Professor Messer's

CompTIA Network+

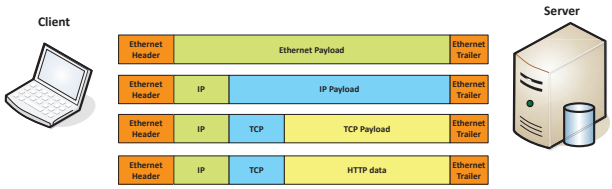
N10-007 Course Notes

http://www.ProfessorMesser.com

1.1 - Introduction to IP

A Series of Moving Vans

- Efficiently move large amounts of data
  - Use a shipping truck
- The network topology is the road
  - Ethernet, DSL, coax cable
- The truck is the Internet Protocol (IP)
  - We've designed the roads for this truck
- The boxes hold your data
  - Boxes of TCP and UDP
- Inside the boxes are more things
  - Application information



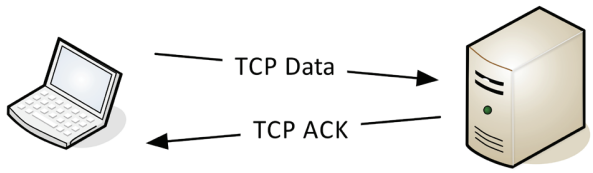
TCP and UDP

- Transported inside of IP
  - Encapsulated by the IP protocol
- Two ways to move data from place to place
  - Different features for different applications
- OSI Layer 4
  - The transport layer
- Multiplexing
  - Use many different applications at the same time
  - TCP and UDP

TCP - Transmission Control Protocol

- Connection-oriented
  - A formal connection setup and close
- "Reliable" delivery
  - Recovery from errors
  - Can manage out-of-order messages or retransmissions
- Flow control
  - The receiver can manage how much data is sent

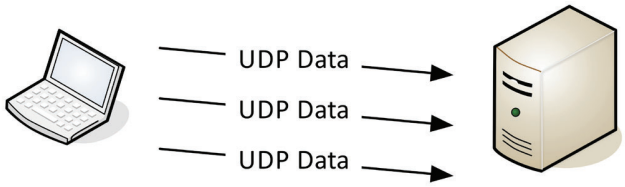
TCP - Transmission Control Protocol Communication



UDP - User Datagram Protocol

- Connectionless
  - No formal open or close to the connection
- "Unreliable" delivery - No error recovery
  - No reordering of data or retransmissions
- No flow control
  - Sender determines the amount of data transmitted

UDP - User Datagram Protocol Communication



Lots of Ports

- IPv4 sockets
  - Server IP address, protocol, server application port number
  - Client IP address, protocol, client port number
- Non-ephemeral ports –permanent port numbers
  - Ports 0 through 1,023
  - Usually on a server or service
- Ephemeral ports – temporary port numbers
  - Ports 1,024 through 65,535
  - Determined in real-time by the clients

Port Numbers

- TCP and UDP ports can be any number between 0 and 65,535
- Most servers (services) use non-ephemeral (not-temporary) port numbers
  - This isn't always the case - it's just a number.
- Port numbers are for communication, not security
- Service port numbers need to be "well known"
- TCP port numbers aren't the same as UDP port numbers

ICMP

- Internet Control Message Protocol
  - "Text messaging" for your network devices
- Another protocol carried by IP - Not used for data transfer
- Devices can request and reply to administrative requests
  - Hey, are you there? / Yes, I'm right here.
- Devices can send messages when things don't go well
  - That network you're trying to reach is not reachable from here
  - Your time-to-live expired, just letting you know