



WiFi Technology Overview

Course Outline

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Course Description:

WiFi Technology and Network as a local wireless LAN has very good potential for growth. The end users of technology have been using this service and many vendors and service providers are focusing on WiFi network business. Understanding of the technology, network and the working of the individual component will be necessary to plan, implement, operate and maintain the network to ensure good quality network and service to end user. The air interface of the network will be of high importance and understanding of this will be critical to maintain data throughput in the network. The course helps the participants to understand the technology and network better and deliver better results

Target Audience:

The target audience for this course includes:

- Engineering managers and engineering staff who wants to understand the working of WiFi Network and Technologies and various building blocks of these networks.

Delivery Method:

The delivery will be instructor-led classroom training with extensive practical case studies, interactive discussions and Q&A / quiz sessions

Course Material:

The course material will be in the form of presentation slides (Hardcopy or protected Softcopy)

Pre-requisites:

The participants are expected to have prior knowledge of:

- Basic Communication knowledge
- Knowledge on wireless technology

Duration:

2 Days

Revision:

1.0

Course Outline

Day 1:

Wi-Fi Overview

- WLAN introduction and applications
- Relationship between IEEE 802.11 and WiFi
- BSS, IBSS, ESS, DS, BSSID, SSID
- IEEE 802.11 set of standards
- Spectrum of operation
- AP and STA hardware structure
- Virtual AP
- WLAN deployment scenarios

Physical Layer of IEEE 802.11

- RF fundamentals: path loss and fading
- Basics of wireless channels
- Understanding dB, dBm and EIRP
- Noise floor, Noise Figure and SNR
- RSSI, data rate relationship
- Key challenges for the 802.11 PHY. layer
- DSSS & OFDM PHY: Fundamentals and data rate support
- Use of OFDM in 802.11
- Rate Adaptation in WLAN

Advanced Physical Layer concepts

- Introduction to 802.11n PHY layer enhancements
- OFDM in 802.11n
- Basics of MIMO
- Introduction to STBC
- Link Adaptation
- Tradeoff using MIMO techniques

MAC layer in 802.11

- DCF Protocol in WLAN
- CSMA/CA, BEB
- RTS/CTS and Fragmentation

- Inter frame spacing
- Data, Control and Management frames
- Network entry process
- Timing and power management
- Power save (TIM, PS-POLL)

Day 2

Wi-Fi Security

- Introduction to WLAN Security
- WEP - Encapsulation & Decapsulation (RC4)
- WPA - TKIP; WPA2 - CCMP mode of operation (AES)
- 802.1x Authentication and Key management
- Introduction to WIDS, WPS

QoS in 802.11

- EDCF & Access Category
- HCF & TS
- TXOP concepts
- QoS mapping from Layer 3 to Layer 2 (IP QoS)
- Block-ACK
- APSD

802.11n MAC overview

- Frame Aggregation techniques
- Enhanced Block Ack
- Reverse Direction
- Other 11n enhancements

Demos using open source tools

- Protocol analysis using Wireshark
- Performance analysis using Iperf/Jperf