



CHAPTER 1

Overview

This chapter describes the Cisco Unified Wireless Network Solution and the Cisco Wireless Control System (WCS). It contains these sections:

- [Overview of the Cisco Unified Wireless Network Solution, page 1-1](#)
- [Overview of WCS, page 1-2](#)
- [WCS Versions, page 1-3](#)
- [Embedded Access Points, page 1-6](#)
- [WCS User Interface, page 1-6](#)
- [Cisco WCS Navigator, page 1-7](#)

Overview of the Cisco Unified Wireless Network Solution

The Cisco Unified Wireless Network solution is designed to provide 802.11 wireless networking solutions for enterprises and service providers. It simplifies the deployment and management of large-scale wireless LANs and enables a unique best-in-class security infrastructure. The operating system manages all data client, communications, and system administration functions, performs radio resource management (RRM) functions, manages system-wide mobility policies using the operating system security solution, and coordinates all security functions using the operating system security framework.

The Cisco Unified Wireless Network Solution consists of Cisco Unified Wireless Network Controllers (hereafter called *controllers*) and their associated lightweight access points controlled by the operating system, all concurrently managed by any or all of the operating system user interfaces:

- An HTTPS full-featured web user interface hosted by Cisco controllers can be used to configure and monitor individual controllers.
- A full-featured command line interface (CLI) can be used to configure and monitor individual controllers.
- The Cisco Wireless Control System (WCS) can be used to configure and monitor one or more controllers and associated access points. WCS has tools to facilitate large-system monitoring and control. It runs on Windows 2003 and Red Hat Enterprise Linux ES/AS 4 servers.
- An industry-standard SNMP V1, V2c, and V3 interface can be used with any SNMP-compliant third-party network management system.

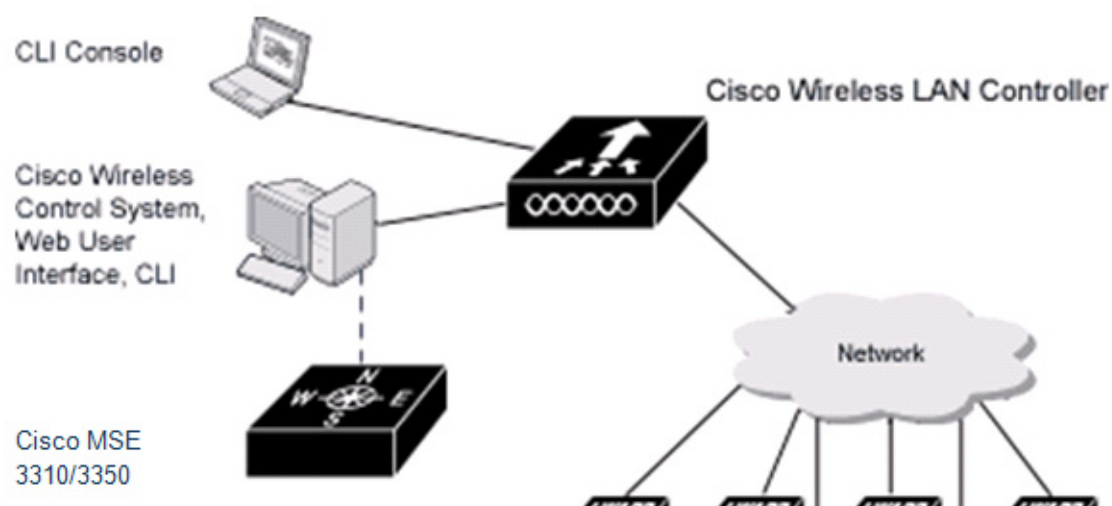
The Cisco Unified Wireless Network Solution supports client data services, client monitoring and control, and all rogue access point detection, monitoring, and containment functions. It uses lightweight access points, controllers, and the optional WCS to provide wireless services to enterprises and service providers.

**Note**

This document refers to controllers throughout. Unless specified otherwise, the descriptions herein apply to all Cisco Unified Wireless Network Controllers, including but not limited to Cisco 2000 and 2100 Series Unified Wireless Network Controllers, Cisco 4100 Series Unified Wireless Network Controllers, Cisco 4400 Series Unified Wireless Network Controllers, and controllers within the Cisco Wireless Services Module (WiSM) and Cisco 26/28/37/38.xx Series Integrated Services Routers.

Figure 1-1 shows the Cisco Unified Wireless Network Solution components, which can be simultaneously deployed across multiple floors and buildings.

Figure 1-1 Cisco Unified Wireless Network Solution



Overview of WCS

The Cisco Wireless Control System (WCS) is a Cisco Unified Wireless Network Solution management tool that adds to the capabilities of the web user interface and command line interface (CLI), moving from individual controllers to a network of controllers. WCS includes the same configuration, performance monitoring, security, fault management, and accounting options used at the controller level and adds a graphical view of multiple controllers and managed access points.

WCS runs on Windows 2003 and Red Hat Enterprise Linux ES 5.1. On both Windows and Linux, WCS can run as a normal application or as a service, which runs continuously and resumes running after a reboot.

The WCS user interface enables operators to control all permitted Cisco Unified Wireless Network Solution configuration, monitoring, and control functions through Internet Explorer 6.0 or later. Operator permissions are defined by the administrator using the WCS user interface Administration menu, which enables the administrator to manage user accounts and schedule periodic maintenance tasks.

WCS simplifies controller configuration and monitoring while reducing data entry errors. WCS uses the industry-standard SNMP protocol to communicate with the controllers.

WCS Versions

You can install WCS with one of two capabilities: WCS Base or WCS Location. Regardless of whether you choose WCS Base or WCS Location, a license is required.

WCS Base

The WCS Base supports wireless client data access, rogue access point, and rogue ad hoc detection and containment functions (such as on-demand location of rogue access points that are mapped next to the detecting access point), and Cisco UWN Solution monitoring and control.

It also includes graphical views of the following:

- Autodiscovery of access points as they associate with controllers
- Autodiscovery and containment or notification of rogue access points
- Map-based organization of access point coverage areas, which is helpful when the enterprise spans more than one geographical area
- Rogue ad hoc
- User-supplied campus, building, and floor plan graphics, which show the following:
 - Locations and status of managed access points
 - Locations of rogue access points based on the signal strength received by the nearest managed Cisco access points
 - Coverage hole alarm information for access points based on the received signal strength from clients. This information appears in a tabular rather than map format.
 - RF coverage maps

The WCS Base also provides system-wide control of the following:

- Streamlined network, controller, and managed access point configuration using customer-defined templates
- Network, controller, and managed access point status and alarm monitoring
- Automated and manual data client monitoring and control functions
- Automated monitoring of rogue access points, rogue ad hocs, coverage holes, security violations, controllers, and access points
- Full event logs for data clients, rogue access points, coverage holes, security violations, controllers, and access points
- Automatic channel and power level assignment by radio resource management (RRM)
- User-defined automatic controller status audits, missed trap polling, configuration backups, and policy cleanups
- Real-time location of rogue access points and rogue ad hocs to the nearest Cisco access point
- Real-time and historical location of clients to the nearest Cisco access point

WCS Base + Location

The WCS Location includes all the features of the WCS Base as well as these enhancements:

- On-demand location of rogue access points and rogue ad hocs to within 33 feet (10 meters)
- On-demand location of clients to within 33 feet (10 meters)
- Ability to use location appliances to collect and return historical location data viewable in the WCS Location user interface

Relationship with Cisco Location Appliances

When WCS Location is used, end users can also deploy Cisco 2700 Series Location Appliances. The location appliance enhances the high-accuracy built-in WCS Location capabilities by computing, collecting, and storing historical location data, which can be displayed in WCS. In this role, the location appliance acts as a server to a WCS server by collecting, storing, and passing on data from its associated controllers.

After a quick command line interface (CLI) configuration, the remaining location appliance configuration can be completed using the WCS user interface. After each location appliance is configured, it communicates directly with its associated controllers to collect operator-defined location data. The associated WCS server operators can then communicate with each location appliance to transfer and display selected data.

The location appliance can be backed up to any WCS server into an operator-defined FTP folder, and the location appliance can be restored from that server at any time and at defined intervals. Also, the location appliance database can be synchronized with the WCS server database at any time. Operators can use the location appliance features and download new application code to all associated appliances from any WCS server.

When WCS is enhanced with a location appliance, it can display historical location data for up to 2,500 laptop clients, palmtop clients, VoIP telephone clients, radio frequency identifier (RFID) asset tags, rogue access points, rogue ad hocs, and rogue clients for each location appliance in the Cisco Unified Wireless Network Solution. Operators can configure location appliances to collect this data and statistics at defined intervals.

You can also use WCS to configure location appliance event notification parameters. *Event notification* is a feature that enables you to define conditions that cause the location appliance to send notifications to the listeners whom you have specified in WCS.

In this way, WCS acts as a notification listener. It receives notifications from the location appliance in the form of the locationNotifyTrap trap as part of the bsnwras.my MIB file. WCS translates the traps into user interface alerts and displays the alerts in the following format:

Absence:

- Absence of Tag with MAC 00:0c:cc:5b:e4:1b, last seen at 16:19:45 13 Oct 2005.

Containment:

- Tag with MAC 00:0c:cc:5b:fa:44 is In the Area 'WNBU > WNBU > 4th Floor > wcsDevArea'

Distance:

- Tag with MAC 00:0c:cc:5b:fa:47 has moved beyond the distance configured for the marker 'marker2'.
- Tag with MAC 00:0c:cc:5b:f9:b9 has moved beyond 46.0 ft. of marker 'marker2', located at a range of 136.74526528595058 ft.

**Note**

Refer to the *Cisco Location Application Configuration Guide* for more detailed information about the location appliance and its use with WCS.

Comparison of WCS Base and WCS Location

Table 1-1 compares the WCS Base and WCS Location features.

Table 1-1 **WCS Base and WCS Location Features**

Features	WCS Base	WCS Location
Location and tracking		
Low-resolution client location	Yes	—
High-resolution client location	—	Yes
Integration with location appliance	—	Yes
Low-resolution rogue access point location	Yes	—
High-resolution rogue access point location	—	Yes
Client data services, security, and monitoring		
Client access via access points	Yes	Yes
Multiple wireless LANs (individual SSIDs and policies)	Yes	Yes
Rogue access point detection and containment using access points	Yes	Yes
802.11a/b/g/n bands	Yes	Yes
Radio resource management		
Real-time channel assignment and rogue access point detection and containment	Yes	Yes
Real-time interference detection and avoidance, transmit power control, channel assignment, client mobility management, client load distribution, and coverage hole detection	Yes	Yes
Automated software and configuration updates	Yes	Yes
Wireless intrusion protection	Yes	Yes
Global and individual AP security policies	Yes	Yes
Controls Cisco Unified Wireless Network Controllers	Yes	Yes
Supported workstations		
Windows 2003	Yes	Yes
Red Hat Enterprise Linux ES 5.1	Yes	Yes

Embedded Access Points

WCS software release 5.1 is supported for use with the AP801, the integrated access point in the Cisco 880 Series Integrated Services Routers (ISRs). This access point uses its own software image separate from the router and can operate as an autonomous access point that is configured and managed locally or as a centrally managed access point using LWAPP. The AP801 is preloaded with both an autonomous Cisco IOS release and an LWAPP recovery software image.

When you want to use the AP801, you must enable the LWAPP recovery image on the access point by entering this CLI command on the router in privileged EXEC mode: **service-module wlan-ap 0 bootimage unified**. After enabling the recovery image, enter this CLI command on the router to shut down and reboot the access point: **service-module wlan-ap 0 reload**. After the access point reboots, it discovers the controller, downloads the full LWAPP software release from the controller, and acts as a lightweight access point.

**Note**

To use the CLI commands mentioned above, the router must be running Cisco IOS Release 12.4(20)T or later.

In order to support LWAPP, the router must be running the Cisco Advanced IP Services IOS image. A license is required to upgrade to this image on the router. Refer to these URLs for licensing information:

http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_overview.html

http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/csa_commands.html

The Cisco 880 Series ISRs with an LWAPP recovery image require DHCP to obtain an IP address on the access point. An IP address is needed to communicate with the controller and to download its image upon boot-up. The router can provide DHCP server functionality, the DHCP pool to reach the controller, and setup option 43 for the controller IP address in the DHCP pool configuration. Use the following configuration to perform this task:

```
ip dhcp pool embedded-ap-pool
network 60.0.0.0 255.255.255.0
dns-server 171.70.168.183
default-router 60.0.0.1
option 43 hex f104.0a0a.0a0f /* single WLC IP address (10.10.10.15) in hex format */
```

The AP801 has a single 2.4-GHz 802.11g/b/n radio, which supports lower packet levels than the 802.11b/g/n radio in the Cisco Aironet 1250 series access points. The AP801 stores the radio power levels and passes them to the controller when the access point joins the controller. The controller uses the supplied values to limit the user's configuration.

**Note**

For more information on the AP801, refer to the documentation for the 800 series routers at this URL:

http://www.cisco.com/en/US/products/hw/routers/ps380/tsd_products_support_series_home.html.

WCS User Interface

The WCS user interface enables the network operator to create and configure Cisco Unified Wireless Network Solution coverage area layouts, configure system operating parameters, monitor real-time Cisco Unified Wireless Network Solution operation, and perform troubleshooting tasks using an HTTPS

web browser window. The WCS user interface also enables the WCS administrator to create, modify, and delete user accounts; change passwords; assign permissions; and schedule periodic maintenance tasks. The administrator creates new usernames and passwords and assigns them to predefined permissions groups.

**Note**

Cisco recommends Internet Explorer 6.0 or later on a Windows workstation for full access to WCS functionality.

Cisco WCS Navigator

The Cisco Wireless Control System Navigator (Cisco WCS Navigator) manages multiple Cisco WCSs (running the same version as Navigator) and provides a unified view of the network. It uses SOAP/XML over HTTPs to communicate with individual WCSs. With WCS Navigator, there is monitoring functionality and reporting capability across all WCSs. In addition, network wide searches are available. In Windows and Linux, Cisco WCS Navigator runs as a service, which runs continuously and resumes running after a reboot.

In order for the WCS Navigator to detect the regional WCSs, you must manually add them to the system using either the IP address or hostname and specify the login credentials for each of the regional WCSs. After being added, WCS Navigator provides summary information and links to the regional WCS systems.

