Cisco Router-on-a-stick with Switch

In this post I will explain how to provide routing between two VLANs on a simple Layer 2 switch using a Cisco router with just one interface. This is called also Router-on-a-stick. This configuration is usually asked as a question in CCNA exams, so I hope it will be helpful for people preparing for certification. Let's see the diagram below to get us started:
A Cisco Layer 2 switch carries two VLANs (VLAN 10 – RED and VLAN 20 – GREEN) with two hosts connected on them as shown on the diagram above. The first host belongs to Network 10.10.10.0/24 (VLAN10) and the second one to 20.20.20.0/24 (VLAN20). By default, if the switch is just a normal Layer 2 switch the two hosts can not communicate between them because they belong to different VLANs and there is no routing. Thus, if we want to provide network connectivity between the two VLANs we need to have a Layer 3 engine somewhere in the network. This can be accomplished either if the switch is Layer 3 or if there is a router in place. In our example we use a router to provide Layer 3 connectivity as shown in our diagram.

The router uses just a single interface connected to a trunk port on the switch. The Router interface can be divided into two subinterfaces, with each subinterface belonging to the appropriate VLAN. The switch port connected to the router must be a trunk in order to be able to carry both VLANs towards the router port. Lets see the configuration below:

**SWITCH CONFIGURATION**

```
# conf t
(config)# vlan 10
(config-vlan)# exit
(config)# vlan 20
(config-vlan)# exit

(config)# interface FastEthernet1/0/1
(config-if)# description trunk-to-router-on-a-stick
(config-if)# switchport trunk encapsulation dot1q
(config-if)# switchport mode trunk
(config-if)# exit
```
(config)# interface FastEthernet1/0/2
(config-if)# description connection-to-RED-VLAN
(config-if)# switchport mode access
(config-if)# switchport access vlan 10
(config-if)# exit

(config)# interface FastEthernet1/0/3
(config-if)# description connection-to-GREEN-VLAN
(config-if)# switchport mode access
(config-if)# switchport access vlan 20
(config-if)# exit
(config)# exit
# copy run start

ROUTER CONFIGURATION
# conf t
(config)# interface fastethernet 0/0.10
(config-if)# encapsulation dot1q 10
(config-if)# ip address 10.10.10.2 255.255.255.0
(config-if)# exit
(config)# interface fastethernet 0/0.20
(config-if)# encapsulation dot1q 20
(config-if)# ip address 20.20.20.2 255.255.255.0
(config-if)# exit

Now, in order for the two hosts to communicate between them, they must set as
default gateway the IP address of the corresponding router subinterface address
(e.g for host in VLAN 10 the gateway must be 10.10.10.2 and for host in VLAN
20 the gateway must be 20.20.20.2).
About the Author

Harris Andrea is a Cisco Certified Professional with more than 18 years of experience working with Cisco network technologies. He is the author of two Cisco Books ("Cisco ASA Firewall Fundamentals" and "Cisco VPN Configuration Guide") which have been embraced by thousands of Cisco professionals all over the world. You can find more Cisco configuration guides and tutorials on his blog here [http://www.networkstraining.com](http://www.networkstraining.com)