Hands-on tutorials

# Extract information from unstructured documents with Amazon Bedrock and Amazon Textract

# Extract information from unstructured documents with Amazon Bedrock and Amazon Textract: Hands-on tutorials

# Table of Contents

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| | |
|---|---|
| **AWS experience** | Beginner |
| **Time to complete** | 20 minutes |
| **Cost to complete** | Less than $0.15 if completed within two hours and the notebook is deleted at the end of the tutorial. |
| **Get help** | Troubleshooting Amazon Bedrock models<br><br>Debugging traning issues |
| **Last update** | November 14, 2024 |

## Overview

In this tutorial, you will learn how to utilize Amazon Bedrock and Amazon Textract to extract and process information from unstructured documents.

Amazon Bedrock is a fully managed service that offers a choice of high-performing foundation models (FMs) from leading AI companies like AI21 Labs, Anthropic, Cohere, Meta, Mistral AI, Stability AI, and Amazon through a single API, along with a broad set of capabilities you need to build generative AI applications with security, privacy, and responsible AI.

Amazon Textract is a machine learning (ML) service that automatically extracts text, handwriting, layout elements, and data from scanned documents.

## What you will accomplish

In this tutorial, you will:

- Enable access to a foundation model on your AWS account
- Create a new Jupyter notebook to write test code and run tests

- Generate code
- Clean up your resources

# Prerequisites

Before starting this tutorial, you will need:

- An AWS account: if you don't already have one follow the Setup Your Environment tutorial.

# Implementation

## Step 1: Enable Anthropic FM

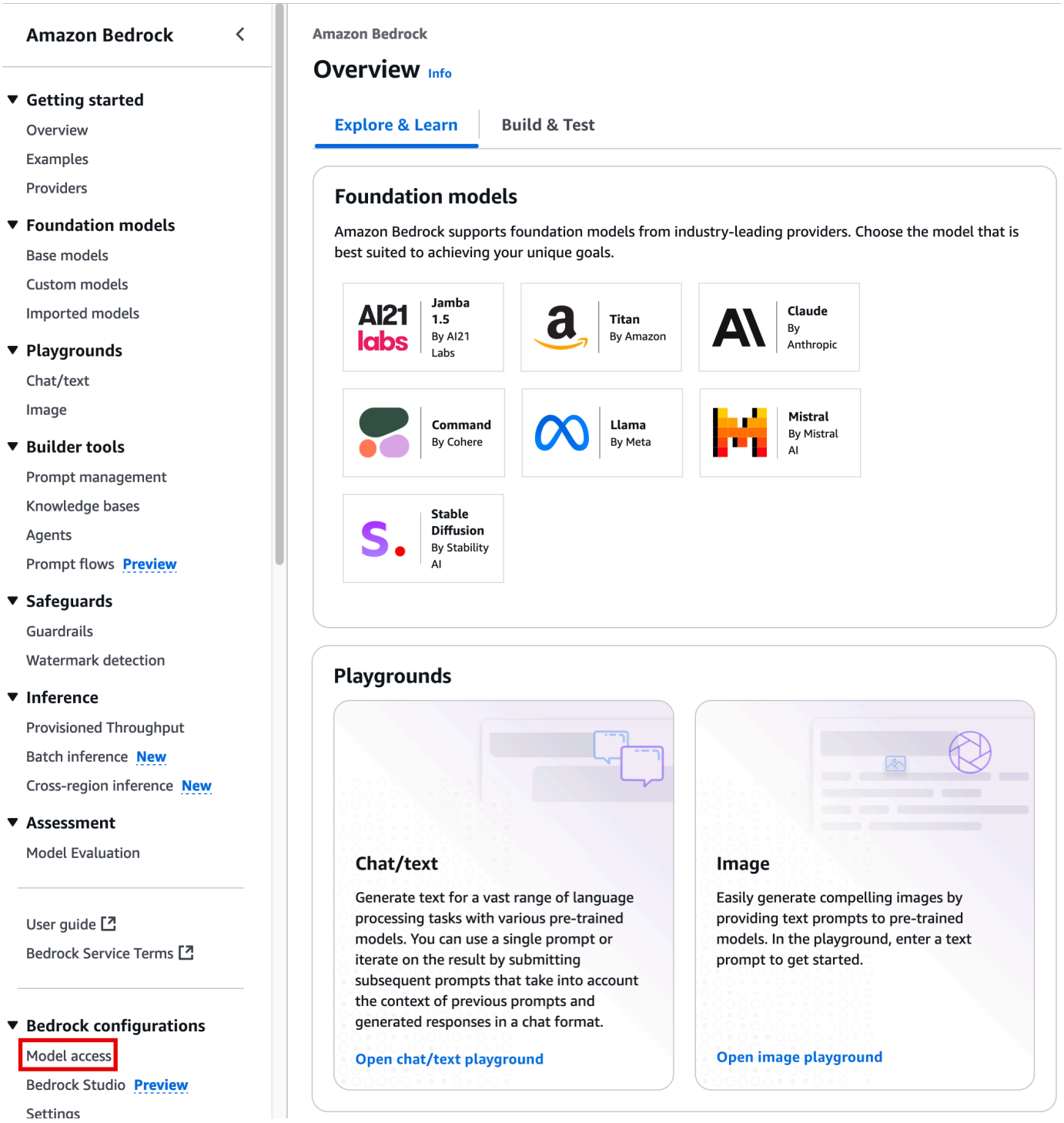
In this step, you will enable the use of Anthropic models on your AWS account.

> **Note**
>
> **Already requested and obtained access to Anthropic models on Amazon Bedrock?** Skip to Step 2: Create a Jupyter Notebook.

1. Open Amazon Bedrock

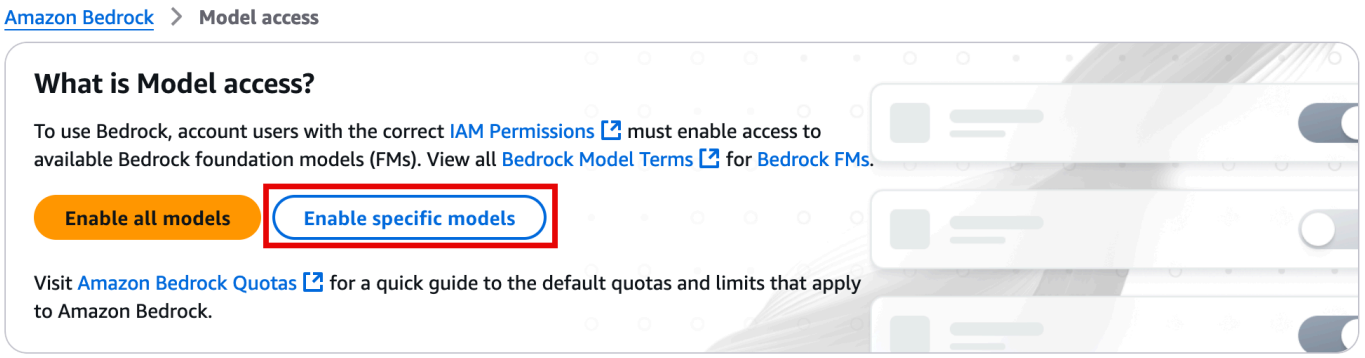
   **Sign in** to the AWS Management console, and **open** the Amazon Bedrock console at https://console.aws.amazon.com/bedrock/home.

   In the left navigation pane, under **Bedrock configurations**, choose **Model Access**.



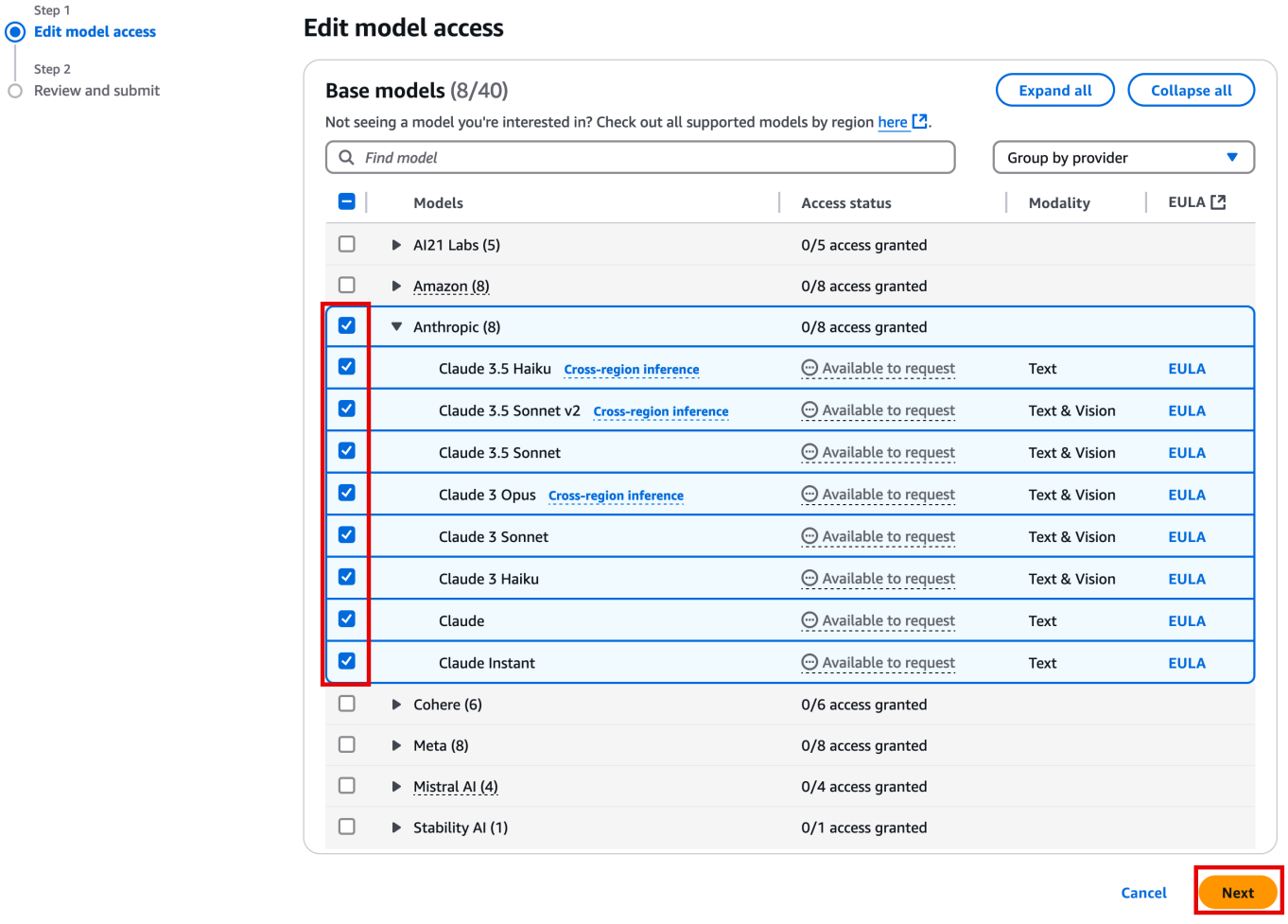

2. Enable a model

   On the **What is Model access?** page, choose **Enable specific models**.



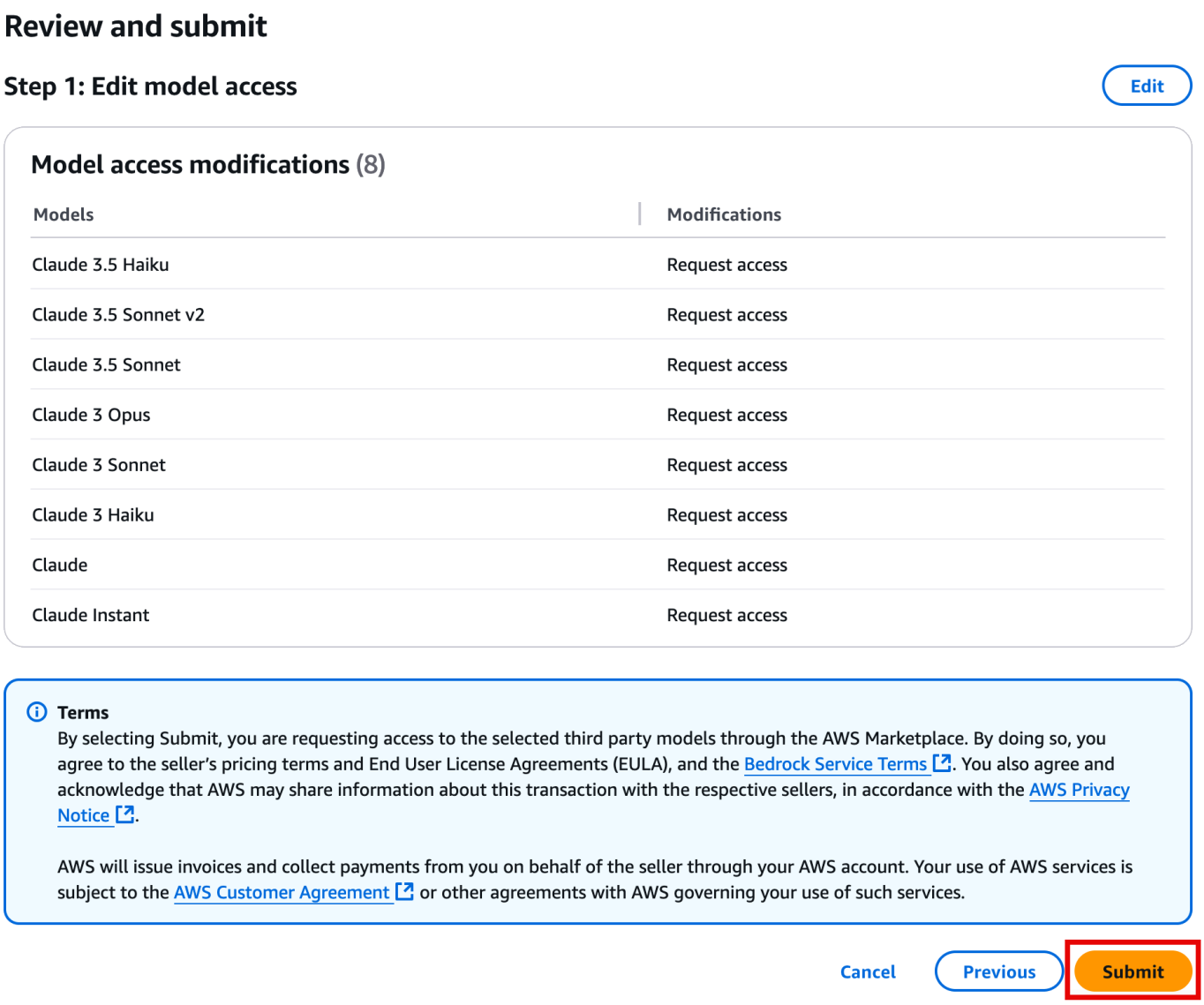

3. Choose the Anthropic models

On the **Edit model access** page, select the **Anthropic models**, and choose **Next**.




4. Review and submit the change

On the **Review and submit** page, review your selections, and choose **Submit**.




## Step 2: Create a Jupyter Notebook

In this step, you will create a Jupyter notebook to write your Proof-of-Concept code and test it out with real documents.

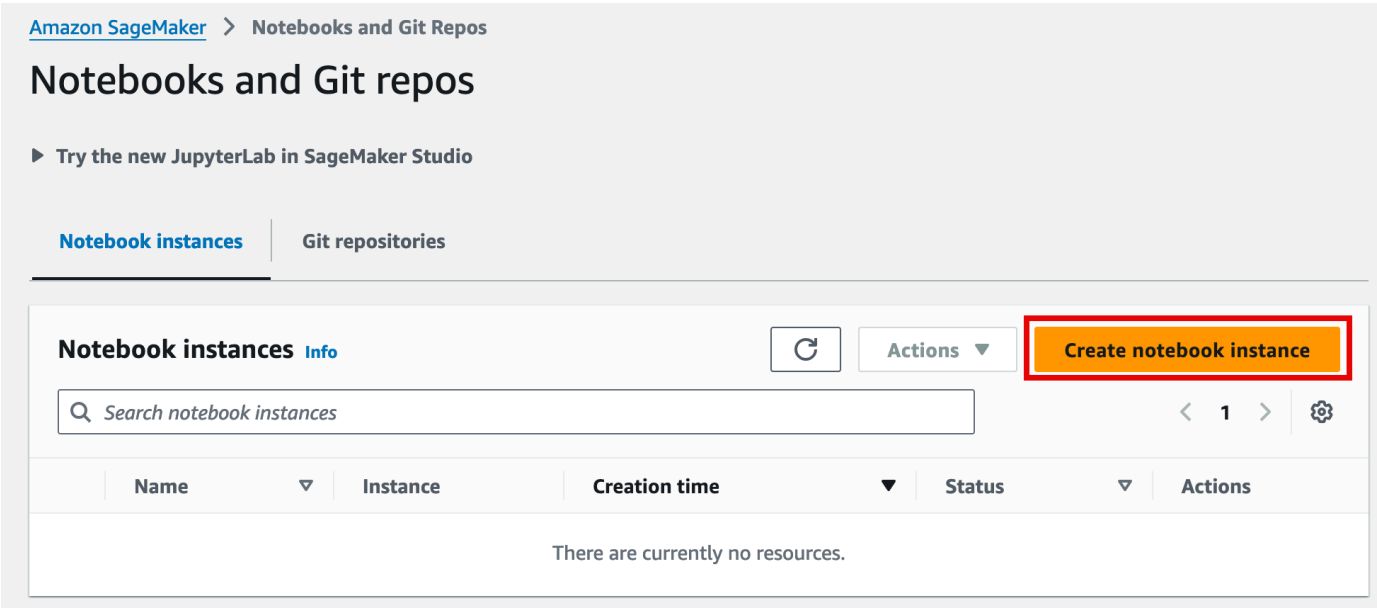
1. Open Amazon SageMaker AI

   **Open** the Amazon Sagemaker console at https://console.aws.amazon.com/sagemaker/home.

   In the left navigation pane, under **Applications and IDEs**, choose **Notebooks**.


2. Create a notebook instance

   On the **Notebooks and Git repos** page, choose **Create notebook instance**.



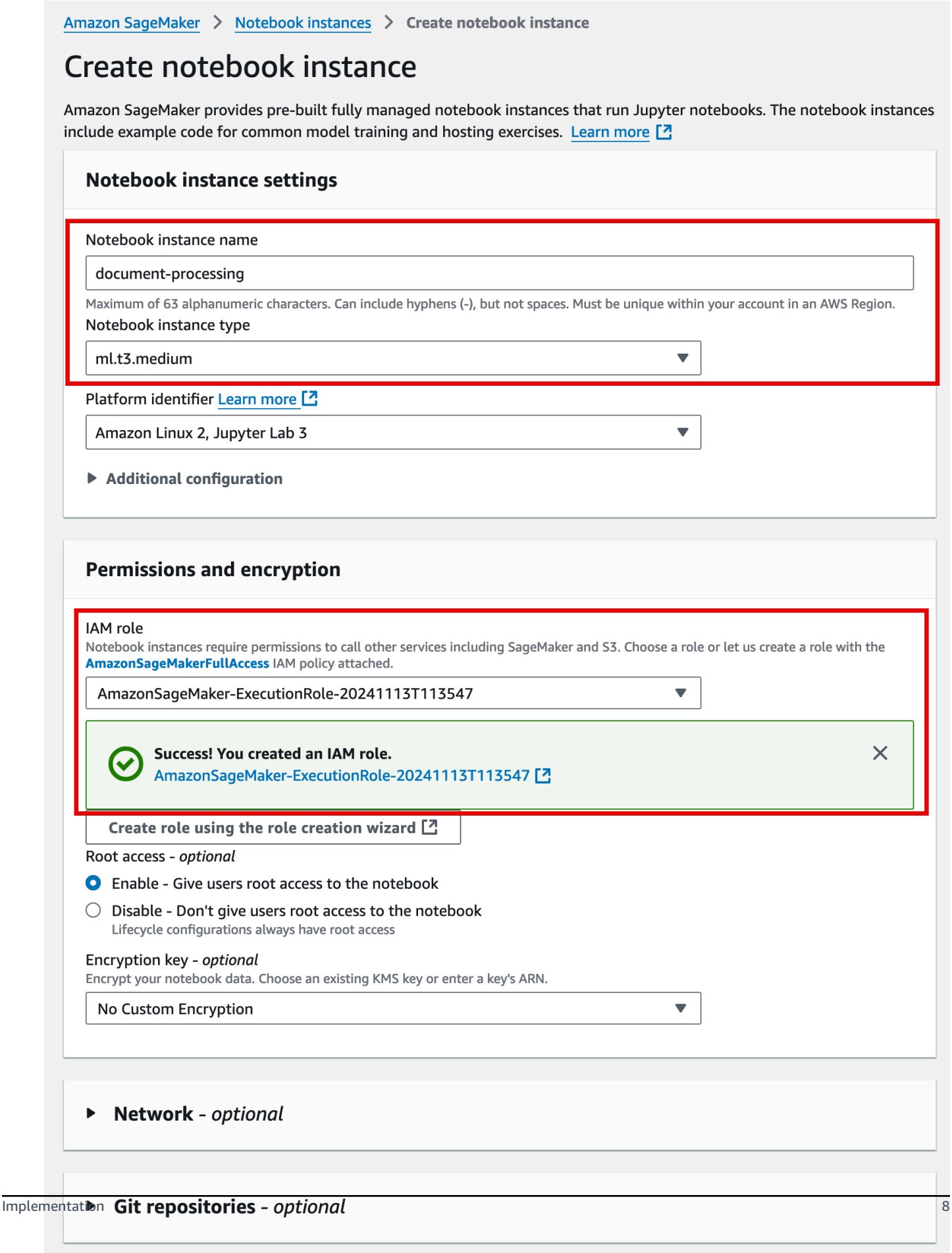

3. Configure notebook instance settings

   On the **Create notebook instance** page:

   In the **Notebook instance settings** section:

   - For **Notebook instance name**, enter a **name** for your Jupyter instance.
   - For **Notebook instance type**, verify **ml.t3.medium** is selected.

- Keep all other default settings.

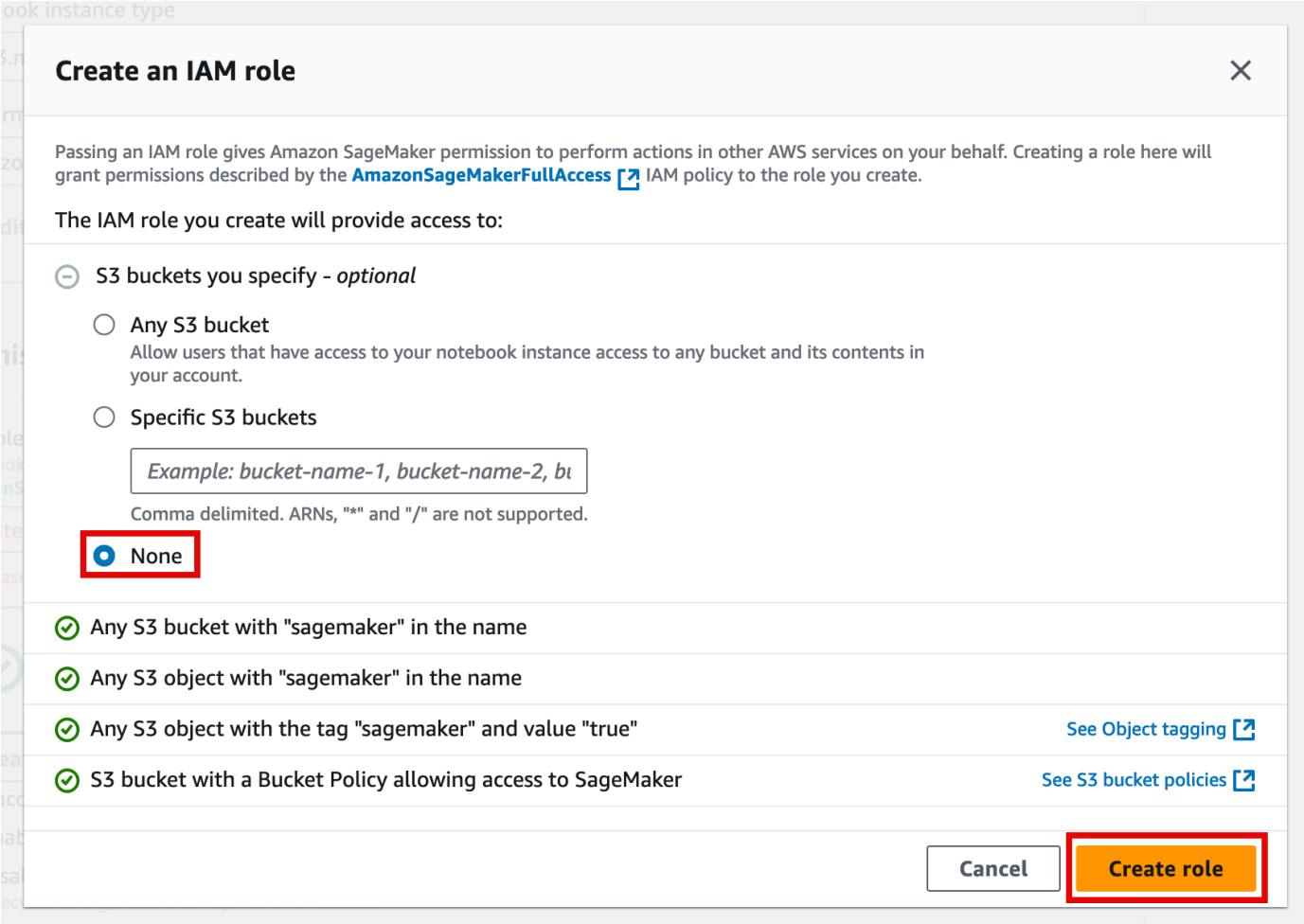

Amazon SageMaker > Notebook instances > Create notebook instance
Create notebook instance
Amazon SageMaker provides pre-built fully managed notebook instances that run Jupyter notebooks. The notebook instances include example code for common model training and hosting exercises. Learn more
Notebook instance settings
Notebook instance name
document-processing
Maximum of 63 alphanumeric characters. Can include hyphens (-), but not spaces. Must be unique within your account in an AWS Region.
Notebook instance type
ml.t3.medium
Platform identifier Learn more
Amazon Linux 2, Jupyter Lab 3
Additional configuration
Permissions and encryption
IAM role
Notebook instances require permissions to call other services including SageMaker and S3. Choose a role or let us create a role with the AmazonSageMakerFullAccess IAM policy attached.
AmazonSageMaker-ExecutionRole-20241113T113547
Success! You created an IAM role.
AmazonSageMaker-ExecutionRole-20241113T113547
Create role using the role creation wizard
Root access - optional
Enable - Give users root access to the notebook
Disable - Don't give users root access to the notebook
Lifecycle configurations always have root access
Encryption key - optional
Encrypt your notebook data. Choose an existing KMS key or enter a key's ARN.
No Custom Encryption
Network - optional
Git repositories - optional
Tags - optional

4. Configure permissions and encryption

   In the **Permissions and encryption** section:

   - For **IAM role**, choose **Create a new role**.
   - On the **Create an IAM role** pop up window, for **S3 buckets you specify – optional**, choose **None**, and then choose **Create role**.

   Then, choose **Create notebook instance**.



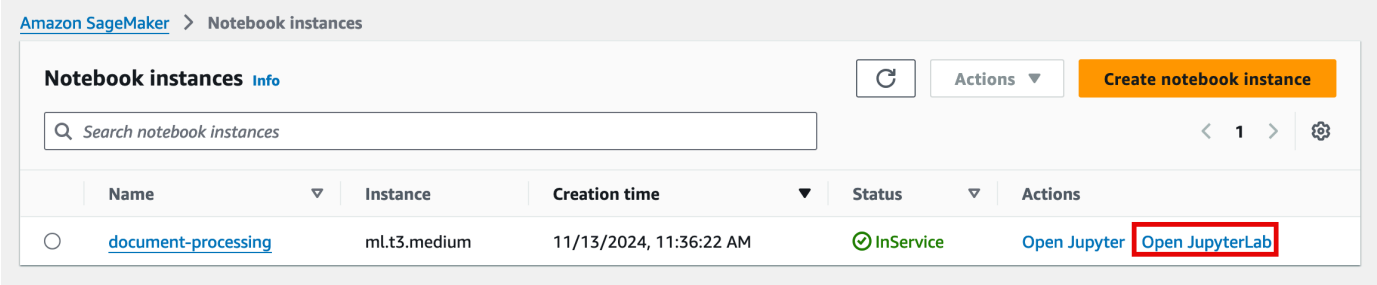

## Step 3: Generate code to process your documents

In this step, you will use Bedrock playground to generate code for your Jupyter notebook.

1. Open JupyterLab

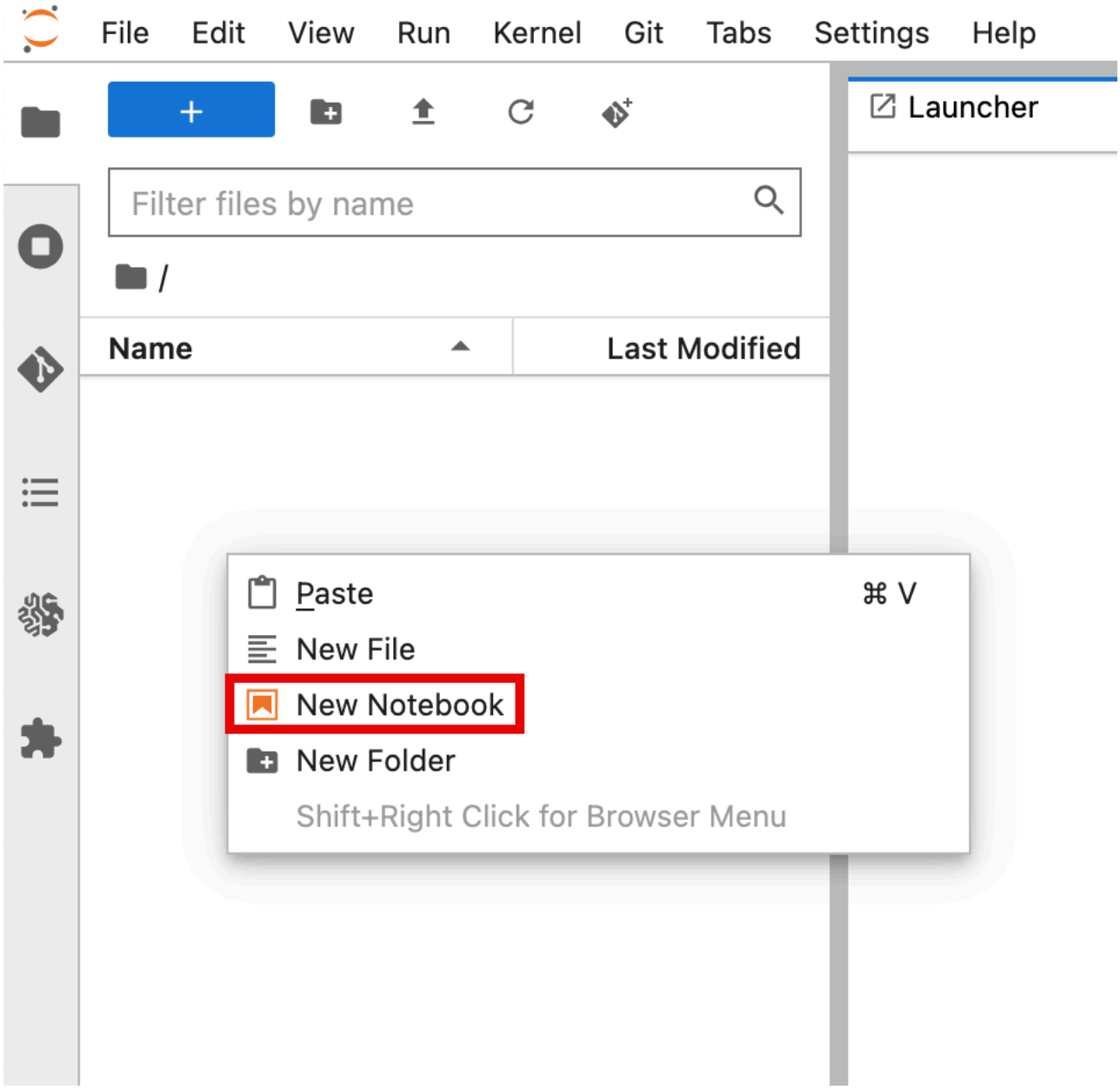
On the **Notebook instance** page, choose **Open JupyterLab** for the instance you created in the previous step.

> **Note**
>
> The notebook will open in a separate browser tab.



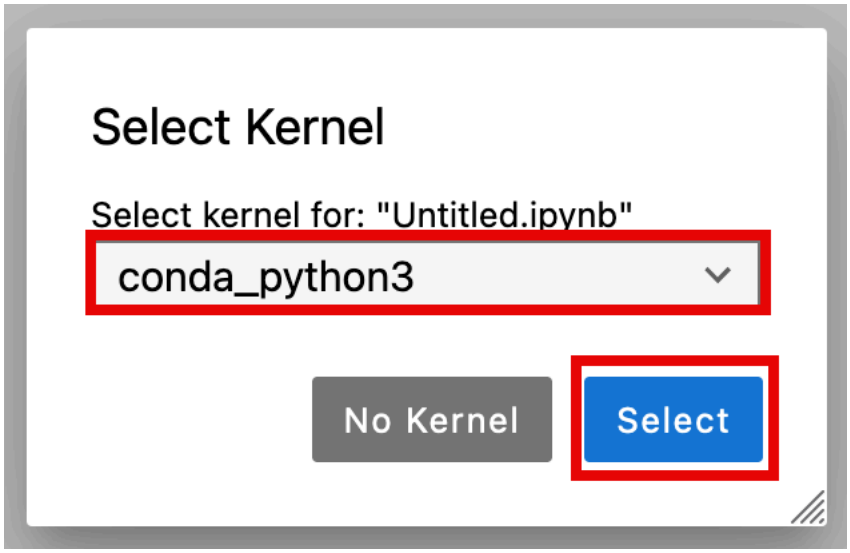

2. Create a new notebook

   On the **JupyterLab** tab, right-click the file area, and then select **New Notebook**.




3. Select kernel

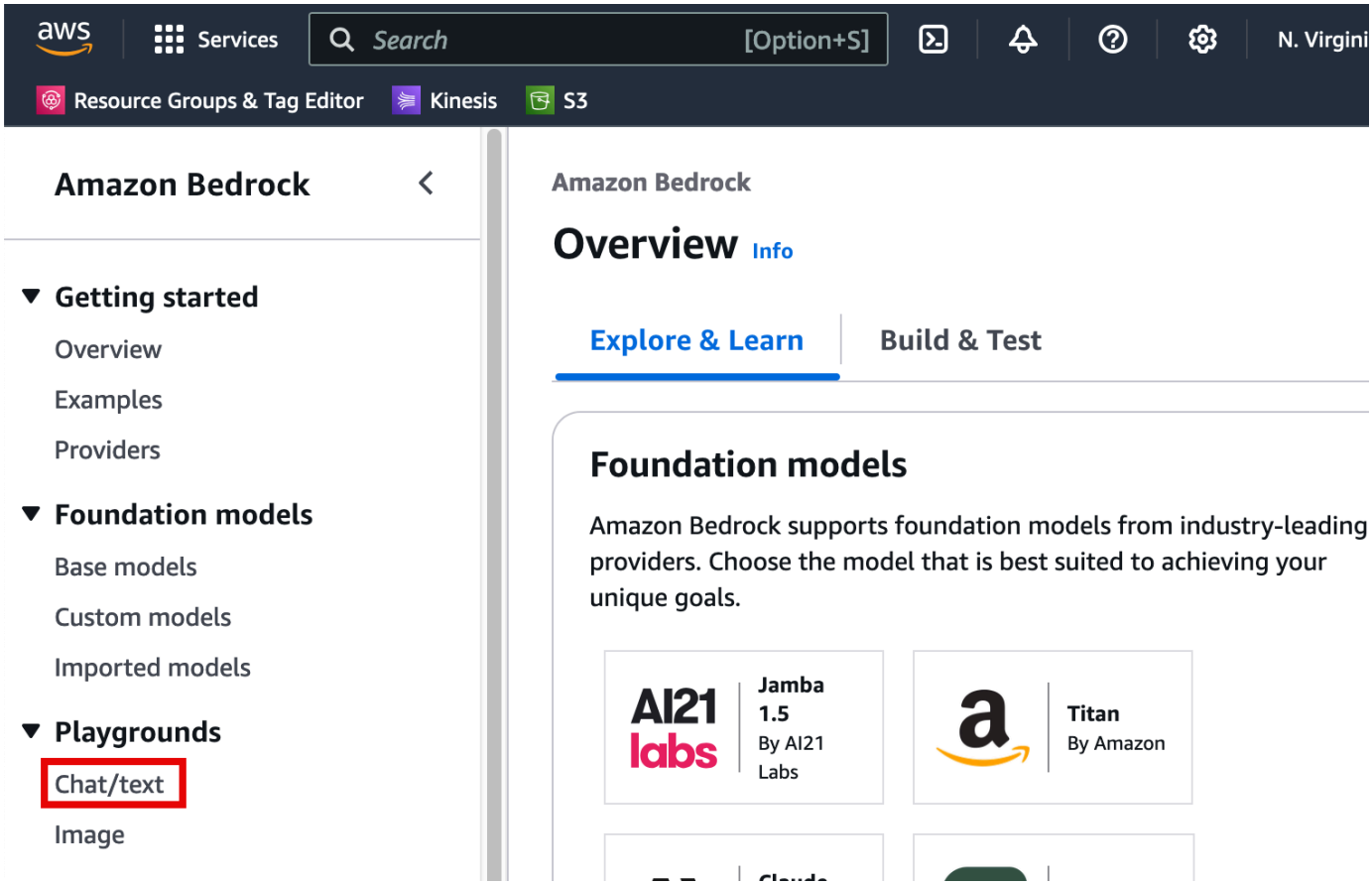
   On the **Select Kernel** pop up window, choose **conda_python3**, and choose **Select**.




4. Open the chat playground

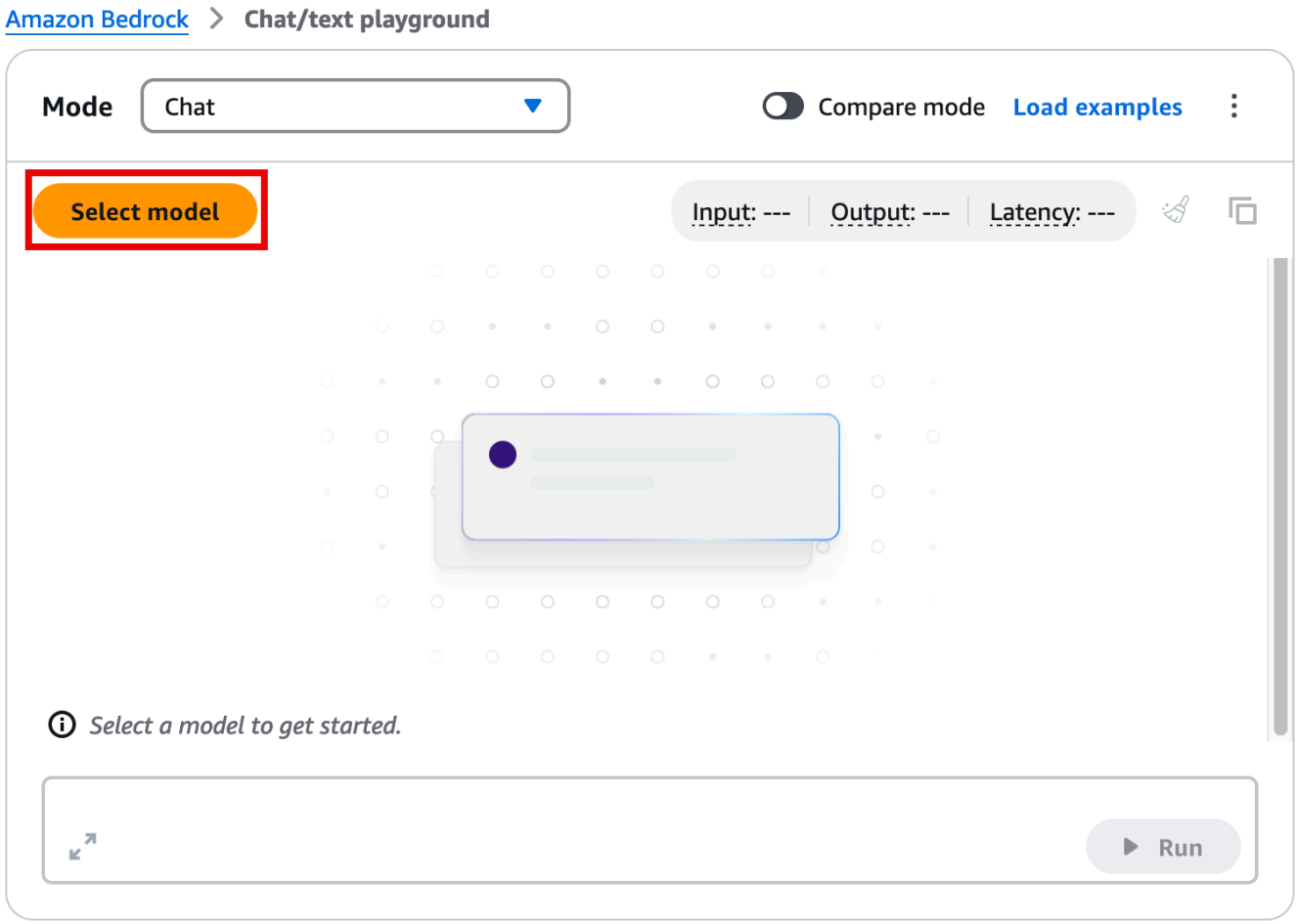
   In a new tab, **open** the Amazon Bedrock console at https://console.aws.amazon.com/bedrock/home.

   In the left navigation pane, under **Playgrounds**, choose **Chat/text**.



5. Select the model

   On the **Mode** page, choose **Select model**.

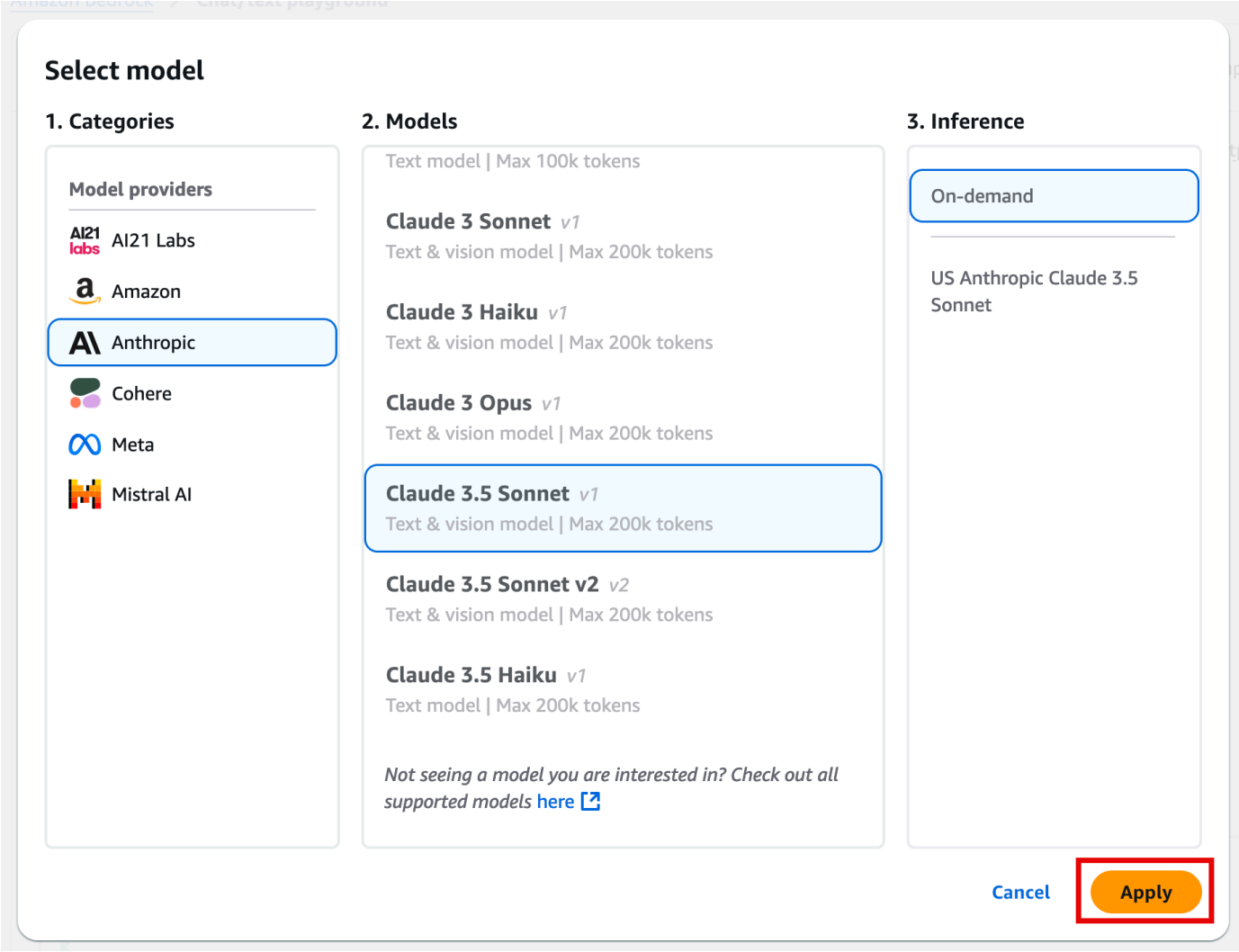



6. Specify the model details

   In the **Select model** dialog box:

   - For **Categories**, choose **Anthropic**.
   - For **Models with access**, choose the **Claude 3.5 Sonnet** model.
   - Then, choose **Apply**.

> **Note**
>
> The Claude 3.5 Sonnet is the most intelligent model from Anthropic. You can see a more detailed model comparison here.



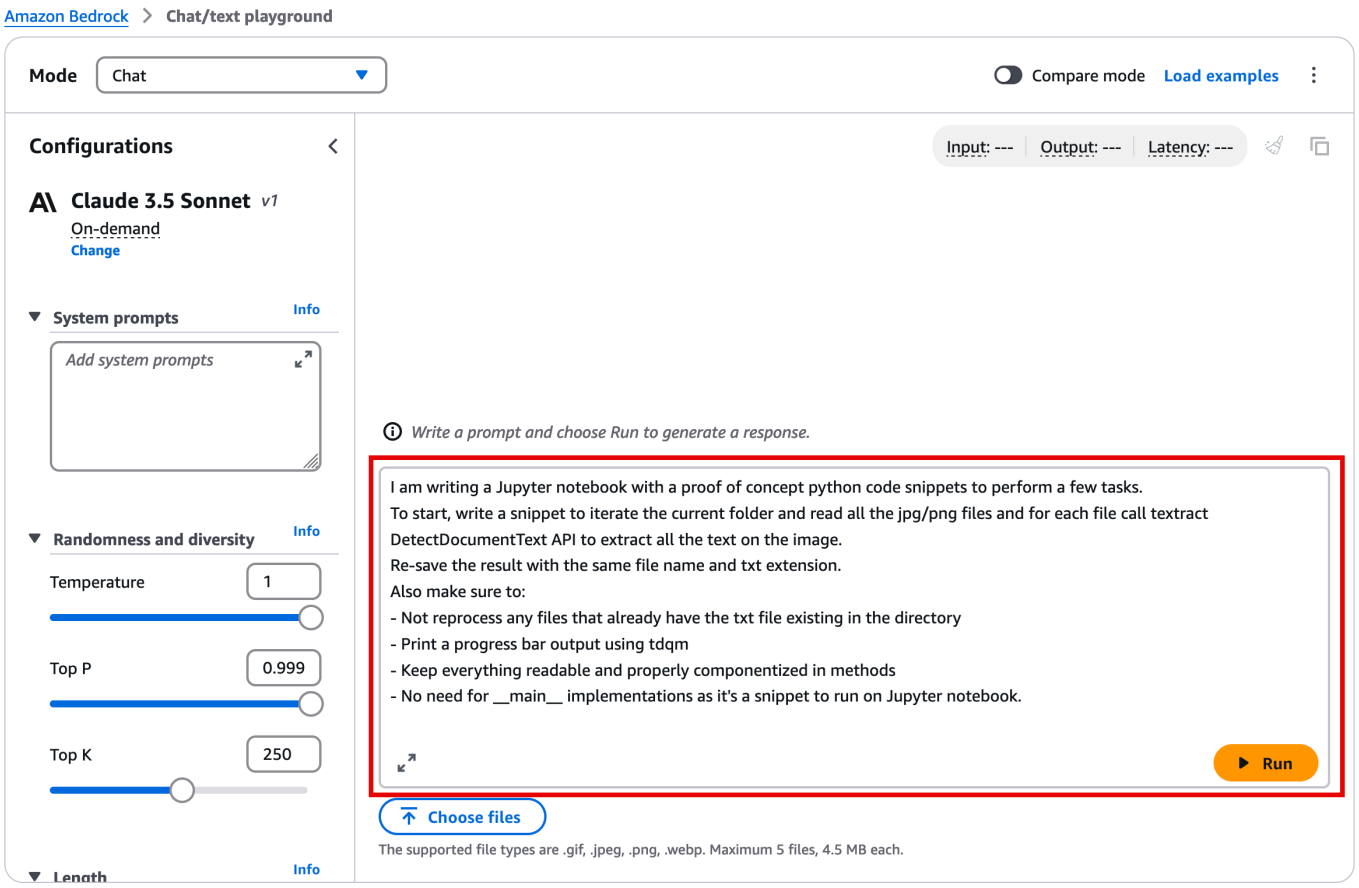

7. Generate code

In the **Chat playground**, you can now ask the LLM to write sample code. The following is an example prompt that you can use to extract information from an unstructured document.

```
I am writing a Jupyter notebook with a proof of concept python code snippets to
 perform a few tasks.
To start, write a snippet to iterate the current folder and read all the jpg/png
 files and for each file call textract DetectDocumentText API to extract all the
 text on the image.
Re-save the result with the same file name and txt extension.
Also make sure to:
- Not reprocess any files that already have the txt file existing in the directory
```

```
- Print a progress bar output using tdqm
- Keep everything readable and properly componentized in methods
- No need for __main__ implementations as it's a snippet to run on Jupyter
 notebook.
```

Once you enter your prompt, and choose **Run**, the prompt response will include code and also explanation of everything that the model generated. The code will typically be enclosed in quotation marks.




8. Check the output

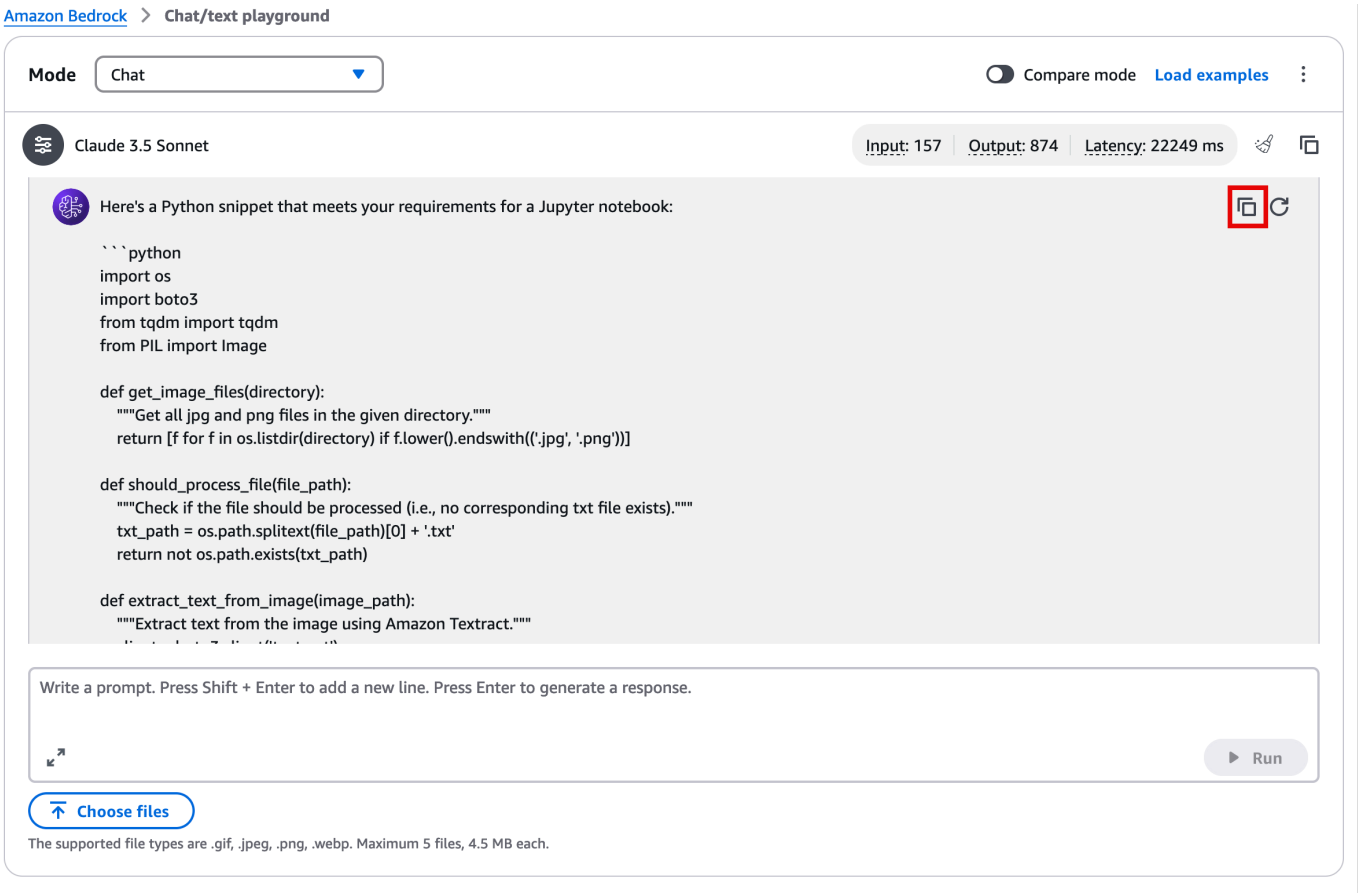
The generated code with the example prompt should look similar to the following example. You can also use the **copy** function to **paste** the code directly into the Jupyter notebook.

```
import os
import boto3
from tqdm import tqdm
from PIL import Image

def get_image_files(directory):
```

```
    """Get all jpg and png files in the given directory."""
    return [f for f in os.listdir(directory) if f.lower().endswith(('.jpg',
 '.png'))]

def should_process_file(file_path):
    """Check if the file should be processed (i.e., no corresponding txt file
 exists)."""
    txt_path = os.path.splitext(file_path)[0] + '.txt'
    return not os.path.exists(txt_path)

def extract_text_from_image(image_path):
    """Extract text from the image using Amazon Textract."""
    client = boto3.client('textract')

    with open(image_path, 'rb') as image:
        response = client.detect_document_text(Document={'Bytes': image.read()})

    extracted_text = []
    for item in response['Blocks']:
        if item['BlockType'] == 'LINE':
            extracted_text.append(item['Text'])

    return '\n'.join(extracted_text)

def save_text_to_file(text, file_path):
    """Save the extracted text to a file."""
    txt_path = os.path.splitext(file_path)[0] + '.txt'
    with open(txt_path, 'w', encoding='utf-8') as f:
        f.write(text)

def process_images_in_directory(directory):
    """Process all images in the given directory."""
    image_files = get_image_files(directory)

    for image_file in tqdm(image_files, desc="Processing images"):
        image_path = os.path.join(directory, image_file)

        if should_process_file(image_path):
            extracted_text = extract_text_from_image(image_path)
            save_text_to_file(extracted_text, image_path)

# Usage in Jupyter notebook
directory = '.'  # Current directory
```

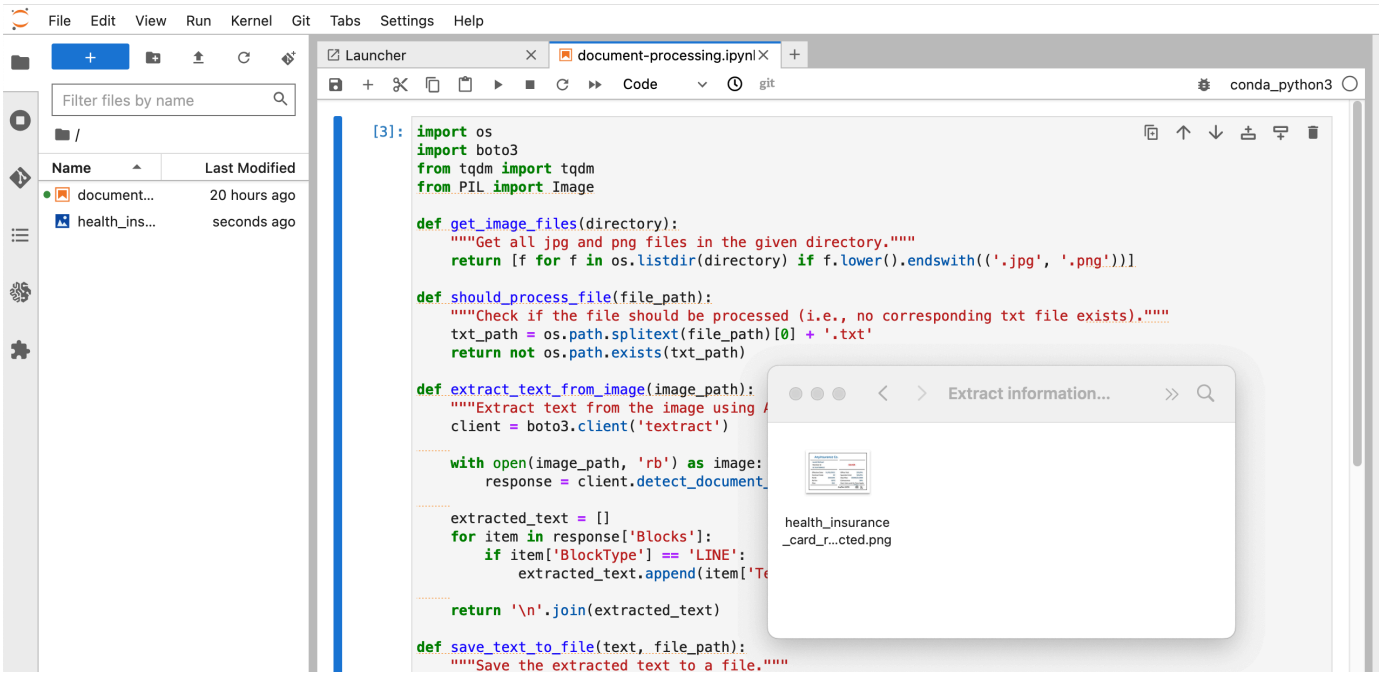
```
process_images_in_directory(directory)
```

> **Note**
>
> The previous example code is built to process all files on the current directory and needs an image in order to fully process the code.




9. Prepare your image file

   You can use your own image or download and save this image. Then, **find** the image you want to use on your local machine, and **drag** the file to the Jupyter Notebook file explorer in order to copy and paste it.

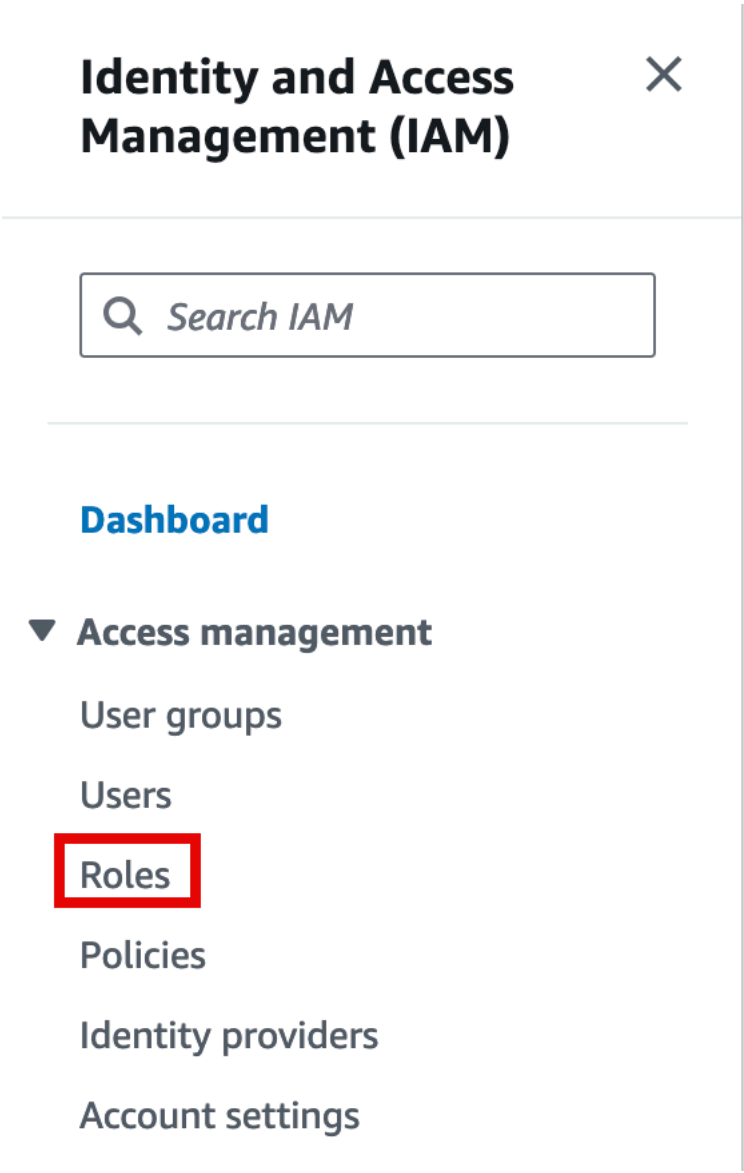



10. Configure permissions

    Before you can run the code in your JupyterLab, the IAM role that was previously created for your Jupyter notebook, needs the appropriate permissions to run the AWS services that your code is going to use. If you chose to use the previous example, Amazon Textract is the AWS service that would need the appropriate permissions.

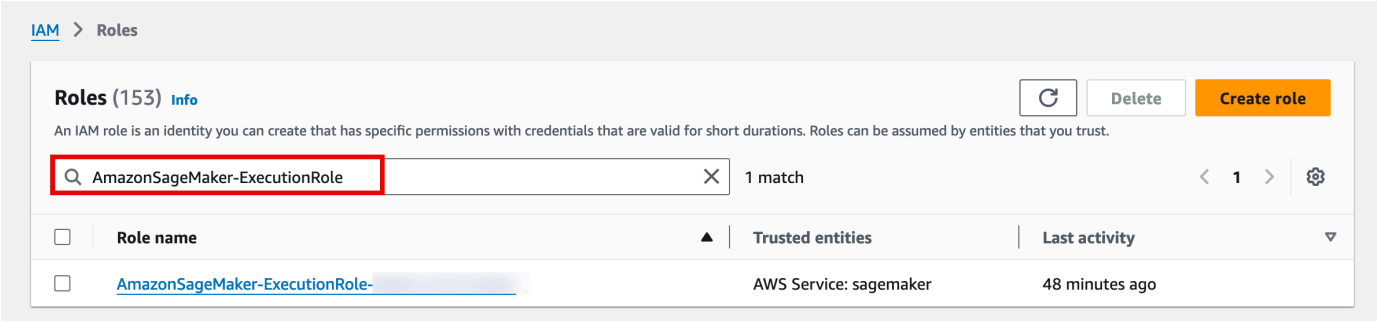
    **Open** the AWS IAM console at https://console.aws.amazon.com/iam/home.

    In the left navigation pane, choose **Roles**.



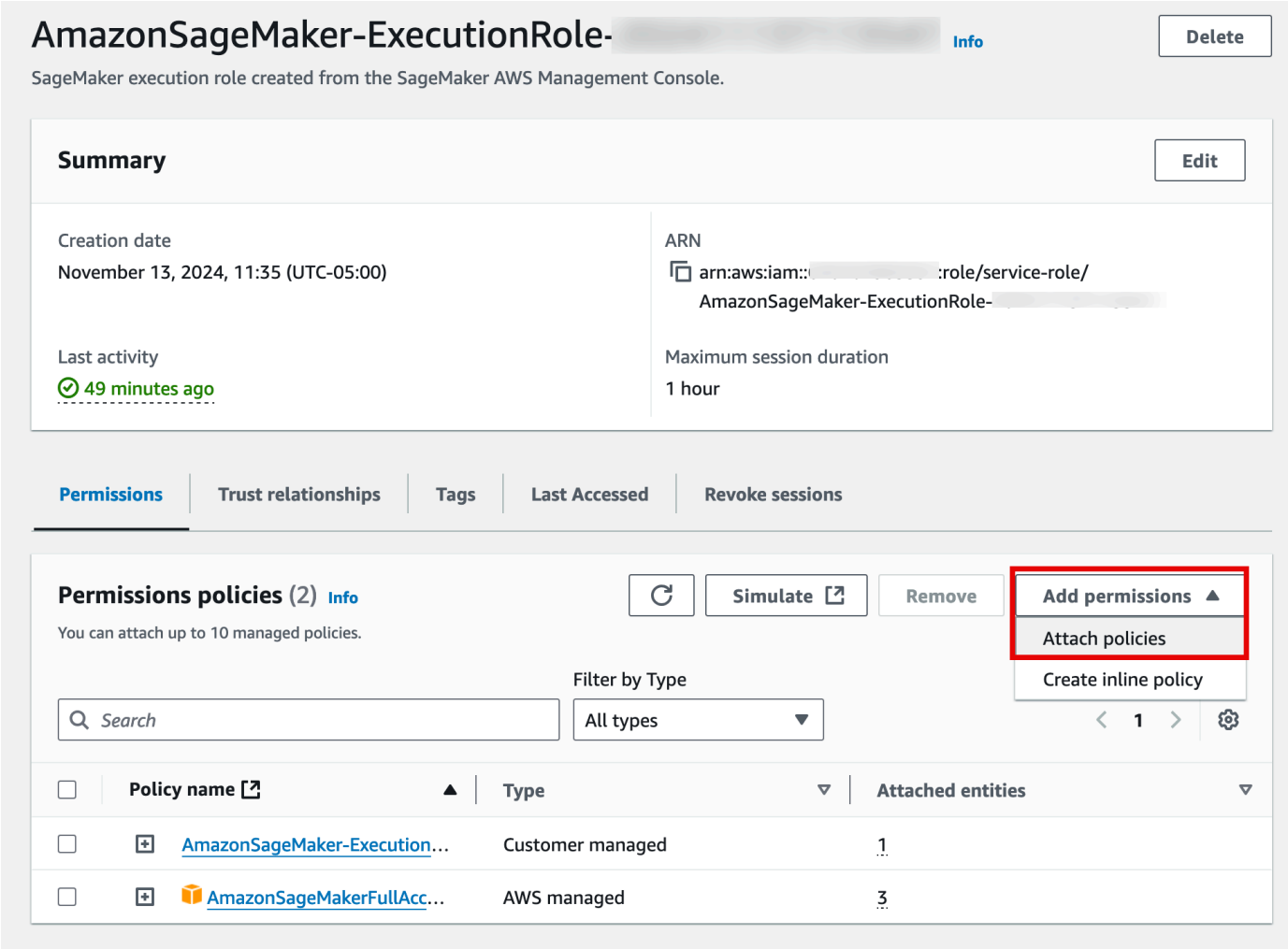

11. Search for the IAM role

    In the **search box**, find the previously created **AmazonSageMaker AI-ExecutionRole-<timestamp>** role, and **open** the role.



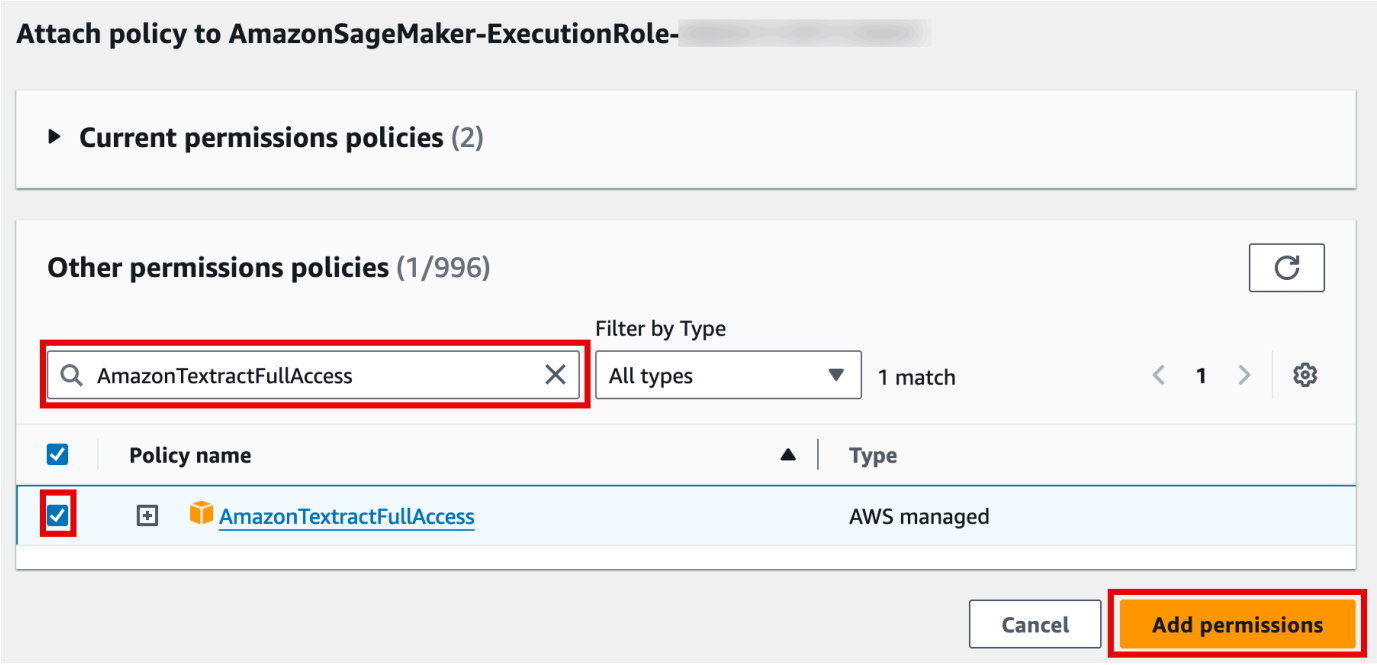
12. Add permissions

    On the **AmazonSageMaker AI-ExecutionRole-<timestamp>** page, choose the **Add permissions** drop down, and select **Attach policies**.



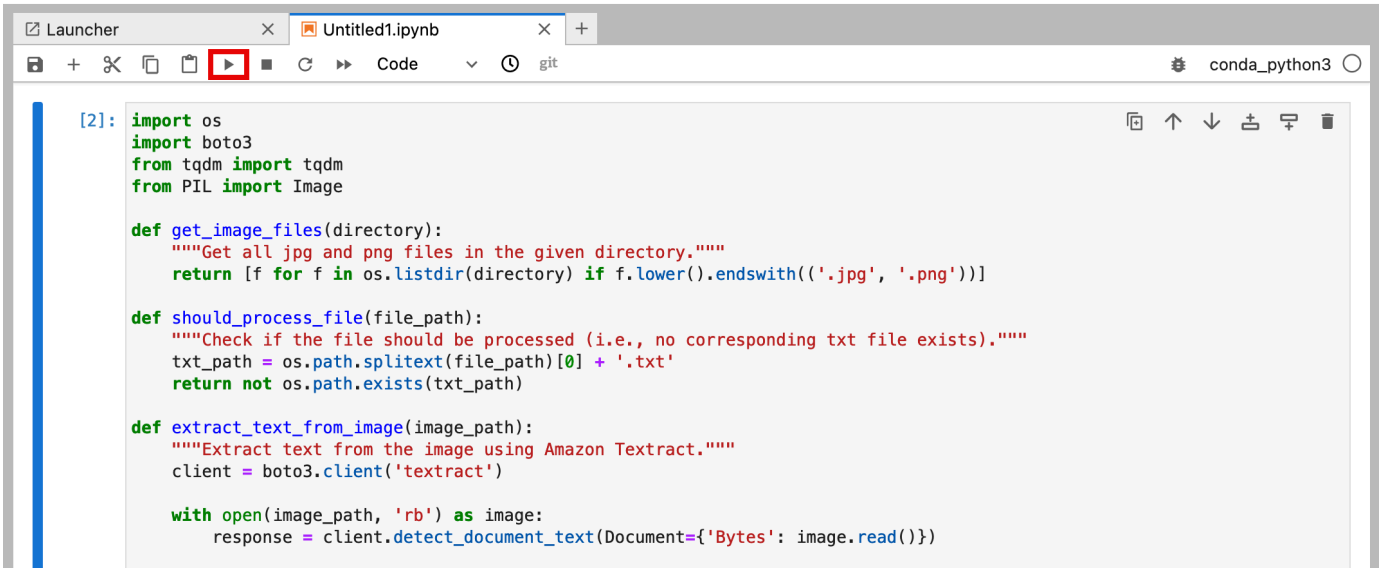

13. Attach the policy

    On the **Attach policy to AmazonSageMaker AI-ExecutionRole-<timestamp>** page, in the **Other permissions policies** section search bar, enter **AmazonAmazon TextractFullAccess**. Then, select the **policy**, and choose **Add permissions**.



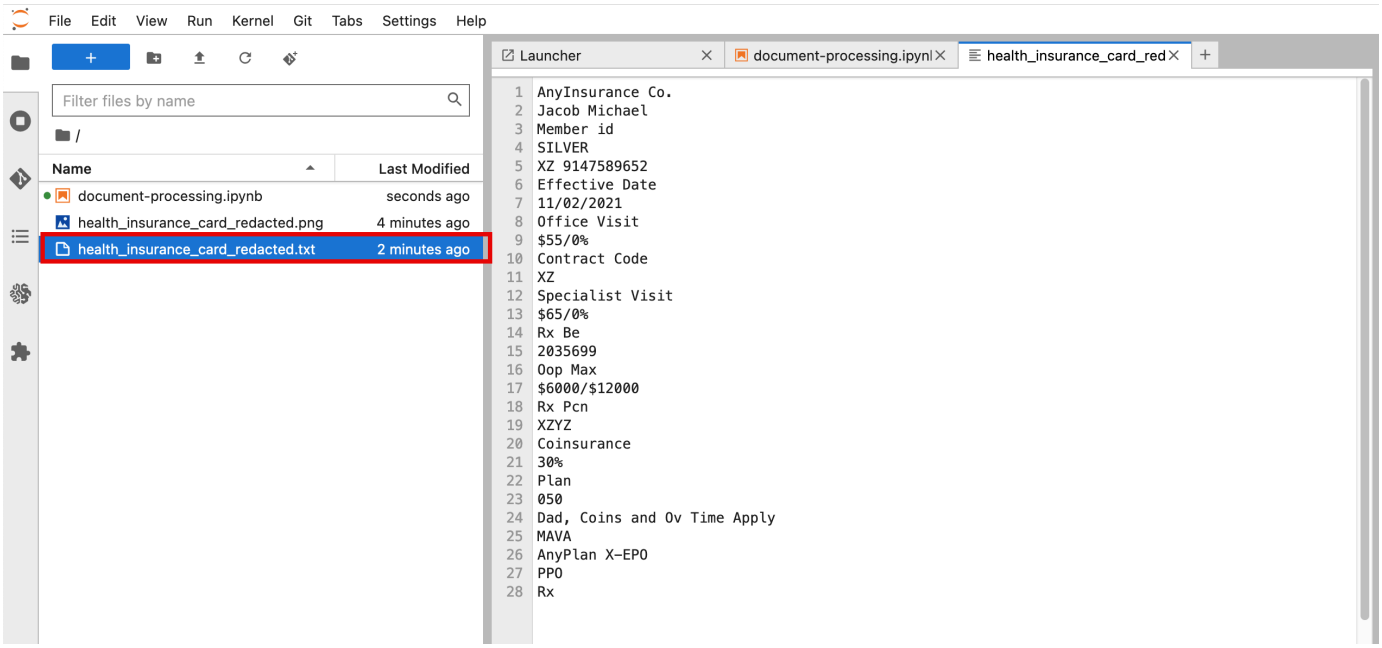

14. Run the notebook

    Navigate back to your **JupyterLab** tab, and select **Run**.




15. View the text file

    After your code runs you should now be able to see a **.txt file** with the extracted text in the left navigation pane of your JupyterLab.



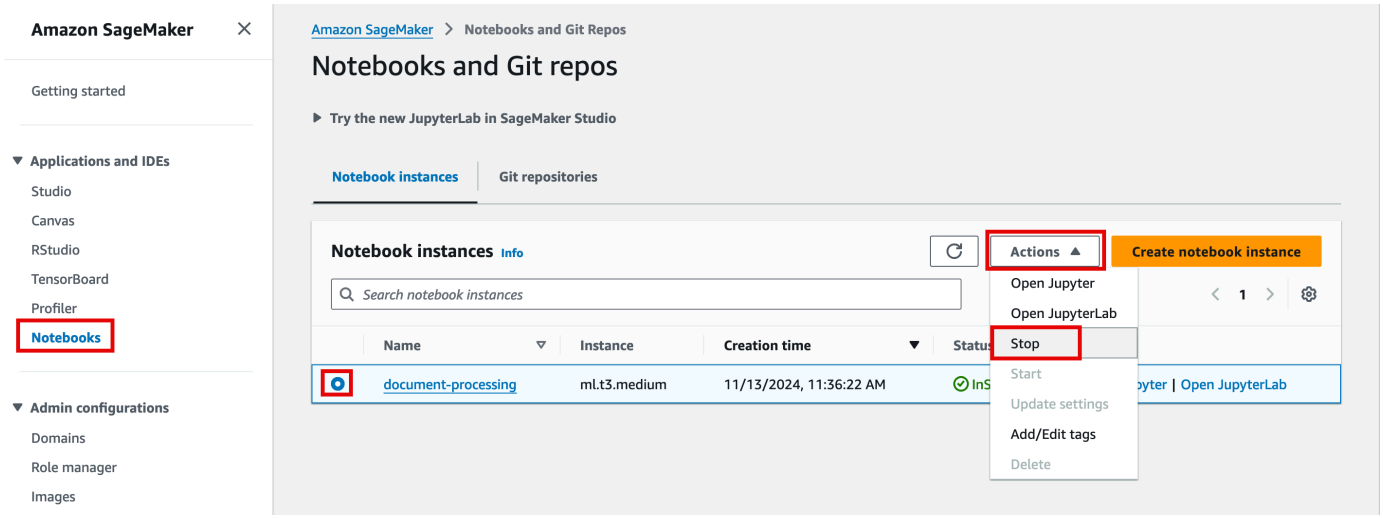

## Clean up resources

In this step, you will go through the steps to delete all the resources you created throughout this tutorial. It is recommended that you stop the Jupyter notebook you created to prevent unexpected costs.

- Delete the notebook

  In the SageMaker AI console, in the left navigation pane, choose **Notebooks**, and select the **Notebook**. Then, choose **Actions**, and select **Stop**.

  > **Note**
  >
  > The stop operation might take around 5 minutes. Once the notebook is stopped you can also delete it by choosing **Actions** and selecting **Delete**.




# Congratulations

You have created a sample Proof-of-Concept to extract information from documents.