Visual Studio vs Visual Studio Code vs Jupyter Notebook comparison study

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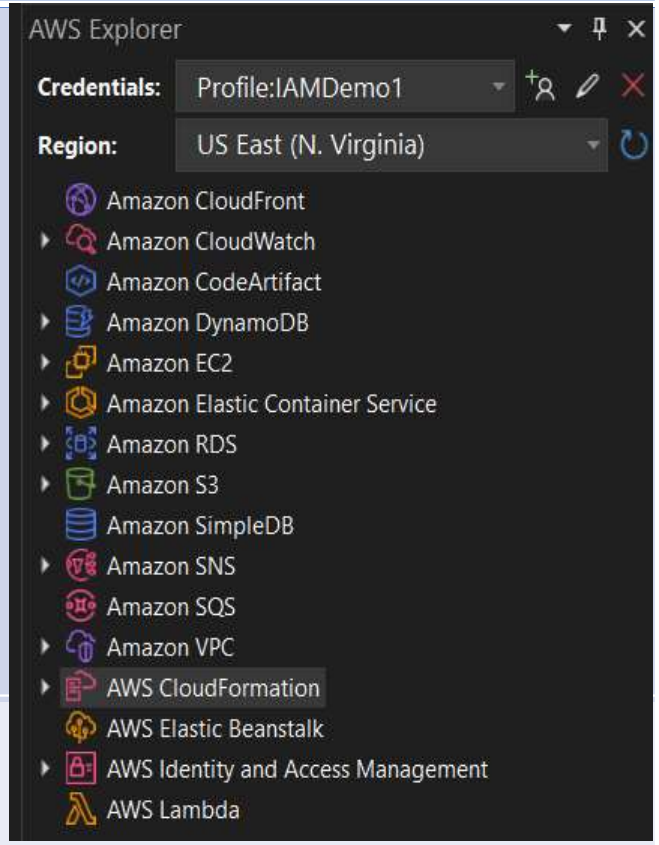
Contents

Comparison based on Github options

	Visual Studio	Visual Studio Code	Jupyter Notebook
Can they connect to github	Yes, steps are outlined in later slides	Yes, steps are outlined in later slides	Yes, steps are outlined in later slides (Can be directly done through AWS Management Console)
Can they do edit/test code before committing to github	Yes, Visual Studio has ability to setup Python projects and run Python code	Yes, the code can be run and tested in Visual Code	Yes, the code can be edited/tested in Jupyter Notebook

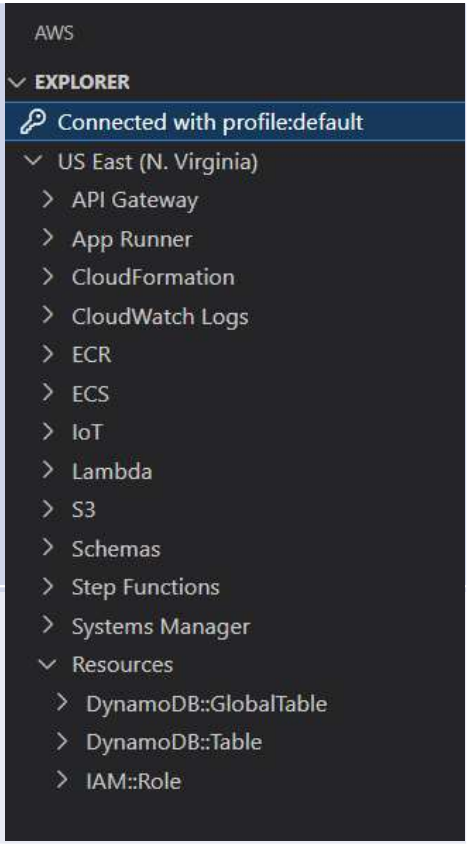
Comparison based on AWS options

	Visual Studio
Can they connect to AWS through Python code/AWS CLI	• No separate option available for AWS CLI through Visual Studio • IAM credentials can be used for logging into the toolkit and setup • All the AWS apps can be accessed directly through AWS Toolkit – this is available only on Windows, not available on MAC yet (https://aws.amazon.com/visualstudio/) (details on next slides)
AWS DynamoDB support	All operations are available as part of the AWS Toolkit, can create, edit, change tables (details on next slides)



Comparison based on AWS options

	Visual Studio Code
Can they connect to AWS through Python code/AWS CLI	• Plugin available for AWS CLI through Visual Studio Code • IAM credentials can be used for logging into the toolkit and setup • AWS apps can be accessed directly through AWS Toolkit – this is available on all the OS: Windows, Linux and MAC OS (https://aws.amazon.com/visualstudiocode/) (details on next slides) • Supports Python SDK (https://docs.aws.amazon.com/toolkit-for-vscode/latest/userguide/setup-toolkit.html)
AWS DynamoDB support	• Available in preview/read-only mode • Unable to make changes to the tables/create tables



Comparison based on AWS options

	Jupyter Notebook
Can they connect to AWS through Python code/AWS CLI	• Command Line Interface is available in Jupyter Notebook • AWS connection to Jupyter Notebook can be done through AWS Sagemaker Studio Notebook • Provides one click Jupyter Notebook deployment • Comes with Pre-installed Sagemaker Python SDK (https://docs.aws.amazon.com/sagemaker/latest/dg/ex1-prepare.html) (details on next slides)
AWS DynamoDB support	• AWS DynamoDB can be accessed through Jupyter Notebook available through Amazon Sagemaker Studio • All operations on DynamoDB tables can be done through Python scripts/boto3 (details on next slides)

Comparison based on general points

	Visual Studio	Visual Studio Code	Jupyter Notebook
Which are more commonly used by the industry (rank if you can)	More suitable for debugging/application development	Most used in data science application, has in-built Jupyter Notebook support (https://code.visualstudio.com/docs/datascience/jupyter-notebooks)	Better than Visual Studio code for data science/machine learning operations
Which are more commonly used for CI/CD (rank if you can)	In-built Azure DevOps services support, can be more suitable for CI/CD operations (https://learn.microsoft.com/en-us/azure/devops/organizations/accounts/set-up-vs?view=azure-devops)	Azure tools plugin/extensions available (https://learn.microsoft.com/en-us/previous-versions/azure/devops/all/java/vscode-extension?view=tfs-2017)	CI/CD operations for DevOps can be done through Amazon Sagemaker and interaction with other services (https://guyernest.medium.com/using-jupyter-notebooks-as-your-cloud-ide-for-devops-a49c03e5cb3f)
Can they be used both on PC and Mac/Apple	Available on Windows and MAC OS (not on Linux)	Available on Windows, Linux and MAC OS	Available on Windows, Linux and MAC OS

Comparison based on general points

	Visual Studio	Visual Studio Code	Jupyter Notebook
Fees – is there any fees?	Free download available for Visual Studio Community version	Completely free of cost for all OS	Completely free of cost for all OS
Pros and cons	Pro: • Cloud connectivity • Feature-rich • Github support Cons: • Slower at times • Version updates needed, older versions work slower (https://visualstudio.microsoft.com/vs/professional/)	Pro: • Free editor • Supports all languages • Github support Cons: • Needs extra plugins support • Comes with only base functions (https://code.visualstudio.com/docs/editor/whyvscode)	Pro: • Easy to use • Lightweight • Keeps the data secured • Github support Cons: • Can't work easily if multiple developers are collaborating (https://betterprogramming.pub/pros-and-cons-for-jupyter-notebooks-as-your-editor-for-data-science-work-tip-pycharm-is-probably-40e88f7827cb)

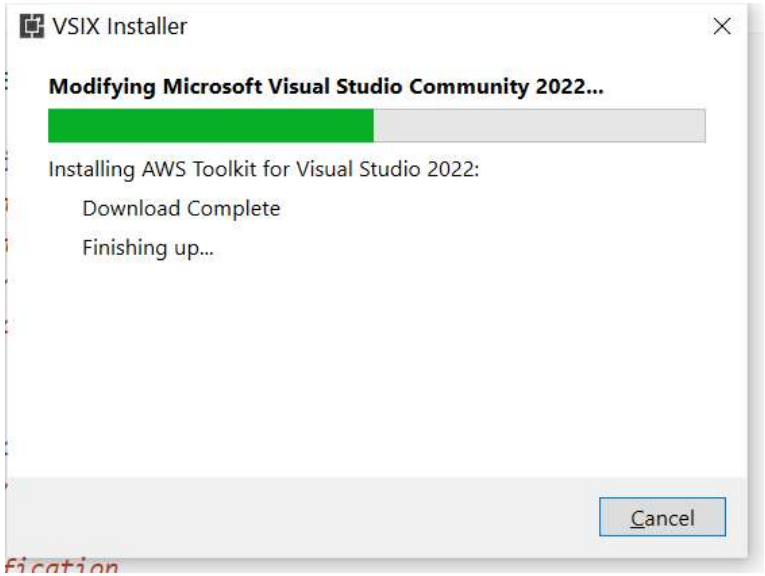
Visual Studio vs. Visual Studio Code comparison

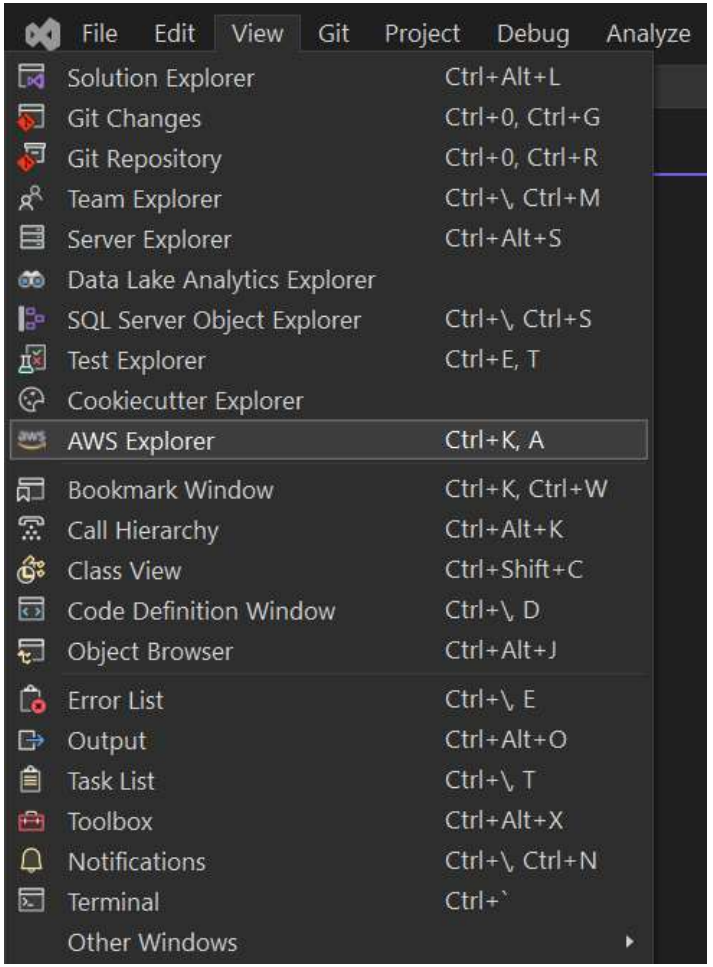
Visual Studio	Visual Studio Code
Product by Microsoft	Product by Microsoft
Complete IDE suite	More of a code editor with many languages support
More useful for collaborative inputs from multiple developers	More popular in data science community
Better in-built functionalities	Provides better plugins support
Sometimes works slower, heavier software, feature-rich	Faster than Visual Studio
Paid versions are expensive	Provides better pricing options

References:

- https://www.infoworld.com/article/3436860/visual-studio-vs-visual-studio-code-how-to-choose.html
- https://www.turing.com/kb/ultimate-guide-visual-studio-vs-visual-studio-code

AWS connect with Visual Studio





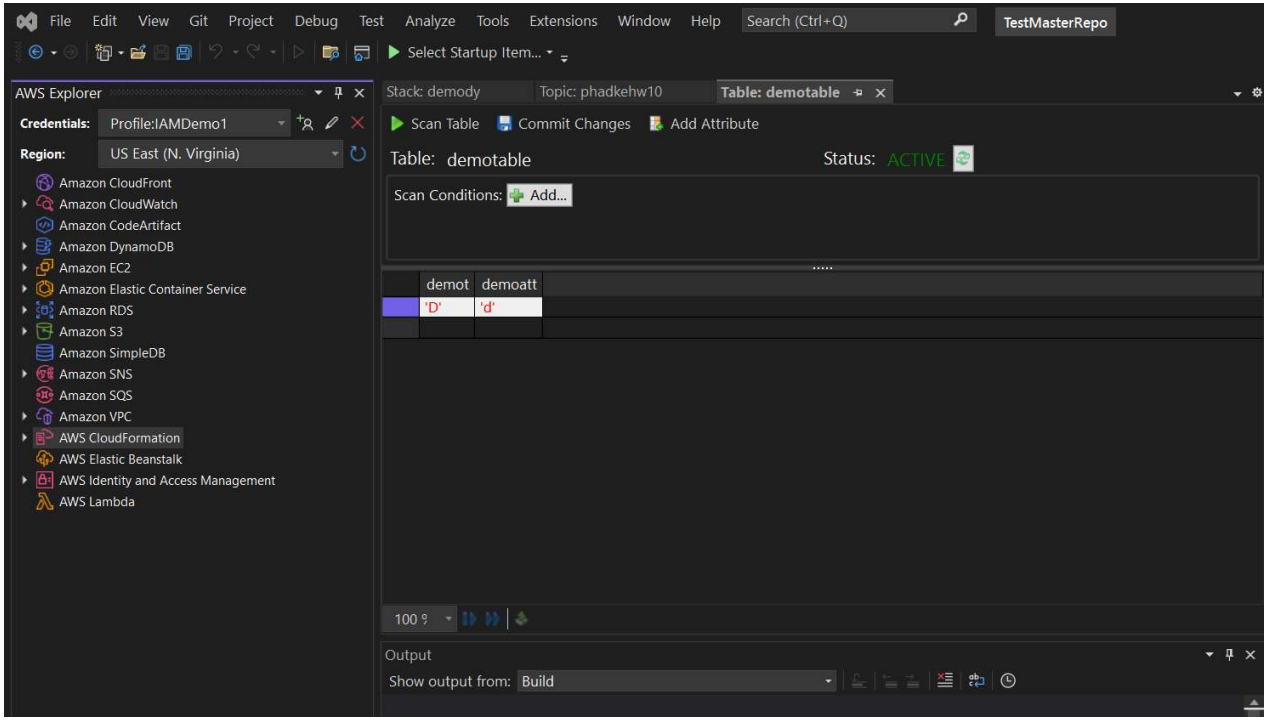
1. Install AWS Toolkit from Marketplace

2. AWS Explorer is added to the menu

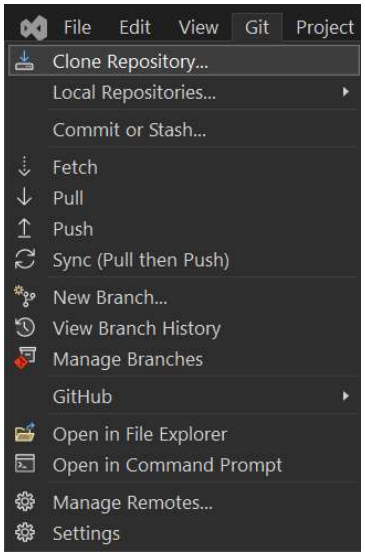
3. AWS functions are added to the Explorer and available to use

AWS DynamoDB with Visual Studio

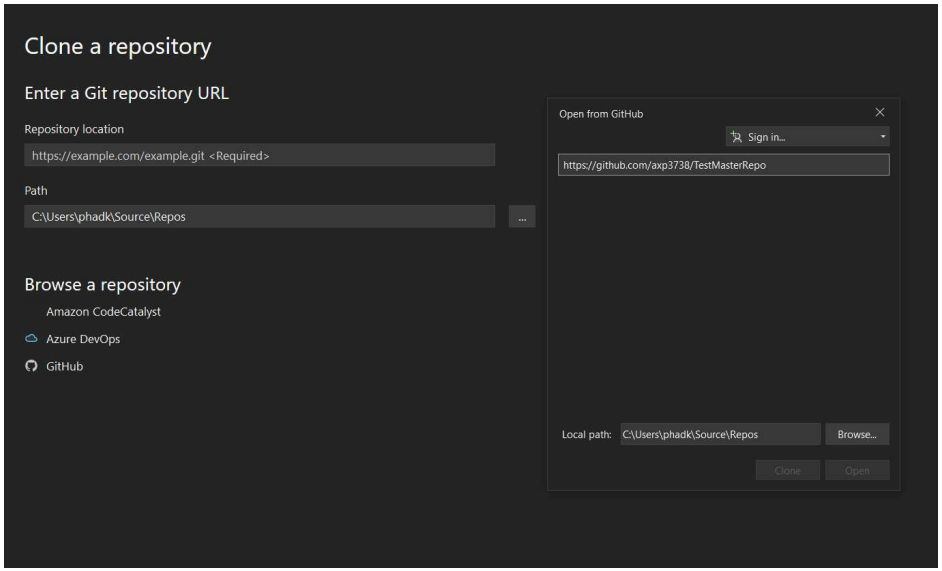
DynamoDB is available in editable mode, and changes committed are reflected in DynamoDB
E.g. demotable, below



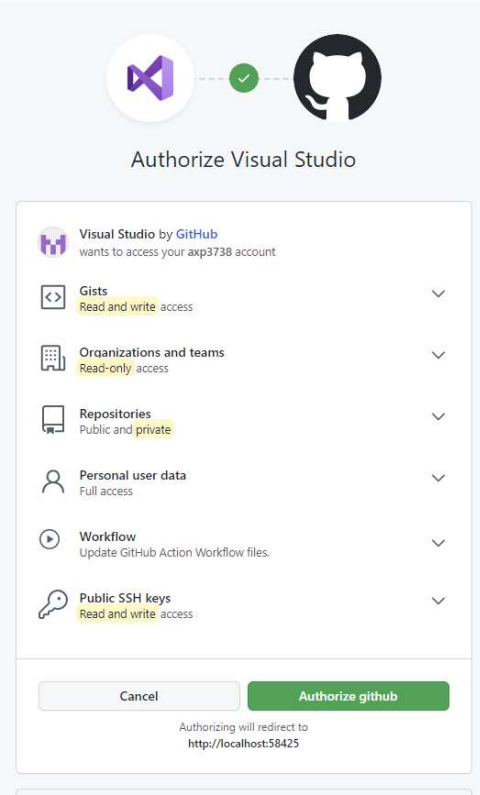
Github connect with Visual Studio



1. Menu: Git -> Clone Repository

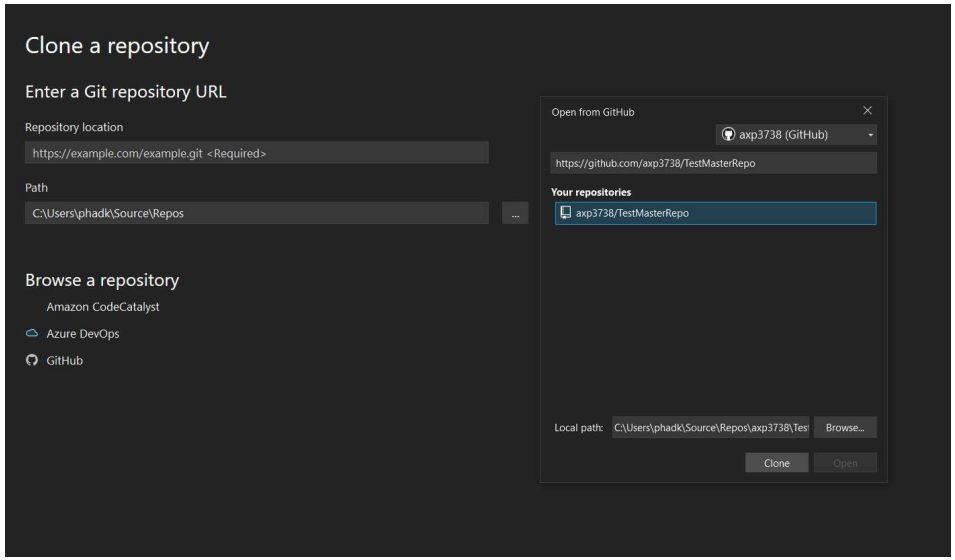


2. Enter repository URL



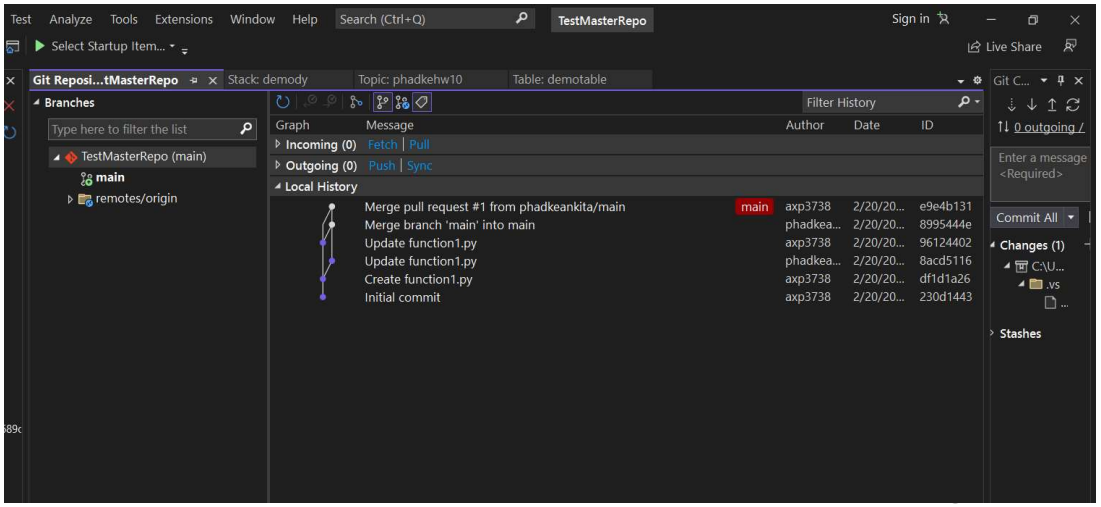
3. Authorize Visual Studio

Github connect with Visual Studio

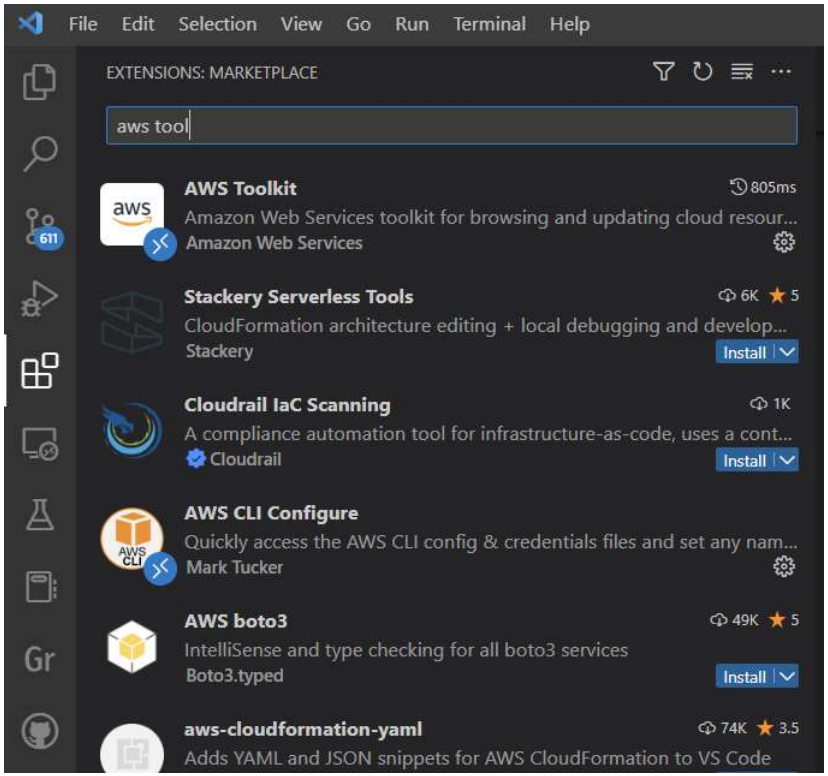


4. Create local repository

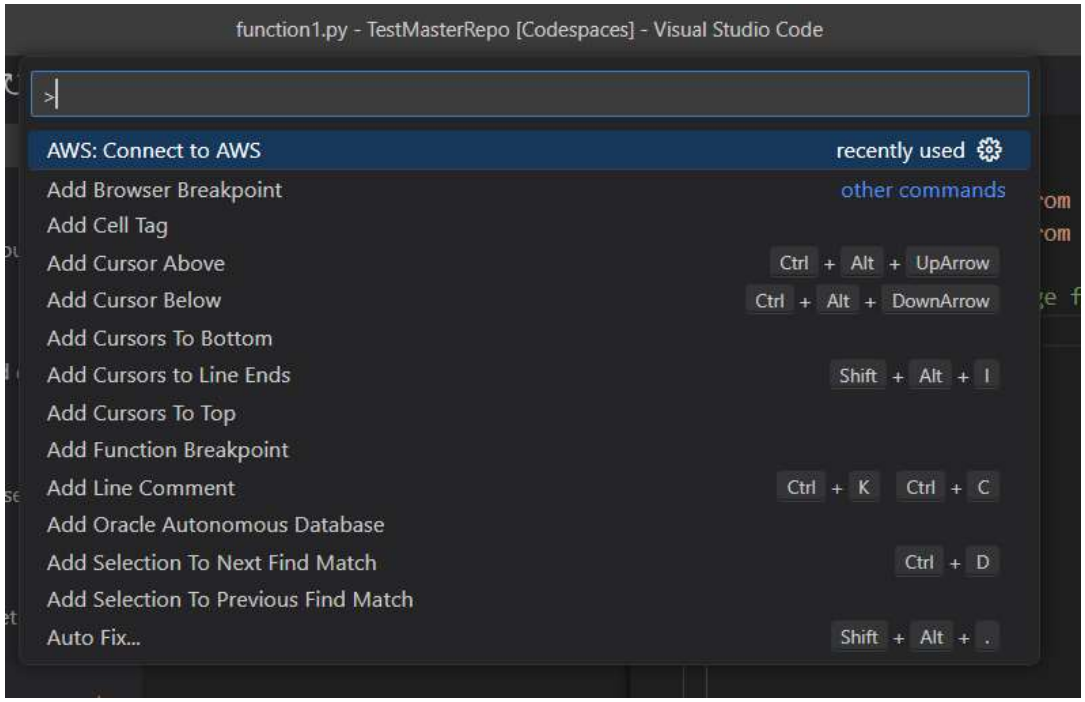
5. Versions, details, history, code are available



AWS connect with Visual Studio Code

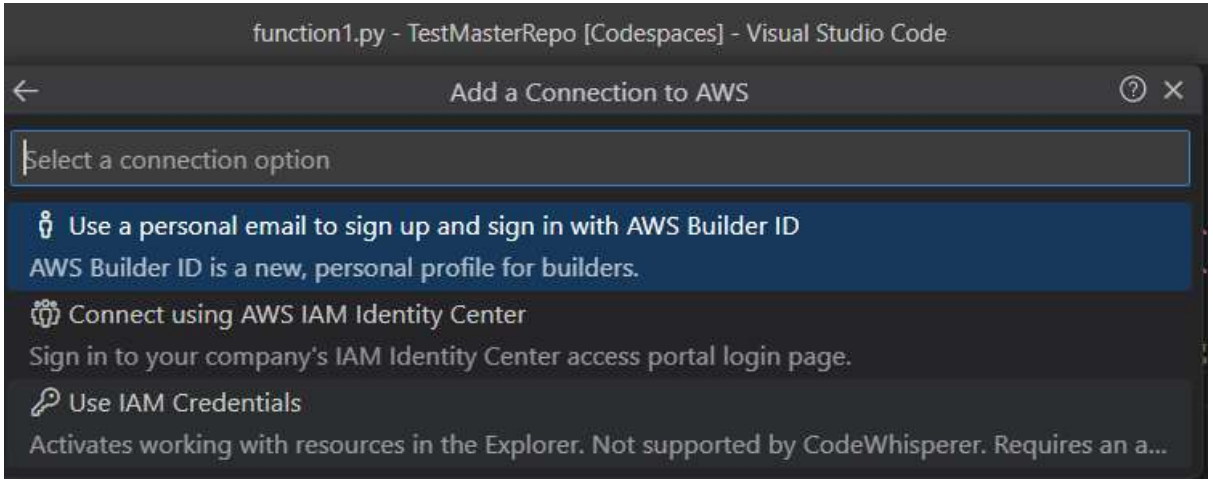


1. Install AWS Toolkit extension from Marketplace



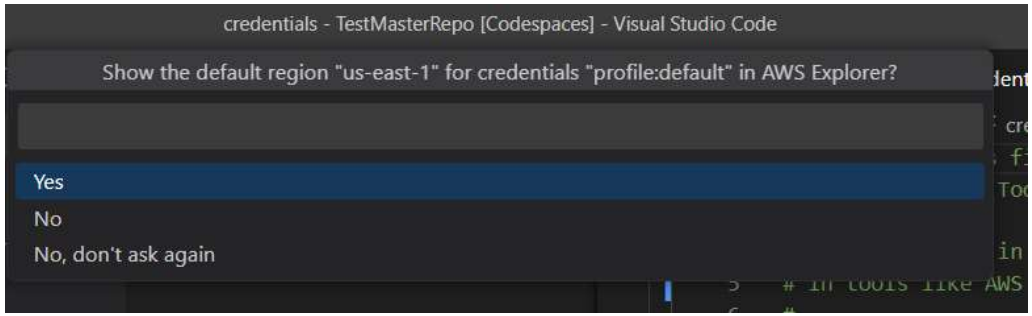
2. Open Connect to AWS option to configure the login

AWS connect with Visual Studio Code

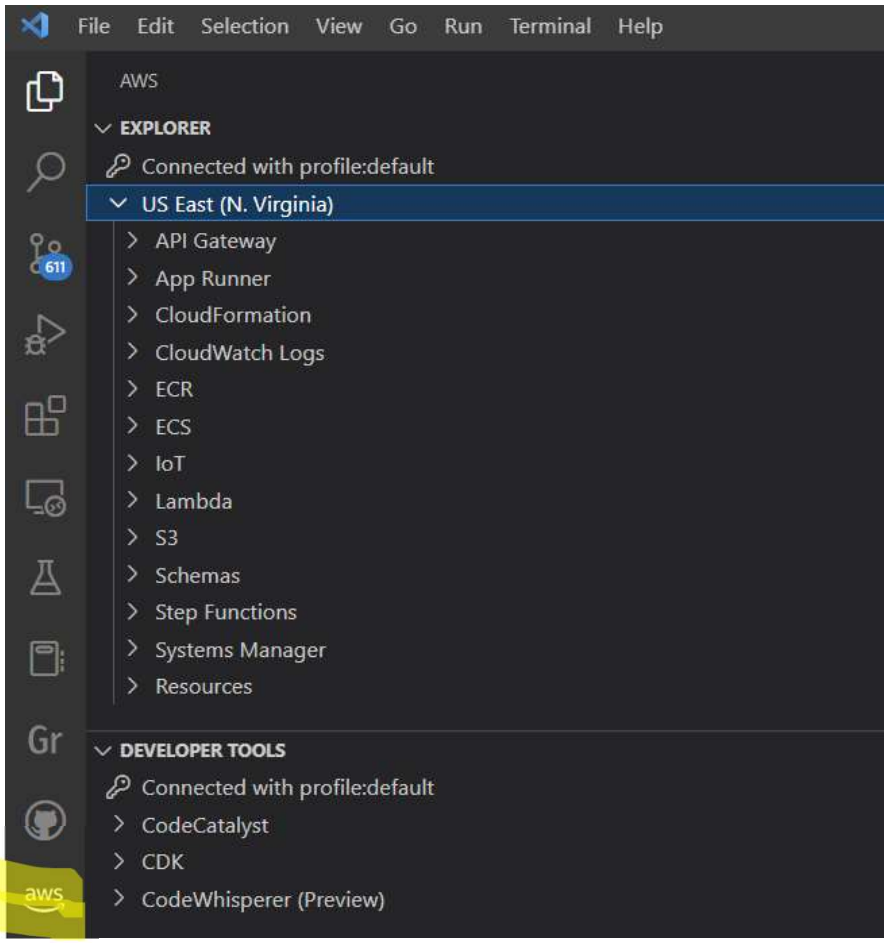


3. Select the option ‘Use IAM Credentials’

4. Put the access key & secret access key and continue



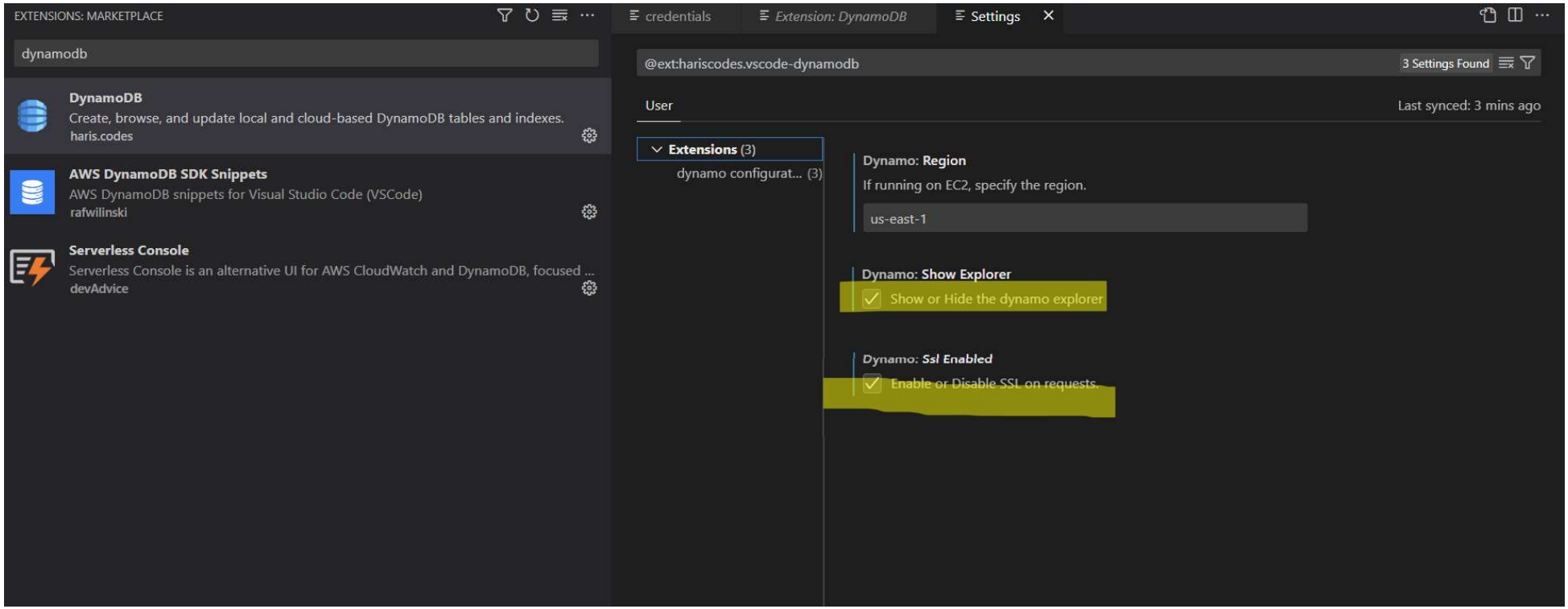
AWS connect with Visual Studio Code



5. AWS options are added in Visual Studio Code, through AWS Toolkit

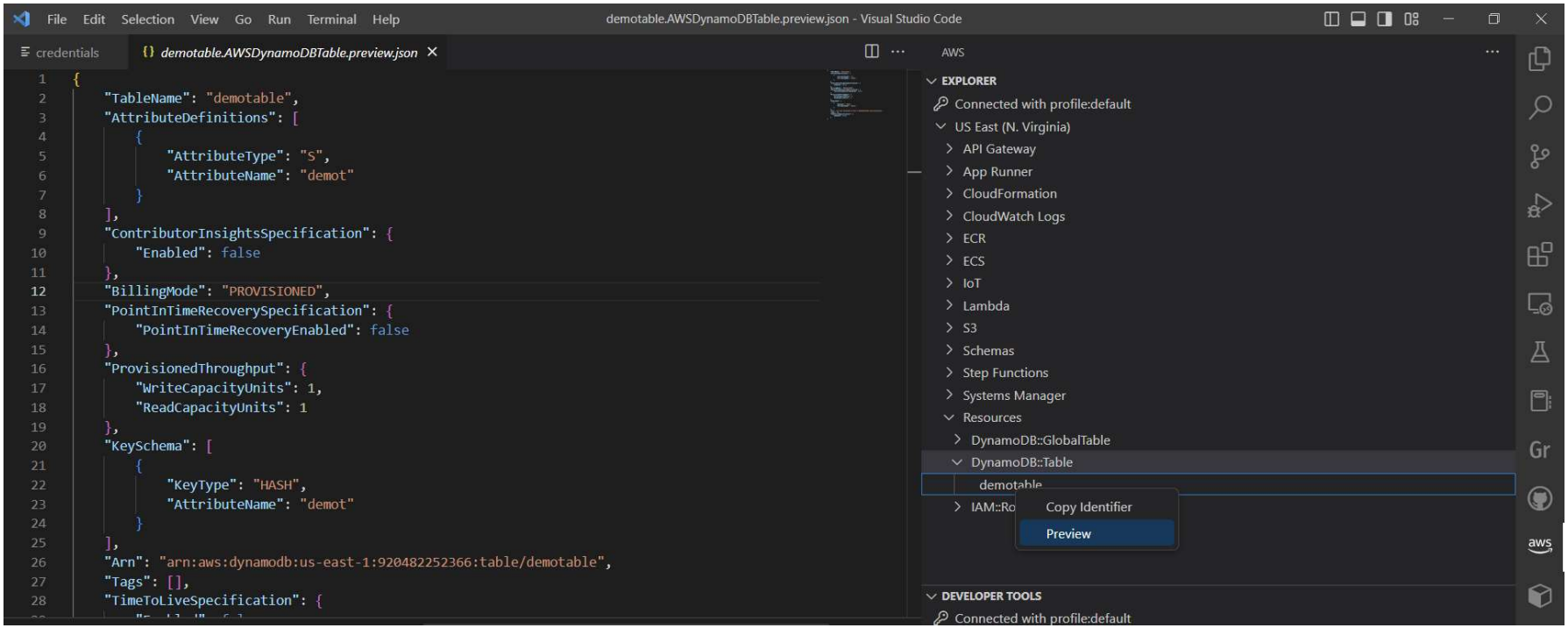
AWS DynamoDB with Visual Studio Code

DynamoDB related options can be enabled through the relevant plugins, add those and enable the options



AWS DynamoDB with Visual Studio Code

DynamoDB option is only available in view-only mode (preview only)
Changes couldn't be done to the DynamoDB tables, or new tables couldn't be created



AWS website lists VS Code as a typically used Toolkit for Python

- https://aws.amazon.com/developer/language/python/
- https://aws.amazon.com/visualstudiocode/

Tools

Download the tools needed to run Python applications on AWS

SDK for Python

Simplifies use of AWS services by providing a set of libraries that are consistent and familiar for Python developers.

Download SDK »

AWS IDE Toolkits

Use popular Integrated Development Environments (IDEs) to author, debug, and deploy your code on AWS.

Get the PyCharm Toolkit »

Get the Intellij Toolkit »

Get the VS Code Toolkit »

Get Amazon CodeWhisperer »

AWS CDK for Python

Use the AWS Cloud Development Kit (CDK) for your Infrastructure as Code with Python.

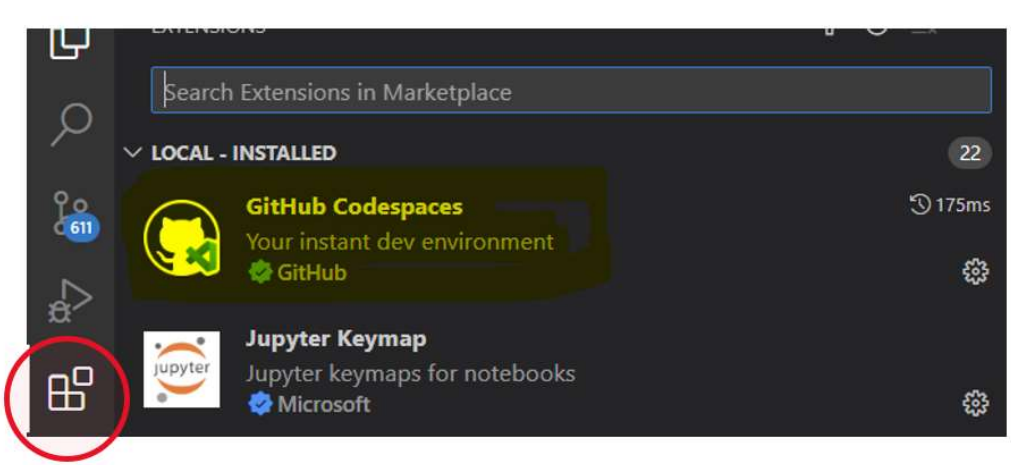
Download CDK »

AWS IoT SDK for Python

Access AWS IoT using MQTT or MQTT over the WebSocket protocol from Python.

Clone on Github »

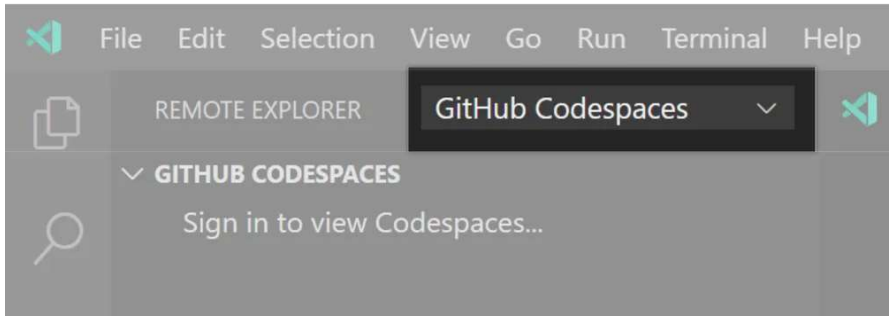
Github connect with Visual Studio Code

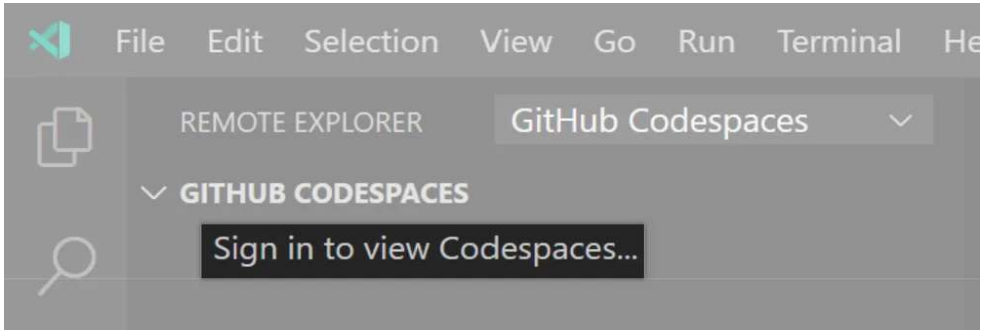


1. Download visual studio code, install codespace

2. Above symbol is added in visual studio code's left bar menu: 'Remote Explorer'

Github connect with Visual Studio Code

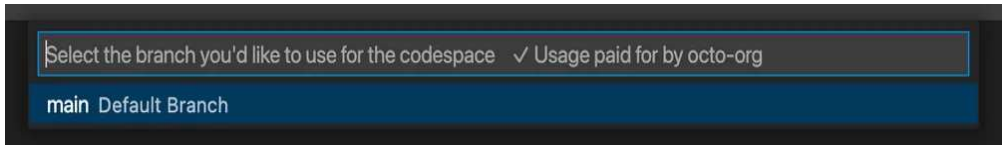


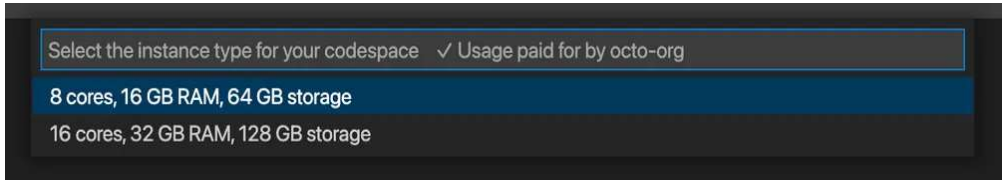


3. Click on remote explorer and go to codespaces option and try to select GitHub branch of interest

4. To authorize VS Code to access account on GitHub, click Allow

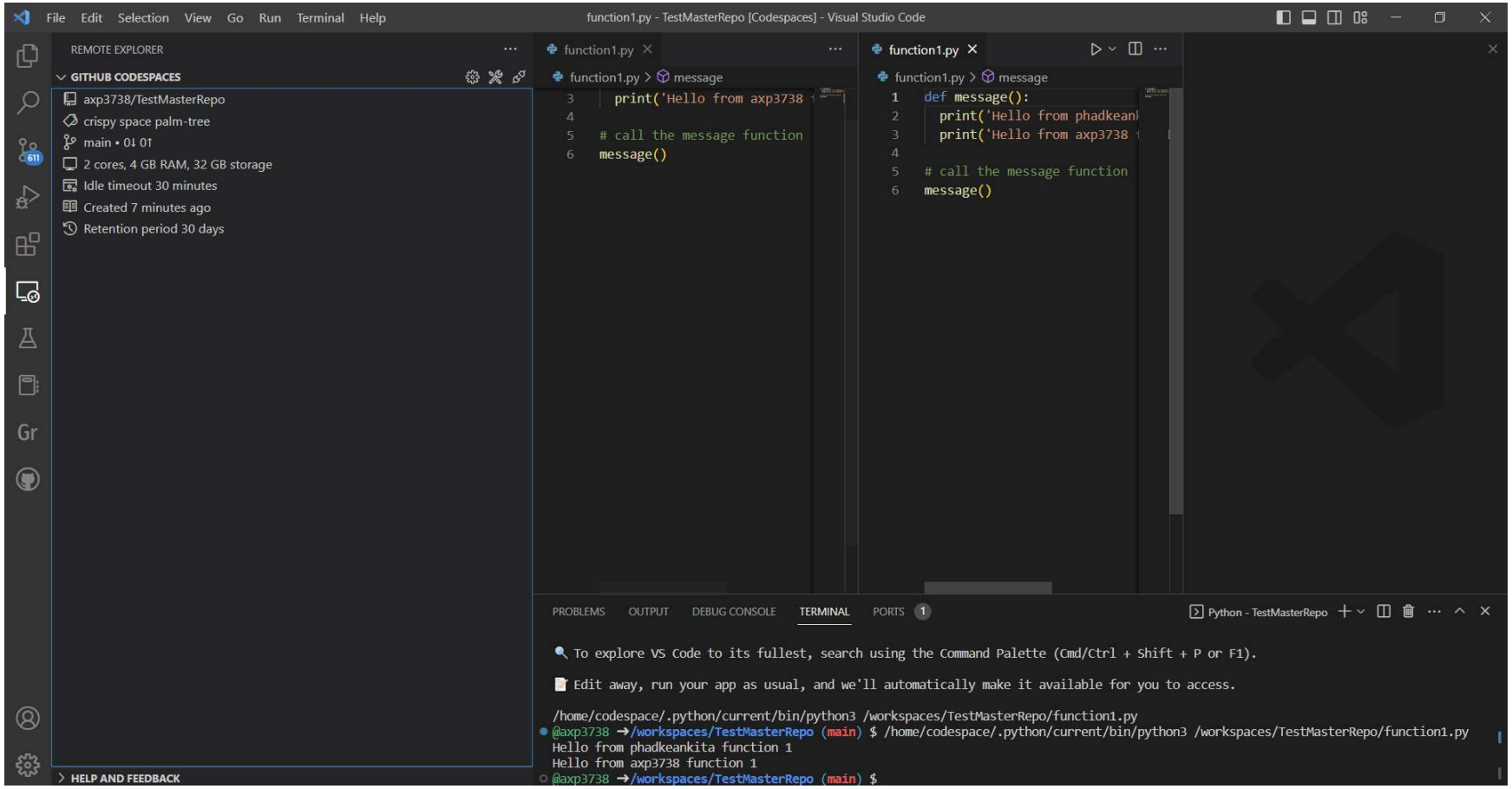
5. Back in Visual Studio Code, select main branch and storage options as below





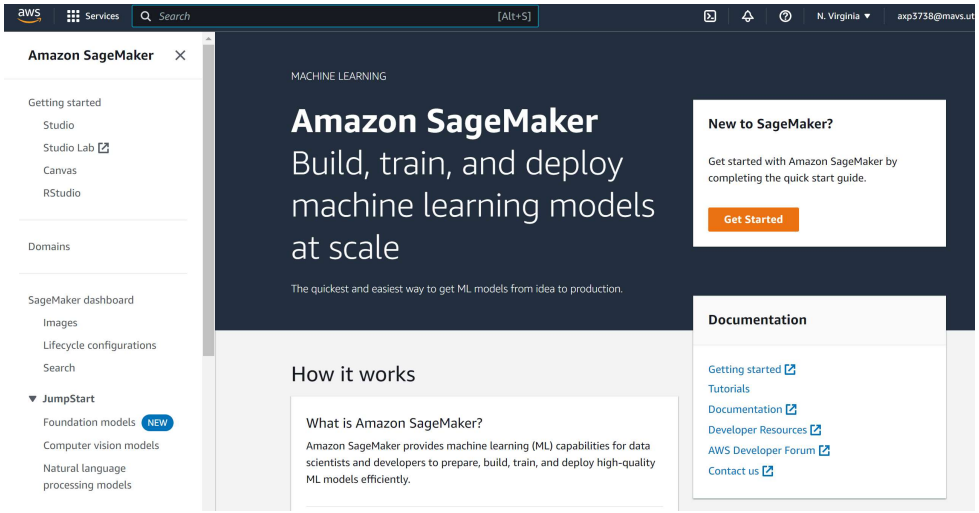
Github connect with Visual Studio Code

6. Files present in your GitHub repository can be seen in Visual Studio Code

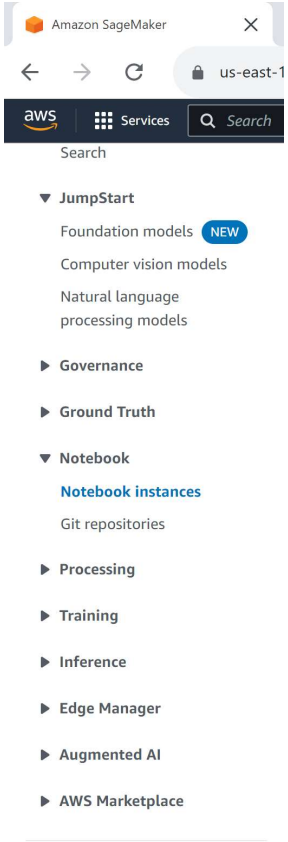


AWS connect with Jupyter Notebook

Can be done using Sagemake studio
(https://docs.aws.amazon.com/sagemaker/latest/dg/ex1-prepare.html)

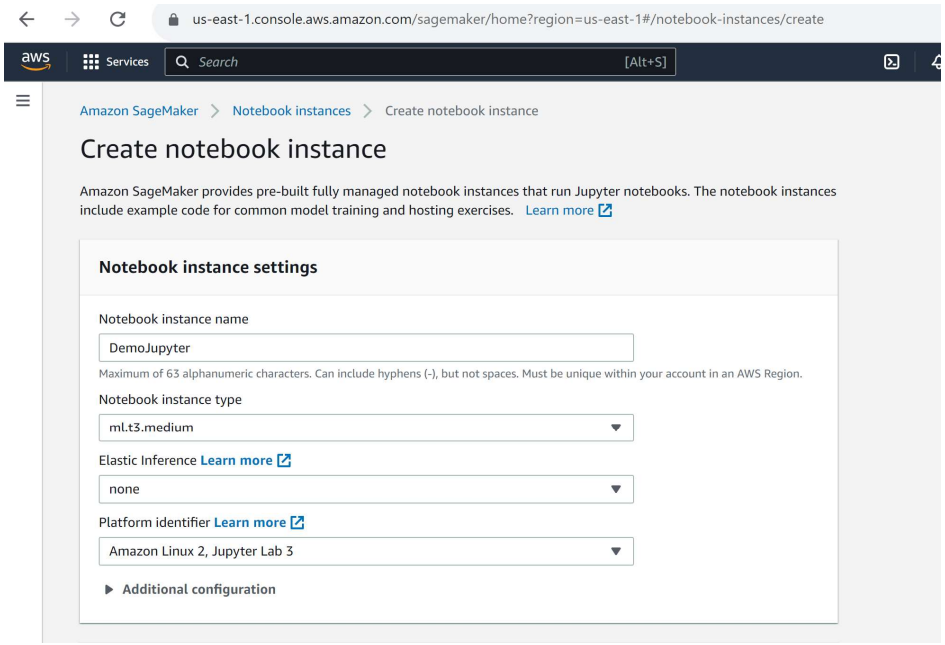


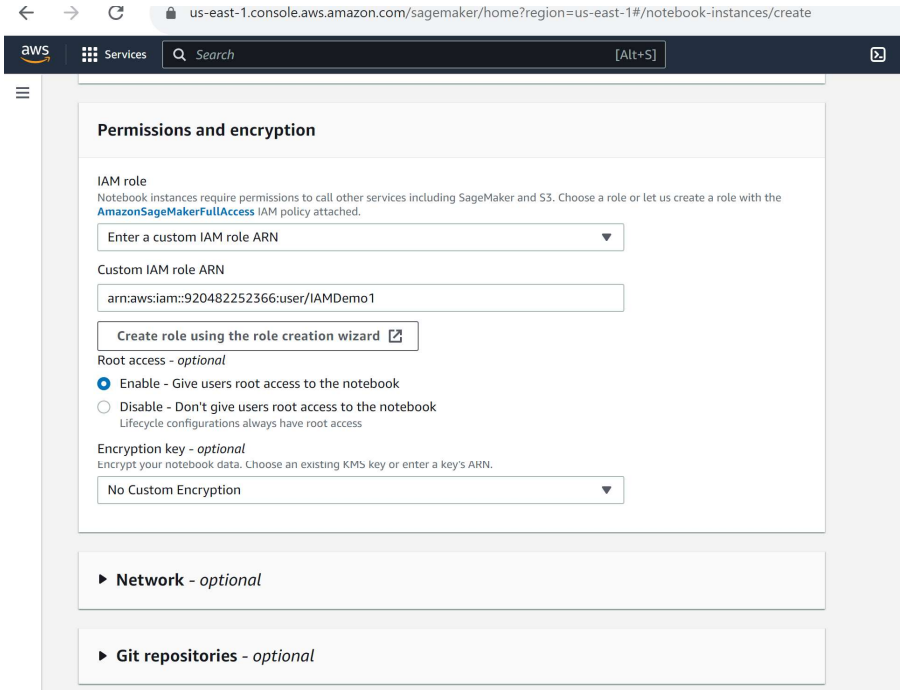
1. AWS Management Console -> Open Amazon Sagemaker



2. Open Notebook option & Navigate to Notebook instances

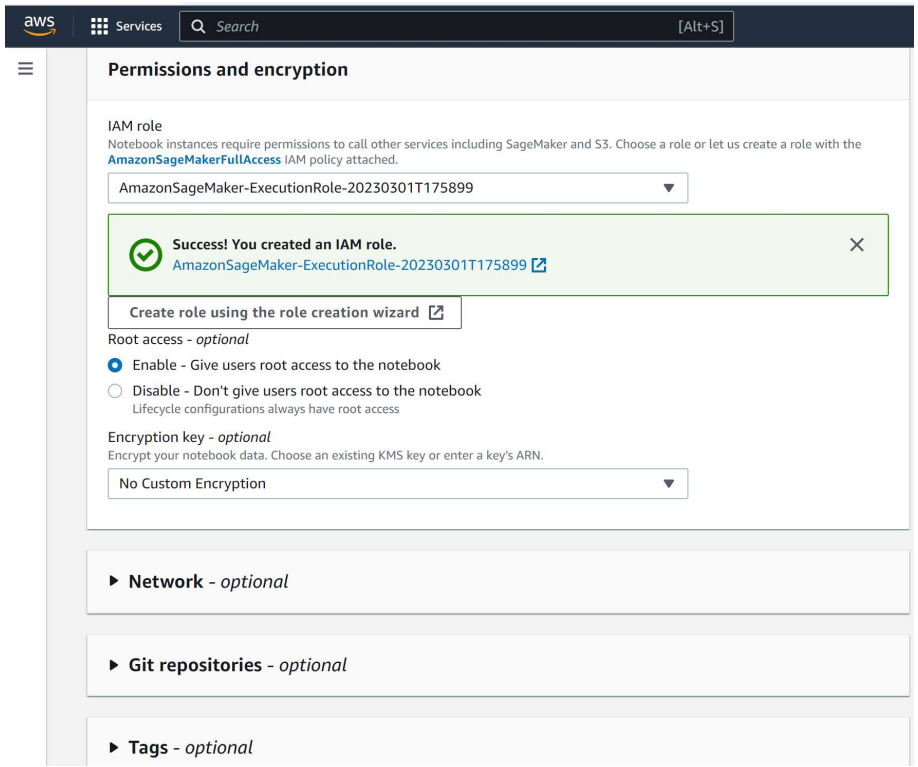
AWS connect with Jupyter Notebook

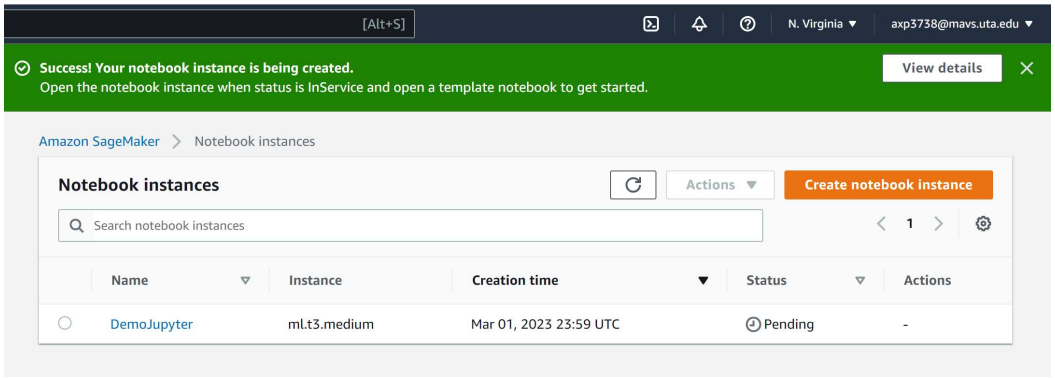




3. Select Create Notebook instance
(IAM user linked should have AmazonSageMakerFullAccess IAM policy attached.)
(Selected option to let AWS create the custom IAM role/ARN)

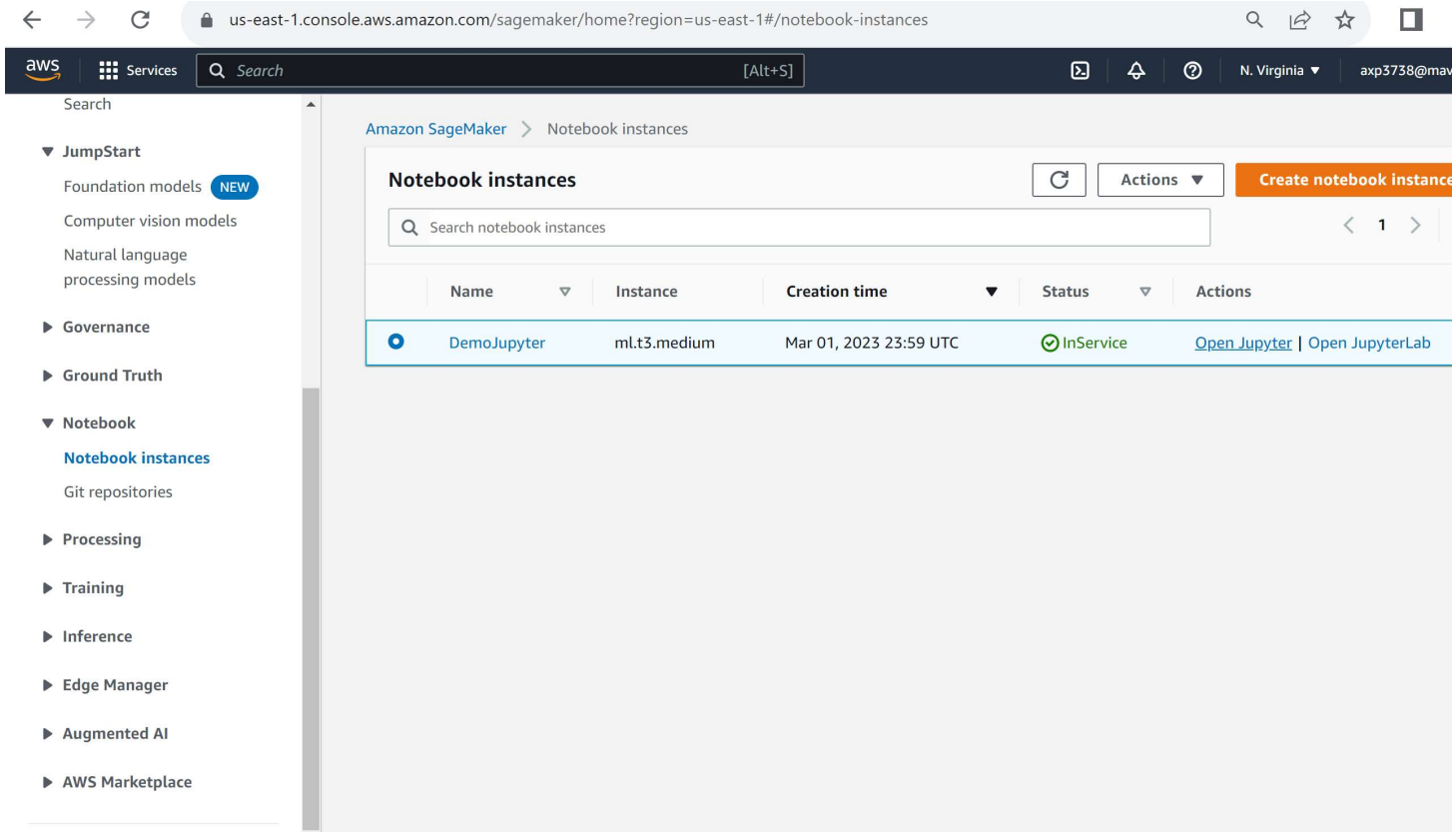
AWS connect with Jupyter Notebook





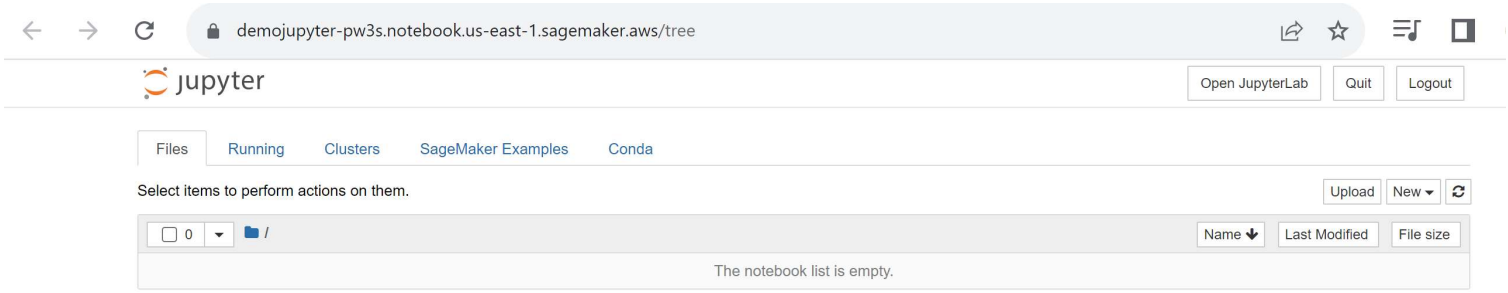
4. AWS creates the custom IAM role, and the notebook instance as required

AWS connect with Jupyter Notebook



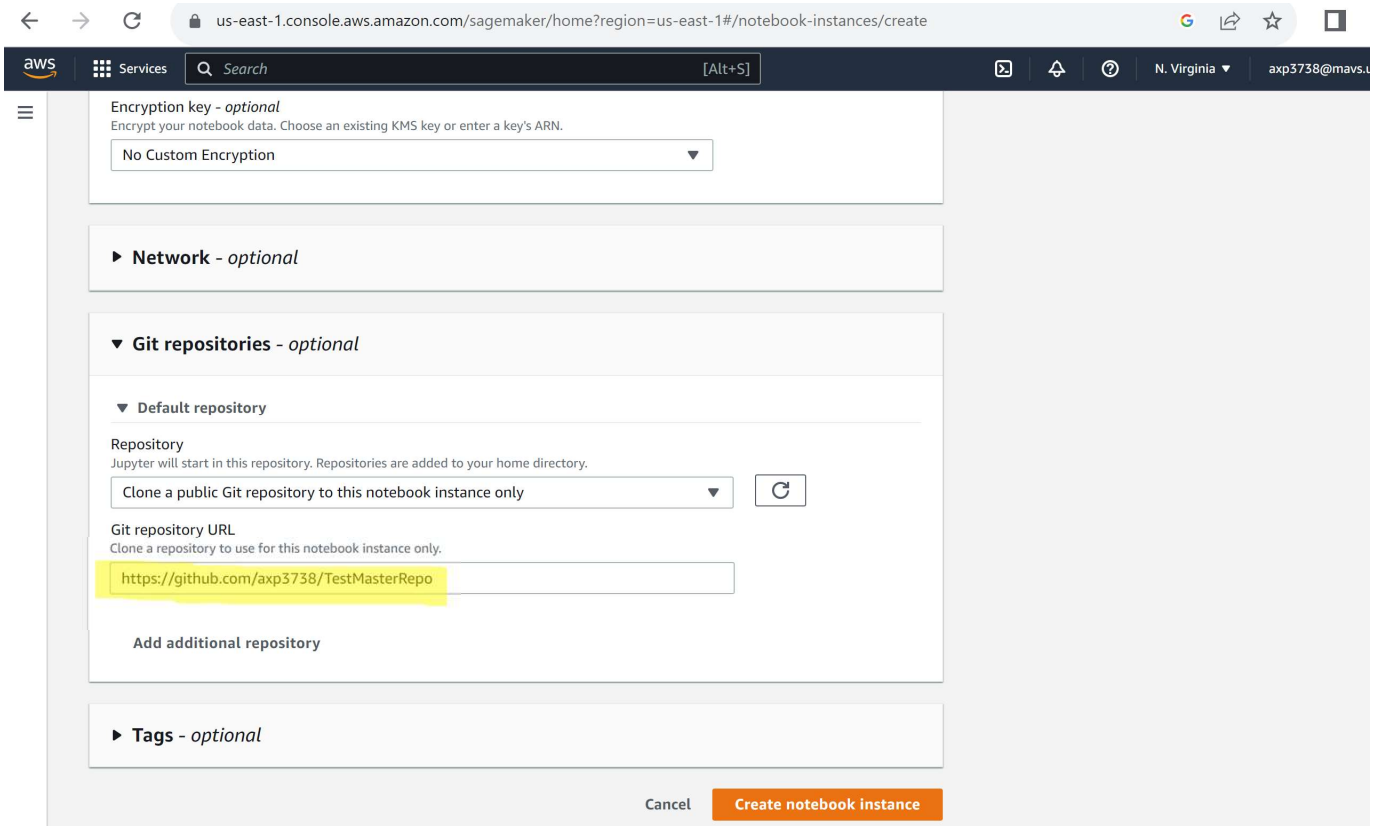
4. Notebook can be launched using Open Jupyter link, after creation

AWS connect with Jupyter Notebook



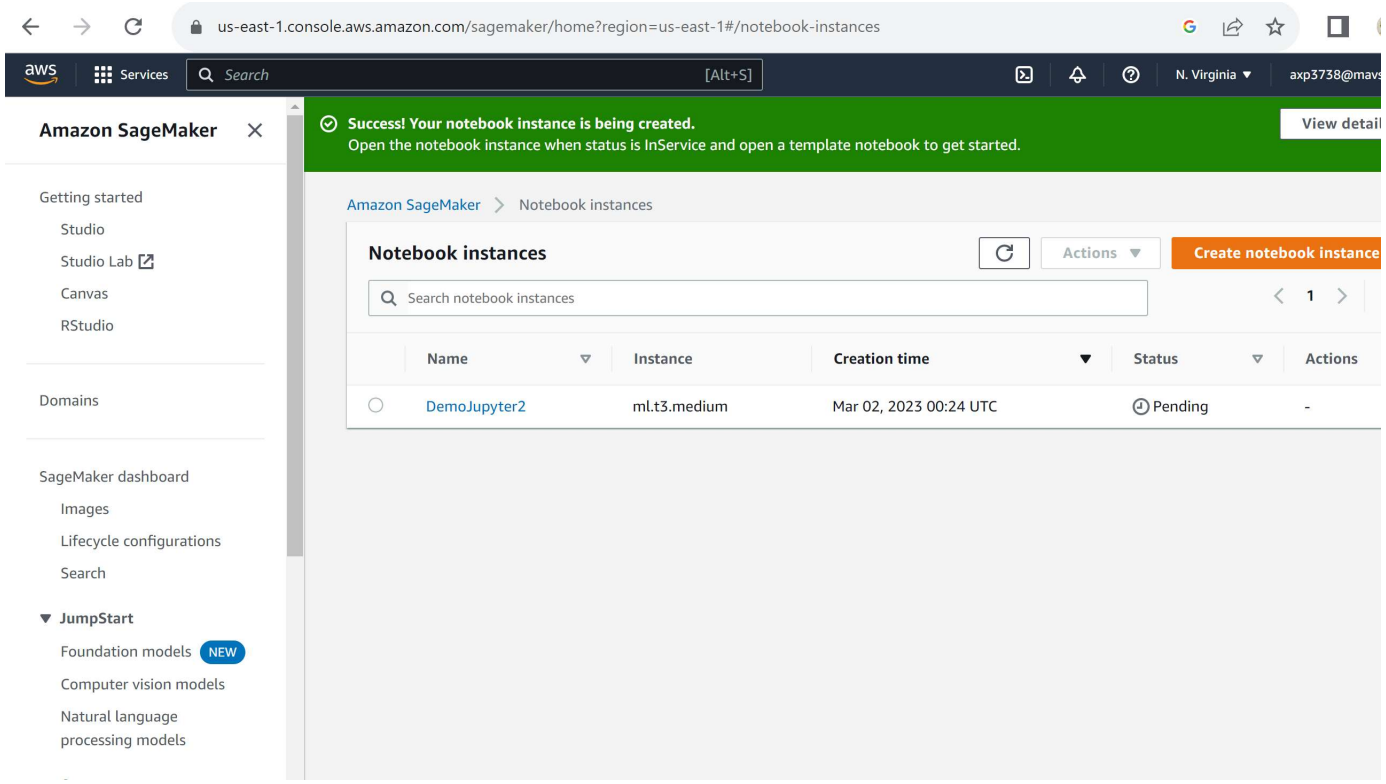
5. Notebook can be accessed as above

Github connect with Jupyter Notebook



1. Can be done using Amazon Sagemake studio, through AWS Management Console, while creating Jupyter Notebook: by adding the Github repository name

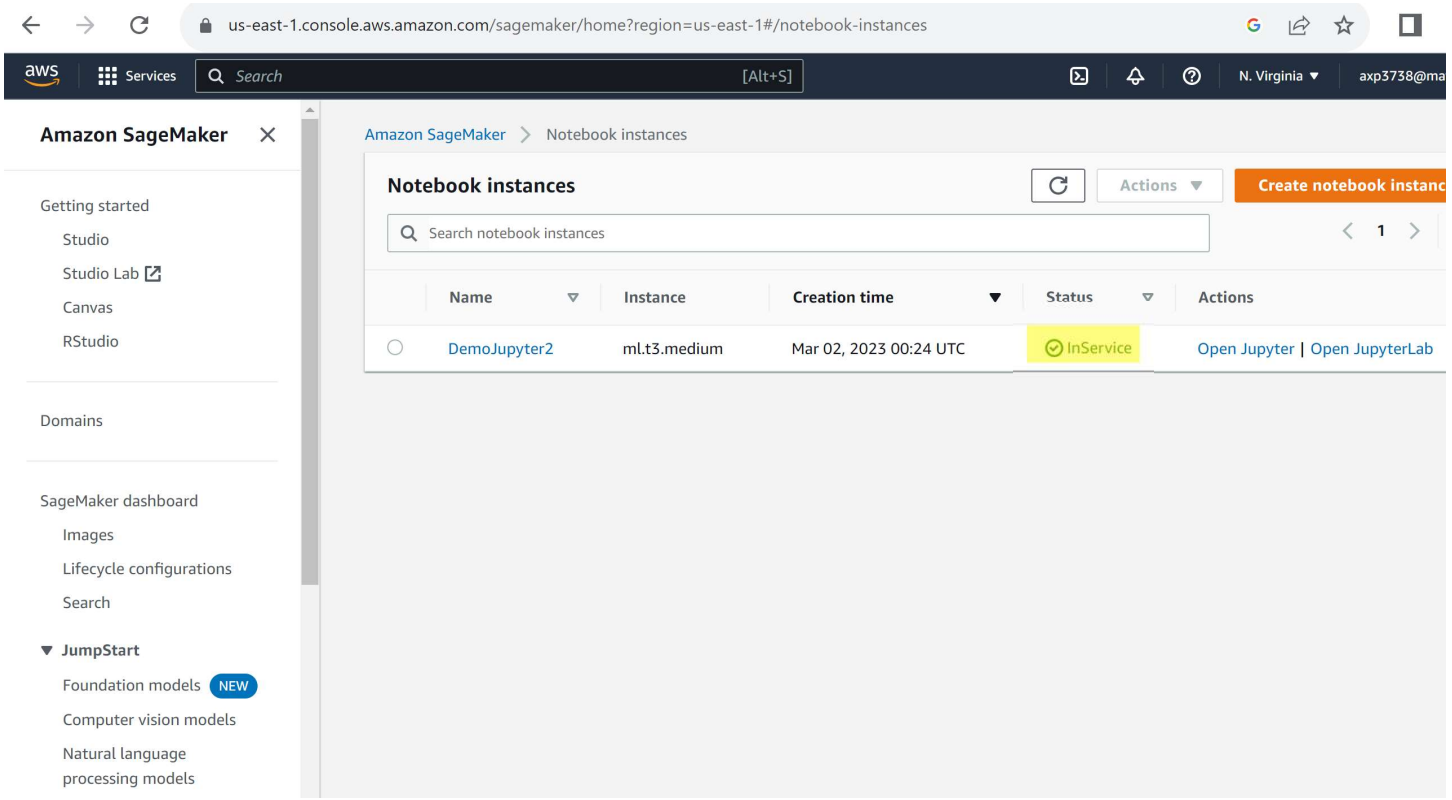
Github connect with Jupyter Notebook



2.

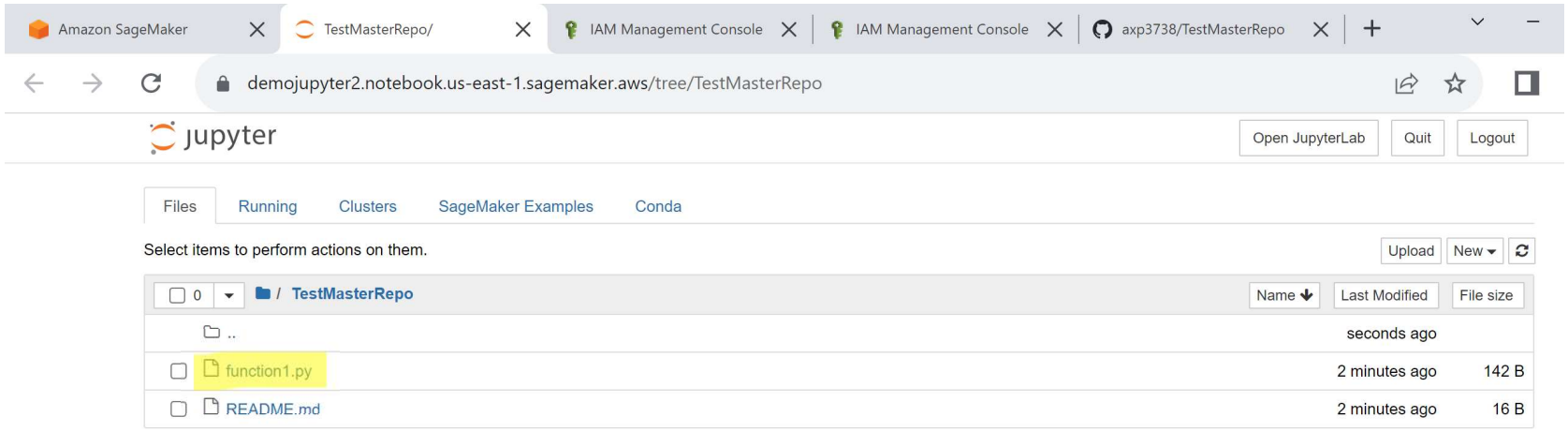
2. Once instance is submitted, Notebook gets created

Github connect with Jupyter Notebook



3. After the Notebook is ready, it can be accessed through Open Jupyter link

Github connect with Jupyter Notebook

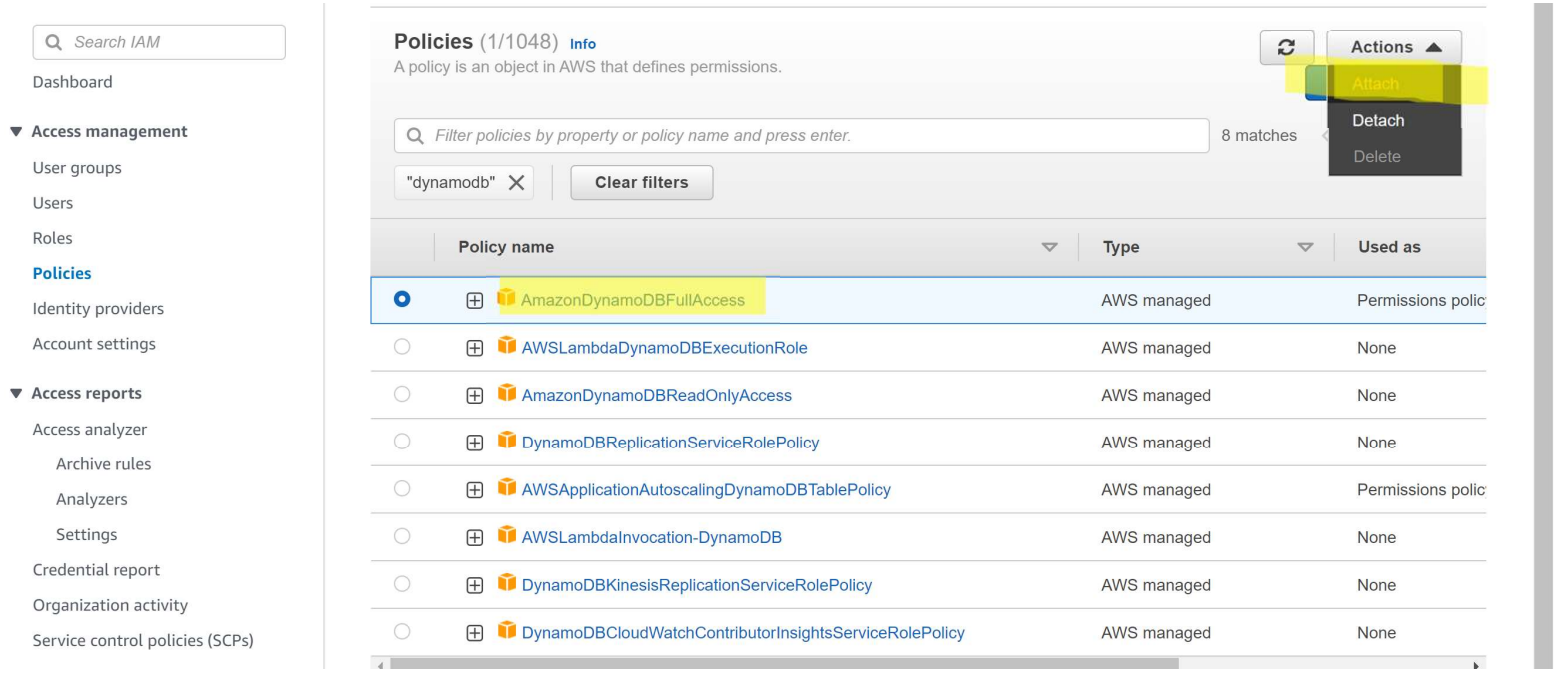


4. The Notebook shows the code from chosen github repository

DynamoDB connect with Jupyter Notebook

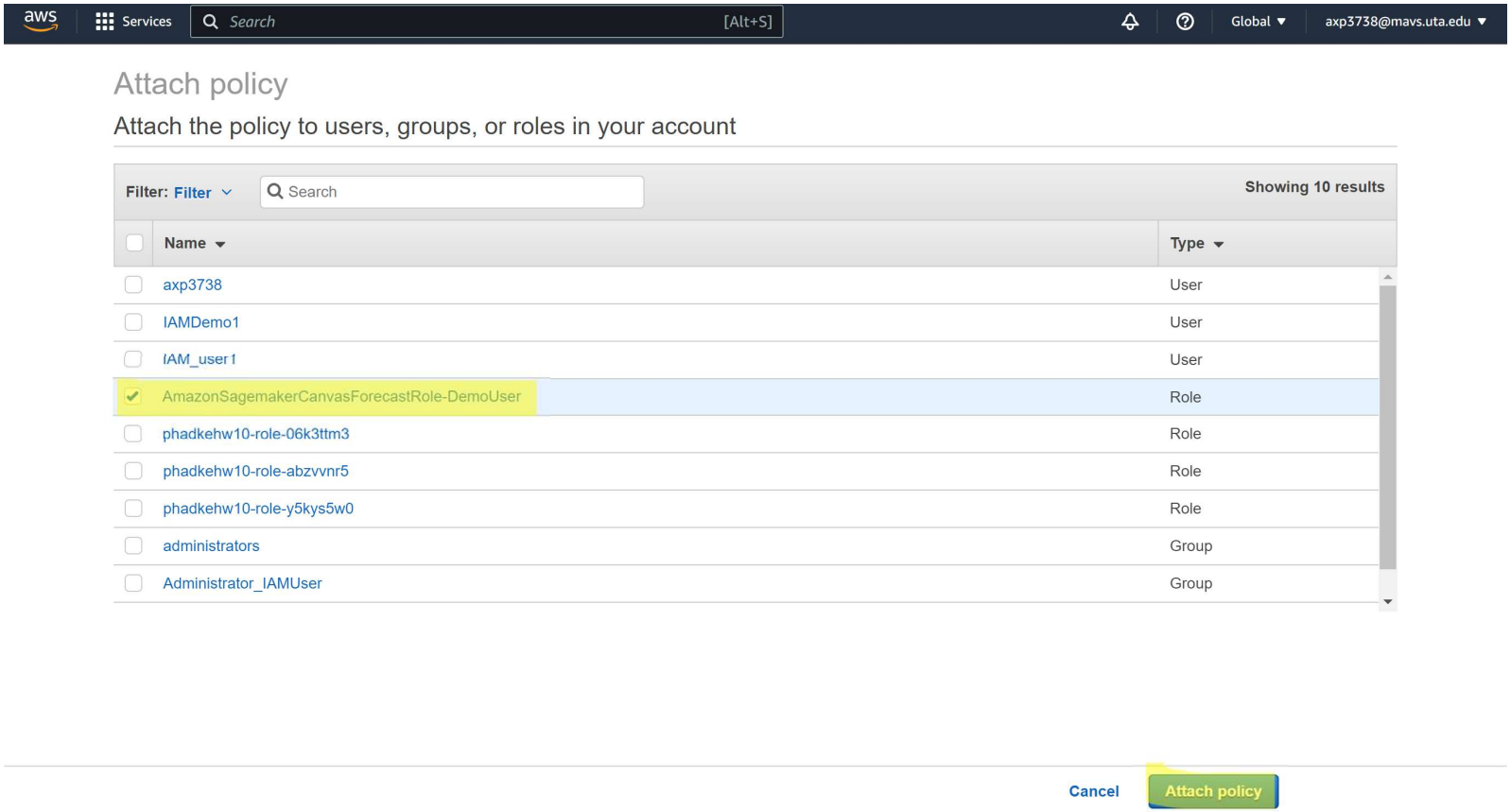
1. Can be done through Amazon Sagemaker and Jupyter notebook

2. Open the IAM policies, select the policy to allow DynamoDB access, click on Attach



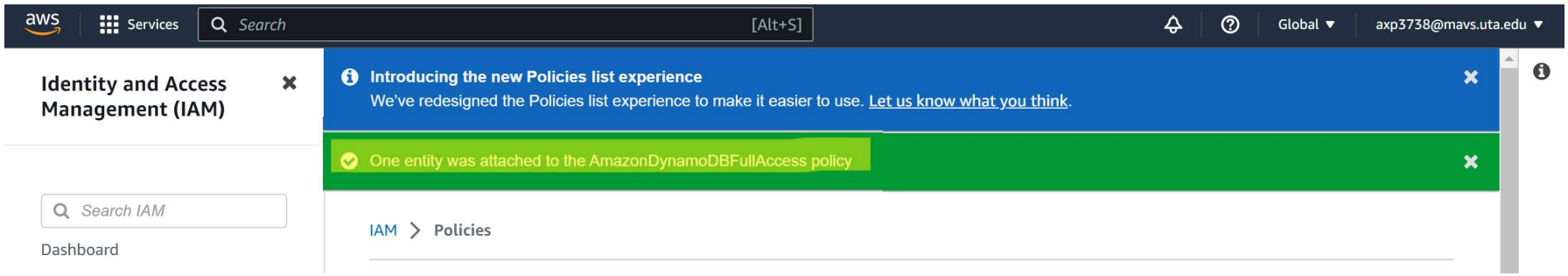
DynamoDB connect with Jupyter Notebook

3. Select the appropriate IAM user used in Amazon Sagemaker, on the next screen and click on Attach Policy



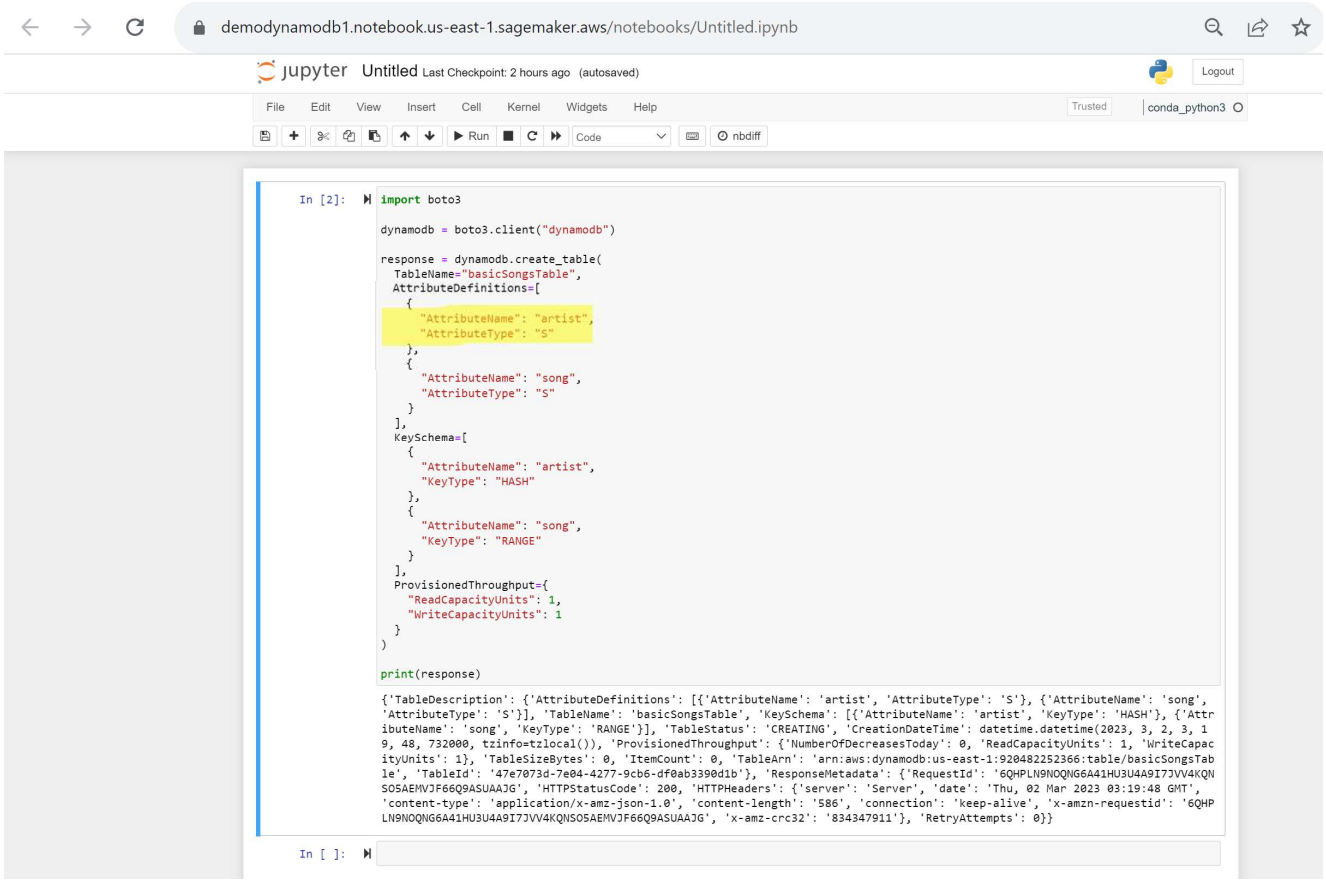
DynamoDB connect with Jupyter Notebook

4. After successful policy update, below confirmation is obtained



5. Launch Jupyter notebook through Amazon Sagemaker and open a blank notebook.
Write a sample script to create a new DynamoDB table

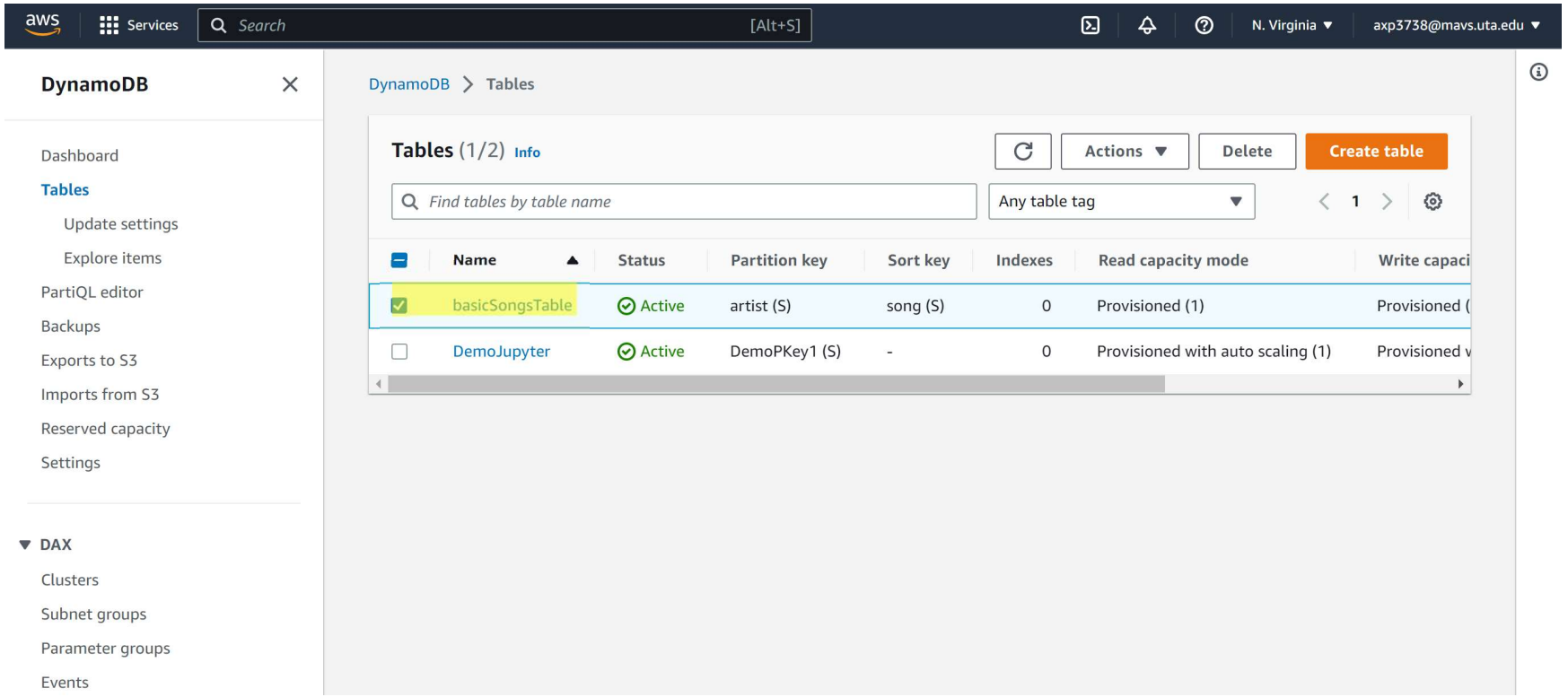
DynamoDB connect with Jupyter Notebook



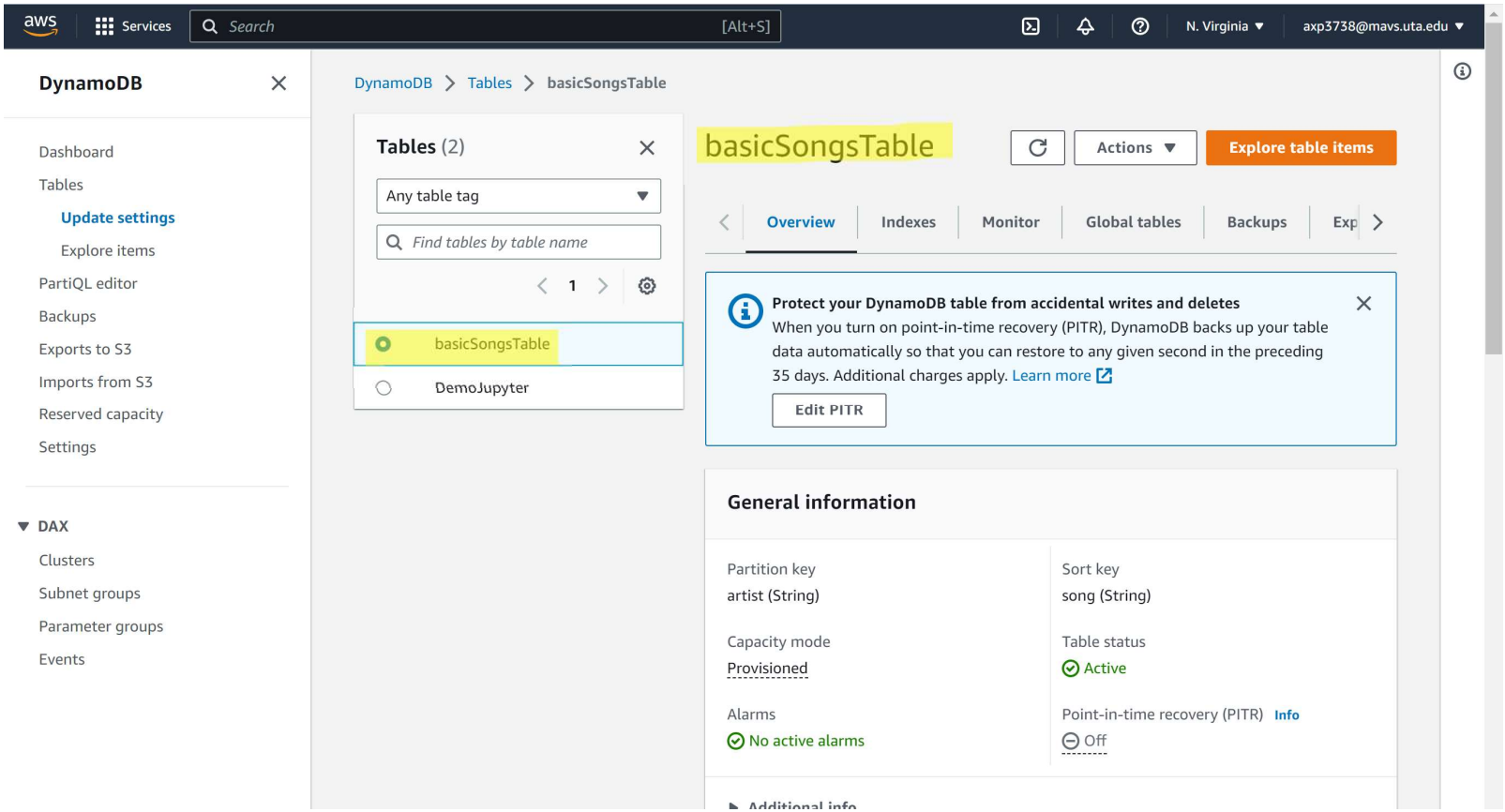
Reference: https://www.fernandomc.com/posts/ten-examples-of-getting-data-from-dynamodb-with-python-and-boto3/

DynamoDB connect with Jupyter Notebook

6. Check the table status in DynamoDB, table is created successfully.



DynamoDB connect with Jupyter Notebook



Conclusion

- Jupyter notebook looks like the best option as it provides all the below:
  - AWS integration – through Amazon Sagemaker
  - Github integration – available through Amazon Sagemaker or standalone with Jupyter notebook
  - Code compilation, testing and editing options are available
  - In-built Python support with boto3
  - DynamoDB full access
  - No separate download/install is needed if done through Amazon Sagemaker
  - No extra added cost, other than the AWS services cost