# Chapter 5: Connecting to Access Points (AP)

## Objective

At the end of chapter 5 you will understand the fundamentals of being a WiFi Station (STA) and connecting to WiFi Access Points (AP). You will have an introduction to the TCP/IP Networking stack and you will have basic understanding of the first three layers of the stack i.e. physical, datalink and network layers of WiFi which enable connections and encryption. You will understand some of the basics of IP networking (addresses, netmasks). Lastly you will understand the role of the WICED Device Configuration Table (DCT).

## Time: 1 Hr

## Fundamentals

### TCP/IP Networking Stack

Almost all complicated systems manage the overall complexity by dividing the system into layers. The “Network Stack” or “TCP/IP Network Stack” is exactly that, a hierarchical system for reliably communicating over multiple networking mediums (Wifi, Ethernet, etc.)

|  |  |  |  |
| --- | --- | --- | --- |
| **Layer** | **Protocol** | **Protocol Data Unit** | **Comment** |
| [Application](https://en.wikipedia.org/wiki/Application_layer) | [HTTP](https://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol) + [MQTT](https://en.wikipedia.org/wiki/MQTT) |  |  |
| [Transport](https://en.wikipedia.org/wiki/Transport_layer) | [TCP](https://en.wikipedia.org/wiki/Transmission_Control_Protocol) + [UDP](https://en.wikipedia.org/wiki/User_Datagram_Protocol) | Segments + Datagram |  |
| [Network](https://en.wikipedia.org/wiki/Network_layer) | [IP](https://en.wikipedia.org/wiki/Internet_Protocol) + [ICMP](https://en.wikipedia.org/wiki/Internet_Control_Message_Protocol) | Packets |  |
| [Data-Link](https://en.wikipedia.org/wiki/Data_link_layer) | WiFi | Frames | Converts bits into unencrypted frames. This layer only communicates only on the Local Area Network |
| [Physical](https://en.wikipedia.org/wiki/Physical_layer) | 802.11b | Bits | Sends and receives streams of bits over the WiFi Radio |

### (physical layer) Channels

### (data link layer) SSID

### (data link layer) Encryption

#### OPEN

#### WEP

#### WPA2 PSK or Personal

#### WPA2 Enterprise

### IP Networking

#### IP Address

#### netmask

### Introducers

### WICED DCT

## Exercise(s)

### run the snip app that lets you select with AP to connect to

### pre-program SSID open

### pre-program SSID wep

### pre-program SSID WPA2

### enter the SSID and write to the DCT

### Find access points

### Security (wep, wpa

### Dhcp, dns,

### connect/reconnect