



Technical Guide

# High Availability

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# 1 Introduction

The article is aimed at explaining the setup of the High Availability (HA) functionality on the Controller. HA is a system or component that is continuously operational for a desirably long length of time. Edgecore's HA mechanism uses redundancy to achieve high availability with minimum impact during service transition. HA 1+1 can be configured to provide redundancy for one Controller. Once the HA links have been established, all system configurations, user databases, user online status, system resource status, managed AP profile are synchronized between the Active AC and the Standby AC. Furthermore, the Standby AC uses a HA link monitoring module to check the status of the Active ACs. During an event that an Active AC is not responding via the HA interface, this module will regard this AC as no longer providing service and take over network service.

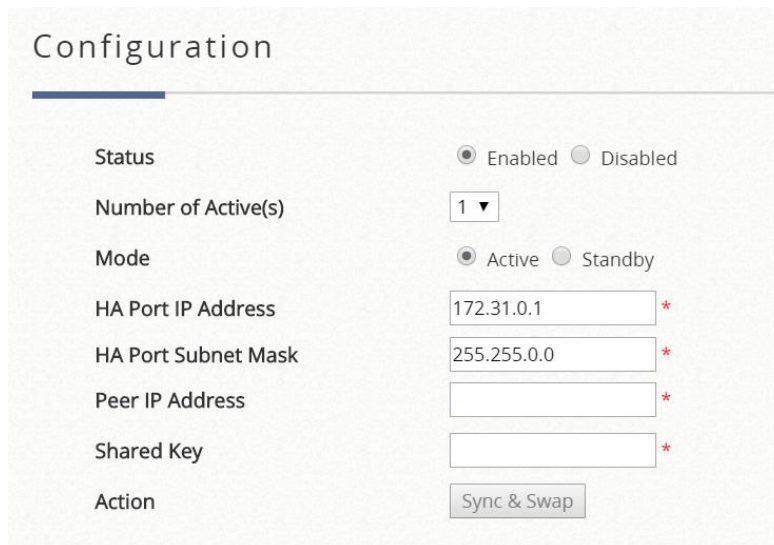
In this article, HA 1+1 and 2+1 will be illustrated. Detailed configurations are shown in the following chapters.

## 2 HA Basics

### 2.1 Requirements

1. All EWSs have to be of the same firmware version and model.
2. EWS (Active) WAN must have a static IPv4 address.
3. EWS (Active) needs to have NTP server enabled.
4. EWS (Active) and EWS (Standby) HA ports (LAN1) need to be connected directly.
5. EWS (Active) WAN1 and WAN2 can only be enabled with Fiber port, Ether port or 10G port.
6. EWS (Active)'s LAN1 is not used in PLM.

## 2.2 HA Parameters



The screenshot shows a 'Configuration' window with the following fields and values:

Parameter	Value	Required
Status	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled	
Number of Active(s)	1 ▼	
Mode	<input checked="" type="radio"/> Active <input type="radio"/> Standby	
HA Port IP Address	172.31.0.1	*
HA Port Subnet Mask	255.255.0.0	*
Peer IP Address		*
Shared Key		*
Action	<button>Sync &amp; Swap</button>	

- Status**  
 The main on/off switch for the HA functionality. Enable/Disable HA here.
- Number of Active(s)**  
 Select the Number of Actives from dropdown list. For HA 1+1, select one; for HA 2+1, select two.
- Mode**  
 Select the mode of the controller—Active or Standby.
- HA Port IP Address/Subnet Mask**  
 Enter the Port IP Address and Subnet Mask for HA here. Default value is set to 172.31.0.1/255.255.0.0.
- Peer IP Address**  
 Enter the Peer's Port IP Address for HA here. Note that HA only supports for the WAN connection with a static IP Address.
- Shared Key**  
 The required key for the handshake between the Active and Standby. The key is a numeric number 6-9 digits long.
- Sync & Swap**  
 This function is only available for 1+1 HA on the Standby Controller. Clicking the button switches the Standby Controller to Active Controller.

## 2.3 HA Port

For most EWS models, LAN1 is used as the HA port. EWS5206 is one exception that uses LAN3 as the HA port. Please check which LAN port is used as the HA port for your EWS model prior to configuring for HA.

The function of LAN1/HA port depends on whether HA is enabled or disabled and is determined through software.

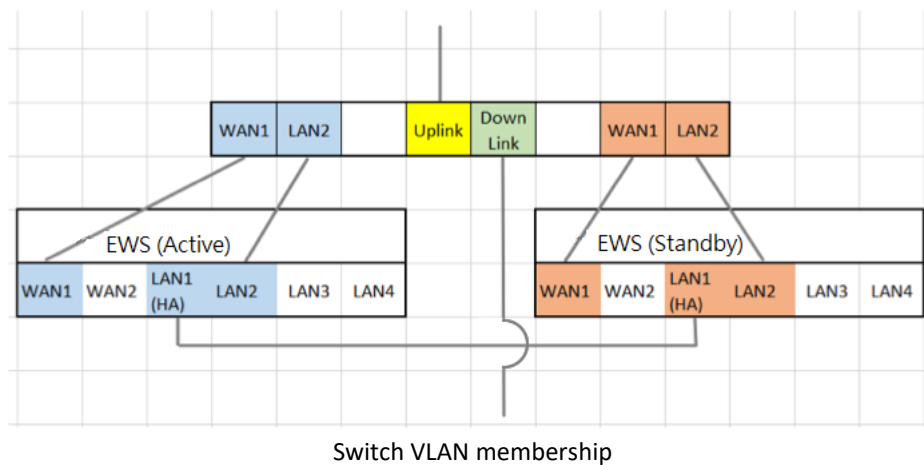
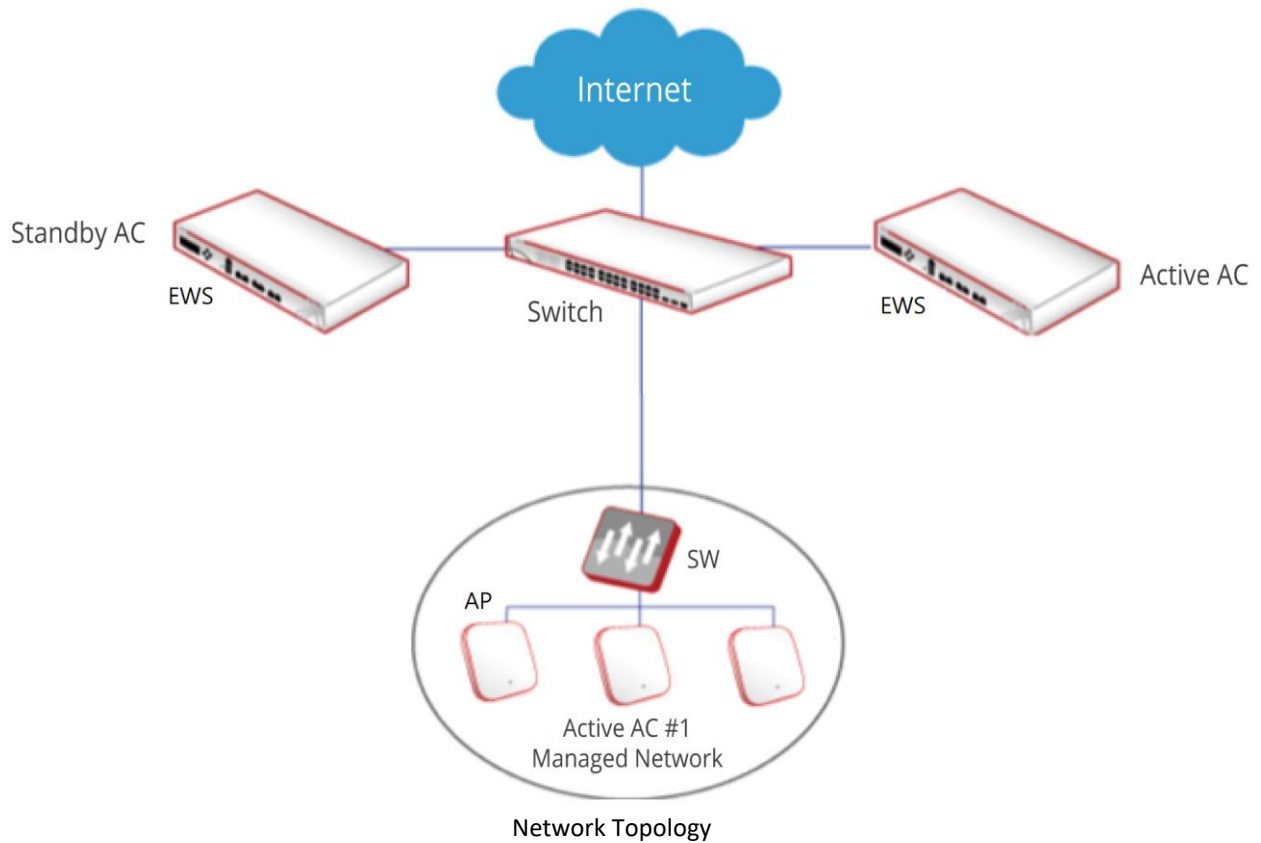
When HA is enabled, LAN1 port becomes the dedicated HA port.

When HA is disabled, LAN1 functions normally as a LAN port.

In other words, once HA is configured, LAN1 of the AC will act as the HA port and will no longer perform normal LAN port functions.

## 3 HA 1+1 Configuration

### 3.1 Network Structure



In HA 1+1, two EWS-Controllers are used, where one is in “Active” mode (Active AC) and the other one in “Standby” mode (Standby AC). When the Active AC malfunctions, the Standby AC will take over and become the new Active AC, and the new Active AC will take on all the settings of the previous Active AC.

### 3.2 Configure AC #1 (Active)

- a. First, go to **System > WAN** and set the WAN port to "Static".

The screenshot shows the 'WAN1 Configuration' page. Under 'Interface Type', the 'Static (Use the following IP settings)' option is selected and highlighted with a red box. Below this, the following IP settings are configured:

IP Address:	10.70.5.69	*
Subnet Mask:	255.255.0.0	*
Default Gateway:	10.70.1.254	*
Preferred DNS Server:	8.8.8.8	*
Alternate DNS Server:		

Other options like 'Dynamic (IP settings assigned automatically)', 'PPPoE', and 'PPTP' are unselected.

Set WAN1 to have a static IP address

- b. Go to **System > General > System**, check if the system time is correct and use AC #1 as NTP server.

The screenshot shows the 'System Time' page. The 'Current Time' is 2018/06/22 00:00:13. The 'Time Zone' is set to '(GMT-08:00)Pacific Time(US&Canada);Tijuana'. Under 'Time Update', the 'NTP' option is selected and highlighted with a red box. Below this, five NTP servers are listed:

- NTP Server 1: time.nist.gov
- NTP Server 2: ntp1.fau.de
- NTP Server 3: clock.cuhk.edu.hk
- NTP Server 4: ntps1.pads.ufrj.br
- NTP Server 5: ntp1.cs.mu.OZ.AU

At the bottom, the checkbox 'Use this controller as an NTP server' is checked and highlighted with a red box.

Use AC#1 as NTP server.

- c. Go to **System > High Availability** and configure the settings as shown in the screenshot below. When HA is active, LAN1 of the AC becomes the HA interface. The HA Port IP Address/HA Port Subnet Mask can be configured as desired. However, make sure it does not conflict with the WAN port or any Service Zone on AC. The Shared Key allows the AC to only synchronize data within the HA group. Apply the settings and reboot the AC.

### Current Status

Dedicated Port	LAN1
Status	No Peer
Link to Peer's UI	HA Configuration ▾ <a href="#">Goto</a>
Version	10000

### Configuration

Status	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled	1. Enable HA function
Number of Active(s)	<input type="text" value="1"/>	2. Choose 1 for 1+1 HA
Mode	<input checked="" type="radio"/> Active <input type="radio"/> Standby	
HA Port IP Address	<input type="text" value="172.31.0.1"/> *	3. The IP interface of HA port (Port1) of both controllers should be within the same subnet
HA Port Subnet Mask	<input type="text" value="255.255.0.0"/> *	
Peer IP Address	<input type="text" value="172.31.0.2"/> *	
Shared Key	<input type="text" value="*****"/> *	4. Key should be the same on both controller
Action	<a href="#">Sync &amp; Swap</a>	

Active AC settings

### 3.3 Configure AC #2 (Standby)

- Make sure AC #1 (Active) has successfully boot up before configuring AC #2 (Standby). Go to **System > High Availability**, enable High Availability and configure the settings as shown in the screenshot below. Select Standby. Similarly, the HA Port IP Address/HA Port Subnet Mask can be configured as desired as long as it does not conflict with the WAN port or any Service Zone on AC.

Main > System > High Availability Configuration

### Current Status

Dedicated Port	LAN1
Status	No Peer
Version	10000

### Configuration

Status	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled	1. Enable HA function
Number of Active(s)	<input type="text" value="1"/>	2. Choose 1 for 1+1 HA
Mode	<input type="radio"/> Active <input checked="" type="radio"/> Standby	
HA Port IP Address	<input type="text" value="172.31.0.2"/> *	3. The IP Interface of HA port (Port 1) of both controllers should be within the same subnet.
HA Port Subnet Mask	<input type="text" value="255.255.0.0"/> *	
Peer IP Address	<input type="text" value="172.31.0.1"/> *	
Shared Key	<input type="text" value="*****"/> *	4. Key should be the same on both controllers
Action	<a href="#">Sync &amp; Swap</a>	

Standby AC settings



- b. Click Apply. Make sure the LAN1 ports of both ACs are directly connected before rebooting AC #2.

### 3.4 Confirm HA status on both ACs

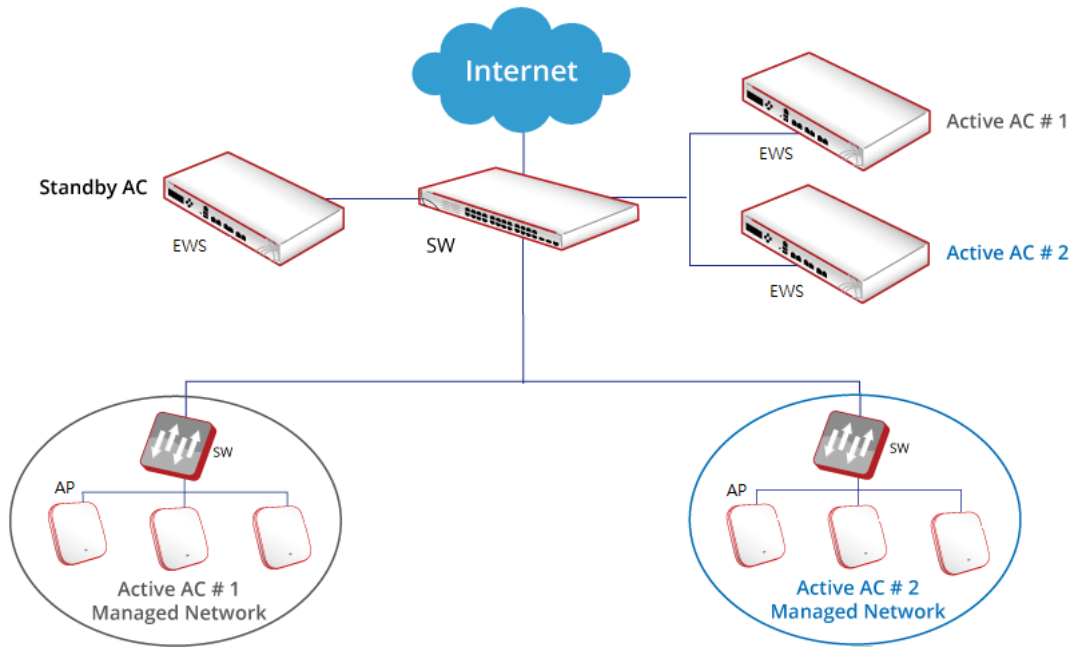
- a. After AC #2 reboots, go to *System > High Availability Configuration* on AC #1 (Active) to see the current HA status. The current HA status of AC #2 (Standby) can also be found by clicking the “Goto” button.



After clicking “Goto”, Status should show “Peer is detected”.

## 4 HA 2+1 Configuration

### 4.1 Network Structure



Network Topology

[1] WAN1 Uplink	[3] AC #1 WAN1	[5] WAN2 Uplink	[7] AC #1 WAN2	[9] AC #1 HA	[11] AC #1 HA	[13]	[15]	[17] AC #1 LAN2 (256)	[19] AC #1 LAN2 (256)	[21]	[23]
[2] AC #2 WAN1	[4] AC #3 WAN1	[6] AC #2 WAN2	[8] AC #3 WAN2	[10] AC #2 HA	[12] AC #3 HA	[14]	[16]	[18] AC #2 LAN2 (257)	[20] AC #3 LAN2	[22]	[24]

Edgecore Cable Connection Example

WAN1 – VLAN 1
WAN2 – VLAN 2
HA – VLAN 128
AC #1 LAN2 – VLAN 256
AC #2 LAN2 – VLAN 257

Switch VLAN membership

In HA 2+1, three EWS-Controllers are used, where two are in “Active” mode (Active AC) and the other one in “Standby” mode (Standby AC). This means that the Standby AC can be the backup for either

one of the two Active ACs.

Similarly, when one of the Active AC malfunctions, the Standby AC will take over and become the new Active AC, and the new Active AC will take on all the settings of the previous Active AC.

Note that when and if the malfunctioned Active AC comes back to operation, this AC would have the same HA IP Address/Subnet Mask as the AC (previously the Standby AC) that has replaced this AC, causing an IP address conflict.

Edgecore switch prevents this issue by blocking the traffic for the malfunctioned AC after the AC has malfunctioned. So for HA 2+1 and also HA 3+1 scenarios, an Edgecore switch has to be used.

Note that if the malfunctioned Active AC can't come back to operation, this AC should be taken down. No matter the malfunctioned Active AC is repaired or replaced by another AC, called a Standby AC, all ACs need to be reconfigured. The detailed configurations are shown in Section 4.2, 4.3 and 4.4.

In this example, AC #1 and AC #2 are the Active ACs and AC #3 is the Standby AC, and both AC #1 and AC #2 have dual WAN connections. All the WAN/LAN ports of the ACs should be connected to the Edgecore switch, where all the WAN ports belong to the same VLAN group, and all the HA ports belong to the same VLAN group. Note that AC #1 and AC #2 can have different VLANs for their LAN connections.

When selecting the Edgecore switch, the LAN port of the Edgecore switch should be noticed. In this case, the minimum number of LAN ports required is 16. There are three ACs, two for Active ACs and one for Standby AC. Each AC needs four ports, two for WAN, one for HA and one for LAN. Therefore, a total of 12 ports are required for three ACs. Besides, two ports as uplink and two ports as downlink.

## 4.2 Configure AC #1 and AC #2 (Active)

- a. Go to **System > WAN** on both AC#1 and AC#2 to configure WAN port settings. Similar to HA 1+1, WAN ports of both AC #1 and AC #2 should be configured as Static. See the table below for WAN configurations.

	WAN1	WAN2
AC #1	10.131.1.90/255.255.0.0	10.201.1.90/255.255.0.0
AC #2	10.131.1.100/255.255.0.0	10.201.1.100/255.255.0.0

- b. Go to **System > General > System** and set both AC#1 and AC#2 as NTP server.

System Time

Current Time: 2018/06/22 00:00:13

Time Zone: (GMT-08:00)Pacific Time(US&Canada);Tijuana

Time Update: ☒ NTP ☐ Manually set up

NTP Server 1: time.nist.gov

NTP Server 2: ntp1.fau.de

NTP Server 3: clock.cuhk.edu.hk

NTP Server 4: ntps1.pads.ufrj.br

NTP Server 5: ntp1.cs.mu.OZ.AU

☒ Use this controller as an NTP server

Use both AC#1 and AC#2 as NTP server.

- c. Go to **System > High Availability**. Make sure the HA interface does not conflict with WAN ports or any Service Zone on AC #1, AC #2 and AC #3.

Main > System > High Availability Configuration

Current Status

Dedicated Port: LAN1

Status: No Peer

Link to Peer's UI: HA Configuration Goto

Version: 10000

Configuration

Status: ☒ Enabled ☐ Disabled

Number of Active(s): 2

Mode: ☒ Active ☐ Standby

HA Port IP Address: 172.31.0.1

HA Port Subnet Mask: 255.255.0.0

Peer IP Address: 172.31.0.3

Shared Key: .....

1. Choose 2 for 2+1 HA

AC #1 HA settings.

**Current Status**

Dedicated Port	LAN1
Status	No Peer
Link to Peer's UI	HA Configuration <span>Goto</span>
Version	10000

**Configuration**

Status	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
Number of Active(s)	2
Mode	<input checked="" type="radio"/> Active <input type="radio"/> Standby
HA Port IP Address	172.31.0.2 *
HA Port Subnet Mask	255.255.0.0 *
Peer IP Address	172.31.0.3 *
Shared Key	***** *

AC #2 HA settings.

- d. Click Apply and reboot AC #1 and AC #2.

### 4.3 Configure AC #3 (Standby)

Make sure both AC #1 and AC #2 have successfully boot up before configuring AC #3.

- a. Go to **System > High Availability**, enable High Availability and select Standby. Configure the settings as shown in the screenshot below.

**Configuration**

Status	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
Number of Active(s)	2
Mode	<input type="radio"/> Active <input checked="" type="radio"/> Standby
HA Port IP Address	172.31.0.3 *
HA Port Subnet Mask	255.255.0.0 *
#1 Peer IP Address	172.31.0.1 *
#2 Peer IP Address	172.31.0.2 *
Shared Key	***** *
Switch Support	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled

AC #3 HA settings

- b. Enable Switch Support and configure the settings as shown in the screenshot below. The switch has to be managed (Switch Management) before it can be selected from the drop-down menu. Note that the Standby LAN Port(s) will take on VLANs in either #1 Active LAN Port VLAN ID(s) or #2 Active LAN Port VLAN ID(s), depending on which one has

malfunctioned, in the same order. In other words, if AC #1 malfunctions, Standby LAN Port(s) 4, 8, 12, 20 will take on VLANs 1, 2, 128, 256, respectively.

**Switch Support**

Switch IP Address:

Multiple entries for the following fields can be done using commas eg. (1,3,5). For detailed instructions on Switch Support Configuration, please refer to the User Manual.

#1 Active Related Port(s)	<input type="text" value="3,7,11,19"/>
#1 Active LAN Port VLAN ID(s)	<input type="text" value="1,2,128,256"/>
#2 Active Related Port(s)	<input type="text" value="2,6,10,18"/>
#2 Active LAN Port VLAN ID(s)	<input type="text" value="1,2,128,257"/>
Standby LAN Port(s)	<input type="text" value="4,8,12,20"/>

AC #3 HA Switch Support settings

- c. Clicking Apply. Make sure the LAN1 ports of both ACs are directly connected before rebooting AC #3.

## 4.4 Confirm HA status of ACs

- a. After AC#2 reboots, go to *System > High Availability Configuration* and click “Goto” to access the Stand-By page.

Main > System > High Availability Configuration

**Current Status** Active

Dedicated Port	LAN1
Status	Peer is detected
Link to Peer's UI	<input type="text" value="HA Configuration"/> <span style="border: 1px solid red; padding: 2px;">Goto</span>
Version	10000

**Current Status** Standby

Dedicated Port	LAN1
Status	Peer is detected
Version	10000

After clicking “Goto”, Status should be “Peer is detected”.



## 5 Reporting

HA report can be sent via Email. Go to *Status > Reporting > Notification Settings*

System Summary

Interfaces

Monitor Users

WiFi Monitor

Process Monitor

Logs & Reports

Reporting

FTP Settings

SMTP Settings

Syslog Settings

Sessions

DHCP Leases

Routing Tables

SYSTEM

USERS


























































DEVICES

NETWORK

UTILITIES

STATUS

## Notification Settings

	Receiver E-mail Address(es)						SYSLOG	Primary FTP	Interval
	1	2	3	4	5	Detail / Test			
Monitor IP Report	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	N/A	N/A	1 Hour 
Local Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
On-Demand Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
Guest Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
Roaming Out Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
Roaming In Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
External Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
Social Media Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
One Time Password Users Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
Session Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	<input type="checkbox"/> 	1 Hour 
Firewall Log	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	<input type="checkbox"/> 	N/A	1 Hour 
High Availability Mode Change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	N/A	N/A	N/A
Local Area AP Status Change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	 	N/A	N/A	2 Mins 

Notification Settings > High Availability Mode Change

## 6 Remarks

Please contact Edgecore's Technical Support Team at [ecwifi@edge-core.com](mailto:ecwifi@edge-core.com) for additional inquiries.