CCNA: Switching, Routing, and Wireless Essentials

**Module 3 – 3.3: VLAN Configuration**

*I. VLAN Ranges on Catalyst Switches*

- Cisco Catalyst switches support a large number of VLANs (e.g., over 4,000 on 2960 and 3650 series).

- VLANs are configured using commands.

- Normal range VLANs are numbered 1-1005.

- Extended range VLANs are numbered 1006-4094.

- The default VLAN configuration can be viewed on the switch.

**- Normal Range VLANs (1-1005):**

+ Common: Used in most networks.

+ Limited IDs: IDs 1002-1005 are reserved. 1 and 1002-1005 are default and can't be deleted.

+ Stored in Flash: Configuration saved in vlan.dat.

+ VTP Sync: Uses VTP to share VLAN info between switches.

**- Extended Range VLANs (1006-4094):**

+ For Big Networks/Providers: Used by large companies or service providers.

+ More IDs: Offers a wider range of VLAN IDs.

+ Stored in Running Config: Saved in the active configuration.

+ Fewer Features: Supports fewer features compared to normal VLANs.

+ VTP Transparent Mode: Requires VTP transparent mode.

Note: 4096 is the *upper boundary (ranh giới trên)* for the number of VLANs available on Catalyst switches, because there are 12 bits in the VLAN ID field of the IEEE 802.1Q header.

*II. VLAN Creation Commands (STEP 1):*

- Flash memory is **persistent (cố định)** and **does not require the copy running-config startup-config command.**

A screenshot of a computer

Description automatically generated

*III. VLAN Creation Example:*

A diagram of a diagram

Description automatically generatedIn topology, the student computer (PC2) has not been associated with a VLAN yet, but it does have an IP address of 172.17.20.22, which belongs to VLAN 20*.*

A black screen with white text

Description automatically generated

Note: In addition to entering a single VLAN ID, a series of VLAN IDs can be entered separated by commas, or a range of VLAN IDs separated by hyphens using the **vlan** vlan-id command. For example, entering the **vlan 100,102,105-107** global configuration command would create VLANs 100, 102, 105, 106, and 107.

*IV. VLAN Port Assignment Command (STEP 2):*

Once you've created a VLAN (like naming a room in your house), you need to put devices into it (put furniture in the room). This is done by assigning switch ports to that VLAN.

Think of switch ports like the doors to the rooms. You need to decide which "door" leads to which "room" (VLAN).

A screenshot of a computer program

Description automatically generated

**Note:** Use the **interface range** command to simultaneously configure multiple interfaces.

*V. VLAN Port Assignment Command Example:*

In the figure, port F0/6 on switch S1 is configured as an access port and assigned to VLAN 20. Any device connected to that port will be associated with VLAN 20. Therefore, in our example, PC2 is in VLAN 20.

A diagram of a computer network

Description automatically generated

A screenshot of a computer program

Description automatically generated

*VI. Data and Voice VLANs:*

Let's imagine you have an office phone (an IP phone) connected to your network. You also have your computer connected to that same phone. Both the phone and the computer share the same physical cable going into the wall.

Even though they share the same cable, the phone and the computer use different "virtual networks" called VLANs. Think of it like having two separate phone lines and two separate internet connections running through the same cable!

**+ Data VLAN:** This is for your computer internet traffic. It's like your regular internet connection.

**+ Voice VLAN:** This is specifically for the phone's voice calls (VoIP). It's optimized for clear phone calls.

A single port on the switch (the wall jack) can handle both these VLANs at the same time. It's like that one cable carrying both phone lines and internet connections. This is how your phone and computer can both work through the same connection. The switch is smart enough to keep the voice traffic and the data traffic separate, even though they're sharing the same wire.

A diagram of a telephone connection

Description automatically generated

*VII. Data and Voice VLANs Example:*

A screenshot of a computer program

Description automatically generated

*VIII. Verify VLAN Information:*

A screenshot of a computer

Description automatically generated

A black background with white text

Description automatically generated

A screen shot of a computer

Description automatically generated