



LOCATION: LONDON

LLEOLIAD: LLUNDAIN

LEVEL 5

LEFEL 5

EXAMINATION PERIOD
MAY 2016

CYFNOD ARHOLIADAU
MAI 2016

MODULE CODE: ACCC5002
LOCAL AREA NETWORKS

TIME: 2 HOURS



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Local Area Networks
BSc Computer Networks (ACCC5002)

Practical Lab Assessment
Year 2/Level 5
May 2016

Name : _____

Student ID : _____

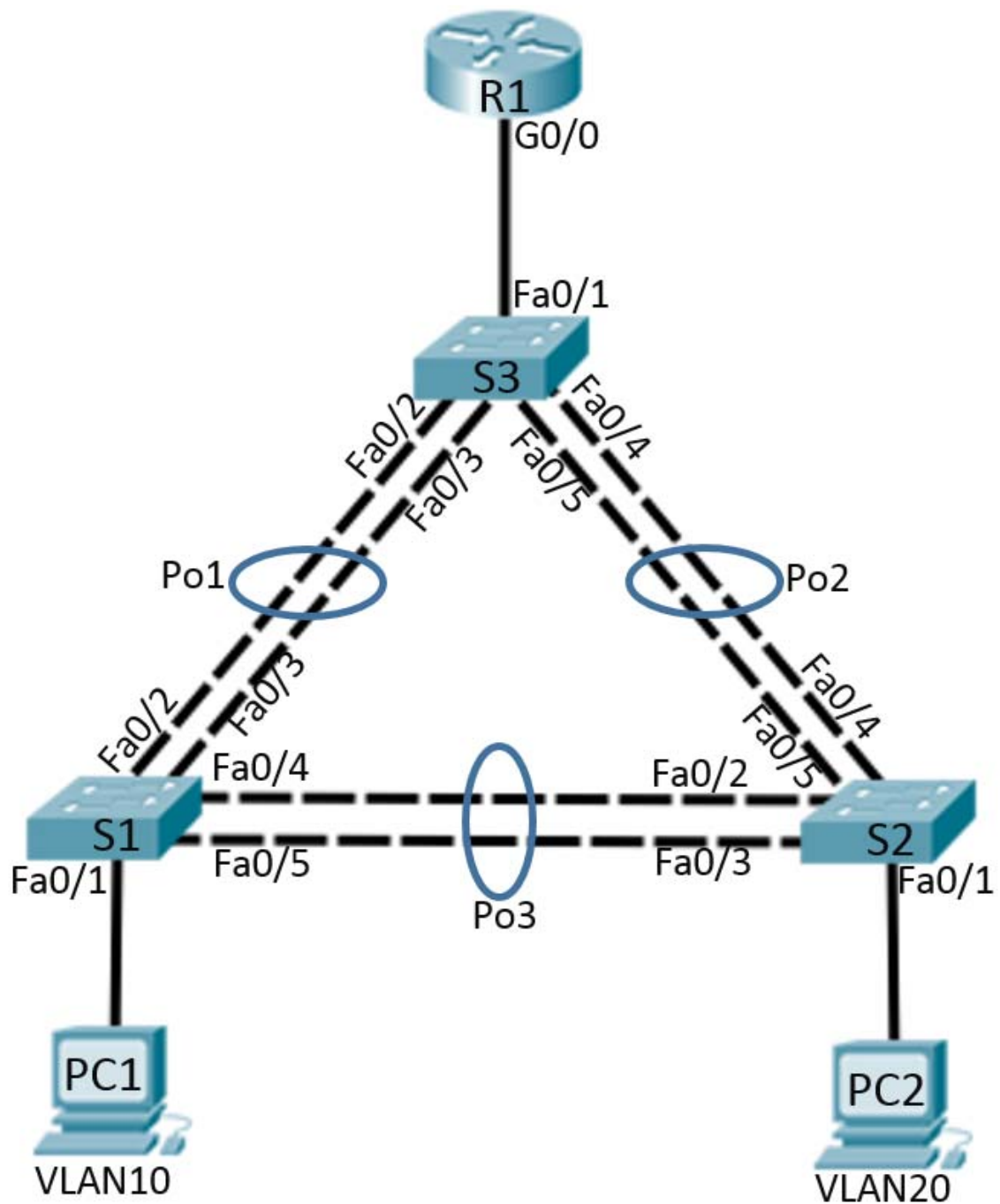
Date & Time : _____

This is an individual practical lab-test, held under examination conditions. You will be assigned three Switches and a Router; you should configure these devices based on the given specifications.

This paper is marked out of 100.

You will have 2 hours to complete this task.

TOPOLOGY DIAGRAM



VLAN 10 – Students: 172.16.10.0/24
 VLAN 20 – Staff: 172.16.20.0/24
 VLAN 99 – Management: 172.16.99.0/24

Addressing Table

(10 marks)

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Ge0/0.10	172.16.10.254	255.255.255.0	N/A
	Ge0/0.20	172.16.20.254	255.255.255.0	N/A
	Ge0/0.99	172.16.99.254	255.255.255.0	N/A
S1	VLAN99	172.16.99.1	255.255.255.0	172.16.99.254
S2	VLAN99	172.16.99.2	255.255.255.0	172.16.99.254
S3	VLAN99	172.16.99.3	255.255.255.0	172.16.99.254
PC1	NIC	DHCP	DHCP	DHCP
PC2	NIC	DHCP	DHCP	DHCP

Port Assignments

S1

Ports	Assignment	Network
Fa0/2 – 0/5	802.1q Trunks (Native VLAN 99)	172.16.99.0
Fa0/1	VLAN 10 (Students)	172.16.10.0

S2

Ports	Assignment	Network
Fa0/2 – 0/5	802.1q Trunks (Native VLAN 99)	172.16.99.0
Fa0/1	VLAN 20 (Staff)	172.16.20.0

S3

Ports	Assignment	Network
Fa0/1 – 0/5	802.1q Trunks (Native VLAN 99)	172.16.99.0

Task 1: Prepare the Network (5 marks)

Step 1: Cable a network that is similar to the one in the topology diagram.

Step 2: Clear any existing configurations on the devices.

Task 2: Perform Basic Device Configurations (10 marks)

Configure the S1, S2, and S3 switches and R1 router according to the following guidelines:

- Configure the hostname.
- Disable DNS lookup.
- Configure an EXEC mode password.
- Configure a message-of-the-day banner.
- Configure a password for console connections.
- Configure synchronous logging.
- Configure a password for vty connections.
- Enable service password encryption.

Task 3: Router and Switch configuration instructions (50 marks)

1. Configure S3 as a VTP server, and S1 & S2 as VTP clients in the **example.com** domain. Set the VTP password to '**cisco**'.
2. Configure EtherChannel between the switches as per the topology diagram.
3. Create VLANs 10, 20 & 99, and name as required.
4. Assign ports to appropriate VLANs as shown in the Port Assignments table.
5. Configure RSTP PVST+ on all switches.
6. Configure S3 to be the primary root for all VLANs and S1 to be secondary.
7. Configure PortFast and BPDU Guard on the interface connected to PC1 and PC2.
8. Configure S1 as a DHCP server to provide IP addresses and default gateways to users on VLAN 10 & 20. Verify all PCs receive IP address details.
9. Configure management IP addresses for all network switches in VLAN 99, and configure them for Telnet access.

10. Configure router-on-a-stick inter-VLAN routing.
11. Configure subinterfaces on R1 to operate on VLAN 10, 20, and 99 with the address from the Address table.

Task 4: After configuring each host computer, record the host network settings with the `ipconfig /all` command.
(15 marks)

Host PC1 Network Configuration	
Description	DHCP
Physical Address	DHCP
IP Address	DHCP
Subnet Mask	DHCP
Default Gateway	DHCP

Host PC2 Network Configuration	
Description	DHCP
Physical Address	DHCP
IP Address	DHCP
Subnet Mask	DHCP
Default Gateway	DHCP

Host PC3 Network Configuration	
Description	DHCP
Physical Address	DHCP
IP Address	DHCP
Subnet Mask	DHCP
Default Gateway	DHCP

Task 5: Document the Configurations (10 marks)

All documentation for your solution should be submitted. Your name should be clearly printed on the documents.

At the end of the test a pen drive will be given to you, the configuration files for all routers should be copied to the media and handed in to your instructor. It is your responsibility that you copy the files correctly.

On each device, issue the following commands and capture the configurations. Save the file as **devicename_surname_Pno.txt**

```
show run
sh ip int brief
sh ip route
sh vlan
sh int trunk
sh spanning-tree
sh etherchannel summary
sh vtp status
```

Router R1:

```
R1#sh run
Building configuration...

Current configuration : 1117 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname R1
!
!
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
```

```
!  
!  
ip cef  
no ipv6 cef  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
no ip domain-lookup  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
!  
interface FastEthernet0/0  
no ip address  
ip helper-address 172.16.99.1  
duplex auto  
speed auto  
!  
interface FastEthernet0/0.10  
encapsulation dot1Q 10  
ip address 172.16.10.254 255.255.255.0  
ip helper-address 172.16.99.1  
!  
interface FastEthernet0/0.20  
encapsulation dot1Q 20  
ip address 172.16.20.254 255.255.255.0  
ip helper-address 172.16.99.1  
!  
interface FastEthernet0/0.99  
encapsulation dot1Q 99  
ip address 172.16.99.254 255.255.255.0  
!  
interface FastEthernet0/1  
no ip address
```

```
duplex auto
speed auto
shutdown
!
interface Vlan1
no ip address
shutdown
!
ip classless
!
ip flow-export version 9
!
!
!
banner motd ^CNO UNAUTHORIZED ACCESS^C
!
!
!
!
line con 0
password 7 0822455D0A16
logging synchronous
login
!
line aux 0
!
line vty 0 4
password 7 0822455D0A16
logging synchronous
login
!
!
!
end
```

R1#

Switch 1 – S1

```
S1#sh run
Building configuration...
```

```
Current configuration : 2166 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname S1
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
ip dhcp pool staff
network 172.16.20.0 255.255.255.0
default-router 172.16.20.254
ip dhcp pool students
network 172.16.10.0 255.255.255.0
default-router 172.16.10.254
no ip domain-lookup
!
!
spanning-tree mode rapid-pvst
spanning-tree vlan 10,20,99 priority 28672
!
interface FastEthernet0/1
switchport access vlan 10
switchport mode access
spanning-tree portfast
spanning-tree bpduguard enable
!
interface FastEthernet0/2
switchport trunk native vlan 99
channel-group 1 mode active
switchport mode trunk
!
interface FastEthernet0/3
switchport trunk native vlan 99
channel-group 1 mode active
switchport mode trunk
!
interface FastEthernet0/4
switchport trunk native vlan 99
channel-group 3 mode active
switchport mode trunk
!
```

```
interface FastEthernet0/5
switchport trunk native vlan 99
channel-group 3 mode active
switchport mode trunk
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
```

```
!  
interface Port-channel 1  
switchport trunk native vlan 99  
switchport mode trunk  
!  
interface Port-channel 3  
switchport trunk native vlan 99  
switchport mode trunk  
!  
interface Vlan1  
no ip address  
shutdown  
!  
interface Vlan99  
ip address 172.16.99.1 255.255.255.0  
!  
ip default-gateway 172.16.99.254  
!  
banner motd ^CNO UNAUTHORIZED ACCESS^C  
!  
!  
!  
line con 0  
password 7 0822455D0A16  
logging synchronous  
login  
!  
line vty 0 4  
password 7 0822455D0A16  
logging synchronous  
login  
line vty 5 15  
login  
!  
!  
end  
  
S1#  
#
```

Switch 2 – S2

S2#sh run

Building configuration...

Current configuration : 1952 bytes

!

version 12.2

no service timestamps log datetime msec

no service timestamps debug datetime msec

service password-encryption

!

hostname S2

!

enable secret 5 \$1\$mERr\$hx5rVt7rPNoS4wqbXKX7m0

!

!

!

no ip domain-lookup

!

!

spanning-tree mode rapid-pvst

!

interface FastEthernet0/1

switchport access vlan 20

switchport mode access

spanning-tree portfast

spanning-tree bpduguard enable

!

interface FastEthernet0/2

switchport trunk native vlan 99

channel-group 3 mode active

switchport mode trunk

!

interface FastEthernet0/3

switchport trunk native vlan 99

channel-group 3 mode active

switchport mode trunk

!

interface FastEthernet0/4

switchport trunk native vlan 99

channel-group 2 mode active

switchport mode trunk

!

interface FastEthernet0/5

switchport trunk native vlan 99

```
channel-group 2 mode active
switchport mode trunk
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Port-channel 2
```

```
switchport trunk native vlan 99
switchport mode trunk
!
interface Port-channel 3
switchport trunk native vlan 99
switchport mode trunk
!
interface Vlan1
no ip address
shutdown
!
interface Vlan99
ip address 172.16.99.2 255.255.255.0
!
ip default-gateway 172.16.99.254
!
banner motd ^CNO UNAUTHORIZED ACCESS^C
!
!
!
line con 0
password 7 0822455D0A16
logging synchronous
login
!
line vty 0 4
password 7 0822455D0A16
logging synchronous
login
line vty 5 15
login
!
!
end
```

S2#

Switch 3 – S3

```
S3#
S3#sh run
Building configuration...
```

Current configuration : 1942 bytes

```
!  
version 12.2  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
service password-encryption  
!  
hostname S3  
!  
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0  
!  
!  
!  
no ip domain-lookup  
!  
!  
spanning-tree mode rapid-pvst  
spanning-tree vlan 10,20,99 priority 24576  
!  
interface FastEthernet0/1  
switchport trunk native vlan 99  
switchport mode trunk  
!  
interface FastEthernet0/2  
switchport trunk native vlan 99  
channel-group 1 mode active  
switchport mode trunk  
!  
interface FastEthernet0/3  
switchport trunk native vlan 99  
channel-group 1 mode active  
switchport mode trunk  
!  
interface FastEthernet0/4  
switchport trunk native vlan 99  
channel-group 2 mode active  
switchport mode trunk  
!  
interface FastEthernet0/5  
switchport trunk native vlan 99  
channel-group 2 mode active  
switchport mode trunk  
!  
interface FastEthernet0/6  
!
```

```
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Port-channel 1
switchport trunk native vlan 99
switchport mode trunk
!
interface Port-channel 2
switchport trunk native vlan 99
```

```
switchport mode trunk
!
interface Vlan1
no ip address
shutdown
!
interface Vlan99
ip address 172.16.99.3 255.255.255.0
!
ip default-gateway 172.16.99.1
!
banner motd ^CNO UNAUTHORIZED ACCESS^C
!
!
!
line con 0
password 7 0822455D0A16
logging synchronous
login
!
line vty 0 4
password 7 0822455D0A16
logging synchronous
login
line vty 5 15
login
!
!
end
```

```
S3#
S3#
S3#
```
