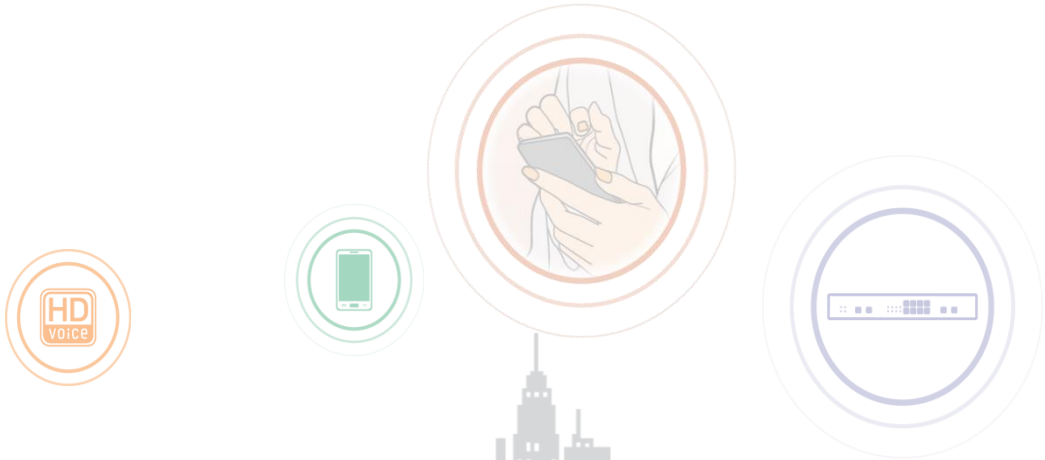
Samsung Wireless Enterprise™

# Samsung WLAN

## Day 1



# Day 1 Outline

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1. Course Outline & Classroom Setup
   - 1.1 WLAN Information Sheet
   - 1.2 Classroom Setup

2. WLAN Product Overview
   - 2.1 Deployment Scenarios
   - 2.2 Access Point Controller's
   - 2.3 AP (Access Point) Specifications
   - 2.4 WEM (Wireless Enterprise Manager)

3. Installation
   - 3.1 Hardware Mounting

4. Basic Installation Section
   - 4.1 Site Information
   - 4.2 Connecting to the APC
   - 4.3 Basic Installation Wizard
   - 4.4 Network Setup / VLANs
   - 4.5 Software Management
   - 4.6 License Setup
   - 4.7 General Configuration
   - 4.8 Configure Radios
   - 4.9 Configure WLANs
   - 4.10 Set Up Access Points
   - 4.11 AP Groups

5. Maintenance
   - 5.1 Backup the APC
   - 5.2 Downloading the Backup
   - 5.3 Upgrade the APC
   - 5.4 Upgrade the AP
   - 5.5 Default the APC
   - 5.6 Disaster Recovery for APC
   - 5.7 APC Redundancy

1. Course Outline & Classroom Setup
   - 1.1 WLAN Information Sheet
   - 1.2 Classroom Setup

# 1.1 WLAN Information Sheet

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- You should have been given a WLAN information sheet.
- You will use this form all week for APC Configuration, AP Setup etc.
- As the course develops, the information in this form will begin to make more sense
- Lets look at it now

# 1.2 Classroom Setup

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**2 wea302i AP's**

**1 WEC8500 "APC"**
**Access Point Controller**

**1 ies4028FP Ubigate Layer 2**
**Ports 17-24 will be used in this class**

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# 2. WLAN Product Overview

- 2.1 Deployment Scenarios
- 2.2 Access Point Controller's
- 2.3 AP (Access Point)
- 2.4 WEM (Wireless Enterprise Manager)

# 2.1 Deployment Scenario #1

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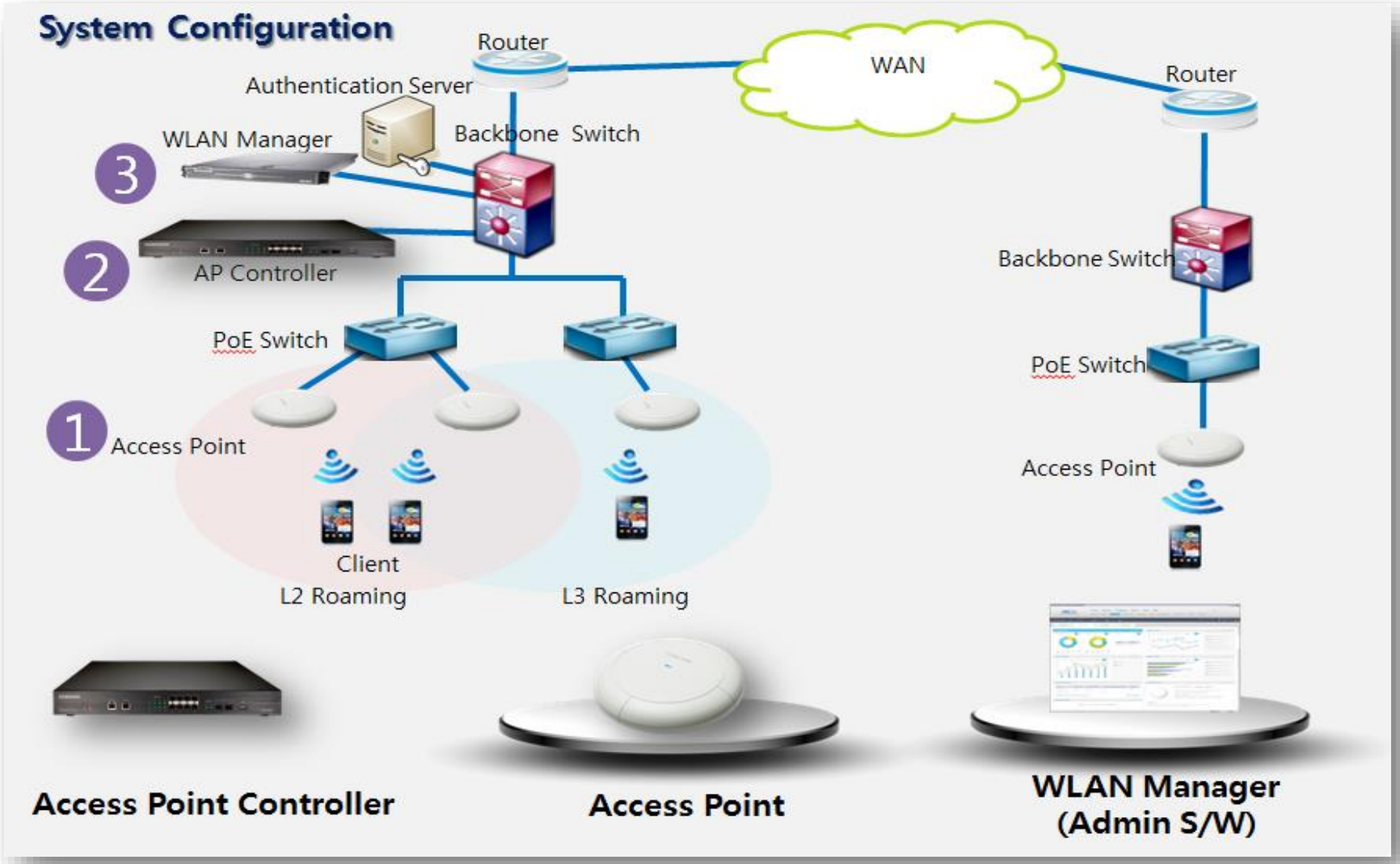

# 2.1 Deployment Scenario #2

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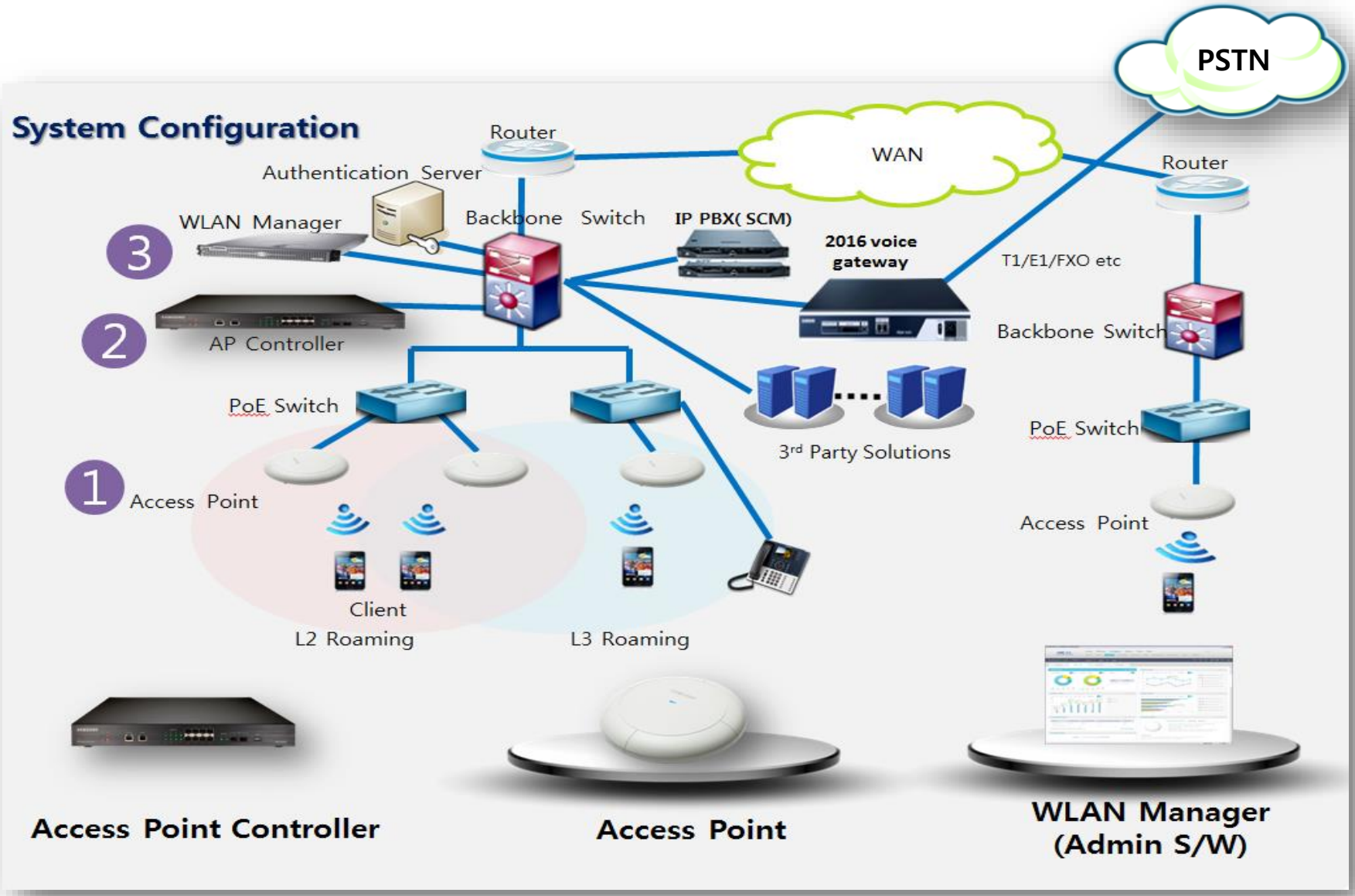

# 2.2 APC (Access Point Controller)

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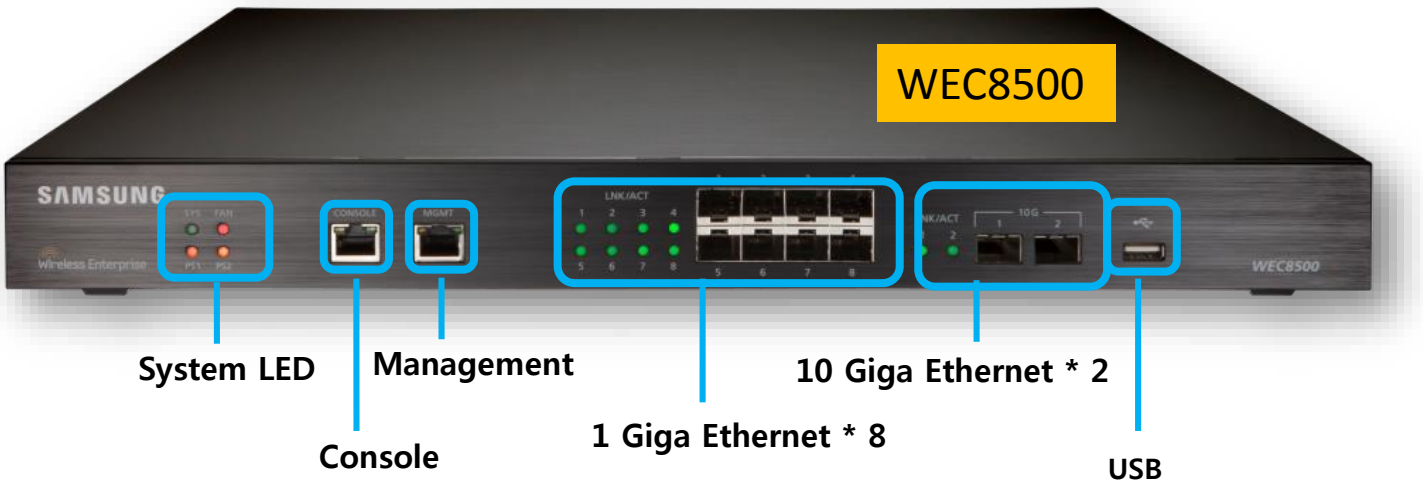
## Introduction to the Samsung Wireless Enterprise Solution

- Samsung Wireless Enterprise (WE) solution provides a variety of telecommunication services required by clients in the wireless environment.
- It allows collaboration of applications such as telephone, message, communicator, etc. that have been used in the conventional wired environment to be used on a wireless terminal such as smart phone, tablet PC, or laptop.
- Samsung APC and WE WLAN AP are the core equipment's to provide various services including user authentication, wireless management, voice and data services in the 802.11-based Wi-Fi environment.
- WE WLAN AP provides the telecommunication environment based on Wi-Fi and APC offers user authentication, quality of service (QoS), handover and security by overall integrating WE WLAN APs.

# 2.2 Access Point Controller




| Interface | Description |
|---|---|
| **Status LED** | It indicates the status of APC by the color of the LED |
| **Console Port** | It is used to check for the operating state of WEC8500 or command by CLI |
| **Ethernet Port** | It supports 100 Megabit Ethernet (Management) |
| **1 Giga Ethernet * 8** | It supports 1 Gigabit Ethernet (SFP) – other side must match 1 gig setup |
| **10 Giga Ethernet * 2** | It supports 10 Gigabit Ethernet (SFP+) |
| **USB** | It supports USB interface |

# 2.2 Access Point Controller's

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## System LED

Indicates the various statuses of system. Each LED displays the following information.


**Figure 4. System LED Configuration**

| LED | Status | Description |
|---|---|---|
| SYS | Green | System is operating normally |
| | Orange | During system booting |
| | Red | Preparing for system booting |
| FAN (fan module) | Green | Installed fan module is operating normally |
| | Orange | During system booting |
| | Red | Fan module fault has occurred |
| PS1 (power module 1) | Green | Normal operation of installed power module 1 |
| | Red | Power is turned off or a fault occurred while the power module 1 is installed. |
| | Off | Power module 1 is not installed. |
| PS2 (power module 2) | Green | Normal operation of installed power module 2 |
| | Red | Power is turned off or a fault occurred while the power module 2 is installed. |
| | Off | Power module 2 is not installed. |

# 2.2 Access Point Controller

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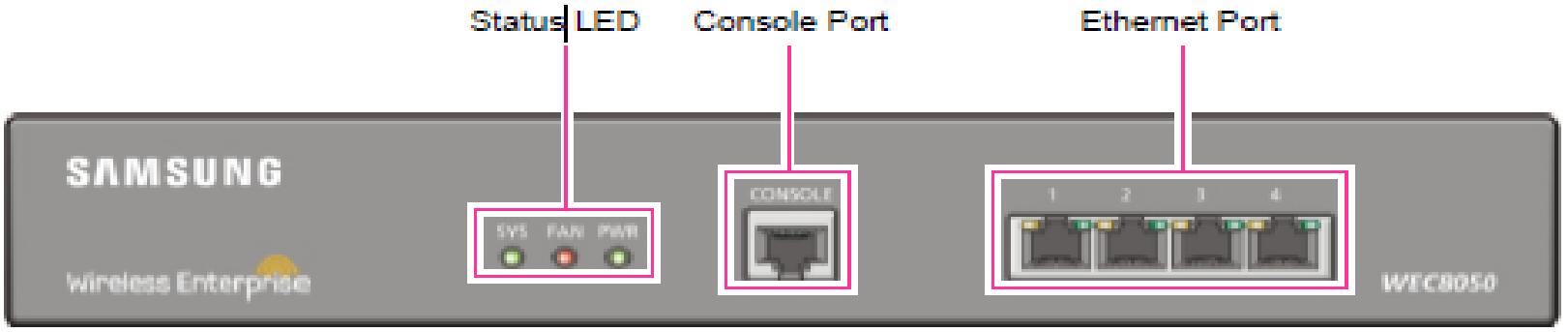
WEC8050




| Interface | Description |
|---|---|
| **Status LED** | It indicates the status of APC by the color of the LED |
| **Console Port** | It is used to check for the operating state of WEC8050 or command by CLI |
| **Ethernet Port** | It supports 4 10/100/1000 Base-T ports. |

# 2.2 Access Point Controller

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## Status LED

This LED indicates the various statuses of system. Each LED displays the following information.


**Figure 9. Status LED configuration**

| LED | Status | Description |
|---|---|---|
| SYS | Green | The system is operating normally |
| | Orange | The system is now booting |
| | Red | Preparing the system for booting |
| FAN | Green | The installed FAN module is operating normally |
| | Orange | The system is now booting |
| | Red | Fan fault |
| PWR | Green | The power is supplied normally |
| | Off | The power is turned off or not supplied |

# 2.2 APC (Access Point Controller)

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## Specifications

| Index | | WEC8050 | WEC8500 |
|---|---|---|---|
| Scalability | Maximum # of APs | 75 | 1000 (Centralized), 3000 (Distributed) |
| | # of Client | 1500 | 20,000 |
| H/W, Interface | Network I/F | 4 X 10/100/1000 mbps, 1 Console | 2 10GE(SFP+), 8 GE(SFP), 1 Console |
| | USB | No | 1 |
| | System Redundancy | Yes | Yes |
| | Redundant Power | No | Yes, Optional |
| | Form Factor | 1 RU | 1 RU |
| Network | Routing | Yes | Yes |
| | VLANs | 128 | 1024 |
| | VLANs per SSID | 50 | 50 |
| | DHCP | Server, Relay | Server, Relay |
| | QoS | Shaping, Policing, 802.1p, Voice Quality Monitoring | Shaping, Policing, 802.1p, Voice Quality Monitoring |
| | System Redundancy | Stateless type (Active-Active, Active-Standby) | Stateless type (Active-Active, Active-Standby) |
| Security | Firewall | Yes, License required | Yes, License required |
| | Authentication | 802.1x | 802.1x |
| | MAC Filtering, ACL | Yes | Yes |
| | Encryption | DTLS | DTLS |
| | AAA | Radius Server and Internal Radius Server | Radius Server and Internal Radius Server |
| RF Manager | RRM | Power, Channel, Coverage Hole | Power, Channel, Coverage Hole |
| | RF Spectrum Analysis | Yes | Yes |
| Handover | L2 | Inter/Intra Controller | Inter/Intra Controller |
| | L3 | Inter/Intra Controller | Inter/Intra Controller |
| Management | CLI | Yes | Yes |
| | GUI | Yes | Yes |
| | SNMP | Yes | Yes |
| | Syslog | Yes | Yes |

## Specifications

| Item | Specifications | |
|---|---|---|
| | 8050 | 8500 |
| Maximum processing capacity under system configuration | Use of 1000 BASE-T 4 Ports: 1.5 Gbps | - When using the 10 GBASE-SR/LR 2 port: 20 Gbps<br>- When using the 1000 BASE-SX/LX 8 port: 8 Gbps |
| Maximum number of AP Groups | 75 | 3000 |
| Maximum number of APs per AP Group | 75 | 1000 |
| Maximum number of WLANs | 255 | 255 |
| Maximum number of stations (clients) per AP | 127 | 127 |
| Maximum number of SSID | 240 | 240 |
| Maximum Number of SSID (WLAN) per AP | 16 | 16 |
| Maximum Number of MAC Addresses | 12K | 12K |
| Maximum Number of IPv4 Unicast Routers | 10K | 10K |
| Maximum Number of System BSSIDs | 2,400 | 16K |
| Firewall Throughput | 1.5 Gbps | 20 Gbps |

# 2.3 AP (Access Point)

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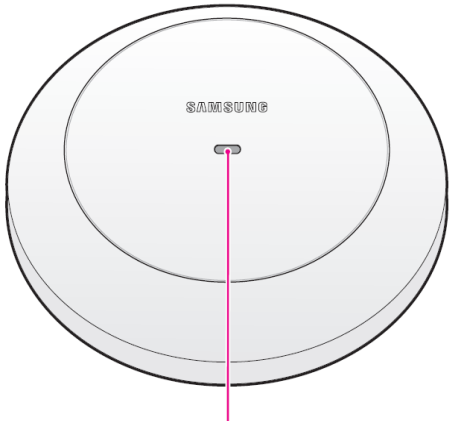
| | Model | Attributes |
|---|---|---|
| 1 | WEA302i | Internal use only |
| 2 | WEA303i | Internal use only |
| 3 | WEA303e | For outdoor use with specified enclosures, can attach an external antenna |
| 4 | WEA403i | Internal use only |
| 5 | WEA412i | Internal use only |
| 6 | WEA453e | Outdoor Access Point |

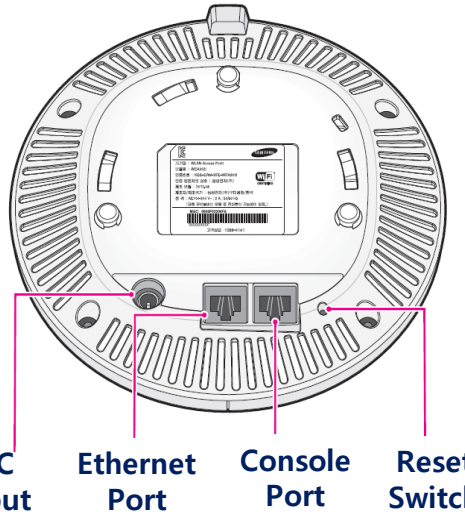
i -> Internal
e -> External

# 2.3 AP (Access Point)

Front View




Back View




**Internal AP**
**WEA302i / WEA303i**

Note: You cannot use a console cable longer than 10 meters for AP connection

**External AP**
**WEA303e**

| Interface | Description |
|---|---|
| **Status LED** | It indicates the status of WEA302i by the color of the LED |
| **Ethernet Port** | It supports1000 BASE-T Gigabit Ethernet and PoE IEEE 802.3af |
| **Console Port** | It is used to check for the operating state of WEA302i or command by CLI |
| **DC input** | It is used when power supplied from AC adaptor |
| **Reset switch** | Reboot WEA302i |

# 2.3 AP (Access Point)


**WEA403i AC**
**3 x 3 MIMO**
**3 spatial streams**

**WEA412i AC**
**2 x 2 MIMO**
**2 spatial streams**

**Note:** For detailed information on AP hardware and Radiation patterns, please refer to the WLAN System Description document. (Chapter 6)

# 2.3 AP (Access Point)

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The new WEA 453e Outdoor Access Point

# 2.3 AP (Access Point)

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Outdoor AP with
Dipole Antennas

Outdoor AP with
a Patch Antenna

Please note that the External Antennas do not come with the Outdoor Access Point.

# 2.3 AP (Access Point) Specifications

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| | | WEA302i | WEA303i | WEA303e |
|---|---|---|---|---|
| **Wireless** | Standard | 802.11a/b/g/n | 802.11a/b/g/n | 802.11a/b/g/n |
| | # of radio | Dual Concurrent Radio | Dual Concurrent Radio | Dual Concurrent Radio |
| | Frequency | 2.4 GHz, 5 GHz | 2.4 GHz, 5 GHz | 2.4 GHz, 5 GHz |
| | Antennas | Internal Type | Internal Type | Internal/External Type |
| | MIMO | 2 X 2 MIMO, 2 Spatial Streams | 3 X 3 MIMO, 3 Spatial Streams | 3 X 3 MIMO, 3 Spatial Streams |
| | PHY Rate | 300 Mbps | 450 Mbps | 450 Mbps |
| **H/W** | Network I/F | 1 GE (RJ45), 1 Console (RJ45) | 1 GE (RJ45), 1 Console (RJ45) | 1 GE (RJ45), 1 Console (RJ45) |
| | PoE | 802.3af/802.3at | 802.3af/802.3at | 802.3af/802.3at |
| | Environment Class | Indoor | Indoor | Indoor/Outdoor |
| **Dimension** | Diameter / Height | 174 mm / 34.1 mm | 174 mm / 34.1 mm | 174 mm / 34.1 mm |
| | Weight | 560 g | 640 g | 640 g |
| **Security** | Standard | 802.11i, WPA/WPA2 | 802.11i, WPA/WPA2 | 802.11i, WPA/WPA2 |
| | Multi SSID | Maximum 16 | Maximum 16 | Maximum 16 |
| | # of Multi VLAN over SSID | Maximum 1,024 | Maximum 1,024 | Maximum 1,024 |
| | Encryption | DTLS | DTLS | DTLS |
| **QoS** | Standard | 802.11e | 802.11e | 802.11e |
| | WMM | Yes | Yes | Yes |
| **Management** | Operation | Controller Based | Controller Based | Controller Based |
| **Certification** | Wi-Fi Certified | WPA/WPA2, WMM, WMM-PS | WPA/WPA2, WMM, WMM-PS | WPA/WPA2, WMM, WMM-PS |
| | KC | Yes | Yes | Yes |

# 2.3 AP (Access Point) Specifications

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| | | WEA412i | WEA403i |
|---|---|---|---|
| **Wireless** | Standard | 802.11a/b/g/n/ac | 802.11a/b/g/n/ac |
| | # of radio | Dual Concurrent Radio | Dual Concurrent Radio |
| | Frequency | 2.4 GHz, 5 GHz | 2.4 GHz, 5 GHz |
| | Antennas | Internal Type | Internal Type |
| | MIMO | 2 X 2 MIMO, 2 Spatial Streams | 3 X 3 MIMO, 3 Spatial Streams |
| | PHY Rate | 867 Mbps | 1.3 Gbps |
| **H/W** | Network I/F | 2 GE (RJ45), 1 Console (RJ45) | 2 GE (RJ45), 1 Console (RJ45) |
| | PoE | 802.3af/802.3at | 802.3af/802.3at |
| | Environment Class | Indoor | Indoor |
| **Dimension** | Diameter / Height | 205 mm / 45 mm | 206 mm / 45 mm |
| | Weight | 820 g | 920 g |
| **Security** | Standard | 802.11i, WPA/WPA2 | 802.11i, WPA/WPA2 |
| | Multi SSID | Maximum 16 | Maximum 16 |
| | # of Multi VLAN over SSID | Maximum 1,024 | Maximum 1,024 |
| | Encryption | DTLS | DTLS |
| **QoS** | Standard | 802.11e | 802.11e |
| | WMM | Yes | Yes |
| **Management** | Operation | Controller Based | Controller Based |
| **Certification** | Wi-Fi Certified | WPA/WPA2, WMM, WMM-PS | WPA/WPA2, WMM, WMM-PS |
| | KC | Yes | Yes |

# 2.3 AP (Access Point) Specifications

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| Category | Items | WEA453e |
|---|---|---|
| Wireless | WIPS | Support WIPS sensor mode |
| | Standard | 802.11a/b/g/n/ac |
| | # of Radio | Dual Concurrent Radio |
| | Frequency | 2.4GHz, 5GHz |
| | Antennas | External Type |
| | MIMO | 3x3 MIMO, 3 Spatial Streams |
| | Spectrum Analysis | Yes (Time Sharing) |
| | PHY Rate | 1.3Gbps |
| H/W | Network I/F | 2 GbE (RJ45), 1 Console (RJ45) |
| | PoE | 802.3at |
| | Environment Class | IP66, IP67 |
| Dimension | Diameter / Height | 267 x 184 x 58mm |
| | Weight | 2.6Kg |
| Security | Standard | 802.11i, WPA/WPA2 |
| | Multi SSID | Maximum 16 |
| | # of Multi VLAN over SSID | Maximum 1.024 |
| | Encryption | DTLS |
| | Rogue AP Detection | Yes |
| QoS | Standard | 802.11e |
| | WMM | Yes |
| Management | Operation | Controlled Mode, Stand-alone Mode |
| Certification | WiFi Certified | WPA/WPA2, WMM, WMM-PS |
| | KC | Yes |

# 2.4 Wireless Enterprise Manager

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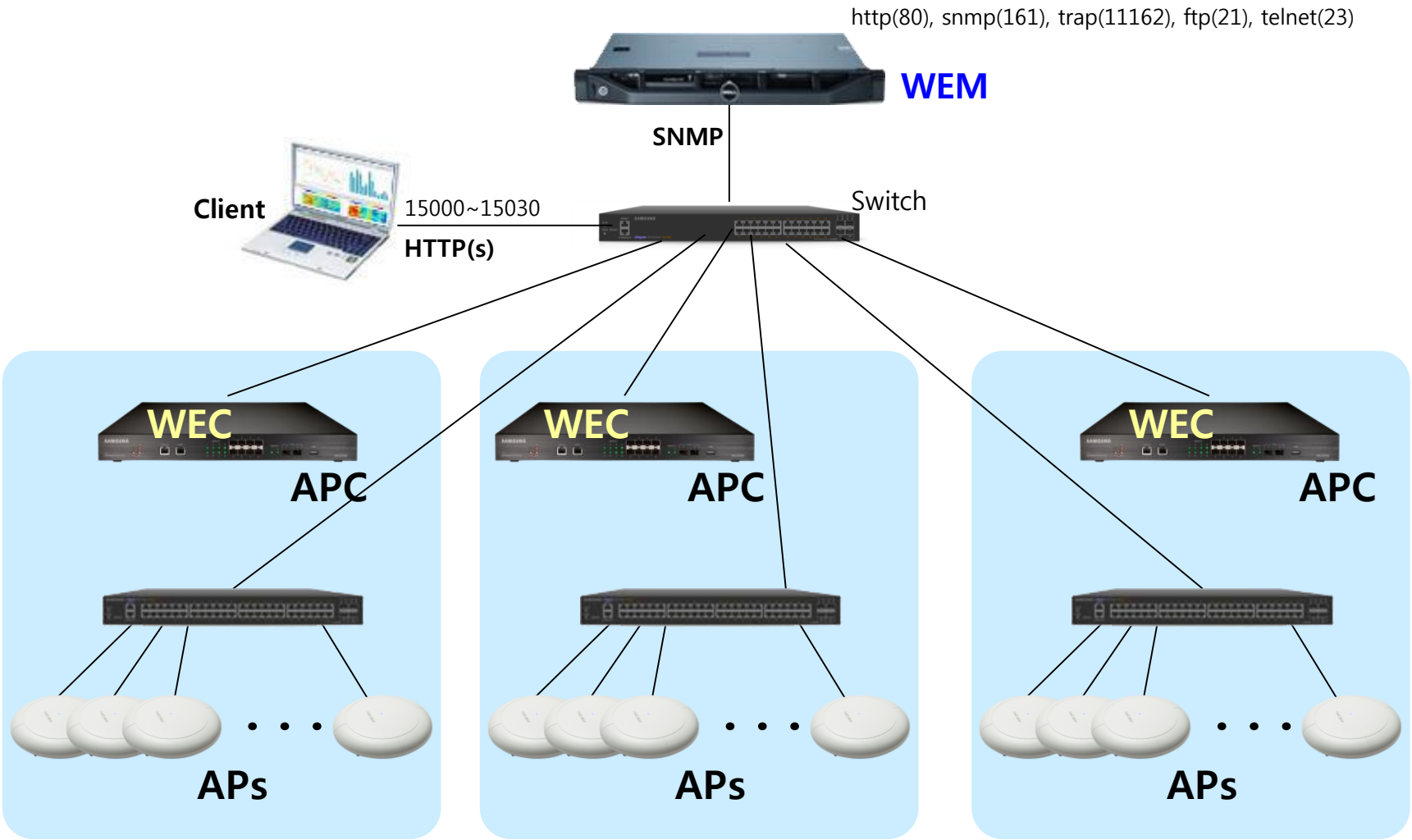
**WEM is a server system which manages APCs, APs, Switches and stations.**

| Category | Descriptions |
|---|---|
| **Monitor** | . Real time alarm, traffic, resource usage and history<br>. General status and detail information of APCs, APs, and Stations<br>. AP and station location, Coverage from RF Map<br>. Dashboard |
| **Configuration** | . Configuration of APC and AP including Template |
| **Operation** | . Managing Login accounts with several privileges<br>. Alarm setting, License management center |
| **Tools** | . Signal strength and channel utilization by spectrum analyzer<br>. Interference Detector<br>. Traffic analyzing by Packet capture through wireless and wired |
| **General** | . Monitoring for WEM status ( resources, process, database, etc) |
| **Troubleshooting** | Ease to analyze root cause of troubles step by step |
| **Reporting** | Reporting Resource, station, AP, Rogue AP, Interferer, Traffic usage each Interface |
| **Alarms** | Quick responses from trouble by real time alarm |

# 2.4 Wireless Enterprise Manager



# 2.4 Wireless Enterprise Manager

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## Specifications for a Server

| Level | Descriptions |
|---|---|
| **Minimum Server Spec.** | OS : Linux(Red Hat Enterprise ES 5.5 or higher)<br>DATABASE : MySQL 5.5<br>**Low-End Server**<br>✓5,000 Stations<br>✓Intel® Xeon® E3-1220 3.10GHz, 16GB RAM, 200GB HDD<br>**Mid-Range Server**<br>✓30,000 Stations<br>✓Intel® Xeon® E5530 2.4GHz, 32GB RAM, 400GB HDD<br>**High-End Server**<br>✓60,000 Stations<br>✓Intel® Xeon® X5670 2.93GHz, 32GB RAM, 600GB HDD |
| **Client PC Spec.** | CPU : 3.0 GHz (Pentium Core2 duo processor)<br>RAM : 2GBytes or higher<br>Browser : Internet Explorer 8.0, FireFox 3.5, Chrome<br>JRE : 1.6.0_20<br>Flash Player |
| **Managed Devices** | Samsung WEC8500 Series Wireless Enterprise Controllers<br>Samsung WEA303, WEA302 Access Points<br>Samsung iES4200 Series Switches |

# 2.4 Wireless Enterprise Manager

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- Samsung will be holding a separate course for “WEM” training.
- Please contact customer service to schedule a date to attend the class.

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# 3. Installation

- 3.1 Hardware Mounting
  - 3.1.1 APC
  - 3.1.2 AP

# 3.1.1 Installation of APC

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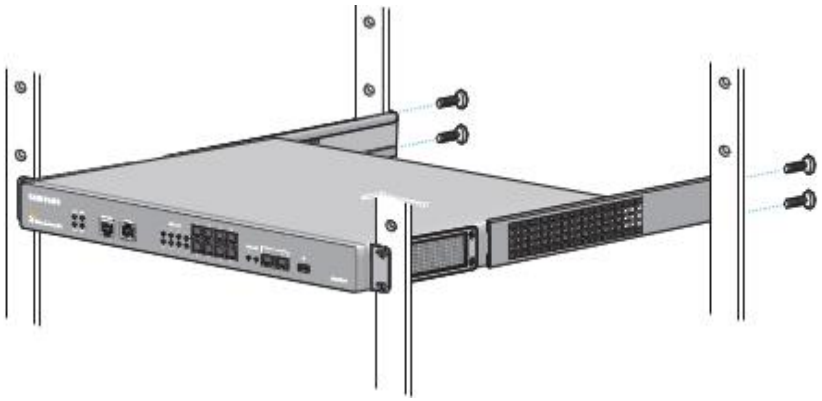
- **APC installation scenarios**

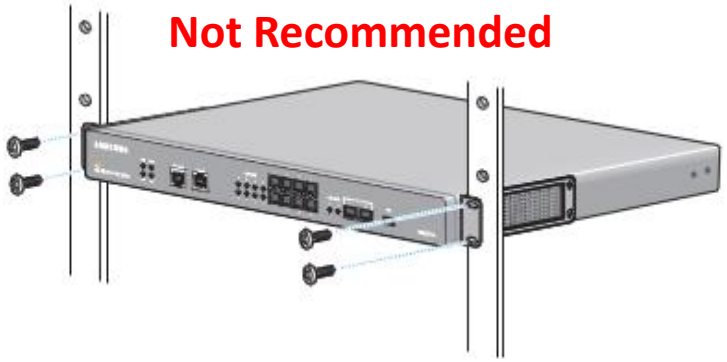
• **Installation - 4 Types**

**1. 4-Post Rack**

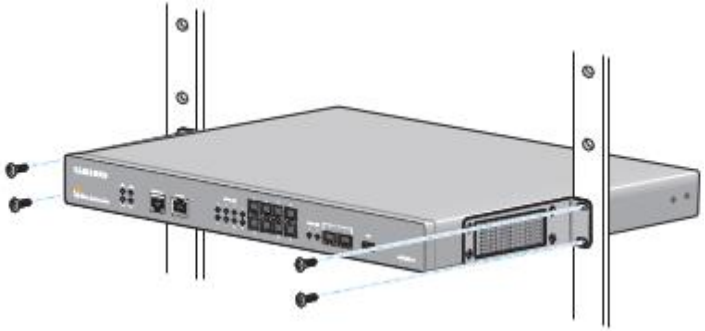


**2. 2-Post Rack (Flush-Mount)**

**Not Recommended**



**3. 2-Post Rack (Mid-Mount)**

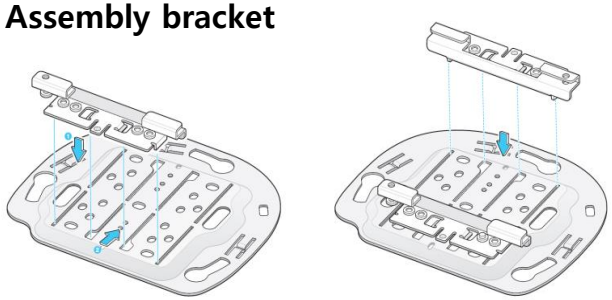


**4. On a Desktop**

# 3.1.2 Installation – AP (1)

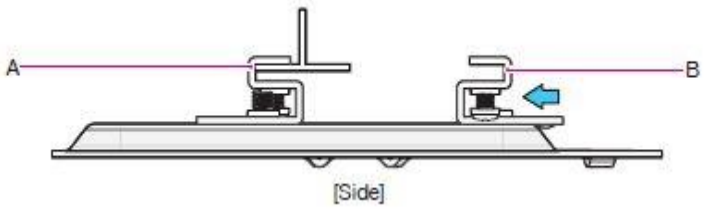
- **AP installation on suspended ceiling grids**

**1. Assembly bracket**



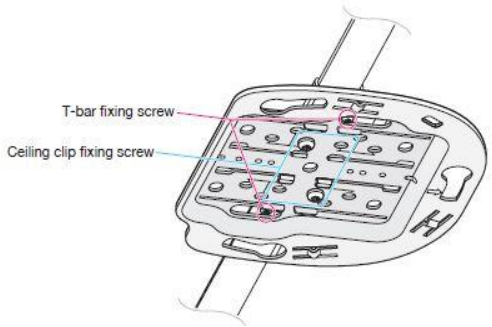
Place a ceiling bracket by making its convex part upward and align a ceiling clip to the groove of the ceiling bracket and insert the clip to the position that is shown in the figure.

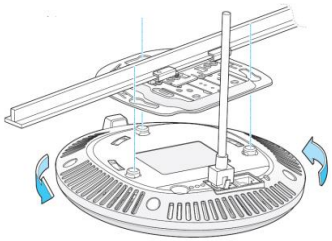
**2. Mount Bracket T-bar**




After inserting the ceiling clip that is fixed with a screw (A in the figure) to the T-bar, push and move the ceiling clip (B in the figure) on the other side according to the T-bar size.

**3. Installation on a ceiling**



After tightening screw for the ceiling clip, draw out a LAN cable and connect it to the Ethernet port and fix the product by turning it clockwise.

# 3.1.2 Installation – AP (2)

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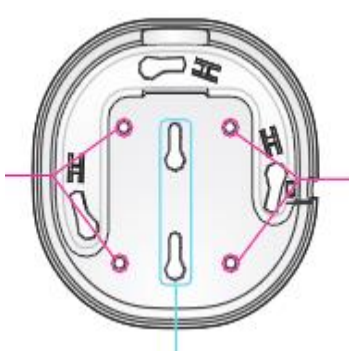
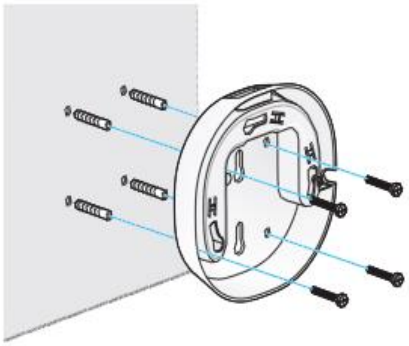
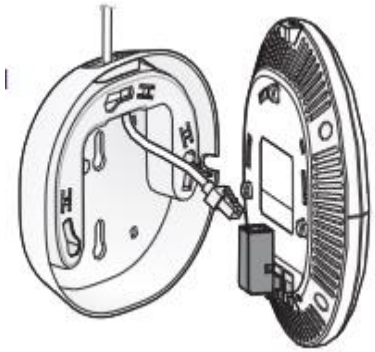
- **AP wall mount installation**

Insert 4 plastic anchors into hole using a hammer







# 4. Basic Configuration Section

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## 4. Basic Installation Section

- 4.1 Site Information
- 4.2 Connecting to the APC
- 4.3 Basic Installation Wizard
- 4.4 Network Setup / VLANs
- 4.5 Software Management
- 4.6 License Setup
- 4.7 General Configuration
- 4.8 Configure Radios
- 4.9 Configure WLANs
- 4.10 Set Up Access Points
- 4.11 AP Groups

# 4.1 Site Information

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- Before configuration of the AP Controller and APs, specific information should be collected from the customer.
- Obtain the '**WLAN Pre-Installation Checklist'** from GSBN.
- Provide this to file to your customer so they can fill in the required information.

- For classroom setup, you have been given a custom made sheet just for training purposes only.
- Please use the "Student_Site_Info" form given by the instructor

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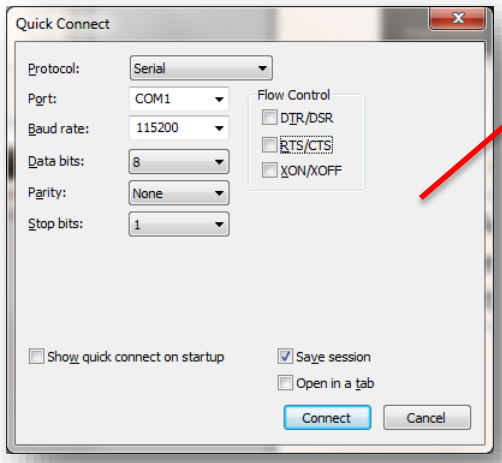
# 4.2 Connecting to APC

- 4.2.1 WEC8050 Connection
- 4.2.2 WEC8500 Connection

# 4.2.1 WEC8050 Connection


Console Connection settings

**Note:** You must always change the default password first via CLI using console port before getting into the GUI.

Also, the WEC8050 does not have a default management port.
We will setup interface ge4 as our management port

# 4.2.1 WEC8050 Connection

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Connecting to APC using CLI is as follows:
Direct connection to the system console port

When the booting of APC is completed, log into the system as follows:

1. For the first connection, log in using ID: ‘samsung’ and Password: ‘samsung’.

```
USERNAME : samsung
PASSWORD : samsung

THIS IS YOUR FIRST LOGIN AFTER USER ACCOUNT HAS BEEN CREATED.

YOU MUST CHANGE YOUR PASSWORD

 ENTER LOGIN PASSWORD      : samsung
 ENTER NEW PASSWORD        : ********
 CONFIRM NEW PASSWORD      : ********
 PASSWORD SUCCESSFULLY CHANGED
WEC8050 #
```

2. After the first login, you must change the password.

Default Credentials:
ID: samsung
Password: samsung

Password Restrictions:

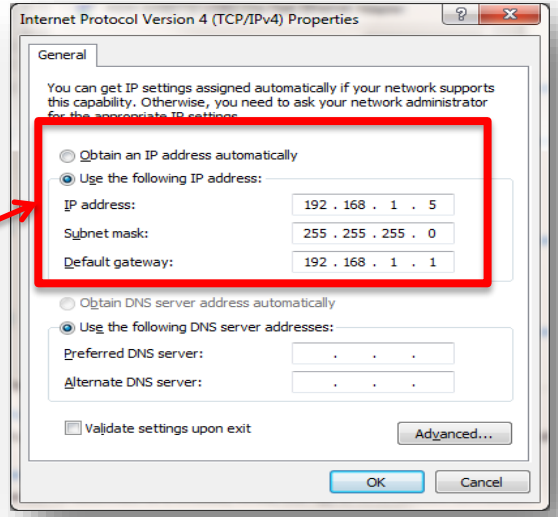
- Password must be any combination of alphabetic, numeric and special character.
- Password length: 8 ~ 25

# 4.2.1 WEC8050 Connection

Samsung Wireless Enterprise™

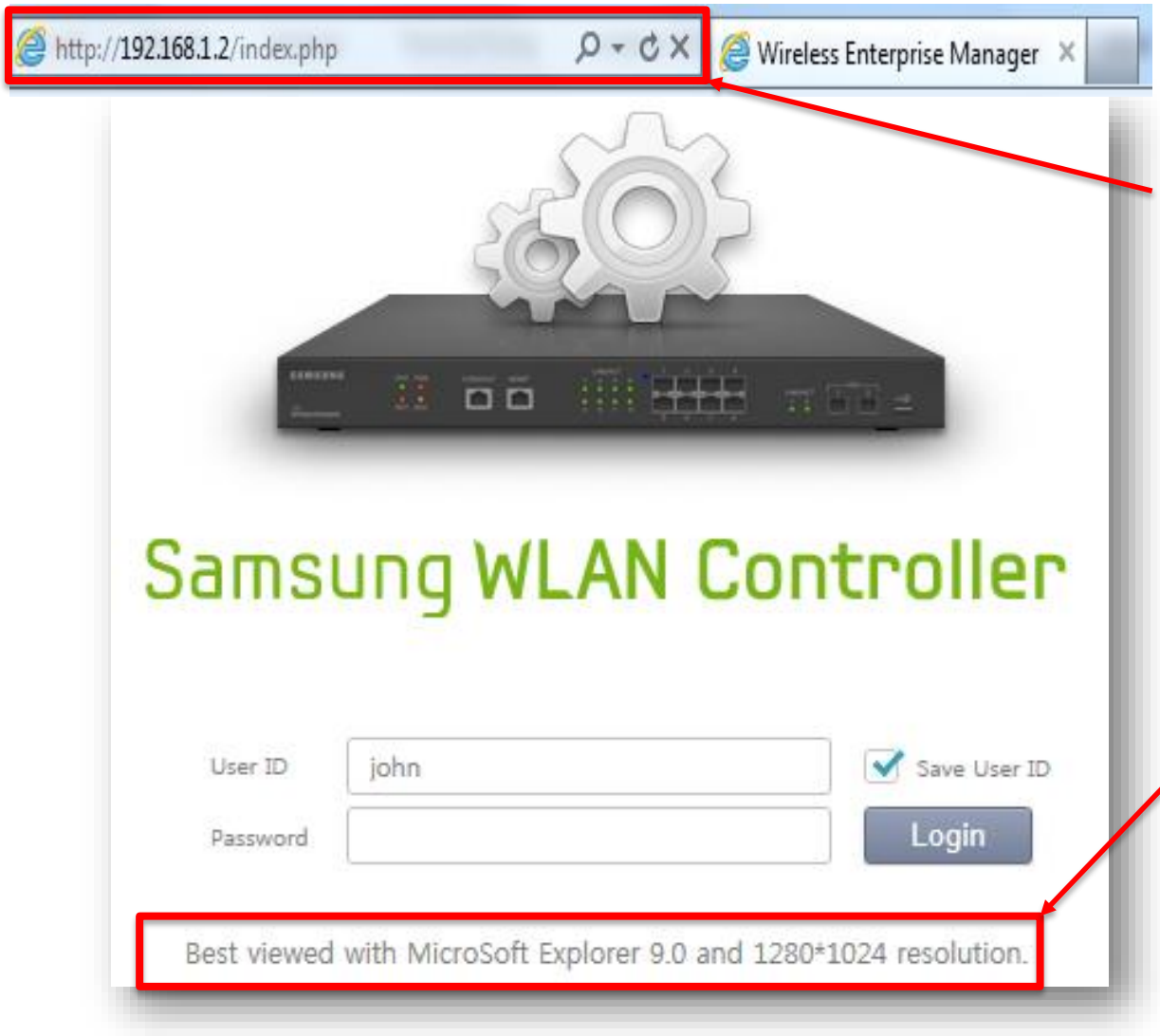
Management Port Setup!

```
WEC8050# configure terminal
WEC8050/configure# interface ge4
WEC8050/configure/interface ge4# no switchport
WEC8050/configure/interface ge4# ip address 192.168.1.2/24
WEC8050/configure/interface ge4# end
WEC8050# save local
```




You will need to set a static IP on your PC to connect

# 4.2.1 WEC8050 Connection




Connect your LAN cable from PC to the ge4 port and browse to the IP address you set in the previous step.

**Login Screen**

Enter your updated login credentials.

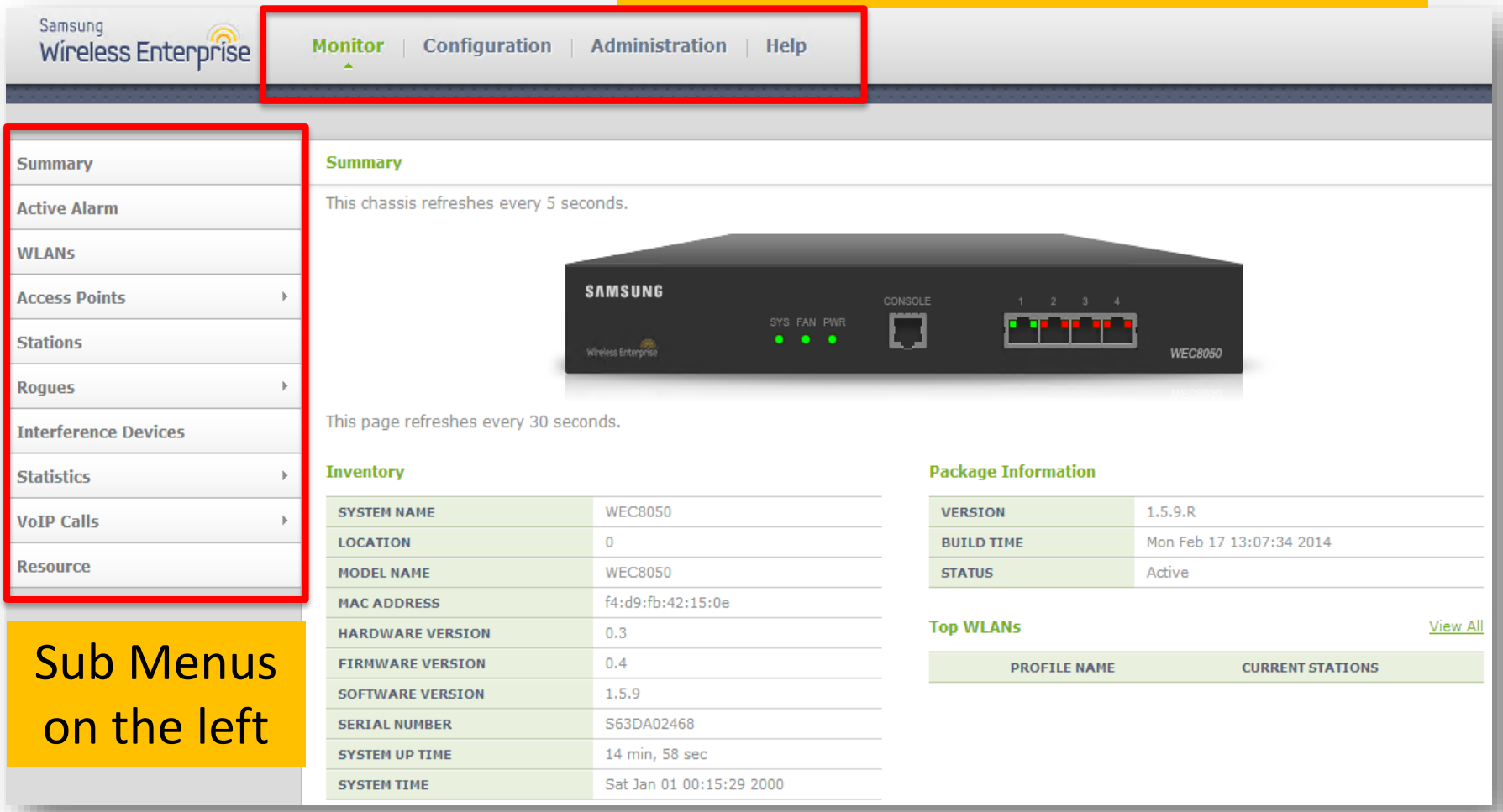
Note best viewing environment in red box.

# 4.2.1 WEC8050 Connection

Samsung Wireless Enterprise™

Main Menus across the top

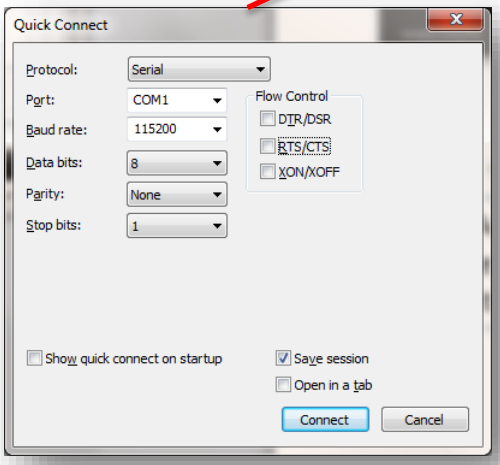
Sub Menus on the left



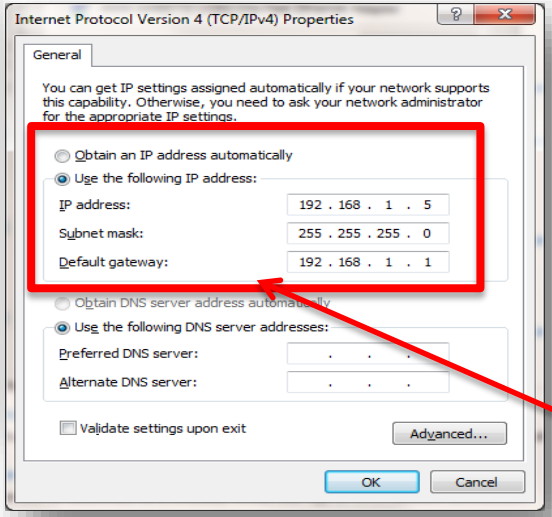
# 4.2.2 WEC8500 Connection

If you want to use 192.168.1.0 network for management, then you must first change the management port IP to a different network via console access


192.168.1.2




Console Connection settings




- The MGMT port is going to give you access to the GUI.
- After you have configure your interfaces, you will no longer need to access through the MGMT port

You will need to set a static IP on your PC to connect

# 4.2.2 WEC8500 Connection

Samsung Wireless Enterprise™

**Note:** You must always change the default password first via CLI using console port before getting into the GUI.

Connecting to APC using CLI is as follows:
Direct connection to the system console port

When the booting of APC is completed, log into the system as follows:

1. For the first connection, log in using ID: ‘samsung’ and Password: ‘samsung’.

```
USERNAME : samsung
PASSWORD : samsung

THIS IS YOUR FIRST LOGIN AFTER USER ACCOUNT HAS BEEN CREATED.

YOU MUST CHANGE YOUR PASSWORD

 ENTER LOGIN PASSWORD      : samsung
 ENTER NEW PASSWORD        : ********
 CONFIRM NEW PASSWORD      : ********
 PASSWORD SUCCESSFULLY CHANGED
WEC8500 #
```

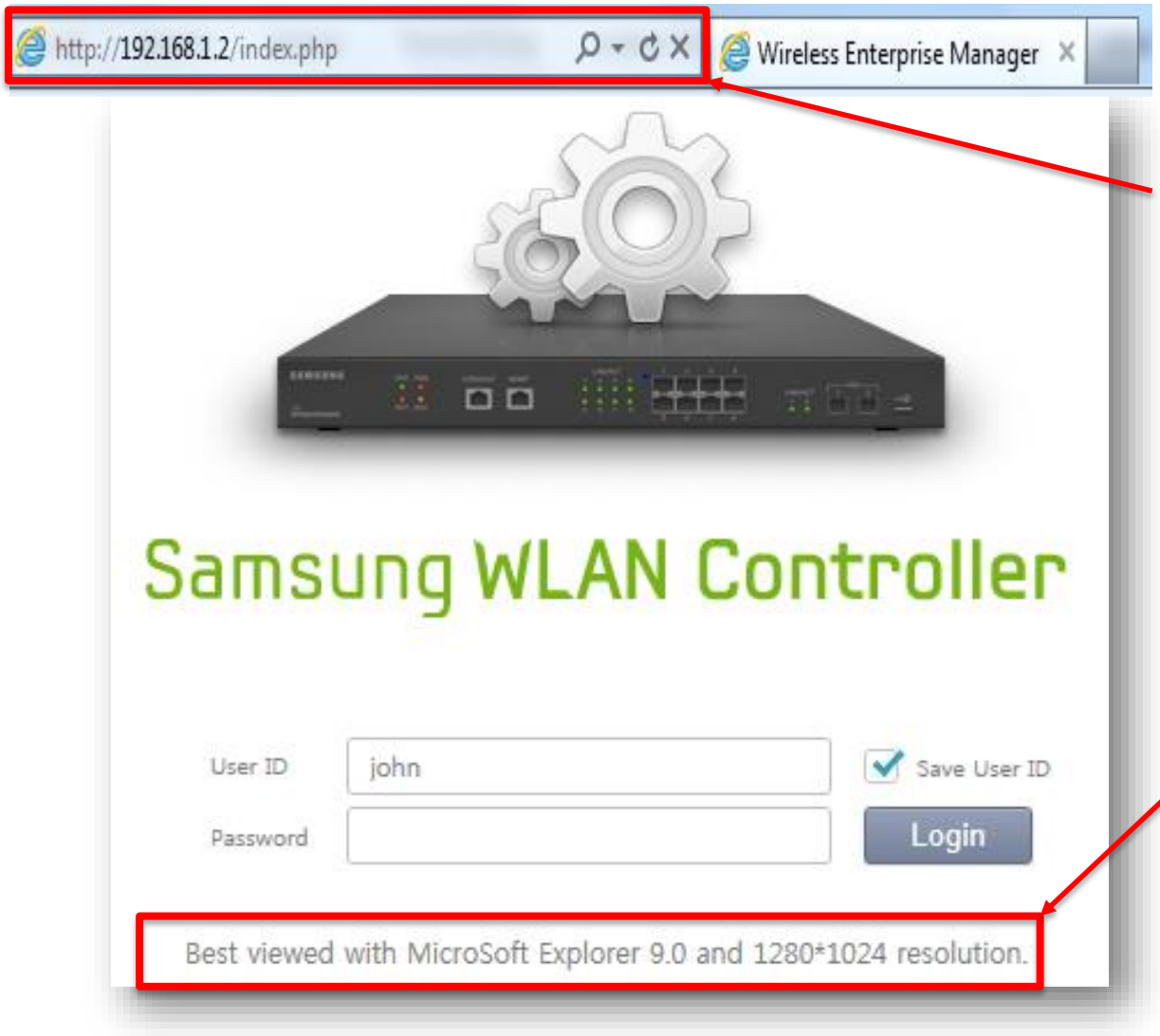
2. After the first login, you must change the password.

Default Credentials:
ID: samsung
Password: samsung

Password Restrictions:

- Password must be any combination of alphabetic, numeric and special character.
- Password length: 8 ~ 25

# 4.2.2 WEC8500 Connection




Connect your LAN cable from PC to the Management port and browse to the IP address of 192.168.1.2.

**Login Screen**

Enter your updated login credentials.

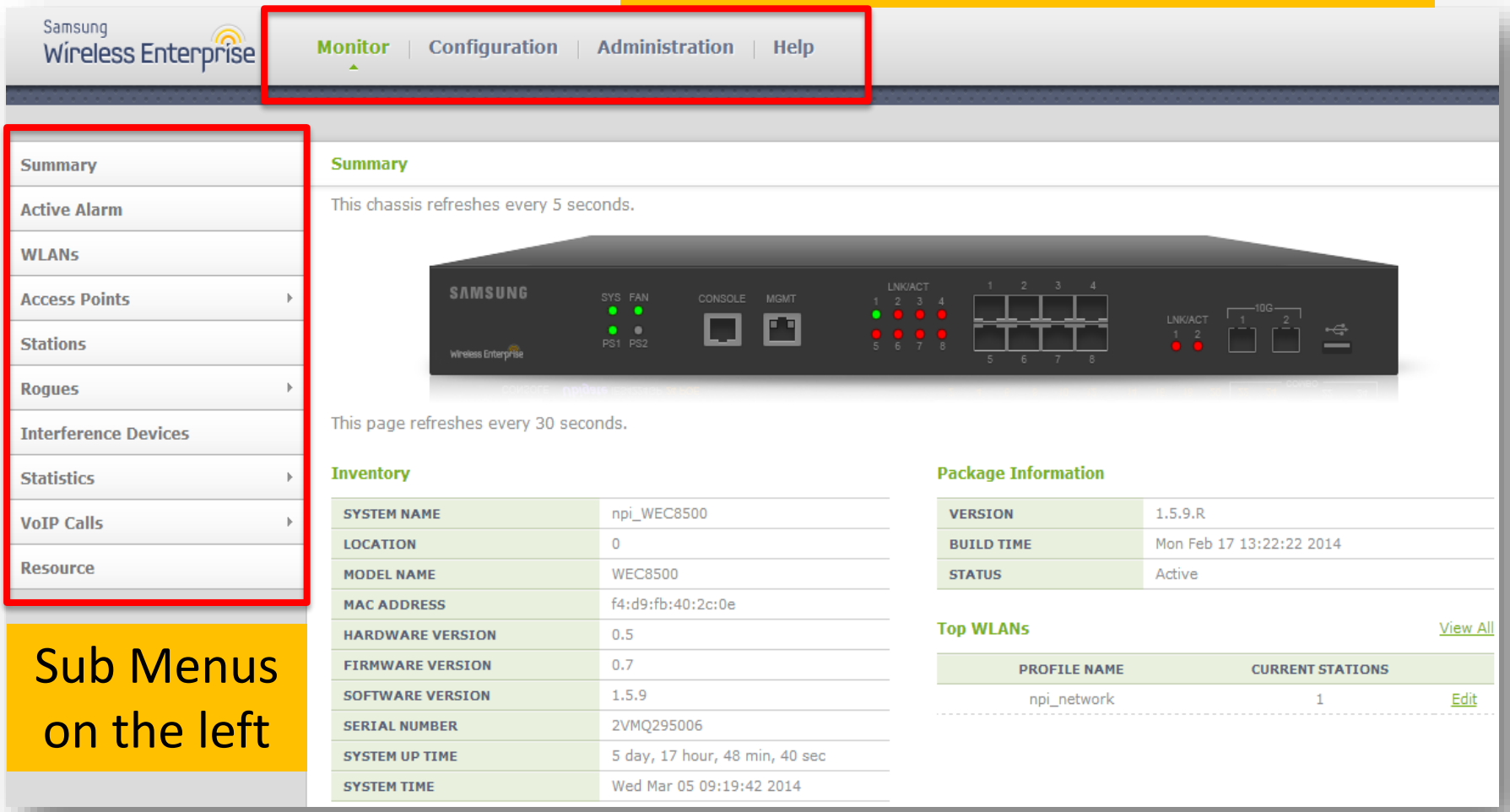
Note best viewing environment in red box.

# 4.2.2 WEC8500 Connection

Samsung Wireless Enterprise™

Main Menus across the top

Sub Menus on the left



# Connecting to APC “Lab 1”

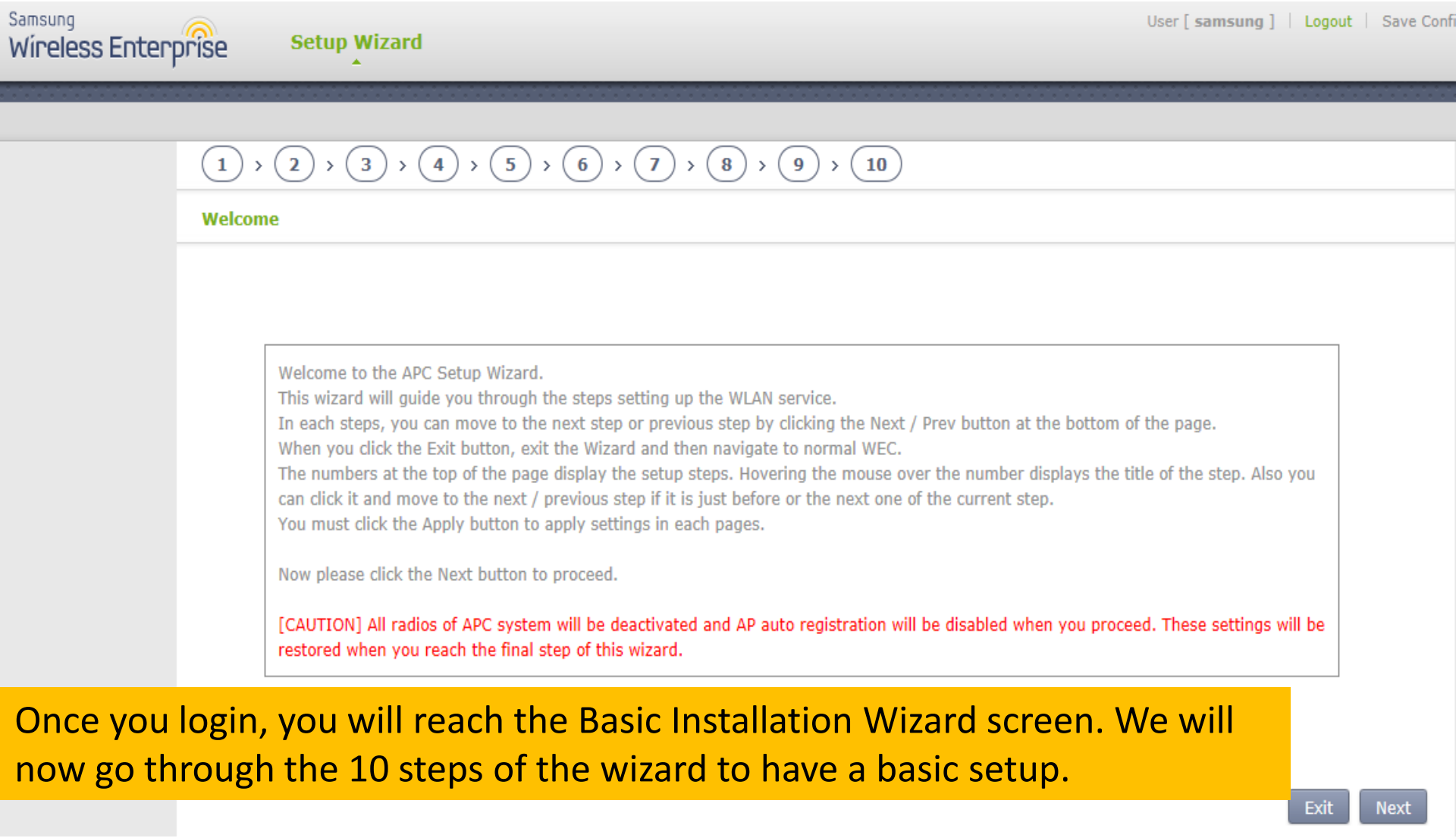
Samsung Wireless Enterprise™

## Lab 1 -

*Connect to the Management Port of the APC*

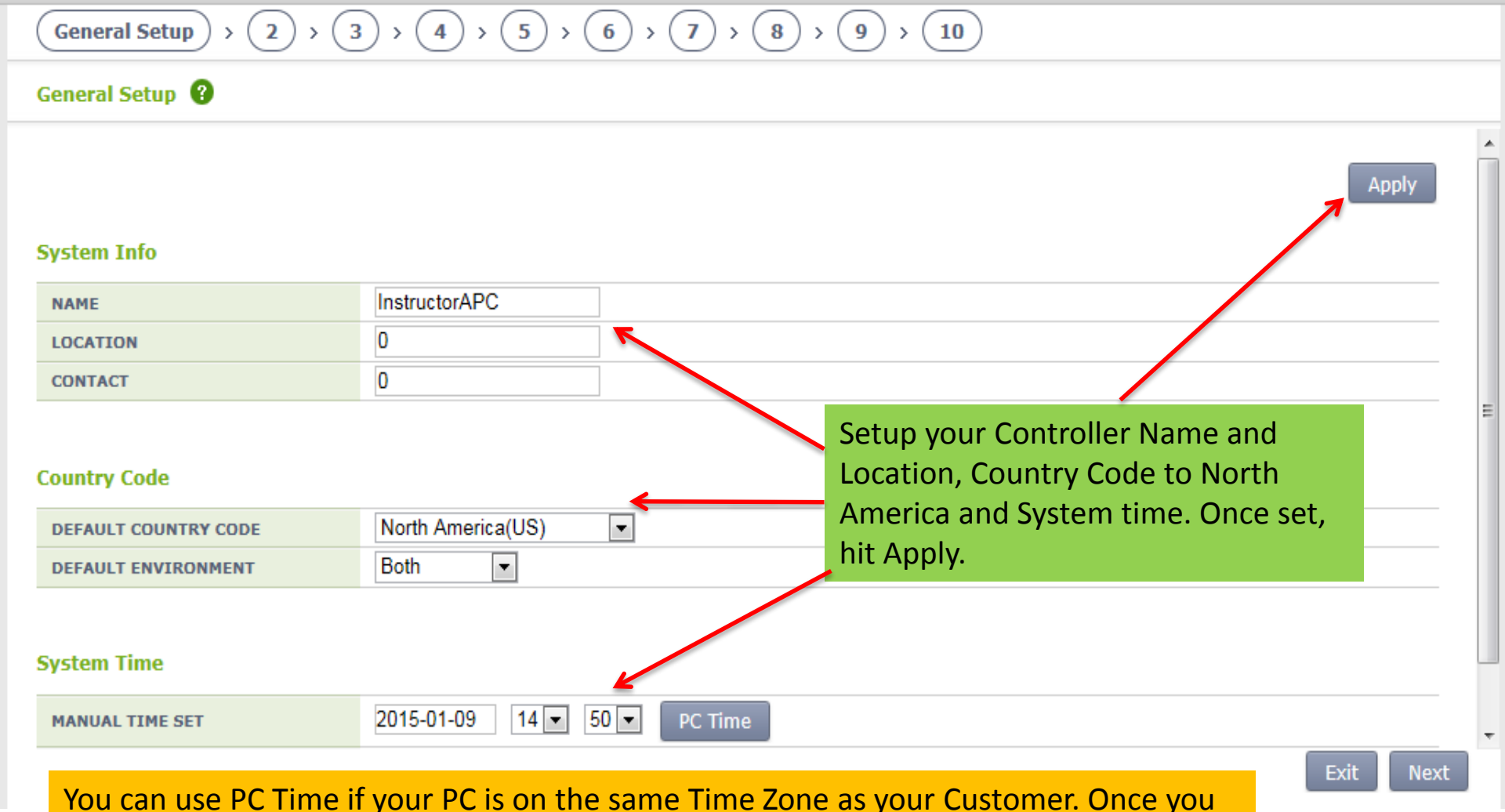
1. Connect a console cable from your PC to the Console Port on the controller to console in.
2. Login using default login credentials:
   - username: samsung
   - password: samsung
3. Change the default password.
4. Connect a LAN cable from your PC to the Management Port
5. Configure your PC with an IP address of 192.168.1.5/24
6. Ping 192.168.1.2
7. Browse to 192.168.1.2 and login using your new credentials

# 4.3 Basic Installation Wizard




Once you login, you will reach the Basic Installation Wizard screen. We will now go through the 10 steps of the wizard to have a basic setup.

# 4.3 Basic Installation Wizard



# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

1 › Interfaces › 3 › 4 › 5 › 6 › 7 › 8 › 9 › 10

Interfaces › Add

Back Apply

| | |
|---|---|
| VLAN ID | 72 |
| VLAN DESCRIPTION | AP-MGMT |
| ADMIN STATUS | Up Down |

Next, we need to add Interfaces. We will first create our AP Management Interface. We want the AP's to use this VLAN to register to the APC

Physical

| PORTS | MODE | |
|---|---|---|
| ge1 | Trunk | |
| ge2 | Not Used | |
| ge3 | Not Used | |
| ge4 | Not Used | |
| ge5 | Not Used | Service Disable |
| ge6 | Not Used | Service Disable |
| | | Service Disable |

You will want to set the port used as a 'Trunk' port.
This port will uplink to your Layer 2 device.

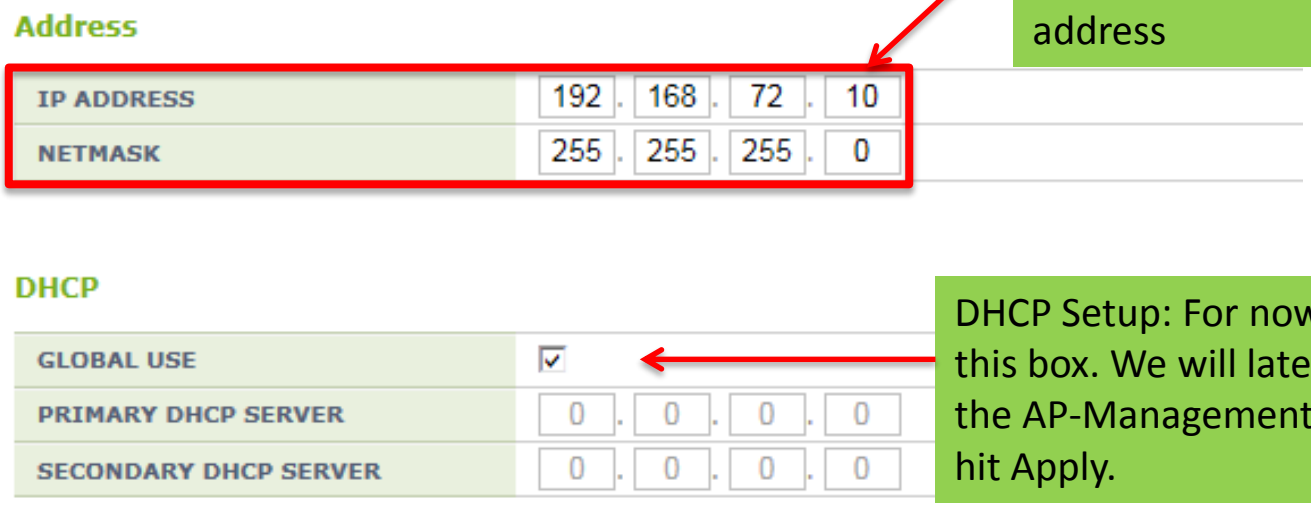
**PLEASE NOTE:**
Your layer2 device port should be setup as a trunk port with the correct VLANs tagged

Classroom Port 28

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

This IP address will be used to access the APC.
For the Management VLAN, this will also be the CAPWAP IP address

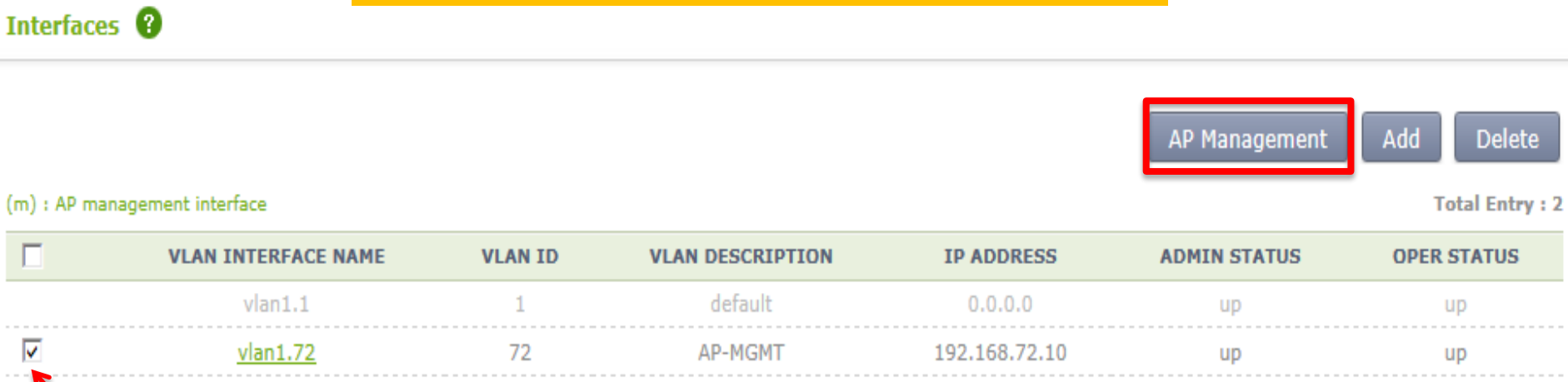



DHCP Setup: For now, please check this box. We will later setup DHCP for the AP-Management network. Next, hit Apply.

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

The CAPWAP IP Address is going to be the address of your AP Management VLAN.
APs will use this address to register to the APC

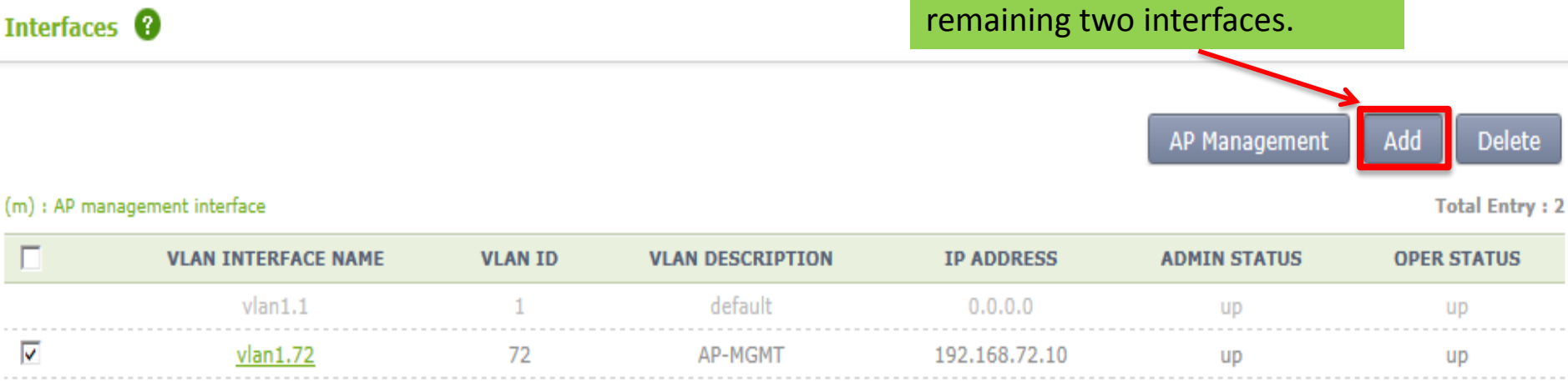



We can see our Interface that we created listed here. Since we want to make this interface our Management interface, we need to check its box and click on AP Management. By doing this, the interface IP address of 192.168.72.10 becomes my CAPWAP IP address.

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

Next, hit add to create our remaining two interfaces.




**PLEASE NOTE:**
For Company and Guest interface, use External DHCP service by unchecking Global use and pointing to a External DHCP Server IP address.

1

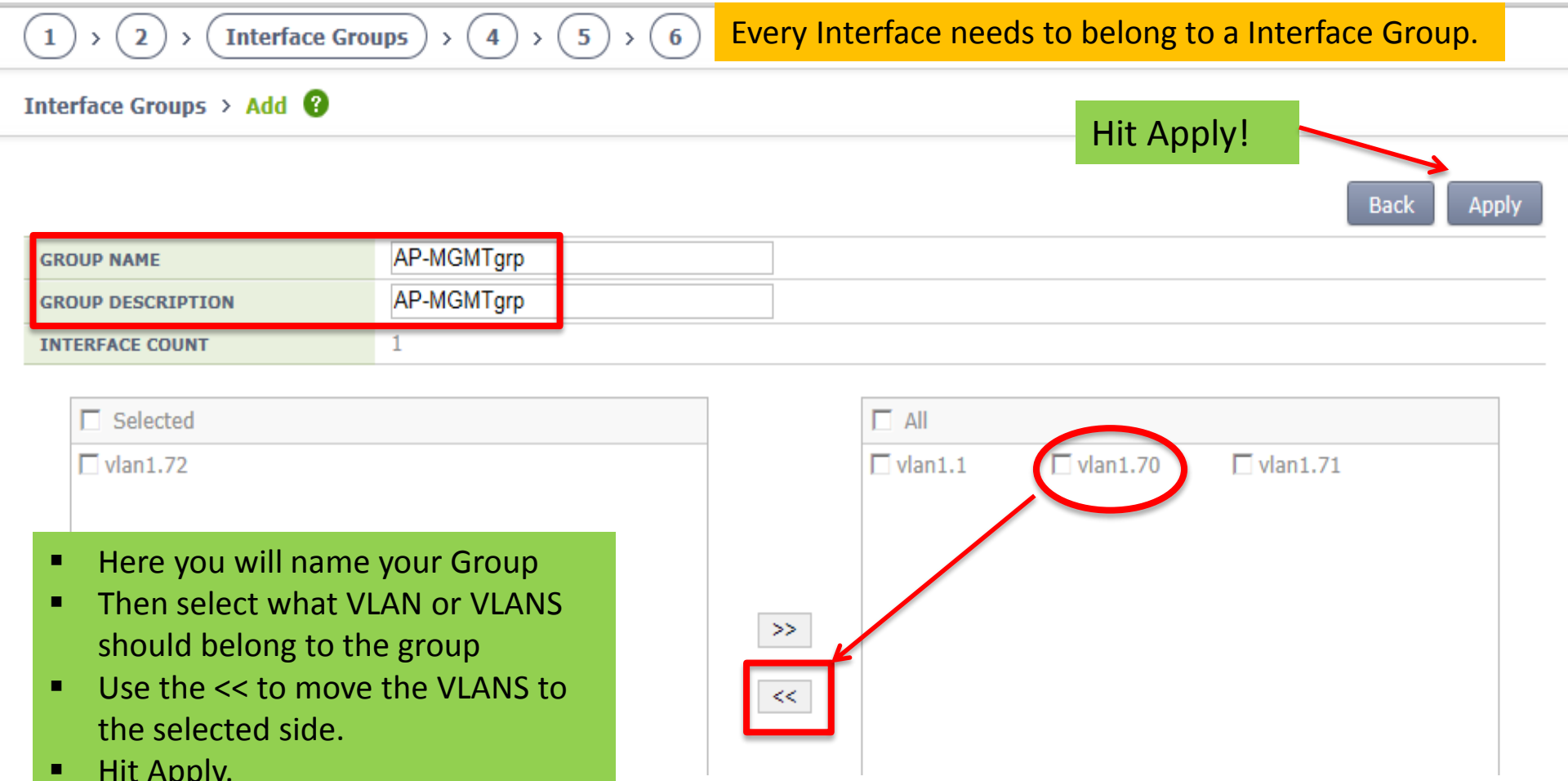
# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™


We can see all our 3 interfaces listed. We can also see that our AP-Management interface (vlan1.72) is marked with “(m)” sign indicating that it is a Management Interface.

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™




- Here you will name your Group
- Then select what VLAN or VLANS should belong to the group
- Use the << to move the VLANS to the selected side.
- Hit Apply.

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

1 › 2 › Interface Groups › 4 › 5 › 6 › 7 › 8 › 9 › 10

Interface Groups

Next, create remaining two Interface Groups and add the corresponding interfaces to their respective Interface Groups.

Add Delete

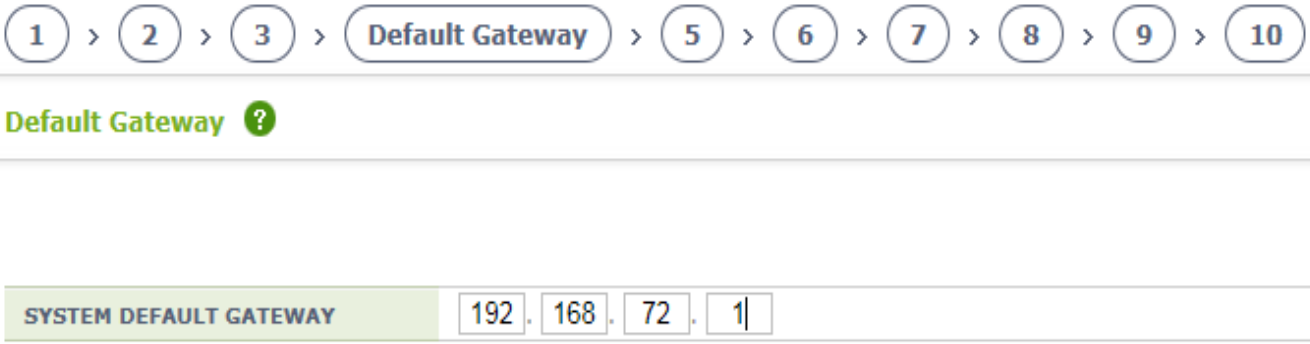
Total Entry : 3

| | GROUP NAME | GROUP DESCRIPTION | IF COUNT |
|---|---|---|---|
| ☐ | AP-MGMTgrp | AP-MGMTgrp | 1 |
| ☐ | CompanyGRP | CompanyGRP | 1 |
| ☐ | GuestGRP | GuestGRP | 1 |

Once created, your Interface Group list should look similar to this.

# 4.3 Basic Installation Wizard

We need to create a static route to our default gateway for all AP-Management and untagged traffic




**Note:** This must be added and routable in order to use remote AP's

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

**Note:** Profile name and SSID cannot be changed once applied.

1 › 2 › 3 › 4 › WLANs › 6 › 7 › 8 › 9 › 10

WLANs › Add

Back Apply

Next, we will create our WLANs using the Site Information sheet.

General

| | |
|---|---|
| PROFILE NAME | 18 |
| SSID | Company70 |
| INTERFACE GROUP | CompanyGRP |
| RADIO AREA | 2.4GHz/5GHz |
| CAPWAP TUNNEL MODE | 802.3 Tunnel |

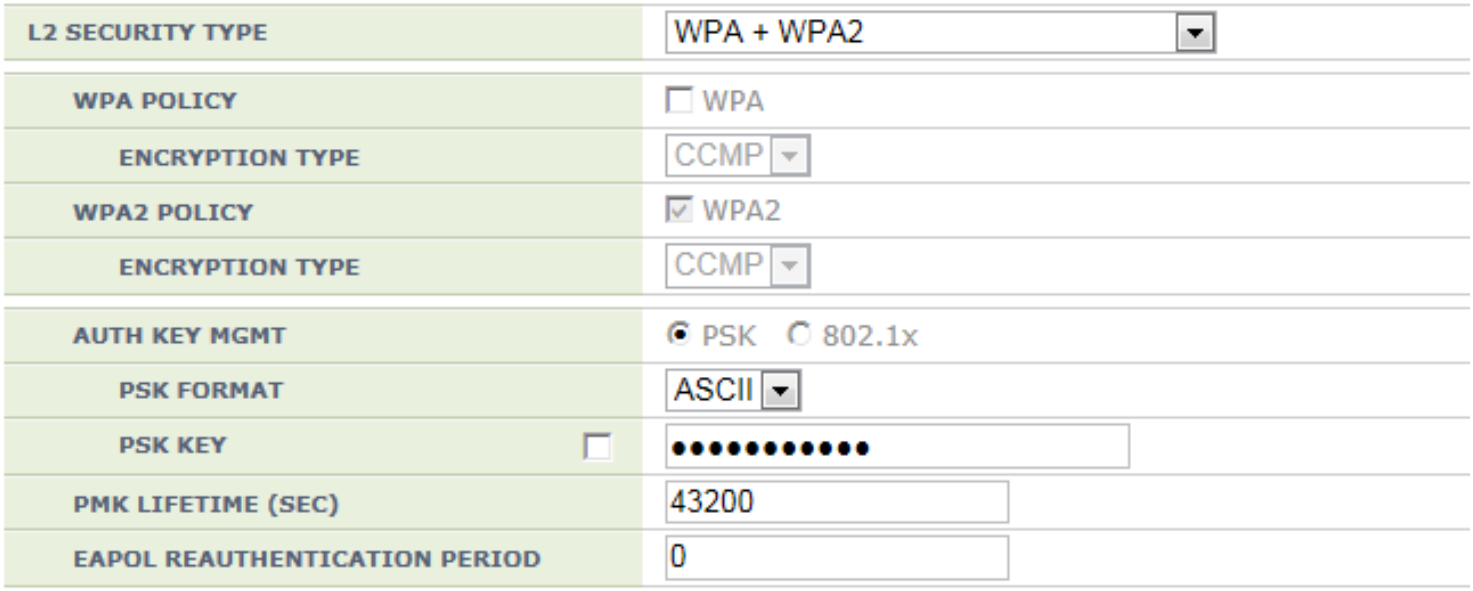
Security

| | |
|---|---|
| L2 SECURITY TYPE | None |

# 4.3 Basic Installation Wizard

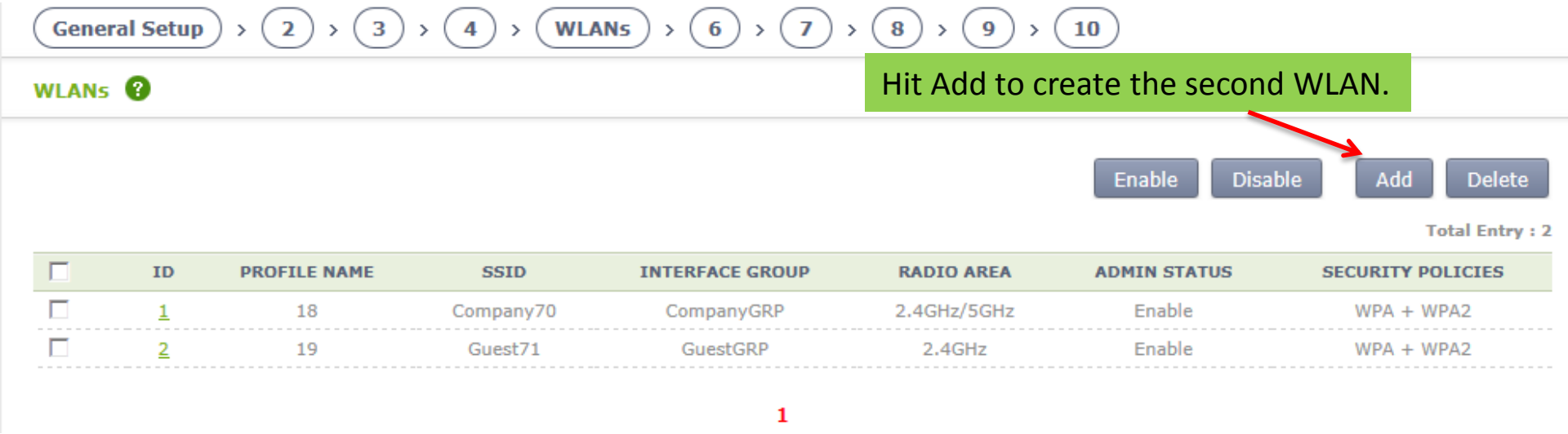
Samsung Wireless Enterprise™

We will add security to our WLAN be selecting the security type as WPA+WPA2. Set Auth Key Mgmt as PSK and enter your PSK key that will be used to access this WLAN. Hit Apply.



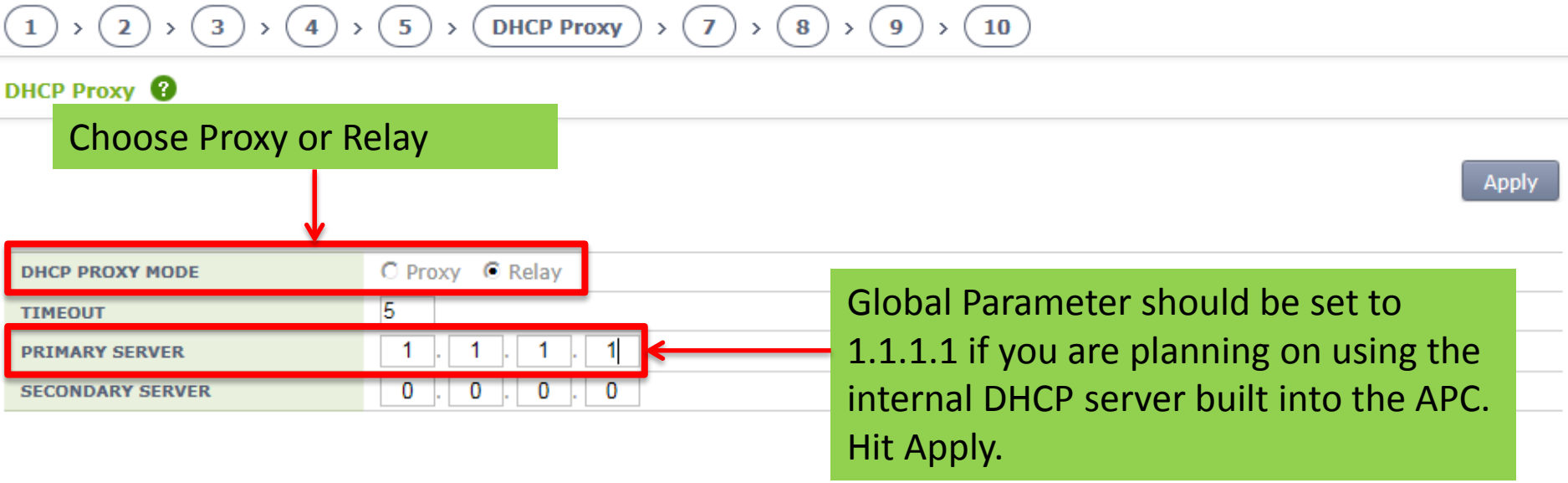
# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

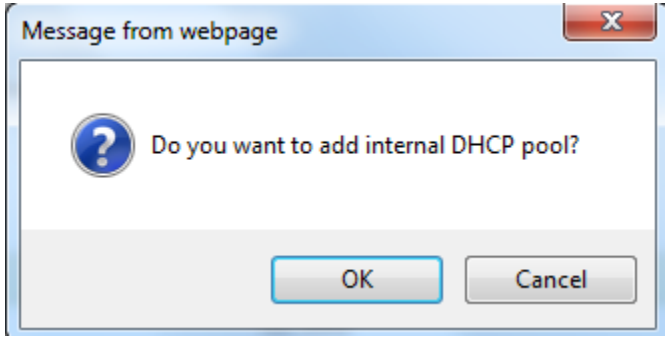



You should be having two WLANs as follows in your WLANs list.

# 4.3 Basic Installation Wizard



# 4.3 Basic Installation Wizard




You will now be asked to add the internal DHCP pool. Hit OK.
We will now be creating the Internal DHCP pool for our AP-Management network.

# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™


DHCP Internal Server › Add

Fill in your DHCP Pool information for your Internal DHCP server and hit Apply.

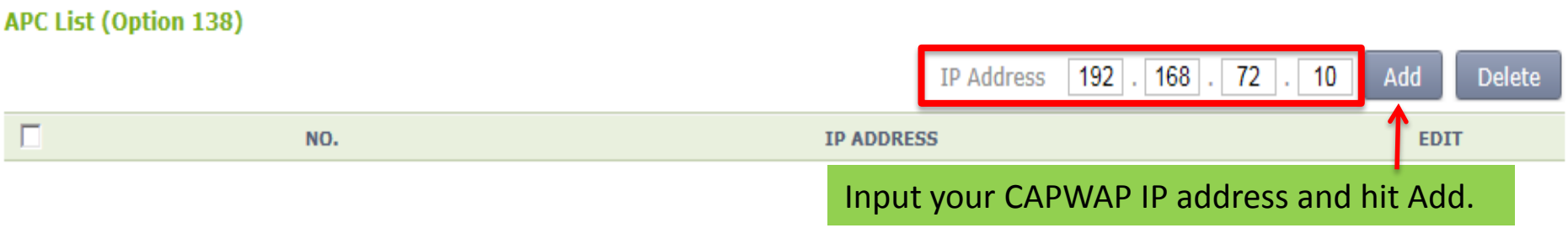
Back Apply

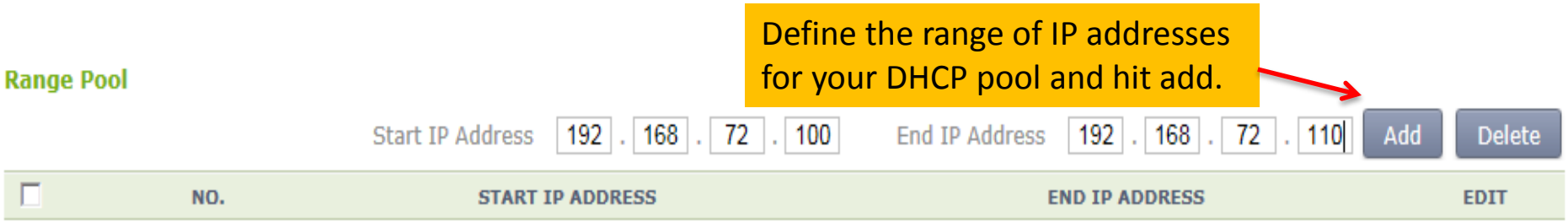
| | |
|---|---|
| POOL NAME | APMGMT |
| NETWORK | 192 . 168 . 72 . 0 |
| MASK | 255 . 255 . 255 . 0 |
| LEASE TIME (SEC) | 86400 |
| DOMAIN NAME | apmgmt.com |
| DEFAULT GATEWAY | 192 . 168 . 72 . 1 |
| 1ST DNS SERVER | 8 . 8 . 8 . 8 |
| 2ND DNS SERVER | 0 . 0 . 0 . 0 |

Only when you hit Apply here, you get to configure advanced settings for your Internal DHCP server such as Option 138 IP address and DHCP Pool range.

# 4.3 Basic Installation Wizard

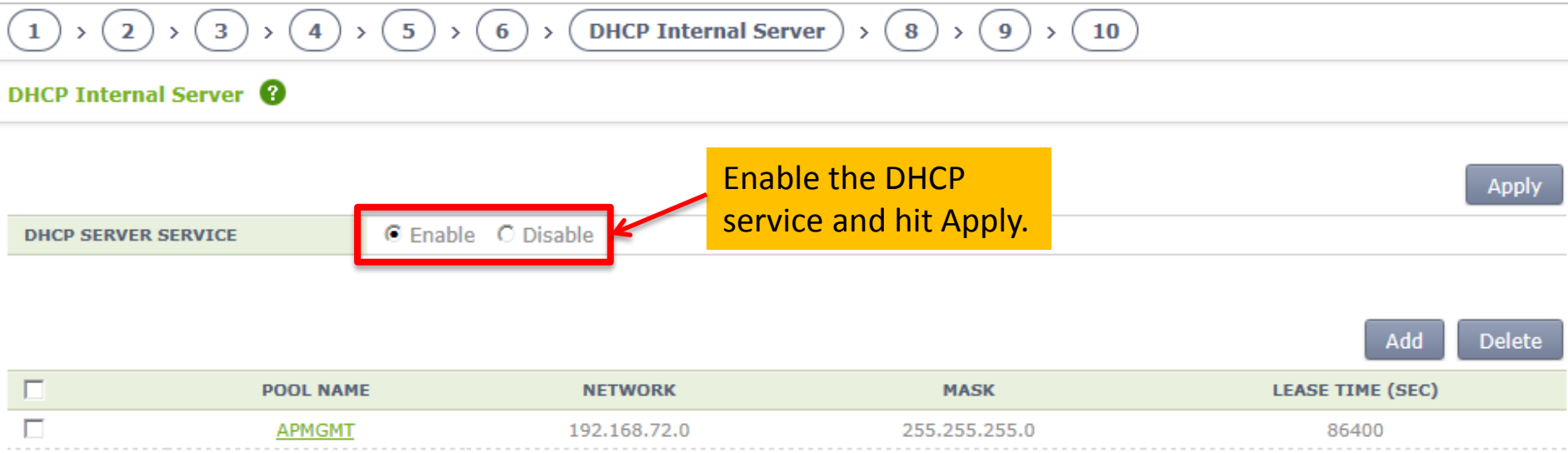
If you using the Internal DHCP for your APC and APs, then you will need to add the IP address of your APC into Option 138. Remember the APs will use this Option 138 IP address to register to the APC.



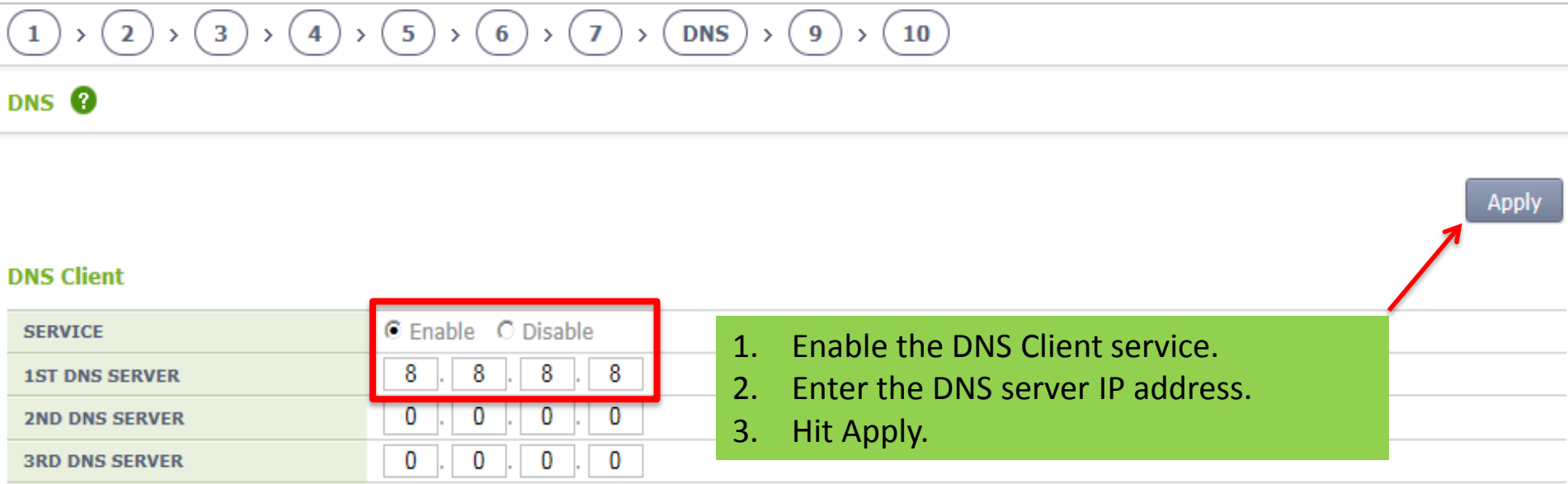

Lastly, hit Apply

# 4.3 Basic Installation Wizard



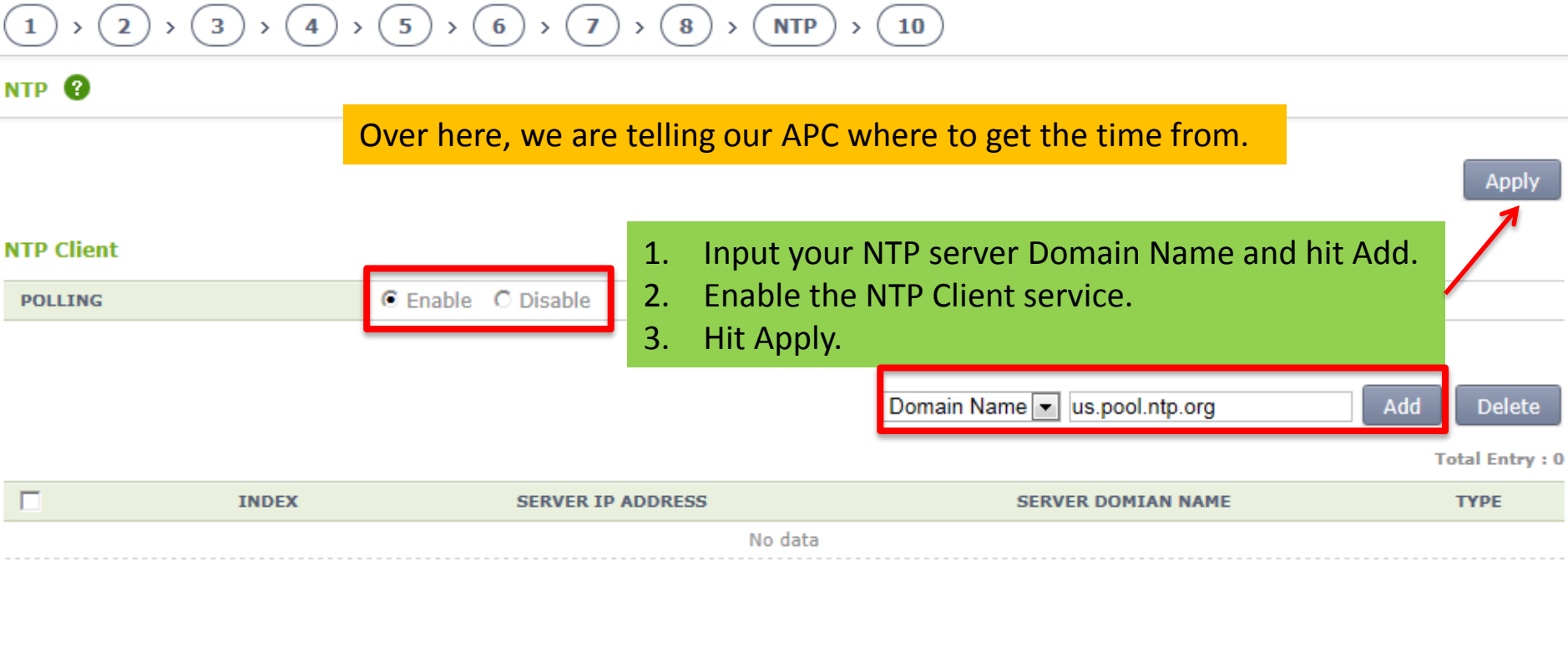
# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™



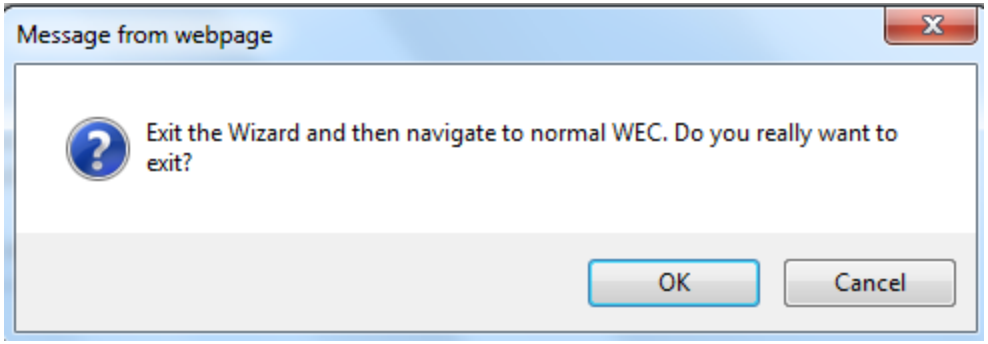
# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™



# 4.3 Basic Installation Wizard

The Basic Installation Wizard is now complete. Simply hit OK to go to the GUI home screen.



# 4.3 Basic Installation Wizard

Samsung Wireless Enterprise™

**Note:**

We will now review through all the steps we covered in the Basic Installation Wizard by navigating to the appropriate section in the GUI. In this way, we would know where to go in the GUI to make any future changes in our configuration. We will also look at some more additional setup.

Samsung Wireless Enterprise™

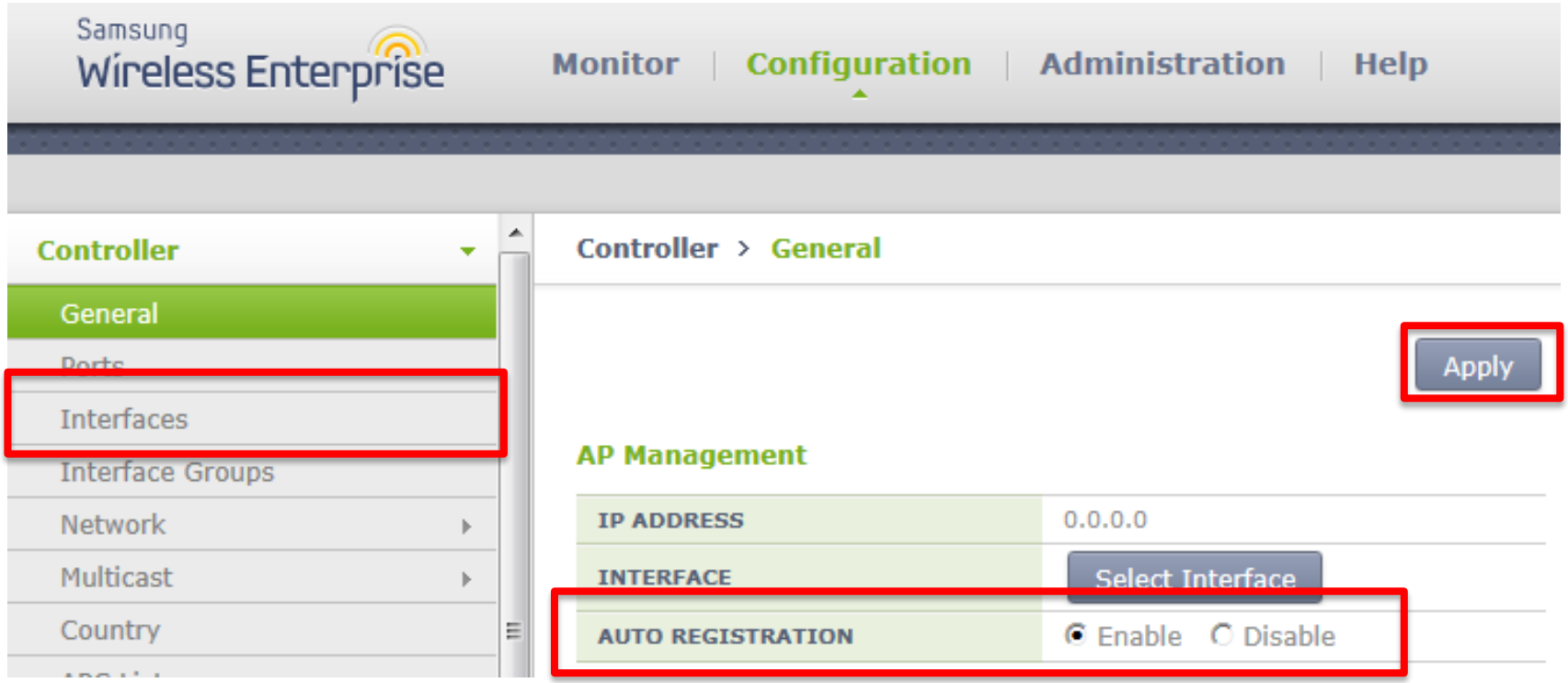
# 4.4 Network Setup & VLANs

- 4.4.1 Setup Interfaces/VLANs
- 4.4.2 Setup Interface Groups
- 4.4.3 CAPWAP IP Address
- 4.4.4 Static Route
- 4.4.5 ARP Table
- 4.4.6 System Name

# 4.4.1 Setup Interfaces

Samsung Wireless Enterprise™

Configuration > Controller > General



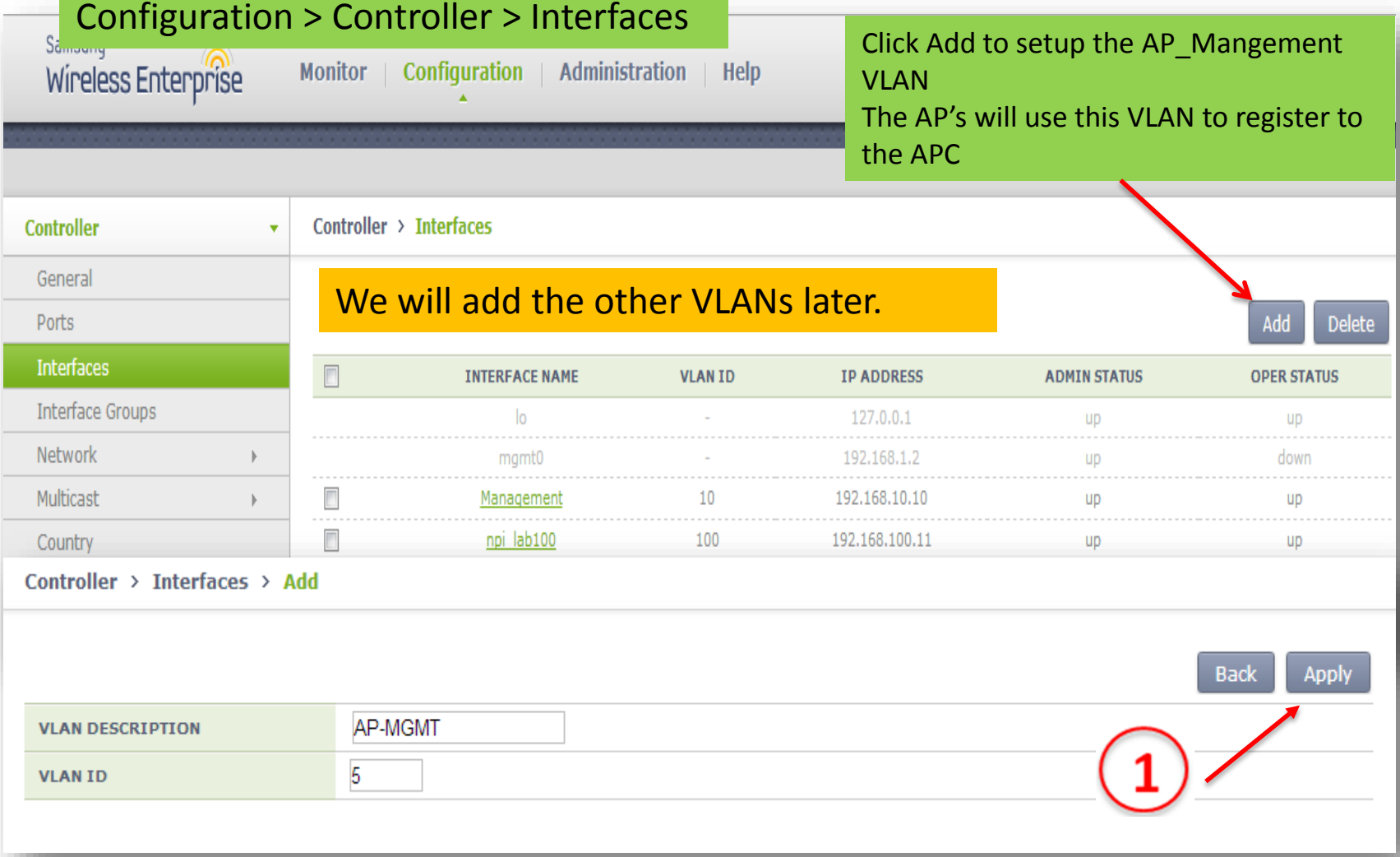

Before adding Interfaces, make sure AP Registration is enabled. If not, select enable and hit Apply.

# 4.4.1 Setup Interfaces

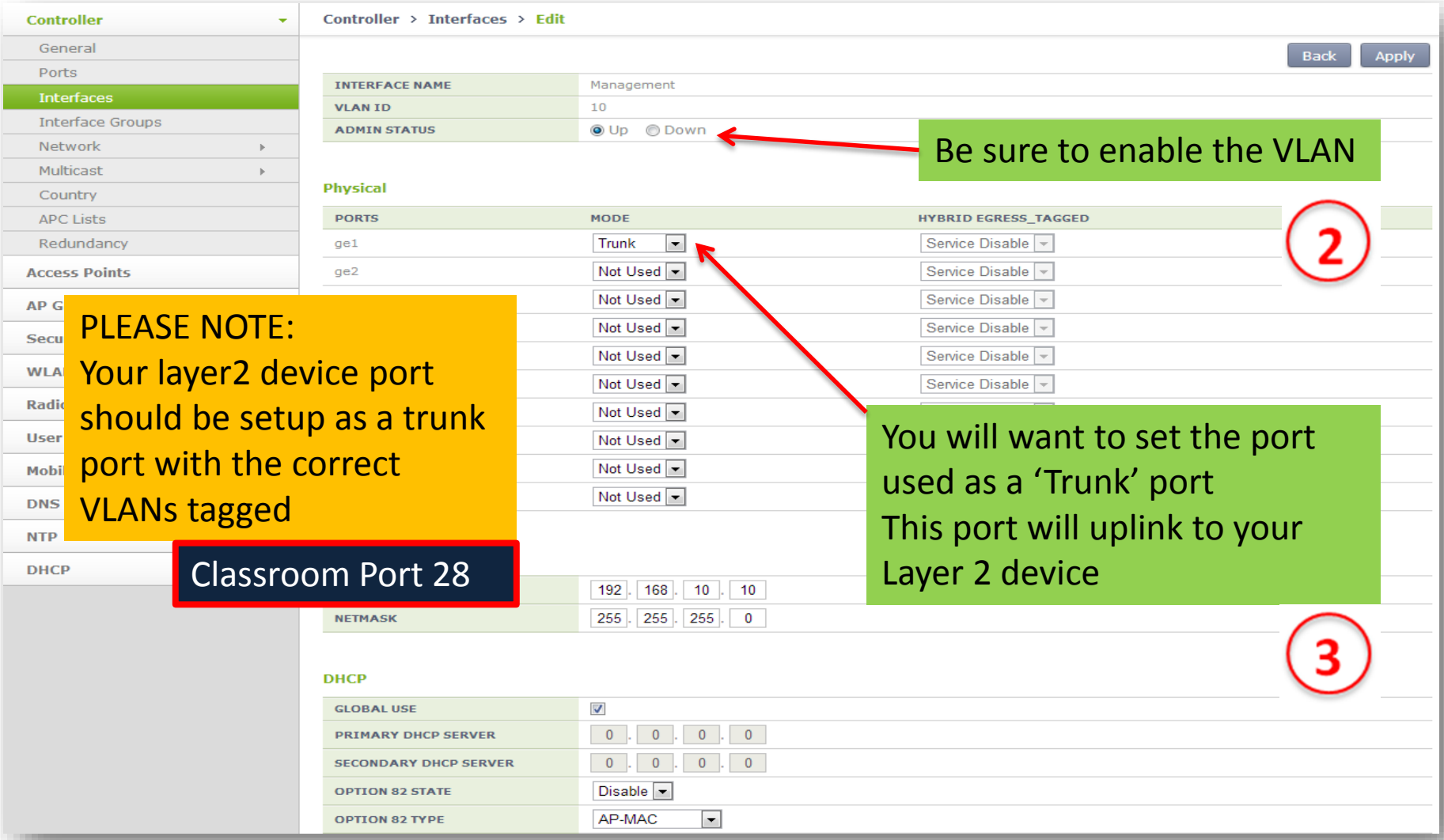
Samsung Wireless Enterprise™

Configuration > Controller > Interfaces

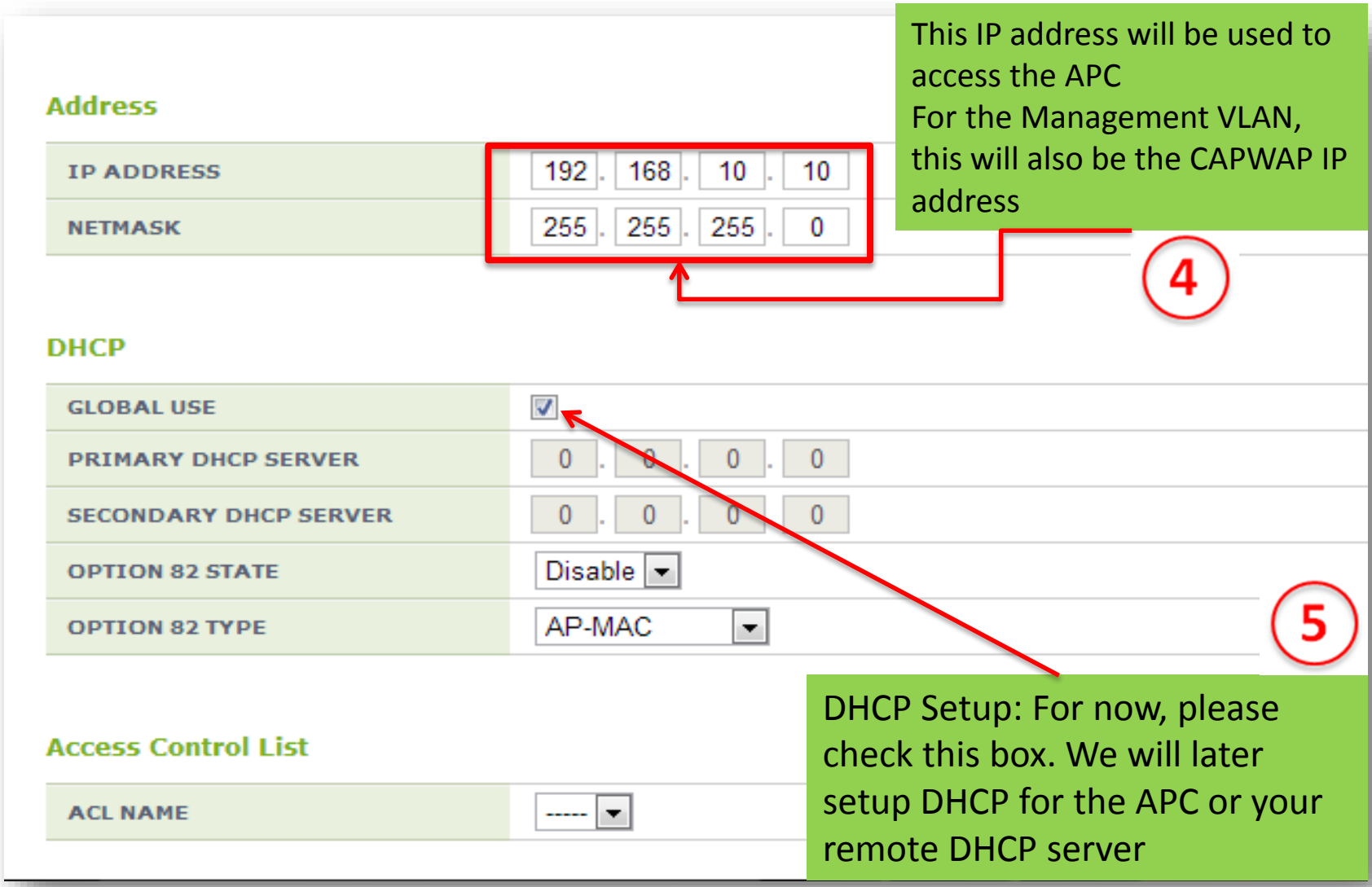
Click Add to setup the AP_Mangement VLAN
The AP's will use this VLAN to register to the APC



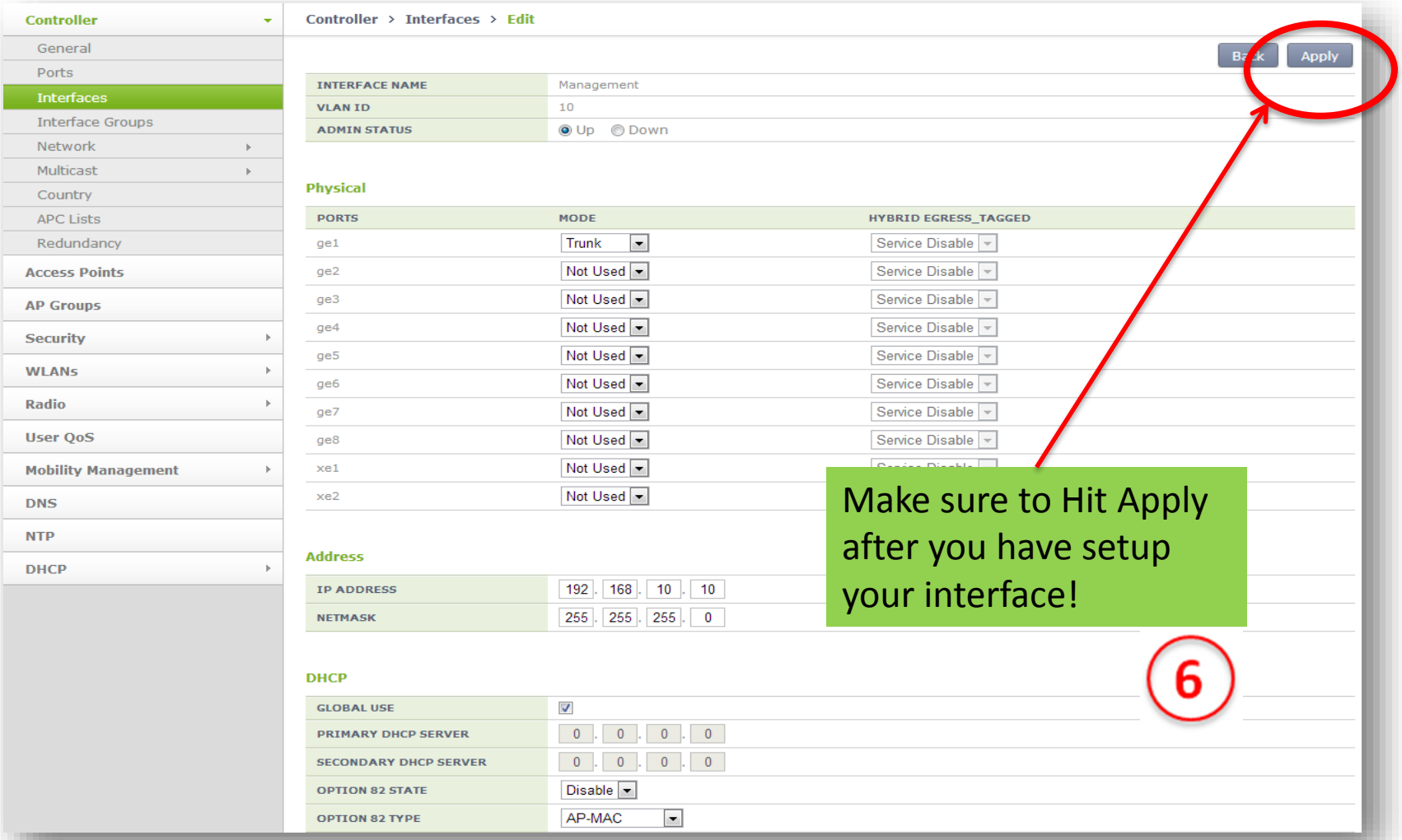
# 4.4.1 Setup Interfaces



# 4.4.1 Setup Interfaces



# 4.4.1 Setup Interfaces

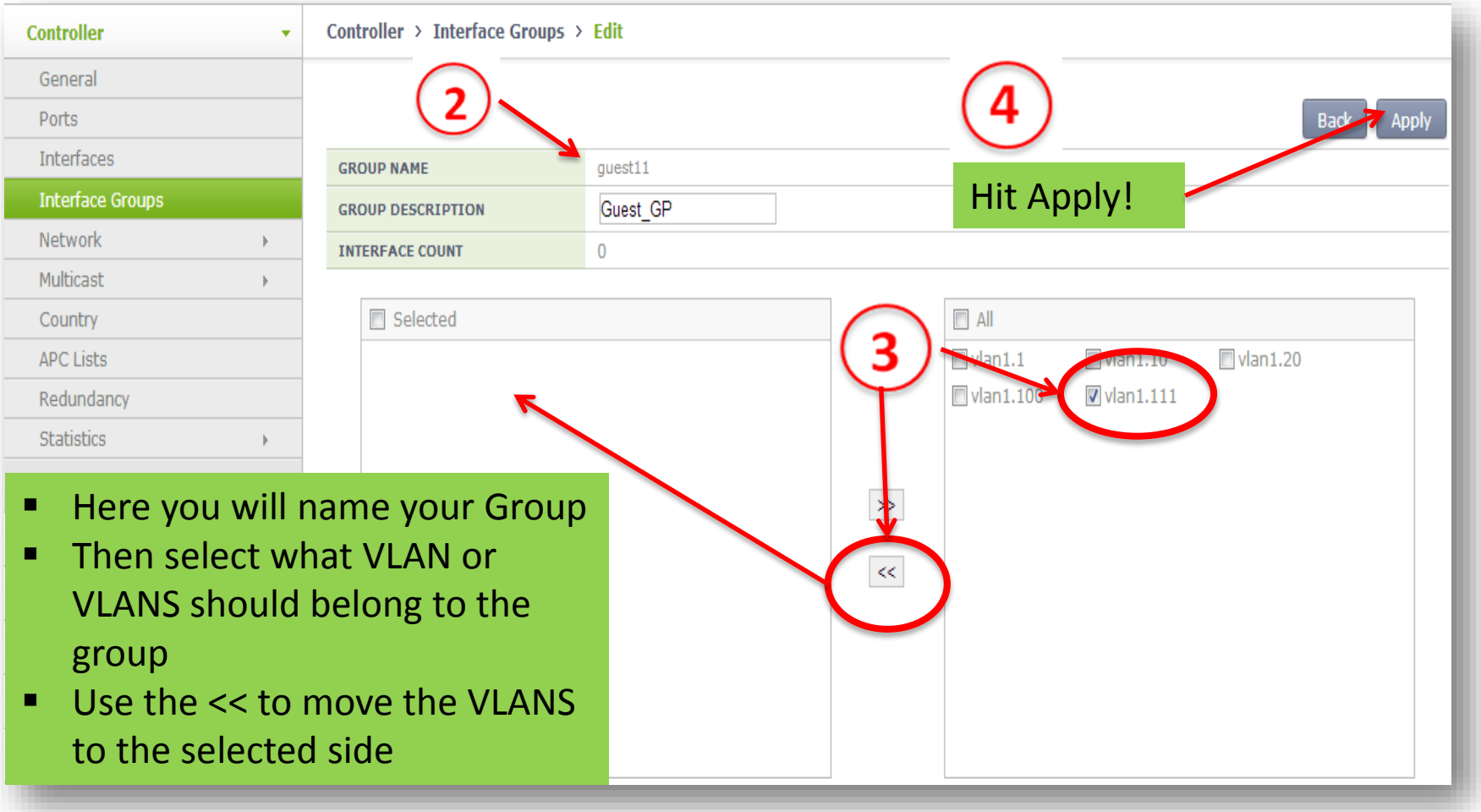


# 4.4.2 Setup Interface Groups

Samsung Wireless Enterprise™

Configuration > Controller > Interface Groups

# 4.4.2 Setup Interface Groups

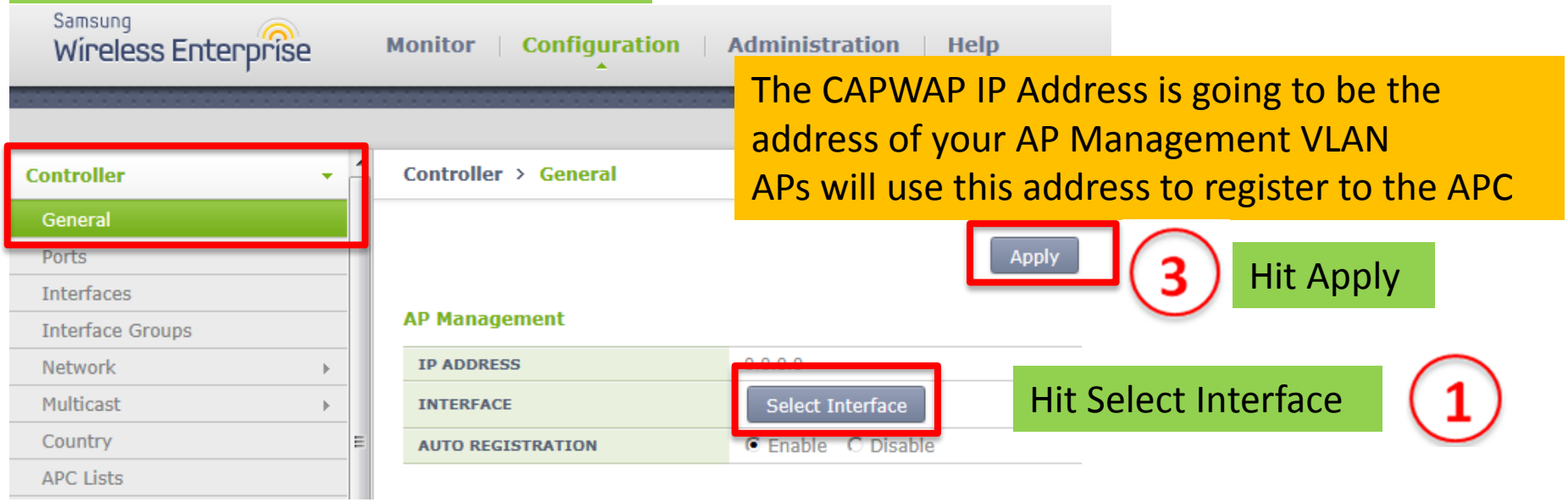



- Here you will name your Group
- Then select what VLAN or VLANS should belong to the group
- Use the << to move the VLANS to the selected side

# 4.4.3 CAPWAP IP Address

Samsung Wireless Enterprise™

## Configuration > Controller > General



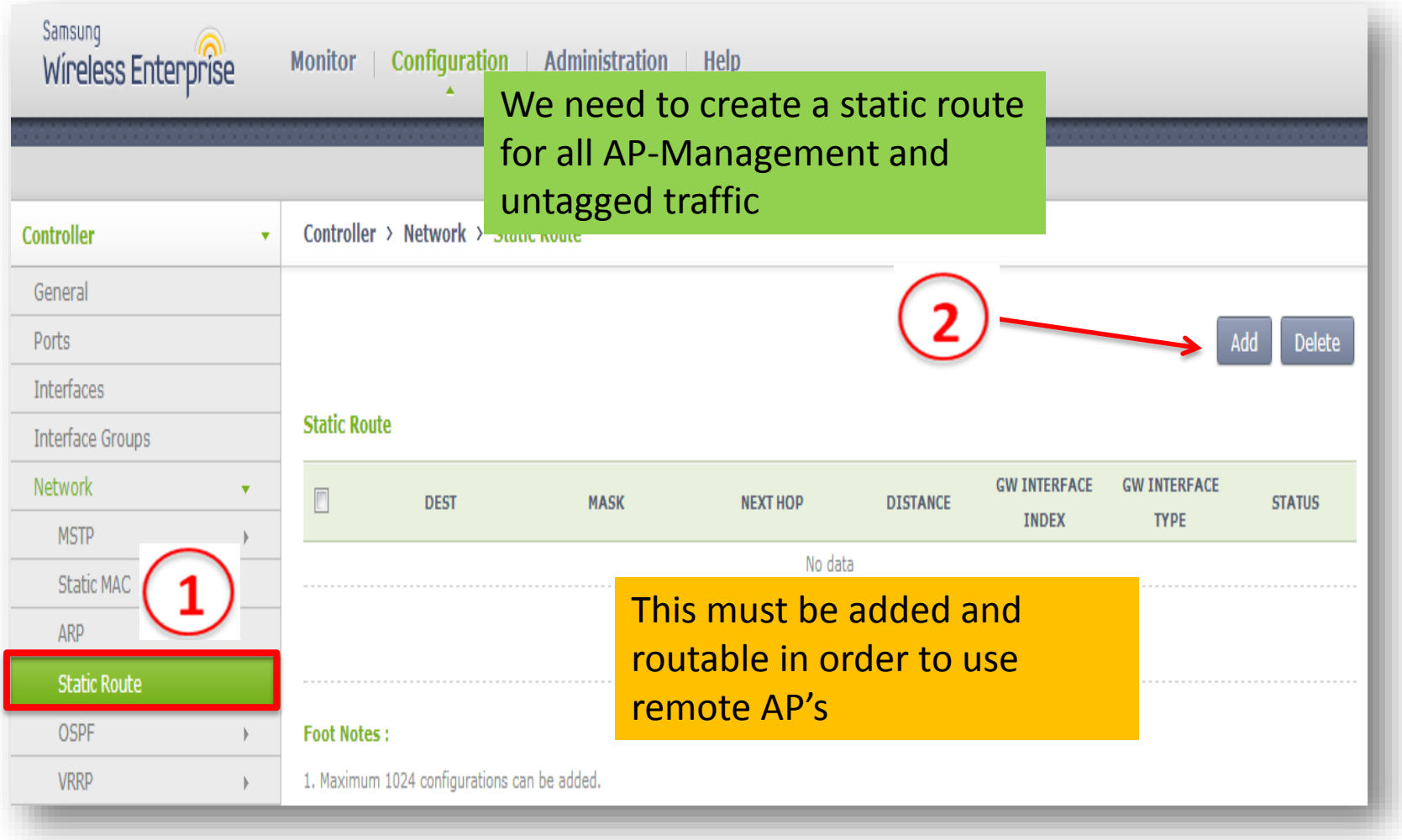

| VLAN INTERFACE NAME | VLAN ID | VLAN DESCRIPTION | IP ADDRESS | ADMIN STATUS | OPER STATUS |
|---|---|---|---|---|---|
| vlan1.1 | 1 | default | 0.0.0.0 | up | up |
| vlan1.70 | 70 | Company70 | 192.168.70.10 | up | up |
| vlan1.71 | 71 | Guest71 | 192.168.71.10 | up | up |
| vlan1.72 | 72 | AP-MGMT | 192.168.72.10 | up | up |

2 Select your Interface

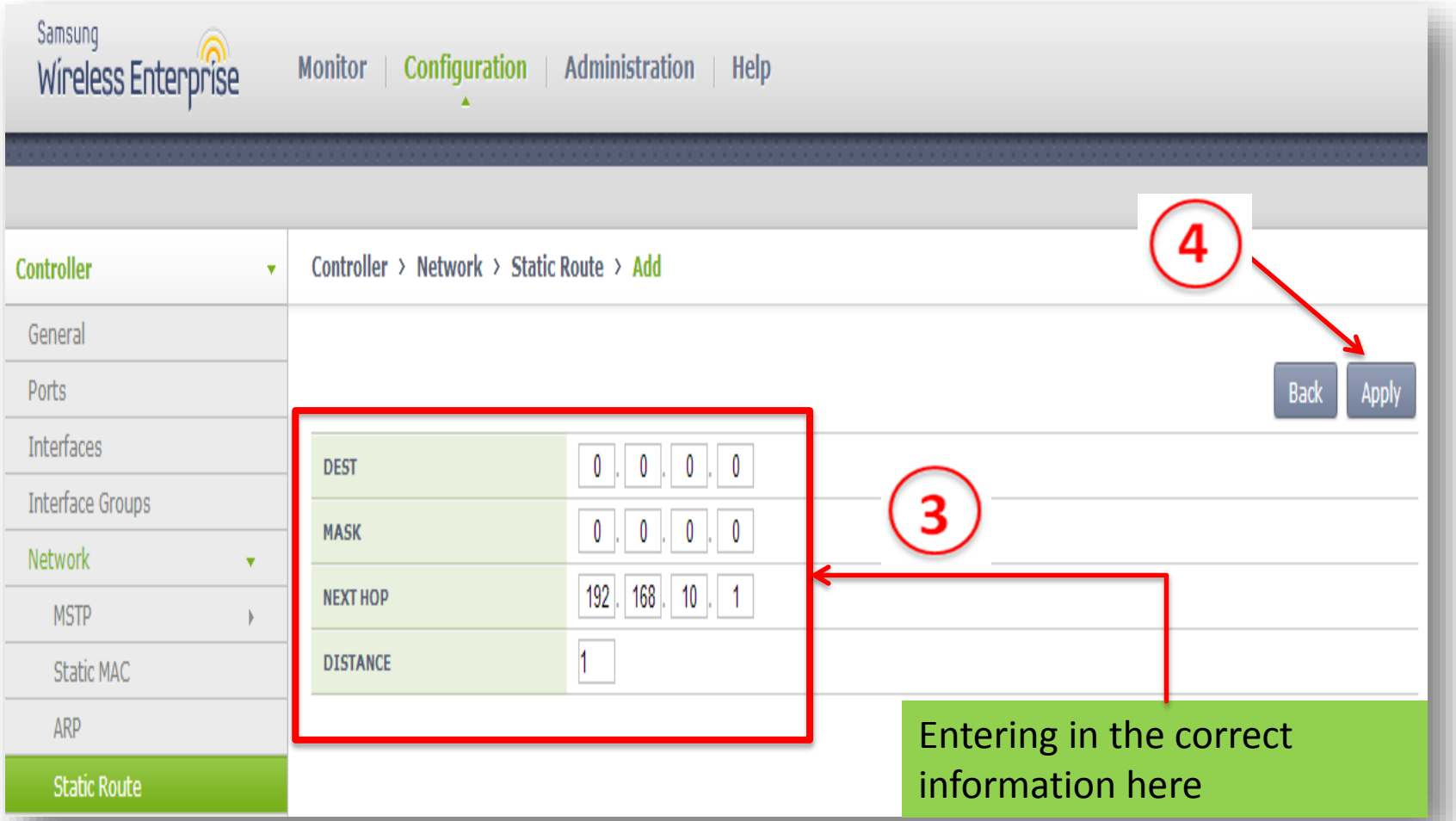
# 4.4.4 Static Route

Samsung Wireless Enterprise™

Configuration > Controller > Network > Static Route



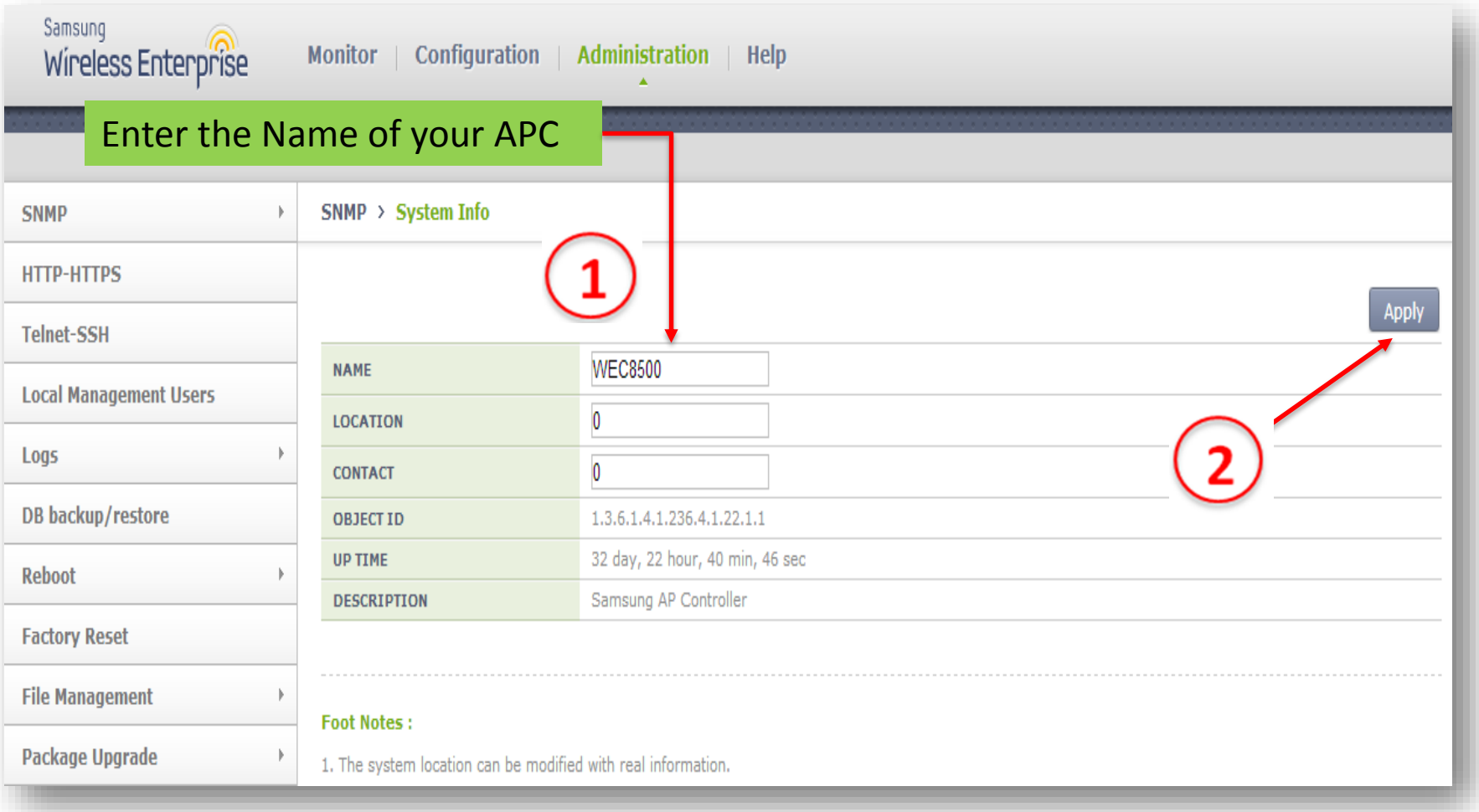
# 4.4.4 Static Route



# 4.4.6 System Name

Samsung Wireless Enterprise™

Administration > SNMP > System Info



# Setup Interfaces “Lab 2”

Samsung Wireless Enterprise™

## Lab 2 -

**Create two new Interface/VLANs (Company and Guest) that will be used in your WLAN service**

1. Go to Configuration → Controller → Interfaces → Add
2. Create a VLAN with the following parameters
3. Interface Name CompanyX were x is your student number
4. For the CompanyX we will use VLAN ID XX “*See Student Info*”
5. Enable your VLAN and add it to interface "ge1" in “Trunk" mode
6. Configure the VLAN IP address to 192.168.x.10/24
7. Under the DHCP section uncheck Global Use and add the parameters per DHCP on the “*See Student Info*”
8. Primary DHCP Server = 192.168.x.1
9. Apply
10. Repeat steps 1 – 8 for the Interface/VLAN “Guestxx” on the “*See Student Info*”

# Interface Groups “Lab 3”

Samsung Wireless Enterprise™

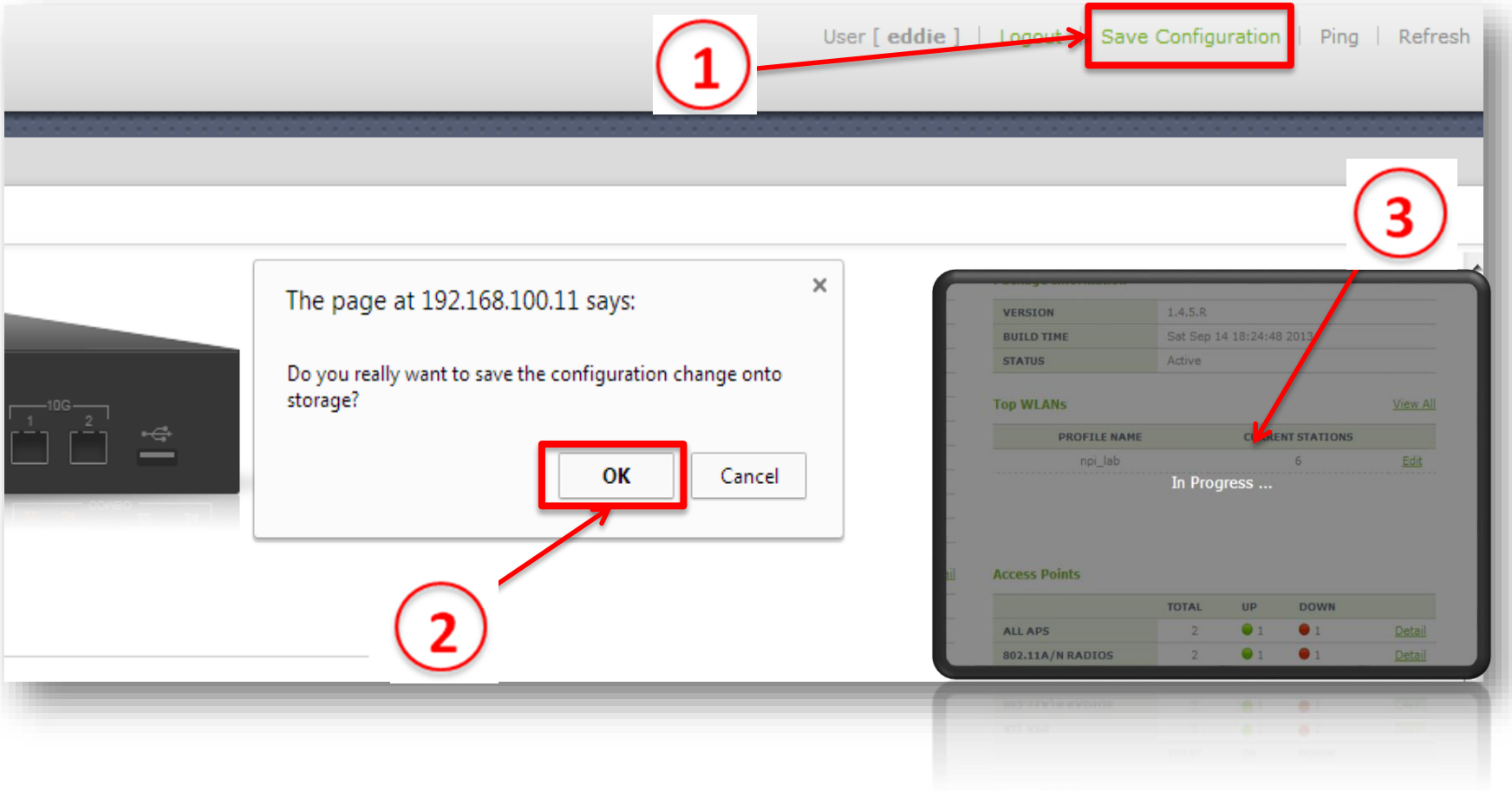
## Lab 3 -

**Create two new Interface Groups that will be used with your Company and Guest VLANs**

1. Go to Configuration → Controller → Interface Groups → Add
2. Define your interface group CompanyX were x is your student number
3. Add your newly created VLAN to the create interface group and apply
4. Repeat steps 1 – 2 for the Guest Interface/VLAN

Samsung Wireless Enterprise™

# SAVE CONFIGURATION



Samsung Wireless Enterprise™

## 4.5 Software Management

- 4.5.1 Verify Installed Version
- 4.5.2 Activate FTP/SFTP
- 4.5.3 Upload Software

# Current Released Software

Samsung Wireless Enterprise™

| WEC8500 | WEC8050 | WEA302i | WEA303i | WEA303e | WEA403i | WEA412i | WEA453e |
|---|---|---|---|---|---|---|---|
| 2.4.19R | 2.4.19R | 2.4.19R | 2.4.19R | 2.4.19R | 2.4.19R | 2.4.19R | 2.4.19R |

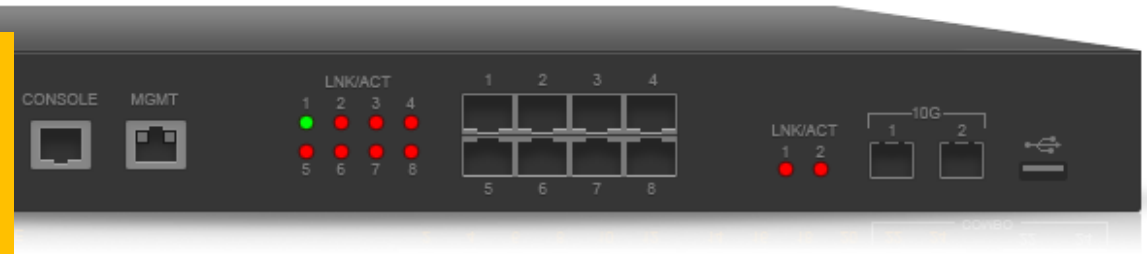
# 4.5.1 Verify Installed Version

Samsung Wireless Enterprise™

Monitor | Configuration | Administration | Help

## Summary

This chassis refreshes every 5 seconds.




Click on Monitor to go to the Monitor Screen that will show the current software version in use. In your case, you should see 2.4.19R

## Inventory

| | |
|---|---|
| SYSTEM NAME | WEC8500 |
| LOCATION | 0 |
| MODEL NAME | WEC8500 |
| MAC ADDRESS | f4:d9:fb:40:2c:38 |
| HARDWARE VERSION | 0.5 |
| FIRMWARE VERSION | 0.7 |
| SOFTWARE VERSION | 2.4.12 |
| SERIAL NUMBER | 2VMQ295001 |
| SYSTEM UP TIME | 2 day, 20 hour, 32 min, 46 sec |
| SYSTEM TIME | Mon Jan 12 11:18:19 2015 |

## Package Information

| | |
|---|---|
| VERSION | 2.4.12.R |
| BUILD TIME | Tue Dec 30 22:56:16 2014 |
| STATUS | Active |

## Top WLANs

View All

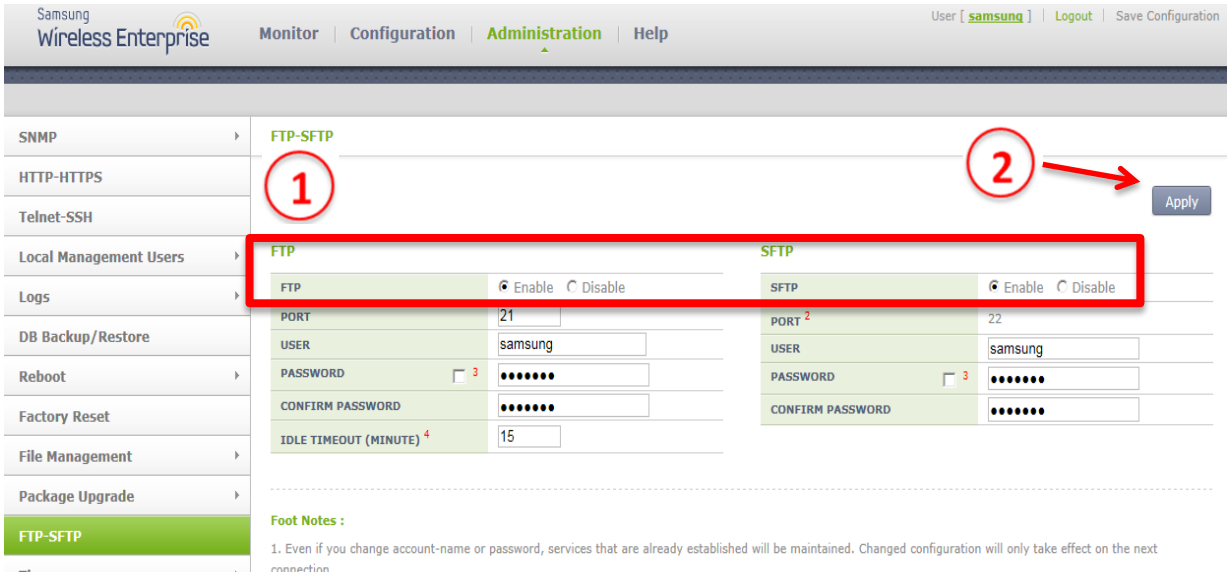
| PROFILE NAME | CURRENT STATIONS | |
|---|---|---|
| 18 | 1 | Edit |

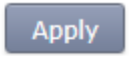
# 4.5.2 Activate FTP/SFTP

Samsung Wireless Enterprise™

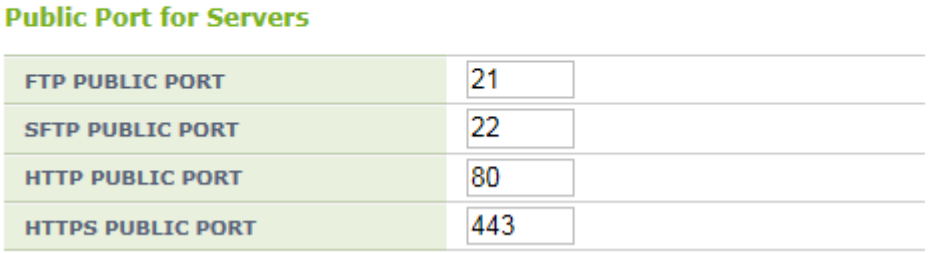
Administration > FTP-SFTP

Enable both FTP and SFTP for software upgrades



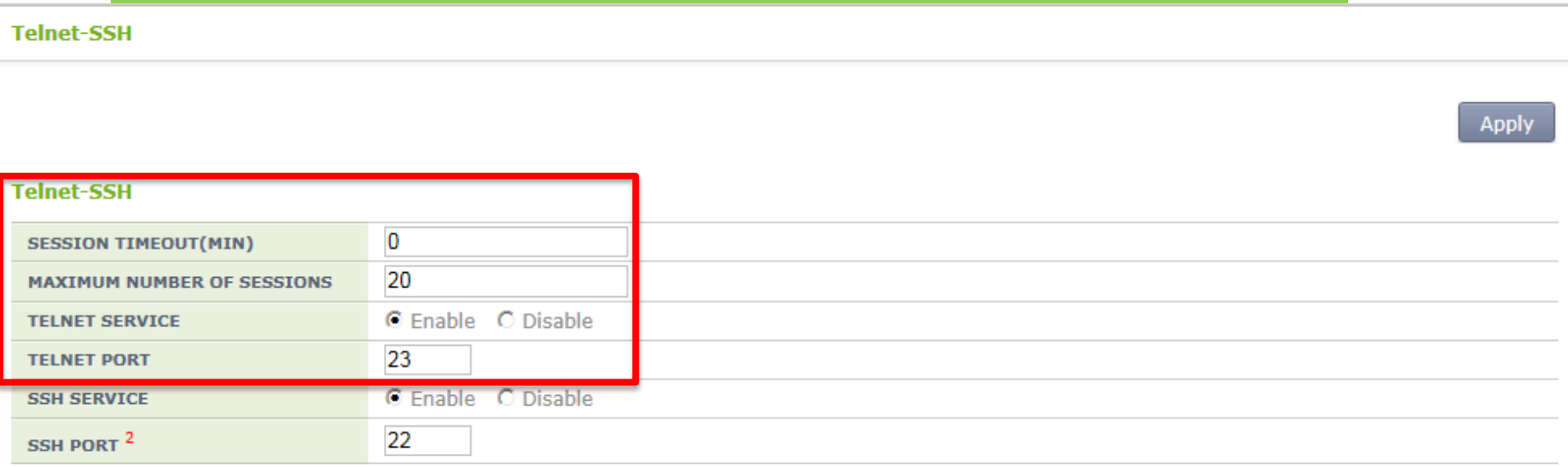

You can also view/set different ports in Configuration>Controller> General



# 4.5.2 Activate Telnet

Samsung Wireless Enterprise™

Telnet service is disabled by default. Go to Administration>Telnet-SSH and enable it.

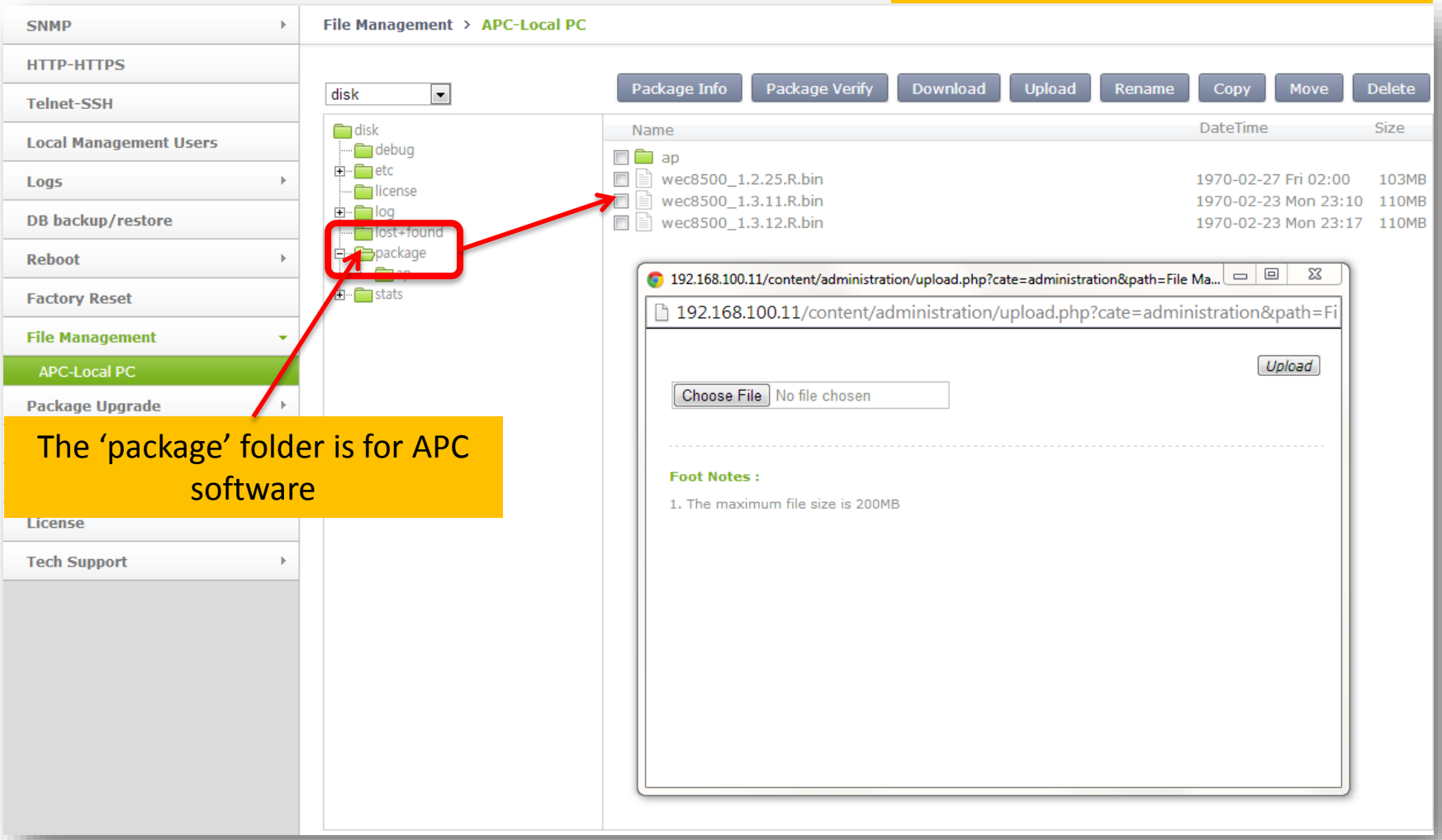


# 4.5.3 Uploading APC Software

Samsung Wireless Enterprise™

Administration > File Management > APC-Local PC

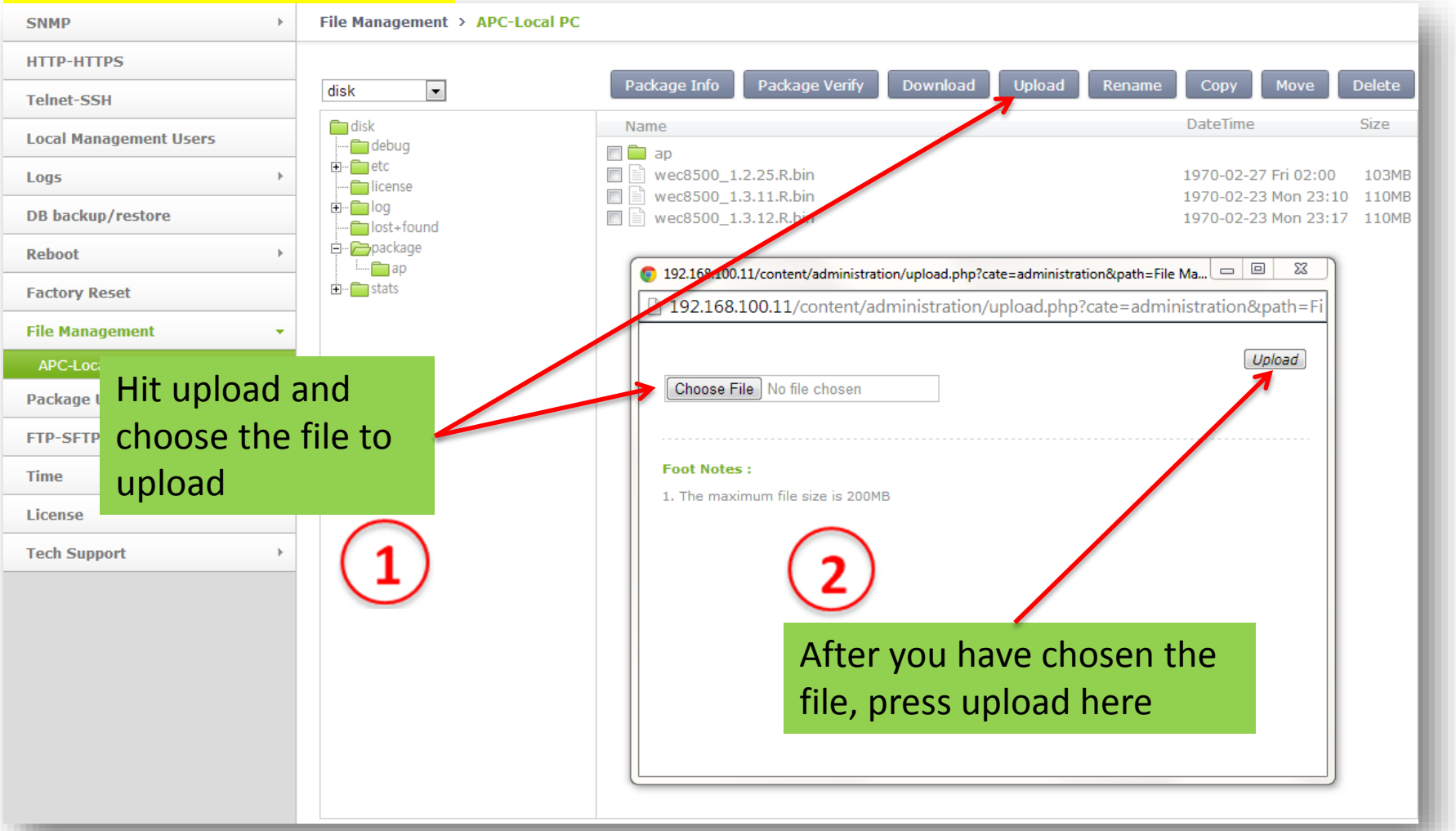
Note: 'wec' is the APC software



# 4.5.3 Uploading APC Software

Samsung Wireless Enterprise™

## *Uploading APC software*

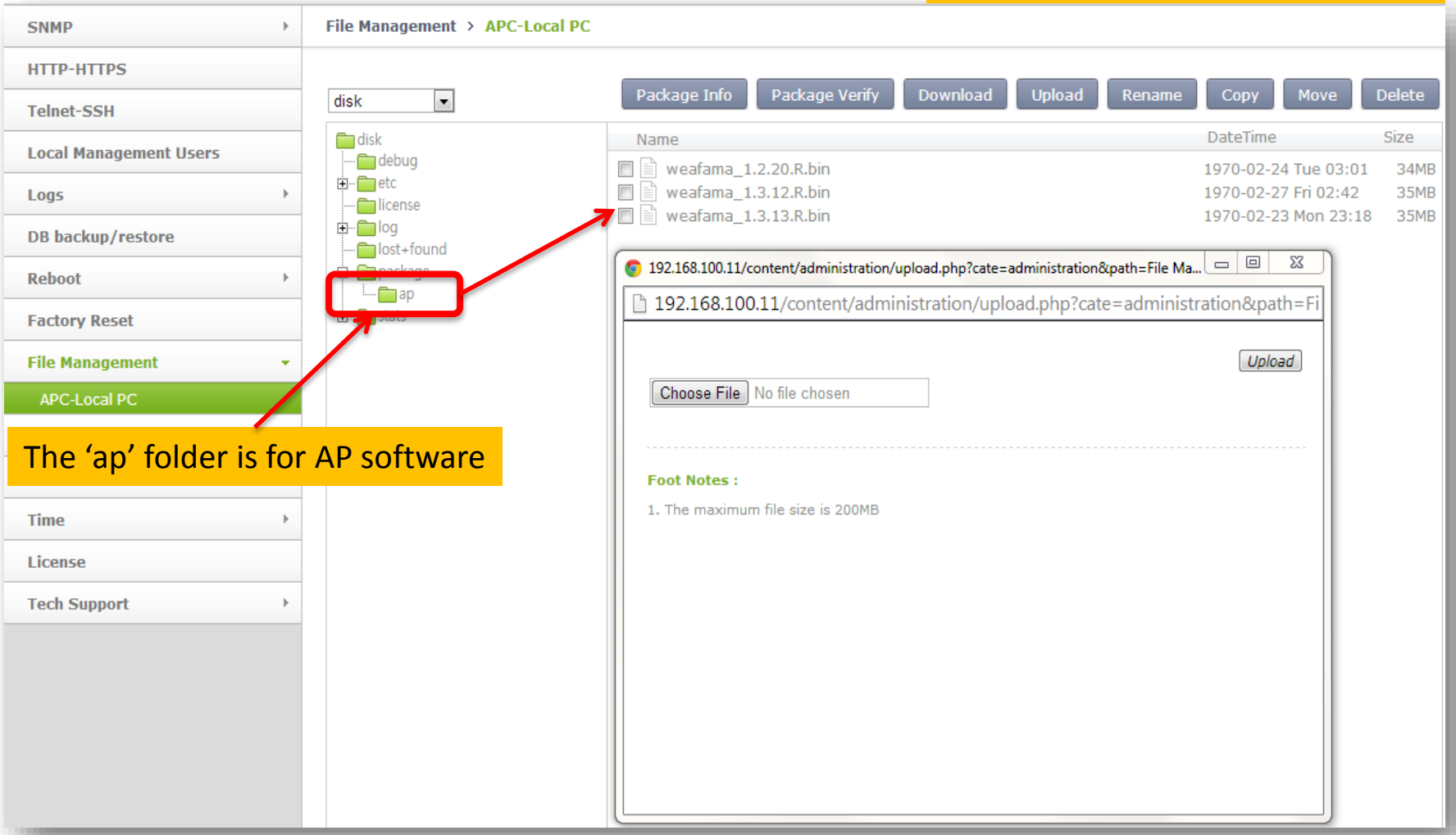


# 4.5.3 Uploading AP Software

Samsung Wireless Enterprise™

***Uploading AP software***

Note: 'wea' is the AP software

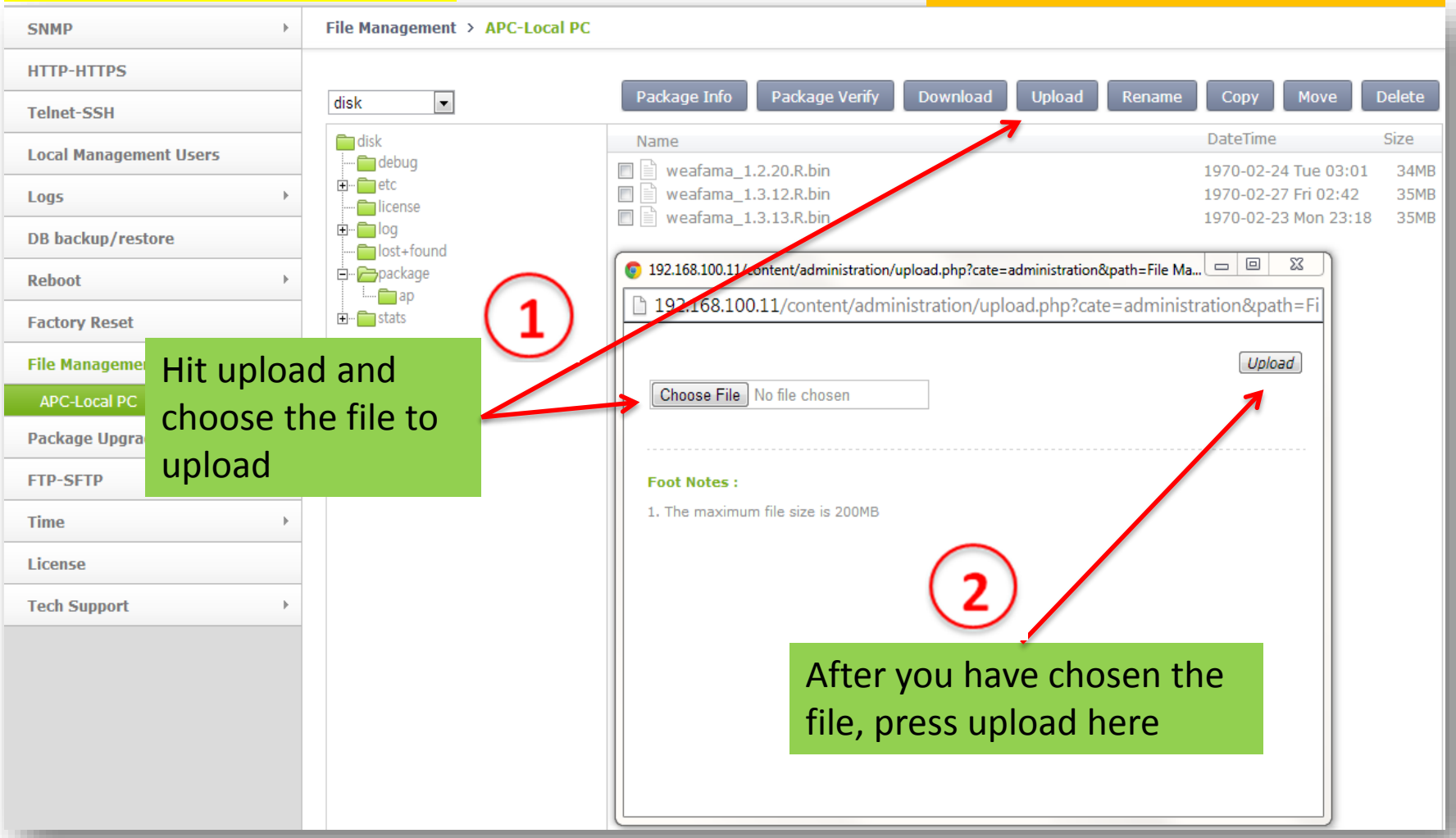


# 4.5.3 Uploading AP Software

Samsung Wireless Enterprise™

***Uploading AP software***

Note: 'wea' is the AP software



# Software Upload on APC & AP “Lab 4”

## Lab 4 -

**Enable FTP and STFP on the APC and upload software on APC and AP.**

1. Go to Administration → FTP-SFTP
2. Set both to Enable
3. Hit Apply
4. (APC Software) Go to Administration -> File Management -> APC-Local PC
5. Under the disk folder, find the package folder and hit upload
6. Choose the APC software and hit upload
7. (AP Software) Go to Administration -> File Management -> APC-Local PC
8. Find the AP folder under disk -> package and then hit upload
9. Choose the AP software and hit upload

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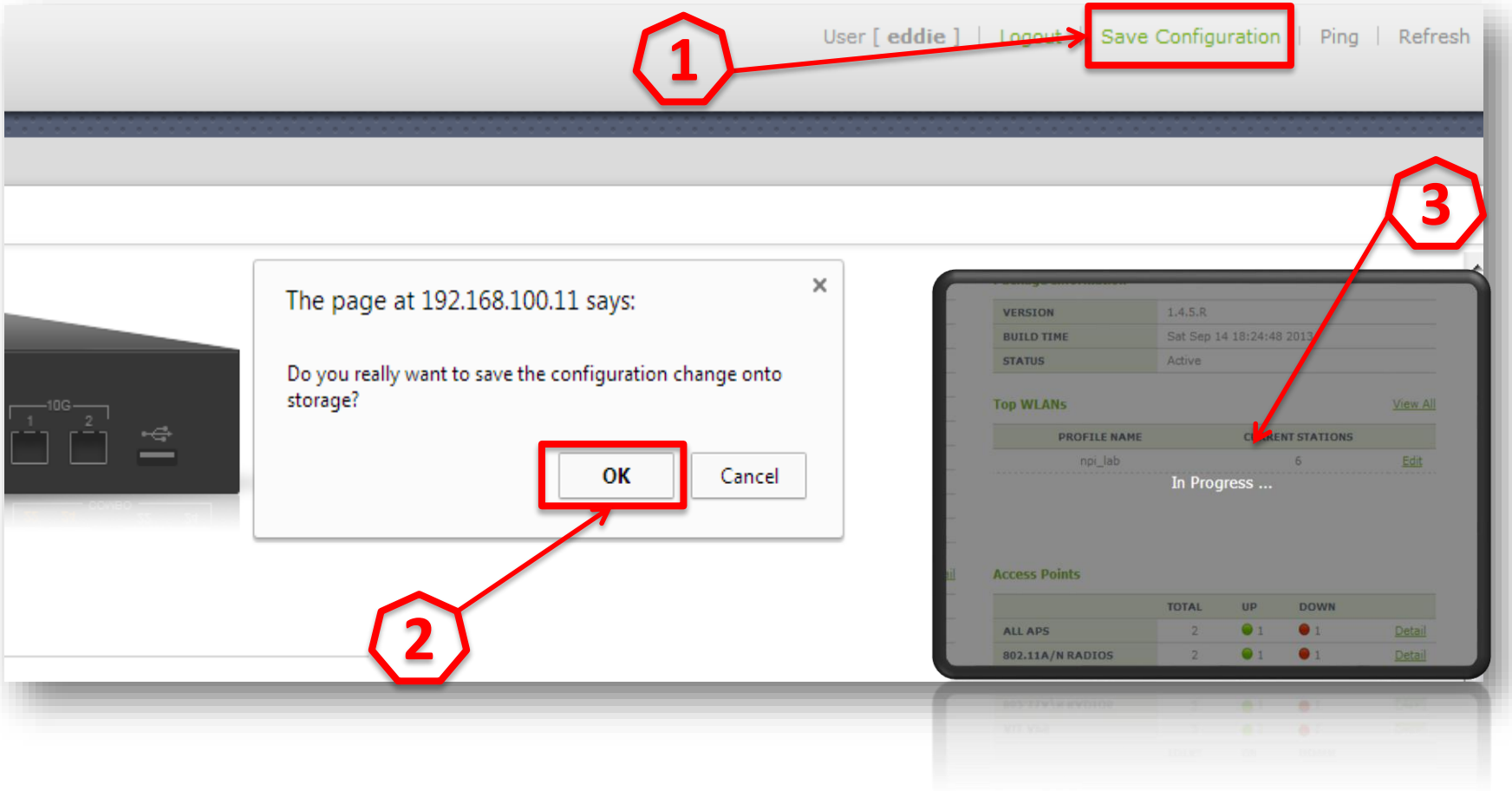
# SAVE CONFIGURATION



# 4.6 License Setup

Samsung Wireless Enterprise™

APC 8500 comes by default with a license for 2 APs

APC 8050 comes by default with a license for 5 APs

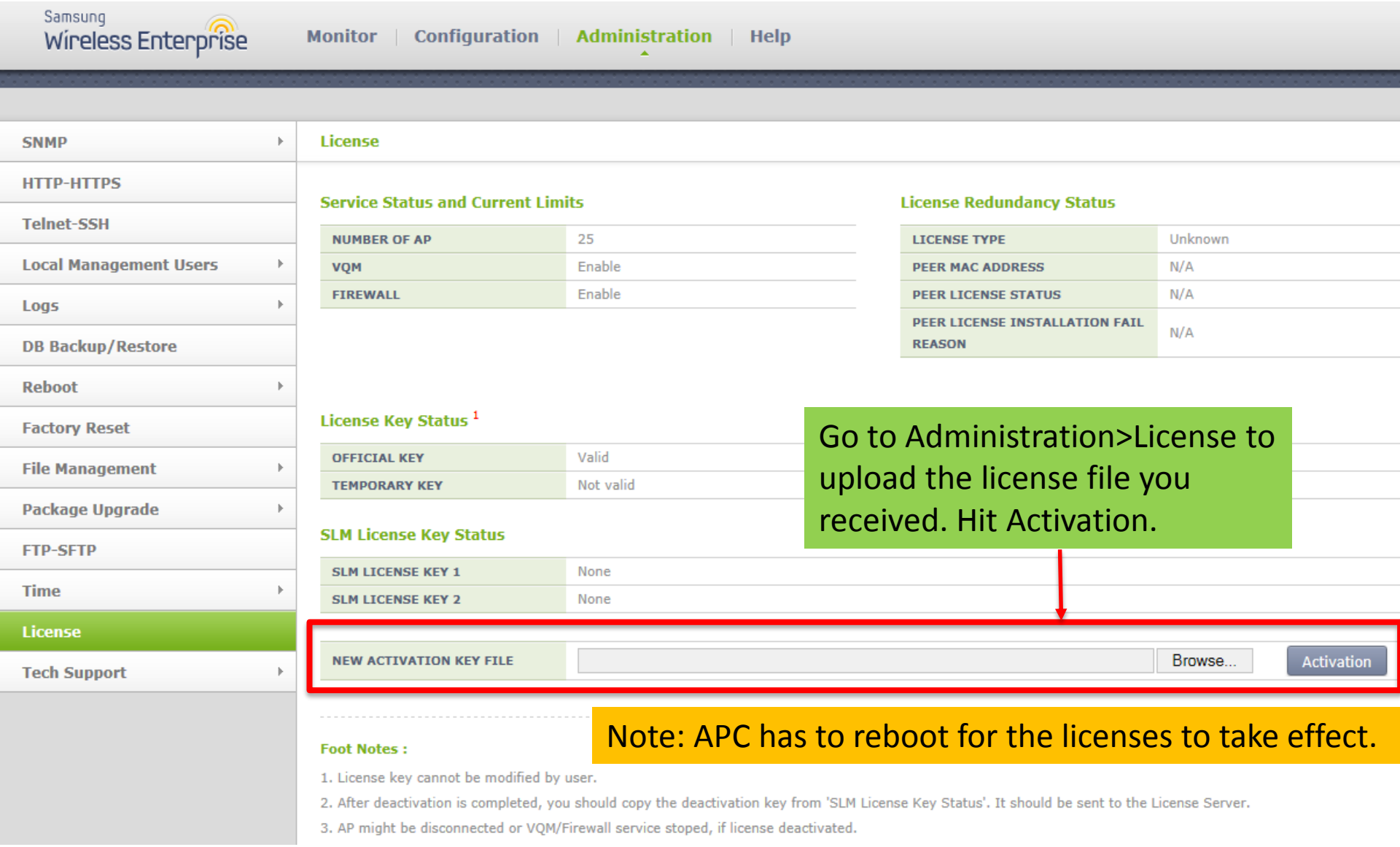
You will need to add your purchased license before moving forward

Samsung Wireless Enterprise™

## 4.6 License Setup

- 4.6.1 Activation Key File
- 4.6.2 Verify License Installed

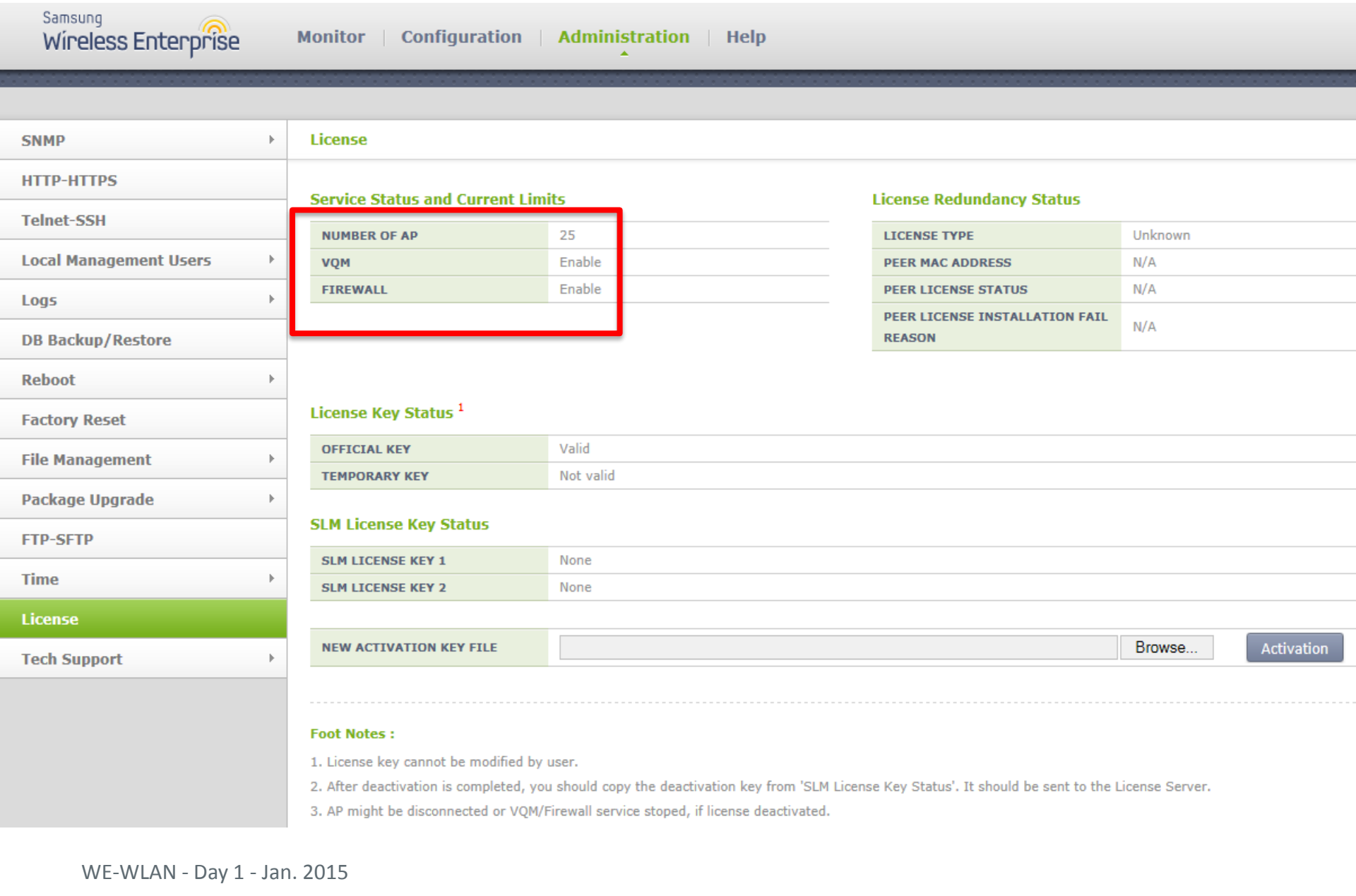
# 4.6.1 Activation Key File




Go to Administration>License to upload the license file you received. Hit Activation.

Note: APC has to reboot for the licenses to take effect.

# 4.6.2 Verify License Installed



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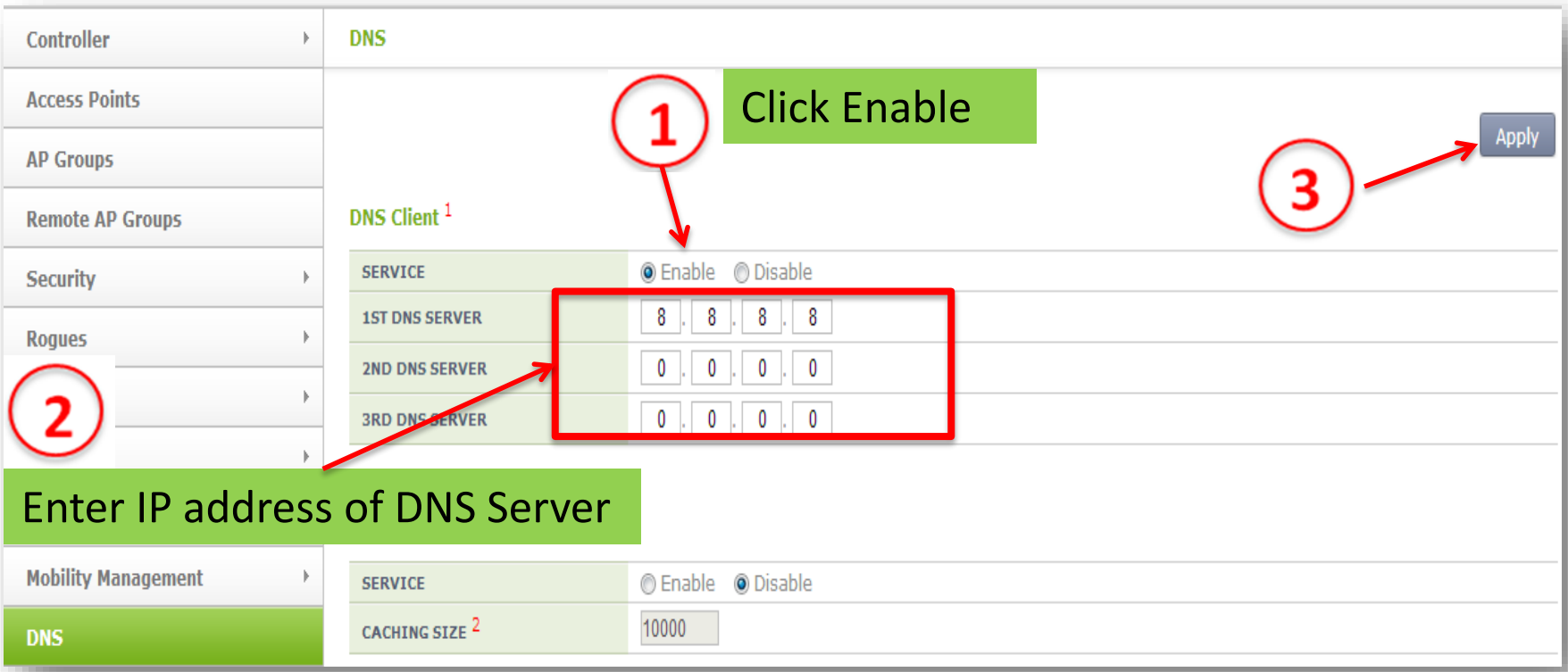
## 4.7 General Configuration

- 4.7.1 DNS Server
- 4.7.2 NTP Server (Internal / External)
- 4.7.3 DHCP Server (Internal / External)
- 4.7.4 APC Country Code
- 4.7.5 User Accounts
- 4.7.6 Radius Authentication
- 4.7.7 Adding a RADIUS Server

# 4.7.1 DNS Server

Samsung Wireless Enterprise™

Configuration > DNS



# 4.7.2 NTP: APC

There are two ways of setting NTP on APC.

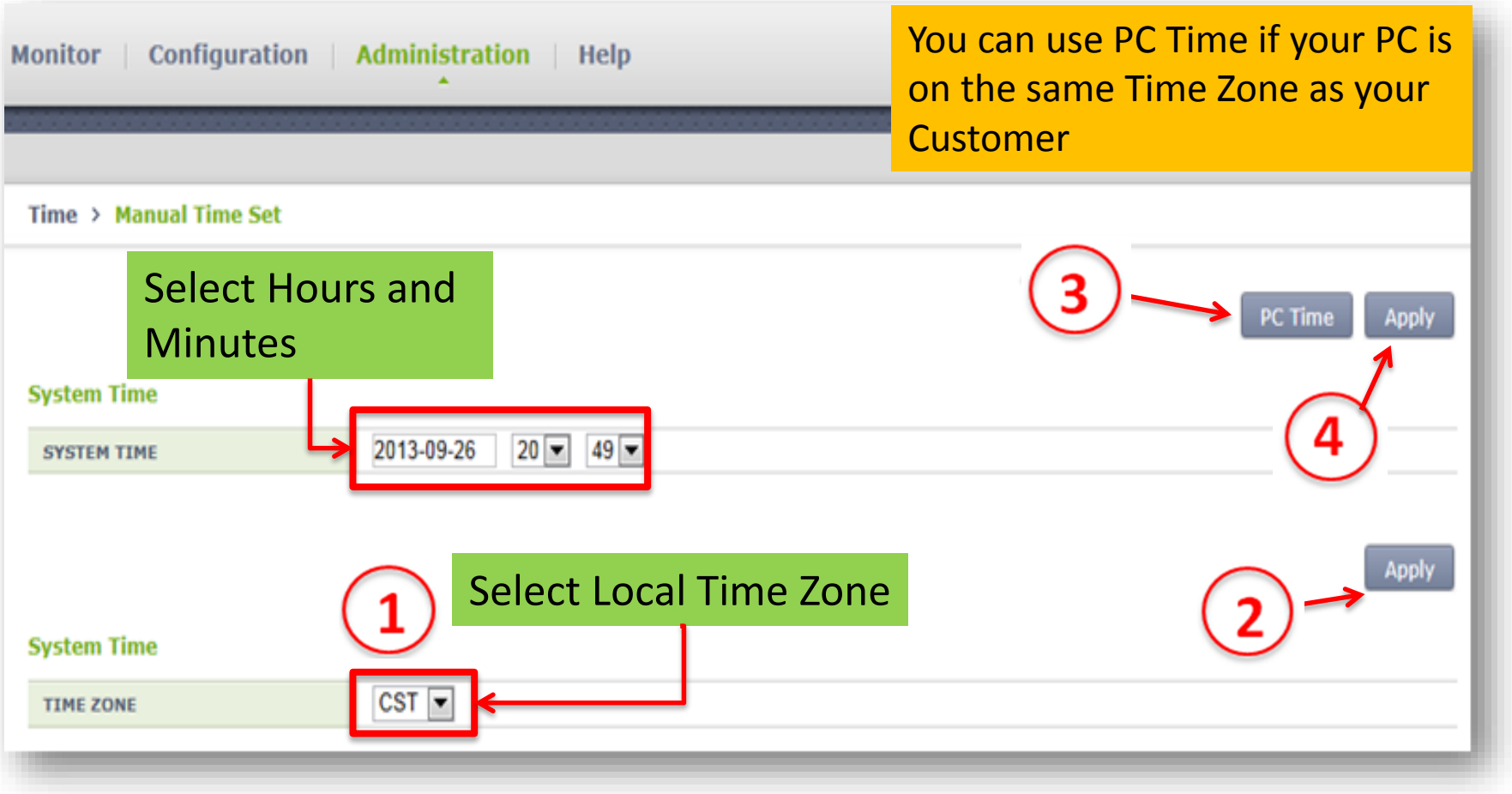
1. **Internal NTP:** APC acts as NTP server

2. **External NTP:** APC acts as NTP client

# 4.7.2 NTP: APC

**Internal NTP**

Administration > Time > Manual Time Set

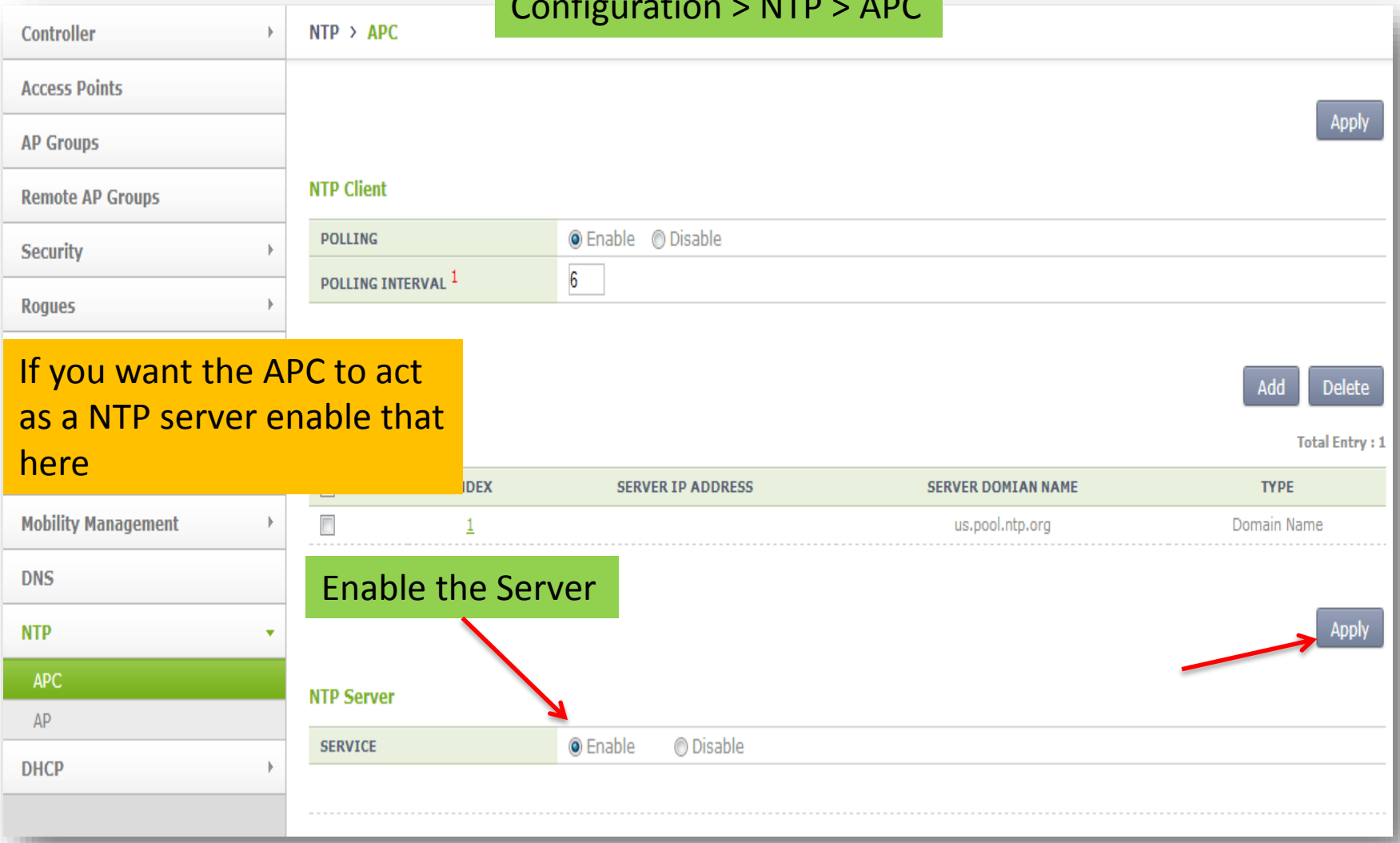


# 4.7.2 NTP: APC

Samsung Wireless Enterprise™

## Internal NTP

Configuration > NTP > APC



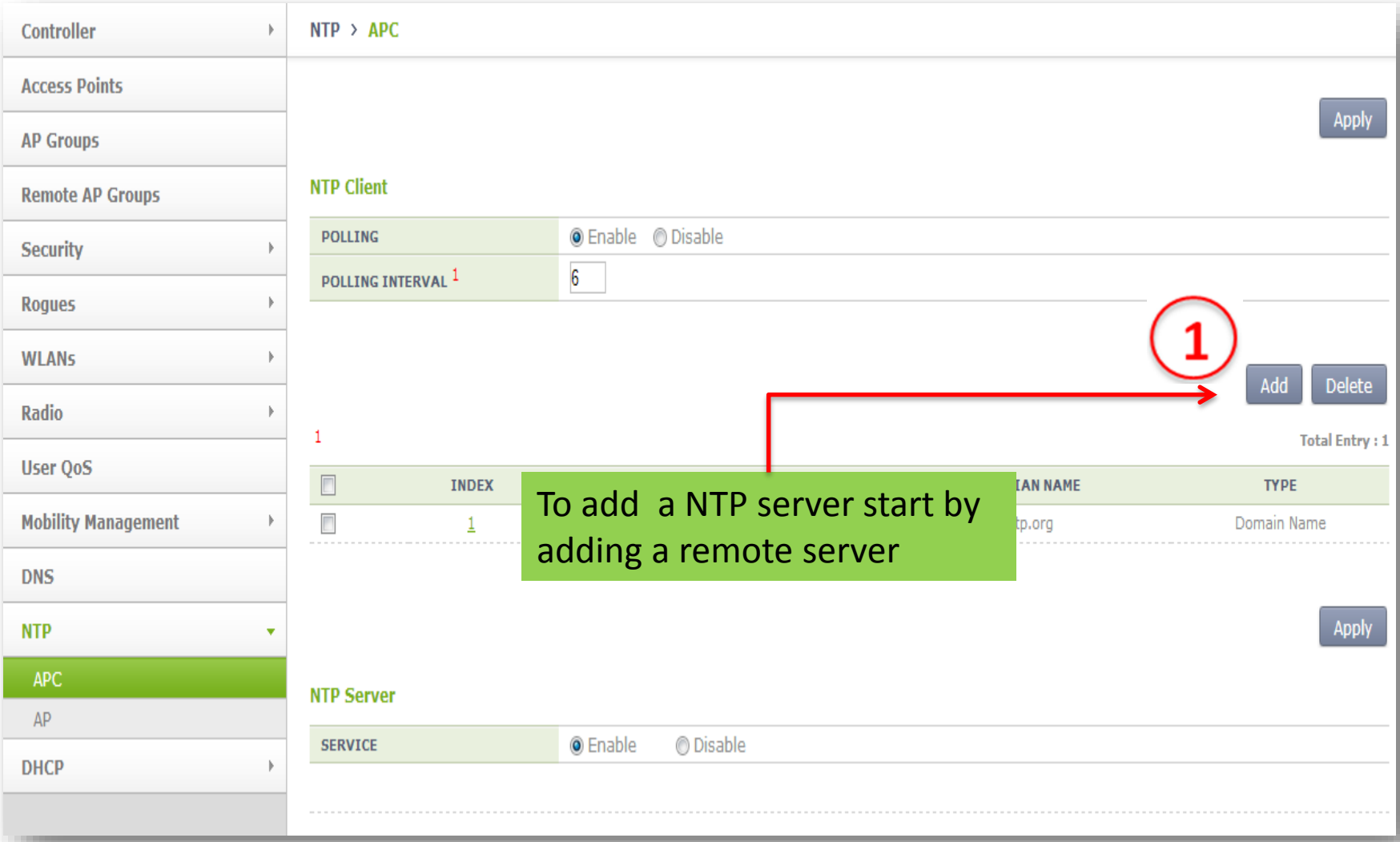

If you want the APC to act as a NTP server enable that here

Enable the Server

# 4.7.2 NTP: APC

Samsung Wireless Enterprise™

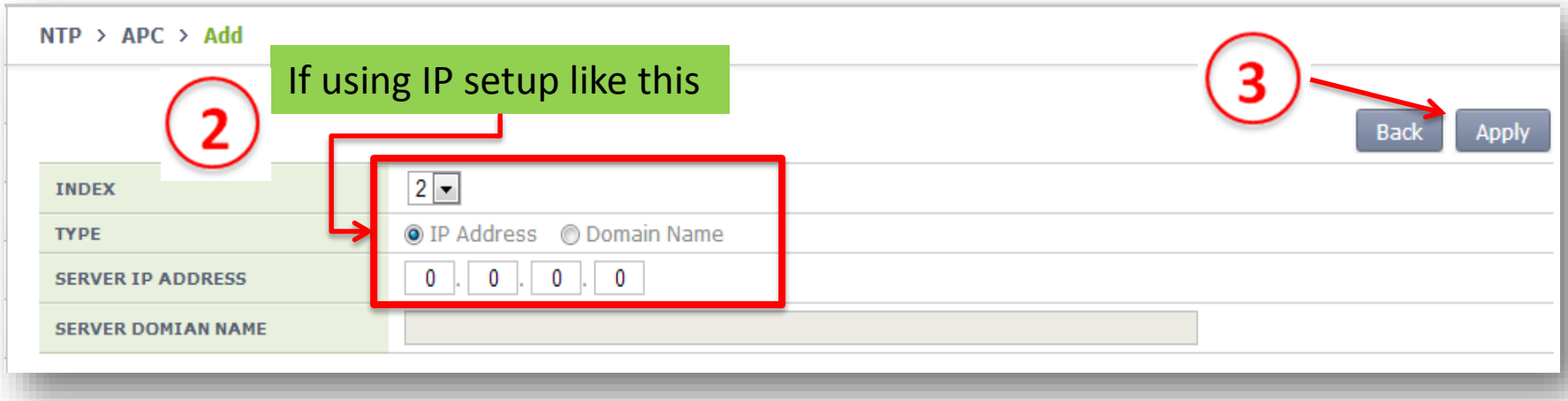
## External NTP



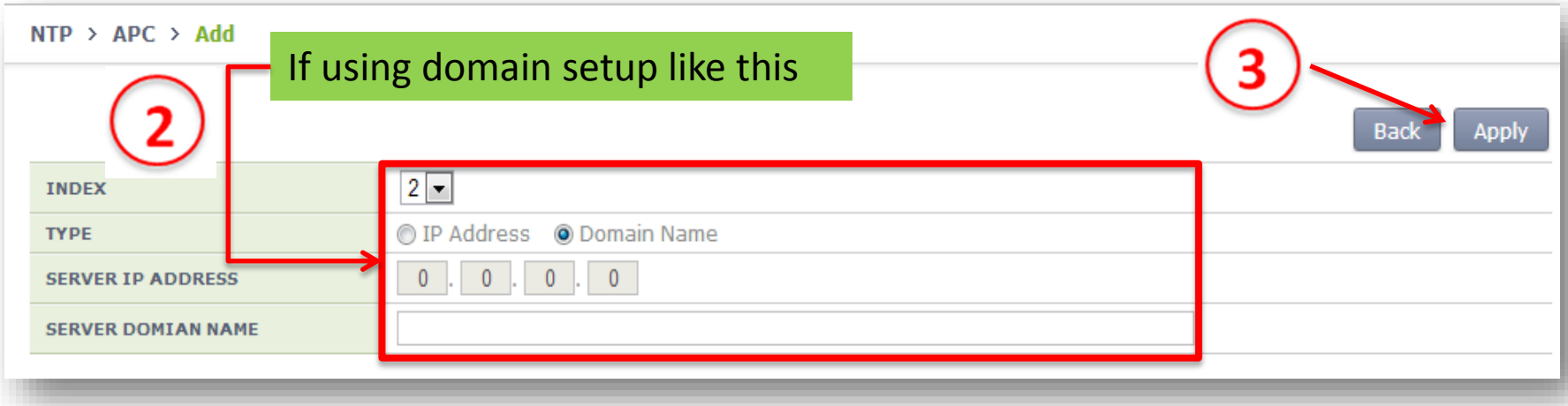
# 4.7.2 NTP: APC

Samsung Wireless Enterprise™

## External NTP



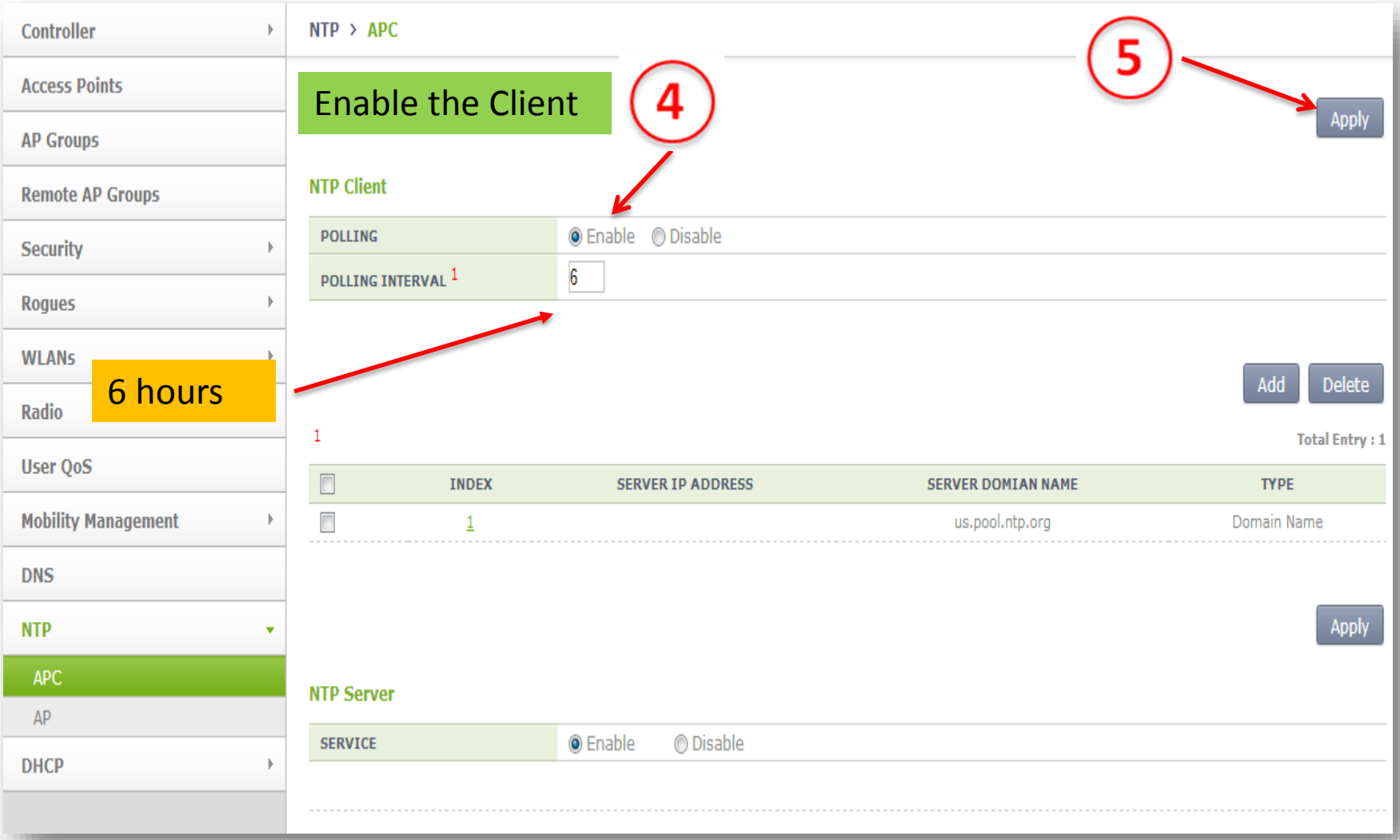

OR



# 4.7.2 NTP: APC

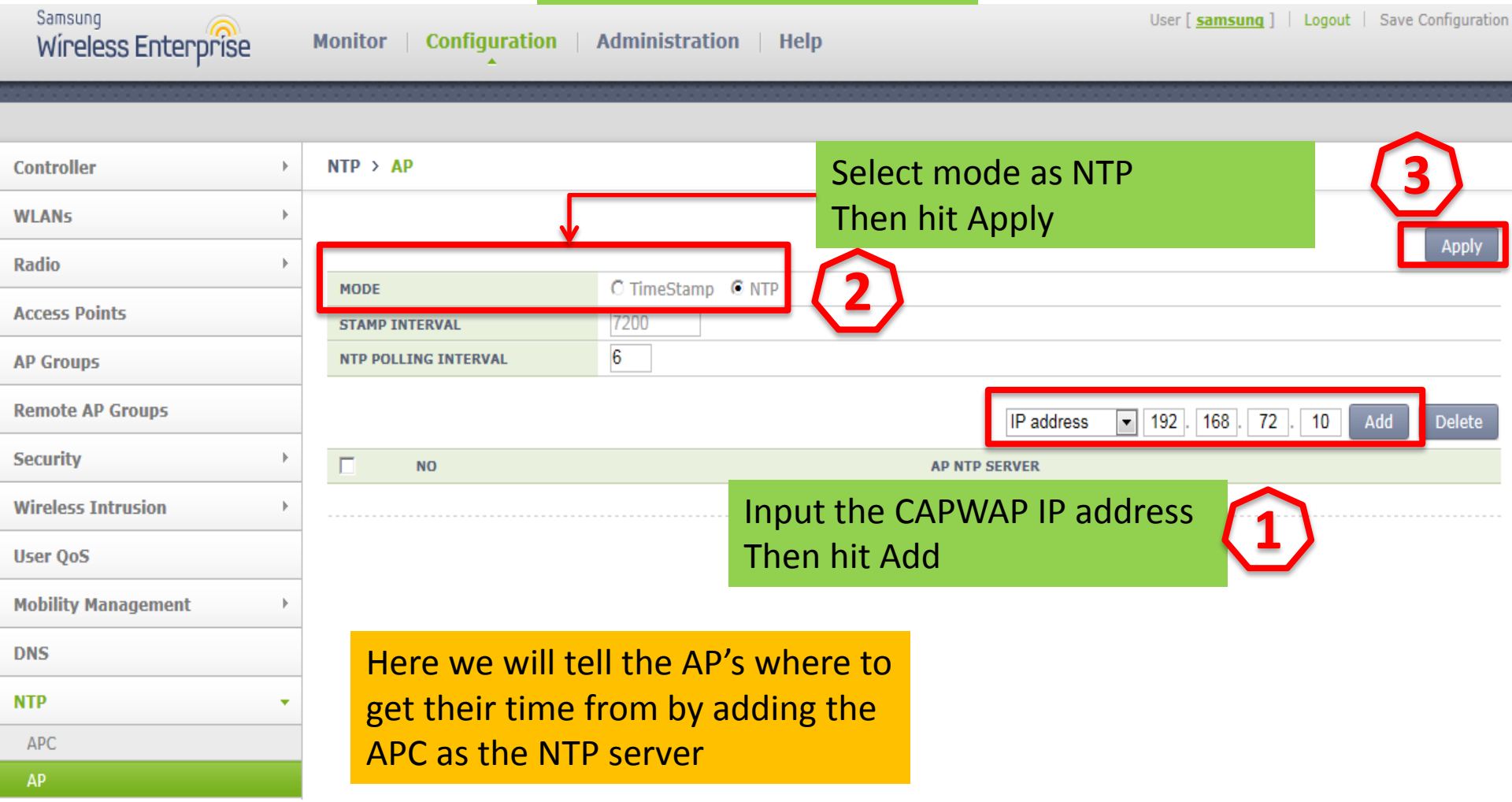
Samsung Wireless Enterprise™

## External NTP



# 4.7.2 NTP: AP

Configuration > NTP > AP




Here we will tell the AP's where to get their time from by adding the APC as the NTP server

# Time Set “Lab 6”

Samsung Wireless Enterprise™

## Lab 6 -

**Manually set the time on your APC and Enable the NTP service for the APC and APs**

1. Go to Administration → Time → Manual Time Set
2. Select PC Time → Hit Apply
3. Set Time Zone to “CST” → Hit Apply
4. Go to Configuration → NTP → APC
5. Set NTP Server to Enable → Hit Apply
6. Go to Configuration → NTP → AP
7. Input CAPWAP IP address
8. Hit Add

# 4.7.3 DHCP Server

There are two ways for clients to get an IP address.

- ***INTERNAL*** *– use the DHCP server in the APC*

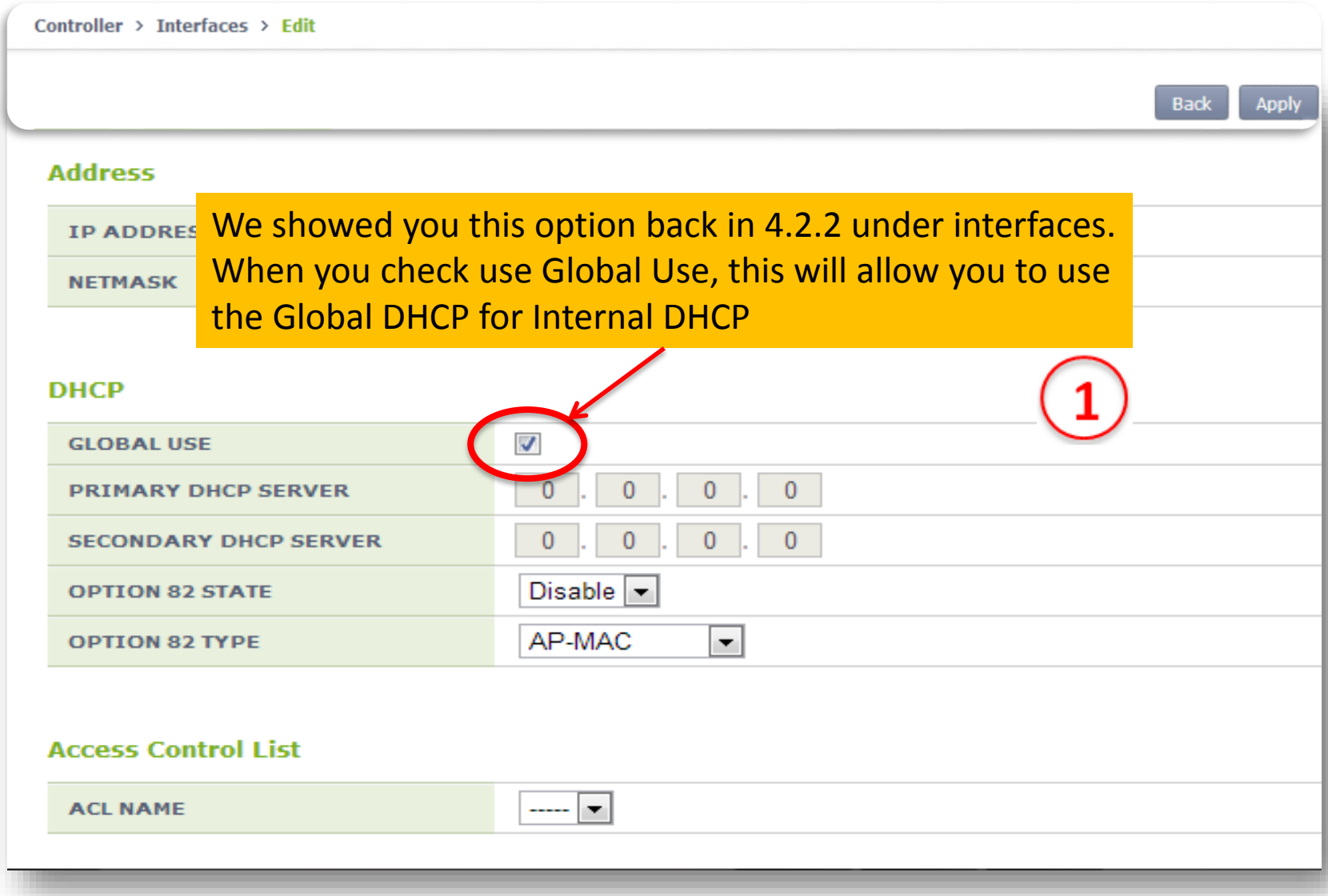
*OR*

- ***EXTERNAL*** *- use a remote DHCP server*

The following slides will show how to do both

Please Note: When you connect AP's they will have to be on the Management VLAN, the DHCP server for that VLAN must have a user option added.
Example = user_option 138 ipaddress 192.168.72.10 (CAPWAP IP) active

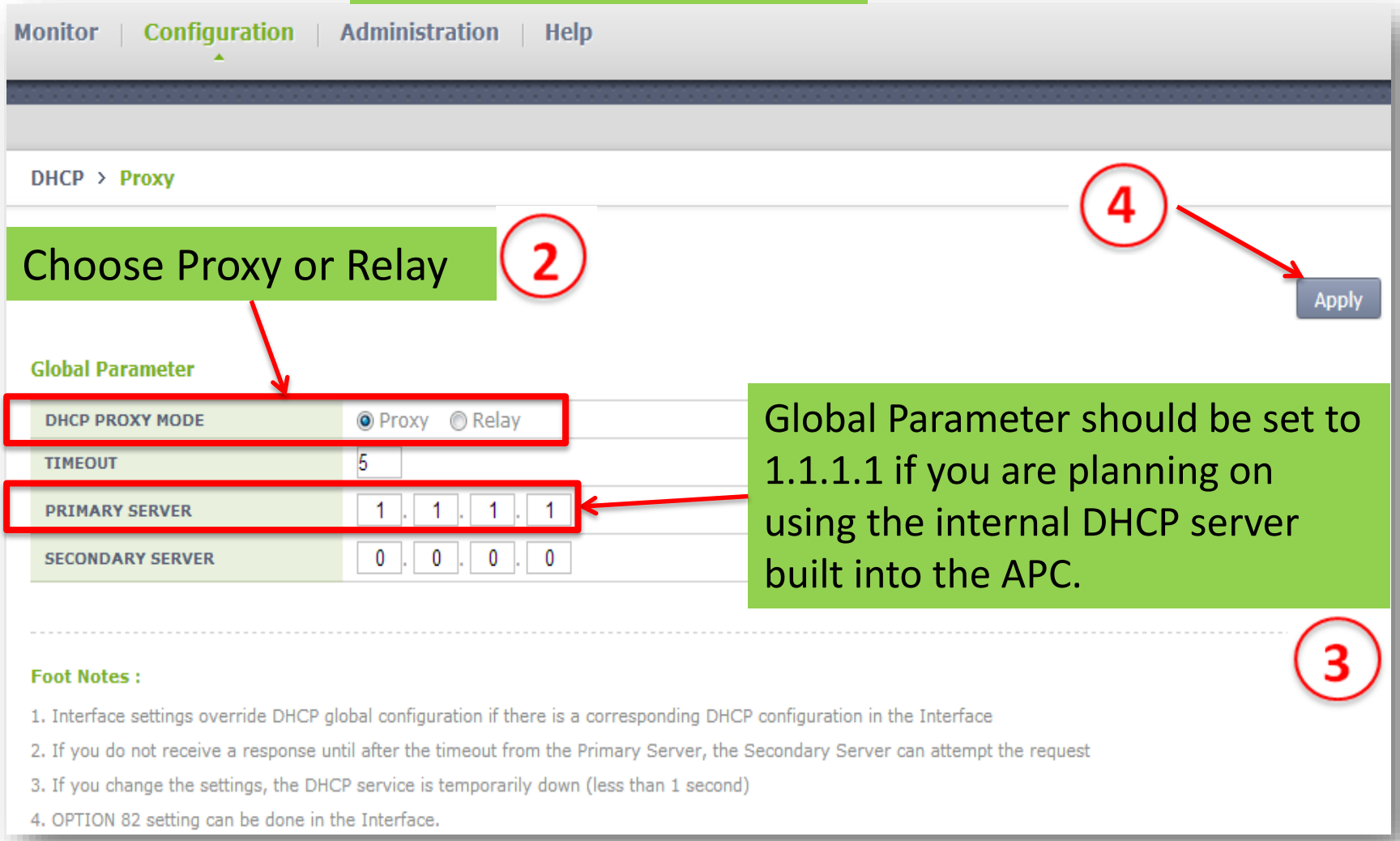
# 4.7.3 DHCP Server (Internal)



# 4.7.3 DHCP Server (Internal)

Samsung Wireless Enterprise™

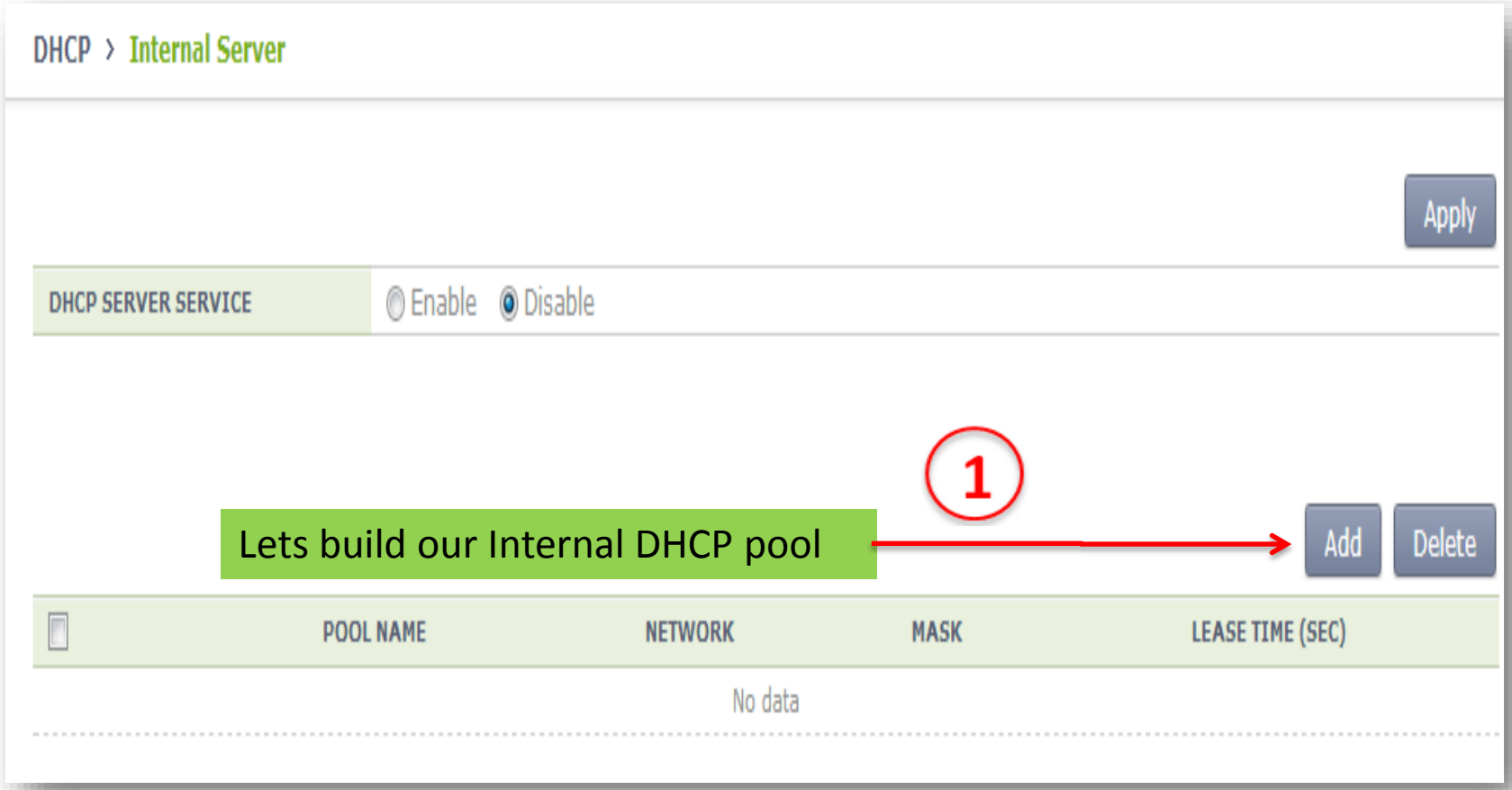
Configuration > DHCP > Proxy



# 4.7.3 DHCP Server (Internal)

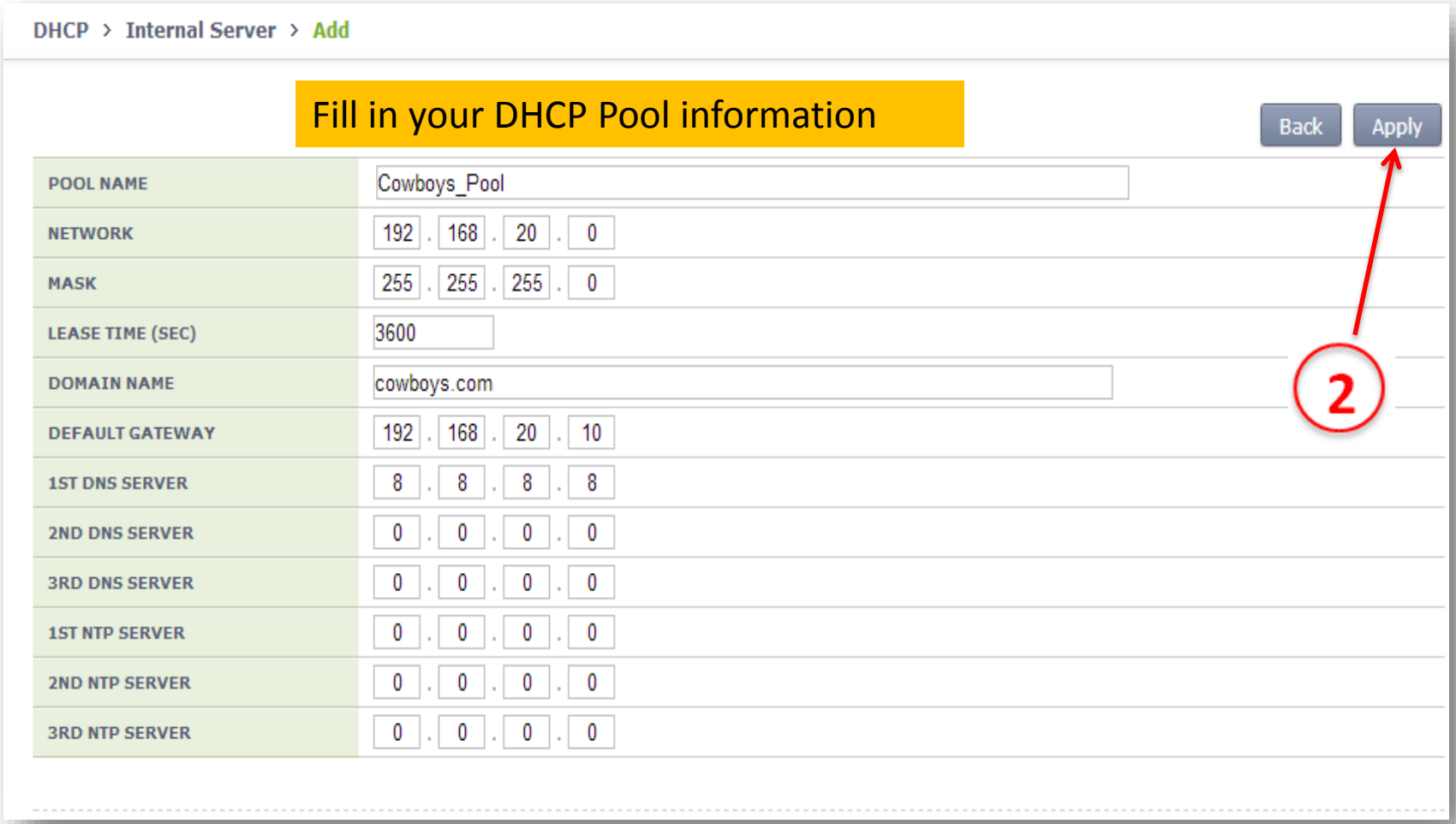
Samsung Wireless Enterprise™

Configuration > DHCP > Internal Server



# 4.7.3 DHCP Server (Internal)

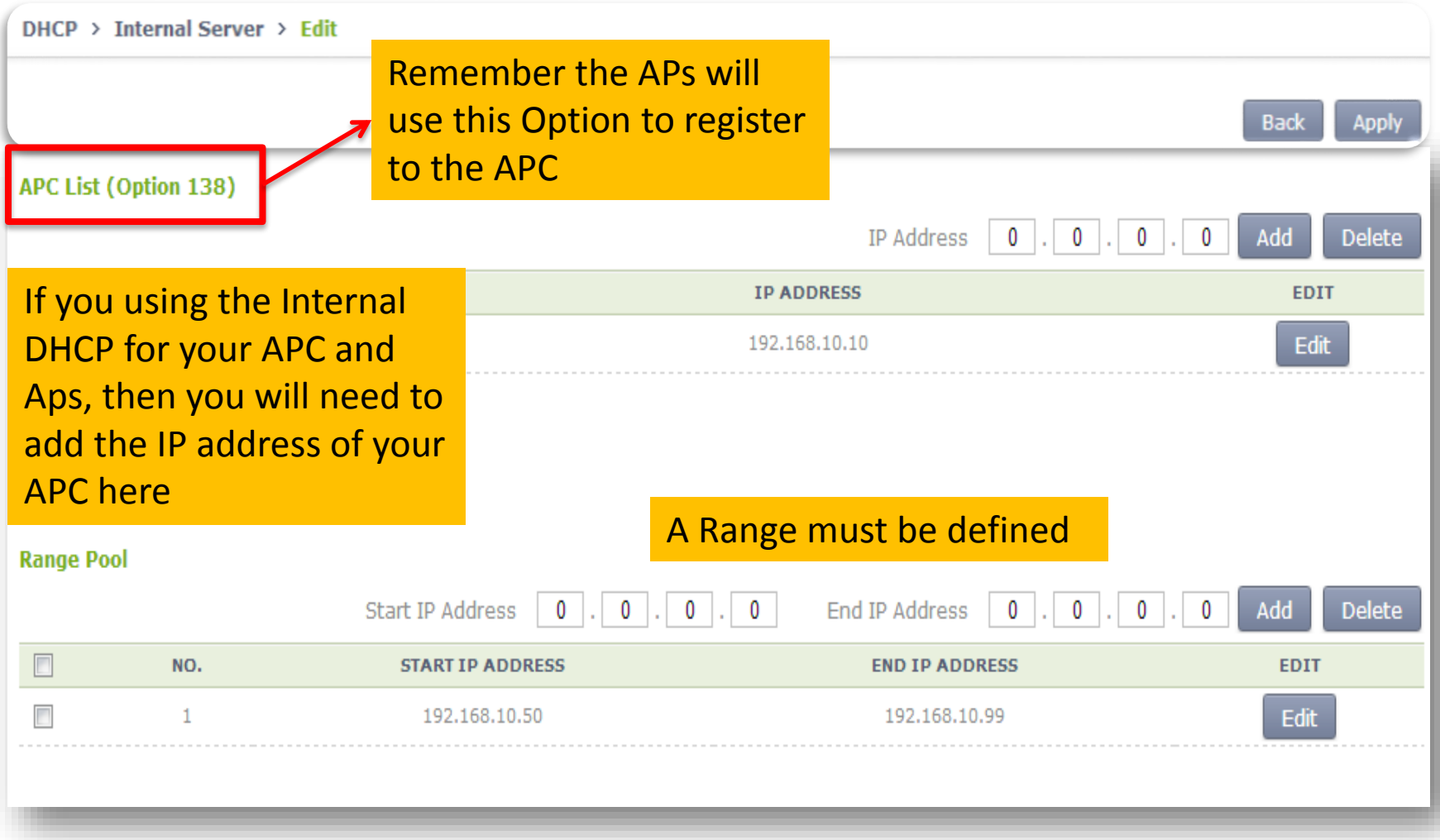
Samsung Wireless Enterprise™



# 4.7.3 DHCP Server (Internal)

Samsung Wireless Enterprise™

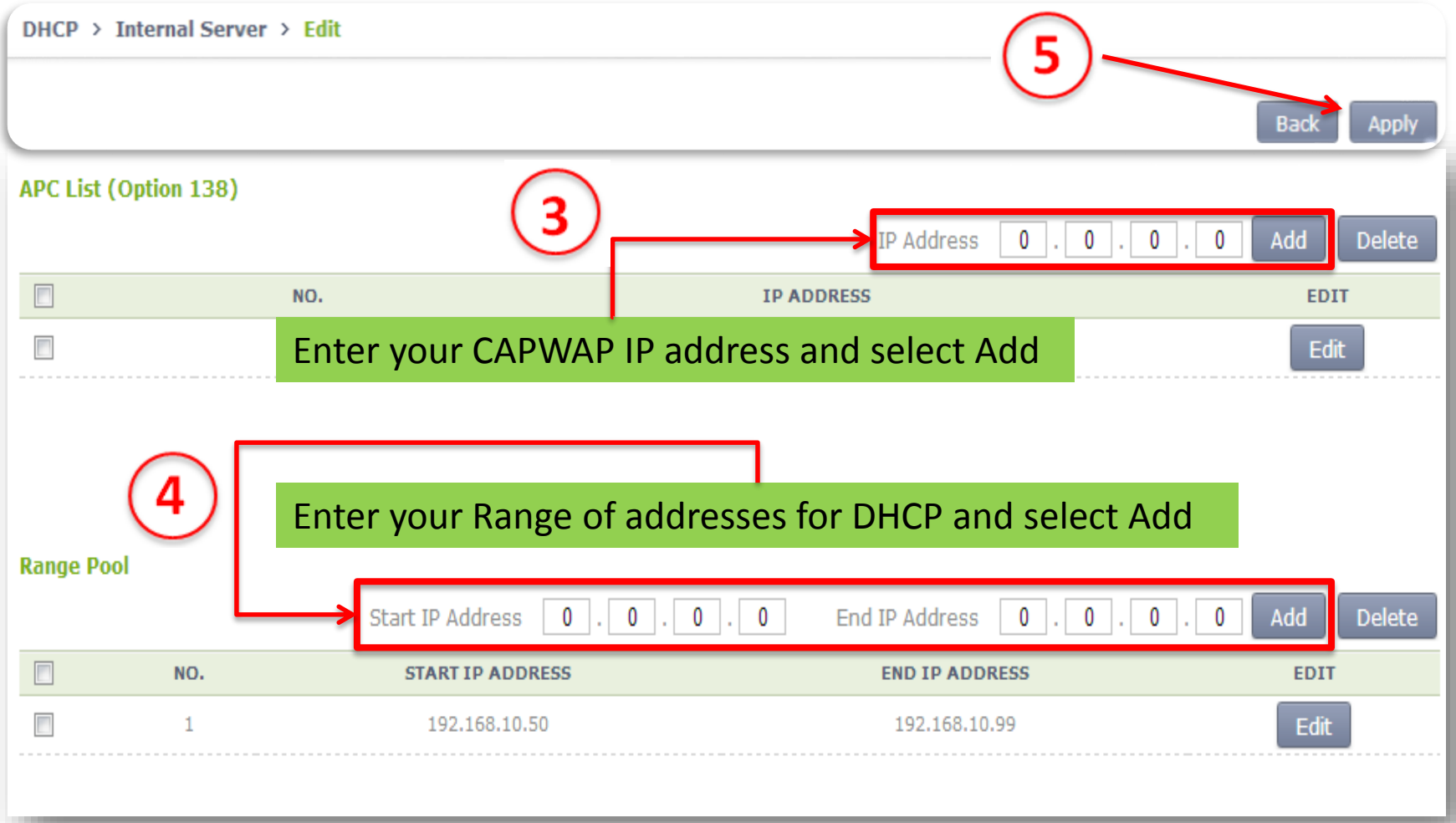
## Internal DHCP Options and Pool Range



# 4.7.3 DHCP Server (Internal)

Samsung Wireless Enterprise™

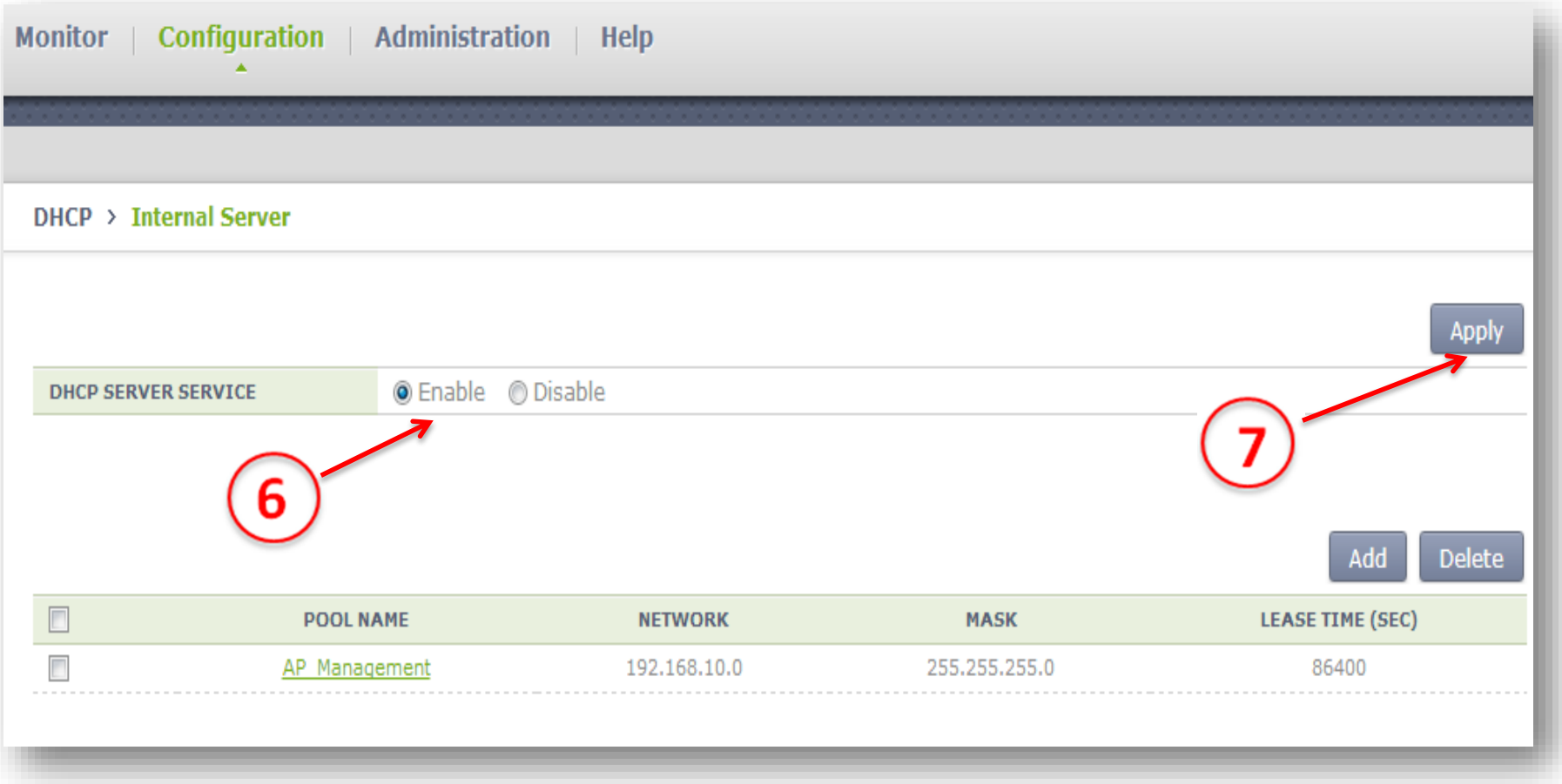
## Internal DHCP Options and Pool Range



# 4.7.3 DHCP Server (Internal)

Samsung Wireless Enterprise™

## Enabling the Internal DHCP Server



# DHCP Server (Internal) “Lab 7”

Samsung Wireless Enterprise™

## Lab 7 -

### Setup the DHCP Pool for the AP_MGMT Interface

1. Go to Configuration → DHCP → Proxy
2. Set Primary Server to 1.1.1.1 → Hit Apply
3. Go to Configuration → DHCP → Internal Server
4. Click Add → Input DHCP pool info “See Student Info”
5. Hit Apply
6. Set Option 138 to the CAPWAP IP of 192.168.xx.10 → Hit Add
7. Set the Range to 192.168.xx.100 – 192.168.xx.110
8. Hit Add
9. Set the DHCP Server Service to Enable → Hit Apply

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# Please Note

***If you are using a remote/external DHCP server, you must setup a relay rule on your DHCP server to the interface IP address of the WLAN***

# 4.7.3 DHCP Server (External)

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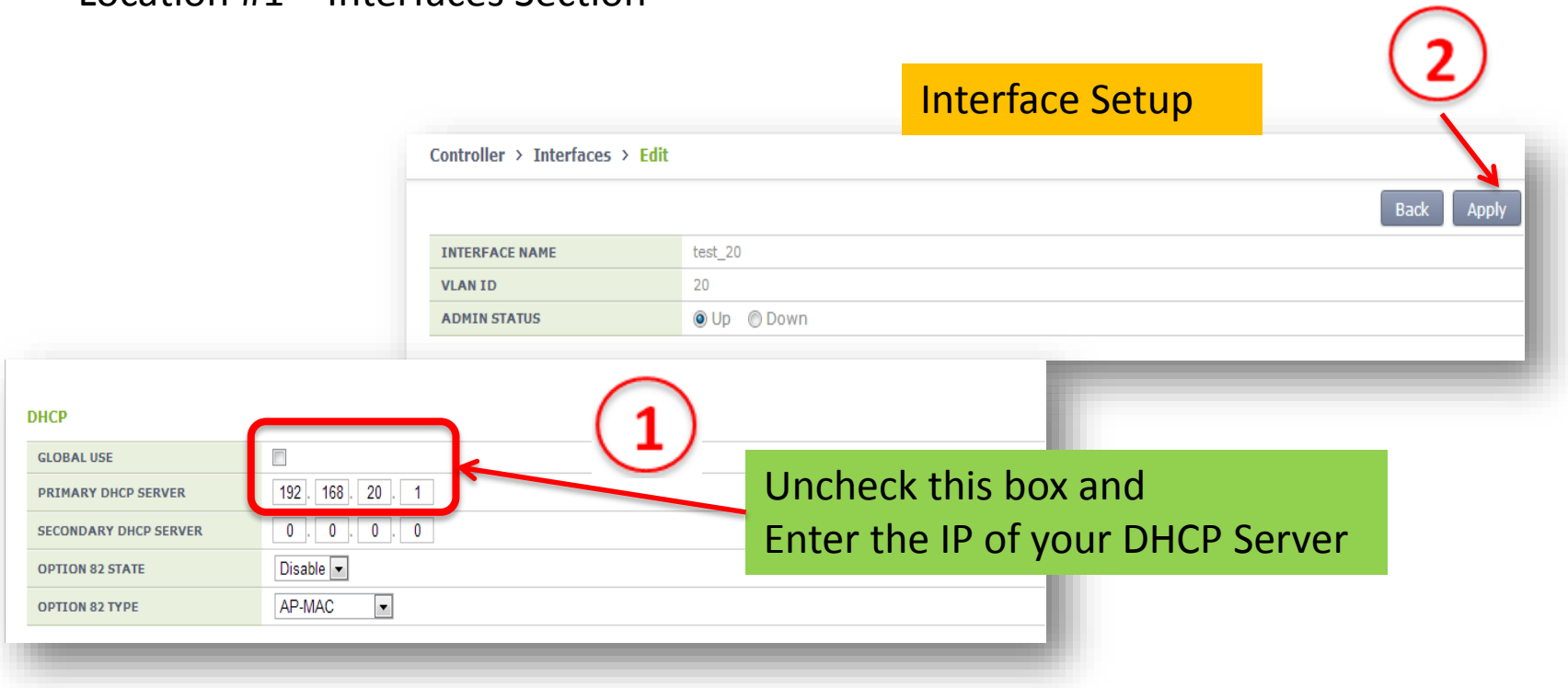
## External DHCP

There are two locations you specify the IP address of your DHCP server.

- Location #1 = Interfaces Section



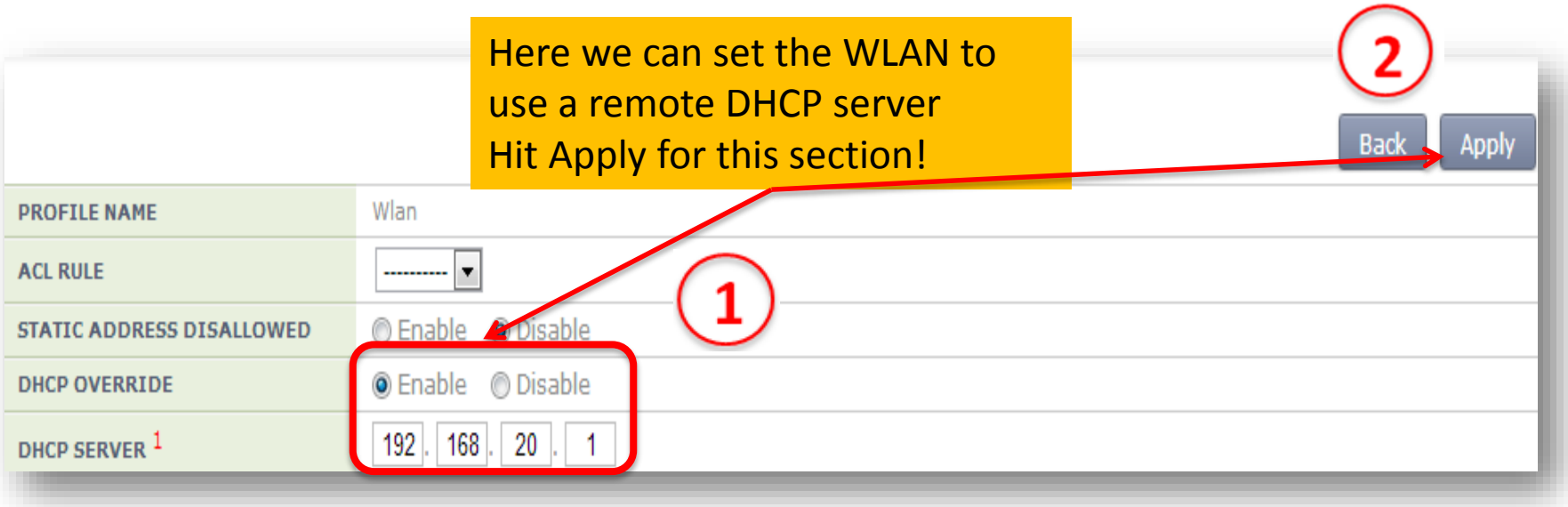
# 4.7.3 DHCP Server (External)

Samsung Wireless Enterprise™

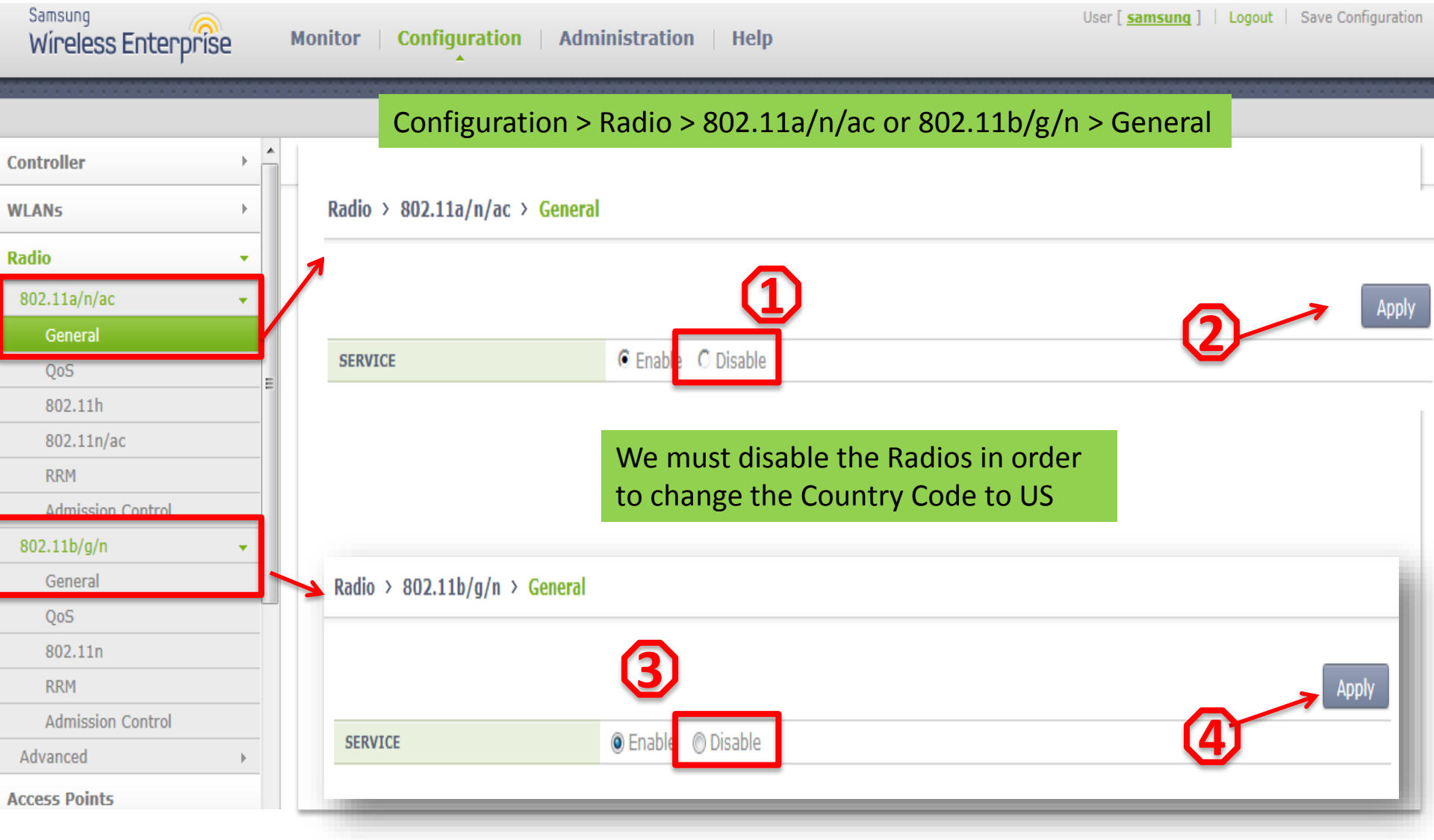
## External DHCP

There are two locations you have to specify the IP address of your DHCP server.

- Location #2 = WLAN Section



# 4.7.4 APC Country Code



# 4.7.4 APC Country Code

Samsung Wireless Enterprise™

Controller > Country

Configuration > Controller > Country

Select your Country

1

2

Apply

Configured Country Code

| | |
|---|---|
| DEFAULT COUNTRY CODE | North America(US) |
| DEFAULT ENVIRONMENT | Both |
| CONFIGURED COUNTRY CODE#1 | None |
| CONFIGURED ENVIRONMENT #1 | Both |
| CONFIGURED COUNTRY CODE#2 | None |
| CONFIGURED ENVIRONMENT #2 | Both |
| CONFIGURED COUNTRY CODE#3 | None |
| CONFIGURED ENVIRONMENT #3 | Both |
| CONFIGURED COMMON CHANNELS AND MAX TX POWER LEVEL(5GHZ) | 36 [17] 40 [17] 44 [17] 48 [17] 52 [20] 56 [20] 60 [20] 64 [20] 100 [30] 104 [30] 108 [30] 112 [30] 116 [30] 120 [30] 124 [30] 149 [30] 153 [30] 157 [30] 161 [30] |
| CONFIGURED COMMON CHANNELS AND MAX TX POWER LEVEL(2.4GHZ) | 1 [20] 2 [20] 3 [20] 4 [20] 5 [20] 6 [20] 7 [20] 8 [20] 9 [20] 10 [20] 11 [20] 12 [20] 13 [20] |
| CONFIGURED ALL CHANNELS (5GHZ) | 36 40 44 48 52 56 60 64 100 104 108 112 116 120 124 149 153 157 161 |
| CONFIGURED ALL CHANNELS (2.4GHZ) | 1 2 3 4 5 6 7 8 9 10 11 12 13 |

# 4.7.4 APC Country Code

Samsung Wireless Enterprise™

Select your Country and hit Apply

**Note:** Samsung is DFS (Dynamic Frequency Selection) certified. DFS is a spectrum-sharing mechanism that allows wireless LANs (WLANs) to coexist with radar systems. It automatically selects a frequency that does not interfere with certain radar systems while operating in the 5 GHz band.

| | | | | | |
|---|---|---|---|---|---|
| COUNTRY CODE | North America(US) | | | | |
| MAX TX POWER LEVEL(5GHZ) | 36 17 | 40 17 | 44 17 | 48 17 | 52 24 |
| | 56 24 | 60 24 | 64 24 | 100 24 | 104 24 |
| | 108 24 | 112 24 | 116 24 | 132 24 | 136 24 |
| | 140 24 | 149 30 | 153 30 | 157 30 | 161 30 |
| | 165 30 | | | | |
| MAX TX POWER LEVEL(2.4GHZ) | 1 27 | 2 27 | 3 27 | 4 27 | 5 27 |
| | 6 27 | 7 27 | 8 27 | 9 27 | 10 27 |
| | 11 27 | | | | |

# APC Country Code “Lab 8”

Samsung Wireless Enterprise™

## Lab 8 -

**Change the country code on your APC**

1. Go to Configuration → Radio → 802.11a/n → General
2. Set service to Disable → Hit Apply
3. Go to Configuration → Radio → 802.11b/g/n → General
4. Set service to Disable → Hit Apply
5. Go to Configuration → Controller → Country
6. Change the Country Code to “United States”
7. Hit Apply
8. Go back and enable the Radio Service

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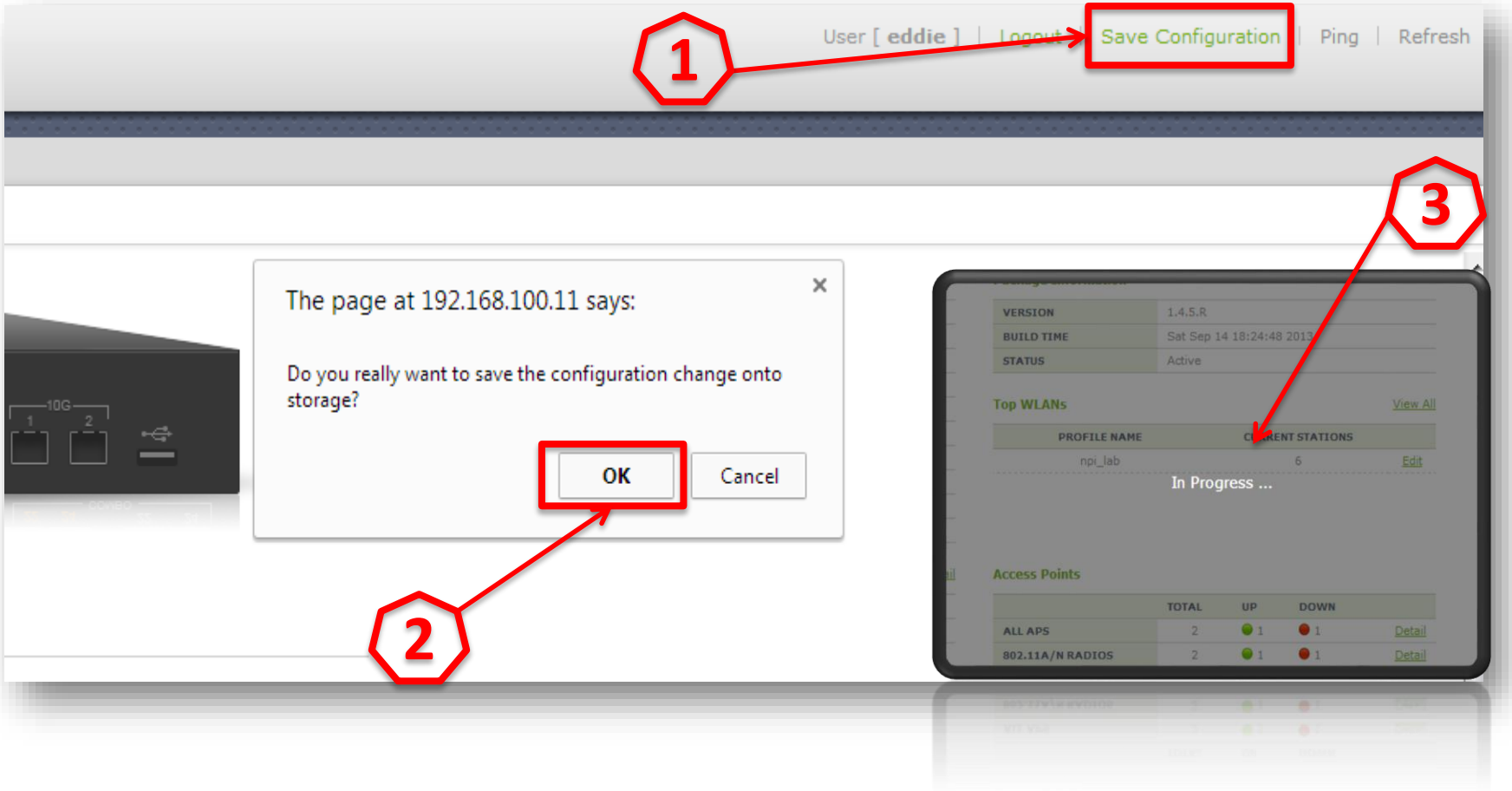
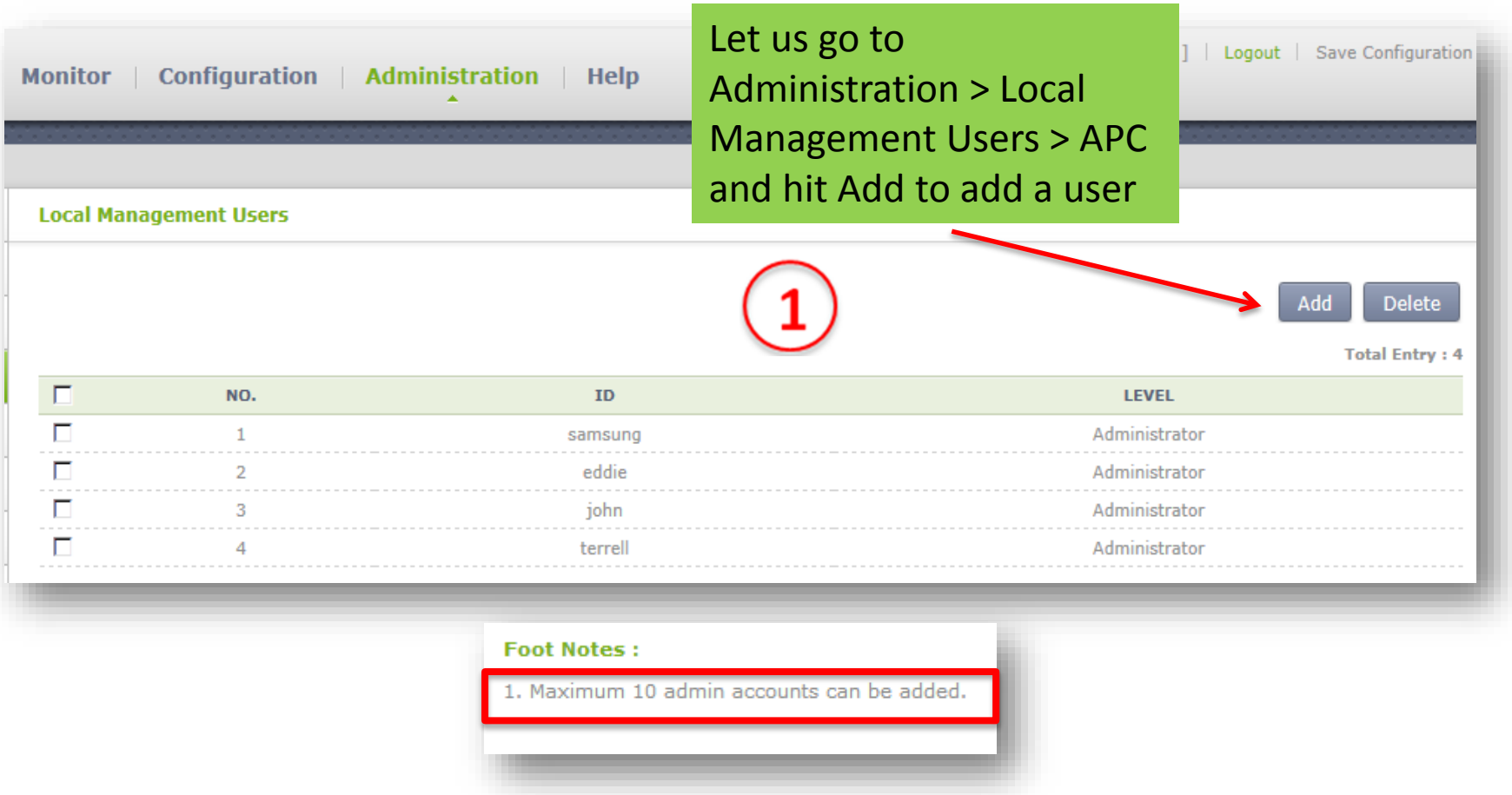
# SAVE CONFIGURATION



# 4.7.5 Set up User Accounts

Samsung Wireless Enterprise™

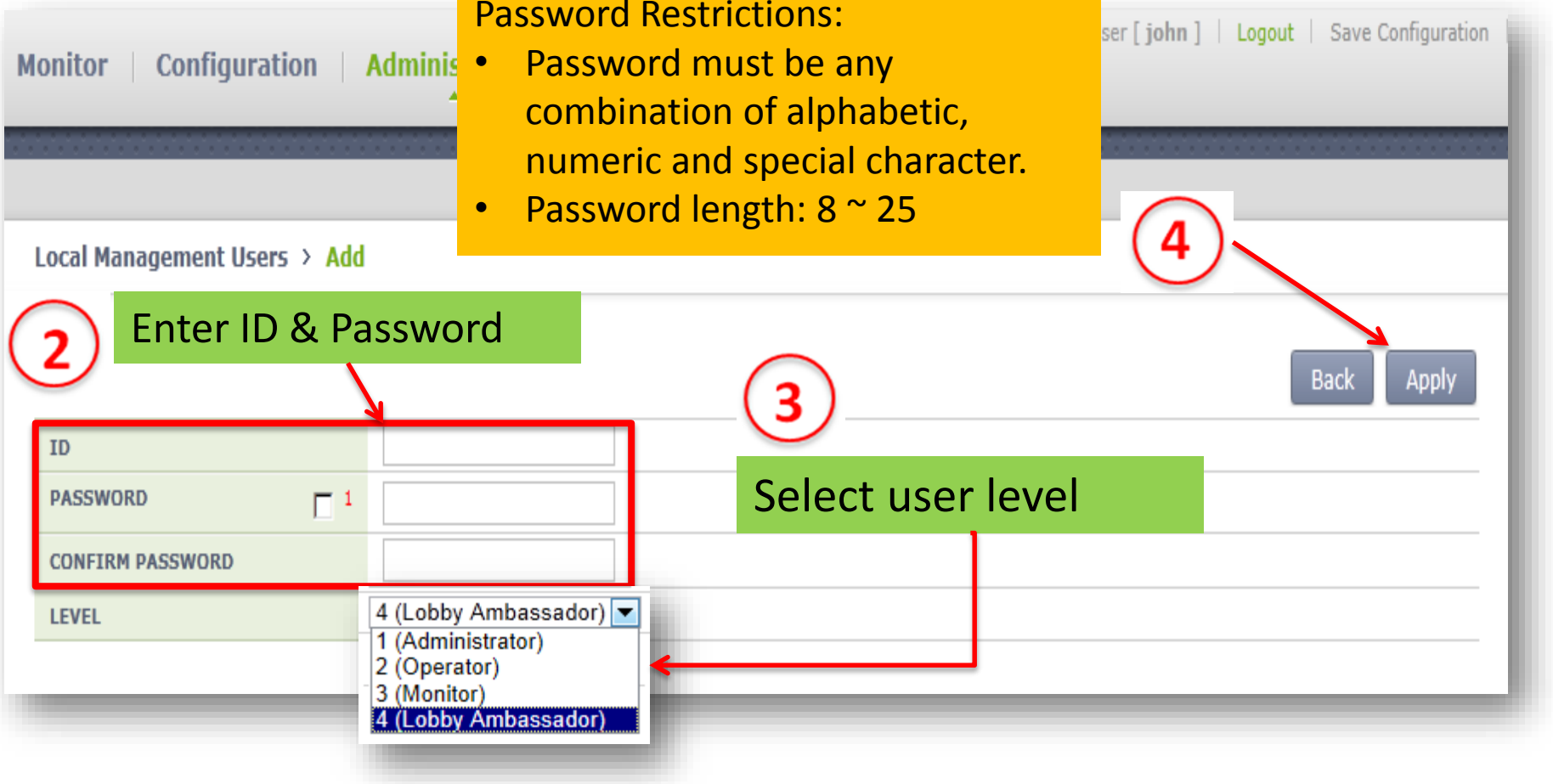


# 4.7.5 Set up User Accounts

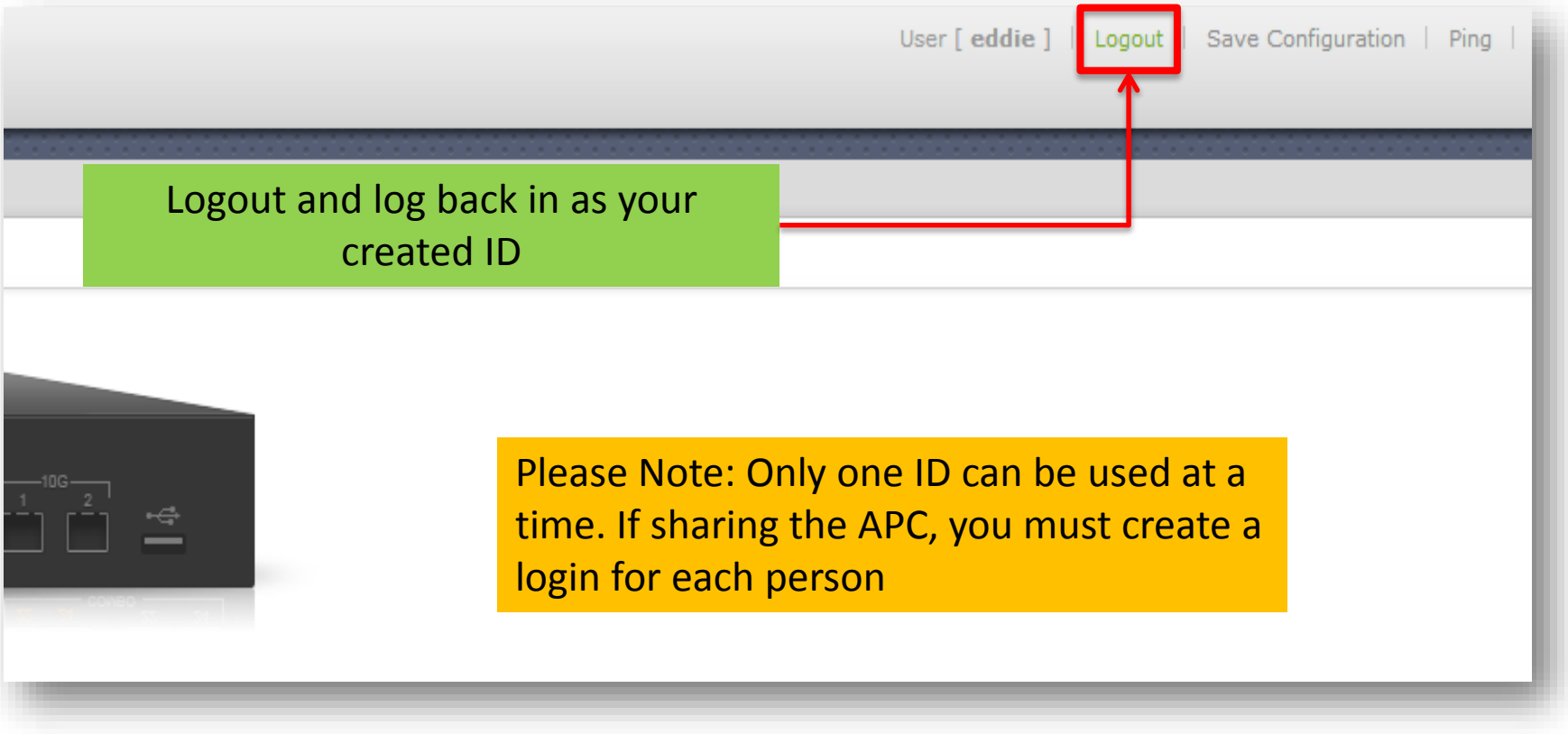
Samsung Wireless Enterprise™

**Note:** User Names & Passwords are case sensitive.
Password Restrictions:

- Password must be any combination of alphabetic, numeric and special character.
- Password length: 8 ~ 25



# 4.7.5 Set up User Accounts



# 4.5.5 Set up User Accounts

Samsung Wireless Enterprise™

**Changing Password:** Via CLI

Use the password command as shown below.

- Next, type your current password.
- Type your new password.
- Confirm your new password.

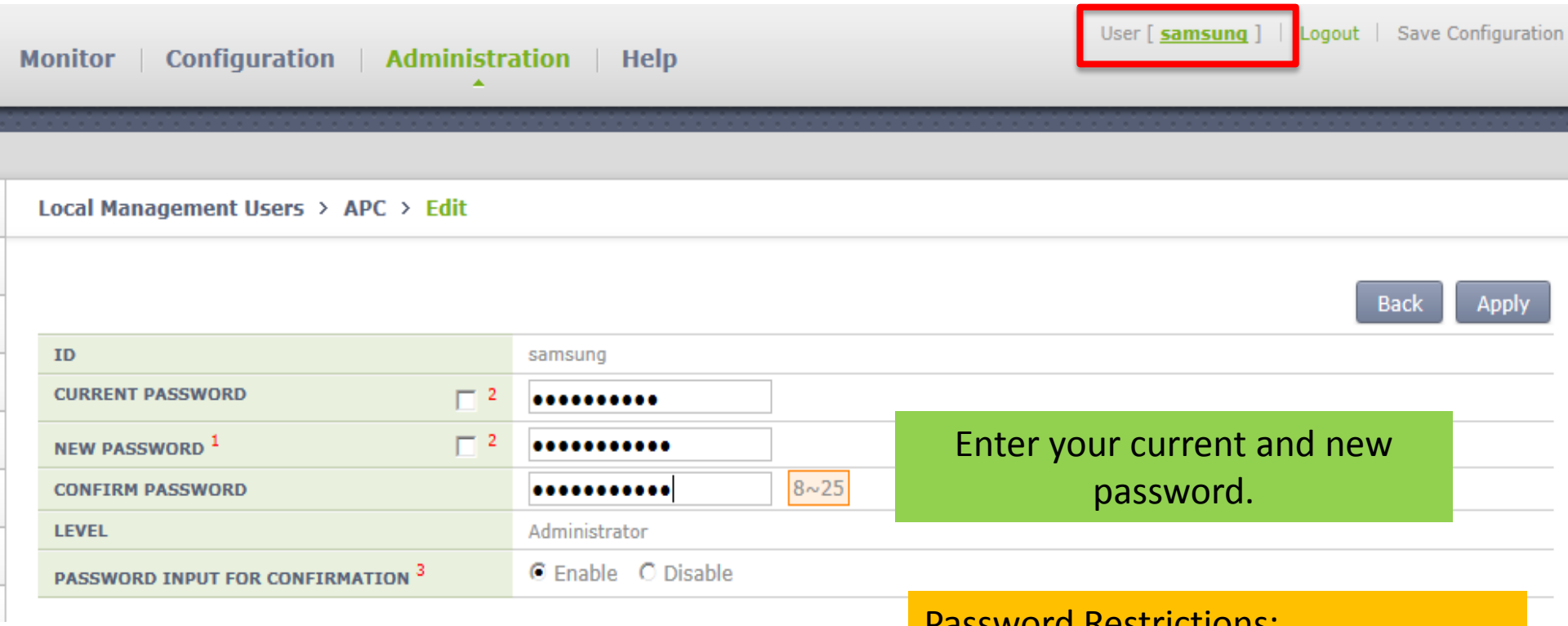
```
WEC8500# password

 CURRENT PASSWORD      : **********
 NEW PASSWORD          : ************
 CONFIRM NEW PASSWORD  : ************

 PASSWORD SUCCESSFULLY CHANGED.
```

# 4.7.5 Set up User Accounts

Samsung Wireless Enterprise™

**Changing Password:** Via GUI

Click on the account username at top right corner of your screen




Enter your current and new password.

Password Restrictions:

- Password must be any combination of alphabetic, numeric and special character.
- Password length: 8 ~ 25

# 4.7.5 Set up User Accounts

Samsung Wireless Enterprise™

## Account Levels

1. Administrator: Administrator privilege that allows to execute all the commands.
2. Operator: Can change system configuration.
3. Monitor: Can retrieve system status.
4. Lobby Ambassador: This user can create accounts for Guest Access

# Create a User Account “Lab 9”

Samsung Wireless Enterprise™

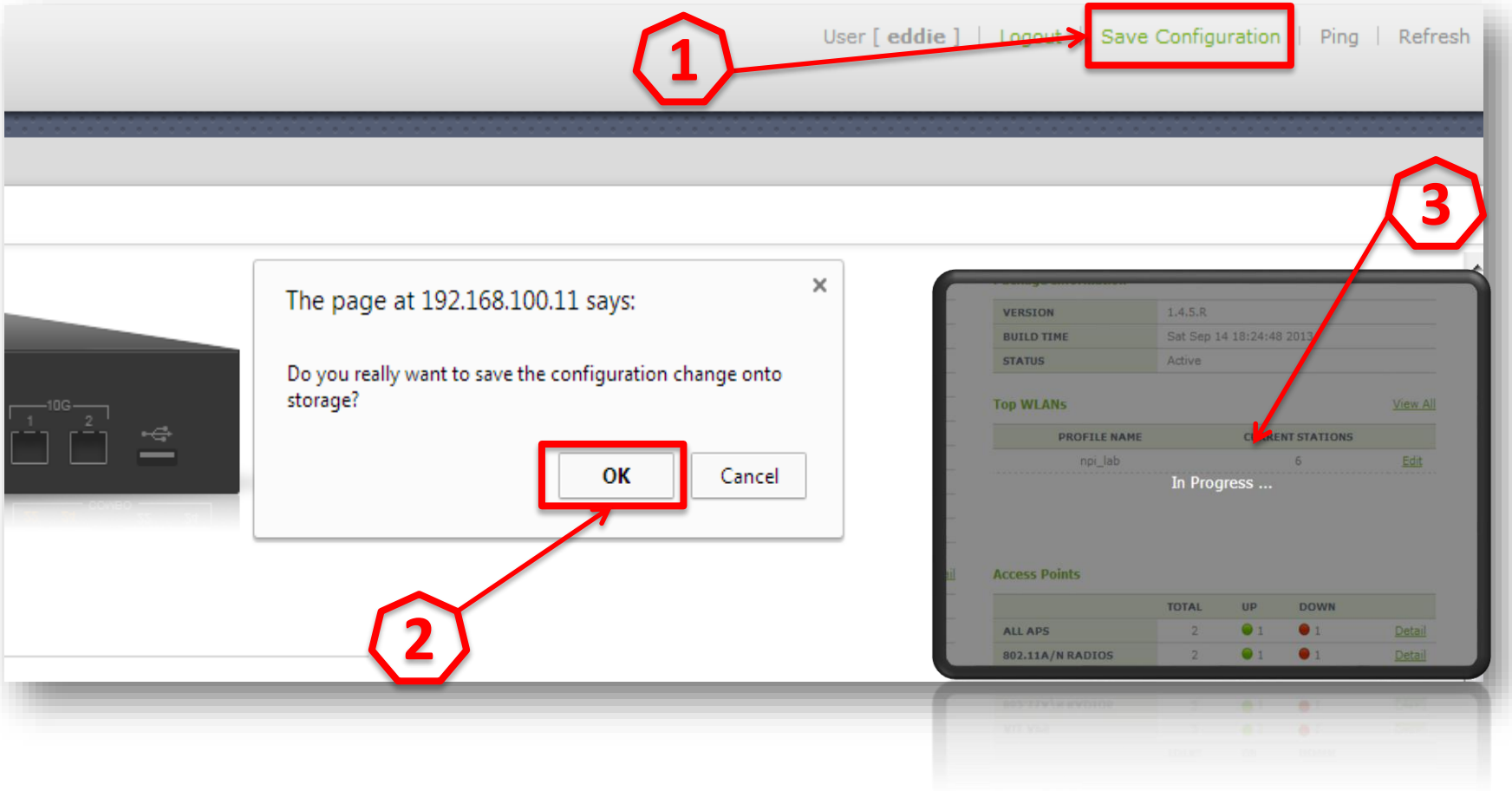
## Lab 9 -

### Create a User Account for yourself

1. Go to Administration → Local Management Users
2. Click Add and create a user account for yourself
3. Level should be equal to Administrator
4. Save Configuration
5. Logout of the APC
6. Login with your new User Account

Samsung Wireless Enterprise™

# SAVE CONFIGURATION



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# Radius Authentication

# 4.7.6 Radius Authentication

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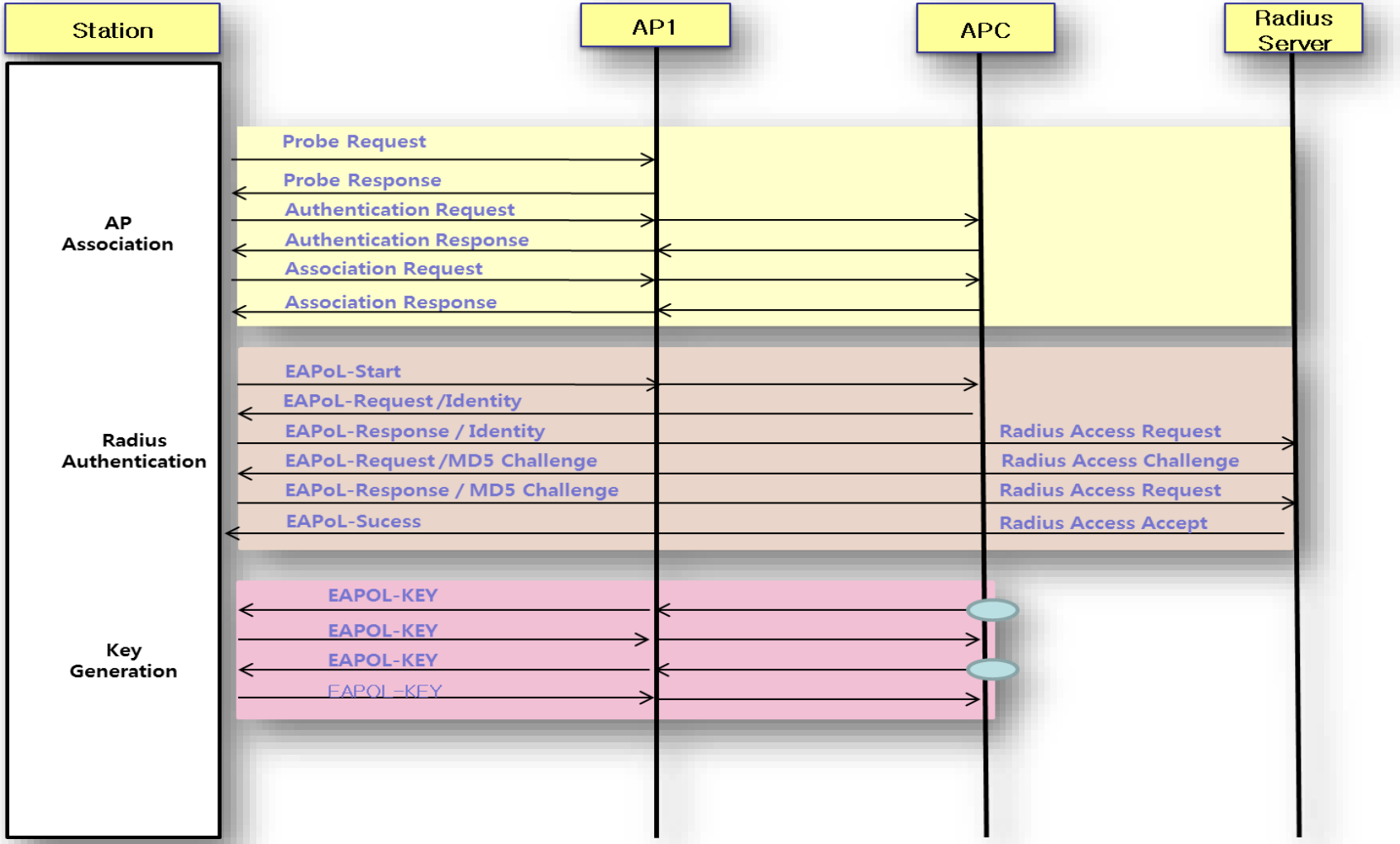
## *The Flow of Authentication of WLAN Station*



# 4.7.7 Adding a RADIUS Server

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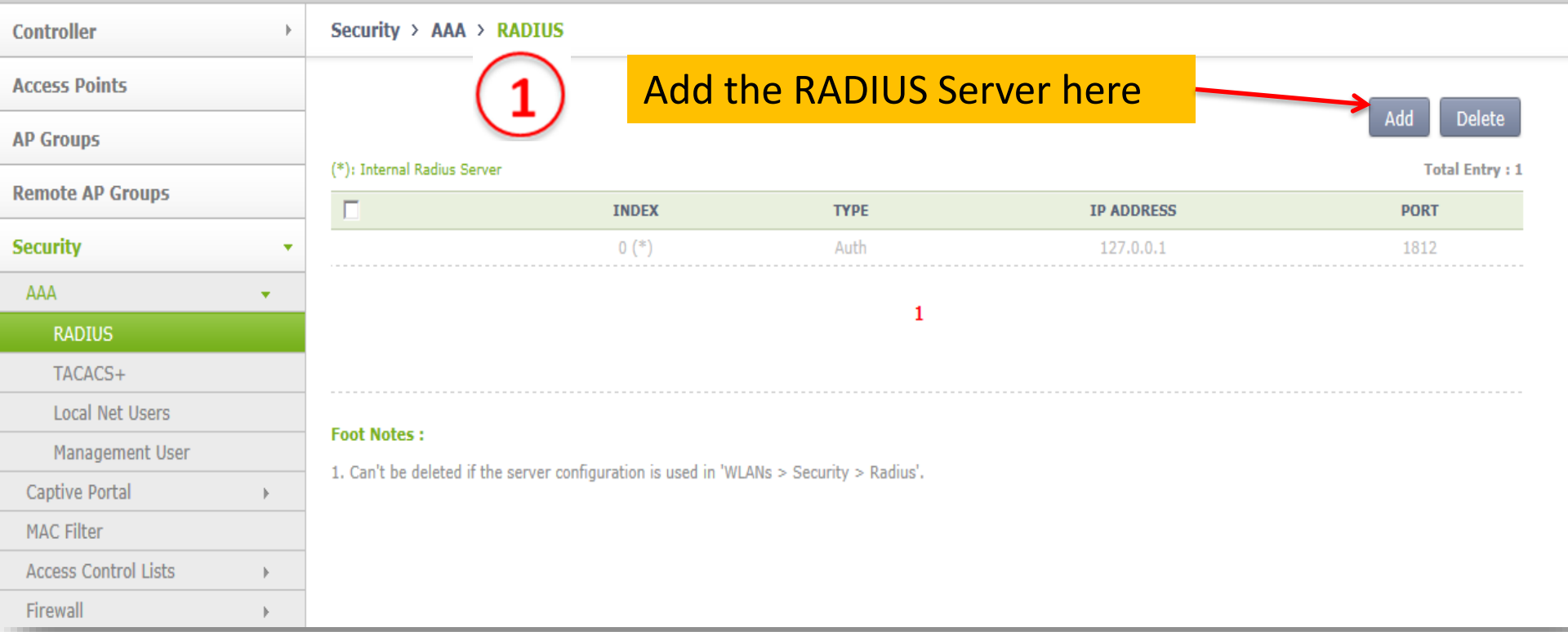
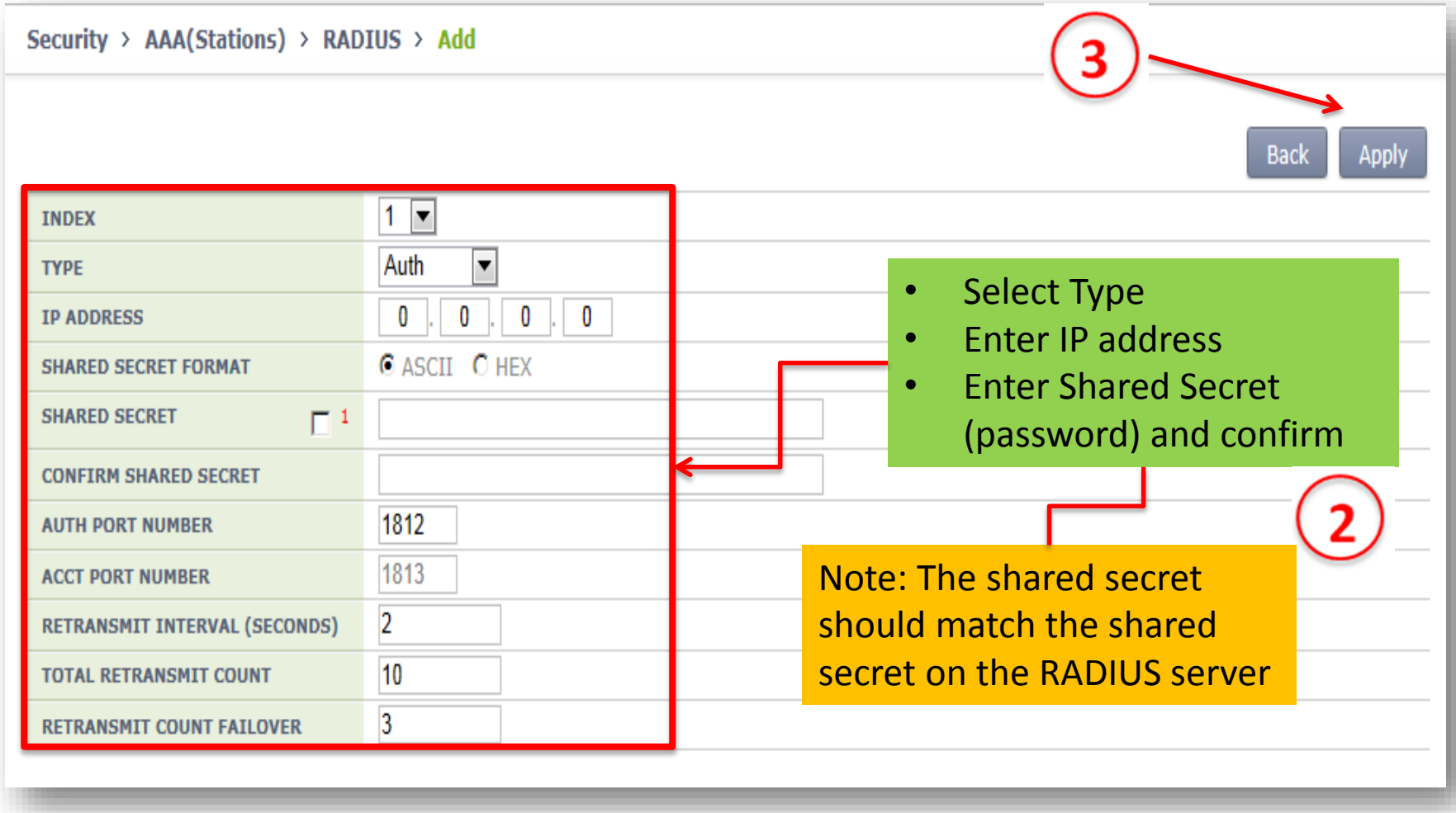
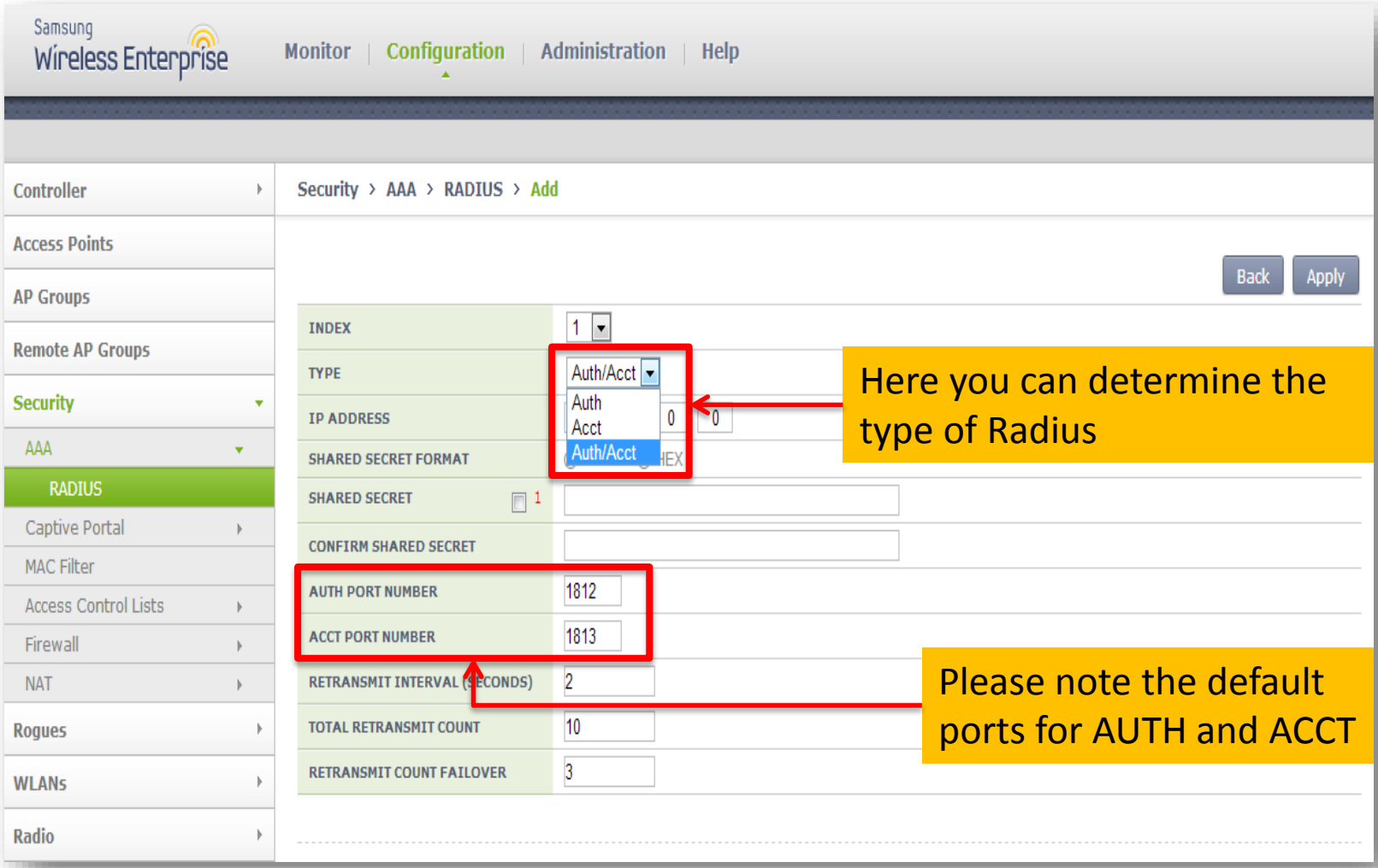
Configuration > Security > AAA > RADIUS



# 4.7.7 Adding a RADIUS Server



# 4.7.7 Adding a RADIUS Server



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# 4.8 Radio Resource Management

- 4.8.1 Setup and Enable 802.11a/b/g/n/ac
- 4.8.2 Delayed Channel Change

# 4.8 Radio Resource Management

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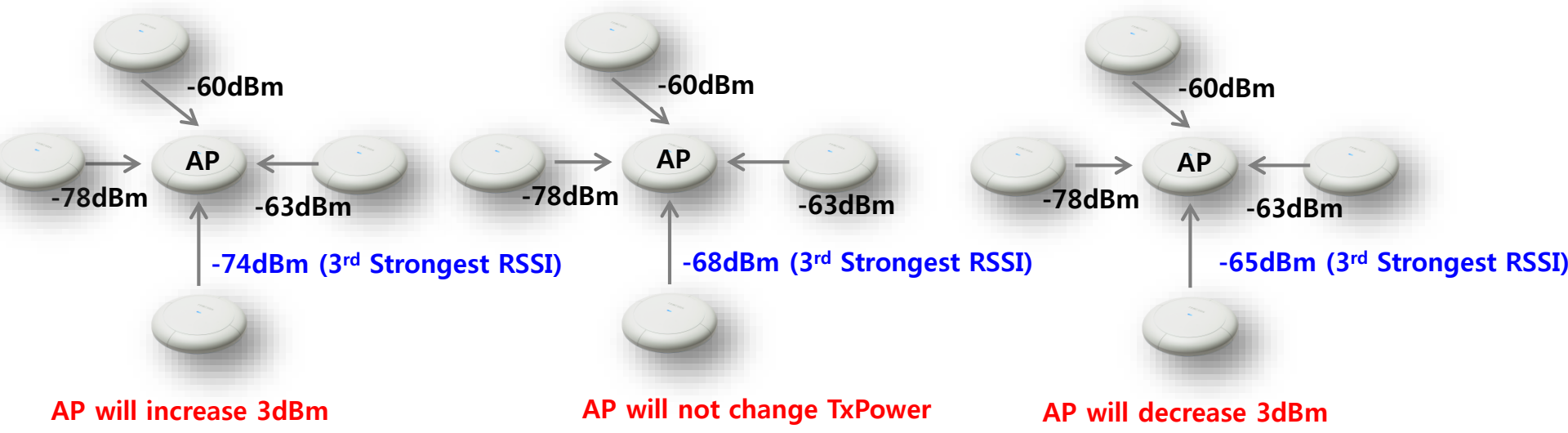
## *Purpose*

- RRM performs automatic setup function of channel and Tx Power for the Access Points.
- RRM is functionally divided into Dynamic Channel Selection (DCS), Dynamic Power control (DPC), and Coverage Hole Detection and Control (CHDC).
  - The DCS automatically sets the channels of the APs.
  - The DPC automatically sets the Tx Power of the AP.
  - The CHDC adjusts the Tx Power when Coverage Hole occurs.

*Example of RRM – DPC(Dynamic Power Control)*

**| RSSI(3rd) – RSSI(Threshold) | >= 3dBm**

* RSSI(3rd) : 3rd strongest RSSI of adjacent APs
* RSSI(Threshold) : RSSI Threshold (default : -70dBm)



# 4.8.1 Setup and Enable 802.11a/b/g/n/ac

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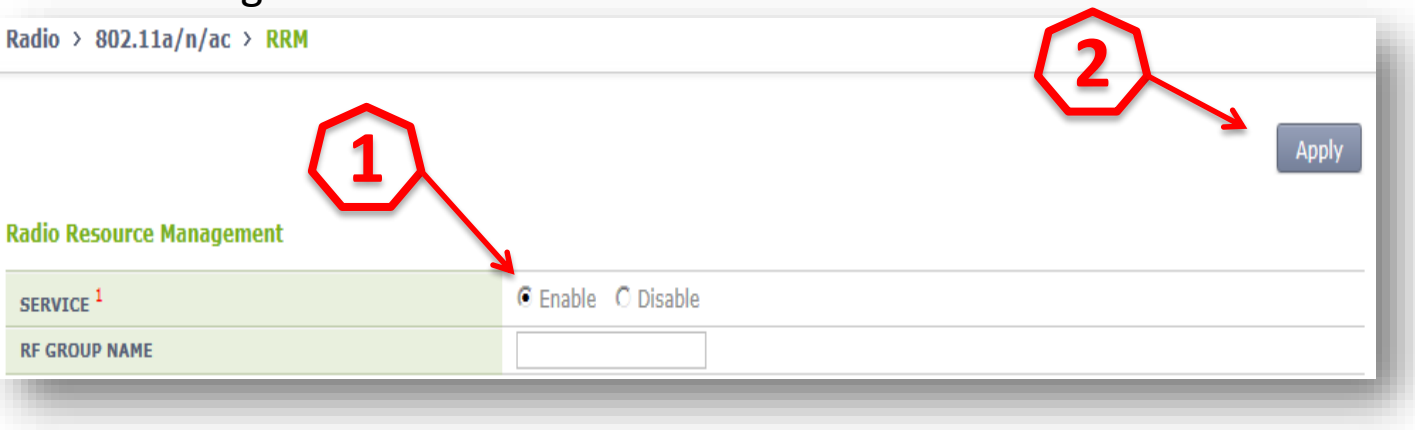
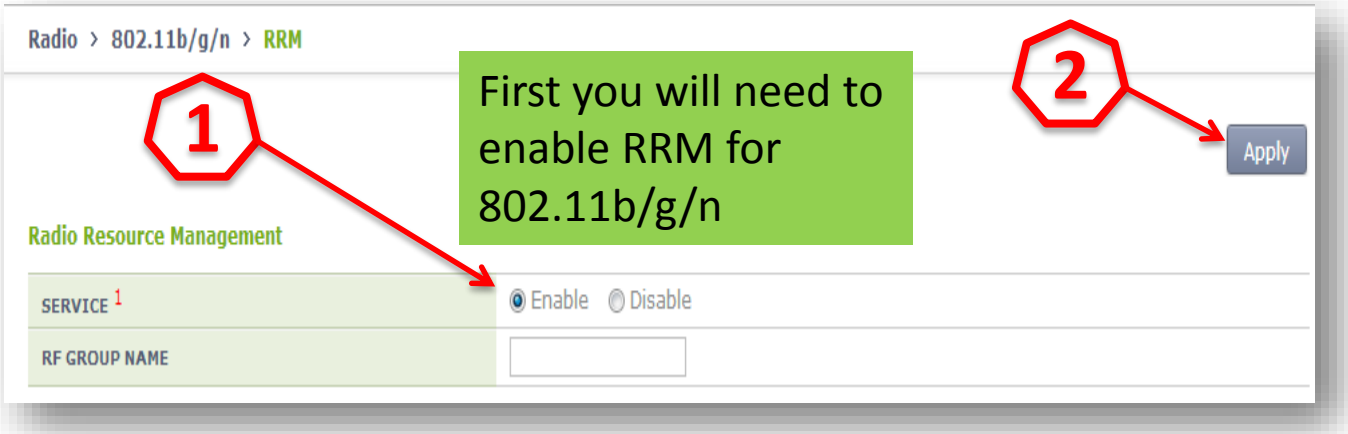
Configuration > Radio > 802.11a/n/ac or 802.11b/g/n > RRM

## Enabling RRM




## Enabling RRM



# 4.8.1 Setup and Enable 802.11a/b/g/n/ac

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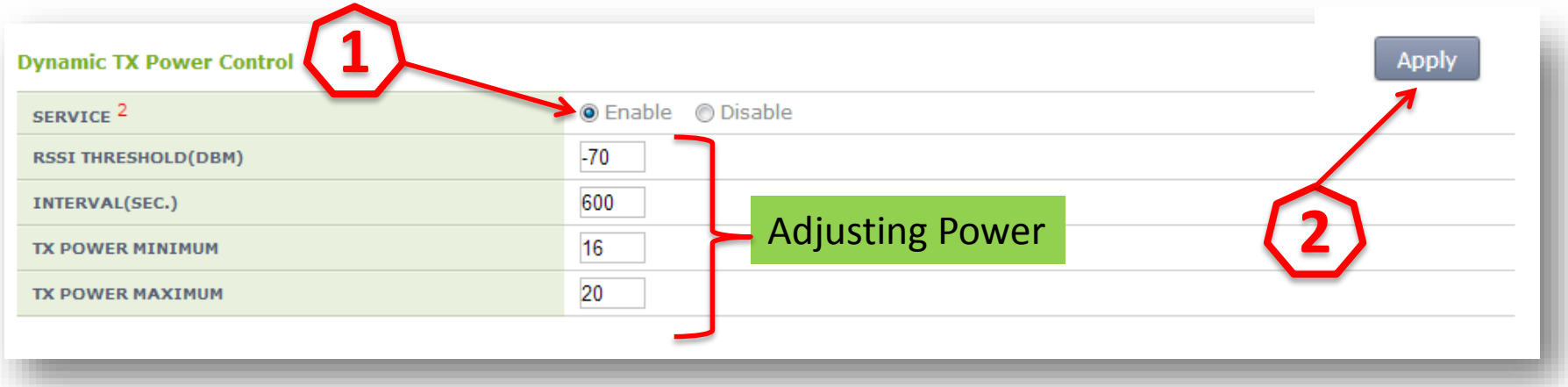
## Enabling Dynamic TX Power Control




TX Power Range: 6 ~ 30

# 4.8.1 Setup and Enable 802.11a/b/g/n/ac

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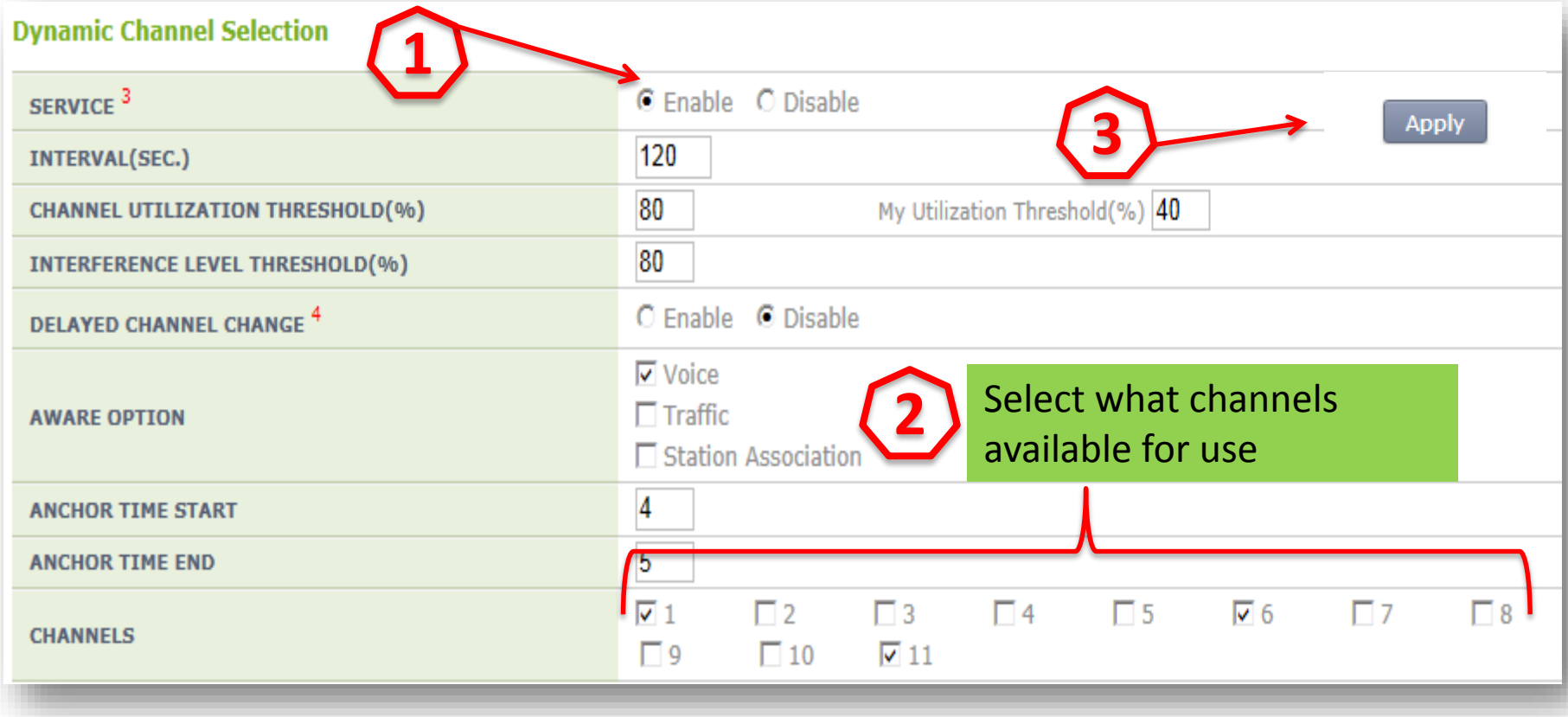
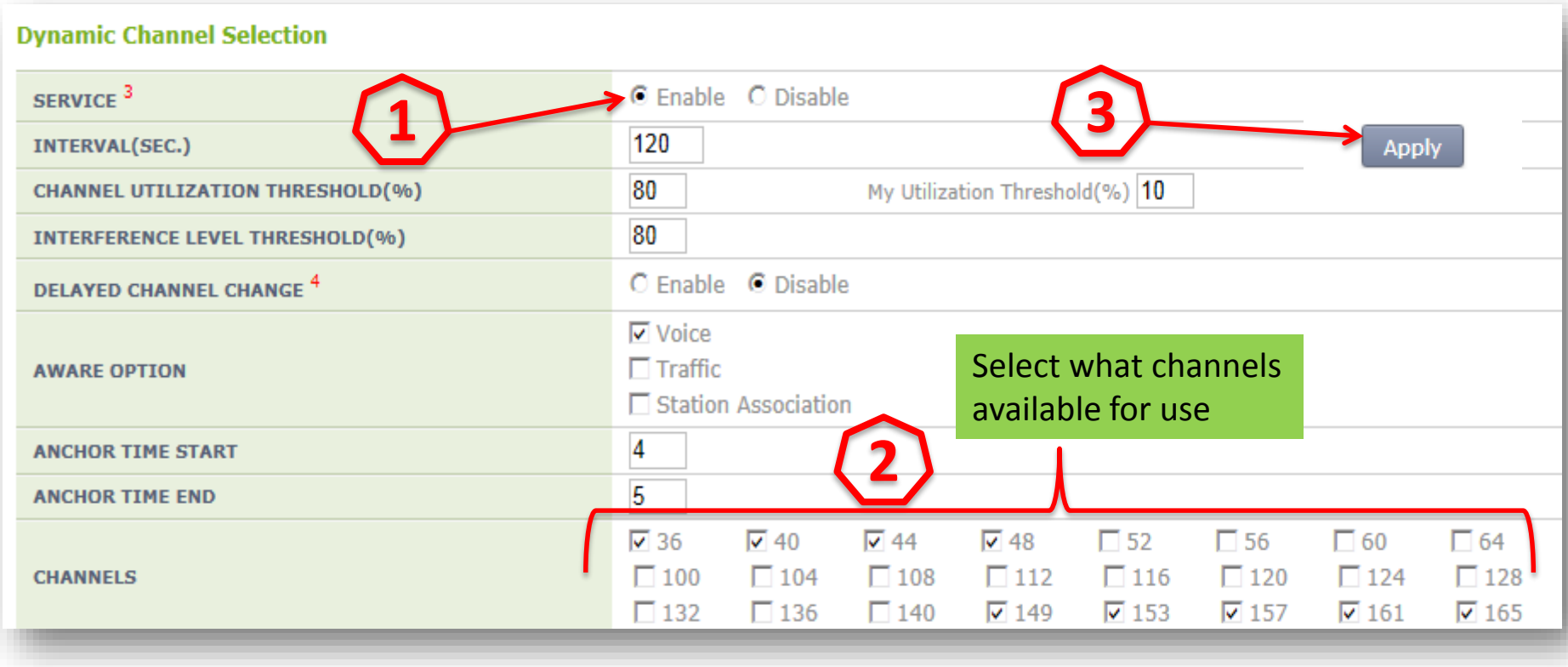
## Enabling Dynamic Channel Selection (802.11b/g/n)



# 4.8.1 Setup and Enable 802.11a/b/g/n/ac

Samsung Wireless Enterprise™

## Enabling Dynamic Channel Selection (802.11a/n/ac)



# 4.8.2 Delayed Channel Change

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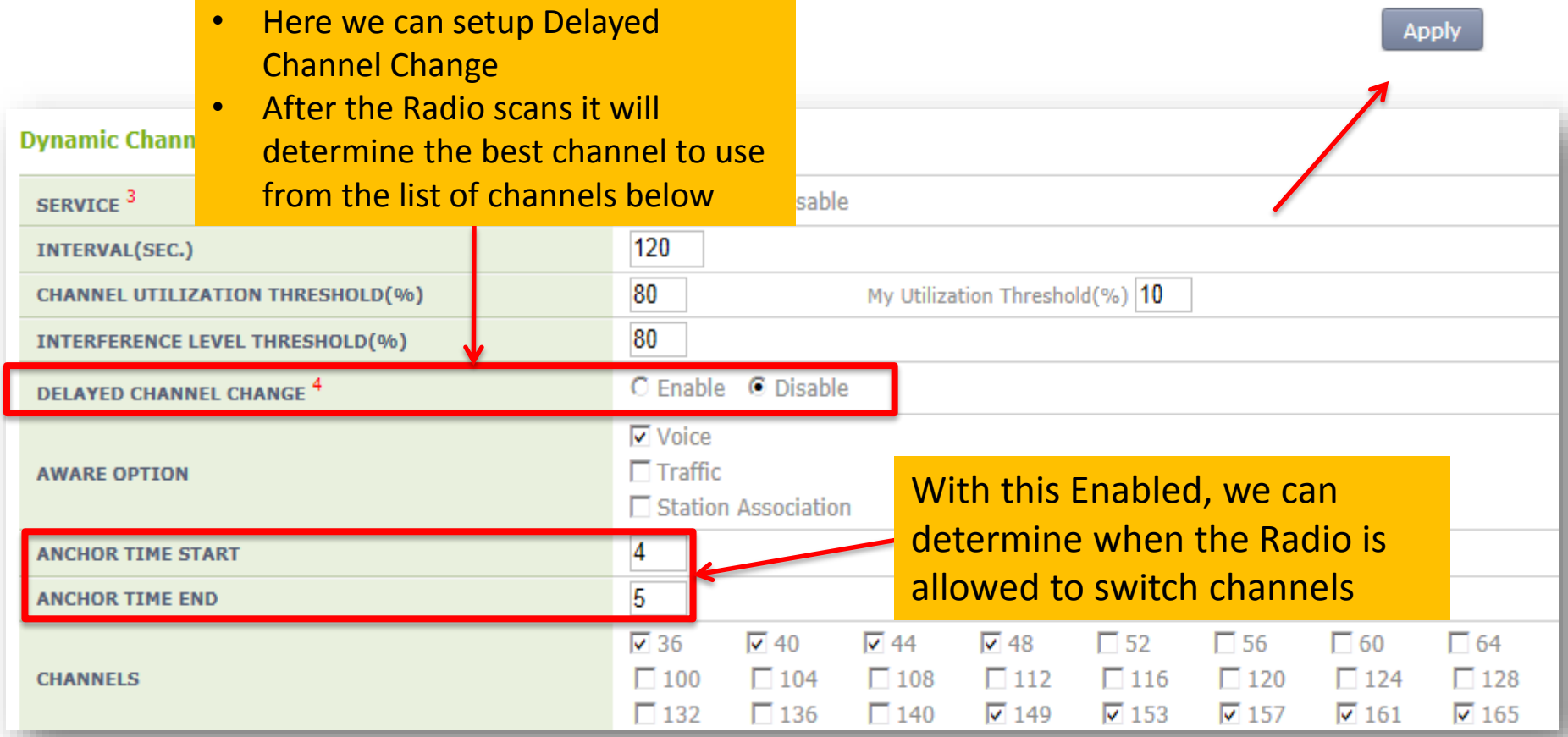
- Here we can setup Delayed Channel Change
- After the Radio scans it will determine the best channel to use from the list of channels below




With this Enabled, we can determine when the Radio is allowed to switch channels

# 4.8.1 Setup and Enable 802.11a/b/g/n/ac

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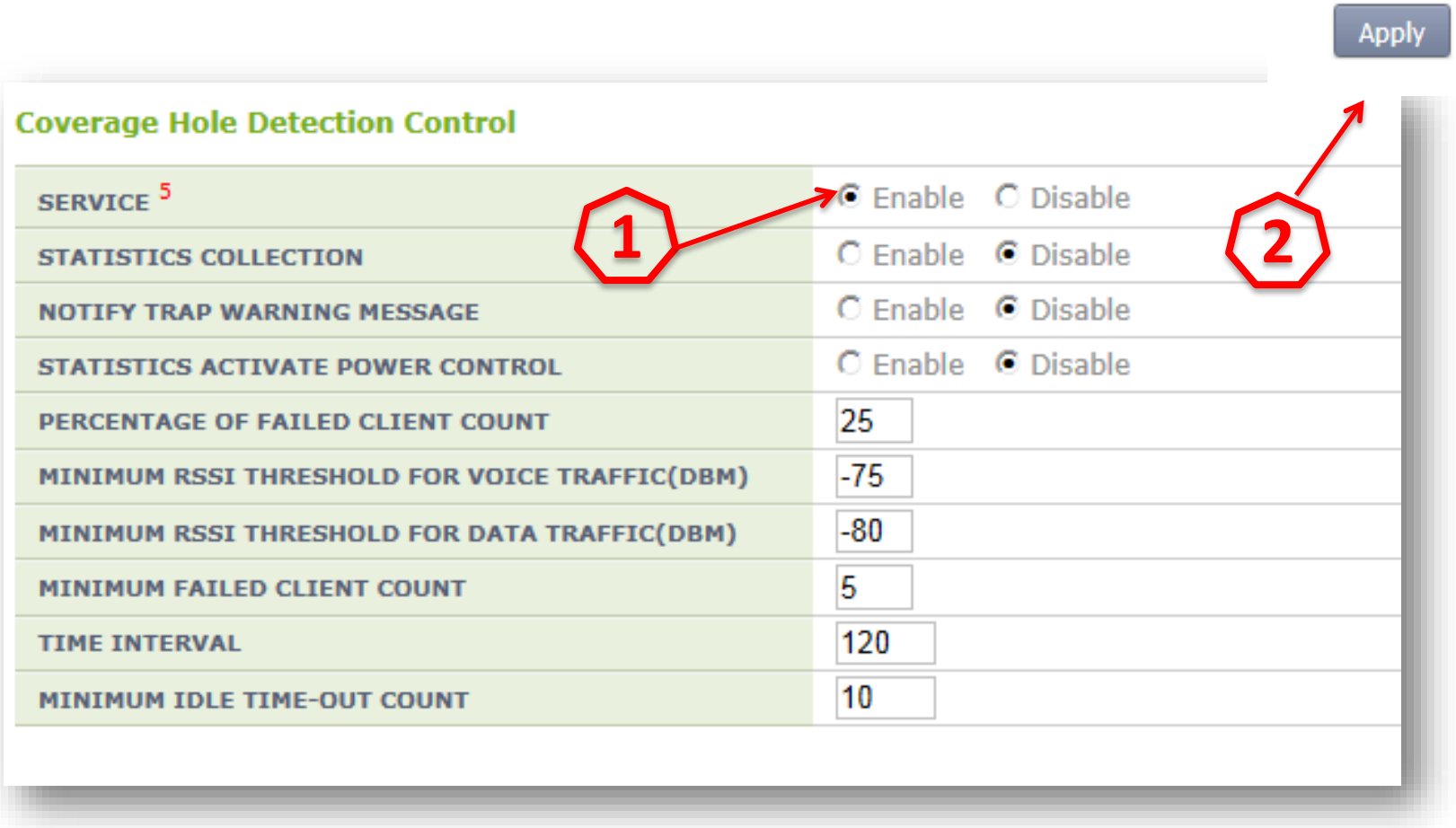

# Check RRM Setup “Lab 10”

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## Lab 10 -

**Verify that the RRM is Enabled for 802.11a/n/ac AND 802.11b/g/n**

1. Go to Configuration → Radio → 802.11a/n/ac → RRM
2. Check that the following are set to Enable
   - Radio Resource Management
   - Dynamic TX Power Control
   - Dynamic Channel Selection
   - Delayed Channel Change (Also select the channels and set the Anchor start and end time)
   - Coverage Hole Detection Control
3. If not, set to Enable and hit Apply for each section
4. Repeat steps 1 – 3 for 802.11b/g/n
5. Save Configuration

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# 4.9 Configure WLANs

- 4.9.1 Creating a WLAN
- 4.9.2 General Options
- 4.9.3 Security Setup
- 4.9.4 Advanced Options
- 4.9.5 Selecting Radius Server
- 4.9.6 Enabling the WLAN

# 4.9.1 Creating a WLAN

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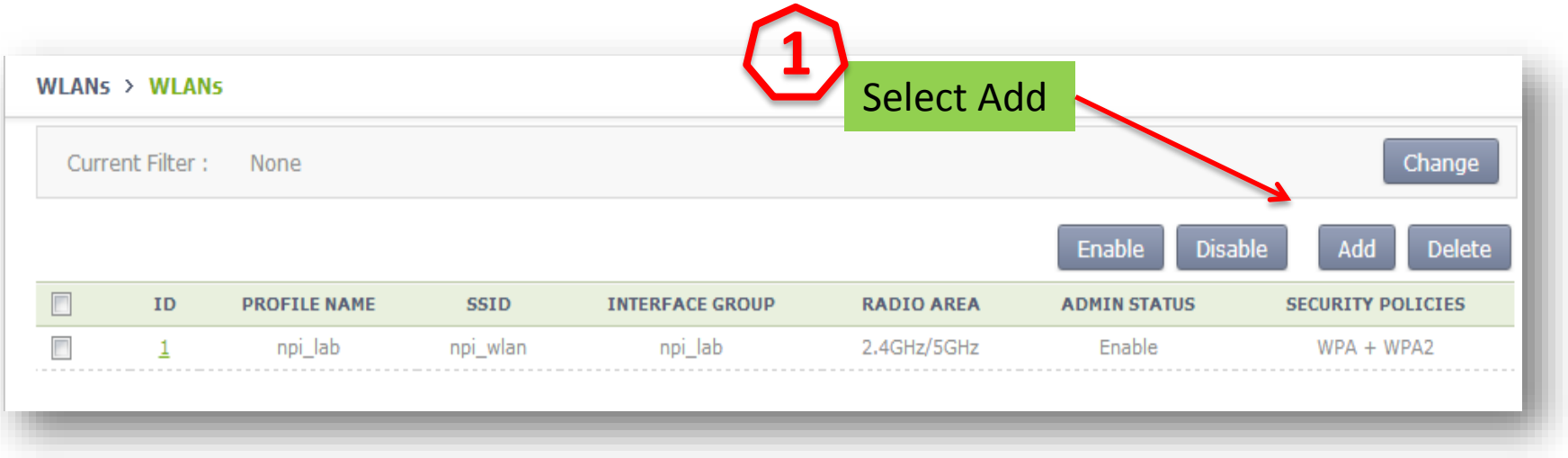
Configuration > WLANs > WLAN

**Note: Profile name and SSID cannot be changed once applied**




**Note:** By default, if your WLAN ID is less than or equal to 16, the WLAN is automatically added to the default AP group. But, if the WLAN ID is greater than 16, the WLAN is not automatically added to the default AP group. So, it won't be broadcasted. If you wish to broadcast this WLAN, you must manually add that WLAN in the AP group. This is a security feature. AP Groups will be discussed later on.

# 4.9.1 Creating a WLAN

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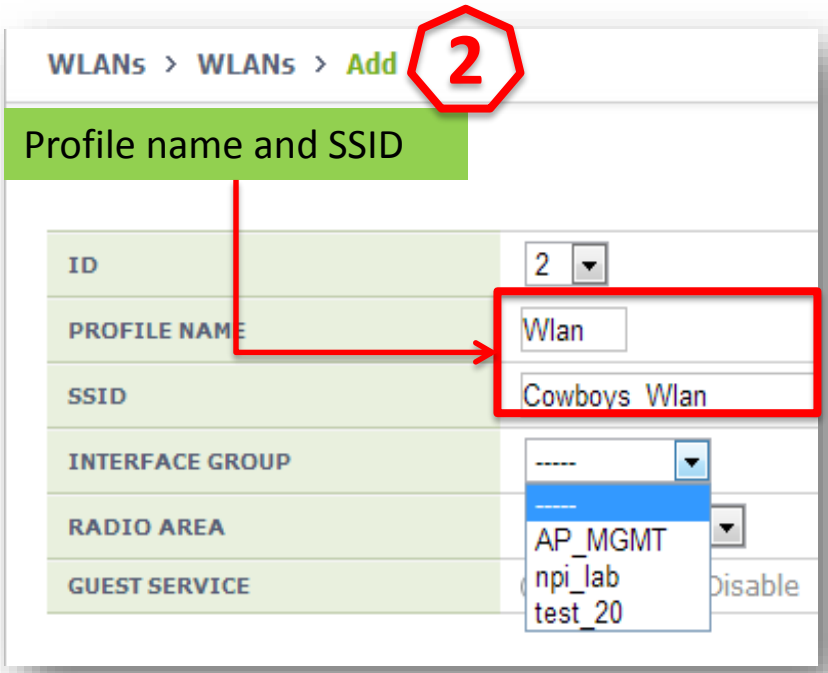
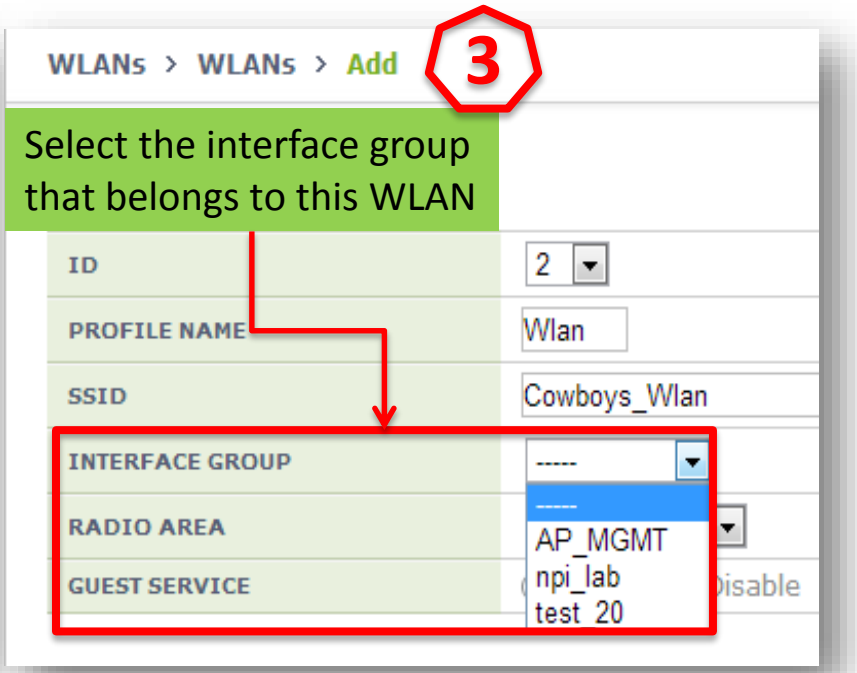
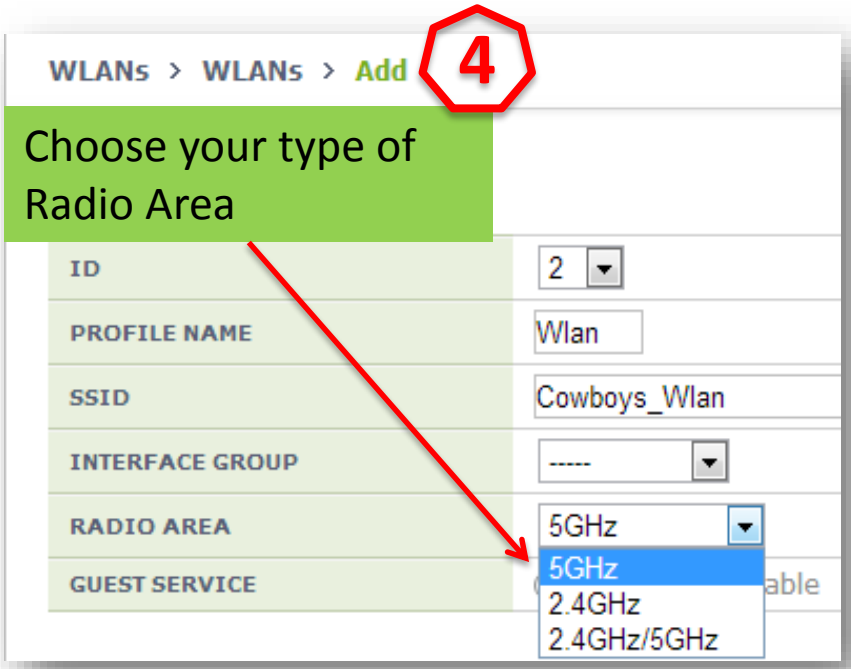
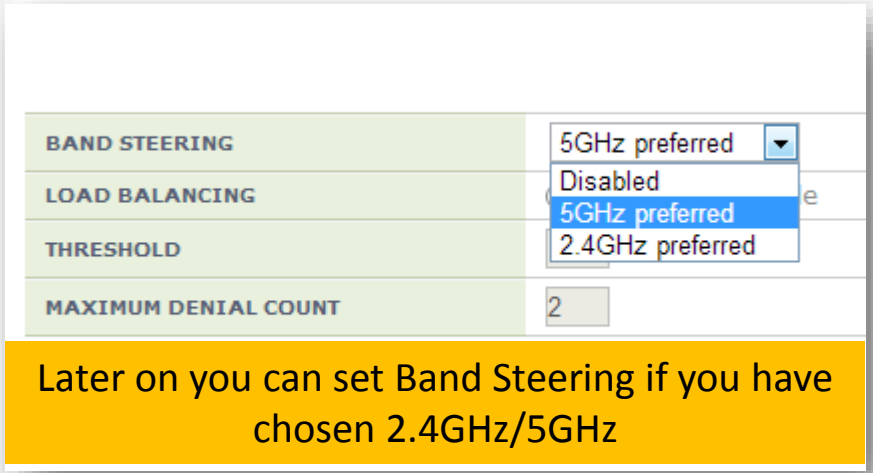
**Note: Profile name and SSID cannot be changed once applied**



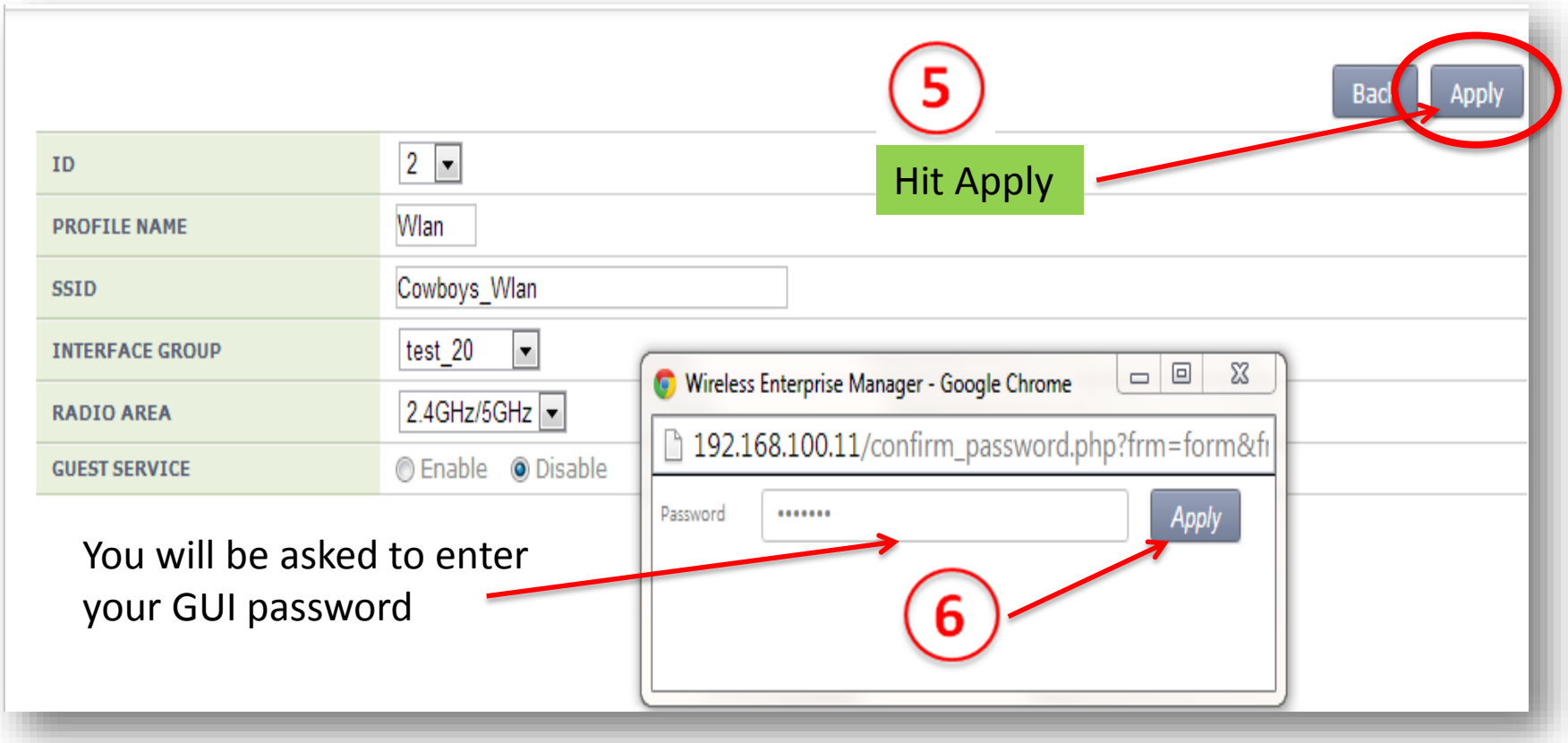



# 4.9.1 Creating a WLAN



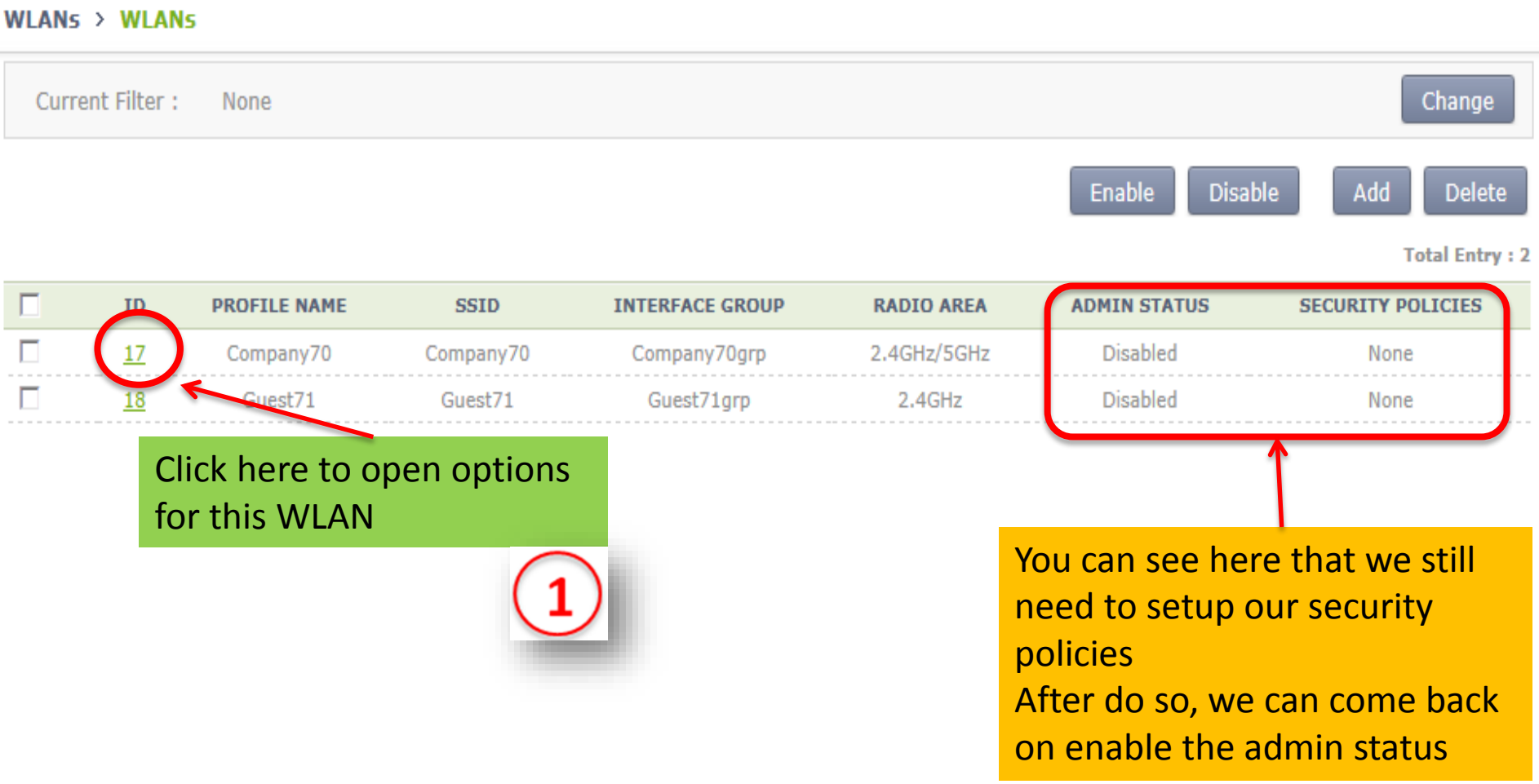



# 4.9.1 Creating a WLAN

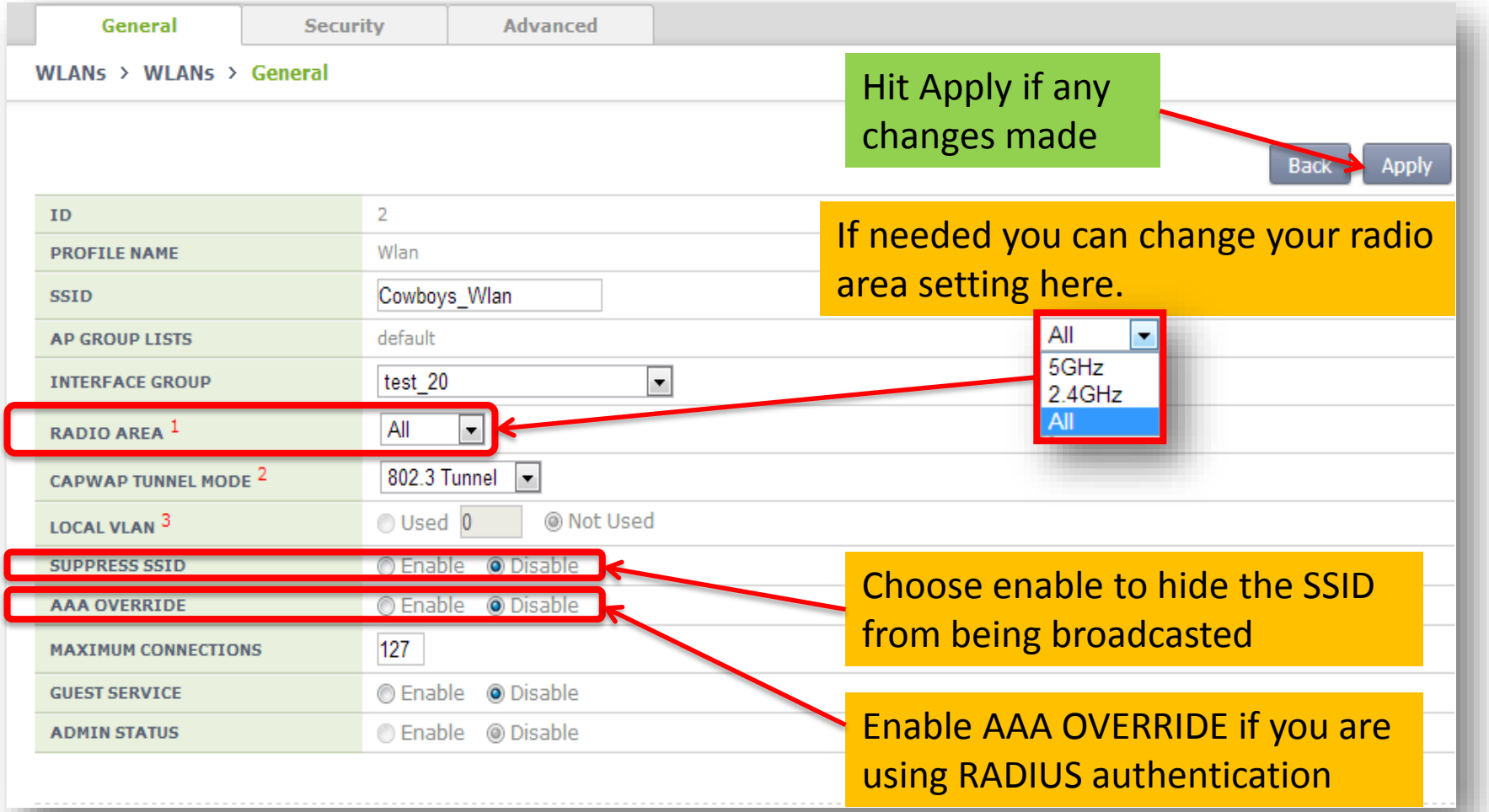


# 4.9.1 Creating a WLAN

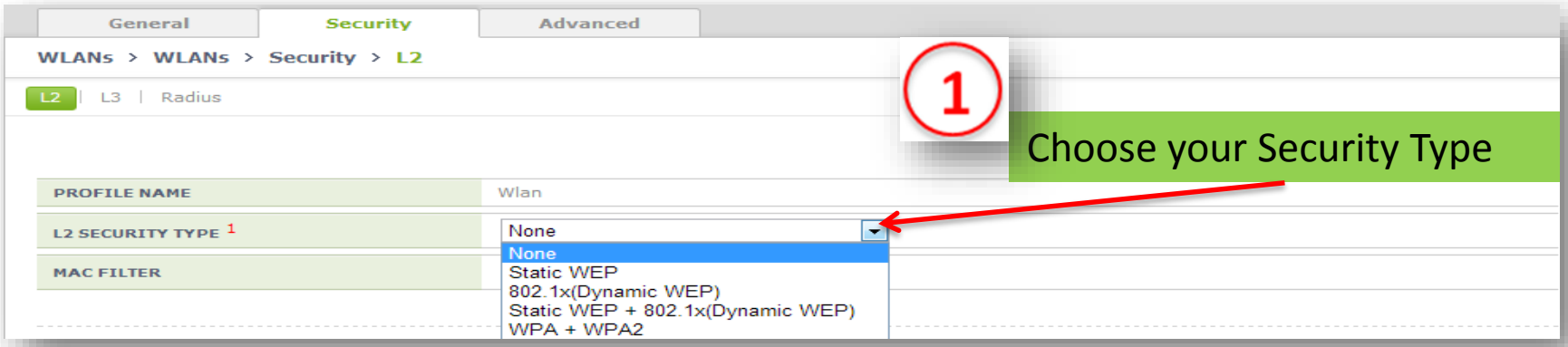
Samsung Wireless Enterprise™

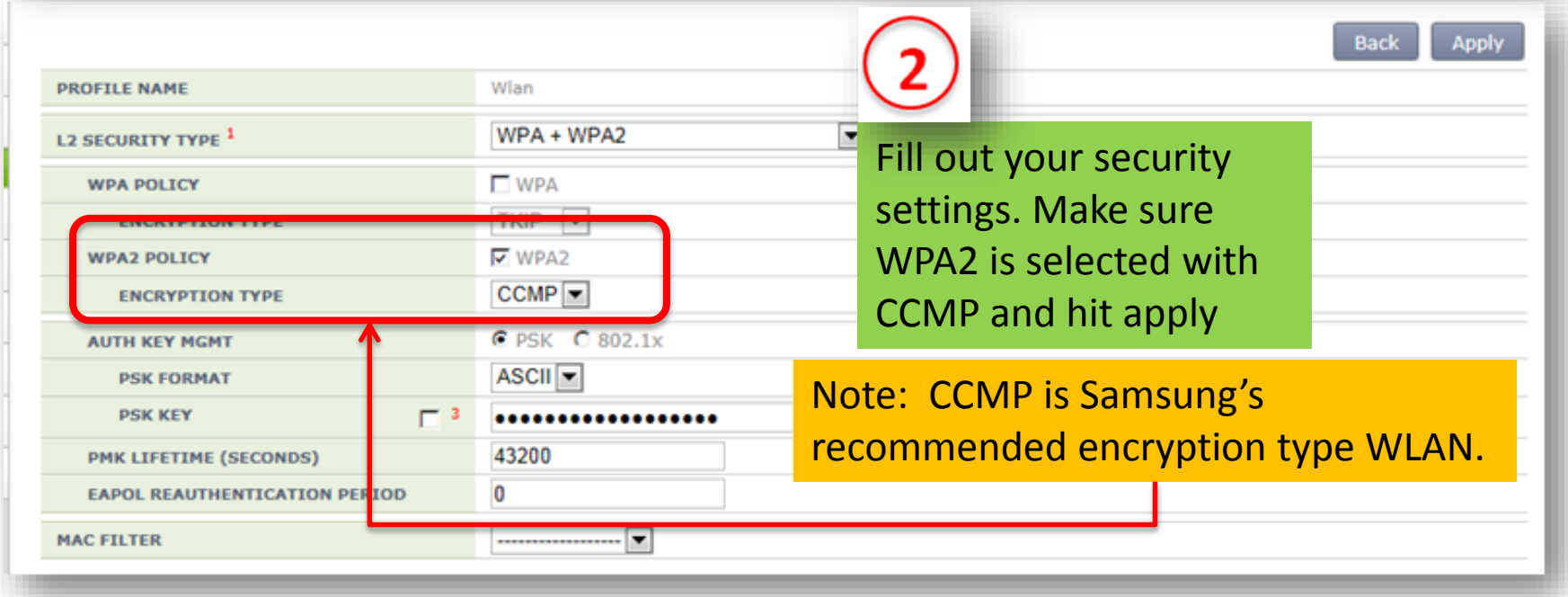


# 4.9.2 General Options



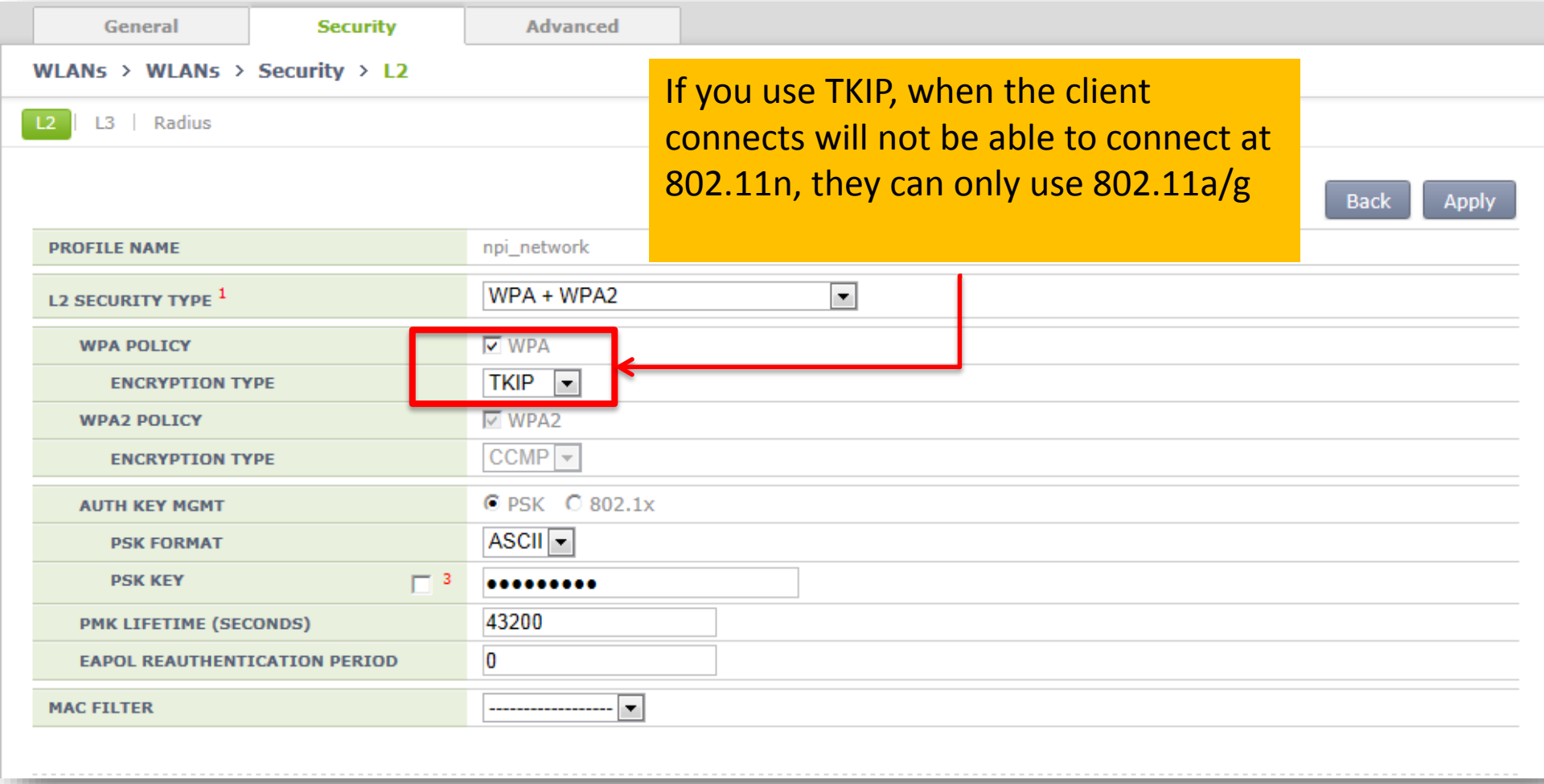
# 4.9.3 Security Setup



# 4.9.3 Security Setup

Samsung Wireless Enterprise™



# 4.9.4 Advanced Options

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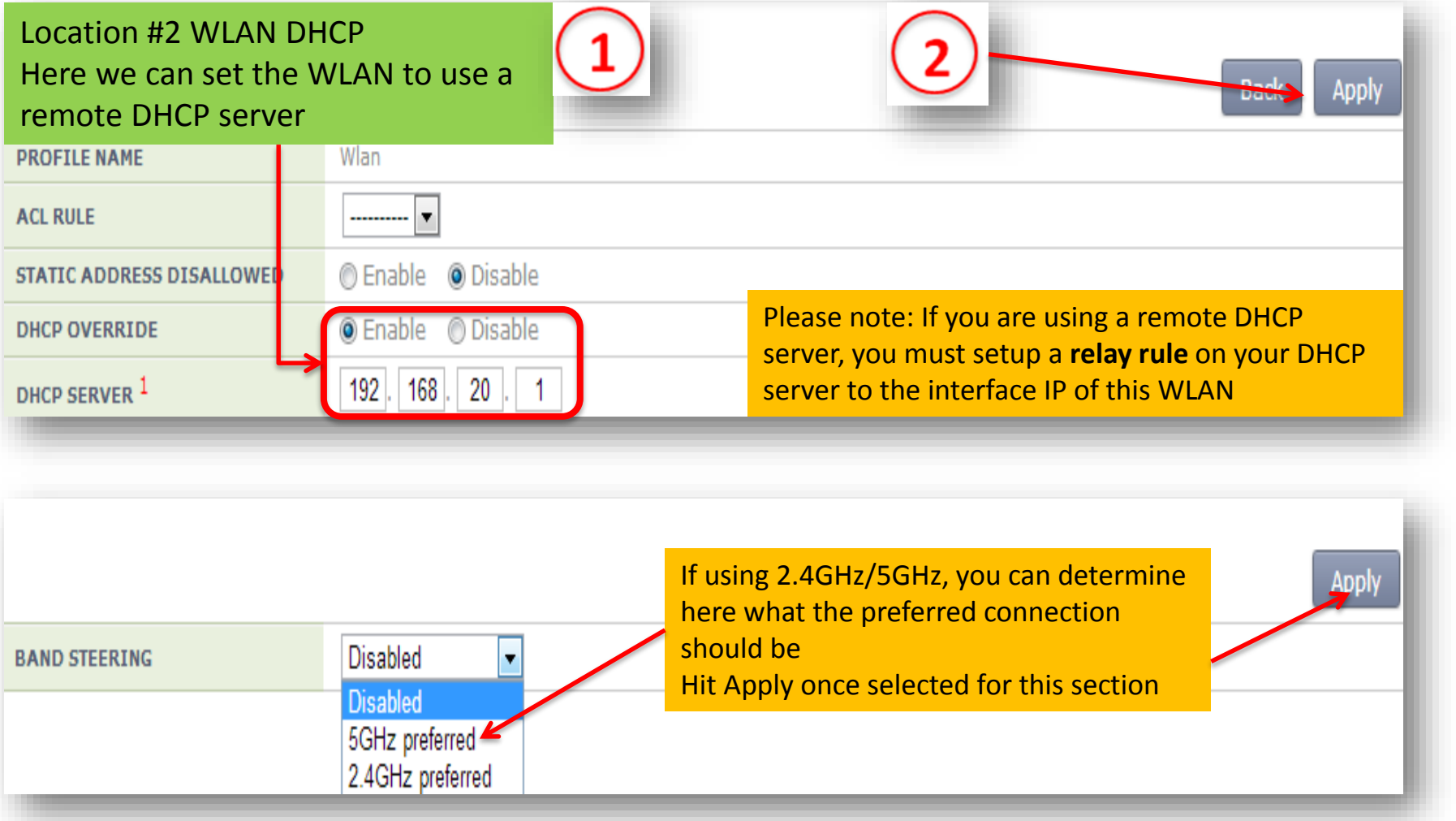
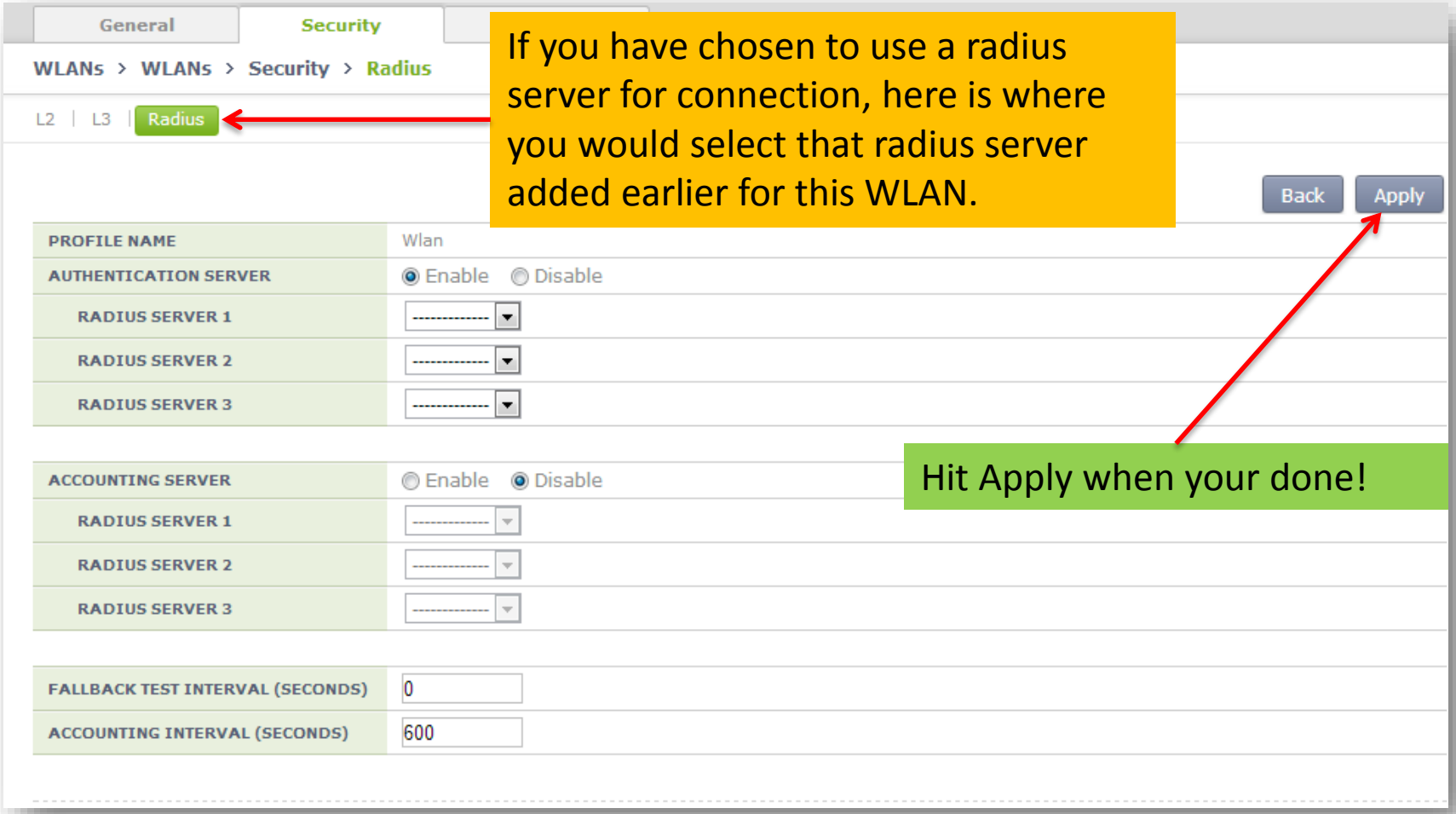


# 4.9.5 Selecting Radius Server



# 4.9.6 Enabling the WLAN

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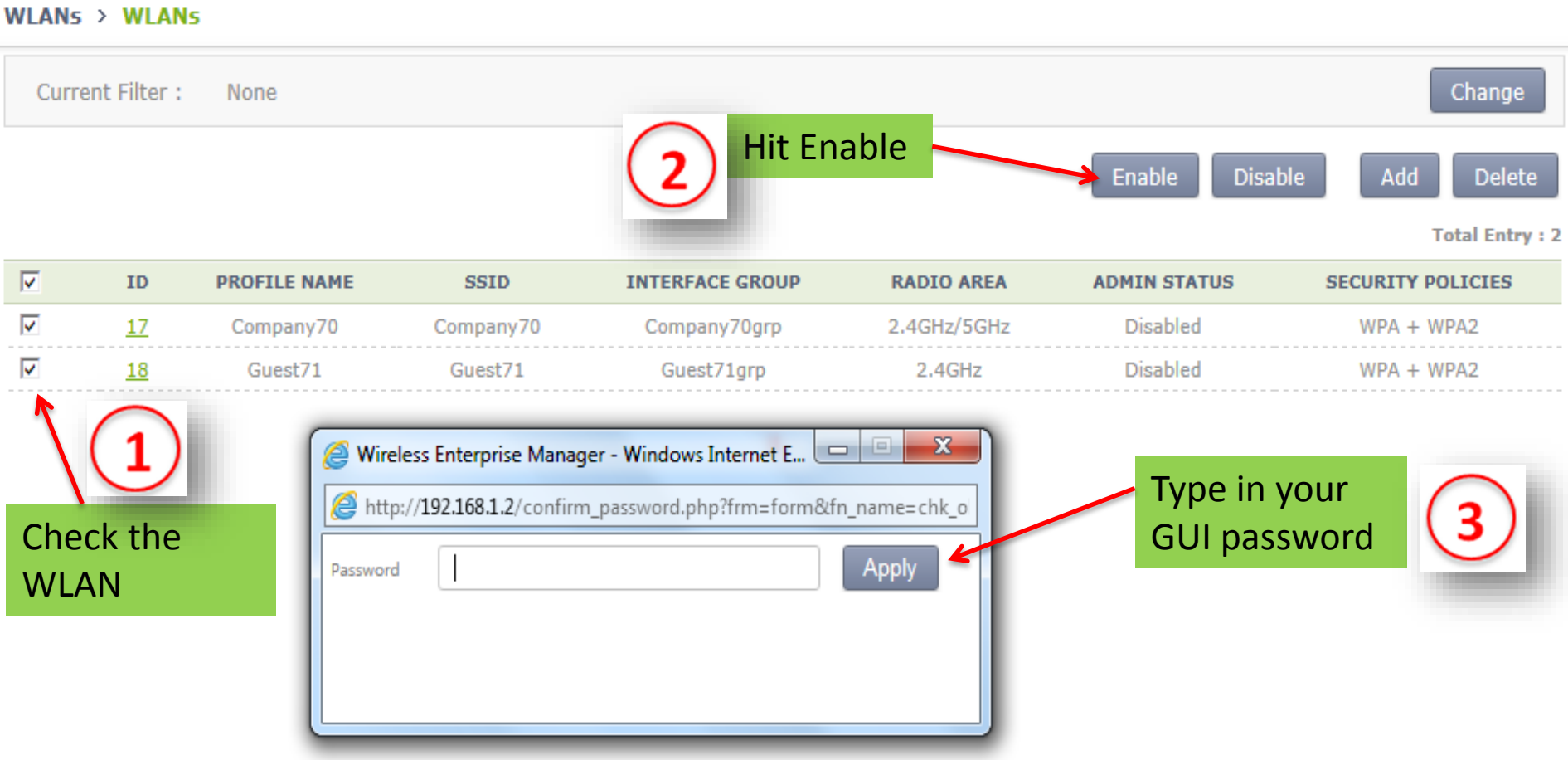

# Lab 11 – (1/2)

**Setup a second WLAN called Company_X0** “See Student Info”

1. Go to Configuration → WLANs → WLANs
2. Click Add and fill in the following according to the “Student Info”
    1. Profile Name
    2. SSID
    3. Interface Group
    4. Radio Area
    5. Guest Service
3. Hit Apply
4. Go back to the Company WLAN
5. Go to the security tab and setup the “L2” Security Type “See Student Info”
6. Hit Apply

## Lab 11 – (2/2)

**Setup a second WLAN called guest_x1** “See Student Info”

1. Go to Configuration → WLANs → WLANs
2. Click Add and fill in the following according to the “Student Info”
    1. Profile Name
    2. SSID
    3. Interface Group
    4. Radio Area
    5. Guest Service
3. Hit Apply
4. Go back to the guest WLAN
5. Go to the security tab and setup the “L2” Security Type “See Student Info”
6. Hit Apply
7. Go to Configuration → WLANs → WLANs
8. Check all WLANs → Enable WLAN

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## 4.10 Set Up Access Points

- 4.10.1 Connect all APs to the network
- 4.10.2 Check List of Access Points
- 4.10.3 Configure Access Points
- 4.10.4 Hard setting a channel
- 4.10.5 Advanced Settings

# 4.10.1 Connect APs to Network

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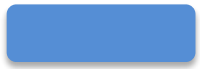
*At this point in the WLAN configuration the LED on the Access Points will go through the following sequence as soon as they are plugged in.*

1. System Start > Steady White LED 
2. Initializing the AP > Steady Blue LED 
3. Provisioning > Repeat Red > Green 

Make sure all of the APs are plugged in and connected to the switch ports with the Management VLAN designated in the APC setup.

# Connect the APs “Lab 12”

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## Lab 12 -

### Connect the Aps to the PoE Switch

1. Plug in the APs to a port in this range 17 – 24
2. Go to Configuration → Access Points
3. Confirm that all APs show in the table

# 4.10.2 List of Access Points

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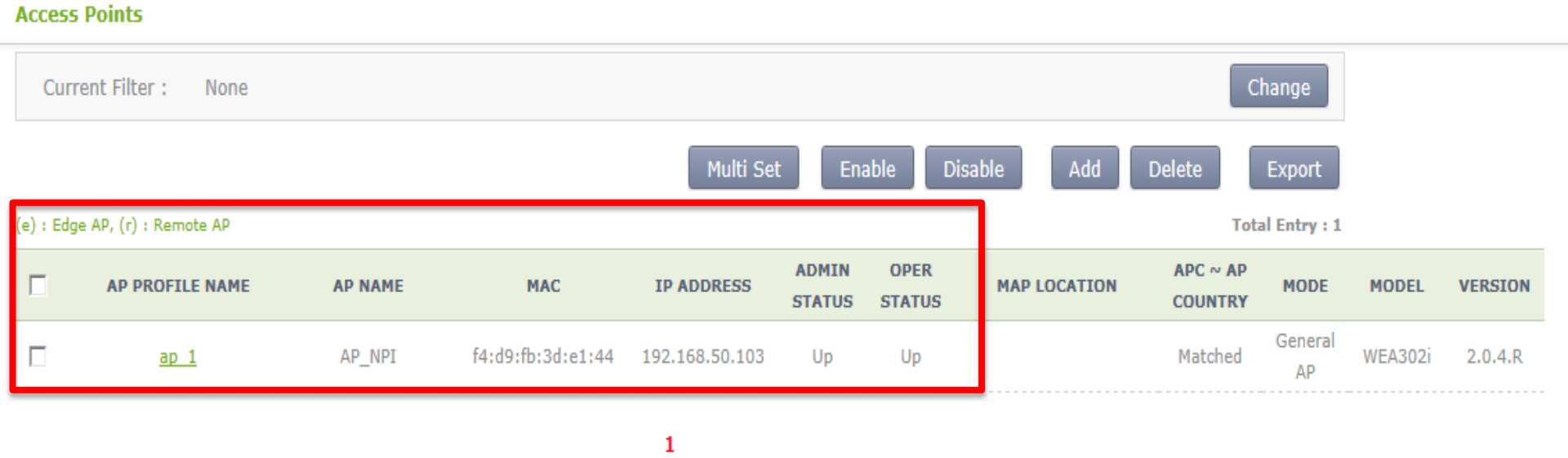
All Access Points that are plugged in and registered will show up in the list below.



# 4.10.3 Configure Access Points

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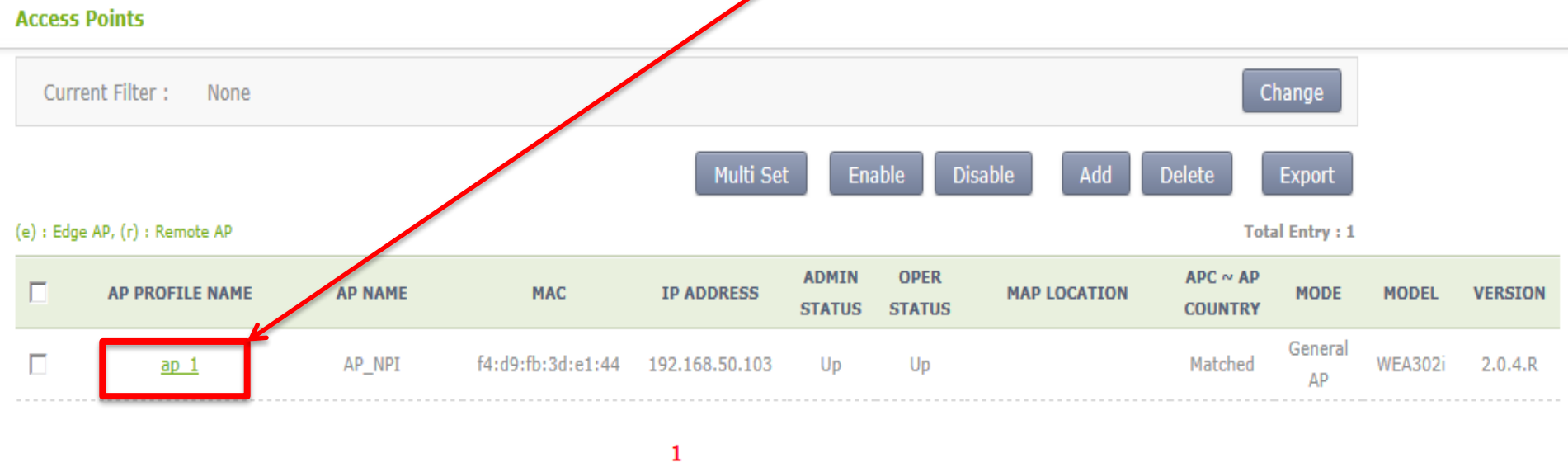
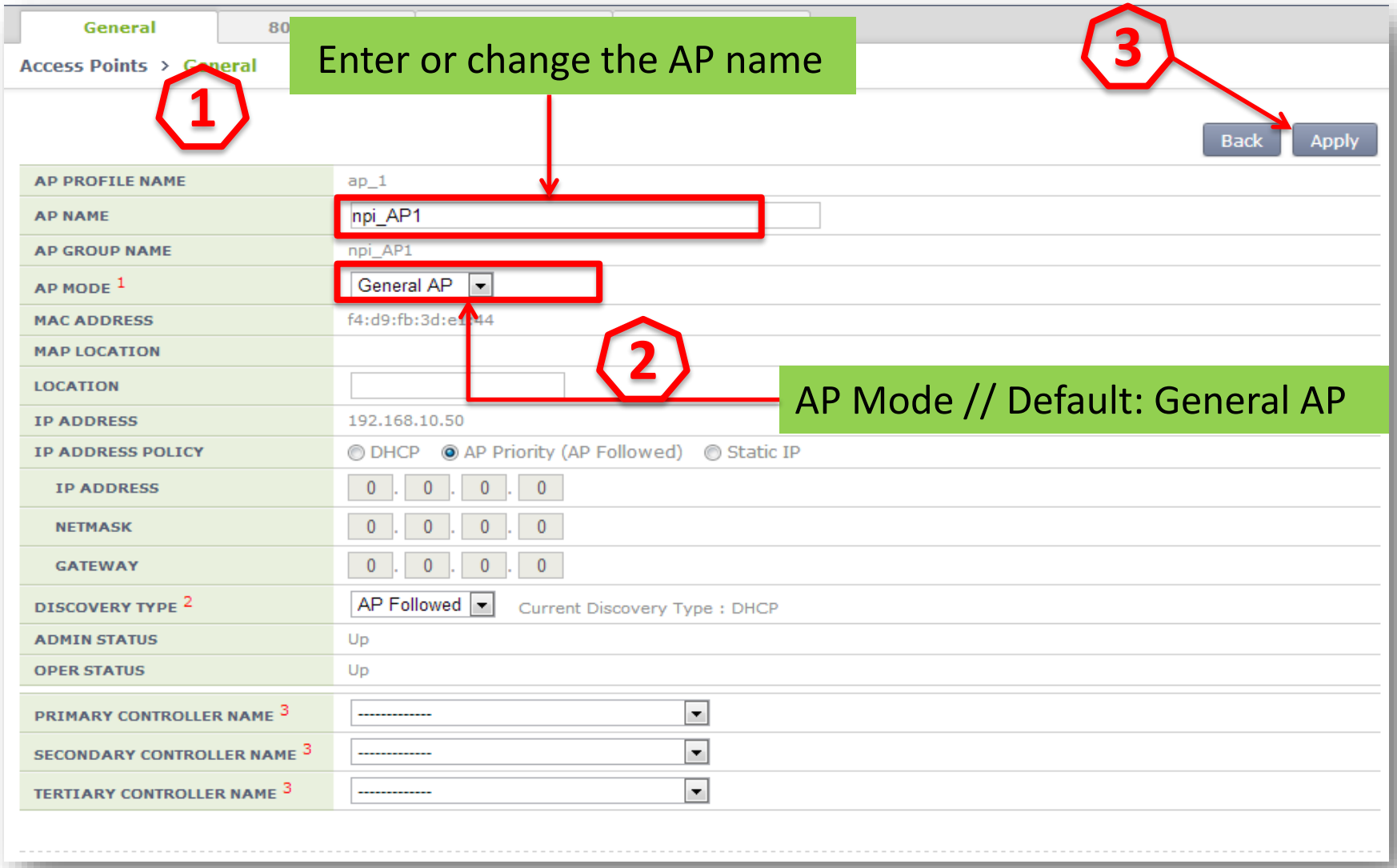
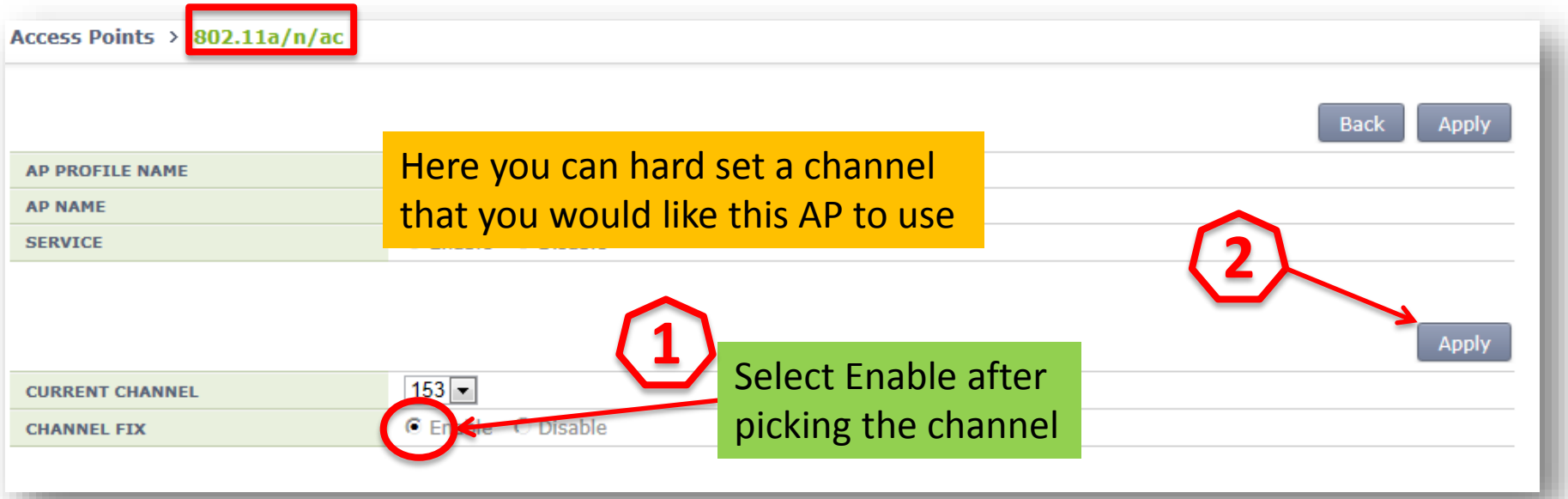
1 To configure an AP, click on the AP Profile Name

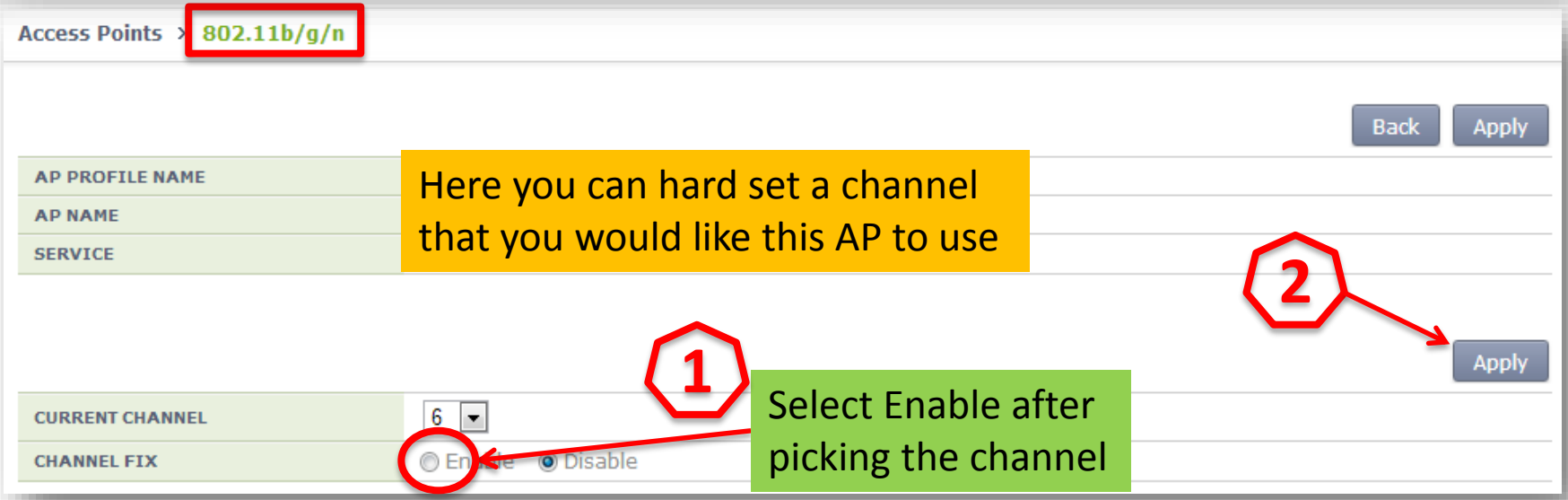


# 4.10.3 Configure Access Points

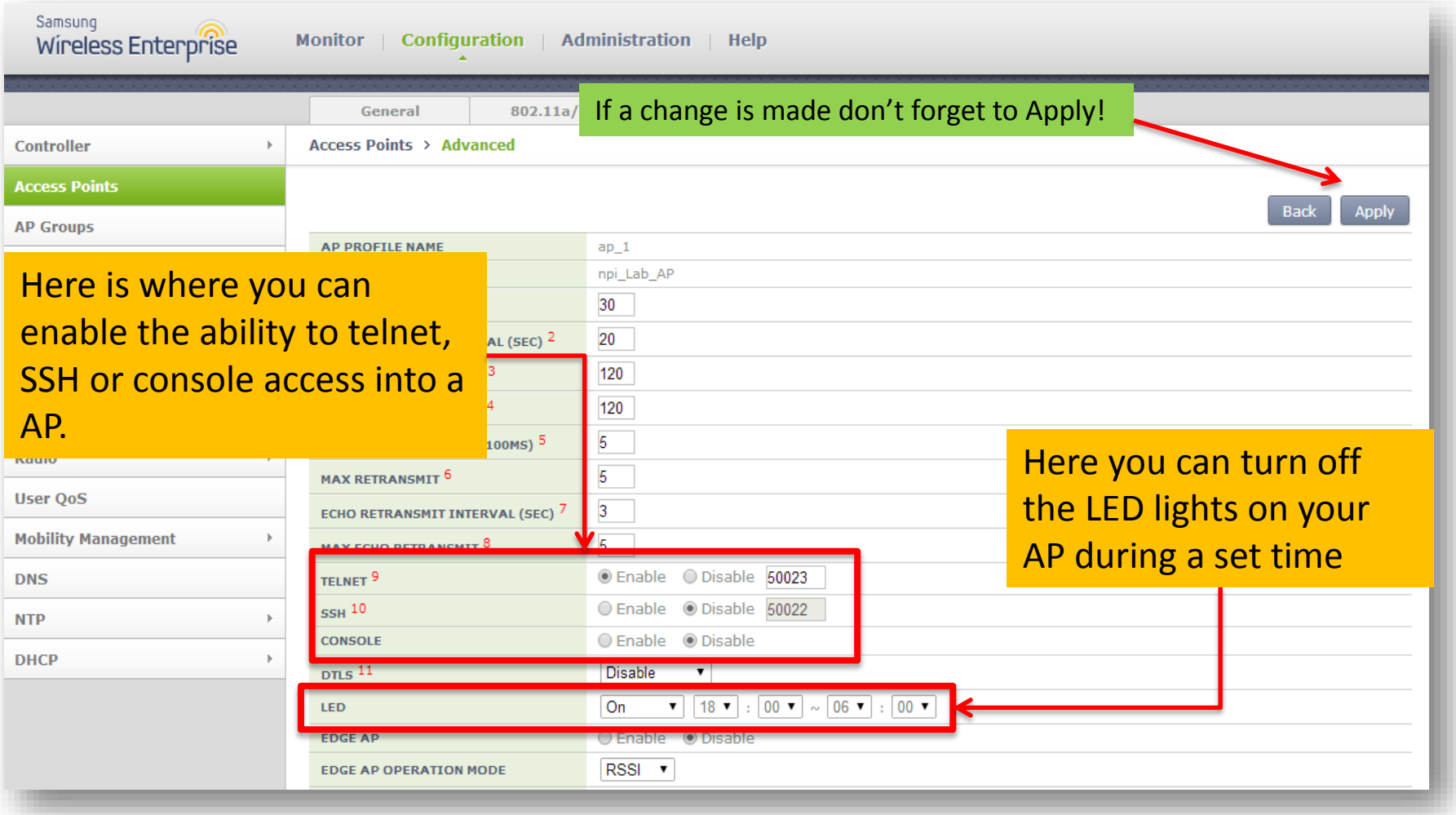


# 4.10.4 Hard setting a channel



# 4.10.5 Advanced Settings



# 4.10.5 Advanced Settings

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Access Points > Advanced

Back Apply

2

Hit Apply

| | |
|---|---|
| AP PROFILE NAME | ap_1 |
| AP NAME | AP_NPI |
| ECHO INTERVAL (SEC) [1] | 30 |
| MAX DISCOVERY INTERVAL (SEC) [2] | 20 |
| REPORT INTERVAL (SEC) [3] | 120 |
| STATISTICS TIMER (SEC) [4] | 120 |
| RETRANSMIT INTERVAL (100MS) [5] | 5 |
| MAX RETRANSMIT [6] | 5 |
| ECHO RETRANSMIT INTERVAL (SEC) [7] | 3 |
| MAX ECHO RETRANSMIT [8] | 5 |
| TELNET [9] | ○ Enable ◉ Disable 50023 |
| SSH [10] | ○ Enable ◉ Disable 50022 |
| CONSOLE | ○ Enable ◉ Disable |
| DTLS [11] | |
| LED | |
| EDGE AP | |
| EDGE AP OPERATION MODE | RSSI |
| SMHO THRESHOLD (DBM) | -80 |
| SMHO WINDOW SIZE (MS) | 300 |
| COUNTRY CODE | North America(US) |
| ENVIRONMENT | Both |
| TIME ZONE | US/Central |

If you have set the country code on the APC, it will carry over to the AP once they have connected to the APC

Set the time zone to US/Central

1

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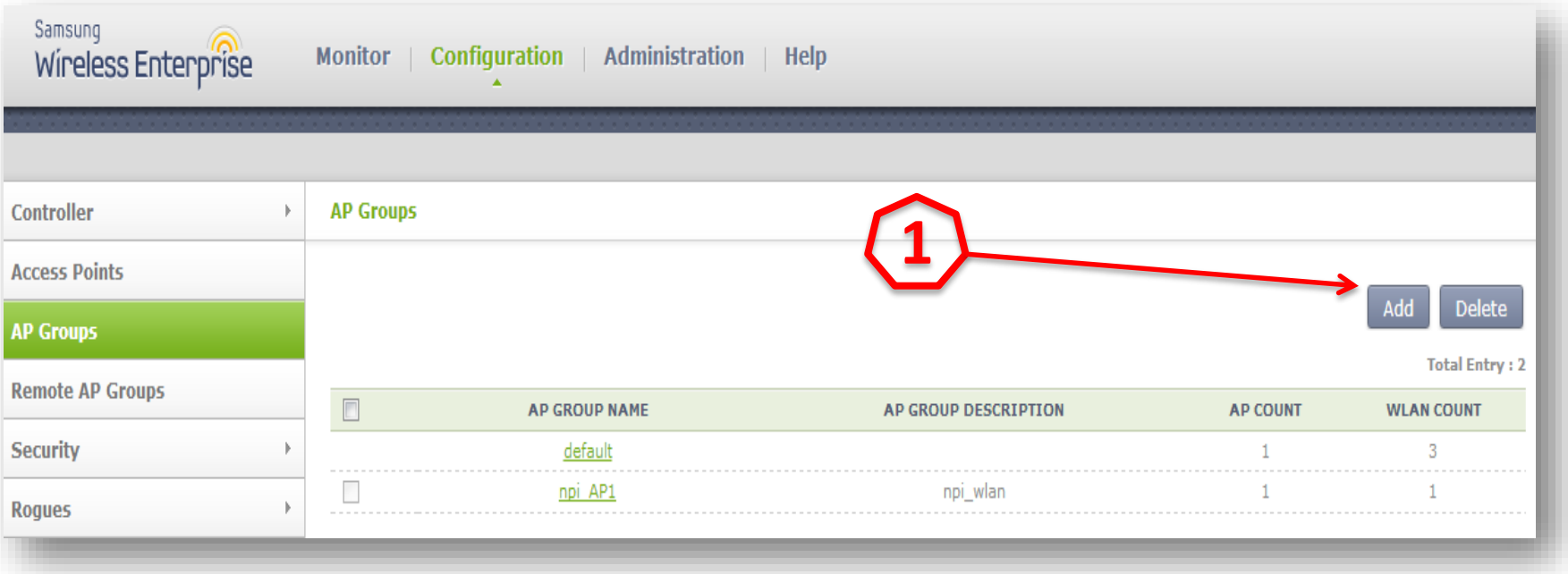
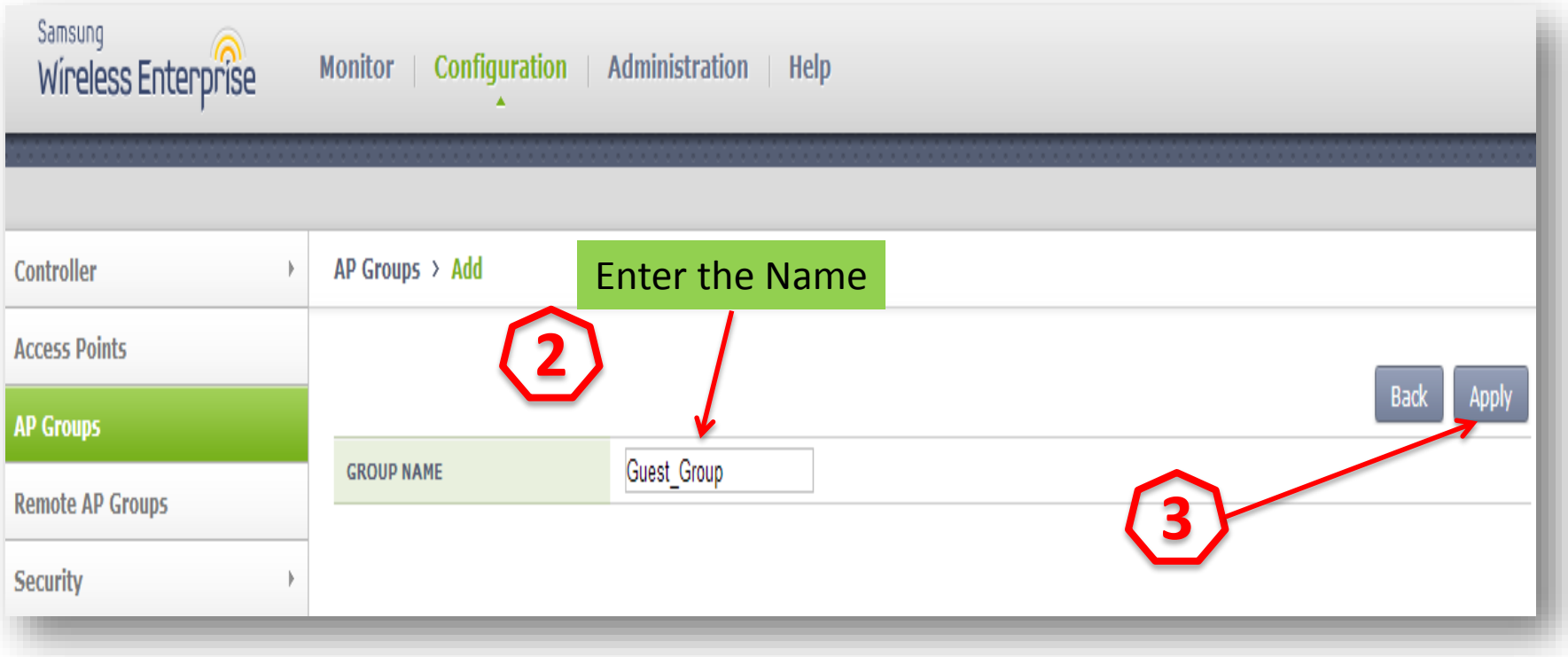
# 4.11 AP Groups

- 4.11.1 Creating an AP Group
- 4.11.2 Setup the AP Group
  - *4.11.2.1 General Tab*
  - *4.11.2.2 Adding AP's*
  - *4.11.2.3 WLANs*
  - *4.11.2.4 Hard setting a channel*
  - *4.11.2.5 Confirm AP Groups*

# 4.11.1 Creating an AP Group



# 4.11.1 Creating an AP Group



# 4.11.2 Setup the AP Group

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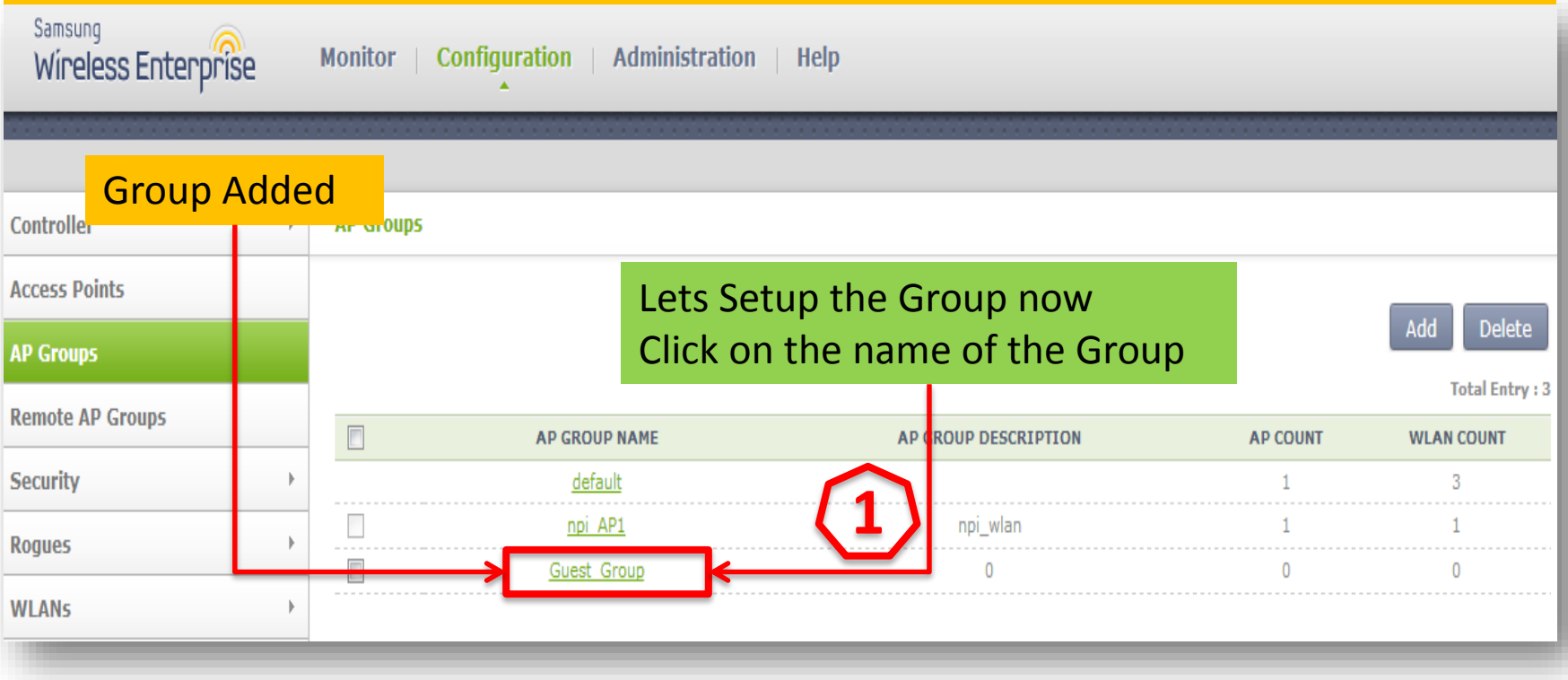
Now we can assign which APs, WLANs (SSID) will be used in this AP Group



# 4.11.2.1 General Tab

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General | APs | WLANs | 802.11a/n | 802.11b/g/n | Advanced

AP Groups > General

Set the AP Group Description Here

Back Apply

| | |
|---|---|
| AP GROUP NAME | Main_AP_Group |
| AP GROUP DESCRIPTION | 0 |
| AP COUNT | 1 |
| WLAN COUNT | 2 |
| OVERWRITE AP CONFIG | |
| AP MODE [1] | General AP |
| OVERWRITE AP CONFIG | |
| LOCATION | 0 |
| OVERWRITE AP CONFIG | |
| IP MODE | DHCP / AP Priority (AP Followed) |
| OVERWRITE AP CONFIG | |
| ADMIN STATUS | Enable / Disable |
| OVERWRITE AP CONFIG | |
| DISCOVERY TYPE [2] | AP Followed |
| PRIMARY CONTROLLER NAME | ---------- |
| SECONDARY CONTROLLER NAME | ---------- |

1

2

Message from webpage

NOTE:
Changing AP Group configurations will cause temporary disruption to service.
All APs in AP Group will be disconnected from the APC if the configuration is incorrect.
Be careful of the following items:

* AP MODE
All APs will be reboot after AP Mode configuration is changed.

Especially, be careful when setting the AP to Repeater Mode because it cannot be accessed without Root AP

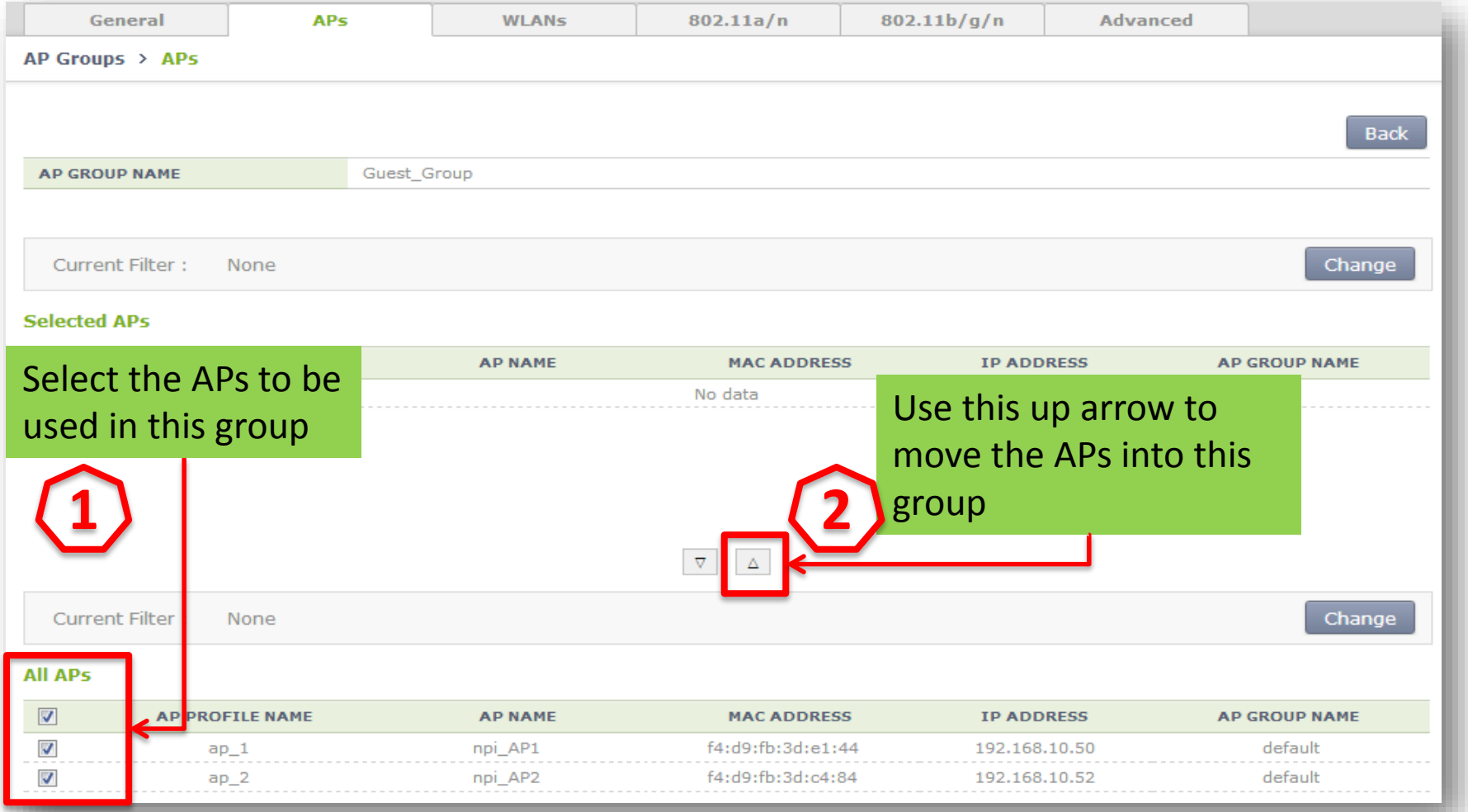
* IP MODE
Changing IP mode to DHCP will cause disconnection between APC and AP unless DHCP environment is established.

* Redundancy Configurations ( DISCOVERY TYPE, CONTROLLER NAMES )
It's possible to connect APs to another APCs for Redundancy.

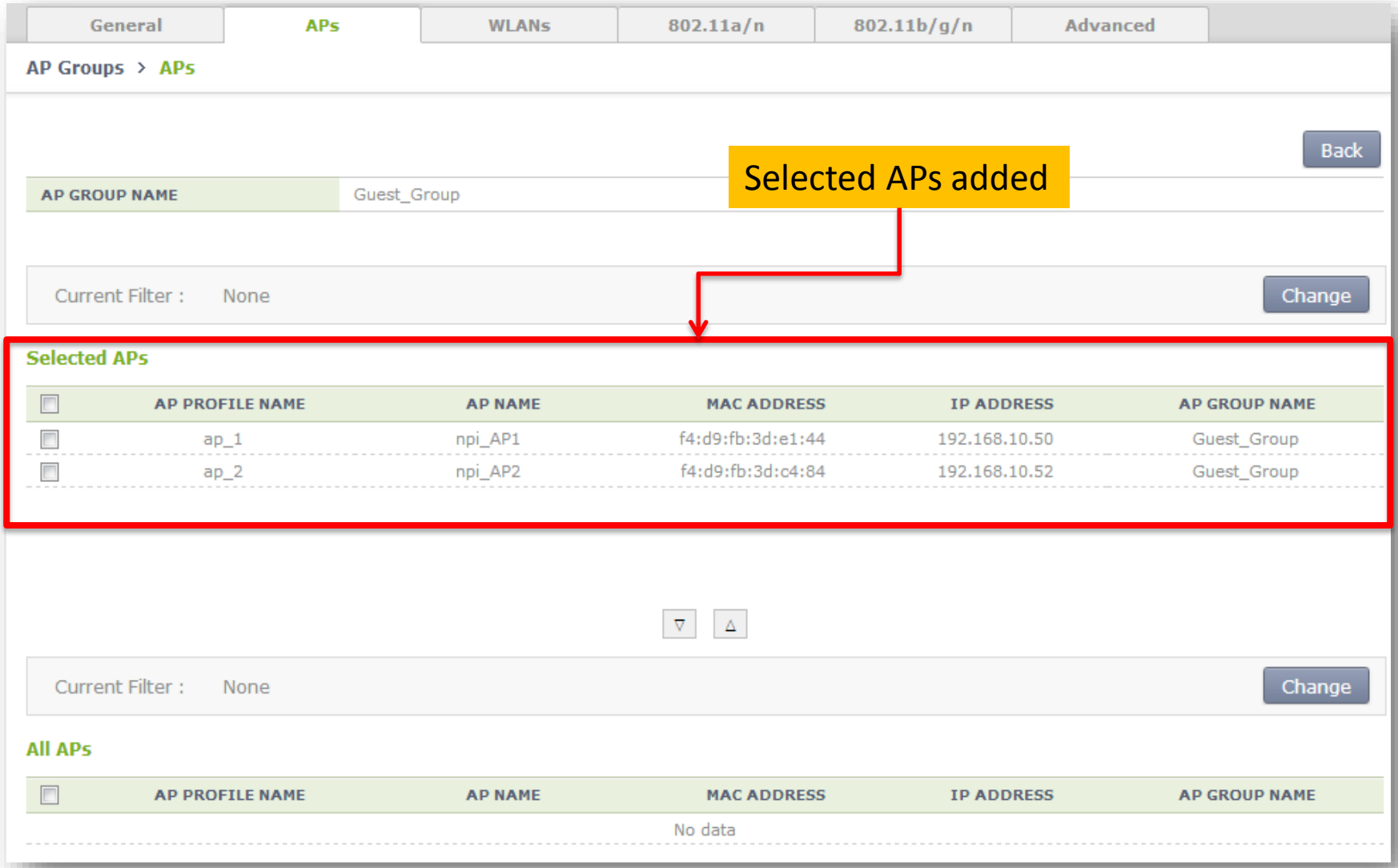
Do you really want to apply?

OK Cancel

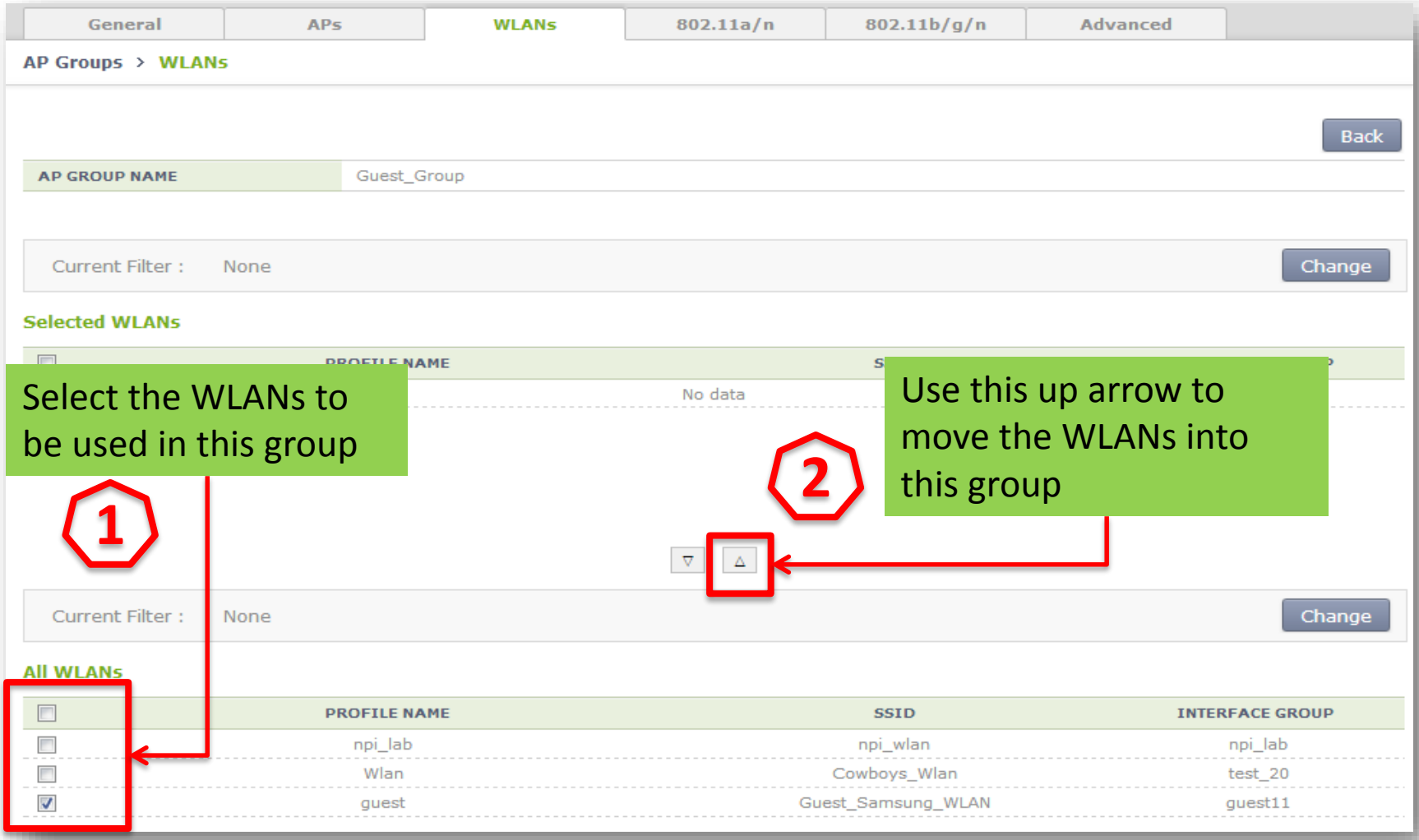
# 4.11.2.2 Adding APs



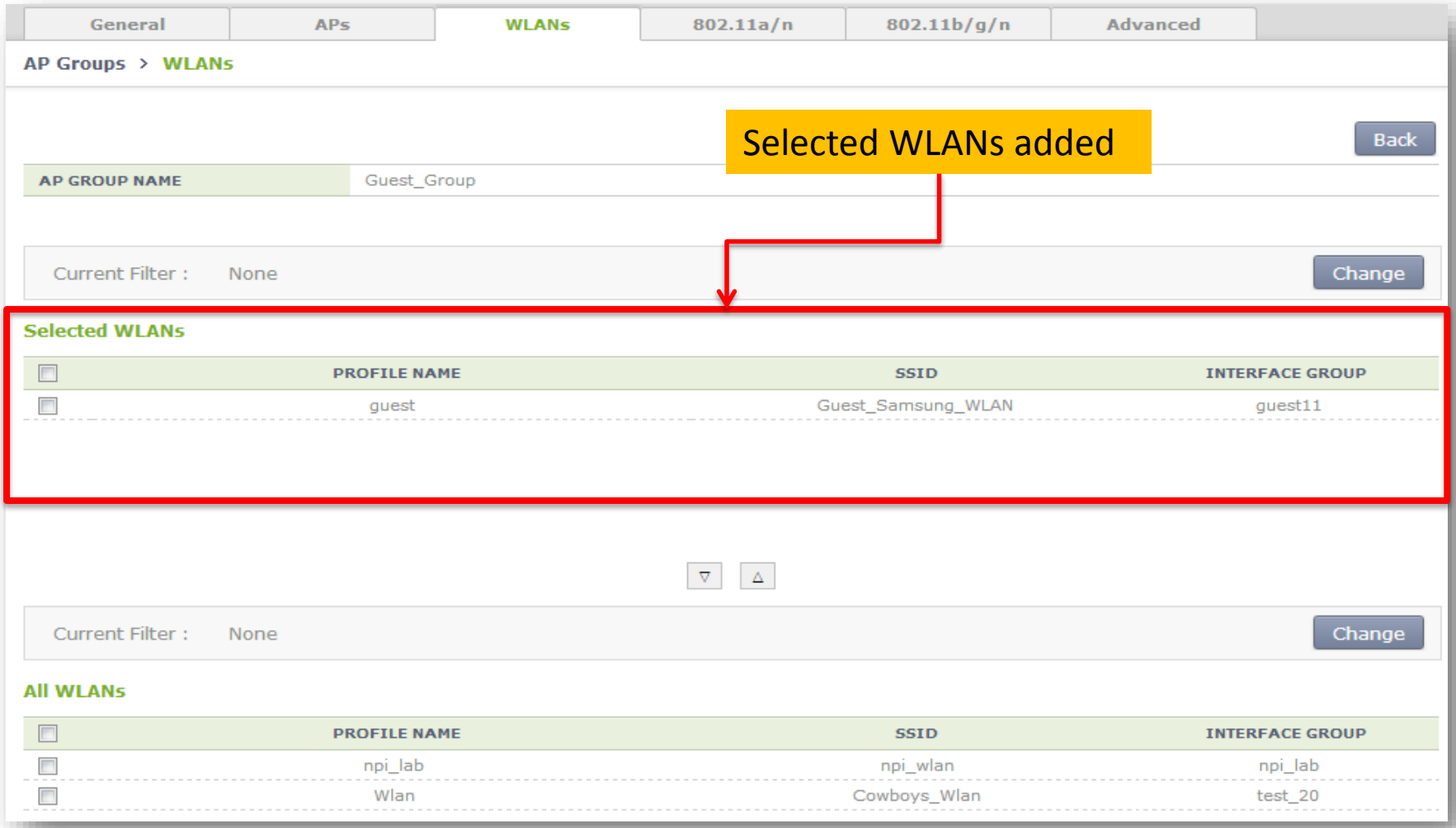
# 4.11.2.2 Adding APs



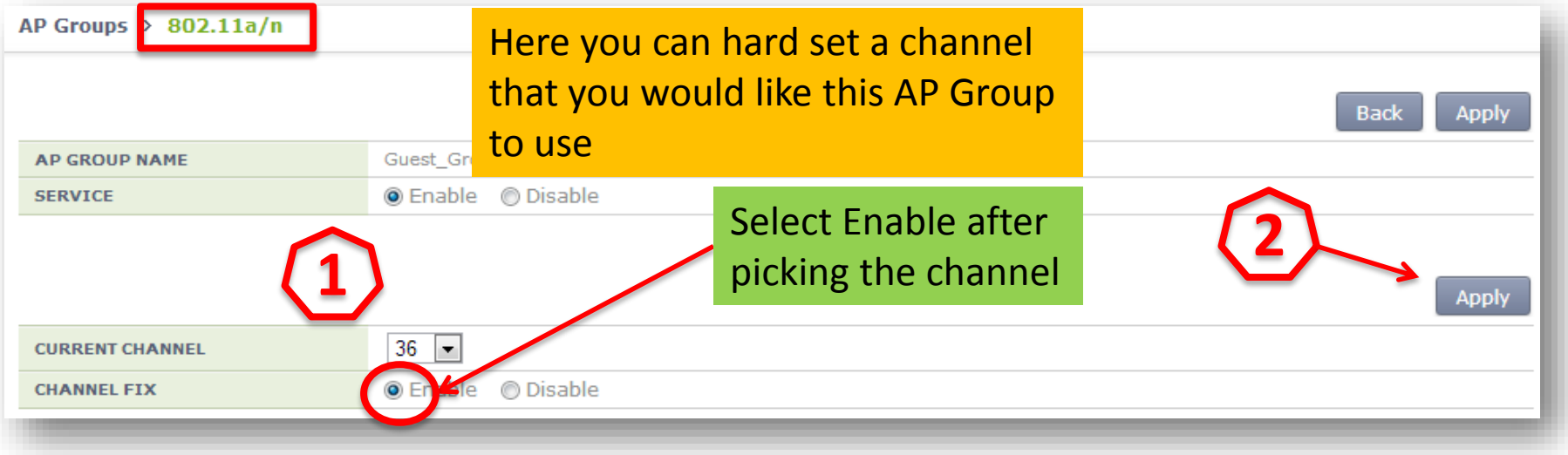
# 4.11.2.3 WLANs

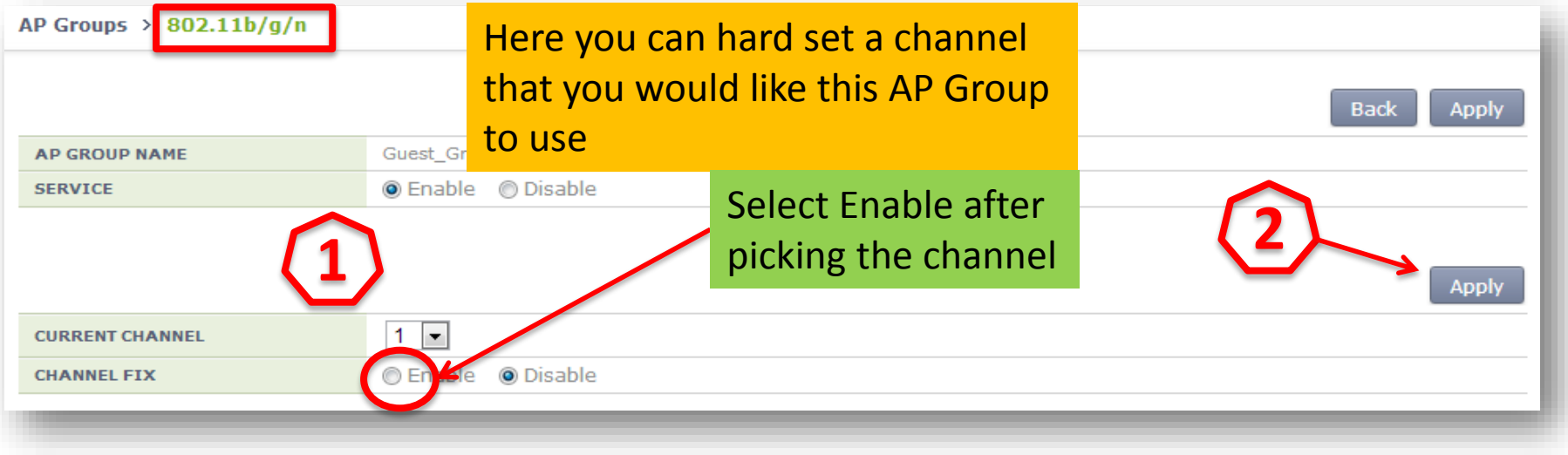

General
APs
WLANs
802.11a/n
802.11b/g/n
Advanced
AP Groups > WLANs
Back
AP GROUP NAME
Guest_Group
Current Filter : None
Change
Selected WLANs
No data
Select the WLANs to be used in this group
1
2
Use this up arrow to move the WLANs into this group
Current Filter : None
Change
All WLANs
PROFILE NAME
SSID
INTERFACE GROUP
npi_lab
npi_wlan
npi_lab
Wlan
Cowboys_Wlan
test_20
guest
Guest_Samsung_WLAN
guest11

# 4.11.2.3 WLANs


General
APs
WLANs
802.11a/n
802.11b/g/n
Advanced
AP Groups > WLANs
Selected WLANs added
Back
AP GROUP NAME
Guest_Group
Current Filter : None
Change
Selected WLANs
PROFILE NAME
SSID
INTERFACE GROUP
guest
Guest_Samsung_WLAN
guest11
Current Filter : None
Change
All WLANs
PROFILE NAME
SSID
INTERFACE GROUP
npi_lab
npi_wlan
npi_lab
Wlan
Cowboys_Wlan
test_20

# 4.11.2.4 Hard setting a channel



# 4.11.2.4 Selecting the PoE type

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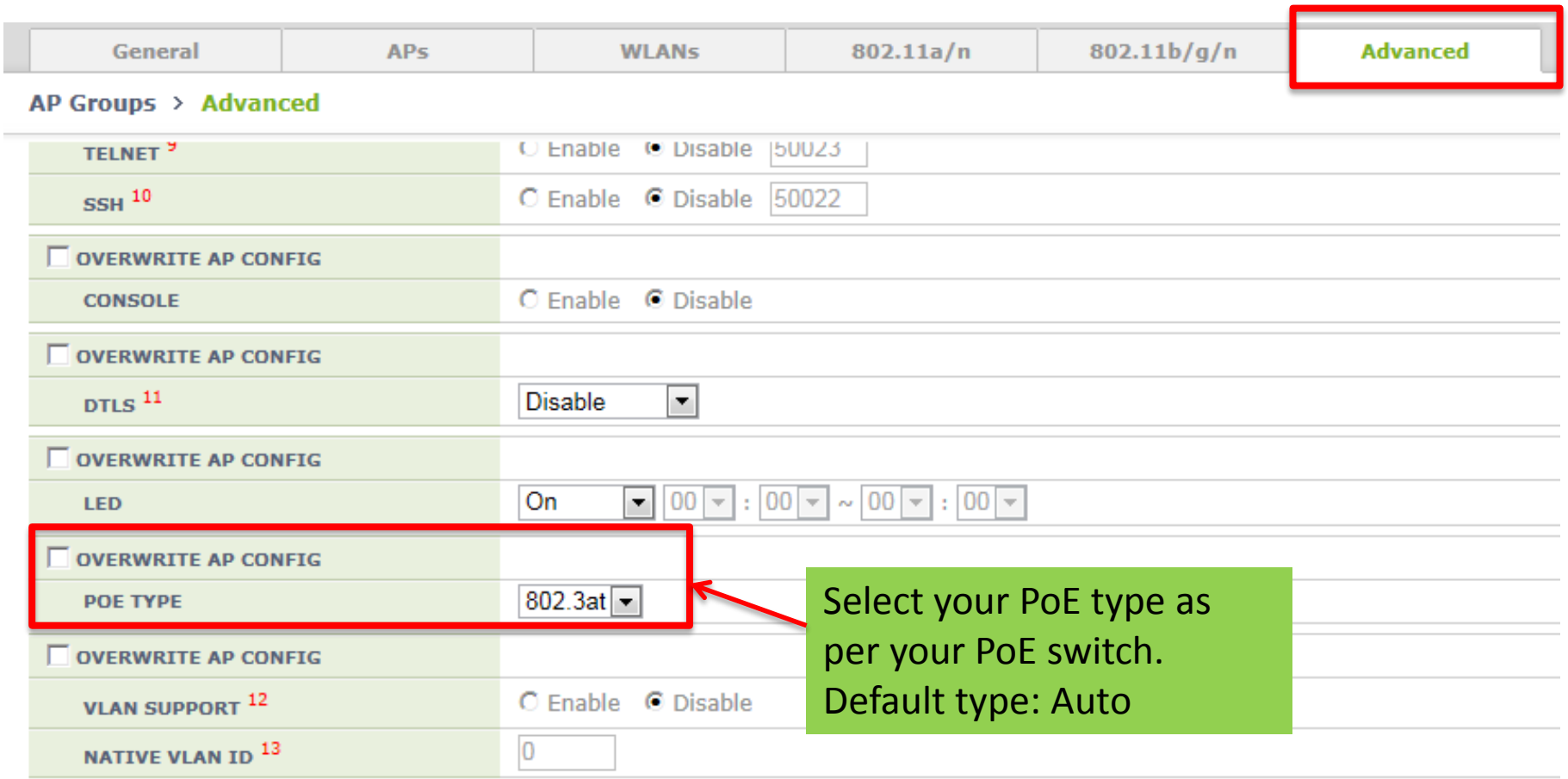

# 4.11.2.5 Confirm AP Groups

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After configuring AP Groups, all of the APs that are plugged in and connected should have the following LED status.

Normal Operation > Steady Green LED

Operational - with no clients currently connected.

Normal Operation > Steady Blue LED

Operational - with one or more clients connected.

# Lab 14 – (1/2)

## Setup and Configure a AP Group “Main_AP_Group”

1. Go to Configuration → AP Groups
2. Select Add → Name this AP Group “Main_AP_Group”
3. Hit Apply
4. Give this AP a Group Description of “Main_AP_Group”
5. Hit Apply
6. Click on “Main_AP_Group”
7. Go to the APs tab → Add the AP named “Company_AP”
8. Click “OK” when prompted
9. Go to the WLANs tab → Add the WLAN names “company_x0”
10. Click “OK” when prompted
11. Verify by connecting a cell phone or laptop to the SSID “company_x0”

# Lab 14 – (2/2)

## Setup and Configure a AP Group “Main_AP_Group”

1. Go to Configuration → AP Groups
2. Select Add → Name this AP Group “Main_AP_Group”
3. Hit Apply
4. Give this AP a Group Description of “Main_AP_Group”
5. Hit Apply
6. Click on “Main_AP_Group”
7. Go to the APs tab → Add the AP named “Guest_AP”
8. Click “OK” when prompted
9. Go to the WLANs tab → Add the WLAN names “guest_x1”
10. Click “OK” when prompted
11. Verify by connecting a cell phone or laptop to the SSID “guest_x1”

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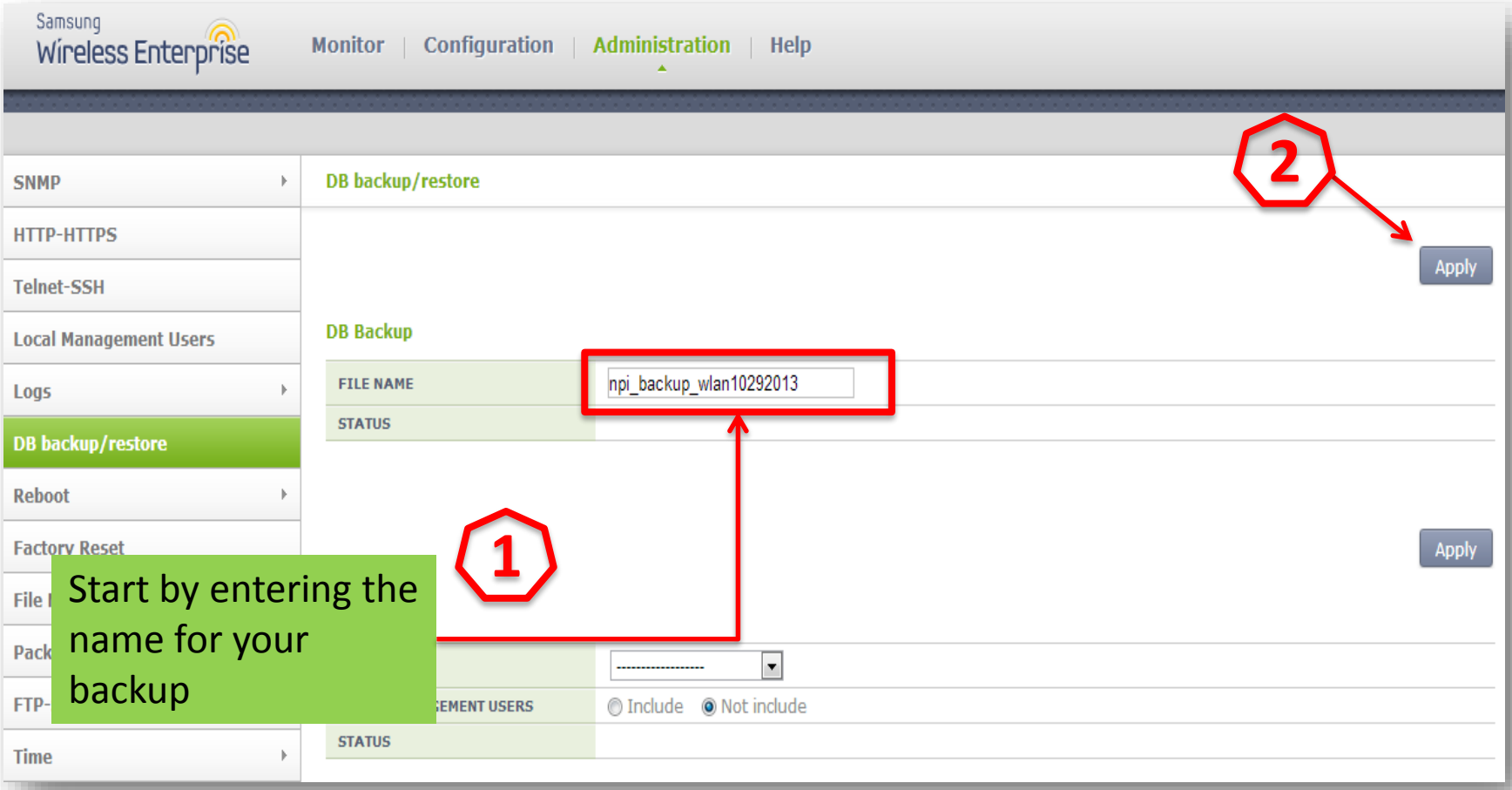
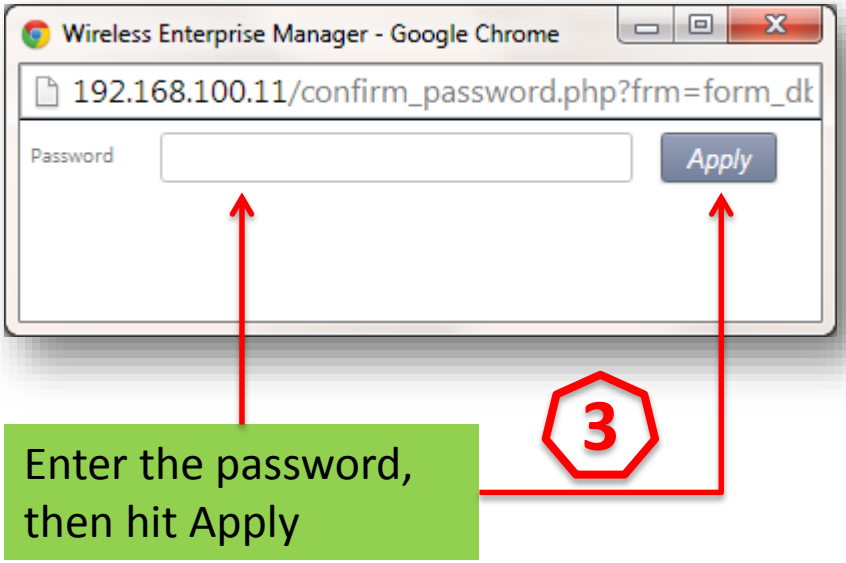
## 5. Maintenance

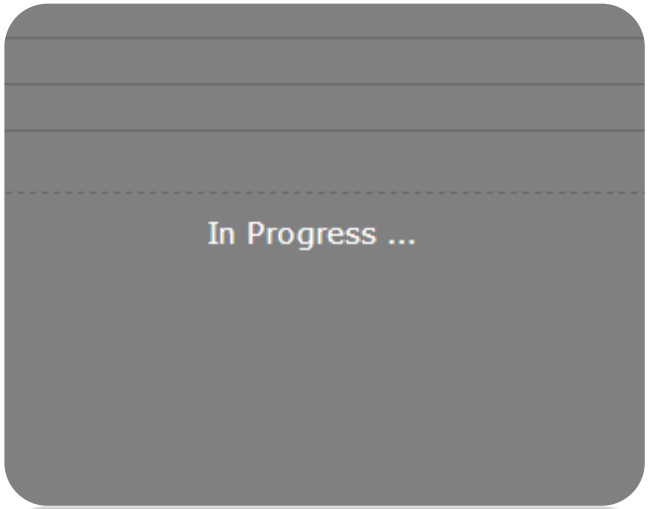
- 5.1 Backup the APC
- 5.2 Downloading the Backup
- 5.3 Upgrading the APC
- 5.4 AP Upgrade
- 5.5 Default the APC
- 5.6 How to Restore the APC

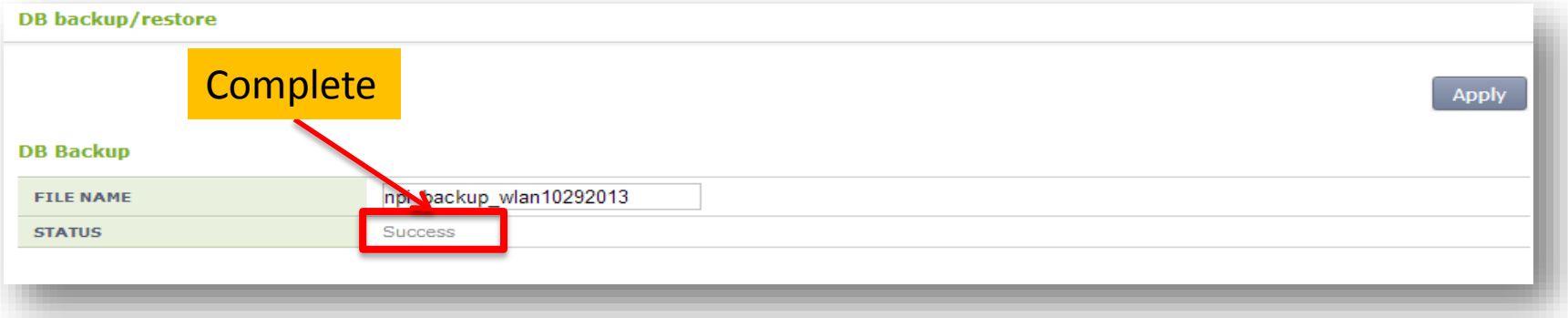
# 5.1 Backup the APC



# 5.1 Backup the APC



# 5.1 Backup the APC

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## Periodic Backup

Apply

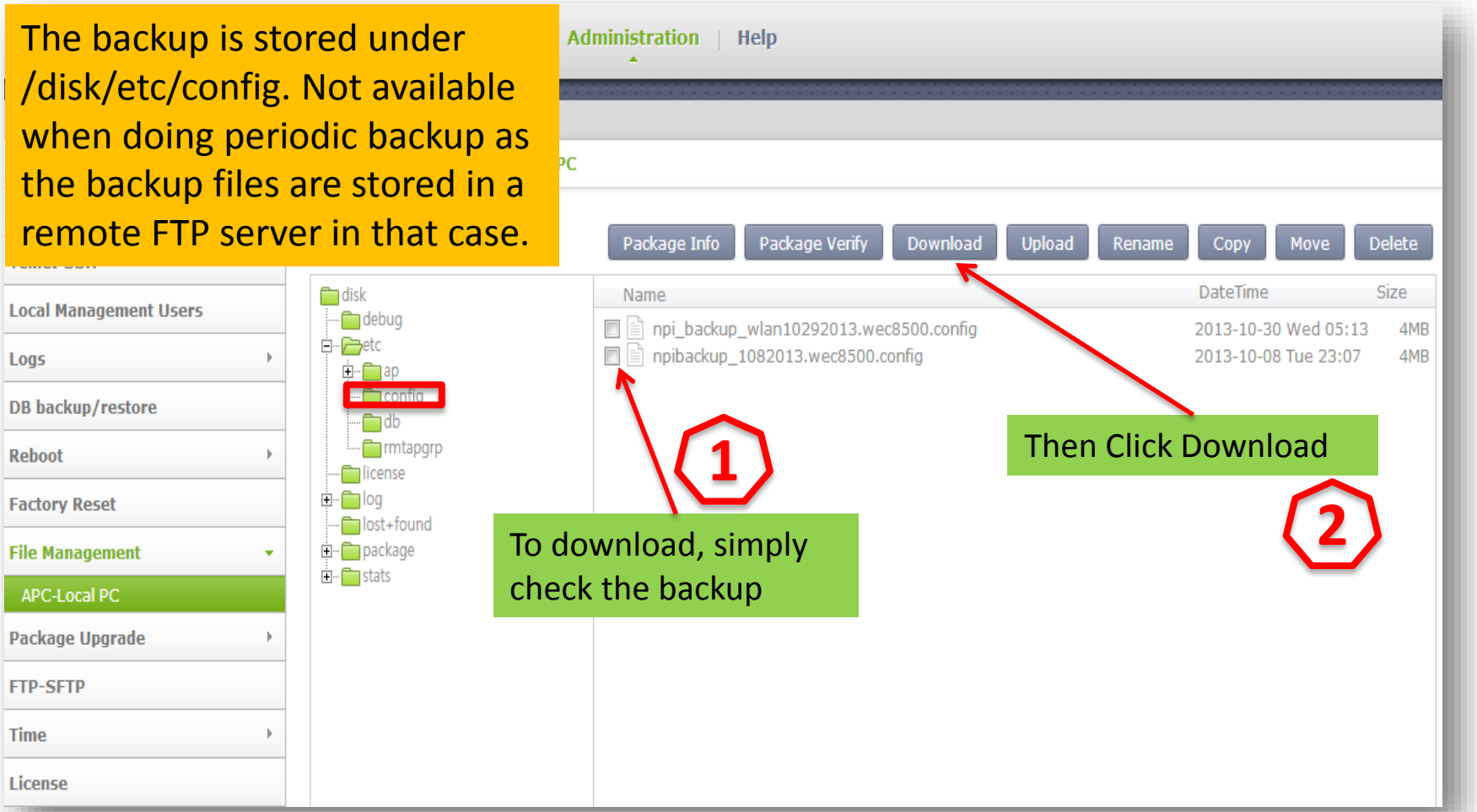
### Periodic Upload

| | |
|---|---|
| UPLOAD | (•) Enable ( ) Disable |
| CYCLE | ( ) Monthly ( ) Weekly (•) Daily<br>Time 11 : 21 |
| IP VERSION | (•) v4 ( ) v6 |
| IPV4 ADDRESS | 12 . 204 . 121 . 12 |
| IPV6 ADDRESS | 0000 : 0000 : 0000 : 0000 : 0000 : 0000 : 0000 : 0000 |
| PORT | 21 |
| USER ACCOUNT | jhannon |
| USER PASSOWORD [ ] 1 | •••••••••••• |
| REMOTE PATH | / |
| TRANSFER MODE | (•) FTP ( ) SFTP |

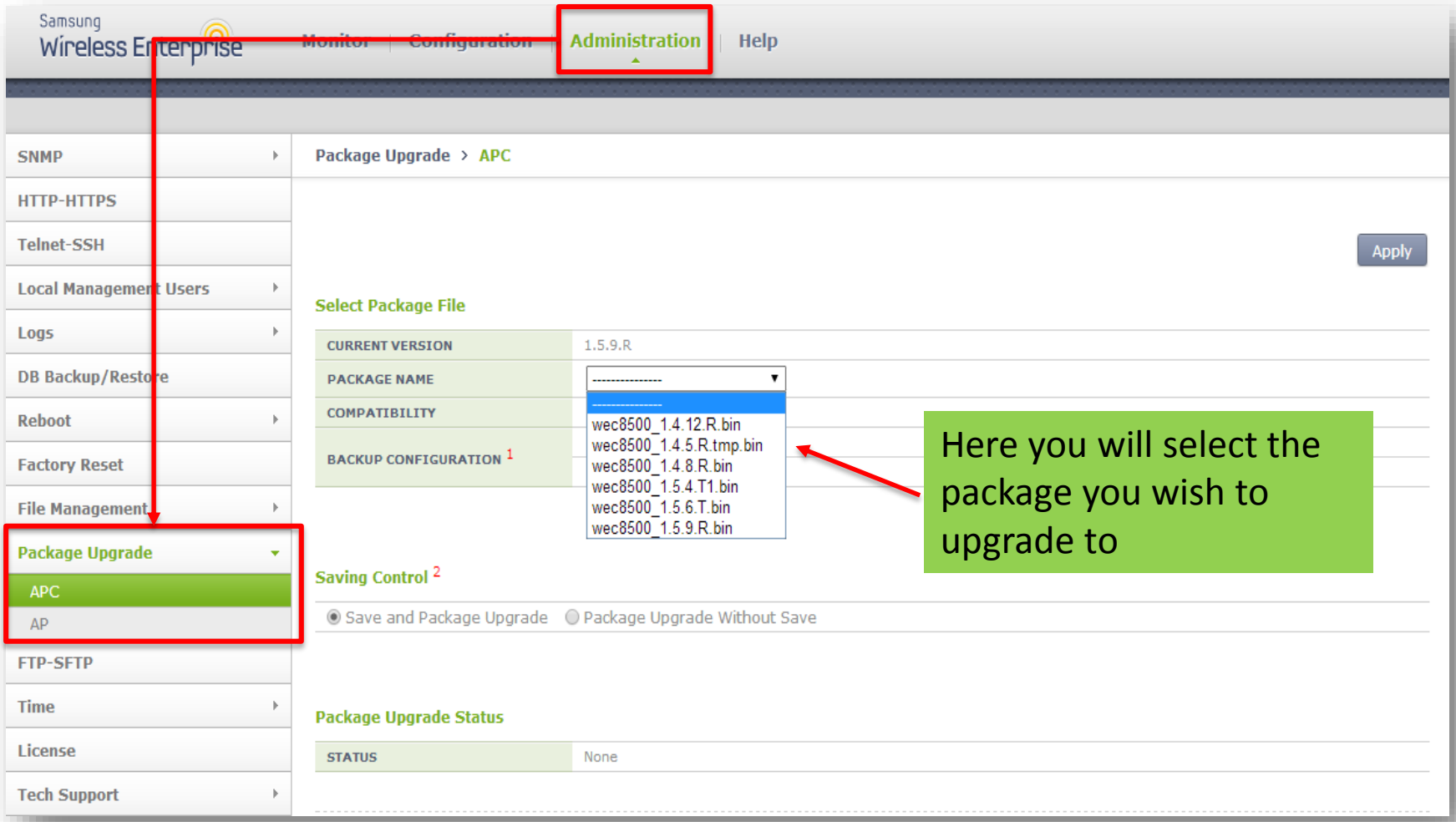
You can also schedule a periodic backup and send the backup files to a remote FTP server.

# 5.2 Downloading the Backup

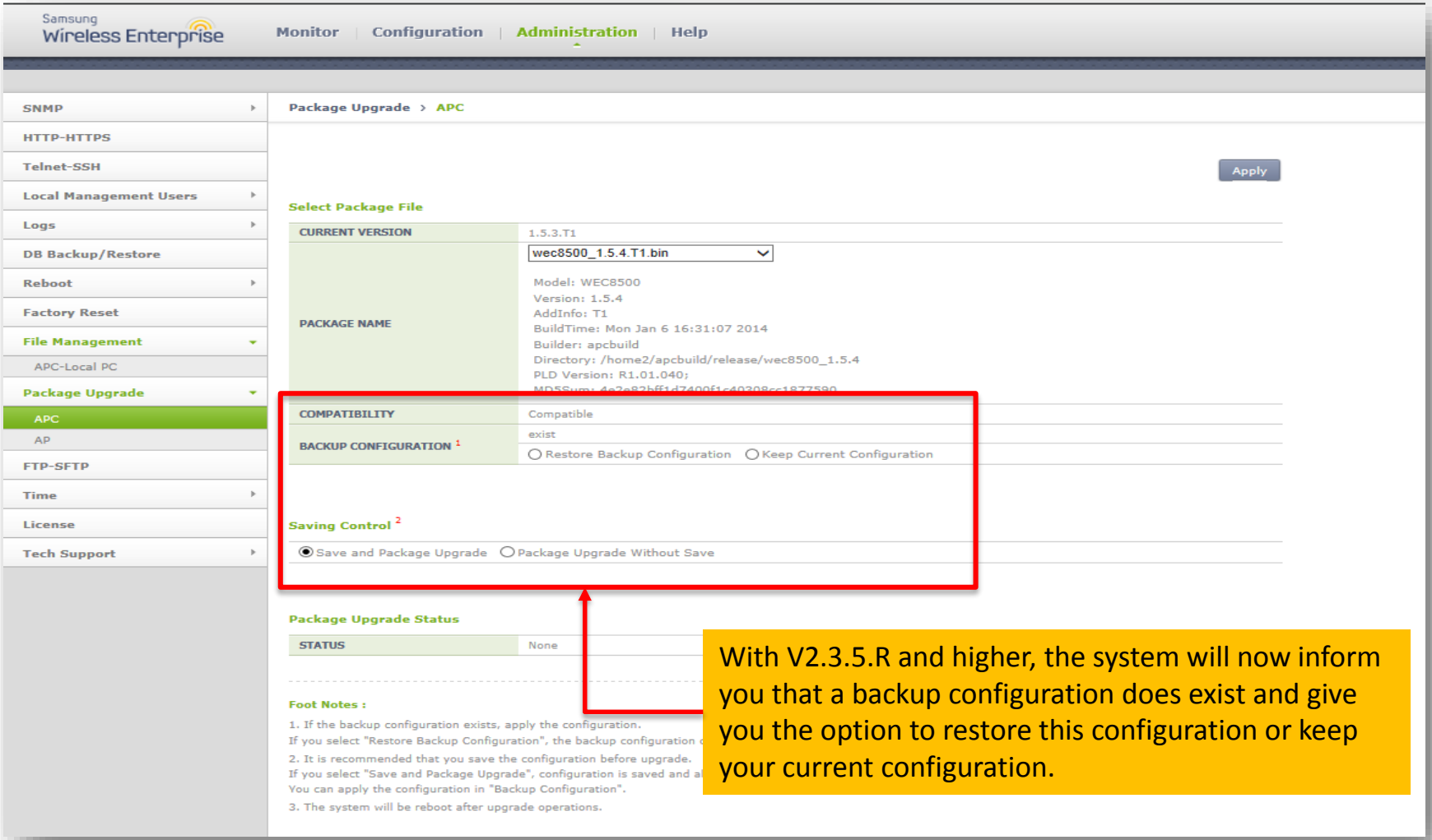
The backup is stored under /disk/etc/config. Not available when doing periodic backup as the backup files are stored in a remote FTP server in that case.



# 5.3 Upgrading the APC

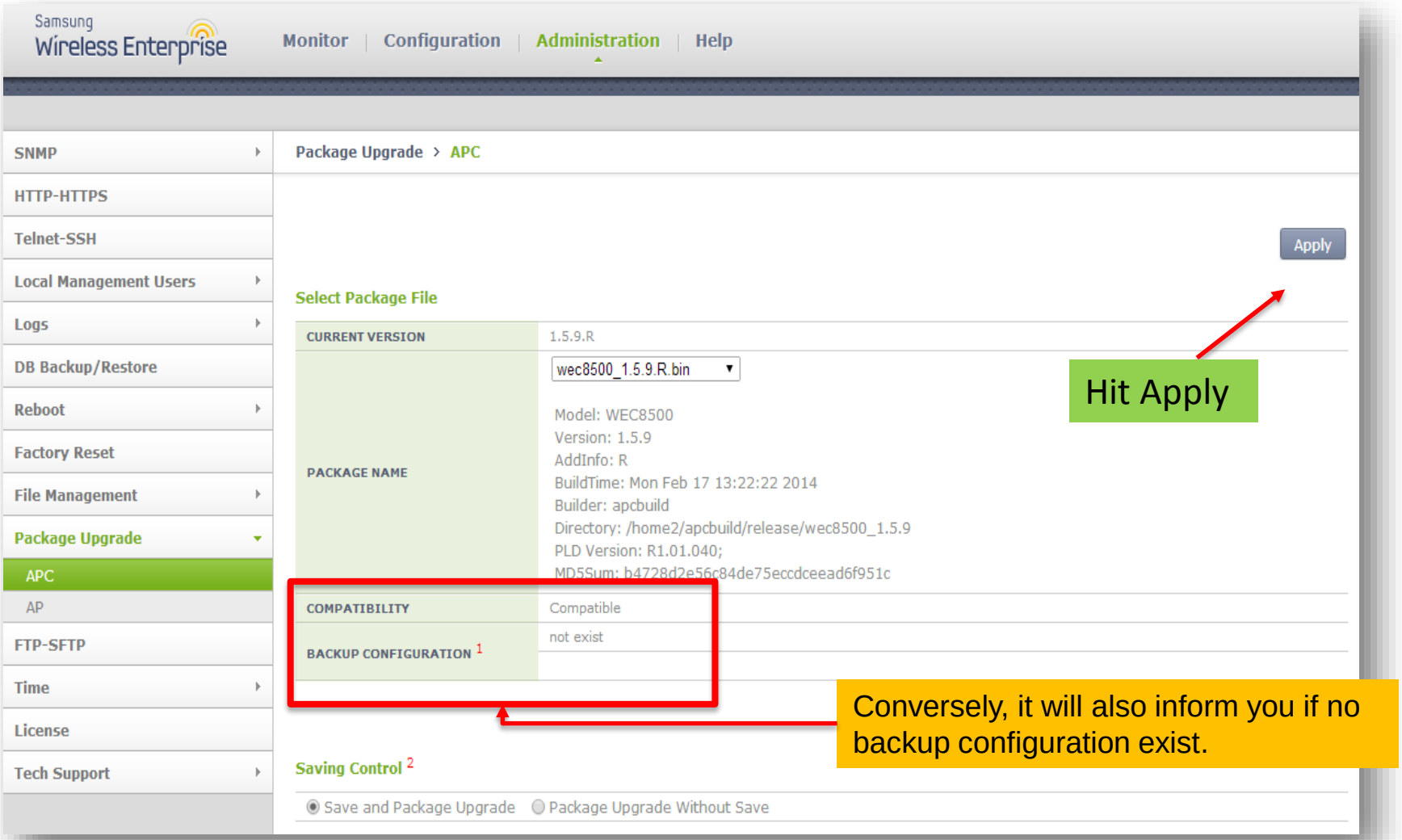


# 5.3 Upgrading the APC




With V2.3.5.R and higher, the system will now inform you that a backup configuration does exist and give you the option to restore this configuration or keep your current configuration.

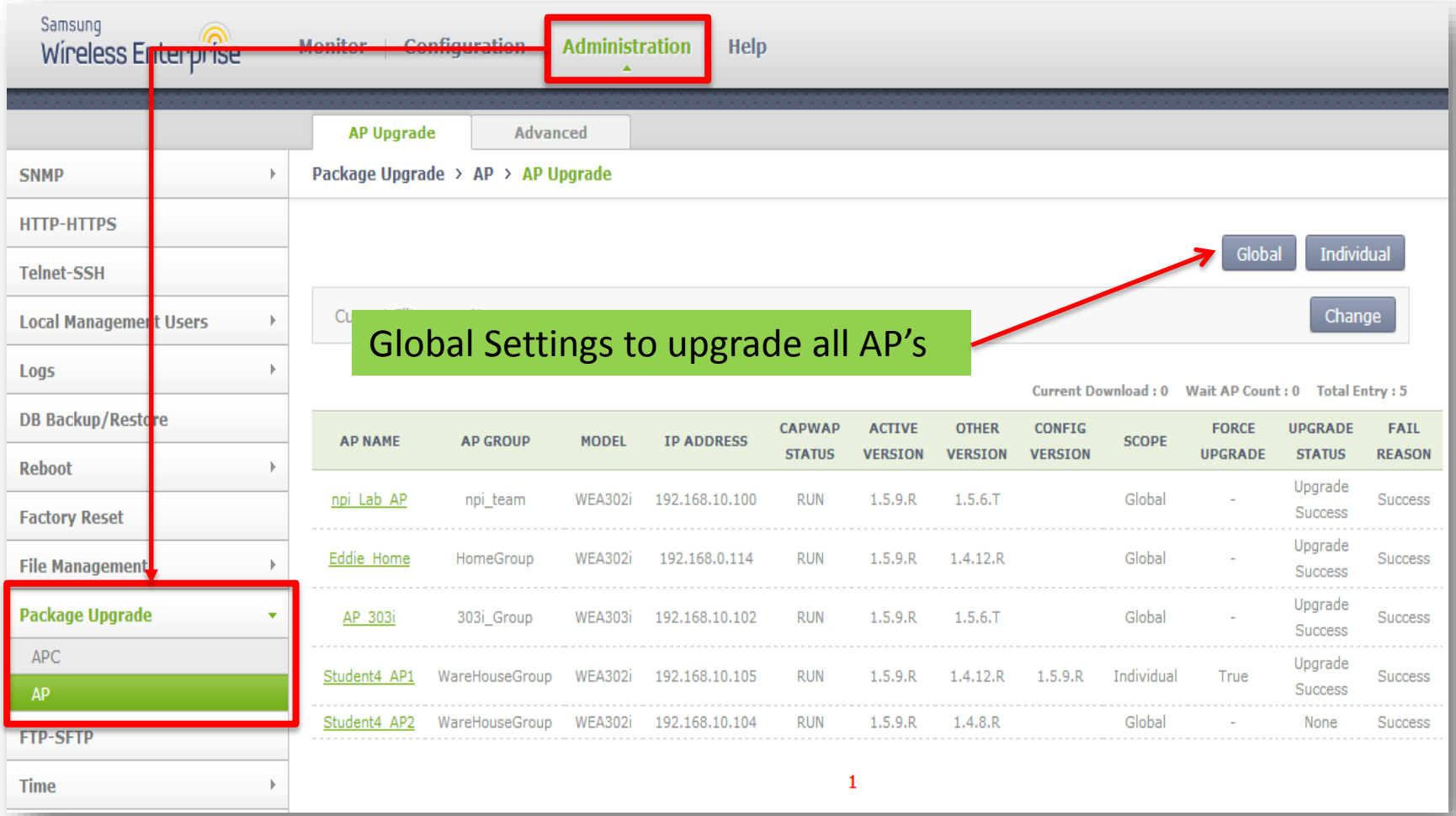
# 5.3 Upgrading the APC



# 5.4 AP Upgrade

YOU SHOULD ALWAYS UPGRADE THE APC BEFORE YOU ATTEMPT TO UPGRADE THE ACCESS POINTS

# 5.4 AP Upgrade



# 5.4 AP Upgrade

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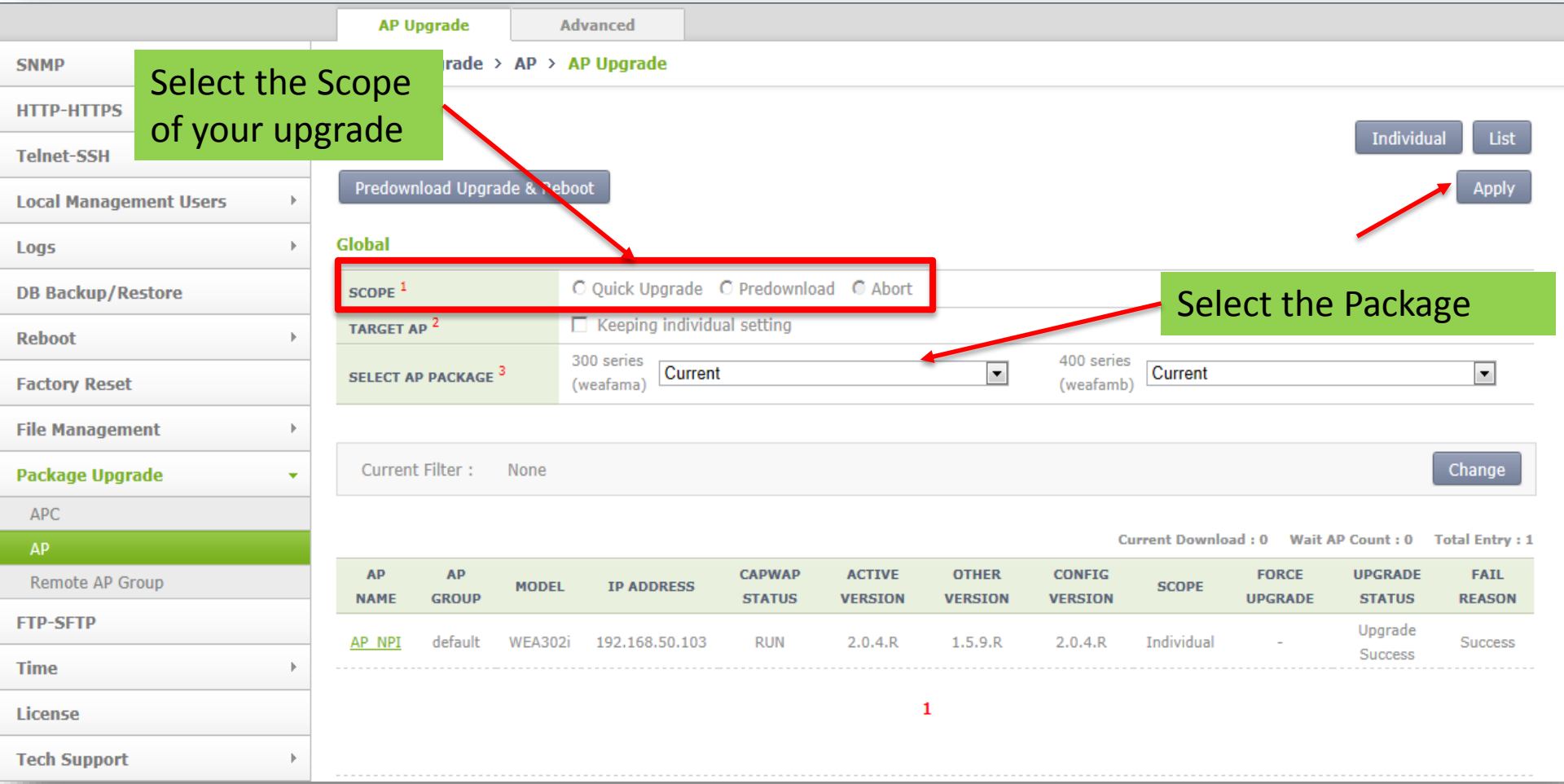
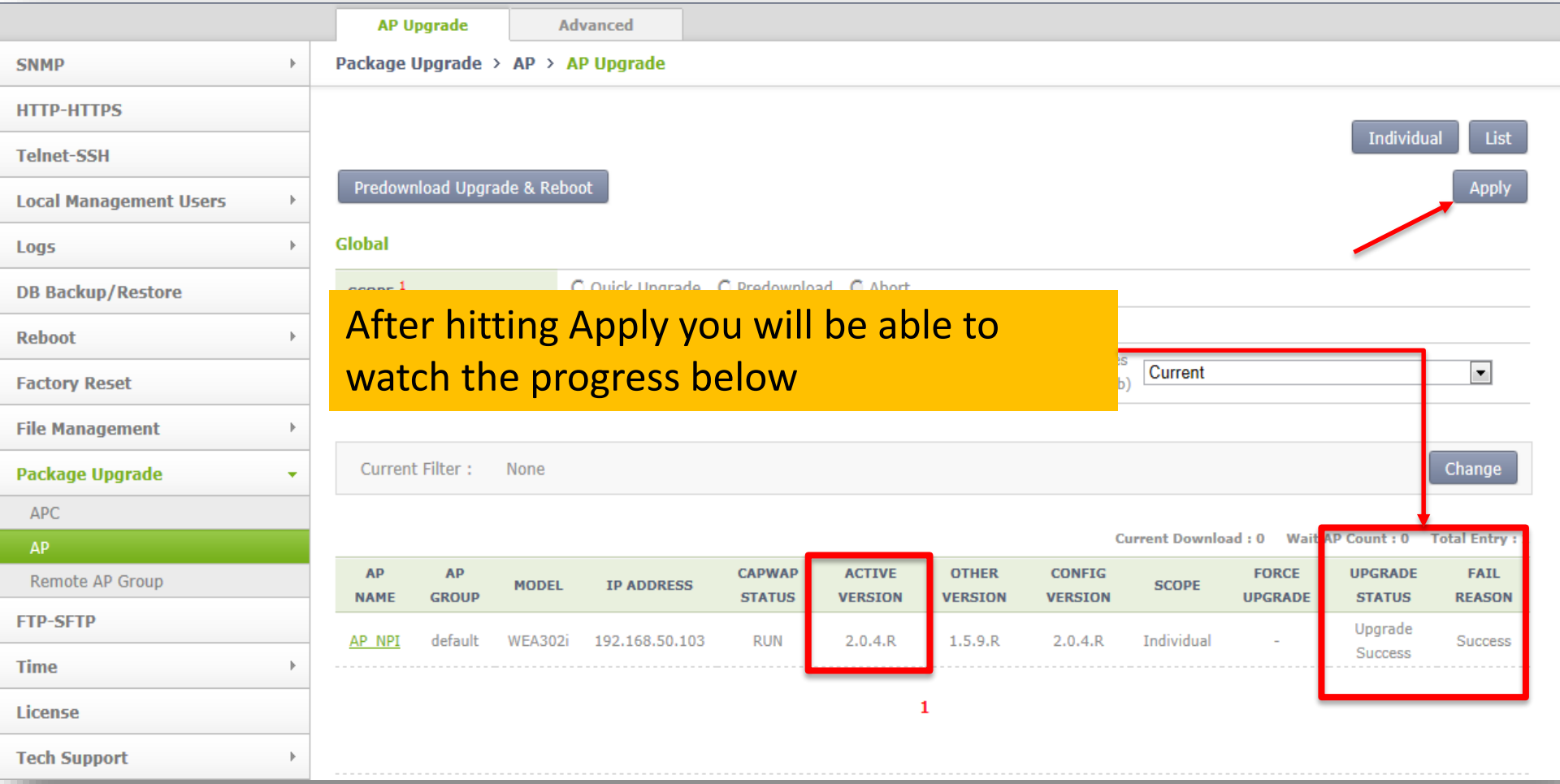
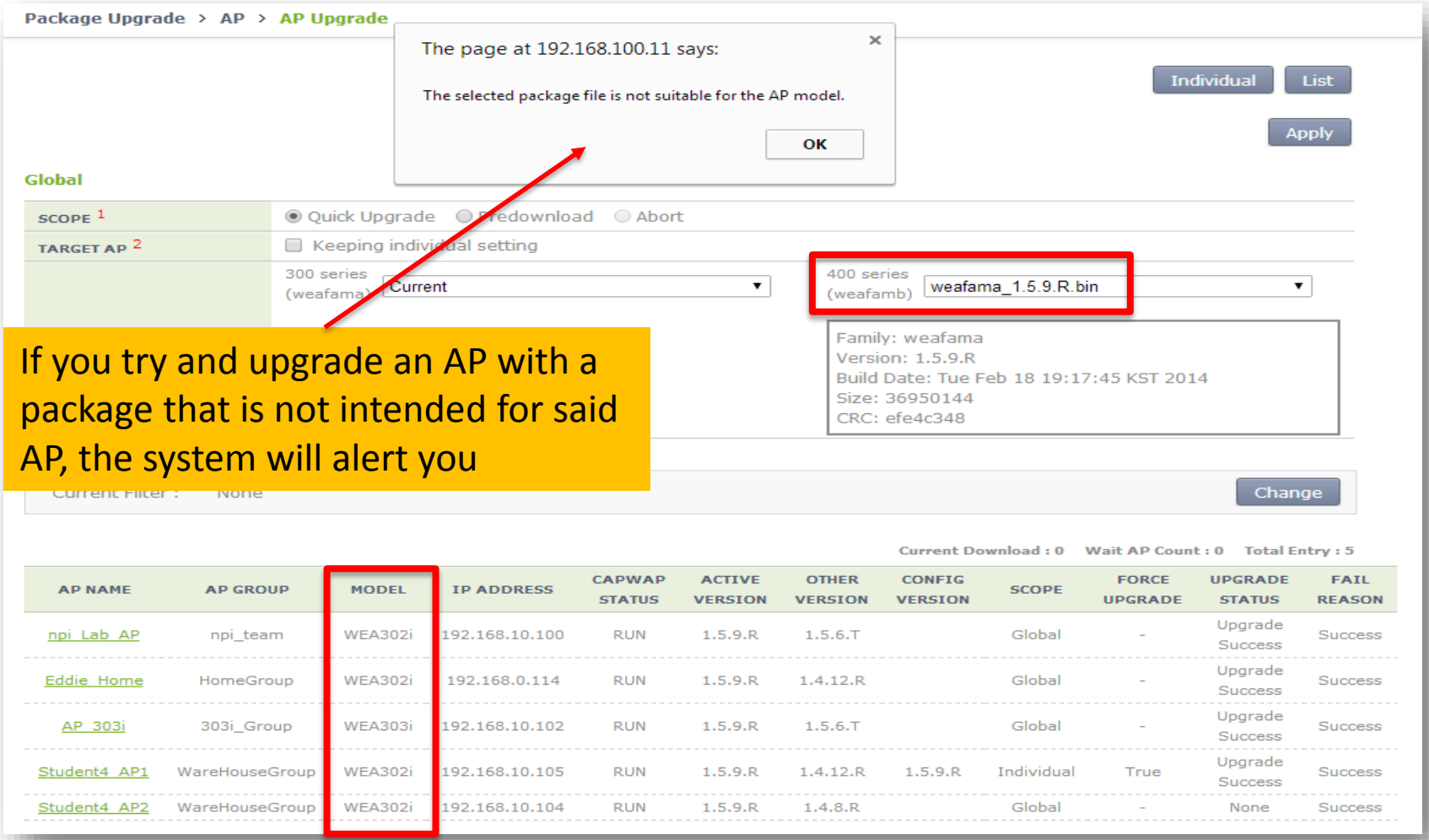


# 5.4 AP Upgrade



# 5.4 AP Upgrade




If you try and upgrade an AP with a package that is not intended for said AP, the system will alert you

# Lab 15 -

## Upgrading the APC and AP

1. Go to Administration → Package Upgrade → APC
2. Select the package
3. Select Save and Package upgrade
4. Select Restore Backup Configuration
5. Hit Apply
6. Verify the new version by clicking on Monitor
7. Go to Administration → Package Upgrade → AP
8. Select Global Settings
9. Select the scope as Quick Upgrade
10. Select the AP Package
11. Hit Apply
12. Verify new version by going back to Administration → Package Upgrade → AP

# 5.5 Default the APC

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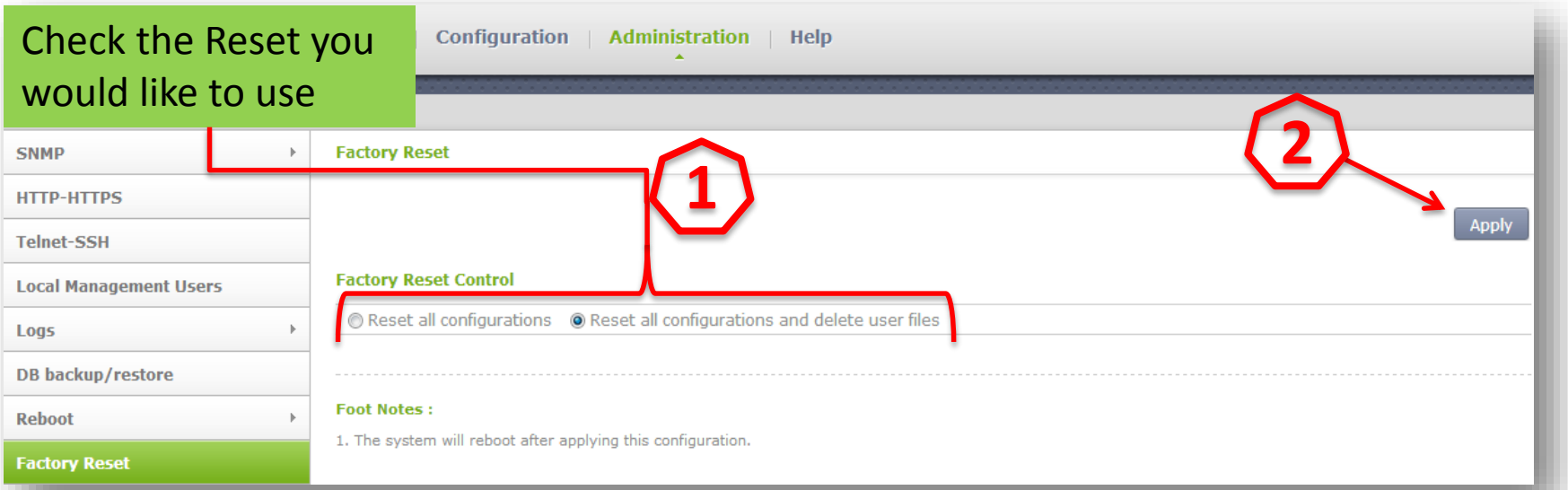
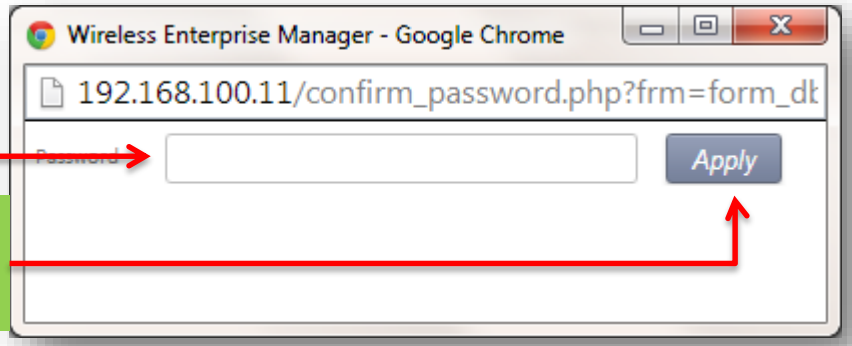
Check the Reset you would like to use




Enter the password, then hit Apply

# 5.6 Disaster Recovery for APC

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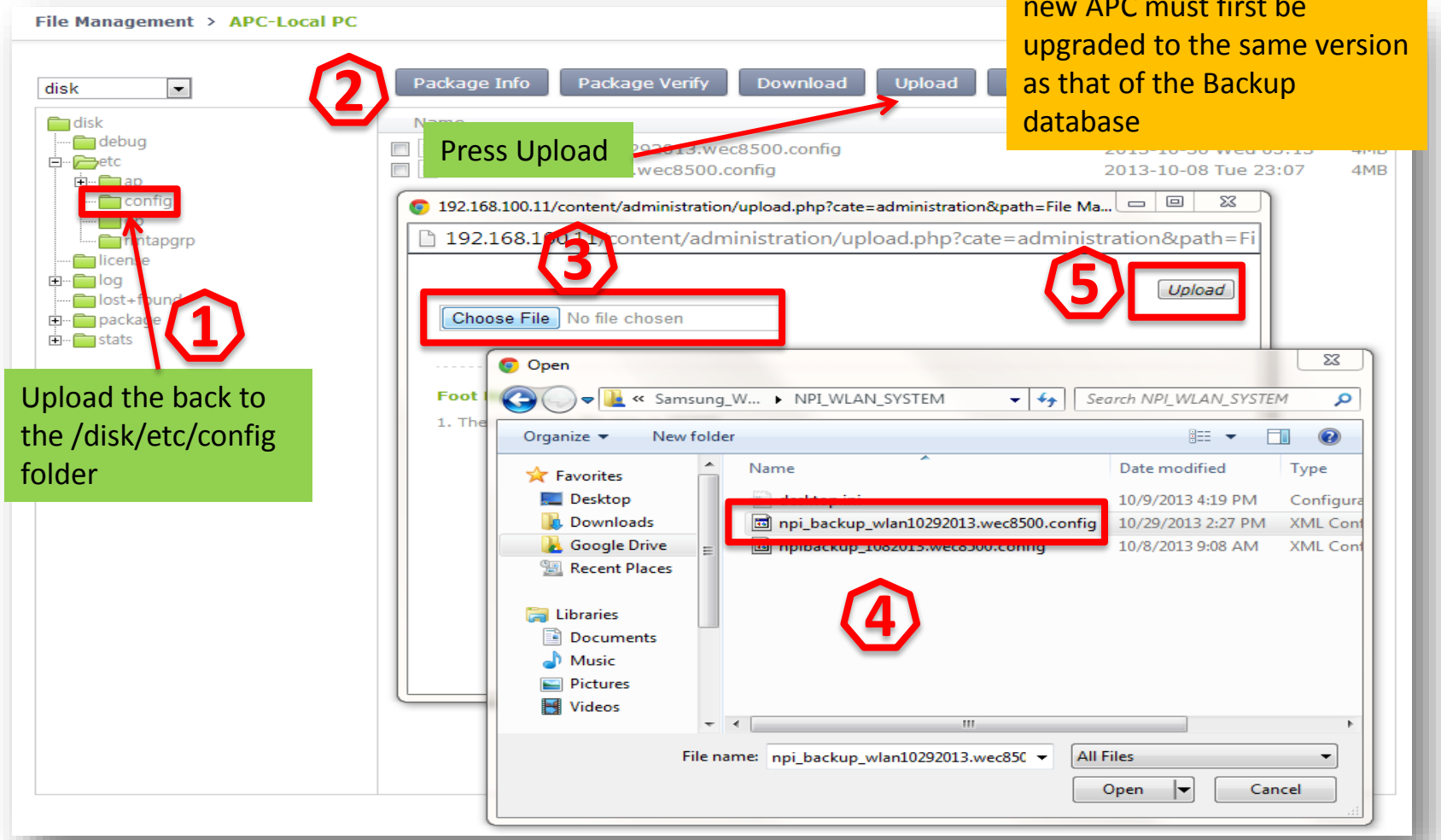
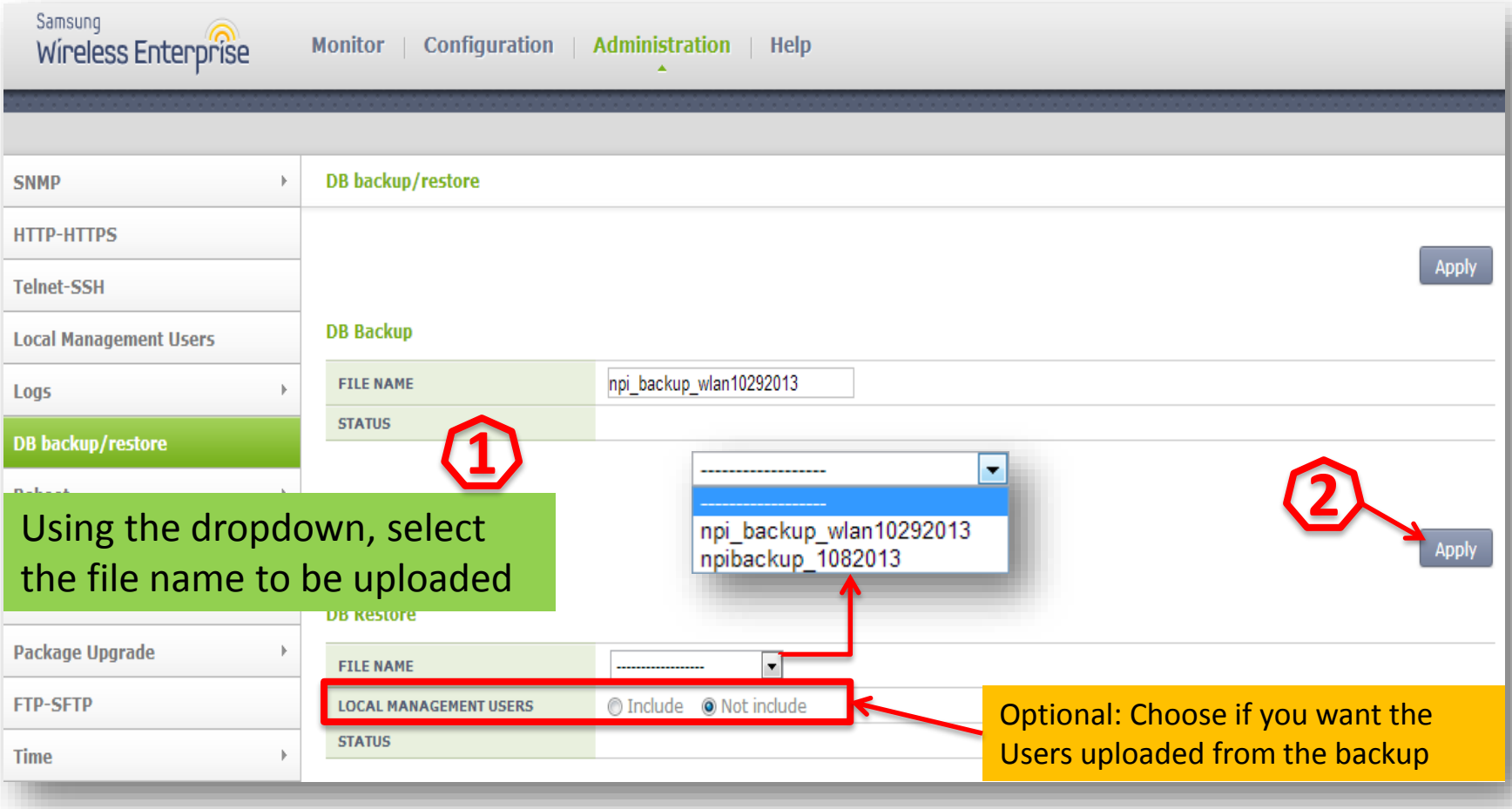
In the event of disaster, the new APC must first be upgraded to the same version as that of the Backup database



# 5.6 Disaster Recovery for APC



# 5.7 APC Redundancy

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An operator can add backup APCs to an AP to make the backup APCs provide the service even when an APC fault occurs.

The maximum number of backup APCs that can be registered to one AP per model is as follows

| APC Model | The maximum number of APC systems that can be registered |
|---|---|
| WEC8500 | 3 (Primary Server, Secondary Server, Tertiary Server) |
| WEC8050 | 2 (Primary Server, Secondary Server) |

If a fault occurs to the primary APC while an AP is connected to the primary APC, the AP is connected to the secondary APC. If a fault also occurs to the secondary APC, the AP is connected to the tertiary APC. For reference, the WEC8050 model does not support a tertiary APC.

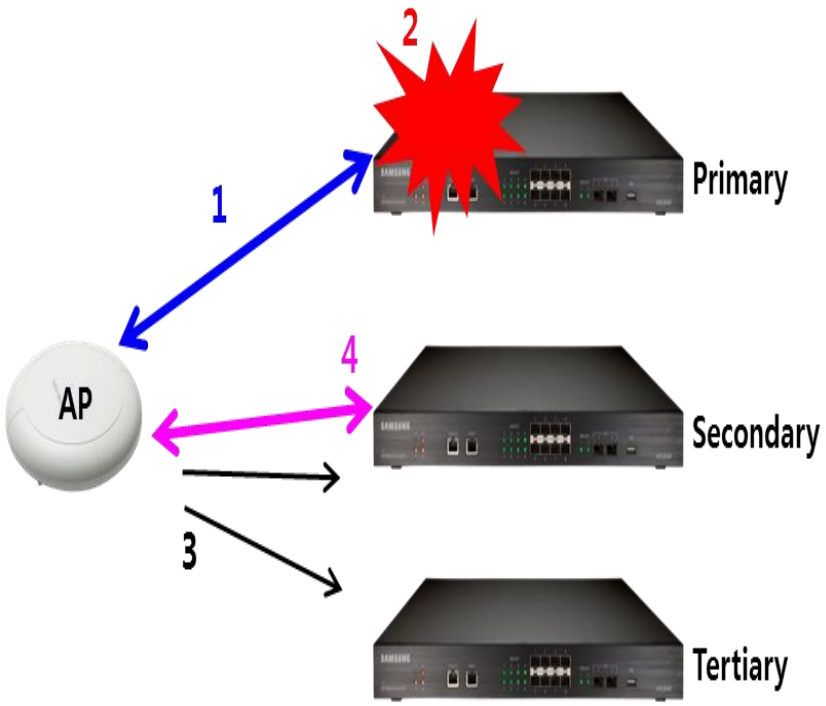
Operator can also configure fallback to return to the original APC from the backup APC during the service. If the fallback operation is configured, the AP periodically performs health check to check whether the primary APC can be connected. When the connection is required, it can immediately perform fallback according to the fallback option or can perform fallback on a specified time. The reason why configuring fallback time zone is to minimize the service interruption due to fallback by making it happens when the load is low.

In an APC, operator can configure the primary and backup APCs of an AP in the following steps.

1. **Register APCs to the APC list.**
2. **Add the APCs in the APC list to redundancy.**
3. **Configure redundant APC servers per AP or AP Group**

APC list is being used for RRM functionality or clustering as well.

# 5.7 APC Redundancy




*1. AP setting & CAPWAP joining*

*- Setting Ethernet IP address & CAPWAP IP of AP*

*- AP gets all APC's IP Lists by provisioning*

*2. Primary APC failure*

*3. AP discovers APCs except Primary*

*- Once AP detects the failure of Primary APC, AP sends Discovery Request to whole APCs except Primary.*

*4. AP joins APC*

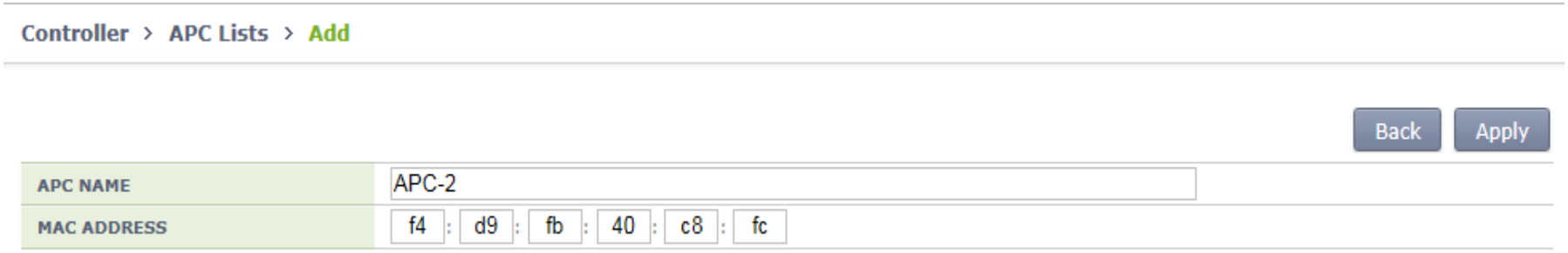
*- If AP receives Response from Secondary, AP tries immediately CAPWAP join to Secondary.*

*If not, AP collect Response from all APCs during Discovery Interval and AP joins CAPWAP to APC of the highest priority.*

# 5.7 APC Redundancy

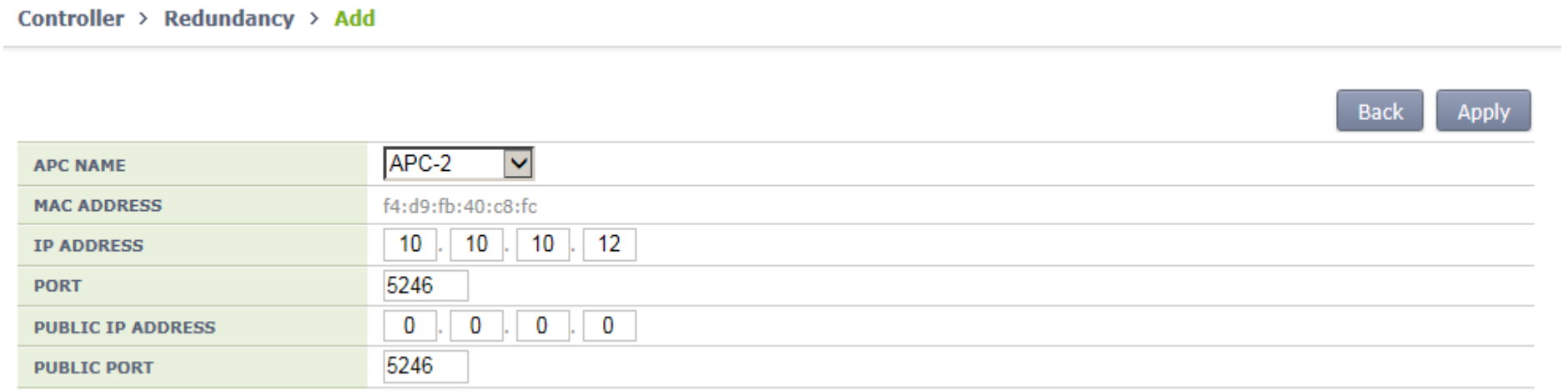
## Prerequisites

1. To configure redundancy, candidate APCs have to be added in APC List.




## Add the APCs in the APC list to redundancy

1. Add APCs to Redundancy



# 5.7 APC Redundancy

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## Configure redundant APC servers per AP

1. Set DISCOVERY TYPE of AP as APC Referral
2. Set PRIMARY CONTROLLER NAME or SECONDARY CONTROLLER NAME

Access Points > General

Back Apply

| | |
|---|---|
| AP PROFILE NAME | ap_1 |
| AP NAME | ap_1 |
| AP GROUP NAME | ap_group |
| AP MODE [1] | General AP |
| MAC ADDRESS | 11:11:11:11:11:11 |
| MAP LOCATION | |
| LOCATION | |
| IP ADDRESS | 0.0.0.0 |
| IP ADDRESS POLICY | DHCP / AP Priority (AP Followed) / Static IP |
| IP ADDRESS | 0 . 0 . 0 . 0 |
| NETMASK | 0 . 0 . 0 . 0 |
| GATEWAY | 0 . 0 . 0 . 0 |
| DISCOVERY TYPE [2] | APC Referral |
| ADMIN STATUS | Up |
| OPER STATUS | Down |
| PRIMARY CONTROLLER NAME [3] | APC-1 (10.10.10.11) |
| SECONDARY CONTROLLER NAME [3] | APC-2 (10.10.10.12) |
| TERTIARY CONTROLLER NAME [3] | ---------- |

[NOTICE]

All APC's must have the same setup, a mirror image of one another.

The interfaces will have different IP's, but should belong to the same vlan.

Naming should match for groups, wlans etc.

Security should be setup the same on both APC's

# 5.7 APC Redundancy

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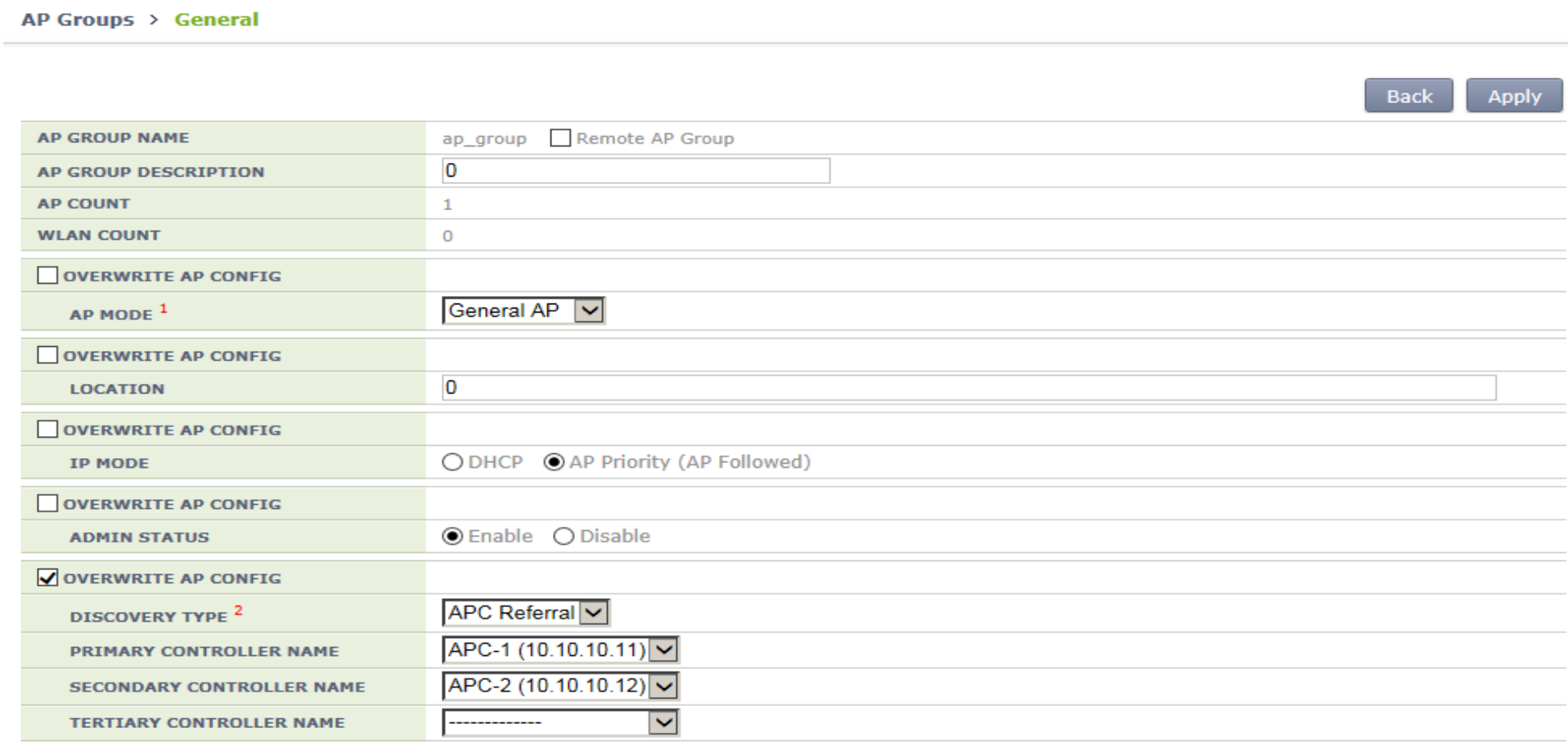
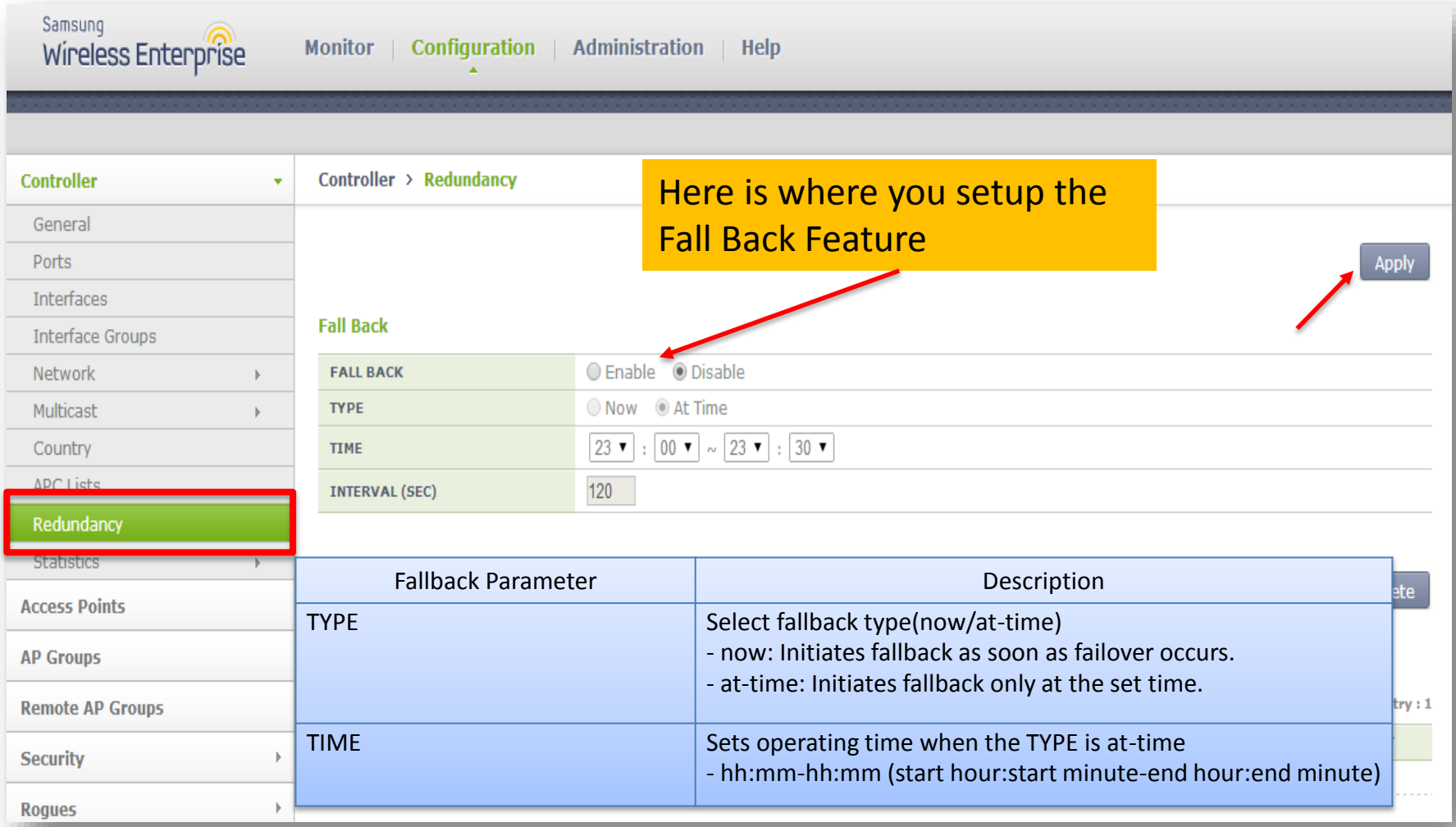
## Configure redundant APC servers per AP Group

1. Enable OVERWRITE AP CONFIG for Redundancy configuration. It makes APC copy AP group profile of redundancy to APs in the AP group.
2. Set DISCOVERY TYPE of AP Group as APC Referral
3. Set PRIMARY CONTROLLER NAME or SECONDARY CONTROLLER NAME



# 5.7 APC Redundancy




| Fallback Parameter | Description |
|---|---|
| TYPE | Select fallback type(now/at-time)<br>- now: Initiates fallback as soon as failover occurs.<br>- at-time: Initiates fallback only at the set time. |
| TIME | Sets operating time when the TYPE is at-time<br>- hh:mm-hh:mm (start hour:start minute-end hour:end minute) |

# Default the APC “Lab 15”

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## Lab 15 -

### Default the APC

1. Go to Administration → Factory Reset
2. Check “Reset all configurations and delete user files”
3. Hit Apply
4. Enter Password and press OK

# End of Day 1