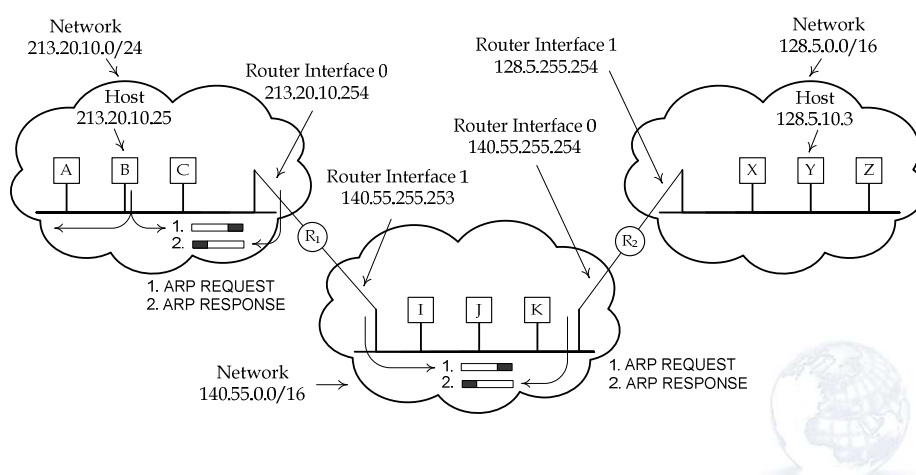


Lecture 13: Address Resolution Protocol (ARP)

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EE426: Communication Networks

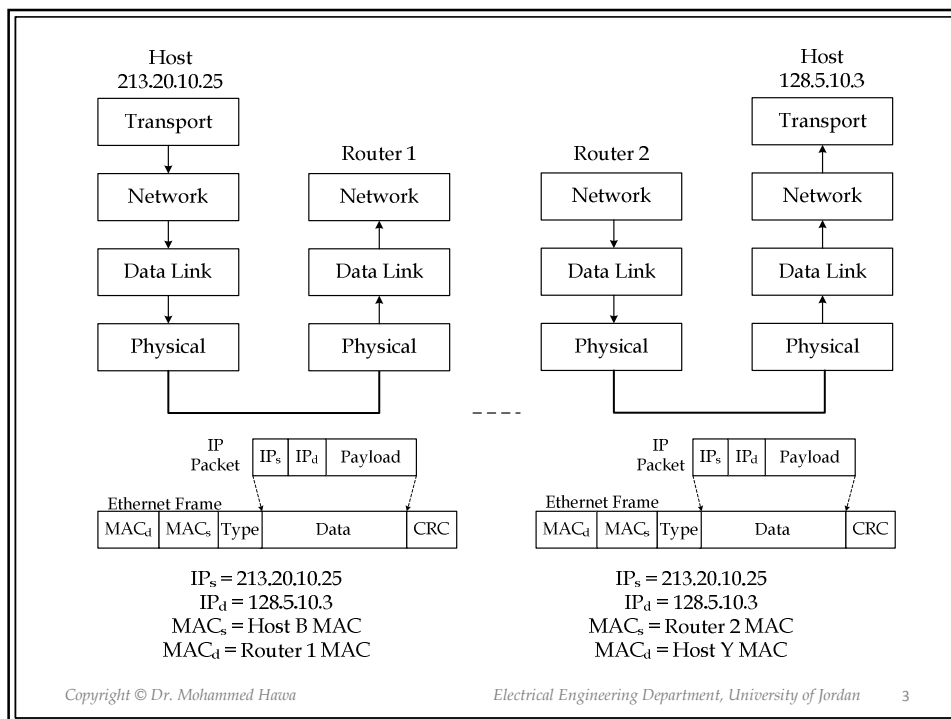
Example



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ARP

- **Address resolution:** The process of translating a host's IP address into the equivalent MAC address.
- A machine can resolve the address of another machine only if both machines are on the same physical network.
- For hosts outside of the network machines resolve the address of the default gateway (next hop).
- ARP (described in RFC 826) can perform address resolution.
- ARP is commonly used to resolve IP addresses into Ethernet MAC addresses, but it can map any type of address to any other address type.
- ARP allows a machine to build an **address binding table**. The machine starts with an empty address binding table (except for an entry to its own address).

Address Binding Table

IP Address	Hardware (MAC) Address	Type
213.20.10.25	0A:07:4B:12:82:55	Static
213.20.10.1	0A:1C:28:71:32:8D	Dynamic
213.20.10.23	0A:11:C3:68:01:99	Dynamic
213.20.10.200	0A:74:59:32:CC:1F	Dynamic
213.20.10.201	0A:04:BC:00:03:28	Dynamic
213.20.10.254	08:77:81:0E:52:FA	Dynamic

- To see the table on your Windows machine:

```
C:\> arp -a
```

ARP

- ARP is executed to fill the table as follows:
 - The machine broadcasts an ARP REQUEST message to all hosts on the physical network.
 - Each machine on the network receives the REQUEST message. All stations (and especially the destination) are required to read this binding and update their cache with the new entry. Only the machine that has the IP address replies with an ARP RESPONSE.
- The address binding table is treated as a cache:
 - Oldest entry is removed when the table runs out of space.
 - Entries are removed after a long period of time (e.g., 20 minutes).
 - New information overrides old information.
- An optimization is to have every machine broadcast its mapping when it boots (Who owns my IP address?).

ARP Messages

