SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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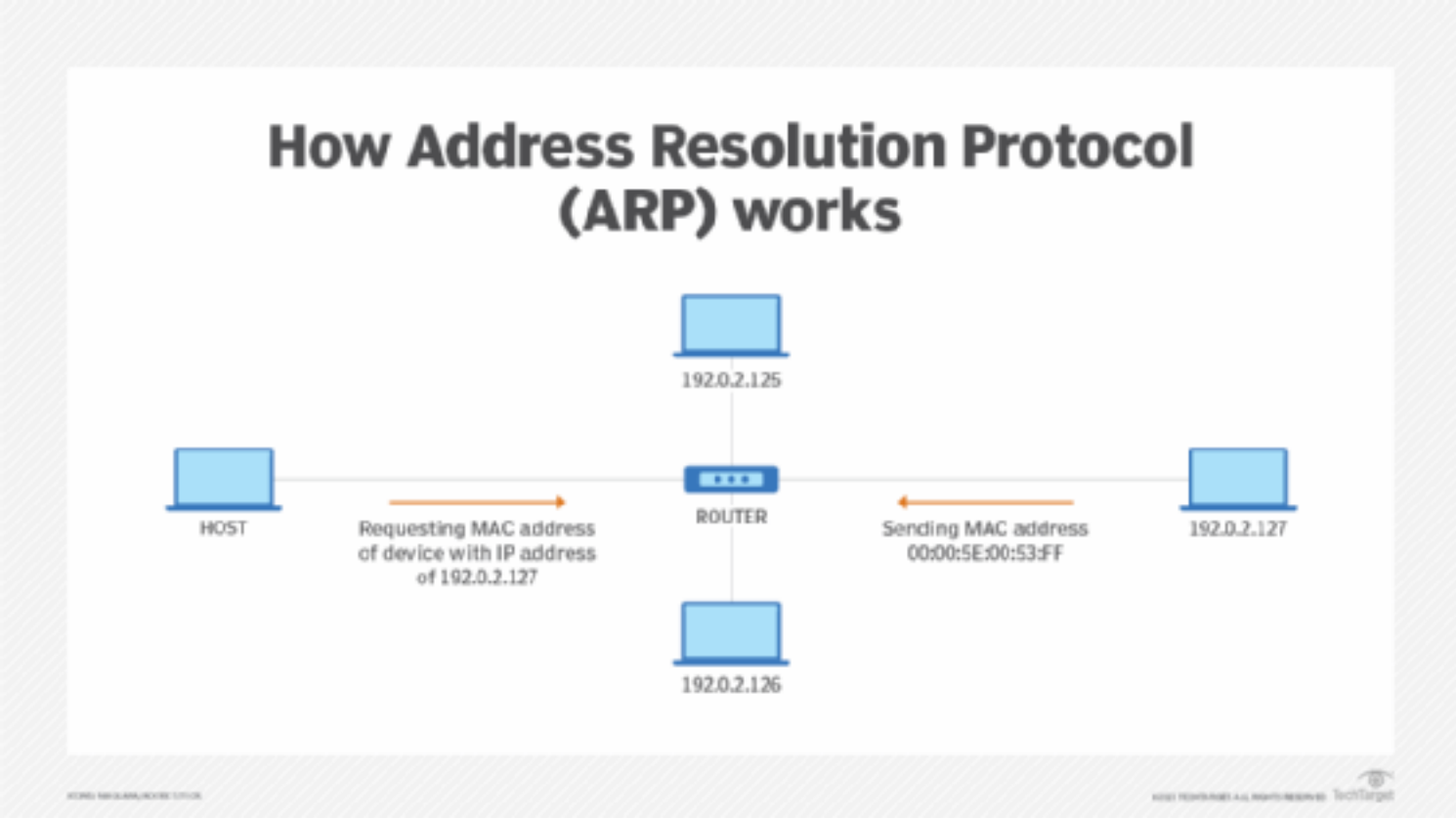
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

19CSB302- COMPUTER NETWORKS

UNIT-3 INTERNETWORKING AND ROUTING

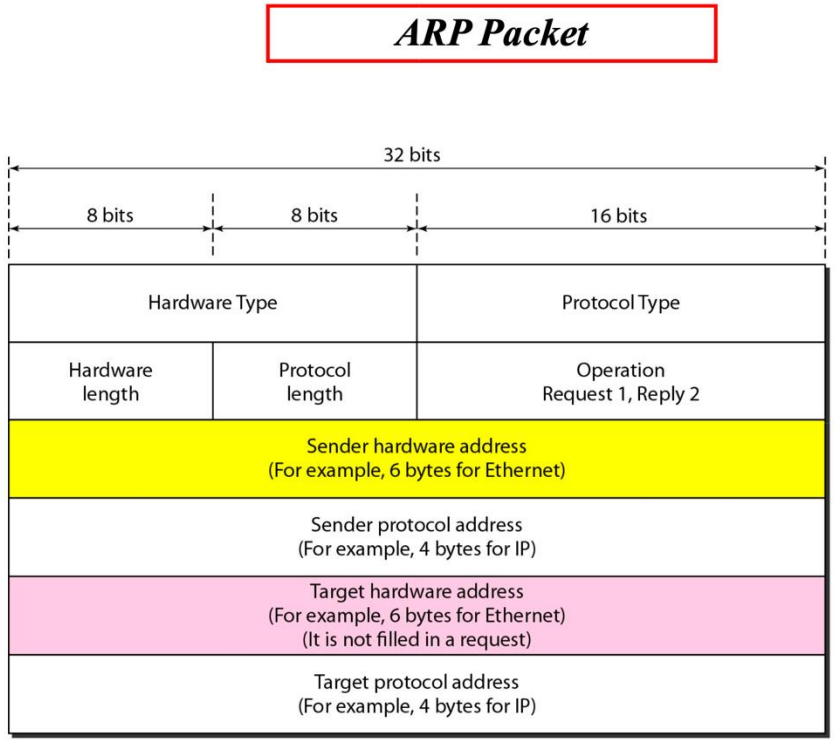
ARP-Address Resolution Protocol

- Address Resolution Protocol (ARP) is a procedure for mapping a dynamic IP address to a permanent physical machine address in a local area network (LAN). The physical machine address is also known as a media access control (MAC) address.
- The job of ARP is essentially to translate 32-bit addresses to 48-bit addresses and vice versa. This is necessary because IP addresses in IP version 4 (IPv4) are 32 bits, but MAC addresses are 48 bits.


How Address Resolution Protocol (ARP) works
192.0.2.125
HOST
Requesting MAC address of device with IP address of 192.0.2.127
ROUTER
Sending MAC address 00:00:5E:00:53:FF
192.0.2.127
192.0.2.126

- When an incoming packet destined for a host machine on a particular LAN arrives at a gateway, the gateway asks the ARP program to find a MAC address that matches the IP address.
- A table called the **ARP cache** maintains a record of each IP address and its corresponding MAC address.
- ARP broadcasts a request packet to all the machines on the LAN and asks if any of the machines are using that particular IP address. When a machine recognizes the IP address as its own, it sends a reply so ARP can update the cache

ARP Packet Format



Hardware type: This is 16 bits field defining the type of the network on which ARP is running. Ethernet is given type 1.

Protocol type: This is 16 bits field defining the protocol.

Hardware length: This is an 8 bits field defining the length of the physical address in bytes. Ethernet is the value 6.

Protocol length: This is an 8 bits field defining the length of the logical address in bytes. For the IPv4 protocol, the value is 4.

Operation (request or reply): This is a 16 bits field defining the type of packet. Packet types are ARP request (1), and ARP reply (2).

- **Sender hardware address:** This is a variable length field defining the physical address of the sender. For example, for Ethernet, this field is 6 bytes long.
- **Sender protocol address:** This is also a variable length field defining the logical address of the sender For the IP protocol, this field is 4 bytes long.
- **Target hardware address:** This is a variable length field defining the physical address of the target. For Ethernet, this field is 6 bytes long. For the ARP request messages, this field is all Os because the sender does not know the physical address of the target.
- **Target protocol address:** This is also a variable length field defining the logical address of the target. For the IPv4 protocol, this field is 4 bytes long.

RARP

Reverse Address Resolution Protocol (RARP) is a network-specific standard protocol. Some network hosts, such as a diskless workstation, do not know their own IP address when they are booted. To determine their own IP address, they use a mechanism similar to ARP

- The reverse address resolution is performed the same way as the ARP address resolution. The same packet format is used for the ARP.
- An exception is the operation code field that now takes the following values–
- **3 for RARP request**
- **4 for RARP reply**