

6th of January 2020

MAC Address Learning Process of a Switch.

A switch learns MAC addresses by examining the source MAC address of every Ethernet frame it receives on its ports. When a frame arrives, the switch records the source MAC address and associates it with the incoming port in its MAC address table. If the MAC address table is already in the table but associated with a different port, the switch updates the entry to reflect the new port, ensuring accurate forwarding when devices move or network topology changes.

After learning the source address, the switch checks the destination MAC address of the frame. If the destination MAC address exists in the MAC address table, the switch forwards the frame only out of the specific port mapped to that address (known as unicast forwarding). If the destination MAC address is not found in the table, the switch treats the frame as unknown unicast and floods it out to all ports in the same VLAN except the port on which it was received. This flooding allows the switch to eventually learn the destination MAC address when the intended device replies.

MAC address entries are not kept permanently; they are stored for a limited time known as the "aging time" (typically around 300 seconds). If a switch does not see traffic from a learned MAC address before the aging timer expires, the entry is removed from the table. This aging process helps the switch adapt to changes in the network, reduce stale entries, and maintain efficient and accurate frame forwarding.