



Lab 6.3.2 Configure Radio Interface through the IOS CLI

Estimated Time: 30 minutes

Number of Team Members: Students will work in teams of two.

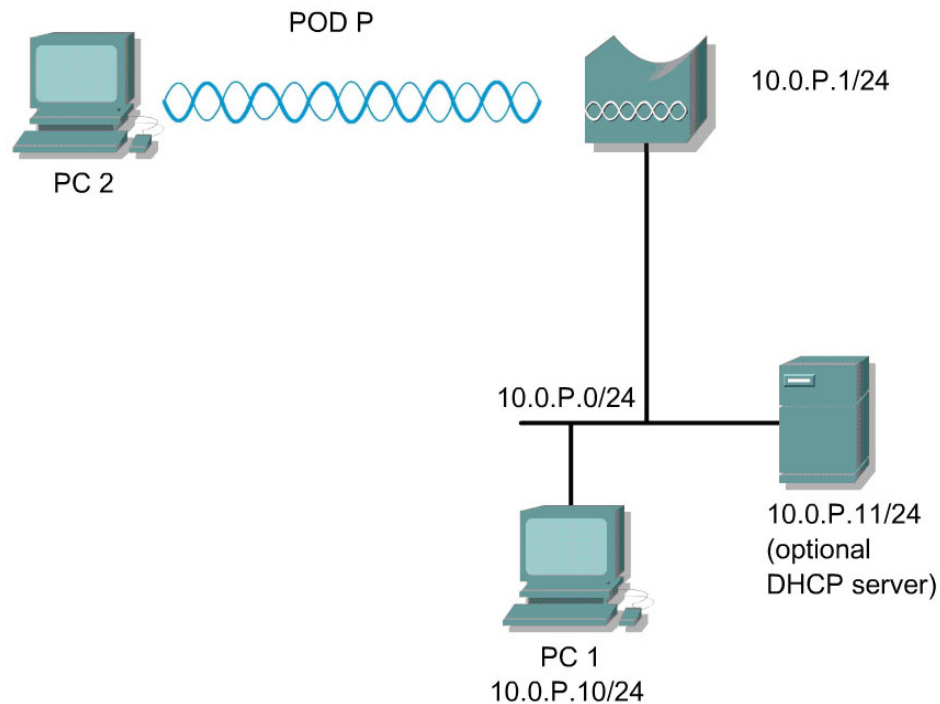
Objective

In this lab, the student will enter basic channel and data rate information for the bridge radio.

Scenario

This section describes how to configure the bridge radio. Use the bridge Radio interface pages in the management system will be used to set the radio configuration.

Topology



Preparation

Configure a PC and bridge according to the Topology

Tools and Resources

- One bridge
- PCs with properly installed Cisco wireless client adapters and utility.
- Several PCs on the wired network that can maintain connectivity to the configuration management pages on the bridge.

Command List

In this lab exercise, the following commands will be used. Refer to this list if assistance or help is needed during the lab exercise.

Command	Description
<code>configure terminal</code>	enter global configuration mode
<code>interface dot11radio <i>number</i></code>	enter the device radio interface. The <i>number</i> is 0 for 11g.
<code>station-role</code>	set the role of the bridge device
<code>speed basic</code>	set the data rate of the bridge
<code>power client</code>	set the power level output of the bridge
<code>channel</code>	set the channel of the bridge
<code>world-mode</code>	set world-mode on the bridge
<code>preamble</code>	set the preamble
<code>antenna</code>	set the receive or transmit antenna

Step 1 Connect to the bridge

Connect to the bridge using the console or telnet.

Enter global configuration mode with the following command:

```
PodP#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
PodP(config)#
```

Step 2 View the available 802.11g radio settings

The bridge radio has many available settings.

Use the following commands to view the available commands for the 802.11g radio:

```
PodP(config)#interface dot11radio 0
PodP(config-if)#?
Interface configuration commands:
  access-expression      Build a bridge boolean access expression
  antenna                dot11 radio antenna setting
  arp                   Set arp type (arpa, probe, snap) or timeout
  bandwidth              Set bandwidth informational parameter
  bridge-group           Transparent bridging interface parameters
  carrier-delay          Specify delay for interface transitions
  cca                   Clear channel assessment threshold
  cdp                   CDP interface subcommands
  concatenation          dot11 packet concatenation
  countermeasure         countermeasure
```

[output omitted]

Note that there are many other commands available.

Step 3 Configuring the role in radio network

The bridge can be configured in a number of station roles to reflect how it is connected to the wired network or the type of clients it is designed to support.

View the available station roles. Then configure the bridge as a root bridge:

```
PodP(config-if) #station-role ?
install          Install Mode for Antenna Alignment
non-root         Bridge non-root
root             Bridge root
workgroup-bridge Workgroup Bridge
PodP(config-if) #station-role root
```

Step 4 Configuring radio data rates

To use the data rate settings to choose the data rates the bridge uses for data transmission. The rates are expressed in megabits per second.

View the available speeds.

```
PodP(config-if) #speed ?
1.0             Allow 1 Mb/s rate
11.0            Allow 11 Mb/s rate
12.0            Allow 12 Mb/s rate
18.0            Allow 18 Mb/s rate
2.0             Allow 2 Mb/s rate
24.0            Allow 24 Mb/s rate
36.0            Allow 36 Mb/s rate
48.0            Allow 48 Mb/s rate
5.5             Allow 5.5 Mb/s rate
54.0            Allow 54 Mb/s rate
6.0             Allow 6 Mb/s rate
9.0             Allow 9 Mb/s rate
basic-1.0       Require 1 Mb/s rate
basic-11.0      Require 11 Mb/s rate
basic-12.0      Require 12 Mb/s rate
basic-18.0      Require 18 Mb/s rate
basic-2.0       Require 2 Mb/s rate
basic-24.0      Require 24 Mb/s rate
basic-36.0      Require 36 Mb/s rate
basic-48.0      Require 48 Mb/s rate
basic-5.5       Require 5.5 Mb/s rate
basic-54.0      Require 54 Mb/s rate
basic-6.0       Require 6 Mb/s rate
basic-9.0       Require 9 Mb/s rate
default        Set default rates
range          Set rates for best range
throughput     Set rates for best throughput
<cr>
PodP(config-if) #
```

Use the following commands to set up the bridge for 54-Mbps service only:

```
PodP(config-if) #speed basic-54.0
PodP(config-if) #
```

Step 5 Configuring radio transmit power

The power level on client devices that associate to the bridge and the bridge radio power can be manually set. Set the transmit power for the 802.11g radio to one of the power levels allowed in your regulatory domain. All settings are in mW.

Use the help to view the power settings which can be configured.

```
PodP(config-if)#power ?
  client  Client radio transmitter power level
  local   Local radio transmitter power level
PodP(config-if)#
```

See which power levels are configurable on the bridge.

```
PodP(config-if)#power local ?
  cck     Set local power for CCK rates
  ofdm    Set local power for OFDM rates
PodP(config-if)#
```

You can set Orthogonal Frequency Division Multiplexing (OFDM) power levels and Complementary Code Keying (CCK) power levels. CCK modulation is supported by 802.11b and 802.11g devices. OFDM modulation is supported by 802.11g and 802.11a devices.

Note: The settings allowed in your regulatory domain might differ from the settings listed here.

Configure the bridge radio power to 5mW.

```
PodP(config-if)#power local cck 5
PodP(config-if)#
```

Note: The 802.11g radio transmits at up to 100 mW for the 1, 2, 5.5, and 11Mbps data rates. However, for the 6, 9, 12, 18, 24, 36, 48, and 54Mbps data rates, the maximum transmit power for the 802.11g radio is 30 mW.

When a client device associates to the bridge, the bridge sends the maximum power level setting to the client. Follow these steps to specify a maximum allowed power setting on all client devices that associate to the bridge, the example below sets the radio transmit power to 100mW:

```
PodP(config-if)#power client 100
PodP(config-if)#
```

Now lower the setting to 5mw:

```
PodP(config-if)#power client 5
PodP(config-if)#
```

Step 6 Configuring radio channel settings

The default channel setting for the bridge radios is least congested. At startup, the bridge scans for and selects the least congested channel. For the most consistent performance after a site survey, it is recommended that a static channel setting for each bridge be assigned. The channel settings on your bridge correspond to the frequencies available in your regulatory domain. Only a bridge running in root mode will allow configuration of a static channel.

See what channels are available

```
PodP(config-if)#channel ?
<1-2462>          One of: 1 2 3 4 5 6 7 8 9 10 11 2412 2417 2422 2427
2432 2437 2442 2447 2452 2457 2462
  least-congested Scan for best frequency
PodP(config-if)#
```

Follow the steps below to assign a static channel setting for the bridge. The example below sets the radio to channel 1:

```
PodP(config-if) #channel 1    (or the channel frequency)
PodP(config-if) #
```

Now assign a least congested channel setting for the bridge. The example below sets the radio to the least congested channel setting:

```
PodP(config-if) #channel least-congested
PodP(config-if) #
```

Step 7 Enabling and disabling world-mode

When **world-mode** is enabled, the bridge adds channel carrier set information to its beacon. Client devices with **world-mode** enabled receive the carrier set information and adjust their settings automatically. For example, a client device used primarily in Japan could rely on **world-mode** to adjust its channel and power settings automatically when it travels to Italy and joins a network there. World mode is disabled by default.

To view **world-mode** options on the bridge, use the help feature.

```
PodP(config-if) #world-mode ?
    dot11d  802.11d World Mode advertise country
    legacy  Legacy World Mode advertize country
PodP(config-if) #
```

When you enter the dot11d option, you must enter a two-character ISO country code (for example, the ISO country code for the United States is US). You can find a list of ISO country codes at the ISO website. After the country code, you must enter indoor, outdoor, or both to indicate the placement of the bridge. Enter the legacy option to enable Cisco legacy world mode.

To enable legacy **world-mode** on the bridge, follow the steps below:

```
PodP(config-if) #world-mode legacy
PodP(config-if) #
```

Step 8 Disabling and enabling short radio preambles

The radio preamble (sometimes called a *header*) is a section of data at the head of a packet that contains information that the bridge and client devices need when sending and receiving packets. The radio preamble can be set to long or short, and is set to short by default.

- Short—A short preamble improves throughput performance. Cisco Aironet Wireless LAN Client Adapters support short preambles. Early models of Cisco Aironet's Wireless LAN Adapter (PC4800 and PC4800A) require long preambles.
- Long—A long preamble ensures compatibility between the bridge and all early models of Cisco Aironet Wireless LAN Adapters (PC4800 and PC4800A). If these client devices do not associate to your bridges, you should use short preambles.

Follow these steps to disable short radio preambles:

```
PodP(config-if) #no preamble-short
PodP(config-if) #
```

Follow these steps to enable short radio preambles:

```
PodP(config-if) #preamble-short
PodP(config-if) #
```

Step 9 Configuring transmit and receive antennas

The bridge can be set to select the antenna the bridge uses to receive and transmit data. There are three options for both the receive and the transmit antenna:

- **Diversity**—This default setting tells the bridge to use the antenna that receives the best signal. If your bridge has two fixed (non-removable) antennas, you should use this setting for both receive and transmit.
- **Right**—If your bridge has removable antennas and you install a high-gain antenna on the bridge's right connector, you should use this setting for both receive and transmit. When you look at the bridge's back panel, the right antenna is on the right.
- **Left**—If your bridge has removable antennas and you install a high-gain antenna on the bridge's left connector, you should use this setting for both receive and transmit. When you look at the bridge's back panel, the left antenna is on the left.

View the available antenna settings

```
PodP(config-if)#antenna ?
gain          Configure Resultant Antenna Gain
receive       receive antenna setting
transmit      transmit antenna setting
```

View the available receive options:

```
PodP(config-if)#antenna receive?
diversity     antenna diversity
left          antenna left
right         antenna right
```

Follow these steps to set the bridge receive and transmit to right: (the interfaces will reset after each change.)

```
PodP(config-if)#antenna receive right
PodP(config-if)#antenna transmit right
PodP(config-if)#
```

Follow these steps to set the bridge receive and transmit to left:

```
PodP(config-if)#antenna receive left
PodP(config-if)#antenna transmit left
PodP(config-if)#
```

Follow these steps to set the bridge back to receive and transmit to diversity:

```
PodP(config-if)#antenna receive diversity
PodP(config-if)#antenna transmit diversity
PodP(config-if)#
```

Step 10 Disable the radio

If the PC is connected through wireless, it is important to switch to a console connection.

Use the shutdown command to turn off the radio. Afterwards, re-enable the interface.

```
PodP(config-if)#shutdown
*Mar  1 02:27:18.082: %LINK-5-CHANGED: Interface Dot11Radio0,
changed state to administratively down
*Mar  1 02:27:18.082: %LINK-5-CHANGED: Interface Virtual-
Dot11Radio0, changed state to administratively down
*Mar  1 02:27:19.083: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Dot11Radio0, changed state to down
PodP(config-if)#
PodP(config-if)#no shutdown
*Mar  1 02:28:00.414: %LINK-5-CHANGED: Interface Dot11Radio0,
changed state to reset
```

```
*Mar  1 02:28:00.414: %LINK-3-UPDOWN: Interface Virtual-Dot11Radio0,  
changed state to down  
*Mar  1 02:28:00.433: %LINK-3-UPDOWN: Interface Dot11Radio0, changed  
state to up  
*Mar  1 02:28:01.432: %LINEPROTO-5-UPDOWN: Line protocol on  
Interface Dot11Radio 0, changed state to up
```