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Difference between ARP and RARP:

ARP (Address Resolution Protocol) and RARP (Reverse Address Resolution Protocol) are networking protocols used to map IP addresses to MAC addresses and vice versa.

Here's a brief explanation of ARP and RARP, including their resolution process, packet format, and encapsulation:

Arp (Address Resolution Protocol):

Resolution Process:

When a device in a network wants to communicate with another device using its IP address, it needs to know the corresponding MAC address.

ARP helps in resolving this mapping.

- The device checks its ARP cache, which maintains a mapping of IP addresses to MAC addresses for recently accessed devices.
- If the mapping is not found in the cache, the device sends an ARP request broadcast message to the network, asking "Who has this IP address? Please tell me your MAC

address.”

- The device with the matching IP address responds with an ARP reply message containing its MAC address.
- The requesting device then updates its ARP cache with the new mapping.

Packet Format:

An ARP packet consists of several fields, including the hardware type, protocol type, hardware address length, protocol address length, operation code, sender hardware address, sender protocol address, target hardware address, and target protocol address.

Encapsulation:

ARP messages are encapsulated within Ethernet frames or other suitable link-layer protocols when transmitted over the network.

Rarp (Reverse Address Resolution Protocol):

Resolution Process:

RARP serves the opposite purpose of ARP. It allows a device to determine its IP address when it knows only its MAC address.

RARP is typically used in diskless workstations or devices that do not have their IP addresses statically configured.

- The device sends a RARP request broadcast message to the network, asking “Who has this MAC address? Please tell me your IP address.”
- A RARP server on the network responds with a RARP reply message containing the IP address associated with the MAC address.

Packet Format:

Similar to ARP, RARP packets have fields such as hardware type, protocol type, hardware address length, protocol address length, operation code, sender hardware address, sender protocol address, target hardware address, and target protocol address.

Encapsulation:

RARP messages are encapsulated within Ethernet frames or other link-layer protocols when transmitted over the network.

Difference Between Arp And Rarp:

	ARP (Address Resolution Protocol)	RARP (Reverse Address Resolution Protocol)
Purpose	Resolves IP addresses to MAC addresses	Resolves MAC addresses to IP addresses
Functionality	Maps IP addresses to MAC addresses for communication	Maps MAC addresses to IP addresses for address assignment

	ARP (Address Resolution Protocol)	RARP (Reverse Address Resolution Protocol)
Usage	Used by devices to find the MAC address of a device with a known IP address	Used by diskless or IP-less devices to determine their IP address
Message Type	ARP Request and ARP Reply messages	RARP Request and RARP Reply messages
Resolution Process	Device sends ARP Request to find the MAC address associated with a known IP address	Device sends RARP Request to find the IP address associated with a known MAC address
Request Type	Broadcast message requesting the MAC address for a specific IP address	Broadcast message requesting the IP address for a specific MAC address
Response Type	Unicast message providing the MAC address corresponding to the requested IP address	Unicast message providing the IP address corresponding to the requested MAC address
Packet Format	ARP packets have fields for hardware type, protocol type, hardware address length, protocol address length, operation code, sender hardware address, sender protocol address, target hardware address, and target protocol address	RARP packets have similar fields as ARP packets
Usage Status	Widely used in modern networks	Largely replaced by DHCP (Dynamic Host Configuration Protocol) for IP address assignment

	ARP (Address Resolution Protocol)	RARP (Reverse Address Resolution Protocol)
Encapsulation	ARP messages are encapsulated within Ethernet frames or other suitable link-layer protocols	RARP messages are encapsulated within Ethernet frames or other link-layer protocols
Common Use Case	Resolving IP addresses to MAC addresses in Ethernet-based networks	Assigning IP addresses to diskless workstations or devices without statically configured IP addresses

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