AWS DATABASE MIGRATION SERVICES

We can use AWS Database Migration Service to migrate databases to AWS quickly and securely. The source database remains fully operational during the migration process, thus minimizing downtime to applications that rely on the database.

The AWS Database Migration Service can migrate your data to and from most widely used commercial and open-source databases.

In this demo we will do a homogeneous / and heterogeneous migration of tables in an RDS Mysql DB from one region to another.

Use **us-east-1**(N-virginia) as source and **us-east-2**(ohio) as the target region.

Prerequisites:

- Install Dbeaver https://dbeaver.io/ . This will enable connectivity to the DB servers.
- Use VPC and more to create the VPCs architectures for RDS instances
  - in us-east-1, create VPC with name **dms-source**
  - in us-east-2, create VPC with name **dms-target**
- Use the default SG for the VPC (with additional inbound rule for all traffic from the internet) or create a S.G that allows all TCP from the public (NB: all traffic is just for demo purposes. Always remember to use the POLP)
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Create Source and Target MySQL DB in both regions

Create MySQL database :

1. In the AWS Console, Navigate to Services > Database, RDS
2. On the RDS console, select "**Subnet groups**" and click on "**Create DB subnet group**"
   a. Name: dms-source-subnet
   b. Description: provide a description

c. VPC: choose the source VPC created above
d. Under Add subnets:
    i. select the AZs, eg. 1a, and 1b
    ii. choose the public subnets in the VPC
e. click on "Create" to create the subnet group.

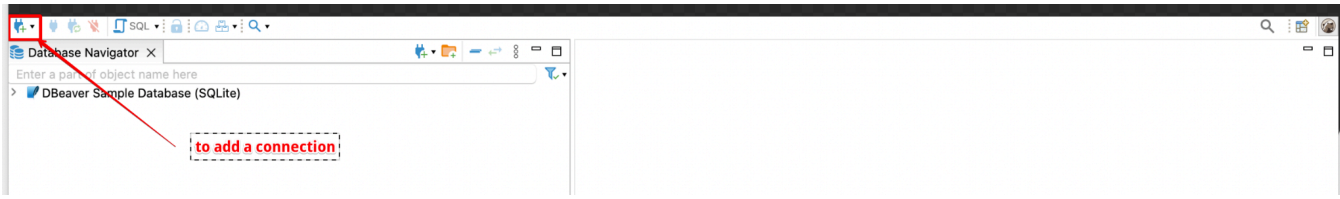
3. On RDS console, select "Databases" and click on "create database" and change the following settings
    a. In **Choose a database creation method** select **Standard create**
    b. for Engine options: **MySQL**
    c. Under Templates section : **Free tier**
    d. Under **Settings**, for "DB cluster identifier" : **source**
    e. Under Credential Settings
        i. Master username: leave default **(admin)**
        ii. **For Credentials management: "Self managed"** , and supply password manually (e.g yaq123456YAQ) or select auto-generate for RDS to generate password.
    f. Under "**Connectivity"** section, select the VPC (e.g dms-source-xxx) and subnet group (dms-source-subnet) created above
    g. Public access : switch to **YES**
    h. select the SG created above
    i. Uncheck **"Enable Enhanced Monitoring"**
    j. Under **Additional Configurations, disable "Backup"** and **"Encryption"**
    k. review and create.

REPEAT STEP 1-3 IN US-EAST-2 TO CREATE THE TARGET DB.
replace "source" with "target" in the naming convention

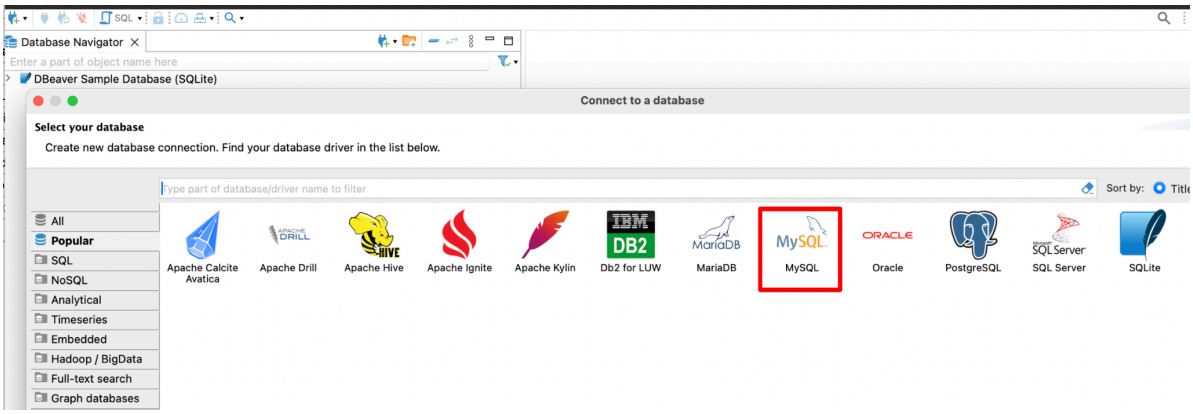
connect to the Source DB and import the following Data

1. Download the the sql script from https://bit.ly/JJTechSampleMYSQLDB

2. Open **Dbeaver** to connect to the source database . click on the icon below to add a connection to a DB

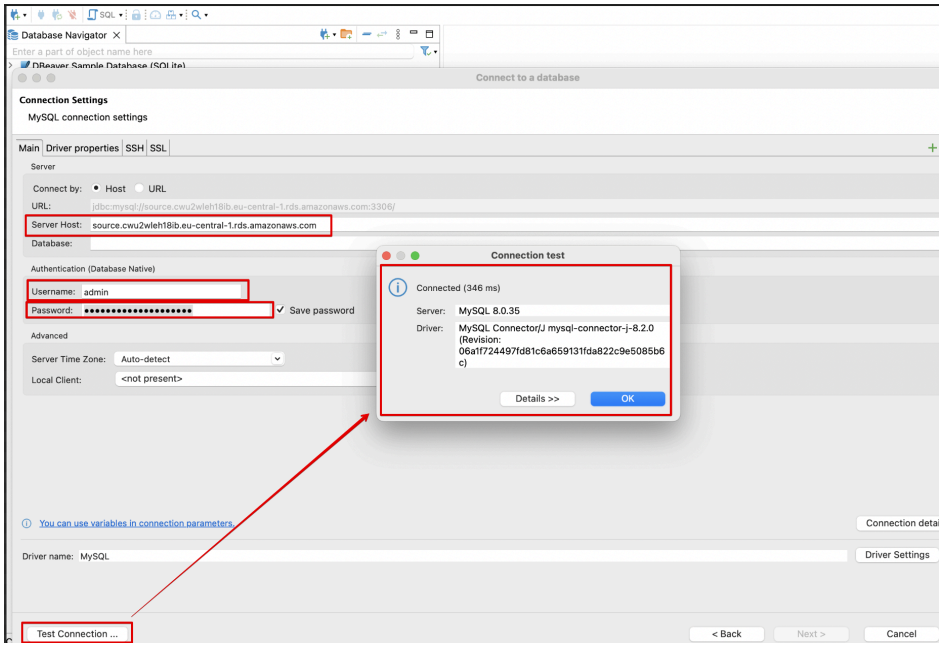


- **select the DB engine** you want to connect to and click on Next



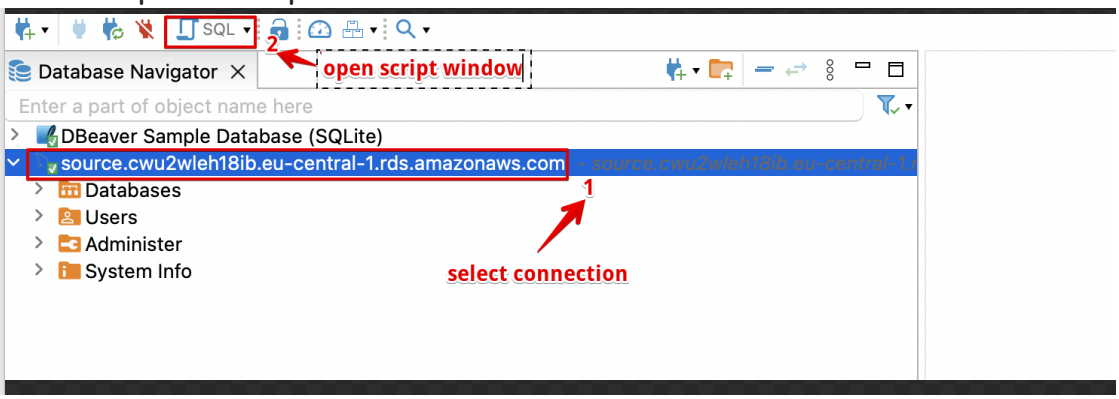
In the "**connection Settings" page**, provide the necessary information

a. Server Host: <YOUR-DB-ENDPOINT>
b. username: **admin**
c. Password: <YOUR-PASSWORD>

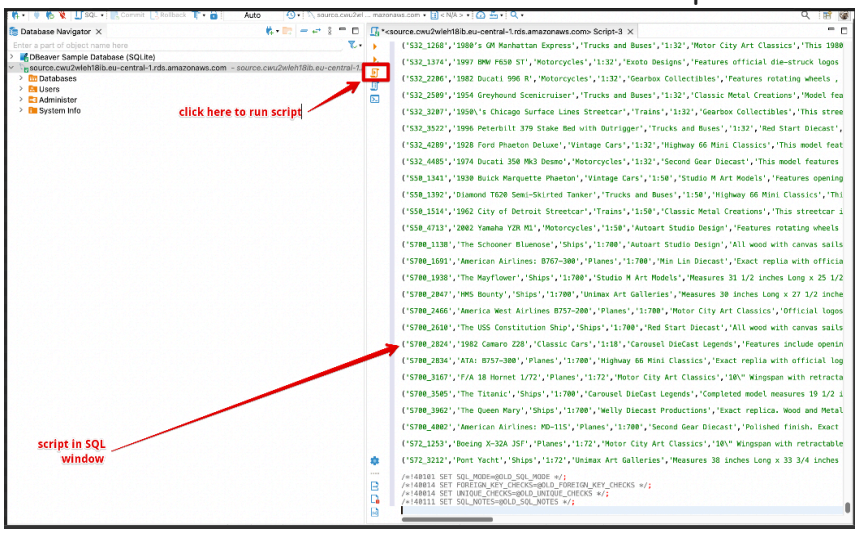


3. Test the connection to make sure it is successful . Click on OK
4. Click on **Finish** to create the connection
5. To connect to the DB, select the created connection, right-click on your mouse and click on **"connect"**

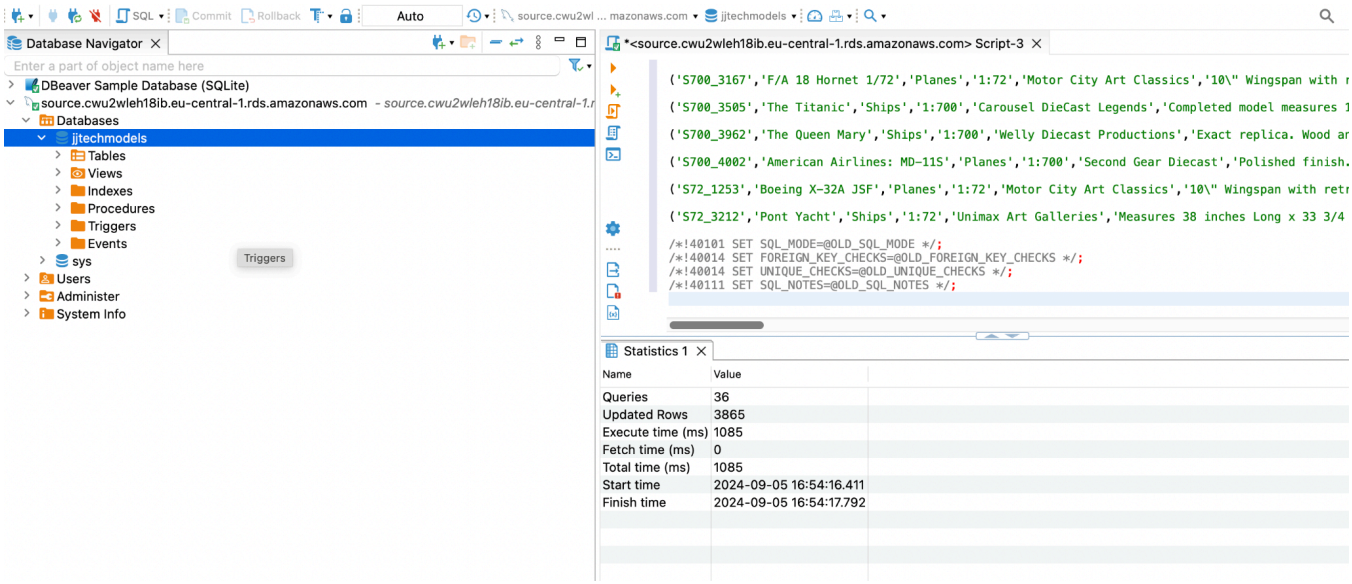
6. Select the DB connection and open a new SQL script editor (to run SQL scripts)
this will open a Script window as shown below.



7. Paste in the content from the downloaded script and run



8. After running the script, new DB name **JJtechmodels** and tables will be created in the DB server.



9. Select import from Self-Contained File
10. Browse to the location of the file you downloaded in step 1 and click on start import.

DATABASE MIGRATION SERVICES (DMS) CONFIGURATION

IN this section we will utilize AWS Database Migration Services, by:

1. Creating the replication network using Subnet groups
2. Create a DMS replication instance
3. Configuring endpoints for source and target database
4. Replicating databases using DMS replication tasks

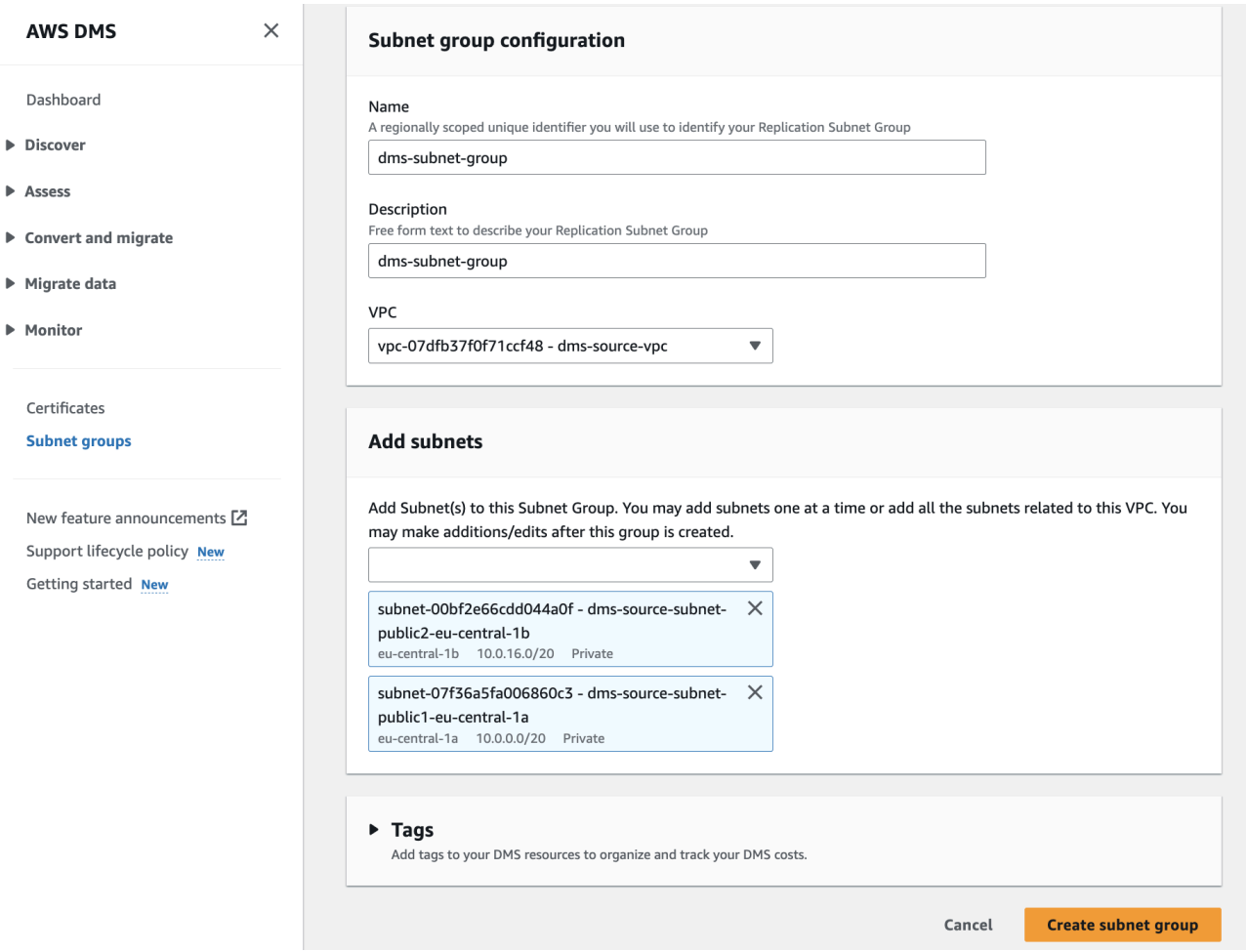
Creating Replication Subnets

To be able to launch a DMS Replication instance, it is necessary to specify what subnet group in the VPC the Replication instance will use. These subnets can be

distributed among the AZs in the AWS Region where your VPC is located. DMS Replication instance requires at least two Availability Zones.

To create the subnet group:

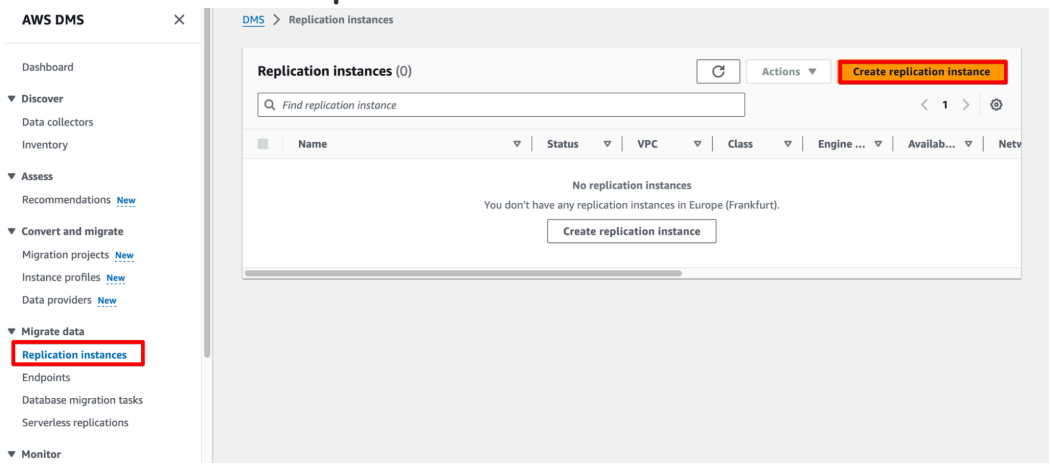
1. In the AWS Console, open the Database Migration Service.
2. In the navigation pane, click **Subnet groups**, then select **Create Subnet group**.
3. On the Create Subnet group page, specify the following settings:
4. Subnet group configuration:
    i. Name: **dms-subnet-group**
    ii. Description: e.g **dms-subnet-group**
    iii. VPC: **Use the VPC you created for the RDS instance**
    b. Add subnets:
    c. Select **2 public subnets in the VPC**
5. Click on **Create subnet group**



CREATE A REPLICATION INSTANCE

The first task in migrating a database is to create a replication instance that has sufficient storage and processing power to perform the tasks you assign and migrate data from your source database to the target database. The required size of this instance varies depending on the amount of data you need to migrate and the tasks that you need the instance to perform.

1. In the AWS Console, open DMS service
2. In the navigation pane, under "Migrate data", click **Replication instances**, then select **Create Replication Instance**.



3. On the Create replication instance page, specify the following settings:
    a. Replication instance configuration
        - Name: **dms-repInstance**
        - Description: **Migration Immersion Day - Rep Inst**
        - Instance class: **dms.t3.medium**
        - High Availability: **Dev or test or Workload (Single-AZ)**
        - VPC: **select the VPC with the subnet group (used above)**
        - **check** Publicly accessible

    2. Advanced Settings
        - VPC security group: **select same security group with DB (e.g default)**

    All other settings can be used as the default values.

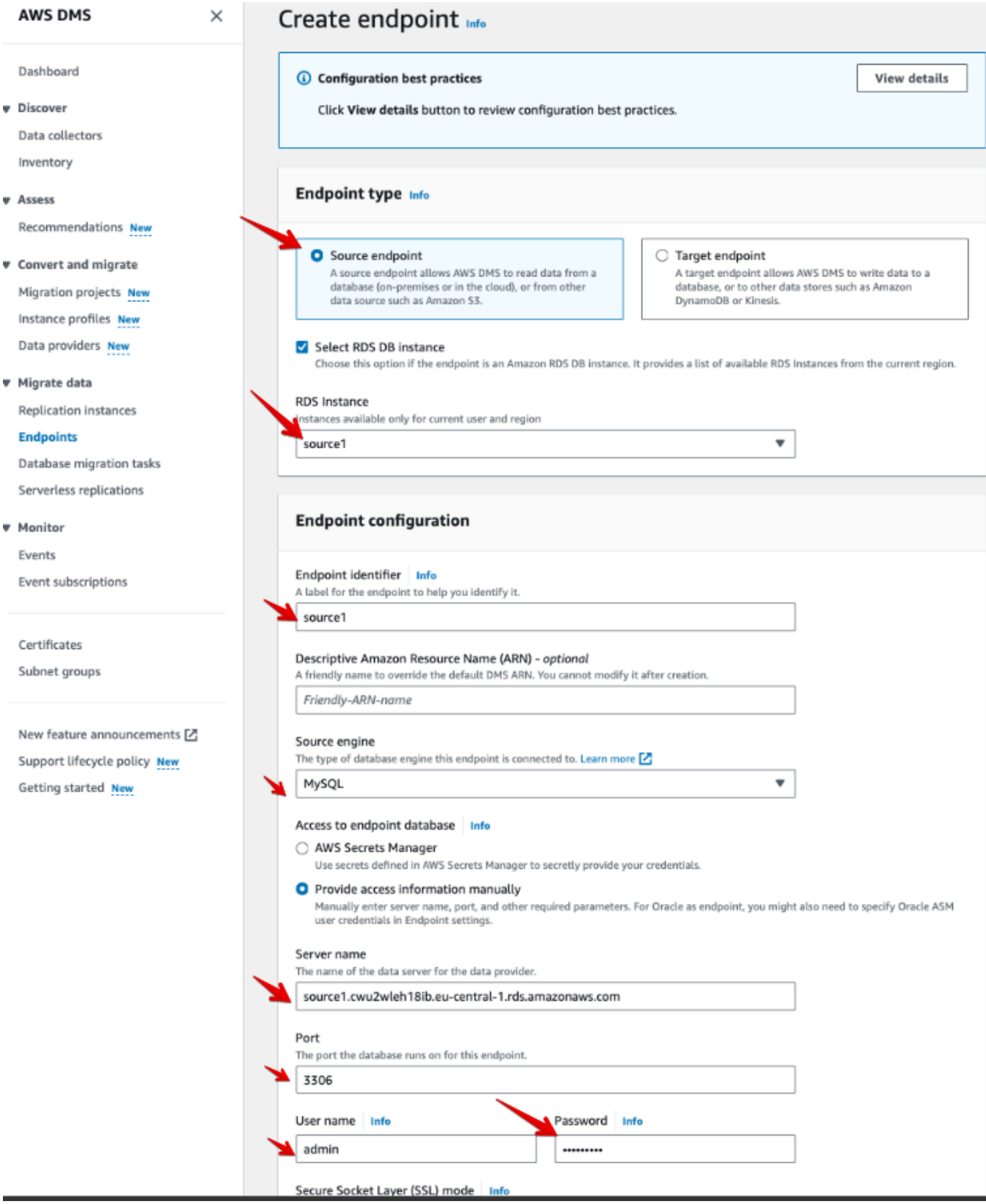
4. Click on **Create**

Now, wait for status "Available" in the Replication instance that you just created:

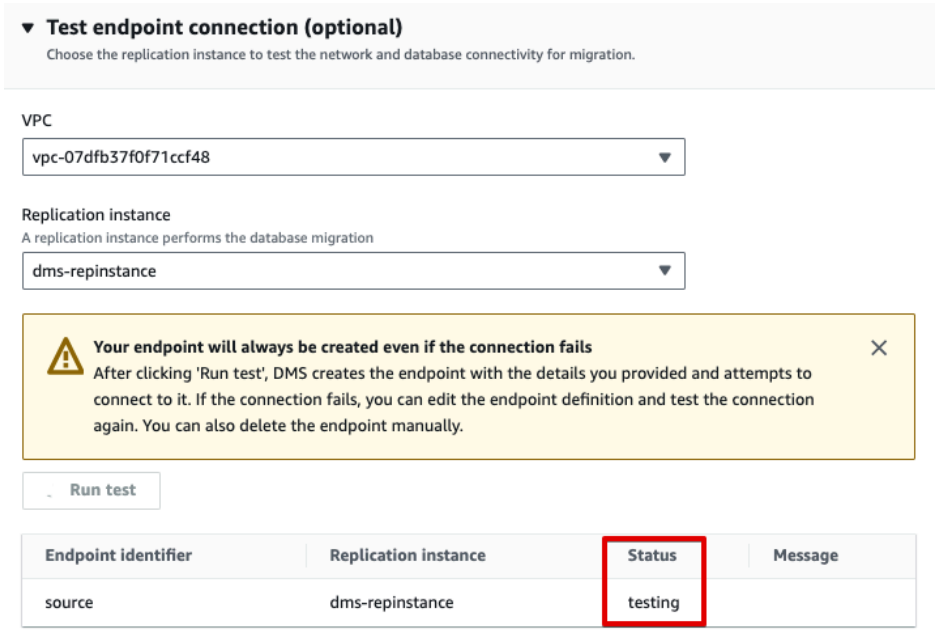
SPECIFY SOURCE AND TARGET ENDPOINTS

While your replication instance is being created, you can specify the source and target data store endpoints. The source and target data stores can be on an Amazon Elastic Compute
Cloud (Amazon EC2) instance. Or they can be on an Amazon Relational Database Service (Amazon RDS) DB instance or an on-premises database.
Create each endpoint separately.

1. On the DMS console, under **Migrate data** choose **Endpoints > Create Endpoint**.
2. On the **Create endpoint** page, choose the **Source endpoint** type.
3. If your data store is an Amazon RDS DB instance, choose the **Select RDS DB instance** option.
4. In the **Endpoint configuration** section, enter a name for your endpoint for **Endpoint identifier**.
5. For **Source engine**, choose the type of database engine you want this endpoint to connect.
6. For Access to endpoint database choose "**provide access information manually**"


AWS DMS
Dashboard
Discover
Data collectors
Inventory
Assess
Recommendations New
Convert and migrate
Migration projects New
Instance profiles New
Data providers New
Migrate data
Replication instances
Endpoints
Database migration tasks
Serverless replications
Monitor
Events
Event subscriptions
Certificates
Subnet groups
New feature announcements
Support lifecycle policy New
Getting started New
Create endpoint Info
Configuration best practices
View details
Click View details button to review configuration best practices.
Endpoint type Info
Source endpoint
A source endpoint allows AWS DMS to read data from a database (on-premises or in the cloud), or from other data source such as Amazon S3.
Target endpoint
A target endpoint allows AWS DMS to write data to a database, or to other data stores such as Amazon DynamoDB or Kinesis.
Select RDS DB instance
Choose this option if the endpoint is an Amazon RDS DB instance. It provides a list of available RDS Instances from the current region.
RDS Instance
Instances available only for current user and region
source1
Endpoint configuration
Endpoint identifier Info
A label for the endpoint to help you identify it.
source1
Descriptive Amazon Resource Name (ARN) - optional
A friendly name to override the default DMS ARN. You cannot modify it after creation.
Friendly-ARN-name
Source engine
The type of database engine this endpoint is connected to. Learn more
MySQL
Access to endpoint database Info
AWS Secrets Manager
Use secrets defined in AWS Secrets Manager to secretly provide your credentials.
Provide access information manually
Manually enter server name, port, and other required parameters. For Oracle as endpoint, you might also need to specify Oracle ASM user credentials in Endpoint settings.
Server name
The name of the data server for the data provider.
source1.cwu2wleh18ib.eu-central-1.rds.amazonaws.com
Port
The port the database runs on for this endpoint.
3306
User name Info
admin
Password Info
Secure Socket Layer (SSL) mode Info

7. scroll down and choose the **Test endpoint connection (optional)** tab.
    a. For **VPC**, choose the VPC of the source DB
    b. choose the replication instance created above
    c. click on **Run test**



8. After you choose **Run test**, AWS DMS creates the endpoint with the details that you provided and connects to it. If the connection fails, edit the endpoint definition and test the connection again. You can also delete the endpoint manually.
9. After you have a successful test, choose **Create endpoint**.

10. Specify a *target database endpoint* using the AWS DMS console. To do this, repeat the steps 2-9 above. Provide the details for the target DB endpoint and use **Target endpoint** as your endpoint type.

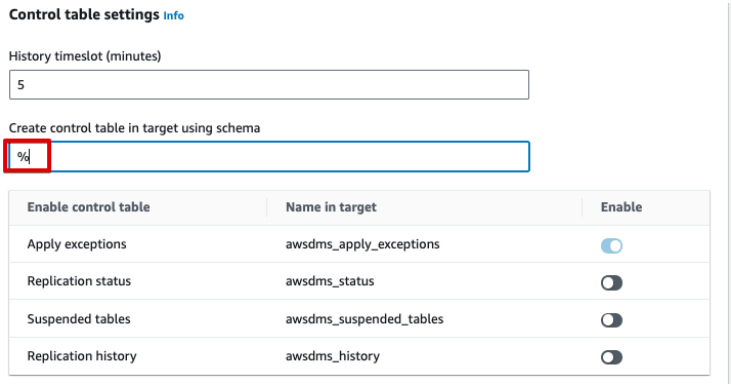
11. When you're finished providing all information for your endpoints, AWS DMS creates your source and target endpoints for use during database migration.

CREATE AND MONITOR THE TASKS

In this step, you create a task to specify what schemas and tables to migrate. Your task also maps data using a target schema and creates new tables for the target database.

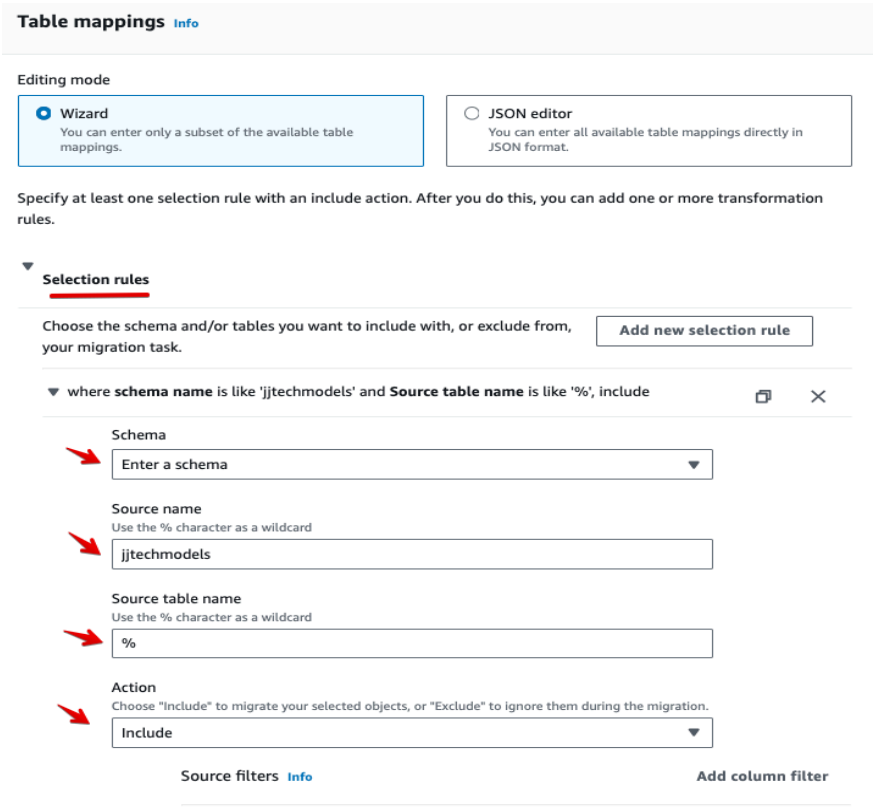
To create a migration task and start your database migration

1. In the console navigation pane, under **Migrate data section** choose **Database migration tasks**, and then choose **Create task**. The **Create database migration task** page opens.
2. In the **Task configuration** section, specify the following task options:
    - **Task identifier** – Enter a unique name for the task.
    - **Replication instance** – select the instance created above
    - **Source database endpoint** – select source endpoint
    - **Target database endpoint** – select the target
    - **Migration type** – Choose **Migrate existing data**.
3. Choose the **Task settings** tab and select wizard
    - Expand the **Advanced task settings:** on the **Create control table in target using schema:** enter **%**
    - leave everything else as default.



4. On **Table mappings**, select **Guided UI**. Expand **Selection rules** and click on **Add new selection rule**
    - Schema: **Enter a schema**
    - source name: **jjtechmodels**
    - Table name: **%**

- Action: **Include**



5. Choose the **Migration task startup configuration** tab, and then
    - choose **Automatically on create**.

6. scroll down and Choose **Create task**.

If you chose **Automatically on create**, your task begins immediately to migrate your data when you choose **Create task**. If you didn't, start your task from the **Database migration tasks** page. On that page, choose your task, and then choose **Start** for **Actions**.

MONITOR YOUR TASK

Now that your migration task is running, you can monitor the progress of your database migration while it happens until the status says load complete

To view migration task metrics

1. In the DMS console navigation pane, choose Database migration tasks.
   2. Choose the name of the running task that you want to monitor.
2. Choose Table statistics.
3. Once the status says load complete. **Connect to the target DB and ensure the tables have migrated**

USING DMS SCT for heterogeneous Migration