CATEGORY II – INTERNAL ONLY

EW CONNECTOR

--- VERSION 1.1 ---

USER GUIDE

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Version History

Date	Description	Version
September 13, 2018	EW API Technical Description, Authentication, Request and Response Parameters, Status Codes, Error Codes	1.0
January 10, 2020	Updated Request and Response Data Structures using JSON RPC 2.0. Revision of various sections	1.1

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1 Introduction

This is a User Guide for internal users at CBW Bank, offering step-by-step instructions on the management of Early Warning Connector Backend. Various sections deal with the identification of users/stakeholders, acronyms, abbreviations, explanations of key technical terms used throughout the document, the various functionalities/features of the EW Connector and Error Codes.

1.1 Purpose & Intended Audience

The purpose of this documentation is to assist Admin Users, L1 and L2 Users of the EW Connector to understand workflows associated with managing the EW Connector backend. The document helps intended Users understand the various features made available in the EW Connector backend, along with their usage and interpretation of error codes.

Functionalities made available to Admin Users of EW Connector include:

- Addition of Customers
- Linking of Fee Profiles with Customer Profiles
- Enabling/Disabling “Active” Status of Customers
- Enabling/Disabling of RMS
- Shutting down of application

Responsibilities of L1 Users of EW Connector include:

- Addition of Customers
- Editing of Fee Profiles
- Linking of Fee Profiles with Customer Profiles
- Updating TopUp details for Approval
- Enabling/Disabling “Active” Status of Customers
- Enabling/Disabling of RMS
- Carrying out Balance Audit of Customer Fee/Consumption
- View History of Transactions/Hits

Responsibilities of L2 Users of EW Connector include:

- Adding new Customers
- Editing fee profiles
- Linking of Fee Profiles with Customer Profiles
- Approve TopUp
- Enabling/Disabling “Active” Status of Customers
- Enabling/Disabling of RMS
- Carrying out Balance Audit of Customer Fee/Consumption
- View History of Transactions/Hits

1.2 Abbreviations, Acronyms, Terms and Definitions

The following table lists the acronyms, abbreviations, terms and definitions used in this document.

Acronym	Definition
AOA	Account Owner Authentication
API	Application Program Interface
DDA	Demand Deposit Account
EW	Early Warning Connector that connects to the Early Warning service
JSON RPC 2.0	Java Script Object Notation Remote Procedure Call Version 2.0
XML	eXtensible Markup Language used for data transfer
RDC	Real Time Deposit Check
RMS	Risk Management System
Key Terms	**Definition**
Admin User, L1 User, L2 User	Designated employees of CBW Bank who are the intended Users of the document.
User	• Refers to the employee(s) of CBW Bank clients who consume the services. • Specifically refers to CBW Bank clients that consume EW (AOA) Services offered through API Server. • Referred to as **"Customer"** in the EW Connector
Routing number	Bank routing number is a nine-digit numeric ID that is assigned to Banks. This unique code indicates the location of the US Bank, and is printed on the bottom of checks.
JSON Format	Message encoded in JSON Format. The standard file format uses human readable text for the purpose of transmitting data. The Request Format includes ID, Method and Parameters (API, Payload) Response Format includes ID and Result (Parameters)
Payload	The actual data in a specified format, that is transmitted alongwith protocol overhead when interacting with applications
Processing Response	Refers to response data with System Error Codes, Inquiry Field Validation Codes and Result Codes
Account Level Response	Refers to response data with Account Score Responses, and reason codes
Request Parameters	The Fields in the **Payload** used for the purpose of eliciting a response from the AOA service.
Response Parameters	The Fields received as a **Response** from the AOA Service to the **Request** transmitted in the Payload.

2 Service Overview

EW Service is intended to offer real time verification of account ownership, by matching account owner data such as Account Name, SSN, DOB, Account Number, Routing Number. This verification is provided by Early Warning LLC, through the Early Warning National Shared Database[SM] Resource. Calling parties (CBW Bank Clients) access the service through the API Server. On receipt of the account authentication information, the calling party uses the verified information to either carry out risk assessment or take suitable action as may be deemed fit.

2.1 How the Service Works

The User (CBW Bank Client) subscribes for Account Ownership Authentication Service through CBW Bank. The User pays a fee for use of the services, at rates specified in the contract entered with CBW Bank.

Whenever the User requires Account Ownership Authentication to be carried out, the User sends a Request in JSON Format to the API Server seeking information on any one of the three Service Categories. The API Server converts the request from JSON Format into XML Format and transmits the request to the AOA Service of Early Warning. The Account Ownership is verified against the National Shared Database[SM] Resource and the same is transmitted back in XML Format to the API Server. This is then converted to JSON Format, and specific relevant fields are transmitted back to the User.

The Response contains two types of Response Data – *Processing Response* and *Account Level Response*.

- *Processing Response* – is the Response data that carries the System Error Codes, the Inquiry Field Validation Error Codes and Result Codes.
- Account Level Response – is the Response data that carries the Account Score Responses and Reason Codes.

The Response Data offers the User (CBW Bank Clients) with information that can either be used for assessing risk or for appropriate action as deemed fit.

2.2 Service Categories

Participating financial institutions can receive responses in one of the following three categories.

- Account status only – *This returns information pertaining only to the Status of the queried Account.*
- Account owner response only – *This returns information pertaining only to the Status of the Account Owner of the queried Account.*
- Account status combined with account owner response – *This returns information pertaining to the Status of the Account as well as the Account Owner of the queried Account.*

2.3 Admin Processes

- Customer Onboarding
- Customer Account Activation
- Customer Fee Management

- Customer User Management
- Customer Balance top-up
- Customer Reports
- Customer Transaction Audit Management

3 Process Flow

Process :

1. Directory Services Admin creates login credentials for Admin User, L1 User and L2 User.
2. The credentials are emailed to the intended users.
3. Users log in to the EW Connector and change the password, before logging in to the EW Connector for accessing features/functionalities.
4. Admin/L1/L2 User onboards Customer(s).
5. Admin/L1/L2 User edits Fee Profile(s) of Customers and Links the same to the Customer Profile(s).
6. L1 User adds/updates details of topup made by Customers.
7. L2 approves the topups made by Customers on notification of topups as updated by L1 User.
8. Admin/L1/L2 User Activates/Deactivates the Status of Customers as per laid down criteria – (discontinued use of service, compromised credentials, inadequate topup, frequent attempts to access from non-whitelisted IP/device).
9. Admin/L1/L2 User enables/disables RMS Check option for Customers, which is used for the purpose of re-verifying the risk score of Customers.
10. The Customer/Consumer side of the process flow is listed out in the section below.

	Certain functions are common for all three Users, with each User having one distinct and unique functionality unavailable to the other two, as listed below : • *Admin User – The only one who can shut down the application* • *L1 User – The only one who can add/update the topup details of Customer(s)* • *L2 User – The only one who can approve the topup details of Customer(s)* • *L1 and L2 Users are the only ones who can view Balance Audit, History and Fee Profile Page*

Process Flow (Customer Side):

1. CBW Bank Clients (Users) whose Profiles are **"Active"** in the EW Connector, seek information from the API Server by transmitting a request in JSON Format.
2. The API Server transmits the request after converting it into XML Format, to the Account Owner Authentication Service from EW.
3. The Account Owner Authentication Service of EW verifies information from the Database and transmits the same back to the API Server in XML Format.
4. The API Server transmits the response in relevant, specific fields to the User, in JSON Format after converting the same from XML Format.
5. This authentication of ownership is transmitted in one of three types of verification responses – **Yes** (*Correct*), **No** (*Incorrect*) or **Conditional** (*Partially Correct*).

6. The response contains one of the following:
    - Account owner match codes.
    - Hard-hit warnings on participant accounts
    - Informational responses on participant accounts

The three methods mentioned above are exposed by EW as a SOAP interface. A REST wrapper has been built around the SOAP requests and responses and all specifications are in the JSON format.

Endpoints:

Production:
https://ew.cbwmoney.com/ew/rest/inquire

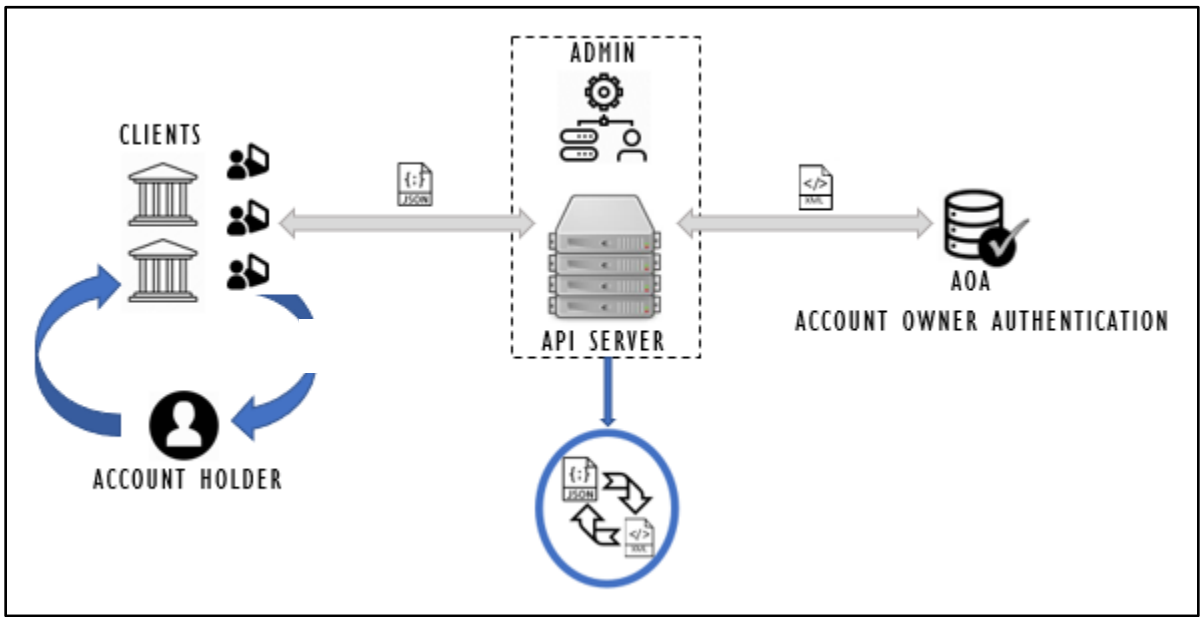


Figure 1 : Process Flow

4 EW Connector

4.1 Logging into EW Connector

1. The URL and credentials are mailed to respective designated Admin, L1 and L2 Users.
2. Click on URL to access the Login Screen of the EW Connector.
3. Enter the (1) username and (2) password in the respective input boxes and click on **Login** as shown in *Fig.2*.
4. First time users can change the password, after logging in the first time, which is explained in subsequent sections.

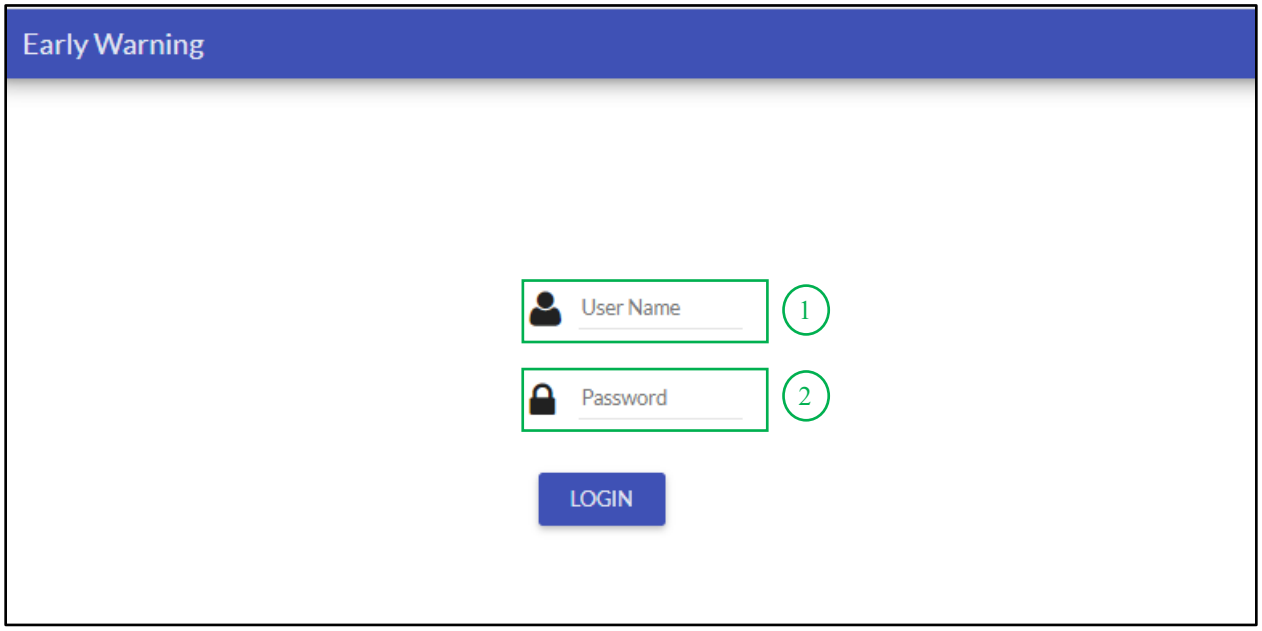


Figure 2 : Logging In

4.2 Home Menu for Admin

By default, the Home Screen of the EW Connector comprises the following :

- The Main Menu (1) comprising four different Menus – Monitor, Customers, Firewall and Email Template.
- Section displaying the list (2) of Customers in EW connector with various details, arranged page-wise.
- The Email ID of the logged in Admin User (3).
- A small drop-down arrow with options for either logging out of the application, changing the password, or Shutting down (4) the application.

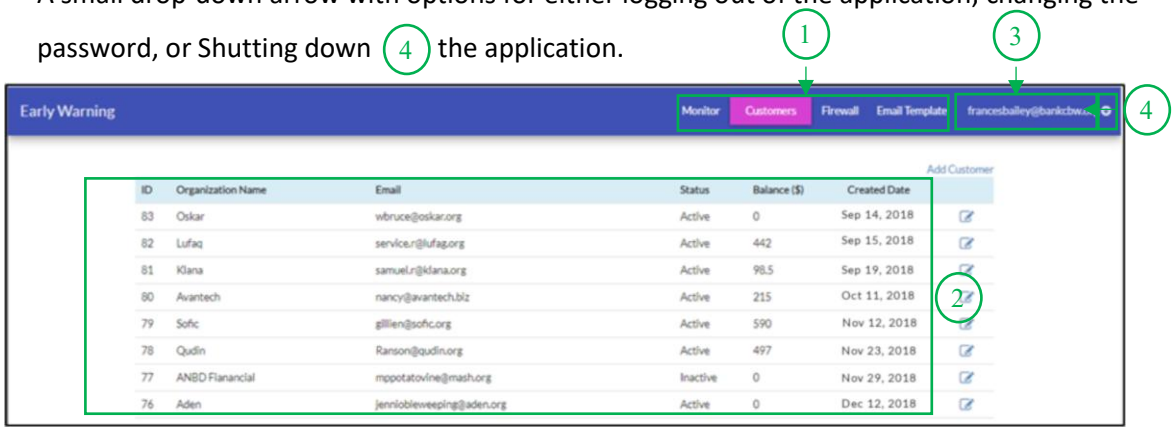


Figure 3: Admin User Home Menu

4.2.1 How to log out of EW Connector

1. Click on the drop-down arrow (1) beside your email ID on the top right of the screen.
2. In the drop down sub menu, click on **Logout** (2). You will be logged out of the EW.

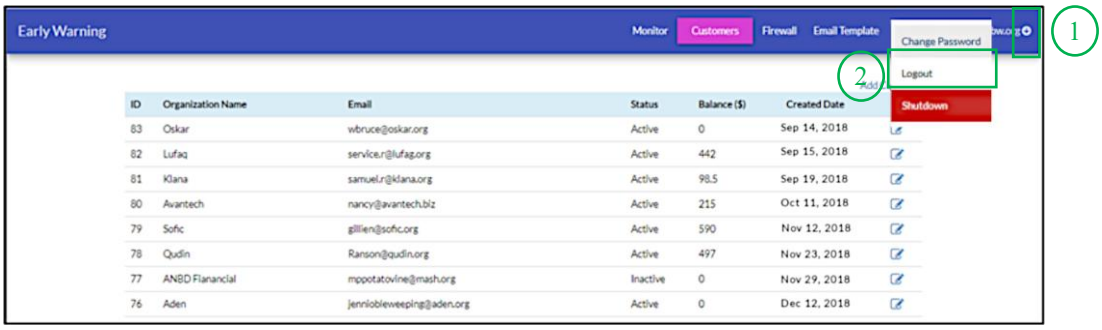


Figure 4 : Logging out of EW

4.2.2 How to change password

1. Click on the drop-down arrow beside your email ID (1) displayed on the top right of the Home Menu.
2. On the drop-down sub menu, click on **Change Password** (2)

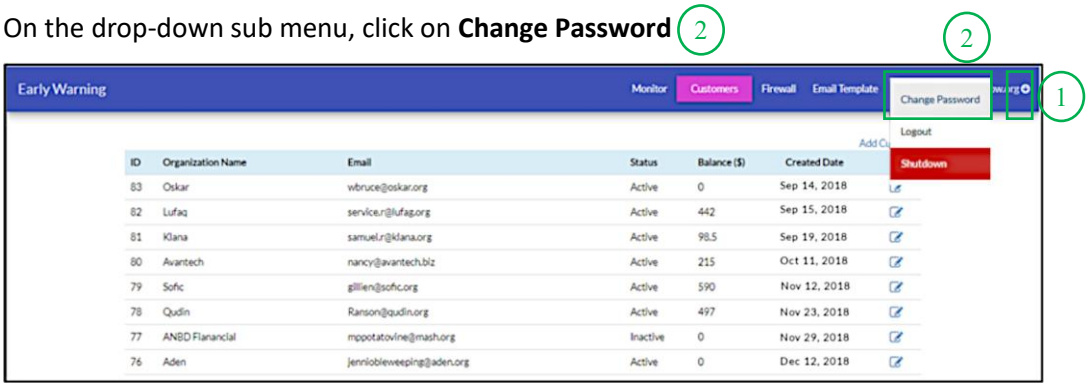


Figure 5 : Changing Password

3. On clicking Change Password, the page navigates to the Change Password Page.

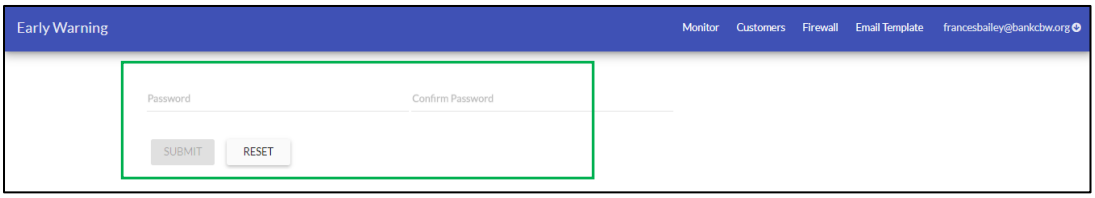


Figure 6 : Changing Password

4. Enter the new password in the **Password** input box.

5. Re-enter new password in the **Confirm Password** input box.
   Note :
   - Password must be 8-15 characters long, with atleast one lower case and one uppercase letter.
   - Password must contain min. one number and one special character ['!', '@', '#', '$', '%', '^', '&', '*', '(', ')']
6. Click on **SUBMIT** to change the password.

4.2.3 Shutting Down

The Admin user uses this option when an error/contingency demands the shutting down of the EW Connector. Caution should be exercised before shutting down, as it will deny access to the application for all users. The EW Connector will have to be restarted at the backend to enable users to log into the EW connector after shutdown.

1. Click on the drop-down arrow beside your email ID (1) displayed on the top right of the Home Menu.
2. On the drop-down sub menu, click on **Shutdown**. (2)

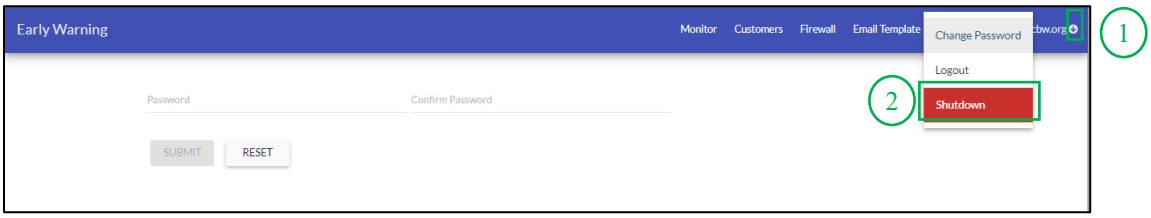


Figure 7 : Shutdown

4.3 Monitor

Monitor option in EW allows the Admin user to view various system related properties of the EW Connector - Application, Memory, and JVM (Java Virtual Machine).

1. To access the Monitor Menu, click on the **Monitor** (1) menu option. This will display the Monitor page.

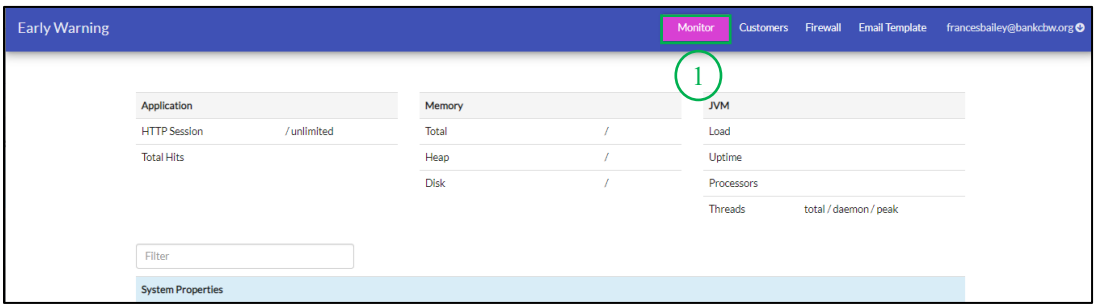


Figure 8 : Monitor

Information in the Monitor page includes the following :

Application	
HTTP Session	Total number of HTTP Sessions
Total Hits	Total number of hits (transactions/enquiries) in the application
Memory	
Total	Total memory used / Total memory of the System
Heap	Heap Size used / Total Heap size
Disk	Disk Size used / Total Disk size
JVM	
Load	JVM load time
Uptime	JVM uptime
Processors	Total number of processors
Threads	Total/daemon/peak threads

4.4 Customers

Customers menu option in EW allows the Admin user to view the list of Customers created earlier, add a Customer, and view detailed information about the Customer. The Customer menu is highlighted in purple and the page is displayed by default when you log in to the EW connector.

1. By default, the Customers (1) page displays the following information:
    - List of Customers with an Edit button to view detailed information of the Customer (2)
    - Add Customer option to add a customer (3)

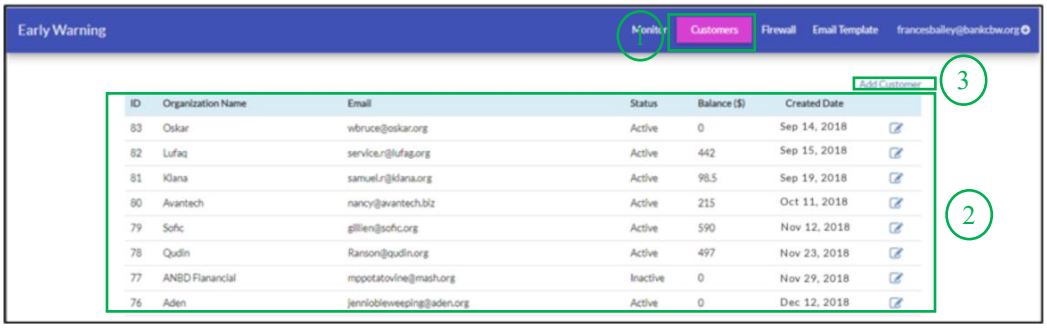


Figure 9 : Customers Page

Customer Page displays the list of records with the recent records displayed first, along with an option to add Customers. Descriptions of various headers in the table are listed below.

Headers	Description
Id	This column displays Unique Id of the transaction
Organization Name	This column displays name of the Organization to which the customer belongs
Email	This column displays the Email id of the client
Status	This column displays the Status of the Customer - *Active* or *Inactive*
Available Balance	Displays present available Balance in US Dollars
Created Date	This column displays the Date on which the user was created
Edit Button	Permits viewing, editing Fee Profile, enabling or disabling Status, RMS Check, and whitelisting the IP address of the Customer for access to the EW Connector
Add Customer	Option to add a Customer

4.4.1 Add Customer

1. To add a Customer, click on (1) **Add Customer** in the Customers page.

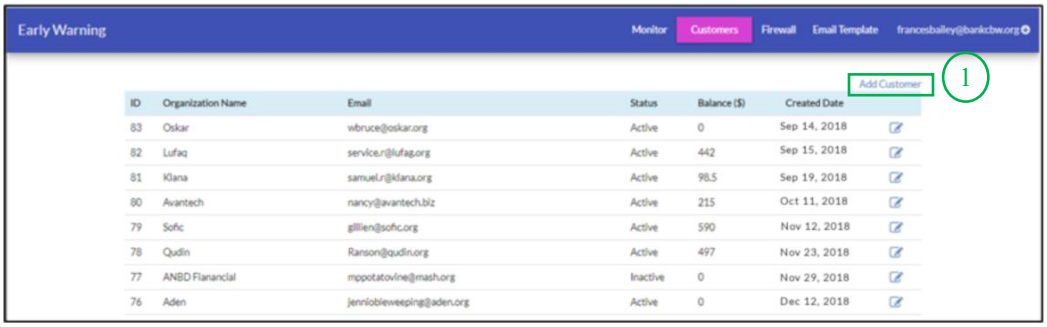


Figure 10 : How to Add Customer

2. On clicking Add, the **Add Customer** page is displayed.

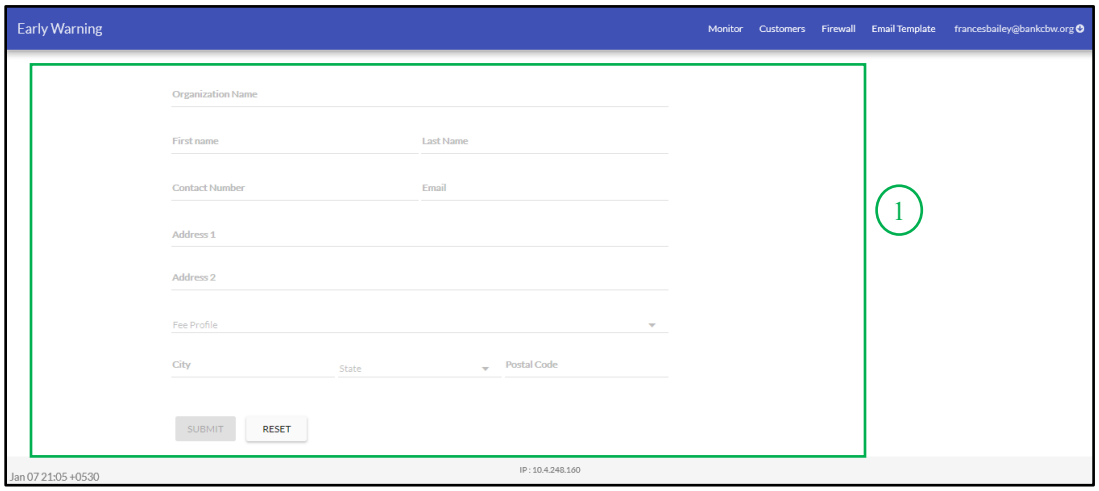


Figure 11: Add Customer

3. Enter the name of the Organization of the customer in **Organization Name** text box.
4. Enter the first name of the Customer in **First Name** text box.

5. Enter the last name of the Customer in **Last Name** text box
6. Enter the 10 digit contact number of the Customer in **Contact Number** text box
7. Enter the email id of the Customer in **Email** text box. This email id is used as login name for connecting with the EW connector.
8. Enter the first line of address of the Customer in **Address 1** text box.
9. Enter the second line of address of the Customer in **Address 2** text box.
10. Select the Fee Profile from **Fee Profile** drop-down list box. Details about **Fee Profile** are explained in subsequent sections.
11. Enter the City of the Customer in **City** text box.
12. Select the State from the **State** drop-down list box.
13. Enter the postal code in **Postal Code** text box.
14. On entering all information, the SUBMIT button will be enabled. Click on **SUBMIT** (1) to create a new Customer else click **RESET** (2) to clear and re-enter the customer information.

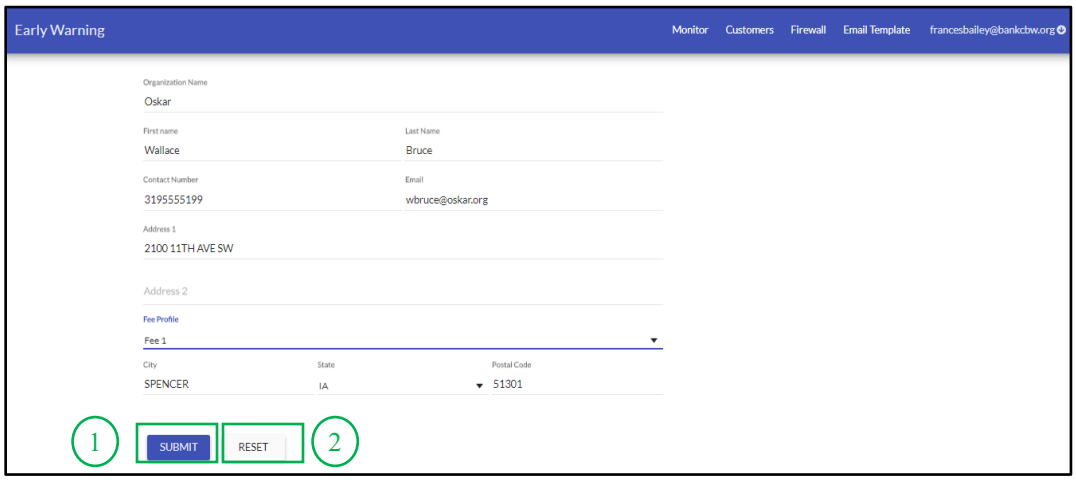


Figure 12: Add Customer with values

🗒	All fields except the Address 2 field are mandatory fields.

15. On clicking **SUBMIT**, the Customer is added and is displayed as the first record and the message, "Customer added successfully" (1) is displayed.

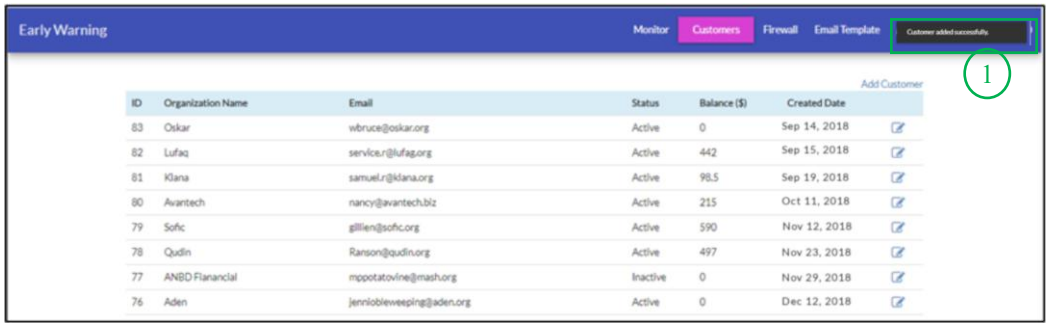


Figure 13: Customer added successfully

4.4.2 View/Edit Detailed Information of a Customer

1. To view/edit detailed information of the Customer, click on the **Edit** button (1) of a specific Customer in the Customers page.

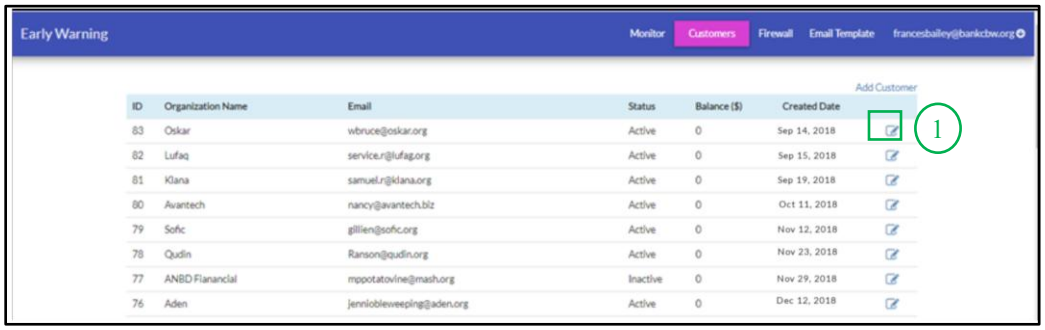


Figure 14: Edit Button

2. On clicking the Edit Button of a specific Customer, the detailed view is displayed. The Fee Profile has an **Edit** (1) option to select a fee profile from the available list. The page permits Users to Enable/Disable the **Status** and **RMS Check** for the profiles as required.

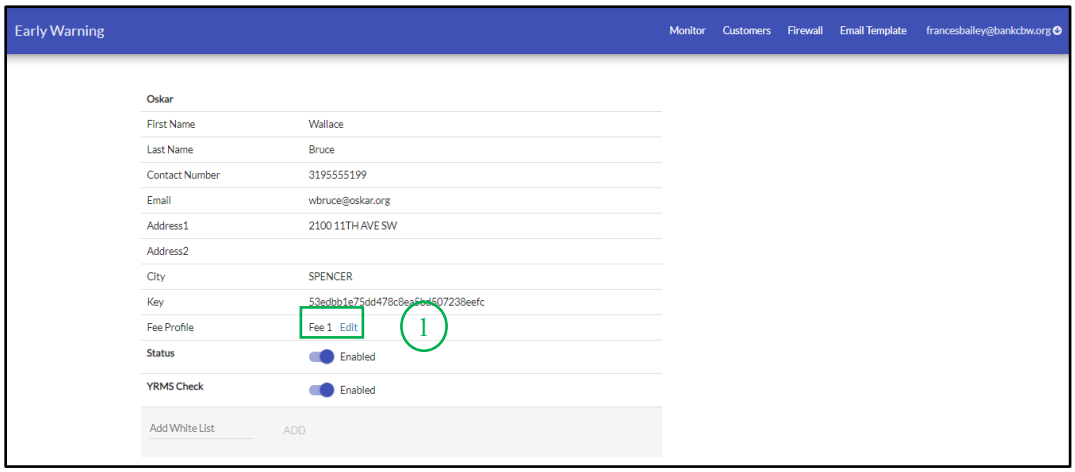


Figure 15: Detailed View

The following table explains the Detailed View of the Customer as show above in Fig.15.

Fields	Information	Description
	Oskar	The Name of the Organization to which the Customer belongs.
First Name	Wallace	First name of the Customer
Last Name	Bruce	Last name of the Customer
Contact Number	3195555199	Contact name of the Customer
Email	wbruce@oskar.org	Email of the Customer
Address1	2100 11TH AVE SW	Address of the Customer
Address2		Address of the Customer

City	SPENCER	Name of the City
Key	53edbb1e75dd478c8ea5bd507238eeff	Private Key for authentication is generated while adding a Customer and is shared to the Customer. Customer will use this key for authentication to access the various APIs
Fee Profile	Fee1	Edit option is used to select the Fee Profile from the available Fee Profile drop-down list.
Status	Can be enabled or Disabled	When enabled or disabled the Status of Customer Account becomes Active or Inactive
RMS Check	Can be enabled or Disabled	If enabled, the RMS check is used to reverify the risk score of the Customer

3. On clicking the **Edit** Button of Fee profile, a **drop-down** list appears with a list of Fee Profiles. Select the relevant one and click on **Save**. 1

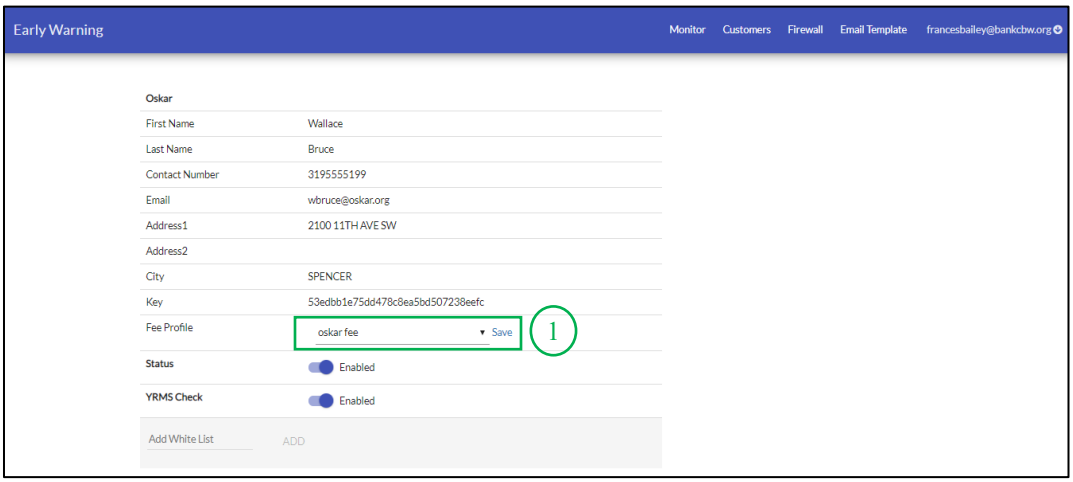


Figure 16:Saving Fee Profile

4. The message, "Fee Profile Updated successfully" 1 will be displayed.

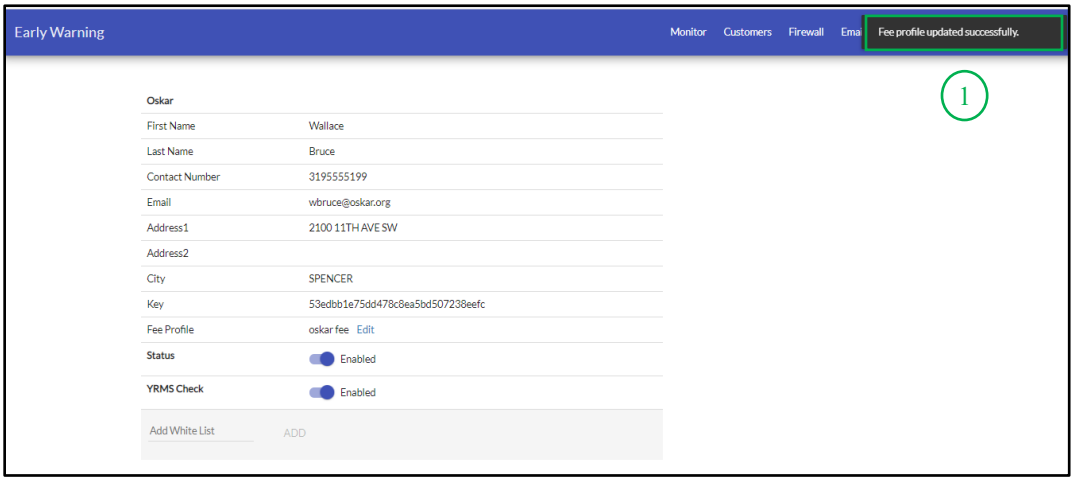


Figure 17:Fee Profile – Saved

4.4.2.1 Enabling/Disabling 'Status' of Customer

This option is used to change the Status of a Customer to either 'Active' or 'Inactive' depending on the criteria for 'Active Status' as specified from time to time internally.

The Admin user can change status of the customer to **Active** or **Inactive** by enabling or disabling the Status of the Customer. Click on the **Status** (1) to enable or disable it. A message, "Customer Status changed successfully" will be displayed when the status of the customer is enabled or disabled.

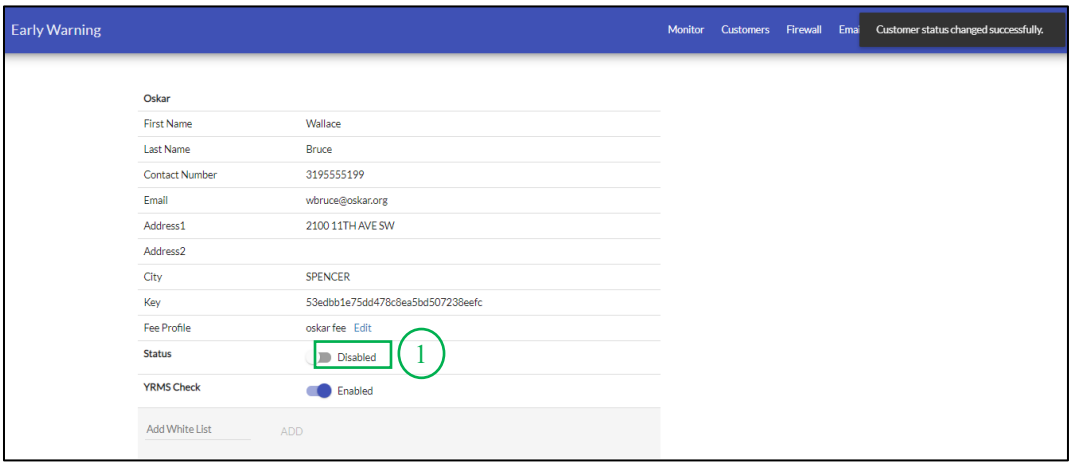


Figure 18: Status – Enable/Disable

4.4.2.2 RMS Check Status Enabling/Disabling

This option is used in scenarios as mentioned below in (1) and (2). This option is used to prevent duplicate utilization of the Risk Management System.

The Risk Management System is used by Customers of CBW Bank either when accessing the EW Connector or as a part of a range of services offered by the Bank.

1. The RMS Enable option is used when Customers accessing the EW Connector have not subscribed to the RMS separately.
2. The RMS Disable option is used when Customers accessing the EW Connector have already subscribed to RMS as a part of other service(s).

The Admin user can reverify the customers risk score by enabling the RMS check. Click on the **RMS Check** (1) to enable or disable it. A message, "Customer RMS status changed successfully", (2) will be displayed when the status of the customer is enabled or disabled.

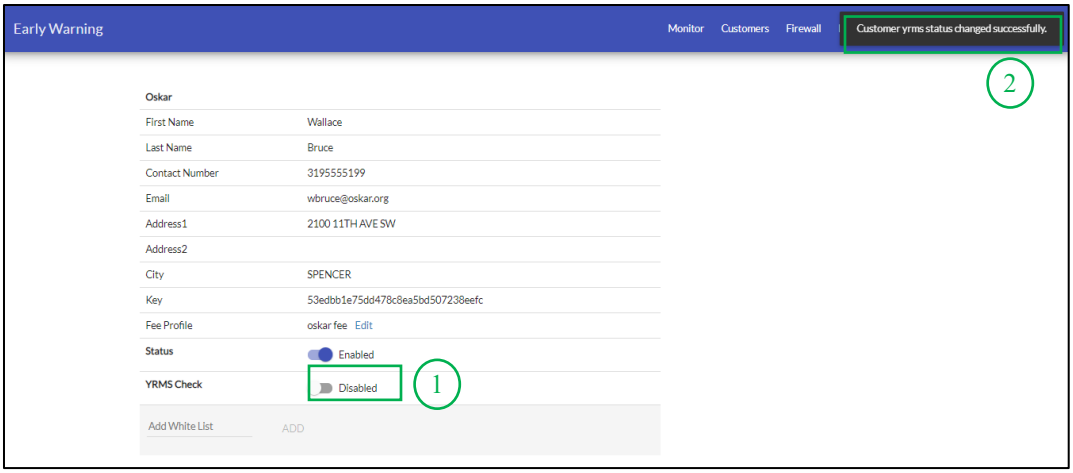


Figure 19: RMS Check – Enable/Disable

4.4.2.3 Whitelisting IP of Customer

The Admin user can whitelist the IP address of the Customer, to grant access to the Customer from the whitelisted IP address.

The Admin user can add the IP address in the **Add White List** and click on **ADD**. The IP address is added to the Whitelist. 1

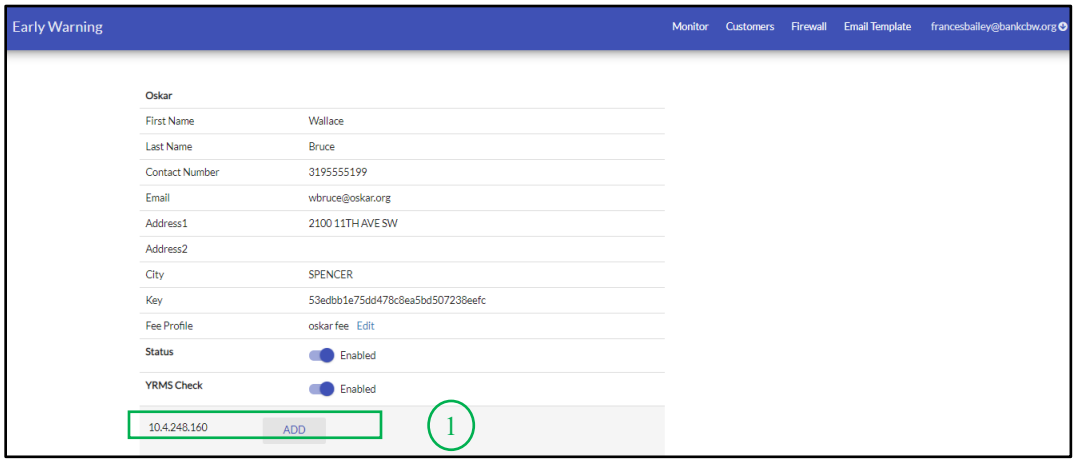


Figure 20: Add Whitelist

4.5 Firewall

Firewall option in EW allows the Admin user to allow an IP address outside of the network through firewall of EW.

1. To access the Firewall menu, click on the **Firewall** menu option. The Firewall page is displayed.

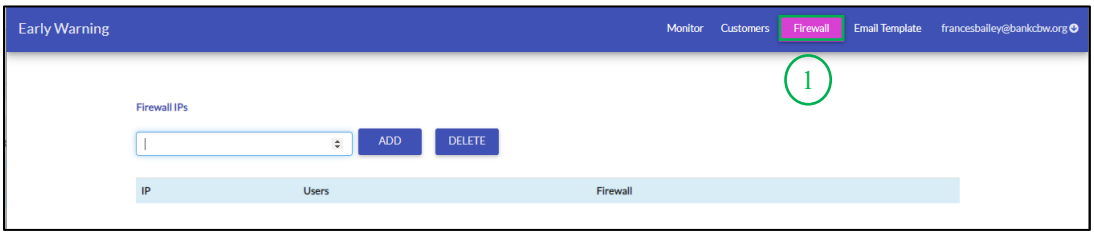


Figure 21 : Firewall page

2. Enter the IP address of the device of a user who can access the EW connector, in the input box.
3. Click on **ADD**.

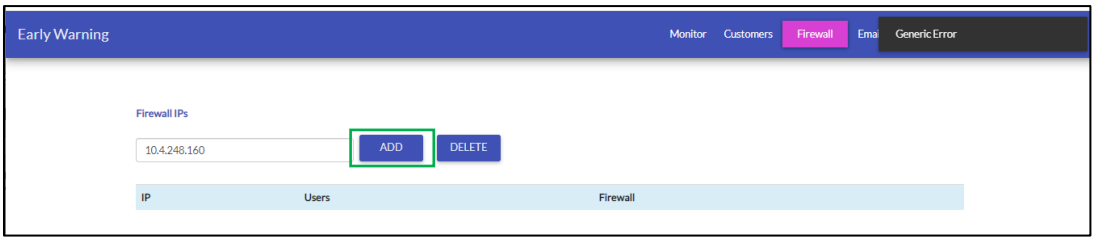


Figure 22 : Add IP address

4. The IP address, Users and Firewall will be added and displayed below.

4.6 Email Template

Email Template option in EW allows the Admin user to view and edit the contents of Standard Email templates used while dispatch of email, including - Welcome mail, Reset Password, Reset API Key, IndusInd Approval, Early Warning Connector created, Low Balance Alert, Reset G Auth, Admin Account, and Email OTP.

To access the Email Template menu, click on the **Email Template** (1) menu option. This displays the Email Template page.

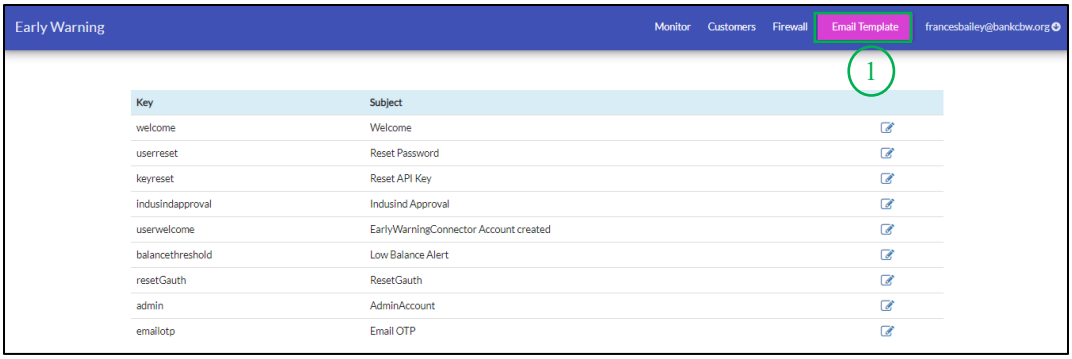


Figure 23 : Email Template Page

The following table describes the various email templates used in EW Connector for :

Subject	**Description**
Welcome	This template is used to send a Welcome mail, when an account is created in Early Warning
Reset Password	This template is used to send an email to share the new password when password has been reset
Reset API Key	This template is used to send an email to share the new API Key when API key has been reset
IndusInd Approval	This template is used to send an email when the user amount is approved
Early Warning Connector Account created	This template is used to send an email to share the account details when the Early Warning Connector account is created
Low Balance Alert	This template is used to generate an alert when the Balance is lesser than the Threshold value of 10 credits
Reset Gauth	This template is used to send an email to share the new Gauth QR code when the Gauth QR code is reset
Admin Account	This template is used to send a mail, when an Admin account is created in Early Warning
EmailOTP	This template is defined to send an OTP to login into the account for the first time

1. To edit an Email template, click on the **Edit** (1) button of the respective account.

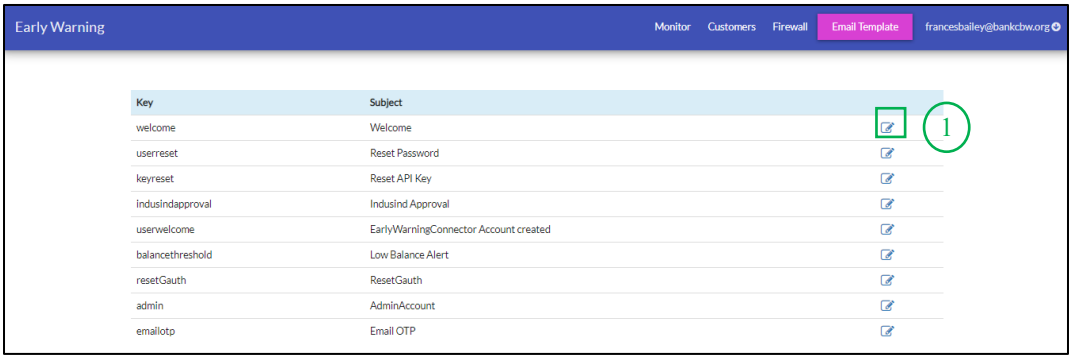


Figure 24 : Edit template

2. On clicking the Edit icon, the Edit template page is displayed. Make the required changes and click on **SUBMIT** (1) else click on **CANCEL** (2) to cancel the modification. On clicking SUBMIT, the content is saved and the page navigates to the previous page. Similarly, you can edit all Email Templates.

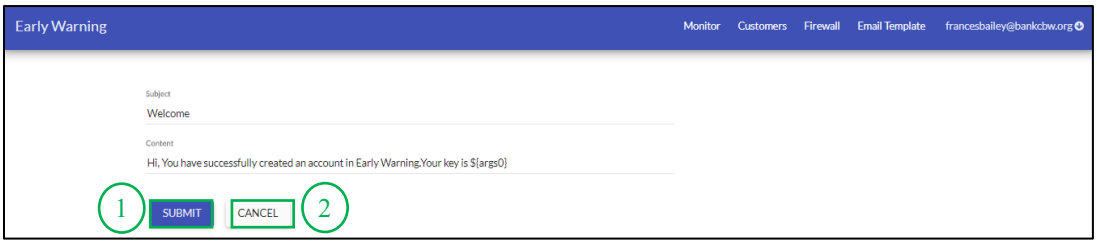


Figure 25 : Submit

The following table lists the content for all the respective email templates.

Subject	**Content**
Welcome	*Hi, You have successfully created an account in Early Warning. Your key is ${args0}*
Reset Password	*Hi, Your password has been reset successfully, Your password is ${args0}*
Reset API Key	*Hi, Your API key has been reset , Your new key is ${args0}*
Indusind Approval	*Hi ,<#list args0 as user> Reference No : ${user.refNum} , Amount : ${user.amount} ,</br>Approved By : ${user.approvedBy},</br>Approved Date : ${user.approvedDate} </br> </#list></html>*
Early Warning	*Hi ${args0}, your Early Warning Connector Account has been created*

Connector Account created	*successfully*
Low Balance Alert	*Hi ${args0}, Your Balance is lower than the threshold value*
Reset Gauth	*Hi ${args0}, <div><imgsrc="${args1}"></img> Your new Gauth QR code is generated*
Admin Account	*Hi ${args0}, Your Admin Account is created in Early Warning*
EmailOTP	*Hi, Your login Email OTP is ${args0}*

4.7 Home Menu for L1 user

The Home Screen of the L1 user displays the following elements by default.

- The Main Menu (1) comprising six different Menus – History, Balance Audit, Customers, Rest Audit, Topup, and Fee Profile.
- The option for entering Topup (2) details – Customer Name, Amount in Dollars and Description, with buttons for submitting entry or to start a new entry.
- The Email ID of the Logged in L1 User (3)
- A small drop-down arrow with options for either logging out or changing the password (4)

	This section deals only with the TopUp Menu, with links to all other menus, Logout and Change password sections.

- History
- Balance Audit
- Customers
- Rest Audit
- Fee Profile
- Logout
- Change Password

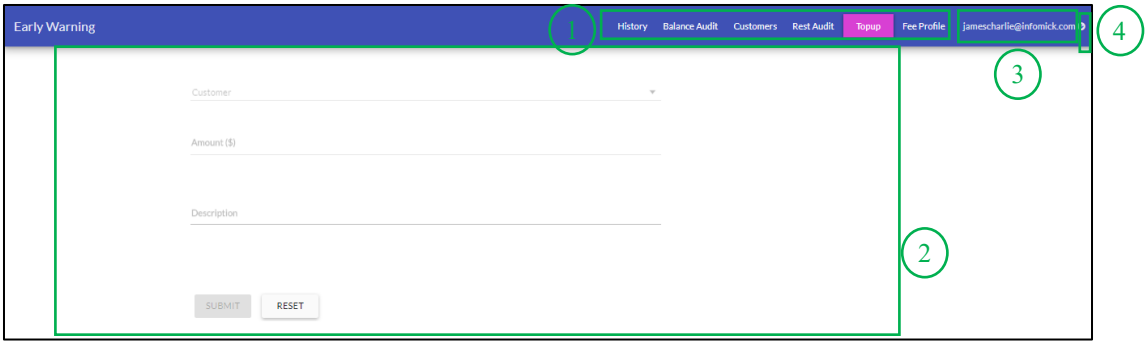


Figure 26: L1 user Home Menu

4.7.1 To update a topup

The Topup menu is highlighted in purple (1) with the page offering input options to select a specific Customer for Topup update.

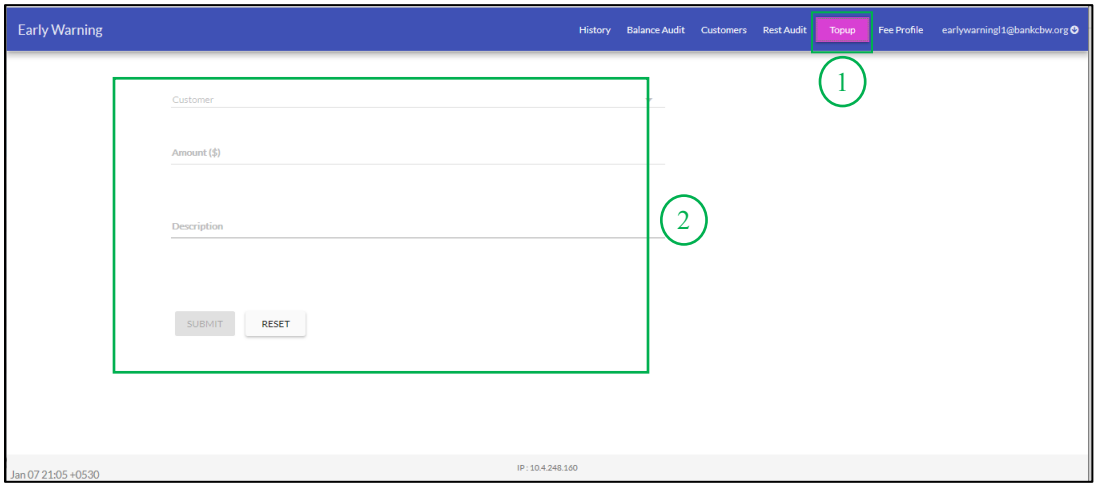


Figure 27: Topup Page

The following table lists the fields necessary for updating top up details for a specific Customer.

Fields	Description
Customer	A drop-down list to select a Customer for whom the Topup is updated
Amount	The Top up amount in US dollars for consumption of EW Services provided by CBW bank.
Description	Description of Fee details.

Update Topup

1. After entering the top up details click on **SUBMIT** (1). To re-enter the Topup details click on **RESET** (2)

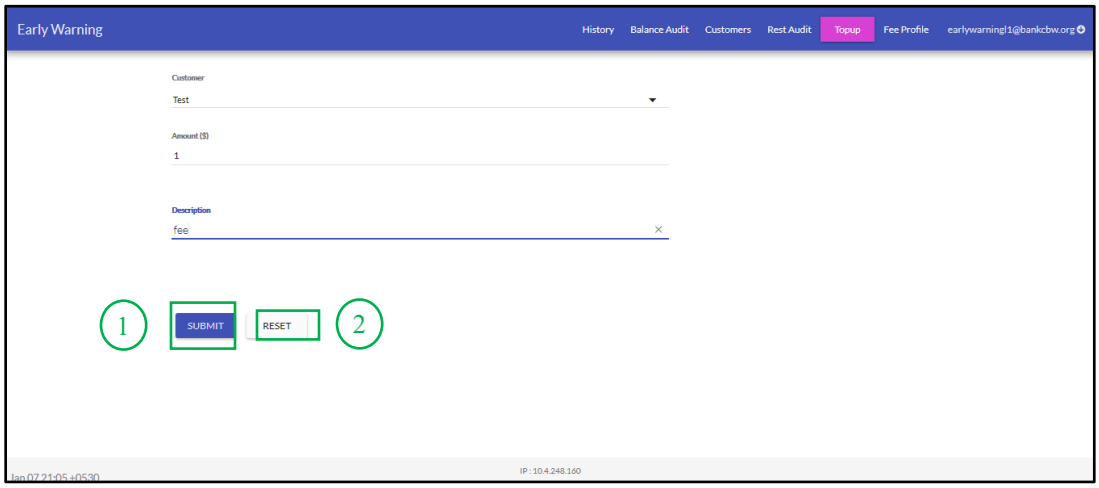


Figure 28: Topup update submission

2. On clicking SUBMIT, the message," Balance *added successfully and waiting for approval"* is displayed.

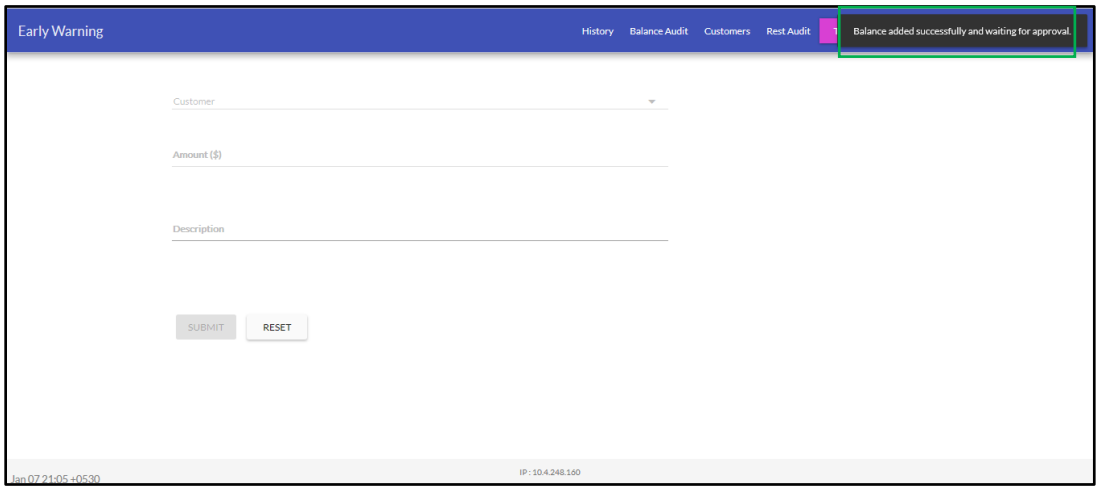


Figure 29: Balance added message

4.8 Home Menu for L2 user

The Home Screen of the L2 user displays the following elements by default:

- Main Menu (1) comprising six different Menus – History, Balance Audit, Customers, Rest Audit, Approve Topup and Fee Profile.
- The list (2) of customers in EW connector, awaiting Topup approval with various details.
- The Email ID of the logged in L2 User (3).
- A small drop-down arrow with options for either logging out or changing the (4) password

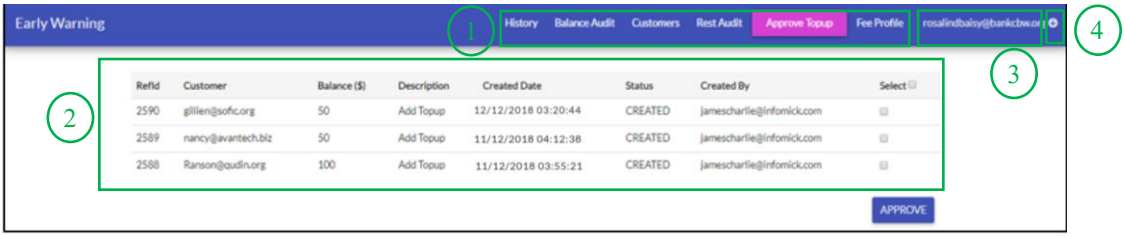


Figure 30: Home Menu

This section deals only with the Approve Topup Menu, with links to all other menus, Logout and Change password sections given below:

- History
- Balance Audit
- Customers
- Rest Audit
- Fee Profile
- Logout
- Change Password

4.8.1 To approve the Topup

The L2 user can view, review and approve the top-ups updated by L1 User.

The **Approve Topup** menu is highlighted in purple (1) and the page is displayed by default when you log in to the EW connector, with a list of details of Customers awaiting Topup (2) approval and the Approve Button (3)

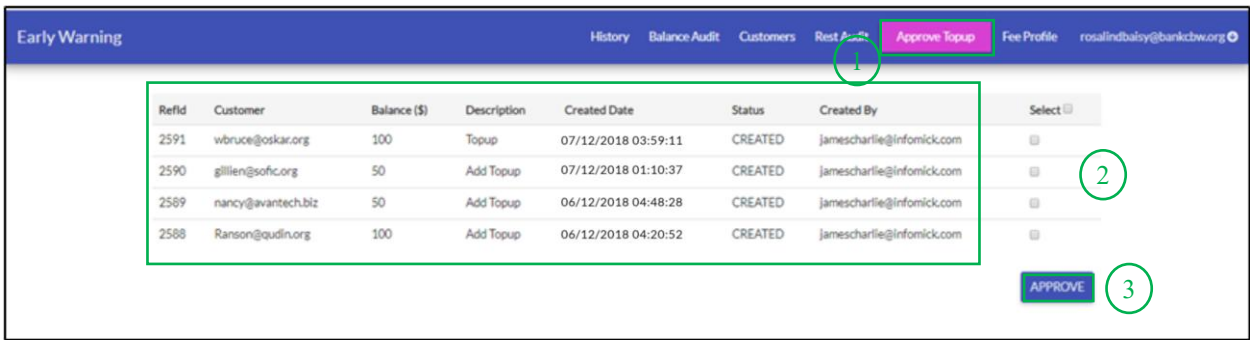


Figure 31: Approve Topup page

The following table lists the top up details of Customers awaiting approval.

Fields	Description
Refid	Unique identification number of the Customer
Customer	Email id of the Customer
Balance	The top-up value in dollars
Description	Description about the Topup
Created Date	Date of creation of the Top-up
Status	Status of the Top-up i.e. CREATED
Created By	Email id of the user who created the Top-up
Select All	Select “Select” check box to select all the Top-ups for approval
Approve	Approve the selected Top -ups

4.8.2 Selecting and Approving all TopUps

1. Review the Topup details, and select all records by choosing **Select** (1) check box. Click on **Approve**. (2)

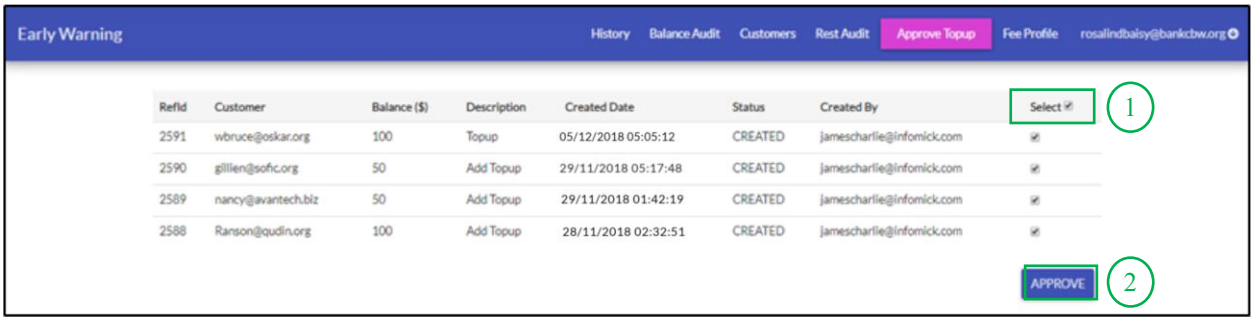
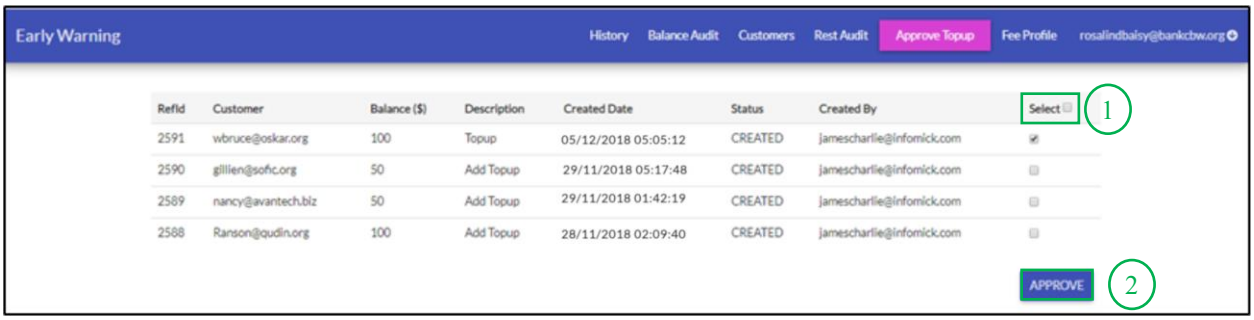


Figure 32: Selecting All Topups

4.8.3 Approving a specific Topup or Topups

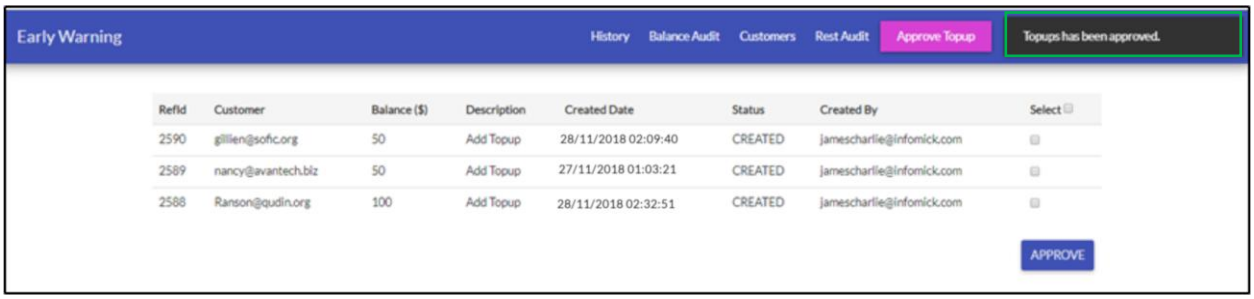
1. To Approve a specific Topup, select the individual check box (1) beside the specific record. On selecting the record, a check mark is displayed. After selecting the relevant topup or topup of specific Customer(s) for approval, click on **Approve**.(2)



RefId	Customer	Balance ($)	Description	Created Date	Status	Created By
2591	wbruce@oskar.org	100	Topup	05/12/2018 05:05:12	CREATED	jamescharlie@infomick.com
2590	gillien@sofic.org	50	Add Topup	29/11/2018 05:17:48	CREATED	jamescharlie@infomick.com
2589	nancy@avantech.biz	50	Add Topup	29/11/2018 01:42:19	CREATED	jamescharlie@infomick.com
2588	Ranson@qudin.org	100	Add Topup	28/11/2018 02:09:40	CREATED	jamescharlie@infomick.com

Figure 33: Selecting a specific Topup

2. The Topup is approved and the message, "*Topup has been approved*" is displayed and removed from the pending for approval list.



RefId	Customer	Balance ($)	Description	Created Date	Status	Created By	Select
2590	gillien@sofic.org	50	Add Topup	28/11/2018 02:09:40	CREATED	jamescharlie@infomick.com	
2589	nancy@avantech.biz	50	Add Topup	27/11/2018 01:03:21	CREATED	jamescharlie@infomick.com	
2588	Ranson@qudin.org	100	Add Topup	28/11/2018 02:32:51	CREATED	jamescharlie@infomick.com	

Figure 34:Approved message

4.9 History

The History Menu permits the User to view the history of services or API requests made by various Customers. By default, this list displays details of History for the last two days (including the current date). The User can search for History of services for a specific date range.
By default, the number of items displayed per page is 10, with navigation buttons permitting the User to move either to the previous/following pages, or to the first/last page.

To view History of Customers

1. Click on **History**(1) in the Main Menu of Home Page of the EW connector.

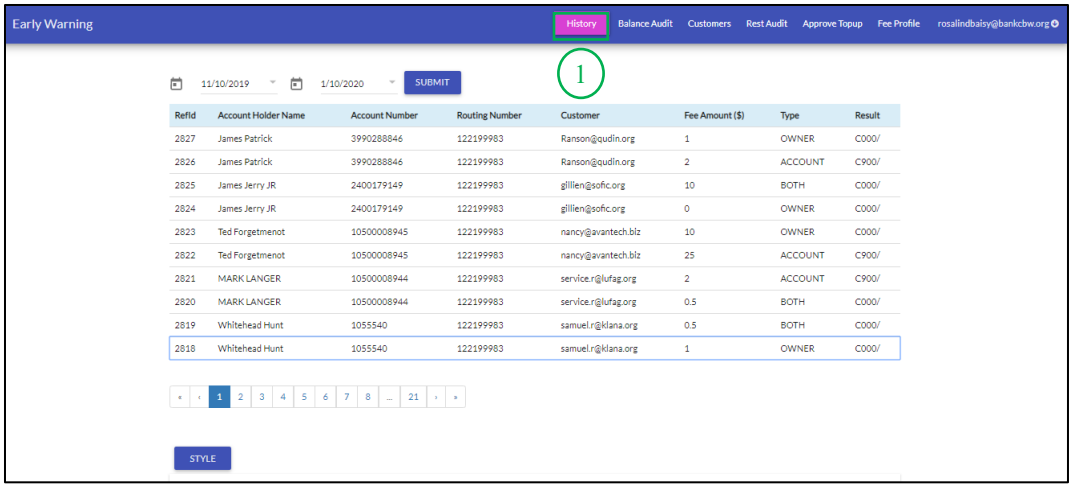


Figure 35 : History Menu

4.9.1 How to search History for a specific date range, including a single day.

Users can search History through two different options.

(1) By manual entry of dates

In the "**From**" input box, input the date (1) from which you want the results to be displayed.

This needs to be in month/day/year format, e.g. **01/01/2020** for January 01, 2020.

Similarly, in the "**To**" input box, input the date till which you want the results to be displayed.

This needs to be in month/day/year format, e.g. **01/11/2020** for January 11, 2020.

Click on **SUBMIT**. (3)

(2) By using the Calendar option

Click on the calendar icon (2) beside the "**From**" box. Select the date from which you want the results to be displayed.

Click on the calendar icon beside the "**To**" box. Select the date till which you want the results to be displayed.

Click on **SUBMIT** (3)

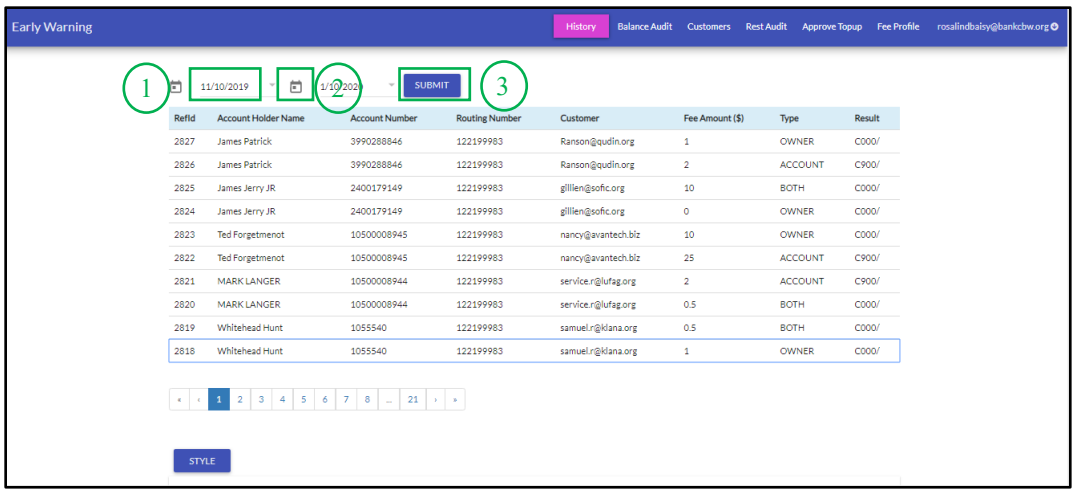


Figure 36 : Searching History for specific date range

Description of various headers in table displayed in History Page

RefId	1	RefId is a unique ID of 4 numeric digits and above that is assigned to any transaction/inquiry on AOA.	
Account Holder Name	2	This column displays the name of the Account Holder whose details were authenticated through the Service.	
Account Number	3	This column displays the Account Number of the Account Holder whose details were authenticated through the Service.	
Routing Number	4	This column displays the unique routing number of the bank branch of the Account Holder whose details were authenticated through the Service.	
Customer	5	This column displays the email ID of the customer (CBW Bank Client).	
Fee Amount ($)	6	This column displays the fee amount deducted for the service from the customer (CBW Bank Client)	
Type	7	This column displays the type of Inquiry /authentication sought from AOA – either *Account*, or *Owner* or *Both*. A brief description of the three services are listed below.	
		Account	Refers to Account Status only
		Owner	Refers to Account Owner Response only
		Both	Refers to Account Status combined with Account Owner Response
Result	8	This column displays the Condition Codes indicating the state of the account owner. A detailed list of condition codes, and relevant field names, field and description are explained in table below.	

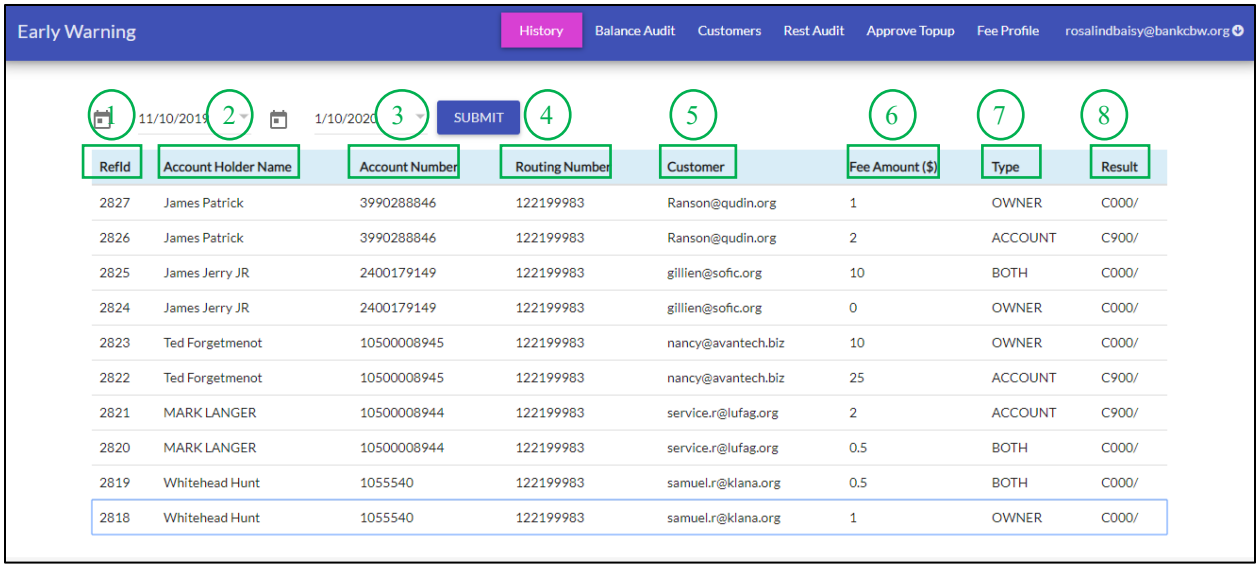


Figure 37 : History Page – Headers in Table

Condition Codes

Condition Code	Field Name	Field	Description
000	AcctMo	Account Number	Normal return – no system errors
300	RTN	Routing/Transit Number	Valid, but not drawn on a DepositChek participant
301			Valid participant but not an AOA contributor/ABA masked
302			Valid participant, but AOA data unavailable
304	FName/LName/BusName	First Name/Last Name/Business Name	No name field populated.
396	AcctNo	Account	No known information
900	AO Field	Account Owner data field	No account owner response requested or provided
901			

4.9.2 How to check the Request and Response Codes in JSON and XML

To check the Request and Response Codes of specific transactions, click anywhere on the row of the desired transaction.

This will expand the section beneath the last listing on the page, displaying the section for Request and Response codes in JSON and XML.

- The column titled Request (1) is the Request JSON from the Customer to CBW Bank.

- The column titled Response (2) is the Response JSON from CBW Bank to the Customer.
- The Column titled Early Warning Request (3) is the Request from CBW Bank to EW in XML format.
- The Column titled Response (4) is the Response from EW to CBW Bank in XML format

To view specific code, click on the column header and the codes are displayed - for e.g. Clicking on (1) will display (5), likewise, clicking on different headers will display the relevant codes.

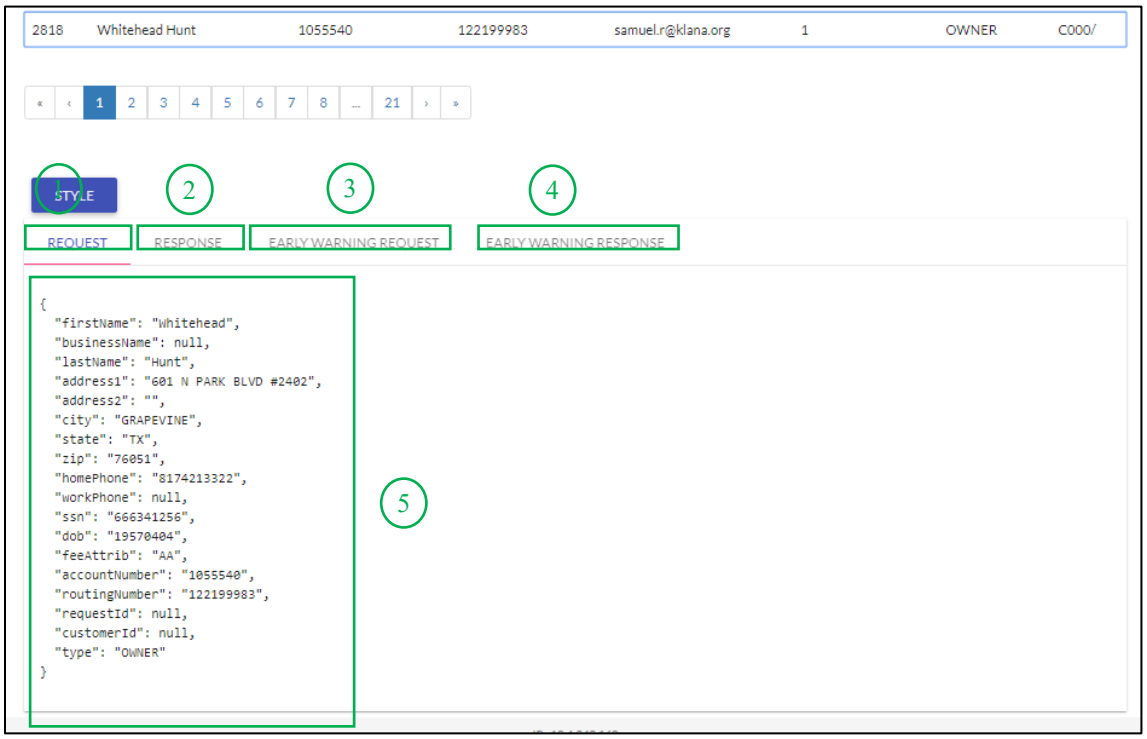


Figure 38 : Checking Request Response Codes

4.10 Fee Profile

Fee Profiles refer to the created profiles that are used for the purpose of calculating fees for the three different services provided in AOA. The fees vary as per various parameters, and the Fee Profile Page permits the Admin User to View existing Fee Profiles and add new Fee Profiles. The **"Customers"** Page has an option for selecting Fee profiles for linking to Customer Profiles which will be used for the purpose of calculation of credits/fees for services consumed.

4.10.1 How to view the Fee Profile

1. To view the Fee Profile, click on **Fee Profile** (1) on the Main Menu.

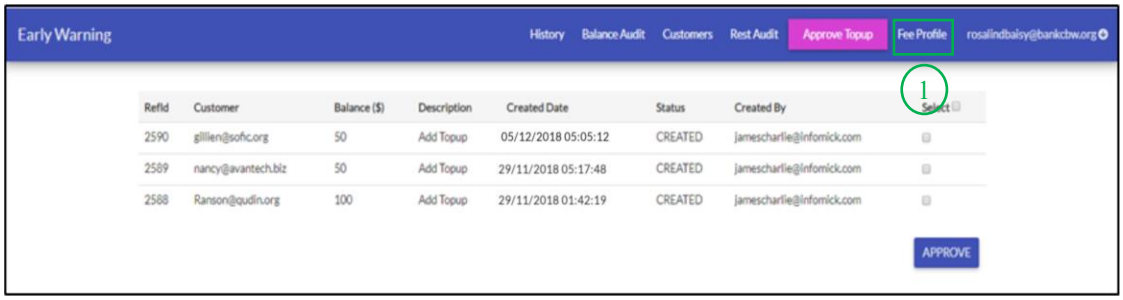


Figure 39 : Fee Profile menu

2. The page navigates to the **Fee Profile** Page.

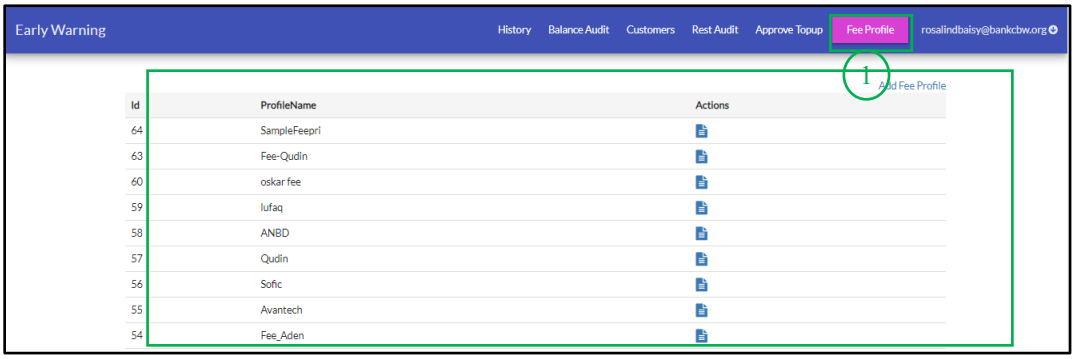


Figure 40 : How to view Fee Profile

3. On the Fee Profiles Page, click on the visibility icon. 1

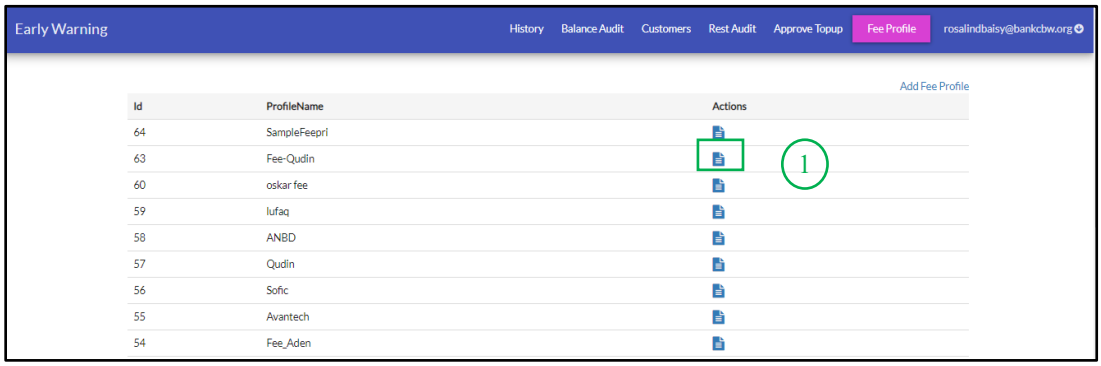


Figure 41 : View Fee Profile

4. The page navigates to the View Fee Profile Page:
   The Page displays the following
   - Account only Fee Slab – with values in Upper limit and Fee Amount 1
   - Owner Only Fee Slab – with values in Upper limit and Fee Amount 2
   - Both account and owner Fee Slab –with values in Upper limit and Fee Amount 3
   - You can go back to the previous page either by clicking on the **Back** Button 4

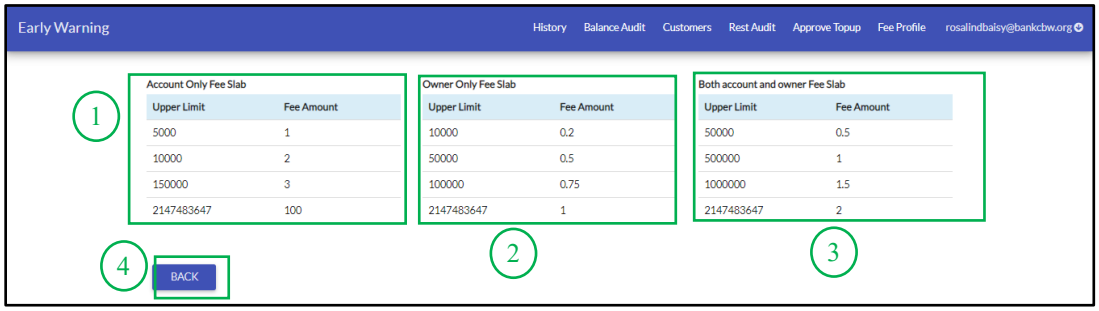


Figure 42 : View Fee Profile Page

Account only Fee Slab	Upper Limit	Fee Amount	Description
	5000	1	In this example, when the upper limit is set to 5000, for the first 5000 hits the fee amount is 1 dollar for each transaction
	10000	2	When the upper limit is set to 10000, for the range between 5001 to 10000 hits, the fee amount is 2 dollars for each transaction.
	150000	3	When the upper limit is set to 150000, for the range between 10001 to 150000 hits, the fee amount is 3 dollars for each transaction
	2147483647	100	Upper limit is not enabled for the first time when the user adds the fee amount. By default, it is set to 214748367. User can enter the Fee Amount. For hits above 150001 and upto the maximum upper limit of 2147483647 hits, the fee amount will be 100 dollars for each transaction.
Owner Only Fee Slab	**Upper Limit**	**Fee Amount**	**Description**
	10000	0.2	In this example, when the upper limit is set to 10000, for the first 10000 hits the fee amount is 0.2 dollar for each transaction
	50000	0.5	When the upper limit is set to 50000, for the range between 10001 to 50000 hits, the fee amount is 0.5 dollar for each transaction.
	100000	0.75	When the upper limit is set to 100000, for the range between 50001 to 100000 hits, the fee amount is 0.75 dollar for each transaction
	2147483647	1	Upper limit is not enabled for the first time when the user adds the fee amount. By default, it is set to 214748367. User can enter the Fee Amount. For hits above 100001 and upto the maximum upper limit of 2147483647 hits, the fee amount will be 1 dollar for each transaction.

Both account and owner Fee Slab	Upper Limit	Fee Amount	Description
	50000	0.5	In this example, when the upper limit is set to 50000, for the first 10000 hits the fee amount is 0.5 dollar for each transaction
	500000	1	When the upper limit is set to 500000, for the range between 500001 to 100000 hits, the fee amount is 1 dollar for each transaction.
	1000000	1.5	When the upper limit is set to 100000, for the range between 50001 to 1000000 hits, the fee amount is 1.5 dollars for each transaction
	2147483647	2	Upper limit is not enabled for the first time when the user adds the fee amount. By default, it is set to 214748367. User can enter the Fee Amount. Here for hits above 1000001 and up to the maximum upper limit of 2147483647 hits, the fee amount will be 2 dollars for each transaction.

4.10.2 How to Add Fee Profile

The Add Fee Profile option is intended to permit the User to create a new Fee Profile which can be used to link to a new or existing Customer in the Account Page for the purpose of calculation.

1. To Add a new Fee Profile, on the Fee Profile page, click on "**Add Fee Profile**" (1)

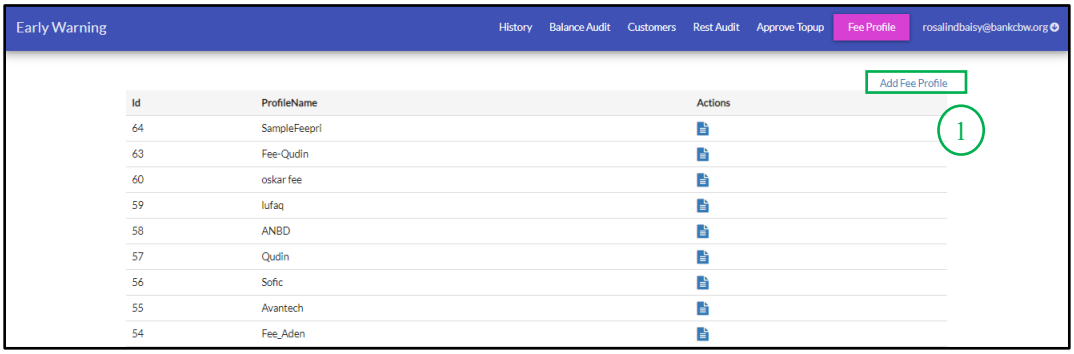


Figure 43 : How to Add Fee Profile

2. The application navigates to the Add Fee Profile Page.
   The Page displays the following
   - An option for naming the new Profile in **Profile name**. (1)
   - The **Type** has options for selecting the service to be enabled for the Fee Profile, namely ACCOUNT, OWNER, BOTH. (2)
   - On the input box for **Fee Amount**, enter the decided fee for the particular service for the new profile. (3) You can use the up arrow or down arrow to increase, or decrease the fee amount. The initial value is 0.01, with the value increasing incrementally by 1.0 as the up arrow.

- Click on **ADD SLAB** (4) This will be displayed in the respective Fee Slab. You can multiple slabs for the fee profile.
- On the input box for **Upper Limit** (5) enter the upper limit of the Fee Profile for the selected Type of the Service.

	Upper limit is not enabled when the fee amount is added the first time. By default, it is set to the maximum limit of 2147483647. You can set the upper limit for subsequent slabs for the specific fee amount.

Refer Fee Profile section for more information

- The Upper limit and Fee Amount are displayed beneath **Account Only Fee Slab** when details are entered for ACCOUNT Type. (6)
- The Upper limit and Fee Amount are displayed beneath **Owner Only Fee Slab** when details are entered for OWNER Type. (7)
- The Upper limit and Fee Amount are displayed beneath **Both account and owner Fee Slab** when details are entered for BOTH Type. (8)
- Click on **SUBMIT** (9) on completion. Click on **BACK** (10) to go back to the previous fee profile page.

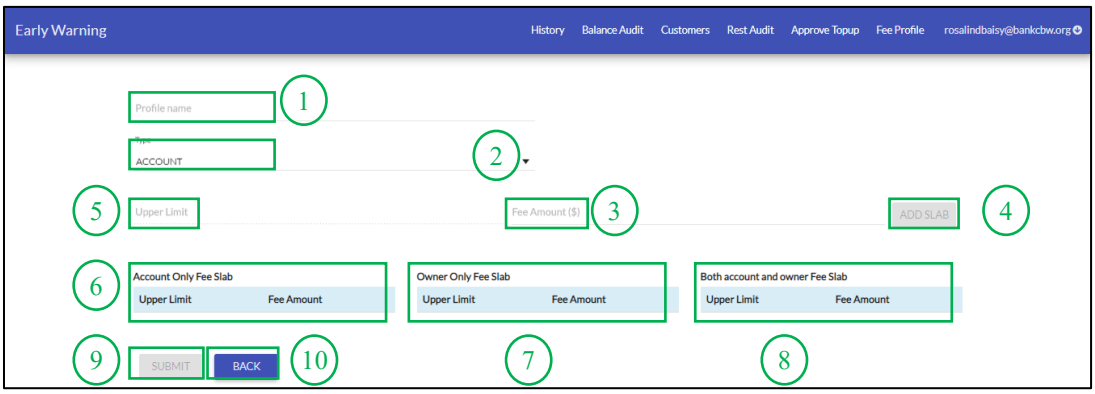


Figure 44 : Add Fee Profile Page

3. The Fee profile page with values. (1)

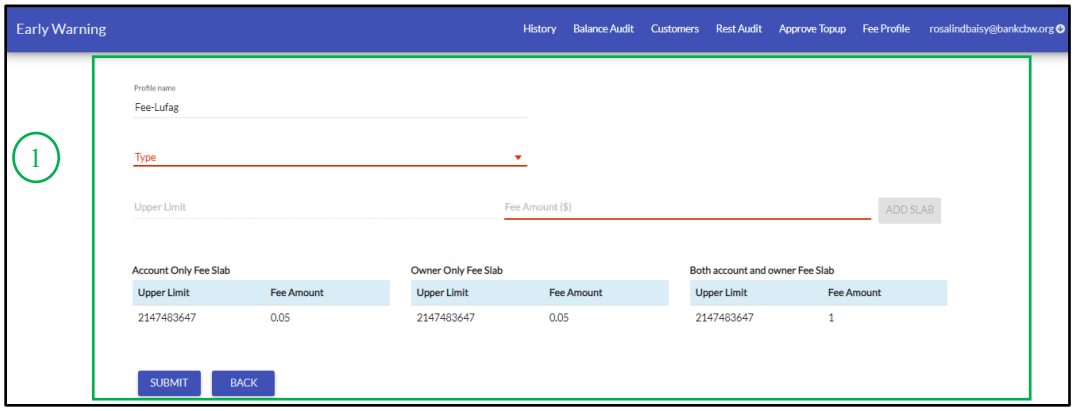


Figure 45 : Add Fee Profile Page with values

4. On clicking **SUBMIT** the message "Fee profile added successfully" (1) is displayed and the fee profile is added to the list (2)

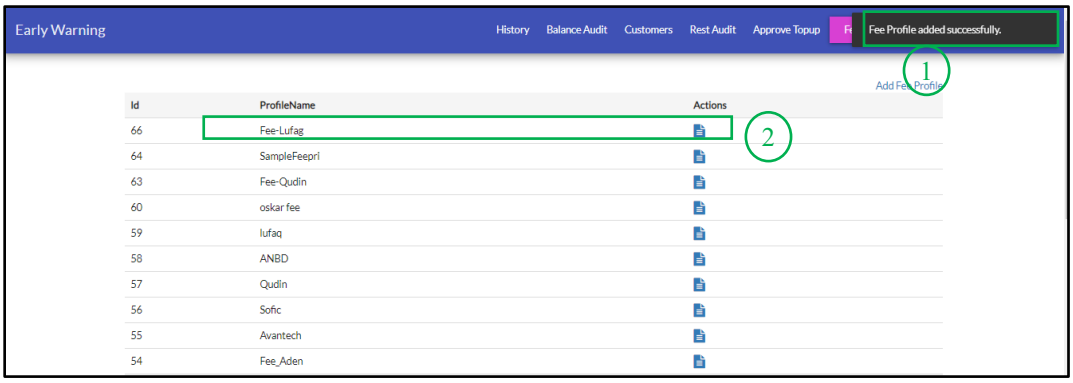


Figure 46 : Fee Profile Page

4.11 Balance Audit

Balance Audit option allows the user to view the chronological list of transactions of Customers who have subscribed to and consumed the EW Services with recent transactions first. The available balances in US Dollars of each of the Customer, type of the transaction, description of the transaction is listed.

To access Balance Audit option,

1. Click on the **Balance Audit** (1) menu option.

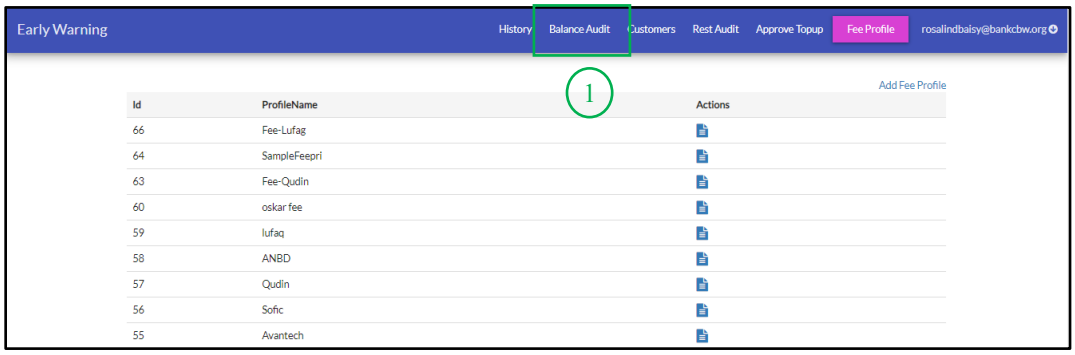
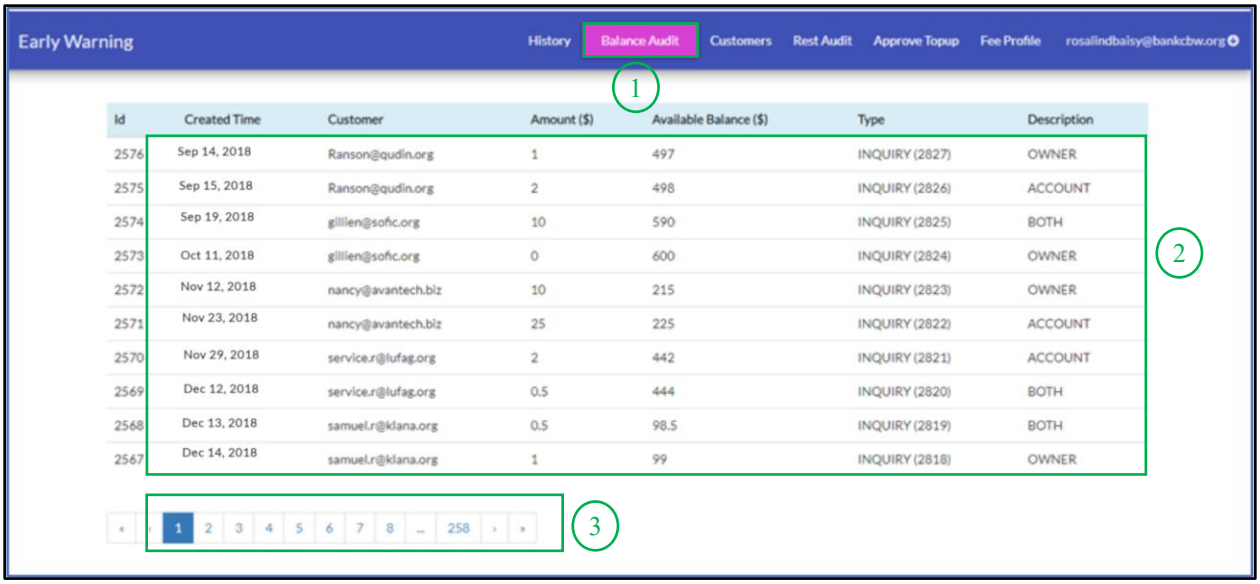


Figure 47: Balance Audit Menu option

2. On clicking Balance Audit menu, the **Balance Audit** page is displayed.



Id	Created Time	Customer	Amount ($)	Available Balance ($)	Type	Description
2576	Sep 14, 2018	Ranson@qudin.org	1	497	INQUIRY (2827)	OWNER
2575	Sep 15, 2018	Ranson@qudin.org	2	498	INQUIRY (2826)	ACCOUNT
2574	Sep 19, 2018	gillien@sofic.org	10	590	INQUIRY (2825)	BOTH
2573	Oct 11, 2018	gillien@sofic.org	0	600	INQUIRY (2824)	OWNER
2572	Nov 12, 2018	nancy@avantech.biz	10	215	INQUIRY (2823)	OWNER
2571	Nov 23, 2018	nancy@avantech.biz	25	225	INQUIRY (2822)	ACCOUNT
2570	Nov 29, 2018	service.r@lufag.org	2	442	INQUIRY (2821)	ACCOUNT
2569	Dec 12, 2018	service.r@lufag.org	0.5	444	INQUIRY (2820)	BOTH
2568	Dec 13, 2018	samuel.r@klana.org	0.5	98.5	INQUIRY (2819)	BOTH
2567	Dec 14, 2018	samuel.r@klana.org	1	99	INQUIRY (2818)	OWNER

Figure 48: Balance Audit Page

The Available balances in dollars (2) of each customer with the recent records first are displayed.

Description of various headers in the table displayed in Balance Audit.

Headers	**Description**	
Id	This column displays Unique Id of the transaction	
Created Date	This column displays the Date on which the transaction was created	
Customer	This column displays the Email id of the customer (participating institution)	
Amount	This column displays the fee amount deducted in dollars for the services consumed by the participating financial institution	
Available Balance	Balance remaining after consuming EW services so far in Dollars	
Type	Type of transaction, transaction created through EW module like INQUIRY. Values are INQUIRY (with unique ID of the customer), CREATED, and APPROVED	
	INQUIRY	INQUIRY (with unique ID of the customer)
	CREATED	Adding a Top up
	APPROVED	Approval of Topup/Fee
Description	This column displays the description of the type of Inquiry sought from AOA – either Account, or Owner or Both. A brief description of the three services are listed below	
	ACCOUNT	Refers to Account Status only
	OWNER	Refers to Account Owner Response only
	BOTH	Refers to Account Status combined with Account Owner Response

Pagination 3

By default, the number of items displayed per page is 10, with navigation buttons permitting the Admin User to move either to the previous/following pages, or to the first/last page.

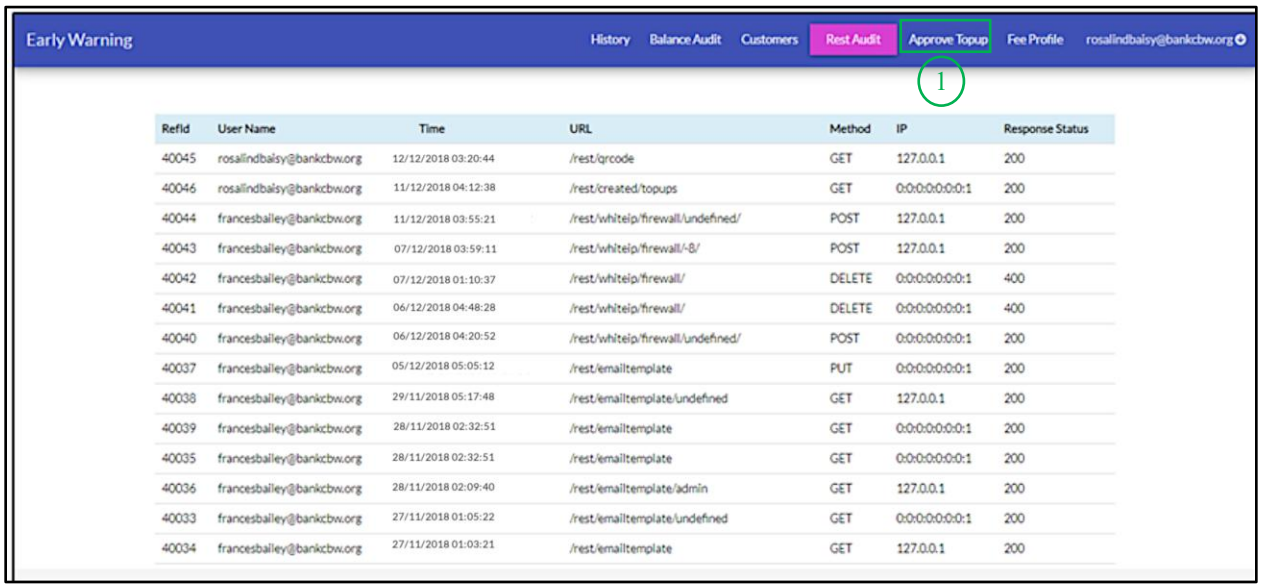
The user can view the records by clicking the buttons at the lower left of the page.

• Click on First page (<<) to view the first 10 records.
• Click on last page (>>) to view the last 10 records.
• Click on the page number to view the records of the relevant page.
• Click on Previous (<) to view the previous 10 records.
• Click on Next (>) to view the next 10 records.

4.12 Rest Audit

Rest Audit allows the L1 and L2 users to view the REST API related information.
To access the Rest Audit,

1. Click on **Rest Audit** menu in the Home page of EW Connector. On clicking, the Rest Audit menu the Rest Audit page is displayed.



RefId	User Name	Time	URL	Method	IP	Response Status
40045	rosalindbaisy@bankcbw.org	12/12/2018 03:20:44	/rest/qrcode	GET	127.0.0.1	200
40046	rosalindbaisy@bankcbw.org	11/12/2018 04:12:38	/rest/created/topups	GET	0:0:0:0:0:0:0:1	200
40044	francesbailey@bankcbw.org	11/12/2018 03:55:21	/rest/whiteip/firewall/undefined/	POST	127.0.0.1	200
40043	francesbailey@bankcbw.org	07/12/2018 03:59:11	/rest/whiteip/firewall/-8/	POST	127.0.0.1	200
40042	francesbailey@bankcbw.org	07/12/2018 01:10:37	/rest/whiteip/firewall/	DELETE	0:0:0:0:0:0:0:1	400
40041	francesbailey@bankcbw.org	06/12/2018 04:48:28	/rest/whiteip/firewall/	DELETE	0:0:0:0:0:0:0:1	400
40040	francesbailey@bankcbw.org	06/12/2018 04:20:52	/rest/whiteip/firewall/undefined/	POST	0:0:0:0:0:0:0:1	200
40037	francesbailey@bankcbw.org	05/12/2018 05:05:12	/rest/emailtemplate	PUT	0:0:0:0:0:0:0:1	200
40038	francesbailey@bankcbw.org	29/11/2018 05:17:48	/rest/emailtemplate/undefined	GET	127.0.0.1	200
40039	francesbailey@bankcbw.org	28/11/2018 02:32:51	/rest/emailtemplate	GET	0:0:0:0:0:0:0:1	200
40035	francesbailey@bankcbw.org	28/11/2018 02:32:51	/rest/emailtemplate	GET	0:0:0:0:0:0:0:1	200
40036	francesbailey@bankcbw.org	28/11/2018 02:09:40	/rest/emailtemplate/admin	GET	127.0.0.1	200
40033	francesbailey@bankcbw.org	27/11/2018 01:05:22	/rest/emailtemplate/undefined	GET	0:0:0:0:0:0:0:1	200
40034	francesbailey@bankcbw.org	27/11/2018 01:03:21	/rest/emailtemplate	GET	127.0.0.1	200

Figure 49 : Rest Audit page

2. The page displays REfId, username, Time, URL, Method, IP, Response Status chronological list.

Fields	Customer Information
REfId	RefId is a unique ID of 4 numeric digits and above that is assigned to any transaction/inquiry on AOA.
Username	Email id of the user of EW Connector
Time	Date and time of the request/transaction
URL	URL refers to the page accessed by the particular User
Method	Refers to the REST APIs called, values are GET, POST, PUT and

	DELETE
IP Address	IP address of the user
Response Status	Refers to Response Status of Rest APIs

5 Consolidated description of semantics of input fields

The consolidated description of semantics of various input fields are given in the following table for easy reference. The contents of the table are indexed in the order of various menus.

Field	Semantics	Mandatory (Y/N)
Login		
User Name	Must be a valid user name (valid email ID)	Y
Password	Password must be 8-15 characters long, with at least one lower case and one uppercase letter. Password must contain min. one number and one special character ['!', '@', '#', '$', '%', '^', '&', '*', '(', ')']	Y
Change Password		
Password	Password must be 8-15 characters long, with at least one lower case and one uppercase letter. Password must contain min. one number and one special character ['!', '@', '#', '$', '%', '^', '&', '*', '(', ')']	Y
Confirm Password	--- Same as above ---	Y
Add Customer		
Organization Name	Organization name must be a minimum of 3 characters long and can contain a maximum of 50 characters	Y
First name	First name must be a minimum of 3 characters long and can contain a maximum of 50 characters	Y
Last Name	Last name must be a minimum of 3 characters long and can contain a maximum of 50 characters	Y
Contact Number	Contact Number must be a 10-digit number	Y
Email	Email must be a valid email address, for example, abc@domain.com	Y
Address 1	Address 1 can contain characters, numbers, special characters	Y
Address 2	Address 2 can contain characters, numbers, special characters	N
Fee Profile	Select from Fee Profile drop down list	Y
City	City can contain characters, numbers, special characters	Y
State	Select from State drop down list	Y
Postal Code	Postal code must be a 5-digit number	Y
Topup		

Customer	Select from Customer drop down list	Y
Amount ($)	Amount can contain numbers only	Y
Description	Description can contain characters, numbers, special characters	Y
Add Fee Profile		
Profile Name	Profile Name can contain characters, numbers, special characters	Y
Type	Select form drop down list	Y
Upper Limit	Upper limit can contain numbers only	Enabled when adding the slab for the second time
Fee Amount ($)	Upper limit can contain numbers only	Y

6 Message Layout and Parameters

6.1 Format Description of JSON RPC 2.0

Request Structure

```
--> {"jsonrpc":"2.0", "method":"XXXX", "params": {XXXXXXX}, "id":X}
```

Keys	Description
ID	Refers to Identification Number sent by the customer
Method	Based on Key Values of Method, CBW bank recognizes the type of service requested by the customer
Params	Refers to the *Request Parameters* sent in by the Customer

Note: Params comprises **API** and **Payload**. The API carries the Authentication Parameters, and the Payload carries the Requested Parameters by the Customer.

Response Structure

```
<--{"jsonrpc":"2.0","result":XX,"id":X}
```

Keys	Description
ID	Refers to Identification Number sent by the customer
Result	Refers to the *Response Parameters* sent by Early Warning in response to Customer's request

6.2 Authentication

The EW connector generates a unique API key, which is issued to the user (financial institution). This unique key is then combined with the Username and converted into a 64 bit encoded token. The signature created by the user through ECDSA algorithm is used along with this 64 bit encoded token to authenticate all requests. Additionally, IP whitelisting is carried out in the application and firewall. The parameters mentioned below are a part of the API payload sent in the request JSON. The sample request structure is appended below for quick reference.

Parameter Name	Possible Values	Field Length	Type	Requirement
Credential	Basic Y2hyaXN0b3B0ZXIubXVycmF5QGRlcG9zaXQtc29sdXRpb25zLmNgbTo5MjUwNThiZGQ5MDU0ZDcxOTJmNDhhNTE4ZjQzZrk4NQ==	N/A	String	Mandatory
Signature	"MIGHAgEAMBMGByqGSM49AgEGCCqGSM49AwEHBG0wawIBAQQg0nSRl9qZvY5mFY6W"	1-17	String	Mandatory

7 Request and Response parameters:

7.1 Account Inquiry

Early Warning evaluates the Account information. Account Inquiry includes Account level information - Account, Account number, routing number and fee Attributes / Channel Indicator.

7.1.1 Request Parameters

Parameter Name	Possible Values	Field Length	Type	Requirement
Type	ACCOUNT	N/A	String	Mandatory
accountNumber		1-17	Non-negative integer	Mandatory
routingNumber		9	Non-negative integer	Mandatory
feeAttrib	AA, BB, CC, DD, EE, FF, GG, HH, II – Please refer APPENDIX B for explanation on these codes	2	String	Mandatory

7.1.2 Sample Request (JSON)


```
{
 "id": 21,
 "method": "ew.inquire",
 "params": {
  "api": {
   "credential": "Basic
Y2hyaXN0b3B0ZXIubXVycmF5QGRlcG9zaXQtc29sdXRpb25zLmNgbTo5MjUwNThiZGQ5MDU0ZDcxOTJm
NDhhNTE4ZjQzZrk4NQ==",
   "signature": " MIGHAgEAMBMGByqGSM49AgEGCCqGSM49AuEHBG0lawIBAQQgonSRl9qZvY5mFY6W
"
  },
  "payload": {
"type": "ACCOUNT",
  "accountNumber": "61231234340",
  "routingNumber": "122199983",
  "feeAttrib": "BB" }
 }
}
```

Account status response includes Owner status match code, Match Result containing FirstName, Last Name, Business Name, Social Security Number, Date of Birth, City, Address; Primary Account Status code, Secondary Account Status code, Additional Account Status code, Error codes and Status.

High Risk Warning codes are:

- Closed, pending closed, or post no debit statuses codes 002, 003, 010, 012, 013, 014, 102, 103, 110, 112, 113, 114
- Stop-payment status codes004-007, 104-107
- Highest-risk Enhanced Overdrawn status codes 020-022, Overdrawn status codes 030, 031, 130

Informational Response codes are:

- Returning item status are 015-016 unless this is the only information returned on the account
- The account is a not a demand deposit account (DDA). Non-DDA status codes are 080, 081, 082, 084, or 098
- The account is present- 099, 199
- No known information about the account - 096

7.1.3 Response Parameters

Parameter Name	Possible values
ownerStatus	Eg: C000, where C is the match code and 000 is the participant status code. Please refer Appendix C for possible match codes and participant status codes.
matchResult (object)	This object is returned with all null values because none of information below is passed in the account only inquiry
firstName	Null
lastName	Null
businessName	Null
Ssn	Null
dob	Null
city	Null
address	Null
priAccountStatus	Please refer APPENDIX B for possible primary account status codes and their interpretation.
secAccountStatus	Please refer APPENDIX B for possible secondary account status codes and their interpretation.
addAccountStatus	Please refer APPENDIX B for possible additional account status codes and their interpretation.
errorCode	Please refer APPENDIX B for possible error codes and their interpretation.
Status	OK, indicating that the request and the response were sent and received successfully, respectively.

7.1.4 Sample response (JSON)


```
{
 "id": "21",
 "result":{
  "ownerStatus": "C900",
  "matchResult": {
     "firstName": null,
     "lastName": null,
     "businessName": null,
     "ssn": null,
     "dob": null,
     "city": null,
     "address": null
  },
  "priAccountStatus": "S130",
  "secAccountStatus": "000",
  "addAccountStatus": "000",
  "errorCode": "0",
  "status": "OK"
}
}
```


7.2 Owner Inquiry

Account owner authentication and evaluation is done by Early Warning. Account Owner Inquiry includes first name, last name, business name, Address 1, Address 2, City, State, Zip, Home Phone, Work Phone, Social Security number, Date of Birth, Account number, routing number, Free Attrib and type of the Inquiry.

7.2.1 Request Parameters:

Parameter Name	Possible Values	Field Length	Type	Requirement
firstName		1-40	String	Mandatory *
lastName		1-40	String	Mandatory *
businessName		1-87	String	Mandatory *
address1		1-40	String	Optional
address2		1-40	String	Optional
City		1-25	String	Optional
State		2	String	Optional
Zip		5-10	String	Optional
homePhone		10	Non-negative integer	Optional
workPhone		10	Non-negative integer	Optional
SSN		9	Non-negative integer	Optional

Dob		8	Non-negative integer (yyyymmdd)	Optional
accountNumber		1-17	Non-negative integer	Mandatory
routingNumber		9	Non-negative integer	Mandatory
feeAttrib	AA, BB, CC, DD, EE, FF, GG, HH, II – Please refer APPENDIX B for explanation on these codes	2	String	Mandatory
Type	OWNER	N/A	String	Mandatory

* Inquiry must contain one of the following – If one is populated, the other can be left blank

- firstName AND lastName
  OR
- businessName

7.2.2 Sample Request (JSON)


```
{
 "id": 21,
 "method": "ew.inquire",
 "params": {
  "api": {
   "credential": "Basic
Y2hyaXN0b3B0ZXIubXVycmF5QGRlcG9zaXQtc29sdXRpb25zLmNgbTo5MjUwNThiZGQ5MDU0ZDcxOTJm
NDhhNTE4ZjQzZrk4NQ==",
   "signature": " MIGHAgEAMBMGByqGSM49AgEGCCqGSM49AuEHBG0lawIBAQQgonSRl9qZvY5mFY6W
"
  },
  "payload":
{
 "firstName": "Jane",
 "businessName": null,
 "lastName": "Viola",
 "address1": "W 5th Street",
 "address2": "",
 "city": "Manhattan",
 "state": “NY”,
 "zip": “10020”,
 "homePhone": "9712452012",
 "workPhone": "9712452012",
 "ssn": "911018872",
 "dob": "19680407",
 "feeAttrib": "HH",
 "accountNumber": "61231234340",
 "routingNumber": "122199983",
 "type": "OWNER"
}
```

Account Owner Enquiry Response includes Matching Owner status, Match result containing first name, last name, business name, Address, City, error code and status.

In the response of the Owner Inquiry, the Owner Status is a four-character code with the first character being a letter, followed by 3 numbers. The letter indicates the match code and the number indicates the condition code. The match code depends on the overall match for name, address, SSN, dob and other details provided for verification. The remaining three characters of the owner status response is a code known as the participant status code. The code indicates the high-level account status and indicates whether the inquiry resulted in a hard or soft hit.

7.2.3 Response Parameters

Parameter Name	Possible values
ownerStatus	Please refer APPENDIX B for possible codes
matchResult (object)	For this inquiry, match values must be returned for some or all of the fields in this object, depending on what information was passed.
firstName	Y/N/null
lastName	Y/N/null
businessName	Y/N/null
Ssn	Y/N/null
dob	Y/N/null
city	Y/N/null
address	Y/N/null
errorCode	Please refer APPENDIX B for possible error codes
Status	OK, indicating that the request and the response were sent and received successfully, respectively.

7.2.4 Sample response (JSON)


```
{
 "id": "21",
 "result":
{
   "ownerStatus": "C000",
   "matchResult": {
      "firstName": "Y",
      "lastName": "Y",
      "businessName": null,
      "ssn": "N",
      "dob": "N",
      "city": "N",
      "address": "N"
   },
   "errorCode": "0",
   "status": "OK"
}
}
```

7.3 Both Account / Owner Inquiry

Early Warning evaluates both Account and Owner information and the Inquiry includes first name, last name, business name, Address 1, Address 2, City, State, Zip, Home Phone, Work Phone, Social Security number, Date of Birth, Account number, routing number, Fee Attribute and type of the Inquiry which is both Account and Owner.

7.3.1 Request Parameters

Parameter Name	Possible Values	Field Length	Type	Requirement
firstName		1-40	String	Mandatory *
lastName		1-40	String	Mandatory *
businessName		1-87	String	Mandatory *
address1		1-40	String	Optional
address2		1-40	String	Optional
City		1-25	String	Optional
State		2	String	Optional
Zip		5-10	String	Optional
homePhone		10	Non-negative integer	Optional
workPhone		10	Non-negative integer	Optional
Ssn		9	Non-negative integer	Optional
Dob		8	Non-negative integer (yyyymmdd)	Optional
accountNumber		1-17	Non-negative integer	Mandatory
routingNumber		9	Non-negative integer	Mandatory
feeAttrib	AA, BB, CC, DD, EE, FF, GG, HH, II – Please refer APPENDIX B for explanation on these codes	2	String	Mandatory
Type	BOTH	N/A	String	Mandatory

7.3.2 Sample Request (JSON)


```
{
 "id": 21,
 "method": "ew.inquire",
 "params": {
  "api": {
   "credential": "Basic
Y2hyaXN0b3B0ZXIubXVycmF5QGRlcG9zaXQtc29sdXRpb25zLmNgbTo5MjUwNThiZGQ5MDU0ZDcxOTJm
NDhhNTE4ZjQzZrk4NQ==",
   "signature":
"MIGHAgEAMBMGByqGSM49AgEGCCqGSM49AuEHBG0lawIBAQQgonSRl9qZvY5mFY6W"
```

```
  },
  "payload":{
 "firstName": "Jane ",
 "businessName": null,
 "lastName": "Viola",
 "address1": "W 5th street",
 "address2": "",
 "city": "Manhattan",
 "state": "NY",
 "zip": "10020",
 "homePhone": "9712452012",
 "workPhone": "9712452012",
 "ssn": "911018872",
 "dob": "19680407",
 "feeAttrib": "HH",
 "accountNumber": "61231234340",
 "routingNumber": "101100045",
 "type": "BOTH"
}
```


7.3.3 Response parameters

Parameter Name	Possible values
ownerStatus	Please refer APPENDIX B for possible condition codes
matchResult (object)	For this inquiry, match values must be returned for some or all of the fields in this object, depending on what information was passed.
firstName	Y/N/null
lastName	Y/N/null
businessName	Y/N/null
Ssn	Y/N/null
dob	Y/N/null
city	Y/N/null
address	Y/N/null
errorCode	Please refer APPENDIX B for possible error codes
Status	OK, indicating that the request and the response were sent and received successfully, respectively.

7.3.4 Sample Response (JSON)


```
{
 "id": "21",
 "result":
{
   "ownerStatus": "C300",
   "matchResult": {
      "firstName": null,
      "lastName": null,
```

```
      "businessName": null,
      "ssn": null,
      "dob": null,
      "city": null,
      "address": null
    },
    "priAccountStatus": "S096",
    "secAccountStatus": "000",
    "addAccountStatus": "000",
    "errorCode": "0",
    "status": "OK"
}
}
```

APPENDIX A – HTTP Errors

Error Code	Description	Explanation
403	Forbidden	Access Denied – API key is not enabled or the token header is missing or no token has been sent in the header or the format of the header is incorrect (such as unwanted white spaces)
500	Internal Server Error	Invalid Credentials - Username or API token is missing or user is trying to access the API from a non-whitelisted IP address
415	Unsupported Media Type	Content-Type header is missing, empty or has incorrect value.
400	Bad Request	Bad syntax on one or more parameters.

S

APPENDIX B

1. Early Warning Error Codes

The following error codes may be returned by Early Warning if incorrect data was sent in the request or if there was an issue evaluating the request:

Error	Field Name	Field	Description
000	AcctNo	Account Number	Normal return - no system errors
001	RTN	Routing/Transit Number	Invalid
003	AcctNo	Account Number	Invalid
004	PC/TranCode	PC/Tran Code	Invalid
005	SerialNo	Serial Number	Invalid Serial Number
006	Required field	Required field	Insufficient information
007	AcctNo	Account	Cannot be translated in TEPS
008	AcctNo	Account number	Length error
009	NA	Mnemonic	Not active in TEPS
010	Various	Alphanumeric	Inquiry field length too short
011	Various	Alphanumeric	Inquiry field length too long
013	Amount	Amount	Invalid
101	ClientAPI	FSO API	ID invalid
102	PrimID	Primary FSO ID	Invalid/missing Channel Indicator or Fee Attribute
103	PrimID	Primary FSO ID	Missing. No match to values on Early Warning file
	SecID	Secondary FSO ID	No match to values on Early Warning file
	AddID	Additional FSO ID	No match to values on Early Warning file
104	Various	Numeric or Alphanumeric	Populated with improper data type or value
105	NA	Generic	Bad Layout or Format
106	ClientRecID	FSO Record ID	Missing
107	Required format	Invalid required format	Missing data or invalid data populated in XML node Tag for required field missing Fields out of sequence
998	NA		System failure
999	NA		Timeout

2. Account Owner Codes

In the response of the Owner Inquiry and the Both Account / Owner Inquiry, the Owner Status is a four character code with the first character being a letter, followed by 3 numbers. The letter indicates the match code and the number indicates the condition code. The match code depends on the overall match for name, address, SSN, DOB and other details provided for verification.

The match codes received can be one of the following:

Y = The inquiry field closely or exactly matches the database.

C = The inquiry field conditionally (partially) matches the database

N = The inquiry field does not match the database.

U = No identifying data is available in the database for the account provided.

"C" conditional (partial) match responses are applicable to the following fields:

Full Name (FName+MName+LName)
Business Names
Street Address (Address 1 + Address 2)
City
ZIP (first five digits)
Home Phone
Work Phone
SSN/ITIN (9-digit inquiry)
Date of Birth (DOB)

Only Y/N matches are applicable to the following fields (no conditional matching):

First Name
Last Name
Middle Name or
Initial
State
SSN/ITIN (4-digit inquiry)

To understand the logic of how partial matches are calculated, please refer to **Section 4, subsection "Match Codes and Matching Rules"** of the Early Warning Document.

The remaining three characters of the owner status response is a code known as the participant status code. The code indicates the high-level account status and indicates whether the inquiry resulted in a hard or soft hit. The following participant status codes may be returned by Early Warning:

Hit Type	Status Codes		Description
	Number	Name	
Soft	000	Not Located	Account requested for verification does not exist on the Contributor's master account file. This condition may indicate an account number misread or a potentially fraudulent item.
Hard	002	Closed For Cause	A transaction account which has been closed by Contributor FSO as a result of unacceptable use by the customer. This judgment is made by the FSO in accordance with its transaction account policies.
Hard	003	Closed for Cause/Purged	Account has been removed from the Contributor's master account file. Account will be retained by Early Warning until reissued by the Contributor.
Hard	004	Stop Payment 4 Field Individual Match	A check inquiry (transit item) where all four MICR fields (ABA, account #, serial # and dollar amount) match an individual/unique stop-payment record in the *National Shared Database* resource.
Hard	005	Stop Payment 4 Field Range Match	A check inquiry (transit item) where all four MICR fields (ABA, account #, serial # and dollar amount) match a range of stop-payment records in the Database.
Hard	006	Stop Payment ¾ Individual	A check inquiry (transit item) where three MICR fields (ABA, account #, and serial #) match an individual/ unique stop-payment record in the Database.
Hard	007	Stop Payment ¾ Range	A check inquiry (transit item) where three MICR fields (ABA, account #, and serial #) match a range stop-payment record in the Database.
Hard	010	Post No Debits	Account will not accept any debit activity.
Hard	012	Closed	Account closed.
Hard	013	Closed/Purged	Account has been closed and removed from Contributor's master account file. Account will be retained by Early Warning until the first occurrence of: Three years from the date account originally closed Account is reissued by Contributor.
Hard	014	Pending Closed	Account was closed in the last processing cycle. This status will automatically change to a Status 012 in the next processing cycle unless modified by the contributing FSO.
Hard	015	Return Item	High probability of return.
Soft	016	Account	Moderate probability of return.
Hard	020 021 022	Enhanced OD	Available balance less than zero, with: X = Consecutive days in OD status. Y = Time account has been on the books.
Soft	028	Divested Account	Account has been purchased or assumed by

		– Purged	another FSO and has been removed from Contributor's master account file. The account will be retained by Early Warning for six months.
Soft	030	Overdrawn	Available balance less than zero. Activity may post upon review.
Soft	031	Overdrawn New Account	Available balance less than zero, and account opened within prior 60 days. Activity may post upon review.
Soft	032	Uncollected Funds	Collected balance less than zero. Activity may post upon review.
Soft	033	UCF/New Account	Collected balance less than zero and account opened within prior 60 days. Activity may post upon review.
Soft	034	Dormant/Inactive	Account dormant or inactive. Activity may post upon review.
Soft	035	Deceased	Account holder deceased. Activity may post upon review.
Soft	036	Lost/Stolen Check(s)	Account holder reported check(s) lost or stolen. Activity may post upon review.
Soft	037	Attached	Account subject to levy, garnishment, government reclamation, lien, court order or other restriction of limited amount. Activity may post upon review.
Soft	038	Divested Account	An account purchased or assumed by another FSO.
Informational	040	New Account (8-60)	Account opened between 8-60 days.
Informational	041	New Account (0-7)	Account opened between 0-7 days.
Informational	042	New Account (61-120)	Account opened between 61-120 days.
Informational	043	New Account (121-180)	Account opened between 121-180 days.
Informational	055	Official Item	Cash-equivalent item such as official check, cashier's check, or teller check.
Informational	080	Credit Card Check	Item drawn on non-DDA that is posted to a credit card account and/or drawn against a credit card FSO.
Informational	081	Participant Line of Credit Check	Item drawn on non-DDA and is posted to a credit line account. The drawee FSO is a Contributor to the Database.
Informational	082	Participant Home Equity Check	Item drawn on non-DDA and is posted to a home equity account. The drawee FSO is a Contributor to the Database.
Informational	084	Participant Broker Check	Item drawn on non-DDA and is posted to a brokerage account and/or drawn against a broker-only FSO. The drawee FSO is a Contributor to the Database.
Informational	096	No Known	No positive or negative information is known

		Information	about the item.
Informational	098	Non-DDA	Item drawn on a non-DDA and not included in statuses 080,081, 082, and 084.
Informational	099	Present	Account is present in Contributor's master account file and contains no other status code. Typically, these are accounts with positive balances.
Hard	102	Savings Closed for Cause	A savings account which has been closed by the Contributor FSO as a result of unacceptable use by the customer. This judgment is made by the FSO in accordance with its transaction account policies.
Hard	103	Savings Closed for Cause/ Purged	Closed for Cause savings account has been removed from the Contributor's master account file. Account will be retained by Early Warning until reissued by the Contributor.
Hard	104	Savings Stop Payment 4 Field Individual Match	A savings inquiry where all four MICR fields (ABA, account #,serial # and dollar amount) match an individual/ unique stop-payment record in the Database.
Hard	105	Savings Stop Payment 4 Field Range Match	A savings inquiry where all four MICR fields (ABA, account #,serial # and dollar amount) match a range of stop-payment records in the Database.
Hard	106	Savings Stop Payment ¾ Individual	A savings inquiry where all three MICR fields (ABA, account #,and serial #) match an individual/unique stop-payment record in the Database.
Hard	107	Savings Stop Payment ¾ Range	A savings inquiry where three MICR fields (ABA, account #, and serial #) match a range stop-payment record in the Database.
Hard	110	Savings Post No Debits	Savings account will not accept any debit activity.
Hard	112	Savings Closed	Savings account closed.
Hard	113	Savings Closed/Purged	Savings account has been closed and removed from Contributor’s master account file. Account will be retained by Early Warning until the first occurrence of: Three years from the date account originally closed Account is reissued by Contributor.
Hard	114	Savings Pending Closed	Savings account is closed. Account was closed in the last processing cycle. This status will automatically change to Status 112 in the next processing cycle unless modified by the contributing FSO.
Soft	128	Savings Divested Account/Purged	A savings account purchased or assumed by another FSO and removed from the Contributor's master account file. The Account will be retained by Early Warning for six months.

Soft	130	Savings	Savings account available balance less than zero.

		Overdrawn	Activity may post upon review.
Soft	132	Savings Uncollected Funds	Savings account collected balance less than zero. Activity may post upon review.
Soft	133	Savings UCF/New Account	Savings account collected balance less than zero and account opened within prior 60 days. Activity may post upon review.
Soft	134	Savings Dormant/Inactive	Savings account dormant or inactive. Activity may post upon review.
Soft	135	Savings Deceased	Savings account holder deceased. Activity may post upon review.
Soft	137	Savings Attached	Savings account subject to levy, garnishment, government reclamation, lien, court order or other restriction of limited amount. Activity may post upon review.
Soft	138	Savings Divested Account	Savings account purchased or assumed by another FSO.
Informational	140	Savings New Account (8-60)	Savings account opened between 8-60 days.
Informational	141	Savings New Account (0-7)	Savings account opened between 0-7 days.
Informational	142	Savings New Account (61-120)	Savings account opened between 61-120 days.
Informational	143	Savings New Account (121-180)	Savings account opened between 121-180 days.
Informational	199	Savings Present	Savings account is present in the Contributor's master account file and contains no other status codes. These are typically accounts with positive balances.

3. Account Status Responses

Early Warning returns three specific account status response codes in the response: **Primary Response Code, Secondary Response Code and Additional Response Code**.
The following table describes how account item factors are used to assign priority to the account item response codes.

<table>
<tr><th colspan="3">High-Risk Warning Code Prioritization</th></tr>
<tr><th>If the routing/transit number of the account:</th><th colspan="2">Then:</th></tr>
<tr><td rowspan="6">Belongs to an Early Warning Participant and negative information about the account or item is identified</td><td colspan="2">The status codes are mapped in the following priority levels:</td></tr>
<tr><td>Priority Level</td><td>Status Codes</td></tr>
<tr><td>First</td><td>Closed, pending closed, or post no debit statuses 002, 003, 010, 012, 013, 014, 102, 103, 110, 112, 113, 114</td></tr>
<tr><td>Second</td><td>Stop-pay status codes 004-007, 104-107</td></tr>
<tr><td>Third</td><td>Highest-risk Enhanced Overdrawn status codes 020-022,Overdrawn status codes 030, 031, 130</td></tr>
<tr><td>Fourth</td><td>Returning item status 015-016 unless this is the only information returned on the account</td></tr>
<tr><td>Does not belong to an Early Warning participant and Recent account activity has led toa high-risk account score</td><td colspan="2">High-risk Scored Accounts scores are mapped to the Primary Response field</td></tr>
</table>

4. Informational Response Code Mapping

In the absence of any high-risk warning codes, an Informational response code is returned in the Primary Response code field. The secondary and additional response code fields will contain zeros.

The following table describes how the account item factors are used to map an account item response code to the Primary Response Code field.

Informational Response Code Mapping

If the routing and transit number of the account:	And:	Then these Status Codes are mapped to the Primary Response field:
Belongs to an Early Warning participant	The account is a not a demand deposit account (DDA)	080, 081, 082, 084, or 098 (Non-DDA status codes)
	The account is present	099, 199
Does not belong to an Early Warning participant or has been divested by a participant	No known information about the account is identified	096

For DDA Response Hierarchy Matrix and Savings Response Hierarchy Matrix, please refer to Section 4, subsection "Response Hierarchy Mapping Process" of the document shared by Early Warning.

Fee Attribute

Channel Indicator or Fee Attribute. Service-defined; can be used for Channel Indicator or Fee Attribute. If using this field for Channel Indicator, valid values include:

Value Definition

AA	RDC All
BB	RDC Consumer Home
CC	RDC Consumer Mobile
DD	RDC Small Business
EE	Branch/Teller
FF	ATM
GG	Lockbox/Mail/Corporate
HH	ACH - Deposit
II	Correspondent representment transaction
NT	Teller Transactions
NA	ATM Transactions
NR	Back Office Transactions
NW	Internet/Web