

Configure URWB on the Catalyst 9800 for Mobility Deployment

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Introduction

This document describes configuration for a mobility deployment using an AP that supports URWB and is associated with a Catalyst 9800 Series WLC.

Background Information

This topology supports connectivity for moving assets such as vehicles or robots. It is essential for use cases that require continuous, low-latency communication while in motion.

Acronyms

- Mobility Base (MB)
- Mobility Client (MC)

- Access Point (AP)
- Ultra-Reliable Wireless Backhaul (URWB)
- Wireless LAN Controller (WLC)

Components Used

The configuration involves two different types of hardware components:

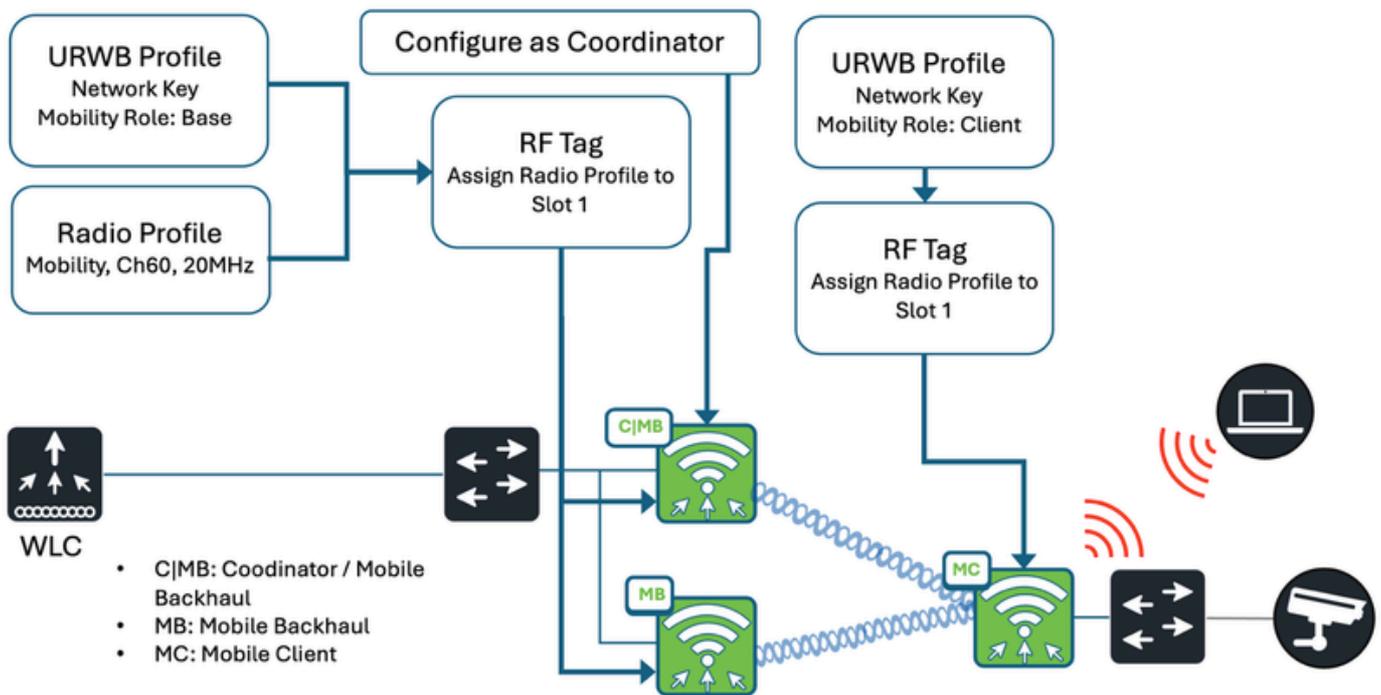
- 3x Cisco Catalyst IW9167
- C9800-40

The information in this document was created from the devices in a specific lab environment. All devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Refer to Old & New terminologies from [here](#)

URWB Mobility Network Topology Using Catalyst 9800 Controller CLI

Example: Simple URWB mobility network



URWB Mobility Configuration from the Catalyst 9800 Controller

At a high level, three steps are required for deployment:

1. Access Points (APs) that support URWB must be associated with the Catalyst 9800 WLC.
2. Apply the necessary configuration to the Access Points.

3. Deploy the Access Points in the network.

Configuring URWB Network Profile

(Configure -> URWB Network Profile)

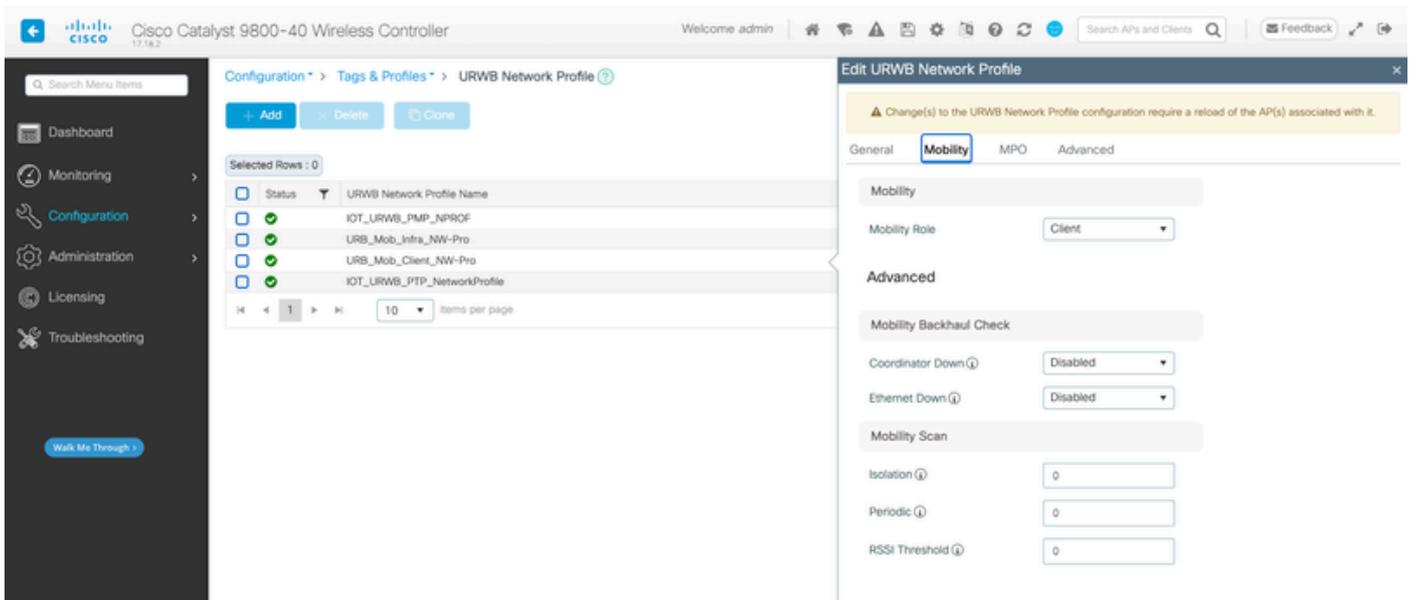
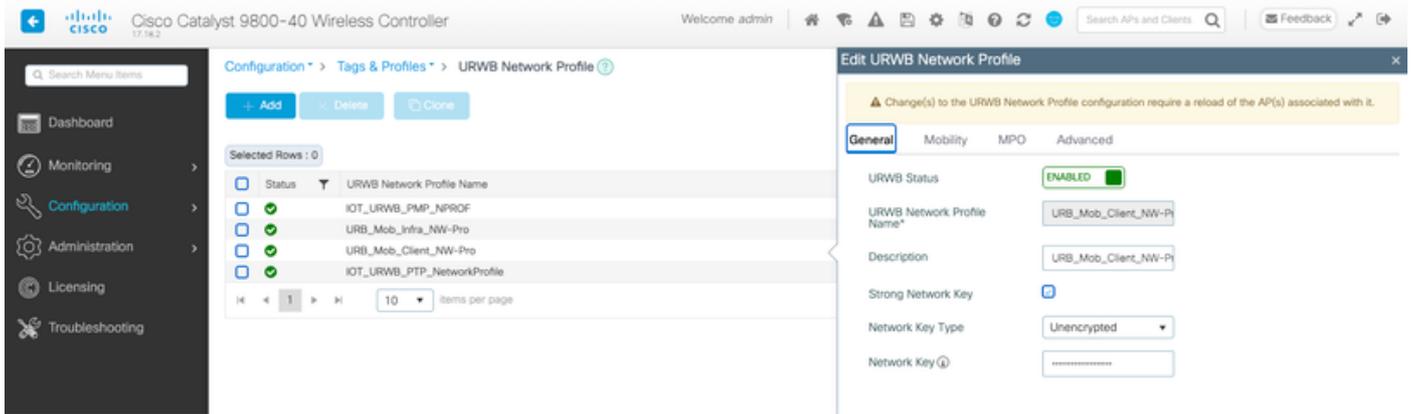
Network Profile for Mobility Base

The screenshot shows the Cisco Catalyst 9800-40 Wireless Controller configuration interface. The left sidebar contains navigation options: Dashboard, Monitoring, Configuration, Administration, Licensing, and Troubleshooting. The main content area is titled 'Configuration > Tags & Profiles > URWB Network Profile'. A table lists several URWB Network Profiles with their status and names. The 'Edit URWB Network Profile' window is open, showing the 'General' tab. The 'URWB Status' is set to 'ENABLED'. The 'URWB Network Profile Name' and 'Description' are both 'URB_Mob_Infra_NW-Pro'. The 'Strong Network Key' is checked, and the 'Network Key Type' is set to 'Unencrypted'. A warning message at the top states: 'Change(s) to the URWB Network Profile configuration require a reload of the AP(s) associated with it.'

The screenshot shows the same configuration interface as above, but with the 'Mobility' tab selected in the 'Edit URWB Network Profile' window. The 'Mobility Role' is set to 'Base'. Under the 'Advanced' section, 'Mobility Backhaul Check' is shown with 'Coordinator Down' and 'Ethernet Down' both set to 'Disabled'. The 'Mobility Scan' section has 'Isolation', 'Periodic', and 'RSSI Threshold' all set to '0'. The same warning message is present at the top.

wireless profile urwb URB_Mob_Infra_NW-Pro
description URB_Mob_Infra_NW-Pro
strong-network-key
network-key key 0 S3cretK3y8675309!!!
no shutdown

Network Profile for Mobility Client

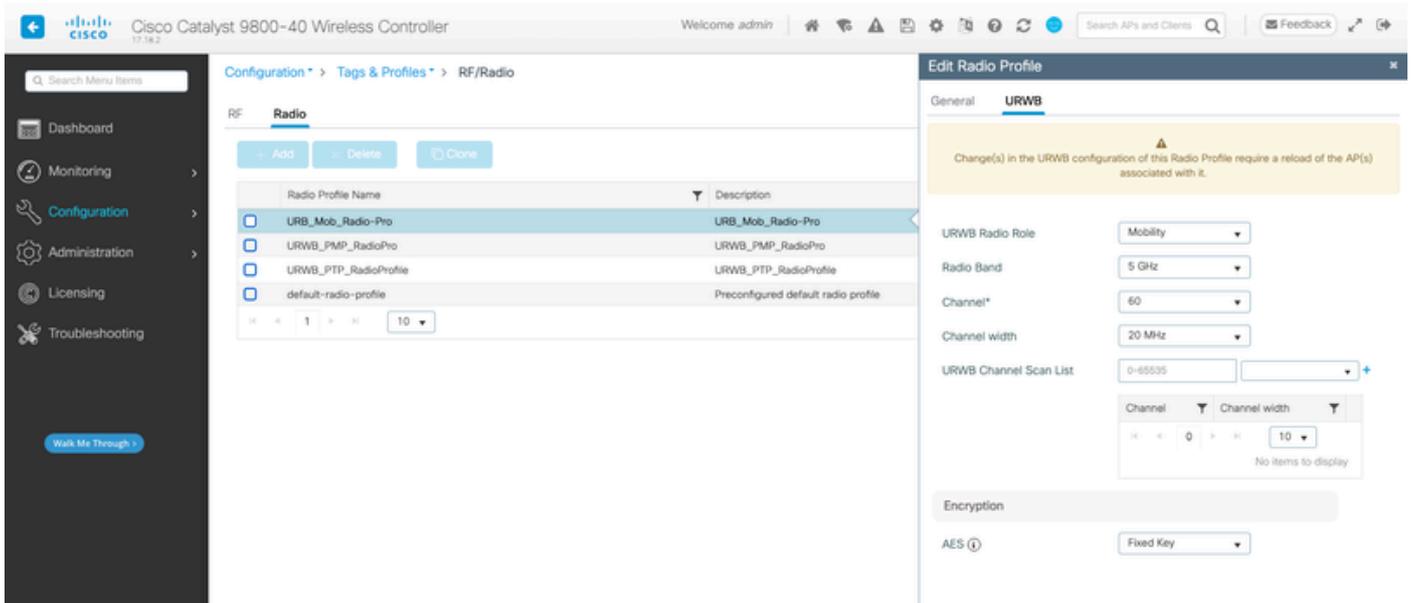
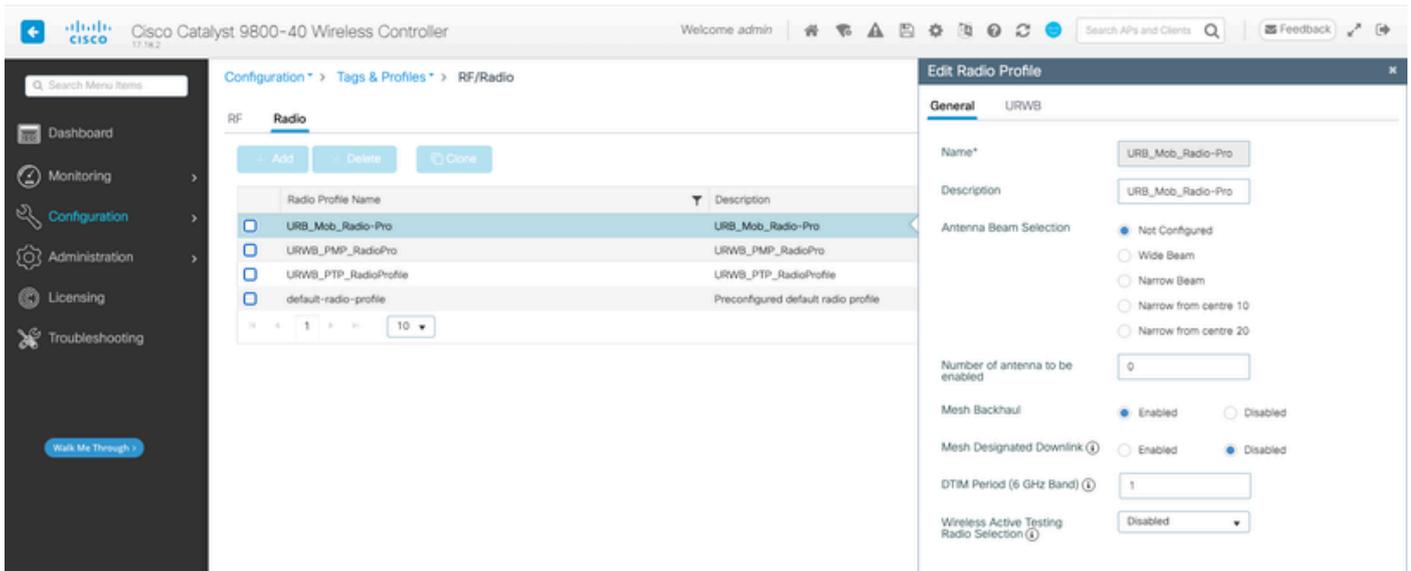


```
wireless profile urwb URB_Mob_Client_NW-Pro
description URB_Mob_Client_NW-Pro
strong-network-key
network-key key 0 S3cretK3y8675309!!!
mobility role client
no shutdown
```

Note: In a mobility cluster, the network key for all Base and Client devices must be the same in order to establish the MPLS tunnel and communicate with each other.

Configuring Radio Profile

(Configuration -> Tags and Profiles -> Radio -> Radio Tab)

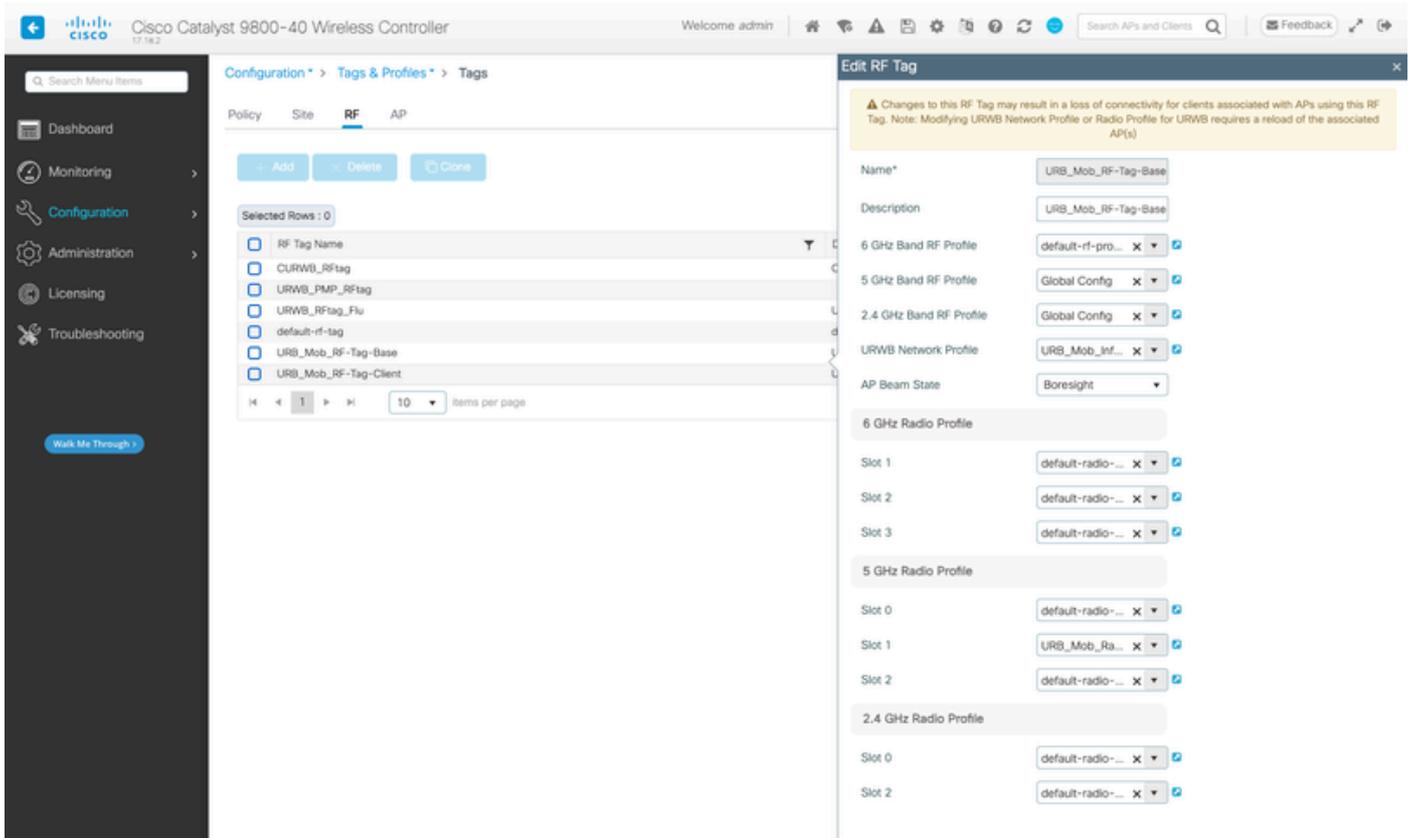


wireless profile radio URB_Mob_Radio-Pro
description URB_Mob_Radio-Pro
urwb channel 5Ghz 60
urwb role mobility

Configuring RF Tags

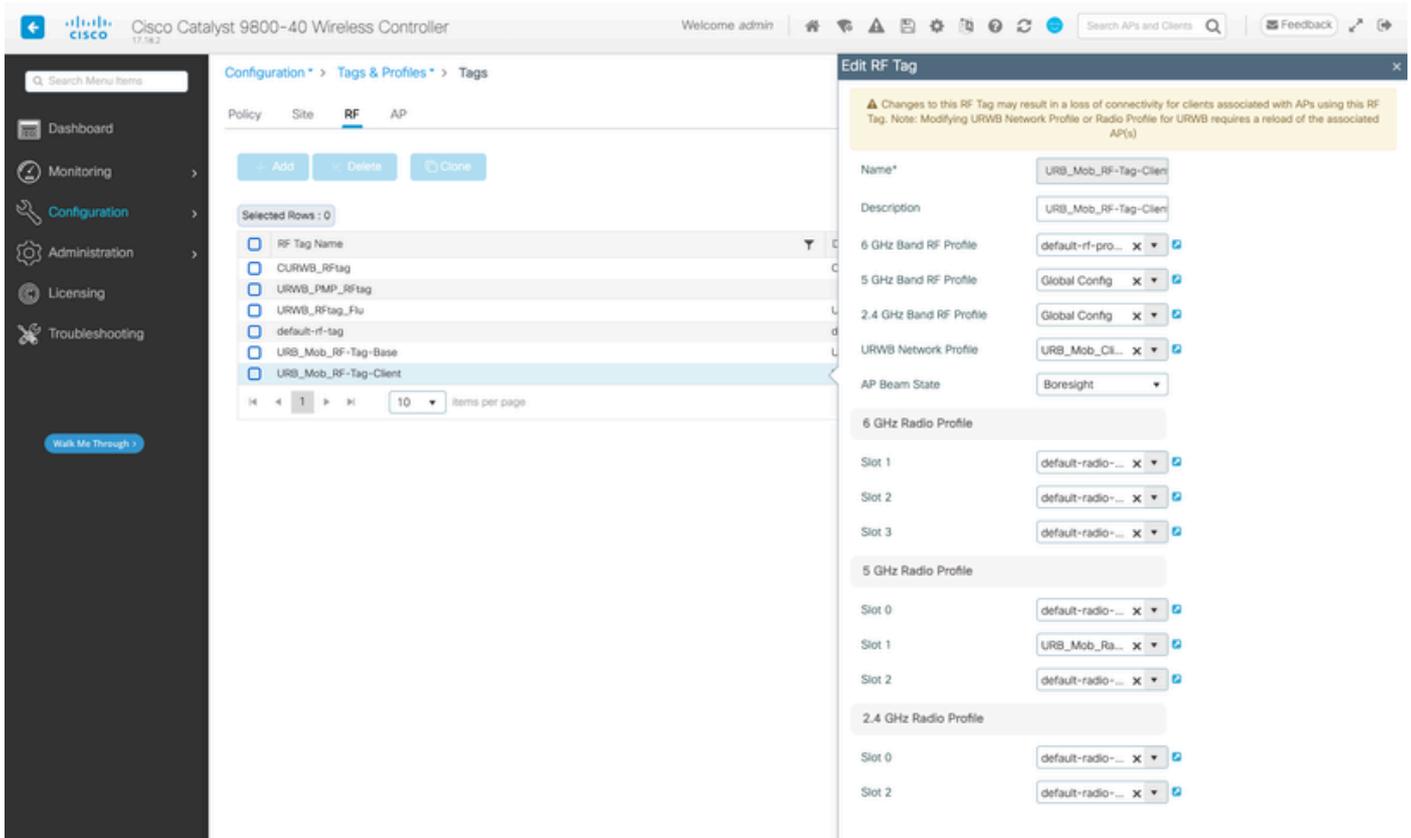
(Configuration -> Tags and Profiles -> Tags -> RF Tab)

RF Tag for Mobile Base



```
wireless tag rf URB_Mob_RF-Tag-Base
description URB_Mob_RF-Tag-Base
dot11 5ghz slot1 radio-profile URB_Mob_Radio-Pro
urwb-profile URB_Mob_Infra_NW-Pro
```

RF Tag for Mobile Client



```
wireless tag rf URB_Mob_RF-Tag-Client
description URB_Mob_RF-Tag-Client
dot11 5ghz slot1 radio-profile URB_Mob_Radio-Pro
urwb-profile URB_Mob_Client_NW-Pro
```

Configuring Access Points

(Configuration -> Wireless -> Access Point)

The screenshot shows the Cisco Catalyst 9800-40 Wireless Controller interface. The left sidebar contains navigation options: Dashboard, Monitoring, Configuration, Administration, Licensing, and Troubleshooting. The main content area is divided into two panes. The left pane shows a list of 'All Access Points' with columns for AP Name, AP Model, Slots, and Admin Status. The right pane is the 'Edit AP' configuration page, with tabs for General, Interfaces, High Availability, Inventory, URWB, Geolocation, ICap, Advanced, and Support Bundle. The 'URWB' tab is selected, and the 'RF' tag is highlighted with a red box. The 'RF' tag is set to 'URB_Mob_RF-Ta...'. Other configuration details include AP Name, Location, Base Radio MAC, Ethernet MAC, Admin Status, AP Mode, Operation Status, Fabric Status, CleanAir NSI Key, LED Settings, and Time Statistics.

```

ap 2416.1bf6.0200
rf-tag URB_Mob_RF-Tag-Client
ap 2416.1bf6.e2c8
rf-tag URB_Mob_RF-Tag-Base
ap 2416.1bf6.e308
rf-tag URB_Mob_RF-Tag-Base

```

Configuring the coordinator

(Configuration -> Wireless -> Access Point. -> URWB)

The screenshot shows the Cisco Catalyst 9800-40 Wireless Controller interface, specifically the 'URWB' configuration page. The 'URWB Coordinator [Config on WLC]' checkbox is highlighted with a red box. The page shows configuration options for the URWB Coordinator, including 'Coordinator' (Enabled) and 'Wired-Only Coordinator' (Disabled).

ap name <ap-name> urwb mode coordinator

Final Steps

After configuring all settings, save the configuration and apply the changes. If the AP does not reset automatically, it can still require a reset for the changes to take effect. The AP table indicates if the AP requires a reload. If needed, it can be reloaded from the C9800. Once the Access Points (APs) reboot and the radios are back online, you can check the RSSI from the Antenna Alignment page and monitor live connectivity from the URWB Network Topology page.

AP Name	AP Model	Slots	Admin Status	Up Time	WLC Association Uptime	IP Address	Base Radio MAC	Ethernet MAC	AP Mode	Power Derate Capable
AP2416.1BF6.0278_PTP_C	W9167EH-B	3	✓	1 days 22 hrs 40 mins 38 secs	1 days 22 hrs 38 mins 54 secs	14.2.210.100	2416.1b8.13c0	2416.1b6.0278	Local	Yes
AP2416.1BF6.E2C8_MB_C	W9167EH-B	3	✓	5 days 16 hrs 40 mins 1 secs	0 days 0 hrs 1 mins 51 secs	14.2.210.109	24d7.9c05.1640	2416.1b6.e2c8	Local	Yes
AP2416.1BF6.E308_MB_C	W9167EH-B	3	✓	0 days 0 hrs 26 mins 58 secs	0 days 0 hrs 0 mins 47 secs	14.2.210.98	24d7.9c05.1840	2416.1b6.e308	Local	Yes
AP6871.61F2.C598_PTP_remote	C9136I-B	4	✓	1 days 22 hrs 35 mins 28 secs	1 days 22 hrs 28 mins 24 secs	14.2.210.120	6871.61f9.5180	6871.61f2.c598	Local	Yes

Edit AP

General Interfaces High Availability Inventory URWB Geolocation ICap **Advanced** Support Bundle

Advanced

Country Code* US

Multiple Countries US

Statistics Timer 180

CAPWAP MTU 1485

AP Link Latency Disabled

AP PMK Propagation Capability Enabled

mDNS

Global mDNS Gateway Disabled

mDNS

Services Learnt 0

Deployment Mode

Default Mode Indoor

Current Mode Outdoor

VLAN Tag

VLAN Tag

VLAN Tag State Disabled

AP Image Management

Out-Of-Band AP Upgrade Capable Yes

Instruct the AP to start image predownload

Instruct the AP to swap the image

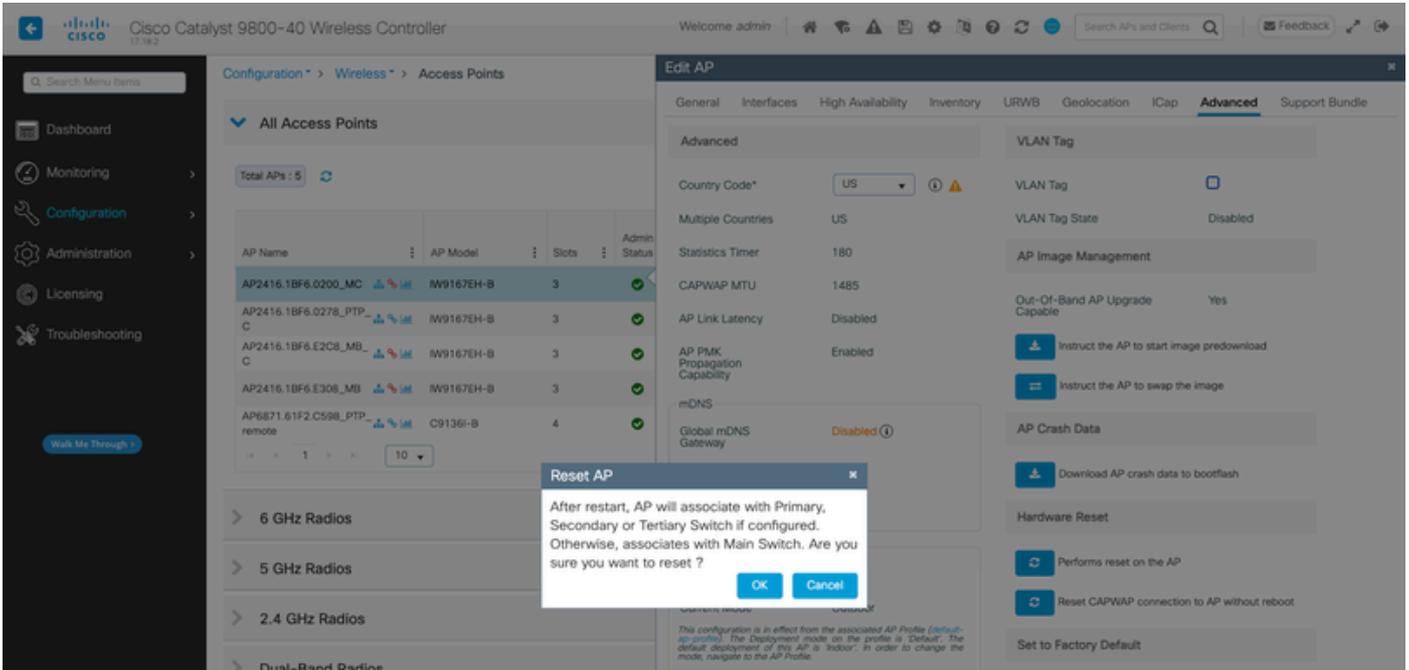
AP Crash Data

Download AP crash data to bootflash

Hardware Reset

Performs reset on the AP

Reset CAPWAP connection to AP without reboot

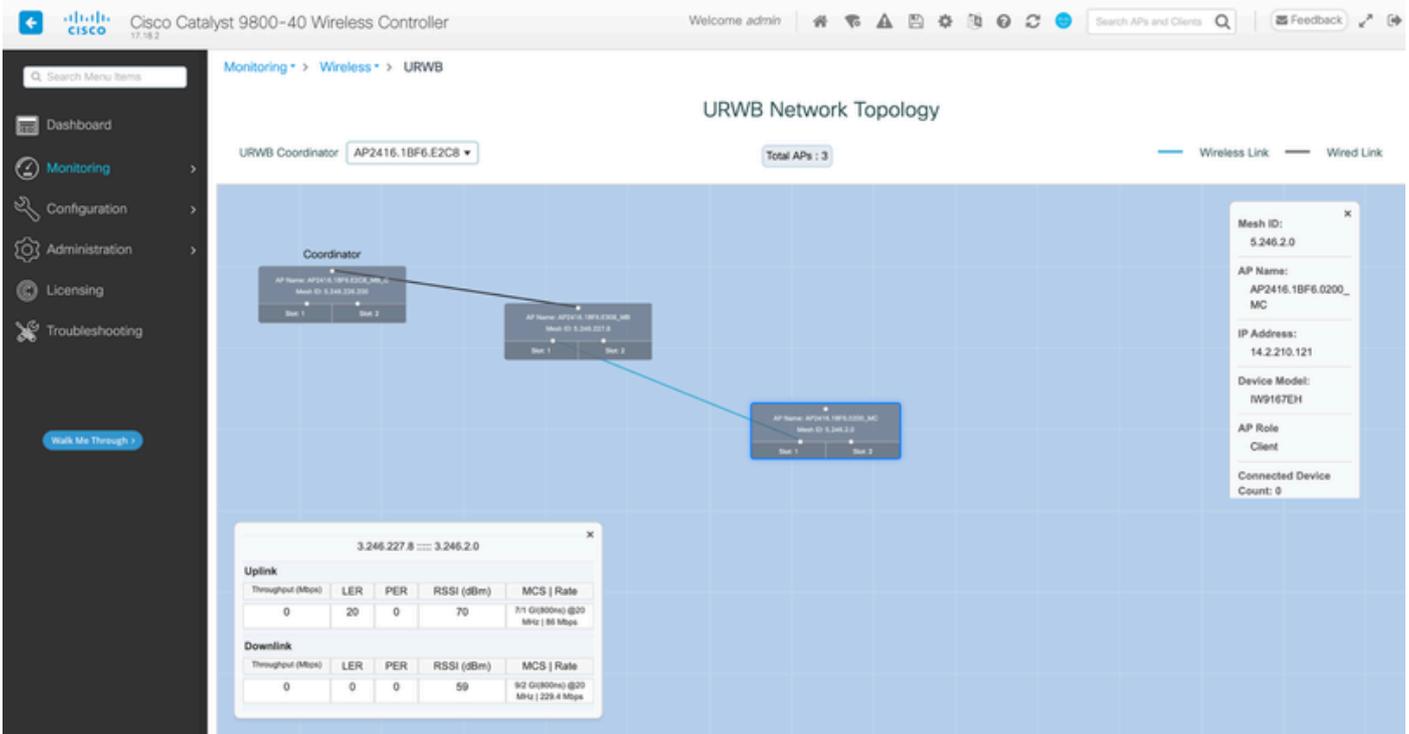


Troubleshoot & Monitor the CURWB Network

Monitoring the URWB network

(Monitoring -> Wireless -> URWB)

URWB Network Topology allows you to check different network key parameter index values for UPLINK and DOWNLINK, such as LER (Link Error Rate), PER (Packet Error Rate), RSSI (Signal Strength), throughput, and so on.



Physical Issues

- Ensure the use of CURWB-supported antennas, correctly connected to radios within recommended guidelines, and oriented in the proper direction.
- Confirm that overlapping coverage is adequate throughout the track.
- Maintain a direct line of sight for radios.

High Channel Utilization

- Mitigate interference through strategic RF planning.
- Utilize multiple frequency deployments with frequency scanning for seamless handover, requiring two radios per vehicle.
- Ensure radios are positioned at least 10 feet apart at the same height, and maintain a minimum of 3 feet between radios on the same pole to prevent interference from nearby devices.

Throughput Issues

Throughput problems can result from several factors:

- Strong signal strength is vital for optimal throughput; weaker signals reduce modulation rates and throughput. Aim for a signal strength between -45 dBm and -70 dBm.
- High channel utilization can also lead to throughput degradation.

Latency Issues

Latency issues, particularly in sensitive applications, can stem from:

- Inadequate signal strength along the track.
- Interference affecting frequency performance.
- The need for Quality of Service (QoS) configurations on radios and switches.
- Fluidity settings requiring verification and fine-tuning according to PLC configurations.

Debugs on the WLC

URWB exec debug:

set platform software trace wncd chassis active R0 urwb-exec debug

URWB config debug:

Set platform software trace wncd chassis active R0 urwb-config debug

URWB database debug:

Set platform software trace wncd chassis active R0 urwb-db debug

CLI commands on the AP

Show urwb modeconfig

Show urwb mpls config

Show urwb dot11Radio <> config

Show urwb mesh route status

Show urwb eng-stats