

Wireless LAN Controller Web Authentication Configuration Example

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Introduction

This document explains how Cisco implements web authentication and shows how to configure a Cisco 4400 Series Wireless LAN (WLAN) Controller (WLC) to support an Internal web authentication.

Prerequisites

Requirements

This document assumes that you already have an initial configuration on the 4400 WLC.

Components Used

The information in this document is based on these software and hardware versions:

- A 4400 series WLC that runs version 7.0.116.0
- Cisco Secure Access Control Server (ACS) version 4.2 installed on a Microsoft® Windows 2003 Server
- Cisco Aironet 1131AG Series Light Weight Access Point
- Cisco Aironet 802.11 a/b/g CardBus Wireless Adapter that runs version 4.0

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure

that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Web Authentication

Web authentication is a Layer 3 security feature that causes the controller to not allow IP traffic (except DHCP and DNS –related packets) from a particular client until that client has correctly supplied a valid username and password. It is a simple Authentication method without the need for a supplicant or client utility. Web authentication is typically used by customers who want to deploy a guest–access network. Typical deployments can include "hot spot" locations such as T–Mobile or Starbucks.

Keep in mind that web authentication does not provide data encryption. Web authentication is typically used as simple guest access for either a "hot spot" or campus atmosphere where the only concern is the connectivity.

Web authentication can be performed using:

- Default login window on the WLC
- Modified version of the default login window on the WLC
- A customized login window that you configure on an external web server (External web authentication)
- A customized login window that you download to the controller

In this document, the Wireless LAN Controller for Internal web authentication is configured.

Web Authentication Process

This is what occurs when a user connects to a WLAN configured for web authentication:

- The user opens a web browser and enters a URL, for example, <http://www.cisco.com>. The client sends out a DNS request for this URL to get the IP for the destination. The WLC bypasses the DNS request to the DNS server and the DNS server responds back with a DNS reply, which contains the IP address of the destination www.cisco.com. This, in turn, is forwarded to the wireless clients.
- The client then tries to open a TCP connection with the destination IP address. It sends out a TCP SYN packet destined to the IP address of www.cisco.com.
- The WLC has rules configured for the client and hence can act as a proxy for www.cisco.com. It sends back a TCP SYN–ACK packet to the client with source as the IP address of www.cisco.com. The client sends back a TCP ACK packet in order to complete the three way TCP handshake and the TCP connection is fully established.
- The client sends an HTTP GET packet destined to www.cisco.com. The WLC intercepts this packet and sends it for redirection handling. The HTTP application gateway prepares a HTML body and sends it back as the reply to the HTTP GET requested by the client. This HTML makes the client go to the default webpage URL of the WLC, for example, <http://<Virtual-Server-IP>/login.html>.
- The client closes the TCP connection with the IP address, for example, www.cisco.com.
- Now the client wants to go to <http://1.1.1.1/login.html>. Therefore, the client tries to open a TCP connection with the virtual IP address of the WLC. It sends a TCP SYN packet for 1.1.1.1 to the WLC.
- The WLC responds back with a TCP SYN–ACK and the client sends back a TCP ACK to the WLC in order to complete the handshake.
- The client sends a HTTP GET for [/login.html](http://1.1.1.1/login.html) destined to 1.1.1.1 in order to request for the login page.

- This request is allowed up to the Web Server of the WLC, and the server responds back with the default login page. The client receives the login page on the browser window where the user can go ahead and log in.

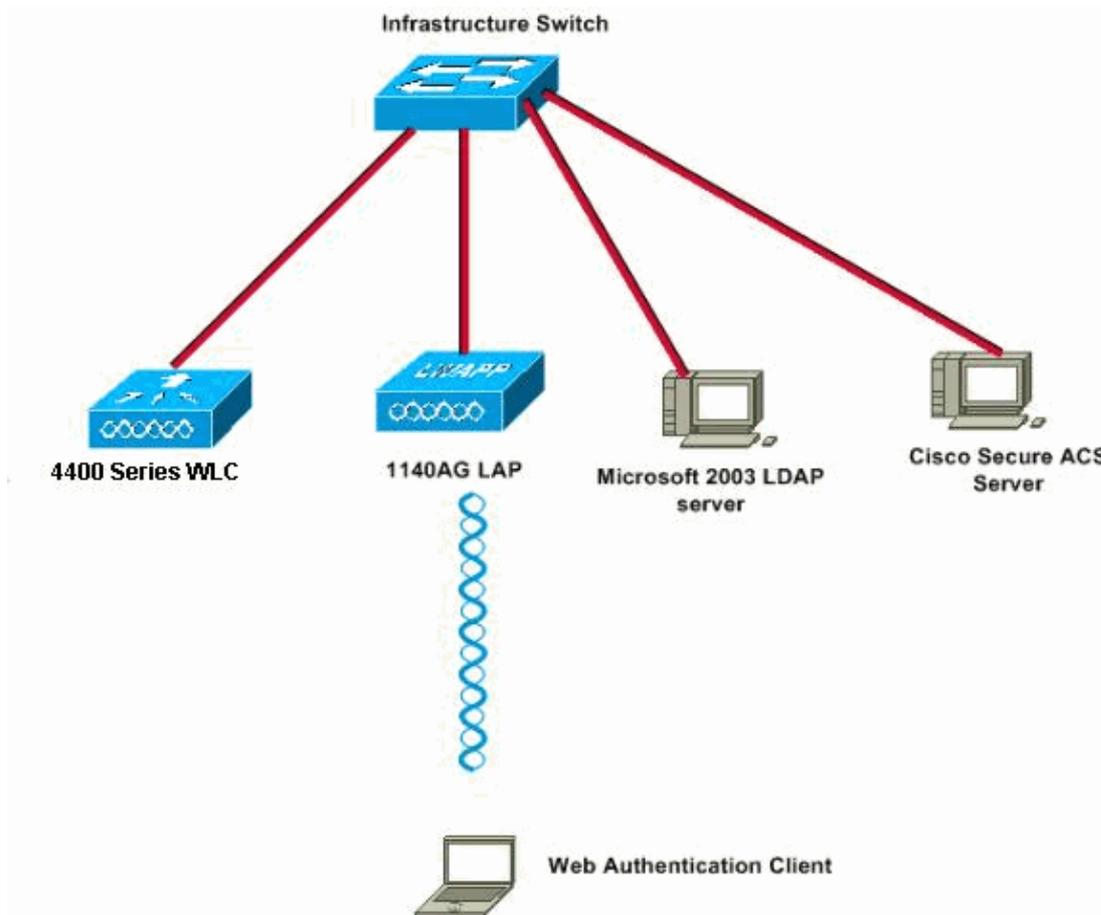
Here is a link to a video on the Cisco Support Community [↗](#) which explains the Web Authentication process:

Web Authentication on Cisco Wireless LAN Controllers (WLCs) [↗](#)



Network Setup

This document uses this network setup:



Configure the Controller for Web Authentication

In this document, a WLAN is configured for web authentication and mapped to a dedicated VLAN. These are the steps involved to configure a WLAN for web authentication:

- Create a VLAN Interface
- Configure WLC for Internal Web Authentication
- Add a WLAN Instance
- Configure Authentication Type (Three Ways to Authenticate Users in Web Authentication)

In this section, you are presented with the information to configure the controller for web authentication.

These are the IP addresses used in this document:

- The IP address of the WLC is 10.77.244.204.
- The IP address of the ACS server is 10.77.244.196.

Create a VLAN Interface

Complete these steps:

1. From the Wireless LAN controller GUI, choose **Controller** from the menu at the top, choose **Interfaces** from the menu on the left, and click **New** on the upper right side of the window to create a new dynamic interface.

The **Interfaces > New** window appears. This example uses Interface Name *vlan90* with a VLAN ID

of 90:



2. Click **Apply** in order to create the VLAN interface.

The **Interfaces > Edit** window appears that asks you to fill interface specific information.

3. This document uses these parameters:

- ◆ IP Address;0.10.10.2
- ◆ Netmask;255.255.255.0 (24 bits)
- ◆ Gateway;0.10.10.1
- ◆ Port Number;24
- ◆ Primary DHCP Server;0.77.244.204

Note: This parameter should be the IP address of your RADIUS or DHCP server. In this example, the management address of the WLC is used as the DHCP server because the Internal DHCP scope is configured on the WLC.

- ◆ Secondary DHCP Server .0.0.0

Note: The example does not have a secondary DHCP server, so uses 0.0.0.0. If your configuration has a secondary DHCP server, add the server IP address in this field.

- ◆ ACL Name None

The screenshot displays the Cisco WLC GUI for configuring an interface. The left sidebar shows the navigation menu with 'Advanced' selected. The main content area is titled 'Interfaces > Edit' and contains several sections:

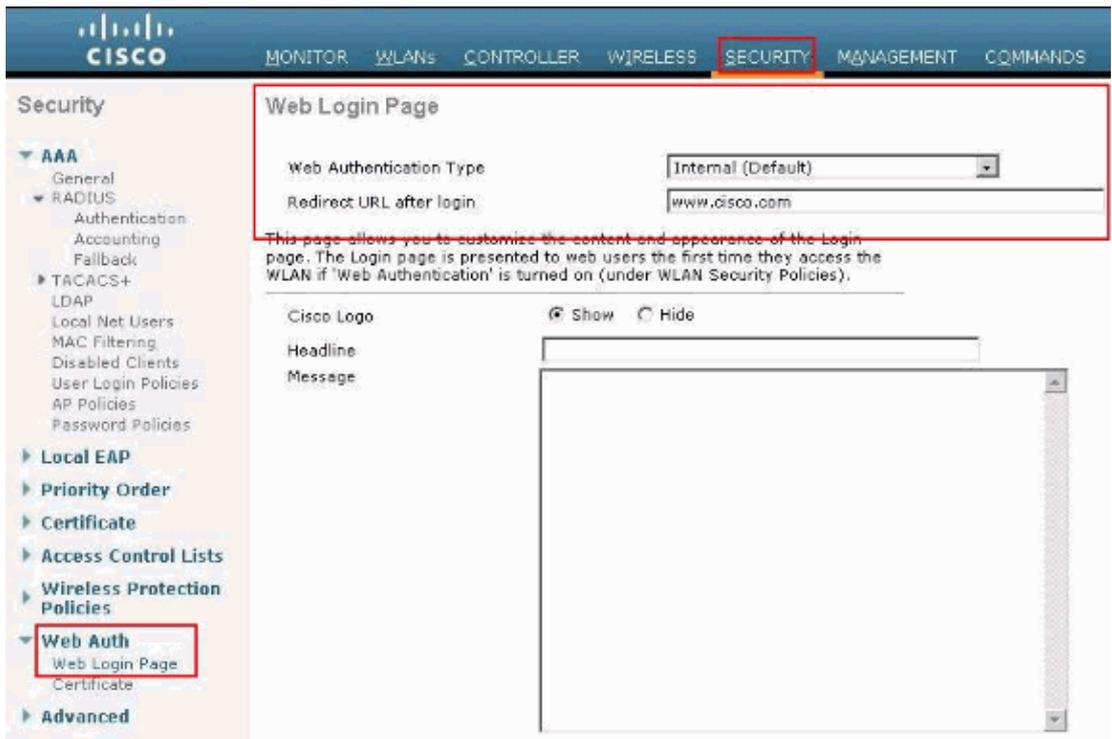
- General Information:** Interface Name (vlan90), MAC Address (00:0b:85:48:53:c0).
- Configuration:** Guest Lan (checkbox), Quarantine (checkbox), Quarantine Vlan Id (0).
- Physical Information:** Port Number (2), Backup Port (0), Active Port (0), Enable Dynamic AP Management (checkbox).
- Interface Address:** VLAN Identifier (90), IP Address (10.10.10.2), Netmask (255.255.255.0), Gateway (10.10.10.1).
- DHCP Information:** Primary DHCP Server (10.77.244.204), Secondary DHCP Server (empty).
- Access Control List:** ACI Name (none).

4. Click **Apply** in order to save the changes.

Configure WLC for Internal Web Authentication

The next step is to configure the WLC for the Internal web authentication. Internal web authentication is the default web authentication type on WLCs. If this parameter has not been changed, no configuration is required to enable Internal web authentication. If the web authentication parameter was changed previously, complete these steps to configure the WLC for Internal web authentication:

1. From the controller GUI, choose **Security > Web Auth > Web Login Page** in order to access the Web Login Page.
2. From the Web Authentication Type drop-down box, choose **Internal Web Authentication**.
3. In the **Redirect URL after login** field, enter the URL of the page to which the end user will be redirected to after successful authentication.



Note: In WLC versions 5.0 and later, the logout page for web–authentication can also be customized. Refer to the Assign Login , Login failure and Logout pages per WLAN section of *Wireless LAN Controller Configuration Guide, 5.2* for more information on how to configure it.

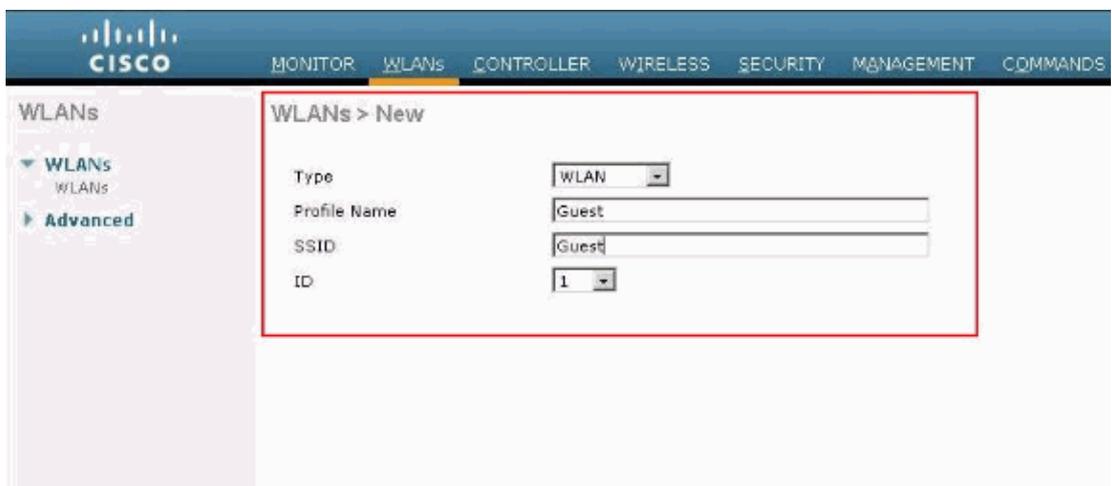
Add a WLAN Instance

Now that Internal web authentication has been enabled and there is a VLAN interface dedicated for web authentication, you must provide a new WLAN/SSID in order to support the web authentication users.

Complete these steps in order to create a new WLAN/SSID:

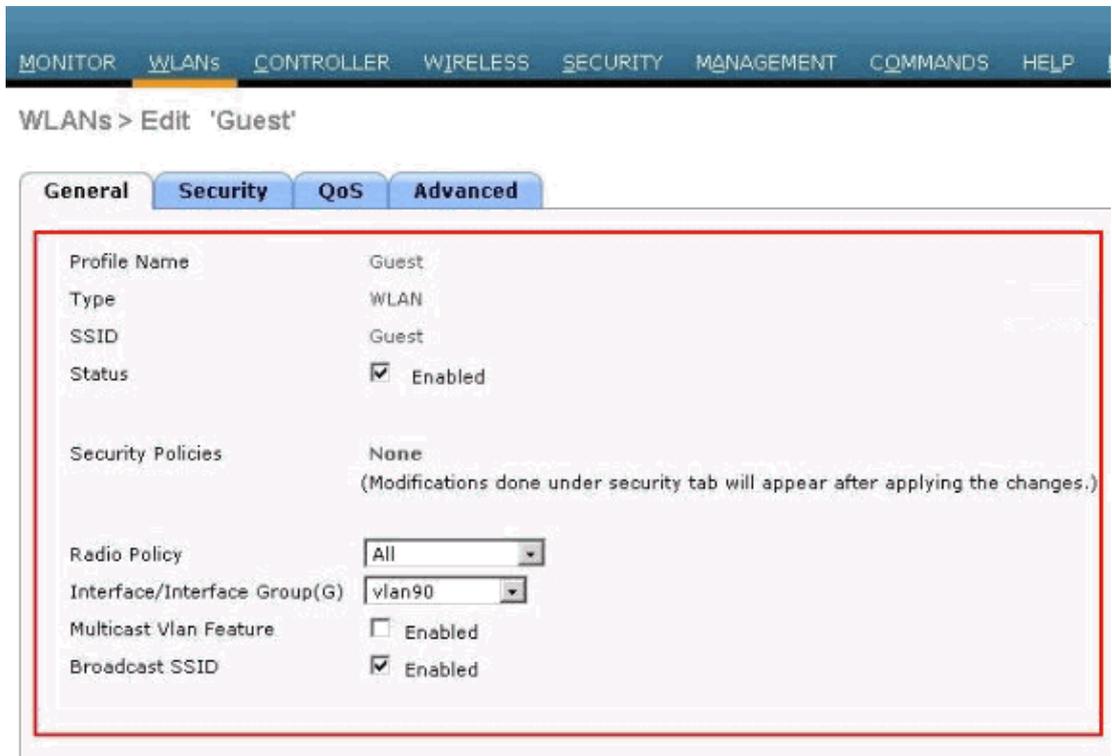
1. From the WLC GUI, click **WLAN** in the menu at the top, and click **New** on the upper right side.

Choose **WLAN** as the Type. Choose a profile name and WLAN SSID for Web authentication. This example uses **Guest** for both the Profile Name and WLAN SSID.



2. Click **Apply**.

A new WLANs > Edit window appears.



3. Check the status box of the WLAN in order to enable the WLAN. From the Interface menu, select the name of the VLAN interface that you created previously. In this example, the Interface Name is *vlan90*.

Note: Leave the default value for other parameters on this screen.

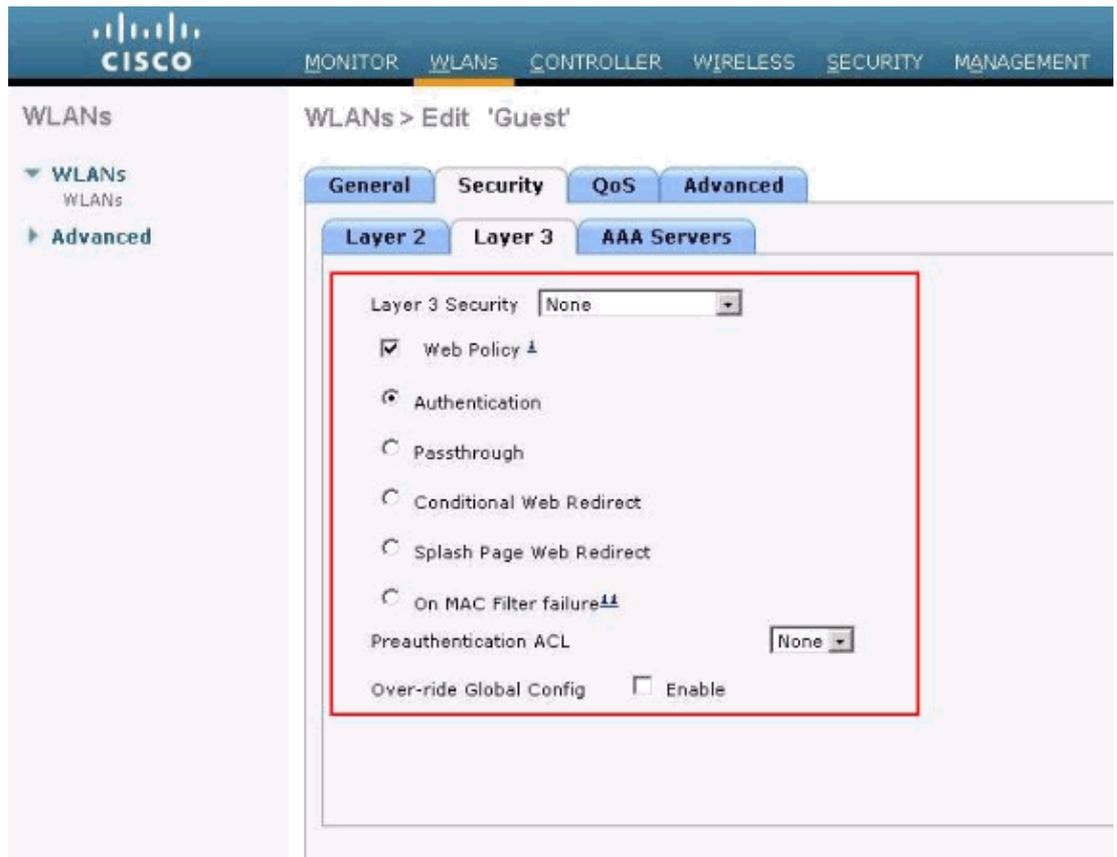
4. Click the **Security** tab.

Complete these steps in order to configure web authentication:

- a. Click the **Layer 2** tab and set the security to *None* .

Note: You cannot configure web passthrough as Layer 3 security with 802.1x or WPA/WPA2 as Layer 2 Security for a WLAN. Refer to Wireless LAN Controller Layer 2 Layer 3 Security Compatibility Matrix for more information on the Wireless LAN Controller Layer 2 and Layer 3 security compatibility.

- b. Click the **Layer 3** tab. Check the **Web Policy** box and choose the *Authentication* option, as shown here:



- c. Click **Apply** in order to save the WLAN.
- d. You are returned to the WLAN summary window. Make sure that the Web-Auth is enabled under the Security Policies column of the WLAN table for the SSID Guest.

Three Ways to Authenticate Users in Web Authentication

There are three ways to authenticate users when you use web authentication. Local authentication allows you to authenticate the user in the Cisco WLC. You can also use an external RADIUS server or a LDAP server as a backend database in order to authenticate the users.

This document provides an example configuration for all three methods.

Local Authentication

The user database for the guest users are stored on the WLC's local database. Users are authenticated by the WLC against this database.

1. From the WLC GUI, choose **Security**.
2. Click **Local Net Users** from the AAA menu on the left.



3. Click **New** in order to create a new user.

A new window displays that asks for username and password information.

4. Enter a User Name and Password in order to create a new user, then confirm the password that you want to use.

This example creates the user named **User1**.

5. Add a description, if you choose.

This example uses **Guest User1**.

6. Click **Apply** in order to save the new user configuration.





7. Repeat steps 3–6 to add more users to the database.

RADIUS Server for Web Authentication

This document uses a wireless ACS on Windows 2003 Server as the RADIUS server. You can use any available RADIUS server that you currently deploy in your network.

Note: ACS can be set up on either Windows NT or Windows 2000 Server. In order to download ACS from Cisco.com, refer to Software Center (Downloads) – Cisco Secure Software (registered customers only) . You need a Cisco web account in order to download the software.

The Set Up ACS section shows you how to configure ACS for RADIUS. You must have a fully functional network with a Domain Name System (DNS) and a RADIUS server.

Set Up ACS

In this section, you are presented with the information to set up ACS for RADIUS.

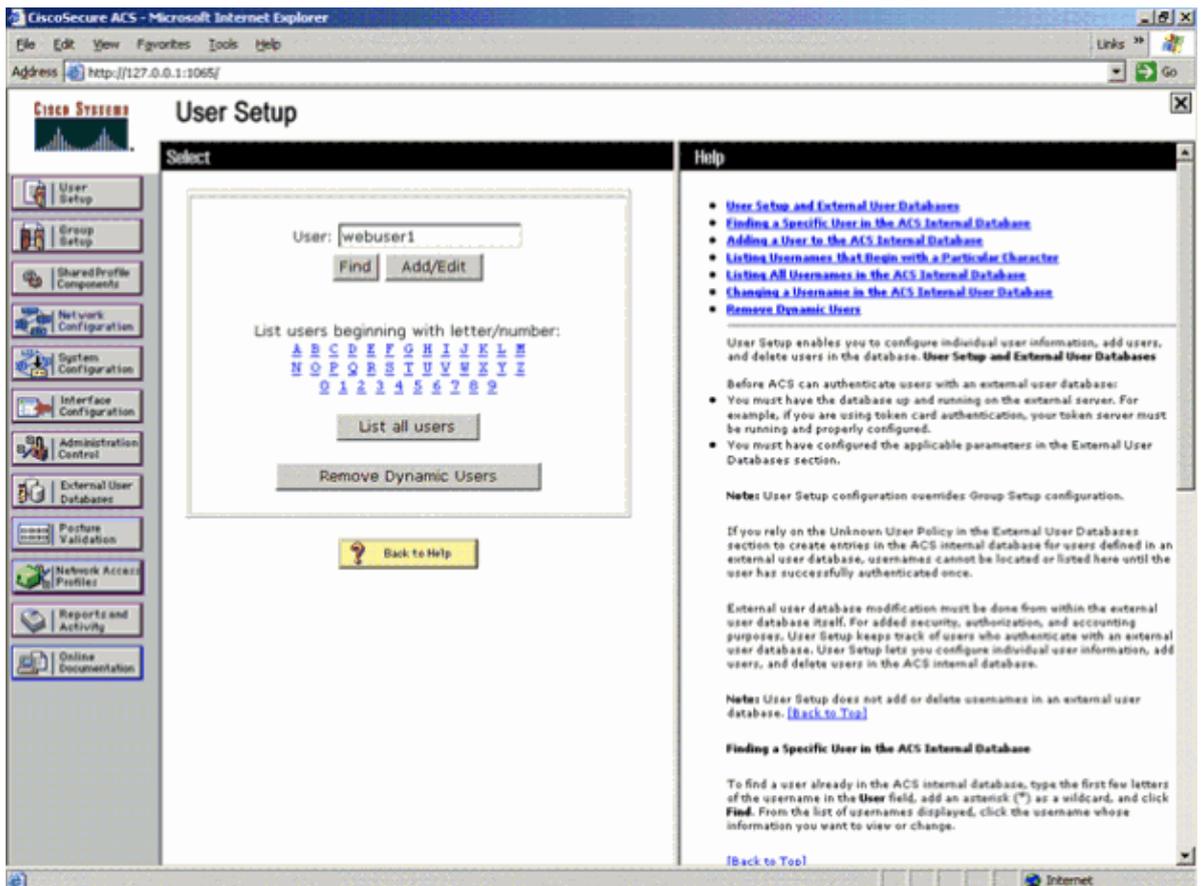
Set up ACS on your server and then complete these steps in order to create a user for authentication:

1. When ACS asks if you want to open ACS in a browser window to configure, click **yes**.

Note: After you set up ACS, you also have an icon on your desktop.

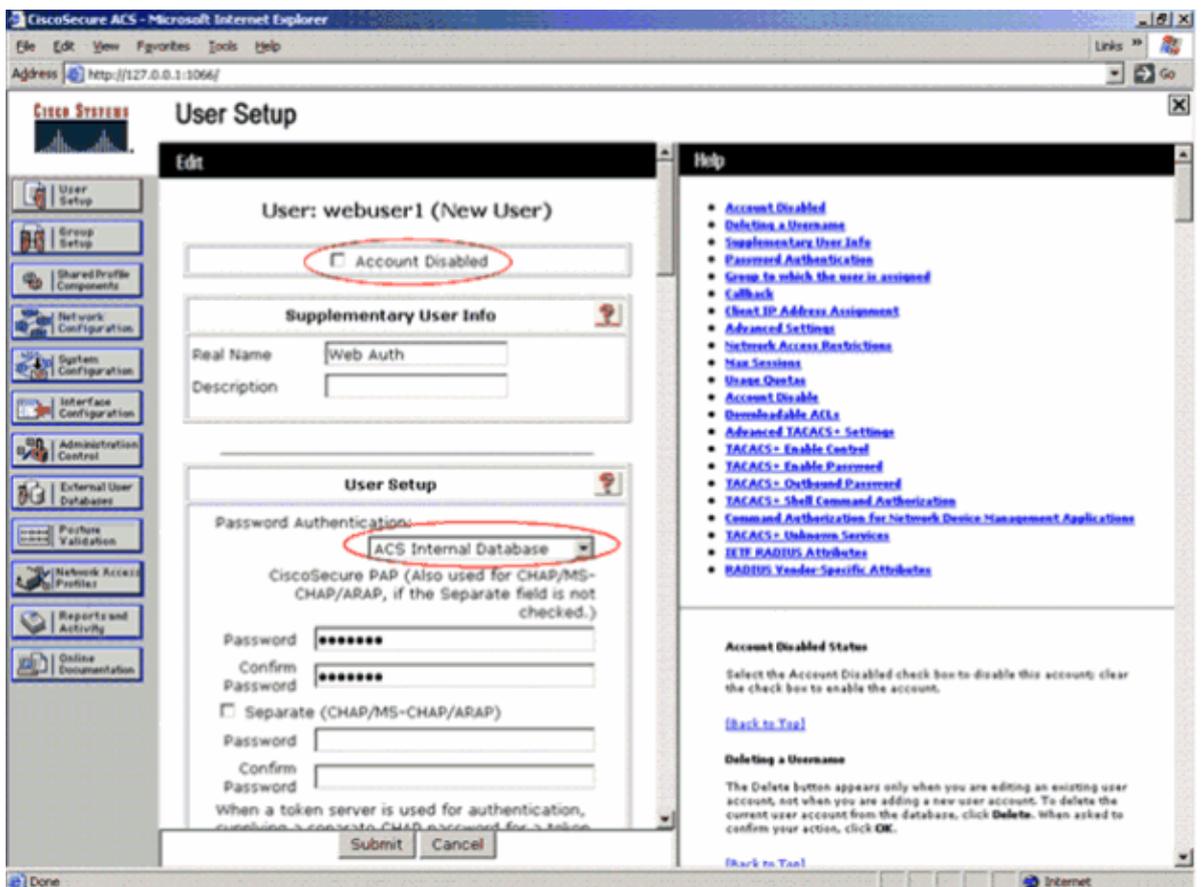
2. In the menu on the left, click **User Setup**.

This action takes you to User Setup screen as shown here:



3. Enter the user that you want to use for web authentication, and click **Add/Edit**.

After the user is created, a second window opens as shown here:



4. Ensure that the **Account Disabled** Box at the top is not checked.
5. Choose **ACS Internal Database** for the Password Authentication option.
6. Enter the password. Admin has an option to configure PAP/CHAP or MD5-CHAP authentication while adding a user in the ACS internal database. PAP is the default authentication type for web-auth users on controllers. Admin has the flexibility to change the authentication method to chap/md5-chap using this CLI command:

```
config custom-web radiusauth <auth method>
```

7. Click **Submit**.

Enter Your RADIUS Server Information into the Cisco WLC

Complete these steps:

1. Click **Security** in the menu at the top.
2. Click **RADIUS Authentication** in the menu on the left.
3. Click **New**, and enter the IP address of your ACS/RADIUS server. In this example, the IP address of the ACS server is **10.77.244.196**.
4. Enter the shared secret for the RADIUS server. Make sure that this secret key is the same as the one you entered in the RADIUS server for the WLC.
5. Leave the Port number at the default, 1812.
6. Ensure that the **Server Status** option is Enabled.
7. Check the **Network User Enable** box so that this RADIUS Server is used for authenticating users of your wireless network.
8. Click **Apply**.

The screenshot shows the Cisco WLC configuration interface for adding a new RADIUS Authentication Server. The page title is "RADIUS Authentication Servers > New". The configuration fields are as follows:

Field	Value
Server Index (Priority)	1
Server IP Address	10.77.244.196
Shared Secret Format	ASCII
Shared Secret	*****
Confirm Shared Secret	*****
Key Wrap	<input type="checkbox"/> (Designed for FIPS customers and requires a key wrap compliant RADIUS server)
Port Number	1812
Server Status	Enabled
Support for RFC 3576	Enabled
Server Timeout	2 seconds
Network User	<input checked="" type="checkbox"/> Enable
Management	<input checked="" type="checkbox"/> Enable
IPSec	<input type="checkbox"/> Enable

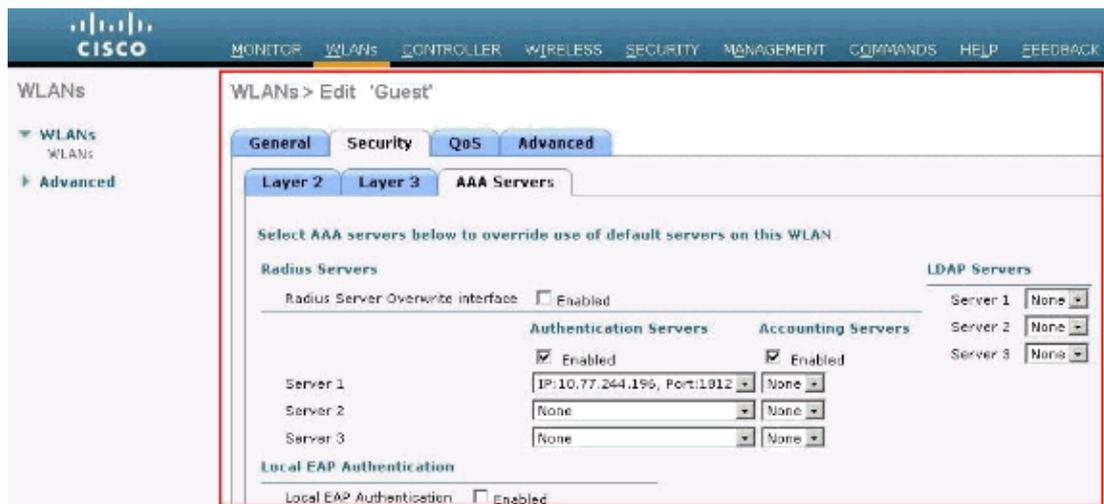
Make sure that the *Network User* box is checked and *Admin Status* is Enabled.



Configuring WLAN with RADIUS Server

Now that the RADIUS server is configured on the WLC, you need to configure the WLAN to use this RADIUS server for web authentication. Complete these steps in order to configure WLAN with the RADIUS server.

1. Open your WLC browser and click **WLANs**. This displays the list of WLANs configured on the WLC. Click the WLAN **Guest** which was created for web authentication.
2. On the **WLANs > Edit** page click the **Security** Menu. Click the **AAA Servers** tab under Security. Then, choose the RADIUS server which is 10.77.244.196 in this example:



3. Click **Apply**.

Verify ACS

When you set up the ACS, remember to download all the current patches and latest code. This should solve impending issues. In case you are using RADIUS Authentication make sure that your WLC is listed as one of the AAA Clients. Click the **Network Configuration** menu on the left hand side to check this. Click the AAA client, then verify the password and the authentication type configured. Refer to the Configuring AAA Clients section of User Guide for Cisco Secure Access Control Server 4.2 for more information on how to configure an AAA client.

The screenshot shows the CiscoSecure ACS Network Configuration page. The main content area is divided into three sections: AAA Clients, AAA Servers, and Proxy Distribution Table. The AAA Clients table has two entries, with the first one circled in red. The AAA Servers table has one entry. The Proxy Distribution Table has one entry. A help sidebar is visible on the right.

AAA Client Hostname	AAA Client IP Address	Authenticate Using
ys.c	10.77.244.204	RADIUS (Cisco Airespace)
wfc210	10.77.244.210	RADIUS (Cisco Airespace)

AAA Server Name	AAA Server IP Address	AAA Server Type
ts-web	10.77.244.196	CiscoSecure ACS

Character String	AAA Servers	Strip	Account
(Default)	ts-web	No	Local

When you choose User Setup, verify again that your users actually exist. Click **List All Users**. A window as shown appears. Make sure the user that has been created exists in the list.

The screenshot shows the CiscoSecure ACS User Setup page. The main content area is divided into two sections: User Setup and User List. The User Setup section has a search form and a list of users. The User List section has a table with columns for User, Status, Group, and Network Access Profile. The 'Webuser1' entry in the table is circled in red.

User	Status	Group	Network Access Profile
User1	Enabled	Default Group (3 users)	(Default)
User2	Enabled	Default Group (3 users)	(Default)
Webuser1	Enabled	Default Group (3 users)	(Default)

LDAP Server

This section explains how to configure a Lightweight Directory Access Protocol (LDAP) server as a backend database, similar to a RADIUS or local user database. An LDAP backend database allows the controller to query an LDAP server for the credentials (username and password) of a particular user. These credentials are then used to authenticate the user.

Complete these steps to configure LDAP using the controller GUI:

1. Click **Security** > **AAA** > **LDAP** in order to open the LDAP Servers.

This page lists any LDAP servers that have already been configured.

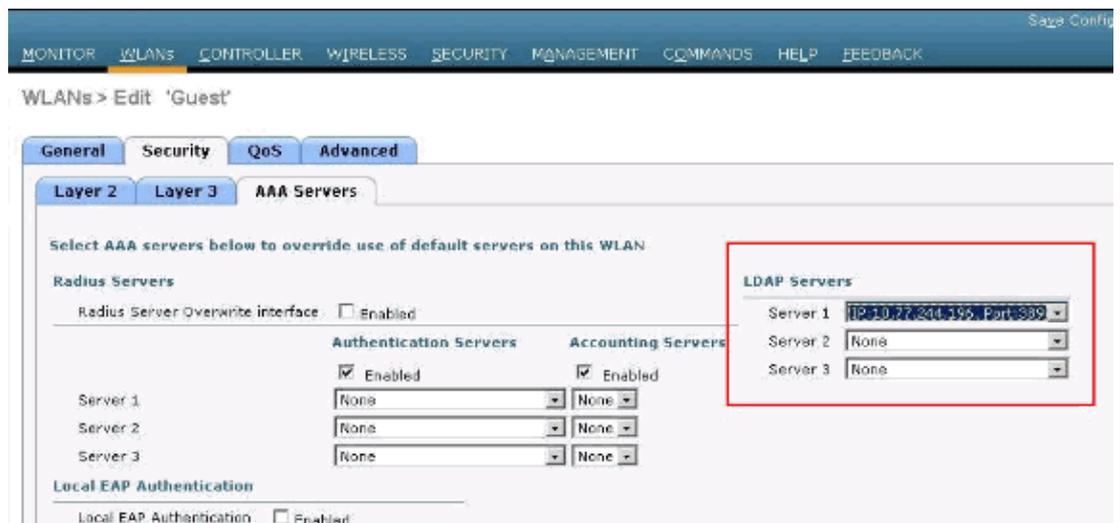
- ◆ If you want to delete an existing LDAP server, move your cursor over the blue drop-down arrow for that server and choose **Remove**.
 - ◆ If you want to make sure that the controller can reach a particular server, hover your cursor over the blue drop-down arrow for that server and choose **Ping**.
2. Perform one of the following:
 - ◆ To edit an existing LDAP server, click the index number for that server. The LDAP Servers > Edit page appears.
 - ◆ To add an LDAP server, click **New**. The LDAP Servers > New page appears.

The screenshot shows the Cisco controller GUI with the following configuration details for a new LDAP server:

Field	Value
Server Index (Priority)	1
Server IP Address	10.77.244.196
Port Number	369
Simple Bind	Authenticated
Bind Username	user2
Bind Password	*****
Confirm Bind Password	*****
User Base DN	ou=active,ou=employees,ou=people,ou=cisco.com
User Attribute	uid
User Object Type	person
Server Timeout	2 seconds
Enable Server Status	Enabled

3. If you are adding a new server, choose a number from the Server Index (Priority) drop-down box to specify the priority order of this server in relation to any other configured LDAP servers. You can configure up to seventeen servers. If the controller cannot reach the first server, then it tries the second one from the list and so on.
4. If you are adding a new server, enter the IP address of the LDAP server in the Server IP Address field.
5. If you are adding a new server, enter the LDAP server's TCP port number in the Port Number field. The valid range is 1 to 65535, and the default value is 389.
6. Check the **Enable Server Status** check box to enable this LDAP server, or uncheck it to disable it. The default value is disabled.
7. From the Simple Bind drop-down box, choose **Anonymous** or **Authenticated** to specify the local authentication bind method for the LDAP server. The Anonymous method allows anonymous access to the LDAP server, whereas the Authenticated method requires that a username and password be entered to secure access. The default value is Anonymous.
8. If you chose Authenticated in Step 7, complete these steps:

- a. In the Bind Username field, enter a username to be used for local authentication to the LDAP server.
 - b. In the Bind Password and Confirm Bind Password fields, enter a password to be used for local authentication to the LDAP server.
9. In the User Base DN field, enter the distinguished name (DN) of the subtree in the LDAP server that contains a list of all the users. For example, ou=organizational unit, .ou=next organizational unit, and o=corporation.com. If the tree containing users is the base DN, type o=corporation.com or dc=corporation, dc=com.
 10. In the User Attribute field, enter the name of the attribute in the user record that contains the username. You can obtain this attribute from your directory server.
 11. In the User Object Type field, enter the value of the LDAP objectType attribute that identifies the record as a user. Often, user records have several values for the objectType attribute, some of which are unique to the user and some of which are shared with other object types.
 12. In the Server Timeout field, enter the number of seconds between re-transmissions. The valid range is 2 to 30 seconds, and the default value is 2 seconds.
 13. Click **Apply** to commit your changes.
 14. Click **Save Configuration** to save your changes.
 15. Complete these steps if you wish to assign specific LDAP servers to a WLAN:
 - a. Click **WLANs** to open the WLANs page.
 - b. Click the ID number of the desired WLAN.
 - c. When the WLANs > Edit page appears, click the **Security > AAA Servers** tabs to open the WLANs > Edit (Security > AAA Servers) page.



- d. From the LDAP Servers drop-down boxes, choose the LDAP server(s) that you want to use with this WLAN. You can choose up to three LDAP servers, which are tried in priority order.
- e. Click **Apply** to commit your changes.
- f. Click **Save Configuration** to save your changes.

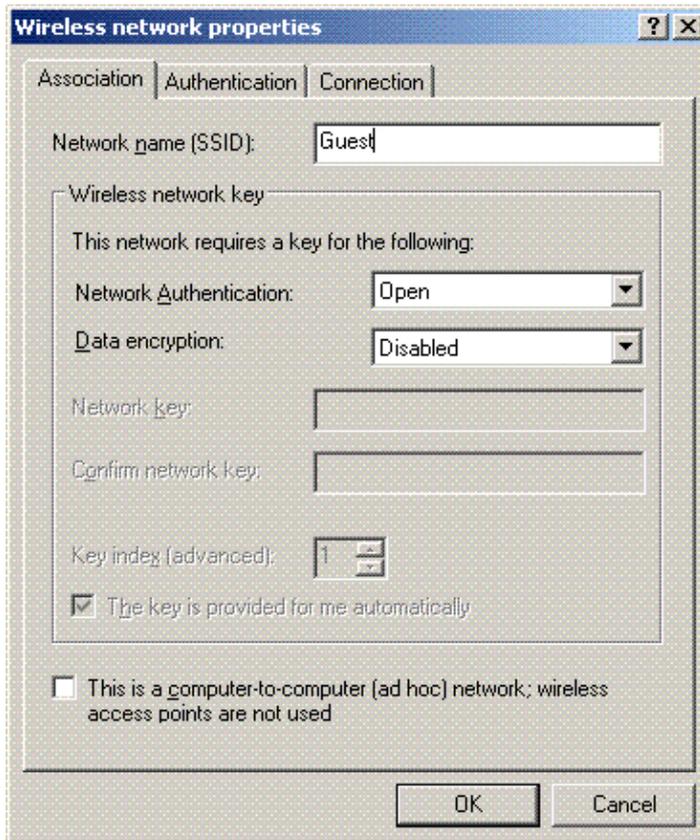
Configure Your WLAN Client to Use Web Authentication

Once the WLC is configured, the client must be configured appropriately for web authentication. In this section, you are presented with the information to configure your Windows system for web authentication.

Client Configuration

The Microsoft wireless client configuration remains mostly unchanged for this subscriber. You only need to add the appropriate WLAN/SSID configuration information. Complete these steps:

1. From the Windows **Start** menu, choose **Settings > Control Panel > Network and Internet Connections**.
2. Click the **Network Connections** icon.
3. Right-click the **LAN Connection** icon and choose **Disable**.
4. Right-click the **Wireless Connection** icon and choose **Enable**.
5. Right-click the **Wireless Connection** icon again and choose **Properties**.
6. From the Wireless Network Connection Properties window, click the **Wireless Networks** tab.
7. Under the preferred networks, area click **Add** in order to configure the Web authentication SSID.
8. Under the Association tab, enter the Network Name (WLAN/SSID) value that you want to use for web authentication.

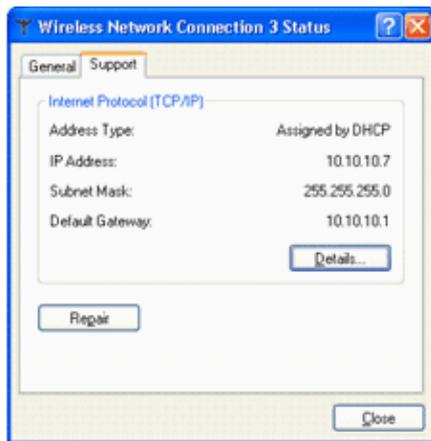


Note: The Data Encryption is Wired Equivalent Privacy (WEP) by default. Disable Data Encryption in order for web authentication to work.

9. Click **OK** at the bottom of the window in order to save the configuration.

When you communicate with the WLAN, you see a beacon icon in the Preferred Network box.

This shows a successful wireless connection to web authentication. The WLC has provided your wireless Windows client with an IP address.



Note: If your wireless client is also a VPN end point and you have web authentication configured as a security feature for WLAN, then the VPN tunnel is not established until you go through the web authentication process explained here. In order to establish a VPN tunnel, the client must first go through the process of web authentication with success. Only then does VPN tunneling become successful.

Note: After a successful login, if the wireless clients are idle and do not communicate with any of the other devices, the client is de-authenticated after an idle timeout period. The timeout period is 300 seconds by default and can be changed using this CLI command: `config network usertimeout <seconds>`. When this occurs, client entry is removed from the controller. If the client associates again, it will move back to a Webauth_Reqd state.

Note: If clients are active after successful login, they will get de-authenticated and entry can still be removed from the controller after the session timeout period configured on that WLAN (for example, 1800 seconds by default and can be changed using this CLI command: `config wlan session-timeout <WLAN ID> <seconds>`). When this occurs, client entry is removed from the controller. If the client associates again, it will move back in a Webauth_Reqd state.

If clients are in Webauth_Reqd state, no matter if they are active or idle, the clients will get de-authenticated after a **web-auth required timeout** period (for example, 300 seconds and this time is non-user configurable). All traffic from the client (allowed via Pre-Auth ACL) will be disrupted. If the client associates again, it will move back to the Webauth_Reqd state.

Client Login

Complete these steps:

1. Open a browser window and enter any URL or IP Address. This brings the web authentication page to the client.

If the controller is running any release earlier than 3.0, the user has to enter `https://1.1.1.1/login.html` to bring up the web authentication page.

A security alert window displays.

2. Click **Yes** in order to proceed.
3. When the Login window appears, enter the username and password of the Local Net User that you created.

Login

Welcome to the Cisco wireless network

Cisco is pleased to provide the Wireless LAN infrastructure for your network. Please login and put your unified wireless solution to work.

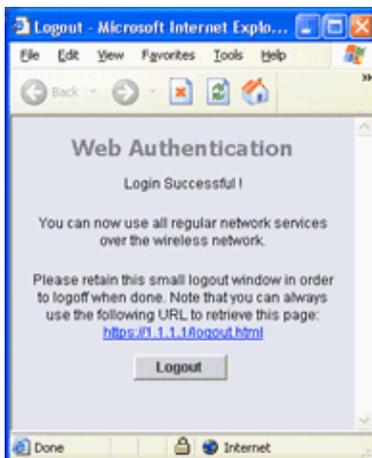
User Name

Password

If your login is successful, you see two browser windows. The larger window indicates successful login and you can use this window to browse the internet. Use the smaller window in order to log out when your use of the guest network is complete.

The screenshot shows a successful redirect for web authentication.

The next screenshot shows the Login Successful window, which displays when authentication has occurred.



Cisco 4404/WiSM controllers can support 125 simultaneous Web Auth Users logins, and scale up to 5000 web auth clients.

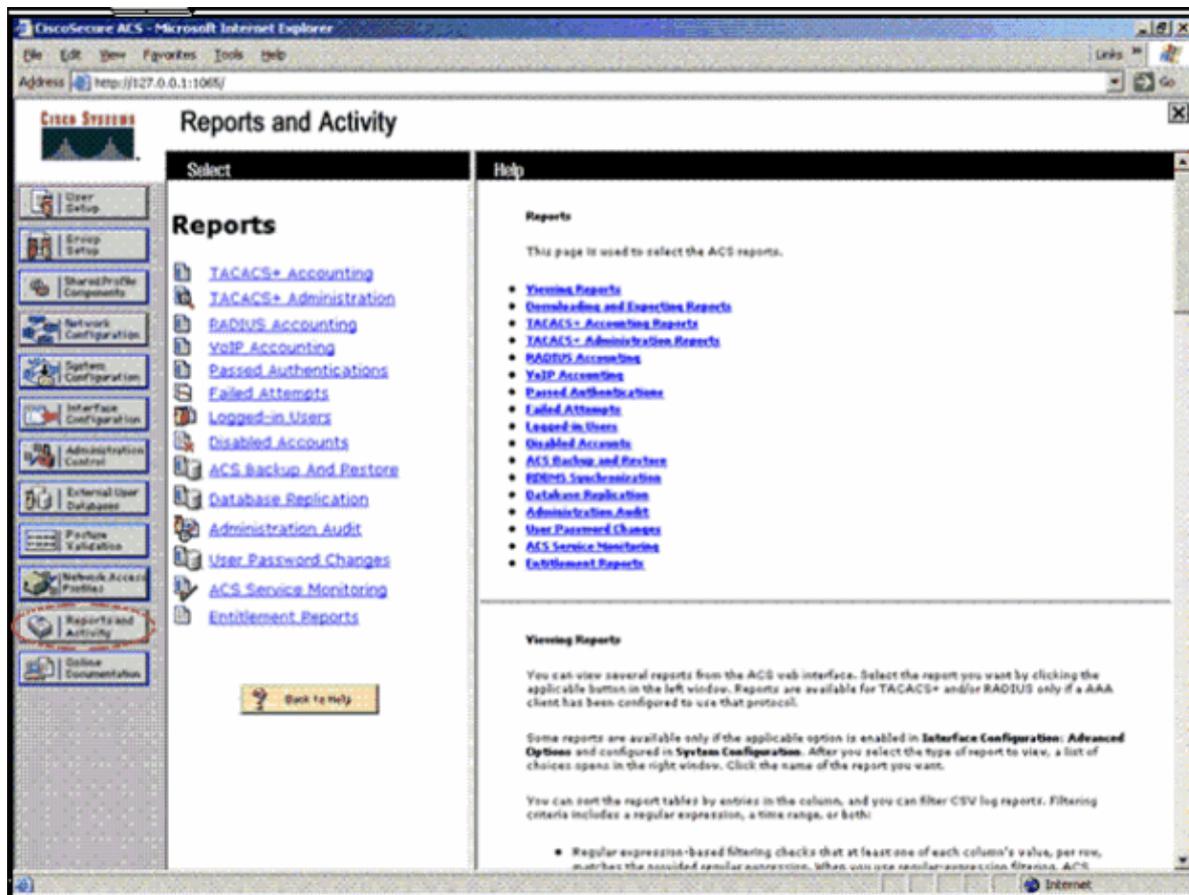
Cisco 5500 controllers can support 150 simultaneous Web Auth Users logins.

Troubleshoot Web authentication

Troubleshoot ACS

If you have issues with password authentication, click **Reports and Activity** on the lower left side of the ACS in order to open all available reports. After you open the reports window, you have the option to open

RADIUS Accounting, Failed Attempts for login, Passed Authentications, Logged-in Users, and other reports. These reports are .csv files, and you can open the files locally on your machine. The reports help uncover issues with authentication, such as incorrect user name and/or password. ACS also comes with online documentation. If you are not connected to a live network and have not defined the service port, ACS uses the IP address of your Ethernet port for your service port. If your network is not connected, you most likely end up with the Windows 169.254.x.x default IP address.



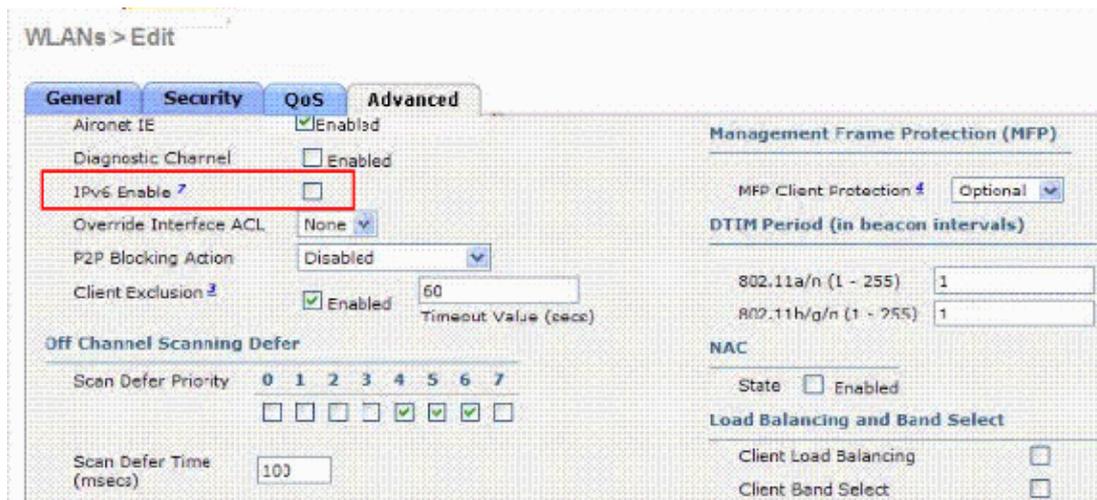
Note: If you type in any external URL, the WLC automatically connects you to the internal web authentication page. If the automatic connection does not work, you can enter the management IP address of the WLC in the URL bar in order to troubleshoot. Look at the top of the browser for the message that says to redirect for web authentication.

Refer to Troubleshooting Web Authentication on a Wireless LAN Controller (WLC) for more information on troubleshooting web authentication.

Web Auth with IPv6 Bridging

In order to configure a WLAN for IPv6 bridging, from the controller GUI, navigate to **WLANs**. Then, select the desired WLAN and choose **Advanced** from the **WLANs > Edit** page.

Select the **IPv6 Enable** check box if you want to enable clients that connect to this WLAN to accept IPv6 packets. Otherwise, leave the check box unselected, which is the default value. If you disable (or uncheck) the IPv6 check box, IPv6 will only be allowed after authentication. Enabling IPv6 means that the controller can pass IPv6 traffic without client authentication.



For more detailed information on IPv6 bridging and the **guidelines for using this feature**, refer to the Configuring IPv6 Bridging section of Cisco Wireless LAN Controller Configuration Guide, Release 7.0.

Related Information

- [External Web Authentication with Wireless LAN Controllers Configuration Example](#)
- [Troubleshooting Web Authentication on a Wireless LAN Controller \(WLC\)](#)
- [Cisco Wireless LAN](#)
- [Wired Guest Access using Cisco WLAN Controllers Configuration Example](#)
- [Cisco Wireless LAN Controller Configuration Guide, Release 7.0 – Managing User Accounts](#)
- [Authentication of Wireless LAN Controller's Lobby Administrator via RADIUS Server](#)
- [Technical Support & Documentation – Cisco Systems](#)

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