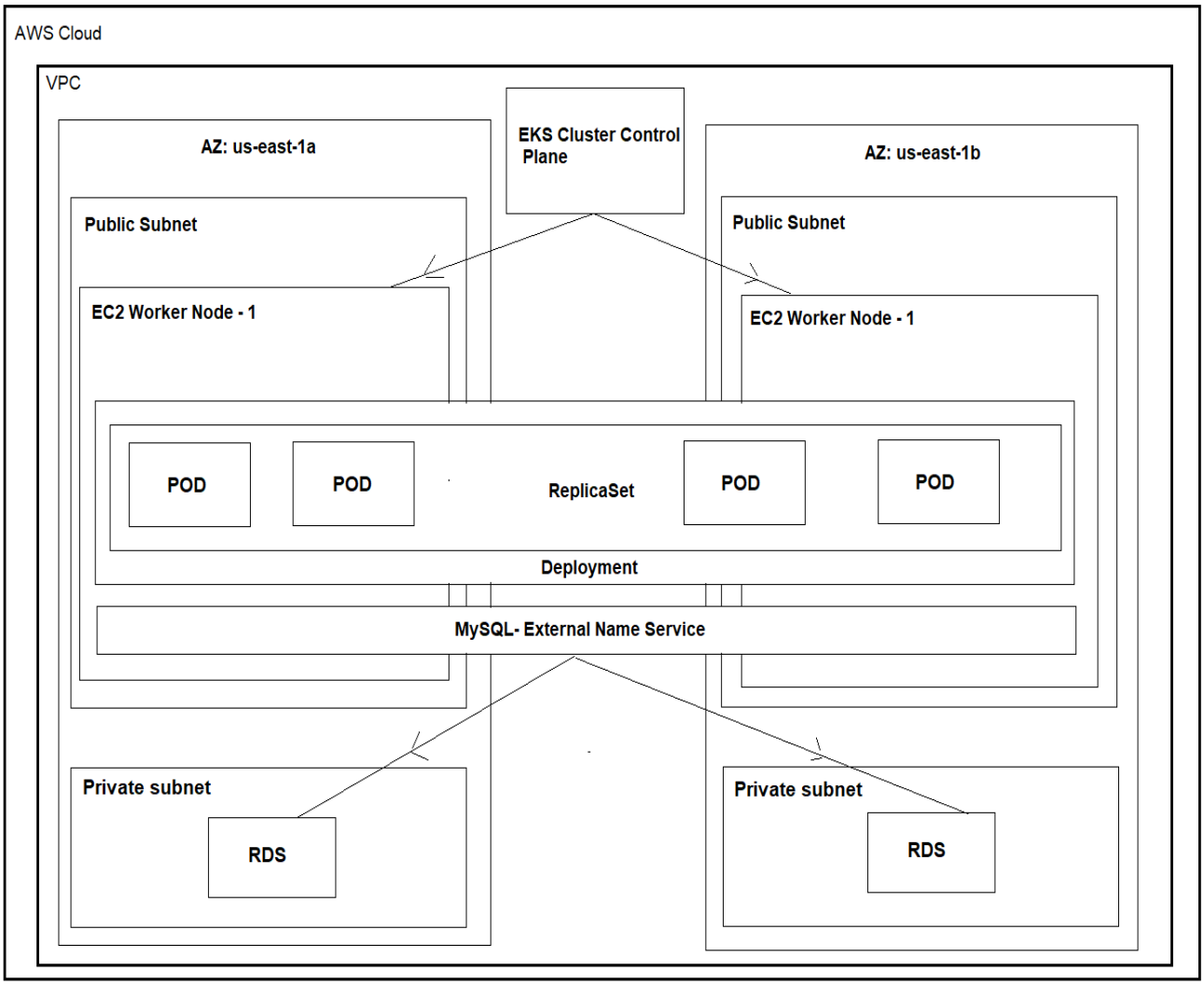
AWS EKS Storage – RDS

Before going to RDS let's see drawback of EBS CSI for MySQL DB.

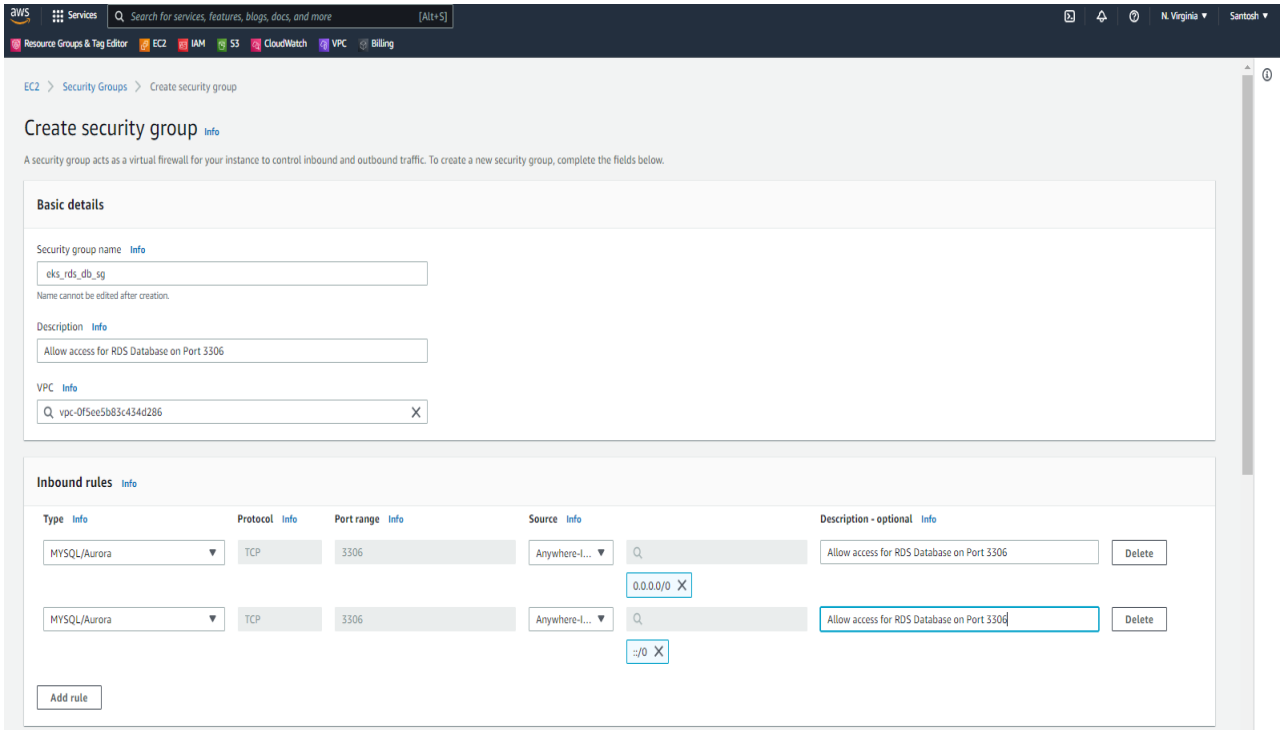
- Complex setup to achieve HA.
- Complex Multi-AZ support for EBS.
- Complex Master-Master MySQL setup.
- Complex Master-Slave MySQL setup.
- No automatic Backup and recovery.
- No auto-upgrade MySQL.

Diagram:

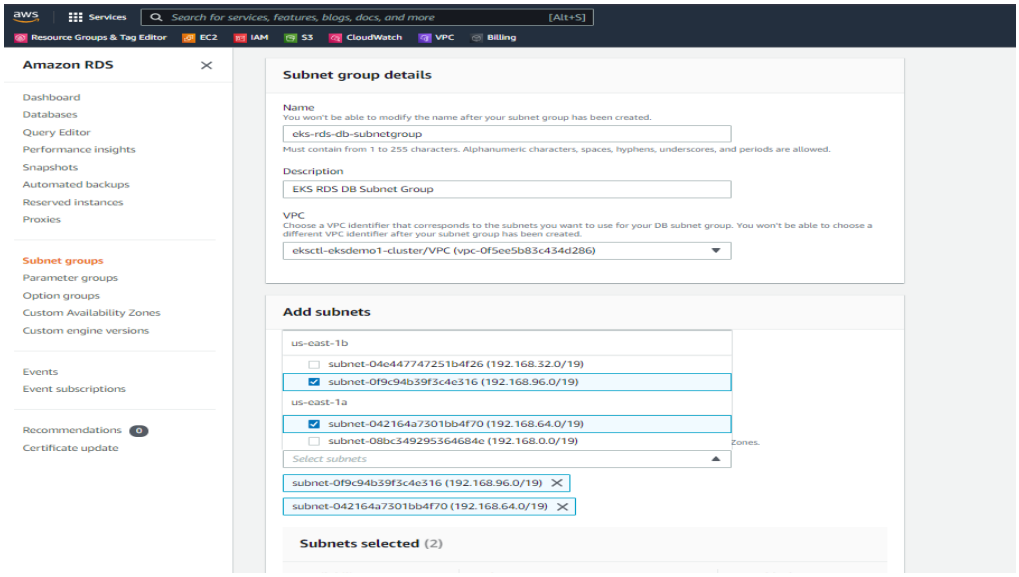


Steps:

1. Create RDS Database
    - Review VPC of our EKS Cluster.
    - Go to Services -> VPC.
    - VPC Name: eksctl-eksdemo1-cluster/VPC.
    - There are default 2 public and private subnet.
    - Pre-requisite-1: Create DB Security Group.
2. Create security group to allow access for RDS Database on port 3306
    - Security group name: eks_rds_db_sg
    - Description: Allow access for RDS Database on Port 3306
    - VPC: eksctl-eksdemo1-cluster/VPC
    - Inbound Rules
    - Type: MySQL/Aurora
    - Protocol: TPC
    - Port: 3306
    - Source: Anywhere (0.0.0.0/0)
    - Description: Allow access for RDS Database on Port 3306
    - Outbound Rules
        - Leave to defaults
    - Pre-requisite-2: Create DB Subnet Group in RDS
    - Go to RDS -> Subnet Groups



3. Click on Create DB Subnet Group
    - Name: eks-rds-db-subnetgroup
    - Description: EKS RDS DB Subnet Group
    - VPC: eksctl-eksdemo1-cluster/VPC
    - Availability Zones: us-east-1a, us-east-1b
    - Subnets: 2 subnets in 2 AZs
    - Click on Create



4. Create RDS Database
    - Create RDS Database
    - Go to Services -> RDS
    - Click on Create Database
    - Choose a Database Creation Method: Standard Create
    - Engine Options: MySQL
    - Edition: MySQL Community
    - Version: 5.7.22 (default populated)
    - Template Size: Free Tier
    - DB instance identifier: usermgmtdb
    - Master Username: dbadmin
    - Master Password: dbpassword11
    - Confirm Password: dbpassword11
    - DB Instance Size: leave to defaults
    - Storage: leave to defaults
    - Connectivity
    - VPC: eksctl-eksdemo1-cluster/VPC
    - Additional Connectivity Configuration
    - Subnet Group: eks-rds-db-subnetgroup
    - Publicly accessible: YES (for our learning and troubleshooting - if required)
    - VPC Security Group: Create New
    - Name: eks-rds-db-securitygroup
    - Availability Zone: No Preference
    - Database Port: 3306
    - Rest all leave to defaults
    - Click on Create Database
    - Edit Database Security to Allow Access from 0.0.0.0/0
        - Go to EC2 -> Security Groups -> eks-rds-db-securitygroup
        - Edit Inbound Rules
        - Source: Anywhere (0.0.0.0/0) (Allow access from everywhere for now)

5. Create Kubernetes externalName service Manifest and Deploy

```
[root@localhost RDS]# ls
deployment.yml  externalName_service.yml  secret.yml  service.yml
[root@localhost RDS]# cat externalName_service.yml
apiVersion: v1
kind: Service
metadata:
  name: mysql
spec:
  type: ExternalName
  externalName: usermgmtdb.c6cu3zvded3a.us-east-1.rds.amazonaws.com

[root@localhost RDS]#
```

```
[root@localhost RDS]# kubectl apply -f externalName_service.yml
service/mysql created
[root@localhost RDS]# kubectl get svc
NAME         TYPE           CLUSTER-IP   EXTERNAL-IP                                        PORT(S)   AGE
kubernetes   ClusterIP      10.100.0.1   <none>                                             443/TCP   142m
mysql        ExternalName   <none>       usermgmtdb.c6cu3zvded3a.us-east-1.rds.amazonaws.com   <none>    7s
[root@localhost RDS]#
```

6. Connect to RDS Database using kubectl and create usermgmt DB.

```
[root@localhost RDS]# kubectl run -it --rm --image=mysql:5.7.22 --restart=Never mysql-client -- mysql -h usermgmtdb.c6cu3zvded3a.us-east-1.rds.amazonaws.com -u dbadmin -pdbpa
ssword11
If you don't see a command prompt, try pressing enter.

mysql>  create database usermgmt;
Query OK, 1 row affected (0.01 sec)

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

mysql> exit
```

7. Create web application deployment and service manifest file and deploy it.

```
[root@localhost RDS]# kubectl apply -f ../RDS/
deployment.apps/usermgmt-microservice unchanged
service/mysql unchanged
secret/mysql-db-password created
service/usermgmt-restapp-service unchanged
[root@localhost RDS]# kubectl get pods -o wide
NAME                                    READY   STATUS    RESTARTS   AGE   IP              NODE                              NOMINATED NODE   READINESS GATES
usermgmt-microservice-9b9bb96b6-h24n7   0/1     Running   0          68s   192.168.52.43   ip-192-168-40-118.ec2.internal   <none>           <none>
[root@localhost RDS]# kubectl get svc
NAME                    TYPE           CLUSTER-IP     EXTERNAL-IP                                          PORT(S)          AGE
kubernetes              ClusterIP      10.100.0.1     <none>                                               443/TCP          152m
mysql                   ExternalName   <none>         usermgmtdb.c6cu3zvded3a.us-east-1.rds.amazonaws.com  <none>           7m29s
usermgmt-restapp-service   NodePort       10.100.167.6   <none>                                               8095:31231/TCP   78s
[root@localhost RDS]# kubectl run -it --rm --image=mysql:5.7.22 --restart=Never mysql-client -- mysql -h usermgmtdb.c6cu3zvded3a.us-east-1.rds.amazonaws.com -u dbadmin -pdbpa
ssword11
If you don't see a command prompt, try pressing enter.

mysql> use usermgmt;
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_usermgmt |
+--------------------+
| users              |
+--------------------+
1 row in set (0.00 sec)

mysql>
```

8. Access Application by using Node public IP Address

```
[root@localhost RDS]# kubectl get pods -o wide
NAME                                    READY   STATUS    RESTARTS   AGE    IP              NODE                              NOMINATED NODE   READINESS GATES
usermgmt-microservice-9b9bb96b6-h24n7   1/1     Running   0          4m3s   192.168.52.43   ip-192-168-40-118.ec2.internal   <none>           <none>
[root@localhost RDS]# kubectl get nodes -o wide
NAME                              STATUS   ROLES    AGE    VERSION               INTERNAL-IP      EXTERNAL-IP      OS-IMAGE         KERNEL-VERSION                CONTAINER-RUN
TIME
ip-192-168-26-134.ec2.internal    Ready    <none>   140m   v1.21.5-eks-bc4871b   192.168.26.134   54.84.150.2      Amazon Linux 2   5.4.156-83.273.amzn2.x86_64   docker://20.1
0.7
ip-192-168-40-118.ec2.internal    Ready    <none>   140m   v1.21.5-eks-bc4871b   192.168.40.118   18.234.238.188   Amazon Linux 2   5.4.156-83.273.amzn2.x86_64   docker://20.1
0.7
[root@localhost RDS]#
```