Lab 8.5.4.2 Configuring Site-to-Site Wireless Link using Enterprise Security

Estimated Time: 45 minutes

Number of Team Members: Students will work in teams of 2.

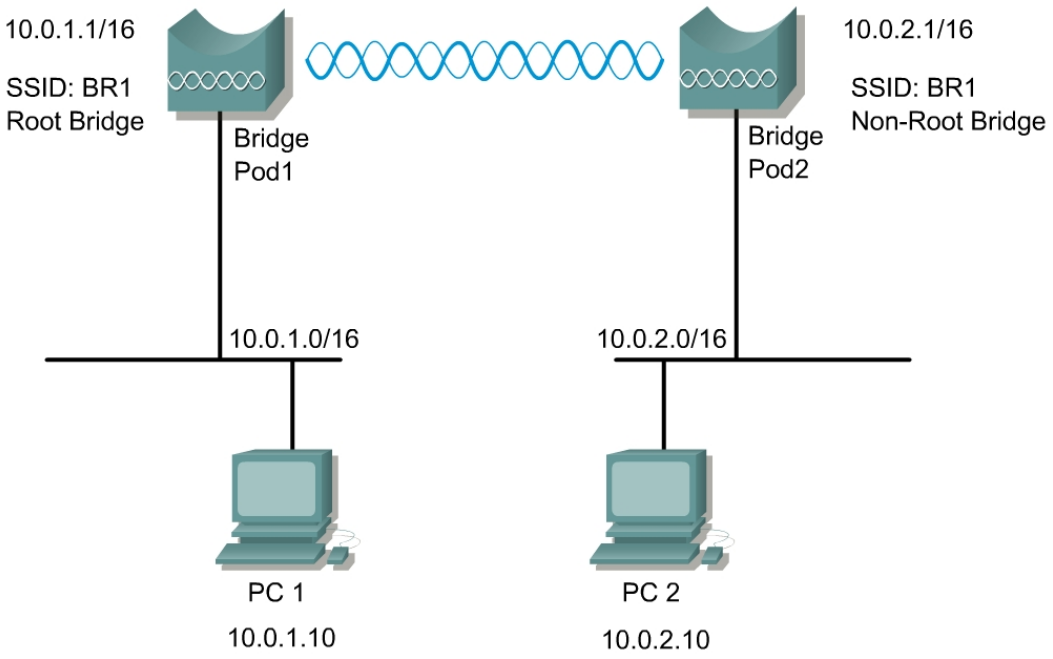
Objective

Configure a site-to-site bridged network using enterprise security features.

Scenario

A remote location located several miles away requires connectivity to the existing wired network. The connection can be bridged wirelessly with the use of two BR350s. The company's security policy mandated a minimum of 128 bit WEP security for all wireless connections.

Topology



Preparation

In this lab, the following will be configured.

Device Name	Label	SSID	Address
BPod1	BR1	BR1	10.0.1.1/16
BPod2	BR2	BR1	10.0.2.1/16

Tools and Resources

Each team will require the following:

- Two wired LAN segments that will be bridged together
- Two Cisco BR350
- PC with FTP server loaded and a file to transfer in the root directory of the FTP server

Step 1 Cable and power the bridge

a. First, attach 2 rubber duck antennas to the RP-TNC connectors.

b. Plug the RJ-45 Ethernet cable into the Ethernet port on the back of the bridge. Plug the other end of the Ethernet cable into the Cisco Aironet power injector TO AP/BRIDGE end.

c. Connect the power cable into the inline power injector and to the receptacle.

Step 2 Connect to the bridge

Connect a nine-pin, male-to-female, straight-through serial cable to the COM port on a computer and to the RS-232 serial port on the bridge. (This cable ships with the bridge)

a. Open a terminal emulator.

b. Enter these settings for the connection:

- Bits per second (baud rate): 9600
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control: Xon/Xoff

c. Press **=** to display the home page of the bridge. If the bridge has not been configured before, the Express Setup page appears as the home page. If this is the case, go to Step 3.

d. If the bridge is already configured, the Summary Status page appears as the home page. When Summary Status screen appears, type :**resetall**, and press **Enter**.

```
Enter "YES" to confirm Resetting All parameters to factory defaults:
YES
00:02:12 (FATAL): Rebooting System due to Resetting Factory Defaults
*** Restarting System in 5 seconds...
```

e. Type **yes**, and press **Enter** to confirm the command.

f. Power cycle the bridge by removing the power.

Step 3 Connect to the BR350 through Express Setup

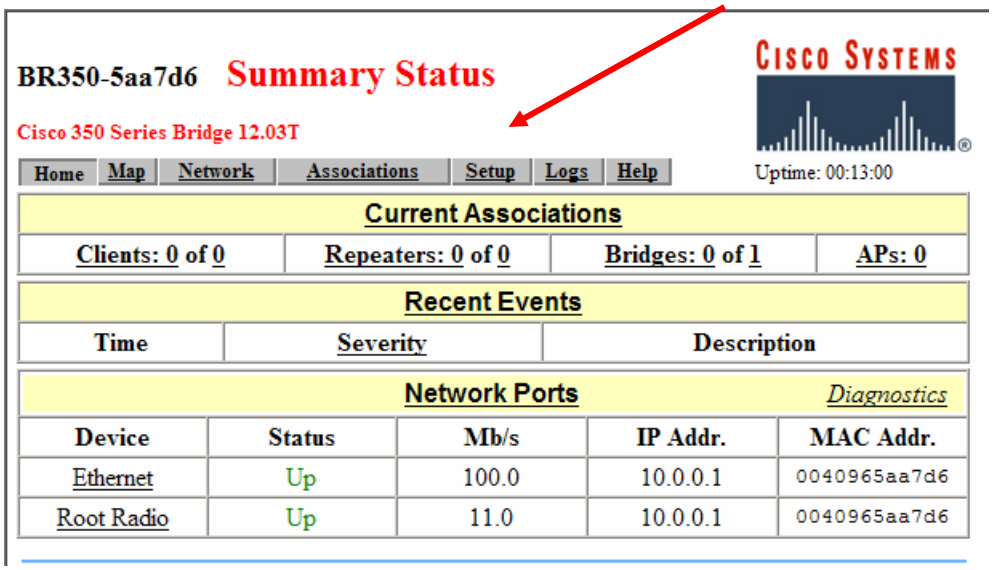
a. Plug a second RJ-45 Ethernet cable into the power injector end labeled TO NETWORK. Plug the other end of the Ethernet cable into the Ethernet port on a switch or hub. Then connect PC1 to the switch. A crossover cable can be used to connect directly from the inline power injector to PC1/PC2.

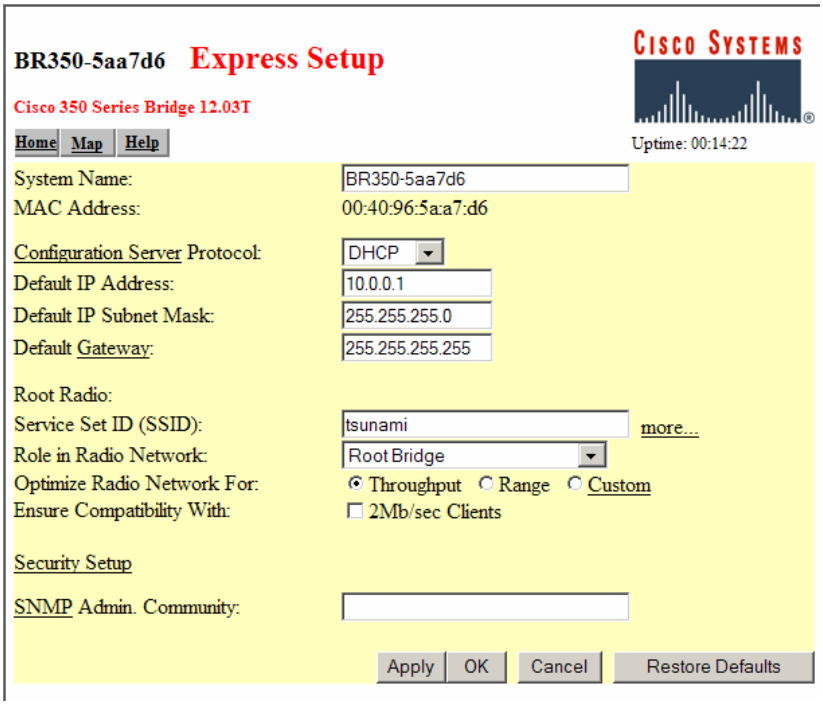
b. Configure PC1 to 10.0.0.2/16.

c. Open a web browser and enter the default bridge address http://10.0.0.1 and press **Enter**.

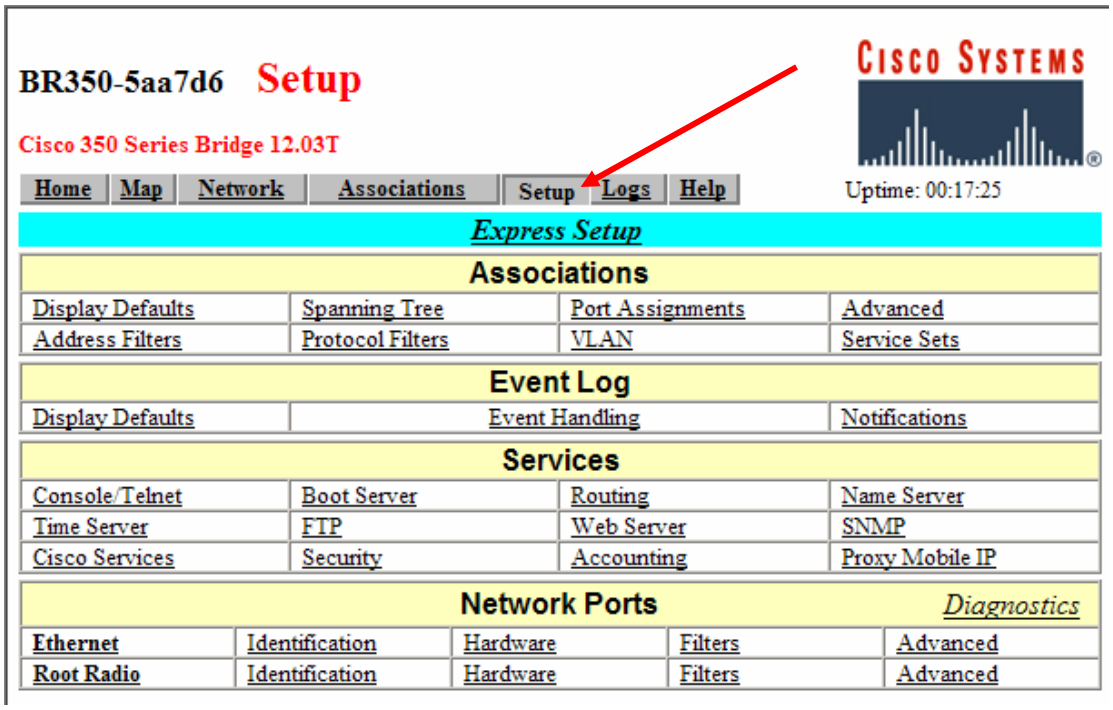
d. Either of the following pages will appear:

- The **Summary Status** Page, also known as the **Home** Page
- The **Express Setup** Page



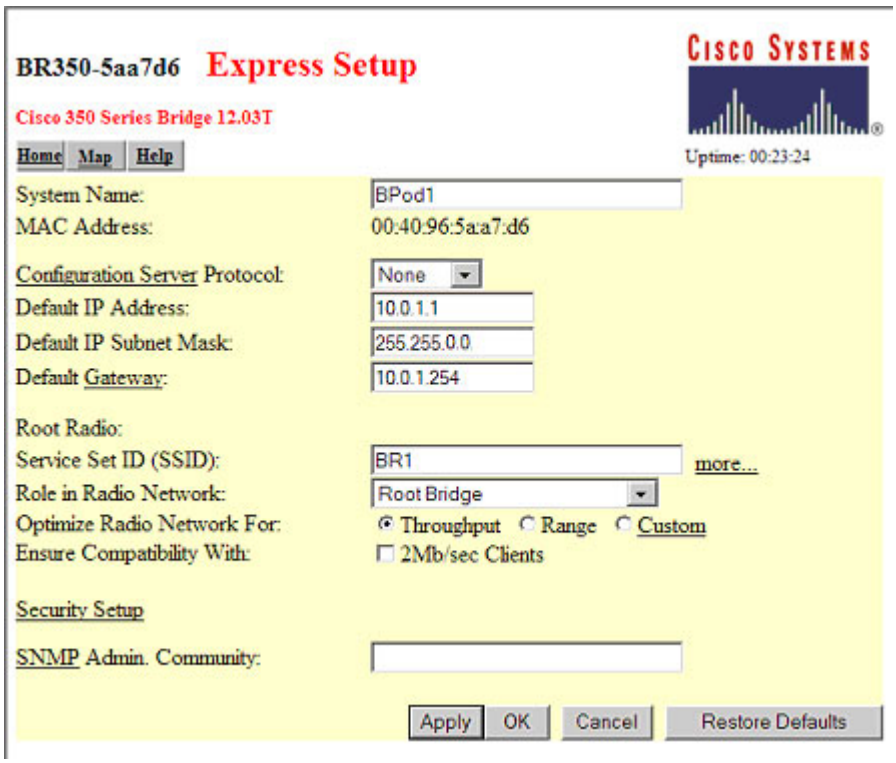


e. If the **Express Setup** Page does not appear, from the **Summary Status** Page click on the **Setup** hyperlink. This will bring up the Setup Page.



f. Click on the Express Setup link. This will bring up the Express Setup Page.

Step 4 Configure the bridge settings



Configure the following settings:

	Parameter	BPod1	BPod2
a.	System Name:	***BPod1***	***BPod2***
b.	Configuration Server Protocol:	***None***	***None***
c.	Default IP address:	***10.0.1.1***	***10.0.2.1***
d.	Default Gateway:	***10.0.1.254***	***10.0.1.254***
e.	Service Set ID:	***BR1***	***BR1***
f.	Role in Radio Network:	***Root Bridge***	***Non-Root Bridge w/o Clients***

g. Click Apply. The connection will drop.

h. Configure the PCs.

- PC1 with an IP address of 10.0.1.10/16
- PC2 with an IP address of 10.0.2.10/16

i. Reconnect to the using the browser. Enter 10.0.P.1 and connect.

j. Verify the settings.

k. What roles can the bridge serve in the network?

_____
_____
_____

l. Why would the BR350 be used in Root AP mode, compared to using a 1200 or 1100 AP?

_____
_____
_____

Step 5 Test the connection

Verify client PCs are configured with the appropriate IP address. The only wireless devices on this topology will be the two wireless multi-function bridges used for the point-to-point connection.

a. Once the wireless bridge link is configured properly, ping from PC1 to BPod2. Then ping from PC1 to PC2.

b. Were these successful?

_____

c. Test layer 7 connectivity by browsing to BPod2 from PC1.

d. Configure FTP or Web services on PC1 and PC2. Transfer a files from PC1 to PC2 and vice versa. Calculate the download performance across the wireless link.

e. What was the download speed in Mbps?

_____

f. What is the distance limitation between two wireless bridges?

_____

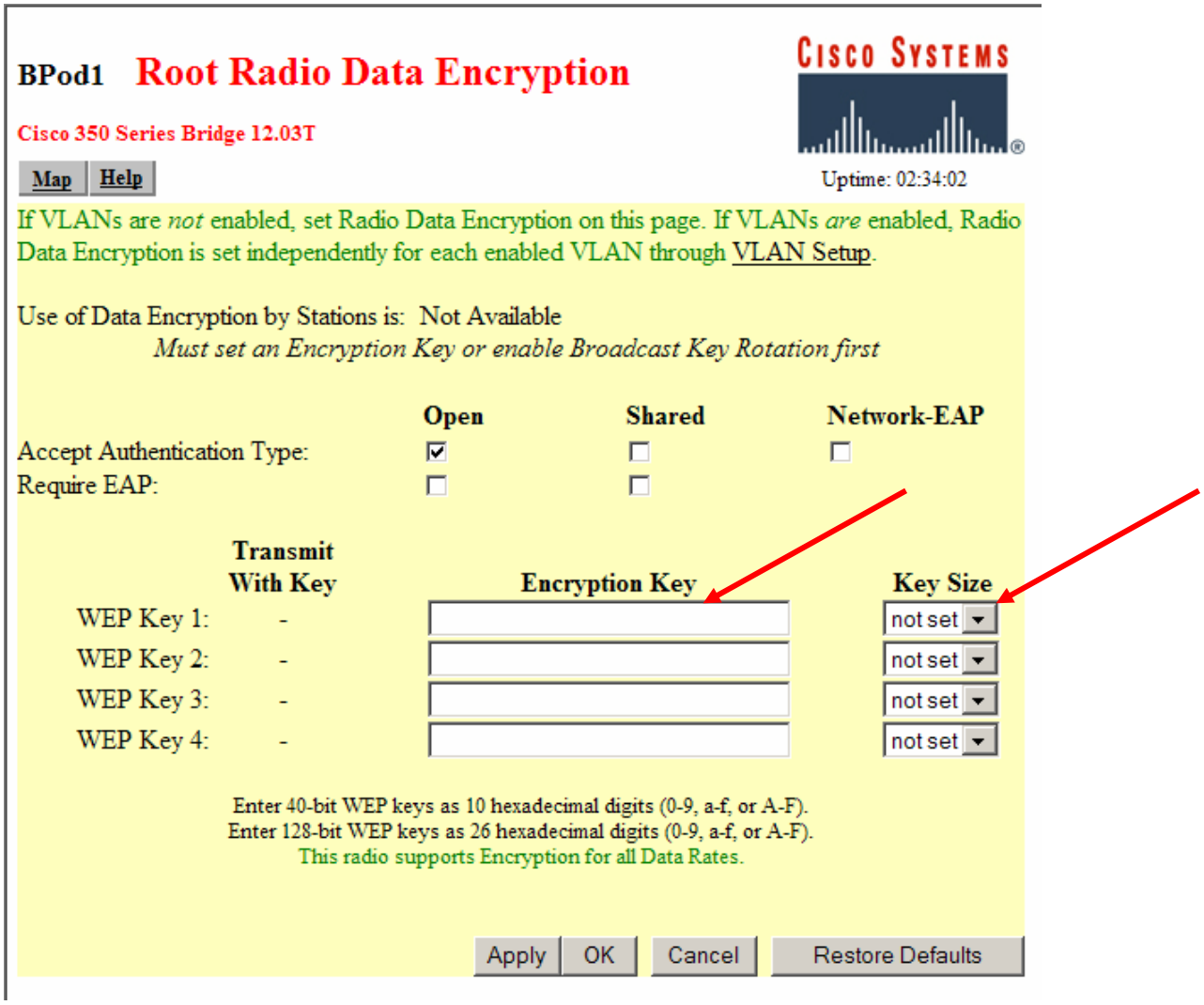
g. What is the distance limitation between an AP and a Bridge?

_____

h. Why are 2 bridges able to connect at longer distances?

_____

Step 6 Configure WEP on both bridges



Follow these steps to set up WEP keys and enable WEP:

a. On the Summary Status page, click **Setup.**

b. On the Setup page, click **Security**.

c. On the Security Setup page, click **Radio Data Encryption (WEP)**.

d. From the **Root Radio Data Encryption** page.

e. Before WEP can be enabled, a WEP key must be entered in at least one of the Encryption Key fields.

f. Use the Key Size pull-down menu to select the **128-bit** encryption for the WEP Key 1.

g. Click in the Encryption Key field and enter a WEP key.

h. How many digits must be entered for 128 bit WEP?

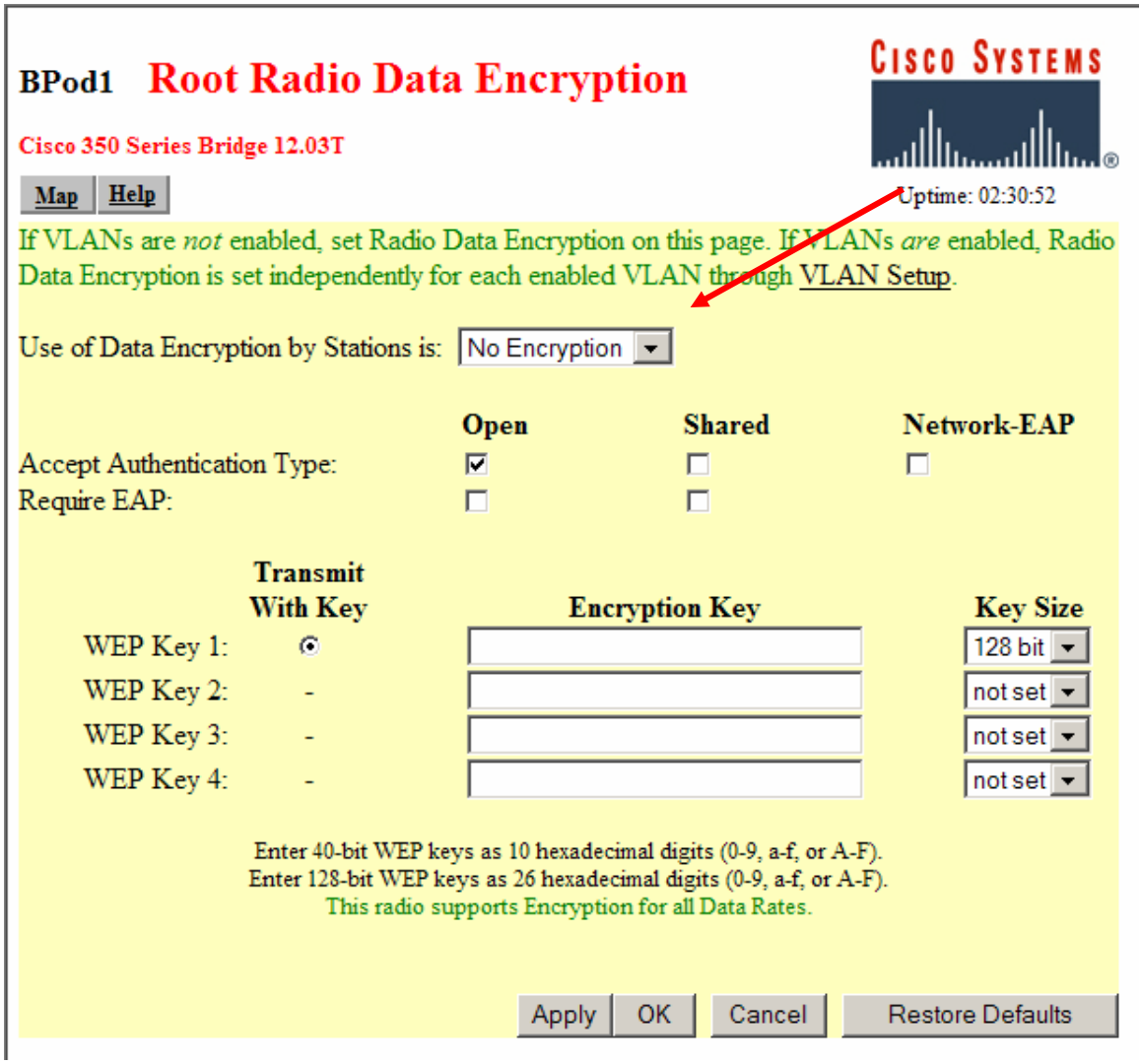
_____

i. Record the key below.

_____

_____

j. Click Apply to save the WEP Key.



k. Notice that the Drop down box appears next to the **Use of Data Encryption by Stations is**. Select Full Encryption from the pull-down menu labeled **Use of Data Encryption by Stations is**.

l. Click OK, which returns the bridge to the **Security Setup** Page.

m. Repeat the same steps on the other bridge.

Note The characters typed for the key contents appear only when typing. After the click **Apply** or **OK**, the key contents cannot be viewed. Select **Not set** from the Key Size pull-down menu to clear a key.

WEP Key Setup Example

Key Slot	Bridge (Root)		Non-Root Device	
	Transmit?	Key Contents	Transmit?	Key Contents
1	x	12345678901234567890abcdef	-	12345678901234567890abcdef
2	-	09876543210987654321fedcba	x	09876543210987654321fedcba
3	-	not set	-	not set
4	-	not set	-	not set

Because the bridge WEP key 1 is selected as the transmit key, WEP key 1 on the other device must contain the same contents.

Step 7 Retest the connection

Once the wireless bridge link is configured with WEP, ping each PC to test end-to-end connectivity between the two PCs.

a. Was this successful? If not, what should be checked?

_____

Configure ftp services on PC1 and PC2. Calculate the download performance across the wireless link.

b. What was the download speed in Mbps? Did WEP have a impact on performance?

_____

c. What other enhancements can be used to improve WEP security?

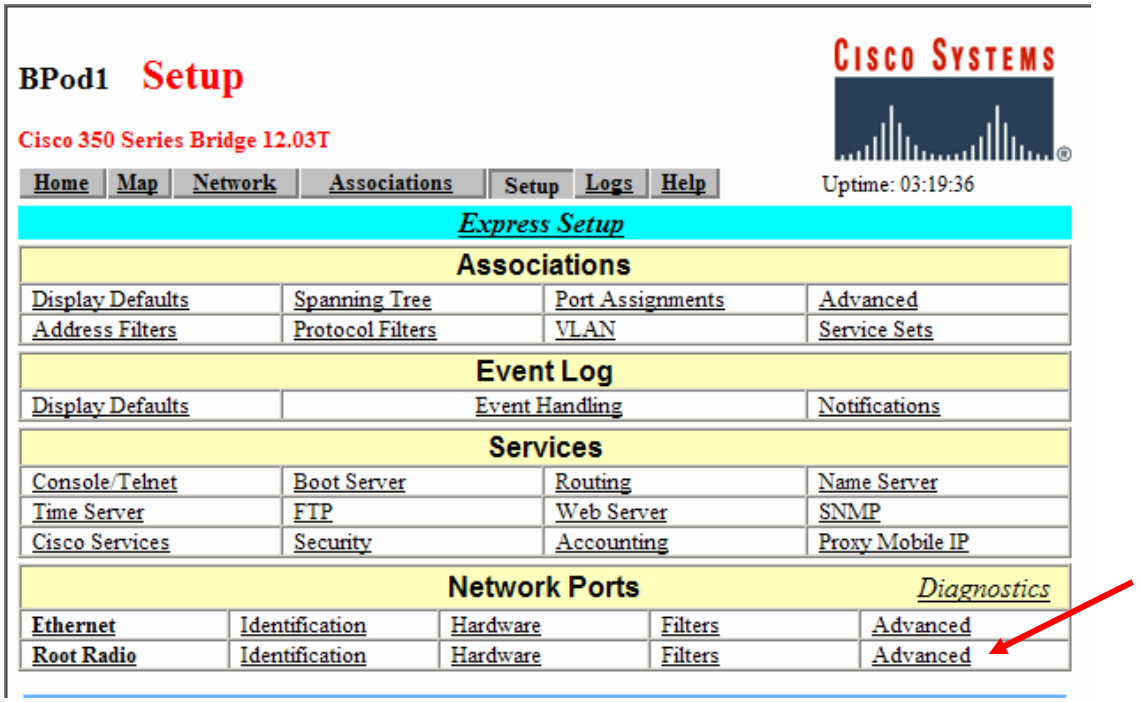
_____

d. What technology can be used at layer 3 to improve security of the wireless link?

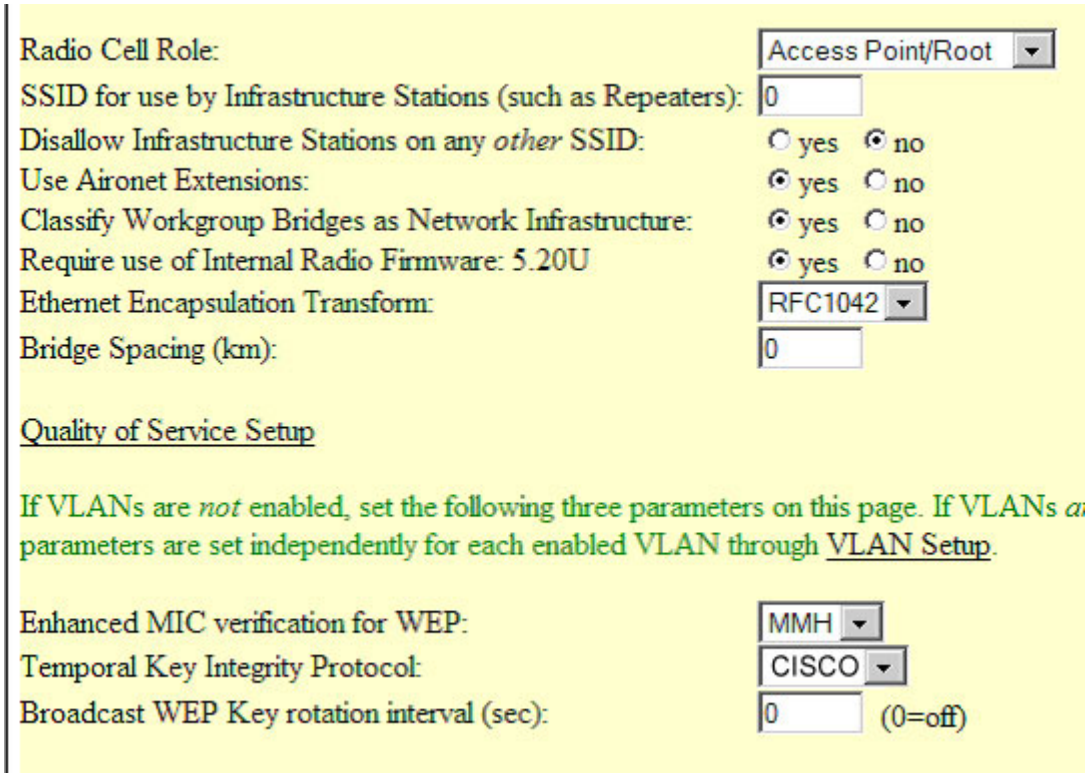
_____

Step 8 Enable enterprise security

Once WEP is configured correctly, additional measures should be configured to secure the wireless link. Follow these steps to set up TKIP, MIC and BKR.



a. From the Setup Page, click **Root Radio** advanced link



b. From the **Root Radio Advance** page, select **MMH** from the drop down list for the Enhanced MIC verification for WEP:.

c. Verify the Use Aironet Extensions is selected as yes.

d. Click the **Apply** button. The wireless link will be lost with the other bridge.

e. Configure the other bridge with the same security setting.

f. The link should be re-established.

g. From the **Root Radio Advance** page, select **Cisco** from the drop down list for the Temporal Key Integrity Protocol:.

h. Verify the Use Aironet Extensions is selected as yes.

i. Click the **Apply** button. The wireless link will be lost with the other bridge.

j. Configure the other bridge with the same security setting.

k. The link should be re-established.

- What attack does TKIP prevent?

  _____

- Why do the Aironet extensions have to be used?

  _____

l. From the **Root Radio Advance** page, select enter a value of 90 seconds as the **Broadcast WEP Key rotation interval**.

m. Click the **Apply** button. The wireless link will be lost with the other bridge.

n. Configure the other bridge with the same security setting.

o. The link should be re-established.

- What attack does BKR prevent?

  _____

