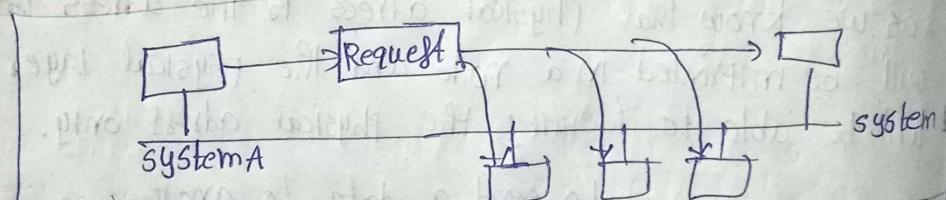


Address Mapping

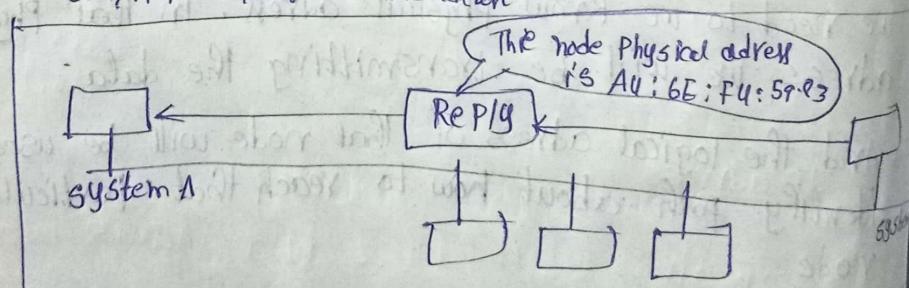
The delivery of a packet to a host or a router requires two levels of addressing: logical and physical. We need to be able to map a logical address to its corresponding physical address and vice versa. This can be done by using either static or dynamic mapping.

- * How to find the physical part of a node when we know its IP address.
 - This is required whenever we send from 1 node to another.
- * If you have the IP address of a node then using that IP address we will be able to determine the route to reach the destination node.
- * But when we have to physically transmit a signal for that node, then we need the physical address of that node.
- * As we know that physical address is the address that will be imprinted in a node and the physical layer will be able to identify the physical address only.
- * So if we want to send a data to another node we need to know physical address. In that physical address we will be transmitting the data.
- * And the logical address of that node will be used to identify path about how to reach that particular node.
- * Suppose if a node knows the IP address of another node but does not have the physical address of another node then it can use this protocol that Address resolution protocol (ARP).

- * so using this (ARP) a node which knows the ip address of another node will be able to determine the physical address
- * so how this address resolution protocol (ARP) works is whenever a system wants to know the physical address
- * it will create a ^(arp) Request packet and that will be broadcasted in the entire network
- * so every other device in that network will be getting this a ^(arp) request message
- * ~~every~~ any node having the ip address matching the it will be determining its own physical address and then that physical address will be inserted in a packet this is called (ARP) reply
- * which will be unicasted to requester node



a. ARP request is broadcast



b. ARP reply has unicast

IP

c

Rs

al

e

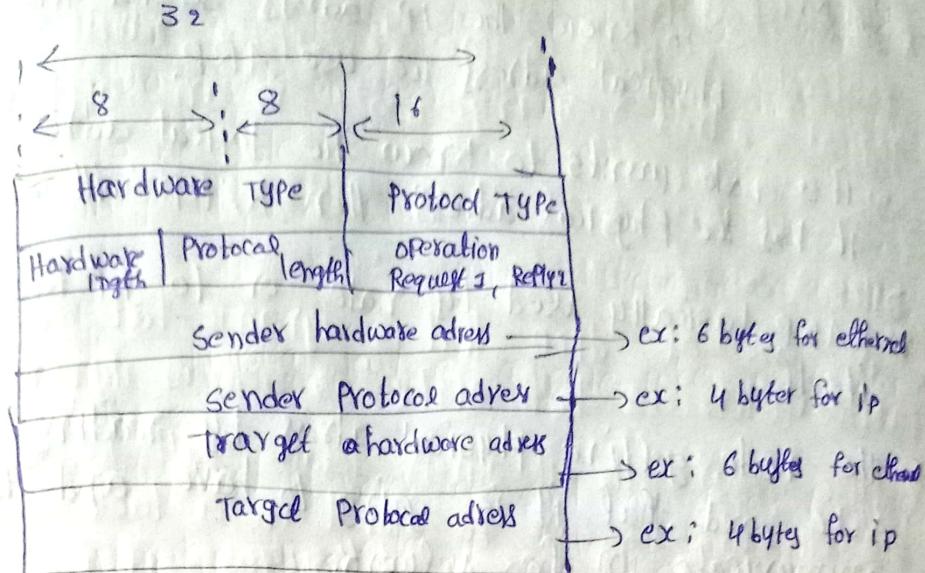
etting

then
and
it that

Item B

System B

ARP packet format



ARP request and reply

A

130.23.43.20

B2:34.55.10.22:10

130.23.213.25

B

ARP Request

0x001	0x000
0x06	0x00



RARP

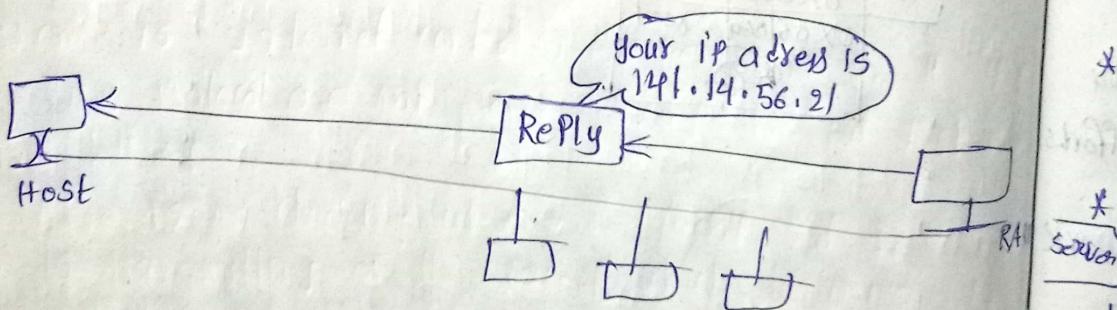
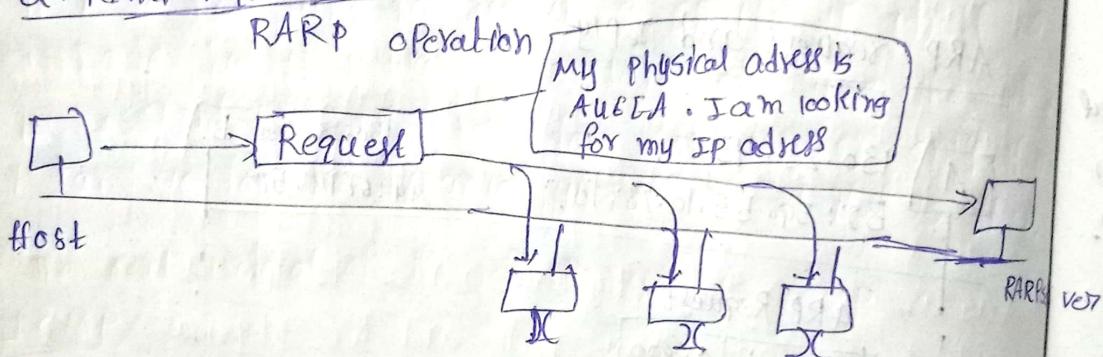
To know the IP address do not know the Physical address we use ARP.

→ If a node wants to know the logical address when it has the Physical address Then RARP will be used

* RARP basically used by node or to get know about itself

* The node getting physical address by reading the NIC card that it is going to have and to be communicate in the network.

a. RARP request is broadcast



RARP Packet format

all the field are same as ARP

→ except order of the address & operation

Hardware type	Protocol type
Hardware length	Protocol length
	Operation Request 3, Reply 4
	Sender hardware address (ex: 6 bytes of ethernet)
	Sender Protocol address (for ex: 4 bytes for IP) (It is not filled for request)
	Target hardware address
	Target protocol address

BOOTP

RARPserver

In case of bootstrap protocol there will be a dedicated server for managing all this.

* So the node will be sending a request. not to all other node in that Network but to relay agent

* And that relay agent know the ip address of bootstrap server that is responsible for maintaining and that will be providing the ip address.

* So the Advantage of bootP protocol over RARP is the number of communication will be less

* But again here also bootstrap is protocol is also a static protocol.

↳ Means IP addresses stored in table.

IMP

* The Bootstrap protocol BootP is a client/server protocol designed to provide physical address to logical address mapping. BootP is an application layer protocol.

DHCP

In case of DHCP that is dynamic host configuration protocol this is both static as well as dynamic.

* Static means the IP address details will ~~be~~ be predetermined and can be stored in a table also as well as and when required suppose if i

IMP
* If i do not want to assign a specific IP address to a node but if i want whenever node ^{want} use the internet to assign the IP address for that duration only. Then i can go for the dynamic type of protocol that is DHCP.

* The next protocol of the network layer is ICMP.

ICMP

ICMP is Internet control message protocol. The IPv4 or IPv6 protocol are not proper delivery the put best effort for delivery.

* There is no checking whether the packet that the network is transmitting or the packet which destination is receiving has error (or) not.

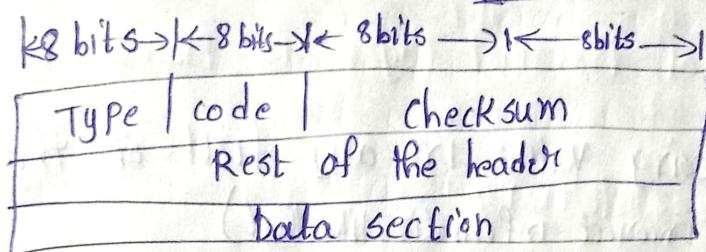
* And there is also know mechanism of finding any information about any other node.

* So for that we want this reliability feature that is error detection mechanism.

^{IMP}
* The IP protocol has no error-reporting or error-correcting mechanism. The IP protocol also lacks a mechanism for host and management querying. The (ICMP) has been designed to compensate for the above two deficiencies.

* It is a companion to the IP Protocol.

General format of ICMP messages



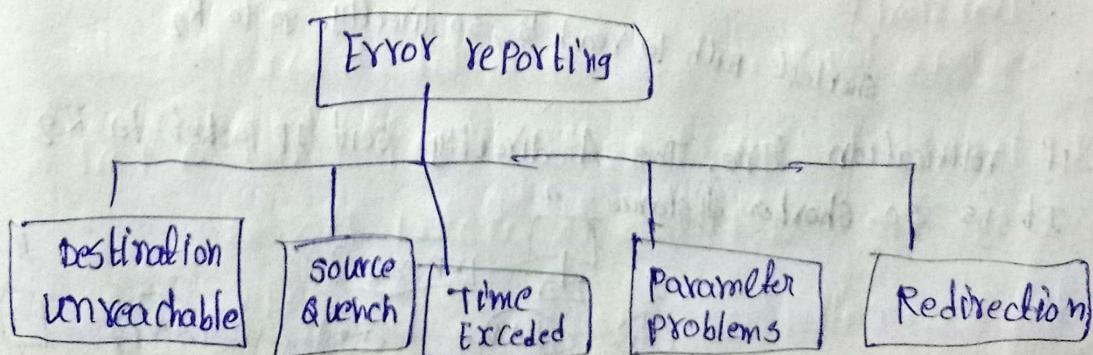
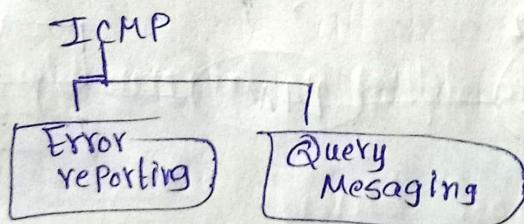
Type : Type of msg

Code : Reason for particular msg type.

Checksum : header and data

Rest of header : specific to each msg type.

Data : info for finding original pkt that had error



Destination unreachable

Router or host can not deliver a datagram

Source quench

Kind of flow control, msg saying datagram discarded due to overflow

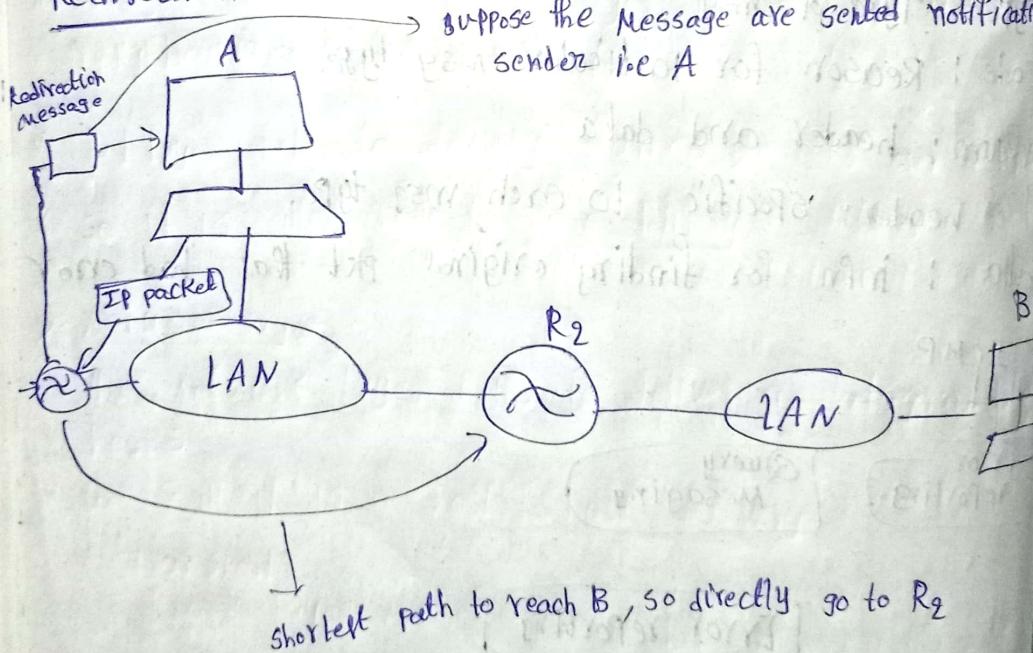
Time exceeded

When TTL becomes 0 and when some fragment does not reach in time

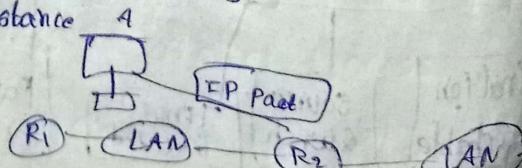
Parameter problem

Ambiguity or missing value in any field of the datagram (sending incorrect information like that)

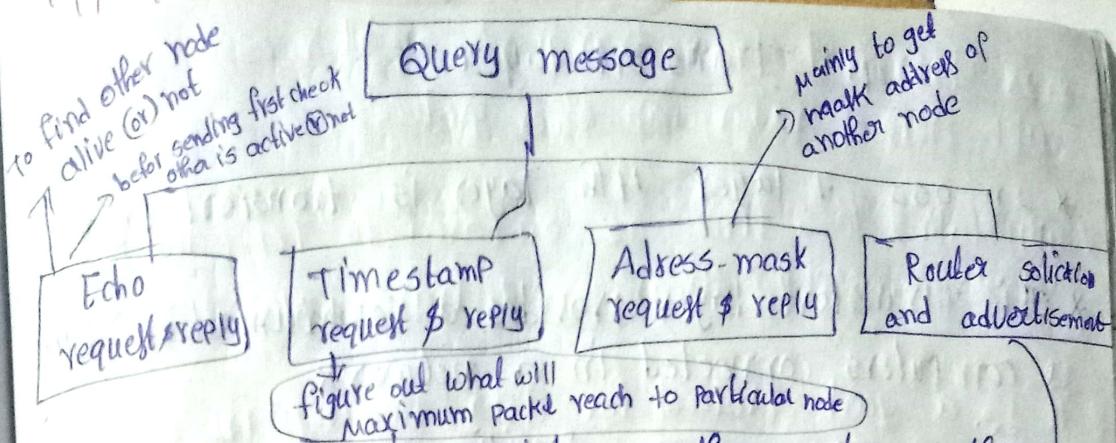
Redirection



If redirection done, then A directly sent IP packet to R₂. It is so shorter distance.



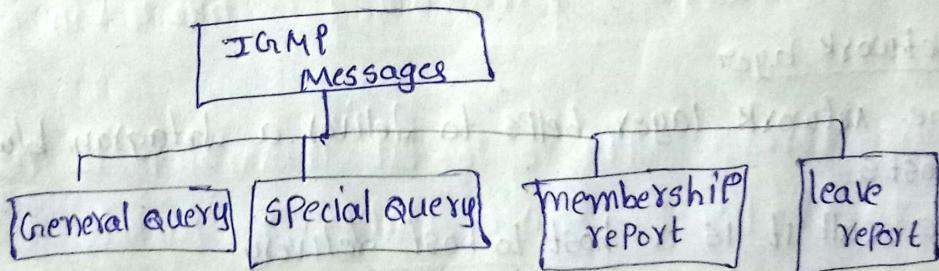
14/08/23



* Query Message is used to another node, another router, another network of devices.

IGMP

The ip protocol can be involved in two types of communication: unicasting and multicasting. The Internet group management protocol (IGMP) is one of the necessary, but not sufficient, protocols that is involved in multicasting. IGMP is a companion to the IP Protocol.



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