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| Date                 | Name 1               | Name 2               | Name 3               | Zaliczenie           |
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## WLAN Laboratory

### Lab 3. Cisco Access Point – part 1

#### Objective:

The students will learn basic functionality of Cisco Access Point, practice configuration with Client Line Interface (CLI), reset and set up network interfaces/IP address and practice basic methods of set up AP devices with Internet browser interface.

#### Student Prerequisites:

- knowledge of the basic WLAN configuration,
- familiarity with the self-learning material of the course,
- basic knowledge of the Linux OS and Windows,
- basic knowledge of IPv4 addresses

#### Hardware and Software to be used in this lab assignment:

WLAN AP device (Cisco AP1200 or 1130AG), PC with WLAN card or laptop, serial console program (eg. Putty.exe), serial (RS232) cable, RJ45 Ethernet cables, Internet Explorer web browser, on some computers a converter USB <-> RS232 is also need.

#### Description of the Experiment:

During the exercise students conducts basic configurations to build a simple WLAN network with wireless Internet access using enterprise class Cisco Access Point device (AP).

#### Lab goals:

- The AP device provide wireless Internet access (form faculty wire LAN) for wireless clients (PC).
- The clients stations should receive their IP address from the faculty DHCP server, in public IP range.

#### Lab phases/tasks:

##### I) Hardware reset

We assume that the AP device is in a configured state and its current configuration is not known. The first point to perform operations is bring the machine settings to a factory initial state.

Reset procedure: Unplug the power to AP, press and hold down the 'reset' button, turn on the power, holding down 'reset' button, wait until the LEDs light up in yellow/orange (2-3 seconds), release the 'reset' button. AP will restarted and restore factory initial settings (it will take approximately 2 minutes).

## II) Connection via RS232 port

Connect PC RS232 port (9 pin socket or USB converter) to AP RS232 port (RJ45 socket) with serial cable. Run console terminal program (putty.exe) and set serial port parameters to: 9600 bps, 8 data, 0 parity, 1 stop, no flow control. Open connection and pres [enter] to get started. You should to get response chars from AP (“ap>”).

Note! Remember to set up putty with proper name of serial port, check the name in Windows device manager.

## III) Enter privileged mode.

Cisco AP have 4 working modes. Basic information about modes are in the table below.

| Command Mode            | Access Method   | Prompt         | Exit  |
|-------------------------|---|----------------|---|
| User EXEC               | This is the first level of access.<br>Change terminal settings, perform basic tasks, and list system information.   | AP>            | Enter the <b>logout</b> command.  |
| Privileged EXEC         | From user EXEC mode, enter the <b>enable</b> command.   | AP#            | To exit to user EXEC mode, enter the <b>disable</b> command.  |
| Global configuration    | From privileged EXEC mode, enter the <b>configure</b> command.  | AP(config)#    | To exit to privileged EXEC mode, enter the <b>exit</b> or <b>end</b> command, or press <b>Ctrl-Z</b> .  |
| Interface configuration | From global configuration mode, specify <b>terminal</b> then specify an interface by entering the <b>interface</b> command followed by the interface type and number. | AP(config-if)# | To exit to privileged EXEC mode, enter the <b>end</b> command, or press <b>Ctrl-Z</b> .<br>To exit to global configuration mode, enter the <b>exit</b> command. |

To configure AP you have to enter to privileged mode.

```
ap>enable
Password: Cisco
ap#
```

**Cisco** is the default password. If the password has been changed, reset the AP to factory defaults. If help is needed refer to the online documentation [1].

## IV) Erase the existing configuration

If there is an existing configuration on the AP, erase the configuration and reload.  
(User commands are written in **bold** chars).

```
ap#erase startup-config
Erasing the nvram filesystem will remove all configuration files! Continue?
[confirm]Y[OK]
Erase of nvram: complete
ap#
*Mar  1 06:43:17.714: %SYS-7-NV_BLOCK_INIT: Initialized the geometry of
nvram
ap#reload

System configuration has been modified. Save? [yes/no]: no
Proceed with reload? [confirm]y
*Mar  1 06:44:28.955: %SYS-5-RELOAD: Reload requested by console. Reload
Reason: Reload Command.Xmodem file system is available.
flashfs[0]: 146 files, 7 directories
```

```

flashfs[0]: 0 orphaned files, 0 orphaned directories
flashfs[0]: Total bytes: 15998976
flashfs[0]: Bytes used: 5513728
flashfs[0]: Bytes available: 10485248
flashfs[0]: flashfs fsck took 27 seconds.
Base ethernet MAC Address: c4:71:fe:b0:83:96
Initializing ethernet port 0...
Reset ethernet port 0...
Reset done!
...

```

NOTE!! For more information about CLI operation refer to on-line documentation [1-3].

#### IV) Configure Hostname

The system name, while not an essential setting, helps identify the AP on your network. The system name appears in the titles of the management system pages. Let's define the device name so that it is unique within the lab. Please choose a name consisting of the prefix "AP\_" and the number of the PC placed after it, eg. "AP\_3" .

- a. Enter into global configuration mode

```

ap>
enable
Password:
ap#
ap#
configure terminal
ap(config)#

```

- b. Now configure the host name with the following command:  
(where N is the your's PC number)

```

ap(config)#hostname AP_N
AP_N(config)#

```

#### IV) Configure the Bridge Virtual Interface (bvi 1)

Define the IP address of the device. On the Cisco device, the IP address should be assigned to the bridge interface (named bvi 1), **not to** FastEthernet100 interface. Once the IP address has been established, further configuration will be possible via the Internet browser.

Enter to the bvi 1 interface configuration mode to configure the ip address, subnet mask of the interface:

Use an IP address from a private address range. To avoid conflicting IP addresses in the lab, set the third byte of the IP address to your PC's number. Assign an IP address and subnets mask to the bvi 1.

```

AP_3(config)# interface bvi1
AP_3(config-if)# ip address 10.0.N.1 255.255.255.0

```

#### V) Connect to AP with TCP/IP protocols

The PC Ethernet NIC IP address, it should be set in 10.0.N.\* 255.255.255.0 address space. In PC command line, check.

```

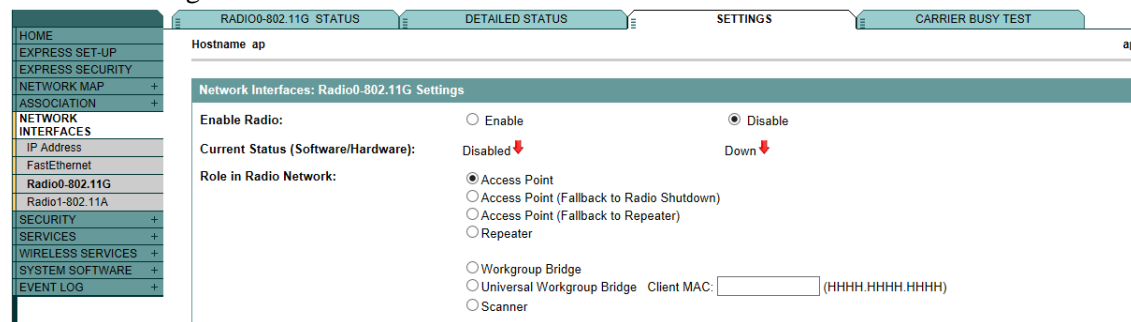
Ping 10.0.N.1

```

If ping indicates the correct connection, enter the AP IP address (10.0.N.1) in a browser address bar.

## V) Configure AP with Internet Explorer (Windows XP) browser.

1. Refer to documentation [1].
2. In the browser, look at information's on page "Home", it is main status of the AP. Identify NICs installed in the AP, names and MAC addresses. Write the NIV names and addresses below:  
.....
3. Open "settings" page on proper (Radio0-80211G) NIC page at "network Interfaces" menu.
4. Set working mode of AP to Access Point.



5. Open "security"->"SSID manager" page.
6. Set the name of WLAN (SSID) to:
  - a. C3\_G2\_<N> for 2.4 GHz radio
  - b. C3\_G5\_<N> for 5 GHz radio

If your AP have only one radio, set the name to: C3\_<N>
7. The SSID network name is not broadcast in the default AP settings. To see the network name in windows set permission to broadcast SSID for each radio NIC. For broadcast a SSID network name a "Guest" mode have to be set. "Guset" mode settings is located on the bottom part of "SSID manager" page. Refer to documentation [1].
8. Check (in Windows or with your smartphone) that your network name is visible to the client computers.
9. Set up static IP and mask in your PC wireless NIC to the same subnet as in your AP.
10. Connect your PC to AP with WLAN and check the connection with ping command (remember to disconnect Ethernet cable connection).
11. Restore a Ethernet cable connection PC ↔ AP.
12. Set up security on your WLAN networks.
  - a. Set WEP security on 2,4 GHz radio
  - b. Set WPA2 security on 5 GHz radio
13. Check the secure connections by establishing a wireless connection PC ↔ AP, (remember to disconnect Ethernet cable connection).
14. Connect AP to backbone LAN network by Ethernet cable.
15. Set dynamic (DHCP) IP for yours PC.
16. In PC Renew DHCP IP address.
17. Check the secure connections by establishing a connection PC with Internet.  
Test the PC <-> Internet connection,  
(ping 8.8.8.8, and open a Internet page e.g. <http://gogle.com>).

If your device have only one radio NIC, please set WEP security at first, check the connection and after that change the security to WPA2 and check the connection again.

**Questions:**

1. Describe the CLI command sequences necessary for set up an IP address and mask for the Ethernet port (BVI 1).
2. Describe location of security parameters in WEB browser configuration interface of AP.

**References:**

[1] Cisco IOS Software Configuration Guide for Cisco Aironet Access Points – web page:  
[https://www.cisco.com/c/en/us/td/docs/wireless/access\\_point/12-3\\_7\\_JA/configuration/guide/i1237sc.html?referring\\_site=bodynav](https://www.cisco.com/c/en/us/td/docs/wireless/access_point/12-3_7_JA/configuration/guide/i1237sc.html?referring_site=bodynav)

[2] Cisco IOS Command Reference for Cisco Aironet Access Points and Bridges – web page:  
[https://www.cisco.com/c/en/us/td/docs/wireless/access\\_point/12-4\\_3g\\_JA/command/reference/cr1243g.html](https://www.cisco.com/c/en/us/td/docs/wireless/access_point/12-4_3g_JA/command/reference/cr1243g.html)

[3] Basic Wireless LAN Connection Configuration Example – web page:  
<https://www.cisco.com/c/en/us/support/docs/wireless-mobility/wireless-lan-wlan/68005-wlan-connect.html#diag>

[4] E. Perahia, R. Stacey, “Next Generation Wireless LANs 802.11n and 802.11ac”, Cambridge University Press, 2013

[5] P. Roshan, J. Leary, “802.11 Wireless LAN Fundamentals” Cisco Press, 2004.