

Hands-On

Hands-On WiFi Networks & WiFi Hotspot

Design & Support



Course Description

This class provides a complete foundation of knowledge for the Wi-Fi networking industry. From basic RF theory to 802.11 frame exchange processes. This course provides a Hands-On introduction to staff who will be responsible for planning, designing and supporting WiFi Networks and WiFi Hot-spots. This Practical Real-World training will benefit the novice as well as the experienced network professional.

Students Will Learn

- Describe the key design criteria for Carrier Hotspots
- Survey sites and environments for coverage
- Appreciate the RF fundamentals that impact WiFi services
- Describe in detail how wireless LANs operate
- Size service coverage
- Size and engineer backhaul
- Appreciate the key security issues of WiFi Systems
- Troubleshooting WiFi Networks and Hot Spots

Prerequisites

Prior to attending the course, delegates must have fundamental understanding of Ethernet LANs and TCP/IP protocols. Practical experience with Microsoft Windows is also required assumed.

Course Outline

1. Essential 802.11 Wireless LAN Concepts

The roles of Wireless LANs

Access Points

Infrastructure vs Peer-Peer WLANs

Service Sets

SSID

The broadcast SSID

BSSID

Distribution System

ESS and ESSID

IEEE 802.11 standards

802.11, 802.11b

802.11a, 802.11g, 802.11h

802.11b/g mixed mode

Dual- and Tri-mode WLAN adapters

Dual- and Tri-mode Wireless networks

RF bands, data rates, ranges

Client devices and accessories

2. Understanding Wireless Client Hardware and Software

The Client Manager

Microsoft Windows operating system components

Adapter driver

Adapter firmware

USB driver

USB firmware

3. Understanding More about 802.11 Wireless Networks

The Wi-Fi Alliance

Wi-Fi Alliance standards

Wired Equivalent Privacy (WEP)

Wi-Fi Protected Access (WPA)

IEEE 802.11i

Wireless Bridges

Wireless Workgroup Bridges

Wireless Repeaters

Wireless Routers

Wireless Residential Gateways

Enterprise Wireless Gateways

Power over Ethernet (PoE)

Example WLAN vendors

4. Radio Frequency (RF) Essentials

What are radio waves?

Frequency, wavelength, power

RF frequencies and bands

Overview of RF propagation

Loss, Attenuation

What is multipath?

Antenna types

Gain

Areas of RF coverage

Antenna components and accessories

Cables and connector types

Impedance

VSWR

Signal Power levels

The dB concept

dBm

UK signal power levels

Noise level

What is SNR?

What is RSSI?

What is DSSS?

What is OFDM?

DSSS and OFDM channels

5. How Wireless LANs Operate

Wireless Clients

Wireless Client profiles

Configuring a Wireless Client profile

Joining a wireless LAN

Scanning for networks

Beacons

Broadcasting the SSID

Passive scanning

Active scanning

Authentication

Association

Frame forwarding

Roaming

Wireless LAN configuration - good working practices

Wireless LAN configuration - bad working practices

Example misconfigurations

Power Management

6. Essential 802.11 WLAN Security Concepts

The need for:

Authentication

Encryption

Message Integrity

Wired Equivalent Privacy (WEP)

How people Hack WEP

Top security issues with Wireless LANs

Example wardriving tools

MAC address filtering

IEEE 802.1X

EAP

Deploying TKIP

Wi-Fi Protected Access (WPA)

PEAP

Deploying AES

Radius and Diameter services

The dangers of Rogue wireless equipment and Rogue wireless LANs

Identifying and dealing with Rogue wireless equipment and networks

7. Sizing Hotspot Services

Area coverage

WiFi Nodes

Backhaul operation

Sizing WiFi Services

Engineering node backhaul

Design workshop

8. Diagnosing and Troubleshooting Problems with 802.11 Wireless Networks

Taking a wireless user problem report

Extracting the information you need from the user

Extracting information from other sources

Correlating events and conditions

Common problems with 802.11 Wireless LANs

A step-by-step troubleshooting guide

Client-side diagnostic tools

Obtaining Access Point diagnostics

Evaluation and Review

Delivery Method

Instructor-Led with numerous Hands-On Labs and Exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

3 Days