

CLOUD COMPUTING LABORATORY- 11

AWS ACADEMY LAB 10

Amazon Web Services

Name: Drishti.

Roll No: 1928228

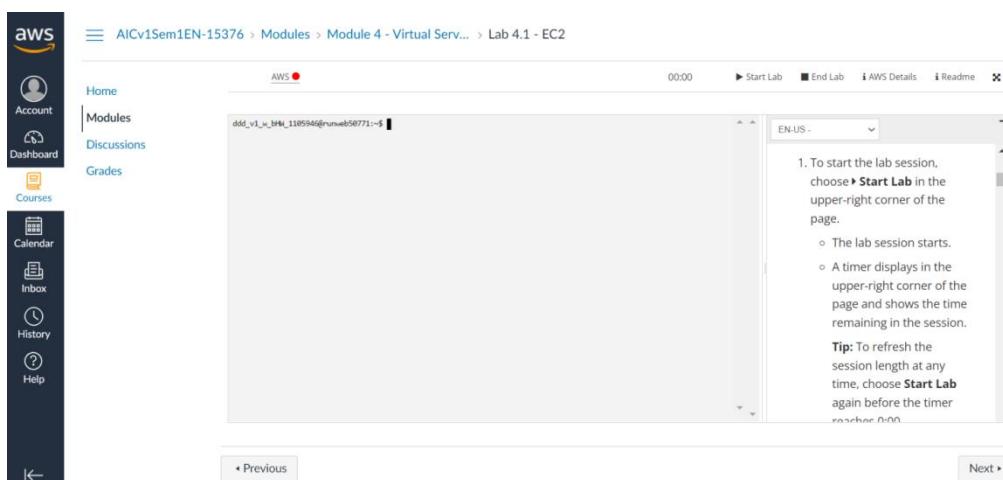
Date: 30/03/2022

Aim: Create an Amazon Relational Database Service (Amazon RDS) database (DB) instance that maintains data used by a web application.

Time Duration: Approximately 1 hour 20 minutes.

Requirements: - AWS account (access to AWS console dashboard)
- Internet connection

1. If we use AWS academy to log in, we go to LAB 10 and click on start lab, allowing the light beside AWS to turn green, before clicking on AWS on the left side, which automatically displays the AWS console dashboard.



2. We go to <https://aws.amazon.com>, click on ‘Sign in to Console’, and login with our root account.

The image shows two screenshots. On the left is the AWS sign-in page. It has a 'Sign in' header, a 'Root user' section selected (with a note about being the account owner), an 'IAM user' section (with a note about performing daily tasks), a 'Root user email address' field containing '1928228@kiit.ac.in', and a 'Next' button. Below the form is a small note about agreeing to the AWS Customer Agreement and Privacy Notice. At the bottom is a 'New to AWS?' link. On the right is a landing page for 'Amazon Lightsail'. It features a large orange and yellow background graphic, the 'Amazon Lightsail' logo, the tagline 'Lightsail is the easiest way to get started on AWS', a 'Learn more »' button, and a cartoon robot character giving a thumbs-up.

Set up an RDS DB instance

3. Choose the Services menu, locate the Database category, and then choose RDS.

The screenshot shows the AWS Services console with the 'Database' category selected in the sidebar. Other visible services include Analytics, Application Integration, AR & VR, AWS Cost Management, Blockchain, Business Applications, Compute, Containers, Customer Enablement, Developer Tools, End User Computing, and Front-end Web & Mobile. A callout highlights the 'RDS' service, which is described as a Managed Relational Database Service. To the right, there's a preview of the RDS dashboard and a sidebar for AWS resources.

4. Choose Create database.

The screenshot shows the Amazon RDS console. The left sidebar lists options like Dashboard, Databases, Query Editor, Performance insights, Snapshots, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom engine versions, and Events. A central callout box promotes the Multi-AZ deployment option for MySQL and PostgreSQL, mentioning improved transactional commit latencies and faster failover. Below this, a 'Create database' button is visible. The main area displays 'Resources' such as DB Instances, DB Clusters, Reserved instances, and Snapshots, along with their respective counts and status. A 'Recommended for you' sidebar suggests tasks like Build RDS Operational Tasks and Amazon RDS Backup and Restore using AWS Backup.

5. In the Choose a database creation method section, choose Easy create.

The screenshot shows the 'Create database' configuration page. At the top, a message says 'We listened to your feedback!' followed by a link to 'Switch to your original interface.' Below this, the 'Choose a database creation method' section contains two options: 'Standard create' and 'Easy create'. The 'Easy create' option is selected and highlighted with a blue border. A note below it states: 'Use recommended best-practice configurations. Some configuration options can be changed after the database is created.'

6. In the Configuration section, configure:
 - a) For Engine type, choose Microsoft SQL Server.
 - b) For DB instance size, choose Free tier.
 - c) Check the box next to Auto generate a password.
7. Choose Create database.

Screenshot of the AWS RDS 'Create database' configuration page:

Configuration Section:

- Engine:** Microsoft SQL Server (selected)
- DB instance size:** Free tier (selected)
- DB instance identifier:** database-1
- Master username:** admin
- Auto generate a password:** checked

View default settings for Easy create:

Easy create sets the following configurations to their default values, some of which can be changed later. If you want to change any of these settings now, use [Standard Create](#).

Important Note:

You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

Buttons at the bottom:

- Cancel
- Create database

8. Your new database displays in the list of databases. The status is Creating.

The screenshot shows the AWS RDS Databases page. A banner at the top states: "Creating database database-1. Your database might take a few minutes to launch. We have generated your database master password during the database creation and it will be displayed in the credential details. This is the only time you will be able to view this password. However you can modify your database to create a new password at any time." Below the banner, the "Databases" section lists "database-1" with the following details: Instance: SQL Server Express Edition, Status: Creating. The "Actions" dropdown menu is open, showing options: Modify, Actions, Restore from S3, and Create database.

The "Databases" table has the following columns: DB identifier, Role, Engine, Region & AZ, and Size. The table shows one row for "database-1".

Feedback English (US) © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

9. In the banner at the top of the page, choose View credential details.

10. Your login credentials display.

11. Save the credential information to a text editor to user later in this lab.

12. To close the pop-up window, choose Close.

A modal dialog titled "Password for your database database-1" is displayed. It contains the following text: "This is the only time you will be able to view this password. Copy and save the password for your reference, otherwise you will need to modify the database to change it." Below this, the "Master username" is listed as "admin" and the "Master password" is listed as "YIK3EgHo8FYx9fVtUnzZ" with a "Copy" button next to it. The "Close" button is located at the bottom right of the modal.

During the database creation and it will be displayed in the credential details. This is the only time you will be able to view this password. However you can modify your database to create a new password at any time.

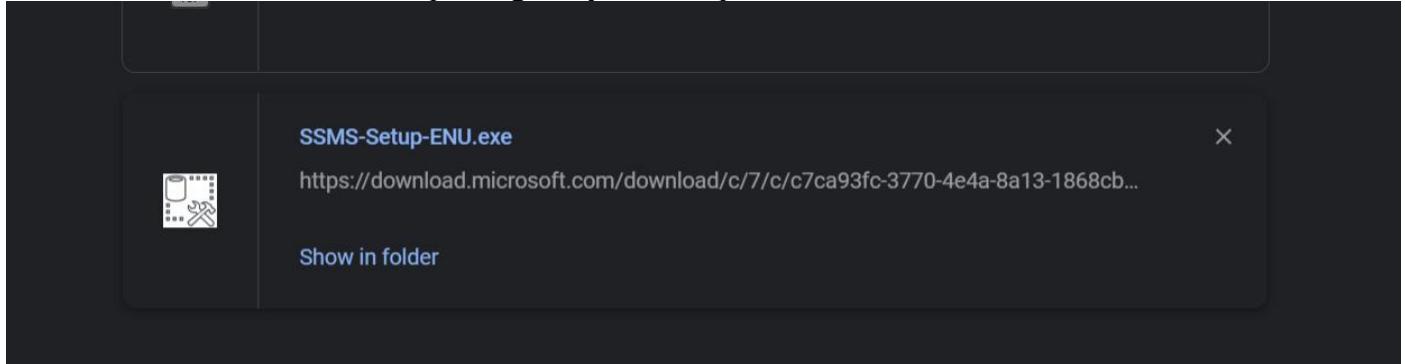
store from S3 Create database

Region & AZ

Close

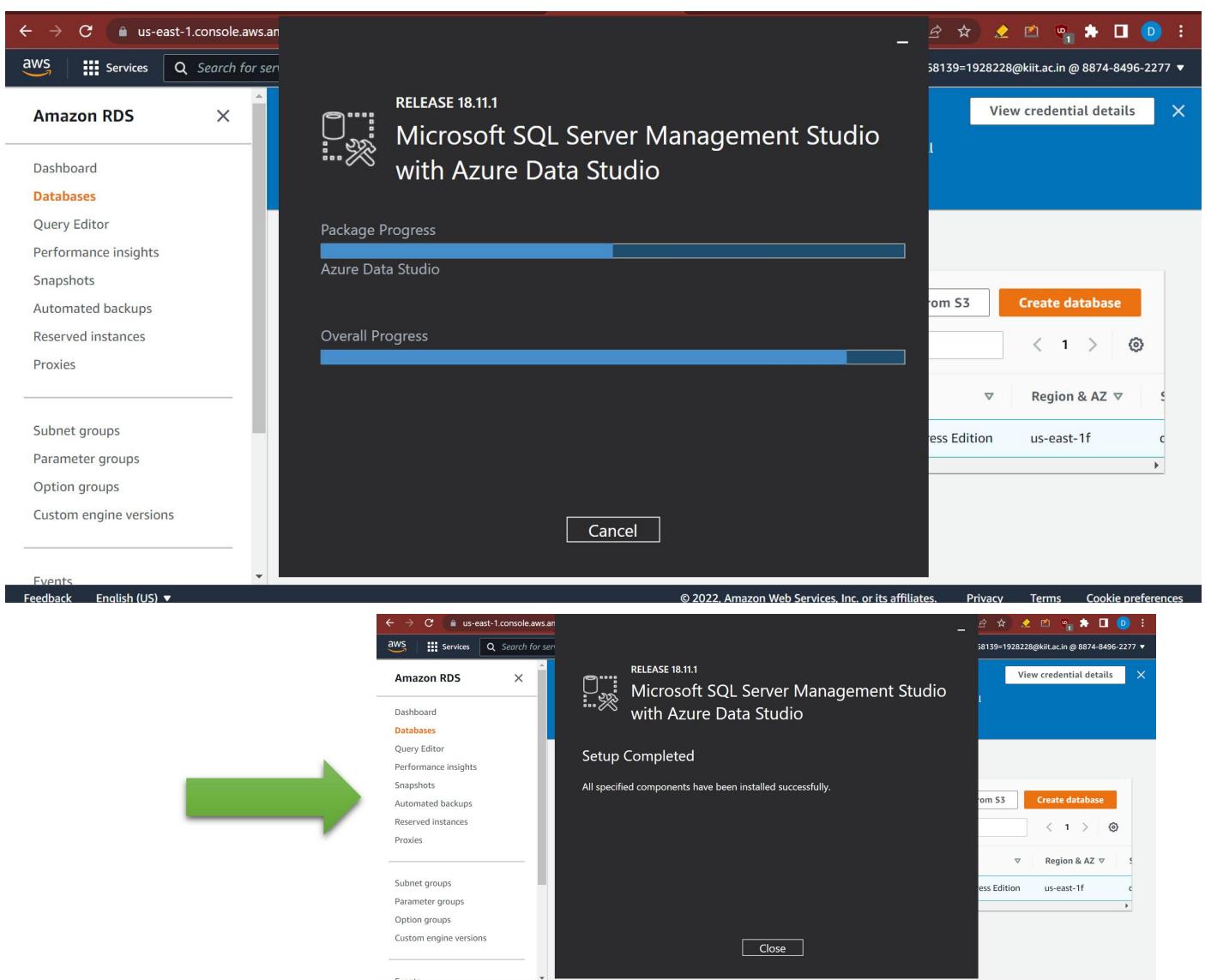
Download and install SQL Server Management Studio

13. To connect to your RDS DB instance, you will need to download and install SQL Server Management Studio.
14. In a new browser tab or window, go to <https://aka.ms/ssmsfullsetup>.
15. Download the installation package to your computer.



16. When the download completes, open and run the installation program.

Note: If you are unable to install new software on your local machine, follow the instructions to use the Amazon Elastic Compute Cloud (Amazon EC2) instance that was launched in this lab environment.



Make your database publicly accessible

17. In the Amazon RDS console, choose the name of the SQL Server database that you created.
18. In the Connectivity & security section, for Security, notice that Public accessibility is currently set to No.

The screenshot shows the 'Connectivity & security' tab in the Amazon RDS console. On the left, there's a sidebar with 'Databases' selected. The main area displays connectivity details:

Endpoint & port	Networking	Security
Endpoint database-1.cskewxjafind.us-east-1.rds.amazonaws.com	Availability Zone us-east-1f	VPC security groups default (sg-0ccbabb1bb943c66e) Active
Port 1433	VPC vpc-02359baf02248885b	Publicly accessible No
	Subnet group default-vpc-02359baf02248885b	Certificate authority rds-ca-2019
	Subnets subnet-0db5f83e7392ab4d1 subnet-0cbb7438953bb921e subnet-0ea3419cd0a433802 subnet-0772a129c974da50d	Certificate authority date August 22, 2024, 10:38 (UTC±10:38)

19. To change this setting, choose Modify at the top of the page.

The screenshot shows the 'Databases' page in the Amazon RDS console. The 'Databases' tab is selected. At the top, there's a 'Modify' button highlighted in orange. The main area lists a single database entry:

DB identifier	Role	Engine	Region & AZ
database-1	Instance	SQL Server Express Edition	us-east-1f

20. Scroll down to the Connectivity section, and expand Additional configuration.

The screenshot shows the 'Modify DB instance: database-1' page in the Amazon RDS console. The 'Modify' button from the previous screen has been clicked, and the page is now in a loading state, indicated by a circular progress bar. At the bottom right, there are 'Cancel' and 'Continue' buttons.

21. For Public access, choose Publicly accessible.
 22. Scroll to the bottom of the page, and choose Continue.

Amazon RDS

Services Search for services, features, blogs, docs, and more [Alt+S] N. Virginia vocabs/user1868139=1928228@kiit.ac.in @ 8874-8496-2277 ▾

Settings

License model License type associated with the database engine license-included

DB engine version Version number of the database engine to be used for this database 14.00.3401.7.v1

DB instance identifier [Info](#) Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region. database-1

New master password [Info](#) Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote), " (double quote) and @ (at sign).

Feedback English (US) ▾ Services Search for services, features, blogs, docs, and more [Alt+S] N. Virginia vocabs/user1868139=1928228@kiit.ac.in @ 8874-8496-2277 ▾

Amazon RDS

Connectivity

Subnet group default-vpc-02359baf02248885b

Security group List of DB security groups to associate with this DB instance. Choose security groups default

Certificate authority rds-ca-2019

Additional configuration

Public access Publicly accessible EC2 instances and devices outside the VPC can connect to the instance. You define the security groups for supported devices and instances. Not publicly accessible No IP address is assigned to the DB instance. EC2 instances and devices outside the VPC can't connect.

Performance Insights [Info](#)

Enable Performance Insights

Maintenance

Auto minor version upgrade [Info](#) Enable auto minor version upgrade Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

DB instance maintenance window The weekly time range during which system maintenance can occur.

Start day	Start time	Duration
Thursday	07 : 40 UTC	0.5 hours

Deletion protection

Enable deletion protection Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

Cancel Continue

Feedback English (US) ▾ Services Search for services, features, blogs, docs, and more [Alt+S] N. Virginia vocabs/user1868139=1928228@kiit.ac.in @ 8874-8496-2277 ▾

23. In the Scheduling of modifications section, for When to apply modifications, choose Apply immediately.

24. Choose Modify DB Instance.

The screenshot shows the 'Amazon RDS' service page. On the left, there's a sidebar with links like Dashboard, Databases, Query Editor, etc. The main area has a 'Summary of modifications' section with a table showing 'Public accessibility' changing from 'No' to 'Yes'. Below it is a 'Scheduling of modifications' section where 'Apply immediately' is selected. At the bottom right are 'Cancel', 'Back', and a large orange 'Modify DB instance' button.

25. After about 30 seconds, the Status for the database changes to Modifying. Before continuing, wait until the status changes to Available.

The screenshot shows the 'Amazon RDS' service page with the 'Databases' section selected. A green success message 'Successfully modified instance database-1' is displayed. Below it, the database list shows 'database-1' with its details: Instance, Engine, and Region & AZ. The status of 'database-1' is shown as 'Modifying' in the 'Status' column of the main table.

The screenshot shows the 'Amazon RDS' service page with the 'Databases' section selected. A green success message 'Successfully modified instance database-1' is displayed. Below it, the database list shows 'database-1' with its details: Instance, Engine, and Region & AZ. The status of 'database-1' is now shown as 'Available' in the 'Status' column of the main table.

S | Services | Search for services, features, blogs, docs, and more | [Alt+S] | N. Virginia | vclabs/user1868139=1928228@kit.ac.in @ 8874-8496-2277 ▾

Amazon RDS X

Dashboard

Databases

Query Editor

Performance insights

Snapshots

Automated backups

Reserved instances

Proxies

Subnet groups

Parameter groups

Option groups

Custom engine versions

RDS > Databases

Databases Group resources C Modify Actions ▾ Restore from S3 Create database

Filter by databases

Size Status CPU Current activity Maintenance VPC M

Size	Status	CPU	Current activity	Maintenance	VPC
db.t2.micro	Available	42.83%	0 Connections	none	vpc-02359baf02248885b N

Events Feedback English (US) ▾ © 2022, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Tip: You might need to refresh the database information. To refresh, choose the refresh icon.

Update your VPC security group

By default, the virtual private cloud (VPC) default security group does not permit inbound SQL Server traffic from external sources. In this task, you will turn on inbound SQL Server connections from your IP address.

Note: If you are using the EC2 instance, you will use the Windows Workstation IP address that you saved earlier. In this case, skip the next few steps to get your IP address.

26. First, get your IP address.
27. In a new browser tab or window, go to <https://whatismyipaddress.com/>
28. Copy the IPv4 value to a text editor to use later in this lab.

← → C whatismyipaddress.com

What's MyIPAddress.com Enter Keywords or IP Address... Q Search ABOUT PRESS BLOG CONTACT

MY IP IP LOOKUP HIDE MY IP VPNS ▾ TOOLS ▾ LEARN ▾

My IP Address is:
IPv4: ? 103.47.19.254
IPv6: ? Not detected

My IP Information:
ISP: Home Broadband Services LLP
City: Noida
Region: Uttar Pradesh
Country: India

Your private information is exposed!
HIDE MY IP ADDRESS NOW Show Complete IP Details

Click for more details about 103.47.19.254

Leaflet | © OpenStreetMap Terms

Location not accurate?
Update My IP Location

29. Now, modify the security group to permit inbound SQL Server connections from your computer or the WindowsWorkstation instance.
30. Return to the browser tab that is open to the AWS console. Ensure that you are on the RDS > Databases page.
31. Choose the name of the database you created.
32. In the Connectivity & security section, under VPC security groups, choose the name of the security group.
33. The security group name looks similar to the following: default (sg-a12345b6)

Security group	Type	Rule
default (sg-0cbbabf1bb943c66e)	EC2 Security Group - Inbound	sg-0cbbabf1bb943c66e
default (sg-0cbbabf1bb943c66e)	CIDR/IP - Outbound	0.0.0.0/0

34. On the Security Groups page, choose the Inbound rules tab.

Name	Security group ID	Security group name	VPC ID	Description
sg-0cbbabf1bb943c66e	default	vpc-02359baf02248885b	default VPC sec	

Name	Security group rule...	IP version	Type	Protocol
sgr-0946f8ceb8398eb34	-		All traffic	All

35. Choose Edit inbound rules, and choose Add rule.

Screenshot of the AWS EC2 Security Groups 'Edit inbound rules' page.

The 'Inbound rules' table shows one rule:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0946f8ceb8398eb34	All traffic	All	All	Custom	sg-0cbbabf1bb943c66e

Buttons at the bottom: Cancel, Preview changes, Save rules.

36. For Type, choose MSSQL.
37. For Source, choose Custom, and enter your IP address or the IP address of the Windows Workstation instance in the text box.
38. Add /32 at the end of the IP address. The full text should look similar to the following:
123.12.123.23/32
39. Choose Save rules.

Screenshot of the AWS EC2 Security Groups 'Edit inbound rules' page showing the updated rule.

The 'Inbound rules' table now includes two rules:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0946f8ceb8398eb34	All traffic	All	All	Custom	sg-0cbbabf1bb943c66e
-	MSSQL	TCP	1433	Custom	103.47.19.254/32

Buttons at the bottom: Add rule, Save rules.

Screenshot of the AWS EC2 Instances page showing a success message and the security group list.

The success message is: "Inbound security group rules successfully modified on security group (sg-0cbbabf1bb943c66e | default)".

The 'Security Groups' table shows one entry:

Name	Security group ID	Security group name	VPC ID	Description
sg-085b866b2b85a2d11	default	vpc-0bfaa154d63dba38c	default VPC	

The screenshot shows the AWS RDS console under the 'Databases' section. On the left, a sidebar lists options like Dashboard, Databases, Query Editor, etc. The main area displays 'Security group rules (3)'. A table lists three rules:

Security group	Type	Rule
default (sg-0cbbabf1bb943c66e)	CIDR/IP - Inbound	103.47.19.254/32
default (sg-0cbbabf1bb943c66e)	EC2 Security Group - Inbound	sg-0cbbabf1bb943c66e
default (sg-0cbbabf1bb943c66e)	CIDR/IP - Outbound	0.0.0.0/0

Below this is a 'Replication' section with one entry:

DB instance	Role	Region & AZ	Replication source	Replication state	Lag
database-1	Reader	us-east-1f		In Sync	0 ms

At the bottom, there are links for Feedback, English (US), and copyright information.

Connect to your DB instance

First, you will need to find the Domain Name System (DNS) endpoint and port number for your DB instance.

40. Return to the RDS > Databases page.
41. Choose the name of the database you created.

The screenshot shows the AWS RDS console under the 'Databases' section. The database 'database-1' is selected. The main area displays the 'Summary' tab:

DB identifier	CPU	Status	Class
database-1	39.00%	Available	db.t2.micro
Role	Current activity	Engine	Region & AZ
Instance	0 Connections	SQL Server Express Edition	us-east-1f

Below the summary are tabs for Connectivity & security, Monitoring, Logs & events, Configuration, Maintenance & backups, and Tags. The 'Connectivity & security' tab is selected, showing sections for Endpoint & port, Networking, and Security.

At the bottom, there are links for Feedback, English (US), and copyright information.

42. On the Connectivity & security tab, copy the Endpoint value to a text editor.
43. The endpoint looks similar to the following: sample-instance.abc2defghije.us-west-2.rds.amazonaws.com
44. Notice the Port number.
45. The default port for SQL Server is 1433.
46. If your port number is different, copy that value to your text editor.

The screenshot shows the AWS RDS 'Connectivity & security' page. On the left, there's a sidebar with options like Dashboard, Databases, Query Editor, etc. The main content area has tabs for Connectivity & security, Monitoring, Logs & events, Configuration, Maintenance & backups, and Tags. The Connectivity & security tab is selected. It displays detailed information about the endpoint:

Endpoint & port	Networking	Security
Endpoint database-1.cskewxjafind.us-east-1.rds.amazonaws.com	Availability Zone us-east-1f	VPC security groups default (sg-0cbabf1bb943c66e) <input checked="" type="checkbox"/> Active
Port 1433	VPC vpc-02359baf02248885b	Publicly accessible Yes
	Subnet group default-vpc-02359baf02248885b	Certificate authority rds-ca-2019
	Subnets subnet-0db5f83e7392ab4d1 subnet-0ccb7438953bb921e subnet-0ea3419cd0a433802	Certificate authority date August 22, 2024, 10:38 (UTC±10:38)

At the bottom, there are links for Feedback, English (US), and various AWS terms.

47. Open the Microsoft SQL Server Management Studio application.
48. The Connect to Server dialog box appears.
 - a) For Server type, choose Database Engine.
 - b) For Server name, enter the database endpoint value that you copied.
 - c) At the end of the endpoint value, add a comma (,) and the port number (the default port number is 1433). *For example, your server name should look similar to the following: database.abc2defghije.us-west-2.rds.amazonaws.com,1433*
 - d) For Authentication, choose SQL Server Authentication.
 - e) For Login, enter the username for your DB instance.
 - f) This is also known as the administrator username. The default is admin.
 - g) For Password, enter the password that you copied for your DB instance.
 - h) This is also known as the administrator user password.
49. Choose Connect.

The screenshot shows the Microsoft SQL Server Management Studio interface. On the left, a Notepad window titled 'login credentials.txt - Notepad' contains the following text:

```
This is the only time you will be able to view this password. Copy and save the password for your reference, otherwise you will need to modify the database to change it.

Master username
admin

Master password
YIK3EgHo8FYx9fVtUnzZ
```

A blue box highlights the text 'database-1.cskewxjafind.us-east-1.rds.amazonaws.com,1433'. A blue arrow points from this highlighted text to the 'Server name:' field in the 'Connect to Server' dialog box on the right. The 'Connect to Server' dialog box shows the following settings:

Server type:	Database Engine
Server name:	database-1.cskewxjafind.us-east-1.rds.amazonaws.com,1
Authentication:	SQL Server Authentication
Login:	admin
Password:	*****
<input type="checkbox"/> Remember password	

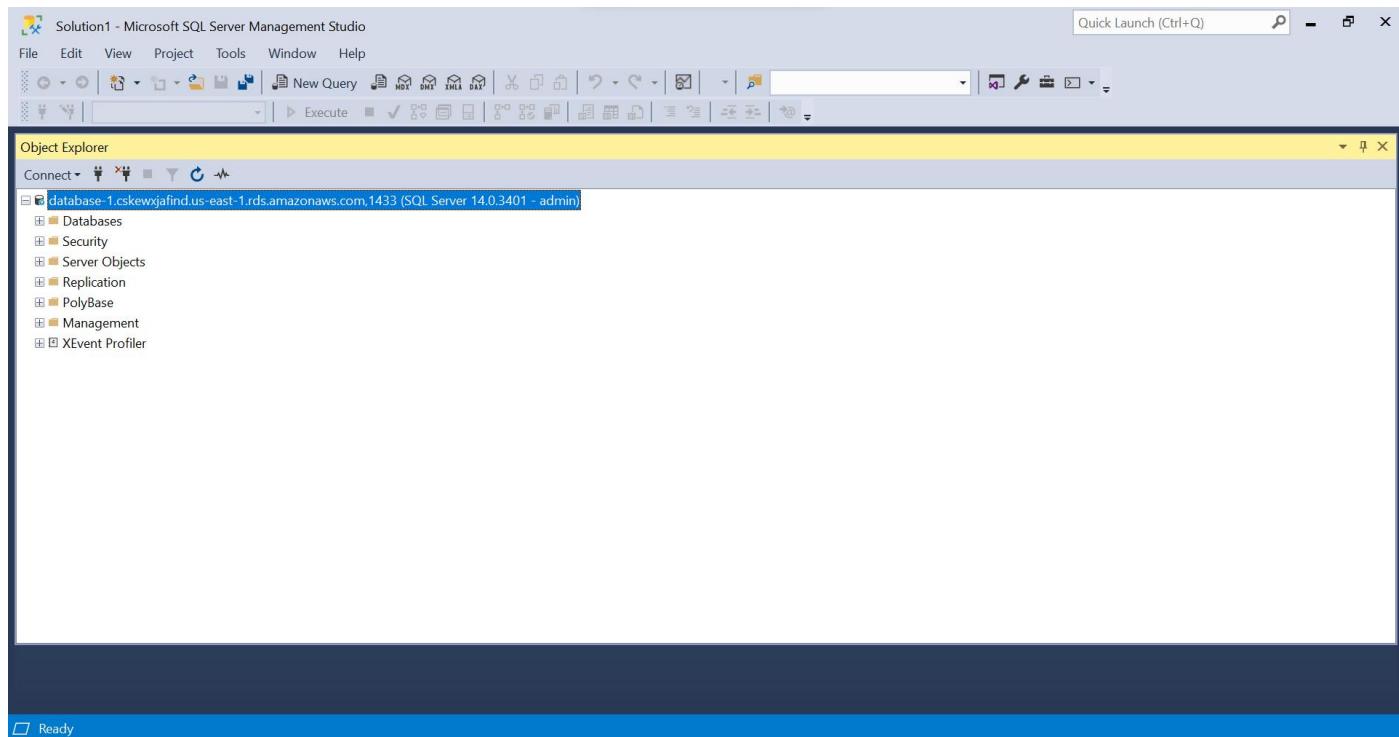
At the bottom of the dialog are buttons for Connect, Cancel, Help, and Options >.

50. After a few moments, you are connected to your database.

If the connection does not succeed, repeat Task 4 to update the default security group. When you add the inbound rule, for Source, choose Anywhere instead of My IP. (Note: Only select Anywhere for the purpose of this lab. This selection presents a security risk in the real world.)

Explore the structure of the relational database

Great work! You can explore the structure of the relational database by expanding the areas in the Object Explorer pane. You will see that the SQL Server has built-in system databases such as model, msdb, and tempdb. You can even create a new database if you would like to experiment more.



Lab Complete

45. Log out of the AWS Management Console.

- In the upper-right corner of the page, choose your user name. Your user name begins with **voclabs/user**.
- Choose **Sign Out**.

46. Choose **End Lab** at the top of this page, and then select **Yes** to confirm that you want to end the lab.