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## WLAN Laboratory

### Lab 1. WLAN gateway

#### Objective:

The students will learn how to use Access Point with WLAN Gateway functionality to build WLAN network to Internet access

#### 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 Gateway device (WLAN Access Point with a router functionality), PC with WLAN card or laptop as a wireless user, 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.

#### Lab goals:

- The WLAN Gateway device provide Internet access (form faculty wire LAN) for wireless clients (PC).
- The clients stations should receive their IP address from the scope 192.168.10.200 - 192.168.10.210 using DHCP server acting in the WLAN Gateway device.

#### Lab phases:

I)

Use the Windows program *Inssider* (or *iwlist* in Linux or similar) to specify which WLAN channel is the least and the most busy. Write the number of the networks operating in the best and the worst channel. Estimate the total number of wireless networks (on all channels).

Best channel: ....., no of networks.....; Worst channel: ....., no of networks.....;

Total number of WLAN networks : .....

## II)

Connect your PC to Internet, check the IP and Mask assigned to the PC by DHCP service. Identify the local wiring subnet in the laboratory (based on IP address and mask assigned to the PC by the DHCP server).

Type the subnet mask and range of IP addresses available in the wiring network lab

IP: .....; Mask: .....

Subnet range: first IP address ....., last IP address .....

## III)

Choose the appropriate WLAN access device (available in the lab).

Write the type of access device (eg. Dlink 2000): .....

Identify a methods of the device configuration (refer to the manual or search with Google).

### Note!

**Each device may be in an unknown configuration state.**

**Before configuring the device, it is necessary to reset the configuration to the factory settings!**

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

## IV) Perform configuration

1. Set the name of the WLAN to "C1\_WLAN <computer\_number>" (<computer\_number > is the number of the using PC, written on the front top of the enclosure)
2. If radio NIC works at 2.4GHz band, set the radio channel to <computer\_number>
3. Set appropriate IP address (192.168.50.1/24) for LAN network adapter in the device.
4. Set up the DHCP server on the device, so that clients in the local network could receive IP addresses from the range 192.168.50.200 to 192.168.50.210
5. Attach the wireless client station (PC) to the AP.
6. Make sure, that DHCP client on radio NIC in PC is active.
7. Test your connection PC <-> gateway (WLAN device) using the ping tool (command: ping 192.168.50.1).
8. Connect by wire the device WAN network interface to faculty wire LAN.  
**Note!, only odd network sockets are connected.**
9. Disconnect the Ethernet cable between PC and WLAN Router.
10. Test the link from PC to Internet.  
(ping 8.8.8.8, and open a Internet page e.g. <http://google.com>).

## V) Secure the wireless link

1. Disconnect WLAN link.
2. Connect Ethernet link between PC and Router, and open configuration interface.
3. Set encryption with WPA method to your WLAN network.
4. Write the WPA personal KEY you chose: .....
5. Disconnect the Ethernet and connect WLAN link, enter the KEY on request..
6. Test your connection PC <-> gate (WLAN device) with ping command.
7. Test the link PC <-> gate <-> Internet with ping and a browser.

## VI) Inspect Wireless Advanced settings

1. Check and note the RTS Threshold parameter: .....
2. Check and note the Fragmentation Threshold parameter: .....
3. Check and note the Beacon Interval: .....

### Questions:

1. What is the function of the Subnet Mask?
2. What is the main difference between wireless gateway and WLAN access point?
3. What are the main advantages of WPA encryption modes over old WEP modes?
4. What are RTS / CTS frames?
5. Which means the number assigned to the RTS threshold parameter?
6. Is the RTS threshold default setting optimal, why? Describe the situation in which you need to change this parameter.
7. In what situation do you need to change the frame fragmentation settings?
8. What is the Beacon Frame function?

### 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.