

Project 1 - Deploying a Multi-Tier Website Using AWS EC2

Topic: Deploy a Multi-tier website using EC2

Description: Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) cloud. Using Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.

Problem Statement:

Company ABC wants to move their product to AWS. They have the following things setup right now:

1. MySQL DB
2. Website (PHP)

The company wants high availability on this product, therefore wants autoscaling to be enabled on this website.

Steps to solve:

1. Launch an EC2 Instance
 2. Enable Auto Scaling on these instances (minimum 2)
 3. Create an RDS Instance
 4. Create Database & Table in RDS Instance
 - Database name: intel
 - Table name: data
 - Database password: intel123
 5. Change hostname in website
 6. Allow traffic from EC2 to RDS Instance
 7. Allow all-traffic to EC2 instance
-

Screenshot of the AWS EC2 Management Console showing a running instance named "Project-server".

Instances (1/1) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pul
Project-server	i-0f1fc1303dcc94d5	Running	t2.micro	Initializing	No alarms	+ us-east-1a	ec2

Instance: i-0f1fc1303dcc94d5 (Project-server)

Details | Security | Networking | Storage | Status checks | Monitoring | Tags

Instance summary

Instance ID i-0f1fc1303dcc94d5 (Project-server)	Public IPv4 address 3.83.83.68 open address	Private IPv4 addresses 172.31.80.122
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-3-83-83-68.compute-1.amazonaws.com open address

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CloudShell Feedback Language

Type here to search

37°C Partly sunny 18:48 15-04-2023

The screenshot shows a Microsoft Edge browser window with the AWS CloudShell interface. The title bar includes tabs for "Start Course | Intellipaat", "YouTube", "Connect to instance | EC2 Manager", and "AWS CloudShell". The main content area is a terminal window titled "AWS CloudShell" for the "us-east-1" region. The terminal displays the following output:

```
Swap usage:  0%
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-80-122:~$
```

The terminal prompt is "ubuntu@ip-172-31-80-122:~\$". The bottom of the screen shows the Windows taskbar with icons for File Explorer, Edge, Mail, and others. The system tray shows the date (15-04-2023), time (18:58), battery level, signal strength, and weather information (37°C Partly sunny).

The screenshot shows a Windows desktop environment with multiple browser tabs open. The active tab is 'aws' in the AWS CloudShell interface, which is running on an EC2 instance in the 'us-east-1' region. The terminal window displays the command 'sudo apt-get install apache2' being run, with the output showing the package download and installation process. The terminal also lists suggested packages and the number of packages to be installed. The AWS CloudShell interface includes a navigation bar with links like 'Start Course | Intellipaat', 'YouTube', 'Connect to instance | EC2 Manager', and 'AWS CloudShell'. The bottom of the screen shows the Windows taskbar with various pinned icons and system status indicators.

```
Get:30 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [110 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [14.2 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [19.4 kB]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [4,068 B]
Get:42 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Fetched 26.6 MB in 5s (5,634 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-80-122:~$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils bzip2 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 mailcap mime-support
  ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser bzip2-doc
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils bzip2 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 mailcap mime-support
  ssl-cert
0 upgraded, 13 newly installed, 0 to remove and 27 not upgraded.
Need to get 2,138 kB of archives.
After this operation, 8,505 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libapr1 amd64 1.7.0-8ubuntu0.22.04.1 [108 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libaprutil1 amd64 1.6.1-5ubuntu4.22.04.1 [92.6 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.1-5ubuntu4.22.04.1 [11.3 kB]
```

Screenshot of the AWS CloudShell interface showing the EC2 Management Console.

The browser tabs include: Start Course | Intellipaat, YouTube, Instances | EC2 Management Con..., and AWS CloudShell.

The AWS CloudShell sidebar shows:

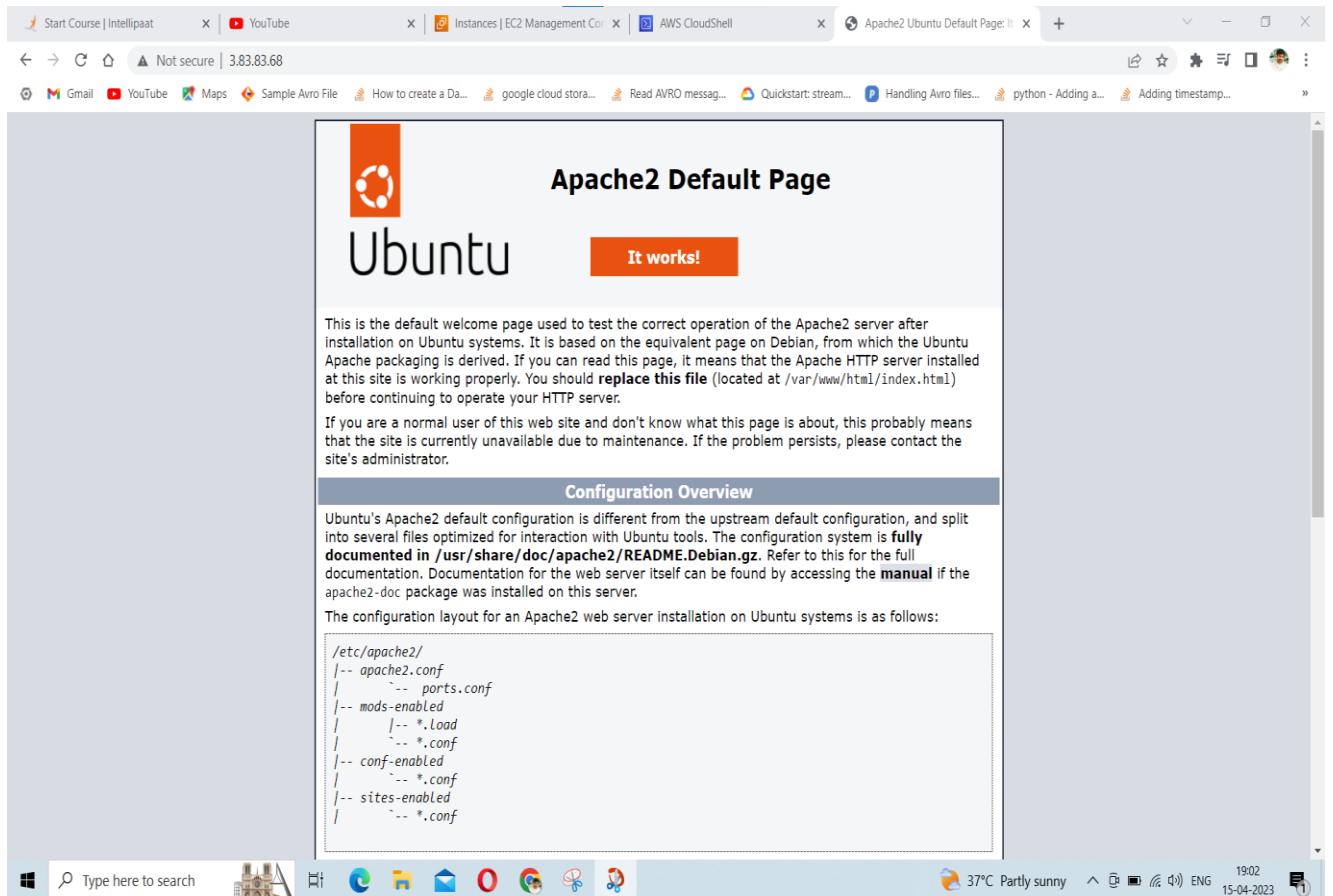
- New EC2 Experience (Learn more)
- EC2 Dashboard
- EC2 Global View
- Events
- Tags
- Limits
- Instances
 - Instances (selected)
 - Instance Types
 - Launch Templates
 - Spot Requests
 - Savings Plans
 - Reserved Instances
 - Dedicated Hosts
 - Scheduled Instances
 - Capacity Reservations
- Images
 - AMIs
 - AMI Catalog

The main content area displays the EC2 Instances page with one instance listed:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pul
Project-server	i-0f1fc1303dcc94d5	Running	t2.micro	2/2 checks passed	No alarms	+ us-east-1a	ec2

The Instance details page for i-0f1fc1303dcc94d5 (Project-server) is shown. The Public IPv4 address 3.83.83.68 is highlighted with a tooltip: "Public IPv4 address copied".

Bottom navigation bar includes: CloudShell, Feedback, Language, © 2023, Amazon Web Services India Private Limited or its affiliates., Privacy, Terms, Cookie preferences, and system status: 37°C Partly sunny, 19:01, ENG, 15-04-2023.

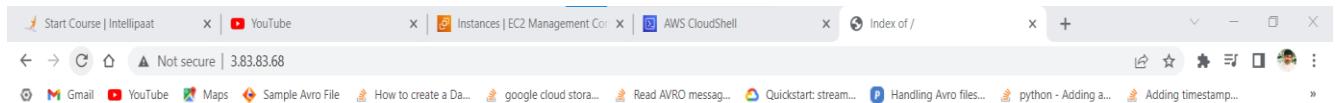


The screenshot shows a Microsoft Edge browser window with the following details:

- Address Bar:** us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0
- Tab Bar:** Start Course | Intellipaat, YouTube, Instances | EC2 Management Con..., AWS CloudShell, Index of /
- Header:** AWS Services Search [Alt+S], N. Virginia, Yaswanth Kumar Desineedi, Actions ▾
- Content Area:** AWS CloudShell terminal session on an Ubuntu instance in us-east-1. The terminal output is:

```
ubuntu@ip-172-31-80-122:~$ cd /var/www/html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
index.html
ubuntu@ip-172-31-80-122:/var/www/html$ sudo rm index.html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
```

A red line highlights the command "sudo rm index.html".
- Bottom Bar:** Feedback, Language, © 2023, Amazon Web Services India Private Limited or its affiliates., Privacy, Terms, Cookie preferences, Type here to search, and system icons.

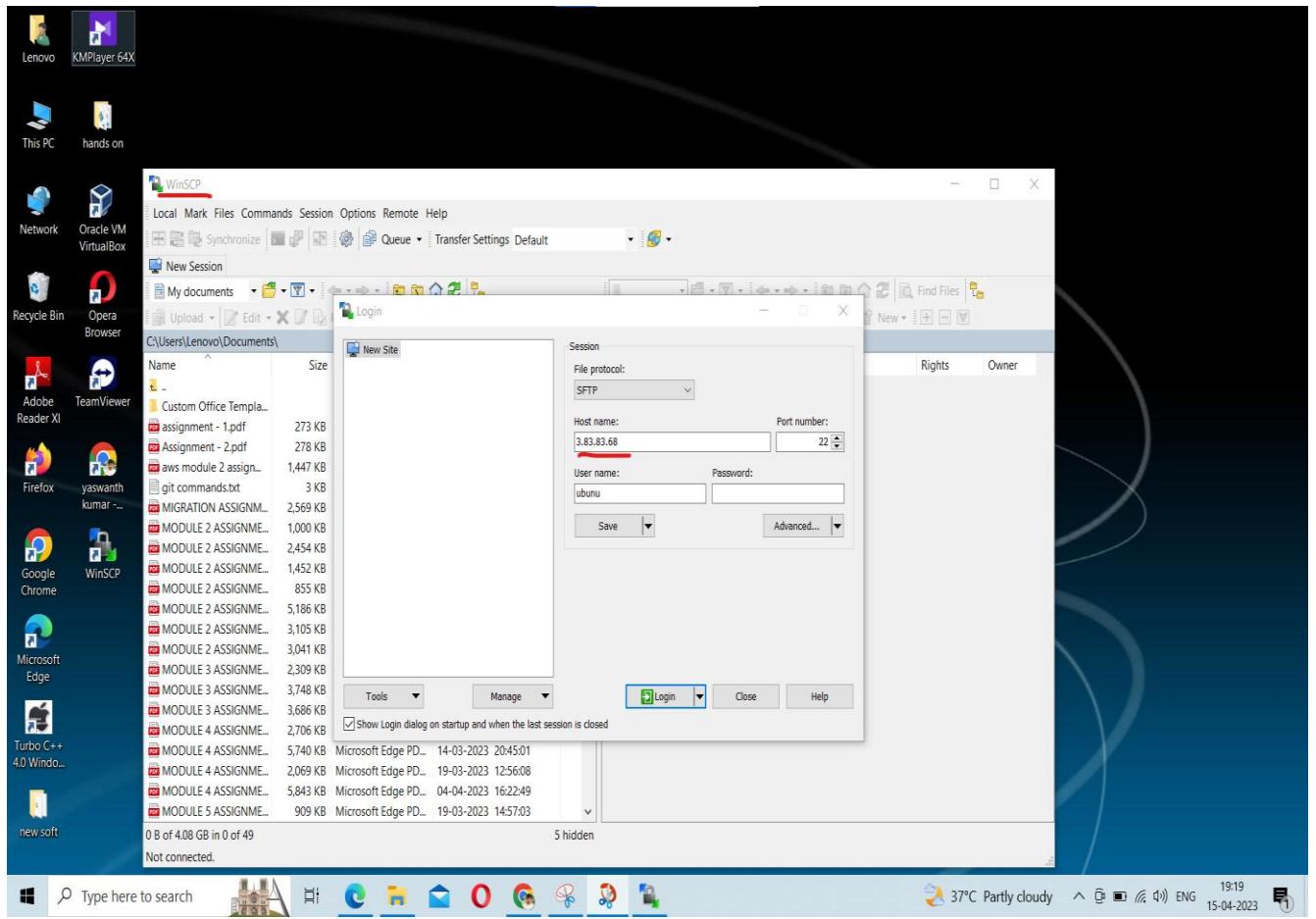


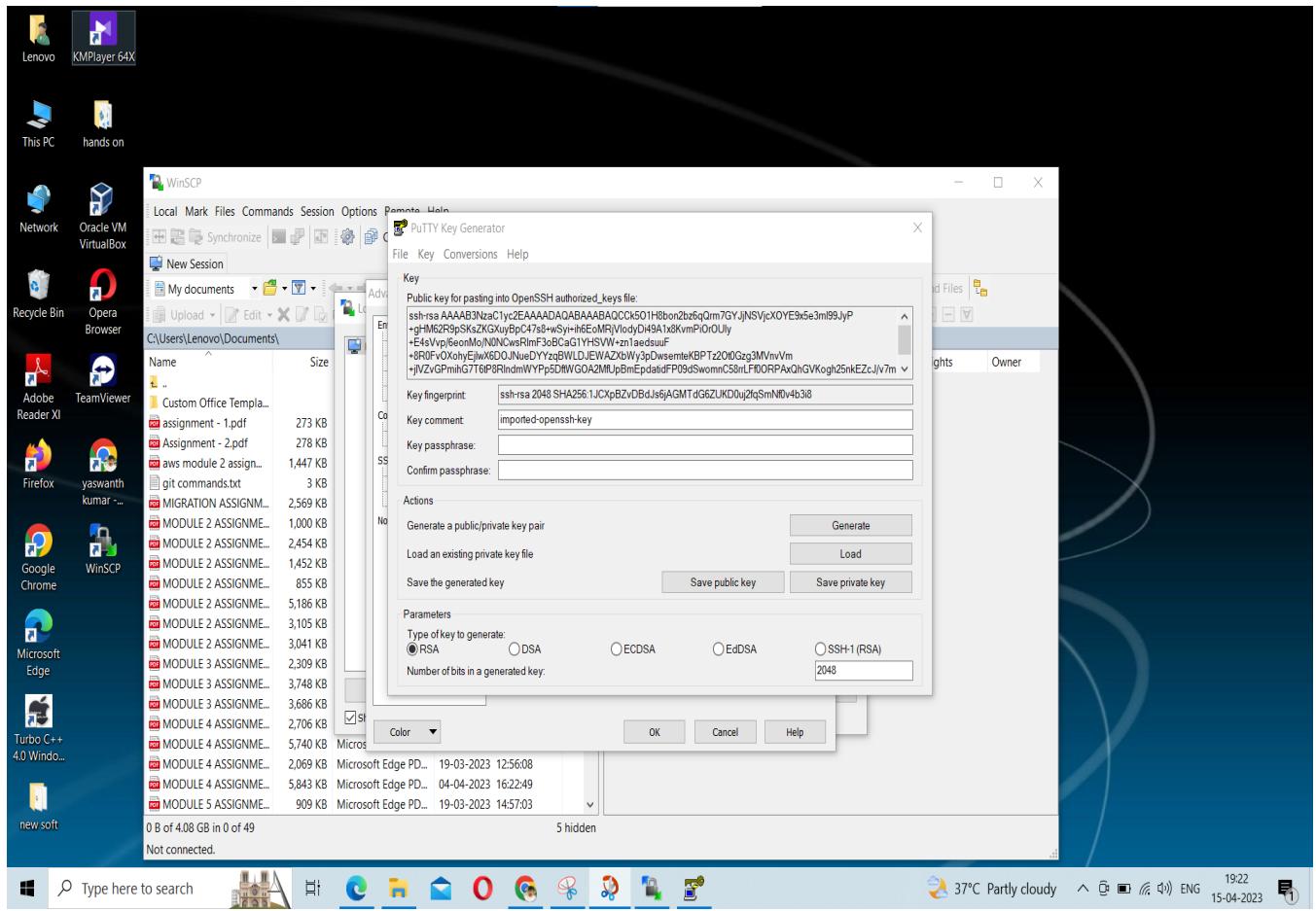
Index of /

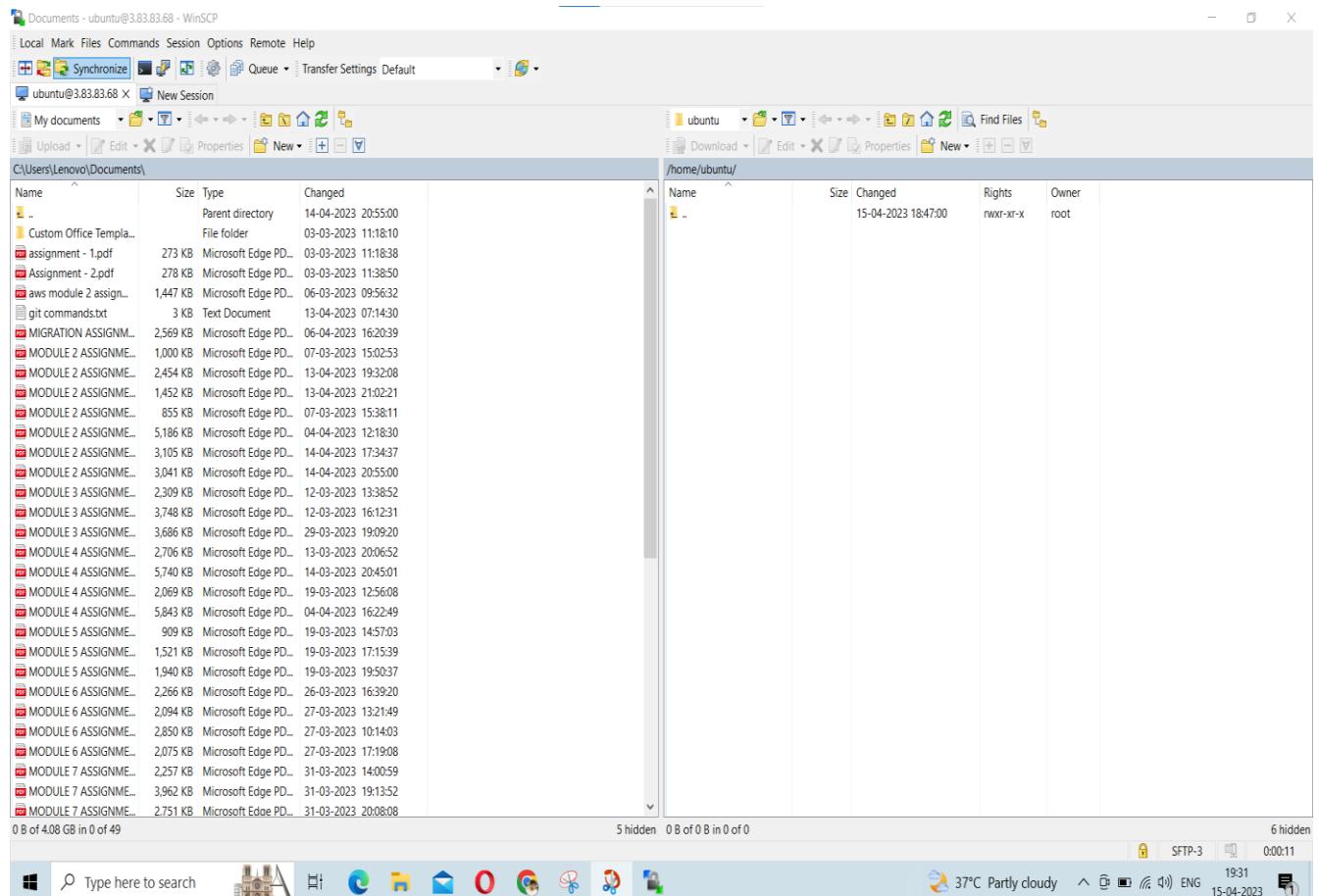
Name Last modified Size Description

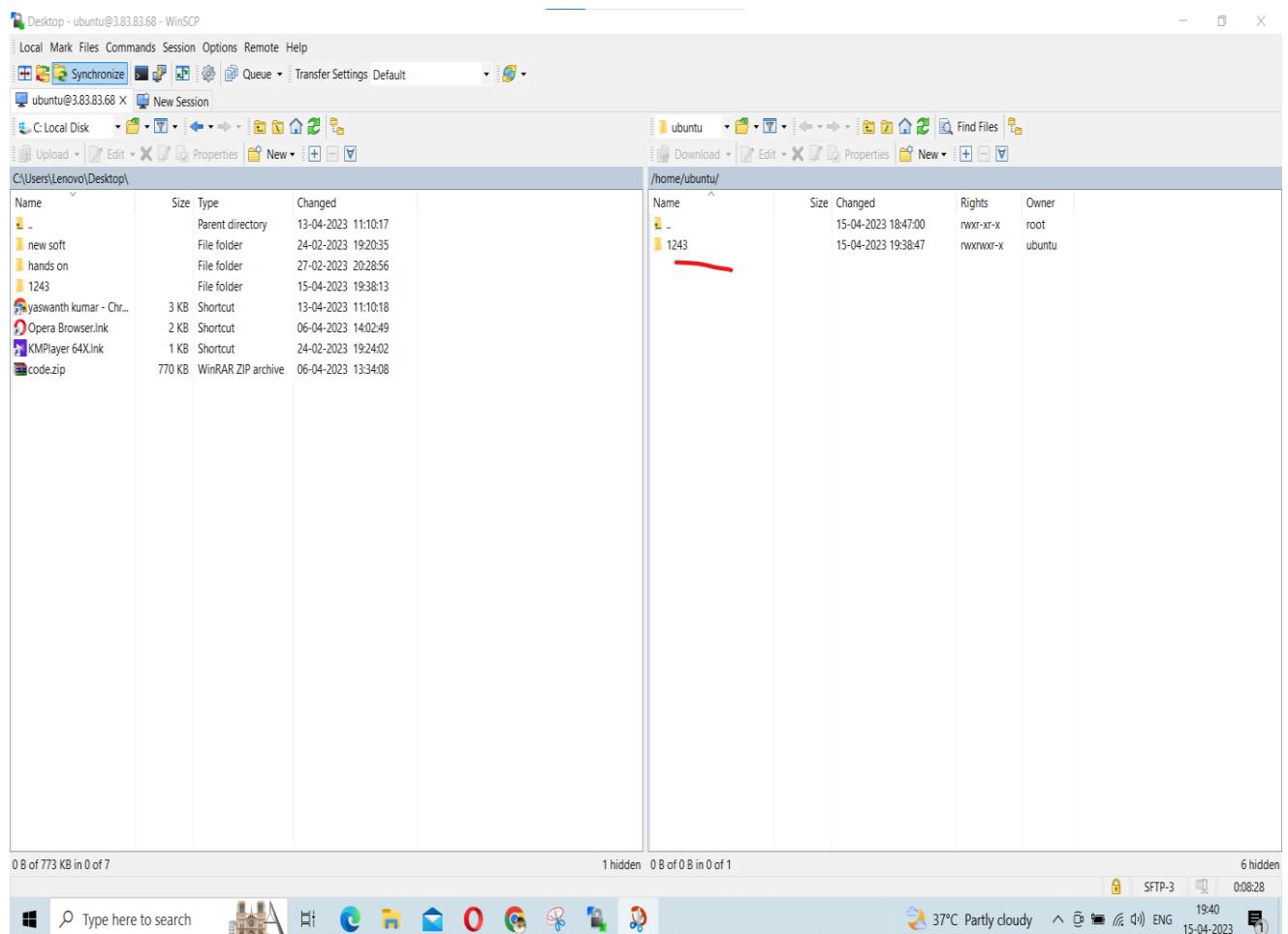
Apache/2.4.32 (Ubuntu) Server at 3.83.83.68 Port 80











The screenshot shows a web browser window with multiple tabs open. The active tab is titled "AWS CloudShell" and displays a terminal session on an EC2 instance in the "us-east-1" region. The terminal output shows the user performing several commands:

```
ubuntu@ip-172-31-80-122:~$ clear
ubuntu@ip-172-31-80-122:~$ cd /var/www/html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
index.html
ubuntu@ip-172-31-80-122:/var/www/html$ sudo rm index.html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
ubuntu@ip-172-31-80-122:/var/www/html$ cd
ubuntu@ip-172-31-80-122:~$ ls
1243
ubuntu@ip-172-31-80-122:~$ cd 1234
-bash: cd: 1234: No such file or directory
ubuntu@ip-172-31-80-122:~$ cd 1243
ubuntu@ip-172-31-80-122:~/1243$ ls
images index.php
ubuntu@ip-172-31-80-122:~/1243$
```

The browser interface includes a search bar, a navigation bar with links like "Gmail", "Maps", and "Services", and a top bar with account information ("N. Virginia" and "Yaswanth Kumar Desineedi"). The bottom of the screen shows the Windows taskbar with various pinned icons.

Start Course | Intellipaat | YouTube | Instances | EC2 Management Con | AWS CloudShell | Index of /

Gmail | YouTube | Maps | Sample Avro File | How to create a Da... | google cloud stor... | Read AVRO messag... | Quickstart: stream... | Handling Avro files... | python - Adding a... | Adding timestamp...

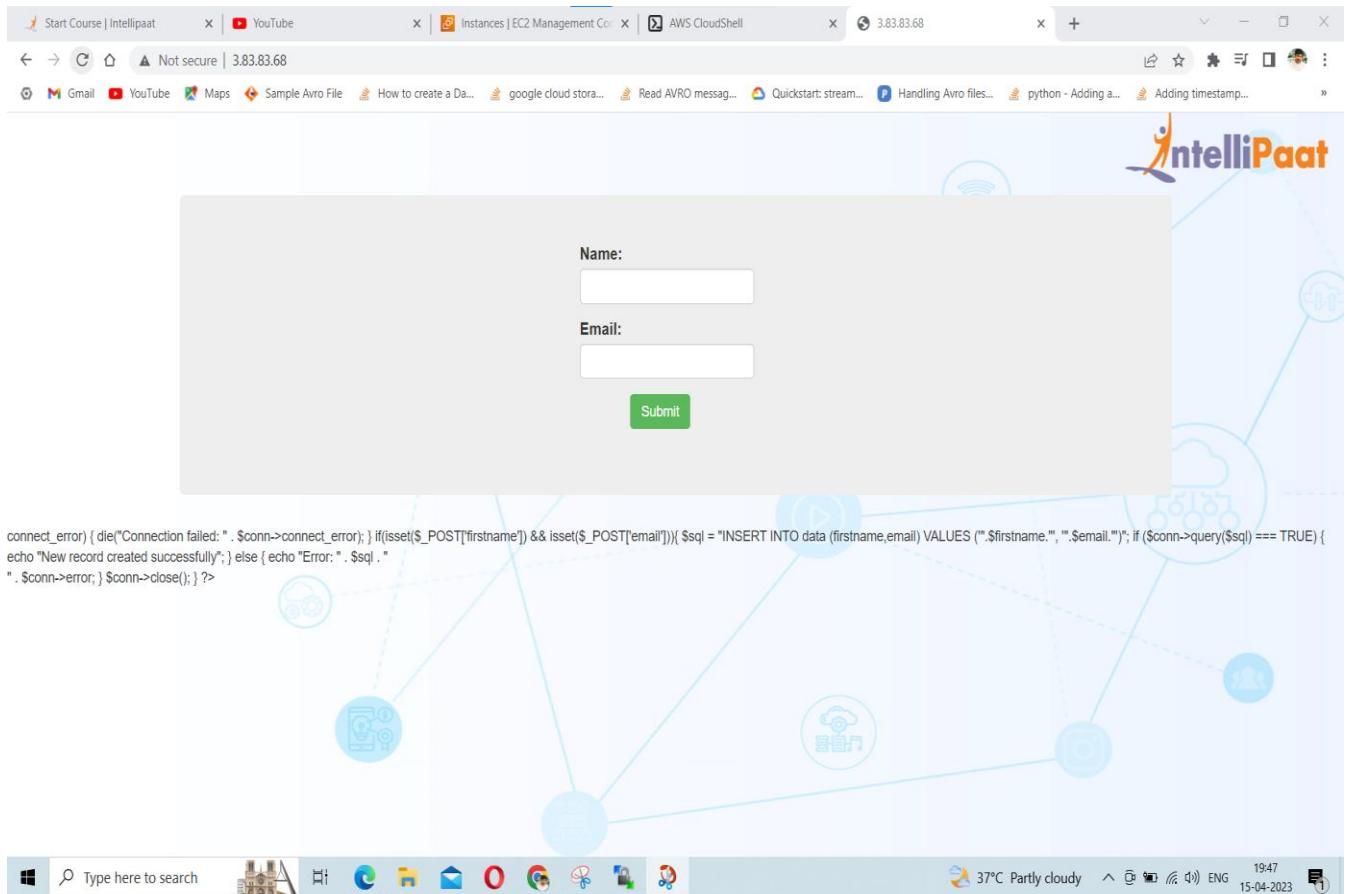
AWS Services Search [Alt+S] Actions N. Virginia Yaswanth Kumar Desineedi

AWS CloudShell us-east-1

```
ubuntu@ip-172-31-80-122:~$ clear
ubuntu@ip-172-31-80-122:~$ cd /var/www/html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
index.html
ubuntu@ip-172-31-80-122:/var/www/html$ sudo rm index.html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
ubuntu@ip-172-31-80-122:/var/www/html$ cd
ubuntu@ip-172-31-80-122:~$ ls
1243
ubuntu@ip-172-31-80-122:~$ cd 1234
-bash: cd: 1234: No such file or directory
ubuntu@ip-172-31-80-122:~$ cd 1243
ubuntu@ip-172-31-80-122:~/1243$ ls
images index.php
ubuntu@ip-172-31-80-122:~/1243$ sudo cp -r /home/ubuntu/1243/* /var/www/html
ubuntu@ip-172-31-80-122:~/1243$ cd /var/www/html/var/www/html
-bash: cd: /var/www/html/var/www/html: No such file or directory
ubuntu@ip-172-31-80-122:~/1243$ cd /var/www/html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
images index.php
ubuntu@ip-172-31-80-122:/var/www/html$
```

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Type here to search 37°C Partly cloudy 19:46 15-04-2023



Screenshot of the AWS RDS console showing the creation of a database named "awsproject-yaswanth".

The browser tabs include:

- Start Course | Intellipaat
- YouTube
- Instances | EC2 Management
- Databases - RDS Management
- AWS CloudShell
- 3.83.83.68

The AWS navigation bar shows:

- Gmail
- YouTube
- Maps
- Sample Avro File
- How to create a Da...
- google cloud stor...
- Read AVRO messag...
- Quickstart: stream...
- Handling Avro files...
- python - Adding a...
- Adding timestamp...

The RDS service menu shows:

- Amazon RDS
- Dashboard
- Databases** (selected)
- Query Editor
- Performance insights
- Snapshots
- Exports in Amazon S3
- Automated backups
- Reserved instances
- Proxies

The main content area displays a message about creating the database:

Creating database awsproject-yaswanth
Your database might take a few minutes to launch.
You can use settings from awsproject-yaswanth to simplify configuration of suggested database add-ons while we finish creating your DB for you.

How was your experience creating an Amazon RDS database? [Provide feedback](#)

A callout box suggests using Blue/Green Deployments:

Consider creating a Blue/Green Deployment to minimize downtime during upgrades
You may want to consider using Amazon RDS Blue/Green Deployments and minimize your downtime during upgrades. A Blue/Green Deployment provides a staging environment for changes to production databases. [RDS User Guide](#) [Aurora User Guide](#)

The "Databases" table lists the created database:

DB identifier	Role	Engine	Region & AZ	Size	Status	Actions
awsproject-yaswanth	Instance	MySQL Community	-	db.t3.micro	Creating	-



Start Course | Intellipaat | YouTube | Instances | EC2 Management | Databases - RDS Management | AWS CloudShell | 3.83.83.68 | + | - | X

us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0

Gmail YouTube Maps Sample Avro File How to create a Da... google cloud stor... Read AVRO messag... Quickstart: stream... Handling Avro files... python - Adding a... Adding timestamp...

AWS Services Search [Alt+S] N. Virginia Yaswanth Kumar Desineedi Actions

aws AWS CloudShell

us-east-1

```
2. If you are using apache2, you are advised to add ppa:ondrej/apache2
3. If you are using nginx, you are advised to add ppa:ondrej/nginx-mainline
or ppa:ondrej/nginx

PLEASE READ: If you like my work and want to give me a little motivation, please consider donating regularly: https://donate.sury.org/

WARNING: add-apt-repository is broken with non-UTF-8 locales, see
https://github.com/oerdnj/deb.sury.org/issues/56 for workaround:

# LC_ALL=C.UTF-8 add-apt-repository ppa:ondrej/php
More info: https://launchpad.net/~ondrej/+archive/ubuntu/php
Adding repository.
Found existing deb entry in /etc/apt/sources.list.d/ondrej-ubuntu-php-jammy.list
Adding deb entry to /etc/apt/sources.list.d/ondrej-ubuntu-php-jammy.list
Found existing deb-src entry in /etc/apt/sources.list.d/ondrej-ubuntu-php-jammy.list
Adding disabled deb-src entry to /etc/apt/sources.list.d/ondrej-ubuntu-php-jammy.list
Adding key to /etc/apt/trusted.gpg.d/ondrej-ubuntu-php.gpg with fingerprint 14AA40EC0831756756D7F66C4F4EA0AAE5267A6C
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:5 https://ppa.launchpadcontent.net/ondrej/php/ubuntu jammy InRelease
Fetched 226 kB in 1s (314 kB/s)
Reading package lists... Done
ubuntu@ip-172-31-80-122:~$ sudo apt install php5.6 mysql-client php5.6-mysqli ✓
```

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Windows Type here to search 35°C Partly cloudy 20:04 15-04-2023

Screenshot of the AWS RDS console showing a successfully created database.

The browser tabs include: Start Course | Intellipaat, YouTube, Instances | EC2 Management, Databases - RDS Manager, AWS CloudShell, 3.83.83.68, and several others related to Avro and timestamp.

The AWS Services navigation bar shows: AWS, Services, Search, and [Alt+S].

The Amazon RDS sidebar includes: Dashboard, **Databases**, Query Editor, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom engine versions, Events, and Event subscriptions.

The main content area displays a success message: "Successfully created database awsproject-yaswanth". It suggests using settings from the database to simplify configuration of suggested database add-ons. A link to provide feedback is provided.

A callout box titled "Consider creating a Blue/Green Deployment to minimize downtime during upgrades" provides information on using Amazon RDS Blue/Green Deployments to minimize downtime during upgrades. It links to the RDS User Guide and Aurora User Guide.

The "Databases" table lists the created database:

DB identifier	Role	Engine	Region & AZ	Size	Status	Actions
awsproject-yaswanth	Instance	MySQL Community	us-east-1b	db.t3.micro	Available	-

The bottom navigation bar includes: CloudShell, Feedback, Language, a search bar, and various icons for file operations like Open, Save, Print, etc. It also shows system status: 35°C Partly cloudy, ENG, and the date 15-04-2023.

Screenshot of the AWS RDS console showing the summary and connectivity & security details for a MySQL database instance.

Summary

DB identifier	CPU	Status	Class
awsproject-yaswanth	3.11%	Available	db.t3.micro
Role	Current activity	Engine	Region & AZ
Instance	0 Connections	MySQL Community	us-east-1b

Connectivity & security

Endpoint & port	Networking	Security
Endpoint awsproject-yaswanth.ccjy3khdgng1.us-east-1.rds.amazonaws.com	Availability Zone us-east-1b	VPC security groups mysg (sg-0f2cldb064b34e2f1) Active
Port 3306	VPC Default-VPC-Don't Delete (vpc-015a22f45304bc0a8)	Publicly accessible No
	Subnet group default-vpc-015a22f45304bc0a8	Certificate authority Info rds-ca-2019
	Subnets	Certificate authority date

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The screenshot shows a web browser window with multiple tabs open. The active tab is titled "AWS CloudShell" and displays a terminal session on an Ubuntu instance. The terminal output is as follows:

```
ubuntu@ip-172-31-80-122:~$ mysql -h awsproject-yaswanth.ccjy3khgng1.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 17
Server version: 8.0.32 Source distribution

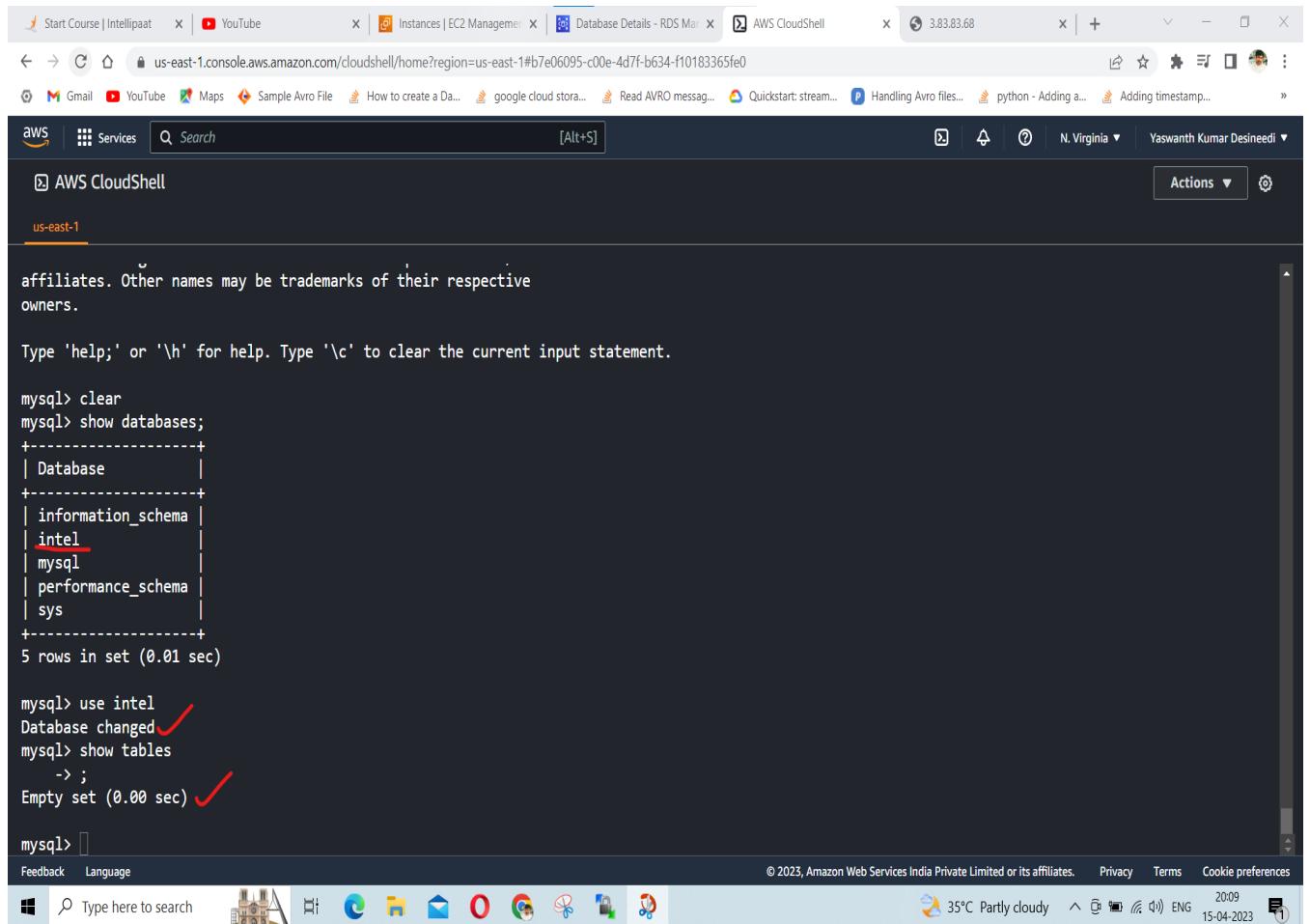
Copyright (c) 2000, 2023, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> 
```

The browser interface includes a top navigation bar with links like "Start Course | Intellipaat", "YouTube", "Instances | EC2 Management", "Database Details - RDS Manager", and "AWS CloudShell". Below the tabs is a search bar and a navigation bar with icons for "aws", "Services", "Search", and "Actions". The main content area is a dark-themed terminal window. At the bottom of the browser window is a taskbar with various pinned icons and a system status bar showing weather (35°C Partly cloudy), time (20:07), date (15-04-2023), and language (ENG).



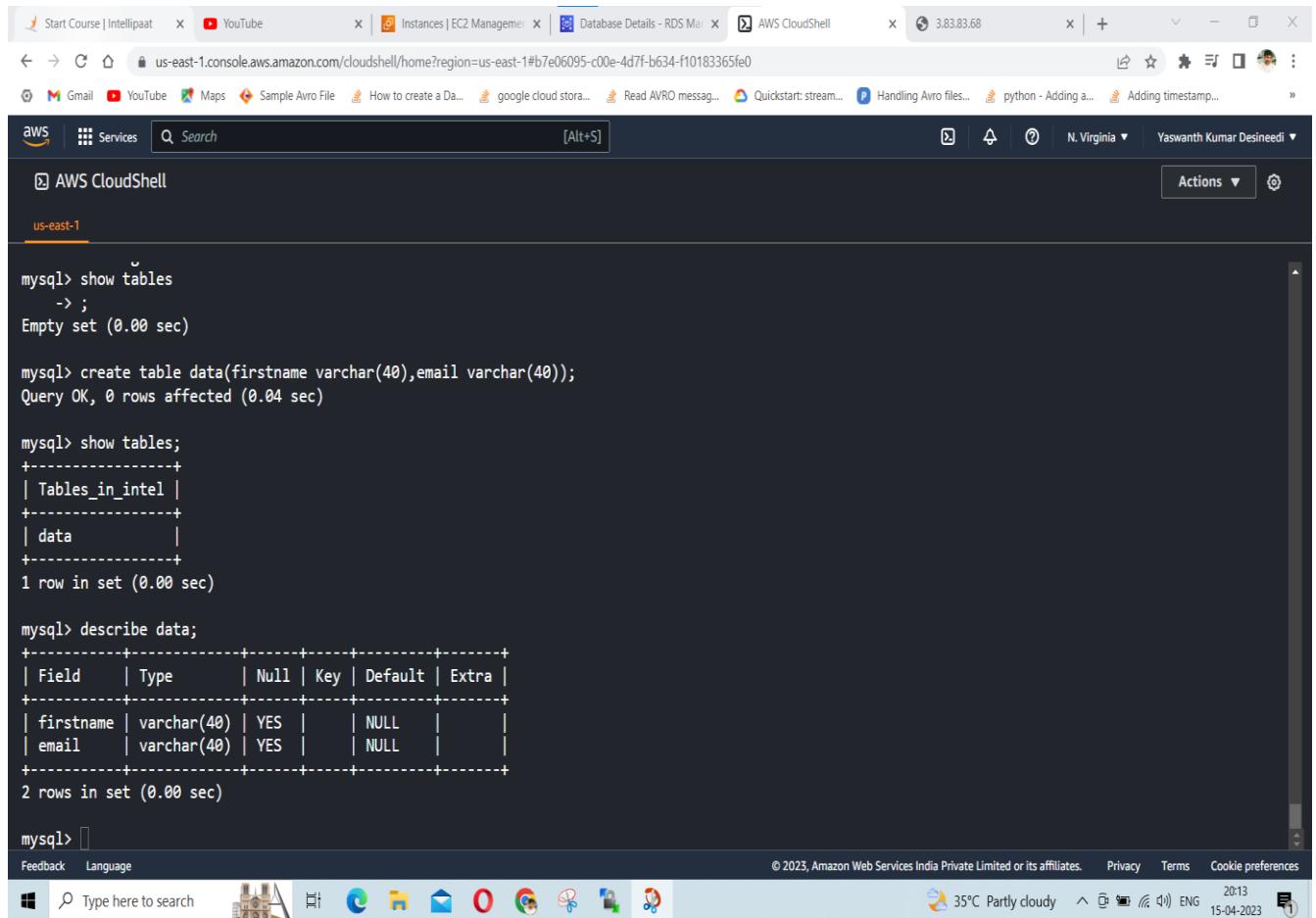
The screenshot shows the AWS CloudShell interface in a browser window. The title bar includes tabs for Start Course | Intellipaat, YouTube, Instances | EC2 Management, Database Details - RDS, AWS CloudShell, 3.83.83.68, and several other links. The main area is titled "AWS CloudShell" and shows a MySQL session:

```
mysql> clear
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| intel |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.01 sec)

mysql> use intel
Database changed
mysql> show tables
-> ;
Empty set (0.00 sec)

mysql>
```

The MySQL session shows the user has cleared the screen, listed databases (information_schema, intel, mysql, performance_schema, sys), switched to the 'intel' database, and checked for tables, which returned an empty set. The interface also includes a search bar, navigation icons, and a sidebar with "Actions".



The screenshot shows a browser window with multiple tabs open. The active tab is 'AWS CloudShell' at the URL us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0. The AWS CloudShell interface is displayed, showing a MySQL session. The session starts with 'Empty set (0.00 sec)', then creates a table named 'data' with columns 'firstname' and 'email'. It then lists the tables in the database, which contains only the 'data' table. Finally, it displays the describe information for the 'data' table, showing two rows with columns 'firstname' and 'email'.

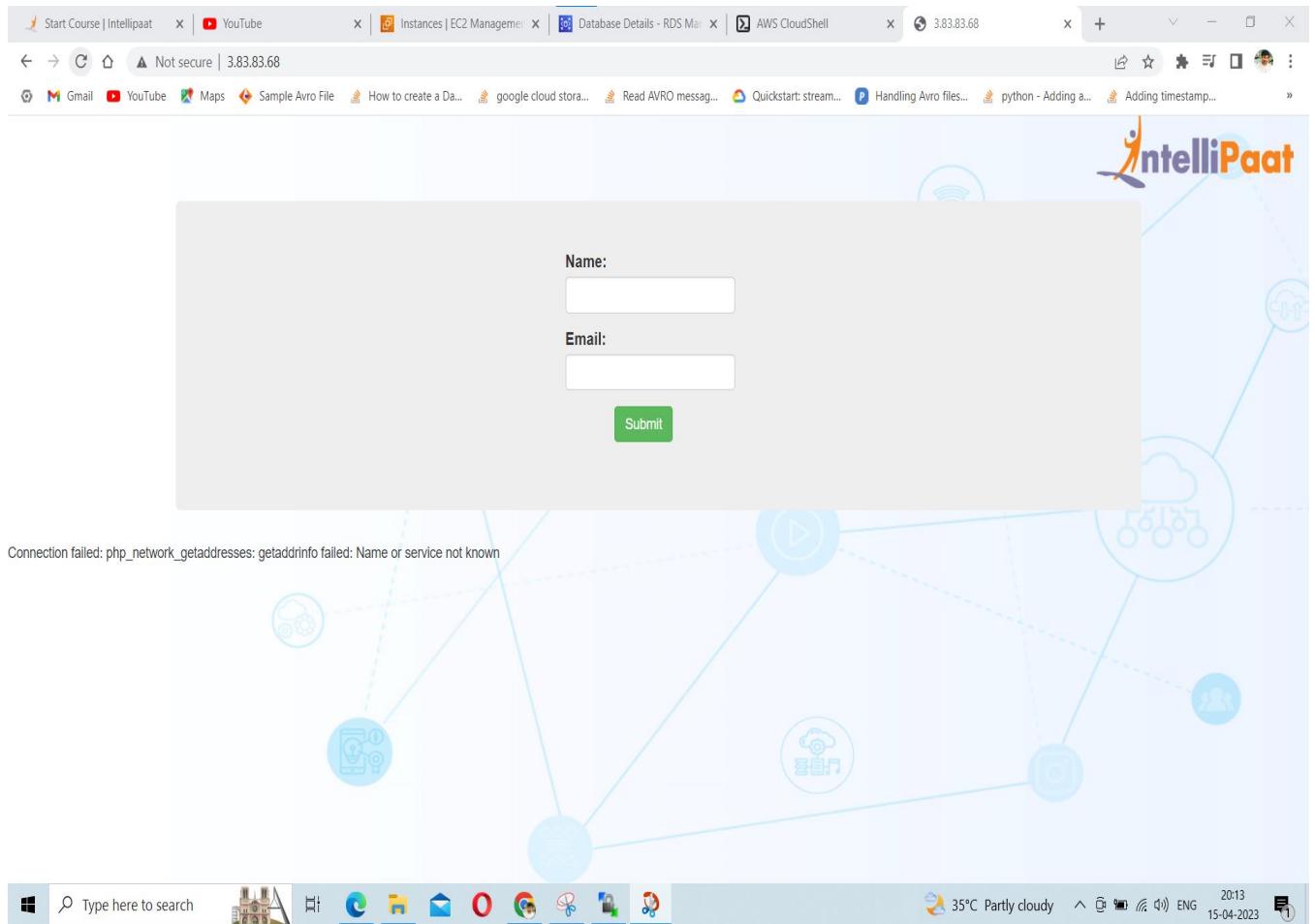
```
mysql> show tables
-> ;
Empty set (0.00 sec)

mysql> create table data(firstname varchar(40),email varchar(40));
Query OK, 0 rows affected (0.04 sec)

mysql> show tables;
+-----+
| Tables_in_intel |
+-----+
| data           |
+-----+
1 row in set (0.00 sec)

mysql> describe data;
+-----+-----+-----+-----+-----+
| Field    | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| firstname | varchar(40) | YES  |     | NULL    |       |
| email     | varchar(40) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql>
```



The screenshot shows a Microsoft Edge browser window with multiple tabs open. The active tab is 'AWS CloudShell' at the URL us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0. The AWS CloudShell interface is displayed, showing a MySQL session. The session output is as follows:

```
Query OK, 0 rows affected (0.04 sec)

mysql> show tables;
+-----+
| Tables_in_intel |
+-----+
| data           |
+-----+
1 row in set (0.00 sec)

mysql> describe data;
+-----+-----+-----+-----+-----+
| Field    | Type     | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| firstname | varchar(40) | YES |     | NULL    |         |
| email     | varchar(40)  | YES |     | NULL    |         |
+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)

mysql> exit
Bye
ubuntu@ip-172-31-80-122:~$ cd /var/www/html
ubuntu@ip-172-31-80-122:/var/www/html$ ls
images index.php
ubuntu@ip-172-31-80-122:/var/www/html$ sudo nano index.php
```

The 'index.php' file is highlighted with a red arrow pointing to it. The AWS CloudShell interface includes a search bar, navigation buttons, and a user profile dropdown. The browser's taskbar at the bottom shows other open tabs like Start Course | Intellipaat, YouTube, Instances | EC2 Management, Database Details - RDS, and AWS CloudShell.

The screenshot shows a terminal window titled "AWS CloudShell" running on an Amazon Linux instance (3.83.83.68). The user is editing a file named "index.php" using the nano 6.2 editor. The code in the editor is:

```
GNU nano 6.2 index.php *
<div class="form-group" action="post">
  <label for="firstname">Name:</label>
  <input type="text" class="form-control" name="firstname">
</div>
<div class="form-group">
  <label for="email">Email:</label>
  <input type="text" class="form-control" name="email">
</div>
  <td colspan="4"></td>
</tr>
</table>
</div>
</div>
<?php
$firstname=$_POST['firstname'];
$email=$_POST['email'];
$servername = "awsproject-yaswanth.ccjy3khgng1.us-east-1.rds.amazonaws.com"; ✓
$username = "intel";
$password = "intel123";
```

The line \$servername is highlighted with a red underline and has a red checkmark next to it. The terminal window includes a menu bar with keyboard shortcuts for various operations like Help, Write Out, Cut, Paste, Execute, Location, Undo, Redo, Set Mark, Copy, and Where Was. Below the menu is a toolbar with icons for Help, Exit, Read File, Replace, Cut, Paste, Execute, Location, Undo, Redo, Set Mark, Copy, and Where Was. The bottom status bar shows the date (15-04-2023), time (20:18), weather (35°C Partly cloudy), and language (ENG).

The screenshot shows a Microsoft Edge browser window with multiple tabs open. The active tab is 'AWS CloudShell' at the URL us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0. The AWS CloudShell interface is displayed, showing a terminal window titled 'us-east-1'. Inside the terminal, a file named 'index.php' is being edited using the nano text editor. The code in the file is a PHP script that creates an HTML form for a user to enter their first name and email address, and then connects to an AWS RDS database using those inputs. The terminal also shows standard nano key bindings at the bottom.

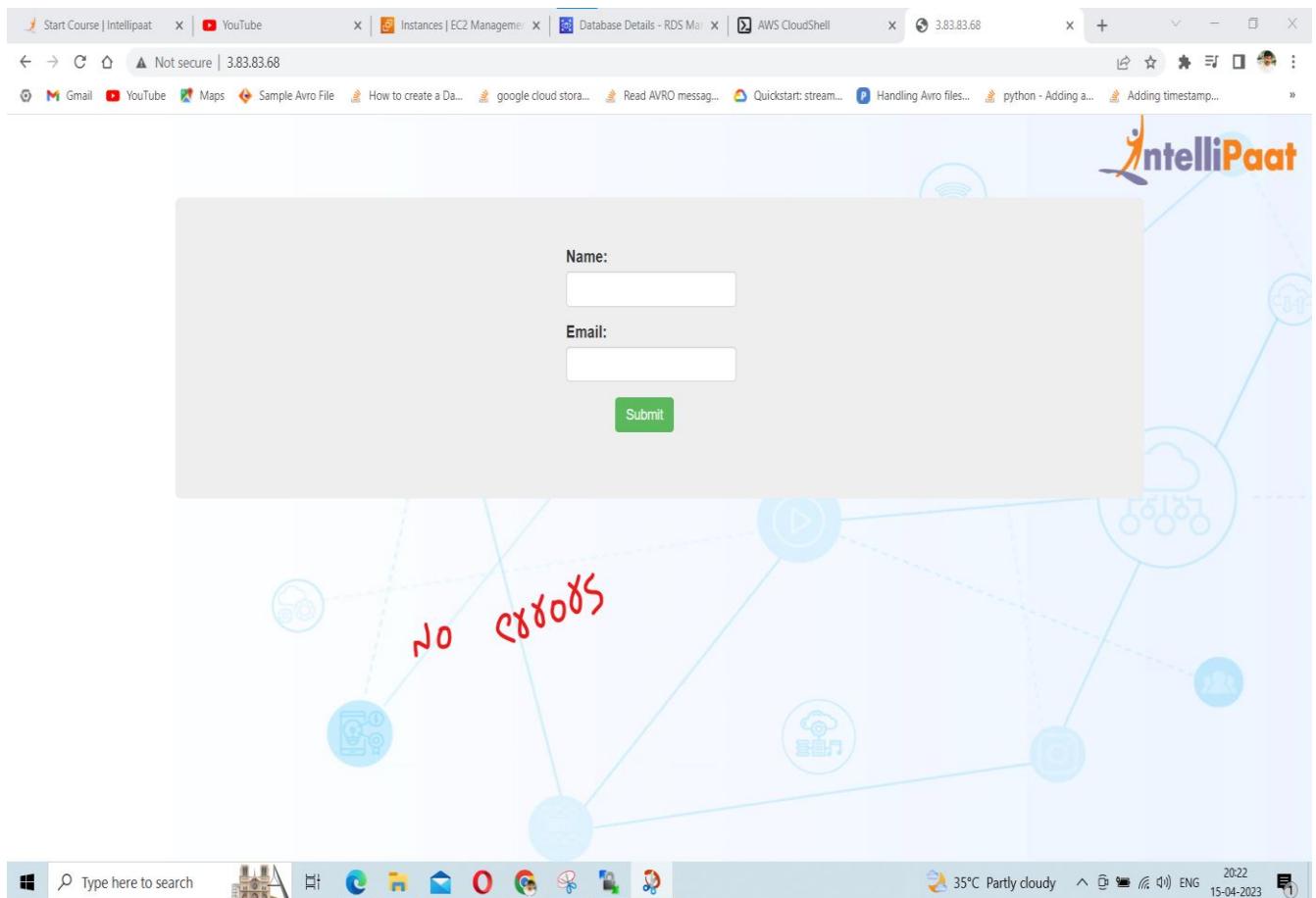
```
GNU nano 6.2 index.php *
<input type="text" class="form-control" name="firstname">
</div>
<div class="form-group">
  <label for="email">Email:</label>
  <input type="text" class="form-control" name="email">
</div>
<td colspan="4"></td>
</tr>
</table>
</div>
</div>
<?php
$firstname=$_POST['firstname'];
$email=$_POST['email'];
$servername = "awsproject-yaswanth.ccjy3khgng1.us-east-1.rds.amazonaws.com";
$username = "admin";
$password = "intel123";
$db = "intel";
// Create connection
```

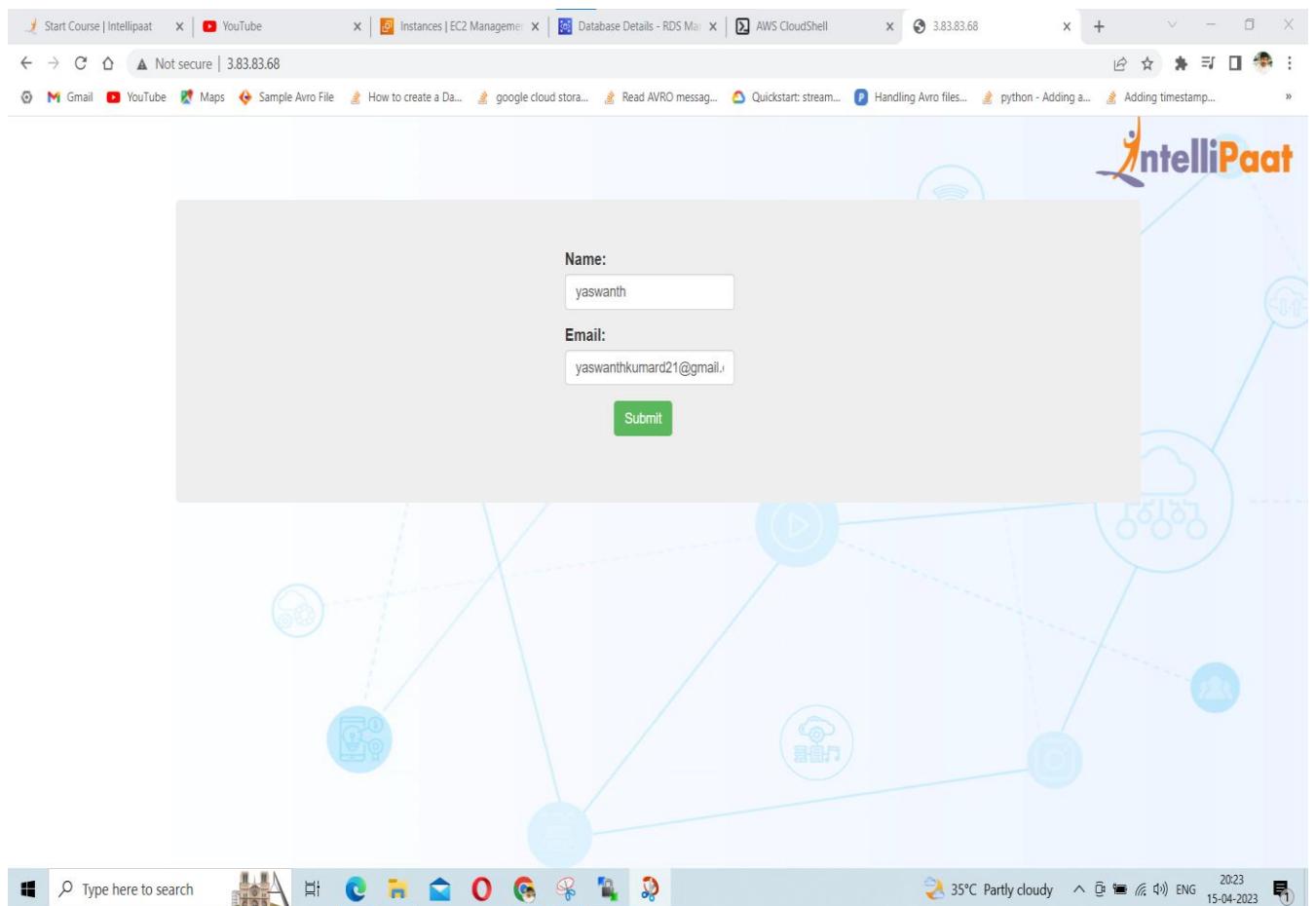
Key bindings shown at the bottom of the terminal:

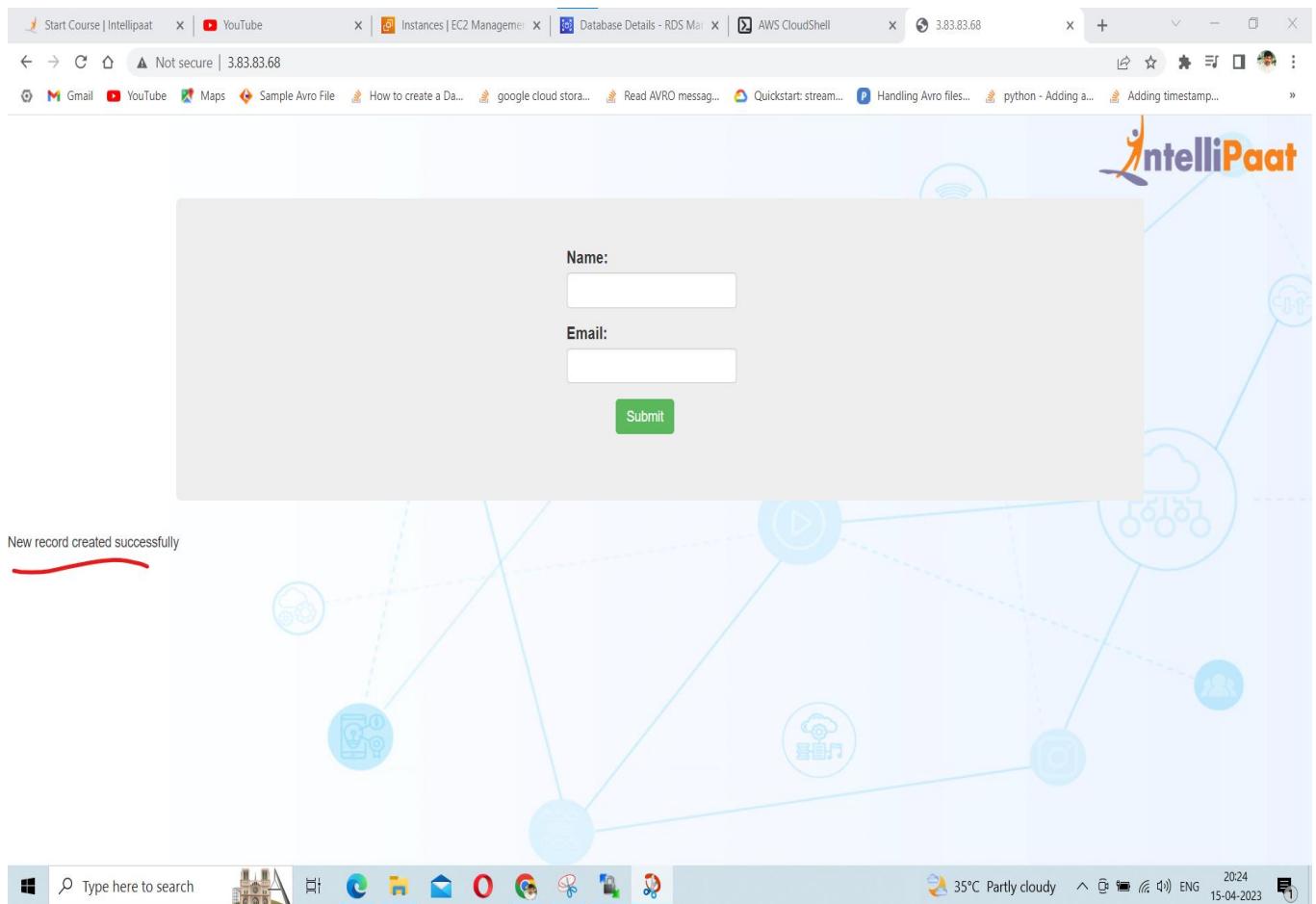
- ^G Help
- ^O Write Out
- ^W Where Is
- ^K Cut
- ^T Execute
- ^C Location
- M-U Undo
- M-A Set Mark
- M-] To Bracket
- ^X Exit
- ^R Read File
- ^V Replace
- ^U Paste
- ^J Justify
- ^/ Go To Line
- M-E Redo
- M-C Copy
- ^Q Where Was

System tray icons and status information:

- Type here to search
- Windows Start button
- File Explorer icon
- Mail icon
- Cloud icon
- Help icon
- Network icon
- Power icon
- 35°C Partly cloudy
- 2021
- ENG
- 15-04-2023







Start Course | Intellipaat | YouTube | Instances | EC2 Manager | Database Details - RDS Manager | AWS CloudShell | 3.83.83.68

us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0

Gmail YouTube Maps Sample Avro File How to create a Da... google cloud stor... Read AVRO messag... Quickstart: stream... Handling Avro files... python - Adding a... Adding timestamp...

AWS Services Search [Alt+S] Actions N. Virginia Yaswanth Kumar Desineedi

AWS CloudShell

us-east-1

```
mysql> use intel;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----+
| Tables_in_intel |
+-----+
| data |
+-----+
1 row in set (0.00 sec)

mysql> select * from data;
+-----+
| firstname | email
+-----+
| yaswanth | yaswanthkumard21@gmail.com |
+-----+
1 row in set (0.00 sec)

mysql>
```

Type here to search

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35°C Partly cloudy ENG 20:27 15-04-2023

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with navigation links like EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances (with sub-links for Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations), and Images (AMIs, AMI Catalog). The main content area displays a table titled "Instances (1/1) Info". The table has columns: Name, Instance ID, Instance state, Instance type, Status check, and Alarms. One row is shown for "Project-server" (Instance ID: i-0f1fc1303dcc94d5, State: Running, Type: t2.micro, Status: 2/2 checks passed, Alarms: No). To the right of the table is a context menu with options: Connect, View details, Manage instance state, Instance settings, Networking, Security, Create image (which is highlighted with a red box), Image and templates, and Monitor and troubleshoot. Below the table, there's a detailed view for the selected instance "i-0f1fc1303dcc94d5 (Project-server)". This view includes tabs for Details, Security, Networking, Storage, Status checks, Monitoring, and Tags. Under the Details tab, the "Instance summary" section shows the Instance ID (i-0f1fc1303dcc94d5 (Project-server)), Public IP4 address (3.83.83.68), Private IP4 addresses (172.31.80.122), Instance state (Running), and Public IPv4 DNS (ec2-3-83-83-68.compute-1.amazonaws.com). The bottom of the screen shows the AWS navigation bar with CloudShell, Feedback, Language, a search bar, and various icons. It also displays system information: 33°C Partly cloudy, ENG, 2028, and the date 15-04-2023.

The screenshot shows a browser window with multiple tabs open. The active tab is 'Amazon Machine Images (AMIs) (1)' under the 'EC2 Management' section of the AWS Management Console. The URL is <https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#images:visibility=owned-by-me>. The page displays a table of AMIs owned by the user, with one entry highlighted:

	Name	AMI ID	AMI name	Source	Owner	Visibility
<input type="checkbox"/>	-	ami-0e599127e33291b57	project-server-Ami	295543071324/project-server-Ami	295543071324	Private

The left sidebar shows navigation links for EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations, and Images. Under Images, 'AMIs' is selected. The bottom of the screen shows the Windows taskbar with various pinned icons and the AWS CloudShell icon.

Screenshot of the AWS Management Console showing the EC2 Management Console - Launch Configurations page.

The browser tab bar includes:

- Start Course | Intellipaat
- YouTube
- EC2 Management Console
- Database Details - RDS Mail
- AWS CloudShell
- 3.83.83.68

The AWS Management Console sidebar shows the following navigation paths:

- Images
- AMIs
- AMI Catalog
- Elastic Block Store
- Volumes
- Snapshots
- Lifecycle Manager
- Network & Security
- Security Groups
- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces
- Load Balancing
- Load Balancers
- Target Groups
- Auto Scaling
- Launch Configurations** (highlighted)
- Auto Scaling Groups

The main content area displays a message about the deprecation of launch configurations:

Recommendation to not use launch configurations
Amazon EC2 Auto Scaling no longer adds support for new EC2 features to launch configurations and will stop supporting new EC2 instance types after December 31, 2022. We recommend that customers using launch configurations migrate to launch templates. For more information, see the documentation.

The "Launch configurations (0)" table has the following columns:

Name	AMI ID	Instance type	Spot price	Creation time
No launch configurations found in this region.				

A "Create launch configuration" button is present at the bottom of the table.

The bottom of the screen shows the Windows taskbar with icons for File Explorer, Task View, Mail, Google Chrome, and File Explorer again. The system tray shows the date (15-04-2023), time (20:33), and weather (33°C Partly cloudy).

Screenshot of the AWS EC2 Management Console showing the "Create launch configuration" wizard.

The browser tabs include: Start Course | Intellipaat, YouTube, EC2 Management Console, Database Details - RDS, AWS CloudShell, 3.83.83.68, and several others related to Avro files and timestamping.

The AWS navigation bar shows Services selected, with a search bar and user N. Virginia ▾ Yaswanth Kumar Desineedi.

The main content area shows the "Create launch configuration" step. A warning message states: "Instead of using launch configurations to create your EC2 Auto Scaling groups, we recommend that you use launch templates and make use of the Auto Scaling guidance option. For more information on migrating launch configurations and using launch templates, see the documentation." A "Create launch template" button is available.

The "Launch configuration name" section has a "Name" input field containing "project-launch-configuration".

The "Amazon machine image (AMI)" section has an "AMI" dropdown menu showing "project-server-Ami".

The "Instance type" section is partially visible.

The bottom navigation bar includes CloudShell, Feedback, Language, a search bar, and various AWS service icons. It also displays weather information (33°C Partly cloudy), the date (15-04-2023), and time (20:34).

The screenshot shows the AWS EC2 Management Console with the URL us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchConfigurations. The browser tab bar includes links for Start Course | Intellipaat, YouTube, EC2 Management Console, Database Details - RDS Mail, AWS CloudShell, 3.83.83.68, and several others like Gmail, YouTube, Maps, Sample Avro File, etc.

The AWS navigation bar at the top has tabs for AWS Services and Search, with a user profile for N. Virginia and Yaswanth Kumar Desineedi.

A modal window is open with the following content:

- Recommendation to not use launch configurations**: A note from Amazon stating that EC2 Auto Scaling no longer adds support for new EC2 features to launch configurations and will stop supporting new EC2 instance types after December 31, 2022. It suggests migrating to launch templates. [See the documentation](#)
- Successfully created launch configuration: project-launch-configuration**

The main EC2 Launch Configurations page shows a table with one item:

Name	AMI ID	Instance type	Spot price	Creation time
project-launch-configuration	ami-0e599127e3...	t2.micro	-	Sat Apr 15 2023 20:36:04 GMT+0530 (India Standard Time)

Below the table, a message says "Select a launch configuration above".



Screenshot of the AWS CloudShell interface showing the creation of an Auto Scaling group.

The browser tab bar includes:

- Start Course | Intellipaat
- YouTube
- Create Auto Scaling group
- Database Details - RDS Manager
- AWS CloudShell
- 3.83.83.68

The AWS CloudShell interface shows the "Create Auto Scaling group" wizard:

Step 2: Choose instance launch options

Name
Auto Scaling group name
Enter a name to identify the group.
 Must be unique to this account in the current Region and no more than 255 characters.

Step 3 - optional: Configure advanced options

Step 4 - optional: Configure group size and scaling policies

Step 5 - optional: Add notifications

Step 6 - optional: Add tags

Step 7: Review

Launch configuration [Info](#) [Switch to launch template](#)

⚠ Instead of using launch configurations to create your EC2 Auto Scaling groups, we recommend that you use launch templates and make use of the Auto Scaling guidance option. For more information on migrating launch configurations and using launch templates, see the documentation [here](#).

Launch configuration
Choose a launch configuration that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.
 [Create a launch configuration](#)

Launch configuration	AMI ID	Date created
project-launch-configuration	ami-0e599127e33291b57	Sat Apr 15 2023 20:36:04 GMT+0530 (India Standard Time)

Security groups Instance type Key pair name

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S Start Course | Intellipaat X YouTube X Create Auto Scaling group X Database Details - RDS Ma X AWS CloudShell X 3.83.83.68 X

← → ⌂ ⌂ ⌂ us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup:

Gmail YouTube Maps Sample Avro File How to create a Da... google cloud stor... Read AVRO messag... Quickstart: stream... Handling Avro files... python - Adding a... Adding timestamp...

N. Virginia ▾ Yaswanth Kumar Desineedi ▾

aws Services Search [Alt+S]

Step 3 - optional
Configure advanced options

Step 4 - optional
Configure group size and scaling policies

Step 5 - optional
Add notifications

Step 6 - optional
Add tags

Step 7
Review

VPC
Choose the VPC that defines the virtual network for your Auto Scaling group.
vpc-015a22f45304bc0a8 (Default-VPC-Don't D... 172.31.0.0/16 Default C

Create a VPC

Availability Zones and subnets
Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.
Select Availability Zones and subnets C

us-east-1a | subnet-01e7e68e8c4a63deb X 172.31.80.0/20 Default

us-east-1b | subnet-0b8ff973bf13c9292a X 172.31.16.0/20 Default

us-east-1c | subnet-0aa25b7fc76a0717c X 172.31.32.0/20 Default

us-east-1d | subnet-0da8d11aba5033b60 X 172.31.0.0/20 Default

us-east-1e | subnet-07989ddafc655f792 X 172.31.48.0/20 Default

us-east-1f | subnet-093995d6ab2f6b3c6 X 172.31.64.0/20 Default

Create a subnet

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Screenshot of the AWS CloudShell interface showing the creation of an Auto Scaling group.

The browser tabs include:

- Start Course | Intellipaat
- YouTube
- Create Auto Scaling group
- Database Details - RDS Manager
- AWS CloudShell
- 3.83.83.68

The AWS CloudShell interface shows the following steps for creating an Auto Scaling group:

- Step 1: Choose launch template or configuration
- Step 2: Choose instance launch options
- Step 3 - optional: Configure advanced options
- Step 4 - optional: Configure group size and scaling policies
- Step 5 - optional: Add notifications
- Step 6 - optional: Add tags
- Step 7: Review

The "Configure group size and scaling policies" step is currently selected. The "Group size - optional" section contains the following configuration:

- Desired capacity: 2
- Minimum capacity: 1
- Maximum capacity: 3

The "Scaling policies - optional" section contains the following text:

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. [Info](#)

The bottom navigation bar includes:

- CloudShell
- Feedback
- Language
- Type here to search
- Icons for various services (File Explorer, Task View, Mail, Edge, Google Chrome, File History, Task Scheduler, Task View, Task View)
- System status: 33°C Partly cloudy
- Date and time: 15-04-2023 20:43
- Language: ENG

Screenshot of the AWS CloudShell interface showing the creation of an Auto Scaling group.

The browser tabs include: Start Course | Intellipaat, YouTube, Create Auto Scaling group, Database Details - RDS Ma..., AWS CloudShell, 3.83.83.68, and several others related to Avro and timestamp handling.

The AWS CloudShell navigation bar shows: Services, Search, [Alt+S], N. Virginia, and the user's name: Yashwanth Kumar Desineedi.

The main content area shows the "Create Auto Scaling group" wizard, Step 1: Choose launch template or configuration. A note says: "Add tags to help you search, filter, and track your Auto Scaling group across AWS. You can also choose to automatically add these tags to instances when they are launched." A callout box provides more information: "You can optionally choose to add tags to instances (and their attached EBS volumes) by specifying tags in your launch template. We recommend caution, however, because the tag values for instances from your launch template will be overridden if there are any duplicate keys specified for the Auto Scaling group."

The "Tags (1)" section shows one tag: Key: name, Value: ASGserver, Tag new instances: checked, Remove button, and Add tag button. It also indicates 49 remaining tags.

Buttons at the bottom: Cancel, Previous, and Next (highlighted).

Screenshot of the Windows taskbar and system tray.

The taskbar includes: CloudShell, Feedback, Language, a search bar with a castle icon, and pinned icons for File Explorer, Edge, Mail, OneDrive, Google Chrome, and File History.

The system tray shows: © 2023, Amazon Web Services India Private Limited or its affiliates., Privacy, Terms, Cookie preferences, a weather icon (33°C Partly cloudy), battery level, network signal, volume, and the date/time: 20:45 15-04-2023.

S Start Course | Intellipaat X YouTube Auto Scaling groups | EC2 Database Details - RDS Manager AWS CloudShell 3.83.83.68 X + - X

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#AutoScalingGroups:

Gmail YouTube Maps Sample Avro File How to create a Da... google cloud stor... Read AVRO messag... Quickstart: stream... Handling Avro files... python - Adding a... Adding timestamp...

N. Virginia N. Virginia Yaswanth Kumar Desineedi

aws Services Search [Alt+S]

project-ASG created successfully

EC2 > Auto Scaling groups

Auto Scaling groups (1) [Info](#)

Search your Auto Scaling groups

Name Launch template/configuration Instances Status Desired capacity Min Max Available

project-ASG project-launch-configuration 0 Updating capacity... 2 1 3 us-east-1a, ...

0 Auto Scaling groups selected

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Type here to search

33°C Partly cloudy ENG 2053 15-04-2023

Screenshot of the AWS CloudWatch Activity Notifications and History pages.

Activity notifications (0)

No notifications are currently specified.

Activity history (2)

Status	Description	Cause	Start time	End time
Successful	Launching a new EC2 instance: i-04ea4a39970df8f76	At 2023-04-15T15:23:37Z a user request created an AutoScalingGroup changing the desired capacity from 0 to 2. At 2023-04-15T15:23:41Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 0 to 2.	2023 April 15, 08:53:44 PM +05:30	2023 April 15, 08:54:15 PM +05:30
Successful	Launching a new EC2 instance: i-008be50cd2b35a123	At 2023-04-15T15:23:37Z a user request created an AutoScalingGroup changing the desired capacity from 0 to 2. At 2023-04-15T15:23:41Z an instance was started in response to a difference between desired and actual capacity, increasing the capacity from 0 to 2.	2023 April 15, 08:53:43 PM +05:30	2023 April 15, 08:54:15 PM +05:30

Screenshot of the AWS CloudShell interface showing the EC2 Instances page.

The browser tab bar includes:

- Start Course | IntelliJ
- YouTube
- Auto Scaling group d...
- Instances | EC2 Manager
- Database Details - RD...
- AWS CloudShell
- 3.83.83.68

The AWS CloudShell navigation bar includes:

- Gmail
- YouTube
- Maps
- Sample Avro File
- How to create a Da...
- google cloud stora...
- Read AVRO messag...
- Quickstart: stream...
- Handling Avro files...
- python - Adding a...
- Adding timestamp...

The AWS CloudShell sidebar shows the following navigation paths:

- New EC2 Experience
- EC2 Dashboard
- EC2 Global View
- Events
- Tags
- Limits
- Instances
 - Instances
 - Instance Types
 - Launch Templates
 - Spot Requests
 - Savings Plans
 - Reserved Instances
 - Dedicated Hosts
 - Scheduled Instances
 - Capacity Reservations
- Images
 - AMIs
 - AMI Catalog

The main content area displays the EC2 Instances list:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pul
ASGserver	i-04ea4a33970df8f76	Running	t2.micro	Initializing	No alarms	+ us-east-1e	ec2
Project-server	i-0f1fc1303dcc94d5	Running	t2.micro	2/2 checks passed	No alarms	+ us-east-1a	ec2
ASGserver	i-008be50cd2b35a123	Running	t2.micro	Initializing	No alarms	+ us-east-1d	ec2

A modal window titled "Select an instance" is open at the bottom of the screen.

Screenshot of the AWS EC2 Instances page showing three running instances.

Instances (1/3) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pul
ASGserver	i-04ea4a39970df8f76	Running	t2.micro	Initializing	No alarms	+ us-east-1e	ec2
Project-server	i-0f1fcf1303dcc94d5	Running	t2.micro	2/2 checks passed	No alarms	+ us-east-1a	ec2
ASGserver	i-008be50cd2b35a123	Running	t2.micro	Initializing	No alarms	+ us-east-1d	ec2

Instance: i-04ea4a39970df8f76 (ASGserver)

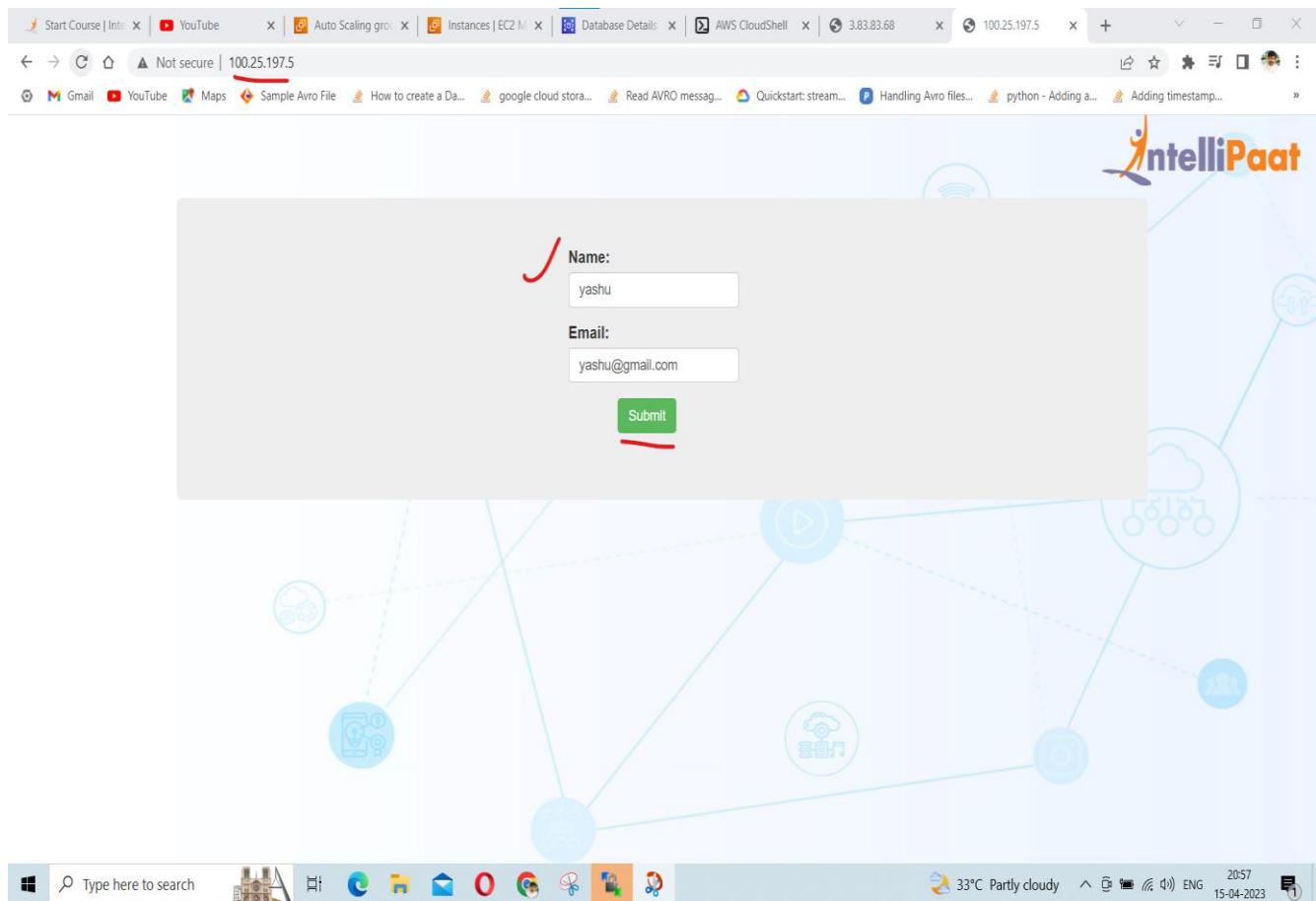
Details Security Networking Storage Status checks Monitoring Tags

Instance summary

Instance ID	100.25.197.5 open address	Private IPv4 addresses
IPv6 address	-	172.31.53.140
Instance state	Running	Public IPv4 DNS
		ec2-100-25-197-5.compute-1.amazonaws.com open address

Public IPv4 address copied

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Screenshot of the AWS CloudShell interface showing the AWS Lambda function "Read AVRO message..." running successfully.

The AWS CloudShell tab shows the output of the Lambda function:

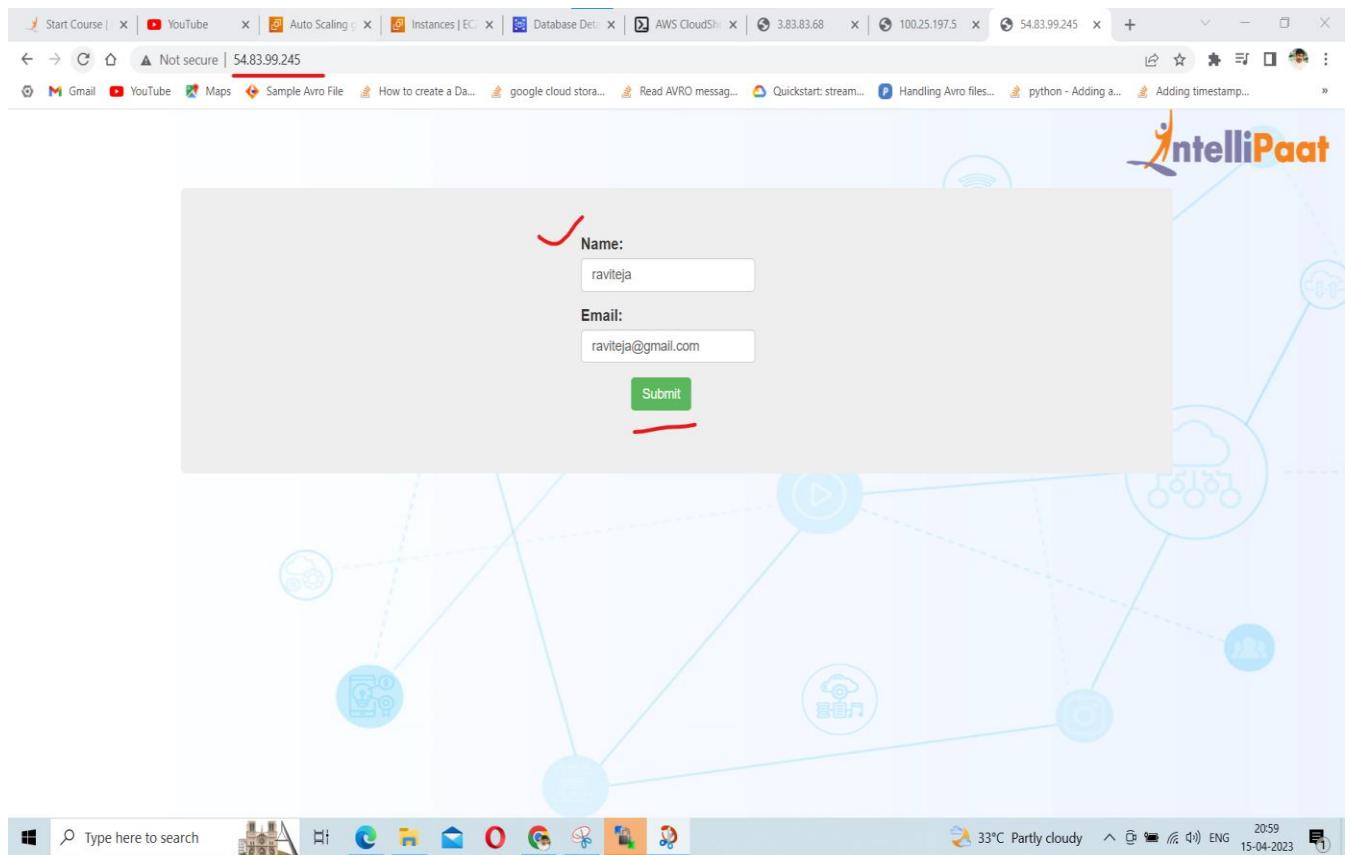
```
Execution ID: 3.83.83.68
Function: 100.25.197.5
Region: N. Virginia
Timestamp: 2023-04-15T10:58:55.000Z
```

The AWS Lambda function "Read AVRO message..." has been triggered 1 time and succeeded 1 time.

The Lambda function code is as follows:

```
function handler(event) {
    console.log("Received event:", event);
    const data = JSON.parse(event);
    console.log("Data received from API Gateway:", data);
    const avroString = data.message;
    const schemaString = data.schema;
    const schema = JSON.parse(schemaString);
    const record = parse(avroString, schema);
    console.log("Record parsed from AVRO string:", record);
    return record;
}
```

The Lambda function uses the `aws-sdk` library to parse the AVRO string and schema. The parsed record is returned as an object.



Start Course | X | YouTube | X | Auto Scaling | Connect to in | Database Data | AWS CloudShell | 3.83.83.68 | 100.25.197.5 | 54.83.99.245 | + | - | X

us-east-1.console.aws.amazon.com/cloudshell/home?region=us-east-1#b7e06095-c00e-4d7f-b634-f10183365fe0

Gmail YouTube Maps Sample Avro File How to create a Da... google cloud stor... Read AVRO messag... Quickstart: stream... Handling Avro files... python - Adding a... Adding timestamp...

AWS Services Search [Alt+S] Actions N. Virginia Yaswanth Kumar Desineedi

AWS CloudShell

us-east-1

```
1 row in set (0.00 sec)

mysql> describe * from data;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '* from data' at line 1
mysql> select * from data;
+-----+
| firstname | email
+-----+
| yaswanth | yaswanthkumard21@gmail.com
| yashu | yashu@gmail.com
+-----+
2 rows in set (0.00 sec)

mysql> select * from data;
+-----+
| firstname | email
+-----+
| yaswanth | yaswanthkumard21@gmail.com
| yashu | yashu@gmail.com
| raviteja | raviteja@gmail.com
+-----+
3 rows in set (0.00 sec)

mysql>
```

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Type here to search 33°C Partly cloudy 21:04 15-04-2023 ENG