Summary of Network Packets: Ethernet, TCP, UDP, ICMP

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1. Ethernet Packet (Layer 2 – Data Link Layer)

- Minimum size: 64 bytes (with data)

- Maximum size: 1518 bytes (standard MTU)

- Main fields:

  - Destination MAC (6 bytes)

  - Source MAC (6 bytes)

  - EtherType (2 bytes), e.g., 0x0800 for IPv4

  - Data (46 to 1500 bytes)

  - FCS (CRC) – Frame Check Sequence (4 bytes)

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2. IP Packet (Layer 3 – Network Layer)

- Header size: 20 bytes (IPv4 without options)

- Key fields:

  - Version, Header Length, TTL, Protocol

  - Source and Destination IP addresses

  - Protocol values:

    - 1 for ICMP

    - 6 for TCP

    - 17 for UDP

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3. TCP Packet (Layer 4 – Transport Layer, Connection-Oriented)

- Header size: Minimum 20 bytes (up to 60 with options)

- Key fields:

  - Source Port (2 bytes)

  - Destination Port (2 bytes)

  - Sequence Number, Acknowledgment Number

  - Flags (SYN, ACK, FIN, RST,PSH ,URG,FIN)

  - Window Size, Checksum, Urgent Pointer

- Common ports:

  - HTTP: 80

  - HTTPS: 443

- o FTP: 21
- o SSH: 22

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4. UDP Packet (Layer 4 – Transport Layer, Connectionless)

- Header size: 8 bytes
- Fields:
  - o Source Port (2 bytes)
  - o Destination Port (2 bytes)
  - o Total Length (header + data)
  - o Checksum
- Common ports:
  - o DNS: 53
  - o DHCP: 67/68
  - o SNMP: 161

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5. ICMP Packet (Internet Control Message Protocol)

- ICMP header size: 8 bytes
- Used for error messages and diagnostics
- Fields:
  - o Type (8 bits)
  - o Code (8 bits)
  - o Checksum (16 bits)
  - o Data (depends on type)
- Common types:
  - o 0: Echo Reply
  - o 3: Destination Unreachable
  - o 8: Echo Request (ping)
  - o 11: Time Exceeded