



Computer Networks 1

Lab 12

CONFIGURING INTER-VLAN ROUTING

Names:

Student No:

Objectives

- Create a basic switch configuration and verify it.
- Create multiple VLANs, name them, and assign multiple member ports to them.
- Create a basic configuration on a router.
- Create an 802.11q trunk line between the switch and router to allow communication between VLANs.
- Test the routing functionality.

Content and Practice

I. Inter-VLAN Issues and Solutions

When VLANs are connected, several technical issues arise. Two of the most common in a multiple-VLAN environment are

- The need for end user devices to reach nonlocal hosts.
- The need for hosts on different VLANs to communicate

When a device needs to make a connection to a remote host, it checks its routing table to determine if a known path exists. If the remote host falls into a subnet that it knows how to reach, the system checks to see if it can connect along that interface. If all known paths fail, the system has one last option: the default route. This route is a special type of gateway route, and it is usually the only one present in the system. On a router, a default route is indicated by an asterisk (*) in the output of the **show ip route** command. For hosts on a local-area network (LAN), this gateway is set to whatever machine has a direct connection to the outside world, and it is the default gateway listed in the workstation's TCP/IP settings. If the default route is being configured for a router that is functioning as the gateway to the public Internet, the default route points to gateway machine at an Internet service provider's (ISP) site. Default routes are implemented by using **ip route** command as shown in Example 1.

Example 1: ip route command

```
Router(Config)#ip route 0.0.0.0 0.0.0.0 192.168.1.1
```

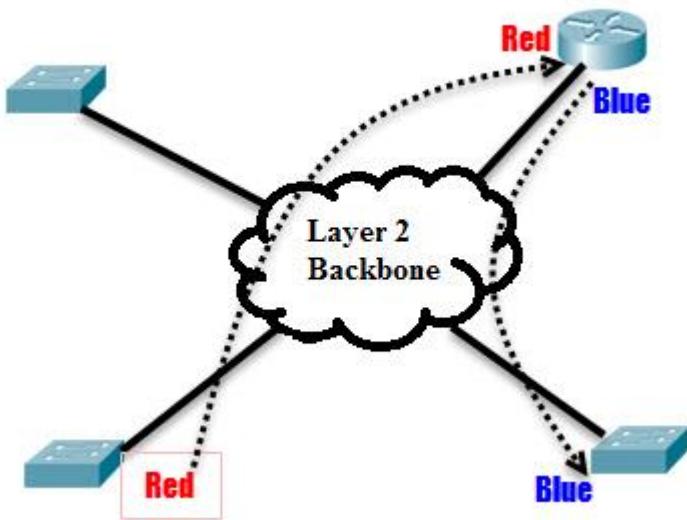
In Example 1, 192.168.1.1 is the gateway. Inter-VLAN connectivity can be achieved through either logical or physical connectivity. Logical connectivity involves a single connection, or trunk, from the switch to the router. That trunk can support multiple VLANs.

This topology is called a “router on a stick” because there is a single connection to the router, but there are multiple logical connections between the router and the switch. An



example is shown in Figure 1.

Figure 1: Router on a stick



Refer to: Cisco Systems, Inc, Cisco Networking Academy Program, CCNA 3 and 4 Companion Guide, Third Edition, Cisco Press, june 2003.

II. Practice

Network topology on Cisco Packet Tracer:

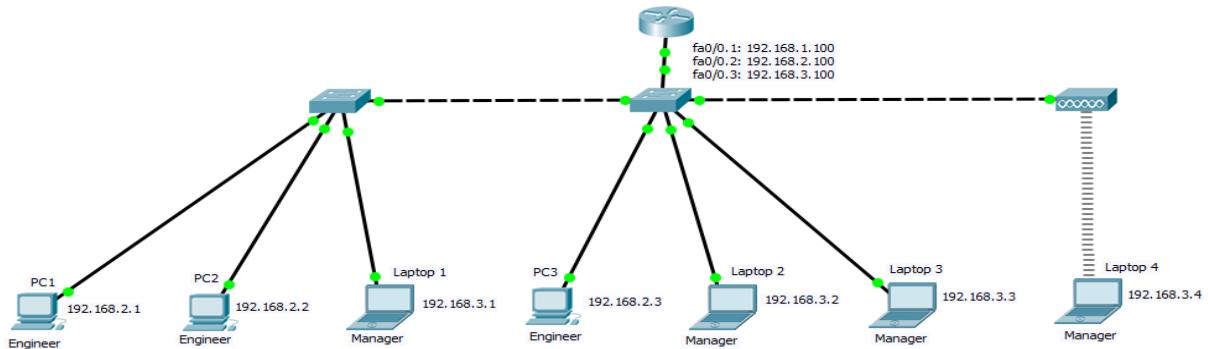


Table 1

PC - Laptop	Switch 1(2960)	Switch 2(2960)	Router 1(1841)
+ PC1,2,3: x=1,2,3. - IP: 192.168.2.x/24 - GW: 192.168.2.100 + Laptop 1,2,3,4: x=1,2,3,4 - IP: 192.168.3.x/24 - GW: 192.168.3.100	+ Vlan 1: - IP: 192.168.1.1/24 + Vlan 2: - Name: Engineer - Port: fa0/2, fa0/3 + Vlan 3: - Name: Manager - Port: fa0/4	+ Vlan 1: - IP: 192.168.1.2/24 + Vlan 2: - Name: Engineer - Port: fa0/2 + Vlan 3: - Name: Manager - Port: fa0/3-0/5	+ Interface fa0/0 + Subinterface fa0/0.1: - IP: 192.168.1.100/24 + Subinterface fa0/0.2: - IP: 192.168.2.100/24 + Subinterface fa0/0.3: - IP: 192.168.3.100/24



	+ Switch trunking: - Port: fa0/1	+ Switch trunking: - Port: fa0/1 + Router trunking: - Port: fa0/6	
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Step 1: Configure the switch 1,2. If you have problems while performing this configuration, refer to Lab 9 “Basic of VLAN”.

Step 2: Configure the host by using **Table 1** information.

Step 3: Configure trunking between two switchs.

Step 4: Verify conectivity: Make sure that computers in the same vlan can ping each other.

Step 5: Configure trunking between switchs and router.

```
Switch 2(config)#interface fa0/6
```

```
Switch 2(config-if)#switchport mode trunk
```

Step 6: Configure the router.

```
Router 1(config)#interface fastethernet0/0
```

```
Router 1(config-if)#no shutdown
```

```
Router 1(config-if)#interface fastethernet0/0.1
```

```
Router 1(config-subif)#encapsulation dot1q 1
```

```
Router 1(config-subif)#ip address 192.168.1.100 255.255.255.0
```

```
Router 1(config-subif)#interface fastethernet0/0.2
```

```
Router 1(config-subif)#encapsulation dot1q 2
```

```
Router 1(config-subif)#ip address 192.168.2.100 255.255.255.0
```

```
Router 1(config-subif)#interface fasethernet0/0.3
```

```
Router 1(config-subif)#encapsulation dot1q 3
```

```
Router 1(config-subif)#ip address 192.168.3.100 255.255.255.0
```

Step 7: Verify conectivity: Make sure that computers in difference vlans can ping each other.

III. Submission

Complete all tasks in section II, then submit Lab12_<student_code>.pkt onto Sakai.