Introduction

Overview of the Access Point

The Cisco Catalyst IW9165E Rugged Access Point and Wireless Client (hereafter referred to as *IW9165E*) supports a 2x2 Wi-Fi 6E design with external antennas, and it is designed to add ultra-reliable wireless connectivity to moving vehicles and machines. Low power consumption, rugged IP30 design and small form factor make the Catalyst IW9165E very simple to integrate into industrial assets.

The IW9165E is designed to add ultrareliable wireless connectivity to moving vehicles and machines. The IW9165E can operate as Cisco Ultra-Reliable Wireless Backhaul (Cisco URWB) starting from Cisco Unified Industrial Wireless (UIW) software release 17.12.1, which delivers high availability, low latency, and zero packet loss with seamless handoffs.

Starting from Cisco Unified Industrial Wireless Software Release 17.13.1, the IW9165E can also operate as a Wi-Fi client in Workgroup Bridge (WGB) mode, which allows it to connect to a Cisco access point infrastructure, and Universal WGB (uWGB) mode, which allows it to connect to a third-party access point infrastructure. Both of these modes help bridge the wired clients that are behind the WGB to the access point on the infrastructure side.

From Cisco Unified Industrial Wireless Software Release 17.14.1, The Catalyst IW9167E can operate in Lightweight AP (control and provisioning of wireless access points (CAPWAP)) mode or Ultra-Reliable Wireless Backhaul (URWB) mode or WGB mode.

The IW9165E has the option to switch images by just updating the software to operate the IW9165E in CAPWAP or WGB or URWB mode without changing the hardware.

For CAPWAP mode, the access points can operate in the following modes:

- **Local mode:** This is the default mode for the AP. In this mode, the AP serves clients. In local mode, the AP creates two CAPWAP tunnels for the controller, one for management and the other for data traffic. This is known as central switching because the data traffic is switched (bridged) from the AP to the controller.

- **Flexconnect mode:** In FlexConnect mode, the data traffic is switched locally and is not sent to the controller. In this mode, the AP behaves like an autonomous AP, but is managed by the controller. Here, the AP continues to function even if the connection to the controller is lost.

- **Fabric mode:** The AP in a fabric mode has a VxLAN tunnel(Access-Tunnel) build to the fabric edge where the AP is attached. In cases where the AP is attached to an Extended Node(EN) or a Policy Extended Node(PEN). The access-tunnels are build between the Access Point (AP) and the respective fabric edge where the extended node is uplinked to. The VxLAN tunnel between an AP and a fabric edge is to preserve the segmentation till the access point. The access point is responsible to insert the SGT tag in the VxLAN tunnel to the fabric edge.

- **Sniffer mode:** In the wireless sniffer mode, the AP starts sniffing the air on a given channel. It captures and forwards all the clients' packets on that channel to a remote machine that runs Airopeek or Wireshark (packet analyzers for IEEE 802.11 wireless LANs). This includes information about the time stamp, signal strength, packet size, and so on.

> **Note** In the sniffer mode, the server to which the data is sent should be on the same VLAN as the wireless controller management VLAN. Otherwise, an error message is displayed.

- **Monitor mode:** In the monitor mode, the AP is excluded from handling data traffic between clients and infrastructure. The AP acts as a dedicated sensor for location-based services (LBS), rogue AP detection, and Intrusion Detection System (IDS). When the AP is in monitor mode, it actively monitors the airwaves and typically does not serve clients.

- **Site Survey mode:** The AP GUI is enabled and is used for configuring the RF parameters for site survey investigation. For information, see the Access Points Survey Mode section in the *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide*.
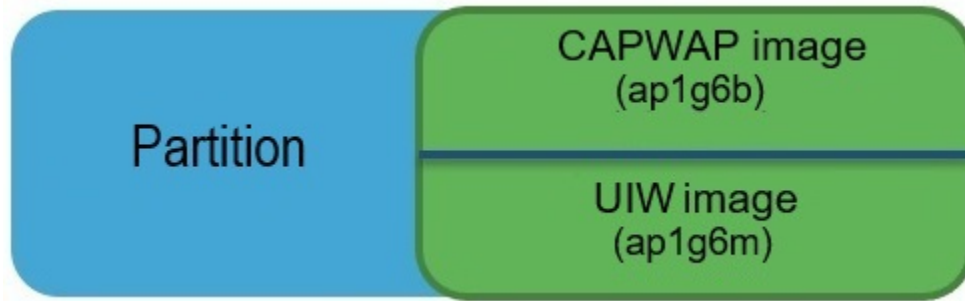
Unsupported Features

- 2.4G radio is not supported.

- Scan radio is not supported.

For more information about how to configure the AP on the Wireless Controller, See Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide.

Determining Image

Software images are stored under different folders on the same partition on IW9165E.

You need to choose the image to boot up with according to the mode your AP is runnning, CAPWAP, Cisco URWB, or WGB/uWGB. The following table provides the software images of each mode:

Table 1: IW9165E Software Images

IW9165E Mode	Software Image
CAPWAP	**ap1g6b-k9w8-xxx.tar**
URWB	Unified Industrial Wireless image **ap1g6m-k9c1-xxx.tar**
WGB/uWGB	

To determine the image that your IW9165E is running, use the **show version** command.

- If the **show version** output displays **Cisco AP Software, (ap1g6b)** as shown in the following example, it means that AP is running the CAPWAP image **ap1g6b-k9w8-xxx.tar**, which supports the CAPWAP mode.

```
Cisco AP Software, (ap1g6b), C9165, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2024 by Cisco Systems, Inc.
Compiled Tue Feb 20 23:04:29 GMT 2024
```

- If the **show version** output displays **Cisco AP Software (ap1g6m)** as shown in the following example, it means that AP is running **ap1g6m-k9c1-xxx.tar** image, which supports the URWB mode or WGB/uWGB.

```
Cisco AP Software, (ap1g6m), C9165, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2024 by Cisco Systems, Inc.
Compiled Tue Feb 20 23:04:29 GMT 2024
```

Catalyst IW9165E Lightweight Access Point supports three wireless technologies on a single hardware platform, such as CAPWAP, URWB, and WGB. The Catalyst IW9165E has the option to switch images by just updating the software to operate the Catalyst IW9165E in CAPWAP, WGB or URWB mode without changing the hardware.

Configuring Image Conversion

To convert the IW9165E access point either from Wi-Fi mode (CAPWAP AP) or URWB mode or WGB mode, follow these steps:

1. To convert from CAPWAP to URWB mode or from WGB/uWGB to URWB mode, use the following CLI command. The access point then reboots and starts up in URWB mode.

   ```
   configure boot mode urwb
   ```

2. To convert from URWB to CAPWAP mode or from WGB/uWGB to CAPWAP mode, use the following CLI command. The access point then reboots and starts up in CAPWAP mode.

   ```
   configure boot mode capwap
   ```

3. To convert from CAPWAP to WGB/uWGB mode or from URWB to WGB/uWGB mode, use the following CLI command:

   ```
   configure boot mode wgb
   ```

Note Image conversion performs a full factory reset which completely erases the configuration and data.

Related Documentation

To view all support information for the Cisco Catalyst IW9165 Rugged Series, see https://www.cisco.com/content/en/us/support/wireless/catalyst-iw9165-rugged-series/series.html.

In addition to the documentation available on the support page, you will need to refer to the following guides:

- For information about IW9165E hardware, see Cisco Catalyst IW9165E Rugged Access Point and Wireless Client Hardware Installation Guide.

- A full listing of the AP's features and specifications is provided in Cisco Catalyst IW9165 Series Data Sheet.

- For information about Cisco URWB mode configuration, see the relevant documents at:

  https://www.cisco.com/content/en/us/support/wireless/catalyst-iw9165-rugged-series/series.html.

- For more information about the configuration on Cisco Catalyst 9800 Series Wireless Controllers, see Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide.