CCNA - VLANs and Inter-VLAN Routing

This document provides a detailed explanation of VLANs and Inter-VLAN Routing, which are important topics in the Cisco Certified Network Associate (CCNA) certification.

# 1. VLANs (Virtual Local Area Networks)

A VLAN is a logical subgroup within a Local Area Network (LAN) that combines a group of devices from different physical LAN segments. VLANs allow network administrators to partition a network into separate, isolated segments to improve performance and security.

Key Characteristics of VLANs:

* - VLANs reduce broadcast domains.
* - They enhance network security.
* - VLANs simplify network management.
* - Devices in different VLANs cannot communicate without a Layer 3 device.

## 2. Types of VLANs

* - Default VLAN: VLAN 1 is the default VLAN on Cisco switches.
* - Data VLAN: Used to carry user-generated traffic.
* - Voice VLAN: Supports voice traffic from IP phones.
* - Management VLAN: Used for switch management traffic.
* - Native VLAN: Carries untagged traffic on trunk ports.

# 3. Inter-VLAN Routing

Inter-VLAN routing allows communication between different VLANs. Since VLANs are isolated at Layer 2, a Layer 3 device (such as a router or Layer 3 switch) is required to route traffic between them.

## 4. Methods of Inter-VLAN Routing

There are two primary methods of Inter-VLAN Routing:

1. 1. \*\*Router-on-a-Stick\*\*: Uses a single physical interface on the router to route traffic between VLANs using subinterfaces.
2. 2. \*\*Layer 3 Switch Routing\*\*: Uses switched virtual interfaces (SVIs) to perform routing on a Layer 3 switch.

## 5. Configuration Example: Router-on-a-Stick

Example configuration on a router:

interface GigabitEthernet0/0.10  
 encapsulation dot1Q 10  
 ip address 192.168.10.1 255.255.255.0

interface GigabitEthernet0/0.20  
 encapsulation dot1Q 20  
 ip address 192.168.20.1 255.255.255.0

# 6. Benefits of VLANs and Inter-VLAN Routing

* - Enhanced security by isolating sensitive data.
* - Improved performance through reduced broadcast domains.
* - Easier network management and scalability.