AWS Training Session

Soumil N Shah

(Data Collection and processing Team Lead)

About Me

- Bombay is where I was born and raised. I came to the United States to pursue a double master's degree in electrical and computer engineering.
- I fell in love with programming and have since enjoyed teaching and sharing my skills through seminars, YouTube, and blogs.
- I like to Bike and play Badminton during my Free time

Contents

Contents (Cont)

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- Introduction to SNS topic
- Lab Session 1
- Integrate AWS Lambda with SQS Queue + SNS
- Lab Session 2

What is Cloud ?

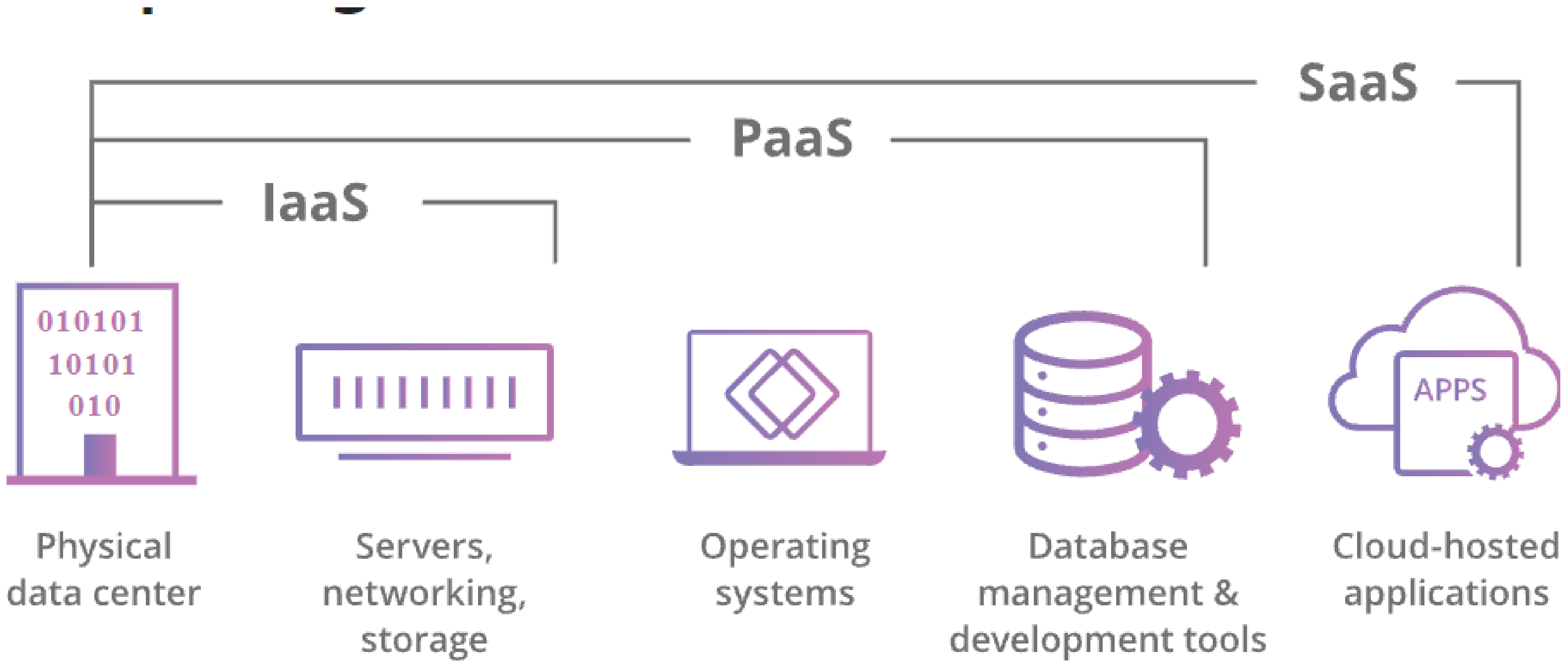
- The cloud is made up of servers in data centers all over the world. Moving to the cloud can save companies money and add convenience for users.

Advantage of Cloud Technology

- Cost Savings
- Security
- Flexibility
- Mobility
- Insight
- Increased Collaboration
- Quality Control
- Disaster Recovery
- Loss Prevention
- Automatic Software Updates
- Competitive Edge
- Sustainability

AND Much More

What are the main service models of cloud computing?


SaaS
PaaS
IaaS
010101
10101
010
APPS
Physical data center
Servers, networking, storage
Operating systems
Database management & development tools
Cloud-hosted applications

SaaS

- Software-as-a-Service (SaaS): Instead of users installing an application on their device, SaaS applications are hosted on cloud servers, and users access them over the Internet. SaaS is like renting a house: the landlord maintains the house, but the tenant mostly gets to use it as if they owned it. Examples of SaaS applications include Salesforce, MailChimp, and Slack.

PaaS

- **Platform-as-a-Service (PaaS)**: In this model, companies don't pay for hosted applications; instead they pay for the things they need to build their own applications. PaaS vendors offer everything necessary for building an application, including development tools, infrastructure, and operating systems, over the Internet. PaaS can be compared to renting all the tools and equipment necessary for building a house, instead of renting the house itself. PaaS examples include Heroku and Microsoft Azure.

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Module I

AWS Lambda

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What is AWS Lambda ?

- AWS Lambda is a serverless compute service that lets you run code without provisioning or managing servers, creating workload-aware cluster scaling logic, maintaining event integrations, or managing runtimes.
- With Lambda, you can run code for virtually any type of application or backend service - all with zero administration. Just upload your code as a ZIP file or container image, and Lambda automatically and precisely allocates compute execution power and runs your code based on the incoming request or event, for any scale of traffic.
- You can set up your code to automatically trigger from over 200 AWS services and SaaS applications or call it directly from any web or mobile app. You can write Lambda functions in your favorite language (Node.js, Python, Go, Java, and more) and use both serverless and container tools, such as AWS SAM or Docker CLI, to build, test, and deploy your functions.

Benefits

No servers to manage

- AWS Lambda automatically runs your code without requiring you to provision or manage infrastructure. Just write the code and upload it to Lambda either as a ZIP file or container image.

Continuous scaling

- AWS Lambda automatically scales your application by running code in response to each event. Your code runs in parallel and processes each trigger individually, scaling precisely with the size of the workload, from a few requests per day, to hundreds of thousands per second.

Cost optimized with millisecond metering

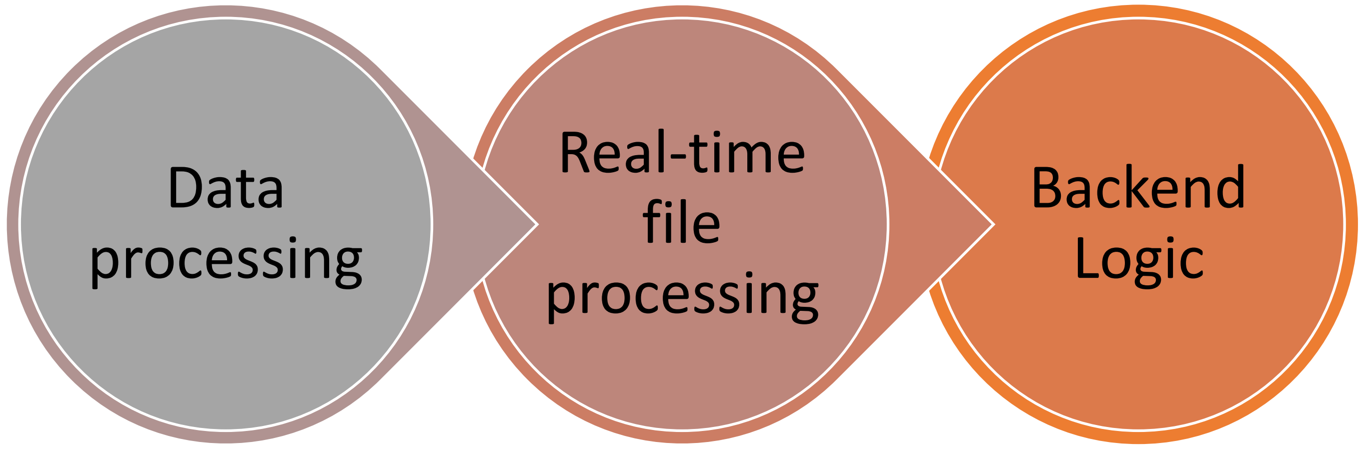
- With AWS Lambda, you only pay for the compute time you consume, so you're never paying for over-provisioned infrastructure. You are charged for every millisecond your code executes and the number of times your code is triggered. With Compute Savings Plan, you can additionally save up to 17%.

Consistent performance at any scale

- With AWS Lambda, you can optimize your code execution time by choosing the right memory size for your function. You can also keep your functions initialized and hyper-ready to respond within double digit milliseconds by enabling Provisioned Concurrency.

Use cases

Use cases



Lab I (Hello World)

Lambda Chaining

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Lambda Chaining

- One fairly common thing people want to do with Lambdas is chain them together to build microservices and workflows. This sounds easy enough in theory, but in practice tends to be much more complex (as is the case with most things in AWS).
- Which is why AWS introduces a new feature called AWS Step Functions more in Later slide on Step Functions

Lab II Lambda Chaining

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Lab III Lambda Deployment Package

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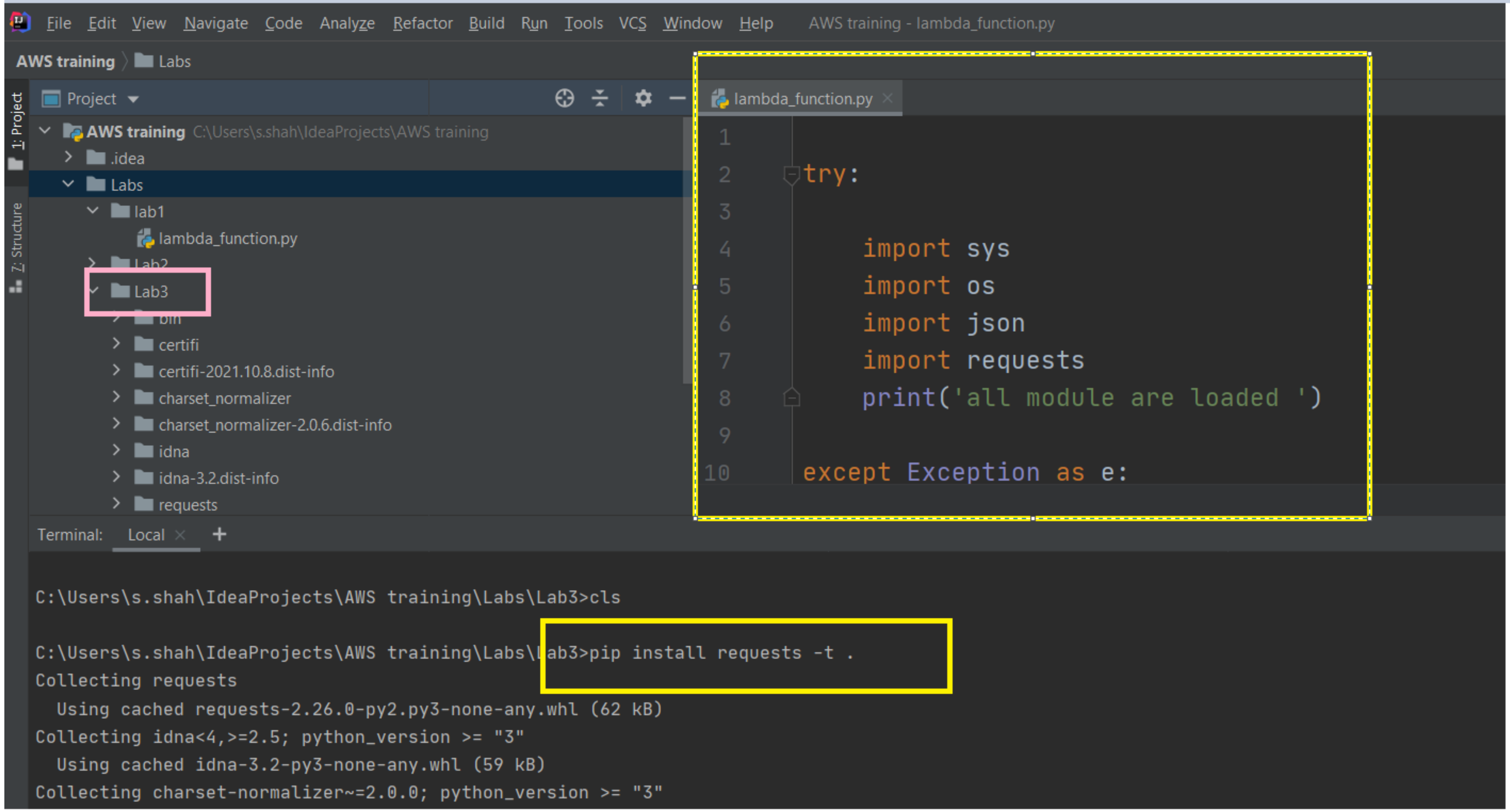
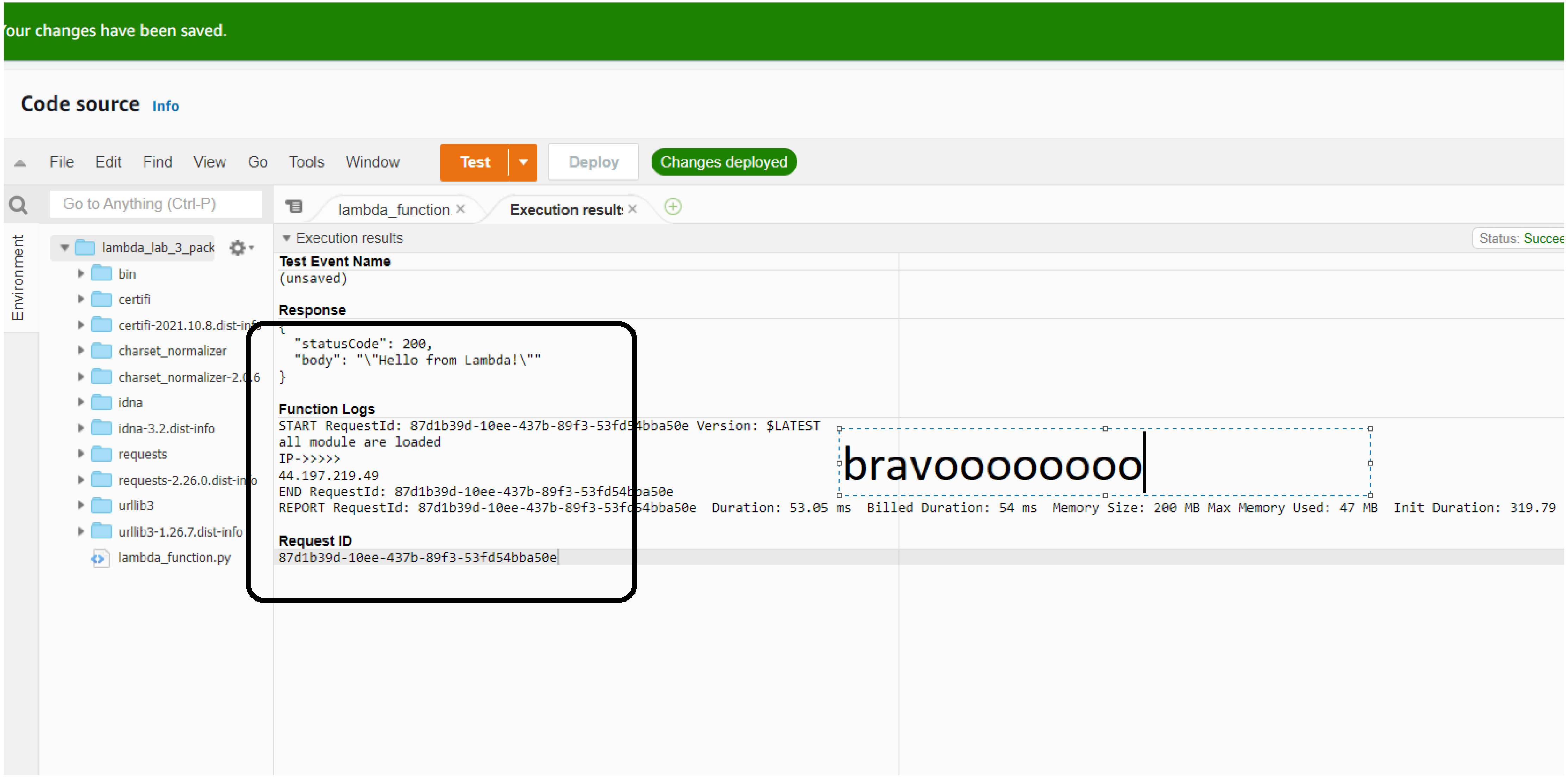
Learning on How to create Deployment Package with External Library


File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help AWS training - lambda_function.py
AWS training 〉 Labs
Project
AWS training C:\Users\s.shah\IdeaProjects\AWS training
.idea
Labs
lab1
lambda_function.py
Lab2
Lab3
bin
certifi
certifi-2021.10.8.dist-info
charset_normalizer
charset_normalizer-2.0.6.dist-info
idna
idna-3.2.dist-info
requests
lambda_function.py
Terminal: Local

```python

try:

    import sys
    import os
    import json
    import requests
    print('all module are loaded ')

except Exception as e:
```

```
C:\Users\s.shah\IdeaProjects\AWS training\Labs\Lab3>cls

C:\Users\s.shah\IdeaProjects\AWS training\Labs\Lab3>pip install requests -t .
Collecting requests
  Using cached requests-2.26.0-py2.py3-none-any.whl (62 kB)
Collecting idna<4,>=2.5; python_version >= "3"
  Using cached idna-3.2-py3-none-any.whl (59 kB)
Collecting charset-normalizer~=2.0.0; python_version >= "3"
```

- Zip the files and Lets Deploy this lambda



Test Event Name

(unsaved)

Response

```
{
  "statusCode": 200,
  "body": "\"Hello from Lambda!\""
}
```

Function Logs

```
START RequestId: 87d1b39d-10ee-437b-89f3-53fd54bba50e Version: $LATEST
all module are loaded
IP->>>>>
44.197.219.49
END RequestId: 87d1b39d-10ee-437b-89f3-53fd54bba50e
REPORT RequestId: 87d1b39d-10ee-437b-89f3-53fd54bba50e  Duration: 53.05 ms  Billed Duration: 54 ms  Memory Size: 200 MB Max Memory Used: 47 MB  Init Duration: 319.79
```

Request ID

87d1b39d-10ee-437b-89f3-53fd54bba50e

bravoooooooo

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Lab IV Lambda layers

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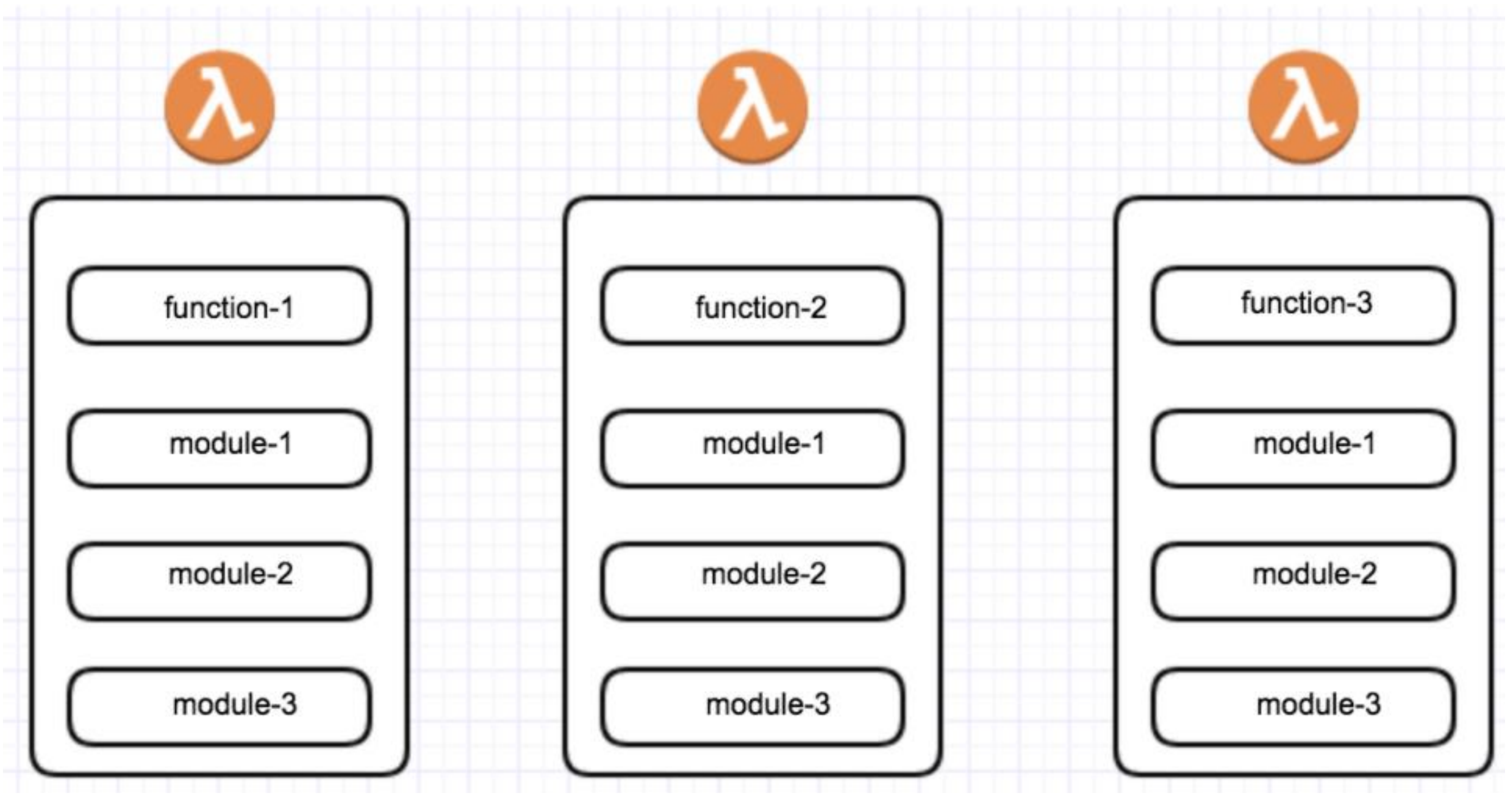
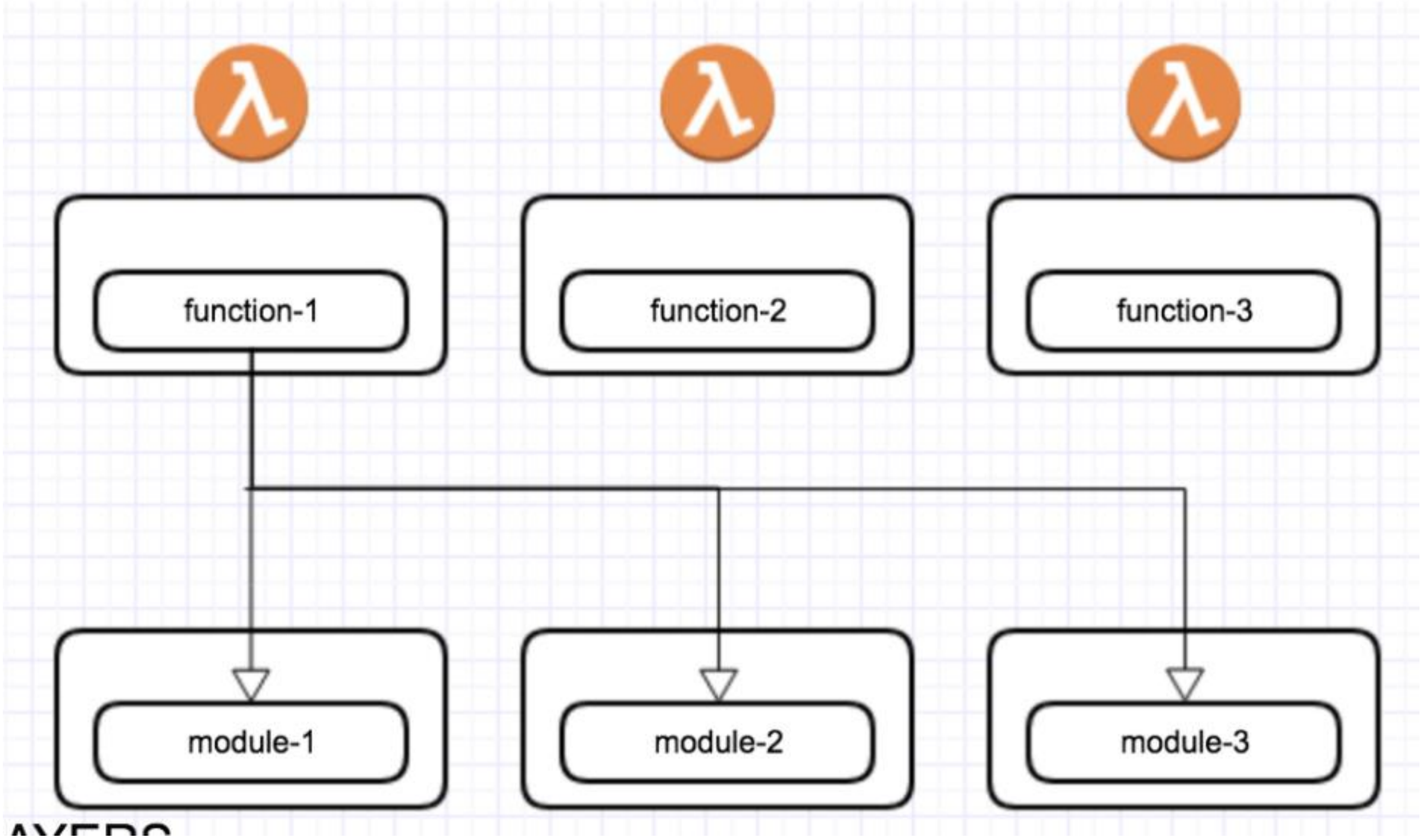
AWS Layers

- Serverless developers frequently import libraries and dependencies into their AWS Lambda functions. While you can zip these dependencies as part of the build and deployment process, in many cases it’s easier to use layers instead.

Without layers



With layers



Benefits of AWS Layers

- **Single package for all shared dependencies.** No need to package shared dependencies with your lambda functions. Instead, create a layer and reuse with different functions.
- **You can keep the size of deployments small.** Each lambda function can have the code only specific to the action it is intended to perform.
- **Easier code updates.** If the common dependencies are managed in the layers, then updating the dependency is very easy, as you only need to update the layer in which the dependency is packaged.

Lab Creating AWS Layers

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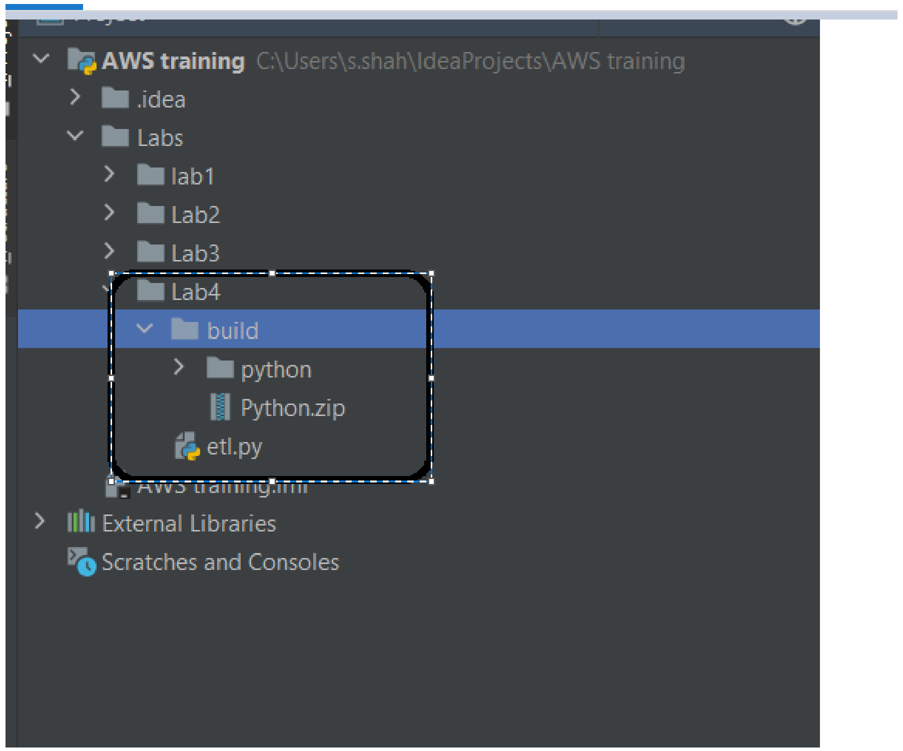
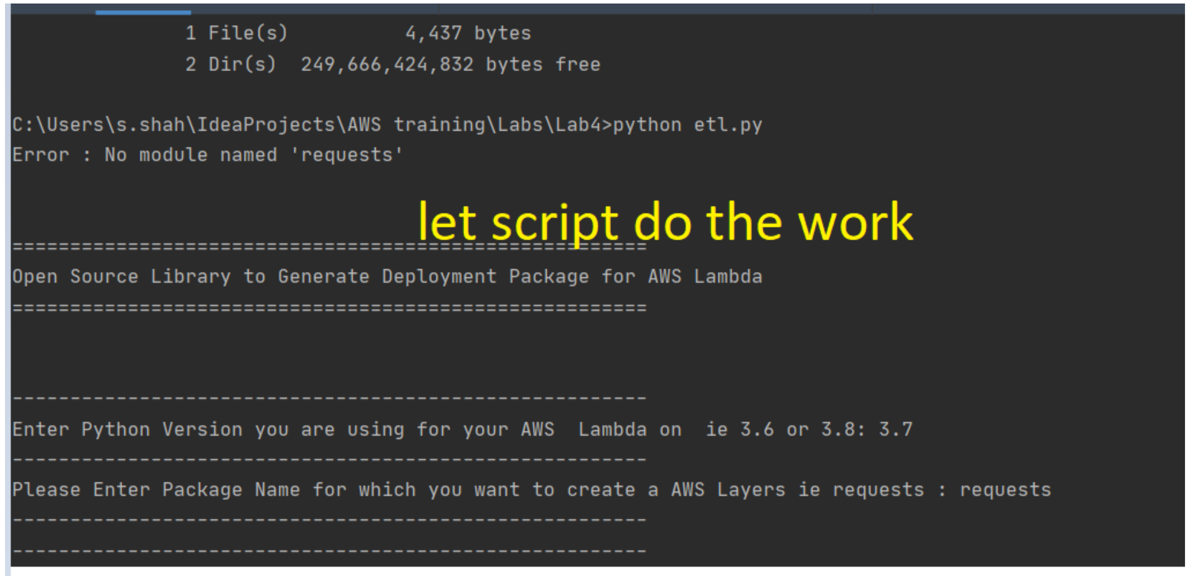
Code

- Clone the Library I made
- https://github.com/soumilshah1995/create-aws-layers-for-python-lambda.git

Create a layers



```
AWS training  C:\Users\s.shah\IdeaProjects\AWS training
  .idea
  Labs
    lab1
    Lab2
    Lab3
    Lab4
      build
        python
        Python.zip
      etl.py
    AWS training.iml
External Libraries
Scratches and Consoles
```



```
               1 File(s)          4,437 bytes
               2 Dir(s)  249,666,424,832 bytes free

C:\Users\s.shah\IdeaProjects\AWS training\Labs\Lab4>python etl.py
Error : No module named 'requests'

=======================================================
Open Source Library to Generate Deployment Package for AWS Lambda
=======================================================


-------------------------------------------------------
Enter Python Version you are using for your AWS  Lambda on  ie 3.6 or 3.8: 3.7
-------------------------------------------------------
Please Enter Package Name for which you want to create a AWS Layers ie requests : requests
-------------------------------------------------------
-------------------------------------------------------
```

Time to test it

Lambda with Docker Container

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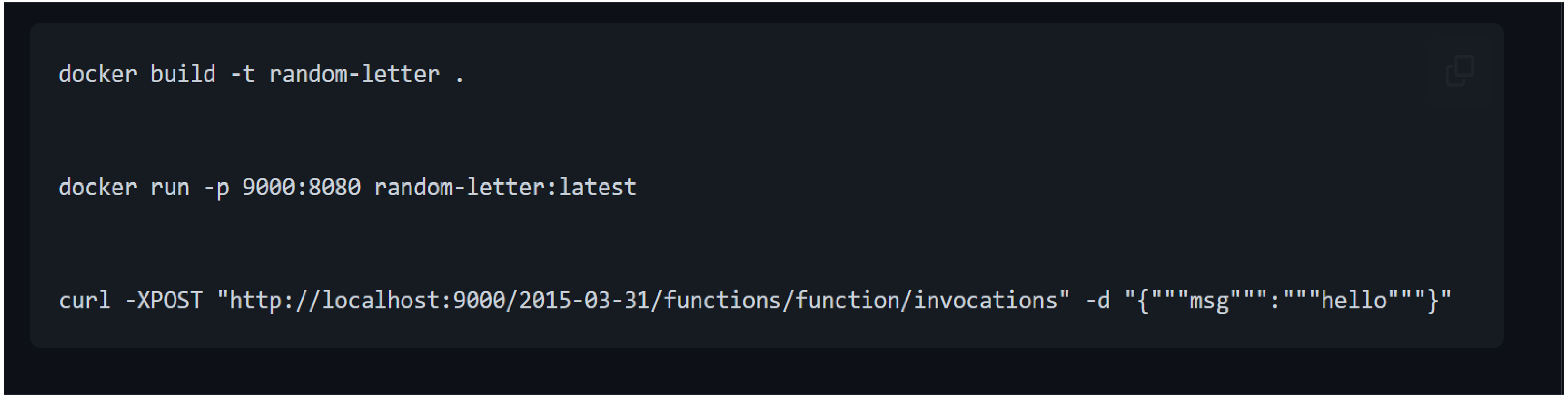
Code

- Download https://github.com/soumilshah1995/PythonLambdaDockerECR.git



```
docker build -t random-letter .


docker run -p 9000:8080 random-letter:latest


curl -XPOST "http://localhost:9000/2015-03-31/functions/function/invocations" -d "{"""msg""":"""hello"""}"
```

Lab on testing Lambda

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References

[1] https://faun.pub/aws-lambda-layers-d07831ff50ea

[2] https://aws.amazon.com/lambda/