Configuring a Wireless LAN Connection

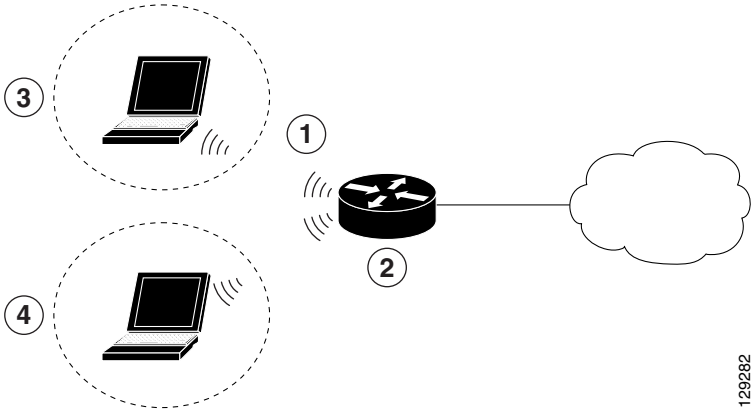
The Cisco 1800 series integrated services fixed-configuration routers support a secure, affordable, and easy-to-use wireless LAN solution that combines mobility and flexibility with the enterprise-class features required by networking professionals. With a management system based on Cisco IOS software, the Cisco routers act as access points, and are Wi-Fi certified, IEEE 802.11a/b/g-compliant wireless LAN transceivers.

You can configure and monitor the routers using the command-line interface (CLI), the browser-based management system, or Simple Network Management Protocol (SNMP). This chapter describes how to configure the router using the CLI. Use the **interface dot11radio** global configuration CLI command to place the device into radio configuration mode.

See the *Cisco Access Router Wireless Configuration Guide* for more detailed information about configuring these Cisco routers in a wireless LAN application.

Figure 9-1 shows a wireless network deployment.

Figure 9-1 Sample Wireless LAN



1	Wireless LAN (with multiple networked devices)
2	Cisco 1800 series integrated services router connected to the Internet
3	VLAN 1
4	VLAN 2

In the configuration example that follows, a remote user is accessing the Cisco 1800 series integrated services router using a wireless connection. Each remote user has his own VLAN.

Configuration Tasks

Perform the following tasks to configure this network scenario:

- Configure the Root Radio Station
- Configure Bridging on VLANs
- Configure Radio Station Subinterfaces

An example showing the results of these configuration tasks is shown in the section "Configuration Example."

Note The procedures in this chapter assume that you have already configured basic router features as well as PPPoE or PPPoA with NAT. If you have not performed these configurations tasks, see Chapter 1, "Basic Router Configuration," Chapter 3, "Configuring PPP over Ethernet with NAT," and Chapter 4, "Configuring PPP over ATM with NAT," as appropriate for your router. You may have also configured DHCP, VLANs, and secure tunnels.

Configure the Root Radio Station

Perform these steps to create and configure the root radio station for your wireless LAN, beginning in global configuration mode:

	Command	Purpose

Step 1	**interface** *name number*
	
	Example:
	`Router(config)# interface dot11radio 0`
	`Router(config-if)#`
		Enters interface configuration mode for the specified wireless interface.

Step 2	**broadcast-key** [[**vlan** *vlan-id*] **change** *secs*] [**membership-termination**] [**capability-change**]
	
	Example:
	`Router(config-if)# broadcast-key vlan 1 change 45`
	`Router(config-if)#`
		Specifies the time interval (in seconds) between rotations of the broadcast encryption key used for clients.
		
		Note Client devices using static Wired Equivalent Privacy (WEP) cannot use the access point when you enable broadcast key rotation—only wireless client devices using 802.1x authentication (such as Light Extensible Authentication Protocol [LEAP], Extensible Authentication Protocol-Transport Layer Security [EAP-TLS], or Protected Extensible Authentication Protocol [PEAP]) can use the access point.
		
		Note This command is not supported on bridges.
		
		See the *Cisco IOS Commands for Access Points and Bridges* document for more details.

	Command	Purpose

Step 3	**encryption** *method algorithm key*
	
	Example:
	`Router(config-if)# encryption vlan 1 mode ciphers tkip`
	`Router(config-if)#`
		Specifies the encryption method, algorithm, and key used to access the wireless interface.
		
		The example uses the VLAN with optional encryption method of data ciphers.

Step 4	**ssid** *name*
	
	Example:
	`Router(config-if)# ssid cisco`
	`Router(config-if-ssid)#`
		Creates a Service Set ID (SSID), the public name of a wireless network.
		
		Note All of the wireless devices on a WLAN must employ the same SSID to communicate with each other.

Step 5	**vlan** *number*
	
	Example:
	`Router(config-if-ssid)# vlan 1`
	`Router(config-if-ssid)#`
		Binds the SSID with a VLAN.

Step 6	**authentication** *type*
	
	Example:
	`Router(config-if-ssid)# authentication open`
	`Router(config-if-ssid)# authentication network-eap eap_methods`
	`Router(config-if-ssid)# authentication key-management wpa`
		Sets the permitted authentication methods for a user attempting access to the wireless LAN.
		
		More than one method can be specified, as shown in the example.

Step 7	**exit**
	
	Example:
	`Router(config-if-ssid)# exit`
	`Router(config-if)#`
		Exits SSID configuration mode, and enters interface configuration mode for the wireless interface.

Step 8	**speed** *rate*
	
	Example:
	`Router(config-if)# basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0`
	`Router(config-if)#`
		(Optional) Specifies the required and allowed rates, in Mbps, for traffic over the wireless connection.

Step 9	**rts** [**retries** | **threshold**]
	
	Example:
	`Router(config-if)# rts threshold 2312`
	`Router(config-if)#`
		(Optional) Specifies the Request to Send (RTS) threshold or the number of times to send a request before determining the wireless LAN is unreachable.

	Command	Purpose

Step 10	**power** [**client** | **local**] [**cck** [*number* | **maximum**] | **ofdm** [*number* | **maximum**]]
	
	Example:
	`Router(config-if)# power local cck 50`
	`Router(config-if)# power local ofdm 30`
	`Router(config-if)#`
		(Optional) Specifies the radio transmitter power level.
		
		See the *Cisco Access Router Wireless Configuration Guide* for available power level values.

Step 11	**channel** [*number* | **least-congested**]
	
	Example:
	`Router(config-if)# channel 2462`
	`Router(config-if)#`
		(Optional) Specifies the channel on which communication occurs.
		
		See the *Cisco Access Router Wireless Configuration Guide* for available channel numbers.

Step 12	**station-role** [**repeater** | **root**]
	
	Example:
	`Router(config-if)# station-role root`
	`Router(config-if)#`
		(Optional) Specifies the role of this wireless interface.
		
		You must specify at least one root interface.

Step 13	**exit**
	
	Example:
	`Router(config-if)# exit`
	`Router(config)#`
		Exits interface configuration mode, and enters global configuration mode.

Configure Bridging on VLANs

Perform these steps to configure integrated routing and bridging on VLANs, beginning in global configuration mode:

	Command or Action	Purpose

Step 1	**bridge** [*number* | **crb** | **irb** |**mac-address-table**]
	
	Example:
	`Router(config)# bridge irb`
	`Router(config)#`
		Specifies the type of bridging.
		
		The example specifies integrated routing and bridging.

Step 2	**interface** *name number*
	
	Example:
	`Router(config)# interface vlan 1`
	`Router(config)#`
		Enters interface configuration mode.
		
		We want to set up bridging on the VLANs, so the example enters the VLAN interface configuration mode.

	Command or Action	Purpose

Step 3	**bridge-group** *number*
	
	Example:
	`Router(config)# bridge-group 1`
	`Router(config)#`
		Assigns a bridge group to the interface.

Step 4	**bridge-group** *parameter*
	
	Example:
	`Router(config)# bridge-group spanning-disabled`
	`Router(config)#`
		Sets other bridge parameters for the bridging interface.

Step 5	**interface** *name number*
	
	Example:
	`Router(config)# interface bvi 1`
	`Router(config)#`
		Enters configuration mode for the virtual bridge interface.

Step 6	**ip address** *address mask*
	
	Example:
	`Router(config)# ip address 10.0.1.1 255.255.255.0`
	`Router(config)#`
		Specifies the address for the virtual bridge interface.

Repeat Step 2 through Step 6 above for each VLAN that requires a wireless interface.

Configure Radio Station Subinterfaces

Perform these steps to configure subinterfaces for each root station, beginning in global configuration mode:

	Command	Purpose

Step 1	**interface** *type number*
	
	Example:
	`Router(config)# interface dot11radio 0.1`
	`Router(config-subif)#`
		Enters subinterface configuration mode for the root station interface.

Step 2	**description** *string*
	
	Example:
	`Router(config-subif)# description Cisco open`
	`Router(config-subif)#`
		Provides a description of the subinterface for the administrative user.

	Command	Purpose

Step 3	**encapsulation dot1q** *vlanID* [**native** | **second-dot1q**]
	
	Example:
	`Router(config-subif)# encapsulation dot1q 1 native`
	`Router(config-subif)#`
		Enables IEEE 802.1q encapsulation on the specified subinterface.

Step 4	**no cdp enable**
	
	Example:
	`Router(config-subif)# no cdp enable`
	`Router(config-subif)#`
		Disables the Cisco Discovery Protocol (CDP) on the wireless interface.

Step 5	**bridge-group** *number*
	
	Example:
	`Router(config-subif)# bridge-group 1`
	`Router(config-subif)#`
		Assigns a bridge group to the subinterface.

Step 6	**exit**
	
	Example:
	`Router(config-subif)# exit`
	`Router(config)#`
		Exits subinterface configuration mode, and enters global configuration mode.

Repeat these steps to configure more subinterfaces, as needed.

Configuration Example

The following configuration example shows a portion of the configuration file for the wireless LAN scenario described in the preceding sections.

```
!
bridge irb
!
interface Dot11Radio0
 no ip address
 !
 broadcast-key vlan 1 change 45
 !
 !
 encryption vlan 1 mode ciphers tkip
 !
 ssid cisco
    vlan 1
    authentication open
    authentication network-eap eap_methods
    authentication key-management wpa
 !
 ssid ciscowep
    vlan 2
```

```
   authentication open
 !
 ssid ciscowpa
   vlan 3
   authentication open
 !
 speed basic-1.0 basic-2.0 basic-5.5 6.0 9.0 basic-11.0 12.0 18.0 24.0 36.0 48.0 54.0
 rts threshold 2312
 power local cck 50
 power local ofdm 30
 channel 2462
 station-role root
!
interface Dot11Radio0.1
 description Cisco Open
 encapsulation dot1Q 1 native
 no cdp enable
 bridge-group 1
 bridge-group 1 subscriber-loop-control
 bridge-group 1 spanning-disabled
 bridge-group 1 block-unknown-source
 no bridge-group 1 source-learning
 no bridge-group 1 unicast-flooding
!
interface Dot11Radio0.2
 encapsulation dot1Q 2
 bridge-group 2
 bridge-group 2 subscriber-loop-control
 bridge-group 2 spanning-disabled
 bridge-group 2 block-unknown-source
 no bridge-group 2 source-learning
 no bridge-group 2 unicast-flooding
!
interface Dot11Radio0.3
 encapsulation dot1Q 3
 bridge-group 3
 bridge-group 3 subscriber-loop-control
 bridge-group 3 spanning-disabled
 bridge-group 3 block-unknown-source
 no bridge-group 3 source-learning
 no bridge-group 3 unicast-flooding
!
interface Vlan1
 no ip address
 bridge-group 1
 bridge-group 1 spanning-disabled
!
interface Vlan2
 no ip address
 bridge-group 2
 bridge-group 2 spanning-disabled
!
interface Vlan3
 no ip address
 bridge-group 3
 bridge-group 3 spanning-disabled
!
interface BVI1
 ip address 10.0.1.1 255.255.255.0
!
interface BVI2
 ip address 10.0.2.1 255.255.255.0
```

```
!
interface BVI3
 ip address 10.0.3.1 255.255.255.0
!
```