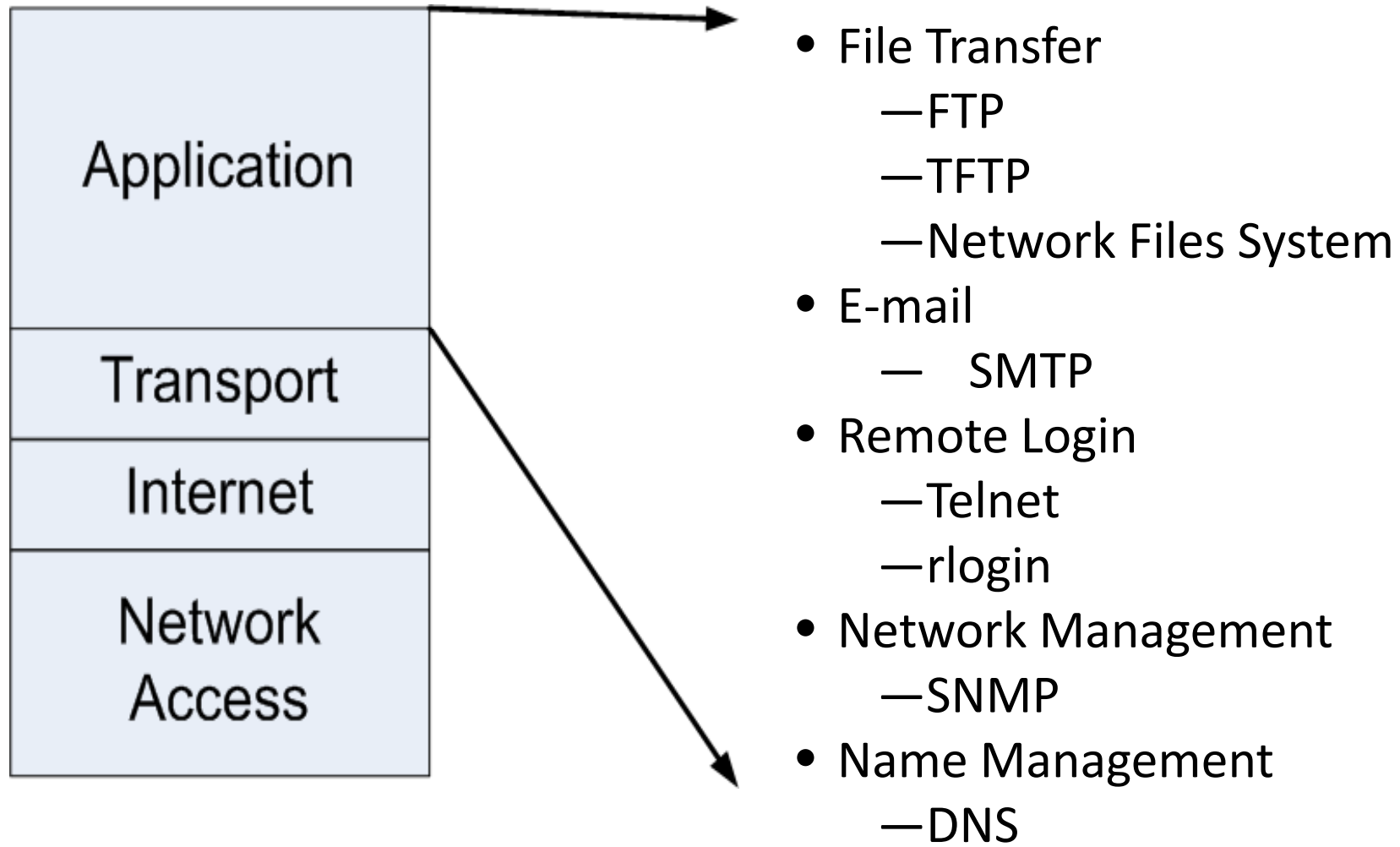
UDP Characteristics

- Operates at transport layer of OSI and TCP/IP models
- Provides applications with access to the network layer without the overhead of reliability mechanisms
- Connectionless protocol
- Limited error checking
- Best-effort delivery
- No data recovery features

TCP Characteristics

- Operates at the transport layer of the TCP/IP stack.
- Provides applications with access to the network layer
- Connection-oriented protocol
- Full-duplex mode operation
- Error checking
- Sequence of data packets
- Acknowledgement of receipt
- Data recovery features

TCP/IP Application Layer Overview



Summary

- TCP/IP was the protocol used in DARPANET, the decentralized network of computers created by the US Dept. of Defense that became the basis for the internet.
- TCP/IP is now the most widely used protocol for a number of reasons, including its flexible addressing scheme, usability by most operating systems and platforms, its many tools and utilities, and the need to use it to connect to the internet.
- The components of the TCP/IP stack are the network access, internet, transport, and application layers.

Summary

- The OSI model and TCP/IP stack are similar in structure and function, with correlation at the physical, data-link, network and transport layers. The OSI model divides the application layer of the TCP/IP stack into 3 separate layers.
- The IP component of the term TCP/IP determines where packets of data are to be routed based on their destination addresses. IP is connectionless, operates at the network layer, delivers data packets on a best-effort not provide any data recovery functions.

Summary

- UDP is a protocol that operates at the transport layer and provides applications with access to the network layer without the overhead of the reliability mechanisms of TCP. UDP is a connectionless, best-effort delivery protocol.
- TCP is a protocol that operates at the transport layer and provides applications with access to the network layer. TCP is connection-oriented, provides error checking, delivers data reliability, operates in full-duplex mode, and provides some data recovery functions.
- TCP/IP supports a number of application, including FTP (support bidirectional binary and ASCII file transfers), TFTP, and Telnet.

