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ETS

Course Profile

Implementing Wireless LANs (WLAN)

ETS242

Duration:

4 days

Objectives:

Learn how to actually design, install and configuring a multi-segment Wireless LAN.

Emphase multi-vendor standards-based solutions.

Identify Inter-operability issues and work with WLAN components from different vendors to implement complete solutions.

Implement a development methodology to guide participants through even the toughest network challenges.

Explore wireless tools including the latest in site surveying techniques, wireless protocol sniffers and diagnostics.

Who should attend:

Experienced networked professionals involved in the evaluation, design, planning, installation, and management of WLAN.

Prerequisites:

This course is for network engineers who have practical experience in all phases of network design, installation, maintenance and troubleshooting of wired LANs.

Follow-on courses:

Wireless LAN Security (ETS248) and Wireless Protocols & Troubleshooting (ETS249).

Course style:

The course is presented as a mixture of discussion, teaching sessions and extensive hands-on exercises.



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ETS242

Detailed Contents:

Radio Frequency Concepts

Basic Radio Frequency Concepts
Sine Wave Radio Signal
Frequency is Cycles Over Time
Increasing Frequency
The Frequency Bands
Different Categories of Bands
WLAN Radio Spectrum Bands
The ISM Band
Specific Bands Are Made Up of Channels
Spectrum Band Channels
Signal Quality
Radio Modulation Concepts
Modulation Techniques
Spread Spectrum Concepts
FHSS
Frequency Hopping
Direct Sequence Spread Spectrum
Using Chipping Codes
DSSS Channels
DSSS Channel Distribution
Module Summary

Governing the Radio Spectrum

Governing the Radio Spectrum in the US
US Spectrum Chart and the ISM Band
International Telecommunication Union
Department of Communications
Comisión Federal de Telecomunicaciones
International DSSS Channel Allocation
WLAN Power Limitations
FCC and RF Exposure
Module Summary



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Course Profile

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ETS242

Wireless LAN Industry Standards	IEEE 802.11 Standard Current Wireless LAN Standards - IEEE 802.11 and 802.11b IEEE 802.11x Architecture Next Generation Wireless LAN Standards: IEEE 802.11a and 802.11g Other Wireless LAN Standards: IEEE 802.11e and 802.11i Wireless Ethernet Compatibility Alliance (WECA) Wi-Fi Testing Parameters Module Summary
Components of a Wireless LAN	WLAN Components The Access Point Access Point Ports Wireless Client Adapters Antennas Module Summary
Wireless LAN Topology	WLAN Topologies Station Services Basic Service Set Independent Service Set Extended Service Set Distribution Services Authentication and Association Process Peer-to-Peer Ad Hoc Peer-to-peer with Access Point Single AP Bridging Multiple AP Bridging Multiple AP Separate Bridging AP Repeater The OSI Model CSMA/CA Access Method RTS/CTS Protocol Module Summary



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Course Profile

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ETS242

Wireless LAN Antenna Theory

FCC Requirements
Omni and unidirectional Antenna Characteristics
Antenna Size and Frequency Relationship
Antenna "Gain"
Isotropic versus Dipole Antennas
Understanding the Term dB or Decibel
Effective Isotropic Radiated Power (EIRP)
Polarization and other Antenna Issues
Diversity Antennas
Antenna Radiation Patterns
Antenna Types
Antenna Accessories
Antenna Selection Process
Module Summary

Wireless Network Interface Cards

Wireless NIC Characteristics
Title: Wireless NIC PC Interface
Wireless NIC Operating System Support
Wireless NIC Antennas
Wireless NIC ESSID
Wireless NIC Operating Mode
Wireless NIC Power Mode
Wireless NIC Encryption
Wireless NIC Roaming Support
Wireless NIC Roaming Example
Wireless NIC Dynamic Data Rate Support
Wireless NIC Load Balancing
Wireless NIC Vendors
Provide Wireless NIC Vendor Support
Module Summary

Wireless Access Points

Identify Wireless AP Characteristics
Access Point Antennas
Access Point Wired Interface
Access Point Management Interface
Access Point Bridging
Access Point Wireless to Wireless Bridging
Access Point Wired to Wireless Bridging
Access Point Wired to Wired Bridging
Access Point DHCP Server
Access Point NAT / Firewall Support



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ETS242

Access Point Frame Buffering
Access Point Access Control Lists
Access Point Dynamic Rate Switching
Access Point Client Mobility Support
Access Point Roaming across IP Subnets
Access Point Migration Path
Access Point Encryption
Access Point Quality of Service (QoS)
Access Point Performance
Types of Access Points (Aps)
SOHO Characteristics
Enterprise / Service Provider AP Characteristics
Enterprise / Industrial AP Characteristics
AP Characteristic Matrix
List of main WLAN vendors
Access Point Vendor Support
Access Point Vendor Support (cont.)
AP Suppliers - Distinguishing Features
Module Summary

Wireless LAN Antenna Leading WLAN Antenna Vendors
Cushcraft Antennas
Xirtex Antenna
Radiall / Larson Antennas
Custom Antennas and Certification
Radiall / Larson Custom Antenna
Xertex Custom Antenna
Xertex Custom Antenna Examples - part II
Module Summary

The Wireless LAN Pre-Installation
Procuring the WLAN Equipment
Procurement Priorities
Preparatory Installation
Install the Data Cables
Install the Power Cables
tag the Equipment
Sample Equipment Log
Configure Access Points
Module Summary



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Wireless LAN Installation

- Install WLAN Equipment
- Mount Access Point
- Heated NEMA Enclosure Example
- Sample Mounting Options 3Com Access Points
- Sample Mounting Options 3Com Access Points
- Sample Surface Mount - Option II
- Sample Ceiling Mount - 3Com AP
- Cisco AP 350 Series Wall Mount
- Mount Detached Antennae
- Yagi Antenna Mount Example
- Ceiling Mast Mount Example
- Mount Lightning Arrestors
- Install Client Adapters
- Module Summary

Wireless LAN Installation - Testing For Connectivity

- Test for Connectivity
- Test for Client/AP Association
- Association Troubleshooting
- Test for Network Connectivity
- Test for Required Coverage
- Test for Required Throughput
- Module Summary

Wireless LAN Configuration and Setup

- Access Point User Interface
- Direct Connection
- Remote Connection
- Dial-Up Connection
- HTML Web Browser
- Telnet
- SNMP
- AP User Interface
- Vendor-Specific Utilities
- Connect to and Configure the AP
- Install and Configure the Client Adapters
- Module Summary

Wireless LAN - Network Management

- Maintaining the Wireless LAN
- Wireless Security and 802.11 WEP
- Limits of using WEP
- Alternative WLAN Security
- MAC Filtering
- Maintain Firmware Updates
- Module Summary



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Implementing Wireless LANs (WLAN)

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Wireless LAN Troubleshooting and Diagnostics

- Diagnosing the Wireless LAN
- Diagnose Problems with Association
- Association vs Network Problems
- Two Sets of Diagnostic Tools
- Vendor-specific utilities
- Using an RF Spectrum Analyzer
- Anritsu Model MS2711A
- When to use an RF analyzer
- RF Analysis - part I
- RF Analysis - part II
- RF Analysis - part III
- RF Analysis - part IV
- RF Analysis - part V
- RF Analysis - part VI
- Module Summary

Wireless LAN - Assessing Customer Requirements

- Network Traffic Associated With Application Types
- Client/Server Applications
- Host Emulation Data Collection Applications
- E-Mail and Web Browsing Applications
- Wireless Voice Over IP
- CAD, X-Ray Transfer, and Streaming Video
- End User Device Characteristics
- Laptop and Desktop PC Characteristics
- Personal Digital Assistant Characteristics
- Data Collection Terminal Characteristics
- Wireless Voice Over IP Telephones
- Characteristics of Facilities Housing WLANs
- Typical Hotel Characteristics
- Typical Airport Characteristics
- Typical Office Characteristics
- Typical school Characteristics
- Typical Healthcard Characteristics
- Typical Warehouse/Retail Characteristics
- Typical Outdoor Storage Yard Characteristics
- Module Summary



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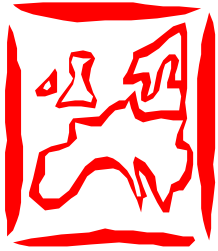
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Wireless LAN Equipment

End User Mobility and Throughput
Availability and Expandability
Data Security
User Authentication
Management and Network Support
Interference
Interoperability
Network Partitioning
Module Summary

The Wireless LAN Survey

The Wireless LAN Site Survey
Site Survey Tools
The Site Survey Plan
Site Survey Plan Topics
Configure Access Point
Configure Client Test Utility Program
Spectrum Analysis
Spectrum Scan
Building Materials and RF Signal Range
Other Materials and RF Signal Range
Multipath Fading
802.11b Dynamic Rate Shifting
Cell Documentation
The 'Outside - In' Survey Technique
'Outside - In' continued
A Linear Survey
Pre-Defined Cells
Data and Power Cabling
Data Cabling and Power Over Ethernet
Plenum
Firewalls and Risers
Mounting Considerations
External Mounting
Module Summary



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To book this course, or to obtain more information, contact:

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This information is provided in good faith to represent the typical contents of the course material. The course will change as required to keep pace with technology changes and learning styles, as a result the exact contents may differ from those specified here. The benefit of instructor led training is that it will evolve to suit the needs of any specific class, therefore no warranty is given that any specific course will cover the subjects outlined here to any implied level of detail.

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