



# Cisco Unified Wireless Network

6.0 Release & 802.11n



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# Agenda

**Architecture & 802.11n overview**

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**Next-Gen Access Points**

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**Next-Gen Controllers**

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**New Features/Functions**

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**Cisco WCS**

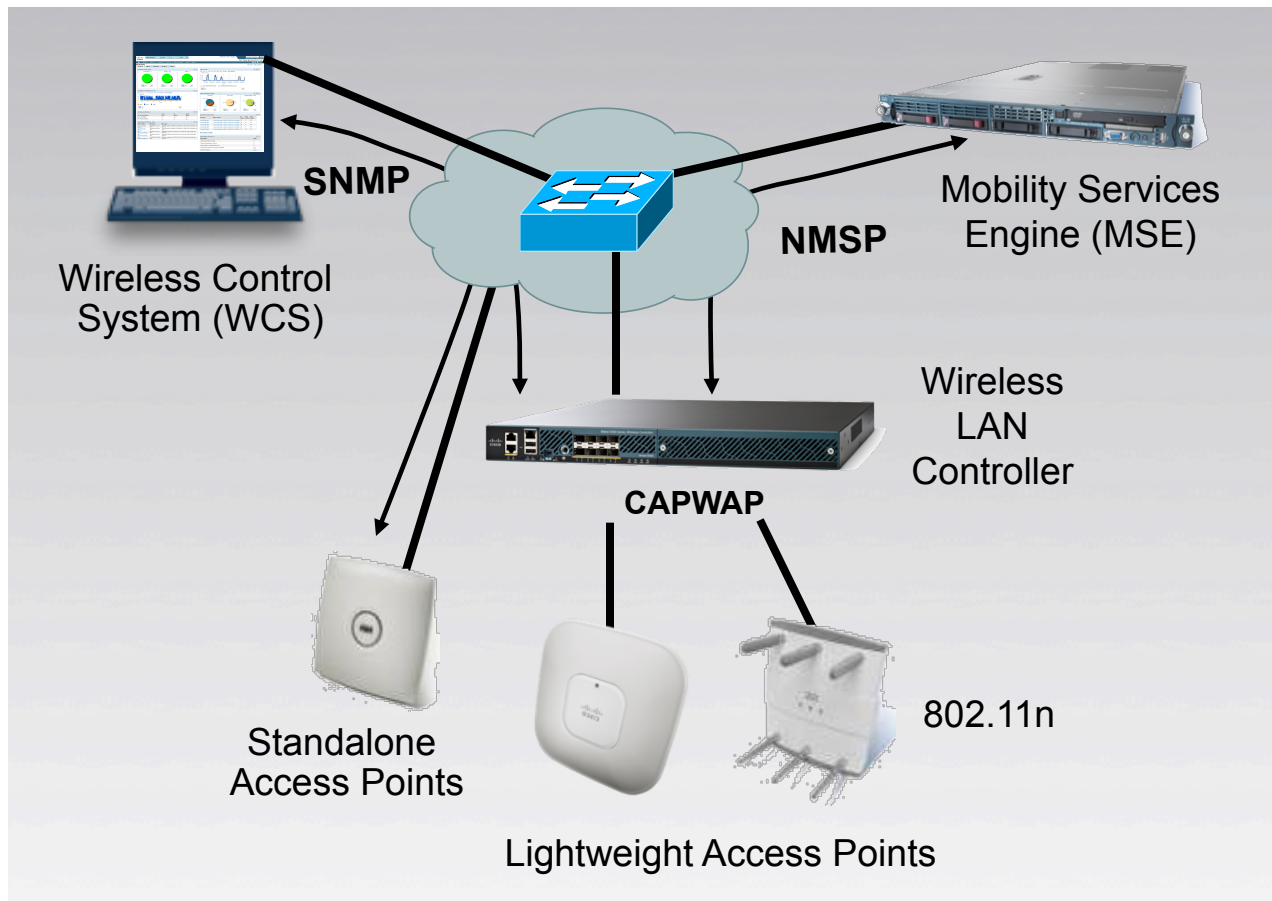
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**Q&A**

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# Cisco Unified Wireless Network Architecture Overview



- 802.11n and 802.11a/g
- Highly scalable
- Real-time RF visibility and control
- Monitor and migrate standalone access points
- Easily configure
  - WLAN controllers using SNMP
  - Access points using CAPWAP
- Built-in support for Mobility Services
  - Context-Aware Services (Location)
  - Adaptive Wireless Intrusion Prevention System (WIPS)
- Wired and wireless guest access



Client Devices and Wi-Fi Tags

# 802.11n Technical Update





# Technical Elements of 802.11n

MIMO

40Mhz Channels

Packet  
Aggregation

Backward  
Compatibility

MIMO

40Mhz  
Channels

Packet  
Aggregation

Backward  
Compatibility

# Aspects of 802.11n

MIMO

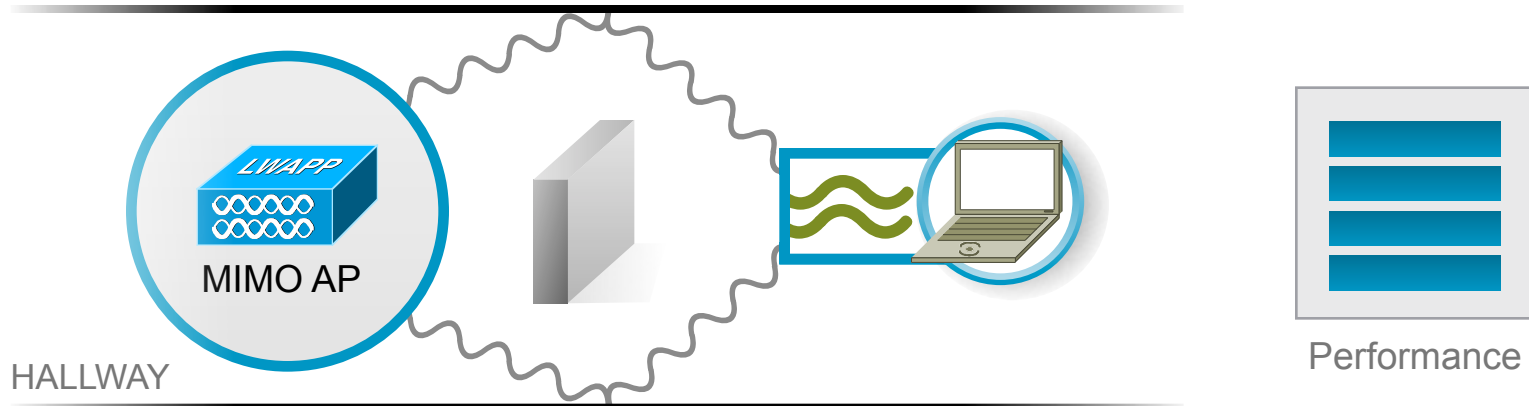
40MHz Channels

Packet Aggregation

Backward Compatibility

MIMO (Multiple Input, Multiple Output)

With Beamforming Transmitter, Increase of Signal Strength  
 Without Beamforming Transmitter, Phase Arrivals of Signal



Performed by Transmitter (Talk Better)

Ensures Signal Received in Phase

Increases Receive Sensitivity

Works with non-MIMO and MIMO Clients

Beam Forming

Maximal Ratio Combining

Spatial Multiplexing

# Aspects of 802.11n

40MHz Channels

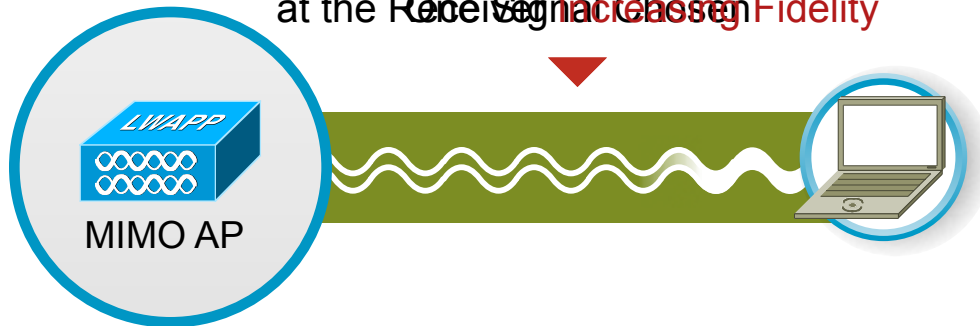
Packet Aggregation

Backward Compatibility

MIMO (Multiple Input, Multiple Output)

**Without MRC**

Multiple Signals are Received  
at the Receiver as One Signal  
with Lower Fidelity



Performance

Performed by Receiver  
(Hear Better)

Combines Multiple Received Signals

Increases Receive Sensitivity

Works with non-MIMO and MIMO Clients

Beam Forming

**Maximal Ratio Combining**

Spatial Multiplexing

# Aspects of 802.11n

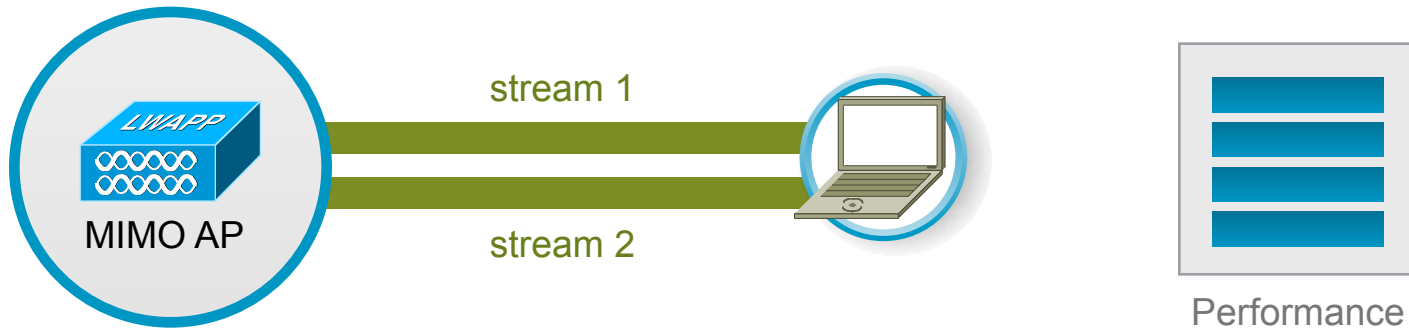
40MHz Channels

Packet Aggregation

Backward Compatibility

MIMO (Multiple Input, Multiple Output)

Information Is Split and Transmitted on Multiple Streams



Transmitter and Receiver Participate

Concurrent Transmission on Same Channel

Increases Bandwidth

Requires MIMO Client

Beam Forming

Maximal Ratio Combining

**Spatial Multiplexing**

# Aspects of 802.11n

MIMO

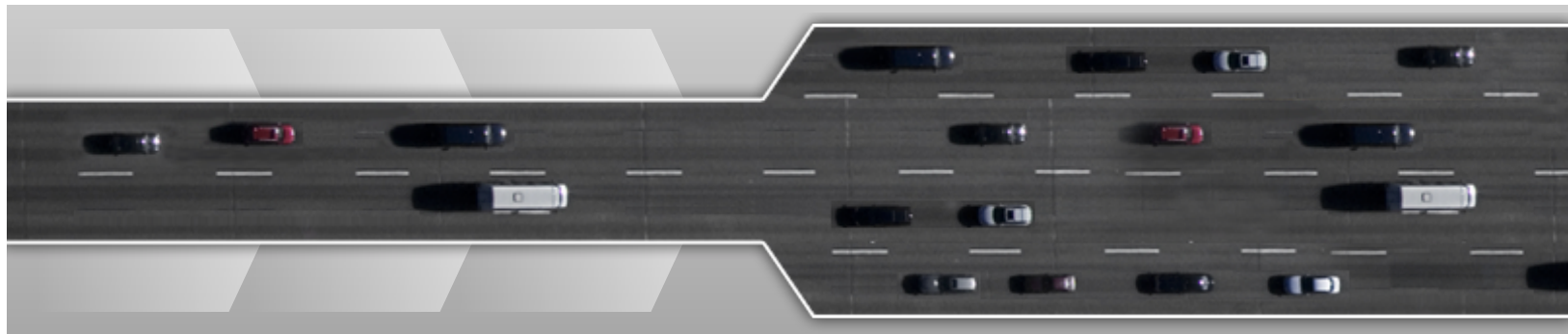
40MHz Channels

Packet  
Aggregation

Backward  
Compatibility

40MHz Channels

## Moving from 2 to 4 Lanes



40-MHz = 2 aggregated 20-MHz channels—takes advantage of the reserved channel space through bonding to gain more than double the data rate of 2 20-MHz channels



# Aspects of 802.11n

MIMO

40MHz Channels

Packet Aggregation

Backward Compatibility

Packet Aggregation

## Carpooling Is More Efficient Than Driving Alone



Without Packet Aggregation

802.11n  
Overhead

Data  
Unit  
Packet

802.11n  
Overhead

Data  
Unit  
Packet

802.11n  
Overhead

Data  
Unit  
Packet

802.11n  
Overhead

Data Unit  
Packet Packet Packet

With Packet Aggregation

# Aspects of 802.11n

MIMO

40Mhz Channels

Packet  
Aggregation

Backward  
Compatibility

Backward Compatibility

2.4GHz

5GHz

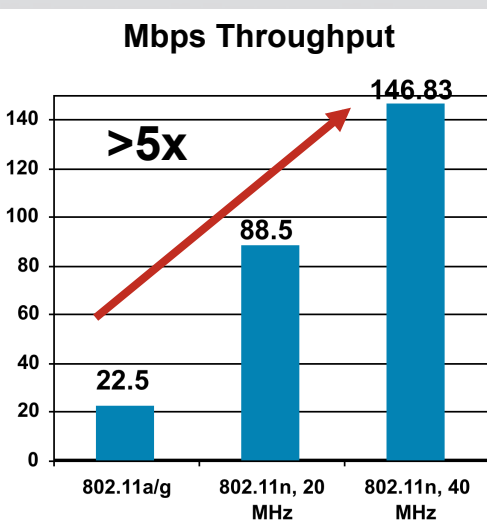
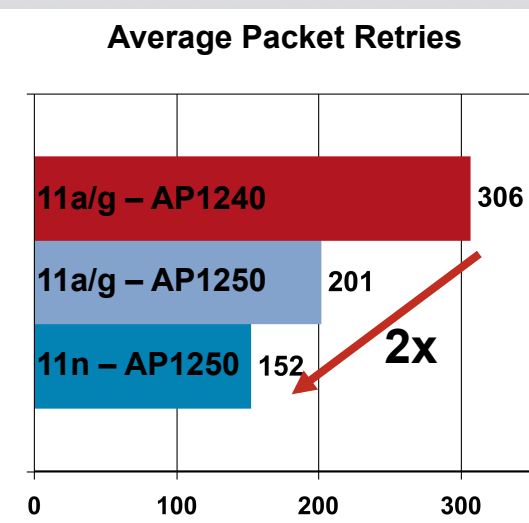
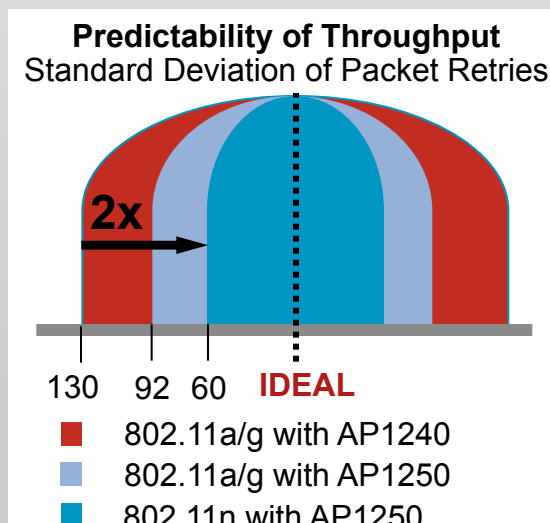
11n Operates  
in Both  
Frequencies



802.11ABG Clients Interoperate with 11n AND  
Experience Performance Improvements

# 802.11n

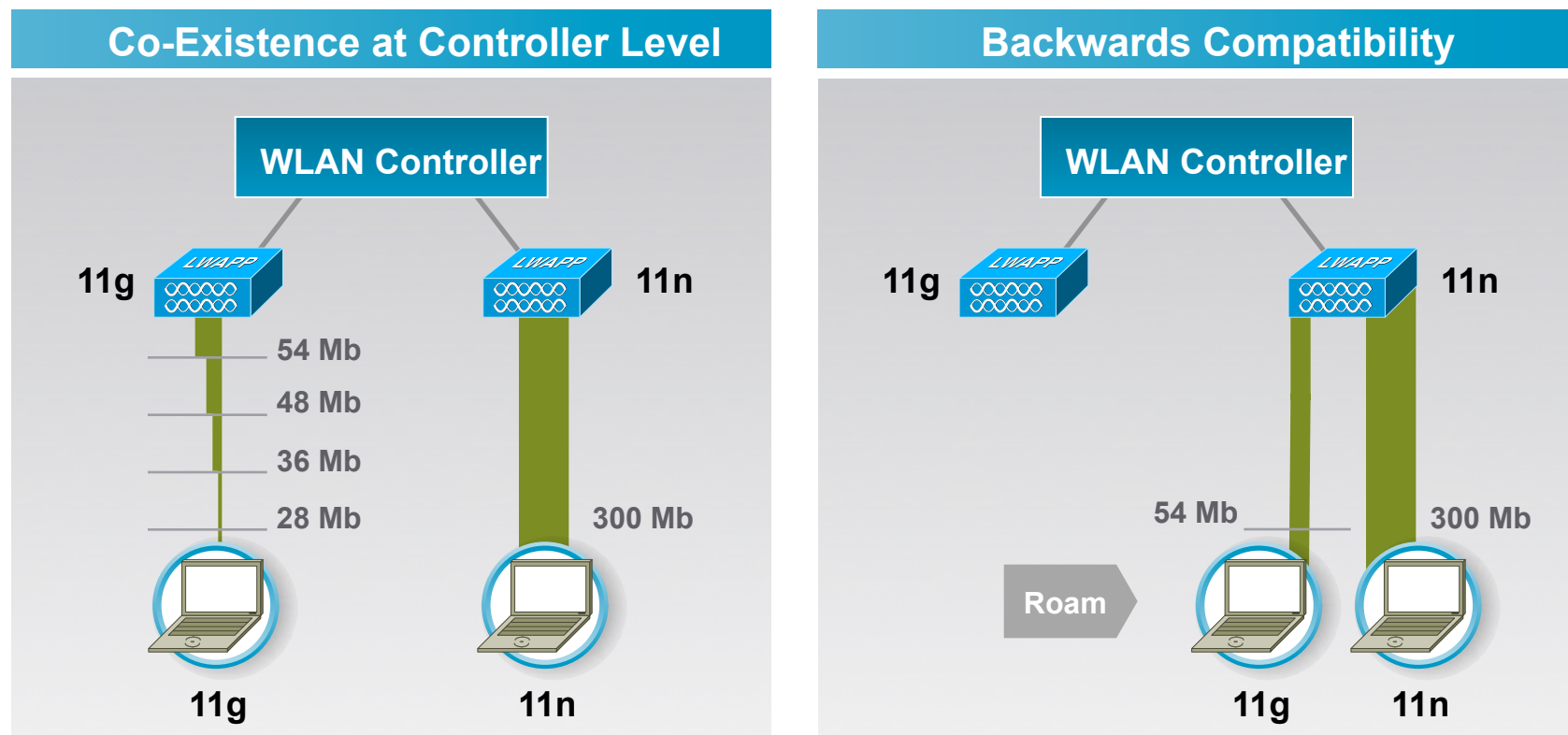
## It's About a Whole Lot More Than Speed

Throughput	Reliability	Predictability																								
5x more throughput	2x more reliable	2x more predictable																								
Enhanced file transfer and download speeds for large files	Lower latency for mobile unified communications	More consistent coverage and throughput for mobile applications																								
 <p><b>Mbps Throughput</b></p> <table border="1"><thead><tr><th>Standard</th><th>Throughput (Mbps)</th></tr></thead><tbody><tr><td>802.11a/g</td><td>22.5</td></tr><tr><td>802.11n, 20 MHz</td><td>88.5</td></tr><tr><td>802.11n, 40 MHz</td><td>146.83</td></tr></tbody></table>	Standard	Throughput (Mbps)	802.11a/g	22.5	802.11n, 20 MHz	88.5	802.11n, 40 MHz	146.83	 <p><b>Average Packet Retries</b></p> <table border="1"><thead><tr><th>Configuration</th><th>Average Packet Retries</th></tr></thead><tbody><tr><td>11a/g - AP1240</td><td>306</td></tr><tr><td>11a/g - AP1250</td><td>201</td></tr><tr><td>11n - AP1250</td><td>152</td></tr></tbody></table>	Configuration	Average Packet Retries	11a/g - AP1240	306	11a/g - AP1250	201	11n - AP1250	152	 <p><b>Predictability of Throughput</b> Standard Deviation of Packet Retries</p> <table border="1"><thead><tr><th>Configuration</th><th>Standard Deviation</th></tr></thead><tbody><tr><td>802.11a/g with AP1240</td><td>130</td></tr><tr><td>802.11a/g with AP1250</td><td>92</td></tr><tr><td>802.11n with AP1250</td><td>60</td></tr></tbody></table>	Configuration	Standard Deviation	802.11a/g with AP1240	130	802.11a/g with AP1250	92	802.11n with AP1250	60
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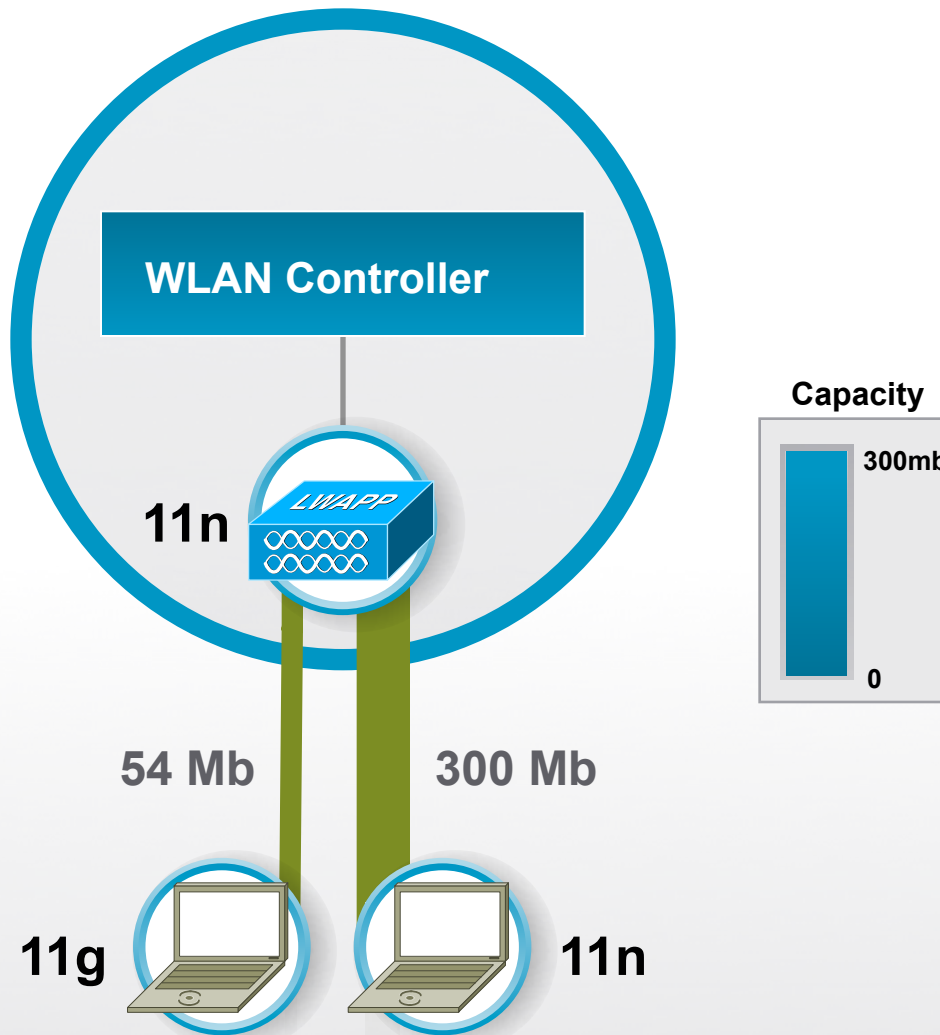
# Backward Compatibility & Co-Existence

- Co-existence of ABG/N APs
- Benefits of 11n accrue to ABG clients

MIMO benefits ABG clients on the AP receive side from MRC



# Mixed Mode Performance

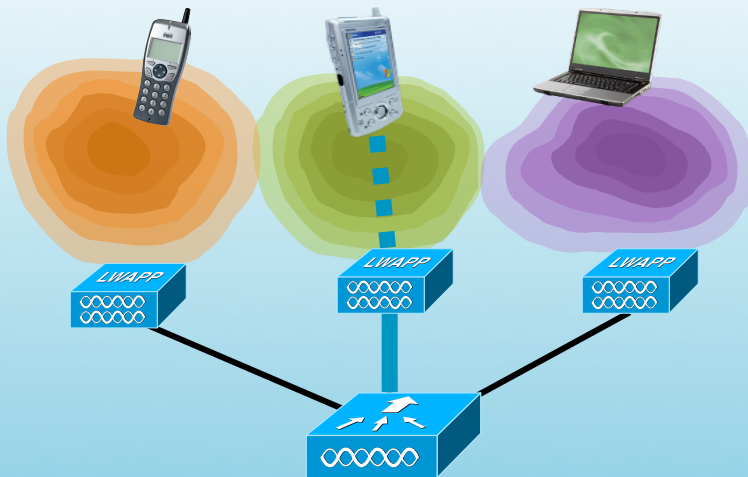


- **3 Modes of operation supported**
  - Legacy
  - Green Field
  - Mixed
- **Mixed mode experiences slight performance impact due to ABG clients**
- **11n clients still transmit at full performance**
- **PHY and MAC for 11n provides co-existence and protection for ABG clients**

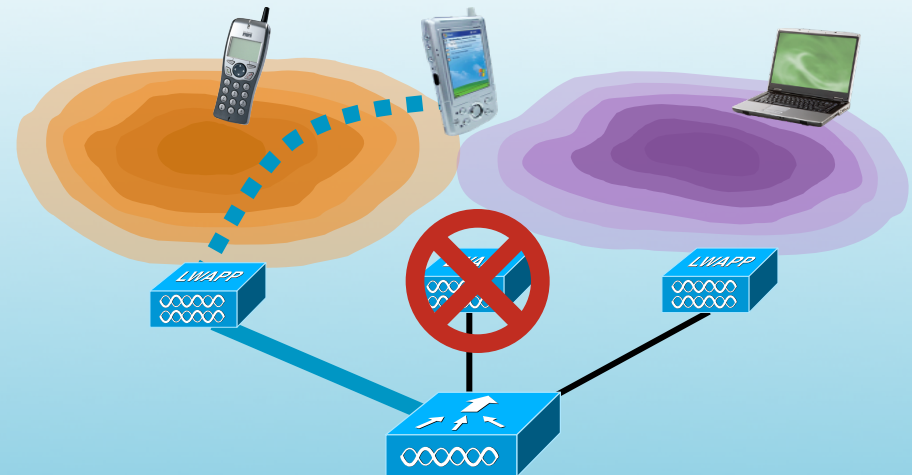


# RRM Removes Coverage Holes Automatically

Normal Operation

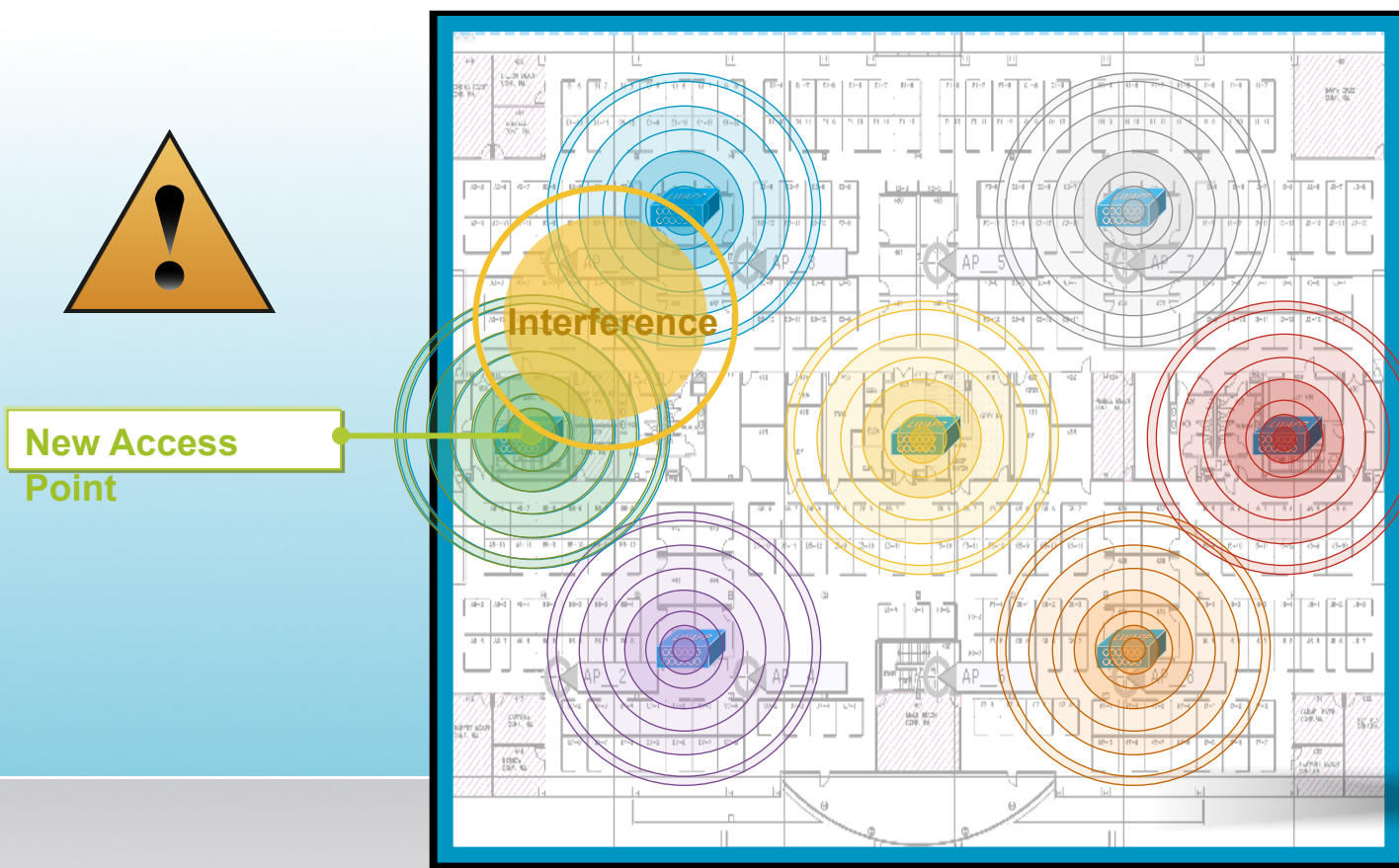


Access Point Failure  
Coverage Hole Detected and Filled



- Higher network availability with built-in coverage hole mitigation
- Reducing immediate need of operator involvement for regulation issues

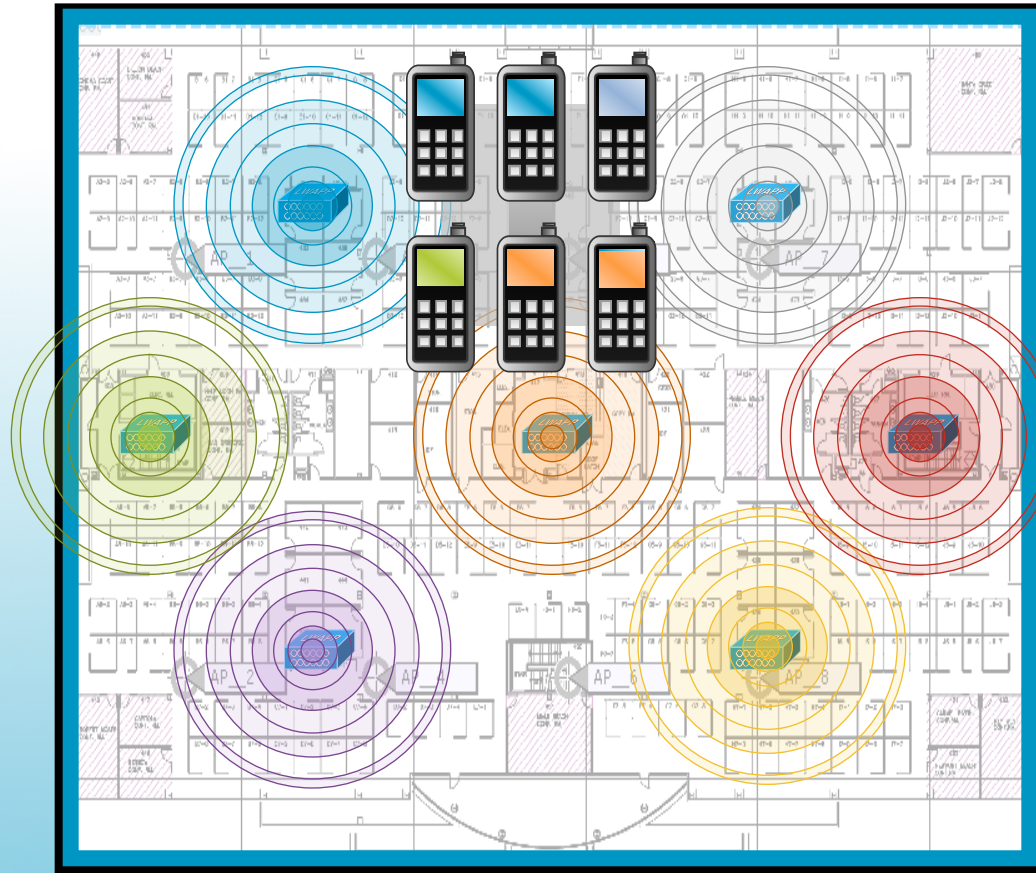
# RRM Automates Channel & Power Management



- An optimized RF environment allows for superior application performance and higher network availability
- Complete RF management without specialized RF skills

# CAC Optimizes MOS Scores in High Density

**Access Point  
Overloaded!**



**Device Load  
Balancing**

- **Set a minimum allowable MOS score**
- **Prevent clients from initiate calls through overloaded APs**

# Cisco Next-Generation Portfolio

Best-of-Breed Performance, Reliability, and Manageability



## Aironet 1140 and 1250 Series Access Points

802.11n performance with standard PoE  
Simple deployment for offices



## 5500 Series Wireless Controller

Scalability for 250 APs; thousands of clients  
Flexibility for any network topology



## Simplified Operations—WCS Management

Consistent, flexible user interface  
Historical trending and reporting



The Industry's Leading 802.11n Solution



# Agenda

Architecture overview

**Next-Gen Access Points**

Next-Gen Controllers

New Features/Functions

Cisco WCS

Q&A





# Cisco Next-Generation Wireless

Portfolio



*9X performance of A/G*



## ■ Cisco Aironet 1140 Series

- Carpeted Indoor Environments
- Easy to Deploy-Sleek design with integrated antennas
- 802.11n performance with efficient 802.3af power
- Blends seamlessly into the environment



## ■ Cisco Aironet 1250 Series

- Rugged Indoor Environments
- Versatile RF coverage with external antennas
- Flexible power options for optimal RF coverage

# Cisco Unified Wireless Network

## Product Description

### Indoor Access Points



1140  
AGBN



1130AG

### Indoor Rugged Access Points



1250  
AGBN



1240AG

### Outdoor Access Points/Bridges



1500



1520



1400



1300

### Access Points

#### Features

- Industry's best range and throughput
- Enterprise-class security
- Only 802.11n Draft 2 support with PoE
- Simultaneous air monitoring and traffic delivery
- Wide area networking for outdoor areas

#### Benefits

- Zero-touch management
- No dedicated air monitors
- Supports all deployment scenarios (indoor and outdoor)
- From secure coverage to advanced services

# Agenda

Architecture overview

Next-Gen Access Points

**Next-Gen Controllers**

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# Cisco 5500 Series Wireless Controller

## Optimized for 802.11n



- Integrates seamlessly into the Cisco Unified Wireless Network
- Control plane scalability
- New licensing allows for scale-as-you-grow and feature flexibility
- Supports OfficeExtend Solution and DTLS Encryption
- Supports Cisco M-Drive technology including ClientLink and BandSelect Technology



### Specifications At-a-Glance

Access Points	12 - 250
Devices	> 7,000
Mobility Scale	18,000 APs in Mobility Domain
Form	1 RU Appliance
Interfaces	8 GigE Ports

# Cisco 802.11n System Differentiators

## 5500 Series, 1140 and 1250 Series Access Points

### Scale

- Wire speed, non-blocking performance
- Simultaneous access point upgrades (100 APs)
- Access point pre-imaging for scalable upgrades\*

### Flexibility

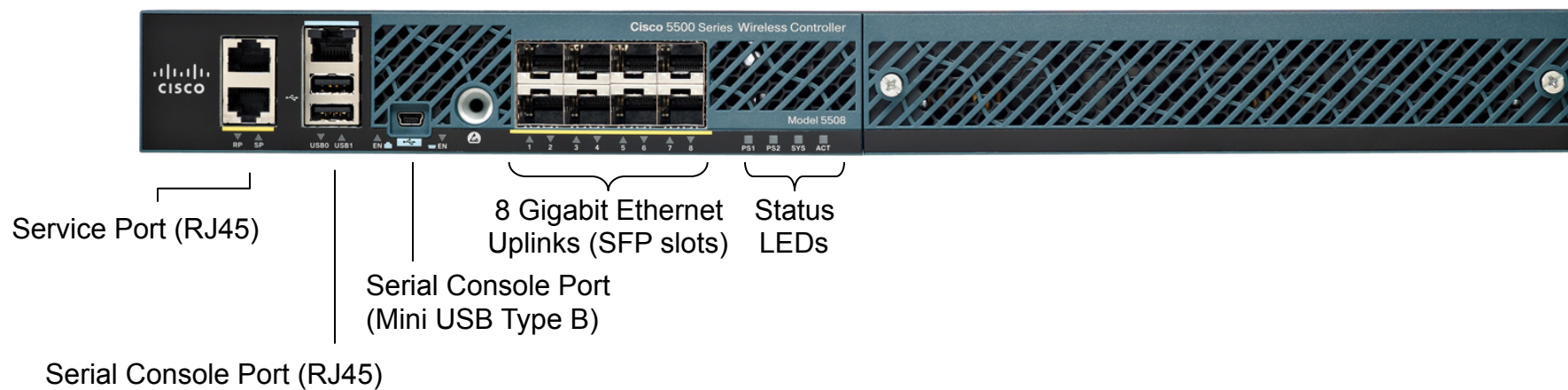
- Flexible licensing for scale-as-you-grow
- Industry's broadest architecture unifying teleworker, branch office, campus and outdoor
- Seamless integration and controller co-existence

### Enhanced Services

- M-Drive enhancements with BandSelect\* for load balancing clients from 2.4GHz to 5GHz
- ClientLink to improve legacy device performance
- Enhanced roaming performance

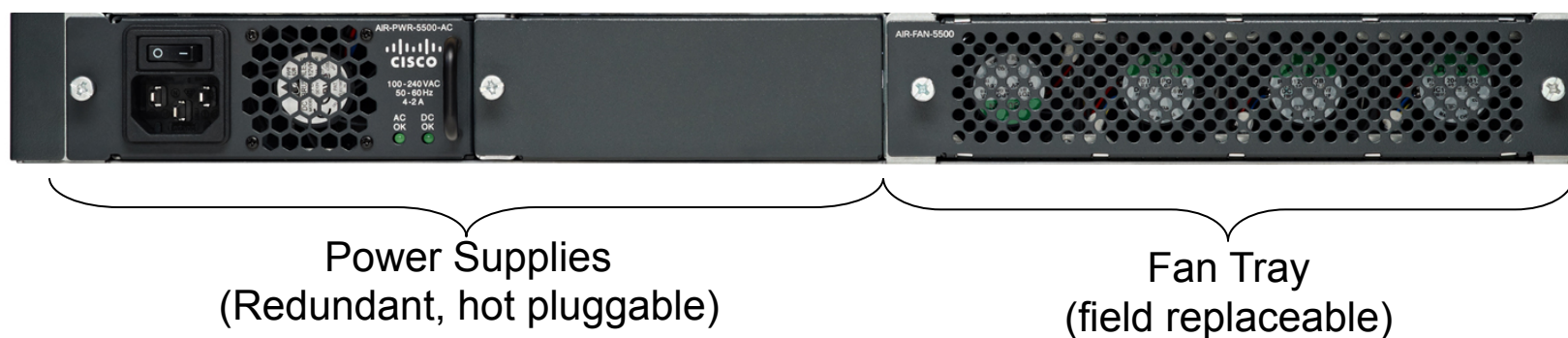


# 5508 Details – Front Panel



- Service Port
  - Out of band 10/100/1000 Ethernet network management interface
- Serial Console Ports
  - Provides command line interface
  - RJ45 and mini USB options
- 8 Gigabit Ethernet Uplinks
  - SFP (mini-GBIC) slots – choose the media type
  - APs are automatically load balanced across all interfaces

# 5508 Details – Back Panel



- Power Supplies

- One standard, optional second for redundancy

- Hot pluggable

- Fan Tray

- Field replaceable

# Cisco Unified Wireless Network

## Product Description

### Wireless LAN Controllers



5500

4400

2106

### Catalyst 6500 Series Wireless Services Module (WiSM)



WiSM

### Switch and Router Platforms



Integrated Services  
Routers WLCM

Catalyst 3750G  
Integrated WLC  
Switch

### Network Unification

#### Features

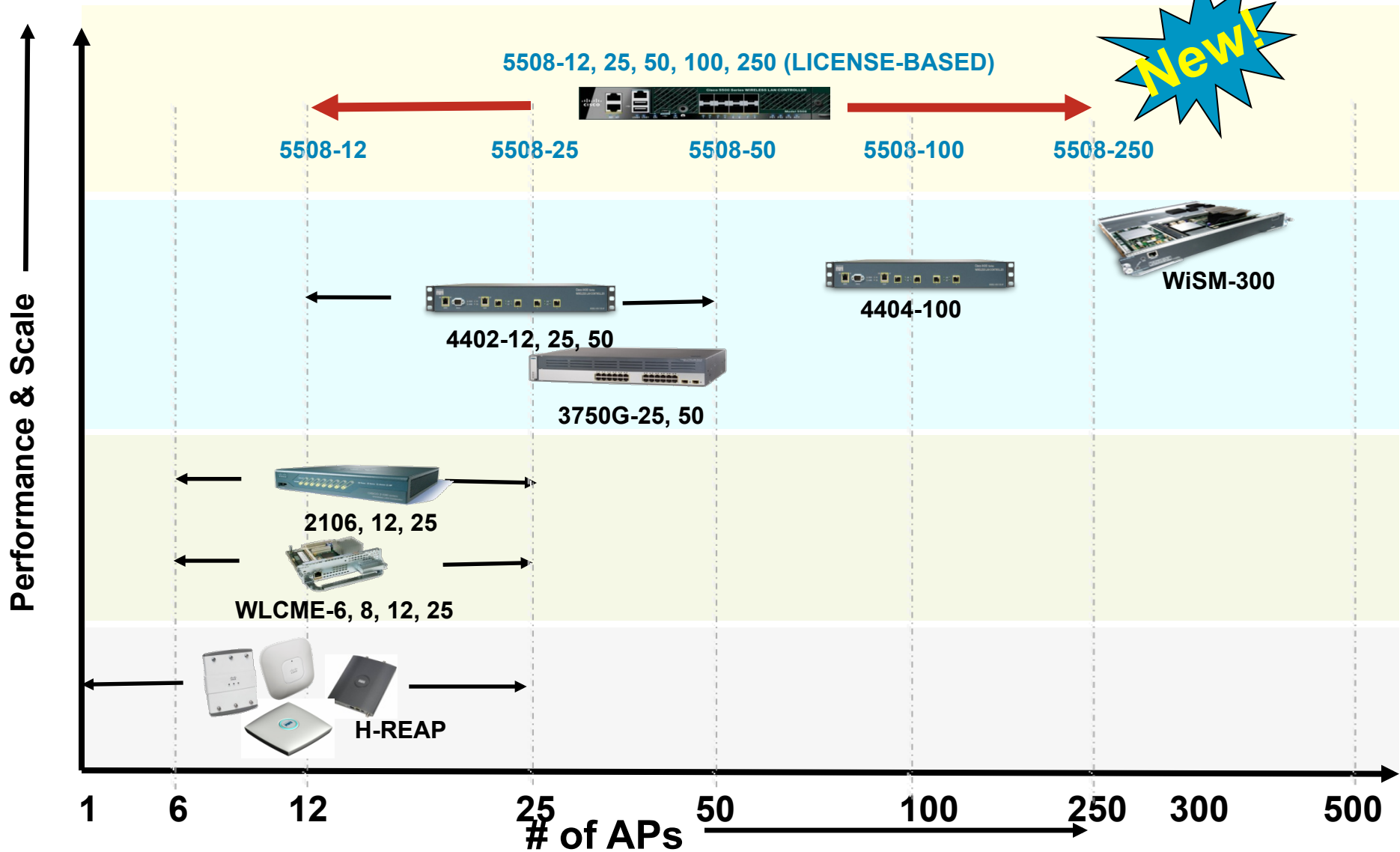
- Enterprise scalability and reliability
- Real-time RF Management
- Multi-layered security
- Mobility management
- Standalone and integrated options

#### Benefits

- Up to 2100 APs per Cat 6K chassis
- Cost-effective solution for main, branch, and remote campuses as well as SMB
- Ideal for data, voice, and video
- Wired and wireless integration

# Cisco Wireless Controller Portfolio

*Most Widely Deployed Controllers in the Industry*



# Agenda

Architecture overview

Next-Gen Access Points

Next-Gen Controllers

**New Features/Functions**

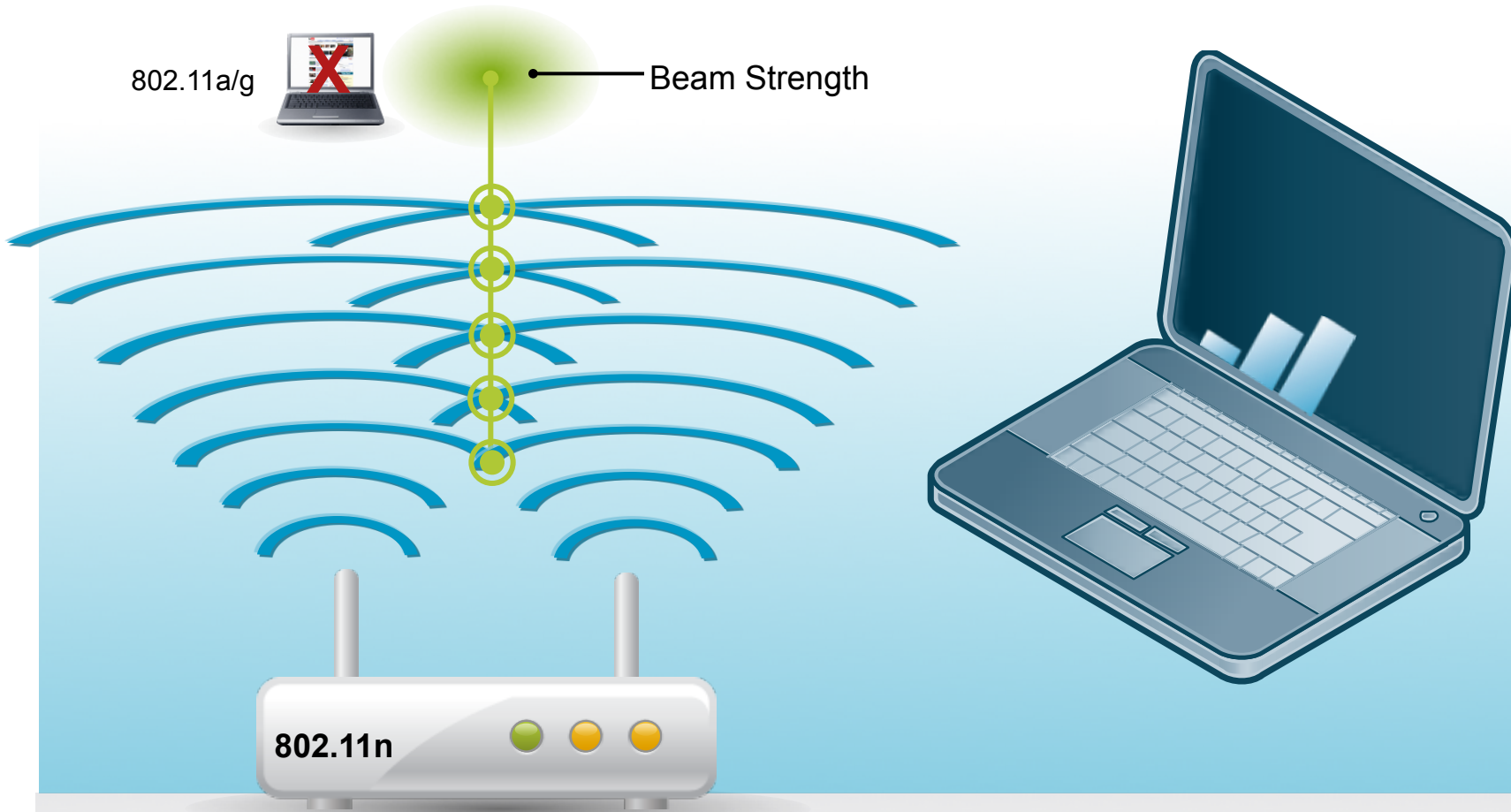
Cisco WCS

Q&A



# Existing 802.11n Solutions

## Beam Strength Not Directed to Client

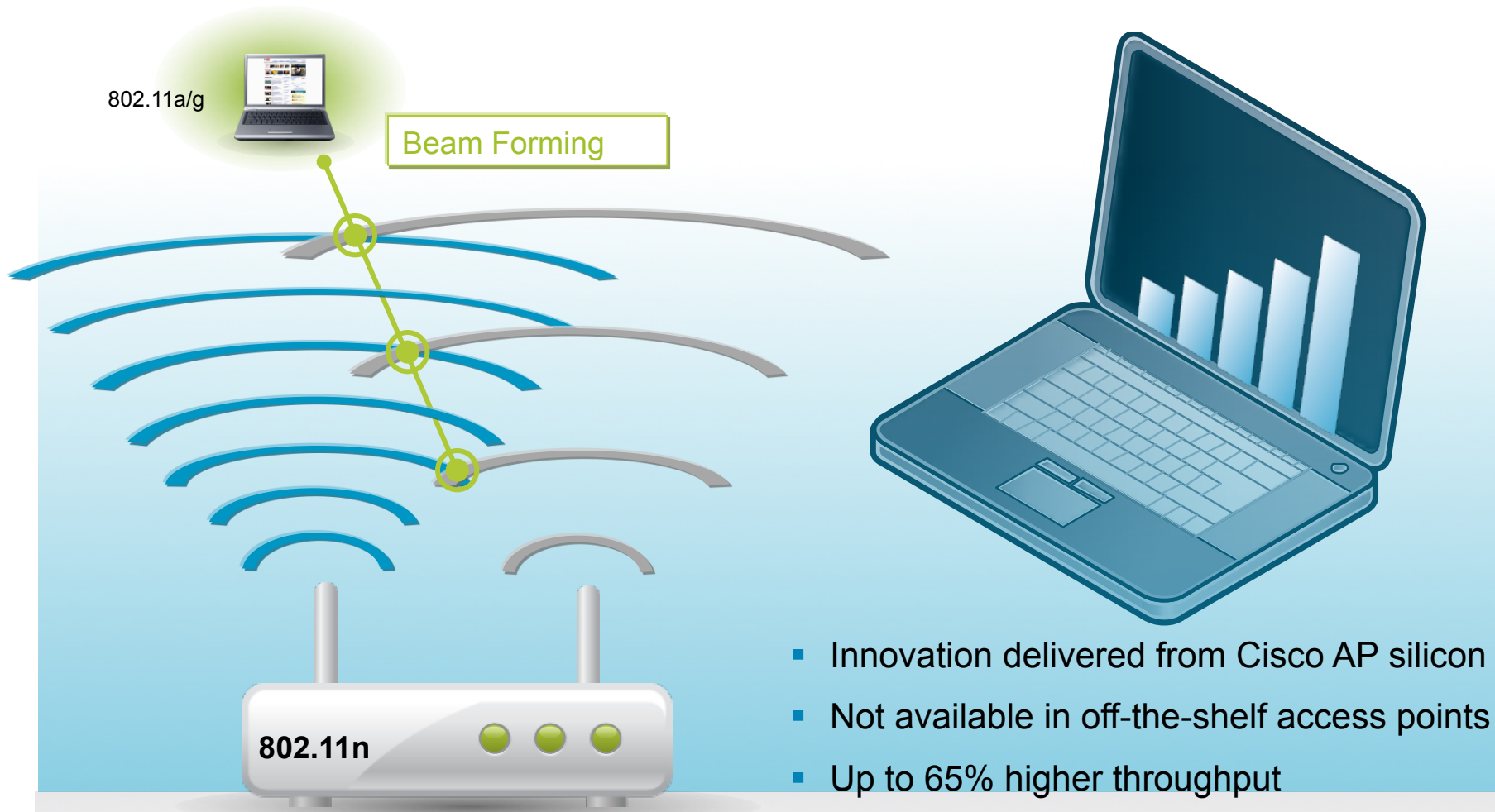


802.11a/g Client Connection Not Optimized,  
Creates Coverage Hole



# Cisco M-Drive with ClientLink

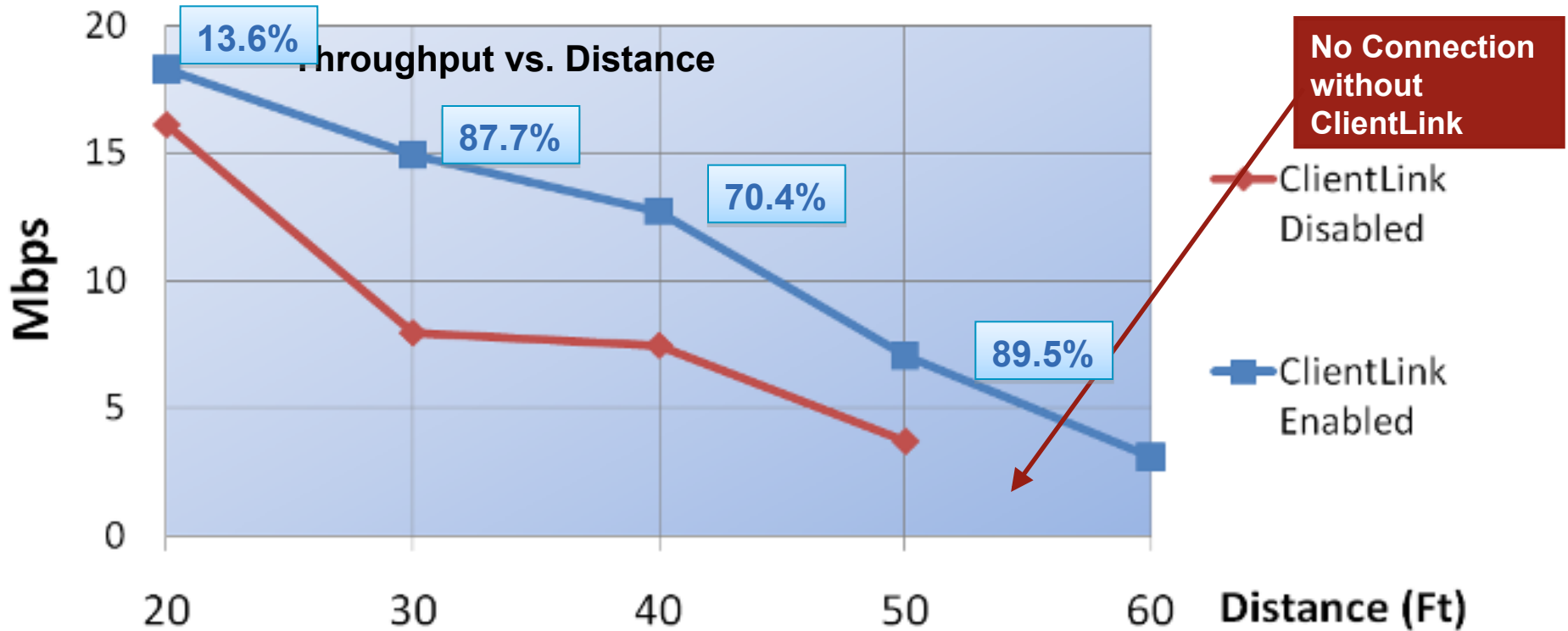
## Cisco Innovation: Beam Forming Intelligence



ClientLink uses Beam Forming to Direct Signal to Improve Performance and Coverage for 802.11a/g Devices



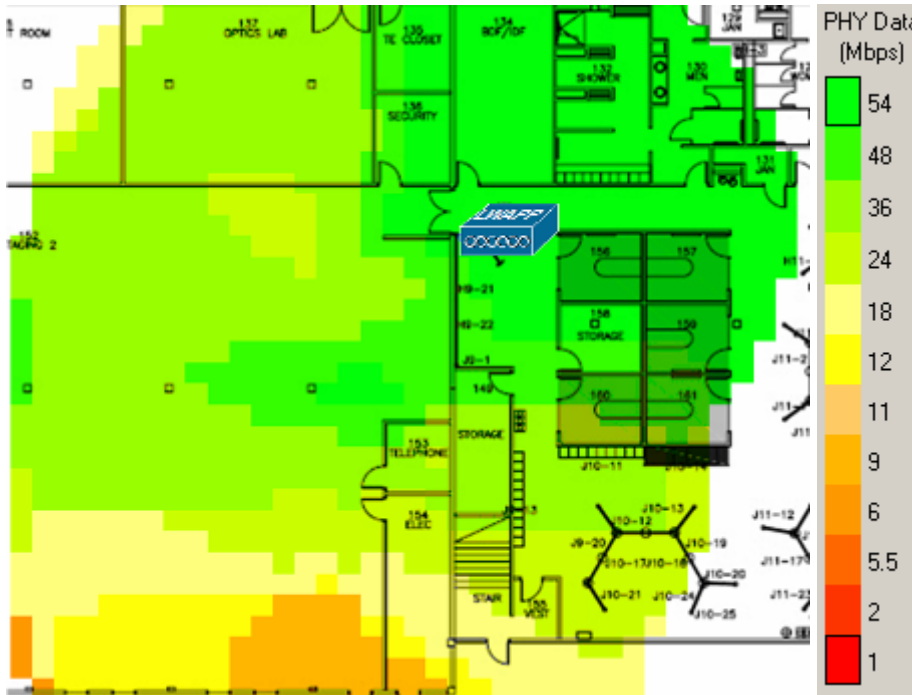
# ClientLink: Higher throughput for 11a/g devices



**Beam Forming Directs Signal to improve performance and coverage for any standards based 802.11a/g device**

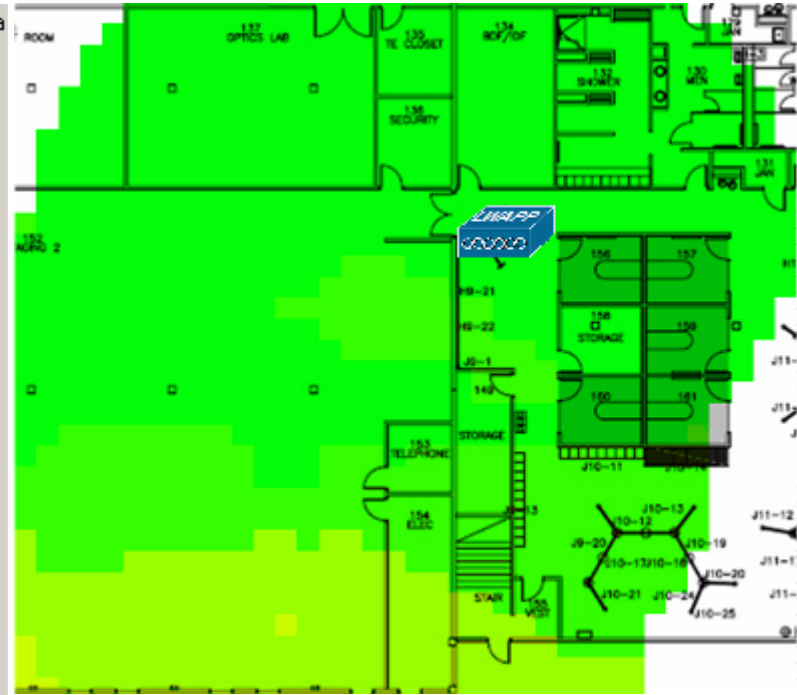
# ClientLink reduces coverage holes

## ClientLink Disabled



Lower Data Rates

## ClientLink Enabled



Higher Data Rates



Reduced coverage holes leads to better roaming experience

Increase of 27% in capacity

# OfficeExtend Solution Highlights

## OfficeExtend Solution



## Key Benefits

- Secure, convenient, cost-effective mobile teleworker solution enabling a consistent mobility experience
- Ease of deployment for IT; plug and play for end user
- 802.11n ready 1140 AP and 1130 AP supported

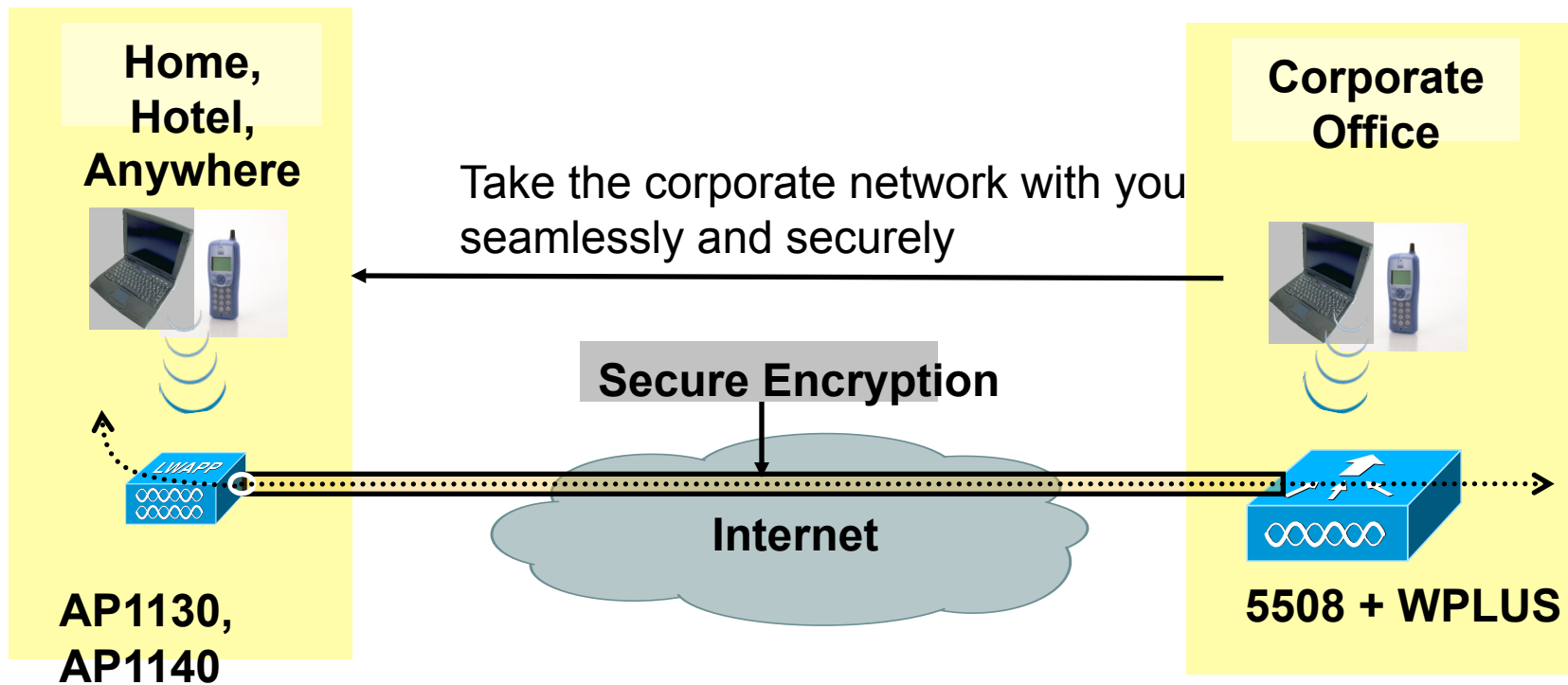
## Features

- Scalable up to 250 APs per Wireless Controller
- WCS provisioning for mass deployment
- Personal SSID for non-corporate use
- Ease of deployment with no special configuration needed on the Wireless Controller
- Encryption of data at line rate, no encryption module needed
- Supports UC wireless phones

## Solution Elements

- 5508 Wireless Controller
- 1130 AP; 1140 AP
- Management through WCS
- OfficeExtend Solution is available with the WPlus software package

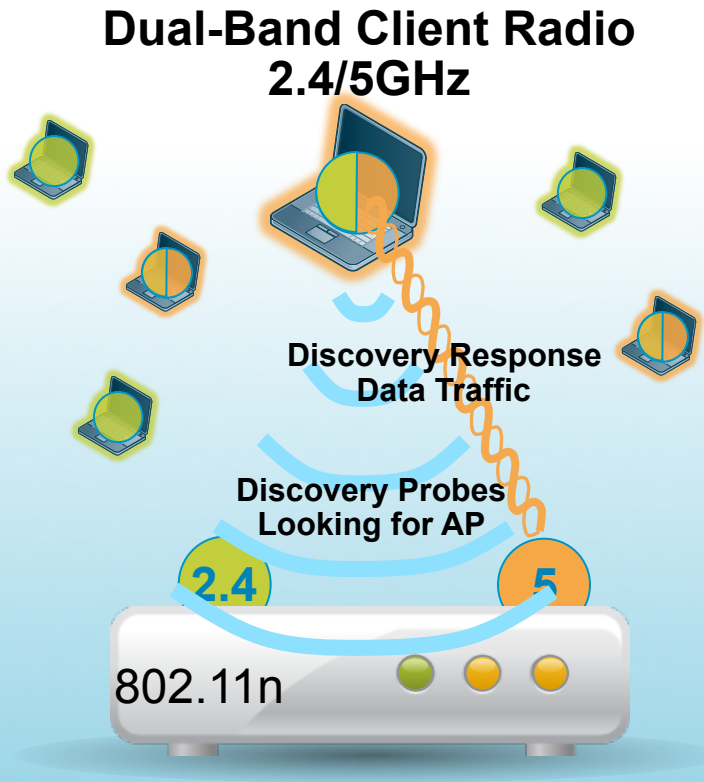
# OfficeExtend Solution



- Secure** ↔ Secure DTLS encryption between AP and Corporate network over the WAN
- Simple** ↔ AP can call home to automatically set up secure tunnel
- Cost Effective** ↔ Reduce costs through telecommuting, reduced cell phone charges, and lower OpEx

# BandSelect

## Access Point Assisted 5 GHz Band Selection



Many dual-band clients connect to 2.4GHz

BandSelect assists dual-band clients to select higher capacity 5 GHz band

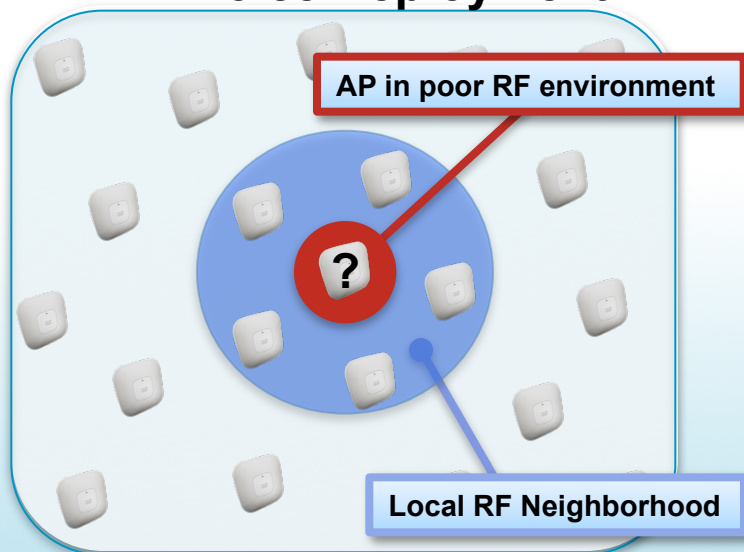
**Benefit: Optimizes RF usage**

- Better use of the 5 GHz band
- Frees up 2.4 GHz for single band clients
- Supported on Aironet 1140 and 1250 Series

**Optimized RF utilization by moving 5 GHz capable clients out of the congested 2.4 GHz channels**

# Localized RF Neighborhoods

## Voice Deployment



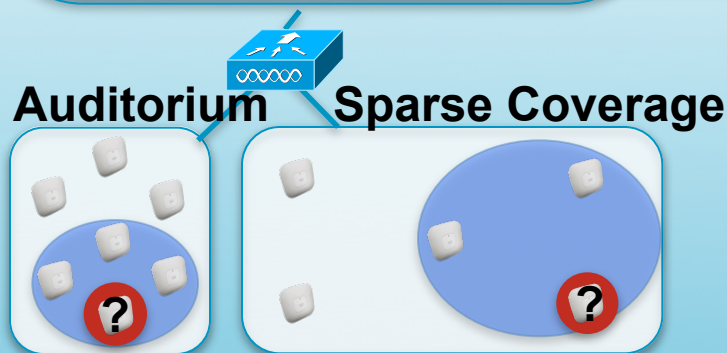
Large wireless networks with diverse AP deployments require sophisticated channel and power tuning

RRM utilizes advanced logic to evaluate an AP's local RF neighborhood to determine the best channel and power settings for the specific area

Changes are made locally to the RF neighborhood

**Benefit: Optimizes RF coverage & capacity**

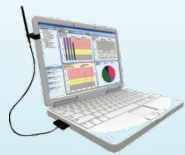
- Adapts to a variety of RF environments
- No complex configuration required
- Minimizes service disruptions
- Faster channel plan convergence



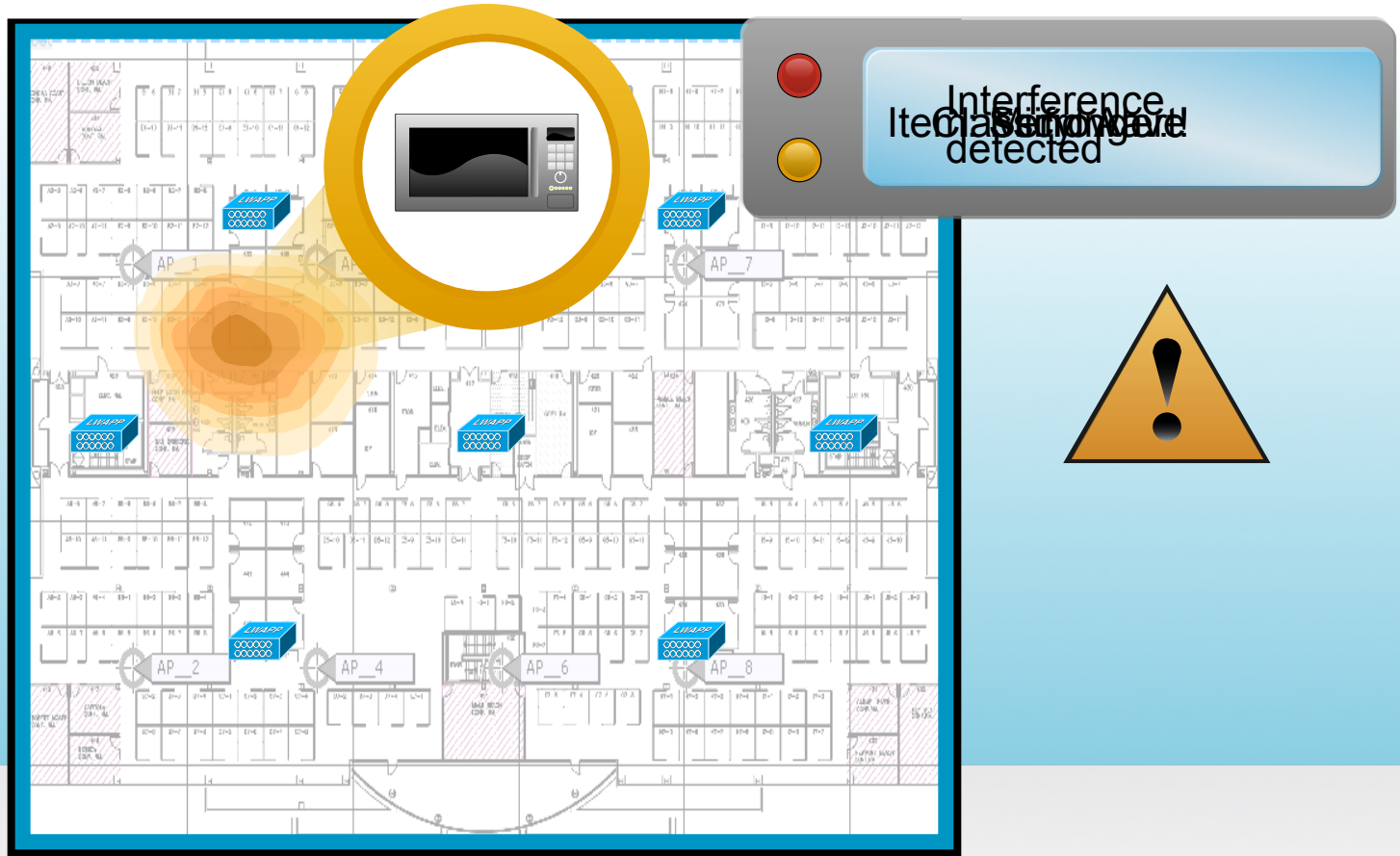
**Automated coverage and capacity optimization for a variety of RF environments and AP deployment densities**

# Detect and Mitigate RF Interference

## Cisco M-Drive Technology



Spectrum Expert



Comprehensive Detection of Microwaves, Bluetooth, Cordless Phones, Wireless Cameras, RF Jammers, etc



# Agenda

Architecture overview

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New Features/Functions

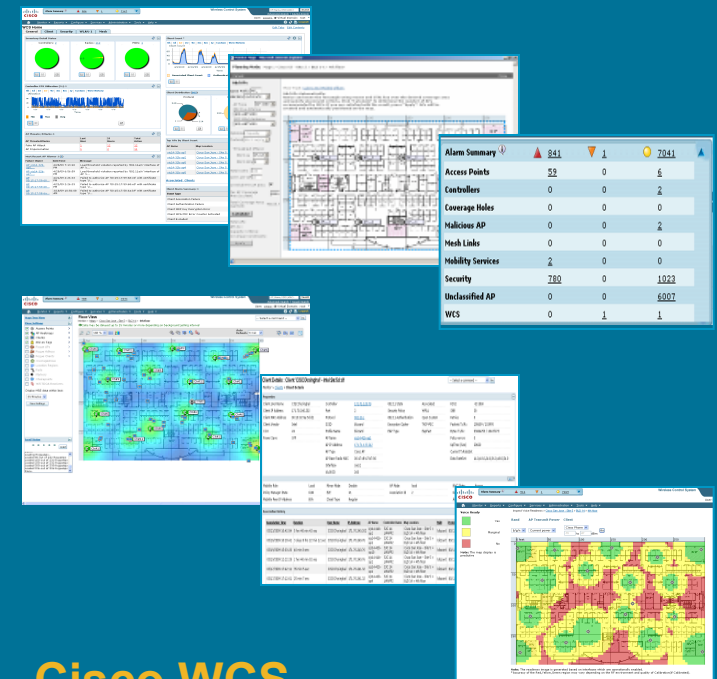
**Cisco WCS**

Q&A



# Cisco Wireless Control System (WCS)

## Comprehensive WLAN Lifecycle Management



### Cisco WCS

- Complete visibility and control of the RF environment
- Comprehensive lifecycle management in a single centralized platform
- Easy trending, capacity planning and troubleshooting
- Lower OPEX and CAPEX

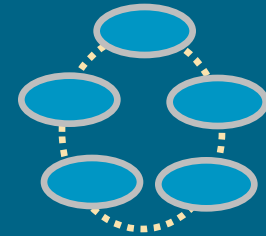
# Release 6.0 Update

## New Flexible Easy-to-Use Interface

### Usability Enhancements

- New ease-of-use features:
  - Flexible, easy-to-use, fully configurable interface
  - Streamlined workflows and unified cross-links
  - Ever-present search and summary
  - Customized user-defined display
  - Breadcrumb trail navigation path
- Enhancements to all lifecycle phases

### WLAN Lifecycle Management Enhancements



### Streamlined Workflows

IP Address	Controller Name
<a href="#">171.71.128.75</a>	SJC 14 LWAPP1
<a href="#">171.71.128.78</a>	SJC 14 LWAPP2

Summary	
Monitor > Controllers > 171.71.128.75 > System > Summary	
System	
Summary	
Spanning Tree Protocol	
CLI Sessions	
DHCP Statistics	
WLANs	
Ports	
Security	
Mobility	
802.11a/n	
802.11b/g/n	

Alarms Events Total APs 18	
General	
IP Address	171.71.128.75
Name	SJC 14 LWAPP1
Type	4400
UP-Time	6 days 13 hrs 21

### Breadcrumb Trail

### Settings

Configure > [Controllers](#) > [171.71.128.75](#) > Properties > **Settings**

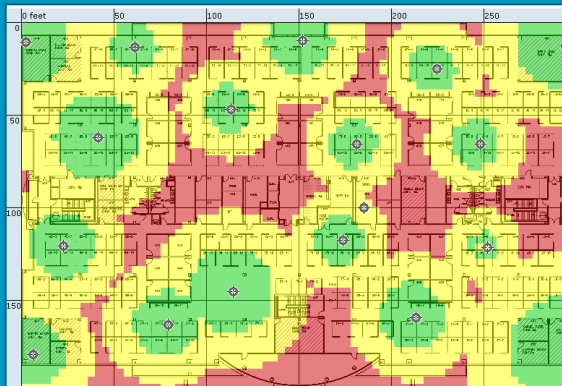
### Benefits

- Greater flexibility in structuring and displaying information
- Access to critical data and performance of operational activities is quicker and more streamlined



# Voice and Location Readiness

## Inspect Voice Readiness



**Step 1**  
Launch Voice Readiness Tool



**Voice Ready**

	Yes
	Marginal
	No

**Note:** The map display is predictive

**Step 2**  
Perform Voice Assessment



Planning Mode: Maps > Cisco San Jose - Site 5 > BLD 14 > 4th floor

Add APs | Delete APs | Map Editor | Synchronize with Deployment | Generate Proposal

Contributing APs	Protocol	HeatMap Type	RSSI Cutoff	Resolution	RSS
<input checked="" type="checkbox"/> AP_1	802.11b/g/n	Signal Strength	-75 dBm	High	-35 dBm
<input checked="" type="checkbox"/> AP_2					
<input checked="" type="checkbox"/> AP_3					

Refresh HeatMap

Click on an AP to change its position and properties. Drag the AP with the mouse and place them in required location.

**Step 3**  
Use Planning Mode to Adjust Access Point Placement

## Inspect Location Readiness



**Step 1**  
Launch Location Readiness Tool  
(Context-Aware Services)



**Location Ready**

	Yes
	No

**Note:** In a "Location Ready" region, estimated locations should be within 10 meters of corresponding true locations at least 90% of the time

**Step 2**  
Perform Location Assessment



Planning Mode: Maps > Cisco San Jose - Site 5 > BLD 14 > 4th floor

Cancel

Add APs

Name Prefix: AP\_

Add APs: Automatic

AP Type: AP 1250

Enable 11n Support:

802.11a/n Antenna: AIR-ANTS135DG

802.11b/g/n Antenna: AIR-ANT2422DG

Protocol: 802.11a/n

Throughput (Mbps): 10-12

802.11b/g/n: 5

Services:  Advanced Options  Data/Coverage

Floor Type: Cubes And Walled Offices

Add APs Automatically: Resize and move the rectangle using mouse and specify placement criteria. Click "Calculate" recommended by WCS. If you are satisfied with created and automatically positioned on the map.

**Step 3**  
Use Planning Mode to Adjust Access Point Placement



# Deployment

## Flexible Configuration Templates Streamline Operations

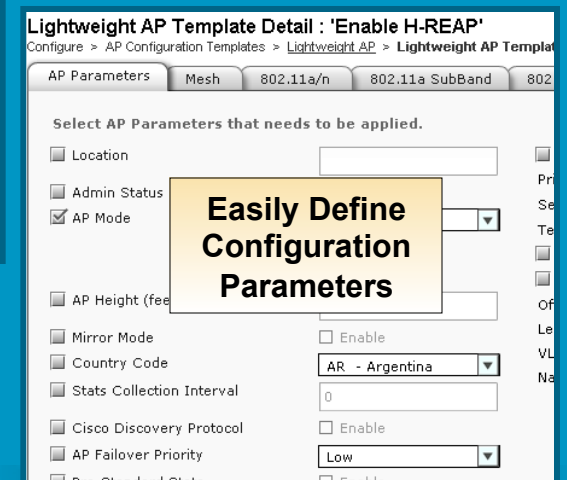
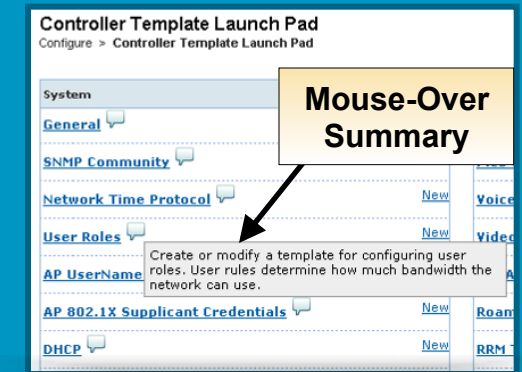
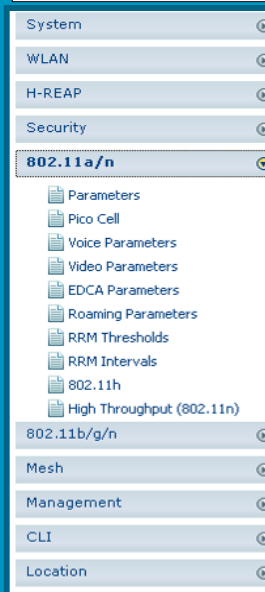
### Industry's Broadest Array of Integrated Configuration Templates

- Apply common configurations across one or more controllers and access points
  - Streamline day-to-day operations and specialized configuration requirements
- Rules-based access control and partitioning
  - Service Provider centralized management of multiple customer WLANs
- Standalone access point monitoring and migration
- Google Earth integration
- Secure guest access

### Benefits

- Fast creation and maintenance of configurations for wireless LAN controllers, access points, and MSE
- Easily segment wireless LAN for enhanced control
- Single management platform for configuration and monitoring of standalone and lightweight access points

### Customizable Templates



# Guest Access Provisioning

## Customized Guest User Profiles

The screenshot displays the Cisco Guest Access Provisioning web interface. On the left, a list of guest users is shown, with 'David Stiff' highlighted and a red box around it. A red arrow points from this box to the 'Controller Template 'David Stiff'' configuration page. The configuration page has two tabs: 'General' and 'Advanced'. The 'General' tab is active, showing fields for Profile (None), User Role (default), Life Time (Limited), End Time (7 Hours, 0 Minutes, 10/02/2009), Apply to (Indoor Area), Campus (Cisco S1 - Site 5), Building (BLD 14), and Floor (All Floors). Below the configuration fields are 'Save', 'Delete', and 'Cancel' buttons. At the bottom, there is an 'Account Expiry' section with a note: '\* This Guest User is currently not active on any controller(s).'

## Secure Access for Provisioning Personnel

- Quick setup of guest users
- Individual or bulk provisioning
- Easy parameter management:
  - Start and end time
  - Apply access to a defined area or controllers
  - Bandwidth usage
  - Customized terms and conditions
- LDAP Web authentication support
- Unified wired and wireless guest access



# AAA Options and Configuration Audit

## AAA Options

**Controller Template 'Server 1'**  
 Configure > Controller\_Template\_Launch\_Pad > Security > TACACS+ Servers > Controller Template 'Server 1'

General

Template Name: Server 1

Server Type: Authentication

Server Address: 10.101.10.102

Port Number: 49

Shared Secret Format: ASCII

Shared Secret: \*\*\*\*

Confirm Shared Secret: \*\*\*\*

Admin Status:  Enable

Retransmit Timeout: 5 (secs)

Buttons: Save, Apply to Controllers..., Delete, Cancel



Local  
Radius  
TACACS+

Radius and TACACS+ for  
WCS User and Group  
Custom Privilege Levels

**All Groups**  
Administration > AAA > All Groups

Group Name
<a href="#">Admin</a>
<a href="#">ConfigManagers</a>
<a href="#">System Monitoring</a>
<a href="#">Users Assistant</a>
<a href="#">LobbyAmbassador</a>
<a href="#">Monitor Lite</a>
<a href="#">North Bound API</a>
<a href="#">SuperUsers</a>
<a href="#">Root</a>
<a href="#">User Defined 1</a>

## AAA User Authentication

- Authenticate WCS users via local, Radius, TACACS+
- Assign users to groups
- Supports custom group attributes

## Configuration Audit

**Tools > Config Audit Summary Page**

Summary	Count
Total Enforced Config Groups	0
Total Mismatched Controllers	2
Total Config Audit Alarms	2

**Audit Status**

[Mismatch](#)

[Mismatch](#)

**Controllers**  
Configure > Controllers

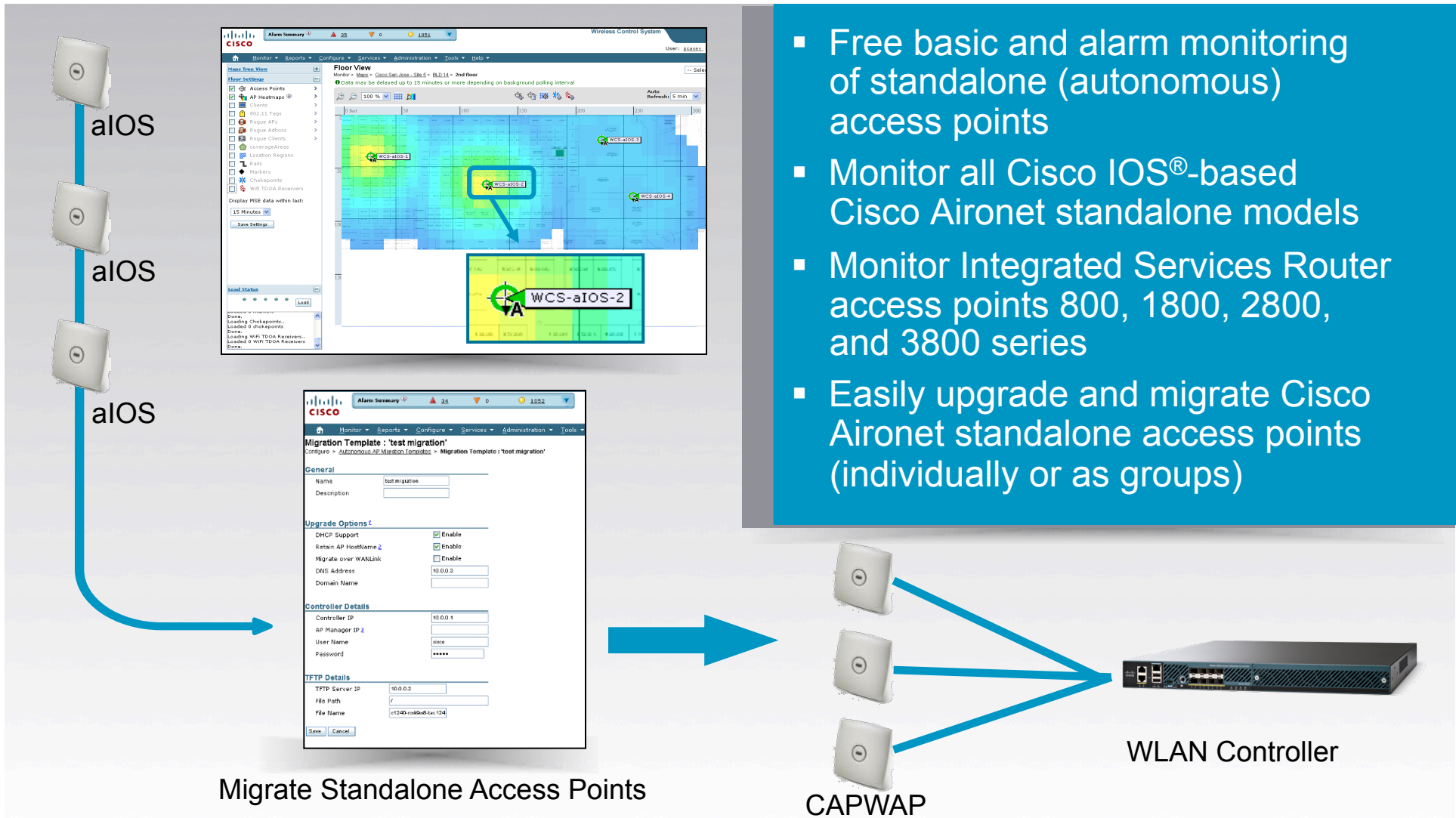
Entries 1 - 2 of 2

<input type="checkbox"/>	IP Address	Controller Name	Audit Status
<input type="checkbox"/>	<a href="#">171.71.128.75</a>	SJC 14 LWAPP1	<a href="#">Mismatch</a>
<input type="checkbox"/>	<a href="#">171.71.128.78</a>	SJC 14 LWAPP2	<a href="#">Mismatch</a>

## Configuration Audit

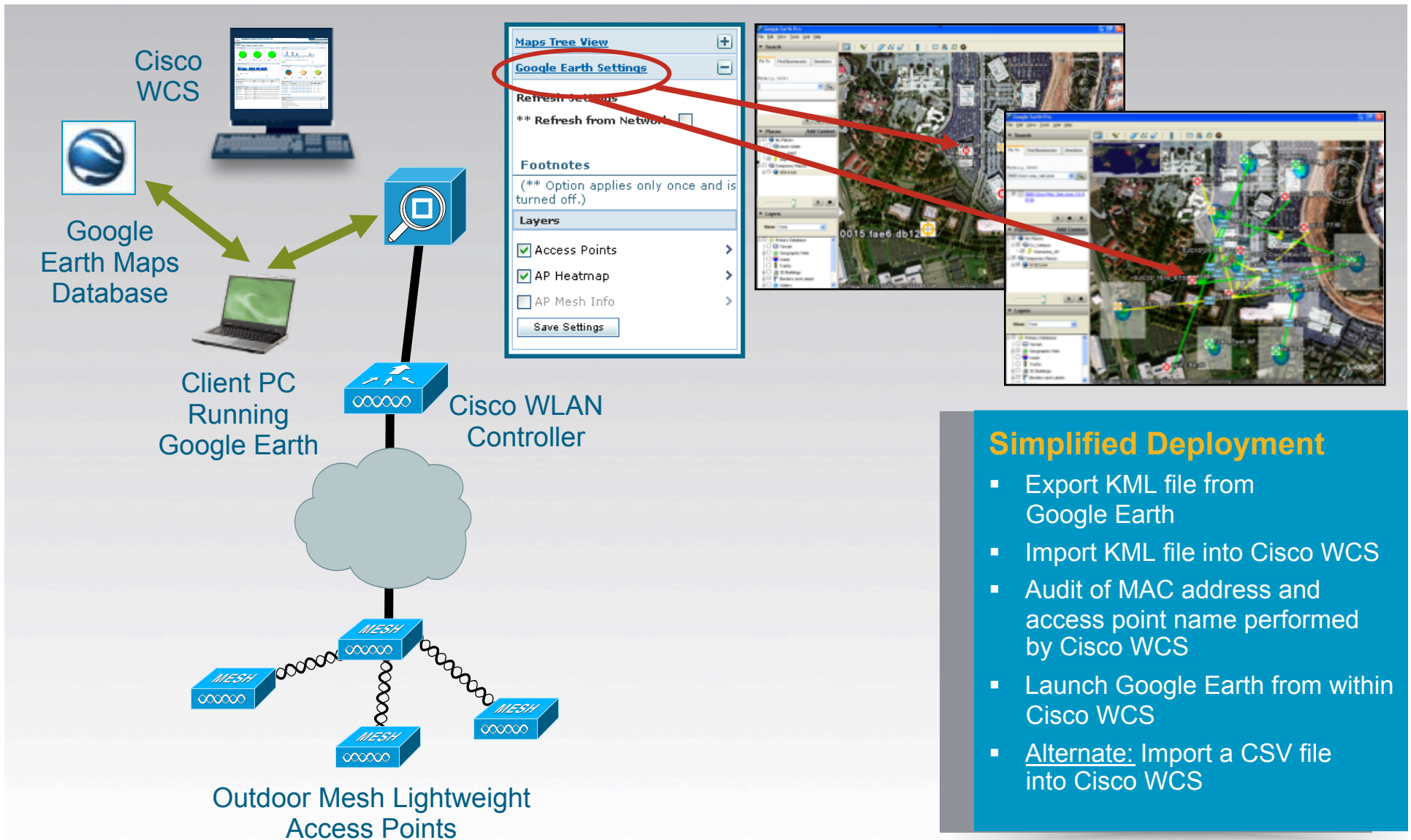
- Audit configuration on WLAN controller vs. Cisco WCS template
- Daily checks and reporting
- Detail list of variances

# Standalone Access Point Monitoring and Migration



# Google Earth Integration

## Outdoor Wireless Mesh



### Simplified Deployment

- Export KML file from Google Earth
- Import KML file into Cisco WCS
- Audit of MAC address and access point name performed by Cisco WCS
- Launch Google Earth from within Cisco WCS
- Alternate: Import a CSV file into Cisco WCS

# Monitoring

## Easy-to-Use Graphical Interface Improves IT Productivity

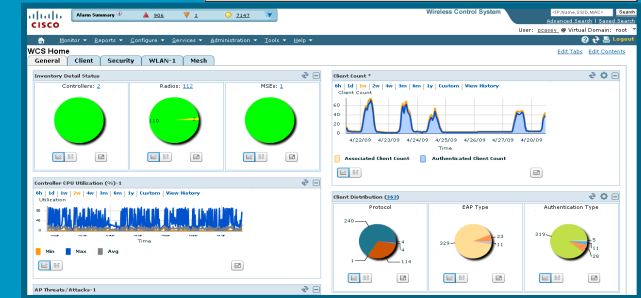
Quickly Access the Information You Need — When You Need It

- Monitoring is seamlessly interconnected with all lifecycle phases
- Customizable and modularized displays
  - Flexibly display only the most relevant user-defined information
  - Interactive graphs, charts, and tables support quick configuration and reconfiguration
  - Click-through to device-specific information
- Ever-present alarm summary and search tool
- Workflow cross links to actionable data about healthy and unhealthy network events

### Benefits

- Quick assessment of network conditions, coverage, status, alarms, and faults
- Reduced IT training costs and operating expenses through simplified ease of use

### Customizable Dashboard



### Alarm Summary

Alarm Summary	841	1	7041
Access Points	59	0	6
Controllers	0	0	2
Coverage Holes	0	0	0
Malicious AP	0	0	2
Mesh Links	0	0	0
Mobility Services	2	0	0
Security	780	0	1023
Unclassified AP	0	0	6007
WCS	0	1	1

### Color-Coded Icons

- Access Points
- AP Heatmaps
- Clients
- 802.11 Tags
- Rogue APs
- Rogue Adhocs
- Rogue Clients
- coverageAreas
- Location Regions
- Rails
- Markers
- Chokepoints
- Wifi TDOA Receivers

### Cross-Network Searches

<IP,Name,SSID,MAC>

Advanced Search | Saved Search

New Search

Search Category:

Search for controller by:

Select a network:

Audit Status:

Items per page:

Save Search:

# Easily Monitor Each Location

The screenshot shows the Cisco Wireless Control System (WCS) interface. On the left, there is a navigation pane with a 'Maps Tree View' and 'Floor Settings' section. The main area displays a floor plan with a heat map overlay and several access point icons labeled 'Ch#1', 'Ch#6', and 'Ch#11'. A search bar at the top right contains the text '<IP,Name,SSID,MAC>' and a 'Search' button. A dropdown menu is open on the right side, listing various tools like 'Add Access Points...', 'Position APs...', 'Remove Access Points...', etc. An 'Alarm Summary' window is open in the top left, showing a table of metrics.

Category	Value 1	Value 2	Value 3
Alarm Summary	935	1	7330
Access Points	6	0	2
Controllers	0	0	2
Coverage Holes	0	0	0
Malicious AP	0	0	2
Mesh Links	0	0	0
Mobility Services	3	0	2
Security	926	0	1071
Unclassified AP	0	0	6250
WCS	0	1	1

**Ever-Present Alarm Summary (Expandable)**

**Ever-Present Search**

**Quick Access To Tools**

**Simplified Customization of Display**

**Heat Map of Each Location**

**Mapping Hierarchy and Icons (Expandable)**

# Cisco M-Drive

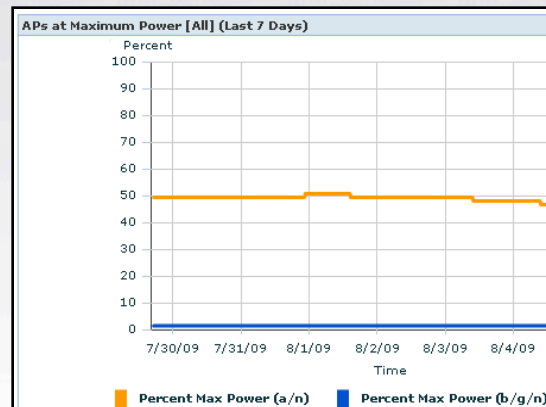
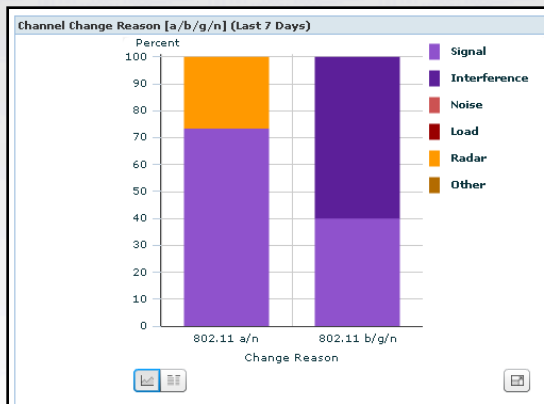
## Radio Resource Management (RRM)

**RRM**  
Monitor > RRM

**RRM Statistics (Last 24 Hours)**

Statistics	Value
Number of RF Groups	1
AP's at maximum power (a/n)	<a href="#">46.58 %</a> (34 out of 73)
AP's at maximum power (b/g/n)	<a href="#">1.37 %</a> (1 out of 73)
Total Configuration Mismatches	0

Statistics	Last 24 Hrs	Last 7 Days
Total Channel Changes	9	20
Total Coverage Hole Events	0	0



- Automated RF management
  - Access point channel assignments and output power
  - Coverage hole compensation
- RF visibility:
  - Access points at maximum power
  - Configuration mismatches
  - Channel changes
  - Channel change reason
  - Coverage hole events

### Benefits

- Quickly assess the RF environment and network health
- View steps implemented by RRM to stabilize the network
- Properly tune RRM intervals
- Reduce trouble tickets

# Security Monitoring and Status

## Customizable Security Display

**Security Index**

Score: 37.34%

Top Security Issues | [View All](#) | [Devices](#)

- MFP Client Protection is set to "Optional" for WLAN (8)
- "Client Exclusion" is disabled for the WLAN (6)
- No WLAN Key Management methods is configured (applicable only for WPA+WPA2) (4)
- SSH is enabled and timeout is set to zero on the controller (2)
- A weak encryption method (WEP 104 bits) is configured for the WLAN (2)

Footnotes:  
Security index is calculated as part of 'Configuration Sync' background task.  
Last execution time: Sun May 10 08:01:10 GMT 2009

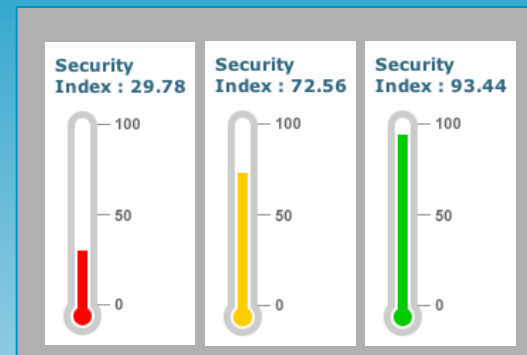
Malicious Rogue APs			
Malicious Rogue APs	Last Hour	24 Hours	Total Active
Alert	2	2	2

Unclassified Rogue APs			
Unclassified Rogue APs	Last Hour	24 Hours	Total Active
Alert	6968	6968	6249

Friendly Rogue APs			
Friendly Rogue APs	Last Hour	24 Hours	Total Active
Internal	15	15	15

Adhoc Rogues			
Adhoc Rogues	Last Hour	24 Hours	Total Active
Alert	98	98	6

## Security Index Provides Quick Assessment



## Easily Address Rogue Devices

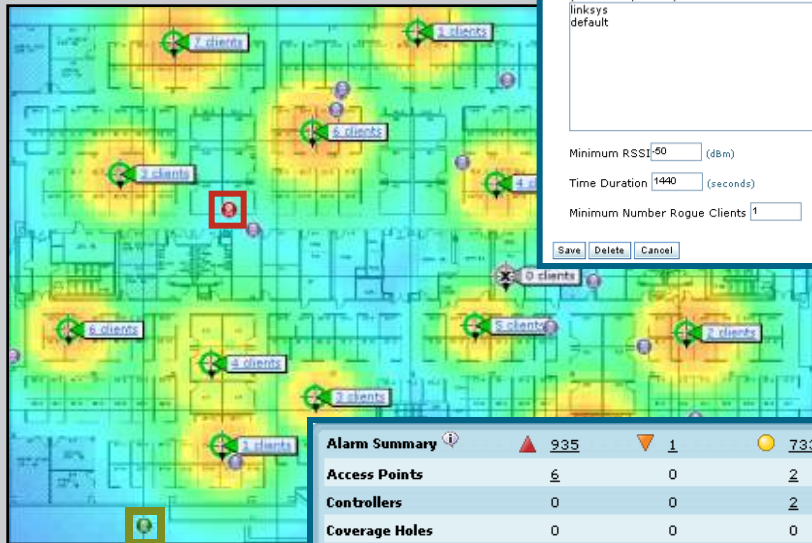
<input type="checkbox"/>	Severity	Failure Source	Owner	Date/Time	Message
<input type="checkbox"/>	▲	<a href="#">AP 00:21:5a:a8:a9:84</a>		2/25/09 1:06:39 PM	Failed to auth
<input type="checkbox"/>	●	<a href="#">Rogue AP 00:1d:e6:24:3b:c2</a>		8/3/09 8:40:09 PM	Rogue AP '00:



# Rules-Based Rogue Management

Legend:

-  Malicious (Threat or Alert)
-  Known Friendly
-  Unknown



### Wireless LAN Controller Template

Controller Template 'BadAPs'

Configure > Controller Template Launch Pad > Security > Rogue AP Rule

**General**

Rule Name: BadAPs  
 Rule Type: Malicious  
 Match Type: Match Any Condition

**Malicious Rogue Classification Rule**

Open Authentication:   
 Match Managed AP SSID:   
 Match User Configured SSID (Enter one per line): linksys default

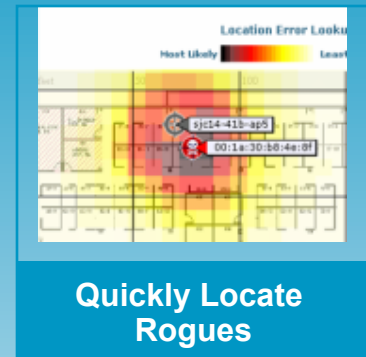
Minimum RSSI: 50 (dbm)   
 Time Duration: 1440 (seconds)   
 Minimum Number Rogue Clients: 1

Save Delete Cancel




Alarm Summary	▲ 935	▼ 1	● 7330
Access Points	6	0	2
Controllers	0	0	2
Coverage Holes	0	0	0
Malicious AP	0	0	2
Mesh Links	0	0	0
Mobility Services	3	0	2
Security	926	0	1071
Unclassified AP	0	0	6250
WCS	0	1	1

## Automatically Classify Rogues as: Malicious or Friendly

- Open
- Managed SSID
- Any SSID
- Minimum RSSI
- Time duration
- Number of rogue clients



## Auto Detect Threat, Alert or Fault State Using RLDP or Rogue Detector

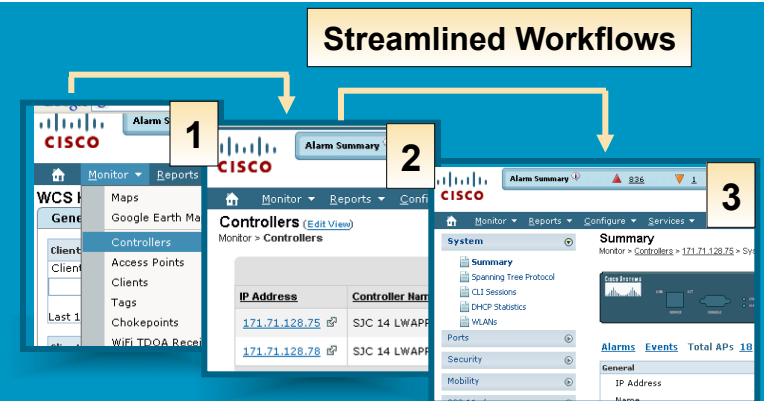
-  Threat—Requires Attention **Now**
-  Alert—Put It in the Queue
-  Fault—Put It in the Queue

# Troubleshooting

## Dynamic Resources Aid Effective Troubleshooting

### Identify, Isolate, and Resolve Problems Across All WLAN Components

- Workflows support seamless linkage between all tools, alarms, alerts, searches, and reports
- Built-in client and infrastructure tools support:
  - Quick assessment of service disruptions
  - Receipt of notices about performance degradation
  - Streamlined research and quick action for resolution
- RF troubleshooting with Cisco M-Drive technology, Cisco CleanAir, and Client Link



#### Client Mobility

Entries 1 - 10 of 10

**Roam Reason**

New association detected

Disassociation detected

#### Client Troubleshooting Tool

Monitor > Clients

Show: Associated Clients

Client User Name	Client IP Address	Client MAC Address
znaimudd	0.0.0.0	00:1a:a1:92:b9:89

#### Access Point Connection Information

#### Access Point Details

Monitor > Access Points > SJC14-42A-IDS1

AP Name	AP IP Address	Port No.	Neighbor Name
SJC14-42A-IDS1	10.32.37.222	4	sjc14-42a-sw2.cisco.com

Neighbor Address	Neighbor Port	Duplex	Interface Speed
10.32.17.155	FastEthernet1/0/2	Full Duplex	100 Mbps

#### Benefits

- More clearly understand underlying operational nuances occurring in the wireless network
- Quickly discover events occurring outside baseline parameters
- Efficiently assess and reestablish optimal network performance

# Asset Tracking

## Lost and Stolen Devices

Find Assets

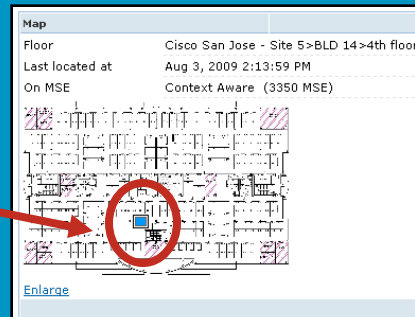
00:1b:77:a2:bb:64 Search  
Advanced Search | Saved Search

Clients (Edit View)  
Monitor > Clients

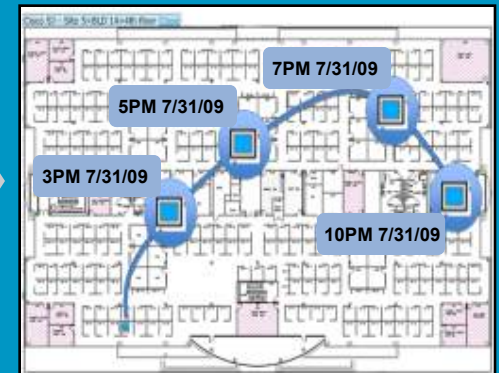
Show: ---Select client filter---

Client User Name	Client MAC Address	Client IP Address	Vendor Name	CCX	AP Name	Con
CISCO\jvathomp	00:1b:77:a2:bb:64	171.70.243.105	Intel	V4	sic1d-11b-ap4	SJC

**Step 1**  
MAC Address Search and Find



**Step 2**  
Locate Device on Network



**Step 3**  
Location History

Monitoring and Alerts

Event Definition 'Missing Laptop'  
Services > Context Aware Notifications > Notification Settings > Event Settings > Stolen Device Tracking > Missing Laptop

Add/Edit Condition

Condition Type Missing

Trigger If Missing for Time (mins) 60

Apply To Clients

Match By Asset Name Equals Bob's Laptop

Add Cancel

**Step 1**  
Set Up Monitoring



**Step 2**  
Alert Sent (Trap, E-Mail, Syslog)

# Client and Voice Troubleshooting

**Client Troubleshooting**

**Step 1**  
Client Search

**Step 2**  
Location and Connection Troubleshooting

**Step 3**  
RF Interference Analysis

**Voice Auditing**

**Step 1**  
Voice Deployment Readiness

**Step 2**  
Voice Configuration Audit

Audit Status	Start Time	End Time	#Total Devices	#Completed Devices	#Rules
Complete	7/22/09 9:39 AM	7/22/09 9:39 AM	1	1	16

IP Address	Rule	Result	Details
171.71.128.78	VoWLAN SSID	Skipped	Rule skipped since it was invalid
171.71.128.78	CAC: 7920 AP	Skipped	Rule skipped since it was invalid
171.71.128.78	CAC: 7920 Client	Skipped	Rule skipped since it was invalid
171.71.128.78	DHCP Assignment	Skipped	Rule skipped since it was invalid
171.71.128.78	MFP Client	Skipped	Rule skipped since it was invalid
171.71.128.78	Platinum QoS	Skipped	Rule skipped since it was invalid
171.71.128.78	Non Platinum QoS	Skipped	Rule skipped since it was invalid
171.71.128.78	WMM	Skipped	Rule skipped since it was invalid
171.71.128.78	CCKM	Skipped	Rule skipped since it was invalid
171.71.128.78	TSM	Skipped	Rule skipped since it was invalid
171.71.128.78	ACM	Skipped	Rule skipped since it was invalid

# Reporting

## Flexible Reports Meet Any Requirement

### More Effectively Manage, Maintain, and Evolve Your Wireless LAN

- Generate reports from the Report Launch Pad
  - Reports for network activity, performance, usage, devices, inventory, compliance and security
  - Real-time and historic assessments
  - Options for charts, graphs, and tables
  - Run reports individually or in user-defined groups
  - Output to CSV, PDF, or email (on demand/scheduled)
- Simplified capacity planning for future growth
  - Trend data from several reports

### Benefits

- Quickly address network trends and changing business or end user requirements
- Reduce or eliminate the need to manually gather critical WLAN information
- Improve operational productivity with preconfigured and customized reporting

**Customizable Templates**

- Client
- Compliance
- Device
  - AP Profile Status
  - Busiest APs
  - Device Summary
  - Inventory
  - Up Time
  - Utilization
- Guest
- Mesh
- Network Summary
- Performance
- Security

**Report Launch Pad**

Client: [Dropdown]

- Busiest Clients [New]
- Client Count [New]
- Client Sessions [New]
- Client Summary [New]
- Client Traffic Stream Metrics [New]
- Throughput [New]
- Unique Clients [New]
- vs Client Statistics [New]
- Compliance
- Configuration Audit [New]
- PCI [New]

**Mouse-Over Summary**

This report displays all unique clients by the time, protocol, and controller filters that you select. A unique client is determined by the MAC address of the client device. These clients are sorted by controller in this report.

### Create Customized Reports

**Create Custom Report**

Custom Report Name: Client Summary

**Available data fields**

- Client Summary
- Client Summary by Protocol
- Client Summary by SSID
- Client Summary by VLAN
- Client Summary by Vendor
- Number of Unique APs
- Number of Users per AP
- Total Session Time (Minutes)

**Data fields to include**

- Number of Sessions
- Number of Users
- Number of Unique Users
- Number of New Users
- Average Session Time (Minutes)
- Average Session Time per User (Minutes)
- Total Traffic (MB)
- Average Traffic per Session (KB)
- Average Traffic per User (KB)
- Total Throughput (Mbps)
- Average Throughput per Session (Kbps)
- Average Throughput per User (Kbps)

Blue fields are mandatory in this subreport.

**Data field sorting**

Sort by: None [Dropdown]  Ascending  Descending

Then by: None [Dropdown]  Ascending  Descending

Then by: None [Dropdown]  Ascending  Descending

Then by: None [Dropdown]  Ascending  Descending

Only reports in tabular format can be sorted.  
Fields that cannot be sorted do not appear in the sorting menus.

Apply Reset Cancel



**CISCO**

**Thank You!**