Lab Sheet – 12

Title: Configure VLANs

Aim:

- Configure static and dynamic trunking protocol
- Configure inter-VLAN routing

Task:

- Configure static trunking protocol
- Configure dynamic trunking protocol
- Configure Router-on-a-Stick inter-VLAN routing

Activities

Exercise 01: Configure Static and Dynamic Trunking Protocol

Use "NST21022 Labsheet 12E1.pka" file

Addressing Table

Device	Interface	IP Address	Subnet Mask
PC-1	NIC	192.168.1.10	255.255.255.0
PC-2	NIC	192.168.2.10	255.255.255.0
PC-3	NIC	192.168.3.10	255.255.255.0
PC-A	NIC	192.168.1.20	255.255.255.0
PC-B	NIC	192.168.2.20	255.255.255.0
PC-C	NIC	192.168.3.20	255.255.255.0

1. Create additional VLANs on S1, S2 and S3 according to the table below.

VLAN Number	VLAN Name
10	Red
20	Green
30	Blue
999	Native

2. Assign Ports to VLANs

Ports	Assignments	Network
S2 F0/1 – 8 **S3 F0/1 – 8**	VLAN 10 (Red)	192.168.1.0/24
S2 F0/9 – 16 **S3 F0/9 – 16**	VLAN 20 (Green)	192.168.2.0/24
S2 F0/17 – 24 **S3 F0/17 – 24**	VLAN 30 (Blue)	192.168.3.0/24

3. Dynamic trunking protocol (DTP) manages the trunk links between Cisco switches. Currently, all the switchports are in the default trunking mode, which is dynamic auto
    a. On S1, configure the trunk link to dynamic desirable on the interface GigabitEthernet 0/1

        S1(config)# interface g0/1

        S1(config)# switchport mode dynamic desirable

    b. On S2, verify that the trunk has been negotiated by issue the ***show interface trunk*** command
    c. For the trunk link between S1 and S3, configure interface GigabitEthernet 0/2 as a static trunk link on S1. In addition, disable DTP negotiation on interface GigabitEthernet 0/2 on S1

        S1(config)# interface g0/2

        S1(config)# switchport mode trunk

        S1(config)# switchport nonegotiate

        configure interface GigabitEthernet 0/2 as a static trunk link on S3 also.
    d. Verify DTP status

        S1# show dtp

    e. Verify trunking is enabled on all the switches

        S1# show interface trunk

    f. Configure VLAN 999 as the native VLAN for the trunk links on all switches.

        S1(config)# interface g0/1

        S1(config)# switchport trunk native vlan 999

    g. Notice that each PC can ping the other PC that shares the same subnet.
        i. PC-1 can ping PC-A
        ii. PC-2 can ping PC-B
        iii. PC-3 can ping PC-C

Exercise 02: Configure Router-on-a-Stick inter-VLAN routing

Use "NST21022 Labsheet 12E2.pka" file

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0/0.10	192.168.1.1	255.255.255.0	N/A
	G0/0/0.20	192.168.2.1	255.255.255.0	
	G0/0/0.30	192.168.3.1	255.255.255.0	
PC-A	NIC	192.168.1.10	255.255.255.0	192.168.1.1
PC-1	NIC	192.168.1.11	255.255.255.0	192.168.1.1
PC-B	NIC	192.168.2.10	255.255.255.0	192.168.2.1
PC-2	NIC	192.168.2.11	255.255.255.0	192.168.2.1
PC-C	NIC	192.168.3.10	255.255.255.0	192.168.3.1
PC-3	NIC	192.168.3.11	255.255.255.0	192.168.3.1

1. Create and name VLANs on S1

VLAN Number	VLAN Name
10	Staffs
20	Students
30	Guests

2. Assign Ports to VLANs

Ports	Assignments	Network
S1 F0/1 – 2	VLAN 10 (Staffs)	192.168.1.0/24
S1 F0/11-12	VLAN 20 (Students)	192.168.2.0/24
S1 F0/21-22	VLAN 30 (Guests)	192.168.3.0/24

3. Verify VLAN configuration

4. Configure sub interfaces on R1 using 802.1Q encapsulation
    a. Create the sub interfaces G0/0/0.10
        i. Set the encapsulation type 802.1Q, assign VLAN 10 and assign the correct IP address to the sub interface.

R1(config)# int g0/0/0.10

R1(config-subif)# encapsulation dot1Q 10

R1(config-subif)# ip address 192.168.1.1 255.255.255.0

    b. Repeat the steps for other 2 sub interfaces.
5. Verify configuration
    a. Use ***show ip interface brief*** command to verify sub interface configuration.
    b. Enable G0/0/0 interface.
6. Try to ping between PCs on different networks.
    a. The pings should still fail.
    b. Because the router was configured with multiple subinterfaces assigned to different VLANs, the switch port connecting to the router must be configured as a trunk. Enable trunking on interface G0/1.
    c. Verify the trunk configuration on S1
7. Test connectivity.