Deployment Guide

RUCKUS WAN Gateway – Adoption of Devices

June 2023

Rev. 1

Table of Contents

Changes in Revision 1

- Minor text changes and corrections.
- Added sections around Zone filters and Domain filters.
- Added section around disabling WLAN radios.
- The Access Point Profiles section was rewritten.
- Added section around sync troubleshooting.
- Removed references to source-of-truth around SmartZone.

Intended Audience

This document explains how ICX switches and SmartZone controllers are onboarded and managed by RWG.

This document is written for and intended for use by technical engineers with background in switching, Wi-Fi design and 802.11 wireless engineering principles.

For more information on how to configure RUCKUS products, please refer to the appropriate RUCKUS user guide available on the RUCKUS support site at https://support.ruckuswireless.com/

The RWG documentation is embedded in the product.
You can access it by navigating to https://{your RWG_IP_address}/admin/manual/help_online

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Overview

All the required services to build solutions for MDU, HSP and ISP verticals are tightly integrated in RWG. But first, the SmartZone controllers and ICX switches need to be onboarded or adopted by RWG. That way, RWG will be able to read and store the device's configuration and push new configurations to the controllers and switches automatically.

Once adopted, the devices stay in sync with RWG.

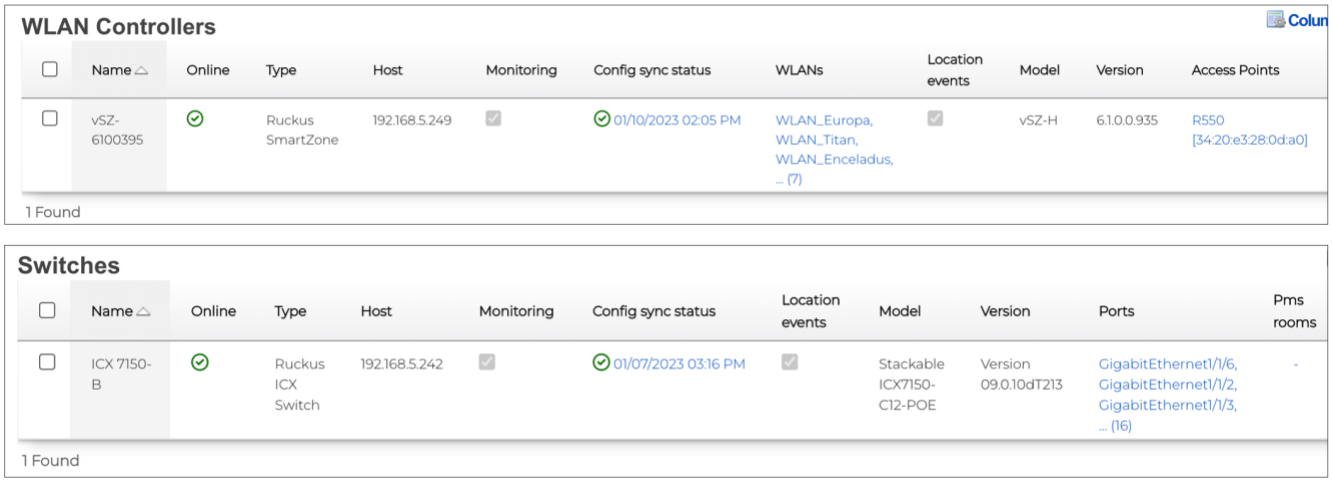


FIGURE 1 – ADOPTED WLAN CONTROLLERS AND SWITCHES

Adoption of ICX Switches

When an ICX switch is first adopted, RWG retrieves its physical interfaces using SNMP. Therefore, the ICX switch needs to have a read-only SNMP community string pre-configured. Use the following command to configure the SNMP string:

```
snmp-server community public ro
```

RWG is not capable to import, or to configure every feature of an ICX switch. RWG can only import or push VLANs, interfaces configuration (port names, status, tagged or untagged mode) and RADIUS configuration to an ICX switch.

The VLANs and interfaces configuration are pushed and kept in sync using the **Switch Port Profiles** scaffold. The RADIUS configuration is pushed using configurations defined at **Services/RADIUS Server Options** scaffold. All configurations are pushed to ICX using SSH.

To adopt a new ICX, navigate to **Network/Wired**, then click **Create New** in the **Switches** section:

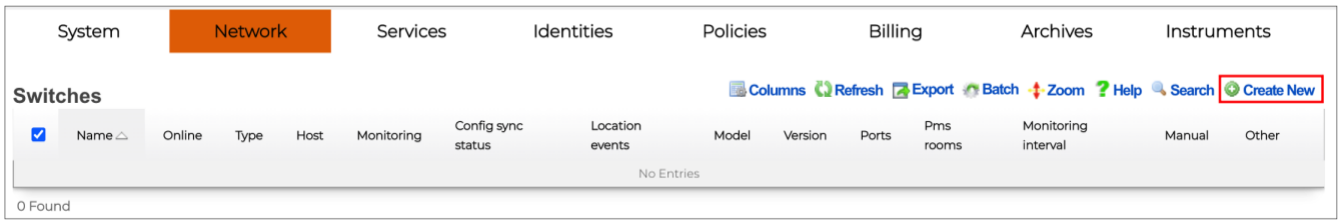


FIGURE 2 – CREATE NEW SWITCH

Enter the following information:

- **Name**: Enter a name for the switch
- **Type**: Select **RUCKUS ICX Switch**
- **Host**: Enter the switch IP address
- **Username**: Enter the username for a SSH connection
- **Password**: Enter the password for a SSH connection
- **Enable password**: Enter the enable password.
- **IP group & policy:** Keep this option checked.

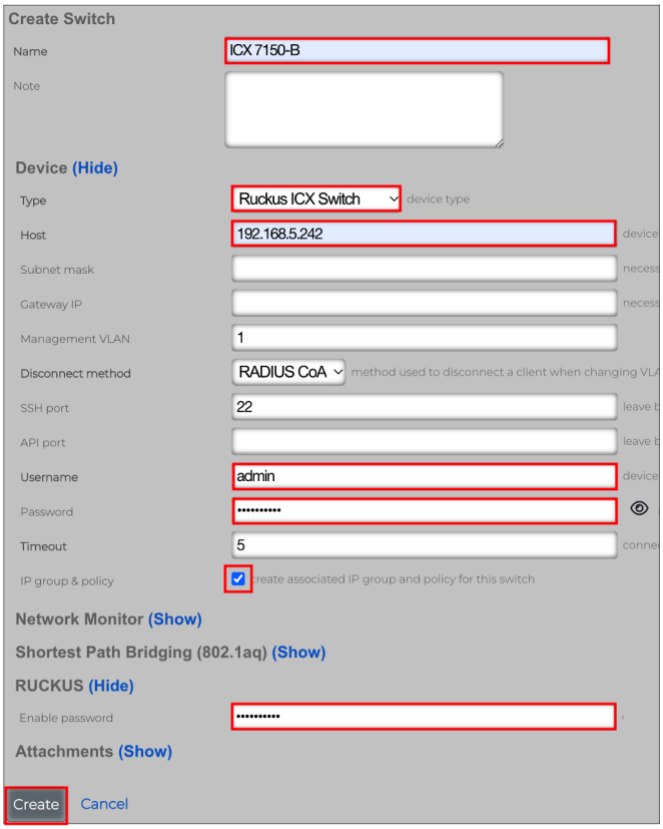


FIGURE 3 – CREATE NEW SWITCH

Click **Create** to finish.

Config Sync

Click the **Refresh** button. The **Online** icon should turn to green, and a list of interfaces will show under **Ports**.

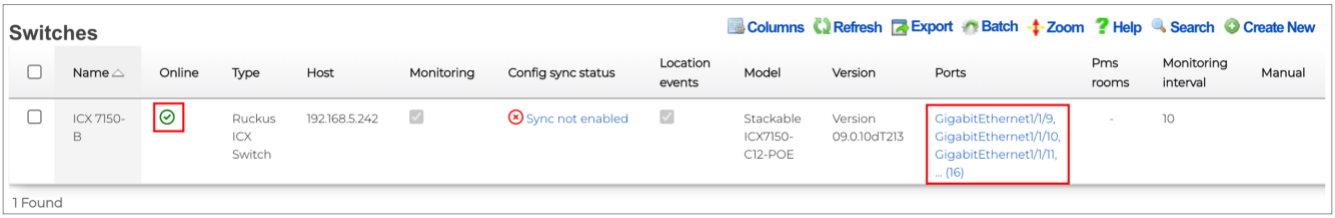


FIGURE 4 – THE SWITCH IS ONLINE

Scroll down to see port details at the **Switch Port** section:

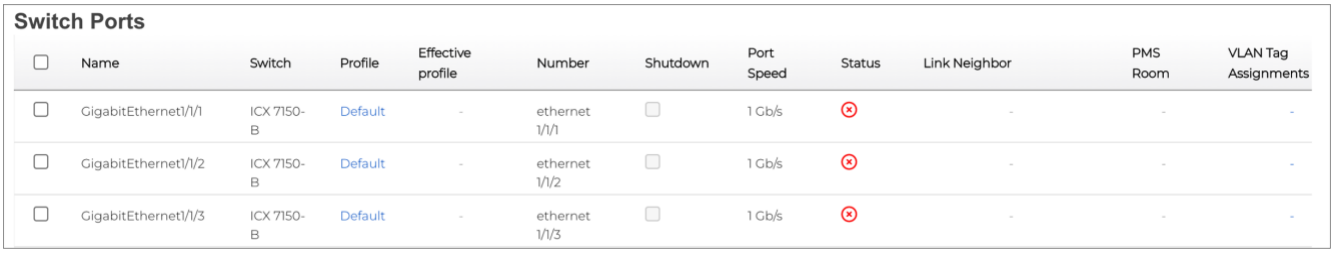


FIGURE 5 – SWITCH PORTS

Next, click **Sync not enabled**:

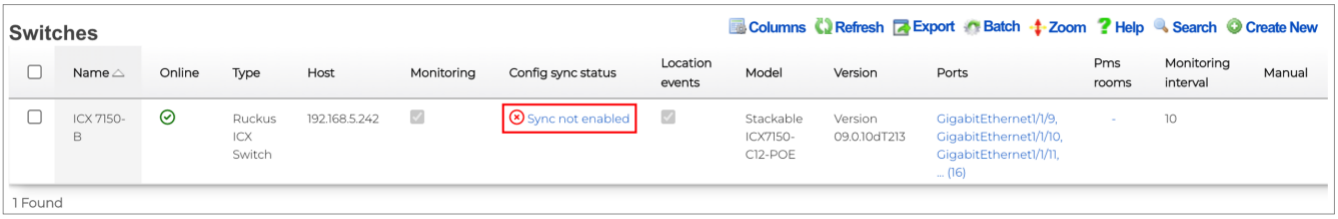


FIGURE 6 – SYNC IS NOT ENABLED

Next, click on **Generate Diff to Enable Sync**. After a while, the list of commands that need to be pushed to the switch will show. Click **Enable Config Synchronization**. Click **OK** after you read the warning message.

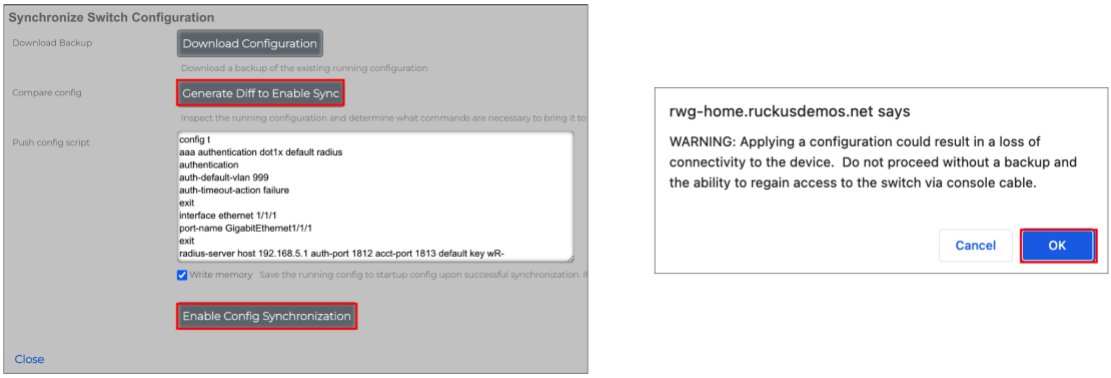


FIGURE 7 – GENERATE DIFF

Note: After clicking **OK**, if you receive the message **Unable to sync – device has no switch ports. Please import ports first**, that means RWG was unable to retrieve the ICX interfaces using SNMP. Make sure the ICX switch is configured with a read-only community string. The default string used by RWG is **public**.

The **Config sync status** shows in green now, and it displays the date and time for the synchronization.

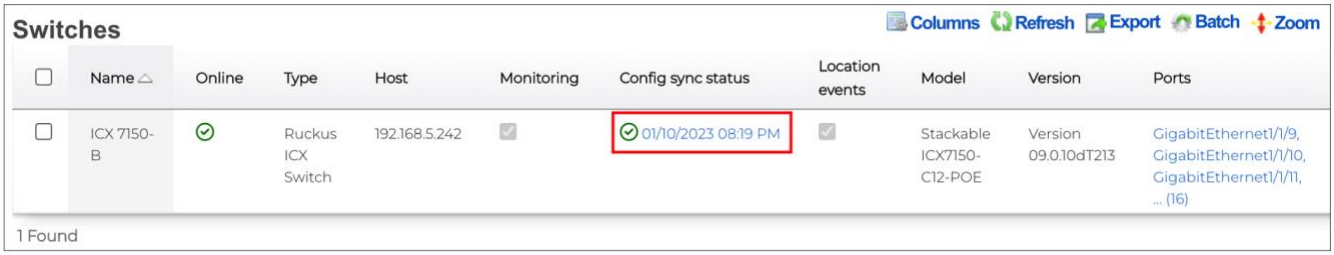


FIGURE 8 – THE SWITCH IS IN SYNC

Check the ICX configuration. You will find lines to enable authentication using 802.1x, the RADIUS server configuration, and port names for the interfaces. Except for VLAN 999 used for authentication, no other VLANs are pushed to the switch.

```
vlan 999 name Auth-Default by port
!
!
!
authentication
  auth-default-vlan 999
  auth-timeout-action failure
!
radius-server host 192.168.5.1 auth-port 1812 acct-port 1813 default key 2 $K1BNIlltcjhoJTJuaTkqXkNnQCwlKw== dot1x mac-auth
```

```
interface ethernet 1/1/1
 port-name GigabitEthernet1/1/1
!
interface ethernet 1/1/2
 port-name GigabitEthernet1/1/2
!
interface ethernet 1/1/3
 port-name GigabitEthernet1/1/3
!
interface ethernet 1/1/4
 port-name GigabitEthernet1/1/4
!
interface ethernet 1/1/5
 port-name GigabitEthernet1/1/5
!
interface ethernet 1/1/6
 port-name GigabitEthernet1/1/6
!
etc ...
```

FIGURE 9 – ICX CONFIGURATION

Switch Port Profile

Switch Port Profiles are used to push new VLANs and interfaces to an ICX switch. Navigate to **Network/Wired** and scroll down to the section **Switch Port Profiles**. A default profile is created automatically when the switch is adopted. It contains all switch interfaces.

Click on **Create New**.

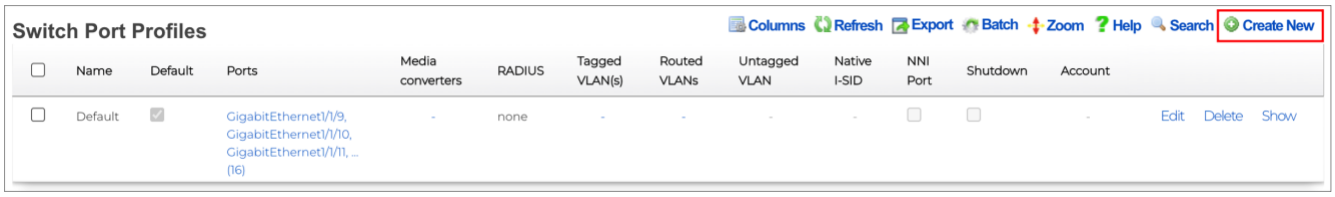


FIGURE 10 – NEW SWITCH PORT PROFILE

Enter the following information:

- **Name**: enter a name for the profile
- **Ports**: click the blank field to see the dropdown list, then click on the ports that you want to configure. They will show at the right of the field. Click the red ✖ to unselect a port.
- **Untagged VLAN**: enter the VLAN ID
- **Tagged VLAN**: If you need to add tagged interfaces instead of untagged, you need to create a VLAN interface first at **Network/LAN/VLAN Interfaces**.

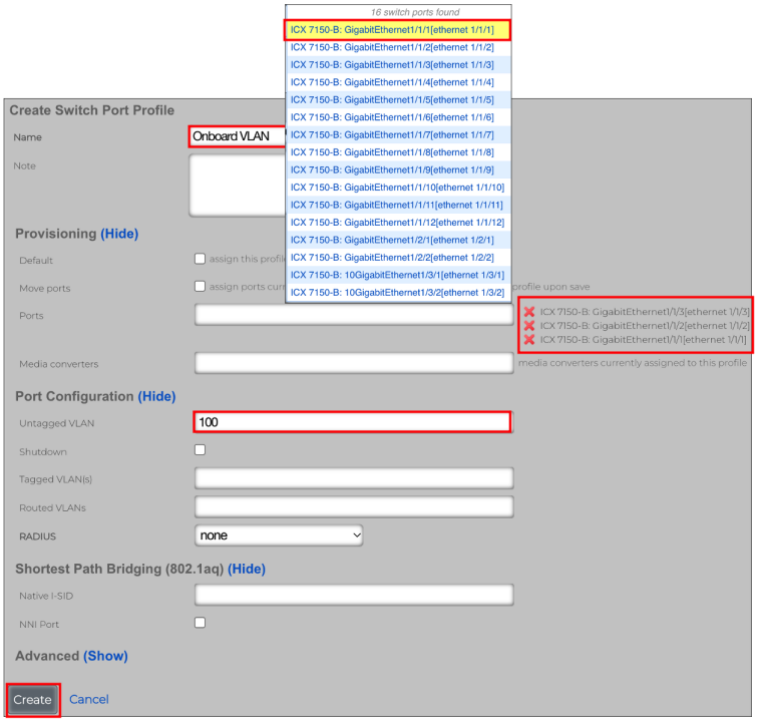


FIGURE 11 – CREATE SWITCH PORT PROFILE

Click **Create** to finish.

The new VLAN with the interfaces is pushed to the ICX switch automatically. Open a SSH session to the ICX switch to see the results:

```
SSH@ICX-7150-B(config)#sh ru vlan
vlan 1 name DEFAULT-VLAN by port
!
vlan 100 by port
 untagged ethe 1/1/1 to 1/1/3
!
vlan 999 name Auth-Default by port
!
```

FIGURE 12 – VLAN 100 CREATED

VLAN Interfaces in RWG

The **VLAN Interfaces** scaffold is used to create tagged VLANs that are configured in the RWG interfaces. They can be pushed to ICX switches using switch port profiles.

Navigate to **Network/LAN** and click **Create New** in the VLAN Interfaces section:

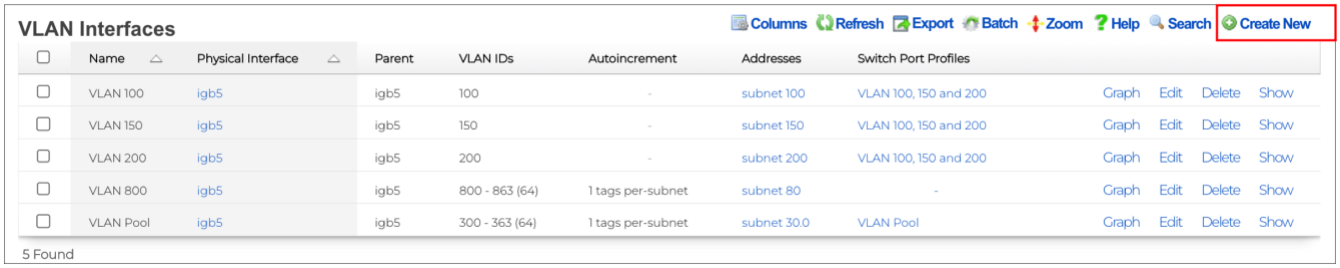


FIGURE 13 – CREATE NEW VLAN INTERFACE

Enter the following information:

- **Name**: Enter a name for the VLAN interface
- **Physical Interface**: Select the RWG physical interface where the VLAN will be configured.
- **VLAN IDs**: Enter the VLAN ID
- **Autoincrement**: Select **none | single L2 | n tags = 1** to create a single VLAN. Other options allow the creation of a range of VLANs, starting at the VLAN ID defined previously.

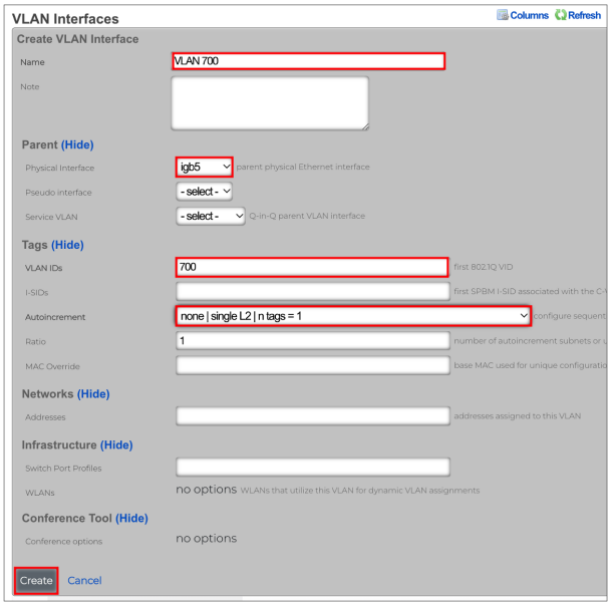


FIGURE 14 –VLAN INTERFACES

Click **Create** to finish.

A new entry shows in the **VLAN Interfaces** table. You can also see the new VLAN in a SSH session to RWG.

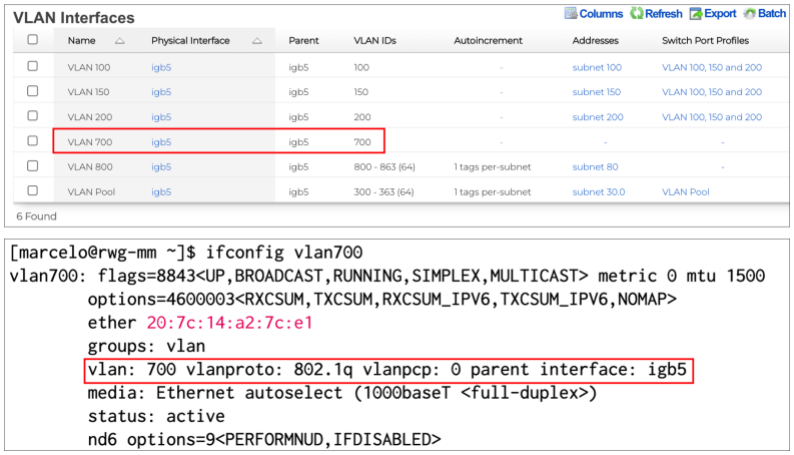


FIGURE 15 –VLAN 700 CREATED

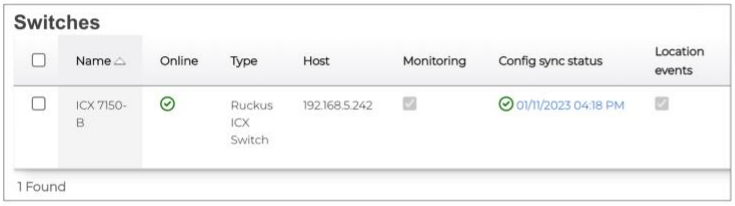
To push the new VLAN to the ICX switch, you need to use Switch Port Profiles, as described in the previous section.

Source of Truth for VLANs

RWG is the source-of-truth for VLANs and interfaces. Open a SSH session to the ICX switch and use the following commands to create VLAN 200 and add interfaces:

```
(config)# vlan 200
(config-vlan-200)# untagged e 1/2/1 to 1/2/2
```

Perform a new sync for the switch. Navigate to **Network/Wired**, click on the last sync date, then **Generate Diff**:



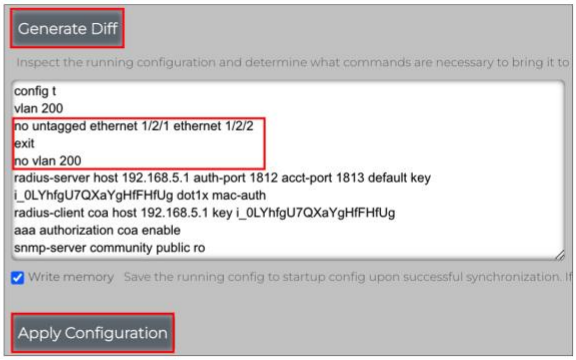


FIGURE 16 – GENERATE DIFF AND APPLY CONFIGURATION

When you click **Apply Configuration**, RWG will remove the vlan and interfaces created in the CLI, because there is no corresponding switch port profile configured in RWG. RWG is the source-of-truth for VLANs, interfaces and RADIUS configuration for the ICX switches.

Adoption of SmartZone Controllers

RWG uses REST API calls to fetch and update the configuration of a SmartZone controller.

Upon adoption, RWG retrieves the zones, access points and WLANs from the SmartZone controller, and stores that information in its internal repository.

Because RWG uses a different scheme to represent the AGs and WGs – instead, it uses Access Point Profiles, it may attempt to delete existing WGs in SmartZone that are not in a 1:1 relationship with the AG.

> **Important Note:** It is not a requirement that the entire SmartZone controller needs to be in sync with RWG. It is possible to define domain and zone filters to determine which zones will be maintained in sync. That is a very useful feature to adopt a pre-installed SmartZone, which may contain hundreds of zones. Using that feature, RWG can sync only a small subset of the zones configured in SmartZone – only the ones required for the RWG solutions. RUCKUS recommends up to 10 zones in a typical environment.

To adopt a new SmartZone controller, navigate to **Network/Wireless**, then click **Create New** in the **WLAN Controllers** section:

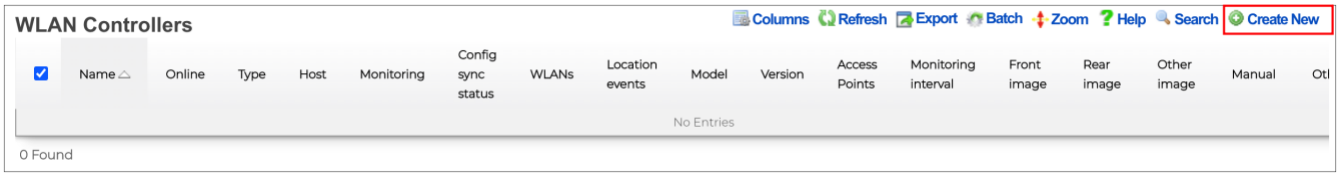


FIGURE 17 – CREATE NEW WLAN CONTROLLER

Enter the following information:

- **Name**: Enter a name for the controller
- **Type**: Select **RUCKUS SmartZone**
- **Host**: Enter the controller IP address or FQDN
- **Username**: Enter the username for a user with full admin access
- **Password**: Enter the password
- **IP group & policy**: Keep this checkbox marked.

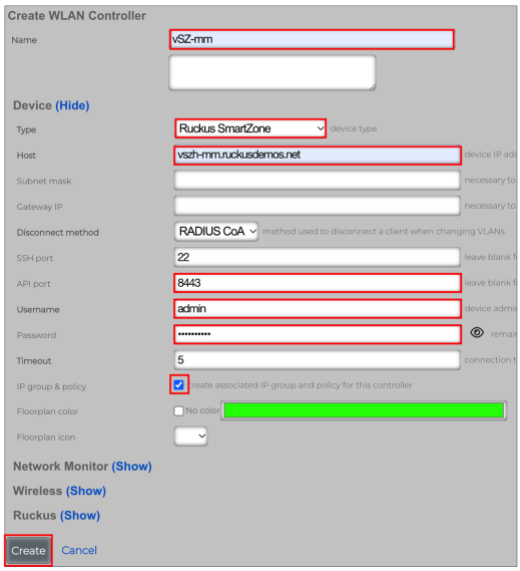


FIGURE 18 – CREATE WLAN CONTROLLER

Click **Create** to finish.

Click **Refresh**. The **Online** icon should turn green, and the new WLAN controller entry should show the model and version:

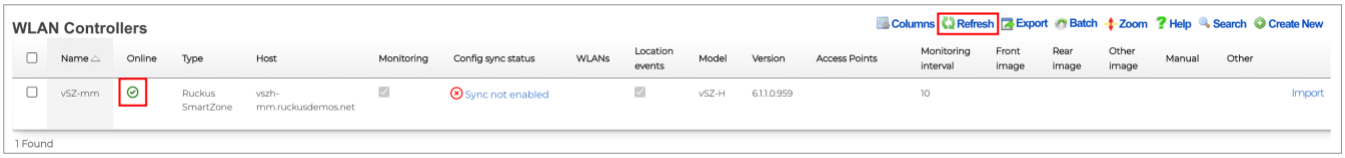


FIGURE 19 – NEW WLAN CONTROLLER

Scroll right, and click **Import**.

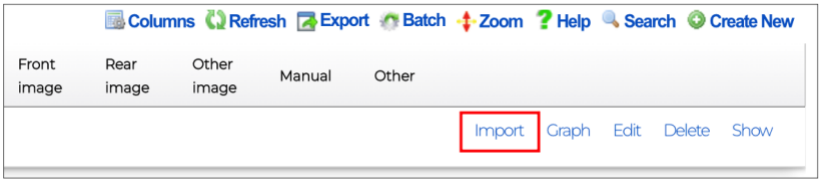


FIGURE 20 – IMPORTING

If you click on the zones, only the highlighted zones will be imported, and that selection will be saved to the controller entry in RWG. From that moment on, only those zones and the WLANs and access points under them will be monitored by RWG and kept in sync.

You can also control whether or not the Access Points, WLANs and Access Point profiles will be imported.

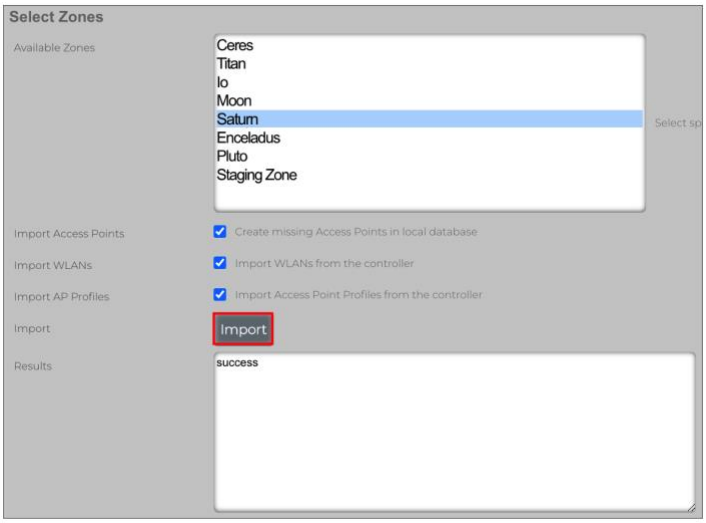


FIGURE 21 – SELECT WHAT TO IMPORT

Click **Import**. You should receive a success message.

Note: to select multiple zones or to deselect a zone in a Mac computer, use **Cmd ⌘ + click**. To select multiple zones or to deselect a zone in Windows, use **CTRL + click**.

Config Synchronization

Click on **Sync not enabled**. Next, click **Enable Config Synchronization**, then click **OK** after you read the warning message.

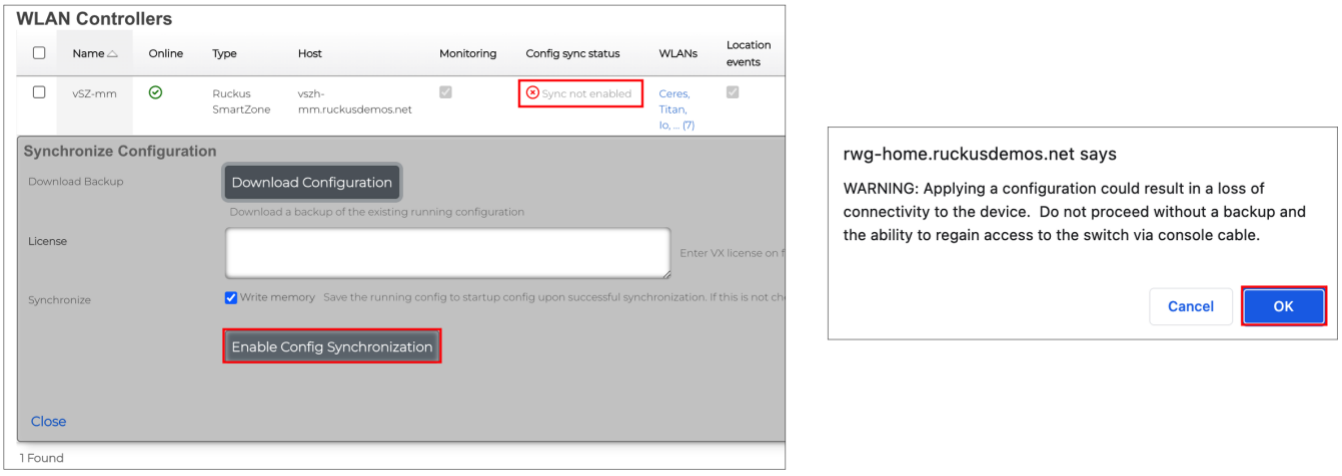


FIGURE 22 – CONFIG SYNCHRONIZATION

The **Config sync status** shows in green now, and it displays the date and time for the synchronization.

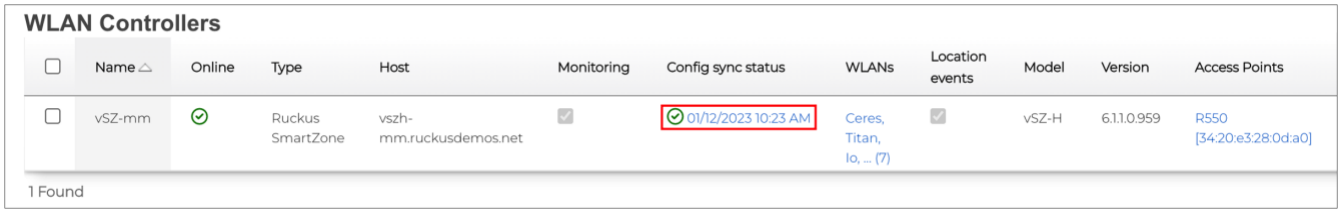


FIGURE 23 – SMARTZONE IS IN SYNC

Using Zone Filters and Domain Filters

When you select zones using **Import**, the selection is added to **Zone filter** in the **Network Monitor** section for the controller entry.

Currently, the zones are added using the internal zone IDs. A future RWG version will show the zone names instead. You can use the API call **/rkszones** in Postman to retrieve the zone IDs, and enter them manually at any time.

The example below shows two zone IDs. RWG will only manage and sync the zones that are included in the list. If none is included, then all zones will be managed by RWG.

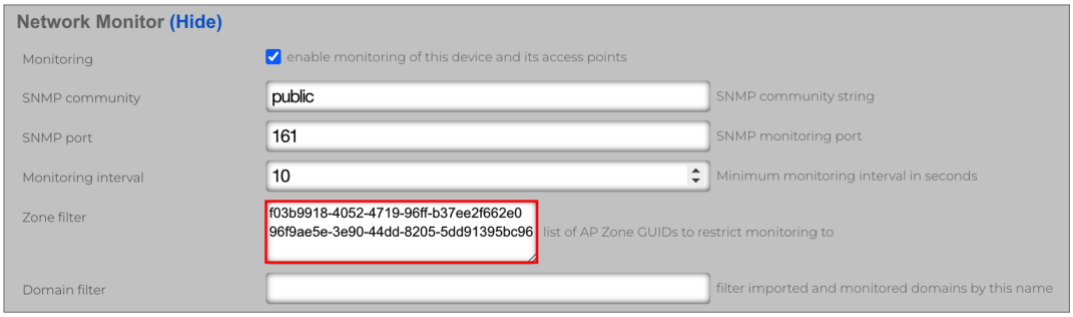


FIGURE 24 – USING ZONE FILTER

This is another way to restrict the scope of zones that will be managed by RWG.

In a similar fashion as with the Zone filters, we can use a **Domain filter** in the controller entry to determine which domains (or more correctly, the zones that are under it) will be managed by RWG.

Enter the domain names in the Domain filter field – not the domain IDs.

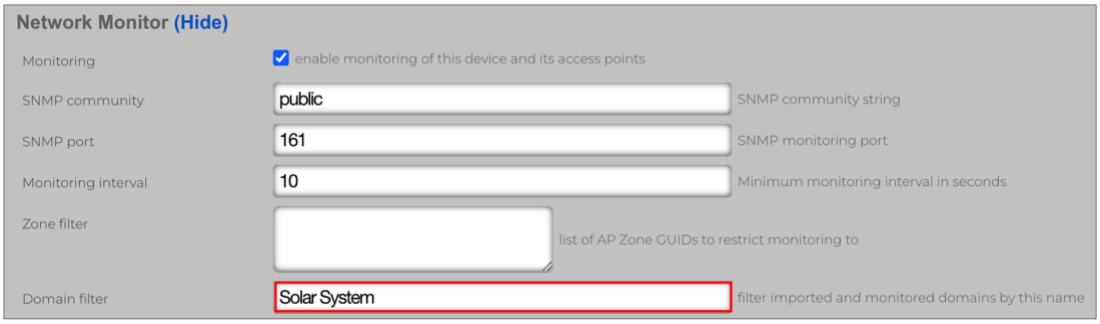


FIGURE 25 – USING DOMAIN FILTER

Create a New Zone

To create a new zone using the RWG UI, navigate to **Network/Wireless**, then scroll down to the **Access Point Zones** section and click **Create New**:

FIGURE 26 – CREATE A NEW ZONE

Enter the following information:

- **Name**: Enter the zone name. It must be a unique zone name in SmartZone.
- **Controller**: Select the SmartZone controller.
- **Domain Name**: Enter the domain name. It must be an existing name. If you leave the field blank, then the zone will be created in the System domain.
- **AP Login Name**: Enter the login name for the zone. If you leave both the login name and password blank, the zone will take the credentials used for the adoption of the SmartZone controller.
- **AP Login Password**: Enter the password for the zone. If you leave the field blank, the zone will take the password used for the adoption of the SmartZone controller.
- **Proxy AAA Requests:** Defines whether the zone will be a proxy zone or non-proxy. The default setting is proxy.

You can also enable the DFS channels, define the channel width for 5 GHz and the country code.

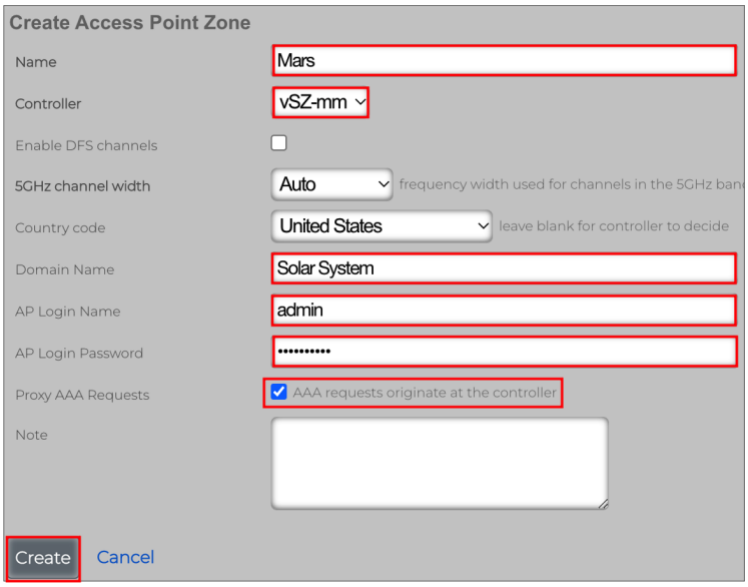


FIGURE 27 – CREATE ACCESS POINT ZONE

Click **Create** to finish.

The new zone is pushed to SmartZone automatically, without the need of a sync, and a new entry shows in the **Access Point Zones** section.

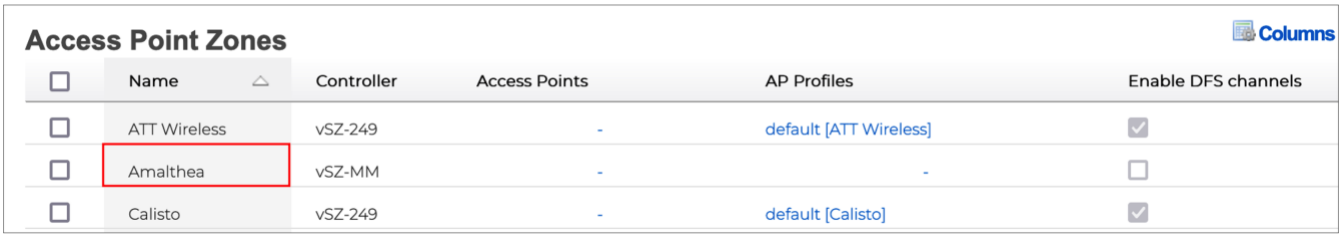


FIGURE 28 – NEW ZONE CREATED

Delete a Zone

To delete a zone, click **Delete** in the zone entry at the **Access Point Zones** section.

FIGURE 29 – DELETE A ZONE

If you delete a zone using the SmartZone UI, it will be restored after the next sync in RWG.

Create a New WLAN using the RWG UI

To create a new WLAN using the RWG UI, navigate to **Network/Wireless**, then scroll down to the WLANs section and click **Create New**:

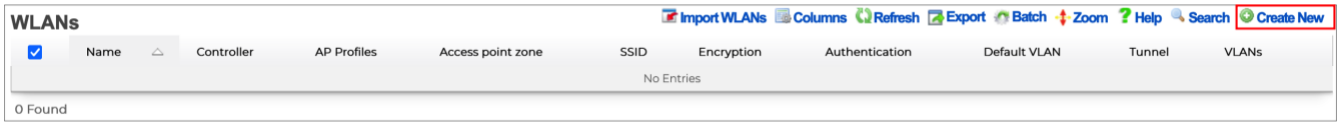


FIGURE 30 – CREATE A NEW WLAN

Enter the following information:

- **Name**: Enter a name for the WLAN.
- **Access point zone**: Select the zone where the WLAN will be created.
- **Controller**: Select the SmartZone controller. The list of zones displayed in the Access point zone dropdown will reflect the selection.
- **AP Profiles**: Click None to deselect all profiles, then select the profile that matches the zone.
- **SSID**: Enter the SSID for the WLAN.
- **Encryption**: Select the desired encryption type.
- **Authentication**: Select the desired authentication type.
- **Pre-shared key**: Enter the pre-shared key, if required.
- **Enabled**: Determines which radios will broadcast the SSID.

FIGURE 31 – CREATE WLAN

Click **Create** to finish.

A new entry shows in the **WLANs** section, and the new WLAN is pushed to SmartZone automatically.

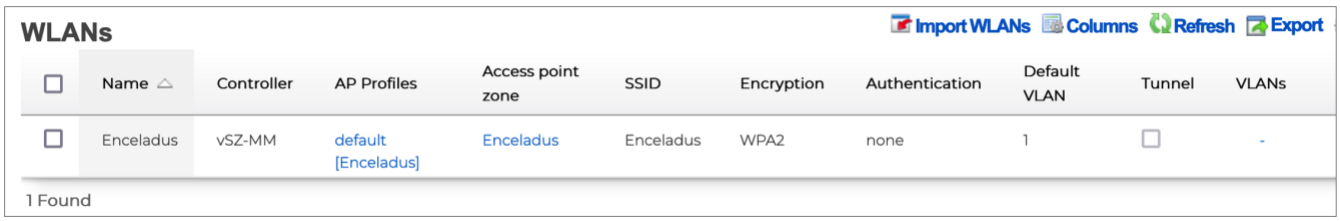


FIGURE 32 – NEW WLAN CREATED

Create a New WLAN using the SmartZone UI

If you create a WLAN using the SmartZone UI, it is not created in RWG automatically. You need to do a sync or import the WLANs in RWG. You can start a sync at the WLAN Controllers section, and the importation can be done in either of these sections:

- **WLAN Controllers**: Select the controller entry, scroll right, and click **Import**.
- **WLANs**: Click **Import WLANs** at the top menu of the WLANs section.

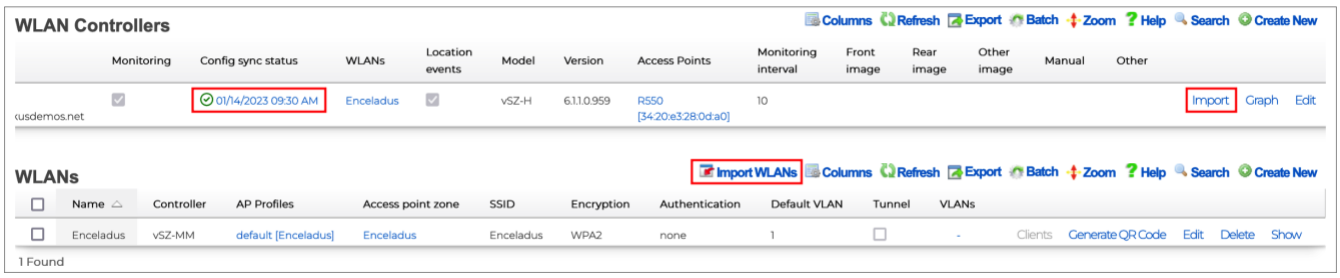


FIGURE 33 – IMPORTING WLANS

Delete a WLAN

Use the RWG UI to delete a WLAN. Click **Delete** on the WLAN entry you need to delete. The WLAN will be deleted in RWG and SmartZone immediately.

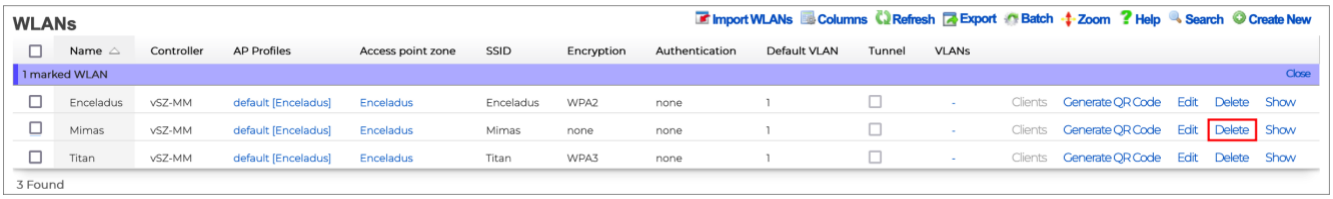


FIGURE 34 – DELETE A WLAN

If you delete a WLAN using the SmartZone UI, the WLAN will be restored in SmartZone after the next RWG sync.

Supported WLAN Types in RWG

RWG supports the following WLAN types:

- **Encryption Methods:** None, WEP 128-bit, WPA2, WPA3, WPA2/WPA3 and WPA Mixed.
- **Authentication:** None, MAC Authentication Bypass, Multiple PSK, 802.1X-EAP, 802.1X-PSK and 802.1X-MAC.

If a WLAN type not supported by RWG is created using the SmartZone UI, it will be ignored by RWG, and maintained in SmartZone.

The following table shows all WLANs supported by RWG and their corresponding names.

	SmartZone name	RWG name	RWG pushes to SmartZone	RWG imports from SmartZone
Authentication Type	Standard usage	none	Yes	Yes
	Hotspot (WISPr)	*Not supported*	No	No
	Guest Access	*Not supported*	No	No
	Web Authentication	*Not supported*	No	No
	Hotspot 2.0 Access	*Not supported*	No	No
	Hotspot 2.0 Onboarding	*Not supported*	No	No
	Wechat	*Not supported*	No	No
Authentication Methods	OPEN	none	Yes	Yes
	802.1X	802.1X EAP	Yes	Yes
	MAC Address	MAC Authentication Bypass	Yes	Yes
	802.1X EAP & MAC	802.1X EAP-MAC	Yes	Yes
	External DPSK	Multiple PSK	Yes	Yes
Encryption Methods	WPA2	WPA2	Yes	Yes
	WPA3	WPA3	Yes	Yes
	WPA2/WPA3-Mixed	WPA2/WPA3	Yes - same passphrase for WPA2 and WPA3	Yes - same passphrase for WPA2 and WPA3
	OWE	*Not supported*	No	No
	OWE-Transition	*Not supported*	No	No
	WPA-Mixed	WPA Mixed	Yes	Yes
	WEP-64	*Not supported*	No	No
	WEP-128	WPA Mixed	Yes	Yes
	None	none	Yes	Yes

FIGURE 35 – SUPPORTED WLANS TABLE

Access Point Profiles

Access Point Profiles define radio parameters for one or more of access points, and can also be used to define how the WLANs will use the radios. RWG does not have separate objects that correspond to AGs and WGs in SmartZone – only the Access Point Profile.

When a new Access Point Profile is created in RWG, a new AG and a new WG are created in SmartZone automatically, and the WG is associated to the AG for the 2.4 GHz and 5 GHz radios.

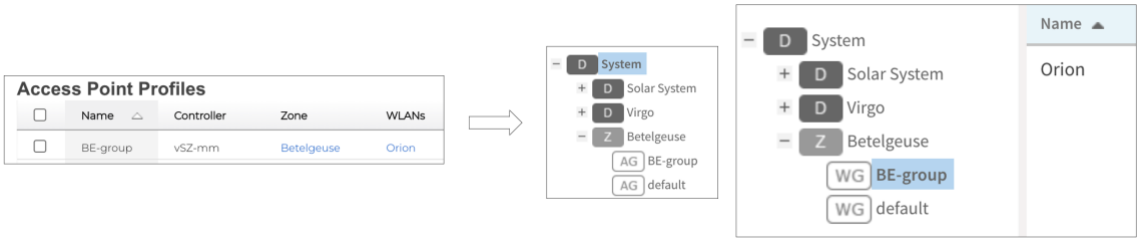


FIGURE 36 – AG AND WG CREATED IN SMARTZONE BY RWG

When both radios are used in a WLAN, RWG expects a 1:1 relationship between WGs and AGs. During a sync, RWG will attempt to modify the AG and WG configuration in SmartZone to meet that rule. The sync might fail depending on the AG/WG configuration in SmartZone. In those cases, the operator will need to change the AG/SZ configuration in SmartZone manually.

FIGURE 37 – WGS BEFORE AND AFTER A SYNC

Enable and Disable WLAN Radios

You can select which radios will broadcast the SSID in the WLANs scaffold. The default is both radios on.

When only radio is selected, RWG creates two additional WGs with the extension 2.4 GHz and 5 GHz, and places the WLAN in the selected radio.

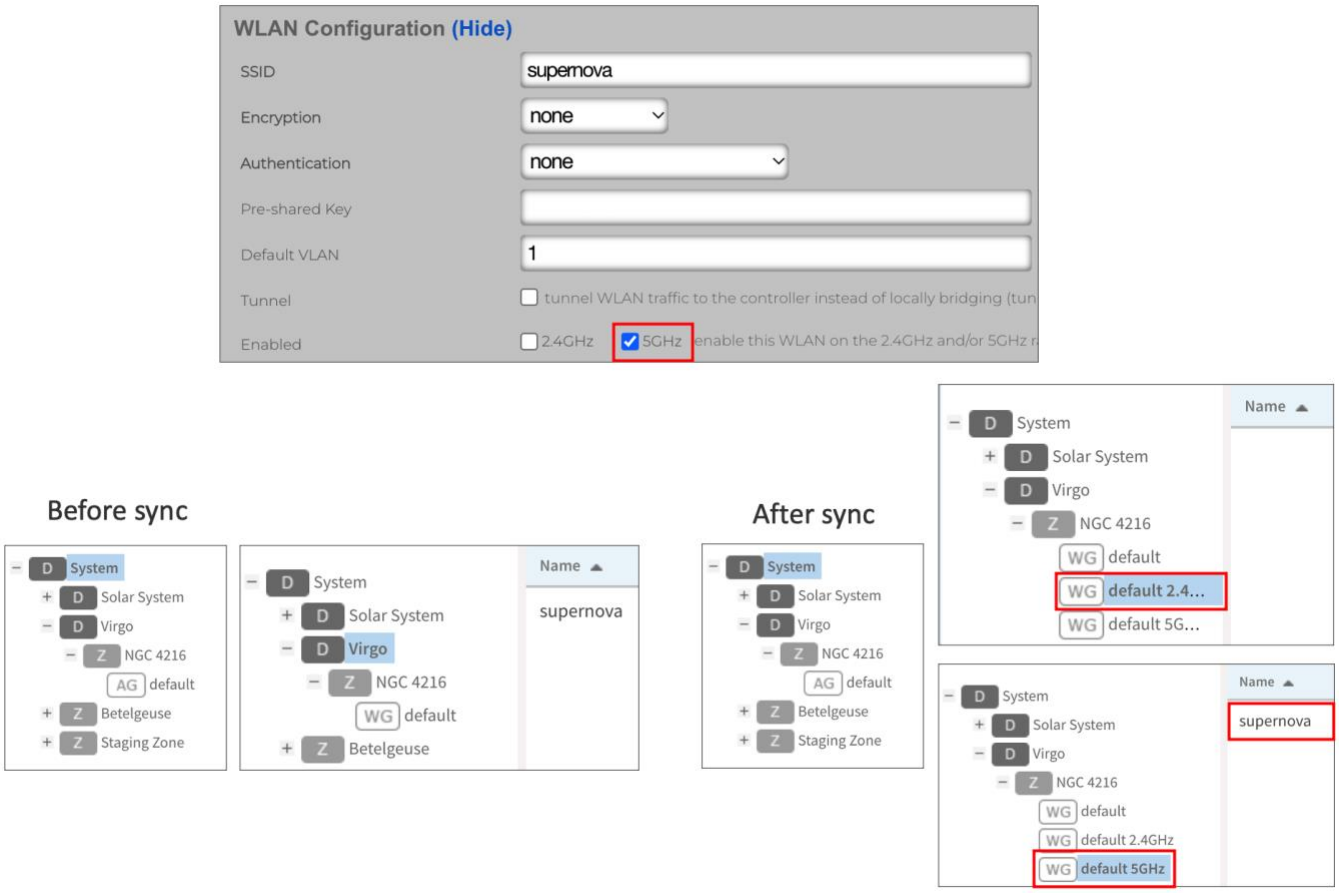


FIGURE 38 – ENABLE AND DISABLE WLAN RADIOS

Create a New Access Point Profile

To create a new access point profile in RWG, navigate to **Network/Wireless**, then click **Create New** in the **Access Point Profiles** section:

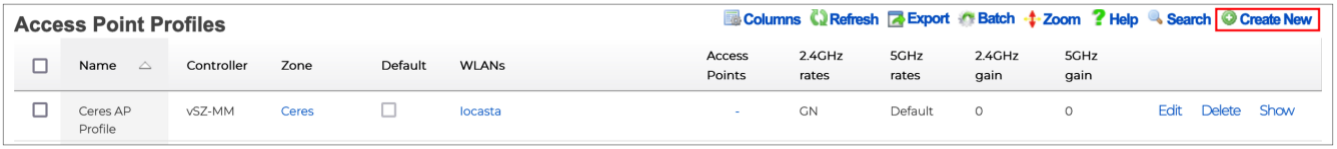


FIGURE 39 – CREATE NEW ACCESS POINT PROFILE

Enter the following information:

- **Name**: Enter the name for the access point profile.
- **Zone**: Select the zone where the profile will be created
- **Controller**: Select the controller. The list of zones displayed in the **Zone** dropdown list will follow this selection.
- **WLANs**: If a WLAN is included, a WG will also be created in the zone, and the WLAN will be added to it. If the WLAN is from a different zone, it will be duplicated in the selected zone.

You can also configure the management VLAN and radio parameters for the access points as required.

Click **Create** to finish.

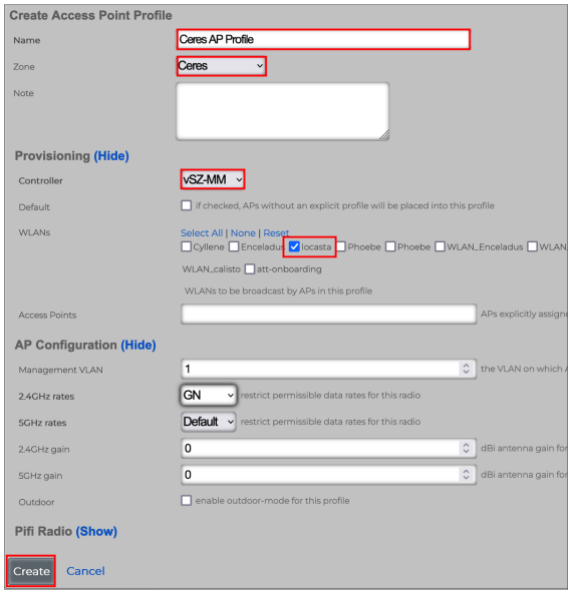


FIGURE 40 – CREATE NEW ACCESS POINT PROFILE

A new access point profile is created in RWG, and an AG and WG are created in SmartZone automatically.

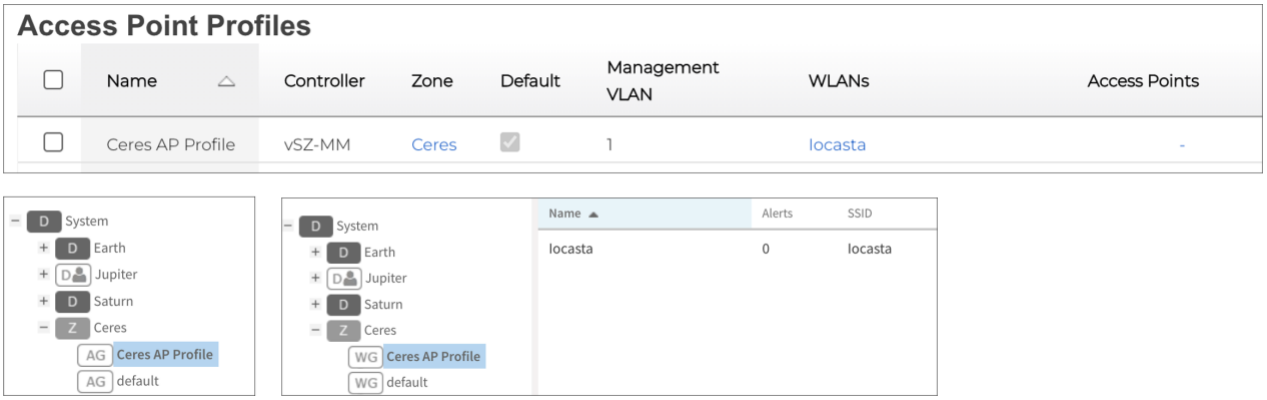


FIGURE 41 – NEW ACCESS POINT PROFILE, AG AND WG

Delete an Access Point Profile

To delete an access point profile in RWG, click **Delete** in an access point profile entry:

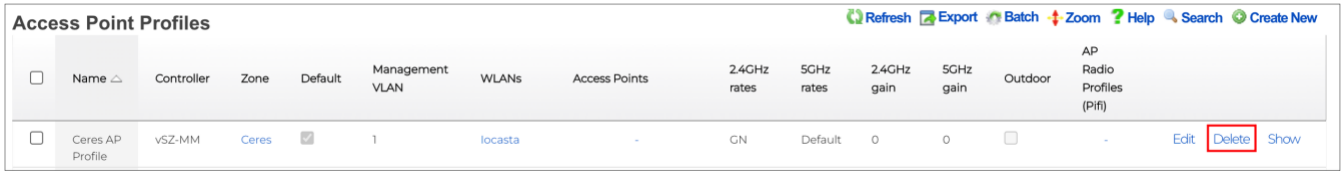


FIGURE 42 – DELETE AN ACCESS POINT PROFILE

The AG and WG will be deleted in SmartZone automatically. If you delete the AG and WG using the SmartZone UI, they will be restored after a RWG sync.

Sync Troubleshooting

The diff messages displayed after **Generate Diff** or **Synchronize Configuration** show what RWG needs to change in SmartZone to get it in sync. When the sync fails, the message header shows the reason.

In the example below, sync failed because RWG was unable to delete a WG, because it is being used by an AG. The operator will need to change the WG/AG association manually in SmartZone.

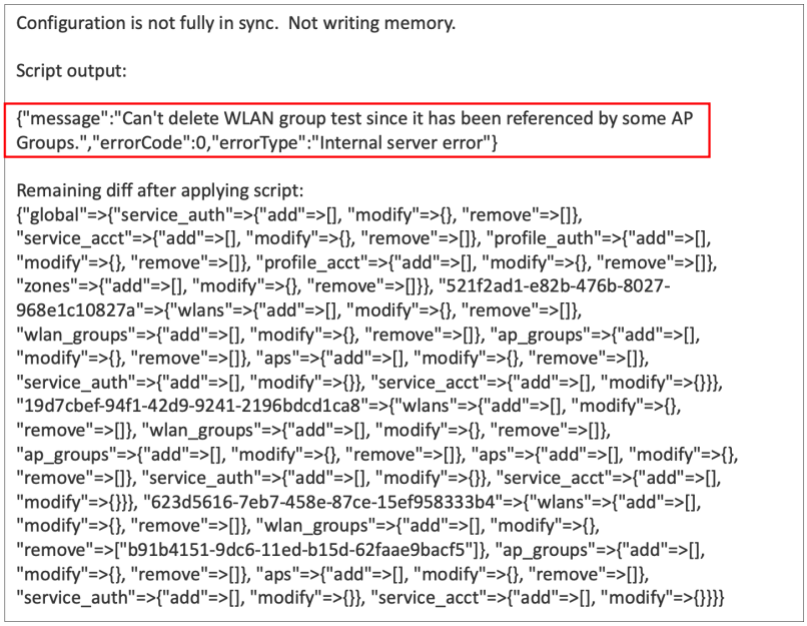


FIGURE 43 – CAN'T DELETE WLAN GROUP

The body of the diff message shows the details.

This example below shows same body from the last slide, but using a different format for clarity. The message body starts with a section for global settings. It contains sections for AAA services and profiles and zones. In this example, no changes are being made at the global level – notice that all lists [] and dictionaries {} are empty.


```
{
 "global"=>
 {"service_auth"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "service_acct"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "profile_auth"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "profile_acct"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "zones"=>{"add"=>[], "modify"=>{}, "remove"=>[]}
  },
 "521f2ad1-e82b-476b-8027-968e1c10827a"=>
 {"wlans"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "wlan_groups"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "ap_groups"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "aps"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "service_auth"=>{"add"=>[], "modify"=>{}},
  "service_acct"=>{"add"=>[], "modify"=>{}}},
 "19d7cbef-94f1-42d9-9241-2196bdcd1ca8"=>
 {"wlans"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "wlan_groups"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "ap_groups"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "aps"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "service_auth"=>{"add"=>[], "modify"=>{}},
  "service_acct"=>{"add"=>[], "modify"=>{}}},
 "623d5616-7eb7-458e-87ce-15ef958333b4"=>
 {"wlans"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "wlan_groups"=>{"add"=>[], "modify"=>{}, "remove"=>["b91b4151-9dc6-11ed-b15d-62faae9bacf5"]},
  "ap_groups"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "aps"=>{"add"=>[], "modify"=>{}, "remove"=>[]},
  "service_auth"=>{"add"=>[], "modify"=>{}},
  "service_acct"=>{"add"=>[], "modify"=>{}}}
 }
```


FIGURE 44 – MESSAGE BODY

Every zone has its own section with sub-sections for wlans, wlan groups, APs and AP groups and AAA services. The zones are shown by their zone ID.

No changes are required for the first two zones, but in the third zone RWG wants to remove the WLAN group with ID b91b4151-9dc6-11ed-b15d-62faae9bacf5.

Currently, you need to use API calls in Postman or python scripts to get the actual names for the zone ID and WLAN group ID. A future version of RWG will show the names instead of the IDs.

Troubleshooting Sync Errors

Follow these steps when sync fails:

- Check the global section first. Look for lists or dictionaries that are not empty.
- Check the sections for each of the zones, and look for lists or dictionaries that are not empty.
- For any section with lists or dictionaries that are not empty, fetch the names for the zones, WLAN, WLAN groups, etc., using Postman or python scripts.
- Attempt to make the required changes in SmartZone manually (they should fail too).
- Fix the underlying reason for the failure – for example, if a WG cannot be deleted, change the AG configuration to use the default WG instead.

If there are lots of zones showing required changes in the diff message, you will need to check all zones. For SmartZone with a lot of zones that need to be managed by RWG, a good strategy is to sync just a few zones (3 to 5), fix any issues, then sync a new batch and fixes the issues, and continue until all zones are imported and sync works. An easy way to sync just a few zones is to manually add the zone IDs at the Zone filter field in the SmartZone entry.

Example – Can't Delete WLAN Group

Firs, look for the header message and any non-empty lists in the body:

FIGURE 45 – HEADER MESSAGE AND BODY DETAILS

The header message gives the reason for the failed sync. Use Postman to get the zone name. The WLAN groups already show in the header message.

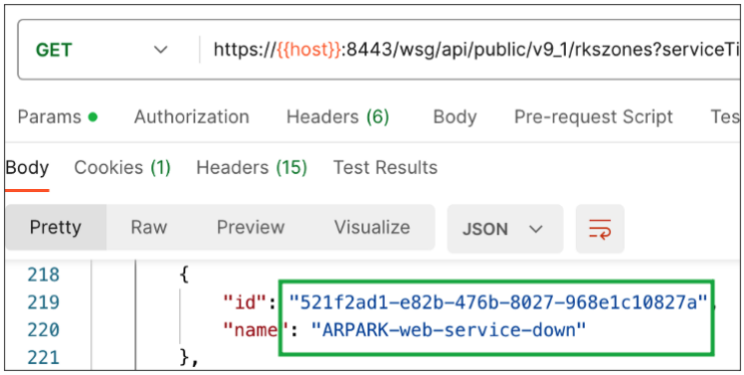


FIGURE 46 – RETRIEVE THE ZONE NAME USING POSTMAN

If you attempt to delete the WGs 2.4GHz and 5GHz in SmartZone it also fails.

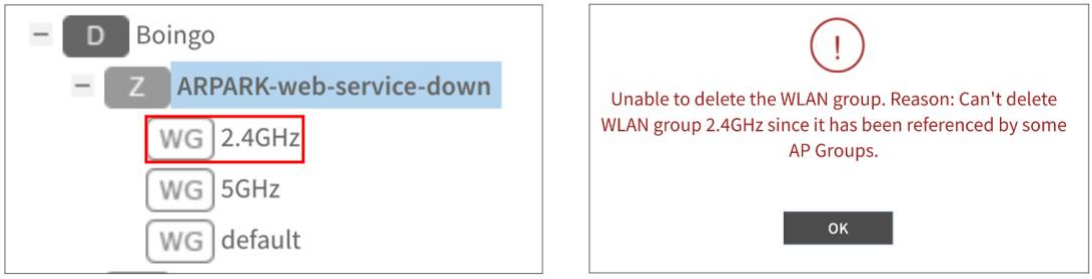


FIGURE 47 – THE WLAN GROUPS CANNOT BE DELETED

A possible fix is to change the AG configuration, by changing the AG association to the default WG for both radios.

FIGURE 48 – CHANGING THE AG/WG ASSOCIATION

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