An-Najah National University
Faculty of Engineering and IT

جامعة النجاح الوطنية
كلية الهندسة وتكنولوجيا المعلومات

Computer Engineering Department
Course Name: Networks Lab Number: 10636594
Lab Report Grading Sheet

Instructor: Dr. Muhannad Al-Jabi	Experiment #: 8
Academic Year: 2020/2021	Experiment Name: Wireless Networks (WLAN)
Semester: Summer Semester	

Students	
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3-	4-
Performed on: 29th of July	Submitted on: 7th of August

Report's Outcomes

ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %

Evaluation Criterion	Grade	Points
Abstract answers of the questions: "What did you do? How did you do it? What did you find?"	0.5	
Introduction and Theory Sufficient, clear and complete statement of objectives. In addition to Presents sufficiently the theoretical basis.	1.5	
Apparatus/ Procedure Apparatus sufficiently described to enable another experimenter to identify the equipment needed to conduct the experiment. Procedure sufficiently described.	2	
Experimental Results and Discussion (In-Lab Worksheet) Crisp explanation of experimental results. Comparison of theoretical predictions to experimental results, including discussion of accuracy and error analysis in some cases.	4	
Conclusions and Recommendations Conclusions summarize the major findings from the experimental results with adequate specificity. Recommendations appropriate in light of conclusions. Correct grammar.	1	
Appearance Title page is complete, page numbers applied, content is well organized, correct spelling, fonts are consistent, good visual appeal.	1	
Total	10	

Abstract:

In this experiment, we are going to configure the AP1242 access point as a WLAN (Wireless Local Area Network). A WLAN is a network between computer hosts or mobile hosts that doesn't need any wires to transmit data.

Objectives:

- Dealing with WLAN networks.
- Installing a WLAN network using an access point.
- Configuring the WLAN in infrastructure mode.
- Configuring the WLAN in ad hoc mode.
- Securing the WLAN Network.

Procedure:

First of all, we need to assign the access point an IP address, there are multiple ways to do this, but it our case, we will use the console port on the access point.

We will connect both sides of the RJ-45 and DB-9 cable to the console port on the access point and the COM port on the PC respectively. Then, we will use the hyper terminal to configure the access point just like the previous experiments.

The settings for the hyper terminal connecting are as follows:

- 9600 Baud.
- 8 Data bits.
- No parity.
- 1 Stop bit.
- No flow control.

We will enter the enable mode and execute the **show run** command to view the current running configuration for the access point:

Procedure: *(cont.)*

```
ap>en
Password:
ap#sh run
Building configuration...

Current configuration : 1362 bytes
!
version 12.4
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname ap
!
logging rate-limit console 9
enable secret 5 $1$5Nt2$mOpEJLTgA.XXHXCO.lzPz1
```

```
!
bridge irb
!
!
interface Dot11Radio0
 no ip address
 no ip route-cache
 shutdown
 station-role root
 bridge-group 1
 bridge-group 1 subscriber-loop-control
 bridge-group 1 block-unknow
 no bridge-group 1 source-learning
 no bridge-group 1 unicast-flooding
 bridge-group 1 spanning-disabled
!
interface Dot11Radio1
 no ip address
 no ip route-cache
 shutdown
 no dfs band block
 channel dfs
 station-role root
 bridge-group 1
 bridge-group 1 subscriber-loop-control
 bridge-group 1 block-unknown-source
```

```
 speed auto
 bridge-group 1
 no bridge-group 1 source-learning
 bridge-group 1 spanning-disabled
!
interface BVI1
 ip address dhcp client-id FastEthernet0
 no ip route-cache
!
ip http server
no ip http secure-server
ip http help-path http://www.cisco.com/warp/public/779/smbiz/prodconfig/help/eag

bridge 1 route ip
!
!
!
line con 0
line vty 0 4
 login local
!
end
```

Procedure: *(cont.)*

We can see that there's no IP address assigned to the BVI1 interface, we will assign the IP address **10.0.7.10** to the access point. To do that, first we need to enter the configuration mode using the **conf t** command, then we will select the interface BVI1 using the **int bvi1** command, and finally, we will assign the IP address using the **ip address 10.0.7.10 255.0.0.0** command.

```
ap(config)#int bvi1
ap(config-if)#ip address 10.0.7.10  255.0.0.0
```

Now we can use the Telnet to access the command line interface (CLI). All we need to do is just to connect the PC to the access point and assign a valid IP address (10.0.7.2 for example). The username and password are both **Cisco**.

```
User Access Verification

Username: Cisco
Password:
ap>
```

The next step now is to configure the basic settings and to enable the radio interfaces for the access point.

In the browser, we need to type the access point IP address (10.0.7.10) to access its settings GUI. The username and password are both **Cisco**.

To change the name of the access point, we navigate to the Express Setup page, we changed access point name to AP-7.

Now to enable the radio interfaces, first of all we need to head to the summary page, click on radio interface **Radio0-802.11G**, then from the top of the page, we will choose settings, then we will check the enable radio button and finally click apply. The same steps will be repeated for the **Radio1-802.11A** radio interface.

The next step is to configure the security settings to prevent unauthorized access to the network.

Procedure: *(cont.)*

First, we will head to the Express Security page. Next, for the SSID, we will type **AP.7**. Then, we will check the Broadcast SSID check box. For the security settings, we will choose WEP, key 1, encryption size 40, and the encryption key 1234567890. Finally, we click apply to save the settings.

The SSID we just added will appear at the bottom of the page:

SSID Table

Delete	SSID	VLAN	Encryption	Authentication	Key Management	Native VLAN	Broadcast SSID
◉	AP.7	none	wep mandatory	open	none		✓

We can also notice that in the summary page, the radio interfaces now have green arrows:

Network Interfaces

Interface	MAC Address	Transmission Rate
⇑ FastEthernet	f0f7.5525.e672	100Mb/s
⇑ Radio0-802.11G	003a.9a55.9460	54.0Mb/s
⇑ Radio1-802.11A	003a.9a54.a3a0	54.0Mb/s

To make sure that the network is configured properly, we will connect both PCs to the network **AP.7**, then we will assign the IP 10.0.7.2 for PC1 and the IP 10.0.7.3 for PC2. Then we will use the ping command in the terminal to send packets from PC1 to PC2:

```
C:\Users\NetworksPC>ping 10.0.7.3

Pinging 10.0.7.3 with 32 bytes of data:
Reply from 10.0.7.3: bytes=32 time=1ms TTL=128
Reply from 10.0.7.3: bytes=32 time=1ms TTL=128
Reply from 10.0.7.3: bytes=32 time=1ms TTL=128
Reply from 10.0.7.3: bytes=32 time=6ms TTL=128

Ping statistics for 10.0.7.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 6ms, Average = 2ms

C:\Users\NetworksPC>
```

The next step is to reset the access point, we can save the current configuration as a text file and load it after resetting the access point. To do that, we need to head to the System Software then System Configuration, then we can press right click on **config.txt** and save it. We can also load the configuration file in the same page.

Procedure: *(cont.)*

To reset the access point to the default settings, we can either use the previous page (Software reset), or we can reset it using the following method:

- Disconnect the power.
- Hold the Mode button.
- Plug the access point back to the power and keep holding and wait for 3-5 seconds till the ethernet LED turns red.

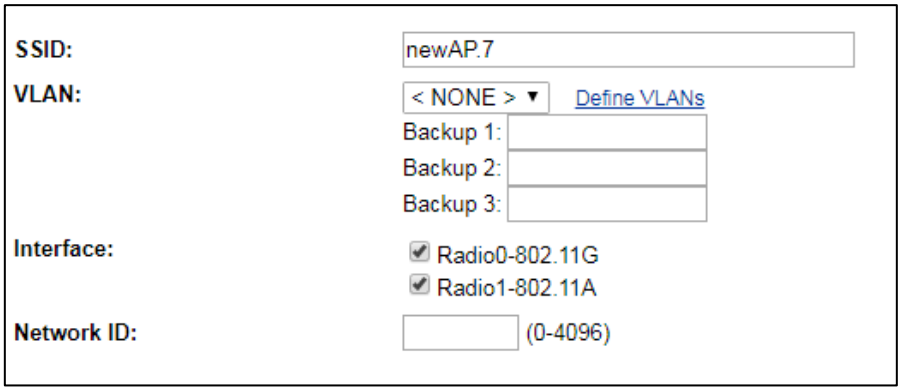
For the second part of the experiment, we will configure a secure ad hoc WLAN.

First of all, we need to configure the BVI1 interface the same way we did in the first part, next we will head to the browser and open the access point page using the same IP and the same password in the first part.

Now we will head to Security, then Encryption Manager, we will check from Cipher the AES CCMP encryption:

Next we will head to the SSID Manager and fill in the fields according to the following pictures:

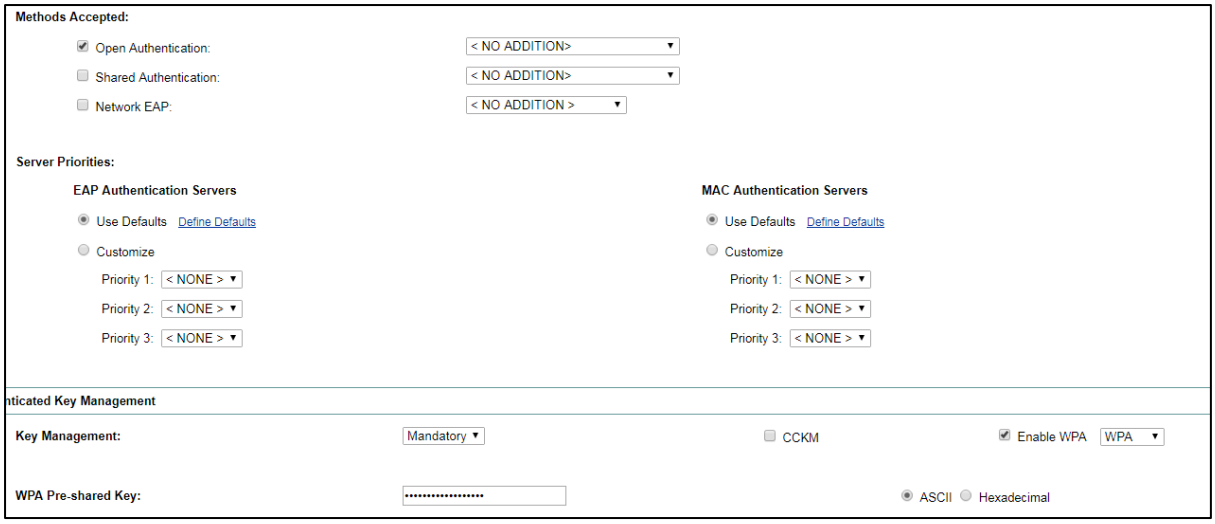
Creating a new SSID:



Procedure: *(cont.)*

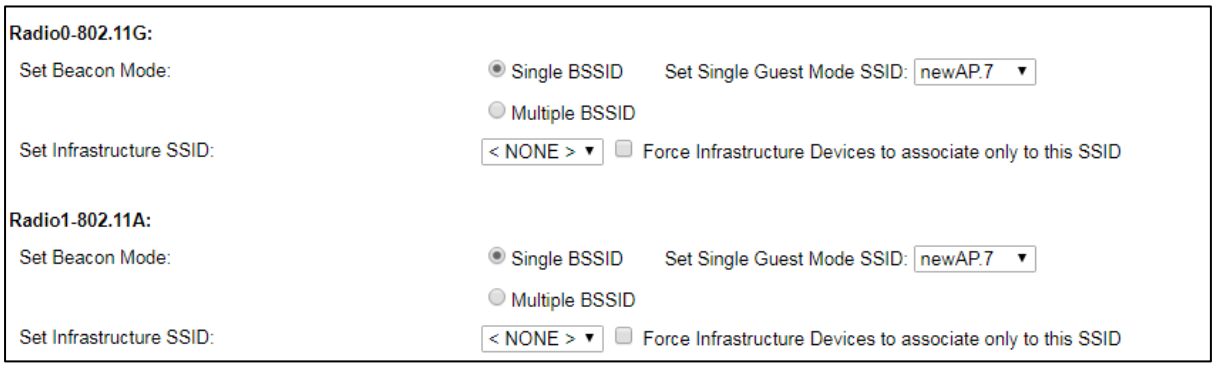
Client Authentication Settings and Client Authentication Key Management:

The WPA PSK is **Net123456**, this key will be used to connect to the access point from the PCs later.



We will click apply.

Guest Mode/Infrastructure SSID Settings:

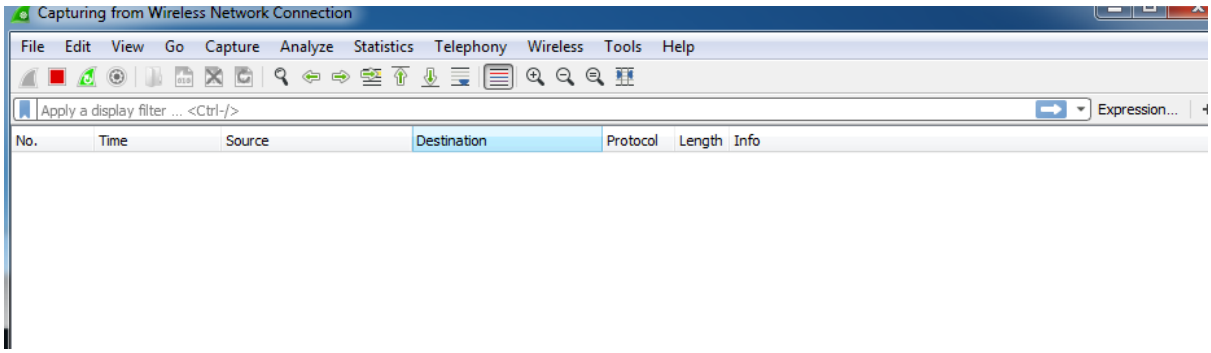


We will click apply.

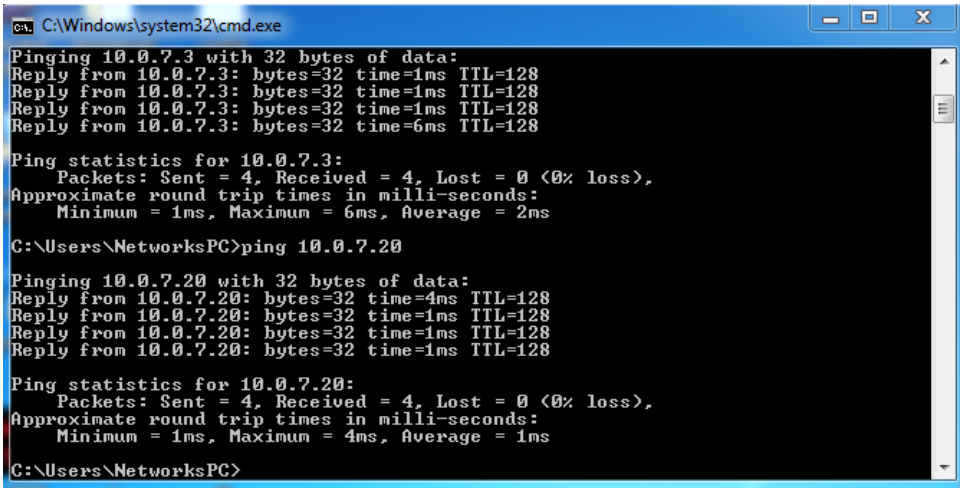
Now we will connect to the access point from both of the PCs to test our network. We will use the **Net123456** as the network password as we mentioned earlier. We will assign the IP 10.0.7.2 for the first PC and the IP 10.0.7.20 for the second PC. Now we will navigate to Wireshark to view the packets sent/received on the PCs.

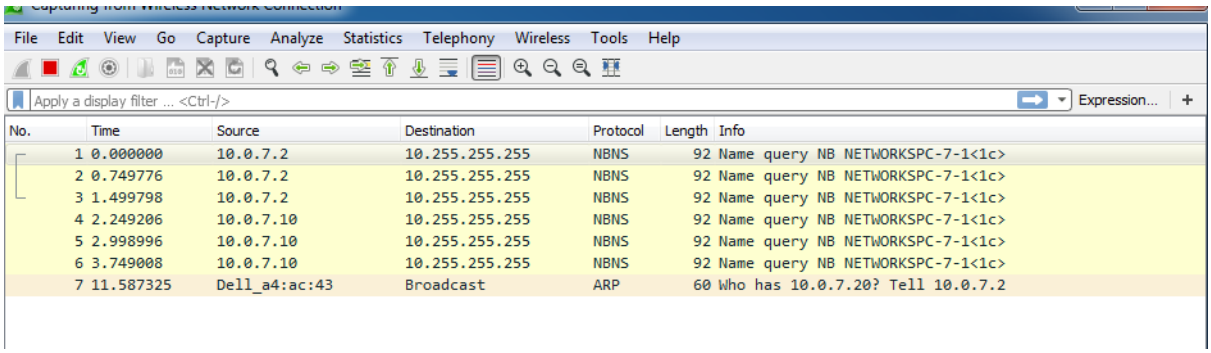
Procedure: *(cont.)*

In the beginning, we can see that the Wireshark did not detect any packets upon connecting to the network:



We will now ping from PC1 to PC2 to see the packets in Wireshark:

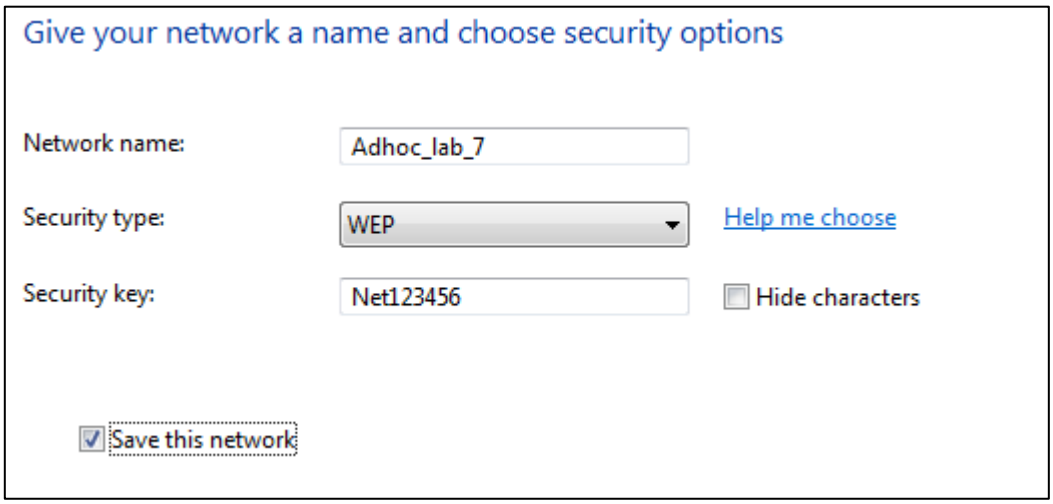




Procedure: *(cont.)*

In the final part of our experiment, we will configure an Ad Hoc WLAN on windows 7.

First of all, we will assign the IP 10.0.7.10 for the first PC and the IP 10.0.7.20 for the second PC. Next we will head to Network and Sharing Center menu, then we will click on Set Up a New Connection or Network. From the given menu, we will select Set Up a Wireless Ad Hoc (Computer-to-Computer) Network, then we will click next twice. In the given menu, we will fill in the fields according to the following picture:

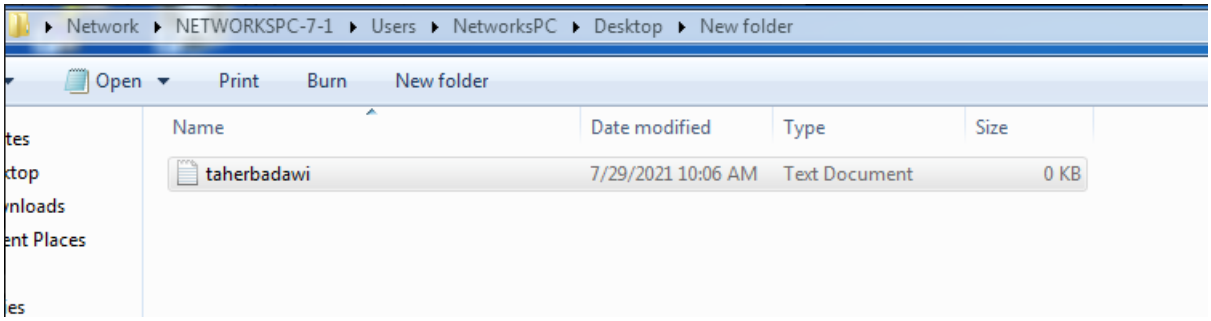


We will repeat the same steps for the second PC, but the network name will be Adhoc_lab instead.

Now will create a sharing folder the same way in the previous experiments and try to exchange files using the network we made.

Procedure: *(cont.)*

We can see in the following picture that we were able to create a folder in the first PC and view it from the other PC, the folder contains the file named after a mixture of both of our names:



Conclusion:

In the end, we learned how to set up an access point using the command line interface and the GUI provided using the browser. We configured the access point in two different modes (infrastructure mode and ad hoc mode) and we were able to exchange packets between two different computers successfully. Additionally, we learned about Wireshark and how it can be used to track packets and provide different information about them. Finally, we learned how to configure an ad hoc network on windows 7 and exchange files successfully.