Amazon Web Services Adapter Guide

For SAP Cloud Integration and SAP Integration Suite

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THE BEST RUN SAP

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1 INTRODUCTION

This is a guide for the Amazon Web Services adapter for SAP Cloud Integration. This guide covers all relevant information for integration developers to start working with the Amazon Web Services adapter. Please read this guide carefully before using the Amazon Web Services adapter.

1.1 Coding Samples

Any software coding and/or code lines/strings ("Code") included in this documentation are only examples and are not intended to be used in a productive system environment. The Code is only intended to better explain and visualize the syntax and phrasing rules of certain coding. The correctness and completeness of the Code given herein are not guaranteed.

1.2 Internet Hyperlinks

The documentation may contain hyperlinks to the Internet. These hyperlinks are intended to serve as a hint about where to find related information. The availability and the correctness of this related information or the ability of this information to serve a particular purpose are not warranted.

2 AMAZON WEB SERVICES INTEGRATION

2.1 Introduction

Amazon Web Services (AWS) is Amazon's cloud web hosting platform that offers flexible, reliable, scalable, easy-to-use and cost-effective solutions. AWS provides on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered pay-as-you-go basis. These cloud computing web services provide a variety of basic abstract technical infrastructure and distributed computing building blocks and tools.

2.2 Amazon Web Services Adapter

The Amazon Web Services adapter enables the SAP Cloud Integration tenant to exchange information with Amazon Web Services (AWS). The protocols supported by the adapter are S3 (Amazon Simple Storage Service), SQS (Amazon Simple Queue Service), SNS (Amazon Simple Notification Service), and SWF (Amazon Simple Workflow Service). A brief explanation of each of the protocols is provided below.

- *S3 (Amazon Simple Storage Service)*

  Amazon Simple Storage Service is known as the storage for the Internet. It is designed to make web-scale computing easier for developers. Amazon S3 has a simple web services interface that allows the storage and retrieval of any amount of data, at any time, from anywhere on the web. It gives any developer access to the same highly scalable, reliable, fast, inexpensive data storage infrastructure that Amazon uses to run its global network of websites. The service aims to maximize the benefits of scale and pass those benefits on to developers.

- *SQS (Amazon Simple Queue Service)*

  Amazon Simple Queue Service (Amazon SQS) offers a secure, durable, and available hosted queue that lets distributed software systems and components integrate and decouple.

- *SNS (Amazon Simple Notification Service)*

  Amazon Simple Notification Service (Amazon SNS) is a web service that manages the delivery or sending of messages to subscribed clients. In Amazon SNS, there are two types of clients, namely publishers (or producers) and subscribers (or consumers). Publishers communicate asynchronously with subscribers by producing and sending a message on a topic. Subscribers can consume or receive the message via one of the supported protocols (Amazon SQS, HTTP/S, email, SMS, Lambda).

- *SWF (Amazon Simple Workflow Service)*

  The Amazon Simple Workflow Service (Amazon SWF) enables the building of applications that can coordinate work across distributed components. In Amazon SWF, a task represents a logical unit of work that is performed by a component of an application. Coordinating tasks across the application involves managing inter-task dependencies, scheduling, and concurrency following the logical flow of the application.

2.2.1 Features

Amazon Web Service Adapter provides the following features in the Adapter:

Authentication Supported:

The adapter supports different types of authentication:

- *Access and Secret Key*
- *Security Token Service (AssumeRole)*
- *Security Token Service (AssumeRoleWithWebIdentity)*

Sender Adapter:

- *AWS S3 to poll files from AWS S3 service*
  - Support for patterns in the filename.
  - Possibility to archive processed files to the same bucket as part of the post-processing step.
  - Possibility to archive processed files to a different bucket as part of the post-processing step.
  - Possibility to sort files based on Filename, Filesize, and Timestamp.
  - Capability to retrieve additional metadata maintained for the file on the S3 bucket. Multiple attributes can be retrieved at the same time.
  - Support for Server-Side Decryption.
  - Functionality to generate pre-signed URL.

- *AWS SQS to receive a message from an AWS SQS queue*
  - Support for Standard and FIFO queues.
  - Possibility to keep or delete the message from the queue after reading as part of the post-processing step.
  - Possibility to keep a message in the queue after processing.
  - Capability to retrieve additional metadata maintained for a message on the SQS queue. Multiple attributes can be retrieved at the same time.

Receiver Adapter*:*

- *AWS S3 to* push files into AWS S3 service. This protocol has the following features:
  - Option to append timestamp and message ID to the file name during the creation process.
  - Option to select a storage class.
  - Different handling options for existing S3 bucket files
  - Option to upload attachments to the S3 bucket.
  - Server-Side Encryption.
  - Possibility to add multiple custom metadata to the file while storing it.
  - Capability to read a particular file from the S3 bucket using the Read operation of the receiver adapter.

- *AWS SQS to* send a message to the AWS SQS queue. This protocol has the following features:
  - Support for Standard and FIFO queue.
  - Option to add multiple message attributes while writing a message to queue.
  - For the Standard queue, the option to provide delay seconds to avoid subsequent processing by any other consumer.
  - For the FIFO queue, the option to provide message deduplication id and message group ID.

- *AWS SNS* to push real-time notification messages to interested subscribers over multiple delivery protocols. This protocol has the following features:
    - Support for Standard topics.
    - Option to provide Identical Payload for all consumers.
    - Option to provide custom payload for different consumers.
    - Option to format the response in XML and JSON formats.
      Option to provide multiple Message attributes.

- *AWS SWF to provide* full control over implementing tasks and coordinating them. This protocol has the following feature:
    - Support for multiple operations that can be selected from a pre-defined list.
    - Option to determine request and response format. Currently, JSON is supported.

2.3 Architecture Overview

The Amazon Web Services adapter can be used as a Sender Adapter from Amazon Web Services. Figure 2.1 below shows how the Amazon Web Services adapter can be used in scenarios where information must be pulled from an Amazon Web Services S3 bucket or an SQS queue. The supported protocols on the sender side are S3 (Amazon Simple Storage Service) and SQS (Amazon Simple Queue Service).

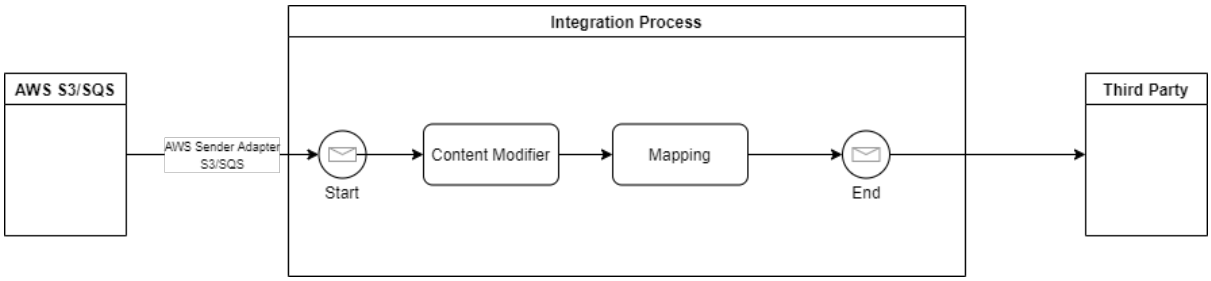


Figure 2.1 Amazon Web Services Solution for SAP Cloud Integration

Figure 2.2 shows a scenario where the adapter can be used in a simple request-reply pattern to send information to Amazon Web Services. The receiver adapter is used for such integration patterns. The supported protocols for the receiver adapters are S3, SQS (Simple Queue Service), SNS (Simple Notification Service), and SWF (Workflow service).

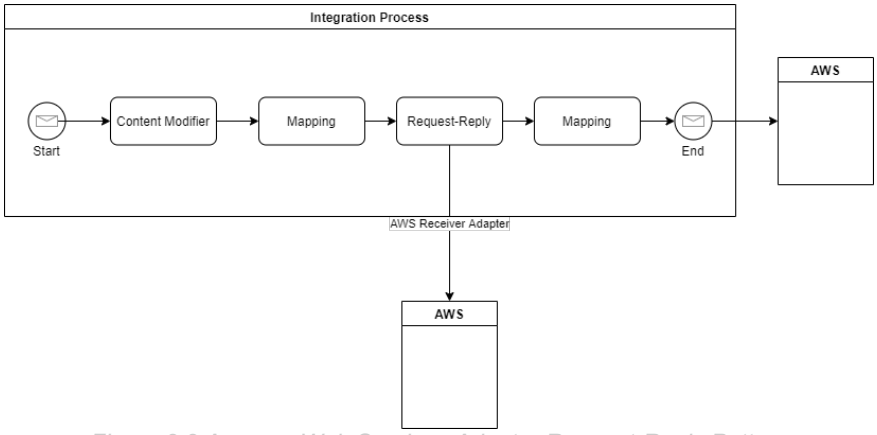


Figure 2.2 Amazon Web Services Adapter Request-Reply Pattern

Figure 2.3 shows a scenario where the adapter can be used at the end of the flow on the receiver side to send information to Amazon Web Services.

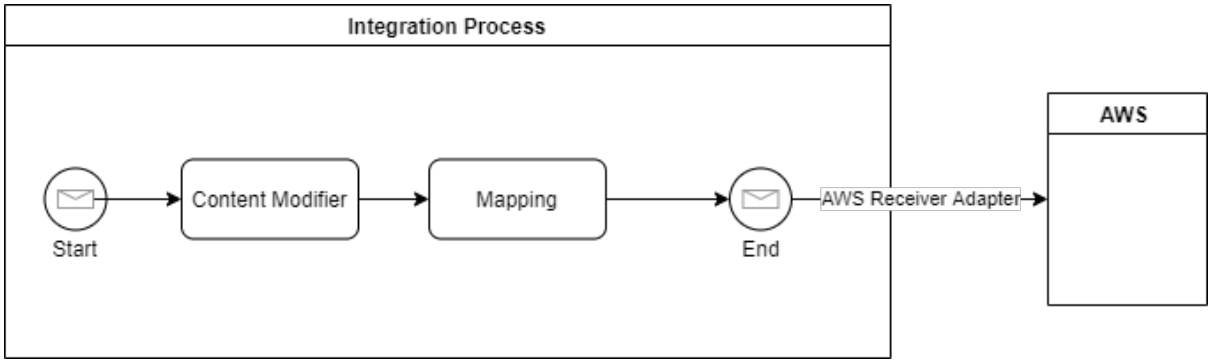


Figure 2.3 Amazon Web Services Receiver Adapter

3 SUPPORTED OPERATIONS AND VERSIONS

The supported API versions for different protocols are listed in Table 1:

Protocol	API version
S3	2006-03-01
SQS	2012-11-05
SNS	2010-03-31
SWF	2012-01-25

Table 1 Supported API Versions

The operations supported by the AWS receiver adapter for different protocols are listed in the table below.

Direction	Protocol	Operation	Description
Receiver	S3	Write	Writes an object to an AWS bucket.
	SQS	Write	Writes a message to AWS queue.
	SNS	Write/Publish	Sends a message to an Amazon SNS topic.
	SWF	Count Closed Workflow Executions	Returns the number of closed workflow executions within the given domain that meet the specified filtering criteria.
		Count Open Workflow Executions	Returns the number of open workflow executions within the given domain that meet the specified filtering criteria.
		Count Pending Activity Tasks	Returns the estimated number of activity tasks in the specified task list.
		Count Pending Decision Tasks	Returns the estimated number of activity tasks in the specified task list.
		Deprecate Activity Type	Deprecates the specified activity type.
		Deprecate Domain	Deprecates the specified domain.
		Deprecate Workflow Type	Deprecates the specified workflow type.
		Describe Activity Type	Returns information about the specified activity type.
		Describe Domain	Returns information about the specified domain, including description and status.
		Describe Workflow Execution	Returns information about the specified workflow execution including its type and some statistics.

Direction	Protocol	Operation	Description
		Describe Workflow Type	Returns information about the specified workflow type.
		Get Workflow Execution History	Returns the history of the specified workflow execution.
		List Activity Types	Returns information about all activities registered in the specified domain that matches the specified name and registration status.
		List Closed Workflow Executions	Returns a list of closed workflow executions in the specified domain that meet the filtering criteria.
		List Domains	Returns the list of domains registered in the account.
		List Open Workflow Executions	Returns a list of open workflow executions in the specified domain that meet the filtering criteria.
		List Tags for Resource	List tags for a given domain.
		List Workflow Types	Returns information about workflow types in the specified domain.
		Poll for Activity Task	Used by workers to get an ActivityTask from the specified activity taskList.
		Poll for Decision Task	Used by deciders to get a DecisionTask from the specified decision taskList.
		Record Activity Task Heartbeat	Used by activity workers to report to the service that the ActivityTask represented by the specified taskToken is still making progress.
		Register Activity Type	Registers a new activity type along with its configuration settings in the specified domain.
		Register Domain	Registers a new domain.
		Register Workflow Type	Registers a new workflow type and its configuration settings in the specified domain.
		Request Cancel Workflow Execution	Records a WorkflowExecutionCancelRequested event in the currently running workflow execution identified by the given domain, workflowId, and runId.
		Respond Activity Task Canceled	Used by workers to tell the service that the ActivityTask identified by the taskToken was successfully canceled.
		Respond Activity Task Completed	Used by workers to tell the service that the ActivityTask identified by the taskToken was completed successfully with a result.
		Respond Activity Task Failed	Used by workers to tell the service that the ActivityTask identified by the taskToken has failed with reason.
		Respond Decision Task Completed	Used by deciders to tell the service that the DecisionTask identified by the taskToken has been completed.
		Signal Workflow Execution	Records a WorkflowExecutionSignaled event in the workflow execution history and creates a decision task for the workflow execution identified by the given domain, workflowId, and runId.
		Start Workflow Execution	Starts execution of the workflow type in the specified domain using the provided workflowId and input data.

Direction	Protocol	Operation	Description
		Tag Resource	Add a tag to an Amazon SWF domain.
		Terminate Workflow Execution	Records a WorkflowExecutionTerminated event and forces closure of the workflow execution identified by the given domain, runId, and workflowId.
		Undeprecate Activity Type	Undeprecates a previously deprecated activity type.
		Undeprecate Domain	Undeprecates a previously deprecated domain.
		Undeprecate Workflow Type	Undeprecates a previously deprecated workflow type.
		Untag Resource	Remove a tag from an Amazon SWF domain.

Table 2 Supported Operations

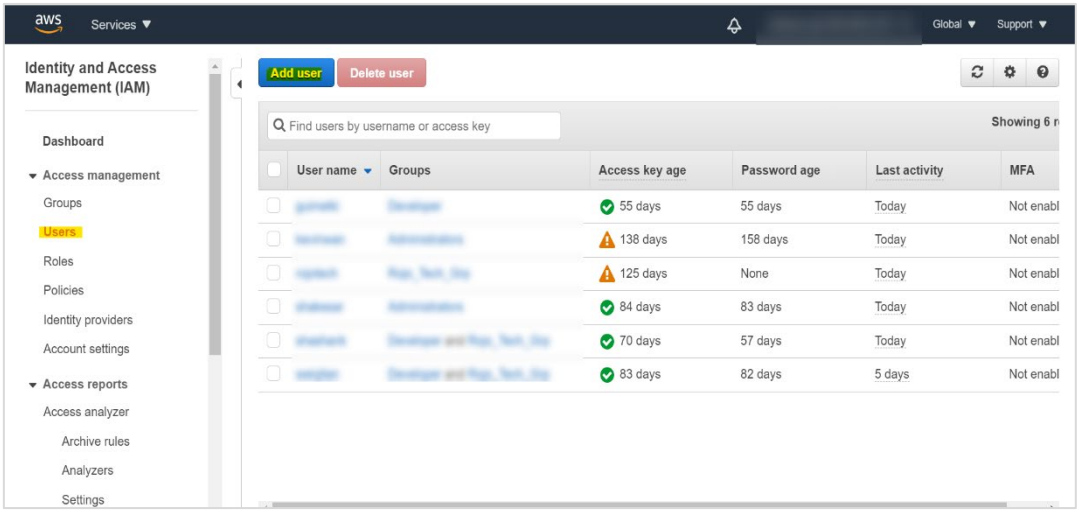
4 ADAPTER INSTALLATION

Refer to the Amazon Web Services Adapter Installation Guide for detailed steps about Adapter installation.

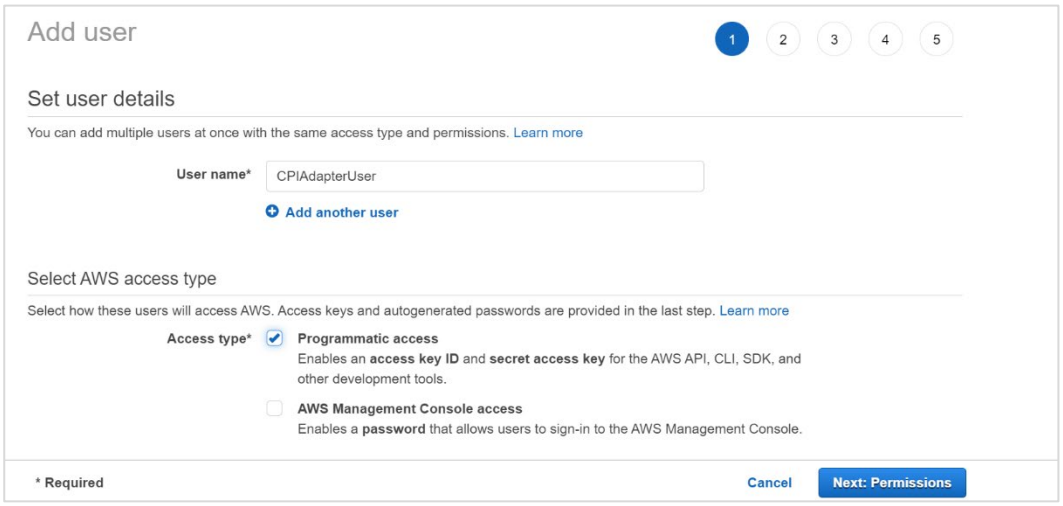
5 AWS CONFIGURATION

The Access Key and Secret Key from Amazon Web Services are used in the credentials of SAP Cloud Integration as shortly described in Section 6. To get the Access Key and Secret Key from the Amazon Web Services account, the root user needs to create an AWS Identity and Access Management (IAM) user. Follow the below steps to create an IAM user and get the Access Key and Secret Key:

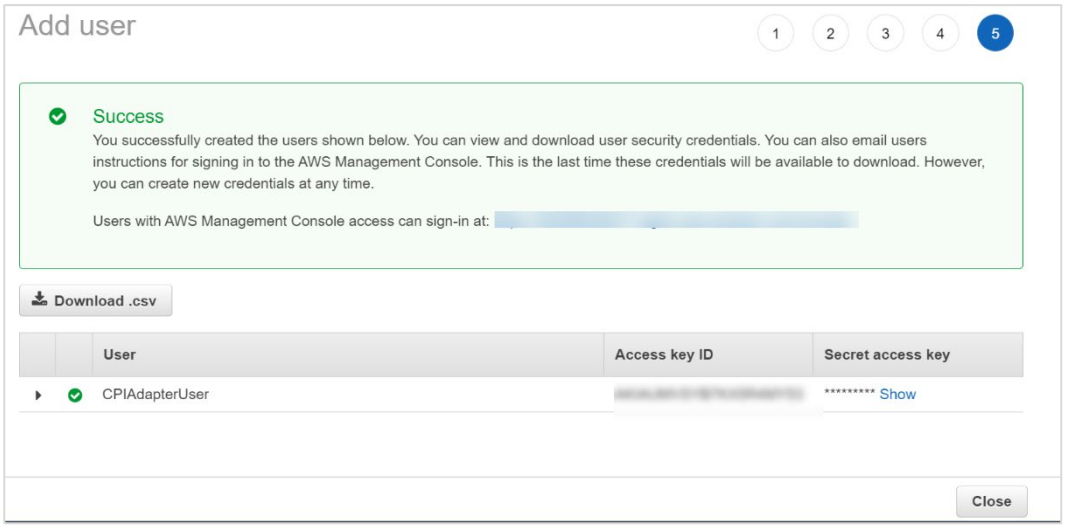
1. Sign in to the AWS Management Console.
2. In the navigation bar on the upper right, choose the account name or number and then choose My Security Credentials.
3. Select the User tab from the left panel.
4. Select Add User.



5. Choose a Username and select AWS Access type as **Programmatic access**. Click next.



6. Apply the required permission to the user and click **Next**.
7. Finally, review the details and click on **Create User**.



8. Choose Download Key File or Copy the Access Key and Secret Key. This is the only opportunity to save the secret access key.

6 AUTHENTICATION

This section provides details on the different authentication mechanisms supported by the AWS Adapter in SAP Cloud Integration.

The AWS adapter supports the AWS signature as the authentication mechanism. In the next sections, the creation of Credentials as Security Material in SAP Cloud Integration is discussed.

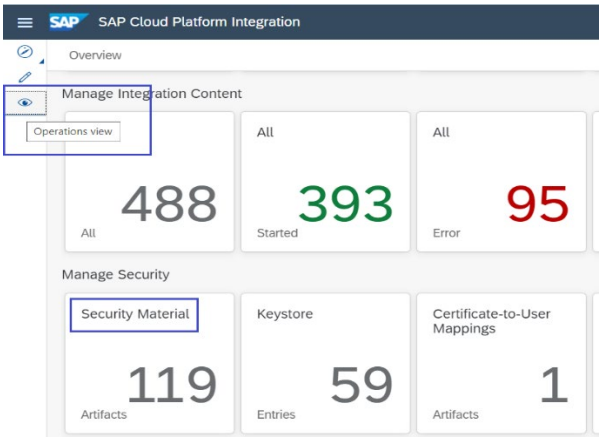
6.1 Creating Secure Parameter Credentials in Security Material

Purpose

To create Secure Parameter Credentials in Security Material

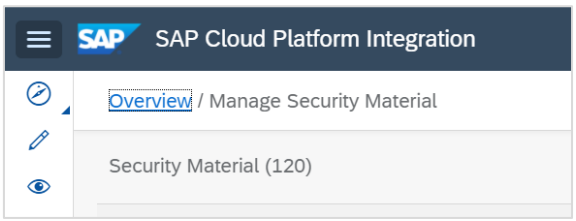
Procedure

1. Navigate to Operations View and then to “Security Material”.

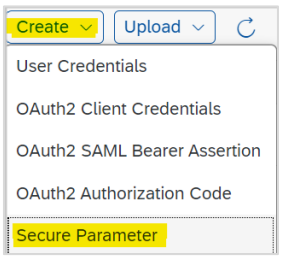


2. Create a Secure Parameter for Client ID and Client Secret obtained after creating an IAM user. Please refer to Section 5 on how to create an IAM user, Client ID, and Client Secret in AWS.

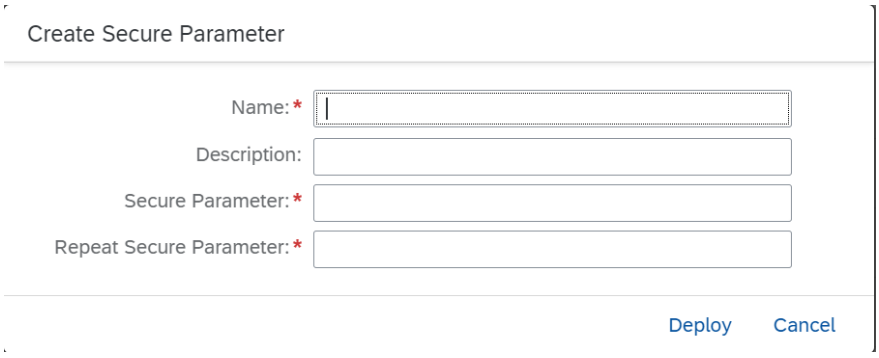
   - Access Manage Security Material.



   - Go to Create > Secure Parameter.



- Enter the Secure Parameter details.



6.2 Using Secure Parameter

The Security artifact created in Section 6.1 should be used in the **Connection tab** of the Adapter as shown in Figure 6.1. More specific details on how to configure the properties in the Connection tab as described in Section 5.

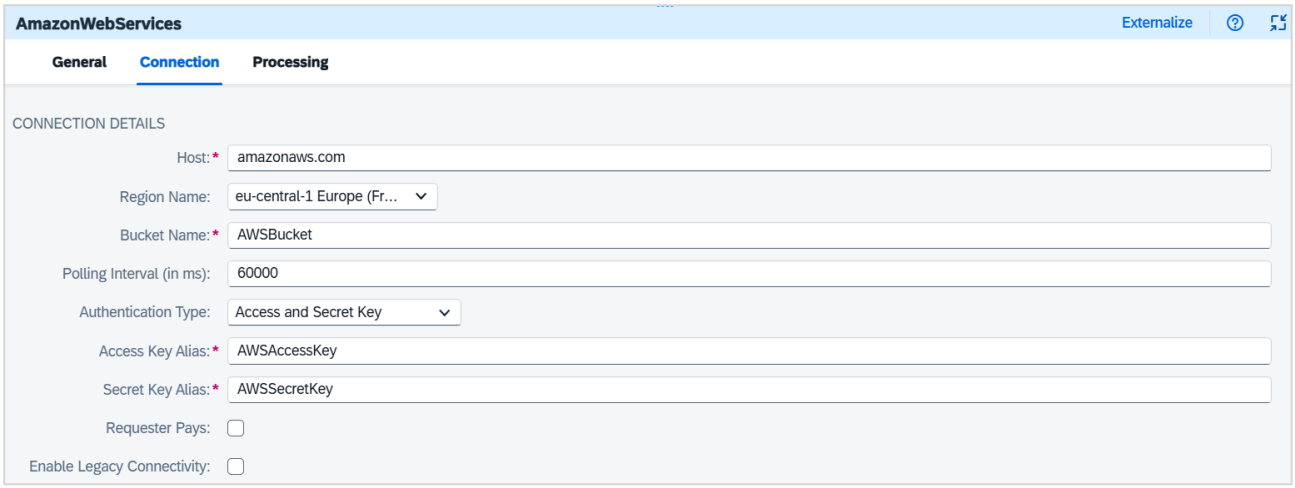


Figure 6.1 Placing the Connection details in the Connection Tab.

Note that the adapter validates the server certificate while connecting to Amazon Web Services. In case the root certificates of Amazon Web Services are not present in the SAP Cloud Integration Keystore, then an error will be shown.

6.3 Creating OAuth2 Client Credentials in Security Material

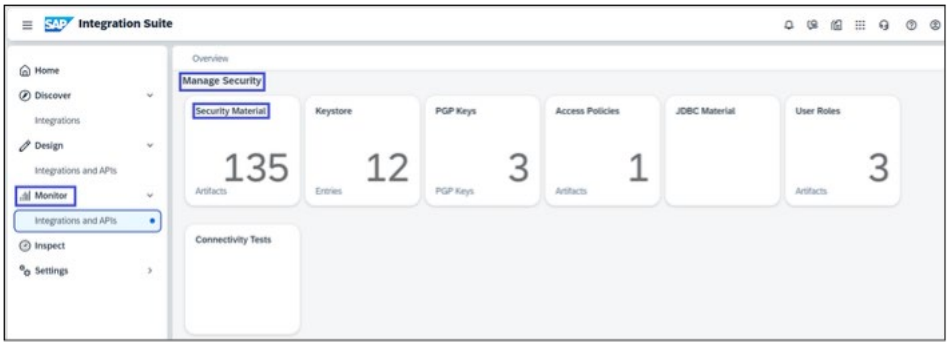
Purpose

To create credentials in Security Material for **OAuth2 Client Credentials**.

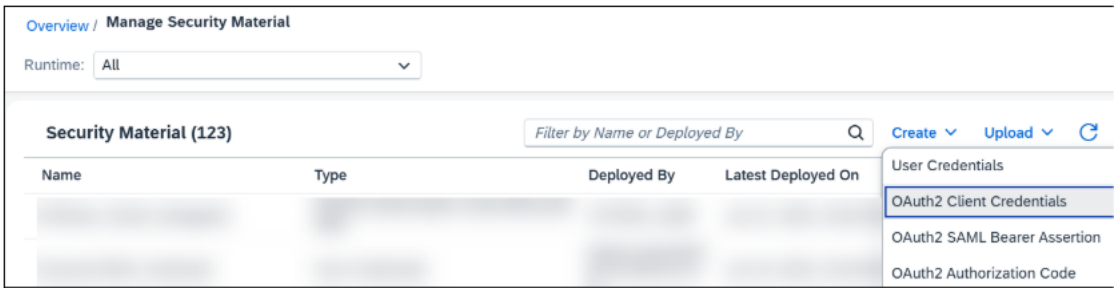
Procedure

1. In SAP Integration Suite, navigate to **Monitor** > **Integrations and APIs**. This opens the **Overview** page.

2. On the **Overview** page, go to **Manage Security** section and click **Security Material**.



3. On Manage Security Material page, click Create to select **OAuth2 Client Credentials** from the dropdown.



4. In the Create **OAuth2 Client Credentials** popup, provide the below details.

Parameter	Description
Name	Specify the name for the credentials.
Description	Specify the description for the credentials.
Token Service URL	Specify the URL of the OAuth2 authorization server that issues the access token. Example: https://login.microsoftonline.com/<tenant ID>/oauth2/v2.0/token Sample Value: https://login.microsoftonline.com/140d0cc2-1123-41f-a952-f7dykl321v/oauth2/v2.0/token
Client ID	Specify the ID of the client to which you are connecting. **Note:** This value can be found under **Overview** in the Azure Portal.
Client Secret	Specify the Secret key of the client to which you are connecting. **Note:** This value can be found under **Certificate and Secrets** in the Azure Portal.
Client Authentication	Select the Client Authentication which allows you to access an application using Client ID and Client Secret. By default, the Send as Body Parameter is selected, this option sends the Client ID and Client Secret as a JSON content to the authentication server in the request body. Example: **Send as Body Parameter**

Parameter	Description
Scope	Specify the OAuth2 scope information to be included in the request body. Example: api://<clientid>/.default
Content Type	Select content type to indicate the media type. Ensure Content Type is set to **'application/x-www-form-urlencoded'**:

5. Click **Deploy** to complete the process.

When you refresh the Manage Security Material page, the new artifact is displayed (with Type **OAuth2 Client Credentials**) in the artifact table.

7 ADAPTER CONFIGURATION

This section describes different parameters that should be configured for Sender and Receiver Adapters for different supported protocols.

7.1 Sender Adapter Configuration

The AWS Sender Adapter connects an SAP Cloud Integration tenant to an Amazon Web Services bucket. Once “AmazonWebServices” is selected from the list of sender adapters and S3 as the message protocol, configuring the parameters mentioned in Sections 7.1.1 and 7.1.2 is possible.

7.1.1 Amazon Simple Storage Service (S3)

7.1.1.1 *General*

After selecting the Amazon Web Services Adapter from the list of adapters and selecting the protocol as **S3**, the General tab of the adapter gives an overview of the selections made. The basic information can be shown in Figure 7.1.

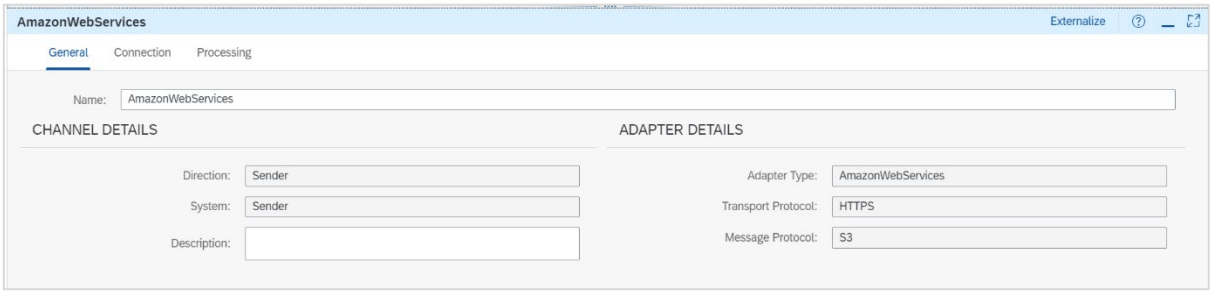


Figure 7.1 General Tab of AWS S3 Sender Adapter

7.1.1.2 *Connection*

This section provides details about the connection parameters. The Connection tab of the Amazon Web Services Adapter for the “S3” protocol is shown in Figure 7.2.

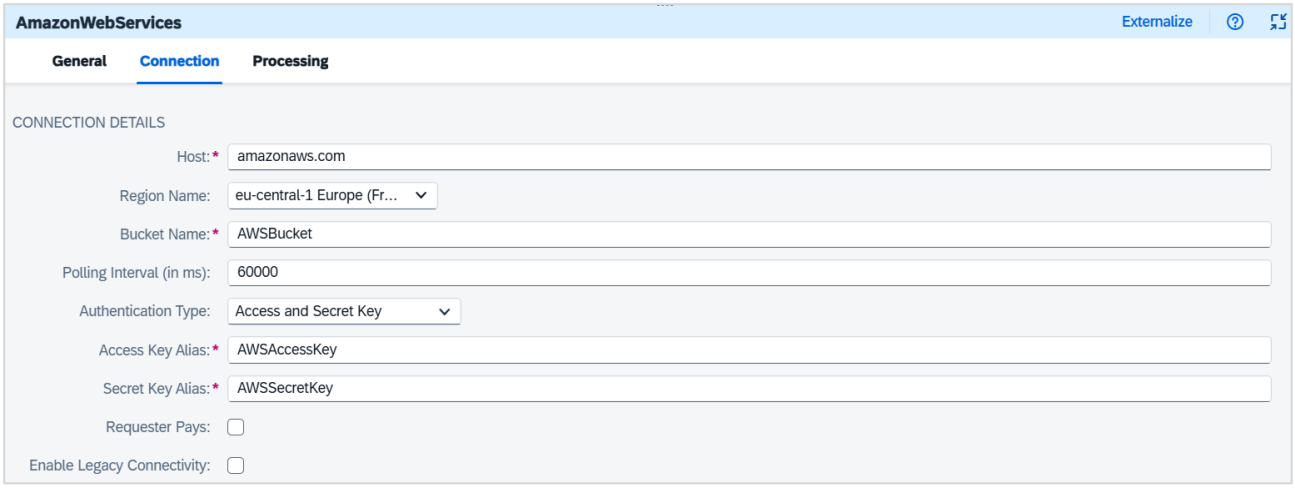


Figure 7.2 Connection tab of AWS S3 Sender Adapter

Each one of the properties of this tab is described in Table 3 below.

Section	Parameter name	Description
Connection Details	Host	Domain of the AWS region. Default value : amazonaws.com
	Region Name	AWS region where the Bucket resides. Select the region from the pre-configured list. If the region does not exist in the pre-configured list, then the user can manually enter the region name.
	Bucket Name	Name of the bucket on AWS where the Sender Adapter should poll files from. Example: AWS-Sender-Bucket. **Note**: The bucket name should not contain "." characters.
	Polling Interval (in ms)	Polling Interval in milliseconds. Default value: 60000
	Authentication Type	Select the authentication type. • **Access and Secret Key** for access with long term credentials. • **Security Token Service (AssumeRole)** for temporary IAM role-based access. • **Security Token Service (AssumeRoleWithWebIdentity)** to use an Identity Provider.
	Access Key Alias	Name of the secured parameter that stores the AWS Access Key. The process of creating credentials is explained in section 6.
	Secret Key Alias	Name of the secured parameter that stores the AWS Secret Key. The process of creating credentials is explained in section 6.
	Microsoft Entra ID Credential (Only available when **Security Token Service (AssumeRoleWithWebIdentity)** is selected.)	Specify the OAuth2 Client Credentials security artifact created for Microsoft Entra ID as a Web Identity Provider.
	Role ARN Alias	Specify the name of the secure parameter that stores the Role ARN.

Section	Parameter name	Description
	Role Session Name	Specify the Role Session Name for a session of the same role assumed with different principals.
	External ID Alias (Only available when **Security Token Service (AssumeRole)** is selected.)	Specify the name of the secure parameter that stores the External ID, as defined in the condition of the IAM role's trust relationship.
	Requester Pays	Select this option if the request should pay for data transfer and the request. **Note**: To use this feature, the requestor pay option should be enabled in the AWS bucket. If the requestor pay option is enabled in the bucket, then it is mandatory to select the checkbox in the adapter.
	Enable Legacy Connectivity	Select this option to enable the AWS legacy connectivity. **Note:** This option is disabled by default.

Table 3 Properties of the Connection tab for the AWS S3 Sender Adapter

7.1.1.3 *Processing*

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.3. Each one of the properties of this tab is described in Table 4.

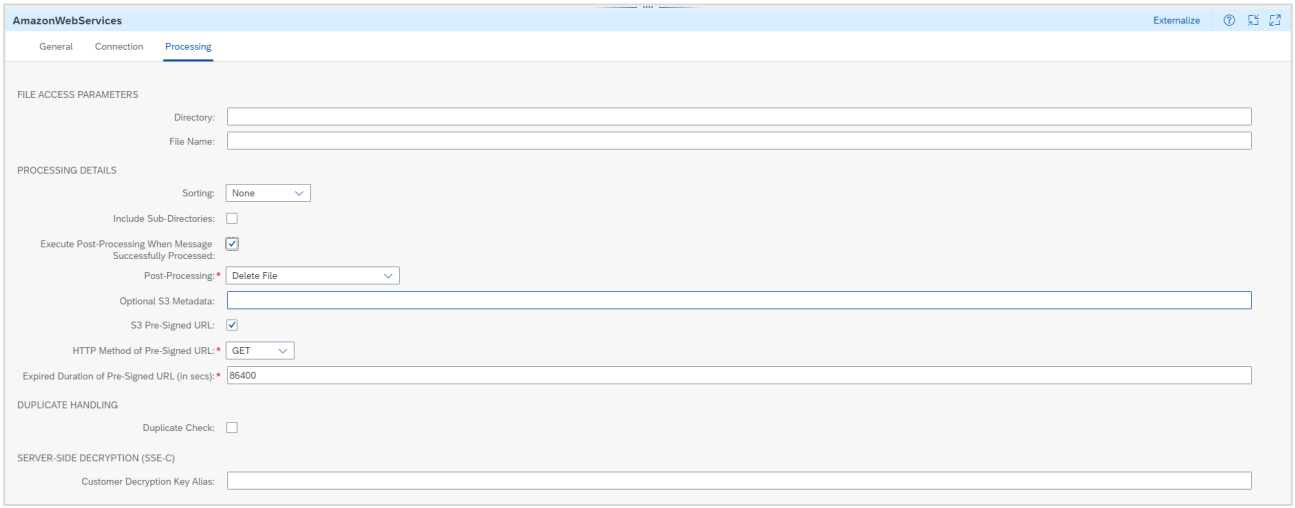


Figure 7.3 Processing tab of AWS S3 Sender Adapter

Section	Parameter name	Description
File Access Parameters	Directory	The path on the AWS bucket from where the file should be read. Example: "Directory/SubDirectory" If left blank, then the adapter will read the root directory.
	File Name	The filename to be read. Example: Filename.txt Other Supported values: Wild Card Characters, an asterisk (*), and a question mark (?).

Section	Parameter name	Description
		Asterisk (*) represents zero or more characters in a string of characters, and the question mark (?) represents any one character. Example: '*.xml'. The adapter will read all the files where the filename ends with '.xml' or 'abc?.xml' and will read all the file names such as abcd.xml or abc1.xml. When left blank, the adapter will read all the files present in the S3 directory.
Processing Details	Sorting	The property on which sorting should be done while polling files. The sorting will be done in ascending order of the option selected. *Available options:* **File Name:** The sorting is performed based on the filename. **File Size:** Sorting is performed based on file size. **Time Stamp:** Sorting is performed based on the timestamp. **None (default):** No sorting is performed. This is the default option for sorting. **Note:** The AWS S3 adapter reads 1000 files from the S3 service and, after this step, sorts these files according to the Sorting settings. In this context, it is important to know that the S3 server provides the files in an order that is not controlled by Cloud Integration.
	Include Sub-Directories	Select the checkbox to read all the files in the directory and subdirectory.
	Execute Post-Processing When Message Successfully Processed	Select this checkbox to execute post-processing step only when the file is successfully processed by the exchange.
	Post-Processing	Specify the action that should be taken after the file has been processed. *Available options:* • **Delete File:** Select this option to delete the file after processing. This is the default option for Post-Processing. • **Keep File and Process Again:** Select this option to keep the file in the source directory and process again. • **Move File to an Archive directory**: Select this option to move the file to an archive directory. After selecting this option, specify the archive directory. It is also possible to add a timestamp in the archived file. • **Copy file to an Archive Bucket:** Select this option to copy the file to another bucket. After selecting this option, specify the archive bucket and archive directory. It is also possible to add a timestamp in the archived file. • **Move the file to an Archive Bucket:** Select this option to move the file to another bucket. After selecting this option, specify the archive bucket and archive directory. It is also possible to add a timestamp in the archived file.

Section	Parameter name	Description
		Note: The Access key and Secret key mentioned in AWS adapter configuration should be the valid for Archive bucket. Same Access Key and Secret Key will be used to write files for the Archive bucket.
	Optional S3 Metadata	Specify the metadata to be populated from S3 object metadata. Multiple metadata can be specified and separated by a comma (,). If specified, then a property with the same name will be created in Cloud Integration. Example: If the file in the S3 bucket has metadata named “MyMetadata” associated with it, to retrieve the metadata in the iFlow, “MyMetadata” has to be specified in the Adapter. During execution, a property with the name “MyMetadata” will be created in Cloud Integration and can be accessed using the expression ${property.MyMetadata}.
	S3 Pre-Signed URL	Select this option to generate a pre-signed URL. Select the HTTP method and the expiration duration of the pre-signed URL. The pre-signed URL is attached to a property with the name “ S3PreSignedURL”. The value of the pre-signed URL can be accessed using the expression ${property. S3PreSignedURL}
	HTTP Method of Pre-Signed URL	Select the HTTP method that should be used for the Pre-Signed URL. It is possible to choose from the following options: • GET • DELETE • HEAD • PATCH • POST • PUT
	Expired Duration of Pre-Signed URL (secs)	Specify the duration in seconds for the Pre-Signed URL to expire. The default value is 86400.
Duplicate Handling	Duplicate Check	Enable this option to avoid duplicate message processing for the period which will be specified by the Message Expiration Period field.
	Duplication Key	Select the Key on which the duplication check should be performed. It is possible to choose from the following options: • S3 Object Key • S3 File Name
	Message Expiration Period (in secs)	Specify the time (in seconds) for which the message key will be stored for the duplicate check.
Serve- Side Decryption (SEE-C)	Customer Decryption Key Alias	Specify the name of the secured parameter that contains the decryption key for Amazon s3 to decrypt data.

Table 4 Properties of the Processing tab for the AWS S3 Sender Adapter

Note: Below mentioned standard properties are created when the Sender Adapter is used to pick a file from an Amazon S3 bucket:

- S3ObjectKey
- S3ObjectName
- S3OwnerId
- S3ObjectSize
- S3StorageClass
- S3RedirectLocation
- S3LastModified
- S3ContentEncoding
- S3ContentType
- S3ETag

The values of these properties can be accessed in the iFlow using the expression **${property.propertyName}**.
Example: **${property.**S3ObjectKey**}**

7.1.2 Amazon Simple Queue Service (SQS)

7.1.2.1 *General*

After selecting the Amazon Web Services Adapter from the list of adapters and selecting the protocol as **SQS**, the General tab of the Adapter provides an overview of selections made. The basic information can be seen here as shown in Figure 7.4.

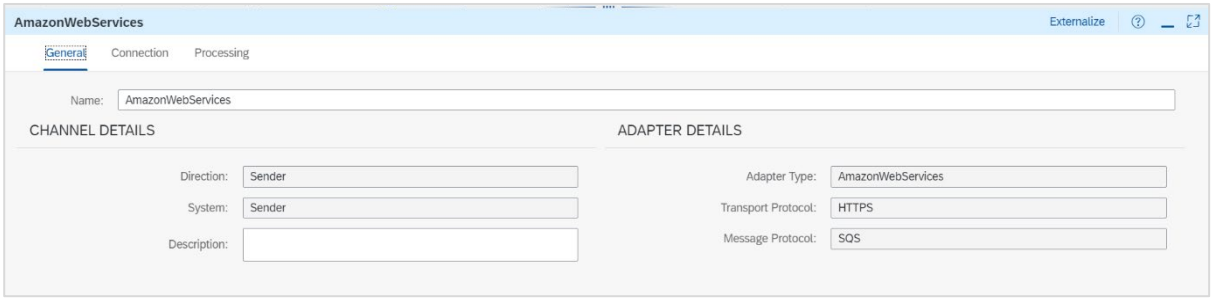


Figure 7.4 General tab of AWS SQS Sender Adapter

7.1.2.2 *Connection*

An example of how the Connection tab of the Amazon Web Services Sender Adapter looks like is shown in Figure 7.5. Each one of the properties of this tab is described in **Error! Reference source not found.**.

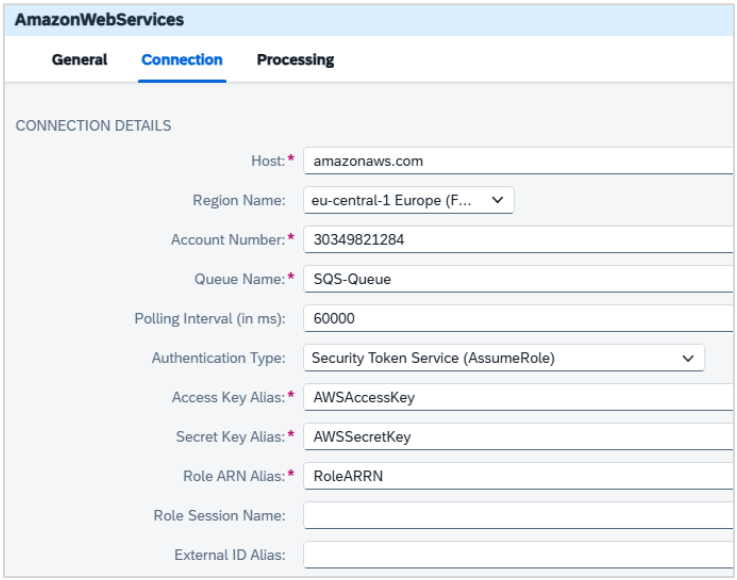


Figure 7.5 Connection tab of AWS SQS Sender Adapter

Section	Parameter name	Description
Connection Details	Host	Domain of the AWS region. Default value : amazonaws.com
	Region Name	AWS region where the Bucket resides. Select the region from the pre-configured list. If the region does not exist in the pre-configured list, then the user can manually enter the region name.
	Account Number	The 12-digit AWS account number for the queue. Example: 123456789012 The reference section provides more details on how to get the AWS account number.
	Queue Name	The AWS SQS Queue Name where the adapter should poll.
	Polling Interval (in ms)	Polling Interval in milliseconds. Default Value: 60000.
	Authentication Type	Select the authentication type. • **Access and Secret Key** for access with long term credentials. • **Security Token Service (AssumeRole)** for temporary IAM role-based access. • **Security Token Service (AssumeRoleWithWebIdentity)** to use an Web Identity Provider.
	Access Key Alias	Name of the secured parameter that stores the AWS Access Key. The process of creating credentials is explained in section 6.
	Secret Key Alias	Name of the secured parameter that stores the AWS Secret Key. The process of creating credentials is explained in section 6.
	Microsoft Entra ID Credential (Only available when **Security Token Service (AssumeRoleWithWebIdentity)** is selected.)	Specify the OAuth2 Client Credentials security artifact created for Microsoft Entra ID as a Web Identity Provider.
	Role ARN Alias	Specify the name of the secure parameter that stores the Role ARN.
	Role Session Name	Specify the Role Session Name for a session of the same role assumed with different principals.
	External ID Alias (Only available when **Security Token Service (AssumeRole)** is selected.)	Specify the name of the secure parameter that stores the External ID, as defined in the condition of the IAM role's trust relationship.

Table 5 Properties of the Connection tab for the AWS SQS Sender Adapter

7.1.2.3 *Processing*

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.6. Each one of the properties of this tab is described in Table 6.

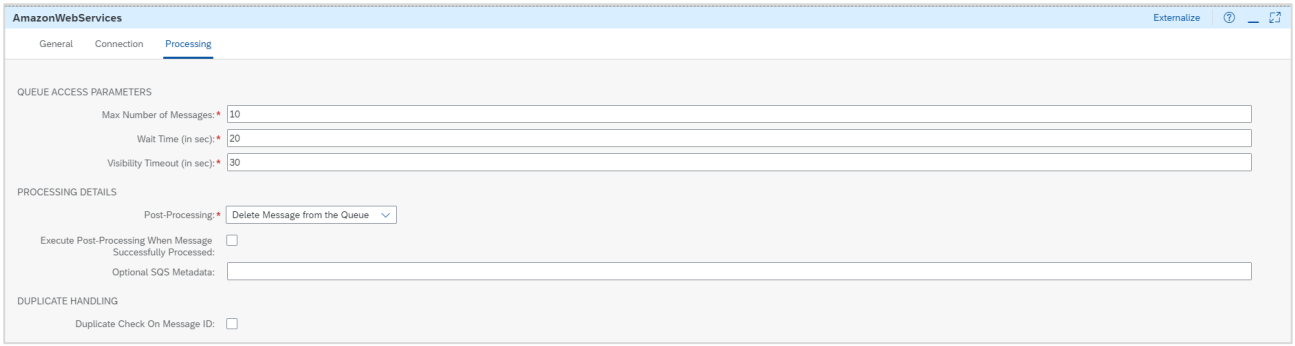


Figure 7.6 Processing tab of AWS SQS Sender Adapter

Section	Parameter name	Description
Queue Access Parameters	Max Number of Messages	The maximum number of messages to be read from the queue. Possible values can be between 1 and 10. The default value is 10. However, it is important to be aware that fewer messages might be returned. More information can be found at this link.
	Wait Time (in seconds)	Duration in seconds to wait for a message to arrive in the queue. The default value is 20.
	Visibility Timeout (in seconds)	Duration in second the message is hidden from subsequent retrieval requests. During the visibility timeout period, the message will not be available to other consumers. The default value is 30.
Processing Details	Post-Processing	Action to be performed after the message processing in the queue. *Available options:* • **Keep Message in the queue:** Select this option to persist the message in the queue. • **Delete Message from the queue:** Select this option to delete the processed message from the queue.
	Execute Post-Processing When Message Successfully Processed	Select this checkbox to execute post-processing step only when the file is successfully processed by the exchange.
	Optional SQS Metadata	Specify the property name to be populated from SQS object metadata. Multiple metadata can be provided by separating the different names with a comma ",".
Duplicate Handling	Duplicate Check On Message ID	Select this option to avoid duplicate message processing based on SQS message ID.
	Message Expiration Period (in secs)	Specify the time (in seconds) for which the message ID will be stored for a duplicate check.

Table 6 Properties of the Processing tab for the AWS SQS Sender Adapter

Note: Below mentioned standard properties are created when the Sender Adapter is used to pick a message from an Amazon SQS queue.

- SQSMessageID
- SQSMessageSenderID
- SQSMessageSentTimestamp
- SQSMessageFirstReceiveTimestamp
- SQSMessageReceiveCount

The values of these properties can be accessed in the iFlow using the expression **${property.propertyName}**.
Example: **${property.SQSMessageID}**.

Additionally, it is also possible to have any other custom attribute that is part of the message populated as a property. But for this to happen, the concerned property needs to be specified in the Optional SQS Metadata property of the Processing tab in the adapter.

7.2 Receiver Adapter Configuration

The Configuration of the Amazon Web Services Receiver Adapter for each one of the supported protocols (S3, SQS, SNS, and SWF) will be discussed in the following sections.

7.2.1 Amazon Simple Storage Service (S3)

This section describes the configuration of the Amazon S3 receiver adapter. The receiver adapter supports two operations:

- **Write operation**: This operation is used to write files to the Amazon S3 bucket. The configurations of the adapter are described in the section 7.2.1.3.

- **Read operation:** This operation is used to read a single file from the Amazon S3 bucket in the middle of the process. The configurations of the adapter are described in Section 7.2.1.4.

7.2.1.1 *General*

After selecting the Amazon Web Services Adapter from the list of adapters and selecting the protocol as **S3**, the General tab of the Adapter provides an overview of the selections made. The basic information is shown in Figure 7.7.

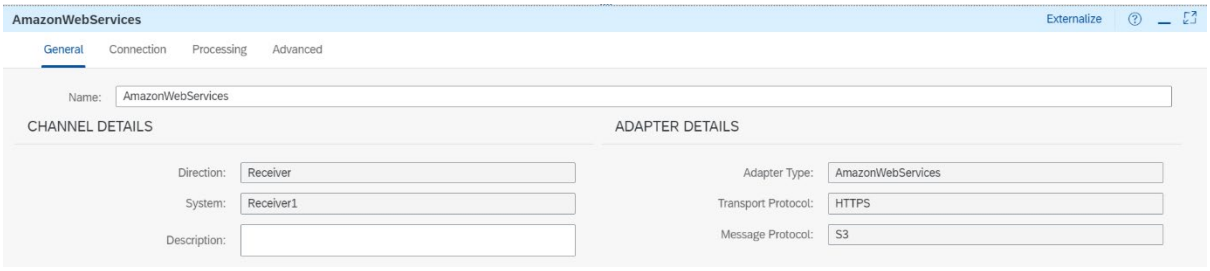


Figure 7.7 General Tab of S3 Receiver Adapter

7.2.1.2 *Connection*

The connection tab of the Amazon Web Services Receiver Adapter for the S3 protocol is shown in Figure 7.8.

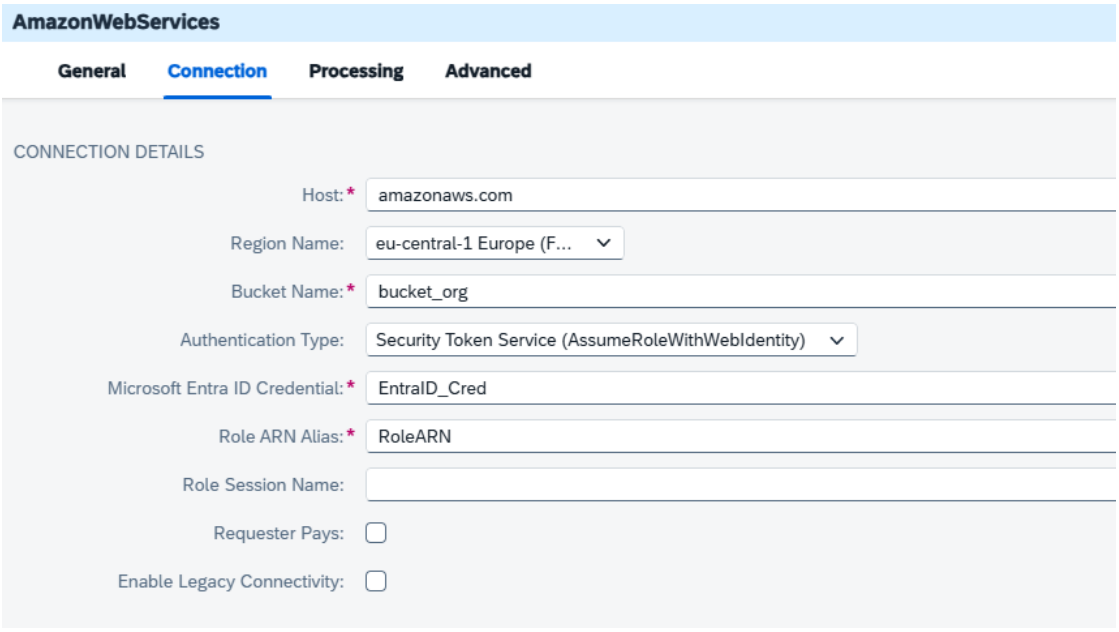


Figure 7.8 Connection Tab of AWS S3 Receiver Adapter

Each one of the properties of this tab is described in Table 7 below.

Section	Parameter name	Description
Connection Details	Host	Domain of the AWS region. Default value: amazonaws.com
	Region Name	AWS region where the Bucket resides. Select the region from the pre-configured list. If the region does not exist in the pre-configured list, then the user can manually enter the relevant region name.
	Bucket Name	Specify the name of the bucket on AWS where the Receiver Adapter should place the file. Example: AWS-Receiver-Bucket. **Note**: The bucket name should not contain "." characters.
	Authentication Type	Select the authentication type. • **Access and Secret Key** for access with long term credentials. • **Security Token Service (AssumeRole)** for temporary IAM role-based access. • **Security Token Service (AssumeRoleWithWebIdentity)** to use an Web Identity Provider.
	Access Key Alias	Name of the secured parameter that stores AWS Access Key. The values can be read dynamically. The process of creating credentials is explained in section 6.
	Secret Key Alias	Name of the secured parameter that stores AWS Secret Key. The values can be read dynamically. The process of creating credentials is explained in section 6.

Section	Parameter name	Description
	Microsoft Entra ID Credential (Only available when **Security Token Service (AssumeRoleWithWebIdentity)** is selected.)	Specify the OAuth2 Client Credentials security artifact created for Microsoft Entra ID as a Web Identity Provider.
	Role ARN Alias	Specify the name of the Secure Parameter that stores the Role ARN.
	Role Session Name	Specify the Role Session Name for a session of the same role assumed with different principals.
	External ID Alias (Only available when **Security Token Service (AssumeRole)** is selected.)	Specify the name of the secure parameter that stores the External ID, as defined in the condition of the IAM role's trust relationship.
	Requester Pays	Select this option if the requester should pay for data transfer and the request.
	Enable Legacy Connectivity	Select this option to enable the AWS legacy connectivity. **Note:** This option is disabled by default.

Table 7 Properties of the Connection tab for the AWS S3 Receiver Adapter

7.2.1.3 *Processing (Write Operation)*

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.9. Each one of the properties of this tab is described in Table 8.

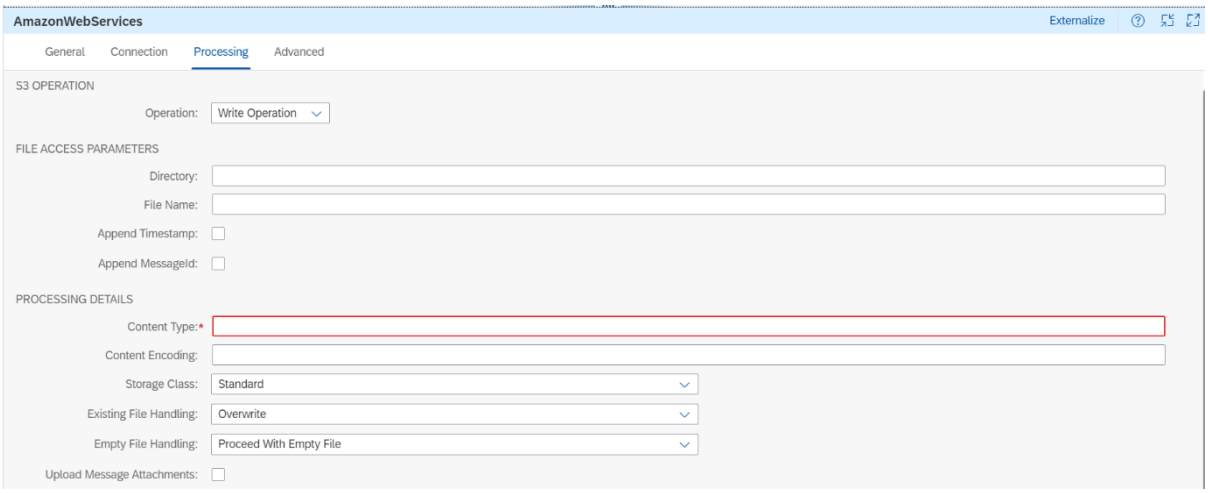


Figure 7.9 Processing Tab of AWS S3 Receiver Adapter for Write Operation

Section	Parameter name	Description
File Access Parameters	Directory	Specify the location where the file should be written. Example: "Directory/SubDirectory". Note: If the directory is left blank, then the files will be created in the root directory. Note that the value can also be read dynamically using a header or property.
	File Name	Specify the name of the file to be written. Example: "filename.txt".

Section	Parameter name	Description
		Note that the value can also be read dynamically **Note**: If the filename is left blank, then the file will be created with the name same as Cloud Integration message ID. using a header or property.
	Append Timestamp	Use this option to append a timestamp to the filename.
	Append MessageId	Use this option to append messageId to the filename.
Processing Details	Content Type	Specify the file's MIME type. Example: "application/xml" or "text/plain". Note that the value can also be read dynamically using a header or property. **Note**: If the filename is left blank, then the file will be created with the name same as Cloud Integration message ID.
	Content Encoding	Specify the content encoding of the file. Example: "gzip". Note that the value can also be read dynamically using a header or property.
	Storage Class	Select the AWS Storage Class. Example: "Standard". The following options are available: • Glacier • Glacier Deep Archive • Intelligent-Tiering • One Zone-Infrequent Access • Reduced Redundancy • Standard • Standard-Infrequent Access
	Existing File Handling	Select the file handling behavior if a file with the same name exists in the directory. Example: "Overwrite". The following options are available: • Fail: Select this option to raise an exception. • Ignore: Select this option to ignore the file. • Overwrite: Select this option to overwrite the existing file.
	Empty File Handling	Select the file handling behavior if the file is empty. Example: “Proceed with Empty File” The following options are available: • Proceed With Empty File: Select this option to create an empty file. • Ignore: Select this option to ignore the empty file.
	Upload Message Attachment	Select this option to upload each message attachment in the exchange as an S3 object.

Table 8 Properties of the Processing tab for the AWS S3 Receiver Adapter

7.2.1.4 *Processing (Read Operation)*

This operation is used to read a single file from the Amazon S3 bucket in the middle of the process.

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.9. Each one of the properties of this tab is described in Table 8.

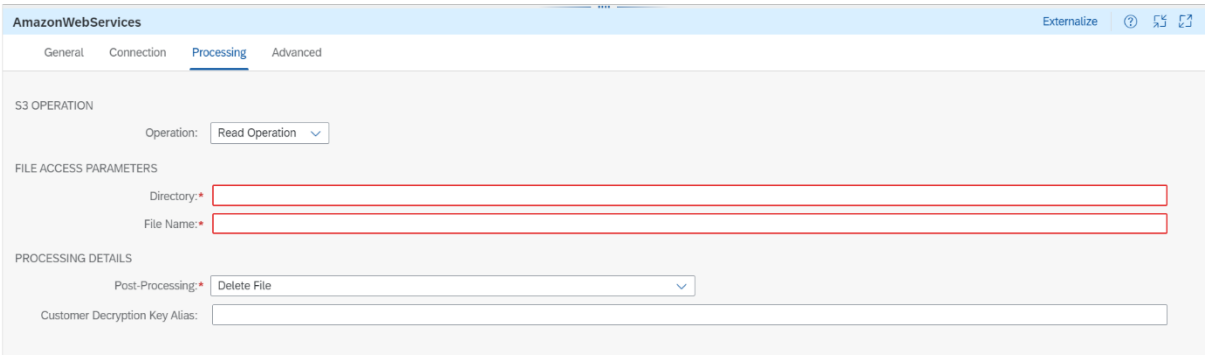


Figure 7.10 Processing Tab of AWS S3 Receiver Adapter for Read Operation

Section	Parameter name	Description
File Access Parameters	Directory	The location where the file should be read. Example: "Directory/SubDirectory" The value can also be read dynamically using a header or property
	File Name	The filename to be read. Example: Filename.txt **Note:** Wild Card Characters, an asterisk (*) and question mark (?) is not supported.
Processing Details	Post-Processing	Specify the action that should be taken after the file has been processed. *Available options:* • **Delete File:** Select this option to delete the file after processing. This is the default option for Post-Processing. • **Keep File and Process Again:** Select this option to keep the file in the source directory and process again. • **Move File to an Archive directory**: Select this option to move the file to an archive directory. After selecting this option, specify the archive directory. It is also possible to add a timestamp in the archived file. • **Copy file to an Archive Bucket:** Select this option to copy the file to another bucket. After selecting this option, specify the archive bucket and archive directory. It is also possible to add a timestamp in the archived file. • **Move the file to an Archive Bucket:** Select this option to move the file to another bucket. After selecting this option, specify the archive bucket and archive directory. It is also possible to add a timestamp in the archived file. **Note**: The Access key and Secret key mentioned in AWS adapter configuration should be the valid for Archive bucket. Same Access Key and Secret Key will be used to write files for the Archive bucket.
	Customer Decryption Key Alias	Specify the name of the secured parameter that contains the decryption key for Amazon s3 to decrypt data.

Table 9 Properties of the Processing tab for the AWS S3 Receiver Adapter

7.2.1.5 *Processing (List Operation)*

This operation is used to list files from a directory in the Amazon S3 bucket in the middle of the process. An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.910. Each one of the properties of this tab is described in Table 10.

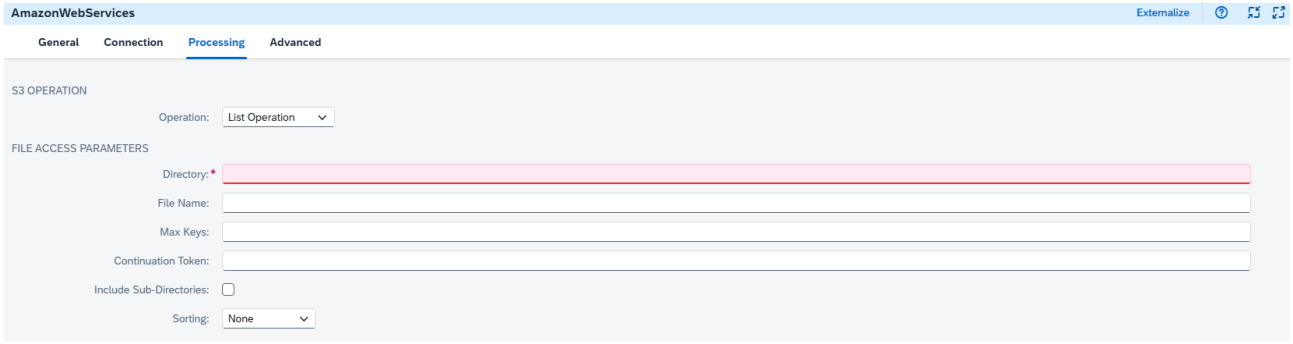


Figure 7.11 Processing Tab of AWS S3 Receiver Adapter for List Operation

Section	Parameter name	Description
File Access Parameters	Directory	The location from where the file should be listed. Example: "Directory/SubDirectory" The value can also be read dynamically using a header or property
	File Name	The name or pattern of the files to be listed. Example: Filename.txt Other Supported values: Wild Card Characters, an asterisk (*), and a question mark (?). Asterisk (*) represents zero or more characters in a string of characters, and the question mark (?) represents any one character. Example: '*.xml'. The adapter will list all the files where the filename ends with '.xml' or 'abc?.xml' and will list all the file names such as abcd.xml or abc1.xml. When left blank, the adapter will list all the files present in the S3 directory.
Processing Details	Include Sub-Directories	Select the checkbox to list all the files in the directory and subdirectory.
	Max Keys	Specify the maximum number of keys to be returned in the response. This value cannot exceed 1000. Example: "750".
	Continuation Token	Specify the token to continue listing on the current bucket. Example: "place_holder".
	Sorting	The property on which sorting should be done while listing the files. The sorting will be done in ascending order of the option selected. *Available options:* • **File Name:** The sorting is performed based on the filename. • **File Size:** Sorting is performed based on file size. • **Time Stamp:** Sorting is performed based on the timestamp. • **None (default):** No sorting is performed. This is the default option for sorting.

Table 10 Properties of the Processing tab for the AWS S3 Receiver Adapter

7.2.1.6 *Advanced*

An example of how the Advanced tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.12. Note that the Advanced tab is empty for the Read operation.

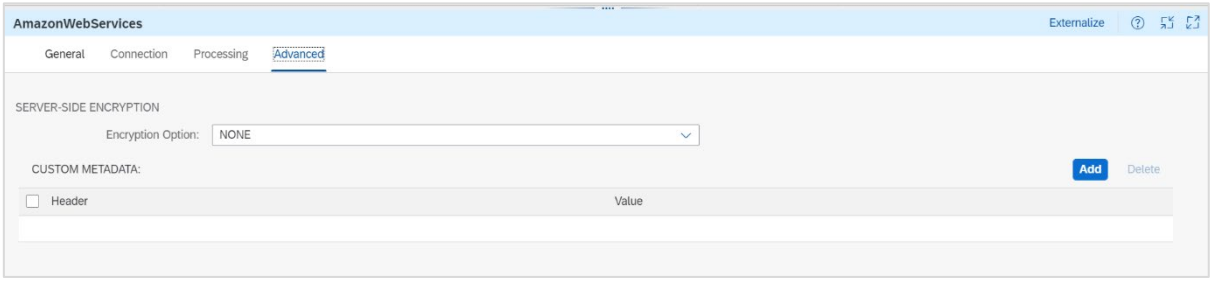


Figure 7.12 Advanced Tab of AWS S3 Receiver Adapter

Each one of the properties of this tab is described in Table 10.

Section	Parameter name	Description
Server-Side Encryption	Encryption Option	Select the server-side encryption used for storing the file in AWS. Example: SSE-S3 (with Amazon S3-Managed Keys). The following options are available: • SSE-C (with Customer-Provided Key) • SSE-KMS (with Customer Master Keys Stored in AWS Key Management Service) • SSE-S3 (with Amazon S3 Managed Key) The default value is NONE.
Custom Metadata	Header	Specify the custom header name to be passed in the request to AWS. This value can also be read dynamically. Note that the header will be added as part of the AWS custom metadata.
	Value	Specify the custom header value to be passed in the request to AWS. This value can also be read dynamically.

Table 10 Properties of the Advanced tab for the AWS S3 Receiver Adapter

7.2.2 Amazon Simple Queue Service (SQS)

7.2.2.1 *General*

After selecting Amazon Web Services from the list of adapters and selecting the protocol as **SQS**, the General tab of the Adapter proves an overview of the selections made. The basic information is shown in Figure 7.13.

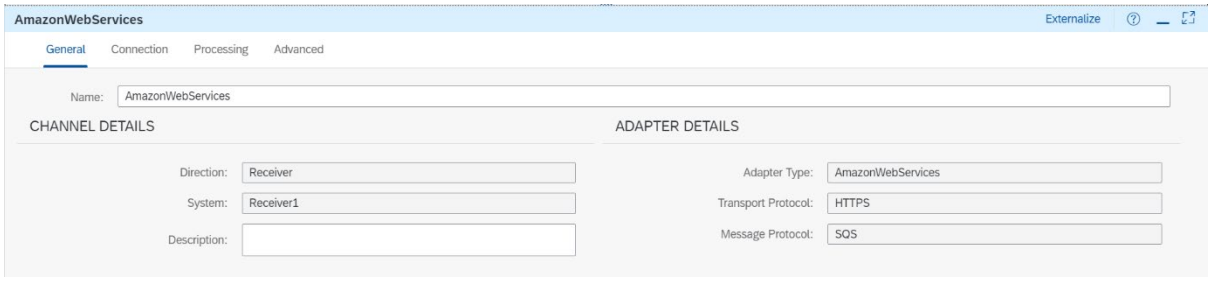


Figure 7.13 General Tab of AWS SQS Receiver Adapter

7.2.2.2 *Connection*

The Connection tab of the Amazon Web Services Receiver Adapter for the SQS protocol is shown in Figure 7.14.

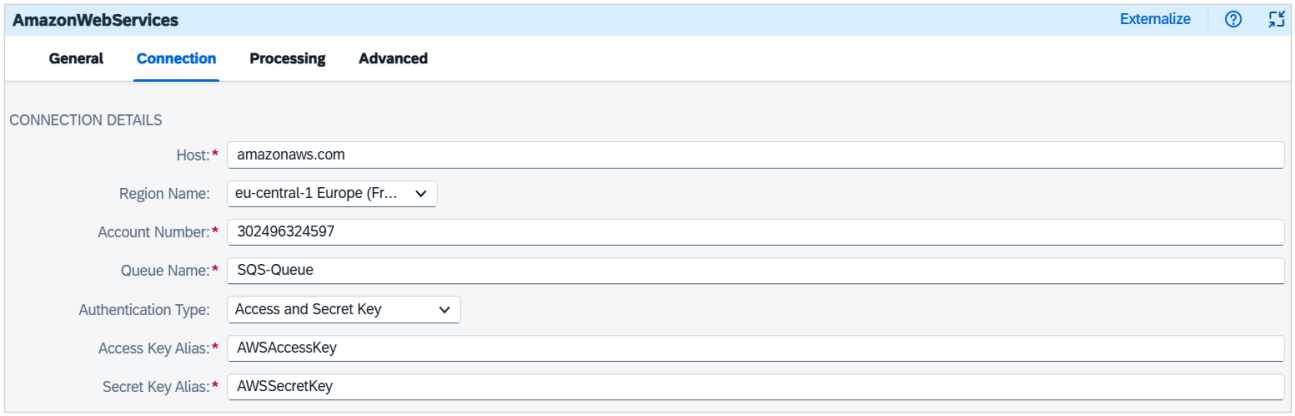


Figure 7.14 Connection Tab of AWS SQS Receiver Adapter

Each one of the properties of this tab is described in Table 11.

Section	Parameter name	Description
Connection Details	Host	Domain of the AWS region. Default value : amazonaws.com
	Region Name	AWS region where the Bucket resides. Select the region from the pre-configured list. If the region does not exist in the pre-configured list, then the user can manually enter the region name.
	Account Number	The 12-digit AWS account number for the queue. Example: 123456789012 The reference section provides more details on how to get the AWS account number.
	Queue Name	The AWS Queue Name where the adapter should poll.
	Authentication Type	Select the authentication type. • **Access and Secret Key** for access with long term credentials. • **Security Token Service (AssumeRole)** for temporary IAM role-based access. • **Security Token Service (AssumeRoleWithWebIdentity)** to use an Web Identity Provider.
	Access Key Alias	Name of the secured parameter that stores the AWS Access Key. The values can be read dynamically.
	Secret Key Alias	Name of the secured parameter that stores the AWS Secret Key. The values can be read dynamically.
	Microsoft Entra ID Credential (Only available when **Security Token Service (AssumeRoleWithWebIdentity)** is selected.)	Specify the OAuth2 Client Credentials security artifact created for Microsoft Entra ID as a Web Identity Provider.
	Role ARN Alias	Specify the name of the Secure Parameter that stores the Role ARN.
	Role Session Name	Specify the Role Session Name for a session of the same role assumed with different principals.

Section	Parameter name	Description
	External ID Alias (Only available when **Security Token Service (AssumeRole)** is selected.)	Specify the name of the secure parameter that stores the External ID, as defined in the condition of the IAM role's trust relationship.

Table 11 Properties of the Connection tab for the AWS SQS Receiver Adapter

7.2.2.3 *Processing*

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in the picture below.

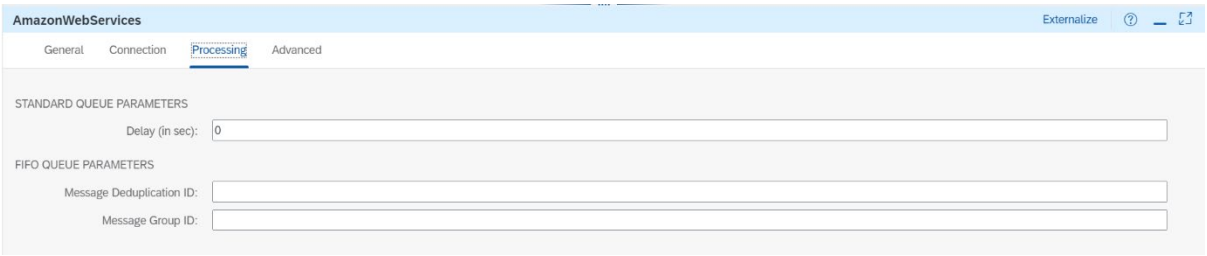


Figure 7.15 Processing Tab of AWS SQS Receiver Adapter

Each one of the properties of this tab is described in Table 12.

Section	Parameter name	Description
Standard Queue Parameters	Delay(s)	Specify the duration (in seconds) after which messages become available for processing. Valid values should be between 0 and 900.
Fifo Queue Parameters	Message Deduplication ID	Specify the message deduplication ID. The value can also be read dynamically using a header or parameter. The message deduplication ID is the token used for the deduplication of sent messages. If a message with a particular message deduplication ID is sent successfully, any messages sent with the same message deduplication ID are accepted successfully but are not delivered during the 5-minute deduplication interval. For more details on message deduplication, refer to the below link: https://docs.aws.amazon.com/AWSSimpleQueueService/latest/SQSDeveloperGuide/using-messagededuplicationid-property.html
	Message Group ID	Specify the message group ID. Value can also be read dynamically using a header or parameters.

Table 12 Properties of the Processing tab for the AWS S3 Receiver Adapter

7.2.2.4 *Advanced*

An example of how the Advanced tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.16.

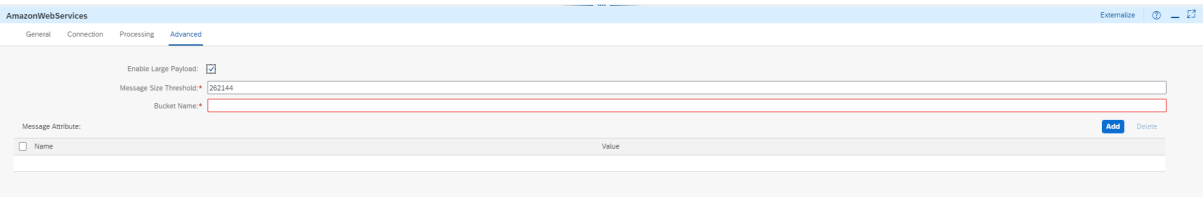


Figure 7.16 Advanced Tab of AWS SQS Receiver Adapter

Each one of the properties of this tab is described in Table 13.

Section	Parameter name	Description
Advanced	Enable Large Payload	Enable the checkbox to process large-size messages. If this option is enabled, then all the payload having a size above the specified threshold will be sent via an S3 bucket and a notification with the S3 object Id will be received in the SQS Queue.
	Message Size Threshold	The threshold value of the payload size above which the payload will be sent to the S3 bucket. Possible values: 0 to 262144 (256Kb). The Default Value is 262144 (256Kb).
	Bucket Name	The name of the S3 bucket where the large files should be written. **Note**: The bucket name should not contain "." characters.
Message Attribute	Name	Specify the custom header name to be passed in the request to AWS. Value can also be read dynamically.
	Value	Specify the custom header value to be passed in the request to AWS. Value can also be read dynamically.

Table 13 Properties of the Advanced tab for the AWS SQS Receiver Adapter

7.2.3 Amazon Simple Notification Service (SNS)

7.2.3.1 *General*

After selecting Amazon Web services from the list of adapters and selecting the protocol as **SNS**, the General tab of the Adapter proves an overview of the selections made. The basic information can be seen in Figure 7.17.

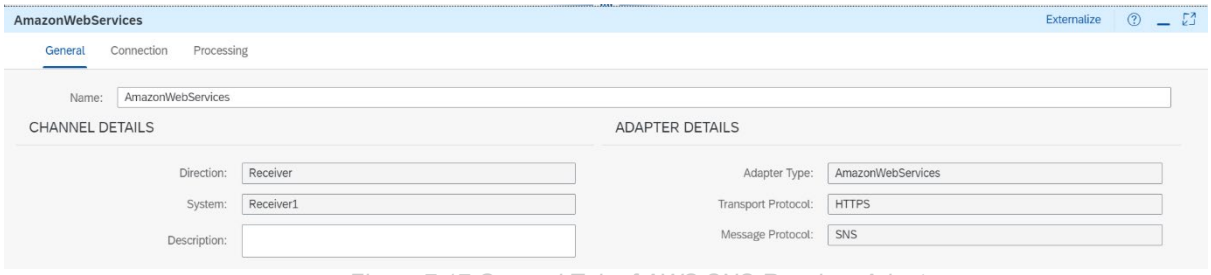


Figure 7.17 General Tab of AWS SNS Receiver Adapter

7.2.3.2 *Connection*

The Connection tab of the Amazon Web Services Receiver Adapter for the SNS protocol is shown in Figure 7.18.

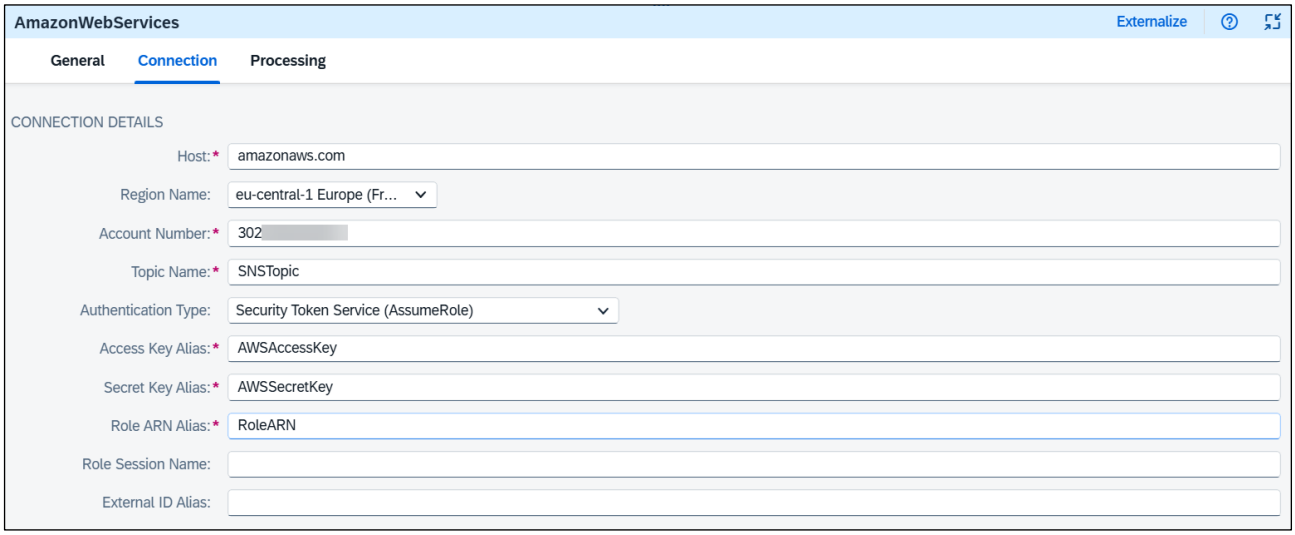


Figure 7.18 Connection Tab of AWS SNS Receiver Adapter

Each one of the properties of this tab is described in Table 14.

Section	Parameter name	Description
Connection Details	Host	Domain of the AWS region. Default value : amazonaws.com
	Region Name	AWS region where the Bucket resides. Select the region from the pre-configured list. If the region does not exist in the pre-configured list, then the user can manually enter the region name.
	Account Number	The 12-digit AWS account number for the queue Example: 123456789012 The reference section provides more details on how to get the AWS account number.
	Topic Name	Specify the AWS Topic name. The value can also be read dynamically using a header or property.
	Authentication Type	Select the authentication type. • **Access and Secret Key** for access with long term credentials. • **Security Token Service (AssumeRole)** for temporary IAM role-based access. • **Security Token Service (AssumeRoleWithWebIdentity)** to use an Web Identity Provider.
	Access Key Alias	Name of the secured parameter that stores the AWS Access Key. The values can be read dynamically.
	Secret Key Alias	Name of the secured parameter that stores the AWS Secret Key. The values can be read dynamically.
	Microsoft Entra ID Credential (Only available when **Security Token Service**	Specify the OAuth2 Client Credentials security artifact created for Microsoft Entra ID as a Web Identity Provider.

Section	Parameter name	Description
	(AssumeRoleWithWebIdentity) is selected.)	
	Role ARN Alias	Specify the name of the secure parameter that stores the Role ARN.
	Role Session Name	Specify the Role Session Name for a session of the same role assumed with different principals.
	External ID Alias (Only available when **Security Token Service (AssumeRole)** is selected.	Specify the name of the secure parameter that stores the External ID, as defined in the condition of the IAM role's trust relationship.

Table 14 Properties of the Connection tab for the AWS SNS Receiver Adapter

7.2.3.3 *Processing*

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.19.

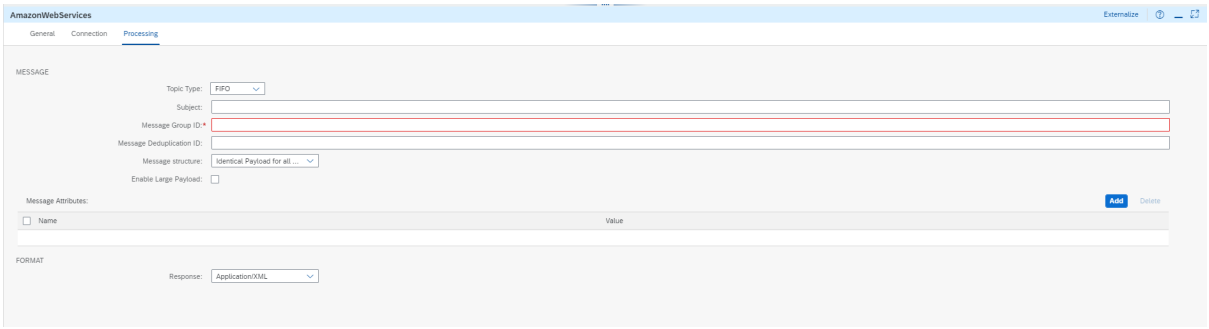


Figure 7.19 Processing Tab of AWS SNS Receiver Adapter

Each one of the properties of this tab is described in Table 15.

Section	Parameter name	Description
Message	Topic Type	Select the type of topic to be used. Possible options include: • Standard • FIFO
	Subject	Specify the subject of the message. Value can also be read dynamically using a header or property.
	Message Group ID	Specify the message Group ID. Value can also be read dynamically using a header or parameters. **Note**: This option is only enabled when the selected topic type is FIFO.
	Message Deduplication ID	Specify the message deduplication ID. The value can also be read dynamically using a header or parameter.The message deduplication ID is the token used for the deduplication of sent messages. If a message with a particular message deduplication ID is sent successfully, any messages sent with the same message deduplication ID are accepted successfully but are not delivered during the 5-minute deduplication interval.

Section	Parameter name	Description
		Note: This option is only enabled when the selected topic type is FIFO.
	Message Structure	Select the message structure to be sent to AWS. Choose between the following available options: • Custom Payload for each Delivery Protocol • Identical Payload for all Delivery Protocols
	Enable Large Payload	Enable the checkbox to process large-size messages. If this option is enabled, then all the payloads having a size above the specified threshold will be sent to the S3 bucket and a notification with the S3 object Id will be received in the SQS Queue.
	Message Size Threshold	The threshold value of the payload size above which the payload will be sent to the S3 bucket. Possible values: 0 to 262144 (256Kb). Default Value: 262144 (256Kb).
	Bucket Name	The name of the S3 bucket where the large files should be written. **Note**: The bucket name should not contain "." characters.
Message Attributes	Name	Specify the custom header name to be passed in the request to AWS. Value can also be read dynamically.
	Value	Specify the custom header value to be passed in the request to AWS. Value can also be read dynamically.
Format	Response	Select the format of the response payload. Choose between the following available options: • Application/XML • Application/JSON

Table 15 Properties of the Processing tab for the AWS S3 Receiver Adapter

7.2.4 Amazon Simple Workflow Service (SWF)

7.2.4.1 *General*

After selecting the Amazon Web Services Adapter from the list of adapters and selecting the protocol as **SWF**, the General tab of the Adapter provides an overview of the selections made. The basic information can be seen in Figure 7.20.

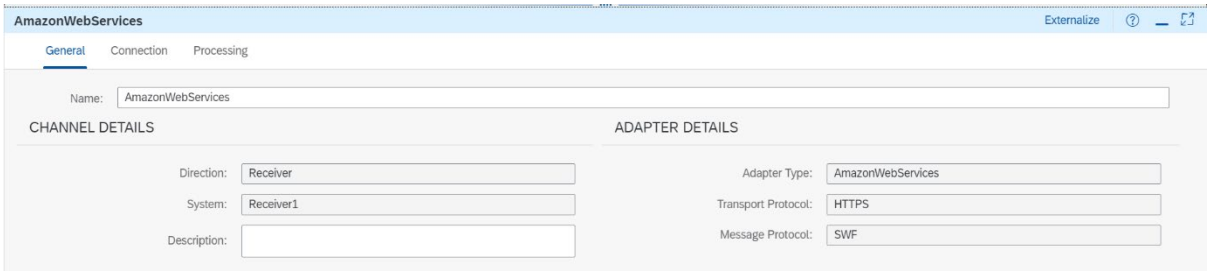


Figure 7.20 General tab of SWF Receiver Adapter

7.2.4.2 *Connection*

The connection tab of the Amazon Web Services Receiver Adapter for the SWS protocol is shown in Figure 7.21.

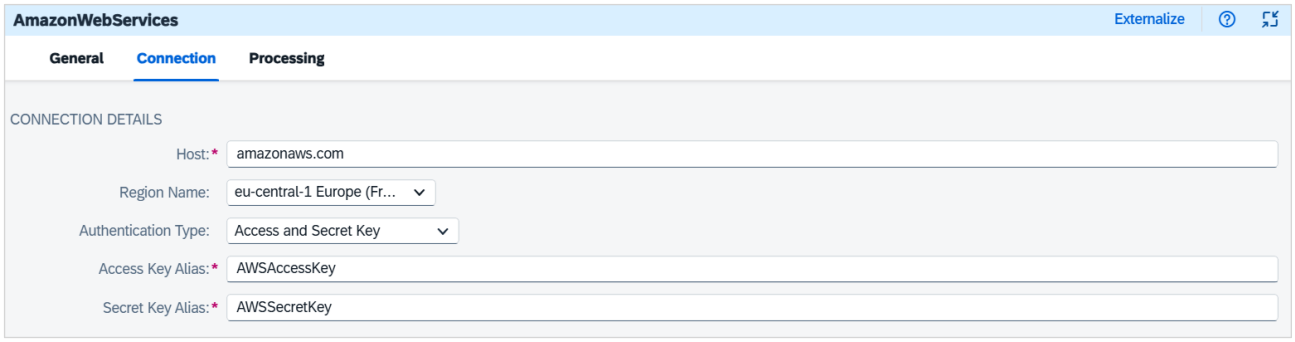


Figure 7.21 Connection tab of SWF Receiver Adapter

Each one of the properties of this tab is described in Table 16.

Section	Parameter name	Description
Connection Details	Host	Domain of the AWS region. Default value: amazonaws.com
	Region Name	AWS region where the Bucket resides. Select the region from the pre-configured list
	Authentication Type	Select the authentication type. • **Access and Secret Key** for access with long term credentials. • **Security Token Service (AssumeRole)** for temporary IAM role-based access. • **Security Token Service (AssumeRoleWithWebIdentity)** to use an Web Identity Provider.
	Access Key Alias	Name of the secured parameter that stores the AWS Access Key. The values can be read dynamically.
	Secret Key Alias	Name of the secured parameter that stores the AWS Secret Key. The values can be read dynamically.
	Microsoft Entra ID Credential (Only available when **Security Token Service (AssumeRoleWithWebIdentity)** is selected.)	Specify the OAuth2 Client Credentials security artifact created for Microsoft Entra ID as a Web Identity Provider.
	Role ARN Alias	Specify the name of the secure parameter that stores the Role ARN.
	Role Session Name	Specify the Role Session Name for a session of the same role assumed with different principals.
	External ID Alias (Only available when **Security Token Service (AssumeRole)** is selected.)	Specify the name of the secure parameter that stores the External ID, as defined in the condition of the IAM role's trust relationship.

Table 16 Properties of the Connection tab for the AWS SWF Receiver Adapter

7.2.4.3 *Processing*

An example of how the Processing tab of the Amazon Web Services Receiver Adapter looks like is shown in Figure 7.22.

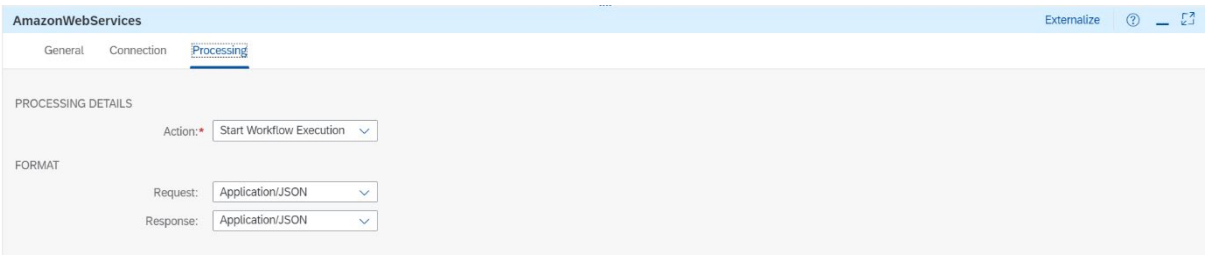


Figure 7.22 Processing tab of SWF Receiver Adapter

Each one of the properties of this tab is described in Table 17.

Section	Parameter name	Description
Processing Details	Action	Select the operation to be performed. The operations are listed in Section 3.
Format	Request	Select the format of the request message. Currently, the adapter supports JSON format.
	Response	Select the format of the response message. Currently, the adapter supports JSON format.

Table 17 Properties of the Processing tab for the AWS SWF Receiver Adapter

8 SAMPLE SCENARIO EXPLAINED

In this chapter, a sample business scenario will be explained to show the use of the adapter and the plug-in in a real-life scenario.

8.1 Amazon Simple Storage Service (S3)

Figure 8.1 shows an integration flow in SAP Cloud Integration that will upload a file in AWS S3. The integration flow is triggered externally by an HTTPS call.

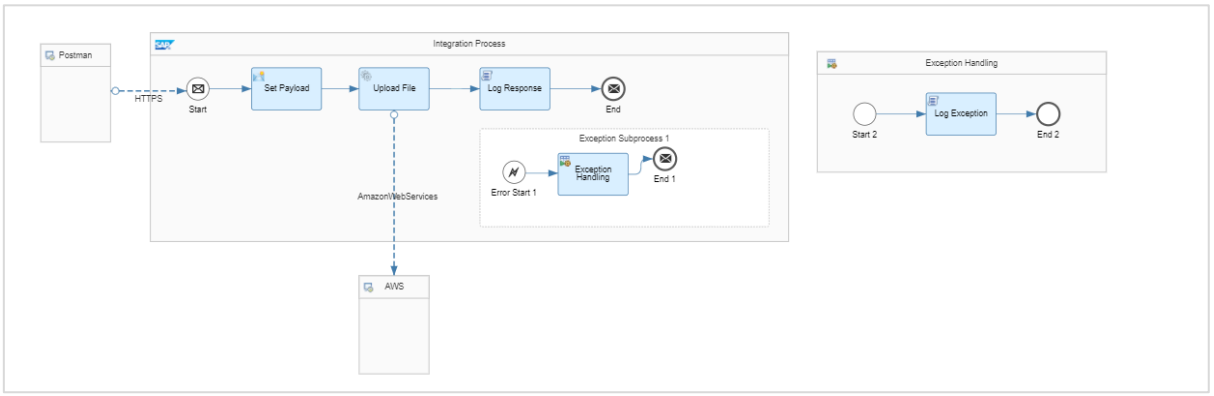


Figure 8.1 SAP Cloud Integration Sample Scenario

In this example, the Content Modifier function is used to create the payload for the file to be placed in AWS S3. Data can also be retrieved from an HTTPS connection (any file such as jpeg, mp3, mp4, etc. is accepted).

Once the data is in the integration flow, the Amazon Web Service adapter needs to be configured. See Figure 8.2 for an example.

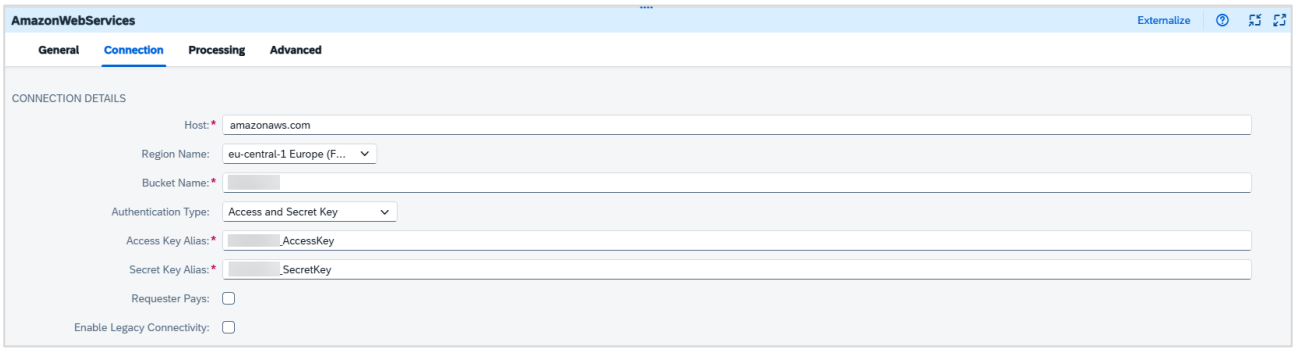
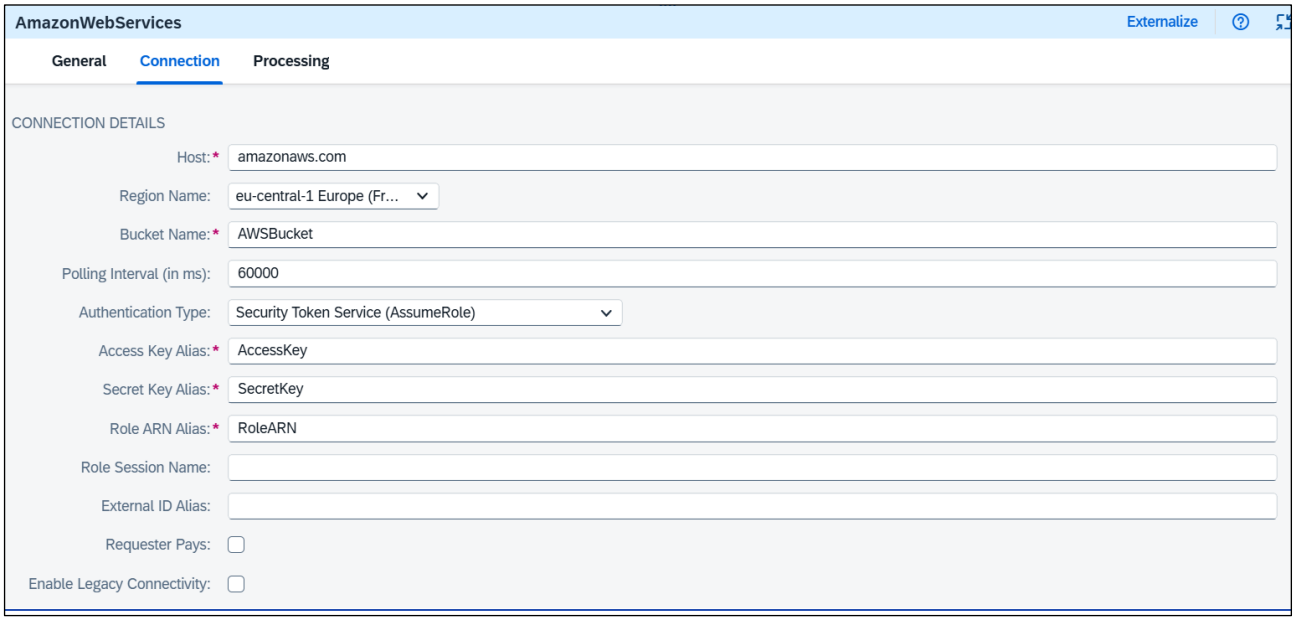


Figure 8.2 Amazon Web Services S3 Connection tab details

In the Connection tab shown in Figure 8.2, you must provide the Amazon Web Services (AWS) details. Enter the bucket name for Amazon S3. Select the authentication type as Access and Secret Key, and provide the credentials previously configured for the **Access Key Alias** and **Secret Key Alias** used in the connection details.

Alternatively, you can perform this operation using another authentication methods like **Security Token Service (AssumeRoleWithWebIdentity)** or **Security Token Service (AssumeRole)**. Additionally, you need to provide the **Role ARN Alias** and **Role Session Name**. The **Microsoft Entra ID Credential** and **External ID Alias** should be provided as per the selected configuration.



Note: Ensure that the necessary permissions are granted to the Role when using the STS authentication method.

Refer to Section 6 for further instructions on how to deploy these credentials. Each field of the Connection tab was previously explained in Section 7.2.1.2.

Following the Connection tab, the next step is to configure the Processing tab. The configuration needed to achieve the sample integration is shown in Figure 8.3.

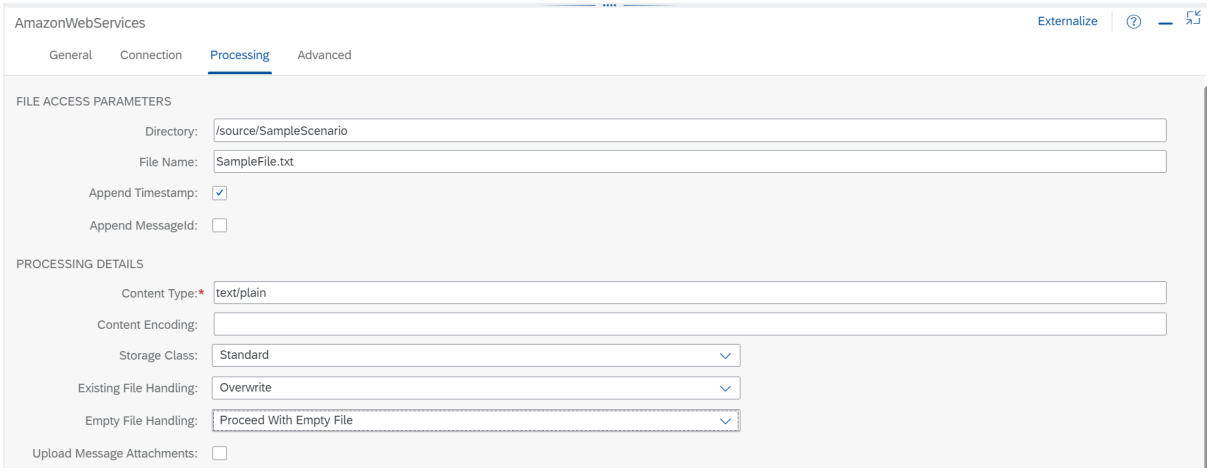


Figure 8.3 Amazon Web Services S3 Processing tab details

In the Processing tab, under the File Access Parameters section, enter the directory where to upload the file and its desired file name. In this case, the directory is mentioned as **/source/SampleScenario** and the file name is **SampleFile.txt**. Under the Process Details section, enter the Content Type as *text/plain*, select Storage class as *Standard*, Existing file handling as *Overwrite*, and Empty File Handling as *Proceed With Empty File*.

Following the Processing tab, the next step is to configure the Advanced tab. See Figure 8.4 for the configuration to be maintained in the Advanced tab.

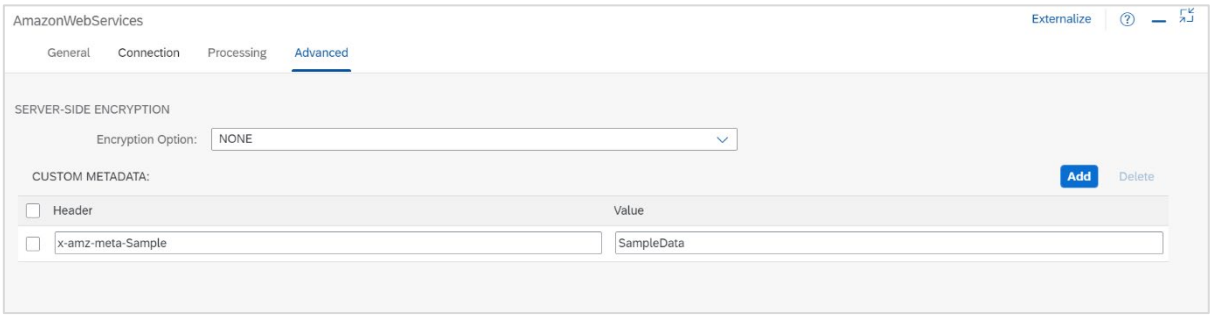


Figure 8.4 Amazon Web Services S3 Advanced tab details

In the Advanced tab, under Server-Side Encryption, select the Encryption option as *None*. Under the Custom Metadata, enter the header as *x-amz-meta-Sample* and in the value enter *SampleData*. The customer metadata setting is optional.

Now that all the necessary configurations are made, the integration flow can be deployed and then called from Postman.

As a result, a new file is created in AWS S3 under the **/source/SampleScenario** directory. See Figure 8.5 for the output file created in Amazon Web Services S3.

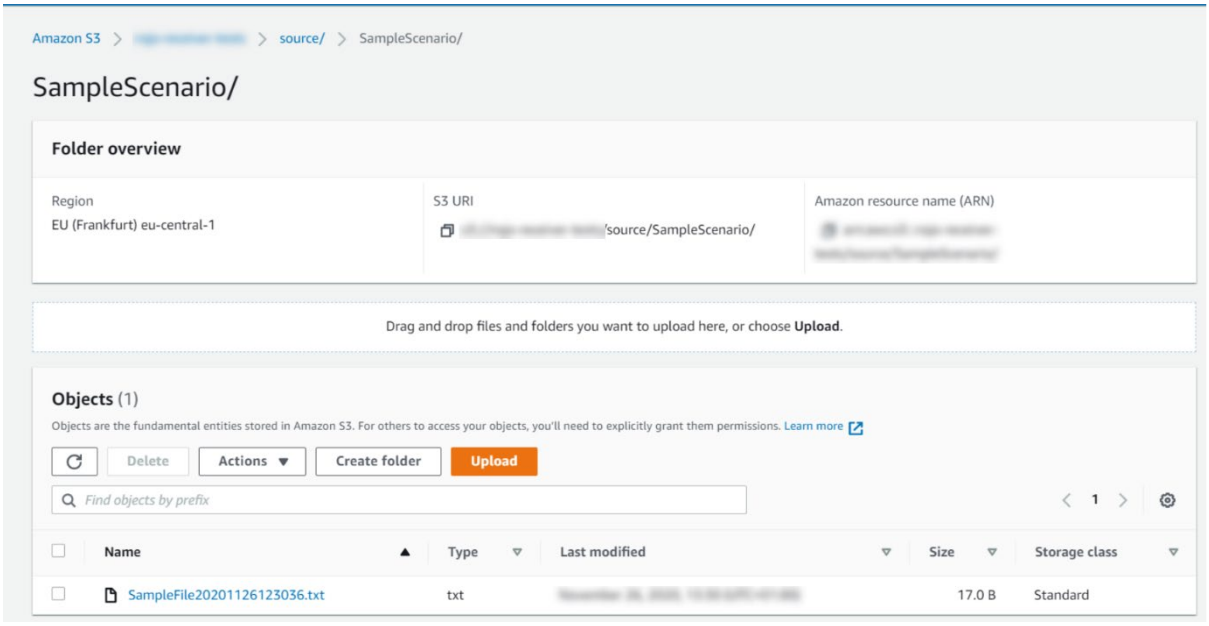


Figure 8.5 Amazon Web Services S3 File

The custom metadata of the file can be seen in the metadata section. See Figure 8.6 for the custom metadata.

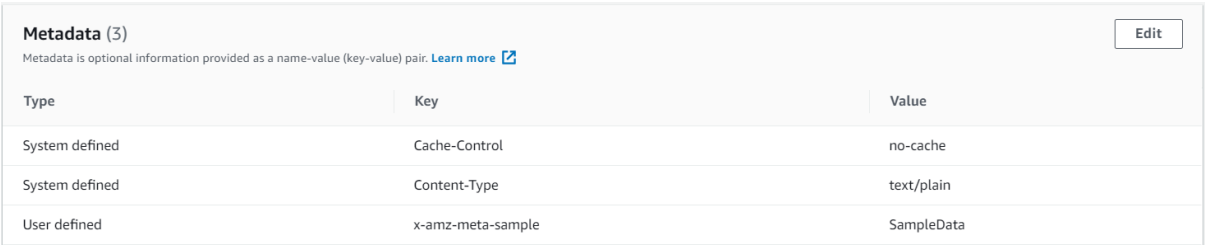


Figure 8.6 Amazon Web Services S3 Custom Metadata details

8.2 Amazon Simple Queue Service (SQS)

Figure 8.7 shows an integration flow in SAP CPI that delivers the message to the specified queue in the Amazon Web Services SQS queue. The integration flow is triggered externally by an HTTPS call.

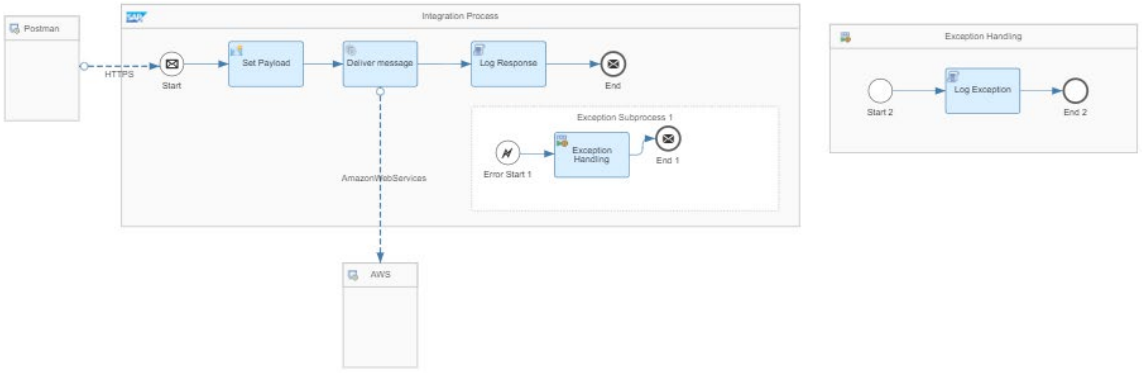


Figure 8.7 SAP CPI SQS Sample Scenario

In this example, data to the SQS Standard queue is sent. In this case, the Content Modifier is used to create the payload to be sent to the queue. Data from any other source may be used as well.

Once the data is in the integration flow, the Amazon Web Services Adapter needs to be configured. See Figure 8.8 for an example.

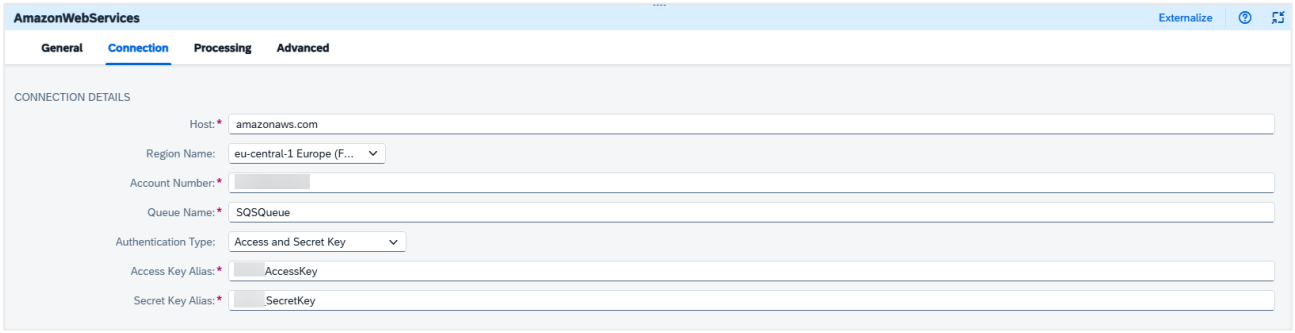


Figure 8.8 Amazon Web Services SQS Connection tab details

In the Connection tab shown in Figure 8.8, provide the Amazon Web Services details.

Provide the Account number from the AWS SQS account, as well as the credentials previously deployed for Access Key Alias and Secret Key Alias for Access and Secret Key authentication type. Refer to Section 6 for further instructions on how to deploy these credentials. Each field of the Connection tab was previously explained in Section 7.2.2.2.

Following the Connection tab, the next step is to configure the Processing tab. The needed configuration to achieve the sample integration is shown in Figure 8.9.

Figure 8.9 Amazon Web Services SQS Processing tab details

In the Processing tab, under the Standard Queue Parameters section, enter 0 in the delay option. As a message to the SQS standard queue is to be delivered, update the Standard Queue Parameters section. In case a message to the FIFO queue is to be delivered, configure the FIFO Queue Parameters section.

Following the Processing tab, the next step is to configure the Advanced tab. See Figure 8.10 for the configuration to be maintained in the Advanced tab.

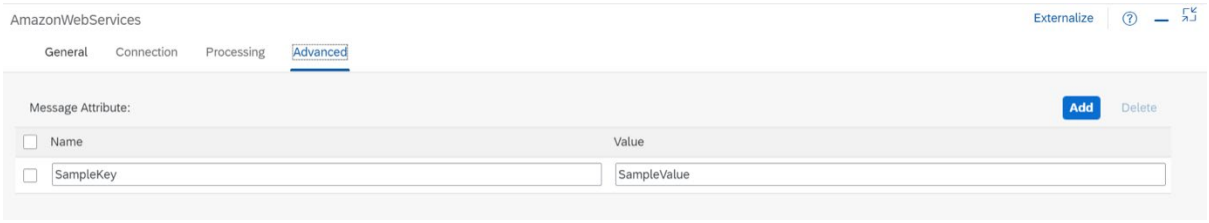


Figure 8.10 Amazon Web Services SQS Advanced tab details

In the Advanced tab, under Message Attribute, enter the Name as *SampleKey*, and in the value enter *SampleValue*. The Message attribute setting is optional to provide.

Now that all the necessary configurations are made, the integration flow can be deployed and then called from Postman.

As a result, the message will be delivered to the queue. See Figure 8.11; 1 message is delivered to the standard queue.

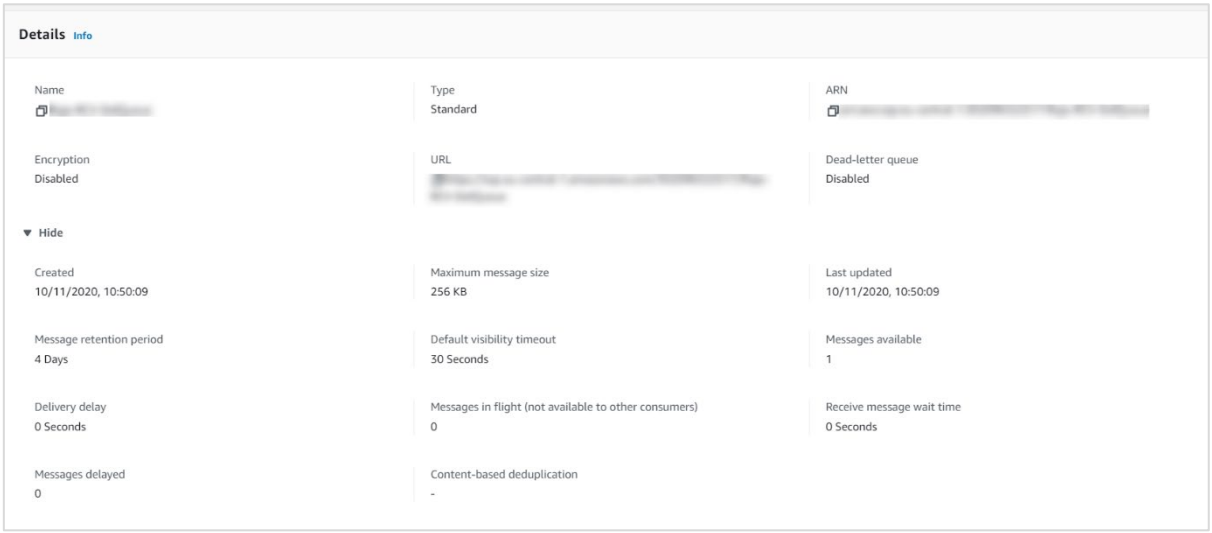


Figure 8.11 Amazon Web Services SQS Queue

See Figure 8.12 for the response message received from AWS SQS.

```
<?xml version="1.0"?>
<SendMessageResponse xmlns="http://queue.amazonaws.com/doc/2012-11-05/">
    <SendMessageResult>
        <MessageId>0f3314dc-72af-4869-9a42-866b545b6445</MessageId>
        <MD5OfMessageBody>998cb654b6ea8fe577dd584adcdc431e</MD5OfMessageBody>
        <MD5OfMessageAttributes>0fb2152a309ba19f86644cf9a3bece48</MD5OfMessageAttributes>
    </SendMessageResult>
    <ResponseMetadata>
        <RequestId>d8afc37b-efeb-551f-b82a-9b425d28d54d</RequestId>
    </ResponseMetadata>
</SendMessageResponse>
```

Figure 8.12 Amazon Web Services SQS Response Message

8.3 Amazon Simple Notification Service (SNS)

Figure 8.13 shows an integration flow in SAP CPI that sends a message to an Amazon SNS topic. The integration flow is triggered externally by an HTTPS call.

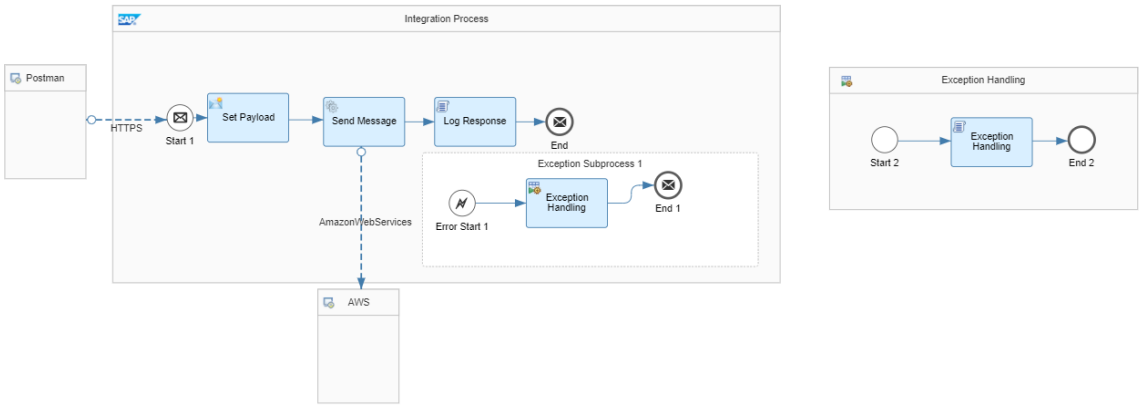


Figure 8.13 Sample Scenario

In this example, a message to the SNS topic having a subscription to the following protocol is sent: EMAIL, HTTPS, SMS, and SQS. In this example, a content modifier is used to attach a payload to be sent to Amazon SNS.

See Figure 8.14 for the payload used.

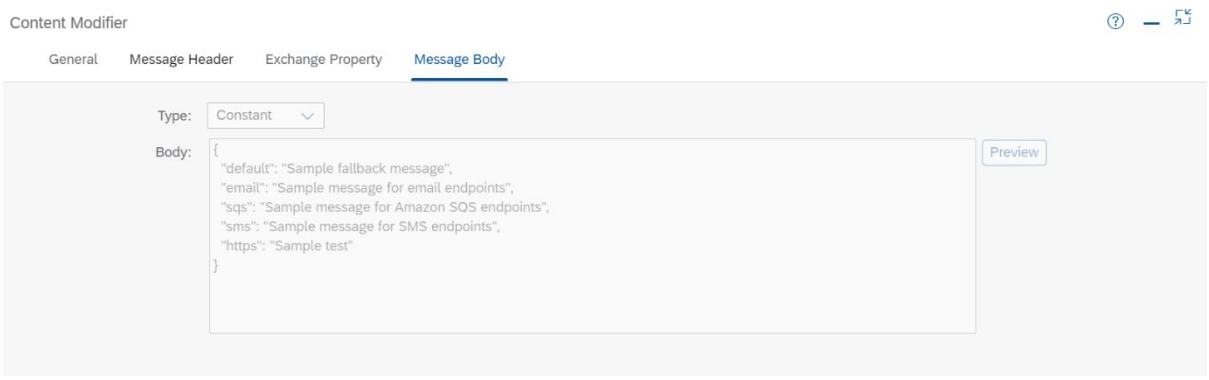


Figure 8.14 Amazon Web Services SNS Custom Payload

Once the data is in the integration flow, the Amazon Web Services Adapter needs to be configured. See Figure 8.15 for an example.

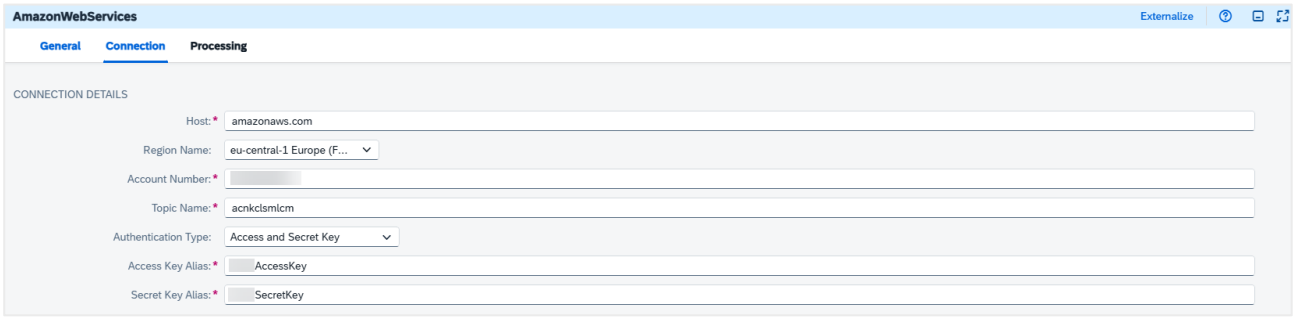


Figure 8.15 Amazon Web Services SNS Connection tab details

In the Connection tab shown in Figure 8.15, provide Amazon Web Services details.

Provide the Account number from the AWS SNS account (Section 0 explains how to get the account number from AWS). Enter the SNS topic name under Topic Name (to get the Topic Name from AWS SNS refer to Section 9.5). For Authentication type as Access and Secret Key, the credentials previously deployed for Access Key Alias and Secret Key Alias are used in the connection details. Refer to Section 6 for further instructions on how to deploy these credentials. Each field of the Connection tab was previously explained in Section 7.2.3.2.

Following the Connection tab, the next step is to configure the Processing tab. See Figure 8.16 for the configuration to be maintained in the Processing tab.

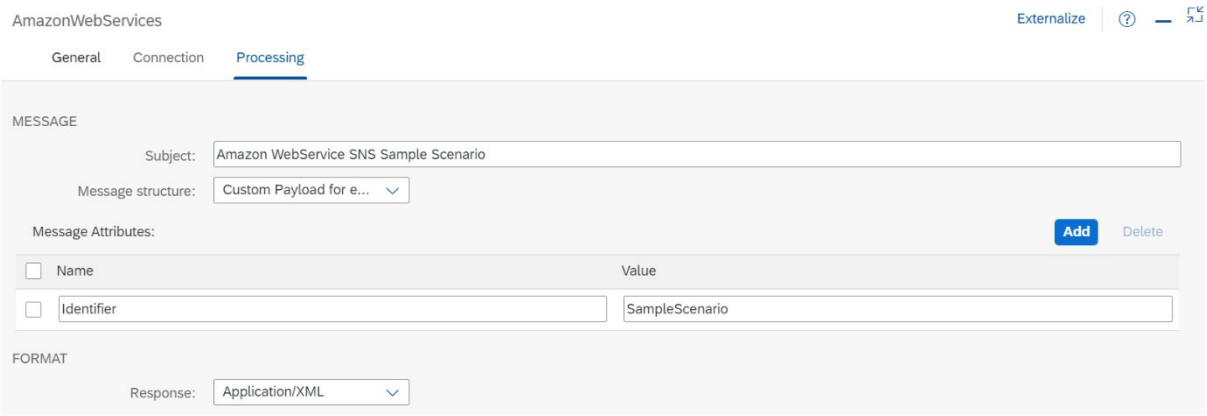


Figure 8.16 Amazon Web Services SNS Processing tab details

In the Processing tab, under the Subject field enter the subject to be sent to the subscriber of the topic. In this case, the Amazon Web Services SNS Sample Scenario is used. *Select Customer Payload for each Delivery Protocol* in the Message structure.

In the Message attributes, enter *Identifier* as the Name and *SampleScenario* as the Value. Amazon SNS supports the delivery of message attributes, which allows the provision of structured metadata items (such as timestamps, geospatial data, signatures, and identifiers) about the message.

Now that all the necessary configurations are made, the integration flow can be deployed and then called from Postman.

As a result, the message will be delivered to the topic, from where the message will be delivered to the subscriber. On the successful processing of the integration flow, a response from Amazon Web Services SNS is received.

See Figure 8.17 for the sample response from SNS.

```
<PublishResponse xmlns="http://sns.amazonaws.com/doc/2010-03-31/">
    <PublishResult>
        <MessageId>20c68961-7216-5258-a328-d158aaf151f1</MessageId>
    </PublishResult>
    <ResponseMetadata>
        <RequestId>dd14cd47-d404-5222-aeb9-957e0ce3218b</RequestId>
    </ResponseMetadata>
</PublishResponse>
```

Figure 8.17 Amazon Web Services SNS Sample Response

8.4 Amazon Simple WorkFlow (SWF)

Figure 8.18 shows an integration flow in SAP CPI that registers the domain in Amazon SWF. The integration flow is triggered externally by an HTTPS call.

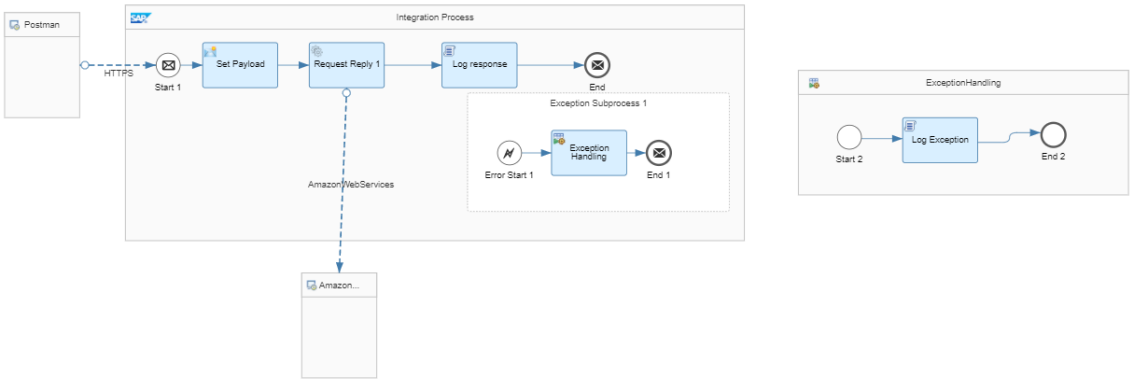


Figure 8.18 SAP CPI Sample Scenario

In this example, a message to Amazon SWF which will register a new domain is sent. In this case, a content modifier is used to create the payload sent to Amazon SWF.

See Figure 8.19 for the payload used.

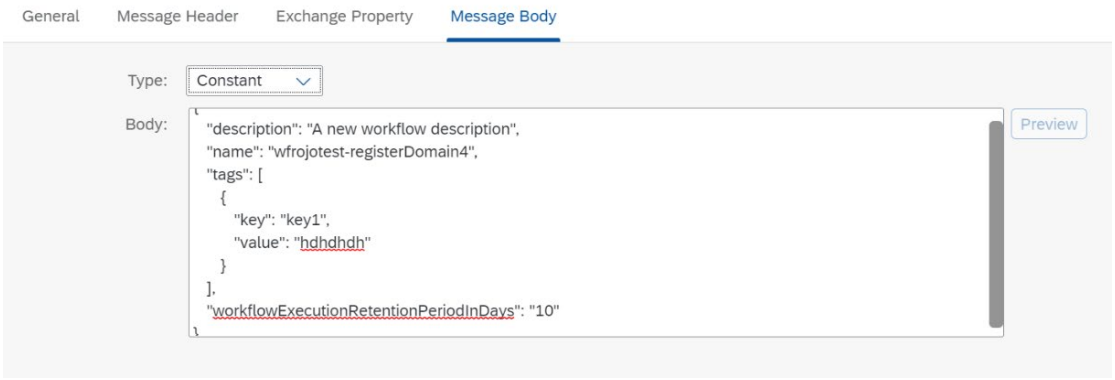


Figure 8.19 Amazon Web Services SWF Custom Payload

Once the data is in the integration flow, the Amazon Web Services Adapter needs to be configured. See Figure 8.20 for an example.

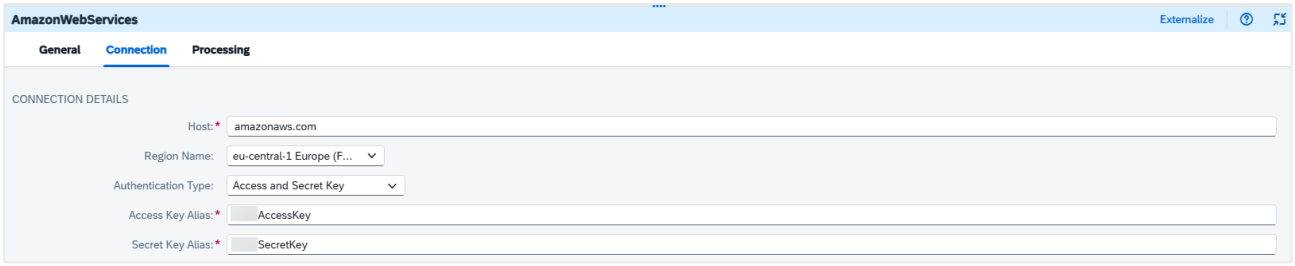


Figure 8.20 Amazon Web Services SWF Connection tab details

In the Connection tab shown in Figure 8.20, provide the Amazon Web Services details. Use the credentials previously deployed for Access Key Alias and Secret Key Alias used in the connection details. Refer to Section 6 for further instructions on how to deploy these credentials. Each field of the Connection tab was previously explained in Section 7.2.4.2.

Following the Connection tab, the next step is to configure the Processing tab. See Figure 8.21 for the configuration to be maintained in the Processing tab.

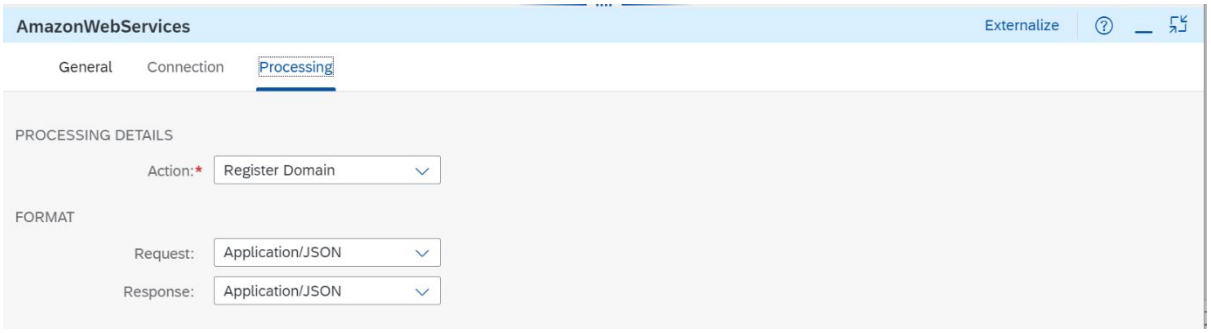


Figure 8.21 Amazon Web Services SWF Processing tab details

In the Processing tab, select *Register Domain* from the Action drop-down. Also, select the respective format for request and response. In this case, the Application/JSON as the request and response format is selected.

Now that all the necessary configurations are made, the integration flow can be deployed and then called from Postman.

As a result, the new domain will be registered in the Amazon SWF.

9 REFERENCES

This section includes reference guides needed to configure the AWS Adapter and to configure Amazon Web Services to connect it with SAP Cloud Integration.

9.1 Microsoft Azure App Setup for AssumeRoleWithWebIdentityProvider

For more information about registering a new application in Azure and configuring the application ID URI, see https://aws.amazon.com/blogs/security/how-to-access-aws-resources-from-microsoft-entra-id-tenants-using-aws-security-token-service.

Note: Ensure that the Access Token version returned by Azure is version 2. For more information, see https://learn.microsoft.com/en-us/entra/identity-platform/access-tokens#token-formats

9.2 Configuring Identity Provider for AWS Role Creation

Purpose

To add an Identity Provider and create a role with permissions to manage user identities outside of AWS

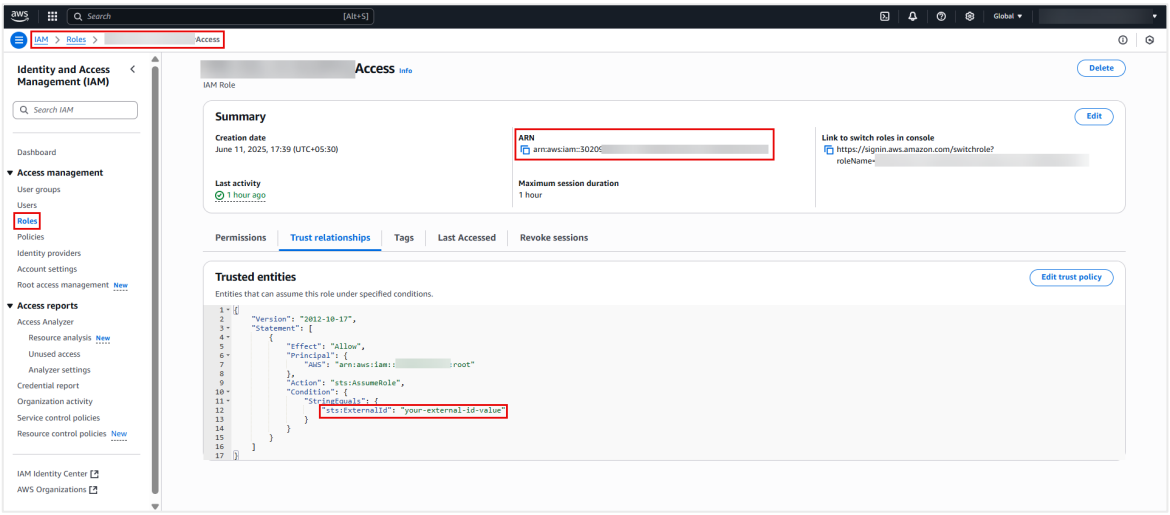
Procedure

1. Sign in to the AWS Management Console and open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane of the console, choose **Identity Provider** and **Add Provider**.
3. Select **OpenID Connect** and specify the **Provider URL** as https://login.microsoftonline.com/<<tenant id>>/v2.0
4. Under **Audience,** specify the client ID and click **Add Provider** to save changes.
5. In a new window, click **Assign Role** and select **Create a New Role**
6. Under the **Create Role** page, select **Trusted Identity Type** as **Web Identity** in case of **STS (WebIdentity)** and **AWS account** in case of **STS (Assume Role)**.
    a) For **Web Identity**, select required values for **Identity provider** and **Audience** from the dropdown and click **Next.**
    b) For **AWS account,** select the required **AWS account** and click **Next.**
7. In the next page, **Add Permissions** by searching and selecting your required permission policies.
8. Finally, enter the role **Name** and description to Finish.

9.3 Getting Role ARN and External ID from IAM Role

1. Go to the AWS Management Console and open the IAM service.
2. In the left menu, click **Roles** and select the configured IAM role.
3. On the role summary page, copy the **Role ARN** shown at the top.

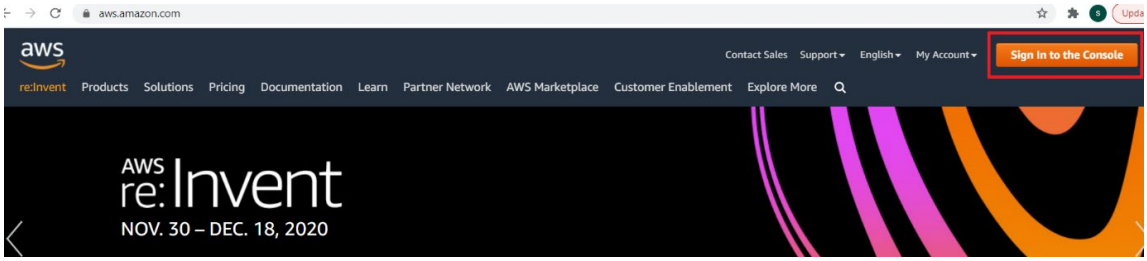
4. You can also configure the **External ID** in the trust relationship, as shown in the example below.



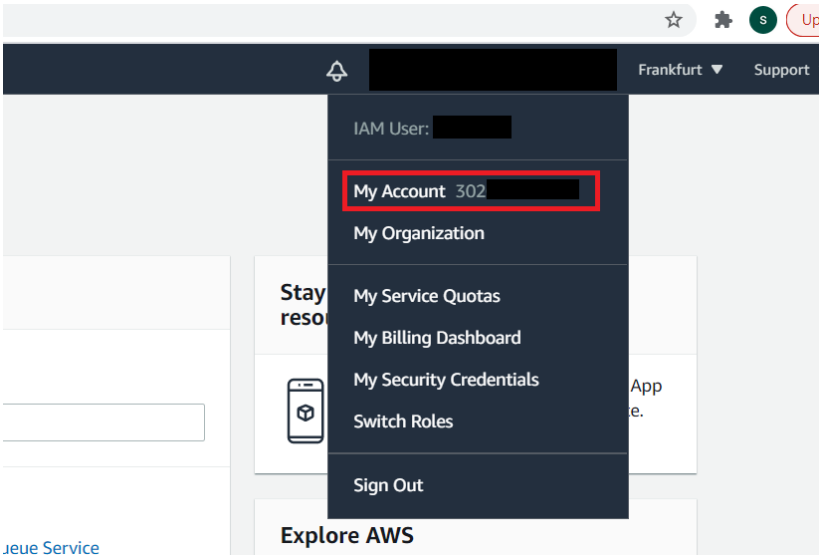
9.4 Getting the Account Number from AWS Tenant

To get the account number from the AWS tenant, follow the below steps:

1. Log in to the AWS account.



2. On the top right side of the page where profile information is displayed, the account number can be seen.



9.5 Getting SNS Topic Name from AWS Tenant

To get the topic name from the AWS tenant, follow the below steps:

1. Log in to the AWS management console.

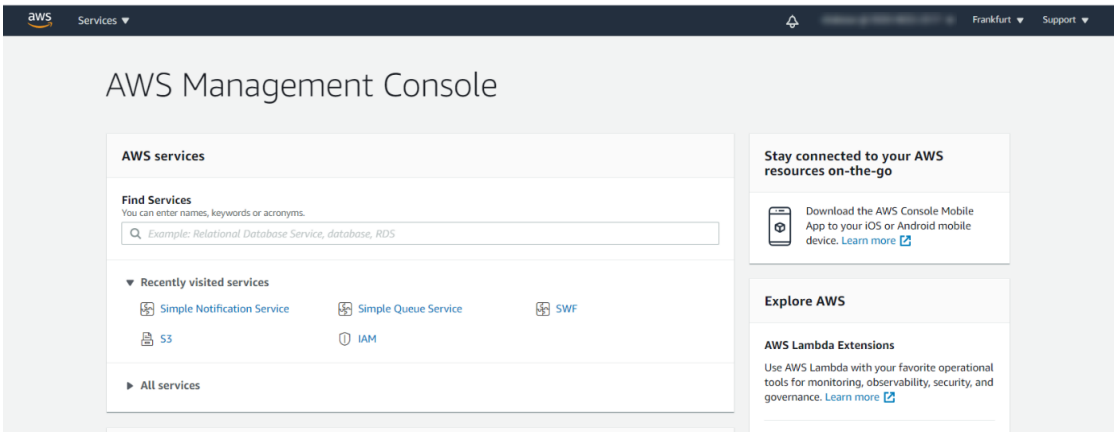


Figure 9.1 Amazon Web Services Management Console

2. On the top left side of the page, select **Services** and search for SNS in the search box. See Figure 9.2 for further reference.

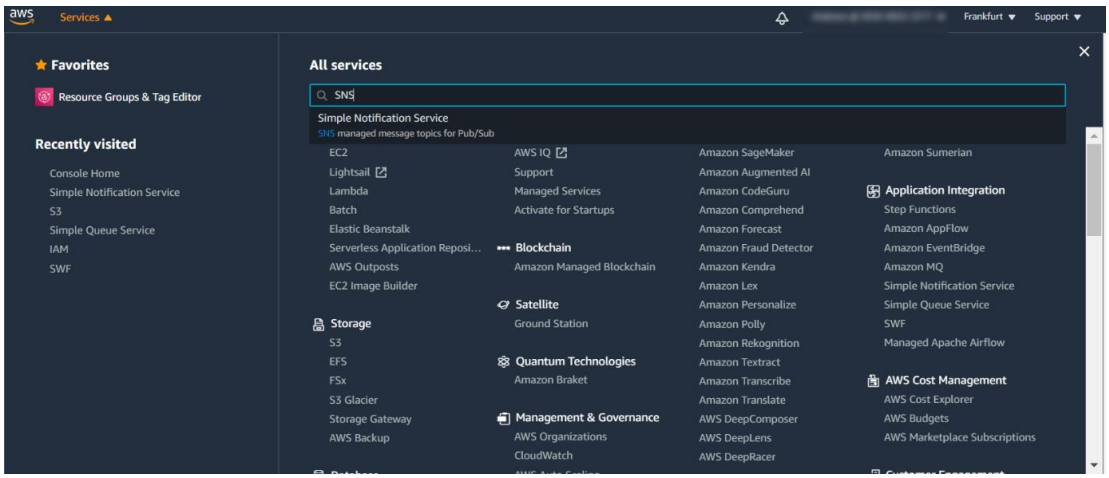


Figure 9.2 Amazon Web Services - Services

3. Select the SNS service, this leads to the Amazon SNS home screen. On the left pane of the window, the Topics are displayed. See Figure 9.3.

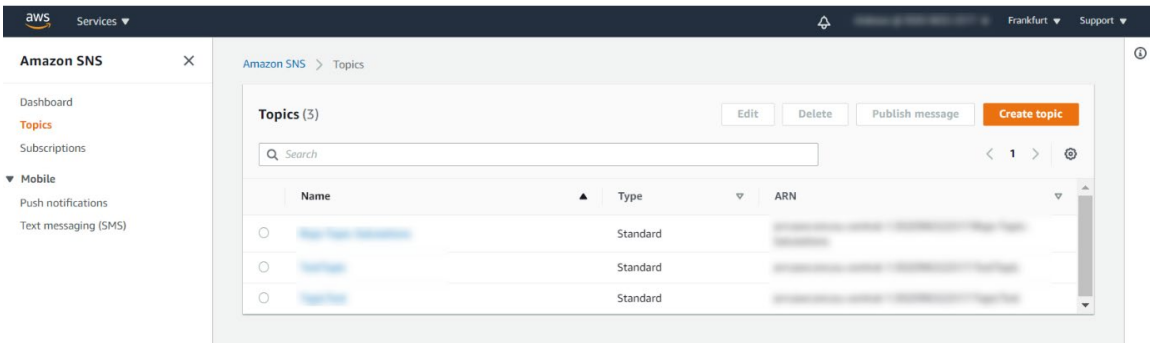


Figure 9.3 Amazon Web Services SNS topic

10 SUPPORT AND TROUBLESHOOTING

In case of issues or errors, change the Log level of the integration flow to **Traces**.

This can be done by following these steps:

1. Navigate to the Monitor Tab of the SAP Cloud Integration tenant.
2. Proceed to the Manage Integration Content section.

An example of such a configuration can be seen in Figure 10.1.

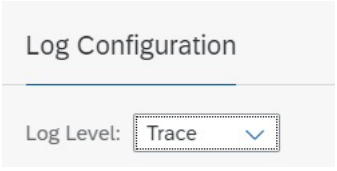


Figure 10.1 Activating Traces

The Trace Log level enables the collection of more traces that can be used to effectively understand the problem. These traces can also be used in a ticket.

In the next sections, a few issues that might be encountered when using the AWS Adapter and possible solutions for them are discussed.

10.1 SSLHandshakeException

Error Message:

javax.net.ssl.SSLHandshakeException: sun.security.validator.ValidatorException: PKIX path building failed: sun.security.provider.certpath.SunCertPathBuilderException: unable to find valid certification path to requested target,
cause: sun.security.provider.certpath.SunCertPathBuilderException: unable to find valid certification path to requested target.

Possible Solution: This error generally means that in the Keystore of SAP Cloud Integration, an entry for the root certificate of Amazon Web Services is missing. Import the Amazon Root CA1 certificate into the SAP Cloud Integration Keystore.

10.2 Incorrect Connection details

Error Message:

amazonwebservices.exceptions.AwsException: The AWS bucket <<Bucket Name>> does not exist or is not accessible.

Possible Solution: Consider one of the following options

- The error generally indicates that the Connection tab configuration is not correct. Please make sure that the Bucket name, Access Key Alias, and Secret Key Alias are correct. If any one of them is not correct, this error is encountered.
- The error might also come if the Requester Pays option is enabled in the bucket and not selected in the Connection tab configuration.
- The error can be permission related on AWS. Ensure that all the minimum set of permissions required for the S3 sender and receiver adapter have been added. It includes:
  - s3:PutObject
  - s3:GetObjectAcl
  - s3:GetObject
  - s3:DeleteObject
  - s3:ListBucket

10.3 Invalid Expression

Error Message:

Invalid parameter value <<attributeName>>, should be ${header.xyz} or ${property.xyz}

Possible Solution: The error generally comes when the expression is not used properly. Please make sure that expressions are formatted as ${header.headername} or ${property.propertyname}.

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