

## ARP (Address Resolution Protocol):

- o ARP is a term which stands for Address Resolution Protocol.
- o ARP translates 32-bit addresses to 48-bit addresses and vice-versa.
- o ARP translates Internet Protocol address to Media Access Control address.
- o Address Resolution Protocol translates Layer 3 address to Layer 2 address.
- o Network Layer protocol used to convert an IP address into a physical address.
- o ARP is used to convert the IP address into its physical correspondence called MAC.
- o Address Resolution Protocol request is broadcast & ARP response is a Unicast.
- o The protocol that determines MAC address from the IP address is called ARP.
- o Address Resolution Protocol (ARP) has always been a Layer 2 protocol not Layer 3.
- o Address Resolution Protocol default ARP aging time is 4 hours or equal 240 minutes.
- o By default, entry will be removed from ARP table if it wasn't used in 240 minutes.
- o Just keep in mind the Cisco Switch holds the CAM table entries only for 5 minutes.
- o If see "0" that means having traffic in that interface just less than a minute ago.
- o Permanent ARP entry does not have any timer associated with it is shown as "-".
- o Address Resolution Protocol only works between devices in the same IP Subnet.

```
R1#show ip arp
Protocol Address           Age (min)  Hardware Addr  Type   Interface
Internet 1.1.1.1                -          aaaa.aaaa.1111 ARPA   FastEthernet0/0
Internet 1.1.1.2                0          aaaa.aaaa.2222 ARPA   FastEthernet0/0
```

```
B0#show arp
Protocol Address           Age (min)  Hardware Addr  Type   Interface
Internet 1.1.1.1                -          ca02.18fc.0008 ARPA
Internet 1.1.1.2                -          ca01.1ffc.0008 ARPA   FastEthernet0/0
Internet 192.168.1.1           122       0a67.08e8.b93d ARPA   FastEthernet0/1
Internet 192.168.1.254        -          ca01.1ffc.0006 ARPA   FastEthernet0/1
```

**Protocol** – The protocol type, almost always Internet.

**Address** – The IP address associated with the MAC address, The IP address of R1.

**Age** – By default, entry removed from ARP table if it wasn't used in 240 minutes.

0 in this column means that the entry was last used 0 minutes ago.

Each time an entry is used, the age will be reset back to zero.

**Hardware** – The MAC address of the host with the corresponding IP address.

**Type** – The type of hardware address. For Ethernet, this value will always be ARPA.

**Interface** – The interface on R1 on which the corresponding host is connected.

R1(config)# ARP 1.1.1.1 ca02.18fc.0008 ARPA	C:\Users\aali.c>arp -a
R1# show ip arp	C:\Users\aali.c>arp -d
R1# clear arp-cache	R1=debug arp

## Gratuitous ARP:

- o Gratuitous Address Resolution Protocol is used in advance network scenarios.
- o It is something performed by computer or network devices while booting up.
- o When device booted up first time, it automatically broadcast its MAC address.
- o After Gratuitous ARP MAC address of the computer is known to every device.
- o And allow DHCP servers to know where to send the IP address if requested.
- o Gratuitous ARP could mean both Gratuitous ARP request & Gratuitous ARP reply.
- o Gratuitous ARP is ARP-Reply that was not prompted by an ARP-Request.
- o Hosts on network send out a Gratuitous ARP when they are initializing their IP stack.
- o GARP is an ARP request for their own IP address & is used to check for duplicate IP.
- o Gratuitous Address Resolution Protocol is useful to detect IP conflict.
- o If there is a duplicate address, then the stack does not complete initialization.
- o GARP is also used to update ARP mapping table & Switch port MAC address table.
- o Gratuitous ARP update the ARP mappings of other devices on the network.
- o There are many use cases for Gratuitous ARP (Address Resolution Protocol).
- o HSRP (and many other redundancy protocols) use Gratuitous ARP frequently.

Destination	Protocol	Length	Info
Broadcast	ARP	60	Gratuitous ARP for 1.1.1.1 (Reply)
Broadcast	ARP	60	Gratuitous ARP for 1.1.1.1 (Reply)
Broadcast	ARP	60	Gratuitous ARP for 1.1.1.2 (Reply)
Broadcast	ARP	60	Gratuitous ARP for 1.1.1.2 (Reply)
Broadcast	ARP	60	Who has 1.1.1.2? Tell 1.1.1.1
ca:01:0c:1c:00:00	ARP	60	1.1.1.2 is at ca:02:01:74:00:00
ca:02:01:74:00:00	ARP	60	Who has 1.1.1.2? Tell 1.1.1.1 (duplicate use of 1.1.1.1 detected!)

**Please google them & understand the difference.**

1-ARP

2- Proxy ARP

3- Gratuitous ARP

4- Reverse Address Resolution Protocol (RARP)

5- Inverse Address Resolution Protocol (InARP)