checksum (Debugging)

Page No. 01
Date

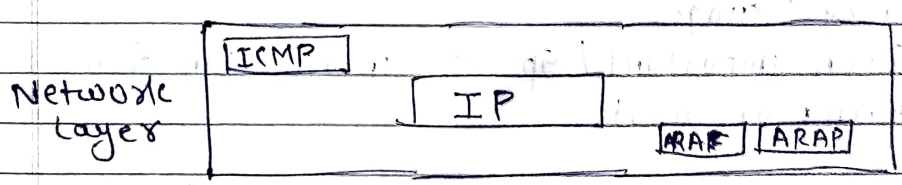
Internet Control Message Protocol

ICMP :-

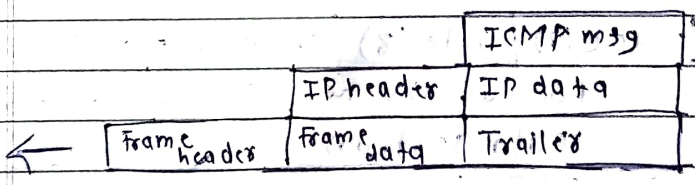
- ICMP is designed to overcome the following two problems with IP Protocol :-

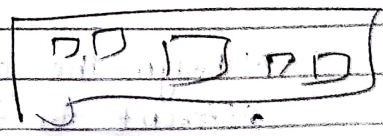
(1) NO error Reporting / Correcting Mechanism
(2) Lacks a mechanism for Queries

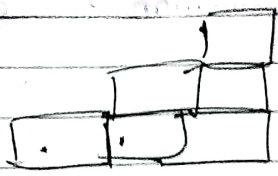
- ICMP is Companion of IP protocol



- ICMP messages are not directly passed to the data link layer, Instead the messages are first encapsulated inside IP datagrams before going to the lower layer.







Page No.
Date

Types of Messages in ICMP

ICMP

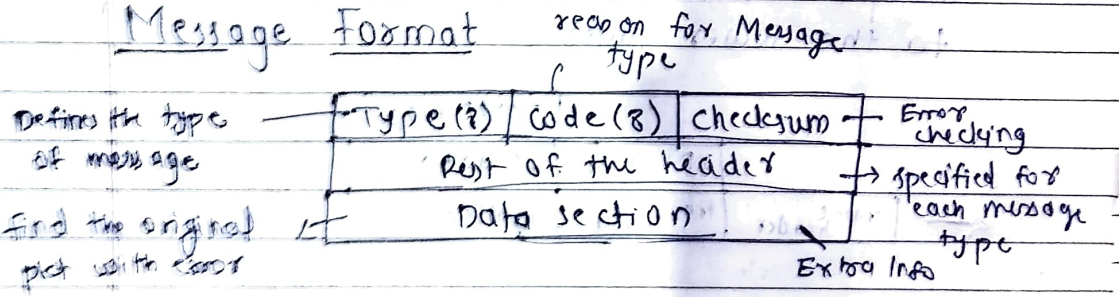
- Error Reporting
- Query Messages

Error Reporting :-
Reports Problem that router or a host may encounter while processing of IP packet.

Query Messages
fetch important / specific information from a Router or host.

e.g. Ping command sends an ICMP Echo req. to host.

Message Format



- An ICMP message has an 8-byte header and a variable-size data section.

- Although the general format at the header is different for each-message type, the first 4-bytes are common to all

Page No.
Date

Error Reporting

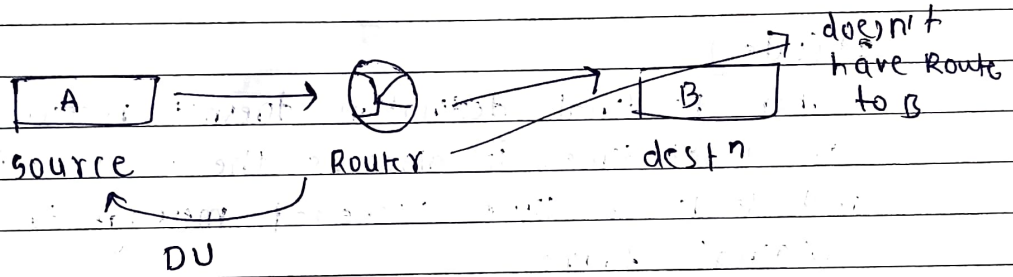
- ICMP always reports error message to the original source

- ICMP does not correct Errors.

Error Reporting Types

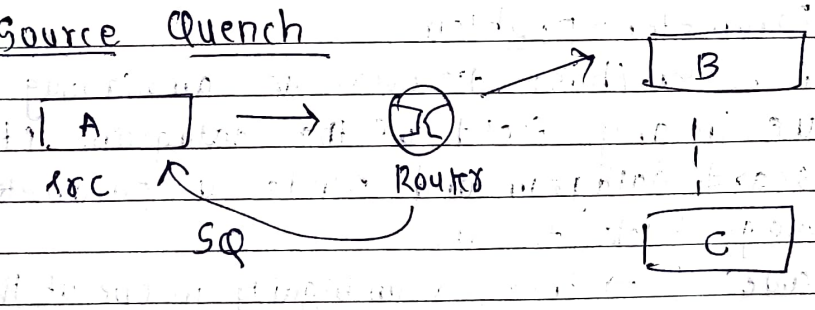
- Destn unreachable
- Source quench
- Time Exceeded
- parameter problems
- redirection

(1) Destination Unreachable



- whenever a route to the destination is not found, datagram is discarded and Router/host send Destination Unreachable Message back to the source.

(2) Source Quench



- This message informs the source that a datagram has been discarded due to congestion

- The src must slow down the sending of datagrams until the congestion is relieved.

3) Time exceeded :-

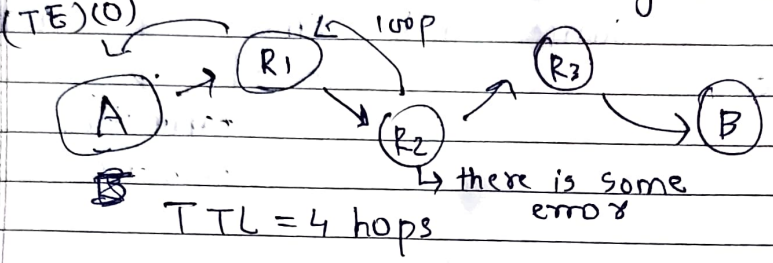
It is generated in the following two cases :-

(1) Code 0

(2) Code 1

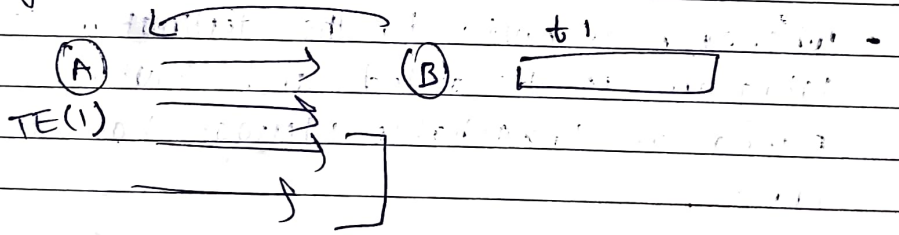
(1) Code 0

Whenever a Router '↓' a datagram with TTL value to zero (0), it discards the datagram and sends a Time exceeded Msg to original source.



(2) Code 1

When the final destination doesn't receive all fragments in a set time, it discards the received fragments and sends a time-exceeded message to the original source.



(4) Parameter-problem

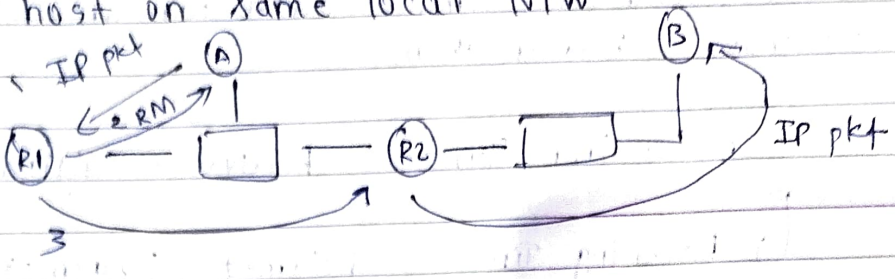
If routers/host discovers an ambiguous or missing value in any field of the datagram, it discard datagram and sends a parameter problem message back to src

↳ code '0' → Error or ambiguity in one of the header field

↳ code '1' → Required Part of the option is missing.

(5) Redirection

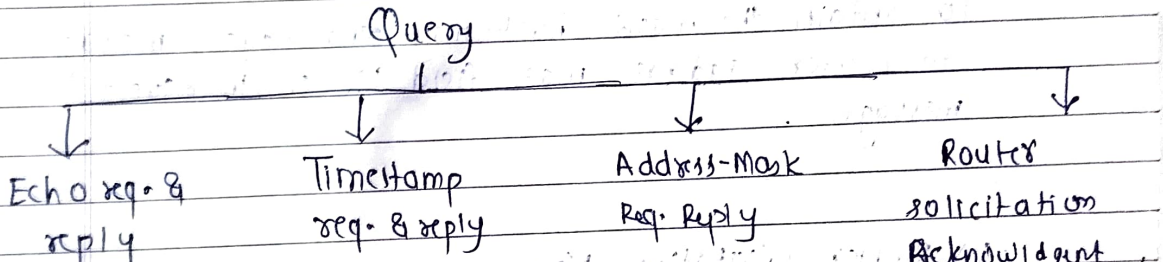
- Redirection message is sent from a router to a host on same local NIW



Query Messages

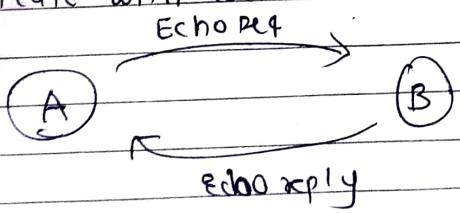
Query Messages are used to diagnose some Network problems.

There are 4 types of Query Messages



(1) Echo request and reply

- Designed for the diagnostic purpose. These messages are used to determine whether two systems can communicate with each other



(2) Time Stamp Request and Reply :-

- Two machines uses these message to determine the Round Trip Time needed for an IP datagram to travel between them

  - Sending Time — Receive - Orginal
  - Receiving Time — Returned - Transmit
  - Round Trip — Sending + Receiving

(3) Mask request & reply

- Marking needed for diskless stations at boot time.
- To obtain the mask, host may send request message to router address mask field is '0' in request message.

(4) Router Solicitation Message

- To know if the routers are alive & functioning
- hosts broadcast router solicitation message, routers reply with routers Ads' message.