Router on a Stick
CCNA Tutorial

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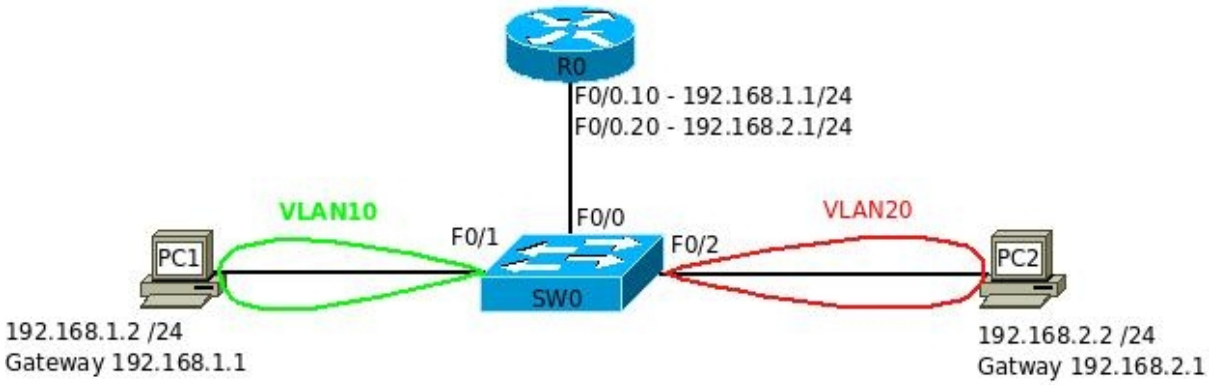
Overview

For host in different vlans to communicate, a layer 3 device must be implemented to route between the vlans. In our case we will have a router connected to a switch via a fast ethernet port which will be configured in trunking mode.

Topology



In our example we will have two vlans:

VLAN 10 192.168.1.0/24
VLAN 20 192.168.2.0/24

On the router we will configure two fastethernet sub-interfaces (f0/0.10 and f0/0.20), one for each of the vlans on the switch (each sub-interface will be given an ip address in its respective vlan). We will have two PC's connected to the switch (one in each vlan) on ports f0/1 and f0/2.

In the example above I am using a Cisco 3600 router with IOS “c3640-js-mz.124-21.bin”, however for the switch in my case I am using a 3600 router with a 16 port NM-16ESW module installed, this particular module. You can read more about the NM-16ESW module at **http://tinyurl.com/5owu6x** You of course use a Cisco switch for the same purpose.

Switch Configuration

The first thing that we need to do is configure our switch.
I will be configuring the switch with the hostname “SW0”

When asked if you would like to enter the initial configuration dialogue, type “no” and hit return.
Now configure the hostname:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname SW0
SW0(config)#
```

Once you have configured the hostname type “exit” and hit return

Now we need to add out two vlans (vlan 10 and vlan 20) to the vlan database:

```
SW0#
SW0#vlan database
SW0(vlan)#vlan 10
VLAN 10 added:
   Name: VLAN0010
SW0(vlan)#vlan 20
VLAN 20 added:
   Name: VLAN0020
SW0(vlan)#apply
APPLY completed.
SW0(vlan)#
```

No we can configure f0/0 as a tunk interface to the router:

```
SW0(config)#int f0/0
SW0(config-if)#switchport trunk encapsulation dot1q
SW0(config-if)#switchport mode trunk
SW0(config-if)#
```

Next we need to configure f0/1 as an access port for PC1 and f0/2 as an access port for PC2:

```
SW0(config-if)#
SW0(config-if)#int f0/1
SW0(config-if)#switchport access vlan 10
SW0(config-if)#switchport mode access
SW0(config-if)#
SW0(config-if)#int f0/2
SW0(config-if)#switchport access vlan 20
SW0(config-if)#switchport mode access
SW0(config-if)#^Z
SW0#
*Mar  1 00:09:52.107: %SYS-5-CONFIG_I: Configured from console by console
SW0#wr
Building configuration...
[OK]
SW0#SW0(config)#
```

Router Configuration

We'll configure the router with the hostname R0 and then add the vlans (10 and 20) to the vlan database on the router:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R0
R0(config)#
R0(config)#
R0(config)#vlan database
R0(config)#exit
R0#
*Mar  1 00:15:03.399: %SYS-5-CONFIG_I: Configured from console by
console
R0#
R0#vlan database
R0(vlan)#vlan 10
VLAN 10 added:
   Name: VLAN0010
R0(vlan)#vlan 20
VLAN 20 added:
   Name: VLAN0020
R0(vlan)#apply
APPLY completed.
R0(vlan)#exit
APPLY completed.
Exiting....
```

Now we need to enable to f0/0 interface on the router and configure sub-interfaces (f0/0.10 and f0/0.20 with IP addresses):

R0(config-if)#
R0(config-if)#
R0(config-if)#int f0/0.10
R0(config-subif)#encapsulation dot1q 10
R0(config-subif)#ip address 192.168.1.1 255.255.255.0
R0(config-subif)#
R0(config-subif)#int f0/0.20
R0(config-subif)#encapsulation dot1q 20
R0(config-subif)#ip address 192.168.2.1 255.255.255.0
R0(config-subif)#
R0(config-subif)#^Z
R0#
***Mar 1 00:25:49.183: %SYS-5-CONFIG_I: Configured from console by console**
R0#
R0#exit

This is the router configuration complete.
You now need to configure PC1 with the following:
IP 192.168.1.2
Subnet Mask 255.255.255.0
Default Gateway 192.168.1.1

You need to configure PC2 with the following:

IP 192.168.2.2
Subnet Mask 255.255.255.0
Default Gateway 192.168.2.1

You should now be able to ping PC2 from PC1 to verify connectivity.