

- Enable IAM Identity Center in Oregon
- Create an administrative account
- Create an execution role and trust policy for AWS Geospatial access
(<https://docs.aws.amazon.com/sagemaker/latest/dg/sagemaker-geospatial-roles.html>)
 - Add geospatial permissions
- Create an Amazon SageMaker Domain
- Create Geospatial notebook
 - Takes a while to start the kernel

Identity and Access Management (IAM)

 Search IAM

Dashboard

▼ Access management

User groups

Users

• Roles

Policies

Identity providers

Account settings

▼ Access reports

Access analyzer

Archive rules

Analyzers

Settings

Credential report

Organization activity

Service control policies



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IAM > Roles > Create role

Step 1

Select trusted entity

Step 2

Step 3

Name, review, and create

Select trusted entity Info

Trusted entity type

- AWS service**
Allow AWS services like EC2, Lambda, or others to perform actions in this account.
 - AWS account**
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
 - Web identity**
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
 - SAML 2.0 federation**
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
 - Custom trust policy**
Create a custom trust policy to enable others to perform actions in this account.

Use case

Allow an AWS service like EC2, Lambda, or others to perform actions in this account

Common use cases

- EC2
 - Allows EC2 instances to call AWS services on your behalf.
 - Lambda
 - Allows Lambda functions to call AWS services on your behalf.

Use cases for other AWS services

SageMake

- SageMaker - Execution
Allows SageMaker notebook instances, training jobs, and models to access S3, ECR, and CloudWatch on your behalf



Add permissions

Step 1

Select trusted entity

Step 2

Add permissions

Step 3

Permissions policies (1) Inf

The type of role that you selected requires the following policy

Policy name ▾ Type ▾ Attached entities ▾

AmazonSageMakerFullAccess

 Copy

Provides full access to Amazon SageMaker via the AWS Management Console and SDK. Also provides select access to related services (e.g., S3, ECR, CloudWatch Logs).

```
1  {
2      "Version": "2012-10-17",
3      "Statement": [
4          {
5              "Effect": "Allow",
6              "Action": [
7                  "sagemaker:*",
8                  "sagemaker-geospatial:*"
9              ],
10             "NotResource": [
11                 "arn:aws:sagemaker:*:*:domain/*",
12                 "arn:aws:sagemaker:*:*:user-profile/*",
13                 "arn:aws:sagemaker:*:*:app/*",
14                 "arn:aws:sagemaker:*:*:space/*",
15                 "arn:aws:sagemaker:*:*:flow-definition/*"
16             ]
17         },
18         {
19             "Effect": "Allow",
20             "Action": [
21                 "sagemaker:AddTags"
22             ],
23             "Resource": [
24                 "arn:aws:sagemaker:*:*:flow-definition/*"
25             ]
26         }
27     ]
28 }
```



IAM Management Con New File Geospatial Data Scien Create an Earth Obser Monitoring Lake Mea Getting Started with SageMaker geospatia +

us-east-1.console.aws.amazon.com/iamv2/home?region=us-east-1#/roles/create?policies=arn%3Aaws%3Aiam%3Aaws%3Apolicy%2FAmazonSageMakerFullAccess&...

aws Services Search [Alt+S] Global AdministratorAccess/Emily

Step 2: Add permissions

Edit

Permissions policy summary

Policy name	Type	Attached as
AmazonSageMakerFullAccess	AWS managed	Permissions policy

Tags

Add tags - optional

Info

Tags are key-value pairs that you can add to AWS resources to help identify, organize, or search for resources.

No tags associated with the resource.

Add tag

You can add up to 50 more tags.

Cancel

Previous

Create role

Feedback Language



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IAM Manag X Amazon Sa... X New File X Geospatial X Create an E X Monitoring X Getting Star X Onboard to X SageMaker X SageMaker X + 🔍 ↗ ⚙ 20 🎖

us-west-2.console.aws.amazon.com/sagemaker/home?region=us-west-2#/studio/create-domain/quick-setup

Perfect for single user domains and first time users looking to get started with SageMaker.

Better for admins with large user groups, but you can always update your account configuration settings later if you want to do a quick setup now.

Domain name

Name
Domain name should be unique across the AWS account.

User profile

Name

The name can have up to 63 characters. Valid characters: A-Z, a-z, 0-9, and - (hyphen)

Execution role
The default execution role for both users and spaces in the domain. The execution role must have the [AmazonSageMakerFullAccess](#) policy attached.
▼
[Create role using the role creation wizard](#)

Enable SageMaker Canvas permissions [Info](#)
Enable SageMaker Canvas permissions to attach the [AmazonSageMakerCanvasFullAccess](#) policy to the default execution role. This also enables time series forecasting in Canvas and creates the AmazonSagemakerCanvasForecastRole and attaches the [AmazonSagemakerCanvasForecastRolePolicy](#) policy to the role.

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Screenshot of the AWS IAM Roles page showing the details for the 'sagemaker-geo' role.

The URL is <https://us-east-1.console.aws.amazon.com/iamv2/home#/roles/details/sagemaker-geo?section=permissions>

The role 'sagemaker-geo' is described as allowing SageMaker notebook instances, training jobs, and models to access S3, ECR, and CloudWatch on behalf of the user.

Summary (Edit)

Creation date: February 09, 2023, 16:46 (UTC-06:00)

Last activity: None

ARN: arn:aws:iam::928335852914:role/sagemaker-geo

Maximum session duration: 1 hour

Permissions (selected) | Trust relationships | Tags | Access Advisor | Revoke sessions

Permissions policies (2) Info

You can attach up to 10 managed policies.

< 1 >



Policy name	Type	Description
AmazonSageMakerFullAccess	AWS managed	Provides full access to Amazon SageMaker via the AWS Management Console and SDK. Also provides select access to related service...
AmazonSageMakerGeospatialFullAccess	AWS managed	This policy grants permissions that allow full access to Amazon SageMaker Geospatial through the AWS Management Console and SDK.

Permissions boundary - (not set) Info

Set a permissions boundary to control the maximum permissions this role can have. This is not a common setting but can be used to delegate permission management to others.

Search IAM

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- Account settings

Access reports

- Access analyzer
- Archive rules
- Analyzers
- Settings
- Credential report
- Organization activity
- Service control policies (SCPs)

Related consoles

IAM Identity Center New

Permissions Trust relationships Tags Access Advisor Revoke sessions

Trusted entities

Edit trust policy

```
1  {
2      "Version": "2012-10-17",
3      "Statement": [
4          {
5              "Effect": "Allow",
6              "Principal": {
7                  "Service": [
8                      "sagemaker.amazonaws.com",
9                      "sagemaker-geospatial.amazonaws.com"
10                 ]
11             },
12             "Action": "sts:AssumeRole"
13         }
14     ]
15 }
```

Amazon SageMaker Studio

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No Kernel Share

Set up notebook environment

Setup environment for "Untitled2.ipynb".

Image

Data Science

- Official Python3.8 image ... More Info
- Data Science 3.0
- Official Python 3.10 imag...
- Geospatial 1.0
- Python image for process...

Kernel

Python 3

Cancel Select

Simple (0) 0 s 0 No Kernel | Initializing No kernel: Unknown | Instance MEM Mode: Edit 45°F Partly sunny 6:06 PM 2/9/2023

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Windows Taskbar icons: Spotify, Google Chrome, File Explorer, Settings.

System tray icons: Weather (45°F), Battery, Network, Volume, Date/Time (2/9/2023).

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Geospatial

Unlock building ML models with geospatial data

Create Earth Observation job

Features

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Acquire, transform, and visualize data collected from the Earth's surface to get insights or make predictions.

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Reverse-geocode map coordinates with human readable addresses using Amazon Location Services. Snap inaccurate longitude and latitude to a known road network segment to perform map matching.

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Geospatial Notebooks

Transform and visualize data inside geospatial notebooks, using libraries such as GDAL, Fiona, GeoPandas, Shapely, and Rasterio, as well as SageMaker-specific libraries.

Learn more about Geospatial image ↗

Resources ↗

Get started

- What Is Amazon SageMaker geospatial?
- Get Started with Amazon SageMaker geospatial capabilities

Documentation

- Create an Earth Observation job
- Create a Vector Enrichment job

Example Notebooks/Guidance

- Easily built digital farming ML pipeline
- Guidance for geospatial insights for sustainability

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Earth Observation jobs

Acquire, transform, and visualize data collected from Earth's surface to obtain insights or make predictions.

How it works

How it works

→

→

→

→

Select a model

Select a SageMaker geospatial model for various use cases such as cloud masking or semantic segmentation.

Define input data and run the model

Query an area of interest (AoI) by uploading a GeoJSON file on the map. Based on your AoI, choose an image collection and set the filters you need to run the job.

Visualize

Visualize the output results using the SageMaker geospatial map.

Search by Job name or Job status

C Stop job Delete job Create job < 1 >

	Job Name	Status	Duration	Operation Type	Creation time
Simple	0	0	0	0	0

Type here to search

Geospatial 0

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Vector Enrichment jobs

Reverse-geocode map coordinates with human readable addresses using Amazon Location Services. Snap inaccurate longitude and latitude to a known road network segment to perform map matching.

How it works

How it works diagram showing a complex polygonal shape on the left and a simplified map outline on the right, connected by a double-headed arrow.

Launch a job through the API

Use the Vector enrichment job API to create jobs that help with reverse geocoding or map matching.

Learn more ↗

Visualize results

Use an API to store the Vector Enrichment job output in your S3 bucket. You can use the SageMaker map visualization tool to view your results.

Learn more ↗

search

Name	Arn	Status	Creation time
------	-----	--------	---------------

C < 1 >

Geospatial 0

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Windows Taskbar icons: Spotify, Google Chrome, File Explorer, Settings, and a pizza slice icon.

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How to use the map visualization tool ↗

Sagemaker Geospatial

Datasets (0) + Add Data

Layers + Add Layer

Layer Blending: normal

Map Overlay Blending: normal

Nimitz Freeway

FOURSQUARE

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Search by Job name or Job status

C Stop job Delete job Create job < 1 >

Job Name	Status	Duration	Operation Type	Creation time
[Empty]	[Empty]	[Empty]	[Empty]	[Empty]

Simple 0 1 Deployments

Geospatial 0

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Create Earth Observation Job

Step 1: Select model

Give your job a name and select a model.

Job name
Name your earth observation job.

Maximum of 63 characters. Can include hyphens (-), but not spaces. Must be unique within your account in an AWS Region.

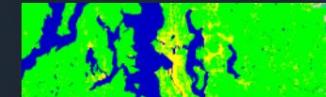
Choose a model

Spectral Index
Band Math
Obtain a combination of spectral bands that indicate the relative abundance of features of interest.

Supported image collections:
Sentinel-2, USGS Landsat, Planet

Cloud Masking
Semantic Segmentation
Identify cloud and cloud-free pixels in satellite imagery.

Supported image collections:
Sentinel-2

Land Cover Segmentation
Semantic Segmentation
Identify land cover types such as vegetation, water, bare ground in satellite imagery.

Supported image collections:
Sentinel-2

Next

Geospatial 0

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Geospatial 0 🔔

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1. Define Area of Interest

2. Choose image collections and set filters

Image collection

Expand all

Sentinel 2 L2A COGs

Date

From Date 01/10/2023 To Date 02/09/2023

average 0% - 100%

Upload Area of Interest

Drag and drop files here or Browse

The input file should contain a single GeoJSON polygon geometry. Example file

A modal window titled "Upload Area of Interest" is displayed over the map. It contains a large dashed box with a cloud icon and an upward arrow, a "Browse" button, and a note about the input file format.

Lake Mead example

<https://aws.amazon.com/blogs/machine-learning/monitoring-lake-mead-drought-using-the-new-amazon-sagemaker-geospatial-capabilities/>

Amazon SageMaker Studio

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Geospatial 1.0 | Python 3 | 16 vCPU + 64 GiB Share

tci = tifffile.imread(tci_path)
plt.figure(figsize=(6, 6))
plt.imshow(tci)
plt.show()

Downloaded image: S2A_115QA_20220704_0_L2A

0 2000 4000 6000 8000 10000

0 2000 4000 6000 8000 10000

Simple 0 Python 3 (Geospatial 1.0) | Idle Kernel: Idle | Instance MEM Mode: Command Ln 1, Col 1 Untitled.ipynb 0 Type here to search 45°F Partly sunny 5:50 PM 2/9/2023

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Geospatial

16 vCPU + 64 GiB Geospatial 1.0 | Python 3 16 vCPU + 64 GiB Share

```
[6]: eojob_config = JobConfig(job_name="eojob_config",
                           ExecutionRoleArn=execution_role,
                           )

[6]: eojob_arn = response["Arn"]
job_details = sg_client.get_earth_observation_job(Arn=eojob_arn)
{k: v for k, v in job_details.items() if k in ["Arn", "Status", "DurationInSeconds"]}

[6]: {'Arn': 'arn:aws:sagemaker-geospatial:us-west-2:928335852914:earth-observation-job/82i2k5u4fy4',
      'DurationInSeconds': 8,
      'Status': 'INITIALIZING'}

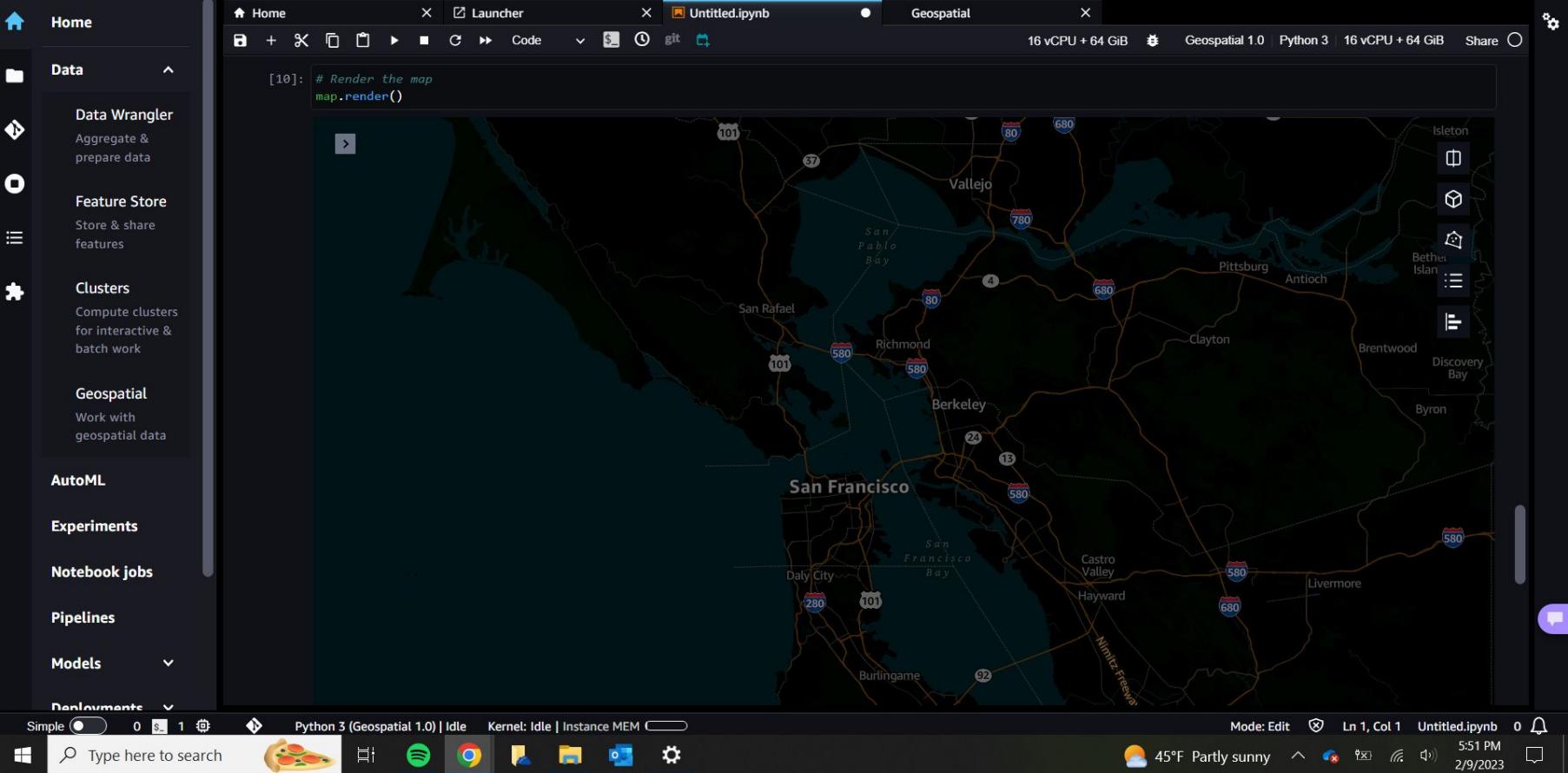
[8]: # List all jobs in the account
sg_client.list_earth_observation_jobs()["EarthObservationJobSummaries"]

[8]: [{"Arn": "arn:aws:sagemaker-geospatial:us-west-2:928335852914:earth-observation-job/82i2k5u4fy4",
      "Name": "lake-mead-landcover",
      "CreationTime": datetime.datetime(2023, 2, 9, 23, 50, 42, 493695, tzinfo=tzlocal()),
      "DurationInSeconds": 27,
      "Status": 'IN_PROGRESS',
      "OperationType": 'LAND_COVER_SEGMENTATION',
      "Tags": {}}]

[9]: # Creates an instance of the map to add EOJ input/output layer
map = sagemaker_geospatial_map.create_map({"is_raster": True})
map.set_sagemaker_geospatial_client(sg_client)

[ ]:
```

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Lake Mead

Callville Bay

Lake Las Vegas

FOURSQUARE

93

147

Visualize AOI

```
config = {"label": "Lake Mead AOI"}  
aoi_layer = map.visualize_eoj_aoi(Arn=eoj_arn, config=config)
```

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