

Mini Project Report Cover Sheet

SRM Institute of Science and Technology

College of Engineering and Technology

Department of Electronics and Communication Engineering

18ECC303J COMPUTER COMMUNICATION NETWORKS

Sixth Semester, 2020-21 (Even Semester)

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Title of the project : WLAN WPA2 PSK Mini Office Setup

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Lab Supervisor : Mrs.B.Priyalakshmi

Reg. No →		RA1811004010118	RA1811004010120	RA1811004010124
Mark split up ↓	Maximum Marks	Marks obtained	Marks obtained	Marks obtained
Novelty in the project work / Abstract	5			
Level of understanding of the design / Configuration	10			
Individual Contribution to the project	5			
Report writing	5			
Total	25			

REPORT VERIFICATION

Lab supervisor Signature with date :

WLAN WPA2 PSK Mini Office Setup

Abstract-

Wireless networks have seen unprecedented rise in their size and number of users in recent years. This unprecedented rise is attributed to the rise in the number of mobile computing devices. Moreover, the amount of data that is handled by these wireless networks has increased in recent years. The project is to study and understand the WLAN WPA2 PSK concept and the advantages of using Wireless Local Area Network, how the devices are controlled in this network. We understand the configuration that we use in Cisco packet tracer to build a WLAN WPA2 PSK network using router, switches and access points.

This circuit increases the security level of LAN and hence disallows unidentified devices to connect in this network.

Motivation/Challenge-

Motive of this project is to design a simple network of an office environment with WLAN networking.

Objective-

The primary objective of this project is to design a mini office environment with WLAN WPA2 PSK protected access networking and connect the devices using Wi-Fi under one network.

Software/Hardware Requirements-

Cisco Packet Tracer

Engineering Standards-

WPA2 PSK- This standard specifies security mechanisms for wireless networks, replacing the short Authentication and privacy clause of the original standard with a detailed Security clause. In the process, the amendment deprecated broken Wired Equivalent Privacy (WEP), while it was later incorporated into the published IEEE 802.11-2007 standard. 802.11i supersedes the previous security specification, Wired Equivalent Privacy (WEP), which was shown to have security vulnerabilities. Wi-Fi Protected Access (WPA) had previously been introduced by the Wi-Fi Alliance as an intermediate solution to WEP insecurities. WPA implemented a subset of a draft of 802.11i. The Wi-Fi Alliance refers to their approved, interoperable implementation of the full 802.11i as WPA2, also called RSN (Robust Security). 802.11i makes use of the Advanced Encryption Standard (AES) block cipher, whereas WEP and WPA use the RC4 stream cipher.

Realistic Constrains-

When an actual network is being designed, they might be some loss of signal and hence the efficiency of the network will be lesser than theoretical efficiency. But here since it is a simulation of a network, Outcomes will be very accurate.

Deliverables-

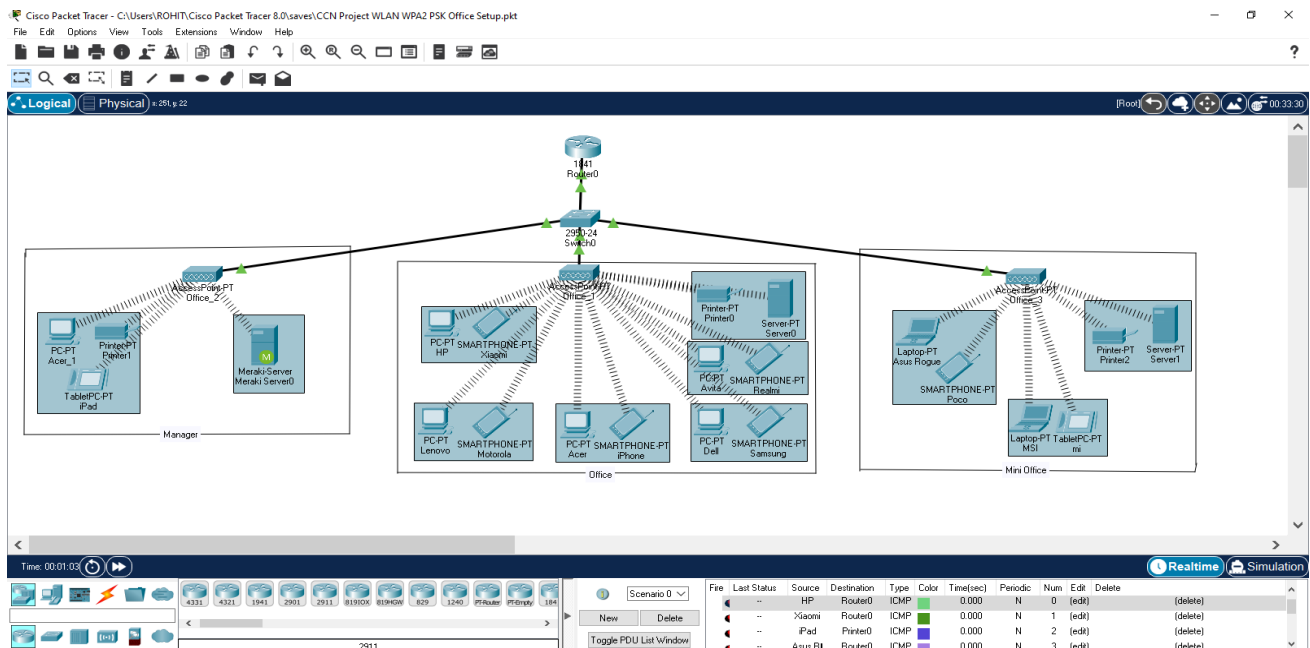
1.WPA2-PSK

1. In addition to the encryption benefits, WPA2 also adds two enhancements to support fast roaming of wireless clients moving between wireless AP's.
2. PMK caching support – allows for reconnections to AP's that the client has recently been connected without the need to re-authenticate.
3. Pre-authentication support – allows a client to pre-authenticate with an AP towards which it is moving while still maintaining a connection to the AP it's moving away from.
4. PMK caching support and Pre-authentication support enable WPA2 to reduce the roaming time from over a second to less than 1/10th of a second. The ultimate benefit of the fast roaming is that WPA2 can now support timing-sensitive applications like Citrix, video, or VoIP (Voice over IP) which would break without it.

2.WLAN

1. It's a reliable sort of communication.
2. As WLAN reduces physical wires so it's a versatile way of communication.
3. It provides high rate thanks to small area coverage.

Methodology-



Network Design of a Mini Office

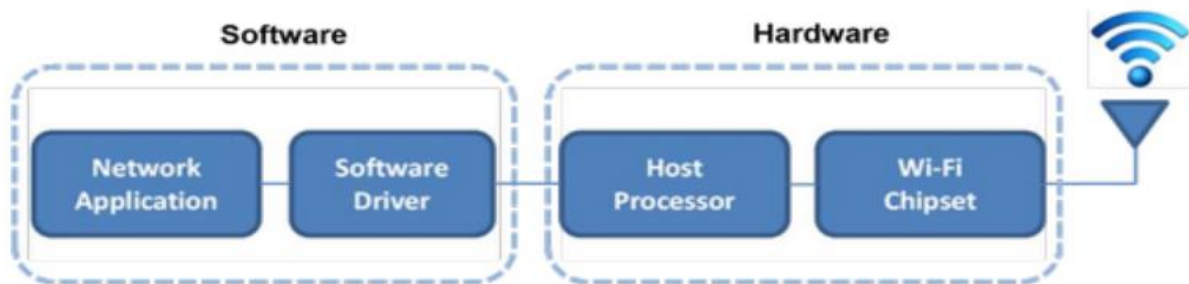
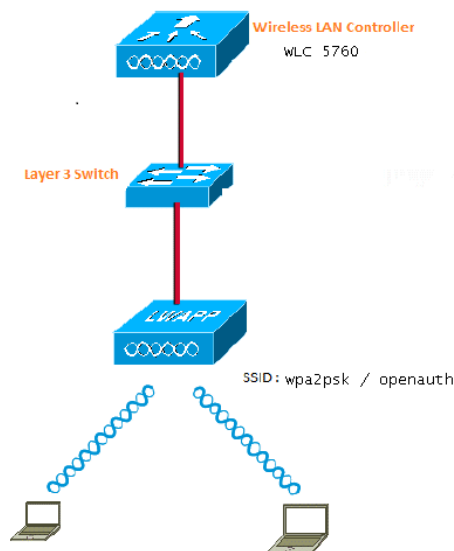


Figure 2: Simplified Block Diagram of a Typical Wi-Fi Module

A WLAN, or wireless LAN, is a network that allows devices to connect and communicate wirelessly. Unlike a traditional wired LAN, in which devices communicate over Ethernet cables, devices on a WLAN communicate via Wi-Fi. While a WLAN may look different than a traditional LAN, it functions the same way. New devices are typically added and configured using DHCP. They can communicate with other devices on the network the same way they would on a wired network. The primary difference is how the data is transmitted. In a LAN, data is transmitted over physical cables in a series of Ethernet packets. In a WLAN, packets are transmitted over the air.



WPA stands for "Wi-Fi Protected Access", and PSK is short for "Pre-Shared Key."

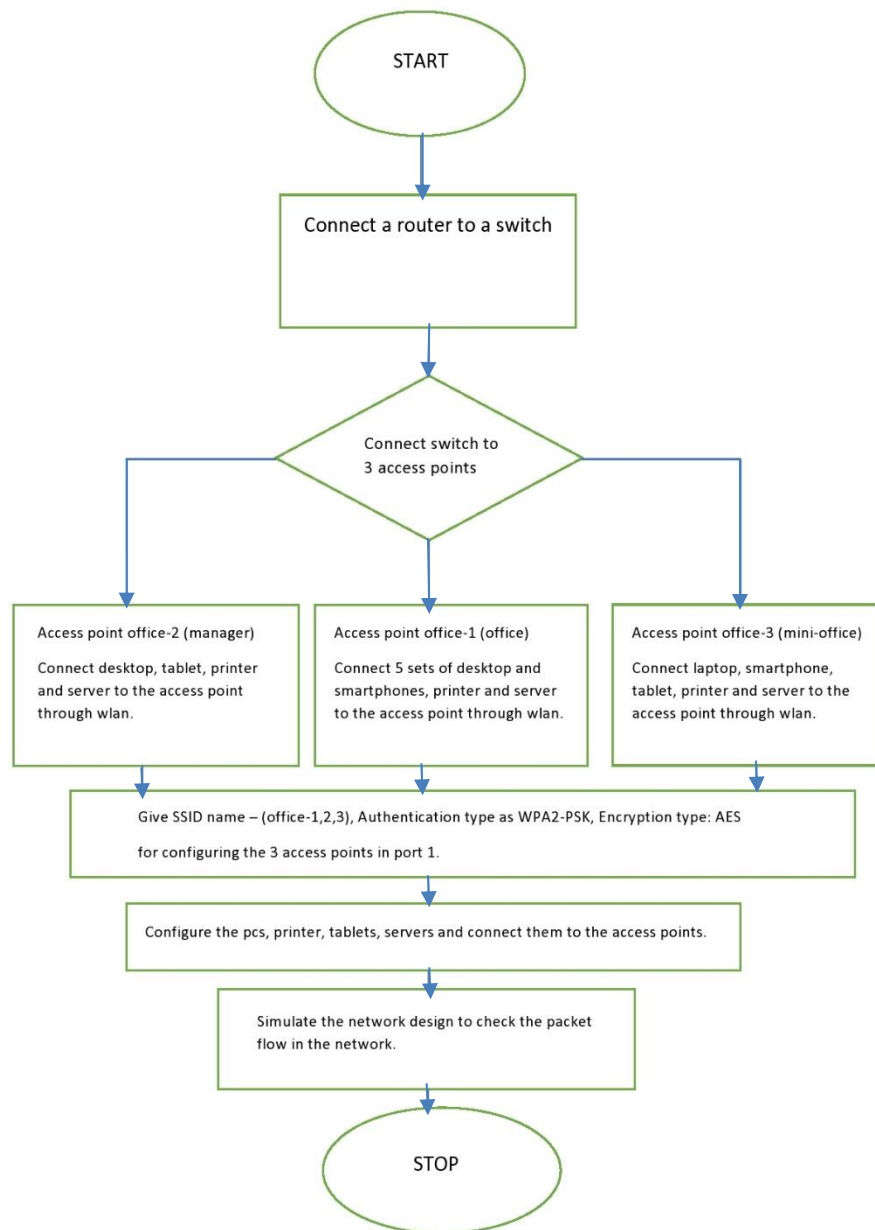
WPA2-PSK [AES] is the recommended secure method of making sure no one can actually listen to your wireless data while it's being transmitted back and forth between your router and other devices on your network. We use WPA2-PSK protection.

Each device is given its own IP address and configured in such a way to connect it wireless.

WMP300N module is a wireless adapter module, used in P.C, laptops, printers and servers in order to establish a wireless communication. We have to power of the device first, remove the wired default module and then replace it with this WMP300N wireless module and then power on the device and configure.

The default IP address is 192.168.2.1.

Flowchart:



Router 0:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
```

Access Point 1:

Office_1

Physical Config Attributes

GLOBAL

Settings

INTERFACE

Port 0

Port 1

Port 1

Port Status ☒ On

SSID Office_1

2.4 GHz Channel 6

Coverage Range (meters) 140.00

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

WEP Key

PSK Pass Phrase 24747904

User ID

Password

Encryption Type AES

Access Point 2:

Office_2

Physical Config Attributes

GLOBAL

Settings

INTERFACE

Port 0

Port 1

Port 1

Port Status ☒ On

SSID Office_2

2.4 GHz Channel 6

Coverage Range (meters) 140.00

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

WEP Key

PSK Pass Phrase 11223344

User ID

Password

Encryption Type AES

Access Point 3:

Office_3

Physical Config Attributes

GLOBAL

Settings

INTERFACE

Port 0

Port 1

Port 1

Port Status ☒ On

SSID Office_3

2.4 GHz Channel 6

Coverage Range (meters) 140.00

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

WEP Key

PSK Pass Phrase 55667788

User ID

Password

Encryption Type AES

HP (PC 0):

HP

Physical **Config** Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

Wireless0

Bluetooth

Port Status ☒ On

Bandwidth 18 Mbps

MAC Address 0001.640D.4253

SSID Office_1

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

☐ WPA-PSK ☐ WPA2

☐ WPA ☐ 802.1X

Method:

WEP Key

PSK Pass Phrase 24747904

User ID

Password

MD5

User Name

Password

Encryption Type AES

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.2

Subnet Mask 255.255.255.0

Xiaomi (Smart Phone):

Xiaomi

Physical **Config** Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

Wireless0

3G/4G Cell1

Bluetooth

Port Status ☒ On

Bandwidth 18 Mbps

MAC Address 00D0.9720.80B9

SSID Office_1

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

☐ WPA-PSK ☐ WPA2

☐ WPA ☐ 802.1X

Method:

WEP Key

PSK Pass Phrase 24747904

User ID

Password

MD5

User Name

Password

Encryption Type AES

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.3

Subnet Mask 255.255.255.0

iPad (Tablet):

iPad

Physical **Config** Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

Wireless0

3G/4G Cell1

Bluetooth

Port Status ☒ On

Bandwidth 36 Mbps

MAC Address 00D0.97E0.9751

SSID Office_2

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

☐ WPA-PSK ☐ WPA2

☐ WPA ☐ 802.1X

Method:

WEP Key

PSK Pass Phrase 11223344

User ID

Password

MD5

User Name

Password

Encryption Type AES

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.14

Subnet Mask 255.255.255.0

Asus Rogue (Laptop):

Asus Rogue

Physical Config Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

Wireless0

Bluetooth

Port Status ☒ On

Bandwidth 24 Mbps

MAC Address 0005.5E.78.7096

SSID Office_3

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

☐ WPA-PSK ☐ WPA2

☐ WPA ☐ 802.1X

Method:

WEP Key

PSK Pass Phrase 55667788

User ID

Password

MD5

User Name

Password

AES

Encryption Type

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.18

Subnet Mask 255.255.255.0

Printer1 (Printer):

Printer1

Physical Config Attributes

GLOBAL

Settings

INTERFACE

Wireless0

Port Status ☒ On

Bandwidth 54 Mbps

MAC Address 000C.8572.5459

SSID Office_2

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

☐ WPA-PSK ☐ WPA2

☐ WPA ☐ 802.1X

Method:

WEP Key

PSK Pass Phrase 11223344

User ID

Password

MD5

User Name

Password

AES

Encryption Type

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.15

Subnet Mask 255.255.255.0

Server0 (Server):

Server0

Physical Config Services Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

Wireless1

Port Status ☒ On

Bandwidth 54 Mbps

MAC Address 0002.4A32.6A7C

SSID Office_1

Authentication

☐ Disabled ☐ WEP ☒ WPA2-PSK

☐ WPA-PSK ☐ WPA2

☐ WPA ☐ 802.1X

Method:

WEP Key

PSK Pass Phrase 24747904

User ID

Password

MD5

User Name

Password

AES

Encryption Type

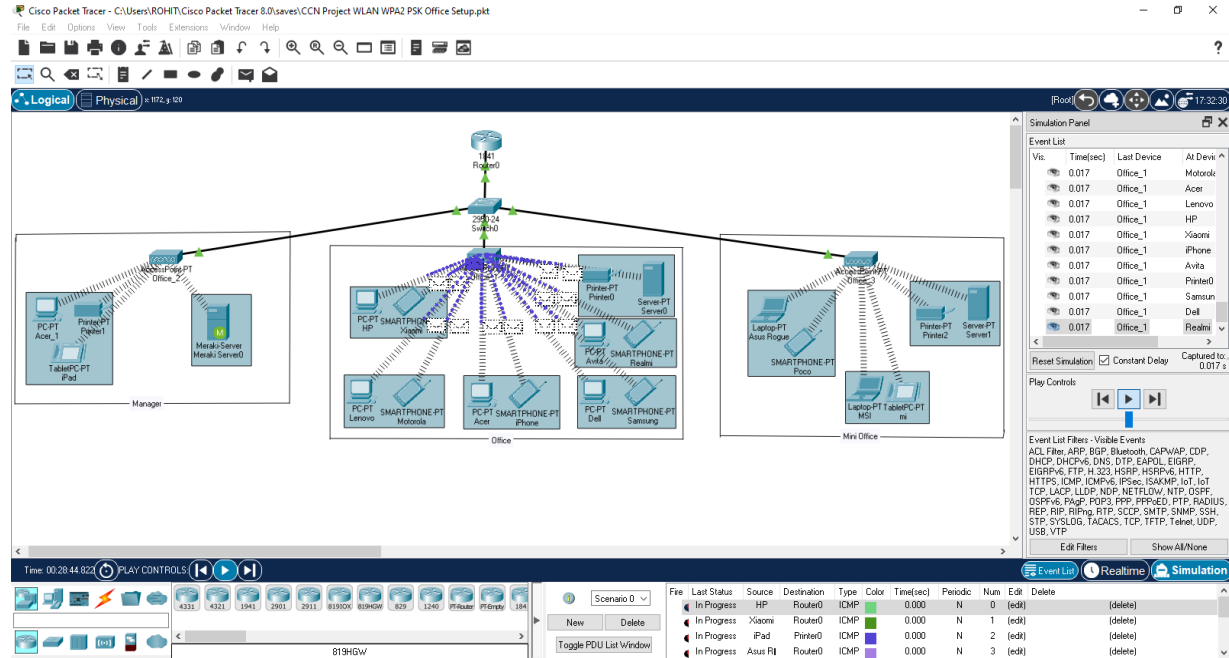
IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.13

Subnet Mask 255.255.255.0

Result/Illustration-



Lenovo

Physical Config Desktop Programming Attributes

Command Prompt

```

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.5

Pinging 192.168.2.5 with 32 bytes of data:

Reply from 192.168.2.5: bytes=32 time=106ms TTL=128
Reply from 192.168.2.5: bytes=32 time=2ms TTL=128
Reply from 192.168.2.5: bytes=32 time=54ms TTL=128
Reply from 192.168.2.5: bytes=32 time=94ms TTL=128

Ping statistics for 192.168.2.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 106ms, Average = 64ms

C:\>tracert 192.168.2.5

Tracing route to 192.168.2.5 over a maximum of 30 hops:

  0  ms      2  ms      5  ms      192.168.2.5

Trace complete.

```

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	Acer	Server0	ICMP		0.000	N	7
	Successful	Asus R1	Acer_1	ICMP		0.000	N	8
	Successful	iPad	mi	ICMP		0.000	N	9
	Successful	iPhone	Meraki Serv	ICMP		0.000	N	10

Port Status Summary Table for MSI

Device Name: MSI

Device Model: Laptop-PT

Port	Link	IP Address	IPv6 Address	MAC Address
Wireless0	Up	192.168.2.21/24	<not set>	0006.2A68.28EC
Bluetooth	Down	<not set>	<not set>	0002.4AB9.3412

Gateway: 192.168.2.1

DNS Server: <not set>

Line Number: <not set>

Wireless Best Data Rate: 24 Mbps

Wireless Signal Strength: 43%

Physical Location: Intercity > Home City > Corporate Office > MSI

Conclusion-

Thus, WLAN WPA2 PSK network for an office environment is successfully designed and executed using Cisco packet Tracer.

References-

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- [3] Youtu.be. 2021. *Before you continue to YouTube*. [online] Available at: <<https://youtu.be/vAr9XsAo0iM>> [Accessed 25 April 2021].
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- [5] Lehembre, G., 2021. *Hacking wifi*. [online] Repository.root-me.org. Available at: <<https://repository.root-me.org/R%C3%A9seau/EN%20-%20Hacking%20wifi.pdf>> [Accessed 20 April 2021].

Individual Contributions:

The contributions of each member of this group were equally important to this project. We designed this project over a google meet.

RA1811004010118-Rohit—Designing the project and report.

RA1811004010120-Vignesh—Designing the project, report and presentation.

RA1811004010124-Ketan—Designing the architecture for the project, and presentation.