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1 Introduction

In this Application Scenario Guideline we will illustrate an actual Enterprise deployment, including its requirements and the corresponding solution and configurations.

The purpose of this guideline is to provide step-by-step configuration instructions that may also be applied to other enterprise deployments.

2 Project Requirements

2.1 Deployment Requirements:

<table>
<thead>
<tr>
<th>Enterprise Building Wi-Fi</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Wall or ceiling mounted</td>
</tr>
<tr>
<td>- Dual-band 2x2 MIMO Technique</td>
</tr>
<tr>
<td>- Coverage is the top priority</td>
</tr>
<tr>
<td>- External antenna</td>
</tr>
<tr>
<td>- Extra LAN port with PoE downlink capability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network Gateway-Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Estimated 3500 concurrent users</td>
</tr>
<tr>
<td>- Centralized manage 1200 APs</td>
</tr>
<tr>
<td>- Standby unit for service redundancy</td>
</tr>
</tbody>
</table>

2.2 Feature Requirements:

<table>
<thead>
<tr>
<th>Wi-Fi Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Customizable Captive Portal (Login Page) for guest to submit credentials</td>
</tr>
<tr>
<td>- User Authentication for granting Wi-Fi access</td>
</tr>
<tr>
<td>- SSID with WPA2-Enterprise security (802.1x Transparent Login)</td>
</tr>
<tr>
<td>- Multiple concurrent devices login limit via the same account</td>
</tr>
<tr>
<td>- Centralized Management for APs at each site</td>
</tr>
<tr>
<td>- Built-in DHCP server in solution to allocate IP addresses to all users</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administrator Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 1+1 High Availability to maintain network service</td>
</tr>
<tr>
<td>- Periodic Usage Reports to track</td>
</tr>
<tr>
<td>- GUI permission for Staff only</td>
</tr>
<tr>
<td>- Websites access limitation for Staff users</td>
</tr>
</tbody>
</table>
3 Proposed Solution

3.1 Recommended Edgecore Models:

<table>
<thead>
<tr>
<th>ECW</th>
<th>EWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>![ECW Image]</td>
<td>![EWS Image]</td>
</tr>
</tbody>
</table>

- 802.11ac wave 2 Dual-band
- 2x2 MIMO
- Internal antennas in 2.4GHz/5GHz, 2dBi/2dBi, 3 dBi (BLE)
- Output power 2.4GHz/5GHz, 18dBm/19 dBm

- 5000 recommended concurrent users
- 1200 APs managed
- High Availability 1+1
- Power Redundancy

<table>
<thead>
<tr>
<th>Location</th>
<th>Area</th>
<th>AP Model</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory</td>
<td>500m² x 40 sties</td>
<td>ECW</td>
<td>400</td>
</tr>
<tr>
<td>Office</td>
<td>300m² x 40 floors x 2 buildings</td>
<td>ECW</td>
<td>800</td>
</tr>
</tbody>
</table>

3.2 Network Topology:

3.3 Expected Results:

3.3.1 Captive Portal with Company Logo

The customizable Login Page allows MIS administrators to easily change the logo on the top with their most current advertisement images.
3.3.2 Staff and Guest connect to the same SSID

User Login Flow (UAM) – Staff/Guest account
After connecting to the SSID, a Service Disclaimer page will pop up. The user will need to tick the checkbox and click on the Confirm button move on to the Login Page. Enter staff/staff for the username/password or complete the E-mail field and click Login. The Login Success Page will show up after.

User Login Flow (WPA2-Enterprise) – Staff account
Client devices associated with the SSID and enter the account username/password to authentication. Once the profile been build and trust, the device could auto transparent connect to the same SSID, simplify the user login flow.
Facebook access blocked for Staff accounts
The Staff Users belong to Staff Group with specific Firewall Rule for blocking their traffics to Facebook website. So, after Staff users have successfully logged in, they cannot reach to www.facebook.com.
Real time and daily network usage reports
When the user successfully associates to the SSID, AP’s Associated Clients List will display each of their connection details. By clicking Plot button, administrator may check the real-time plotting diagram about user traffics. By clicking Kick button, administrator may manually disconnect this user.

Before user successfully logged in, administrator may observe them on EWS’s Non-Login Devices. After user successfully logged in by their accounts, EWS’s Online Users List will have their real-time information.
Last, the administrator may go to *User Events* for granting the statistics about each kind of users’ usage information by selecting the correct parameters.

The administrator could monitor the *System Report* to confirm status of each items.
**GUI permission only for Staff Users**

Check the appropriate SZs and the preferred IP Addresses to allow access permission.

<table>
<thead>
<tr>
<th>No.</th>
<th>Active</th>
<th>Service Zone</th>
<th>IP Address/Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Default</td>
<td>192.168.1.0/16</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>SZ1 Public</td>
<td>172.21.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ2 Public</td>
<td>172.22.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ3 Public</td>
<td>172.23.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ4 Public</td>
<td>172.24.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ5 Public</td>
<td>172.25.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ6 Public</td>
<td>172.26.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ7 Public</td>
<td>172.27.0.0/16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SZ8 Public</td>
<td>172.28.0.0/16</td>
</tr>
</tbody>
</table>

*Example: PC connected to LAN Port to receive an IP of 192.168.X.X*

*Example: Clients connected to SZ1-Public with an IP of 172.21.0.X cannot enter the EWS’s WMI because it is unchecked.*

*Example: Allows all IPs (0.0.0.0/0.0.0.0) to connect to the EWS’s WMI*
## 4 Configuration

### 4.1 Configuration Checklist

<table>
<thead>
<tr>
<th>Items</th>
<th>Configuration paths</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.1 Configuration Checklist</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3.2 Initial Access Browser-based GUI</strong></td>
<td>- Connect admin PC and open a browser</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.3 WAN &amp; LAN Interface Configuration</strong></td>
<td>- System &gt; WAN</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>- System &gt; LAN</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.4 Management IP Address List</strong></td>
<td>- System &gt; General &gt; Management IP Address List</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.5 Admin Password Recovery</strong></td>
<td>- Utilities &gt; Administrator Accounts</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.6 Service Zone Configuration</strong></td>
<td>- System &gt; Service Zones</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.7 Service Zone Captive Portal Customization</strong></td>
<td>- System &gt; Service Zones &gt; Service Zone Configuration &gt; Login Page Customization</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.8 Local Accounts</strong></td>
<td>- Users &gt; Internal Authentication &gt; Local</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.9 Guest Authentication</strong></td>
<td>- Users &gt; Internal Authentication &gt; Guest</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.10 User Policies Configuration</strong></td>
<td>- Users &gt; Policies Firewall</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>- Users &gt; Policies &gt; Privilege</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>- Users &gt; Policies &gt; QoS</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.11 User Group Configuration</strong></td>
<td>- Users &gt; Groups &gt; Configuration</td>
<td>☐</td>
</tr>
<tr>
<td><strong>3.12 Add APs into Management</strong></td>
<td>- Devices &gt; WAPM &gt; Enable CAPWAP</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>- Devices &gt; WAPM &gt; Template</td>
<td>☐</td>
</tr>
</tbody>
</table>
3.13 1+1 High Availability

- System > High Availability
  - Status > Reporting > Notification
  - Status > Reporting > FTP Setting

3.14 Reporting

- Status > Reporting > SMTP Setting
- Status > Reporting > Syslog
  Setting

4.2 System – Initial Access Browser-based GUI

Connect your PC to the EWS’s LAN port, then access the EWS’s Web Management Interface (WMI) by entering 192.168.1.254 in your web browser. Login to the EWS using the Default Username/Password: admin/admin.

Note: first time login will require changing the password.
4.3 System – WAN & LAN Interface Configuration

Go to System > WAN to configure the WAN1 Interface Type as “Static” with required details. Here we set the IP Address as 10.201.5.66/255.255.0.0 with Default Gateway 10.201.1.254.

Go to Status > Interfaces > WAN1 to verify WAN1 IP Address.

Go to System > LAN Ports to select “Tag-Based” as the LAN Port Mode and click on Apply.
4.4 System - Management IP Address List

Go to System > General > Management IP Address List and click the Configure button beside Management IP Address.

Check the appropriate SZs and configure the preferred IP Addresses to allow access to the Web Management Interface.

Note: Unchecking all options and disabling the SSH/Telnet Service will result in being locked out of the EWS. Please be cautious when configuring the Management IP List.
4.5 Utilities - Admin Password Recovery

Go to Utilities > Administrator Accounts and click the “admin” Name to configure password recovery.

Apply the configured Email and Security Answer before setting up the SMTP server.
Setup **SMTP Server** to allow EWS to send Password Recovery Email to administrator.

![SMTP Server Settings](image1.png)

Each email domain uses specific SMTP Server Address/Port and Encryption. This example uses a Gmail account.

**Main IT Administrator Account Credentials**

4.6 **System - Service Zones Configuration**

Go to **System > Service Zones** and confirm WAN Subnet and **Default Service Zone** IP Address are in different subnets. Take below as example,

WAN1 = 10.201.5.66 / Subnet = 255.255.0.0

LAN/Default SZ = 192.168.1.254 / Subnet = 255.255.0.0

![Service Zone Settings](image2.png)

Click Service Zone Name to configure each SZ
Click *Default Service Zone*, and administrators are able to enable the Service Zone Status and configure the basic network settings, including *Service Zone IP address, DHCP scope, and preferred DNS server*, etc.
Next, Configuring *Authentication Settings* is another important session, which administrators can enable *Guest Authentication Database* to allow self-registration users.
4.7 System - Service Zone – Captive Portal Customization

Go to **System > Service Zones > Service Zone Configuration > Login Page Customization** Click “Configure” button to start customizing different Login Page. On the other hand, **Message Page Customization** will provide customizations to message pages such as the login success page.

Each page has 4 different types of customization, **Default, Customize with Template, Upload Your Own, and Use External Page.**
Preview General Login Page in Default mode.

Preview General Login Page in Customize with Template mode with an uploaded logo and customized text.
4.8 Users - Local Accounts

Go to Users > Internal Authentication > Local to create accounts using the Local Database.

Click Add to create a single or multiple accounts at once.
Enter user account credentials and Apply. (in this example, we use staff/staff)

![User account management interface]

Created accounts can be viewed on the Local User List.
4.9 Users – Guest Authentication

Administrator expects that Guest users are authenticated by submitting their Email addresses for granting free Wi-Fi Internet access for 24 hours with limited speed and sessions, which can be achieved by Guest Authentication on EWS controller.

This paragraph will illustrate the configuration steps for Guest Authentication.

Go to Users > Internal Authentication > Guest Authentication, select the radio box to make Guest Login Input to be visible, which is the column for users to enter their Email address. Select Limited radio box to set up limited Guest Access Time, and then the further configurations will be visible. Please assign 24 hours 0 minutes as Quota; 1 minute for Access Limit. Last, assign this Guest Authentication to Guest Group for User Policy enforcement.
4.10 Users – User Policies Configuration

Administrator is going to enforce Policy 1 on Guest users with limited 500 Maximum Concurrent Sessions & QoS bandwidth control; and Policy 2 on Staff users with Firewall Rule to block Facebook access & Unlimited Maximum Concurrent Sessions.

4.10.1 Guest Users → Policy 1 profile configuration

Configure and select Privilege Profile, and QoS Profile to create Policy 1.

Go to Users > Policies > Privilege 1 to check if the Maximum Concurrent Session is 500 as the default value.

Go to Users > Policies > QoS to configure each Group/User’s bandwidth.

In order to configure the QoS Bandwidth Control, Bandwidth Limitation on WAN
must be enabled. Click the hyperlink to access the WAN configuration page.

Click the hyperlink “Bandwidth limitation on WAN” and Enable the feature.

Please check the **Bandwidth Limitation** at WAN checkbox, Apply and restart the EWS to activate the changes.

Check the Enable Bandwidth Limitation on WAN checkbox and configure the Max Uplink/Downlink Bandwidth.

After the EWS has restarted, go to **Users > Policies > QoS** to configure the QoS 1 Profile as shown below.
4.10.2  Staff Users → Policy 2 profile configuration

Go to Users > Policies > Policy 2 profile to check each of the profile numbers.
Go to Users > Firewall and select Firewall 2 to configure User Firewall Rules to block a user’s access to an IP Address or Web Domain.

Click the Add button to create a new Firewall Rule.

Configure a new Firewall Rule (BlockFacebook) with preferred Source and Destination.

Check the checkbox and click the Enable button to Activate & Enable the Firewall Rule.
Go to **Users > Policies > Privilege 2** to configure the *Maximum Concurrent Sessions* of each user under this Policy. (Default = 500)
4.11 Users – User Groups Configuration

Go to Users > Groups > Configuration and select Group 1 to configure the Group parameters, Service Zones Group 1 is allowed access to and the Policy Profile applied when an account in this group connects to the specified Service Zone.

Here we rename the Group Name of Group 1 as Guest, with 2 for Number of devices which are allowed to login, and assign Policy 1 for Default Service Zone.

Here we select and rename Group 2 as Staff, with unlimited Number of devices which are allowed to login, and assign Policy 2 for Default Service Zone.

Go to Users > Groups > Overview to check if the authentication and group relationship are correctly mapping here.
Guest Group is the Default Group for all Authentication Types including the Guest Authentication.

Staff Group has been selected as the Staff Local User Account: staff.

### Group Overview

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Authentication Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest</td>
<td></td>
</tr>
<tr>
<td>Staff</td>
<td>Local</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
</tr>
<tr>
<td>Group 4</td>
<td></td>
</tr>
<tr>
<td>Group 5</td>
<td></td>
</tr>
<tr>
<td>Group 6</td>
<td></td>
</tr>
<tr>
<td>Group 7</td>
<td></td>
</tr>
<tr>
<td>Group 8</td>
<td></td>
</tr>
</tbody>
</table>
4.12 Use WAPM on EWS to manage ECW

Go to Devices, Enable Wide Area AP Management and click Enter to configure WAPM.

4.12.1 Edit WAPM Templates

Go to Devices > Wide Area AP Management > Template, rename the Template Name then apply, configure each item.
**General Settings**

Select each card and check if the parameters are able to fit the network. After edit, click the Apply to save the configuration.

**VAP Configuration**

We can use same procedure to configure other VAP.
Security Configuration

If you would like to use 802.1x authentication, please select WPA-Enterprise.

Advanced Wireless Configuration
4.12.2 Establish CAPWAP Tunnel from AP to EWS

Enable CAPWAP in EWS
Go to Devices > WAPM > CAPWAP

Go to AP > System > CAPWAP, and edit CAPWAP Configuration then apply and reboot. Please make sure AP’s uplink could reach AC, otherwise the CAPWAP tunnel cannot build.
After Reboot, the AP would auto connect to EWS, the overview page could confirm the status of CAPWAP. Also, could monitor this at AP List from EWS.
4.12.3 Applying the template

Select the APs and click Applying template to configure multiple APs at the same time.

After click Apply, the status of AP would become Applying.
When AP successfully been applied, the status would become online and you can click Go button to access the web page of AP.
4.13 1+1 High Availability for Service Redundancy

4.13.1 Configure EWS#1 HA

First, we need to check System time, go to SYSTEM > General > System, and use the main EWS as NTP server.

Go to SYSTEM > High Availability, and Enable the High Availability at EWS#1 After Apply then reboot.

4.13.2 Configure EWS#2

Please make sure EWS#1 boot up successfully before configuring EWS#2. Same as EWS#1, go to SYSTEM > High Availability, enable High Availability and select Standby. After click Apply, before reboot, make sure the LAN1 port of both EWS are directly connect.
### 4.13.3 Confirm HA status of both EWS

Click “Goto” to access the standby page.

### 4.14 Reporting

EWS Controller can automatically send various kinds of user and/or system related reports to configured E-mail address, SYSLOG Server, or FTP Server.

#### 4.14.1 Notification

Go to STATUS > Reporting > Notification, click the check box and select the interval
4.14.2 FTP Setting

Go to STATUS > Reporting > FTP Setting, configure the FTP Settings. After configure, you can click test to confirm it.
4.14.3 SMTP Setting

Go to STATUS > Reporting > SMTP Setting, configure the SMTP Settings.

4.14.4 Syslog Setting
### Local Users Log SYSLOG Settings

- **Tag**: Local
- **Severity**: Informational
- **Facility**: Local 0

### Notification Settings

#### Click pencil to edit the information of Local Users Log

<table>
<thead>
<tr>
<th>Receiver Email Address(es)</th>
<th>SYSLOG</th>
<th>Primary FTP</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Hour</td>
</tr>
</tbody>
</table>

- **Monitor IP Report**: N/A, N/A, 1 Hour
- **Local Users Log**: N/A, N/A, 1 Hour
- **On-Demand Users Log**: N/A, N/A, 1 Hour