

PASS4SURE

Building Converged Cisco Multilayer
Switched Networks

Cisco CCNP – BCMSN

CCNP study Package

642-812 LAB FASTRACK

Preparation Labs provide lab instructions, scenarios and tutorials, all technical support will be provided by Cisco.

**LAB
12**

NOTE: This lab manual is a joint fruit of Pass4sure and ciscosim. If you have any questions or suggestions, or want to exchange experience, please go to <http://www.ciscosim.net>

Copyright © 2001-2008 FREETECH SERVICES Ltd. All Rights Reserved.



Building Converged Cisco Multilayer Switched Networks

642-812-Preparation-Labs

Lab 1.	Configuring 802.1x Port-Based Authentication.....	3
Lab 2.	Routing Between VLANs and VTP Protocol	9
Lab 3.	Configuring L2 & L3 EtherChannel with PAgP	20
Lab 4.	Configuring L2 & L3 EtherChannel with LACP.....	29
Lab 5.	Configuring Layer 3 Redundancy with HSRP.....	34
Lab 6.	Configuring Layer 3 Redundancy with VRRP.....	43
Lab 7.	Configuring AAA	51
Lab 8.	Configuring QoS on LAN	58
Lab 9.	Configuring VACL	66
Lab 10.	Configuring PVLAN	69
Lab 11.	Example Analysis(A)	74
Lab 12.	Example Analysis(B)	76

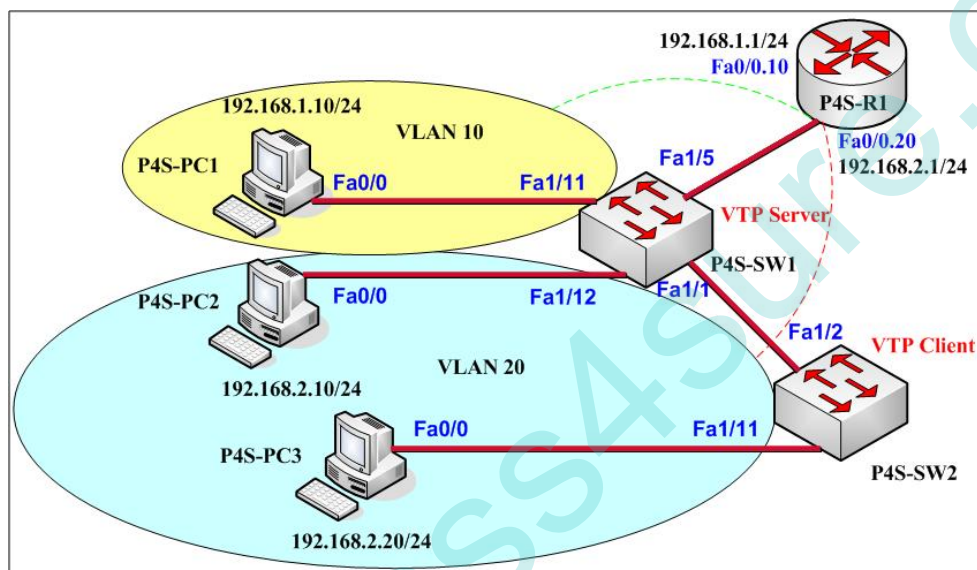
CCNP-BCMSN Lab2

Routing Between VLANs and VTP Protocol

【Lab Objectives】

1. Master the VTP configuration methods.
2. Master the routing configuration methods between VLANs and the sub-interface configurations.

【Lab Topology】



【Lab steps and requirements】

1. Configure P4S-PC1、P4S-PC2 and P4S-PC3 to be used as simulation hosts, the configuration is as follows:

```
P4S-PC1 (config)#no ip routing
P4S-PC1 (config)#
P4S-PC1 (config)#ip default-network 192.168.1.1
P4S-PC1 (config)#
P4S-PC1 (config)#interface fastEthernet 0/0
```

Comment [k1]: Close routing functions.

Comment [k2]: Configure the default gateway of P4S-PC1 as 192.168.1.1.

```
P4S-PC1(config-if)#ip address 192.168.1.10 255.255.255.0
P4S-PC1(config-if)#no shutdown
P4S-PC1(config-if)#exit
P4S-PC1(config)#
```

```
P4S-PC2(config)#no ip routing
P4S-PC2(config)#
P4S-PC2(config)#ip default-network 192.168.2.1
P4S-PC2(config)#
P4S-PC2(config)#interface fastEthernet 0/0
P4S-PC2(config-if)#ip address 192.168.2.10 255.255.255.0
P4S-PC2(config-if)#no shutdown
P4S-PC2(config-if)#exit
P4S-PC2(config)#
```

```
P4S-PC3(config)#no ip routing
P4S-PC3(config)#
P4S-PC3(config)#ip default-network 192.168.2.1
P4S-PC3(config)#
P4S-PC3(config)#interface fastEthernet 0/0
P4S-PC3(config-if)#ip address 192.168.2.20 255.255.255.0
P4S-PC3(config-if)#no shutdown
P4S-PC3(config-if)#exit
P4S-PC3(config-if)#
```

2. Configure trunk between P4S-SW1 and P4S-SW2, the configuration is as follows:

```
P4S-SW1(config)#interface fastEthernet 1/1
P4S-SW1(config-if)#switchport trunk encapsulation dot1q
P4S-SW1(config-if)#switchport mode trunk
P4S-SW1(config-if)#exit
```

Comment [k3]: Select the closed protocol of TRUNK.

Comment [k4]: Specify the trunk mode for the interface

```
P4S-SW2(config)#interface fastEthernet 1/2
P4S-SW2(config-if)#switchport trunk encapsulation dot1q
P4S-SW2(config-if)#switchport mode trunk
P4S-SW2(config-if)#exit
```

Comment [k5]: Specify the same TRUNK closed protocol as that of P4S-SW1

3. Check the trunk information:

```
P4S-SW2#show interfaces trunk

Port      Mode      Encapsulation  Status  Native vlan
-----
Fa1/2     on        802.1q         trunking  1

Port      Vlans allowed on trunk
-----
Fa1/2     1-1005

Port      Vlans allowed and active in management domain
-----
Fa1/2     1

Port      Vlans in spanning tree forwarding state and not pruned
-----
Fa1/2     1

P4S-SW2#
```

Comment [k6]: When the interface Fa1/2 is in TRUNK status and uses the TRUNK protocol of DOT1Q, at the same time the Native Vlan is 1.

Comment [k7]: Vlans allows for TRUNK data transmission

4. Check the VTP status of P4S-SW1 and P4S-SW2 before configuring VTP

```
P4S-SW2#show vtp status
VTP Version                : 2
Configuration Revision     : 0
Maximum VLANs supported locally : 256
Number of existing VLANs   : 5
VTP Operating Mode         : Server
VTP Domain Name            :
VTP Pruning Mode           : Disabled
```

Comment [k8]: VTP version. VTP version 2, increasing the support for token ring

Comment [k9]: VTP configuration versions show the modification information of VLAN

Comment [k10]: By default, all switches are in VTP server mode

Comment [k11]: VTP pruning

```
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0xBF 0x86 0x94 0x45 0xFC 0xDF 0xB5 0x70
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 0.0.0.0 (no valid interface found)
```

Comment [k12]: The password of VTP

5. Configure VTP on P4S-SW1 and P4S-SW2

```
P4S-SW1#vlan database
P4S-SW1(vlan)#vtp domain ccnp
Changing VTP domain name from NULL to ccnp
P4S-SW1(vlan)#
P4S-SW1(vlan)#vtp server
Device mode already VTP SERVER.
P4S-SW1(vlan)#
P4S-SW1(vlan)#vtp password cisco
Setting device VLAN database password to cisco.
P4S-SW1(vlan)#
P4S-SW1(vlan)#vtp pruning
P4S-SW1(vlan)#
```

Comment [k13]: Configure VTP domain name as CCNP

Comment [k14]: The switches are in server mode before being configured.

Comment [k15]: Configure password here in order to assure VTP of security.

Comment [k16]: Enable VTP pruning functions which can effectively reduce the unnecessary flood to increase the effective available bandwidth.

6. Configure VTP in the global configuration mode.

```
P4S-SW2(config)#vtp password cisco
Setting device VLAN database password to cisco
P4S-SW2(config)#
P4S-SW2(config)#vtp domain ccnp
Changing VTP domain name from fuckcisco to ccnp
P4S-SW2(config)#
P4S-SW2(config)#vtp pruning
Pruning switched on
P4S-SW2(config)#
P4S-SW2(config)#vtp mode client
```

Comment [k17]: The password of VTP

Comment [k18]: Specify the VTP domain

Comment [k19]: Enable VTP pruning functions.

Comment [k20]: Specify the VTP working mode of the existing switches

```
Setting device to VTP CLIENT mode.
```

```
P4S-SW2(config)#
```

7. Check the information about VTP status on P4S-SW1 and P4S-SW2

```
P4S-SW2#show vtp status
```

```
VTP Version           : 2
Configuration Revision : 1
Maximum VLANs supported locally : 1005
Number of existing VLANs : 10
VTP Operating Mode    : Client
VTP Domain Name      : ccnp
VTP Pruning Mode     : Enabled
VTP V2 Mode          : Disabled
VTP Traps Generation : Disabled
MD5 digest           : 0x71 0x62 0x0B 0xD1 0xED 0xFD 0x7D 0xAC
Configuration last modified by 199.1.1.3 at 3-2-93 02:11:08
P4S-SW2#
```

8. Create VLAN on P4S-SW1 and P4S-SW2

```
P4S-SW1#vlan database
```

```
P4S-SW1(vlan)#vlan 10 name cisco
```

```
VLAN 10 added:
```

```
Name: cisco
```

```
P4S-SW1(vlan)#exit
```

```
APPLY completed.
```

```
Exiting...
```

```
P4S-SW1#
```

```
P4S-SW1#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
P4S-SW1(config)#
```

```
P4S-SW1(config)#vlan 20
```

Comment [k21]: Enter the VLAN DATABASE configuration mode.

Comment [k22]: Create a VLAN, its number is 10, and name it as Cisco at the same time

Comment [k23]: Create VLAN 20 in the global configuration mode.

```
P4S-SW1(config-vlan)#name microsoft
P4S-SW1(config-vlan)#exit
```

Comment [k24]: Specify the new VLAN as microsoft

9. Check the VLAN configuration on P4S-SW1

```
P4S-SW1#show vlan

VLAN Name                Status    Ports
-----
1    default                active    Fa1/0, Fa1/2, Fa1/3, Fa1/4
Fa1/5, Fa1/6, Fa1/7, Fa1/8
Fa1/9, Fa1/10, Fa1/11, Fa1/12
Fa1/13, Fa1/14, Fa1/15
10   cisco                   active
20   microsoft               active
1002 fddi-default            active
1003 token-ring-default    active
1004 fddinet-default       active
1005 trnet-default         active

VLAN Type  SAID      MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
-----
1    enet  100001   1500  -     -     -   -     -     1002  1003
10   enet  100010   1500  -     -     -   -     -     0     0
20   enet  100020   1500  -     -     -   -     -     0     0
1002 fddi  101002   1500  -     -     -   -     -     1     1003
1003 tr   101003   1500  1005  0     -     -   srb    1     1002
1004 fdnet 101004   1500  -     -     1     -   ibm    -     0     0
1005 trnet 101005   1500  -     -     1     -   ibm    -     0     0
P4S-SW1#
```

Comment [k25]: The customized VLAN

10. Check the VTP status information.

```
P4S-SW1#show vtp status
VTP Version                : 2
Configuration Revision     : 2
Maximum VLANs supported locally : 256
Number of existing VLANs   : 7
VTP Operating Mode         : Server
VTP Domain Name            : ccnp
VTP Pruning Mode           : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0xF3 0x1C 0x33 0x46 0xEA 0x14 0xBB 0x9F
Configuration last modified by 0.0.0.0 at 3-1-02 00:52:53
Local updater ID is 0.0.0.0 (no valid interface found)
P4S-SW1#
```

Comment [k26]: The VTP configuration version changes to version2 due to creating two VLANs.

11. Check the VTP status information on P4S-SW2.

```
P4S-SW2#show vtp status
VTP Version                : 2
Configuration Revision     : 2
Maximum VLANs supported locally : 256
Number of existing VLANs   : 7
VTP Operating Mode         : Client
VTP Domain Name            : ccnp
VTP Pruning Mode           : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0xF3 0x1C 0x33 0x46 0xEA 0x14 0xBB 0x9F
Configuration last modified by 0.0.0.0 at 3-1-02 00:52:53
P4S-SW2#
```

Comment [k27]: The VTP configuration version on P4S-SW2 is 2

12. Check the VLAN information on P4S-SW2.

```
P4S-SW1#show vlan
```

VLAN Name	Status	Ports
1 default	active	Fa0/3, Fa0/4, Fa0/5, Fa0/6 Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24, Gi0/1, Gi0/2
10 cisco	active	
20 microsoft	active	
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	
.....		

Comment [k28]: The VTP protocol on P4S-SW2 successfully the configuration information of P4S-SW1 worked as SERVER.

13. Add the appropriate host ports into the VLAN on P4S-SW1 and P4S-SW2.

```
P4S-SW1 (config)#interface fastEthernet 1/11
P4S-SW1 (config-if)#switchport access vlan 10
P4S-SW1 (config-if)#exit
P4S-SW1 (config)#
P4S-SW1 (config)#interface fastEthernet 1/12
P4S-SW1 (config-if)#switchport access vlan 20
P4S-SW1 (config-if)#exit
```

Comment [k29]: Add the existing interfaces into VLAN 10

14. Configure VLAN on P4S-SW2

```
P4S-SW2 (config)#interface fastEthernet 1/11
P4S-SW2 (config-if)#switchport access vlan 20
P4S-SW2 (config-if)#exit
```

15. Use the ping command on P4S-PC1, P4S-PC2 and P4S-PC3 to test communications between VLANs.

```
P4S-PC1#ping 192.168.1.20
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.1.20, timeout is 2 seconds:
```

```
.....
```

```
Success rate is 0 percent (0/5)
```

```
P4S-PC1#
```

Comment [k30]: Send ICMP data packets on P4S-PC1 to the hosts in VLAN2, the result is being not able to ping successfully

```
P4S-PC2#ping 192.168.2.20
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.2.20, timeout is 2 seconds:
```

```
.!!!!
```

```
Success rate is 80 percent (4/5), round-trip min/avg/max = 24/24/24 ms
```

```
P4S-PC2#
```

```
P4S-PC2#ping 192.168.1.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.1.10, timeout is 2 seconds:
```

```
.....
```

```
Success rate is 0 percent (0/5)
```

```
P4S-PC2#
```

Comment [k31]: Communication can happen in the same VLAN.

Comment [k32]: Communication can't be achieved in different VLANs

```
P4S-PC3#ping 192.168.2.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.2.10, timeout is 2 seconds:
```

```

!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/18/32 ms
P4S-PC3#
P4S-PC3#ping 192.168.1.10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.10, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
P4S-PC3#

```

16. Configure single-arm routing on P4S-R1 to guarantee the communication between two VLANs.

17. Configure the TRUNK link between P4S-R1 and P4S-SW1, the configuration is as follows:

```

P4S-SW1(config)#interface fastEthernet 1/5
P4S-SW1(config-if)#switchport trunk encapsulation dot1q
P4S-SW1(config-if)#
P4S-SW1(config-if)#switchport mode trunk
P4S-SW1(config-if)#exit

```

```

P4S-R1(config)#
P4S-R1(config)#interface fastEthernet 0/0
P4S-R1(config-if)#no ip address
P4S-R1(config-if)#no shutdown
P4S-R1(config-if)#exit
P4S-R1(config)#
P4S-R1(config)#interface fastEthernet 0/0.10
P4S-R1(config-subif)#encapsulation dot1Q 10
P4S-R1(config-subif)#ip address 192.168.1.1 255.255.255.0
P4S-R1(config-subif)#exit

```

Comment [k33]: When configuring sub-interfaces, it is needed to delete the IP of the physical interfaces and activate the physical interfaces at the same time

Comment [k34]: Enable the interface FA0/0.10

Comment [k35]: This command is used to receive data packets of VLAN10, the data packets will be marked as VLAN10 at the same time.

Comment [k36]: Configure IP used for the default gateway of VLAN 10

```
P4S-R1(config)#  
P4S-R1(config)#interface fastEthernet 0/0.20  
P4S-R1(config-subif)#encapsulation dot1Q 20  
P4S-R1(config-subif)#ip address 192.168.2.1 255.255.255.0  
P4S-R1(config-subif)#exit  
P4S-R1(config)#
```

18. Check the P4S-R1 routing table.

```
P4S-R1#show ip route  
  
Gateway of last resort is not set  
  
C    192.168.1.0/24 is directly connected, FastEthernet0/0.10  
C    192.168.2.0/24 is directly connected, FastEthernet0/0.20  
P4S-R1#
```

Comment [k37]: Directly connected route of Sub-interface

19. Use the ping command on P4S-PC1, P4S-PC2 and P4S-PC3 to test routes between VLANs.

```
P4S-PC1#ping 192.168.1.1  
  
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:  
!!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 16/232/1040 ms  
P4S-PC1#  
P4S-PC1#ping 192.168.2.1  
  
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 192.168.2.1, timeout is 2 seconds:  
!!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/223/1012 ms  
P4S-PC1#
```

Comment [k38]: Being able to ping the default gateway successfully

Comment [k39]: Being able to ping the default gateway of VLAN20 successfully

```
P4S-PC1#ping 192.168.2.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.2.10, timeout is 2 seconds:
```

```
..!!!!
```

```
Success rate is 60 percent (3/5), round-trip min/avg/max = 12/48/92 ms
```

```
P4S-PC1#
```

```
P4S-PC1#ping 192.168.2.20
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.2.20, timeout is 2 seconds:
```

```
..!!!!
```

```
Success rate is 60 percent (3/5), round-trip min/avg/max = 20/52/96 ms
```

```
P4S-PC1#
```

Comment [k40]: Being able to ping the host P4S-PC2 successfully

```
P4S-PC2#ping 192.168.1.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.1.10, timeout is 2 seconds:
```

```
!!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/48/88 ms
```

```
P4S-PC2#
```

Comment [k41]: P4S-PC2 can ping P4S-PC1 via routes between VLANs successfully

```
P4S-PC3#ping 192.168.1.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.1.10, timeout is 2 seconds:
```

```
!!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/50/88 ms
```

Comment [k42]: P4S-PC3 in VLAN20 can ping P4S-PC1 in VLAN10 successfully

P4S-PC3#

20. End.

www.pass4sure.com