

Support for CAPWAP and WGB Modes on the Cisco Wi-Fi Interface Module

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The Cisco Wi-Fi Interface Module (WIM) is a pluggable interface module available for all models of the IR1800 series. The Product Identifier (PID) is WP-WIFI6-x where x signifies the regulatory domain. For more information about WIM, see Cisco Wi-Fi Interface Module (WIM) Configuration Guide..

Cisco IOS XE Release 17.14.1 supports:

1. Switch operation mode between Control and Provisioning of Wireless Access Points (CAPWAP) and Workgroup Bridge (WGB).
2. Factory reset and erase configuration.
3. Configure the radios for WGB uplink and concurrent Root AP mode operations.

The following table summarises the management support for Wi-Fi Module operations in IR1800:

Modes	WIM IOS XE Release	Router IOSXE Release	Support
Control and Provisioning of Wireless Access Points (CAPWAP) Mode	17.11.0.155 and later	17.13.1 and later	Cisco Wireless LAN Controller.
Embedded Wireless Controller (EWC) Mode	17.11.0.155 and later	17.13.1 and later	IOS XE CLI vManage (SDWAN controller mode).
Work Group Bridge (WGB) Mode	17.11.0.155 and later	17.13.1	Cisco IoT Operations Dashboard.
		17.14.1	Cisco IoT Operations Dashboard. IOS XE CLI vManage (SDWAN and SD-Routing modes).

Support for CAPWAP and WGB Modes on the Cisco Wi-Fi Interface Module

Management Support for Cisco WIM in CAPWAP Mode

- When operating in CAPWAP mode, the module functions as an Access Point managed by an external Cisco IOS XE Wireless LAN Controller, acquiring an IP address through DHCP and discovering the controller using Layer 3, DHCP, DNS, or IP subnet broadcast.
- Configuration of DHCP server and Switch Virtual Interface (SVI) on the router for WIM is required for the CAPWAP mode for WIM to discover and communicate with Wireless LAN controller.



Note The mode change from CAPWAP mode to WGB mode is supported only when the module is in its factory default configuration.

For more information, see Control And Provisioning of Wireless Access Points (CAPWAP).

Management Support for Cisco WIM in EWC Mode

- The Wi-Fi module acts as a Cisco IOS XE Wireless LAN Controller in Embedded Wireless Controller (EWC) mode, supporting configuration from IOS XE release 17.13.1.



Note The Wi-Fi module in EWC mode does not support changing to CAPWAP or WGB mode.

For more information, see Wireless LAN Controller.

For more information, see EWC Mode.

IPv6 Support

From Release 17.16.1a, vManage and Yang model supports both static and dynamic IPv6 configuration in WGB mode.

You can configure IPv6 on the WIM in WGB mode from the router to:

- obtain IPv6 addresses,
- collect metrics, and
- view configuration details.

Use the `show wireless-bridge clients`, `show wireless-bridge interface ipv4`, and `show wireless-bridge interface ipv6` commands on the router to view client IPv4 and IPv6 configuration details.

For more information on configuring IPv6 address, see Configure IPv6 address.

Management Support for Cisco WIM in WGB Mode

The following section describes the new configuration options available on IR1800 for Deploying Cisco Wi-Fi Interface Module in WGB mode.

Configuring IR1800 for deploying WGB

The following section show how to configure IR1800 for deploying WGB:

Configuring a QoS Profile

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enables privileged EXEC mode.
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**qos-profile** *qos-profile-name* **{bronze | gold | platinum | silver }** **Example:** `router(config-wl-bridge)# qos-profile test-qos-profile bronze`	Create a QoS profile with one of the levels of QoS policy.
Step 5	**End** **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring an SSID Profile With Open Authentication Without a QoS Profile Mapped

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enters privileged EXEC mode.

	Command or Action	Purpose
	`router# enable`	
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**ssid-profile** *ssid-profile-name* **ssid** *ssid-name* | **authentication open** **Example:** `router(config-wl-bridge)# ssid-profile test-ssid-profile ssid test-ssid authentication open`	Create SSID profile with open authentication.
Step 5	End **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring an SSID Profile With Open Authentication With a QoS Profile Mapped

Procedure

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

	Command or Action	Purpose
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**ssid-profile** *ssid-profile-name* **ssid** *ssid-name* **qos-profile** *qos-profile-name* **authentication open** **Example:** `router(config-wl-bridge)# ssid-profile test-ssid-profile ssid test-ssid qos-profile test-qos-profile authentication open`	Create SSID profile with open authentication with a QoS-profile mapped.
Step 5	End **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring an SSID Profile with WPA2 Personal Authentication Without a QoS Profile Mapped

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.

	Command or Action	Purpose
Step 4	**ssid-profile** *ssid-profile-name* **ssid** *ssid-name* **authentication psk key-management wpa2 secret-key {0 | 6 | 7 }** *secret-key* **Example:** `router(config-wl-bridge)# ssid-profile test-ssid-profile ssid test-ssid authentication psk key-management wpa2 secret-key 0 testkey123!`	Create SSID profile with PSK authentication. • 0: Specifies an unencrypted secret key will follow. • 6: Specifies an encrypted secret key will follow. • 7: Specifies a hidden secret key will follow.
Step 5	End **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring an SSID Profile with WPA2 Personal Authentication With a QoS Profile Mapped

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**ssid-profile** *ssid-profile-name* **ssid** *ssid-name* **qos-profile** *qos-profile-name* **authentication psk key-management wpa2 secret-key {0 | 6 | 7 }** *secret-key* **Example:** `router(config-wl-bridge)# ssid-profile test-ssid-profile ssid test-ssid`	Create SSID profile with PSK authentication with QoS profile mapped. • 0: Specifies an unencrypted secret key will follow. • 6: Specifies an encrypted secret key will follow.

	Command or Action	Purpose
	`qos-profile qos-profile-test authentication psk key-management wpa2 secret-key 0 testkey123!`	• 7: Specifies a hidden secret key will follow.
Step 5	End **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring a Dot11radio in WGB Mode and Configuring Various Parameters

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enters privileged EXEC mode.
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**dot11radio {0|1} mode {wgb } ssid-profile** *ssid-profile name* **Example:** `router(config-wl-bridge)# dot11radio 1 mode wgb ssid-profile test-ssid-profile`	Configure a Dot11Radio as WGB.
Step 5	**dot11radio {0|1} {enable | disable }** **Example:** `router(config-wl-bridge)# dot11radio 1 enable`	Enabling Dot11Radio.

	Command or Action	Purpose
Step 6	**dot11radio {0|1} channel** *channel number channel-width* **Example:** `router(config-wl-bridge)# dot11radio 1 channel 40 40`	Configure a Dot11Radio channel details.
Step 7	End **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring a Dot11Radio in uWGB Mode and Configuring Various Parameters

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enables privileged EXEC mode.
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**dot11radio {0|1} mode {uwgb }** *H.H.H* **ssid-profile** *ssid-profile name* **Example:** `router(config-wl-bridge)# dot11radio 1 mode uwgb E462.C49F.9AA0 ssid-profile test-ssid-profile`	Configure a Dot11Radio as uWGB.
Step 5	**dot11radio {0|1} {enable | disable }** **Example:**	Enabling Dot11Radio.

	Command or Action	Purpose
	`router(config-wl-bridge)# dot11radio 1 enable`	
Step 6	**dot11radio {0|1} channel** *channel number channel-width* **Example:** `router(config-wl-bridge)# dot11radio 1 channel 40 40`	Configure a Dot11Radio channel details.
Step 7	**End** **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode.

Configuring a Dot11radio in Root AP Mode and Configuring Various Parameters

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enables privileged EXEC mode.
Step 2	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.
Step 3	**wireless-bridge submode** **Example:** `router(config)# wireless-bridge`	Enters wireless-bridge configuration mode.
Step 4	**dot11radio {0|1} mode {root-ap}** **Example:** `router(config-wl-bridge)# dot11radio 0 mode root-ap`	Configure a Dot11Radio as Root AP. The Root AP places the bridge in access point mode. In this mode, the bridge emulates a Cisco Aironet 1100 Series Access Point and accepts associations from client devices.
Step 5	**dot11radio {0|1} {enable | disable }** **Example:** `router(config-wl-bridge)# dot11radio 0 enable`	Enabling Dot11Radio.

	Command or Action	Purpose
Step 6	**dot11radio {0|1} wlan** *wlan-profile-name wlan-id (2-16)* **vlan** *vlan-id (2-4094)* **Example:** `router(config-wl-bridge)# dot11radio 0 wlan test-wlan-profile 4 vlan 400`	Map a WLAN profile to the Dot11Radio in Root AP mode.
Step 7	**dot11radio {0|1} channel** *channel number channel-width* **Example:** `router(config-wl-bridge)# dot11radio 0 channel 5 20`	Configure a Dot11Radio channel details.
Step 8	**End** **Example:** `router(config-wl-bridge)# end`	Exits wireless-bridge configuration mode and returns to privilege EXEC mode. **Note** 1.The above command bridges V client traffic directly to the route 2.WLAN IDs range from 2 to 16 AP will take effect only after tog 3.Enabling Broadcast tagging in Broadcast tagging configuration

Configure IPv4 address

Use this task to configure the IPv4 address on the WIM in WGB mode from the router.

Procedure

Step 1 Use the **enable** command to enable the privileged EXEC mode.

```
router#enable
```

Step 2 Use the **configure terminal** command to enter the global configuration mode.

```
router#configure terminal
```

Step 3 Use the **wireless-bridge** command to enter the wireless-bridge configuration mode.

```
router(config)#wireless-bridge
```

Step 4 Use the **wgb address ipv4 static** *ipaddress netmask gateway* command to configure a static IPv4 address along with the netmask and the default gateway.

```
router(config-wl-bridge)# wgb address ipv4 static 10.10.10.2 255.255.255.0 10.10.10.1
```

Step 5 Use the **wgb address ipv4 dhcp** command to configure DHCP IPv4 address.

```
router(config-wl-bridge)#wgb address ipv4 dhcp
```

Configure IPv6 address

Use this task to configure the IPv6 address on the WIM in WGB mode from the router.

Procedure

Step 1 Use the **enable** command to enable the privileged EXEC mode.

```
router#enable
```

Step 2 Use the **configure terminal** command to enter the global configuration mode.

```
router#configure terminal
```

Step 3 Use the **wireless-bridge** command to enter the wireless-bridge configuration mode.

```
router(config)#wireless-bridge
```

Step 4 Use the **wgb address ipv6 static** *ipaddress netmask gateway* command to configure a static IPv6 address along with the netmask and the default gateway.

```
router(config-wl-bridge)# wgb address ipv6 static 2000:100::10 64  2000:100::1
```

Step 5 Use the **wgb address ipv6 dhcp** command to configure DHCP IPv6 address.

```
router(config-wl-bridge)#wgb address ipv6 dhcp
```

Verify the WGB Mode Configuration, Monitoring Operational Status

Use the following commands to verify the configuration status:

Command: show run-config | sec wireless-bridge

Example:

```
router#show run-config | sec wireless-bridge
```

Use the following commands for monitoring the operational status:

Command: show wireless-bridge status

Example:

```
router#show wireless-bridge status
Module Operating Mode : WGB mode
Module Status         : Module State Ready
Software Version      : 17.11.0.155
Module Session Status : Login Success
```

Command: show wireless-bridge wlans

Example:

```
router#show wireless-bridge wlans
 wlan  band  oper  vlan  #client  wlan-mode  SSID
```

```
 ----  ----  ----  ----  -------  ---------  -----------------
    2  2.4g    up     2        1   downlink  myssid
```

Command: show wireless-bridge clients

Example:

From Release 17.16.1a, Cisco WIM introduces support for IPv6, and both IPv4 and IPv6 addresses are visible in the output.

```
router#show wireless-bridge clients
 Client-MAC-Addr    band  status        wlan  DeviceType  SSID       IPV4 address      IPV6
 address
 -----------------  ----  ------------  ----  ----------  ---------- ----------------
--------------------------
 E4:62:C4:9F:68:CF    5g  Associated       3   wireless    000_bba    30.30.30.2
FE80::EDA6:F758:9C25:8539
```

Note vManage does not support to view client IPv4 and IPv6 configuration details.

Command: Use the **show wireless-bridge interface ipv4** command to view the IPv4 interface details.

Example:

```
router#show wireless-bridge interface ipv4
Interface            IP-Address      Method   Status                 Protocol   Speed
 Duplex
wired0               unassigned      unset    up                     up         1000
 full
auxiliary-client     20.20.20.5      DHCP     up                     up         n/a
 n/a
service-vlan         n/a             n/a      up                     up         n/a
 n/a
apr0v0               n/a             n/a      up                     up         n/a
 n/a
apr1v0               n/a             n/a      up                     up         n/a
 n/a
```

Command: Use the **show wireless-bridge interface ipv6** command to view the IPv6 interface details.

Example:

```
router#show wireless-bridge interface ipv6
srcr2     Link encap:Ethernet  HWaddr E4:62:C4:9F:52:40
          inet addr:20.20.20.5  Bcast:20.20.20.255  Mask:255.255.255.0
          inet6 addr: 3000:100::9d98:c2e:5a8f:1351/128 Scope:Global
          inet6 addr: 3000:100::c132:d20b:b520:3537/128 Scope:Global
          inet6 addr: fe80::18c:5b82:4cef:c56c/64 Scope:Link
          inet6 addr: 3000:100::5996:1093:a134:ea8c/128 Scope:Global
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:5042 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4841 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:565722 (552.4 KiB)  TX bytes:556927 (543.8 KiB)
```

Command: Use the **show wireless-bridge running-configuration** command to view the configuration and operational status

Example:

```
router#show wireless-bridge running-configuration
### WGB Running config - Hostname: device ###

configure ap management add username Cisco1 password $1$$r0JYqf7z0bIzm/v2jcqVp/ secret
$1$$cN9KzIWhwzaBqoL.xelgi1
configure ap address ipv6 dhcp
configure qos profile qos-profile1 gold
configure ssid-profile wlan2 ssid 000_aab authentication open
configure ssid-profile wlan3 ssid 000_bba authentication open
configure dot11Radio 0 mode wgb ssid-profile wlan2
configure dot11Radio 0 enable
configure dot11Radio 1 enable
configure dot11Radio 1 mode root-ap
configure dot11Radio 1 wlan add wlan3 3 vlan 30
configure dot11Radio 1 channel 36 80
configure dot11Radio 1 tx-power 1
```

For additional Information about WGB and Universal Workgroup Bridge (uWGB) configuration, refer the following documents:

- Workgroup Bridge (WGB)
- Cisco Industrial Wireless Workgroup Bridge and Universal WGB Deployment Guide

Additional Commands

Clear Configuration

To clear the configuration on the Wi-Fi module, use the following command:

```
router# wireless-bridge erase
```

Factory Reset

To perform a factory reset on the module, use the following command:

```
router# wireless-bridge factory reset config/default
```

Mode Conversion

To change the operating mode of the module between WGB and CAPWAP modes, use the following command:

```
router# wireless-bridge boot mode capwap/wgb
```

Firmware Upgrade

Firmware upgrade is supported from Unified Client Image version 17.11 and above when running in WGB mode. To upgrade the firmware, the IR1800 requires the TFTP server to be enabled for the module to obtain the image.

The firmware upgrade process takes about 5-6 minutes to complete. Upon successful upgrade, the Wi-Fi module is automatically reloaded with the new image.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `router# enable`	Enters privileged EXEC mode.
Step 2	**copy rcp://***local-server*/**ap1g8t-k9c1-tar-k9c1-tar** **Example:** `router# copy rcp://netadmin@172.16.101.101/ap1g8t-k9c1-tar bootflash:ap1g8t-k9c1-tar`	Copy the unified client image(ap1g8t-k9c1-tar) to IR1800. The image will be downloaded to the module from this location.
Step 3	**configure terminal** **Example:** `router# configure terminal`	Enters global configuration mode.

Step 4	**tftp-server** *directory*:*image*
	Example:
	`router# tftp-server bootflash:ap1g8t-k9c1-tar`
	`router# end`
		Configure the image location on the TFTP Server of IR1800 and exit from global configuration mode.

Step 5	**wireless-bridge firmware-upgrade** *ap1g8t-k9c1-tar ip netmask gateway* **Example:** `router(config)# wireless-bridge firmware-upgrade ap1g8t-k9c1-tar 10.10.10.1 255.255.255.0 10.10.10.1`	Start Firmware upgrade.
Step 6	**more bootflash:/od_status**	Firmware upgrade takes about 5 to 6 minutes to complete. Check the **od_status** logs to monitor the progress.