ASSIGNMENT 2.2
FUNCTIONALITY OF ARP & RARP

ARP PROTOCOL

Address Resolution Protocol (ARP) is a protocol or procedure that connects an ever-changing Internet Protocol (IP) address to a fixed physical machine address, also known as a media access control (MAC) address, in a local-area network (LAN).

The MAC address is also known as the data link layer, which establishes and terminates a connection between two physically connected devices so that data transfer can take place. The IP address is also referred to as the network layer or the layer responsible for forwarding packets of data through different routers. ARP works between these layers.

When a new computer joins a local area network (LAN), it will receive a unique IP address to use for identification and communication.

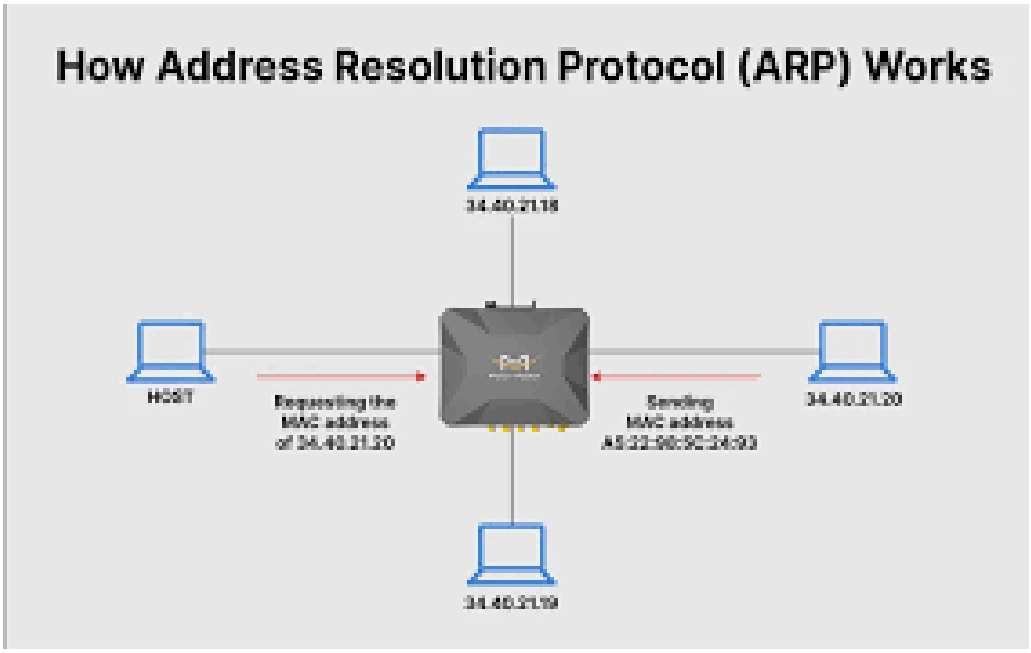
WORKING OF ARP

Packets of data arrive at a gateway, destined for a particular host machine. The gateway, or the piece of hardware on a network that allows data to flow from one network to another, asks the ARP program to find a MAC address that matches the IP address. The ARP cache keeps a list of each IP address and its matching MAC address. The ARP cache is dynamic, but users on a network can also configure a static ARP Table containing IP addresses and MAC addresses.

ARP caches are kept on all operating systems in an IPv4 Ethernet network. Every time a device requests a MAC address to send data to another device connected to the LAN, the device verifies its ARP cache to see if the IP-to-MAC-address connection has already been completed. If it exists, then a new request is unnecessary. However, if the translation has not yet

been carried out, then the request for network addresses is sent, and ARP is performed.

An ARP cache size is limited by design, and addresses tend to stay in the cache for only a few minutes. It is purged regularly to free up space. This design is also intended for privacy and security to prevent IP addresses from being stolen or spoofed by cyberattackers. While MAC addresses are fixed, IP addresses are constantly updated.



Types Of ARP

1. **Proxy ARP**

   Proxy ARP is a technique by which a proxy device on a given network answers the ARP request for an IP address that is not on that network. The

proxy is aware of the location of the traffic's destination and offers its own MAC address as the destination.

2. **Gratuitous ARP**

   Gratuitous ARP is almost like an administrative procedure, carried out as a way for a host on a network to simply announce or update its IP-to-MAC address. Gratuitous ARP is not prompted by an ARP request to translate an IP address to a MAC address.

RARP PROTOCOL

Reverse Address Resolution Protocol (RARP) is a network-specific standard protocol. It is described in RFC 903. 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, but now the hardware address of the host is the known parameter, and the IP address is the queried parameter.

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

WORKING OF RARP

- **When a device needs an IP address, it broadcasts a RARP request packet containing its MAC address in both the sender and receiver hardware address fields.**

ASSIGNMENT 2.2
FUNCTIONALITY OF ARP & RARP

- **A special host known as a RARP server configured on the network receives the RARP request packet. After that, it checks its table of MAC addresses and IP addresses.**
- **If the RARP server finds a matching entry for the MAC address, it sends back an RARP reply packet that includes both the MAC address and the corresponding IP address.**
- **The device that initiated the RARP request packet receives the RARP reply packet. After getting the reply, it then extracts the IP address from it. This IP address is then used for communication on the network.**