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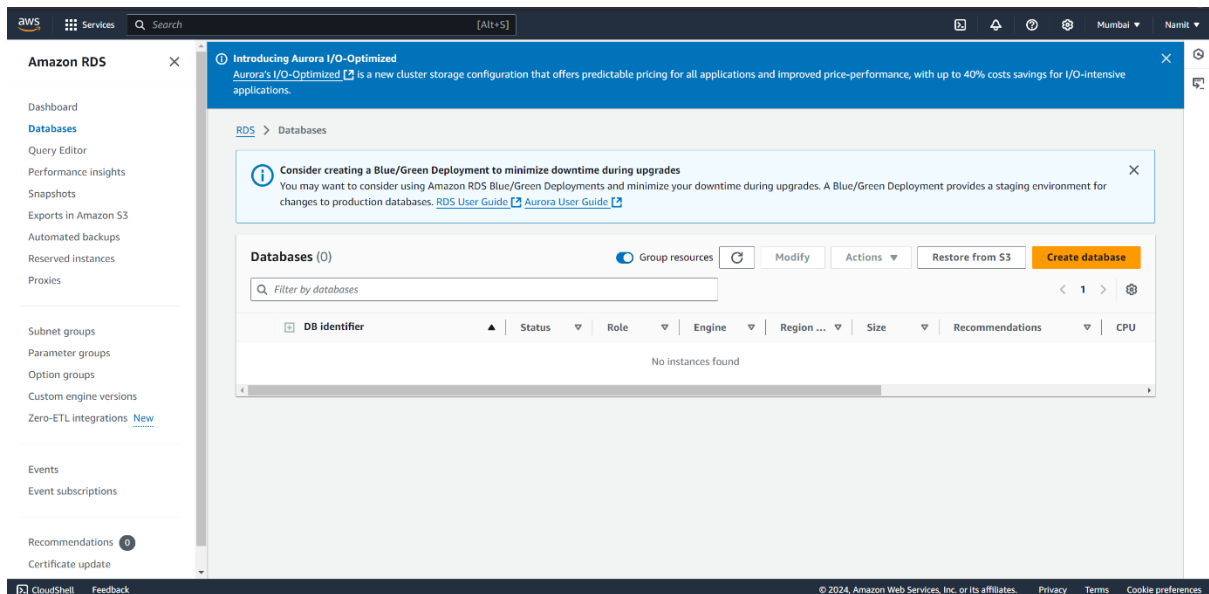
Subject: Advanced Cloud Computing

Name of the Student: Namit Agarwal

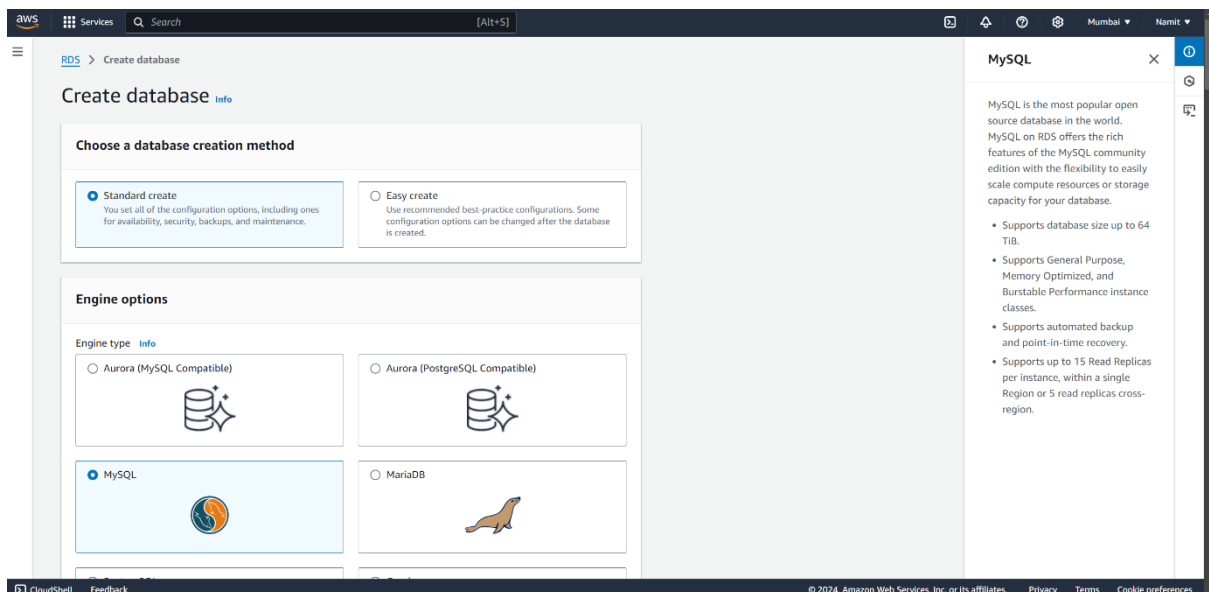
PRN: 20220801019

Title of Practical: Encrypt an Unencrypted RDS DB Instance

- **Create Amazon RDS Database**



- **Select MySQL**



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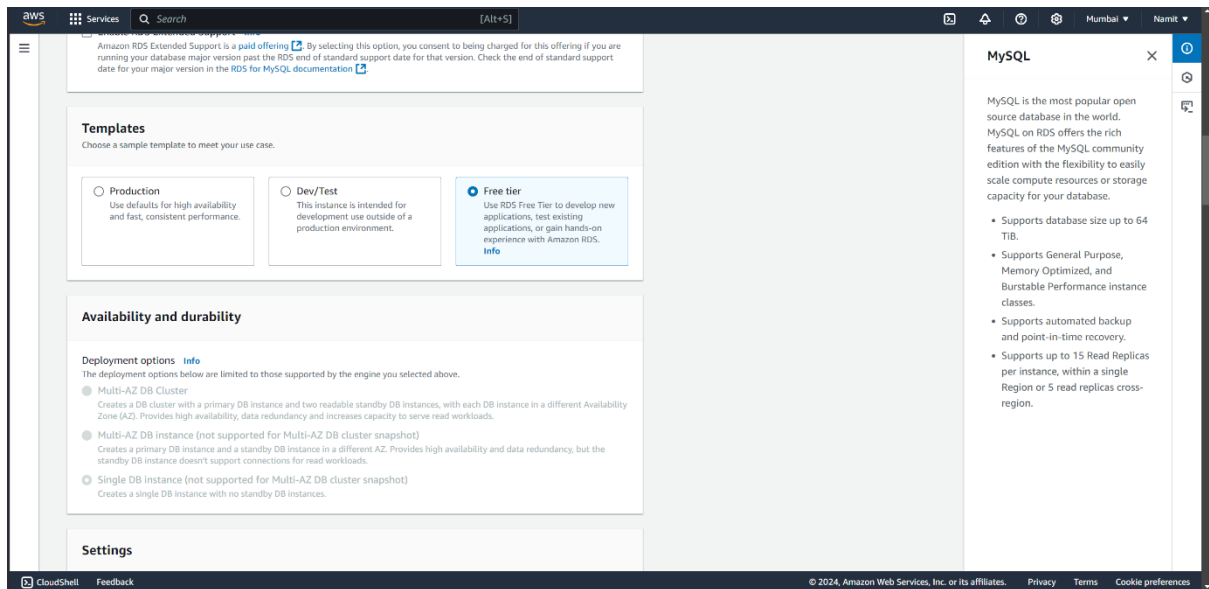
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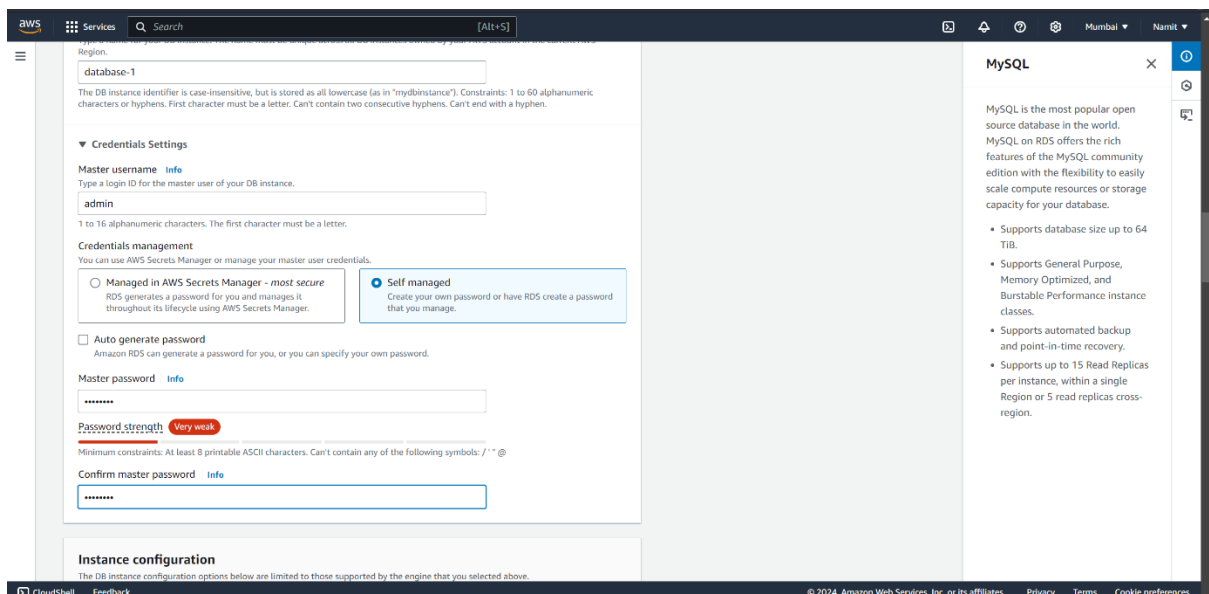
Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Select free tier in templates



The screenshot shows the AWS Management Console interface for creating a new MySQL RDS instance. The 'Templates' section is active, displaying three options: 'Production', 'Dev/Test', and 'Free tier'. The 'Free tier' option is selected, indicated by a blue circle and the text 'Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.' Below the templates, the 'Availability and durability' section shows deployment options: 'Multi-AZ DB Cluster', 'Multi-AZ DB instance (not supported for Multi-AZ DB cluster snapshot)', and 'Single DB instance (not supported for Multi-AZ DB cluster snapshot)'. The 'Settings' section is partially visible at the bottom.

- Set credentials



The screenshot shows the AWS Management Console interface for setting credentials for a new MySQL RDS instance. The 'Credentials Settings' section is active, displaying two options: 'Managed in AWS Secrets Manager - most secure' and 'Self managed'. The 'Self managed' option is selected, indicated by a blue circle and the text 'Create your own password or have RDS create a password that you manage.' Below the options, the 'Master username' field is set to 'admin'. The 'Master password' field is set to a password that is marked as 'Very weak'. The 'Confirm master password' field is also set to the same password. The 'Instance configuration' section is partially visible at the bottom.

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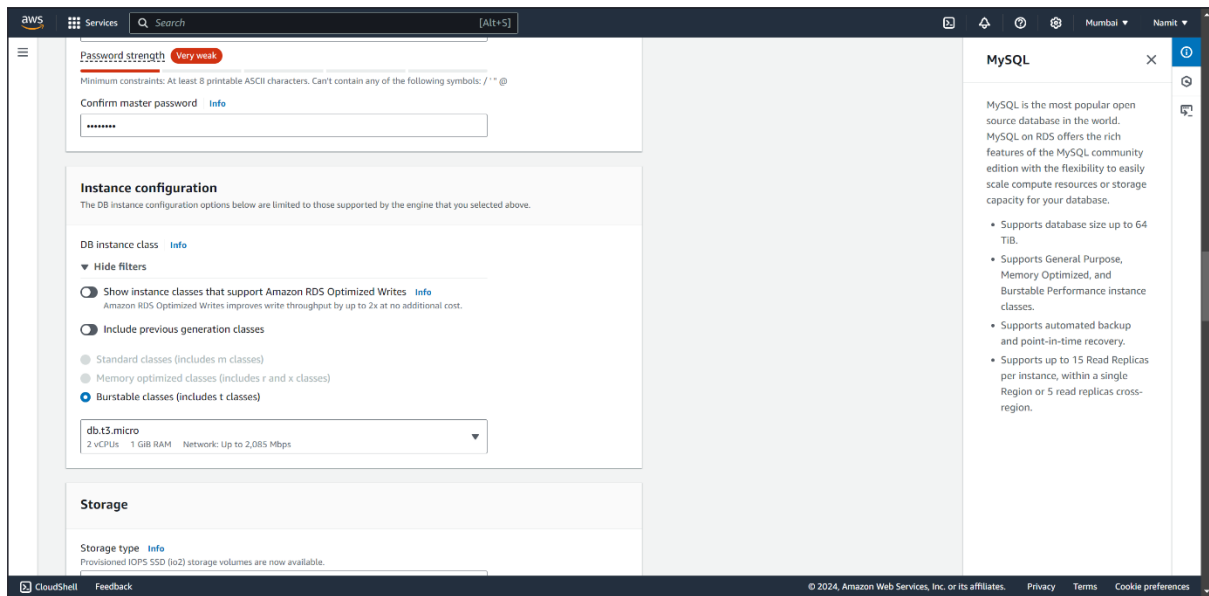
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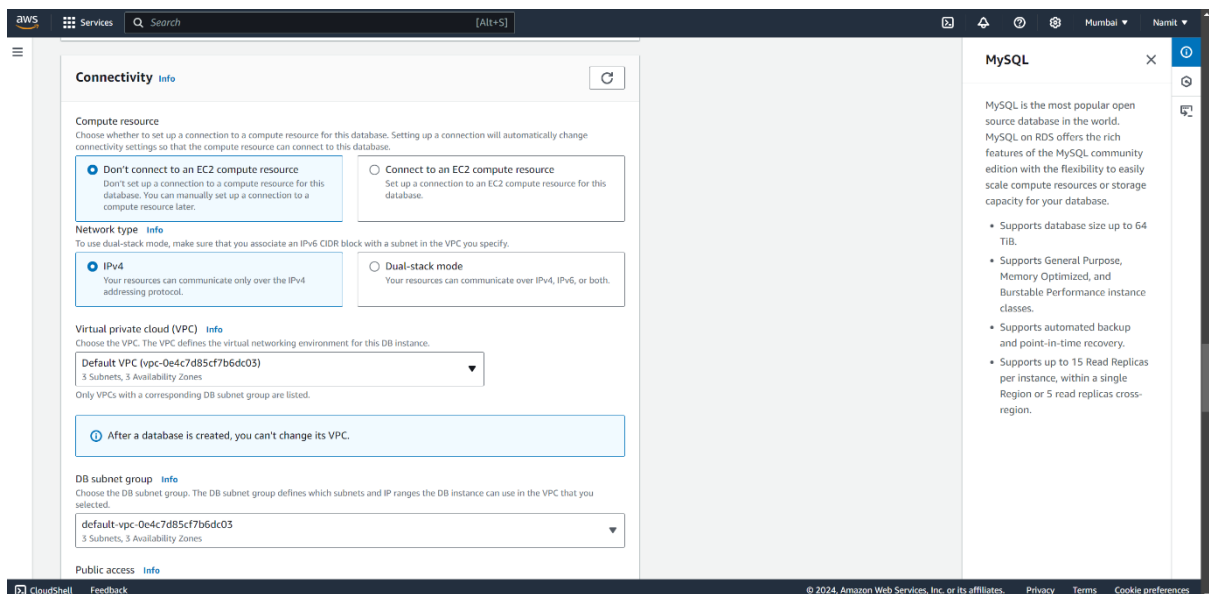
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Leave everything else default



The screenshot shows the AWS Management Console for configuring a new RDS instance. The 'Instance configuration' section is active, showing the 'DB instance class' as 'db.t3.micro' (2 vCPU, 1 GiB RAM, Network: Up to 2,085 Mbps). The 'Storage' section shows 'Storage type' as 'Provisioned IOPS SSD (io2)'. A 'MySQL' sidebar on the right provides information about the database engine and its features.



The screenshot shows the 'Connectivity' section of the RDS instance configuration. The 'Compute resource' section has 'Don't connect to an EC2 compute resource' selected. The 'Network type' section has 'IPv4' selected. The 'Virtual private cloud (VPC)' section shows 'Default VPC (vpc-0e4c7d85cf7b6dc03)' selected. The 'DB subnet group' section shows 'default-vpc-0e4c7d85cf7b6dc03' selected. A 'MySQL' sidebar on the right provides information about the database engine and its features.

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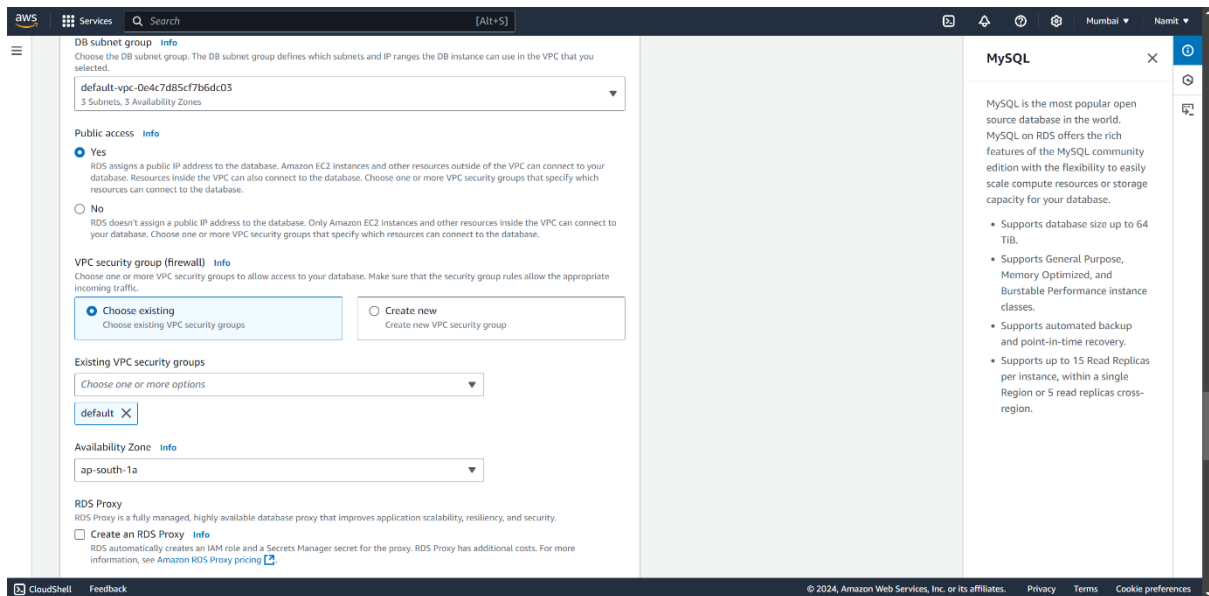
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Public access- yes



The screenshot shows the AWS Management Console for configuring a new RDS DB instance. The 'Public access' section is set to 'Yes', and the 'VPC security group (firewall)' is set to 'Choose existing' with 'default' selected. The 'Availability Zone' is set to 'ap-south-1a'. The 'RDS Proxy' section is set to 'Create an RDS Proxy'.

DB subnet group Info
Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.
default-vpc-0e4c7d85cf7b6dc03
3 Subnets, 3 Availability Zones

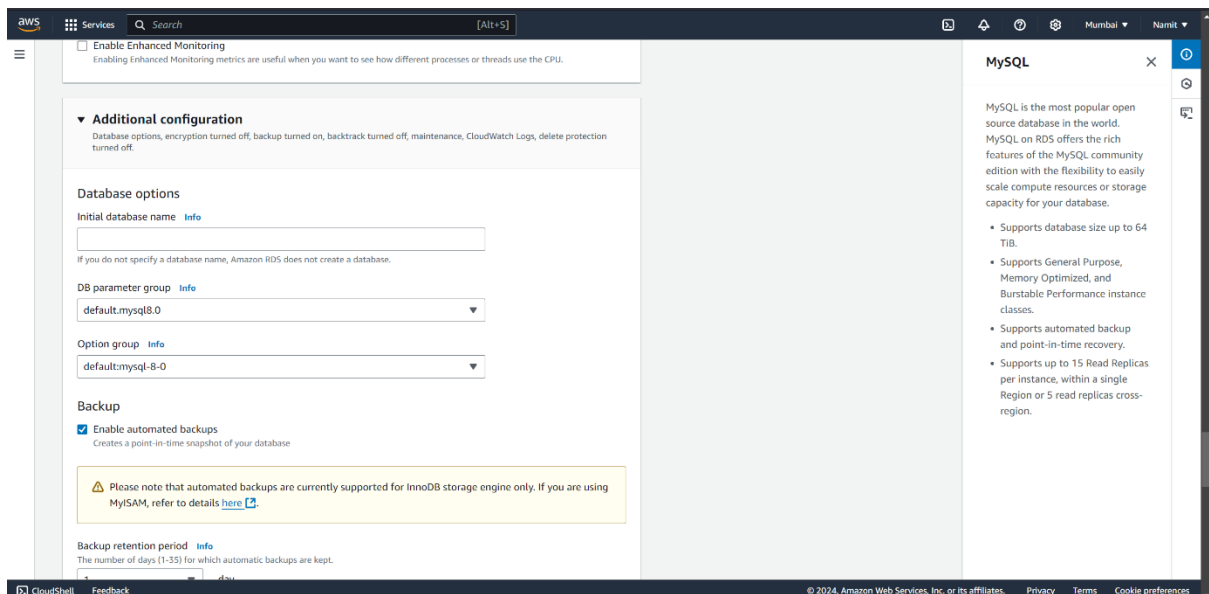
Public access Info
☒ Yes
RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
☐ No
RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) Info
Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.
☒ Choose existing
Choose existing VPC security groups
☐ Create new
Create new VPC security group

Existing VPC security groups
Choose one or more options
default X

Availability Zone Info
ap-south-1a

RDS Proxy
RDS Proxy is a fully managed, highly available database proxy that improves application scalability, resiliency, and security.
☒ Create an RDS Proxy Info
RDS automatically creates an IAM role and a Secrets Manager secret for the proxy. RDS Proxy has additional costs. For more information, see [Amazon RDS Proxy pricing](#).



The screenshot shows the AWS Management Console for configuring a new RDS DB instance. The 'Additional configuration' section is expanded, showing 'Database options' and 'Backup' settings. The 'Initial database name' is empty, the 'DB parameter group' is 'default.mysql8.0', and the 'Option group' is 'default:mysql-8-0'. The 'Backup' section is set to 'Enable automated backups'.

☐ Enable Enhanced Monitoring
Enabling Enhanced Monitoring metrics are useful when you want to see how different processes or threads use the CPU.

Additional configuration
Database options, encryption turned off, backup turned on, backtrace turned off, maintenance, CloudWatch Logs, delete protection turned off.

Database options
Initial database name Info

If you do not specify a database name, Amazon RDS does not create a database.
DB parameter group Info
default.mysql8.0
Option group Info
default:mysql-8-0

Backup
☒ Enable automated backups
Creates a point-in-time snapshot of your database.
Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to details [here](#).

Backup retention period Info
The number of days (1-35) for which automatic backups are kept.
1 day

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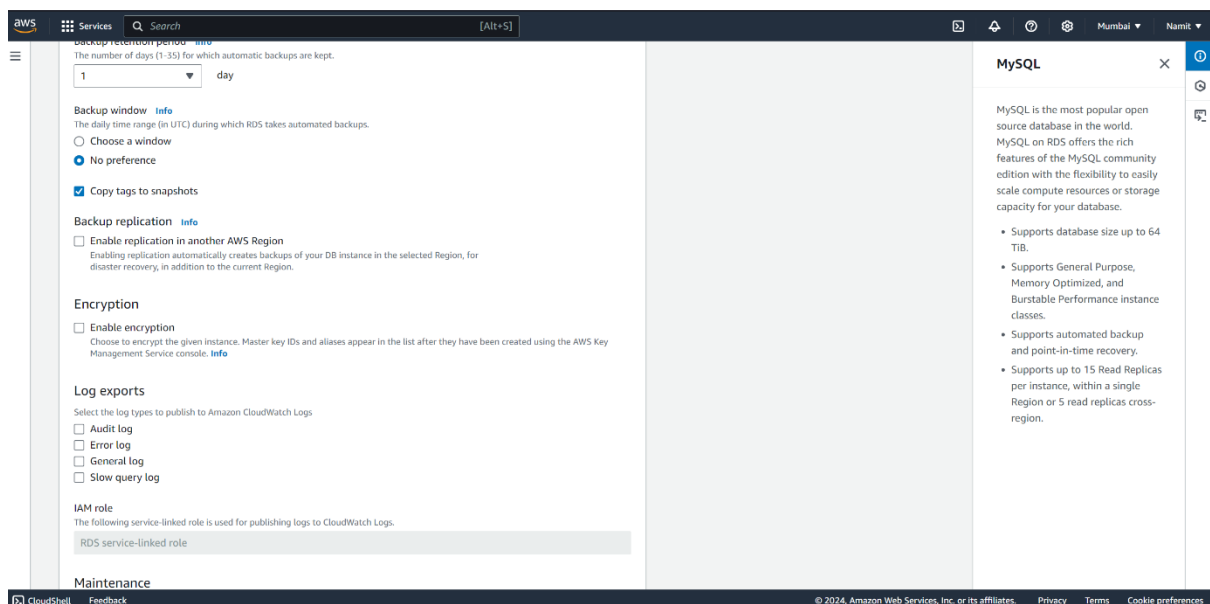
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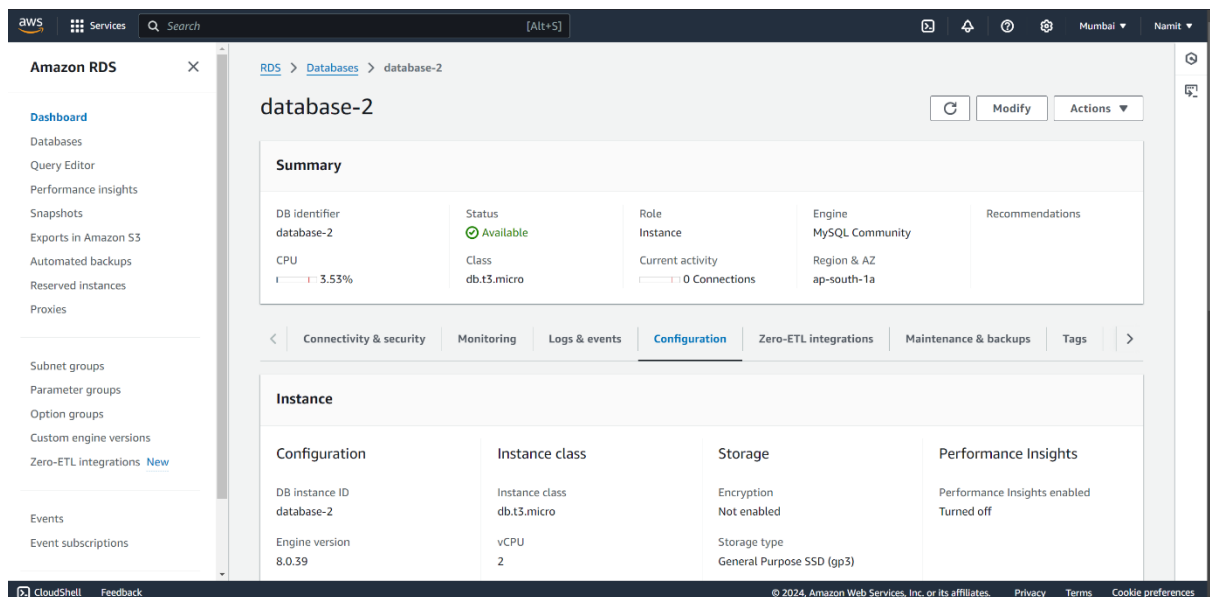
PRN: 20220801019

Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Under additional settings uncheck the encryption



- Create DB



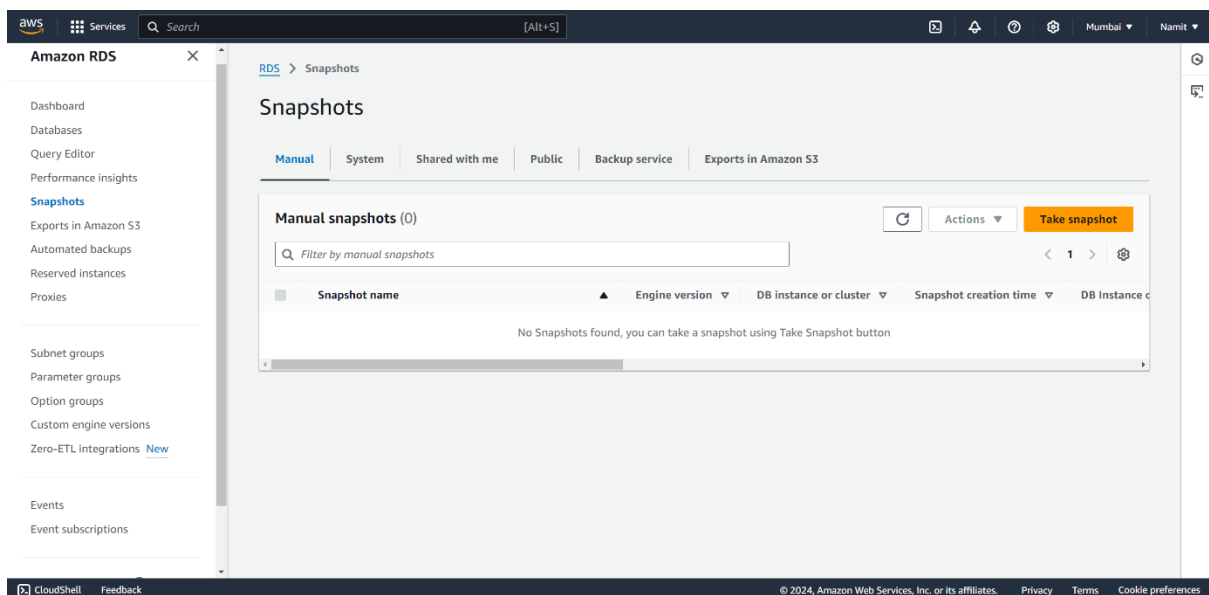
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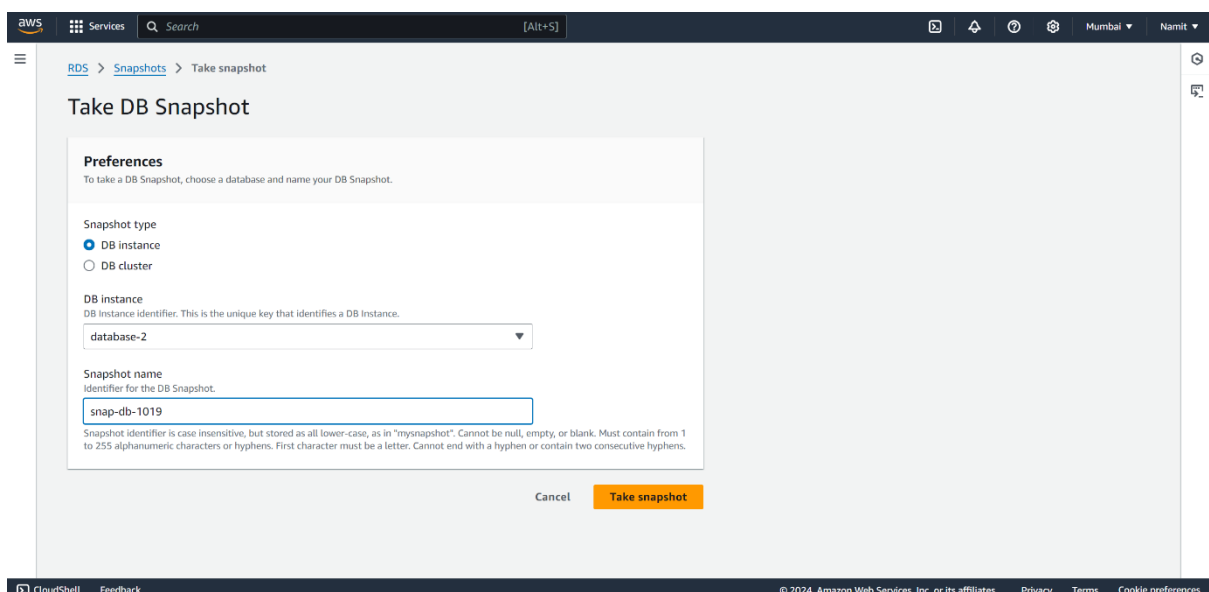
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

- After that we'll take a snapshot of this unencrypted db instance



- Select the instance and give snapshot name



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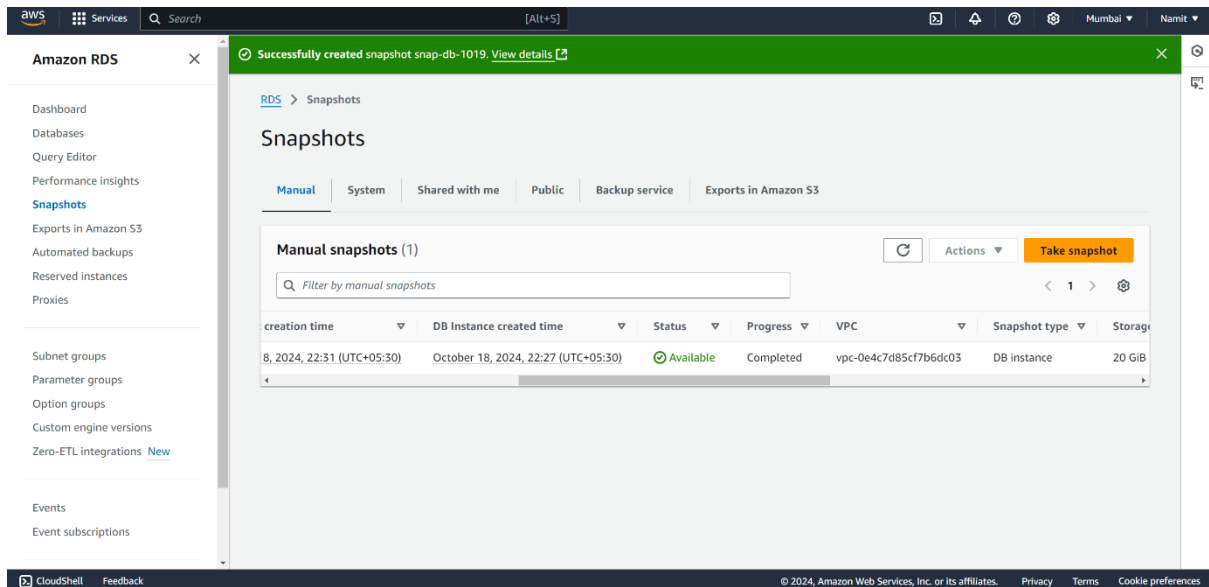
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

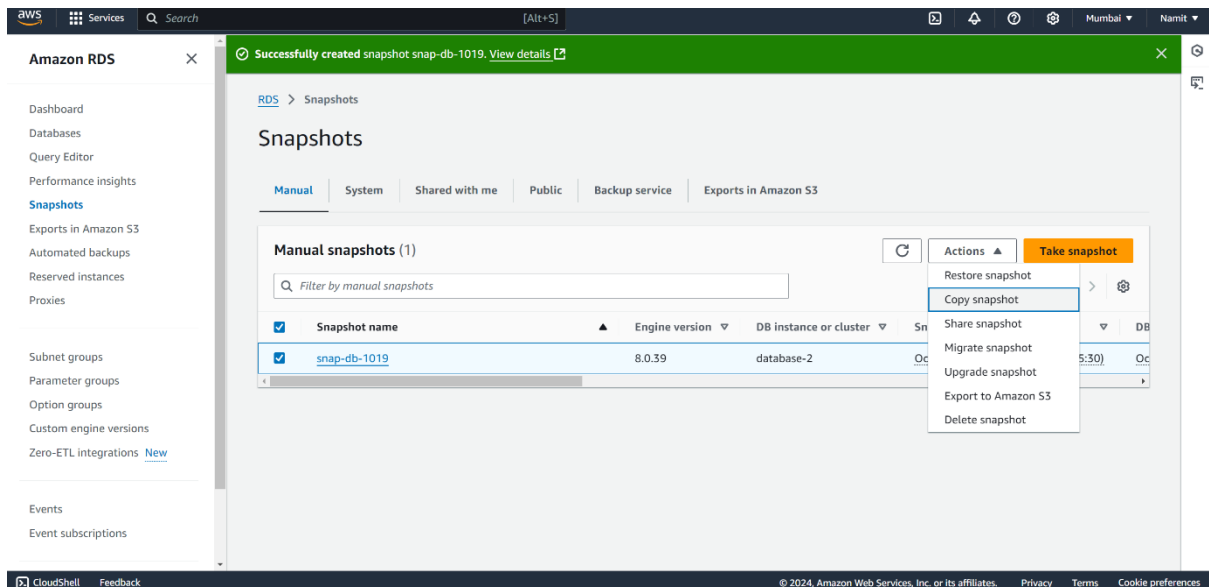
- Snapshot created



The screenshot shows the AWS Management Console interface. A green banner at the top indicates 'Successfully created snapshot snap-db-1019. View details'. The main content area is titled 'Snapshots' and shows a table of manual snapshots. The table has columns for creation time, DB instance created time, status, progress, VPC, snapshot type, and storage. One snapshot is listed with a status of 'Available' and 'Completed'.

creation time	DB Instance created time	Status	Progress	VPC	Snapshot type	Storage
8, 2024, 22:31 (UTC+05:30)	October 18, 2024, 22:27 (UTC+05:30)	Available	Completed	vpc-0e4c7d85cf7b6dc03	DB instance	20 GiB

- Now from actions we copy snapshot



The screenshot shows the AWS Management Console interface. The 'Actions' dropdown menu is open, showing options like 'Restore snapshot', 'Copy snapshot', 'Share snapshot', 'Migrate snapshot', 'Upgrade snapshot', 'Export to Amazon S3', and 'Delete snapshot'. The 'Copy snapshot' option is highlighted.

Snapshot name	Engine version	DB instance or cluster	Sn
✓ snap-db-1019	8.0.39	database-2	Oc

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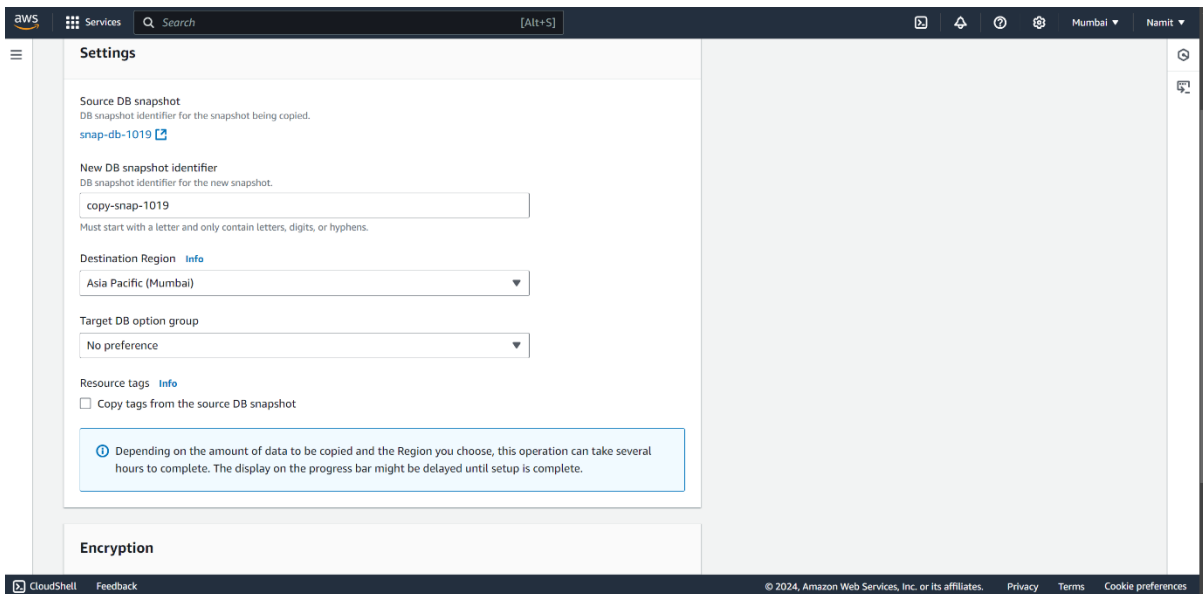
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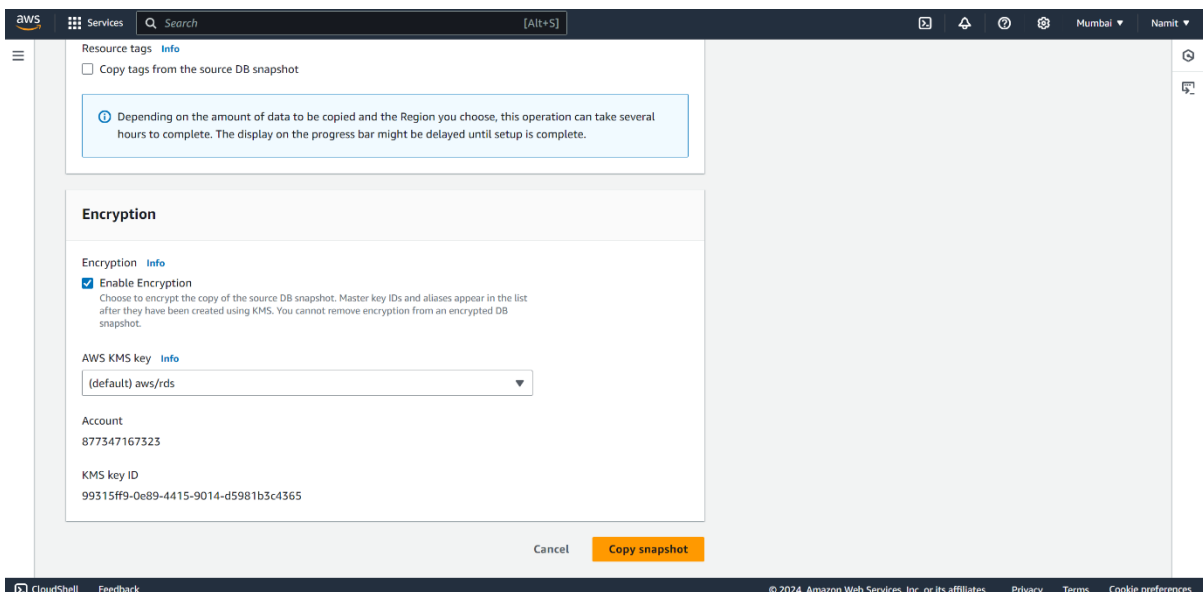
Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Select region u want to restore it in



The screenshot shows the AWS console interface for copying a DB snapshot. The 'Settings' tab is active. The 'Source DB snapshot' is 'snap-db-1019'. The 'New DB snapshot identifier' is 'copy-snap-1019'. The 'Destination Region' is 'Asia Pacific (Mumbai)'. The 'Target DB option group' is 'No preference'. There is a checkbox for 'Copy tags from the source DB snapshot' which is unchecked. A blue information box states: 'Depending on the amount of data to be copied and the Region you choose, this operation can take several hours to complete. The display on the progress bar might be delayed until setup is complete.'

- Here we enable encryption



The screenshot shows the AWS console interface for enabling encryption on a DB snapshot. The 'Encryption' tab is active. The 'Enable Encryption' checkbox is checked. The 'AWS KMS key' is '(default) aws/rds'. The 'Account' is '877347167323'. The 'KMS key ID' is '99315ff9-0e89-4415-9014-d5981b3c4365'. There are 'Cancel' and 'Copy snapshot' buttons at the bottom.

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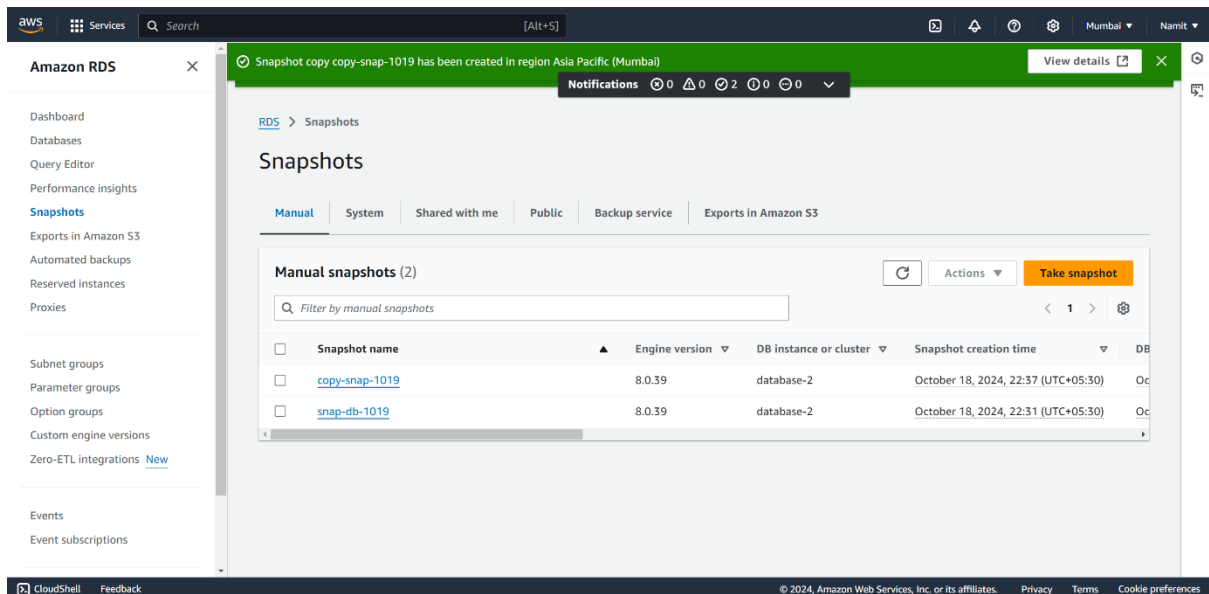
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Copy of snapshot created with encryption enabled

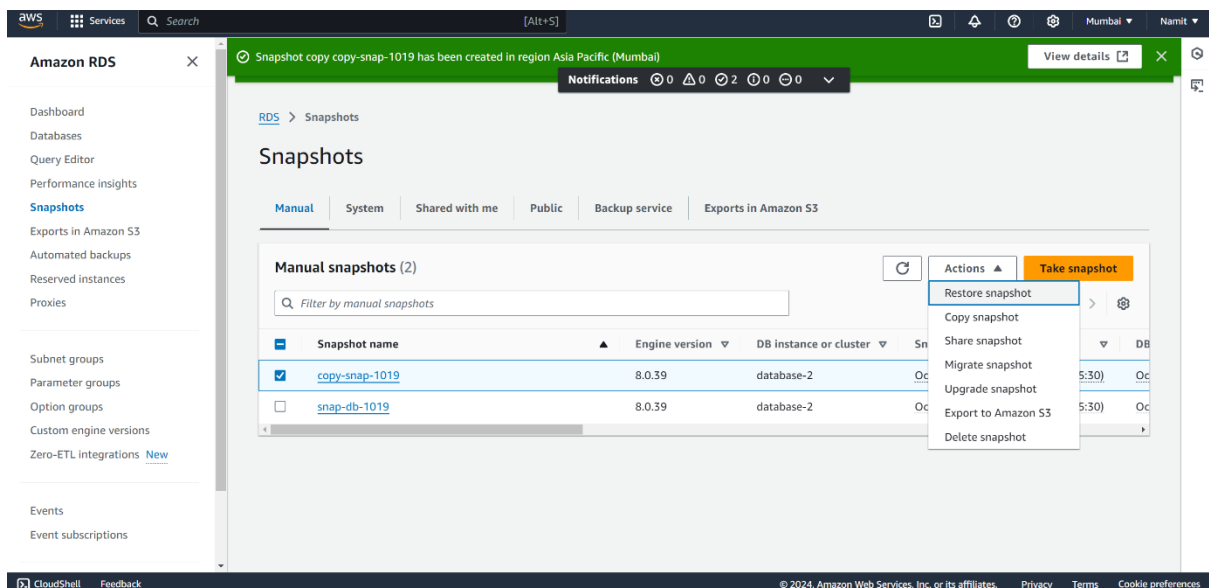


Amazon RDS Snapshots

Manual snapshots (2)

Snapshot name	Engine version	DB instance or cluster	Snapshot creation time
copy-snap-1019	8.0.39	database-2	October 18, 2024, 22:37 (UTC+05:30)
snap-db-1019	8.0.39	database-2	October 18, 2024, 22:31 (UTC+05:30)

- From actions we do restore snapshot



Amazon RDS Snapshots

Manual snapshots (2)

Snapshot name	Engine version	DB instance or cluster	Snapshot creation time
<input checked="" type="checkbox"/> copy-snap-1019	8.0.39	database-2	October 18, 2024, 22:37 (UTC+05:30)
<input type="checkbox"/> snap-db-1019	8.0.39	database-2	October 18, 2024, 22:31 (UTC+05:30)

Actions

- Restore snapshot
- Copy snapshot
- Share snapshot
- Migrate snapshot
- Upgrade snapshot
- Export to Amazon S3
- Delete snapshot

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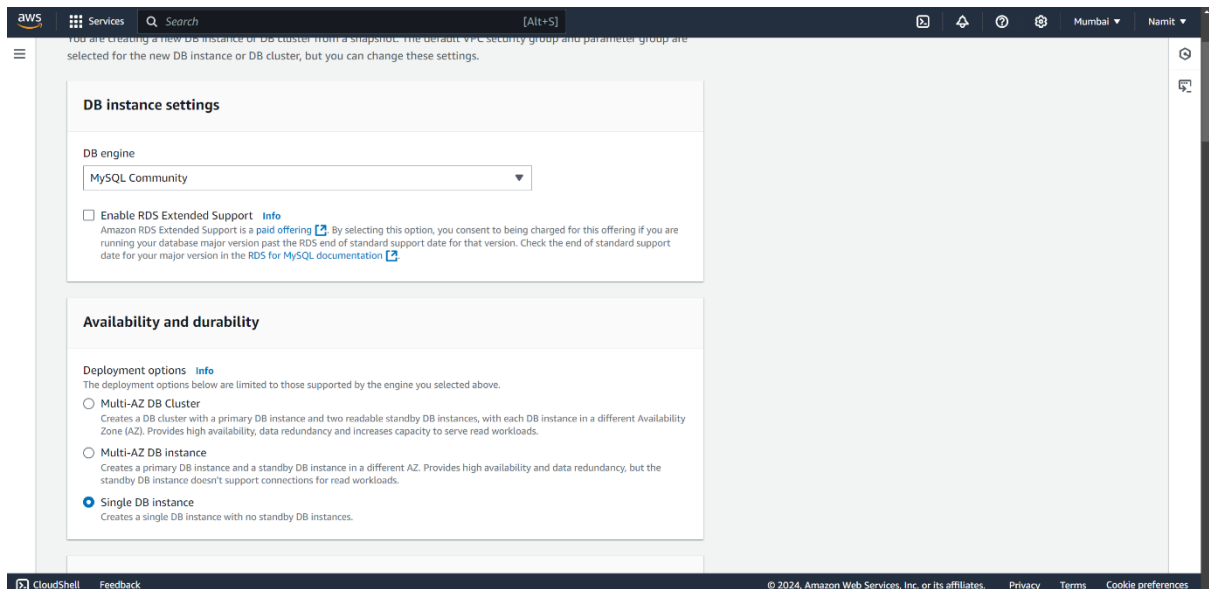
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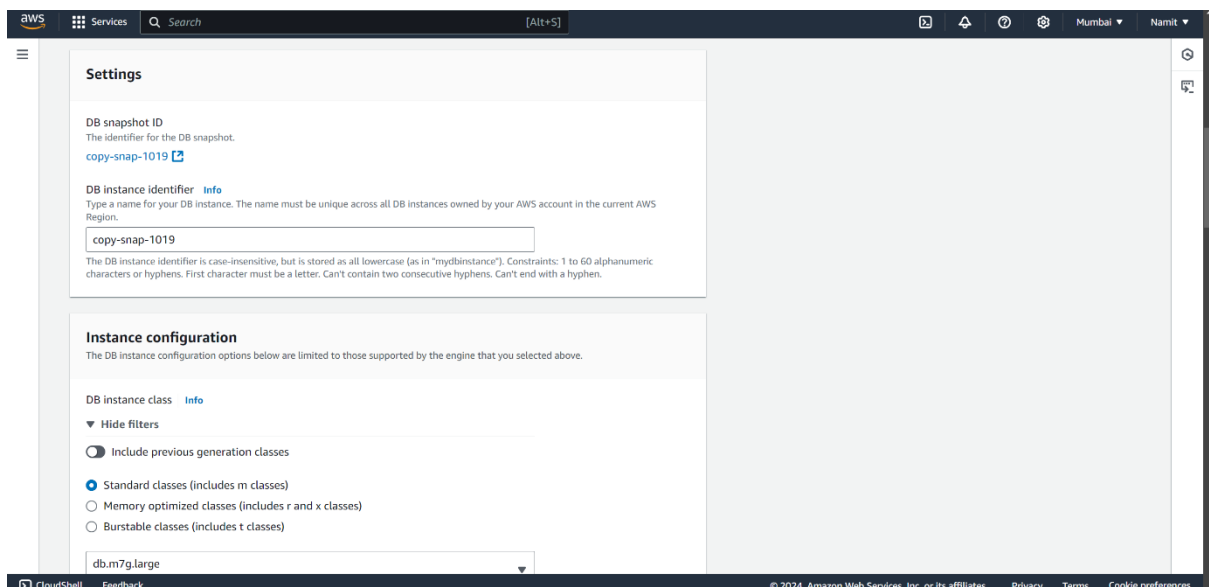
Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Single DB instance



The screenshot shows the AWS Management Console interface for creating a new DB instance. The 'DB instance settings' section is visible, showing 'MySQL Community' as the selected DB engine. Below this, there is a checkbox for 'Enable RDS Extended Support'. The 'Availability and durability' section shows three options: 'Multi-AZ DB Cluster', 'Multi-AZ DB instance', and 'Single DB instance'. The 'Single DB instance' option is selected.

- Leave everything else as it is



The screenshot shows the AWS Management Console interface for creating a new DB instance. The 'Settings' section is visible, showing 'copy-snap-1019' as the selected DB snapshot ID. Below this, there is a text input field for 'DB instance identifier' with the value 'copy-snap-1019'. The 'Instance configuration' section shows 'db.m7g.large' as the selected DB instance class.

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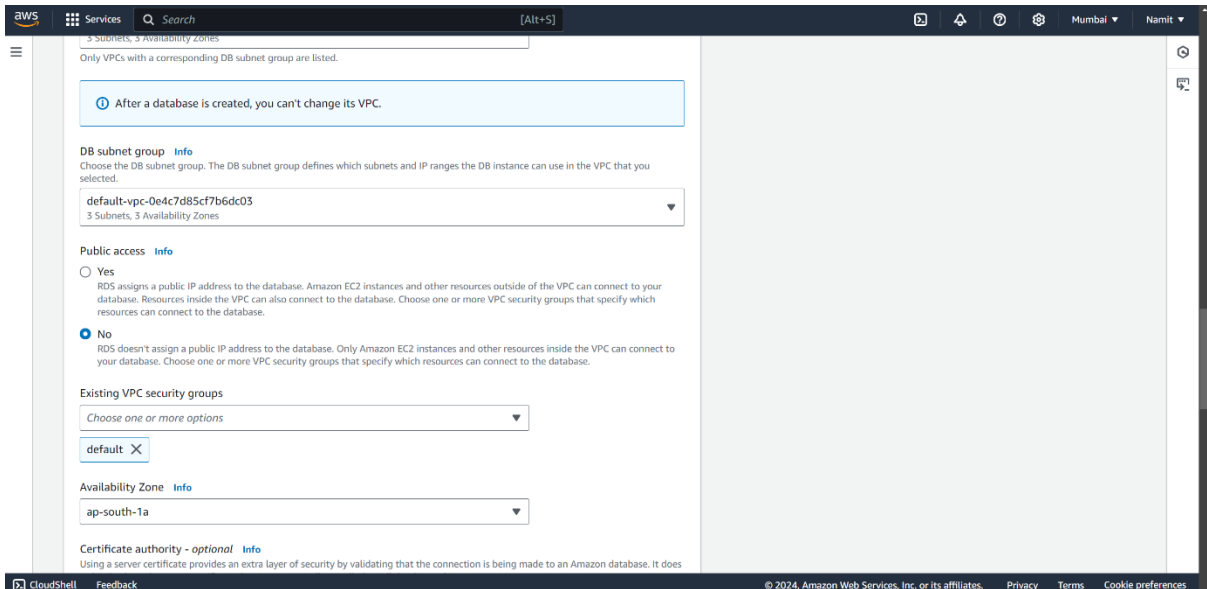
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3 Subnets, 3 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

After a database is created, you can't change its VPC.

DB subnet group Info
Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.

default-vpc-0e4c7d85cf7b6dc03
3 Subnets, 3 Availability Zones

Public access Info
☐ Yes
RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.

☒ No
RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

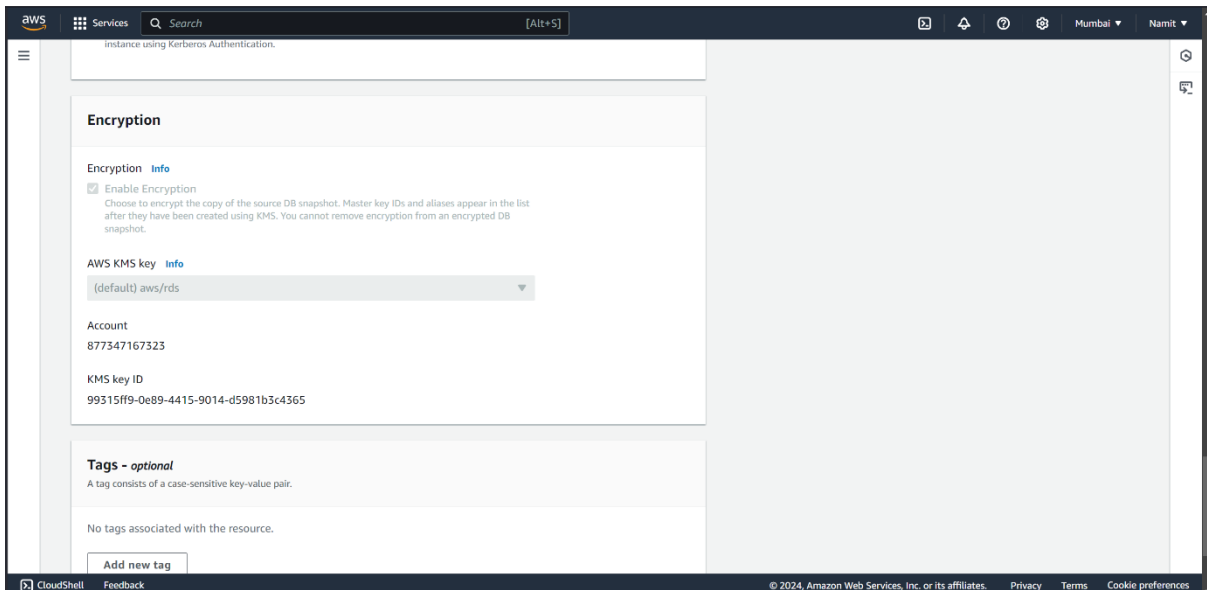
Existing VPC security groups
Choose one or more options

default X

Availability Zone Info
ap-south-1a

Certificate authority - optional Info
Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does

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instance using Kerberos Authentication.

Encryption

Encryption Info
☒ Enable Encryption
Choose to encrypt the copy of the source DB snapshot. Master key IDs and aliases appear in the list after they have been created using KMS. You cannot remove encryption from an encrypted DB snapshot.

AWS KMS key Info
(default) aws/rds

Account
877347167323

KMS key ID
99315ff9-0e89-4415-9014-d5981b3c4365

Tags - optional
A tag consists of a case-sensitive key-value pair.

No tags associated with the resource.

Add new tag

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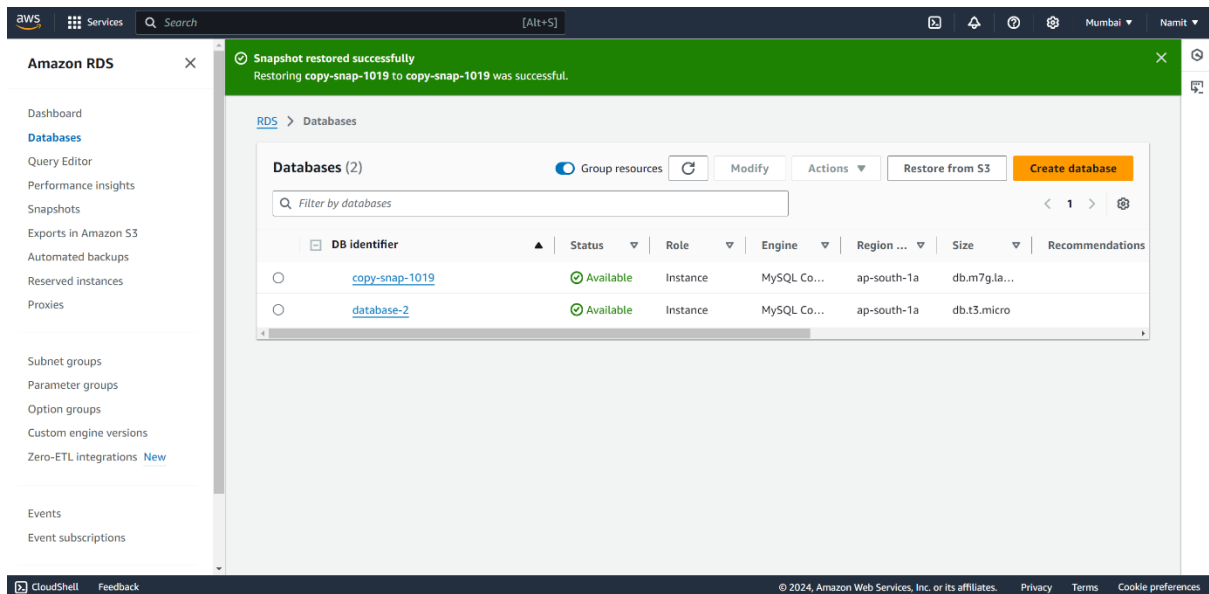
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

- Snapshot restored



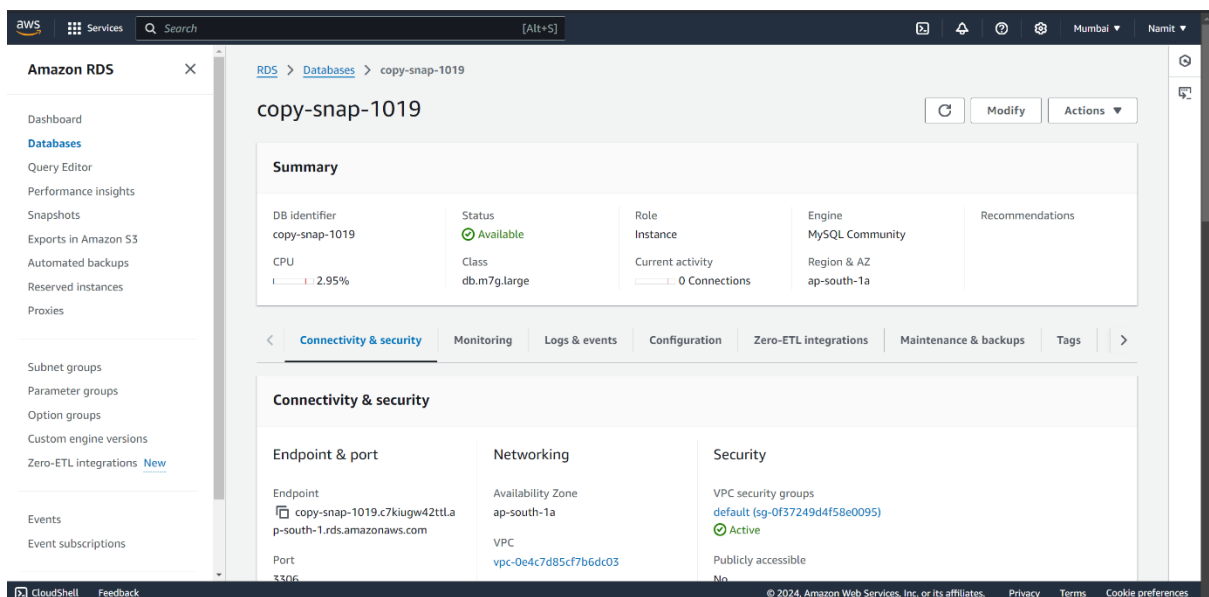
Amazon RDS

Snapshot restored successfully
Restoring copy-snap-1019 to copy-snap-1019 was successful.

Databases (2)

DB identifier	Status	Role	Engine	Region	Size	Recommendations
copy-snap-1019	Available	Instance	MySQL Co...	ap-south-1a	db.m7g.la...	
database-2	Available	Instance	MySQL Co...	ap-south-1a	db.t3.micro	

- Now lets check if encryption is enabled



Amazon RDS

copy-snap-1019

Summary

DB identifier	Status	Role	Engine	Recommendations
copy-snap-1019	Available	Instance	MySQL Community	

Connectivity & security

Endpoint & port	Networking	Security
Endpoint copy-snap-1019.c7kiugw42tlla p-south-1.rds.amazonaws.com Port 3306	Availability Zone ap-south-1a VPC vpc-0e4c7d85cf7b6dc03	VPC security groups default (sg-0f37249d4f58e0095) Active Publicly accessible No

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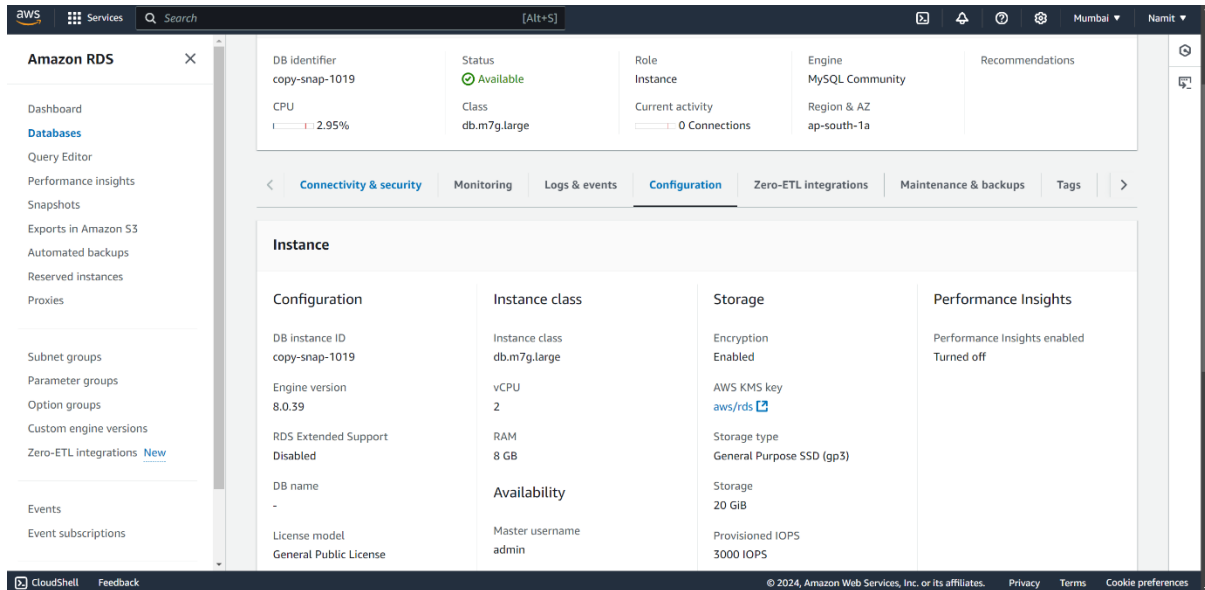
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Title of Practical: Encrypt an Unencrypted RDS DB Instance

- DB Instance is now encrypted



The screenshot displays the AWS Management Console interface for an Amazon RDS DB Instance. The instance is named 'copy-snap-1019' and is in an 'Available' state. The configuration tab is selected, showing details such as the instance class 'db.m7g.large', engine 'MySQL Community', and storage type 'General Purpose SSD (gp3)'. The 'Encryption' status is 'Enabled', and the 'Performance Insights' are 'Turned off'.

Configuration	Instance class	Storage	Performance Insights
DB instance ID: copy-snap-1019	Instance class: db.m7g.large	Encryption: Enabled	Performance Insights enabled: Turned off
Engine version: 8.0.39	vCPU: 2	AWS KMS key: aws/rds	
RDS Extended Support: Disabled	RAM: 8 GB	Storage type: General Purpose SSD (gp3)	
DB name: -	Availability: -	Storage: 20 GiB	
License model: General Public License	Master username: admin	Provisioned IOPS: 3000 IOPS	