Instructions for lab (rev. 200115)

Option 1:

S\_X(config)#interface range Gi 0/1  
S\_X(config-if-range)#switchport mode dynamic auto  
S\_X(config-if-range)#exit

S\_Y(config)#interface range Gi 0/1  
S\_Y(config-if-range)#switchport mode dynamic auto  
S\_Y(config-if-range)#exit

- Check the trunk configuration

S\_X#show interface trunk

- Check the following connections:

1.  
- PC\_X1 -  PC\_Y1,  
- PC\_X2 - PC\_Y2,  
- PC\_X1 - PC\_N1 (N correspond to index number of other group)  
- PC\_X2 - PC\_N2 (N correspond to index number of other group)

- S\_X - S\_Y

2.  
- PC1 - PC2 (may not to work),  
- PC1 - PC1 default gateway (may not to work),  
- PC2 - PC2 default gateway (may not to work),  
- PC1 - S\_X (may not to work),  
- PC2 - S\_X (may not to work),

Names and addresses used in lab.

They overwirites the names and address from cisco labs.

X - is the number of devices on a rack . It should be consistent with the group number.

**SWITCH**

Switch Name: S\_X

Designed VLANs and their names :

VLAN no    VLAN name  
10 - LabX\_10

20 - LabX\_20

99 - LabX\_99\_management

Ports to VLANs assigment:

VLAN 10: Fa 0/1-10

VLAN 20: Fa 0/11-20

Trunk : Fa 0/21-24 and Gi 0/1-2

Network addresses used for different VLANs:

NET1 for VLAN 10: 172.16.10.0/24

NET2 for VLAN 20: 172.16.20.0/24

NET3 for VLAN 99 : 172.16.99.0/24

Cable connections:

A. version for exercise with VLAN connecting through dedicated ports

VLAN 10: S\_X Fa 0/3 - S\_Y Fa 0/5

VLAN 20: S\_X Fa 0/13 - S\_Y Fa 0/15

VLAN 99: S\_X Fa 0/22 - S\_Y Fa 0/24

B. version for exercise with VLAN connecting through trunk port

Trunk: S\_X Fa 0/22 - S\_Y Fa 0/24

[IP addresses](https://eportal.pwr.edu.pl/mod/resource/view.php?id=56957) assigned to management interface (VLAN 99) of switch:

S\_X : 172.16.99.X9/24  
defaul gateway : 172.16.99.X0

IPv6 configuration :

...

**COMPUTERS**

The [IP addresses](https://eportal.pwr.edu.pl/mod/resource/view.php?id=56957) assigned to the computers:

PC1 : 172.16.10.X1/24 gateway : 172.16.10.X0

PC2 : 172.16.20.X2/24 gateway : 172.16.20.X0

IPv6 configuration :

...

B.

version for the exercise with VLAN connecting through trunk port

VLAN 10: FastEthernet 0/0.10 : 172.16.10.X0/24 ,

VLAN 20: FastEthernet 0/0.20 : 172.16.20.X0/24 ,

VLAN 99 : FastEthernet 0/0.99 : 172.16.99.X0/24 native VLAN

Version for Router 2610  
VLAN 99 : Ethernet 0/ 0: 172.16.99.X0/24 , ( not set the native VLAN)  
  
IPv6 configuration :

...

**ROUTER**

Router Name: R\_X

[IP addresses](https://eportal.pwr.edu.pl/mod/resource/view.php?id=56957) assigned to the router LAN interfaces

 Fa 0/0 (Fa 0/2/0 or other): 172.16.99.X0 255.255.255.0

[IP addresses](https://eportal.pwr.edu.pl/mod/resource/view.php?id=56957) assigned to the router's WAN interfaces :

WAN1 : 10.X.N.1/30, (eg 10.1.2.1 for net between the groups 1 and 2)

WAN2 : 10.M.X.2/30, (eg 10.5.1.2 for net between groups of 5 and 1)

... ( the same pattern for the other interfaces )

WAN3 : 10.X.L.1/30

WAN4 : 10.K.X.2/30

IPv6 configuration :

...

The laboratory base on following exercises:

\* [4.1.4.6] CCNA R&S2 v. 5.0 - the basic configuration of the router, configure an SSH connection, the configuration of IPv6

\* [4.1.4.7] CCNA R&S2 v. 5.0 - configuration of the router using the CCP (Cisco Configuration Professional)

\* [5.1.2.4] CCNA R&S2 v. 5.0 - inter-VLAN routing via dedicated ports

\* [5.1.3.7] CCNA R&S2 v. 5.0 - routing between VLANs through a trunk port

Task 0 - The basic configuration of the router and switch.

0 point

\*[ 4.1.4.6 ] CCNA R&S2 v. 5.0 - the basic configuration of the router , configure an SSH connection , the configuration of IPv6

Configuration of PC computer

- Connect PC1 computer to port Fa 0 /1 of the switch.

- Connect PC2 computer to port Fa 0 /11 of the switch.

- Configure PCs to work in the lab network :

[IP addresses](https://eportal.pwr.edu.pl/mod/resource/view.php?id=56957):

PC1 : 172.16.10.X1/24 , gateway : 172.16.10.X0

PC2 : 172.16.20.X2/24 , gateway : 172.16.20.X0

...

X - is the number of the router on the stand and the number of a laboratory student group.

- Set the default gateway to the IP address of the router,

- Remove remaining existing gates, turn off the Internet interface .

To properly connect to a laboratory set, default gateway on Cisco NIC must be configured as the IP address of the router. You also need to remove the exiting default gateway on Internet NIC by disabling this interfeace.

Basic router configuration

Depending on the operating system version and model of your router commands can differ slightly .

- Connect the lowermost Fast Ethernet router port ( 0/0 or 0/2/0 ) to the switch port Fa 0/23.

- Configure IP addressing on PCs.

- Run the putty or hyperterminal and check the console connection .

- Displays the current configuration of the router. Note the names of interfaces .

R\_X#show running-config

- Check the memory size frames, nvram , flash and processor type in your router .

R\_X#show version

- Check whether there is a startup configuration,

R\_X#show startup-config

- If there is a configuration page , delete it and reboot the router.

R\_X#erase startup-config  
R\_X#reload

At the start of unconfigured cisco device startup proposes wants to input into initial configuration mode . Bring out this process by typing respectively

Would you like to terminate autoinstall?[yes/no]:**yes**<ENTER>

Would you like to enter the initial configuration dialog?[yes/no]:**no**<ENTER>

- Please refer to the router CLI .

Check the various configuration levels ( user , privileged user , interface , console , terminals, ... ) .

Router>  
Router>enable  
Router#  
Router#configure terminal  
Router(config)#  
...

- Configure the name of the router.

Router(config)#hostname R\_X  
R\_X(config)#

- Set up the message of the day ( MOTD ) .

R\_X(config)#banner motd #The supervised. Access only to authorized users#

- Set password to access :

enable password unencrypted - class,

console password - cisco

terminals password - cisco

R\_X#configure terminal  
R\_X(config)#enable password class  
R\_X(config)#line console 0

R\_X(config-line)#password cisco  
R\_X(config-line)#logging synchronous  
R\_X(config-line)#exec-timeout 0 0  
R\_X(config-line)#login  
R\_X(config-line)#exit

R\_X(config)#line vty 0 4  
R\_X(config-line)#password cisco  
R\_X(config-line)#logging synchronous  
R\_X(config-line)#exec-timeout 0 0  
R\_X(config-line)#login  
R\_X(config-line)#exit

logging synchronous command prevents the user before interrupting his commands through the messages printed on the console.

exec-timeout command specifies the idle time after which the connection to the router is cloced. A value of 0 makes the connection will not be interrupted. The default value is 10 minutes.

What does 0 0 in the command exec-timeout ? How to set the automatic logout after 5 minutes ?

- Turn off automating DNS [IP addresses](https://eportal.pwr.edu.pl/mod/resource/view.php?id=56957) resolving.

R\_X(config)#no ip domain-lookup<Enter>

- Set IP address on router LAN interface

R\_X(config)#interface Fa 0/0 (Fa 0/2/0 or other)  
R\_X(config-if)#ip address 172.16.99.X0 255.255.255.0  
R\_X(config-if)#no shutdown  
R\_X(config-if)#end

- Save the current configurations to nvram .

R\_X#copy running-config startup-config  
Destinatiion filename [startup-config]?<Enter>

- Compare the configuration in RAM and NVRAM .

R\_X#show running-config  
R\_X#show startup-config

- Back up your configuration by capturing the print of command show running-config from the console to a text file c :/cisco/users/firstname.secondname /R\_X\_config.txt

Basic switch configuration

- Delete the previous configuration and reboot the switch .

Delete a file vlan.dat that contain information about configured VLANs,

S\_X#delete flash:vlan.dat  
Delete filename [vlan.dat]?<Enter>  
Delete flash:vlan.dat?[confirm]<Enter>

Delete the nvram memory ( startup-config )

S\_X#erase startup-config  
S\_X#reload  
Proceed with reload?[confirm]<Enter>

At the start of unconfigured cisco device startup proposes wants to input into initial configuration mode . Bring out this process by typing respectively

Would you like to terminate autoinstall?[yes/no]:**yes**<ENTER>

Would you like to enter the initial configuration dialog?[yes/no]:**no**<ENTER>

- Please refer to the router CLI .

Check the various configuration levels ( user , privileged user , interface , console , terminals, ... ) .

Switch>  
Switch>enable  
Switch#  
Switch#configure terminal  
Switch(config)#  
...

- Configure the switch name

Switch(config)#hostname S\_X  
S\_X(config)#

- Set password to access :

enable password unencrypted - class,

console password - cisco

terminals password - cisco

S\_X#configure terminal  
S\_X(config)#enable password class  
S\_X(config)#line console 0

S\_X(config-line)#password cisco  
S\_X(config-line)#logging synchronous  
S\_X(config-line)#exec-timeout 0 0  
S\_X(config-line)#login  
S\_X(config-line)#exit

S\_X(config)#line vty 0 15  
S\_X(config-line)#password cisco  
S\_X(config-line)#logging synchronous  
S\_X(config-line)#exec-timeout 0 0  
S\_X(config-line)#login  
S\_X(config-line)#exit

logging synchronous command prevents the user before interrupting his commands through the messages printed on the console.

exec-timeout command specifies the idle time after which the connection to the router is cloced. A value of 0 makes the connection will not be interrupted. The default value is 10 minutes.

What does 0 0 in the command exec-timeout ? How to set the automatic logout after 5 minutes ?

- Set up the message of the day ( MOTD ) .

S\_X(config)#banner motd #The supervised. Access only to authorized users#

\* Default gateway,

S\_X (config) ip defaul-gateway 172.16.99.X0

\* A description of the connected interfaces ,

\* Disable DNS lookup for IP dns addresses translation,

S\_X(config)#no ip domain-lookup<Enter>

**Task 1** - VLAN configuration.

1 points

\*[ 5.1.2.4 ] CCNA R&S2 v. 5.0 - inter-VLAN routing via dedicated ports

[6.2.2.5] CCNA R&S2 v. 6.0 - Configuring VLANs and Trunking  
[6.3.2.4] CCNA R&S2 v. 6.0 - Configuring Per-Interface Inter-VLAN Routing

- Check connection of PC1 computer to port Fa 0 /1 of the switch.

- Check connection of PC2 computer to port Fa 0 /11 of the switch.

Switch configuration

- Create following VLANs :

VLAN no  - VLAN name

10 - LabX\_10

20 - LabX\_20

99 - LabX\_99\_management

S\_X(config)#vlan 10  
S\_X(config-vlan)#name LabX\_10  
S\_X(config-vlan)#vlan 20  
S\_X(config-vlan)#name LabX\_20  
S\_X(config-vlan)#vlan 99  
S\_X(config-vlan)#name LabX\_99\_management  
S\_X(config-vlan)#exit  
S\_X(config)#

- Assign VLANs to the following ports:

VLAN 10 - Fa 0/1-10

VLAN 20 - Fa 0/11-20

S\_X(config)#interface range FastEthernet 0/1-10  
S\_X(config-if-range)#switchport mode access  
S\_X(config-if-range)#switchport access VLAN 10

S\_X(config)#interface range FastEthernet 0/11-20  
S\_X(config-if-range)#switchport mode access  
S\_X(config-if-range)#switchport access VLAN 20

S\_X(config)#interface range FastEthernet 0/21-24  
S\_X(config-if-range)#switchport mode access  
S\_X(config-if-range)#switchport access VLAN 99

S\_X(config)#interface range Gi 0/1-2  
S\_X(config-if-range)#switchport mode access  
S\_X(config-if-range)#switchport access VLAN 99

- Turn on all ports using range command.

S\_X(config)#interface range Fa 0/1-24  
S\_X(config-if-range)# no shutdown  
S\_X(config)#interface range Gi 0/1-2  
S\_X(config-if-range)# no shutdown  
S\_X(config-if-range)# end  
S\_X#

- Configure the Management VLAN (IP address, turn on the interface).

Configure an IP address for management VLAN to enables communication with the switch . Communication with the switch will only be possible after you have configured one active connection in VLAN 99. In the exercise it will be the trunk connection between the switch and the router.

S\_X(config)#interface vlan 99  
S\_X(config-if)#ip address 172.16.99.X9 255.255.255.0  
S\_X(config-if)#no shutdown

- Copy the configuration to NVRAM .

- make the communication tests between VLANs

PC1 - PC2

PC1, PC2 - switch

PC1, PC2 - router

router - switch

Save the results. Some connection may not work.

Explain why it is working or not.

- make the possibilities of communication to different networks

PC\_X1 - PC\_Y1

PC\_X2 - PC\_Y2

R\_X - R\_Y

S\_X - S\_Y

Save the results. Some connection may not work.

Explain why it is working or not.

**Task 2** -  Connecting corresponding VLAN on different switches with dedicated links (cables).

**Points 1**

**Connecting corresponding VLAN on different switches with dedicated ports (cables)**

- Connect the corresponding VLANs from the neighboring switches. Use additional cables.

Connect S\_X Fa 0/3 port to S\_Y Fa 0/5 port

Connect S\_X Fa 0/13 port to S\_Y Fa 0/15 port

Connect S\_X Fa 0/22 port to S\_Y Fa 0/24 port

- Check the following connections:

1.  
- PC\_X1 -  PC\_Y1,  
- PC\_X2 - PC\_Y2,  
- PC\_X1 - PC\_N1 (N correspond to index number of other group)  
- PC\_X2 - PC\_N2 (N correspond to index number of other group)

2.

- S\_X - S\_Y

- R\_X - S\_X  
- R\_X - R\_Y

- R\_X - S\_Y

- PC1 - PC2 (may not to work),

- PC1 - S\_X (may not to work),  
- PC2 - S\_X (may not to work),

Save the results. Some connection may not work.

Explain why it is working or not.

**- Ask instructor to check your exercise.**

**Task 3** - Interconnecting VLANs configured on different switches through a trunk port.

Points: 2

**Interconnection the different VLANs form different switches through the trunk link.**

1 point

To save the ports and facilitate management and configuration administrator decide to implement trunk link between switches.

- Disconnect the cables from previous step. (Fa 0/3, Fa 0/5, Fa 0/13, Fa 0/15)

- Interconnect the adjacent switches with single wire. Use the trunk ports.

Connect**S\_X Fa 0/19 port to S\_Y 0/21 port**

- Configure the last ports on your switch as trunk ports. Set the native VLAN to 99.  
Trunk - Fa 0/19-24 i Gi 0/1-2, native VLAN 99

S\_X(config)#interface range FastEthernet 0/19-24, Gi 0/1-2  
S\_X(config-if-range)#switchport mode trunk  
S\_X(config-if-range)#switchport trunk native VLAN 99  
S\_X(config-if-range)#end

- Check the trunk configuration

S\_X#show interface trunk

- Check the following connections:

1.  
- PC\_X1 -  PC\_Y1,  
- PC\_X2 - PC\_Y2,  
- PC\_X1 - PC\_N1 (N correspond to index number of other group)  
- PC\_X2 - PC\_N2 (N correspond to index number of other group)

- S\_X - S\_Y

2.  
- PC1 - PC2 (may not to work),  
- PC1 - PC1 default gateway (may not to work),  
- PC2 - PC2 default gateway (may not to work),  
- PC1 - S\_X (may not to work),  
- PC2 - S\_X (may not to work),

- Remove the static trunk configuration

S\_X(config)#interface range Gi 0/1

S\_X(config-if-range)#no switchport nonegotiate

S\_X(config-if-range)#no switchport mode trunk

S\_X(config-if-range)#exit

**- Configure the trunk using different options:**

1. S\_X set as switchport mode dynamic auto  - S\_Y set as switchport mode dynamic auto  
2. S\_X set as switchport mode dynamic auto  - S\_Y set as switchport mode dynamic desirable   
3. S\_X set as switchport mode dynamic desirable  - S\_Y set as switchport mode dynamic desirable   
4. S\_X set as switchport mode dynamic auto  - S\_Y set as switchport mode trunk  
5. S\_X set as switchport mode access  - S\_Y set as switchport mode trunk

Option 1:

S\_X(config)#interface range Gi 0/1  
S\_X(config-if-range)#switchport mode dynamic auto  
S\_X(config-if-range)#exit

S\_Y(config)#interface range Gi 0/1  
S\_Y(config-if-range)#switchport mode dynamic auto  
S\_Y(config-if-range)#exit

- Check the trunk configuration

S\_X#show interface trunk

- Check the following connections:

1.  
- PC\_X1 -  PC\_Y1,  
- PC\_X2 - PC\_Y2,  
- PC\_X1 - PC\_N1 (N correspond to index number of other group)  
- PC\_X2 - PC\_N2 (N correspond to index number of other group)

- S\_X - S\_Y

2.  
- PC1 - PC2 (may not to work),  
- PC1 - PC1 default gateway (may not to work),  
- PC2 - PC2 default gateway (may not to work),  
- PC1 - S\_X (may not to work),  
- PC2 - S\_X (may not to work),

- Save the results. Some connection may not work.

Explain why it is working or not.

Option 2:

S\_X(config)#interface range Gi 0/1  
S\_X(config-if-range)#switchport mode dynamic auto  
S\_X(config-if-range)#exit

S\_Y(config)#interface range Gi 0/1  
S\_Y(config-if-range)#switchport mode dynamic desirable  
S\_Y(config-if-range)#exit

- Check the trunk configuration

S\_X#show interface trunk

- Check the following connections:

1.  
- PC\_X1 -  PC\_Y1,  
- PC\_X2 - PC\_Y2,  
- PC\_X1 - PC\_N1 (N correspond to index number of other group)  
- PC\_X2 - PC\_N2 (N correspond to index number of other group)

- S\_X - S\_Y

2.  
- PC1 - PC2 (may not to work),  
- PC1 - PC1 default gateway (may not to work),  
- PC2 - PC2 default gateway (may not to work),  
- PC1 - S\_X (may not to work),  
- PC2 - S\_X (may not to work),

- Save the results. Some connection may not work.

Explain why it is working or not.

Option 3:

Follow the previuos steps  
  
- Save the results. Some connection may not work.

Explain why it is working or not.

Option 4:

Follow the previuos steps  
  
- Save the results. Some connection may not work.

Explain why it is working or not.

Option 5:

Follow the previuos steps  
  
- Save the results. Some connection may not work.

Explain why it is working or not.

**- Ask instructor to check your exercise.**