Achievable

CCNA DUMP SHEET

Switching and VLANs

How a switch forwards

Frame	Destination MAC	Switch does
Known unicast	In the MAC table	Out that port only
Unknown unicast	Not in the table	Floods
Broadcast	`FF:FF:FF:FF:FF:FF`	Floods

- **Three functions:** address learn, forward/filter, loop avoidance
- **Learns** *source* MAC, port, VLAN. **Forwards** by *destination* MAC
- **Flood:** every port in the VLAN except the arrival port
- **Aging:** removed after 300 s (5 minutes) with no frame
- **Cisco MAC format:** `5254.00e8.593d`

VLANs

- **VLAN:** one broadcast domain, so ARP stays inside it. Reaching another VLAN takes a router or Layer 3 switch
- **Default VLAN:** VLAN 1. By default, all ports on a switch are in VLAN 1
- **VLAN mode:** changes apply on `exit`

VLAN ID	Use
1, 1002-1005	Cannot be created, changed, or deleted
2-1001	Yours to create. Normal range is 1-1005
1006-4094	Extended range

```
SW1(config)# vlan 2
SW1(config-vlan)# name DATA-VLAN
SW1(config-vlan)# exit
SW1(config)# interface g0/1
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 2
```

Verify

Command	What it does
`show mac address-table`	MAC, VLAN, port
`show mac address-table aging-time`	Aging timer
`show interfaces trunk`	Native, allowed VLANs
`show interfaces g0/3 switchport`	Set vs actual mode

ARP

- **Purpose:** known IP to MAC. Hosts and routers cache it
- **Request:** broadcast. **Reply:** unicast
- **Target:** also caches the sender from the request
- **Other subnet:** the host ARPs for its default gateway
- **First ping can time out** while ARP runs; later pings succeed
- **Cache:** `arp -a` on Windows, `ip neigh show` on Linux

Trunks and 802.1Q

- **Access port:** one VLAN, untagged. **Trunk:** many, tagged
- **802.1Q (dot1q):** a 4-byte tag. ISL is the legacy Cisco protocol
- **Native VLAN:** untagged. Default VLAN 1, set per trunk port. Must match at both ends, or frames hop VLANs
- **Traps:** a trunk allows VLANs 1-4094 by default, and trunk ports are missing from `show vlan`
- **Encapsulation line:** only where the model also supports ISL
- **VLAN 99:** create it first, on both switches

```
SW1(config)# interface g0/3
SW1(config-if)# switchport trunk encapsulation dot1q
SW1(config-if)# switchport mode trunk
SW1(config-if)# switchport trunk native vlan 99
```

`switchport trunk allowed vlan 2-10,15`	Replaces the list
`switchport trunk allowed vlan add 20`	Adds to it
`switchport trunk allowed vlan remove 5`	Removes from it

Voice VLAN

```
SW1(config)# interface g0/2
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 2
SW1(config-if)# switchport voice vlan 5
```

- **PC:** untagged, in the access (data) VLAN
- **Phone:** tags with the voice VLAN; the switch tags frames back
- **Phone learns the VLAN:** by CDP, LLDP-MED, or by hand
- **Verify:** Voice VLAN in `show interfaces g0/2 switchport`

Speed and duplex

Command	What it does
`speed 100`	Interface mode: sets the speed
`duplex full`	Interface mode: sets duplex

Command	What it does
`show interfaces status`	Speed, duplex, VLAN per port
`show interfaces g0/2`	Twice: rising counters are live

- **Match both ends:** both auto, or both set the same
- **Reading the counters:** see the topologies and cabling sheet