

EXPERIMENT 10

Name: Krish Chatwani

Div: T11

Roll No: 16

Aim:

To understand Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers.

Theory:

Docker is a popular platform that enables developers to build, package, and deploy applications as lightweight, portable, and self-sufficient containers. These containers encapsulate all the necessary dependencies and libraries required for an application to run, ensuring consistency across different environments. Here is a theoretical overview of Docker:

Containerization:

Docker utilizes containerization technology to create isolated environments for applications. Containers are lightweight, standalone, and executable packages that include everything needed to run an application, such as code, runtime, system tools, libraries, and settings. This isolation ensures that applications run consistently across different environments, from development to production.

Docker Engine:

At the core of Docker is the Docker Engine, which is responsible for building, running, and managing containers. It consists of the Docker daemon, which manages containers, images, networks, and volumes, and the Docker client, which allows users to interact with the daemon through the Docker API.

Docker Images:

Docker images are read-only templates used to create containers. They contain the application code, runtime, libraries, dependencies, and other files needed to run the application. Images are built using Dockerfiles, which are text files that define the steps needed to create the image.

Docker Containers:

Containers are instances of Docker images that are running as isolated processes on a host machine. They are lightweight, portable, and can be easily started, stopped, moved, and deleted. Containers provide a consistent environment for applications to run, regardless of the underlying infrastructure.

Benefits of Docker:

Portability: Docker containers can run on any platform that supports Docker, making it easy to deploy applications across different environments.

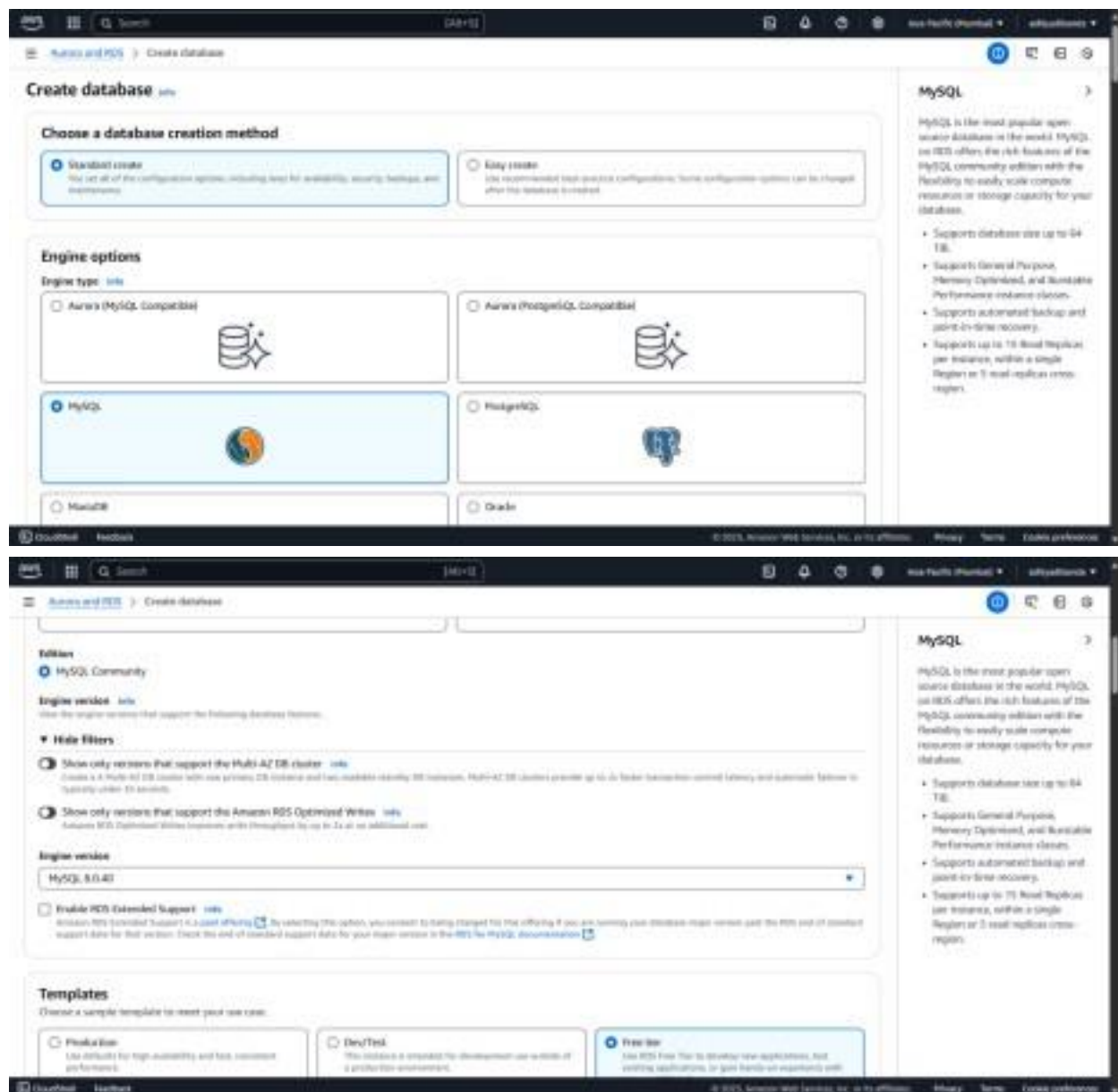
Efficiency: Containers share the host OS kernel, reducing overhead and improving resource utilization.

Isolation: Containers provide a level of isolation that helps prevent conflicts between applications and dependencies.

Scalability: Docker enables easy scaling of applications by quickly spinning up additional containers.

Consistency: Docker ensures that applications run the same way in development, testing, and production environments.

Output:



MySQL

MySQL is the most popular open source database in the world. MySQL on RHEL offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

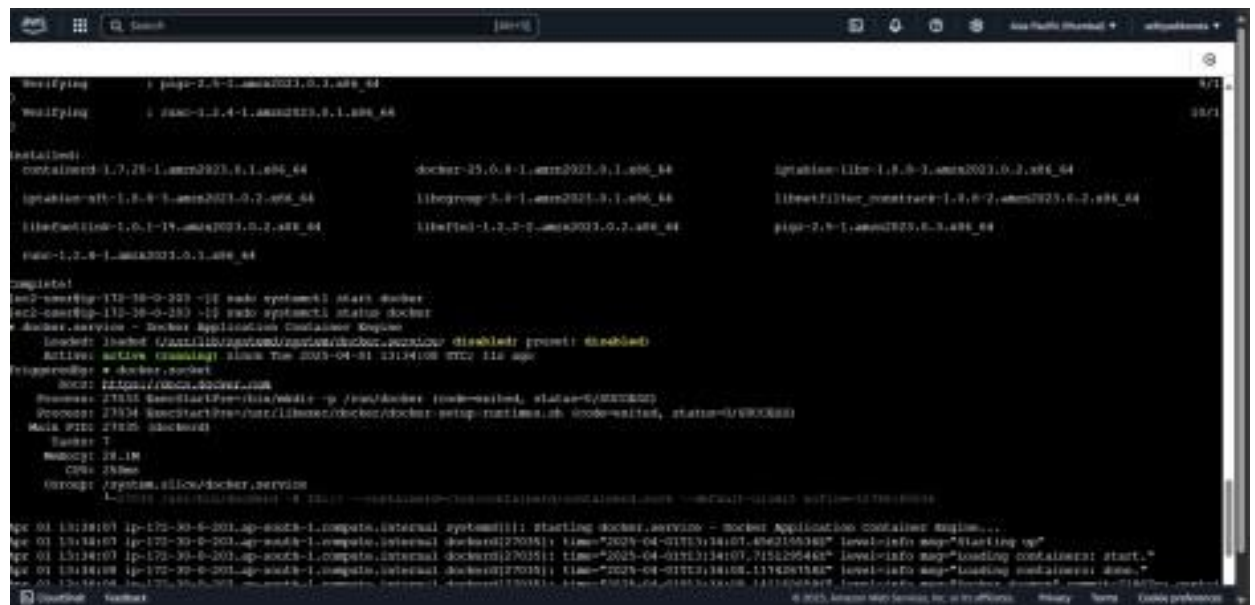
- Supports database size up to 64 TB.
- Supports Genie at Purpose, Memory Optimized, and InnoDB Performance Instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 Read replicas across regions.

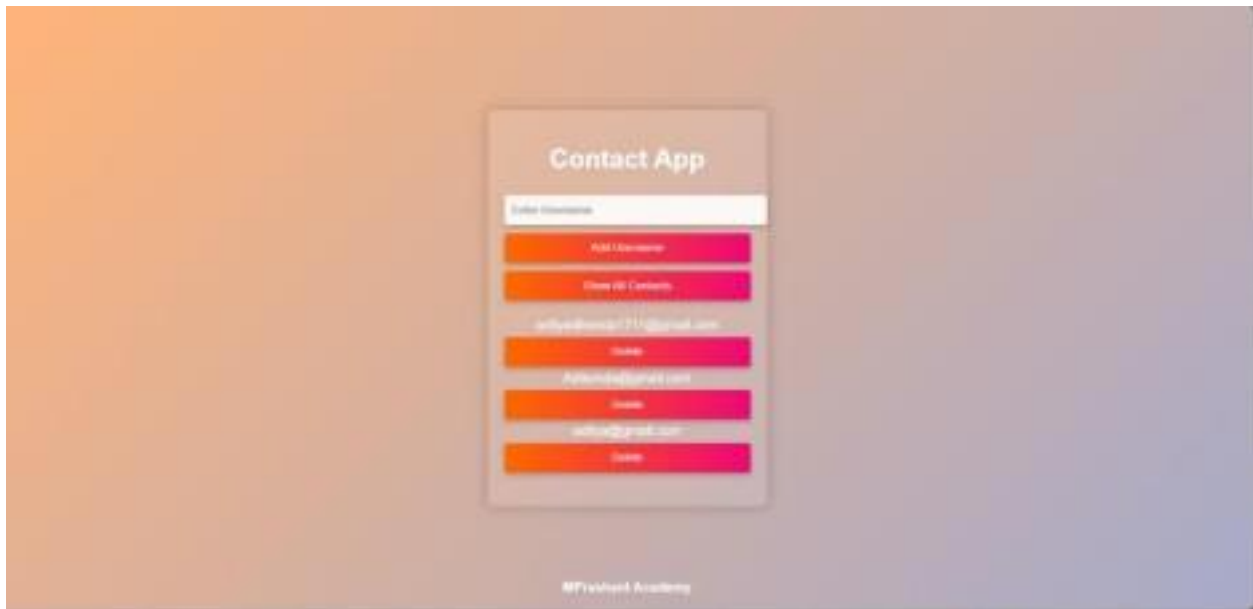
MySQL

MySQL is the most popular open-source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TB.
- Supports General Purpose, Memory Optimized, and Burstable Performance Instance classes.
- Supports automated backups and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, with a single instance or a Read Replica cross-region.

```
root@serverip-102-30-2-203 ~# sudo yum install -y docker
warning: RPMdb: failed to open repository
Dependencies resolved:
Package                               Architecture      Version           Repository        Size
Installing:
docker                                x86_64            25.0.3-1.amzn2023.0.1  amazonlinux     44
Installing Dependencies:
containerd                            x86_64            1.7.15-1.amzn2023.0.1  amazonlinux     34
iptables-libs                         x86_64            1.0.8-5.amzn2023.0.2    amazonlinux     401
iptables-services                    x86_64            1.0.8-5.amzn2023.0.2    amazonlinux     283
libgroup                              x86_64            3.0-1.amzn2023.0.1      amazonlinux     75
libnftables-common                  x86_64            1.0.8-2.amzn2023.0.2    amazonlinux     50
libnftables                          x86_64            1.0.8-19.amzn2023.0.2   amazonlinux     30
libnfnetlink                        x86_64            1.0.2-2.amzn2023.0.2    amazonlinux     86
nftables                           x86_64            2.5-1.amzn2023.0.1      amazonlinux     83
runc                                 x86_64            1.1.4-1.amzn2023.0.2    amazonlinux     3.4
Transaction Summary
Install Package(s)
Total download size: 510 B
```





```
Fetch the logs of a container
ec2-user@ip-172-30-0-203 ~$ sudo docker run -it --rm mysql:8.0 mysql -h t1224.c3aaq1w4qsg.ap-south-1.rds.amazonaws.com -u admin -p
Unable to find image 'mysql:8.0' locally
8.0: Pulling from library/mysql
a1f2a6e83b: Pull complete
8e01aa53f13: Pull complete
5fa3211d7a7: Pull complete
53b8441f7e6: Pull complete
d1339a14fala: Pull complete
e386ff914e3: Pull complete
3272c957f26: Pull complete
106a4902288: Pull complete
36f4325df2d: Pull complete
d34979e7120: Pull complete
8e67a2f637e5: Pull complete
Digest: sha256:b5f77825b52ab281d6281fb281eabbd73507eda8f2c2745790251533ef0306
Status: Downloaded newer image for mysql:8.0
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 28
Server version: 8.0.40 Source distribution

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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> show databases
+-----+
| Database |
+-----+
```

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3272c957f26: Pull complete
106a4902288: Pull complete
36f4325df2d: Pull complete
d34979e7120: Pull complete
8e67a2f637e5: Pull complete
Digest: sha256:b5f77825b52ab281d6281fb281eabbd73507eda8f2c2745790251533ef0306
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mysql> show databases
+-----+
| Database |
+-----+
```



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

mysql> show databases
-> ?
+-----+
| Database |
+-----+
| information_schema |
| my_app_db |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.00 sec)

mysql> use my_app_db
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_my_app_db |
+-----+
| contacts |
+-----+
1 row in set (0.00 sec)

mysql> select * from contacts
-> ?
+----+-----+
| id | username |
+----+-----+
| 1 | adityadikondal711@gmail.com |
| 2 | Adikonda@gmail.com |
+----+-----+
```

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Conclusion:

Docker revolutionizes the software development and deployment process by providing a powerful platform for containerization. By encapsulating applications and their dependencies into lightweight, portable containers,

