

Please fill in the names with CAPITAL LETTERS

Date	Name 1	Name 2	Name 3	Zaliczenie

WLAN Laboratory

Lab 12. Cisco AP1130 Access Point – vlan networks isolation

Objective:

The students will learn advanced VLAN networking functionality of Cisco Access Point, practice of creation and a basic configuration of VLAN interfaces, multi SSID networking with secure valans networks isolation.

Student Prerequisites:

- basic knowledge of the WLAN 802.11a/g/n system,
- basic knowledge of IPv4 addresses and vlan concept

Hardware and Software to be used in this lab assignment:

WLAN AP device (1130AG), PC with WLAN card or laptop, serial console program (eg. Putty.exe), serial (RS232) cable with RJ45 and 9pin plug, RJ45 Ethernet cables, and managed switch with a vlan 802.1Q functionality.

Reset the AP1310 to factory settings before configuration.

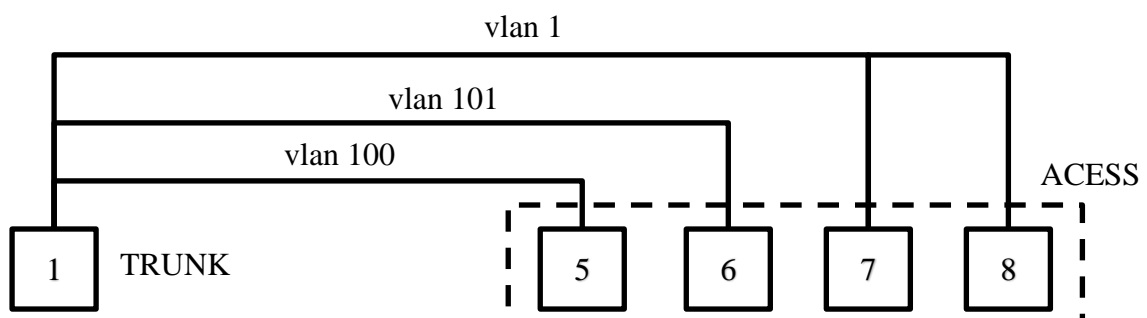
Goal to reach:

Your company provides wireless LAN access service to client A and client B. Both clients occupy a common location within the range of your AP1130 device, but require their networks to be isolated from each other. Your task is to configure the AP in such a way that in the 2.4 GHz band it emits two networks named "CompanyA" and CompanyB ". Traffic to these networks is to be delivered from the switch ports: port 5 for company A and port 6 for company B.

Required device configuration:

Switch

Ports 5 and 6 of the TL-SG108PE switch should be configured as 'access' ports for VLAN 100 and 101, respectively. Port 1 of the switch should be configured as 'trunk' port in which VLAN 100, 101, and the default traffic from VLAN 1 are sent. Packets at port 1 of the switch is delivered to AP1130 on a trunk connection using VLAN 100 for company A and 101 for company B respectively. The management of the AP1130 device and the switch is to be done via the default VLAN 1 (switch ports 7 and 8 configured as access for VLAN 1).



AP1130 WLAN access point

On the AP1130 device, enable multi SSID (mbssid) on the physical Dot11Radio0 radio interface. Configure VLAN 1, 100 and 101 associated with virtual Ethernet interfaces (FastEthernet0.1, FastEthernet0.100, FastEthernet0.101) and virtual radio interfaces (Dot11Radio0.1, Dot11Radio0.100, Dot11Radio0.101) respectively. VLAN 1 interfaces (Dot11Radio0.1, BV11 and FastEthernet0.1) should be connected by bridge No. 1. Connect VLAN 100 interfaces (Dot11Radio0.100 and FastEthernet0.100) with bridge No. 100, and the VLAN 101 interfaces (Dot11Radio0.101 and FastEthernet0.101) connect by bridge No. 101. Configure WLAN networks (create SSIDs) respectively: 'service' for VALN 1, 'CompanyA' for VLAN100 and 'CompanyB' for VLAN 101, and secure them using WPA-PSK method, aes-ccm encryption (or TKIP if computer at your stand has Windows XP) with the password: wlan1234S for 'service', wlan1234A for 'CompanyA' and wlan1234B for 'CompanyB'.

The method of verifying the correctness of the network configuration.

Two computers must be used to test the network configuration:

K1 - where the WLAN card has been assigned a static IP address of 192.168.0.20/24

K2 - where the Ethernet port assigned has a static IP address of 192.168.0.10/24

The configuration is correct if the following tests are met:

Test 1 - wlan network 'service'

K1 connected to the WLAN 'service'				
K2 connected to the switch port	5	6	7	8
Ping from K1 to K2 works fine	NO	NO	YES	YES

Test 2 - wlan network 'CompanyA'

K1 connected to the WLAN 'CompanyA'				
K2 connected to the switch port	5	6	7	8
Ping from K1 to K2 works fine	YES	NO	NO	NO

Test 3 - wlan network 'CompanyB'

K1 connected to the WLAN 'CompanyB'				
K2 connected to the switch port	5	6	7	8
Ping from K1 to K2 works fine	NO	YES	NO	NO

Exercise stages

I) Switch configuration

The IP address for managing the switch is 192.168.0.1/24. (user: admin, pass: admin)

Set the computer's Ethernet port address to 192.168.0.10/24. Reset your switch to factory defaults. Log in with a web browser to the switch address and set the appropriate configuration.

802.1Q VLAN Configuration

802.1Q VLAN Configuration: Enable Disable

VLAN ID	(2-4094)	VLAN Name	
Port	Untagged	Tagged	Not Member
Select All	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Port 1	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 2	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 3	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 4	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 5	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 6	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 7	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Port 8	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

VLAN ID	VLAN Name	Member Ports	Tagged Ports	Untagged Ports	Delete
1	Default_VLAN	1-8		1-8	<input type="checkbox"/>
100	FirmaA	1,5	1	5	<input type="checkbox"/>
101	FirmaB	1,6	1	6	<input type="checkbox"/>

802.1Q VLAN PVID Setting

Select	Port	PVID
<input type="checkbox"/>		<input type="text"/>
<input type="checkbox"/>	Port 1	1
<input type="checkbox"/>	Port 2	1
<input type="checkbox"/>	Port 3	1
<input type="checkbox"/>	Port 4	1
<input type="checkbox"/>	Port 5	100
<input type="checkbox"/>	Port 6	101
<input type="checkbox"/>	Port 7	1
<input type="checkbox"/>	Port 8	1

Note:

1. By default, the PVID of all ports is 1.
2. 802.1Q VLAN PVID will be restored to 1 when 802.1Q VLAN is disabled.

II) Configuration of AP1130

Ethernet port configuration

Connect to the device via a serial interface (RS232) and a text console (putty.exe in serial port mode). This connection mode is called: Console Line Interface (CLI).

Using the CLI, you need to configure the IP address and mask for the Ethernet link so that you can then access the AP from your computer via the TCP / IP protocol.

(RS232 parameters: 9600 bps, 8 data, 0 parity, 1 stop, no flow control).

An AP username with Administrator privileges is: **Cisco**

The AP administrator password is: **Cisco**

```
ap>enable
Password:
ap# conf term
Enter configuration commands, one per line. End with CNTL/Z.
ap(config)# int bvi 1
ap(config-if)# ip address 192.168.0.250 255.255.255.0
ap(config-if)# exit
ap(config)#
```

Connect the AP to the computer with an Ethernet cable and test using the 'ping' command PC to AP communication.

Configuration of the physical interface dot11radio 0

Set multi SSID mode and define encryption method for each WLAN radio link.

```
ap(config)# int dot11Radio 0
ap(config-if)# mbssid
ap(config-if)# station-role root
ap(config-if)# encryption vlan 1 mode ciphers aes-ccm
ap(config-if)# encryption vlan 100 mode ciphers aes-ccm
ap(config-if)# encryption vlan 101 mode ciphers aes-ccm
ap(config-if)# exit
ap(config)#
```

Configuring SSID network names

Define: SSID name, authentication, WPA encryption method, WPA-PSK password and vlan allocation.

```
ap(config)# dot11 ssid service
ap(config-ssid)# authentication open
ap(config-ssid)# authentication key-management wpa
ap(config-ssid)# wpa-psk ascii wlan1234S
ap(config-ssid)# vlan 1
ap(config-ssid)# mbssid guest-mode
ap(config-ssid)# exit
```

```
ap(config)# dot11 ssid FirmaA
ap(config-ssid)# authentication open
ap(config-ssid)# authentication key-management wpa
ap(config-ssid)# wpa-psk ascii wlan1234A
ap(config-ssid)# vlan 100
ap(config-ssid)# mbssid guest-mode
ap(config-ssid)# exit
```

```
ap(config)# dot11 ssid FirmaB
ap(config-ssid)# authentication open
ap(config-ssid)# authentication key-management wpa
ap(config-ssid)# wpa-psk ascii wlan1234B
ap(config-ssid)# vlan 101
ap(config-ssid)# mbssid guest-mode
ap(config-ssid)# exit
```

Define VLAN interfaces

vlan 1

```
ap(config)# interface FastEthernet 0.1
ap(config-subif)# encapsulation dot1Q 1 native
ap(config-subif)# exit
```

```
ap(config)# interface dot11Radio 0.1
ap(config-subif)# encapsulation dot1Q 1 native
ap(config-subif)# exit
```

vlan 100

```
ap(config)# interface FastEthernet 0.100
ap(config-subif)# encapsulation dot1Q 100
ap(config-subif)# bridge-group 100
ap(config-subif)# exit
```

```
ap(config)# interface dot11Radio 0.100
ap(config-subif)# encapsulation dot1Q 100
ap(config-subif)# bridge-group 100
ap(config-subif)# exit
```

vlan 101

```
ap(config)# interface FastEthernet 0.101
ap(config-subif)# encapsulation dot1Q 101
ap(config-subif)# bridge-group 101
ap(config-subif)# exit
```

```
ap(config)# interface dot11Radio 0.101
ap(config-subif)# encapsulation dot1Q 101
ap(config-subif)# bridge-group 101
ap(config-subif)# exit
```

Assigning network names

```
ap(config)# interface dot11Radio 0
ap(config-if)# ssid service
ap(config-if)# ssid FirmaA
ap(config-if)# ssid FirmaB
ap(config-if-ssid)# exit
```

Turning on the radio interface

```
ap(config)# interface dot11Radio 0
ap(config-if)#no shutdown
```

At this stage, all 3 networks should be visible to WLAN clients

III) Configuration correctness test

Two computers must be used to test the network configuration:

K1 - where the WLAN card has been assigned a static IP address of 192.168.0.20/24

K2 - where the Ethernet port assigned has a static IP address of 192.168.0.10/24

The configuration is correct if the following tests are met:

Save the test result in the tables!

Test 1 - wlan network 'service'

K1 connected to the WLAN 'service'				
K2 connected to the switch port	5	6	7	8
Ping from K1 to K2 works fine	NO	NO	YES	YES
Test results				

Test 2 - wlan network 'CompanyA'

K1 connected to the WLAN 'CompanyA'				
K2 connected to the switch port	5	6	7	8
Ping from K1 to K2 works fine	YES	NO	NO	NO
Test results				

Test 3 - wlan network 'CompanyB'

K1 connected to the WLAN 'CompanyB'				
K2 connected to the switch port	5	6	7	8
Ping from K1 to K2 works fine	NO	YES	NO	NO
Test results				

Cisco AP 1310 manual

1. Download from: [Cisco IOS Software Configuration Guide for...](http://radiokomunikacja.edu.pl/f/87)
(<http://radiokomunikacja.edu.pl/f/87>)

Questions:

1. What is VLAN?
2. What is a TRUNK link?
3. What does it mean that the port is set to "tagged"?
4. What is the meaning of the *ap (config-subif) # encapsulation dot1Q 101* command
5. Maximum how many different WLANs can be emitted by one AP1130 radio interface?
6. Draw a diagram of the access network built with the network interfaces, IP addresses and subnet masks marked on each network interface used.