BRYANT SEC 9. DNS, ARP, and DHCP

SEC 9.1 DNS/ARP

The <u>Domain Name System</u> translates a hostname into the IP address assigned to that hostname.

A <u>DNS Query</u> is sent out asking for the IP address and a DNS server answers the request

DNS is also used <u>internally for hosts.</u>

<u>Address Resolution Protocol</u> (or <u>ARP</u>) uses a series of broadcasts and replies to find the MAC address of a host (Along with a cache of addresses.)

To see the ARP cache on a pc, use `arp -a`

To find a (non-cached) MAC Address for Host B, an ARP Request will be sent to the broadcast MAC (FFFF.FFFF.FFFF) containing the IP Address of Host B, requesting that the host with that IP Address will answer.
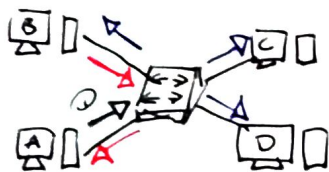
① Host A sends ARP Request.
② Request is broadcast to all <u>other</u> ports
③ Host B Replies

SEC 9.2 DHCP Fun(damentals)

DNS and ARP perform very important network functions but our host needs some important details before it can use those two protocols:

- its own IP address
- it's own Network Mask
- DNS server IP Address
- default gateway IP Address

our options:
- manually configure
- use DHCP

There are four DHCP message types used in an address acquisition:

- **D**iscover
- **O**FFER
- **R**EQUEST
- **A**CKNOWLEDGEMENT

- Host sends DHCPDISCOVER packet on the L3 broadcast address (255.255.255.255) which is basically yelling "IS ANYONE OUT THERE A DHCP SERVER?!?!?"

- Every DHCP Server that recieves the request will respond with a DHCPOFFER containing:
    - IP Address offered
    - Netmask offered
    - amount of time the offer is for (the lease)
    - IP Address of DHCP Server making this offer

- If the host recieves multiple DHCPOFFERs, it chooses the first one recieved, and then broadcast a DHCPREQUEST, identifying the server whose offer has been accepted. If another server has made an offer and been "rejected" it is now free to offer that IP to other clients again.

- Lastly, The DHCP server sends a DHCPACK to the host with the rest of the information needed.