AWS re:Start

LAB

Troubleshooting EC2 Instance Creation

WEEK 9

aws re/start

Overview

In this activity, you use the AWS Command Line Interface (AWS CLI) to launch Amazon Elastic Compute Cloud (Amazon EC2) instances.

When you create the instance, you will reference a user data script to configure the instance to have an Apache web server, a MariaDB relational database (which is a fork of the MySQL relational database), and PHP running on the instance. Together, these software packages installed on a single machine are often referred to as a LAMP stack (Linux, Apache web server, MySQL, and PHP). Using a LAMP stack is a common way to create a website with a database backend on a single machine.

The same user data file will deploy website files and run database configuration scripts on the instance. The result will be an instance that hosts the Café Web Application.

Topics covered

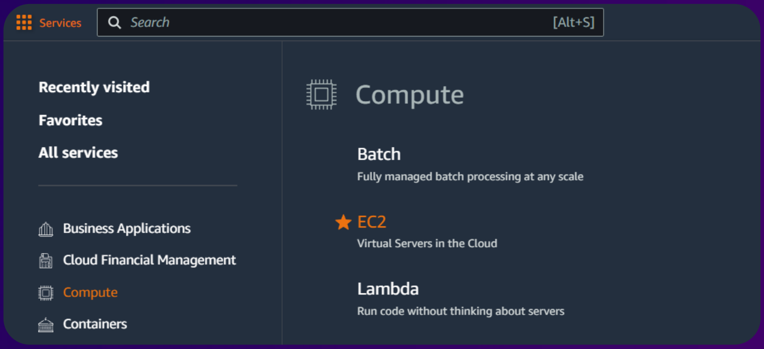
- Launch an EC2 instance by using the AWS CLI.
- Troubleshoot AWS CLI commands and Amazon EC2 service settings by using basic troubleshooting tips and the open-source nmap utility.

Task 1

Connecting to the CLI Host instance

Access the EC2 Management Console

Open the AWS Management Console, and select EC2.



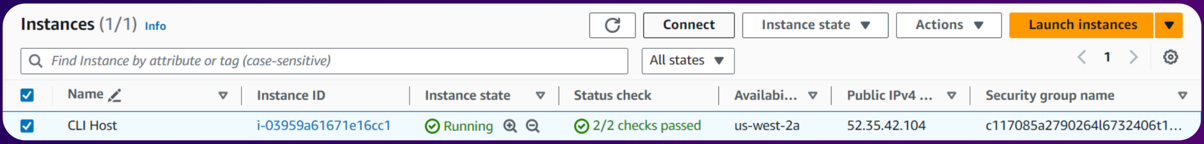
Fully managed batch processing at any scale

Virtual Servers in the Cloud

Run code without thinking about servers

Connect to the CLI Host instance

Navigate to the **Instances** section, select the **CLI Host** instance, and Connect to the instance using EC2 Instance Connect.



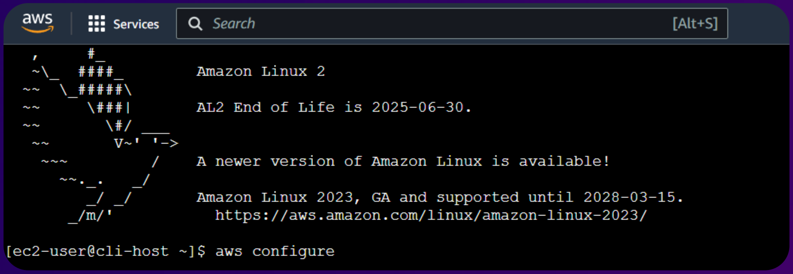
☑	Name	Instance ID	Instance state	Status check	Availabi...	Public IPv4 ...	Security group name
☑	CLI Host	i-03959a61671e16cc1	✓ Running	✓ 2/2 checks passed	us-west-2a	52.35.42.104	c117085a2790264l6732406t1...

Task 2

Configuring the AWS CLI

The configure command

In the EC2 Instance Connect session terminal, run the aws configure command to set up the AWS CLI profile with credentials.

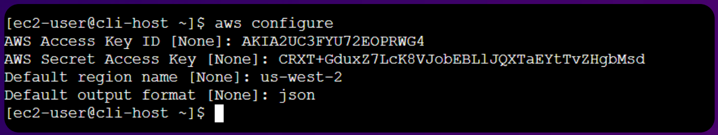


```
   ,     #_
   ~\_  ####_        Amazon Linux 2
  ~~  \_#####\
  ~~     \###|       AL2 End of Life is 2025-06-30.
  ~~       \#/ ___
   ~~       V~' '->
    ~~~         /    A newer version of Amazon Linux is available!
      ~~._.   _/
         _/ _/       Amazon Linux 2023, GA and supported until 2028-03-15.
       _/m/'           https://aws.amazon.com/linux/amazon-linux-2023/

[ec2-user@cli-host ~]$ aws configure
```

Set configuration variables

When prompted, enter the following information:

- AWS Access Key ID
- AWS Secret Access Key
- Default region name
- Default ouput format



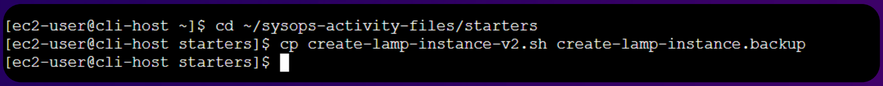
```
[ec2-user@cli-host ~]$ aws configure
AWS Access Key ID [None]: AKIA2UC3FYU72EOPRWG4
AWS Secret Access Key [None]: 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
Default region name [None]: us-west-2
Default output format [None]: json
[ec2-user@cli-host ~]$ █
```

Task 3

Creating an EC2 instance by using the AWS CLI

Step 1: Create a backup of the script

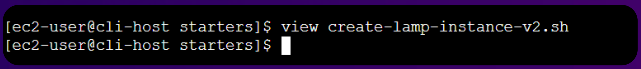
To change to the directory where the script file exists and create a backup of it, run the following commands.



```
[ec2-user@cli-host ~]$ cd ~/sysops-activity-files/starters
[ec2-user@cli-host starters]$ cp create-lamp-instance-v2.sh create-lamp-instance.backup
[ec2-user@cli-host starters]$ █
```

Step 2: Analyze the script

Open the script file in read-only mode in the vi editor, and analyze the contents of the script.



```
[ec2-user@cli-host starters]$ view create-lamp-instance-v2.sh
[ec2-user@cli-host starters]$ █
```

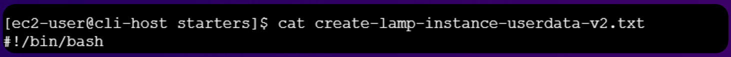
This bash script sets up an EC2 instance for a LAMP application within a specific VPC named "Cafe VPC" on AWS. It identifies the necessary AWS Region and VPC, retrieves subnet, key pair, and AMI ID, and ensures no conflicting resources exist by prompting deletions if necessary. The script creates a security group with ports 22 and 80 open, launches the EC2 instance with these settings, and monitors until a public IP address is assigned, displaying it on the terminal.

Task 3

Creating an EC2 instance by using the AWS CLI

Step 3: Review User Data

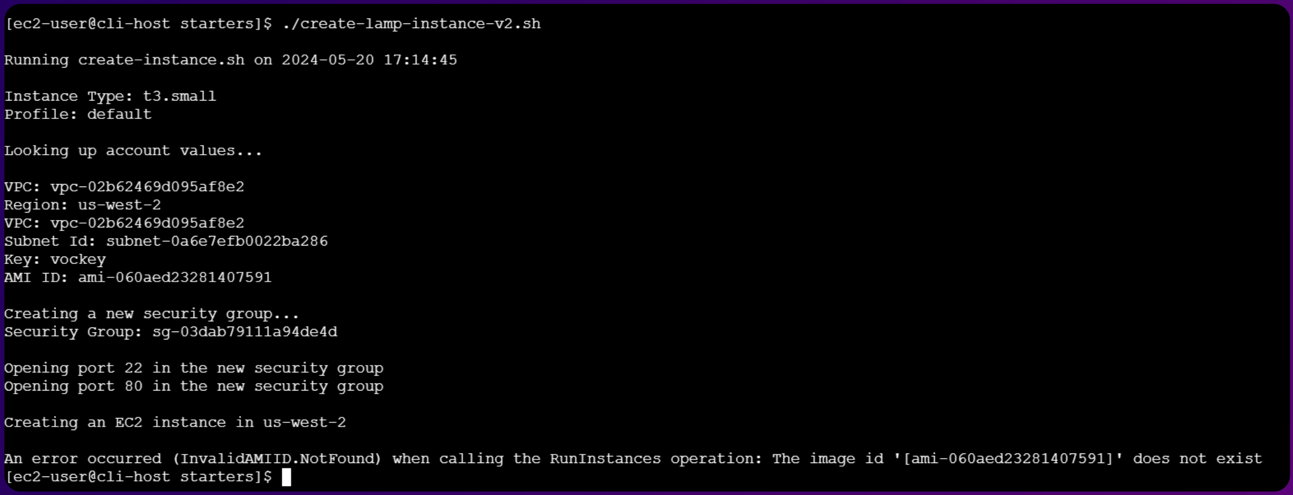
Review the contents of the user data script. The user data script runs a series of commands on the instance after it is launched. These commands will install a web server, PHP, and a database server.



```
[ec2-user@cli-host starters]$ cat create-lamp-instance-userdata-v2.txt
#!/bin/bash
```

Step 4: Try to run the script

Try to run the script. The script fails and exits without successfully completing. Review the displayed error.



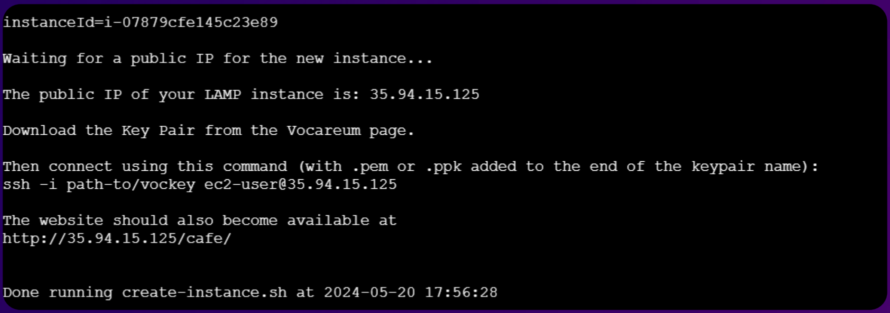
```
[ec2-user@cli-host starters]$ ./create-lamp-instance-v2.sh

Running create-instance.sh on 2024-05-20 17:14:45

Instance Type: t3.small
Profile: default

Looking up account values...

VPC: vpc-02b62469d095af8e2
Region: us-west-2
VPC: vpc-02b62469d095af8e2
Subnet Id: subnet-0a6e7efb0022ba286
Key: vockey
AMI ID: ami-060aed23281407591

Creating a new security group...
Security Group: sg-03dab79111a94de4d

Opening port 22 in the new security group
Opening port 80 in the new security group

Creating an EC2 instance in us-west-2

An error occurred (InvalidAMIID.NotFound) when calling the RunInstances operation: The image id '[ami-060aed23281407591]' does not exist
[ec2-user@cli-host starters]$ █
```

Task 3

Creating an EC2 instance by using the AWS CLI

Step 5: Fix Issue # 1

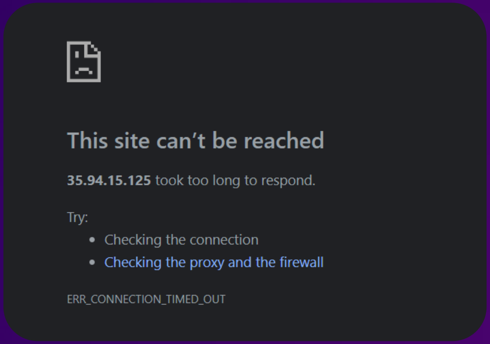
The issue was due to an incorrect Region value being used for the **run-instances** command. Replace the line --region us-east-1 \ in the script with –-region $region \, and run the script again. The **run-instances** command succeeded, and a public IPv4 address was assigned to the new instance.



```
instanceId=i-07879cfe145c23e89

Waiting for a public IP for the new instance...

The public IP of your LAMP instance is: 35.94.15.125

Download the Key Pair from the Vocareum page.

Then connect using this command (with .pem or .ppk added to the end of the keypair name):
ssh -i path-to/vockey ec2-user@35.94.15.125

The website should also become available at
http://35.94.15.125/cafe/


Done running create-instance.sh at 2024-05-20 17:56:28
```

Step 6: Try to connect to the webpage

Use the Public IPv4 address of the new instance to try to connect to the webpage. The attempt fails.



This site can't be reached

35.94.15.125 took too long to respond.

Try:

- Checking the connection
- Checking the proxy and the firewall

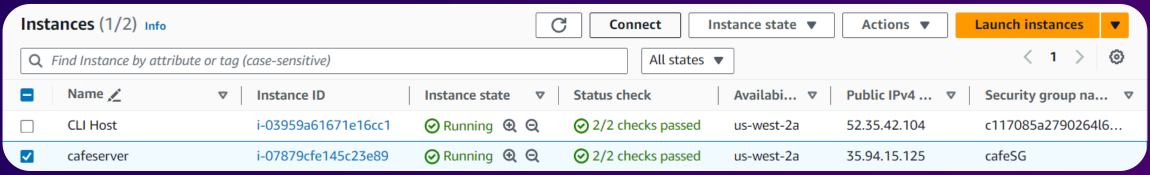
ERR_CONNECTION_TIMED_OUT

Task 3

Creating an EC2 instance by using the AWS CLI

Step 7: Connect to the cafeserver instance

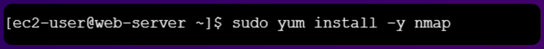
In the EC2 Management Console, connect to the new **cafeserver** LAMP instance by using EC2 Instance Connect.



☐	Name	Instance ID	Instance state	Status check	Availabi...	Public IPv4 ...	Security group na...
☐	CLI Host	i-03959a61671e16cc1	✓ Running	✓ 2/2 checks passed	us-west-2a	52.35.42.104	c117085a2790264l6...
☑	cafeserver	i-07879cfe145c23e89	✓ Running	✓ 2/2 checks passed	us-west-2a	35.94.15.125	cafeSG

Step 8: Install nmap

In the EC2 Instance Connect session terminal for the **cafeserver** LAMP instance, run the following command to install nmap, which is a port scanning tool.



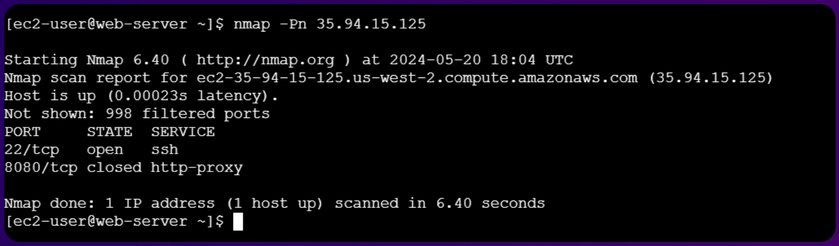
```
[ec2-user@web-server ~]$ sudo yum install -y nmap
```

Task 3

Creating an EC2 instance by using the AWS CLI

Step 9: Run an Nmap scan

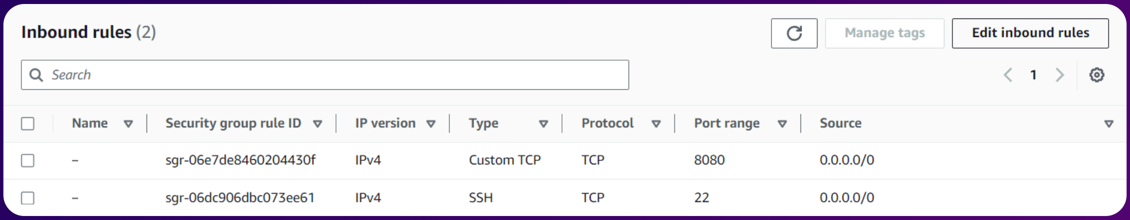
Run the following command to perform an Nmap scan and determine which ports are accessible. The output indicates that port 80 (HTTP) is not open, but TCP port 8080 is open instead.



```
[ec2-user@web-server ~]$ nmap -Pn 35.94.15.125

Starting Nmap 6.40 ( http://nmap.org ) at 2024-05-20 18:04 UTC
Nmap scan report for ec2-35-94-15-125.us-west-2.compute.amazonaws.com (35.94.15.125)
Host is up (0.00023s latency).
Not shown: 998 filtered ports
PORT     STATE  SERVICE
22/tcp   open   ssh
8080/tcp closed http-proxy

Nmap done: 1 IP address (1 host up) scanned in 6.40 seconds
[ec2-user@web-server ~]$ 
```

Step 10: Fix issue #2

Edit the inbound rule for the associated Security Group **cafeSG** to replace TCP port 8080 with port 80 (HTTP).



Inbound rules (2)

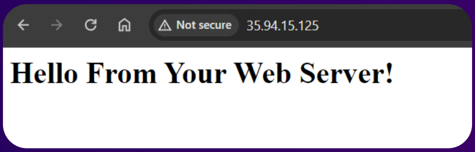
□	Name	Security group rule ID	IP version	Type	Protocol	Port range	Source
□	–	sgr-06e7de8460204430f	IPv4	Custom TCP	TCP	8080	0.0.0.0/0
□	–	sgr-06dc906dbc073ee61	IPv4	SSH	TCP	22	0.0.0.0/0

Task 3

Creating an EC2 instance by using the AWS CLI

Step 11: Access the website

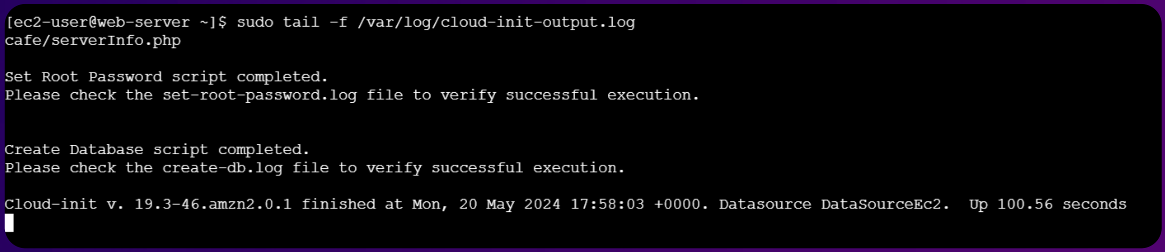
After you identify and resolve the issue, visit the Public IPv4 address of the new instance. If you resolved issue #2 successfully, you should see the following message.



Hello From Your Web Server!

Step 12: Review cloud-init-output.log

Check the log file that shows whether the user data script ran as expected. Run the following command to see the log file entries as they are written. Observe the log file entries. Notice the entries related to the installation of MariaDB and PHP.



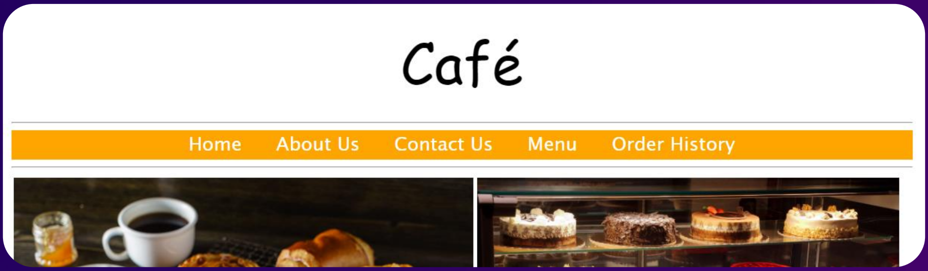
```
[ec2-user@web-server ~]$ sudo tail -f /var/log/cloud-init-output.log
cafe/serverInfo.php

Set Root Password script completed.
Please check the set-root-password.log file to verify successful execution.


Create Database script completed.
Please check the create-db.log file to verify successful execution.

Cloud-init v. 19.3-46.amzn2.0.1 finished at Mon, 20 May 2024 17:58:03 +0000. Datasource DataSourceEc2.  Up 100.56 seconds
█
```

Task 4

Verifying the functionality of the website

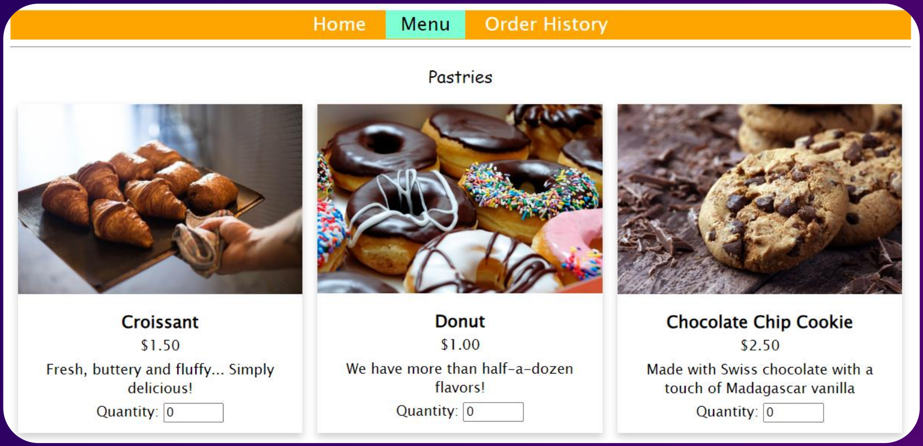
Step 1: Verify that the website is deployed

Visit http://35.94.15.125/cafe to see the café website home page.



Step 2: Order items

Test whether you can order items through the website. Choose the **Menu** link, choose a few desserts to order, and then choose Submit Order.



Croissant
$1.50
Fresh, buttery and fluffy... Simply delicious!
Quantity: 0

Donut
$1.00
We have more than half-a-dozen flavors!
Quantity: 0

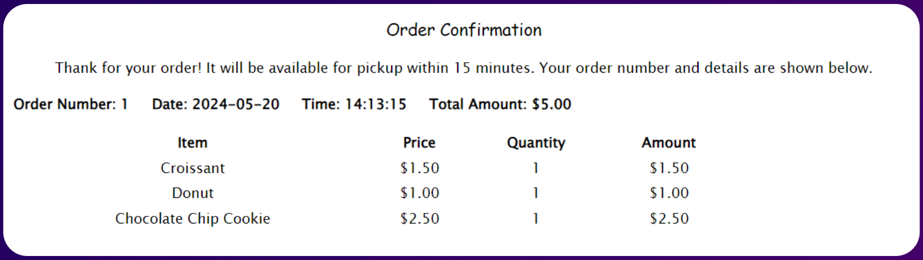
Chocolate Chip Cookie
$2.50
Made with Swiss chocolate with a touch of Madagascar vanilla
Quantity: 0

Task 4

Verifying the functionality of the website

Step 3: Review Order Confirmation

After submitting an order, the **Order Confirmation** page displays with line-item details.



Order Confirmation

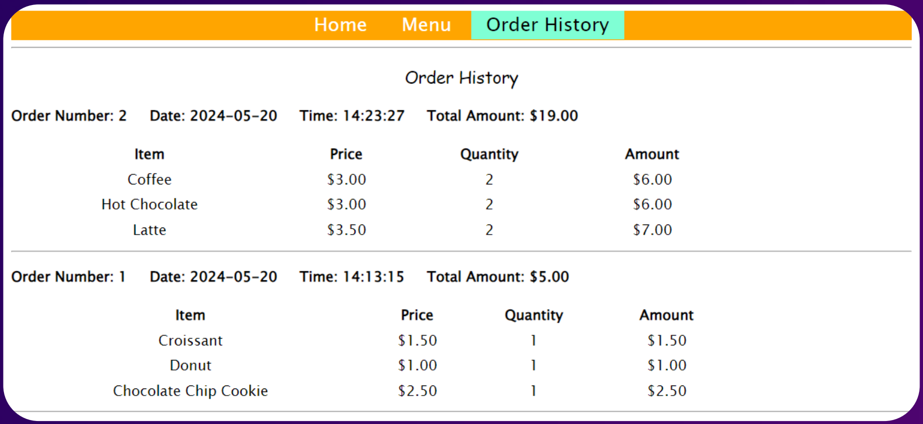
Thank for your order! It will be available for pickup within 15 minutes. Your order number and details are shown below.

Order Number: 1 **Date: 2024-05-20** **Time: 14:13:15** **Total Amount: $5.00**

Item	Price	Quantity	Amount
Croissant	$1.50	1	$1.50
Donut	$1.00	1	$1.00
Chocolate Chip Cookie	$2.50	1	$2.50

Step 4: Review Order History

Place another order for different items. Then, choose the **Order History** page. The details of both orders were captured.



Order History

Order Number: 2 **Date: 2024-05-20** **Time: 14:23:27** **Total Amount: $19.00**

Item	Price	Quantity	Amount
Coffee	$3.00	2	$6.00
Hot Chocolate	$3.00	2	$6.00
Latte	$3.50	2	$7.00

Order Number: 1 **Date: 2024-05-20** **Time: 14:13:15** **Total Amount: $5.00**

Item	Price	Quantity	Amount
Croissant	$1.50	1	$1.50
Donut	$1.00	1	$1.00
Chocolate Chip Cookie	$2.50	1	$2.50

Conclusions

Launching EC2 instances

Using the AWS CLI to launch EC2 instances offers precise control and automation capabilities, streamlining deployment processes.

The aws ec2 run-instances command

The aws ec2 run-instances command is essential for programmatically launching instances with specified configurations, enhancing repeatability and consistency.

User Data scripts

User Data scripts automate instance setup tasks, such as software installation and configuration, ensuring instances are ready to use upon launch.

Troubleshooting

The AWS CLI provides comprehensive tools for troubleshooting, allowing users to query and modify resources to resolve issues efficiently.

The Nmap utility

Nmap is a powerful tool for network discovery and security auditing, useful for identifying open ports and services on EC2 instances for troubleshooting and security checks.

aws re/start

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