**Assignment**

**Module: CCNA - VLans And Inter-VLan Routing**

**🡪 VLANs (Virtual Local Area Networks)**

**🡪 What is a VLAN?**

A **VLAN** is a **logical grouping of devices** in the same broadcast domain, even if they're not on the same physical switch. VLANs help **segment networks**, enhance security, and improve performance.

**🡪 Key Characteristics:**

* Each VLAN is a separate **broadcast domain**.
* Devices in different VLANs **cannot communicate** without a **Layer 3 device** (e.g., a router or Layer 3 switch).
* VLANs are identified by **VLAN IDs** (range: 1–4094)

**🡪 Common VLAN Types:**

| **VLAN Type** | **Purpose** |
| --- | --- |
| Default VLAN | VLAN 1 – assigned to all ports by default |
| Data VLAN | Carries user-generated traffic |
| Voice VLAN | Carries VoIP traffic |
| Management VLAN | Used to manage switches |
| Native VLAN | Untagged traffic on a trunk link |

**🡪 Inter-VLAN Routing**

**Why is Inter-VLAN Routing Needed?**

Devices in separate VLANs **cannot communicate** without routing, even if they are connected to the same switch. Inter-VLAN routing enables communication between VLANs.

🡪 **Methods of Inter-VLAN Routing**

**1. Router-on-a-Stick (Legacy Method)**

* Uses **one physical interface** on the router with **sub-interfaces** for each VLAN.
* Each sub-interface is assigned an **IP address** as the **default gateway** for that VLAN.
* The switchport connected to the router is configured as a **trunk port**.

**2. Layer 3 Switch Inter-VLAN Routing**

* Uses **SVIs (Switched Virtual Interfaces)**.
* Much faster and scalable than router-on-a-stick.
* No need for external router.

**🡪 Summary Table**

| **Concept** | **Description** |
| --- | --- |
| VLAN | Logical segmentation of Layer 2 networks |
| Inter-VLAN Routing | Enables communication between VLANs |
| Router-on-a-Stick | Router uses sub interfaces and trunk link |
| Layer 3 Switch | Uses SVIs and internal routing |

**Inter-VLAN**

**Switch 1**

**Switch>enable**

**Switch# configure terminal**

**Switch config # vlan 10**

**Switch config #name hr**

**Switch config #exit**

**Switch config # vlan 20**

**Switch config # name account**

**switch config # exit**

**switch config # vlan 30**

**switch config # name nr**

**switch config # exit**

**switch config # do show vlan**

**switch config # interface rang fastethernet 0/1-5**

**switch config # switchport mode access**

**switch config # switchport access vlan 10**

**switch config # exit**

**switch config # interface rang fastethernet 0/6-10**

**switch config # switchport mode access**

**switch config # switchport access vlan 20**

**switch config # exit**

**switch config # interface rang fastethernet 0/11-15**

**switch config # switchport mode access**

**switch config # switchport access vlan 30**

**switch config # exit**

**switch config # vtp ?**

**switch config # vtp mode server**

**switch config # vtp domain cisco**

**switch config # vtp password 123456**

**switch config #switchport mode trunk**

**switch config # exit**

**switch config # interface fastenthernet 0/2**

**switch config-if #switchport mode turnk**

**switch config-if # exit**

**switch 2**

**switch>enable**

**switch #configure terminal**

**switch config # do show valn**

**switch config # vtp mode client**

**switch config #vtp domain cisco**

**switch config # vtp password 123456**

**switch config #interface fastethernet 0/1**

**switch config # switchport mode trunk**

**switch config # exit**

**switch config # do show vlan**

**switch config # interface range fastethernet 0/1-5**

**switch config # switchport mode access**

**switch config # switchport access vlan 10**

**switch config # exit**

**switch config # interface range fastethernet 0/6-10**

**switch config # switchport mode access**

**switch config # switchport access vlan 20**

**switch config # exit**

**switch config # interface range fastethernet 0/11-15**

**switch config # switchport mode access**

**switch config # switchport access vlan 30**

**switch config # exit**