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## WLAN Laboratory

### Lab 2. Access Point - BSS

#### Objective:

The students will learn functionality of simple Access Point, practice basic methods of set up AP devices, compare a differences between 802.11g and 802.11n systems and take a look at internal wireless configuration parameters specific to 802.11n systems.

#### Student Prerequisites:

- knowledge of the basic WLAN configuration,
- 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 (Linksys WAP610N and Linksys WAP54G), PC with WLAN card or laptop as a wireless user, device with DHCP server functionality (e.g Linksys WRT54), the RJ45 cables.

#### Description of the Experiment:

During the exercise students conducts wireless network configurations to build simple WLAN network with wireless Internet access provided by faculty backbone wire network using Access Point device. Configuration of two different AP models will be tested.

#### Lab goals:

- The WLAN AP device provide 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) First AP device - model: Linksys WAP54G

Choose the Linksys WAP54G device.

Identify a methods of the device configuration (**refer to the manual** or an use cases with Google).

- How to reset the device to the factory settings?
- What is the factory default IP address of the device? .....

### III)

#### Perform configuration.

1. Reset the device to the factory settings.
2. Connect the device with Ethernet cable to the PC and open the configuration interface.
3. Set IP of the Access Point to: 192.168.<computer\_number>.50 mask: 255.255.255.0
4. Set (SSID) the name of the WLAN to "C2\_WLAN <computer\_number>" (e.g. C2\_WLAN02). <computer\_number > is the number of the using PC, written on the front top of the enclosure.
5. Set the radio channel to <computer\_number>.
6. Disconnect Ethernet cable form your PC.
7. Attach the wireless client station (PC) to the AP (connect to the WLAN: C2\_WLAN <computer\_number>).
8. Set IP at your client PC to 192.168. <computer\_number>.10 / 24 (static IP)
9. Test your wireless connection PC <-> AP device using the ping tool (command: ping 192.168. <computer\_number>.50)
10. Connect by Ethernet wire the device AP to faculty wire LAN.
11. Set dynamic IP in WLAN NIC in your PC (IP from HDCP) and reconnect your WLAN network.
12. Check the IP at your PC WLAN NIC. IP: .....
13. Test the PC <-> Internet connection, (ping 8.8.8.8, and open a Internet page e.g. <http://gogle.com>).

#### IV) Secure the wireless link

1. Connect to administration interface in your Access Point.
2. Set a WPA encryption on your WALN.
3. Enter the WPA key you chose: .....
4. Connect the wireless client station (PC) to the AP.
5. Test your connection PC <-> AP
6. Set dynamic IP in WLAN NIC in your PC (IP from HDCP) and reconnect your WLAN network.
7. Test the PC <-> Internet.

#### V) Second AP device - model: Linksys WAP610N

Choose the Linksys WAP610N device.

Identify a methods of the device configuration (**refer to the manual/** for example use the Google).

- How to reset the device to the factory settings?
  - What is the factory default IP address of the device? .....
  - What is a "Wi-Fi Protected Setup" function?
- .....
- .....
- .....
- .....
- .....
- .....

## VI)

### Perform configuration:

1. Reset the device to the factory settings.
2. Connect the AP device (with Ethernet cable) to the DHCP device (try to use a WLAN gateway device or a router device with DHCP functionality).
3. Connect (with Ethernet cable) PC to the same LAN like AP device and check in DHCP device the IP address of AP device.
4. Open a configuration interface for AP device (use WWW browser and the IP address of AP).
5. Set up a new static IP for the AP device to:  
IP: 192.168.<computer\_number>.50 mask: 255.255.255.0
6. Set IP at your client PC Ethernet NIC to 192.168. <computer\_number>.10 / 24 (static IP)
7. Connect PC to the AP and open in a browser AP administration interface.
8. Set the name of the WLAN network to "C1\_WLAN <computer\_number>"  
(<computer\_number > is the number of the using PC, written on the front top of the enclosure)
9. Set the radio channel at 2.4GHz band to <computer\_number>  
Note! Channel at 5GHz band will be set by AP automatically
10. Disconnect Ethernet cable form your PC.
11. Attach the wireless client station (PC) to the AP (connect to the WLAN: C2\_WLAN <computer\_number>).
12. Set IP at your client PC to 192.168. <computer\_number>.10 / 24 (static IP)
13. Connect by wire the device AP directly to the faculty wire LAN.
14. Set dynamic IP in WLAN NIC in your PC (IP from HDCP) and reconnect your WLAN network.
15. Test the PC <-> Internet connection,  
(ping 8.8.8.8, and open a Internet page e.g. <http://google.com>).

## VII) Secure the wireless link

1. Connect to administration interface in your Access Point.
2. Set a WPA encryption on your WALN.
3. Enter the WPA key you chose: .....
4. Connect the wireless client station (PC) to the AP.
5. Test your connection PC <-> AP
6. Set dynamic IP in WLAN NIC in your PC (IP from HDCP) and reconnect your WLAN network.
7. Test the PC <-> Internet.

## XIII) Inspect Wireless WMM settings (menu: wireless->WMM)

1. Check (and note bellow) what class of traffic can be set in the device.  
.....
2. What "aggregation" parameters you can set ?  
.....
3. What "CW" parameters you can set?: .....  
.....

**Questions:**

1. What is “class of traffic”?
2. What is the purpose and effect of the frame aggregation technique?
3. What is the weak point of frame aggregation?
4. What class of traffic can use strong frame aggregation?
5. Describe what is meaning of CW and describe dependence between CW parameters and class of traffic.

**References:**

- [1] E. Perahia, R. Stacey, “Next Generation Wireless LANs 802.11n and 802.11ac”, Cambridge University Press, 2013
- [2] P. Roshan, J. Leary, “802.11 Wireless LAN Fundamentals” Cisco Press, 2004.