

Exercise 2

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CRC checksums

Please calculate the CRC R of

$$D = 0101\ 1101\ 1010\ 0101\ 1110\ 0000.$$

Use the 4 bit generator

$$G = 1101.$$

Note:

R is always of length $|G|-1$

CRC (Done by Vivien & Fabiola) trials by Linus, Jonathan and Helen

Handwritten binary long division on a chalkboard:

Dividend: 010110011010010111000000000

Long division steps:

$$\begin{array}{r} 1101 \\ 01101 \\ \underline{1101} \\ 000001101 \\ \underline{1101} \\ 00011011 \\ \underline{1101} \\ 1101 \\ \underline{1101} \\ 0 \end{array}$$
$$\begin{array}{r} 1100 \\ 1101 \\ \underline{1101} \\ 010 \end{array}$$

Remainder: 010

Result: R

Purpose of the link layer

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Answer:

Hop-to-hop connection in one network
(NOT between networks)

ARP and inter-networking

What happens, if you want to connect to a host that is not in your local area network?

ARP and inter-networking

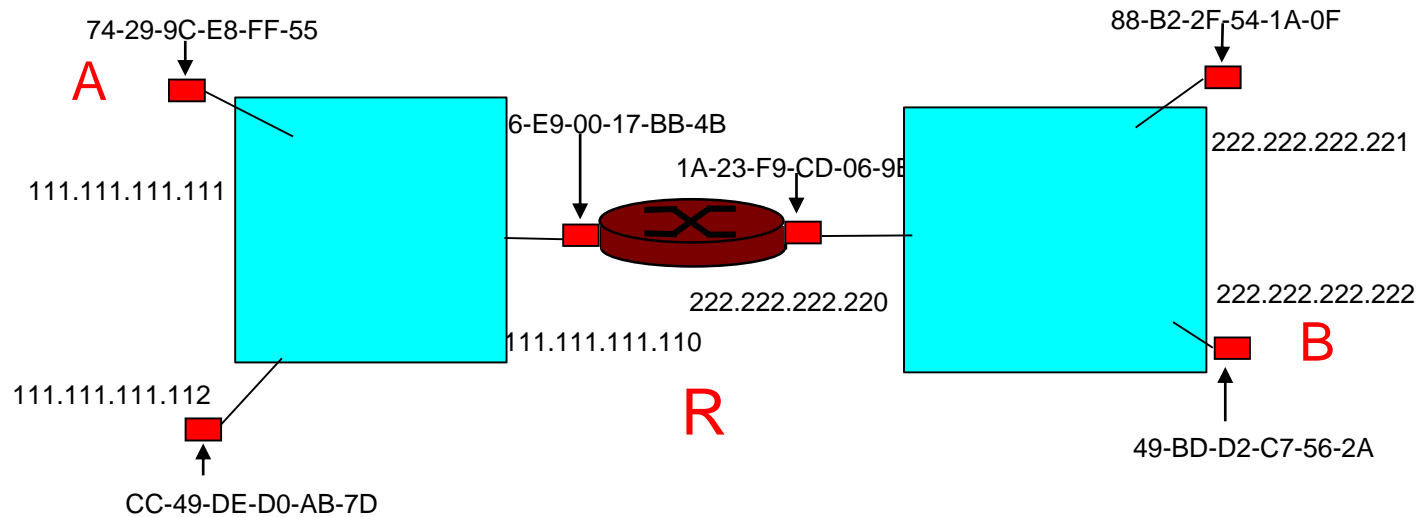
What happens, if you want to connect to a host that is not in your local area network?

Answer:

Remember: ARP is layer 2, routers are layer 3.
Inter-networking is the job of the network layer.

ARP is serving in looking up the MAC of the router that connects to the network of the destination node.

- 1.A creates IP datagram with source A, destination B
- 2.A uses ARP to get R's MAC address for 111.111.111.110
- 3.A creates link-layer frame with R's MAC address as dest, frame contains A-to-B IP datagram
- 4.A's NIC sends frame
- 5.R's NIC receives frame
- 6.R removes IP datagram from Ethernet frame, sees destination B
- 7.R uses ARP to get B's MAC address
- 8.R creates frame containing A-to-B IP datagram sends to B



MAC and IP addresses

Please name a conceptual difference between MAC and IP addresses

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Answer:

MAC addresses are unique identifiers for a specific device.

IP addresses for devices may change frequently

Exponential backoff

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Why does Ethernet use exponential backoff for collision detection?

Answer:

Exponential backoff is a simple way to quickly resolve a collision and to adapt to varying congestion states.

It does not require additional signalling among nodes.