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CS2705

Chapter 9

* ICMP
  + Internet Control Message Protocol
  + Network Layer Protocol
  + Encapsulated in IP Header
    - DL | IP | ICMP
* IP Missing
  + Error reporting
  + Error correction
  + Flow control
  + Host/management Queries
* Packet Format
  + Type - 8 bits
  + Code - 8 bits
  + Checksum - 16 bits
  + Rest of header - 32 bits
  + Data
* Error Reporting (send to original host)
  + Destination Unreachable
  + Source Quench
  + Time Exceeded
  + Parameter Problems
  + Redirection
* Query Messages
  + Echo Request/reply
  + Timestamp request/reply
* Don't send
  + ICMP Error Message
  + Fragment other than the first fragment
  + Has a multicast address
  + Special Address
    - 0.0.0.0
    - 172.0.0.1
  + Include first 8 bytes of data
* Destination Host Unreachable
* 15 codes
  + Host Unreachable
    - Router knows about host
  + Host Unknown
    - Router doesn’t know about host at all
  + Protocol Unreachable
  + Port Unreachable
  + Fragmentation Required
  + Source Routing
* Source Quench
  + Code 0
  + Send 1 per dropped packet
  + Works well in a 1 to 1, less well in a many - to - one
  + Deprecate in 1995
* Time Exceeded
  + Code 0
    - TTL exceeded traceroute
  + Code 1
    - Fragmentation timer
* Parameter Problem
  + Error or Ambiguity in the IP header
  + Code : 0
    - Error in main header
      * pointer to problematic byte
  + Code : 1
    - Error in options
* Redirection
  + Hosts hovc static routes
  + Sometimes its incorrect
  + Router forward to the correct spot
  + Send a redirection message
    - Include IP address of new route
* ECHO
  + Test connection
  + Network troubleshooting
    - ping google.com
  + Include data
    - ping of death
  + response time
* Timestamp
  + Original timestamp
  + Receive timestamp
  + Transmit timestamp
* Routing
  + Autonomous Systems
    - within
  + Intradomain Routing
    - without
* Distance
  + Vector Routing
* Bellman-ford algorithm
* for each vertex (router)
  + if u == self
    - distance [v] = 0
  + else
    - distance [v] = inf;
* for i to n;
  + for edge (link)