NETWORK LAYER

The network layer is in charge of routing network messages (data) from one computer to another. Whenever you need to pass data between different subnets, you have to use a layer-3 device such as a router or a layer-3 switch. (Whenever you want to communicate between different networks or subnets, you have to go through either a router or a Layer 3 switch.)

Protocol:

- **IP:** The most significant protocol at layer 3 is the Internet Protocol, or IP.

Device:

Routers function at the Network layer--they examine the logical device and network address to perform routing tasks.They make decisions based on the network address.

- **Layer 3 Switches**: A Layer Three switch is similar to a regular switch, except that they can use the network address to make forwarding decisions. They combine the functions of a switch and a router into a single device. They make routing decisions based on the subnet address.
- **Routers:** Routers operate at layer 3. A router uses the logical network address specified at the Network layer to forward messages to the appropriate LAN segment.
    - Every port on a router is both a collision domain and a broadcast domain.
    - They use logical device and network addresses contained within the packet to make routing decisions through an internetwork.
    - Addresses in frames are physical device addresses. They are used between two devices in the path.
- **Packet Firewalls:** operates at layer 3. With a packet filtering firewall, you can define ACLs based on that information that is contained within the IP packet, including the source IP address, destination IP address, source port number, and destination port number.
    - Firewalls: Some types of firewall can use information from upper layers of the OSI model to make forwarding decisions.
- **Routed Firewalls:** (possibly the same as a packet firewall) operate at layer 3.
    - A router acting as a firewall at Layer 3 is capable of making forwarding decisions based on the IP address.

Troubleshooting:

- A failed ping test indicates a problem at Layer 3.