Cisco Flexible Radio Assignment

Information About Flexible Radio Assignment

Flexible Radio Assignment (FRA) takes advantage of the dual-band radios included in APs. The FRA is a new feature added to the RRM to analyze the Neighbor Discovery Protocol (NDP) measurements, which manages the hardware used to determine the role of the new flexible radio (2.4 GHz, 5 GHz, or monitor) in your network.

Traditional legacy dual–band APs always had 2 radio slots, (1 slot per band) and were organized by the band they were serving, that is slot 0= 802.11b,g,n and slot 1=802.11a,n,ac.

XOR Support in 2.4-GHz or 5-GHz Bands

The flexible radio (XOR) offers the ability to serve the 2.4-GHz or the 5-GHz bands, or passively monitor both bands on the same AP. The AP models that are offered are designed to support dual 5-GHz band operations, with the Cisco APs *i* model supporting a dedicated Macro/Micro architecture, and the *e* and *p* models supporting Macro/Macro architecture.

When using FRA with the internal antenna (*i* series models), two 5-GHz radios can be used in a Micro/Macro cell mode. When using FRA with external antenna (*e* and *p* models) the antennas may be placed to enable the creation of two completely separate macro (wide-area cells) or two micro cells (small cells) for HDX or any combination.

FRA calculates and maintains a measurement of redundancy for 2.4-GHz radios and represents this as a new measurement metric called COF (Coverage Overlap Factor).

This feature is integrated into existing RRM and runs in mixed environments with legacy APs. The **AP MODE** selection sets the entire AP (slot 0 and slot1) into one of several operating modes, including:

- Local Mode

- Monitor Mode

- FlexConnect Mode

- Sniffer Mode

- Spectrum Connect Mode

Before XOR was introduced, changing the mode of an AP propagated the change to the entire AP, that is both radio slot 0 and slot 1. The addition of the XOR radio in the slot 0 position provides the ability to operate a single radio interface in many of the previous modes, eliminating the need to place the whole AP into a mode. When this concept is applied to a single radio level, its is called *role*. Three such roles can be assigned now:

- Client Serving

- Either 2.4 GHz(1) or 5 GHz(2)

- Monitor-Monitor mode (3)

Note

- MODE: Assigned to a whole AP (slot 0 and slot 1)

- ROLE: Assigned to a single radio interface (slot 0)

Benefits of the FRA

- Solves the problem of 2.4–GHz over coverage.

- Creating two diverse 5–GHz cells doubles the airtime that is available.

- Permits one AP with one Ethernet drop to function like two 5–GHz APs.

- Introduces the concept of Macro/Micro cells for airtime efficiency.

- Allows more bandwidth to be applied to an area within a larger coverage cell.

- Can be used to address nonlinear traffic.

- Enhances the High-Density Experience (HDX) with one AP.

- XOR radio can be selected by the corresponding user in either band–servicing client mode or monitor mode.

Configuring an FRA Radio (CLI)

Procedure

	Command or Action	Purpose
Step 1	**enable**	Enters privileged EXEC mode.
	Example:	
	Device# **enable**	
Step 2	**configure terminal**	Enters global configuration mode.
	Example:	
	Device# **configure terminal**	

	Command or Action	**Purpose**
Step 3	**[no] ap fra** **Example:** Device(config)# **[no] ap fra**	Enables or disables FRA on the AP.
Step 4	**ap fra interval** **Example:** Device(config)# ap fra interval 3	Configures the FRA interval in hours. The range is 1 to 24 hours. **Note** The FRA interval has to be more than the configured RRM interval.
Step 5	**ap fra sensitivity** {**high** | **medium** | **low**} **Example:** Device(config)# ap fra sensitivity high	Configures the FRA sensitivity. • **high**: Sets the FRA Coverage Overlap Sensitivity to **high**. • **medium**: Sets the FRA Coverage Overlap Sensitivity to **medium**. • **low**: Sets the FRA Coverage Overlap Sensitivity to **low**.
Step 6	**end** **Example:** Device(config)# **end**	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.
Step 7	**ap fra revert** {**all** | **auto-only**} {**auto** | **static**} **Example:** Device# ap fra revert all auto	Rolls back the XOR Radio state. • **all**: Reverts all XOR Radios • **auto-only**: Revert only XOR radios currently in automatic band selection. • **auto**: Sets the XOR radios in automatic band selection. • **static**: Sets the XOR radio in static 2.4-GHz band.
Step 8	**show ap dot11** {**24ghz** | **5ghz**} **summary** **Example:** Device# **show ap dot11 5ghz summary**	Shows the configuration and statistics of 802.11 Cisco APs

Step 9	Device# **show ap fra**
	
	Example:
	Device# **show ap fra**
	
	FRA State
	                : Disabled
	FRA Sensitivity
	                : medium (95%)
	FRA Interval
		Shows the current FRA configuration.

	Command or Action	Purpose
| | ```
                  : 1 Hour(s)

AP Name              MAC Address
 Slot ID  Current-Band     COF %
 Suggested Mode
-------------------------------------------------
AP00A6.CA36.295A     006b.f09c.8290
 0      2.4GHz            None
 2.4GHz

COF : Coverage Overlap Factor

test_machine#
``` | |
| Step 10 | **show ap name** *ap-name* **config dot11 dual-band**

Example:

Device# **show ap name config dot11 dual-band** | Shows the current 802.11 dual-band parameters in a given AP. |

Configuring an FRA Radio (GUI)

Procedure

Step 1   Choose **Configuration** > **Radio Configurations** > **RRM** > **FRA**.

Step 2   In the **Flexible Radio Assignment** window, enable FRA status and determine the overlapping 2.4 GHz or 5 GHz coverage for each AP, choose **Enabled** in the **FRA Status** field. By default, the FRA status is disabled.

Step 3   Under the From the **FRA Interval** drop-down list, choose the FRA run interval. The interval values range from 1 hour to 24 hours. You can choose the FRA run interval value only after you enable the FRA status.

Step 4   From the **FRA Sensitivity** drop-down list, choose the percentage of Coverage Overlap Factor (COF) required to consider a radio as redundant. You can select the supported value only after you enable the FRA status.

The supported values are as follows:

- Low: 100 percent

- Medium (default): 95 percent

- High: 90 percent

The **Last Run** and **Last Run Time** fields will show the time FRA was run last and the time it was run.

Step 5   Check the **Client Aware** check box to take decisions on redundancy.

When enabled, the **Client Aware** feature monitors the dedicated 5-GHz radio and when the client load passes a pre-set threshold, automatically changes the Flexible Radio assignment from a monitor role into a 5-GHz role, effectively doubling the capacity of the cell on demand. Once the capacity crisis is over and Wi-Fi load returns to normal, the radios resume their previous roles.

Step 6   In the **Client Select** field, enter a value for client selection. The valid values range between 0 and 100 percent. The default value is 50 percent.

This means that if the dedicated 5-GHz interface reaches 50% channel utilization, this will trigger the monitor role dual-band interface to transition to a 5-GHz client-serving role.

Step 7   In the **Client Reset** field, enter a reset value for the client. The valid values range between 0 and 100 percent. The default value is 5 percent.

Once the AP is operating as a dual 5-GHz AP, this setting indicates the reduction in the combined radios' overall channel utilization required to reset the dual-band radio to monitor role.

Step 8   Click **Apply** to save the configuration.