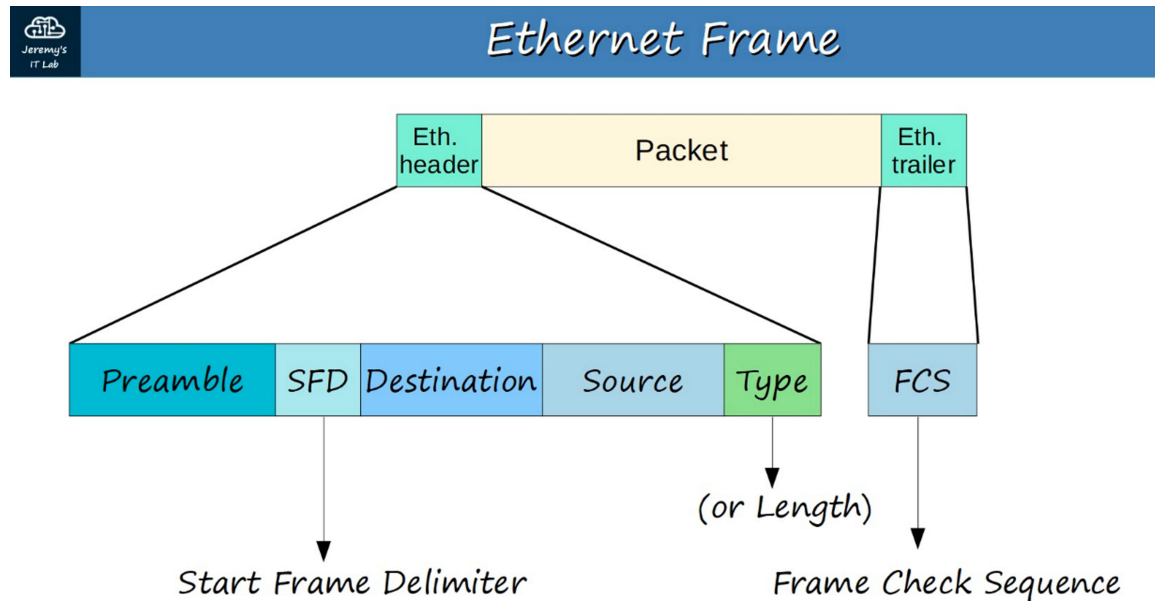


ETHERNET FRAME looks like:



Ethernet Trailer --- PACKET --- Ethernet Header

The Ethernet Header contains 5 Fields:

Preamble -- SFD -- Destination -- Source -- Type

7 bytes -- 1 byte -- 6 bytes -- 6 bytes -- 2 bytes

PREAMBLE:

- Length: 7 bytes (56 bits)
- Alternating 1's and 0's
- 10101010 * 7x
- Allows devices to synchronize their receiver clocks

SFD : 'Start Frame Delimiter'

- Length: 1 byte(8 bits)
- 10101011
- Marks end of the PREAMBLE and beginning of rest of frame.

DESTINATION AND SOURCE

- Layer 2 Address
- Indicates the devices sending / receiving the frame
- MAC = 'Media Access Control'

- = 6 byte (48-bit) address of the physical device

TYPE / LENGTH

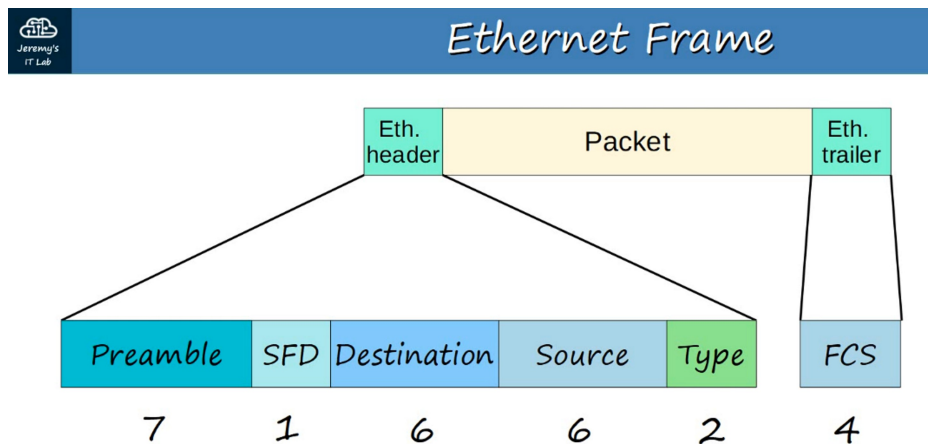
- 2 bytes (16-bit) field
- A value of 1500 or less in this field indicates the LENGTH of the encapsulated packet (in bytes)
- A value of 1536 or greater in this field indicates the TYPE of the encapsulated packet and length is determined via other methods.
- IPv4 = 0x0800 (hexadecimal) = 2048 in decimal
- IPv6 = 0x86DD (hexadecimal) = 34525 in decimal
- Layer 3 protocol used in the encapsulated Packet, which is almost always Internet Protocol (IP) version 4 or version 6.

The ETHERNET TRAILER contains:

FCS

- 'FRAME CHECK SEQUENCE'
- 4 bytes (32 bits) in length
- Detects corrupted data by running a 'CRC' algorithm over the received data
- CRC = "Cyclic Redundancy Check"

Altogether the ETHERNET FRAME = 26 bytes (header + trailer)



= 26 bytes (header + trailer)

MAC ADDRESS (48 bits long)

- 6-bytes (48-bits) physical address assigned to the device when it is made.
- AKA 'Burned-In Address' (BIA)
- Is globally unique
- First 3 bytes are the OUI (Organizationally Unique Identifier) which is assigned to the

company making the device

- The last 3 bytes are unique to the device itself
- Written as 12 hexadecimal characters

Example:

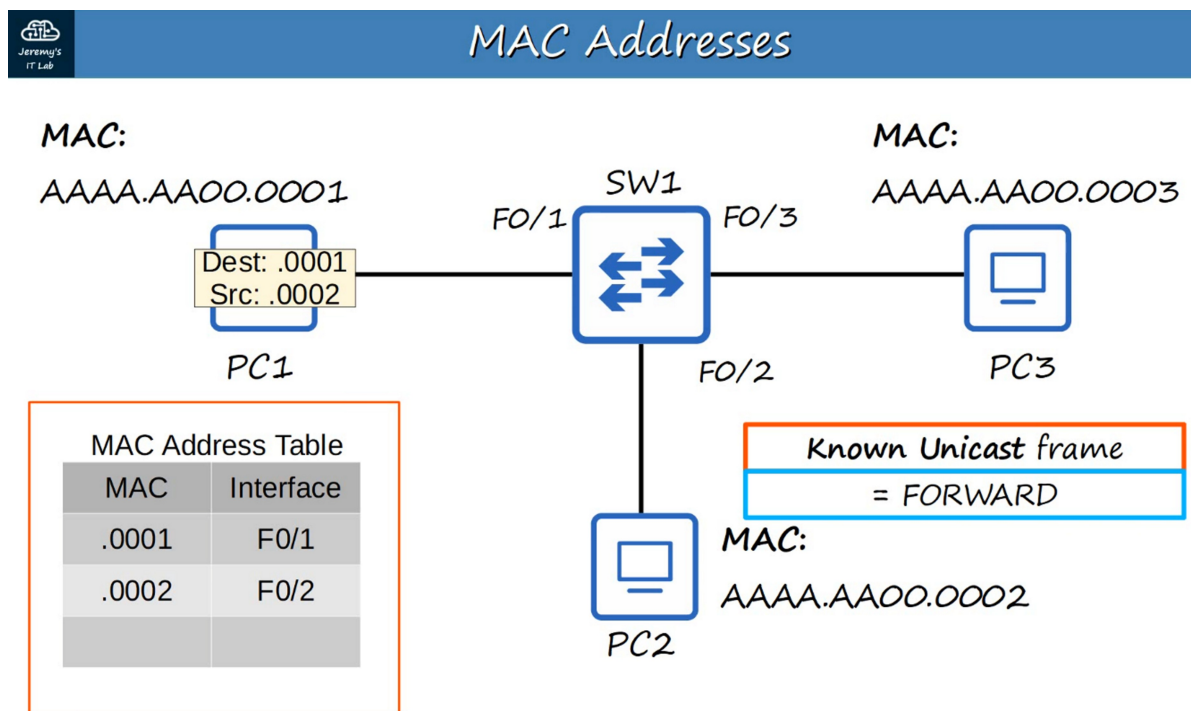
E8:BA:70 // 11:28:74 OUI // Unique Device ID

INTERFACE NAMES

F0/1, F0/2, F0/3... F stands for "Fast Ethernet" or 100 Mbps interfaces.

MAC ADDRESS TABLE

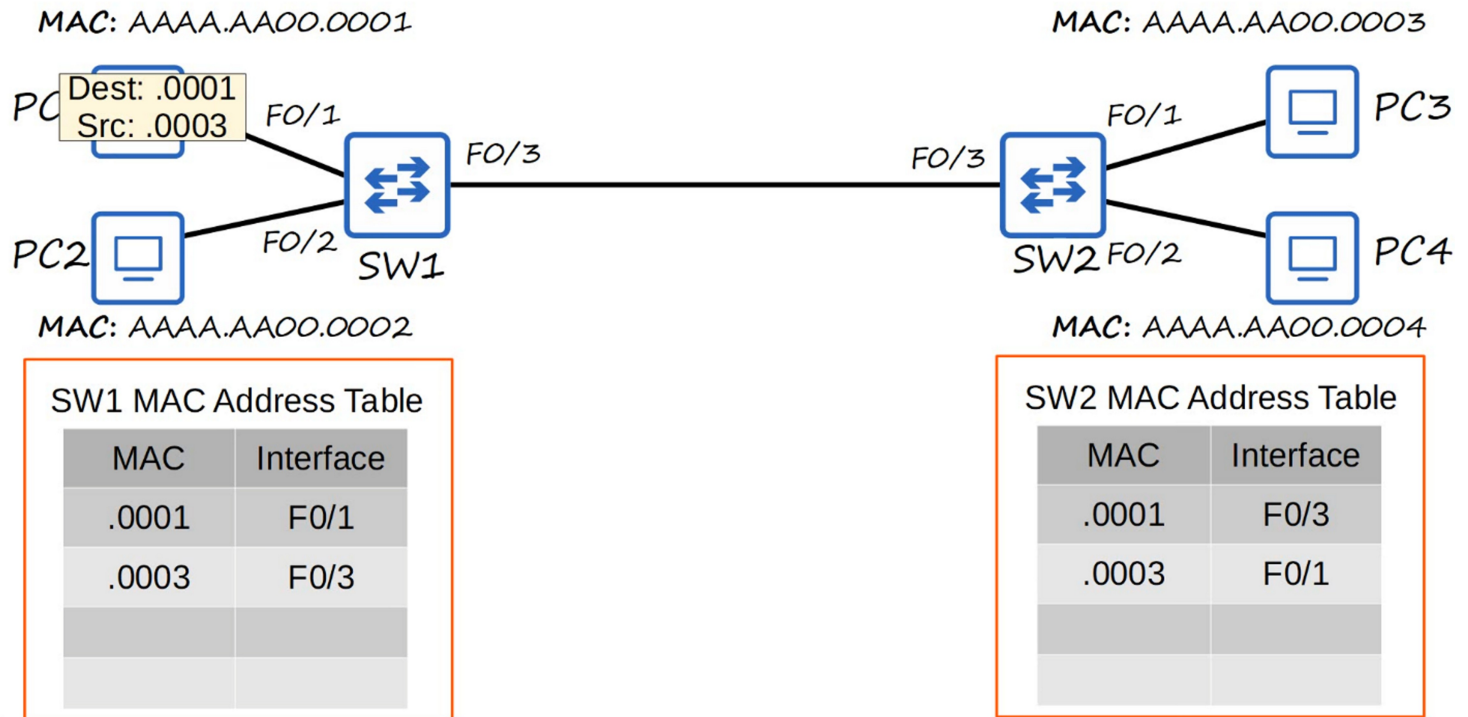
Each Switch stores a DYNAMICALLY LEARNED MAC ADDRESS TABLE, using the SOURCE MAC ADDRESS of frames it receives.



When a Switch doesn't know the DESTINATION MAC ADDRESS of a frame (UNKNOWN UNICAST FRAME), it is forced to FLOOD the frame - Forward the frame out of ALL it's interfaces, except the one it received the packet from.

When a KNOWN Unicast Frame is known (MAC Address is recognized by the entry in the MAC ADDRESS TABLE), the frame is FORWARDED like normal.

MAC Addresses



- Note: Dynamic MAC Addresses are removed from the MAC ADDRESS TABLE every 5 minutes of inactivity.