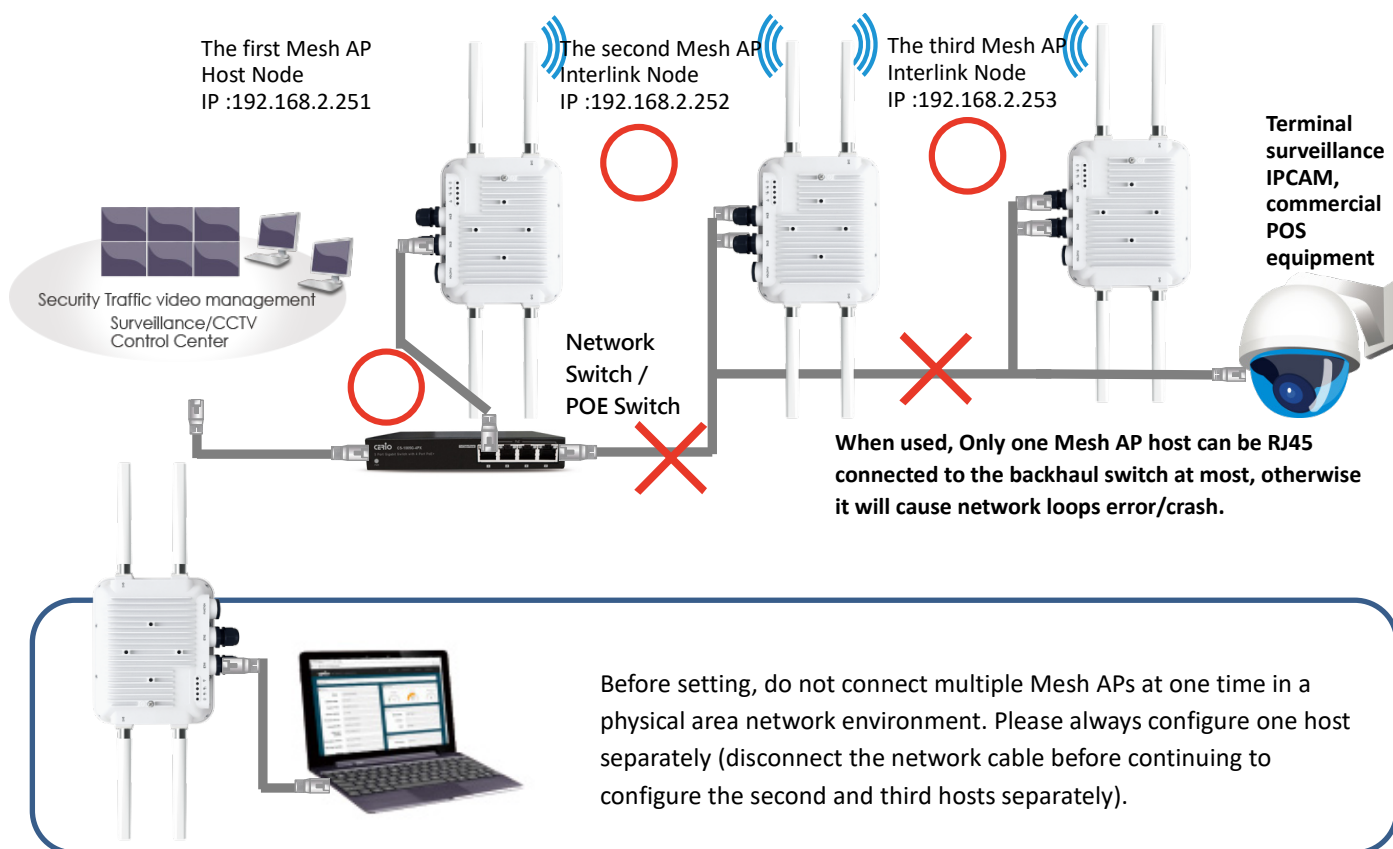
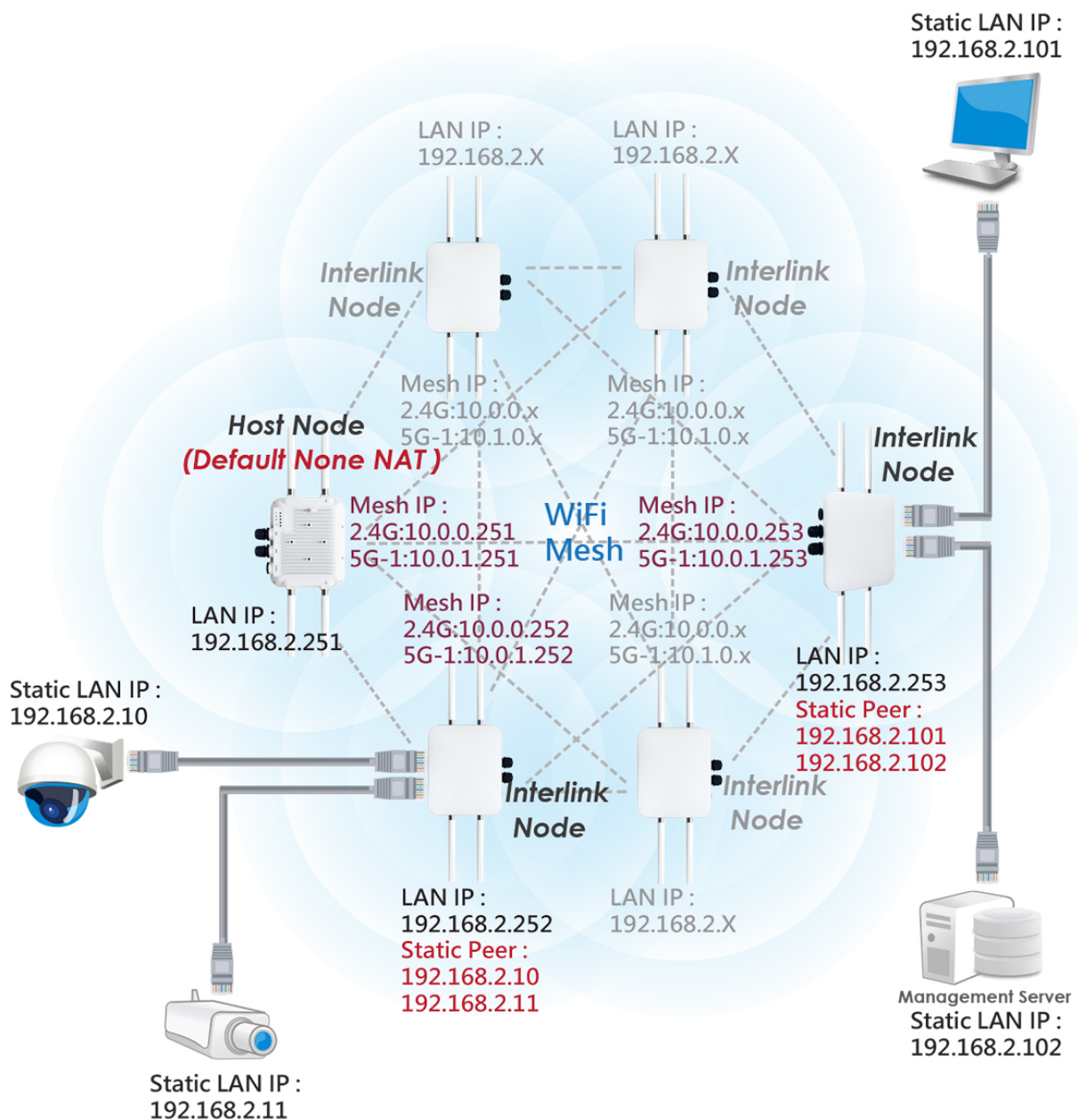


How to establish Mesh to IP Routing mode setup intranet Layer3 environment:



Stage	Description
Step-1 :	Set the wired connection interface (LAN IP) of each Mesh AP device to the same network segment to ensure that each has a different IP address.
Step-2 :	Set the Mesh SSID and encryption of each Mesh AP device to be consistent.
Step-3 :	Set the wireless connection interface (Mesh IP) of each Mesh AP device to Mesh interlink to the same network segment, and ensure that the Mesh WiFi IP address of each Mesh unit is different.
Step-4 :	Make sure that the wireless connection interface settings of each Mesh AP device wireless mesh interlink use the same channel.
Step-5 :	Select the Mesh Bridge interlink protocol to be used for each Layer 3 technology Mesh AP device.

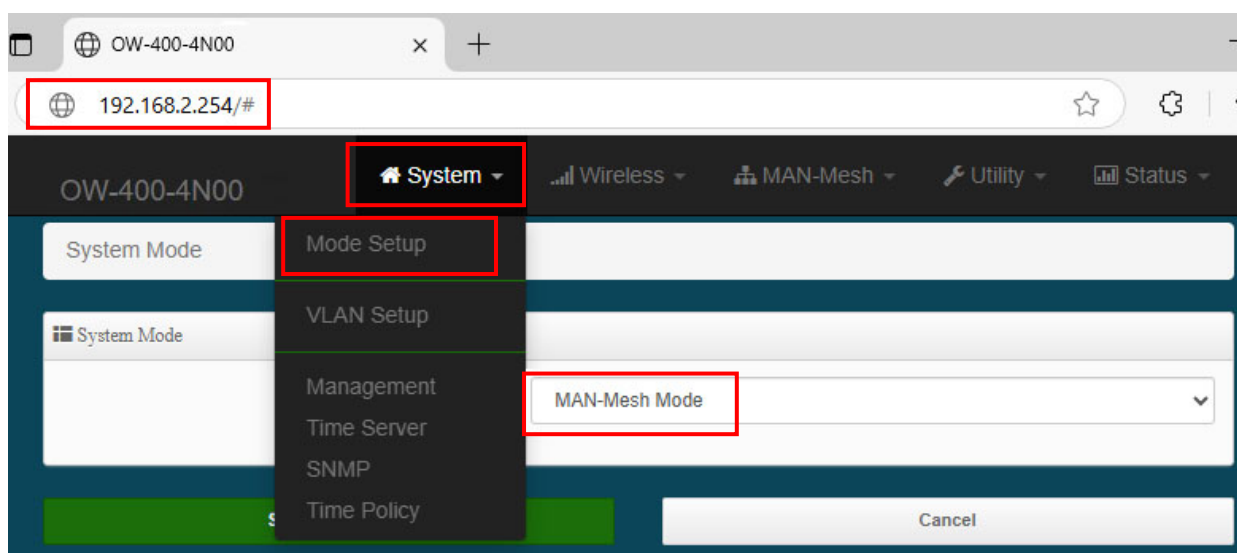
Set IPv4 bridge mode to "IP Routing"
Simply build an Private Intranet architecture.



Set the backend device IP address (Static Peer) for MESH devices

With "IP routing" as the main mode of IPv4 Bridge, Mesh AP devices can quickly complete connections with each other within 10 to 20 seconds.

For the first time, there is a default IP address of 192.168.2.254. After entering the Mesh AP device UI setting interface, first confirm that the system mode is in man-mesh mode.. This function is mainly used to construct a Mesh mesh transmission environment. This example uses three "Mesh AP devices" as an example to guide the key processes of Mesh settings. You can easily build a MAN-MESH LINK environment according to the following process. The steps are as follows:



Step 1 : Set the wired connection interface (LAN IP) of each Mesh AP device to the same network segment to ensure that each has a different IP address.

Click "System " → "VLAN Setup" management page to set the VLAN IP address, making sure that the LAN IP set for each device is different.

- ✓ **Make LAN IP settings for each Mesh AP:** Change the default IP address of 192.168.2.254. Customize it so that the LAN IP of each Mesh AP is not repeated. Save the settings and use the changed IP address. For example, choose to customize the same network segment such as 192.168.2.* network segment (can be any unique address from 1-254). The subnet mask is the same, such as 255.255.255.0, so it can be set as follows:

	Mesh AP unit 1	Mesh AP unit 2	Mesh AP unit 3
LAN IP	192.168.2.251	192.168.2.252	192.168.2.253

Set the first Mesh AP's LAN IP to 192.168.2.251 and subnet mask to 255.255.255.0

Set the LAN IP of the second Mesh AP to 192.168.2.252 and the subnet mask to 255.255.255.0

Set the LAN IP of the third Mesh AP to 192.168.2.253 and the subnet mask to 255.255.255.0

Step-2 : Set the Mesh SSID and encryption of each Mesh AP device to be consistent.

Click the "MAN-Mesh" → "MAN-Mesh Common Setup" Set the MAN-Mesh AP SSID and ensure that each mesh AP to be interconnected is set to use the same MESH SSID and encryption. (Once there is an error or inconsistency in the settings of a certain machine in the environment, MESH will be abnormal and unable to join the operation normally)

The Mesh SSID of the first Mesh AP is customized to "mymesh". Encryption uses "AES128" and a custom key cipher.

Similarly, customize the Mesh SSID of the second Mesh AP to "mymesh". Encryption uses "AES128" and a custom key cipher.

Similarly, customize the Mesh SSID of the third Mesh AP to "mymesh". Encryption uses "AES128" and a custom key cipher.

Step-3 : Set the wireless connection interface (Mesh IP) of each Mesh AP device to Mesh interlink to the same network segment, and ensure that the Mesh WiFi IP address of each Mesh unit is different.

Click the "MAN-Mesh" → "MAN-Mesh Device Setup"-management page, set the MESH IP of each WIFI MESH interface (including Radio-0, Radio-1), and ensure that each designated MESH IP Different (Once the same repeated conflicting IP appears in the environment, MESH will be abnormal and unable to operate normally)

- ✓ **MAN-Mesh Settings:** Enable this radio as a wireless base station (radio) used by MAN-Mesh. Each Radio can only select one Radio to enable WiFi Mesh interface interconnection, or all three Radios can enable WiFi Mesh interface interconnection at the same time. The opening of various radio Mesh interfaces will create more interconnection paths and the possibility of more redundant available interface interconnection paths. The speed of Radio0 (2.4G) is relatively low, but the signal can reach farther and wider. However, since the 2.4G frequency band is more susceptible to interference and clutter, generally only two Radios can be selected, Radio1 (5G). Set to enable mesh interconnection.
- ✓ **IPv4 Addrss :** The default values of the host are 10.0.0.1(2.4G), 10.0.1.1(5G), Change the default Mesh IP setting to the new Mesh IP address to be used by each AP host used in the Mesh architecture. [Note that the wireless Mesh IP must be in a different network segment from the wired LAN IP address. The following example assumes that the Mesh WiFi interfaces of all Radio interfaces need to be turned on and the IP arrangement settings are as follows:](#)

	Mesh AP unit 1	Mesh AP unit 2	Mesh AP unit 3
Radio-0(2.4G)	10.0.0.251	10.0.0.252	10.0.0.253
Radio-1(5G)	10.0.1.251	10.0.1.252	10.0.1.253

The following figure only takes Radio0 (2.4G) as an example. Each unit is set to have a different IPv4 address. One unit is set as the "Host Node" and the other units are set as "interlink Nodes".

192.168.2.251

CERIO OW-400-4N00 CenOS 5.0

MAN-Mesh 0 Device Setup

MAN-Mesh Setup

MAN-Mesh ☒ Enable ☐ Disable

IPv4 Mode ☒ Enable ☐ Disable

IPv4 Address 10.0.0.251

Netmask 255.255.255.255

MAN-Mesh Deployment

Multi-hop Layout

MAN-Mesh Common Setup

IP Filter

MAN-Mesh Device 0 Setup

Device Setup

MAN-Mesh Device 1 Setup

Device Setup

MAN-Mesh Force MAC Address

MAC Address

Add

Interlink Node

Multi-hop Layout

☒ Host Node ☐ Interlink Node

Action

Set the "first Mesh AP's" Radio0 (2.4G) Mesh IP to 10.0.0.251 and subnet mask 255.255.255.255

The Mesh environment architecture requires one device to be configured as a "Host node". Set this on the "first device".

192.168.2.252/#

CERIO OW-400-4N00 CenOS 5.0

MAN-Mesh 0 Device Setup

MAN-Mesh Setup

MAN-Mesh ☒ Enable ☐ Disable

IPv4 Mode ☒ Enable ☐ Disable

IPv4 Address 10.0.0.252

Netmask 255.255.255.255

MAN-Mesh Deployment

Multi-hop Layout

☐ Host Node ☒ Interlink Node

MAN-Mesh MAC Address List

MAC Address Action # MAC Address Action

Add

Similarly, set the Radio0 (2.4G) Mesh IP of the "second Mesh AP's" to 10.0.0.252 and the subnet mask 255.255.255.255.

Other Mesh AP in the Mesh environment architecture are configured as "interlink Node". Set up on the "second device".

192.168.2.253/#

CERIO OW-400-4N00 CenOS 5.0

MAN-Mesh 0 Device Setup

MAN-Mesh Setup

MAN-Mesh ☒ Enable ☐ Disable

IPv4 Mode ☒ Enable ☐ Disable

IPv4 Address 10.0.0.253

Netmask 255.255.255.255

MAN-Mesh Deployment

Multi-hop Layout

☐ Host Node ☒ Interlink Node

MAN-Mesh MAC Address List

MAC Address Action # MAC Address Action

Similarly, set the Radio0 (2.4G) Mesh IP of the "third Mesh AP's" to 10.0.0.253 and the subnet mask 255.255.255.255.

Other Mesh AP in the Mesh environment architecture are configured as "interlink Node". Set up on the "third device".

Step-4 : Make sure that the wireless connection interface settings of each Mesh AP device wireless mesh interlink use the same channel.

Click the **"Wireless " → "Radio Basic Setup "** and select the channel you want to use. Since 2.4G is generally more susceptible to interference and the channels are more cluttered, if you use Mesh Link and confirm that the 2.4Ghz connection in the environment is abnormal or there may be interference, it is recommended to turn off the 2.4GHz Mesh Link and directly select and set Radio 1 (5G) Establish Mesh Link . And make settings to ensure that the "channel" selection settings of "each Radio" (each wireless interface) required for each Mesh AP to connect to each other are consistent.

- ✓ **Band mode and channel setting suggestions :** Select the highest-speed "wireless operating mode" (such as 802.11ax). 20 MHz is the standard universal channel width for Wi-Fi networks. Larger channel widths simultaneously allow for faster, more efficient transmission. If you need more data, (channel mode refers to the frequency range occupied by Wi-Fi channels), set the highest "channel mode", such as Radio 0 (2.4G), Radio select channel mode "20/40Mhz" 1 (5G - When 1), select the channel mode as "80Mhz" (equivalent to binding and merging 4 consecutive 20Mhz channels).
- ✓ **Channel single selection and channel multiple selection :** The method of single-selecting one channel is given priority. When there is a bottleneck in a single available channel or there may be expected interference that makes selection difficult, the multi-channel setting method of multiple selection can be used. When multiple
- ✓ channels are selected, 2 to 3 channels can be selected. The setting is the first choice. Selecting too many channels at one time will also result in the selected channel range being too large, thereby increasing the process and waiting time required for connections between Mesh APs.
- ✓ **Other suggestions :** The channels selected by the Radio1 interface interface can be staggered in the high and low frequency bands respectively, (for example, the example 5G selects CH149 in the 5GHz Band4 band (High) channel

Under the Mesh architecture, each radio can be set as follows :

	Mesh AP unit 1 / Channel / Channel Bandwidth	Mesh AP unit 2 / Channel / Channel Bandwidth	Mesh AP unit 3 / Channel / Channel Bandwidth
Radio-0(2.4G)	CH1 / HT20/40Mhz	CH1 / HT20/40Mhz	CH1 / HT20/40Mhz
Radio-1(5G)	CH149 / VHT80Mhz	CH149 / VHT80Mhz	CH149 / VHT80Mhz

✓ **Other suggestions :**

✓ **Avoid using DFS (Dynamic Frequency Selection) channels shared with military, satellite, and weather services :** The Mesh AP host design meets the requirements of the DFS 5Ghz mechanism. After the mechanism is started, the channel will be temporarily checked for 1 to 10 minutes, and the channel avoidance and jumping process will be performed. In order to avoid disconnection problems between Mesh AP channel transmissions due to DFS factors, please try to give priority to "non-DFS channels" when selecting channels.

*For details of channel support in each region, please refer to the attachment list :

Radio 0 (2.4G) settings for each Mesh unit

The example uses a channel 1 · It is recommended to always give priority to "non-overlapping channels" that are less susceptible to interference, such as 1 or 6 or 11.

Make sure to select the channel bandwidth you want to use. The setting here is to use the highest channel width of 20/40Mhz for wireless frequency range use.

Radio 1 (5G) settings for each Mesh unit

The example uses a channel 149 and ensures that each Mesh AP host has consistent channel settings for this Radio 1 (5G-1).

Make sure to select the channel bandwidth you want to use. The setting here is to use the highest channel width 80Mhz (VHT80) width to use four consecutive 20Mhz wireless channels (width range).

Step 5 : Select the Mesh Bridge interlink protocol to be used for each Layer 3 technology Mesh AP device.

Click "System " → "VLAN Setup" → " IPv4 Bridge" set the IPv4 Bridge and select " IP Routing mode". Let each Mesh AP host complete the connection with each other in Layer3 Routing mode in 10 to 15 seconds.

Go to "VLAN" from "System" Settings.

Click the "arrow" drop-down menu.

Go into IPv4 Bridge Settings to Change the IPv4 bridge mode for each Mesh AP host.

Enter each Mesh AP IPv4 bridging function page, Adjust to IP routing mode.

#	Status	Flag	IP Address	Netmask	Radio 0	Radio 1	Action
1	Up		192.168.2.251	255.255.255.0	myAP_2.4G	myAP_5G	Network
2	Up		192.168.2.252	-	2.4G_1_0	5G_1_1	IPv4 Bridge
3	Up		192.168.2.253	-	2.4G_4_0	5G_4_1	DHCP Server
4	Up		-	-	2.4G_5_0	5G_5_1	Radio 0 Setup
5	Up		-	-	2.4G_6_0	5G_6_1	Access Point
6	Up		-	-	-	-	MAC Filter
7	Up		-	-	-	-	80211r Fast Roaming

- ✓ **Instructions for setting Static Peer IP address :** In a Mesh environment, all interconnected Mesh AP hosts are individual groups in the environment. Each individual group has a Mesh AP host that is responsible for carrying out Layer 3 protocols with IP for other adjacent individual group hosts interconnected by WiFi Mesh Link. Routing Bridge mode transmits communication and coordination. Therefore, each interconnected Mesh AP host serves as the window responsible for communicating with the Layer3 protocol for its own back-end equipment. The setting of this function is to accelerate each individual group and immediately proactively communicate with other individual groups (other L3 Mesh AP host) announces the existence of the IP addresses of the common (backend) devices in its individual group (such as the IP addresses of connected computers or other backend devices such as monitoring IPCAM).

✓

- Correctly set the IP address of its rear device (Static Peer IP) for each Mesh AP host. IP devices in the Mesh environment will accelerate intercommunication between Mesh environments and be immediately recognized.
- When the “Static Peer IP” address setting is set incorrectly (including incorrectly declaring the backend device IP of other individual groups as your own backend IP), it will cause routing conflicts in the overall environment or transmission interruption exceptions. Set this Be sure to set the function correctly.
- When moving IP devices to different Mesh AP host backends, be sure to delete (old address) and add (new address) Static Peer IP simultaneously.

The following example assumes that the Ethernet physical network of 192.168.2.252 (the second Mesh AP host) is connected to two surveillance IPCAM camera devices with an IP address of 192.168.2.10, and an industrial control IP device with an IP address of 192.168.2.11.

Both sets of backend IP devices are correctly added to the Static Peer list of the second Mesh AP host.

192.168.2.252/#

CERIO OW-400-4N00

System | Wireless | MAN-Mesh | Utility | Status

VLAN Setup / VLAN 0 / IPv4 Bridge

IPv4 Bridge

Mode: IP Routing

Static Peer

IP Address: **Add**

Static Peer List

#	IP Address	Action
1	192.168.2.10	Delete
2	192.168.2.11	Delete

The following example assumes that the Ethernet physical network of 192.168.2.253 (the third Mesh AP host) is connected to a computer network server device with an IP address of 192.168.2.101, and a management computer device with an IP address of 192.168.2.102 , both sets of backend IP devices are correctly added to the Static Peer list of the third Mesh AP host.

The screenshot shows the CERIO OW-400-4N00 web interface. The breadcrumb navigation is 'VLAN Setup / VLAN 0 / IPv4 Bridge'. On the left, the 'IPv4 Bridge' section has a 'Mode' dropdown set to 'IP Routing'. On the right, the 'Static Peer' section has an 'IP Address' input field and an 'Add' button. Below this is the 'Static Peer List' table, which contains two entries. The first entry, with IP 192.168.2.101, and the second entry, with IP 192.168.2.102, are both highlighted with a red rectangular box. Each entry has a 'Delete' button in the 'Action' column.

#	IP Address	Action
1	192.168.2.101	Delete
2	192.168.2.102	Delete

After the settings are completed and each Mesh AP host is restarted to apply the settings, the three hosts will automatically connect to the mesh at startup.

After the above 5 steps are completed one by one to set up each machine, the Mesh can be successfully built and set up in IP Routing mode to create an intranet Layer 3 environment.

192.168.2.251/#

CERIO OW-400-4N00 System Wireless MAN-Mesh Utility **Status**

MAN-Mesh Link Chart

MAN-Mesh Link Chart

Overview
MAN-Mesh Link Chart
Wireless Client
MAN-Mesh Client
System Log

MAN-Mesh Neighbours

Address
fe80::8e4d:eaff:feff:ff41
fe80::8e4d:eaff:feff:ff40
fe80::8e4d:eaff:feff:ff4e
fe80::8e4d:eaff:feff:ff4f

MAN-Mesh Routes

Prefix	Metric
10.0.0.251/32	
10.0.0.251/32	
10.0.0.251/32	

Check connection status ;
You can enter "**Status**" → "**MAN-Mesh Client**" Check the status between Mesh AP wireless connection interfaces °
The above Static Peer example is shown here in the Mesh environment neighbor 192.168.2.251 (from the perspective of the first Mesh AP host), the 101 and 102 IP devices are fixed devices behind 192.168.2.252 (the second host), and the 10 and 11 IP devices It is a fixed device behind 192.168.2.253 (the third host).

Cost	Cost
256	256
256	256
256	256
256	256

Interface	Installed
mesh01	yes
mesh11	no
mesh21	no

OW-400-4N00 System Wireless MAN-Mesh Utility **Status**

MAN-Mesh Client

- Overview
- MAN-Mesh Link Chart
- Wireless Client
- MAN-Mesh Client**
- System Log

MAC Address	RSSI	Rate(RX/TX)	Bytes(RX/TX)	Packet(RX/TX)
8c:4d:ea:ff:ff:3f	60	344Mb / 455Mb	1.30MB / 391.00KB	9019 / 5156
8c:4d:ea:ff:ff:4e	55	573Mb / 258Mb	1.69MB / 389.97KB	7102 / 5156

MAN-Mesh Radio 1

MAC Address	RSSI	Rate(RX/TX)	Bytes(RX/TX)	Packet(RX/TX)	SEQ(RX/TX)
8c:4d:ea:ff:ff:4f	27	720Mb / 432Mb	407.76KB / 603.59KB	3217 / 4893	65535 / 258
8c:4d:ea:ff:ff:40	32	864Mb / 576Mb	410.18KB / 6.56MB	3298 / 13239	65535 / 258

Refresh

Check connection status;

When each Mesh AP host is set to restart, the Mesh Link will automatically interconnect. Bridge uses the IP Routing mode to directly identify and communicate with the environment path using the Layer 3 protocol. The link intercommunication is completed quickly and only takes 15 to 20 seconds at the fastest. During this waiting period, you can also enter "System Status" **"Status" → "MAN-Mesh Client"** to check the status of the Mesh AP wireless connection interface.

Summary and additions :

You can also use the functions of "Profile Setting" "Save Settings To PC" (backup files) and "Load Settings From PC" (Restor) system configuration backup files to download and export its config settings after completing the configuration of a single device, and then import and copy them to other devices (For example, after setting the second station and the third station), finally make necessary different setting modifications to the second station and the third station respectively as follows:

The different settings of each Mesh AP host in the environment include:

1. Mesh host role definition (identity differences between "Host Node" and Interlink Node).
2. The IP addresses of the interfaces used must be different (not conflicting), including the difference between the LAN IP address of the wired interface and the enabled Mesh WiFi IP address (Mesh wireless connection interface).
3. Each Mesh AP host sets a Static Peer IP for its own backend (add a new device to the Static Peer IP list).



Regional 5Ghz WiFi channel related, country/region DFS (Dynamic Frequency

Frequency band/U-NII	Frequency/ (MHz)	Frequency / Bandwidth mode / Channel				Regional standards			
		20MHz	40Mhz	80Mhz	160Mhz	(US)	(Europe)	Japan	Taiwan
Band1 (U-NII-1)	5180	36	36~40	36~48 (42)	36~64 (50)	YES	Indoors	Indoors	Indoors
	5200	40	(38)			YES	Indoors	Indoors	Indoors
	5220	44	44~48			YES	Indoors	Indoors	Indoors
	5240	48	(46)			YES	Indoors	Indoors	Indoors
Band2 (U-NII-2A)	5260	52	52~56	52~64 (58)		DFS	Indoors/DFS	Indoors/DFS	Indoors
	5280	56	(54)			DFS	Indoors/DFS	Indoors/DFS	Indoors
	5300	60	60~64			DFS	Indoors/DFS	Indoors/DFS	Indoors
	5320	64	(62)			DFS	Indoors/DFS	Indoors/DFS	Indoors
Band3 (U-NII-2C)	5500	100	100~104	100~112 (106)	100~128 (114)	DFS	DFS	DFS	DFS
	5520	104	(102)			DFS	DFS	DFS	DFS
	5540	108	108~112			DFS	DFS	DFS	DFS
	5560	112	(110)			DFS	DFS	DFS	DFS
	5580	116	116~120	116~128 (122)		DFS	DFS	DFS	DFS
	5600	120	(118)			DFS	DFS	DFS	DFS
	5620	124	124~128			DFS	DFS	DFS	DFS
	5640	128	(126)			DFS	DFS	DFS	DFS
	5660	132	132~136	132~144 (138)		DFS	DFS	DFS	DFS
	5680	136	(134)			DFS	DFS	DFS	DFS
	5700	140	140~144			DFS	DFS	DFS	DFS
	5720	144	(142)			DFS	NO	NO	NO
Band4 (U-NII-3)	5745	149	149~153	149~161 (155)	N/A	YES	NO	NO	NO
	5765	153	(151)			YES	NO	NO	NO
	5785	157	157~161			YES	NO	NO	NO
	5805	161	(159)			YES	NO	NO	NO
	5825	165					YES	NO	NO

*** DFS channels increase the number of channels users can choose. These additional channels are shared for use by specific military radars, satellite communications, and weather radars. The channel sharing process will undergo a pre-use availability check process (Channel Availability Check process, CAC) and follow the automatic dodge channel hopping retreat mechanism. For "MAN -Mesh" or "WDS modes" need to be bound to a fixed channel. When one of the stations avoids frequency hopping, it will cause wireless interruption and will need to be setting again. If it is not "Access Point station mode" for WiFi card to access Internet or "Client Bridg mode" and other channel-based setting applicationsapplication settings , it is recommended that you try not to choose DFS channel.**

