Informatica® Cloud Application Integration
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Create Amazon Bedrock Knowledge Base and Data Source using Guide

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Preface

Use *Create Amazon Bedrock Knowledge Base and Data Source using Guide* to learn how to automatically create a knowledge base and resources when the file is uploaded, and how to ask questions to the Amazon Bedrock Large Language Model (LLM) based on an uploaded file's content using a guide. This guide assumes that you have an understanding of the Amazon Bedrock Connector, Amazon S3 Connector, and Email Connector concepts.

CHAPTER 1

Introduction to Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe

The Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe is based on REST and SOAP APIs. Use the recipe to create a knowledge base and resources automatically when the file is uploaded. You can also use the recipe to ask questions and get answers to the user's questions based on the uploaded file's contents using the Amazon Bedrock Large Language Model (LLM).

When you run the guide, you can specify the knowledge base name to create a new knowledge base or knowledge base ID to use the existing knowledge base, email for notification, and attach files. Optionally, you can prompt questions related to the file content. After you run the guide, the files are uploaded to the Amazon S3 bucket specified in the connection.

The process then creates a knowledge base with the specified name and vector database parameters. It creates data source for the Amazon S3 bucket in the knowledge base.

The process then starts the ingestion job and generates an answer. If the user has provided a prompt, it generates an answer based on the file content.

The process then sends an email notification to confirm successful job creation with the knowledge base ID, data source IDs, and the LLM answer if the prompt was specified. The recipe does not send an email notification about the errors. You can track the errors at the process execution status in Application Integration Console.

You can upload files with a maximum size of 5MB in the following formats:

`.txt`, `.md`, `.html`, `.doc`, `docx`, `.csv`, `.xls`, `.xlsx`, `.pdf`

Prerequisites

To use the Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe, the following prerequisites must be met:

- Create an index in Pinecone
- Configure AWS Secrets Manager
- Configure Amazon S3 bucket
- Configure Role and Policy

Creating an index in Pinecone

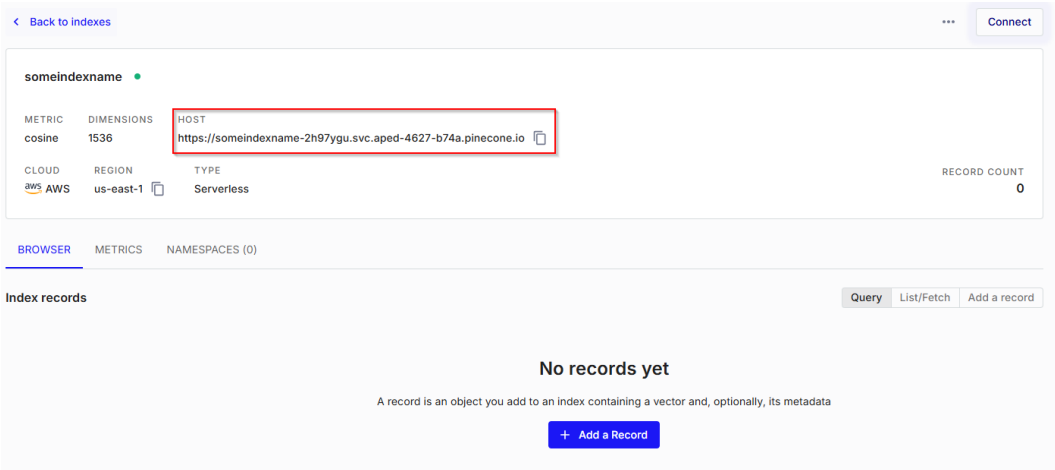
To use the index in Amazon Bedrock, you must create an index in Pinecone and add text for the context.

1. Open the **Create a new index** page in Pinecone.
2. In the **Default** field, enter an index name and the dimensions as shown in the following image:

Note: For the titan-embed-text-v2 model, the available dimensions are 256, 512, 1024. For the titan-embed-text-v1 model, the dimension is 1536. For the cohere models, dimension is 1024. The Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe is preconfigured with model titan-embed-text-v1.

3. Click **Create index**.
   You can save the index host value and API key for future use.

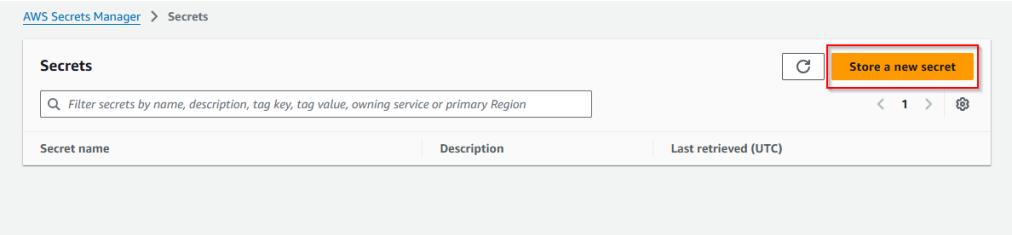
After creating the index, you can use the **HOST** value with `https://` in the **Index_Host** input parameter as shown in the following image:



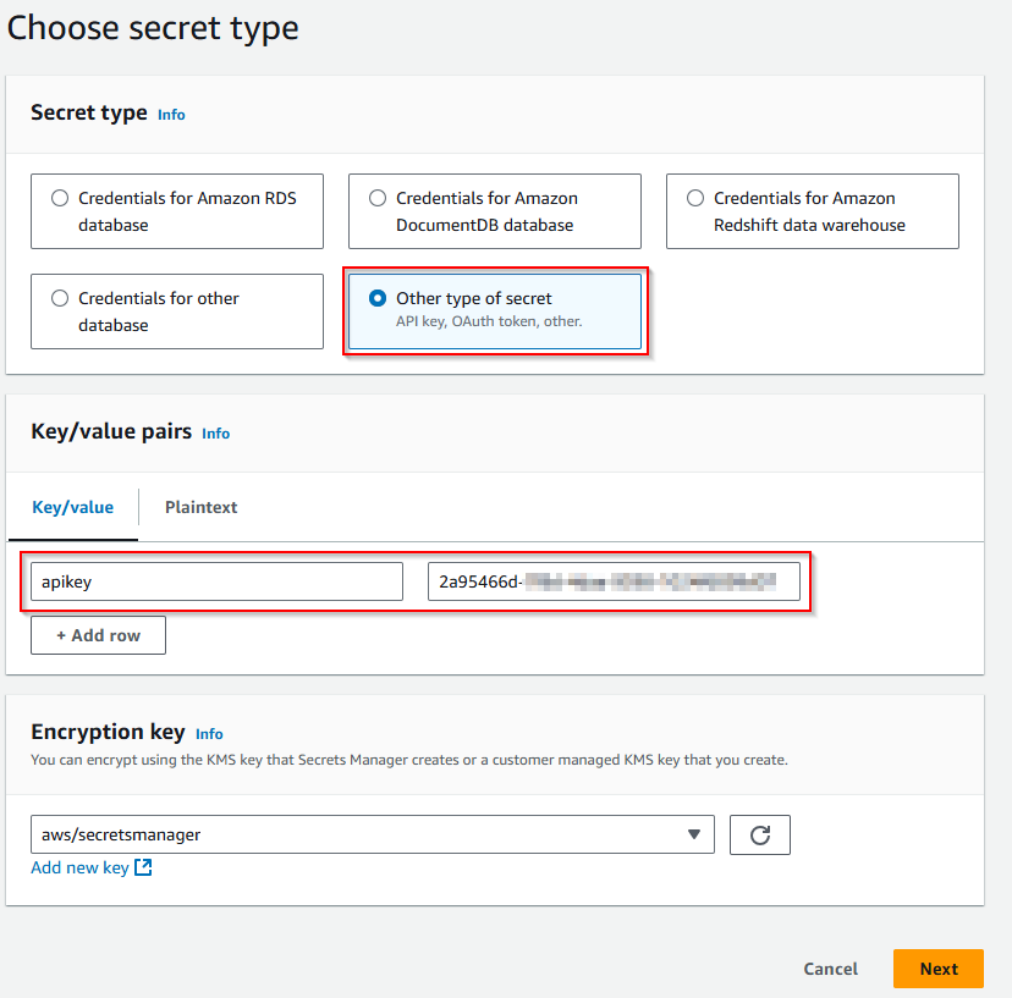
Configuring AWS Secrets Manager

Configure the AWS secret manager and the secret ARN.

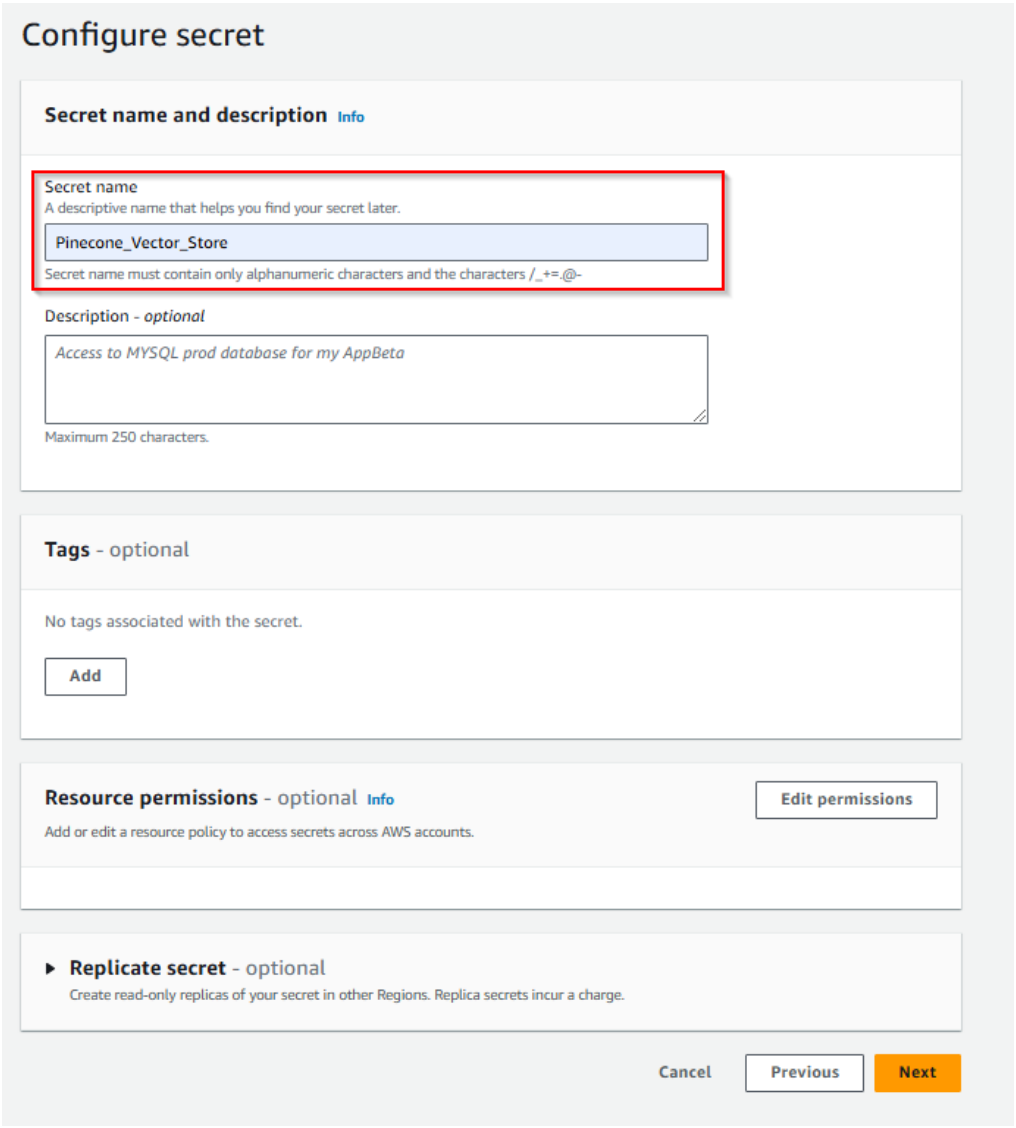
1. Open the AWS console.
2. Go to the **AWS Secrets Manager** service and click **Store a new secret** as shown in the following image:



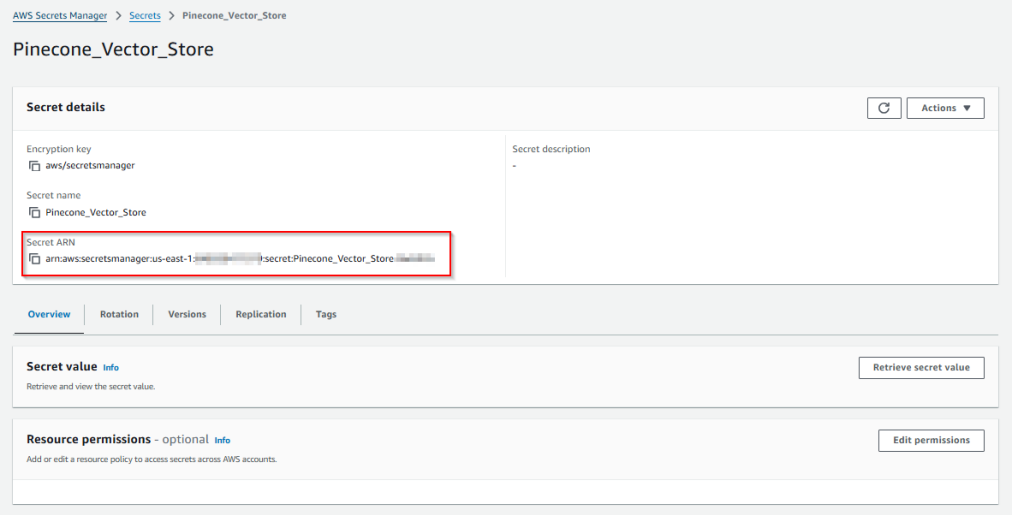
3. In the **Choose secret type** page, select the **Other type of secret** in the **Secret type** section, and set the key as **apiKey** and enter the Pinecone API key value that you created previously, and then click **Next** as shown in the following image:



4. In the **Configure secret** page, set the secret manager name and click **Next** as shown in the following image:


Configure secret
Secret name and description Info
Secret name
A descriptive name that helps you find your secret later.
Pinecone_Vector_Store
Secret name must contain only alphanumeric characters and the characters /_+=.@-
Description - optional
Access to MYSQL prod database for my AppBeta
Maximum 250 characters.
Tags - optional
No tags associated with the secret.
Add
Resource permissions - optional Info
Edit permissions
Add or edit a resource policy to access secrets across AWS accounts.
Replicate secret - optional
Create read-only replicas of your secret in other Regions. Replica secrets incur a charge.
Cancel
Previous
Next

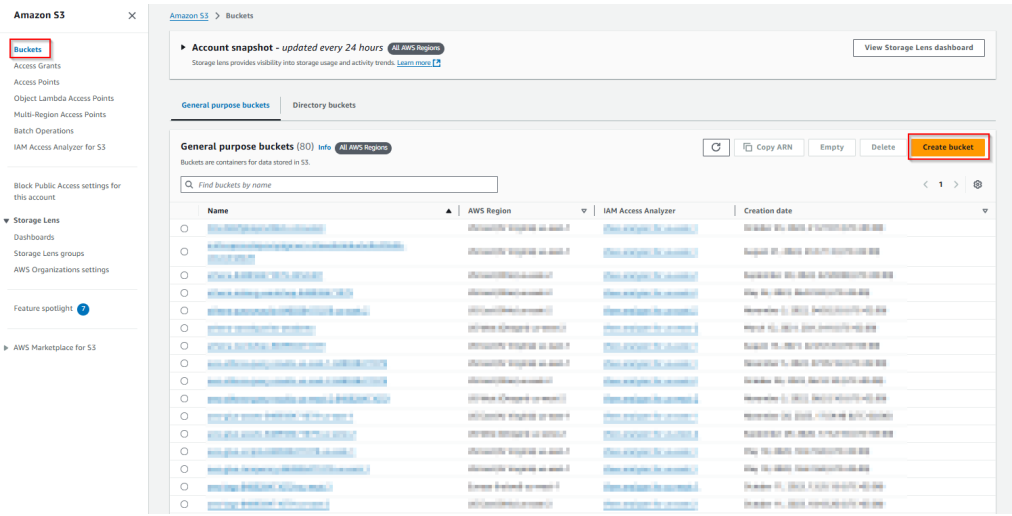
5. Go to the secret manager that you created and save the **Secret ARN** as shown in the following image for future use:



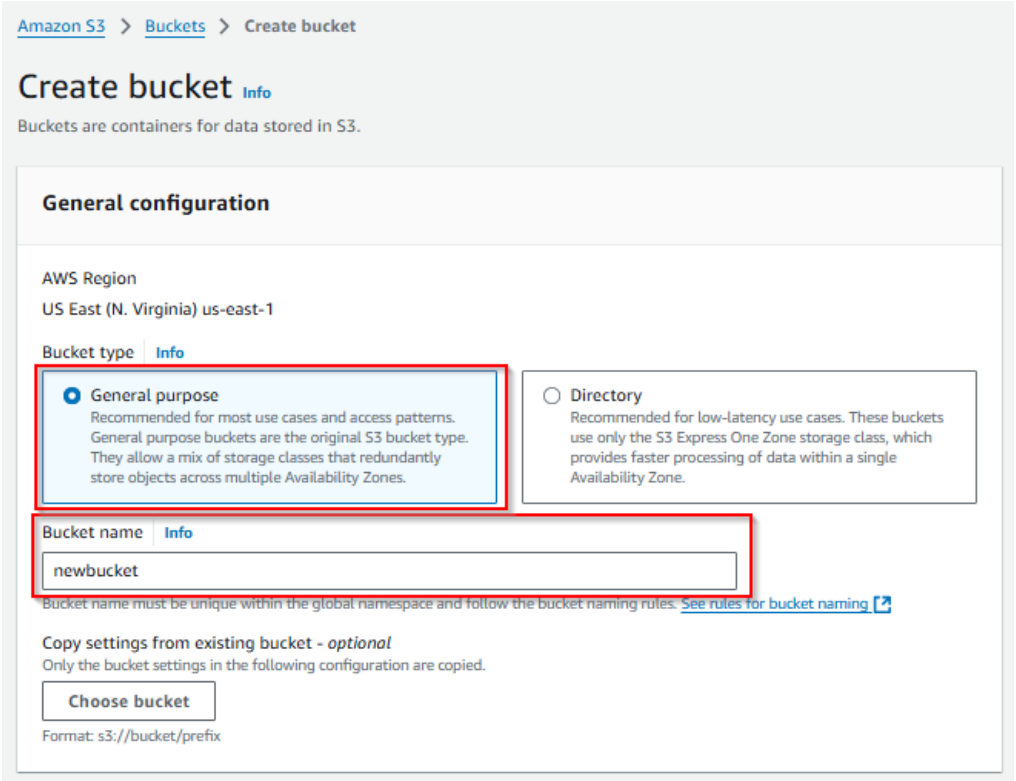
Configure Amazon S3 bucket

To configure an Amazon S3 bucket, perform the following steps:

1. Go to **Amazon S3** > **Buckets**, and then click **Create bucket** as shown in the following image:



2. Select the bucket type as **General purpose** and enter the S3 bucket name in the **Bucket name** field as shown in the following image:

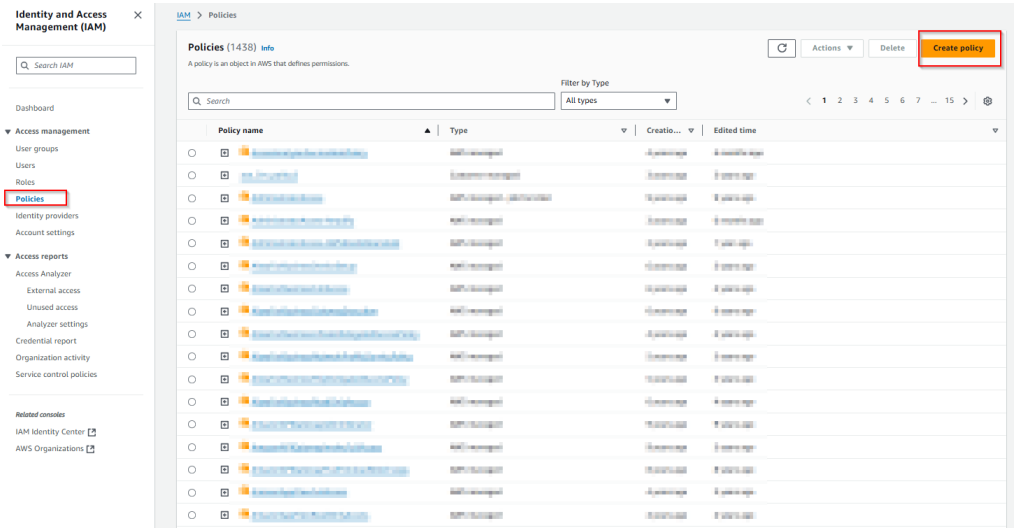


The bucket name will be used as a **BucketName** variable.

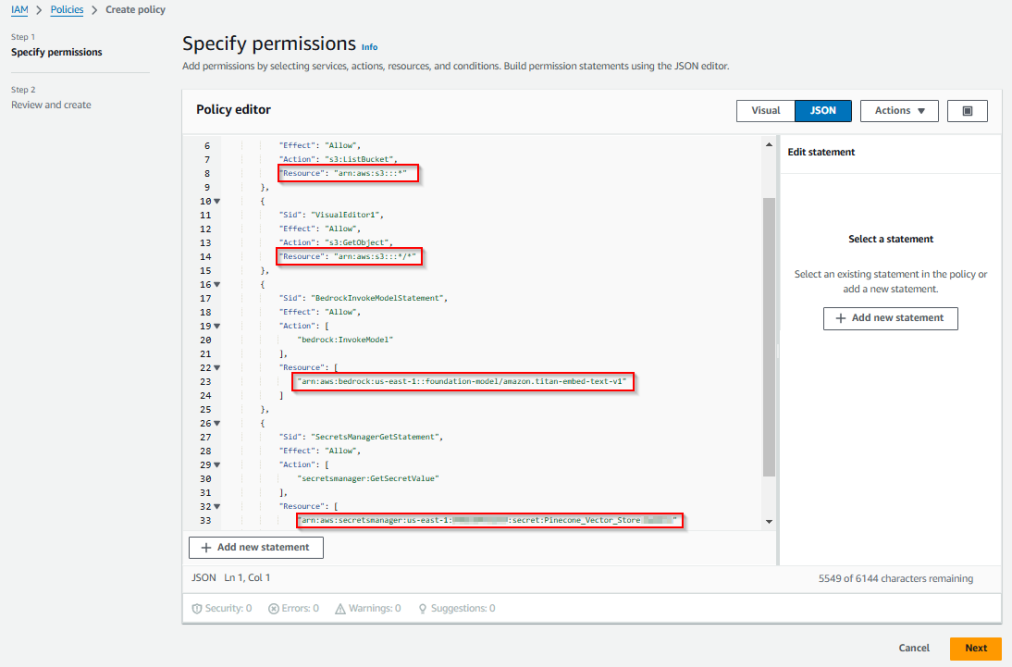
Configure Role and Policy

Configure role and policy in AWS Identity and Access Management (IAM).

1. Go to **Amazon Identity and Access Management (IAM)** > **Policies** > **Create policy** and create a new policy as shown in the following image:



2. Specify the secret ARN, policy name, and model ID. The recipe is preconfigure to use amazon.titan-embed-text-v1. For the list of available models, see https://docs.aws.amazon.com/bedrock/latest/userguide/model-ids.html.
The following image shows the secret ARN, policy name, and model ID in the **Specify permissions** page:

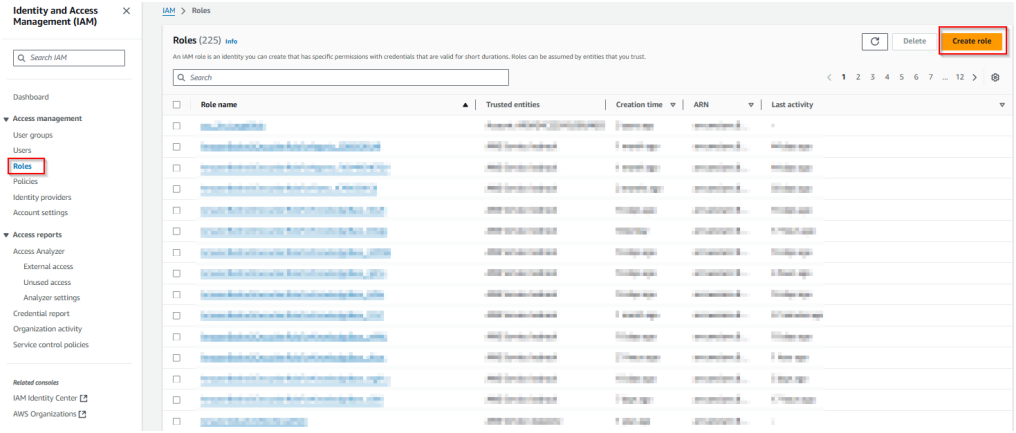


Here is the sample of the secret ARN, policy name, and model ID to enter in the Policy editor :

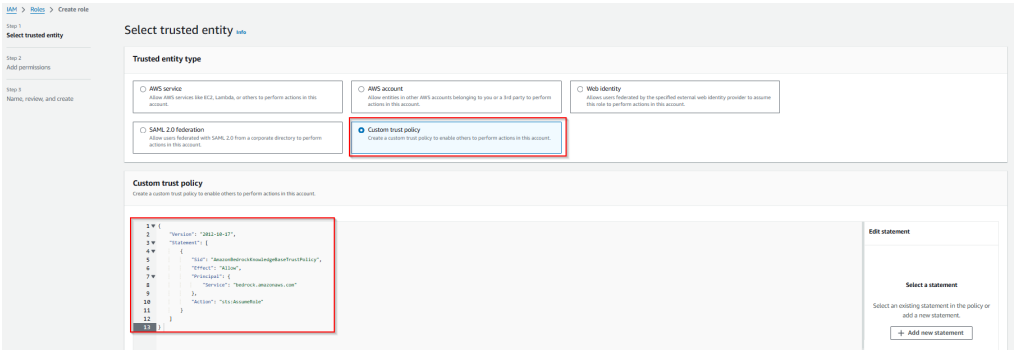
```
{
  "Version": "2012-10-17",
  "Statement": [
      {
         "Sid": "VisualEditor0",
         "Effect": "Allow",
         "Action": "s3:ListBucket",
         "Resource": "arn:aws:s3:::*"
      },
      {
         "Sid": "VisualEditor1",
         "Effect": "Allow",
         "Action": "s3:GetObject",
         "Resource": "arn:aws:s3:::*/*"
      },
      {
         "Sid": "BedrockInvokeModelStatement",
         "Effect": "Allow",
         "Action": [
                "bedrock:InvokeModel"
          ],
          "Resource": [
                      "arn:aws:bedrock:us-east-1::foundation-model/amazon.titan-
embed-text-v1"
          ]
       },
       {
         "Sid": "SecretsManagerGetStatement",
         "Effect": "Allow",
         "Action": [
                   "secretsmanager:GetSecretValue"
          ],
          "Resource": [
```

```
                "{Secret ARN}"
            ]
        }
    ]
}
```

3. Go to **Amazon Identity and Access Management (IAM)** > **Roles** > **Create role** and create a new role as shown in the following image:



4. In the **Select trusted entity** page, select **Custom trust policy** in the **Trusted entity type** section, and configure the policy as shown in th efollowing example:



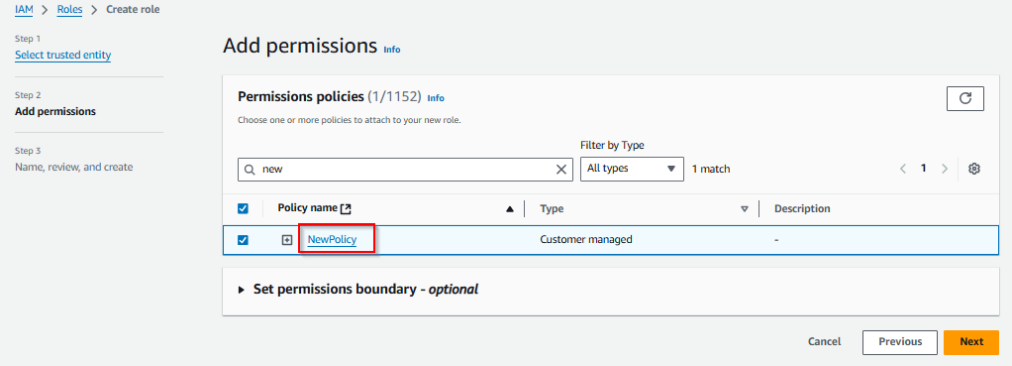
Here is the sample to configure trust policy:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AmazonBedrockKnowledgeBaseTrustPolicy",
            "Effect": "Allow",
            "Principal": {
                "Service": "bedrock.amazonaws.com"
            },
            "Action": "sts:AssumeRole"
        }
```

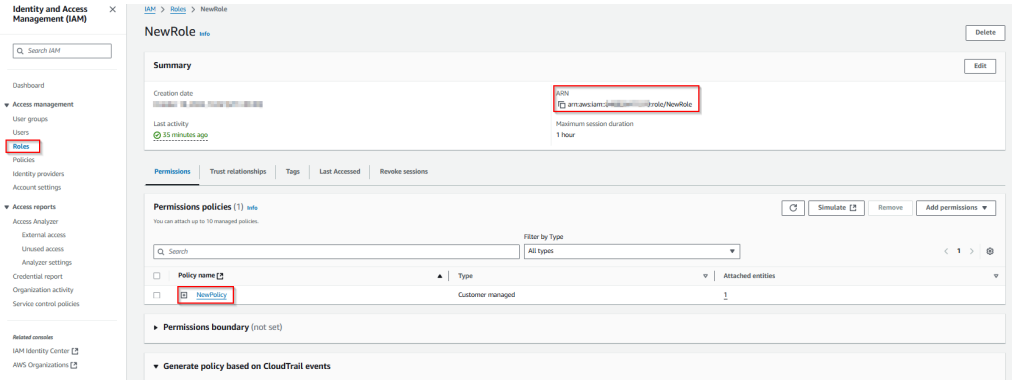
]

}

5. In the **Add permissions** page, add the created policy and set the role name, and then click **Next** as shown in the following image:



6. Go to the created role and save the role **ARN** for future use as shown in the following image:b

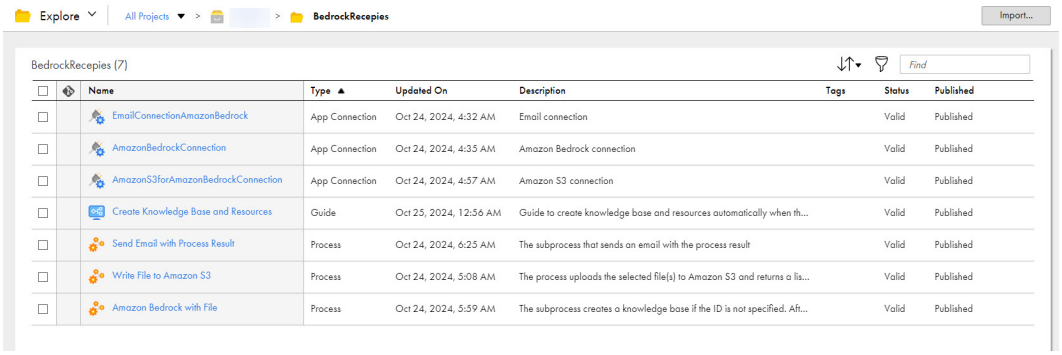


CHAPTER 2

Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe contents

The Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe contains app connections, processes, and a guide.

The following image shows the assets that the Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe package contains:



Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe assets

The following table lists the assets that the Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe package contains:

Asset Name	Asset Type	Description
EmailConnectionAmazonBedrock	App connection	Email connection.
AmazonBedrockConnection	App connection	Amazon Bedrock connection.

Asset Name	Asset Type	Description
AmazonS3forAmazonBedrockConnection	App connection	Amazon S3 connection.
Amazon Bedrock with File	Process	Subprocess that creates a knowledge base if the ID is not specified. The process splits the dataset into chunks and upsert them into the vector database from the Amazon S3 bucket. The process calls LLM using the file as context and sends an answer to the email specified in the user prompt.
Send Email with Process Result	Process	Subprocess that sends an email with the process result.
Write File to Amazon S3	Process	Process that uploads the selected files to Amazon S3 and returns a list of uploaded files.
Create Knowledge Base and Resources	Guide	Guide that creates knowledge base and resources automatically when the file is uploaded. You can ask questions to the LLM based on the content from the uploaded files.

CHAPTER 3

Using the Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe

To use the Create Amazon Bedrock Knowledge Base and Data Source using Guide recipe, you must perform the following steps manually:

1. Copy and access the recipe.
2. Configure and publish the Email connection.
3. Configure and publish the Amazon Bedrock connection.
4. Configure and publish the Amazon S3 connection.
5. Configure and publish the processes.
6. Publish and run the guide.

Step 1. Copy and access the recipe

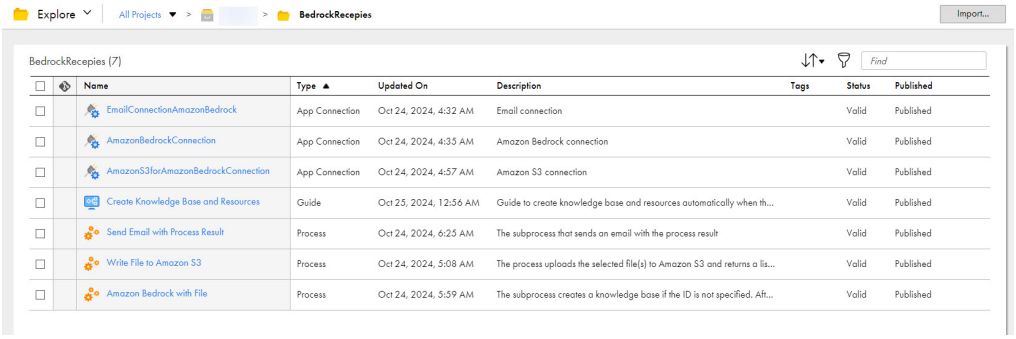
Copy the pre-configured assets in the recipe to a separate project or folder.

1. Open the **Create Amazon Bedrock Knowledge Base and Data Source using Guide** recipe and click **Use**.
2. Select the location where you want to copy the recipe, and then click **Continue**.
3. In the **Copying the recipe** dialog box, click **OK**.

   It might take some time for the recipe to get copied. You will receive a notification when the recipe is ready for use.
4. After the recipe is copied, click **Explore** to access the recipe content.

5. Navigate to the project or folder where you copied the recipe or enter the recipe name in the **Find** box.

   All the assets in the recipe are displayed as shown in the following image:



Step 2: Configure and publish the Email connection

Configure the authentication type and authentication details in the EmailConnectionAmazonBedrock connection, and then publish the connection.

1. Open the **EmailConnectionAmazonBedrock** connection.
2. From the **Type** list, select **IICS Cloud Application Integration Email Service (Licensed for use)**.
3. From the **Run On** list, select **Cloud Server or any Secure Agent**.
4. From the **Authentication Type** list, select **Password** or **OAuth** as needed. Based on the authentication type selected, perform one of the following steps:
   - For **Password** authentication, enter values for the following properties in the **Connection Properties** section:

Property	Description
Authentication	Select **Enable**. Email Connector authenticates the user name and password that you enter in the email connection properties.
User Name	User name to log in to the email server. The user name is either the account name or the email address that is used to send the email with the synchronization results. For example: `notifyme@mydomain.com`
Password	Password for the email address.
Security	Select **SSL** for the Email connection to use the SSL protocol.

Configure the following common properties on the connection creation page:

Property	Description
Host	Email server's DNS name, such as `mail.mydomain.com`, or an IP address, such as `192.168.1.1`.
Port	Port for communication between the Process Server and the email server. Default is **25**.

- For **OAuth** authentication, enter values for the following properties in the **Connection Properties** section:

Property	Description
Authorization URL	Enter the OAuth authorization URL for the email service that is used to authorize the user request. For example: `https://login.microsoftonline.com/xxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxx/oauth2/v2.0/authorize`
Token Request URL	Enter the OAuth token request URL that handles token requests. For example: `https://login.microsoftonline.com/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx/oauth2/v2.0/token` The refresh token expires in 90 days. The user must authenticate again and publish the connection before the token expires.
Client ID	Specify the identifier value from the OAuth provider.
Client Secret	Enter the client secret to connect to the email application.
Scope	Specify the scope. The scope in OAuth authentication limits an application's access to a user's account. You can select multiple scopes for a single client. To enter multiple scopes, separate each value with a space. For a Microsoft Outlook email account, enter the following scope: `https://outlook.office.com/SMTP.Send offline_access`

Configure the following common properties on the connection creation page:

Property	Description
Host	Email server's DNS name, such as `mail.mydomain.com`, or an IP address, such as `192.168.1.1`.
Port	Port for communication between the Process Server and the email server. Default is **25**.

5. Save and publish the connection.

Step 3. Configure and publish the Amazon Bedrock connection

Configure the access key, secret key, and region to connect to Amazon Bedrock, and then publish the AmazonBedrockConnection connection.

1. Open the **AmazonBedrockConnection** connection.
2. In the **Connection Properties** section, enter values for the following properties:

Property	Description
AccessKey	The access key to access Amazon Bedrock.
SecretKey	The secret key to access Amazon Bedrock.
Region	The region that hosts Amazon Bedrock.

3. Save and publish the connection.

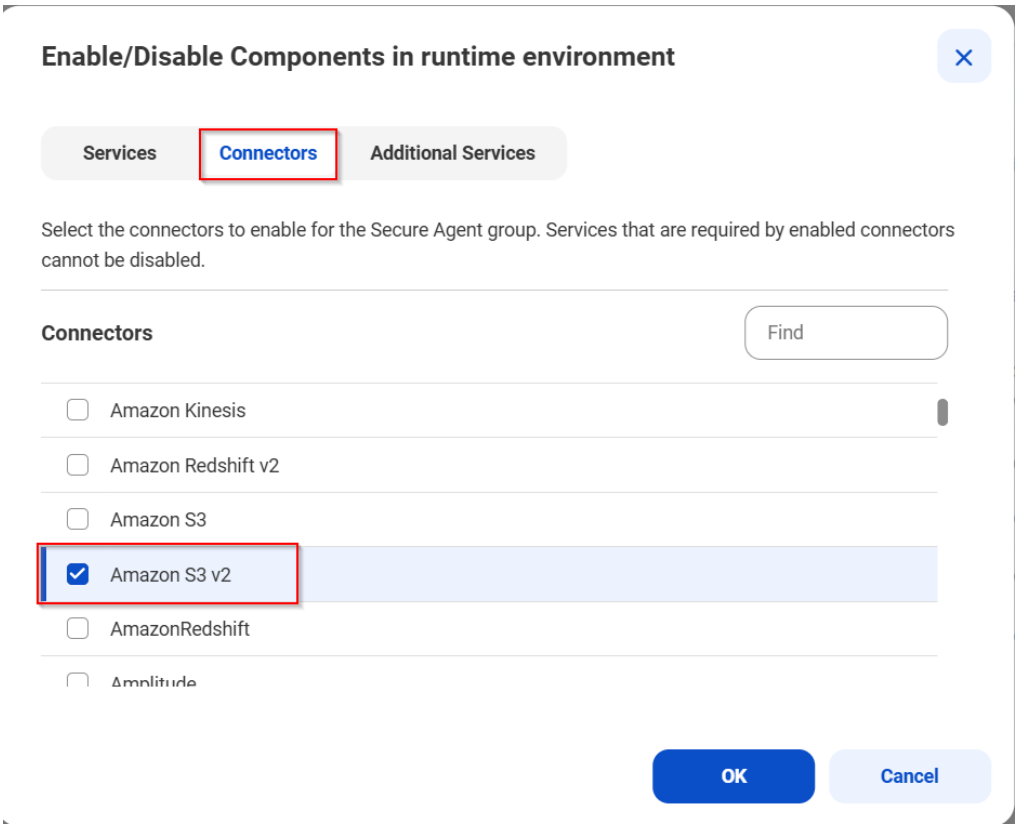
Step 4. Configure and publish the Amazon S3 connection

Configure the Secure Agent and Amazon S3 bucket name to connect to Amazon S3, and then publish the AmazonS3forAmazonBedrockConnection connection.

1. Open the **AmazonS3forAmazonBedrockConnection** connection.
2. From the **Run On** field, select the Secure Agent.

   Note: Ensure that the Amazon S3 v2 Connector is enabled for the Secure Agent from the Enable/Disable Components in runtime environment page of Administrator. For information about enabling connections for a Secure Agent group in Administrator, see *Runtime environments* in Administrator.

   The following image shows the Amazon S3 v2 Connector option on the Administator page.



3. In the **Connection Properties** section, enter values for the following properties:

Property	Description
AccessKeyID	The AWS access key ID of the requester.
Secret Access Key	The AWS secret key of the requester.
Region	The region where a new bucket must be located. For example: `us-east1`

4. On the **Event Targets** page, in the **Amazon S3 Settings** section, enter the bucket name that you created.
5. Save and publish the connection.

Step 5: Configure and publish the processes

Configure the deployment details of the LLM model and publish the processes.

1. Open the **Amazon Bedrock with File** process.
2. In the **Set Flow Configuration** step, in the **Assignments** field, enter values in the following fields:
   - Bucket_Name - The bucket name that you entered in the AmazonS3forAmazonBedrockConnection connection.

- Wait_Time_to_Create_Data_Source - The idle time to create datasource for knowledge base. If the server has significant delays, you can increase the time.
- Wait_Time_Ingestion_Job - The idle time for ingestion job. This time depends on the number and size of files to be converted into a vector database. If the files are large and numerous, you can increase the time to reduce the number of status check requests.
- Embedding_Model - The embedding model in the following format:
  `arn:aws:bedrock:us-east-1::foundation-model/{Embedding_MODEL_ID}`
- RoleArn - The role arn in the following format:
  `arn:aws:iam::{USER_ID}:role/{ROLE_NAME}`
- Storage_Configuration - Update the storage configuration prompt instructions using the Expression Editor, as shown in the following sample code:

```
<storageConfiguration>
<pineconeConfiguration>
<connectionString>{Index Host}</connectionString>
<credentialsSecretArn>{Secret ARN}</credentialsSecretArn>
<fieldMapping>
<metadataField>metadata</metadataField>
<textField>text</textField>
</fieldMapping>
<namespace></namespace>
</pineconeConfiguration>
<type>PINECONE</type>
</storageConfiguration>
```

  If you want to specify a different vector database, specify the appropriate parameters. For more information, see the API_agent_CreateKnowledgeBase documentation.
- LLM_Model - The LLM model ID.

3. Save and publish the process.
4. To publish the **Send Email with Process Result** process, click **Actions** in the row that contains the process and select **Publish**.
5. To publish the **Write File to Amazon S3** process, click **Actions** in the row that contains the process and select **Publish**.

Step 6. Publish and run the Guide

The guide automatically creates or updates the knowledge base and resources when the file is uploaded. You can also ask questions to the LLM based on the content from the uploaded files.

1. Open the **Create Knowledge Base and Resources** guide.
2. On the **Start** tab of the **Start** step, ensure that the **Run As** field is set to **Current User**.
3. Save and run the guide.
4. On the **Actions** menu, click **Run**. Alternatively, you can copy the execution URL from the **Properties Details** dialog box to run the guide.
5. On the **Instructions** page, in the **Select Knowledge Base option** field, perform one of the following step:
   - Select **Create a new Knowledge Base** and enter a knowledge base name in the **Knowledge Base Name** field to create a new knowledge base.
   - Select **Use an existing Knowledge Base ID** and enter an existing knowledge base ID in the **Knowledge Base ID** field.

6. In the **Enter your email** field, enter the email ID to send the notification.
7. In the **Select file to upload** field, upload one or more files with a maximum size of 5MB in the following format:
   `.txt`, `.md`, `.html`, `.doc`, `docx`, `.csv`, `.xls`, `.xlsx`, `.pdf`
8. Optionally, you can ask questions related to the uploaded files.
   The LLM uses these requests as instructions to prepare the final response to your query.
9. Click **Continue**.
10. On the next screen, a message is displayed stating that an email will be sent when the file processing is over.
11. Click **End**.

You can also use the embed code to embed the guide into an HTML document of a third-party application.