



Local Area Networking (LAN) with Wireless Technologies

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Agenda

Technology Overview
Deployment Considerations
Security Overview

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Wireless LAN Technology Options

- IEEE 802.11b
 - 2.4 GHz
 - 11 Mbps
- IEEE 802.11g
 - 2.4 GHz
 - 54 Mbps
- IEEE 802.11a
 - 5 GHz
 - 54 Mbps

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Common Misconceptions

- IEEE 802.11g
 - 54 Mbps Throughput
 - Actual data throughput is 18-20 Mbps
 - Higher throughput with 11b clients
 - Data throughput remains at 5-6 Mbps
 - Throughput is unchanged in compatibility mode
 - Data throughput for 11g clients halves
 - Data throughput for 11b clients remains 5-6 Mbps

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Common Misconceptions

- IEEE 802.11g (cont.)
 - 54 Mbps is available to all clients
 - Highly dependant on RF sensitivity of client
 - 11g clients can connect to 11a infrastructure
 - Different portions of the RF spectrum
 - Dual-band client cards are available (a/b/g)
 - 11g is more expensive
 - Cisco 11g Access Points are the same price as 11b Access Points

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Common Misconceptions

- IEEE 802.11a
 - 54 Mbps Throughput
 - Actual data throughput is 22-24 Mbps
 - 54 Mbps is available to all clients
 - Highly dependant on RF sensitivity of client
 - 11b clients can connect to 11a infrastructure
 - Different portions of the RF spectrum
 - Dual-band client cards are available (a/b/g)
 - 11a is twice as expensive as 11b
 - Cisco 1200 Series 11a Access Points are slightly more expensive than 11g Access Points
 - Dual-band client cards are available (a/b/g)

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Technology Overview
Deployment Considerations
Security Overview

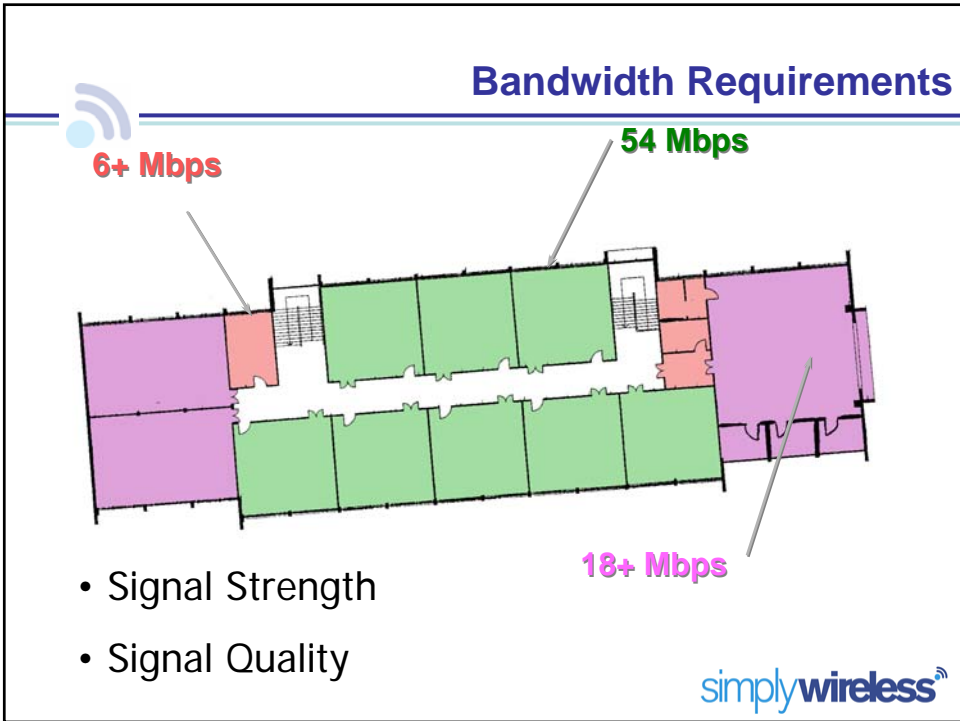
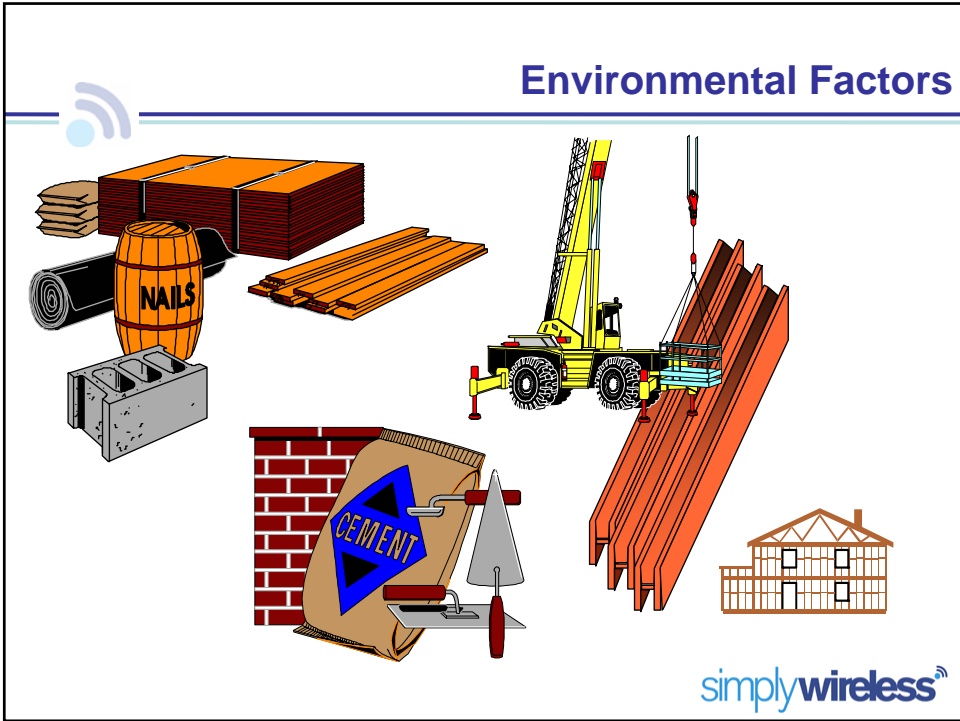


Technology Choice



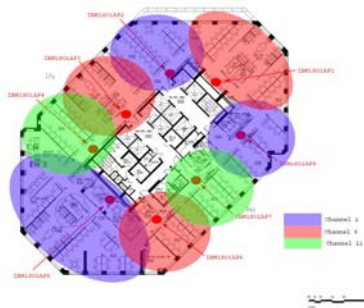
	802.11b	802.11g	802.11a
Bandwidth	11/6 Mbps	54/20 Mbps	54/22 Mbps
Frequency Band	2.4 GHz	2.4 GHz	5 GHz
Availability	Worldwide	Worldwide	US/AP
Future Usage	Phased Out	Yes	Yes





Radio Design

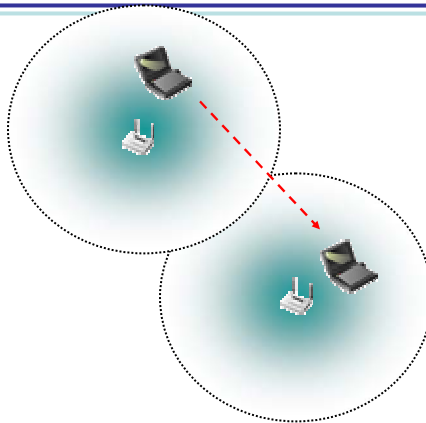
- RF Interference Analysis
- Multi-path Degradation
- Channel Plan
- Optimal Spectrum Usage



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Roaming and Load Balancing

- Client Roaming
 - No Roaming
 - Enterprise Roaming
 - Fast Secure Roaming
- Load Balancing
 - High Density Areas
 - Variable Environments
 - “Hot-desking”, Classrooms, Theatres, etc.



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Network Integration

- Layer 3 / Subnet Roaming
- Virtual LAN / Network Design
- Quality of Service (QoS)

IT Dept. VLAN

Sales VLAN

VoIP VLAN

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Network Security

client

Encryption Key

access point (AP)

Encryption Key

TKIP? WEP? WPA? VPN? EAP? 802.11i?

client

access point (AP)

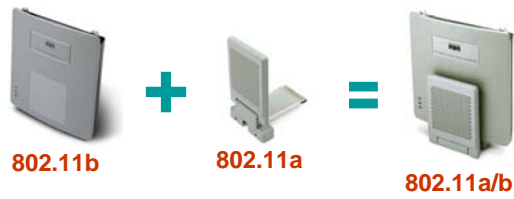
RADIUS Server

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Future Proofing

- Software/Firmware Updates
- Hardware Updates



802.11a/b → 802.11a/b/g

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Client Attributes

- **Power Output**
 - 32mW
 - 100mW
- **Receiver Sensitivity***
- **Physical Size**
 - PCMCIA vs. Mini-PCI



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Client Functionality

Cisco Compatible eXtensions (CCX)



Standards

IEEE 802.11 and Wi-Fi
WEP 40bit and WEP128bit compatibility
802.11 open and shared key authentication

Security

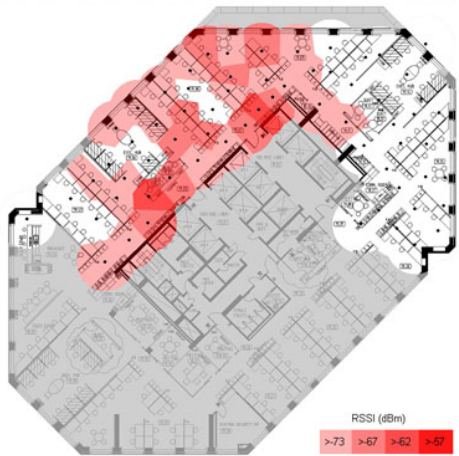
WEP, 802.1X and LEAP (Cisco EAP)
Reporting of APs that fail LEAP authentication
Broadcast key rotation with 802.1X types, including LEAP
Cisco's pre-standard TKIP implementation, or CKIP

Protocol Enhancements

Support active scanning - associate to AP with no SSID in beacon
Handle AP that responds to probe requests that specify different SSIDs
Handle multicasts/broadcasts encrypted with different broadcast keys



Documentation



- RF Coverage
- Signal Strengths
- Signal Quality
- Network Baseline
- Troubleshooting





Technology Overview
Deployment Considerations
WLAN Security Overview

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- What are you protecting?
- How much is your data worth to you?
Or your competitors?

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Simple Security Solutions

- Standard WEP
- MAC address filtering
- No infrastructure overheads
- Provides the simplest form of security

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VPN from Wireless DMZ

- Does not rely on WEP for encryption
- Requires significant VPN infrastructure investment
- Reduces data throughput
- Requires users to login multiple times
- Roaming becomes more difficult

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Cisco LEAP

- Access Points can be considered part of the Access Layer
- Network connection is not available until client is authenticated
- Dynamic data encryption
- Does not impact data throughput
- Roaming can be performed without reauthentication
- Single sign on for computer and user

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PEAP

- Access Points can be considered part of the Access Layer
- Network connection is not available until client is authenticated
- Authentication integrates directly to Windows 2000 Active Directory
- Dynamic data encryption
- Does not impact data throughput
- Roaming can be performed without reauthentication
- Separate sign on for computers and users

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Questions?

