**Fully managed Oracle database instance ready for use in Amazon RDS**

**Step 1: Log in to AWS Console**

1. Open the [AWS Management Console](https://aws.amazon.com/console/).
2. Navigate to the **Amazon RDS** service.

**Step 2: Start Database Creation**

1. On the Amazon RDS dashboard, click **Create database**.

**Step 3: Select Database Engine**

1. In the **Engine options** section:
   * Choose **Oracle** as the database engine.
   * Select the edition and version of Oracle you need.
   * Choose whether to bring your own license (**BYOL**) or use the commercial license.

**Step 4: Choose a Template**

1. If this is for production, select the **Production template**. Otherwise, choose **Free tier** or **Development and testing** as needed.

**Step 5: Configure Database Settings**

1. **Settings:**
   * Give your database a unique **name**.
   * Set a **master username** and a **password** (write these down for later use).

**Step 6: Select Instance Size**

1. Based on your workload, choose the **DB instance class**:
   * For light workloads, use smaller instance types like db.t3.micro.
   * For higher workloads, choose larger instance types like db.m5.large.

**Step 7: Configure Storage**

1. In the **Storage section**, choose:
   * **General Purpose (SSD)** for standard use.
   * **Provisioned IOPS (SSD)** if you need high IOPS performance.
   * Set the storage size (e.g., 100 GiB for moderate use).

**Step 8: Enable High Availability (Optional)**

1. For production databases:
   * Enable **Multi-AZ deployment** to create a standby instance in another Availability Zone.

**Step 9: Configure Connectivity**

1. In the **Connectivity** section:
   * Select the **VPC** where the database will reside.
   * Choose the **Subnet group** and **Security groups**.
   * If required, enable public access to allow external connections.

**Step 10: Review Additional Options**

1. Check default settings or customize:
   * **Backups:** Enable automatic backups with a retention period (e.g., 7 days).
   * **Monitoring:** Turn on **Enhanced monitoring** for detailed metrics.
   * **Maintenance:** Set a preferred maintenance window.

**Step 11: Create the Database**

1. Click **Create database**.
2. Wait for the **Status** to change from **Creating** to **Available**.

**Step 12: Verify Database**

1. Once the status shows **Available**:
   * Click on the database name to see connection details.
   * Note the **endpoint** and **port** for connecting applications or migration tools.

**Creating a replication instance in AWS Database Migration Service (DMS)**

**Step 1: Access AWS DMS**

1. Open the [AWS Management Console](https://aws.amazon.com/console/).
2. Navigate to **AWS Database Migration Service (DMS)**.

**Step 2: Start Replication Instance Creation**

1. In the **Replication Instances** section, click **Create replication instance**.

**Step 3: Configure the Replication Instance**

1. **Replication instance configuration:**
   * **Name:** Enter a unique name for your replication instance.
   * **Description:** Optionally, provide a description.
   * **Instance class:** Choose an instance class based on the size of your database (e.g., dms.t3.medium for small workloads).
   * **Engine version:** Select the AWS DMS engine version (leave default unless specific requirements exist).
   * **Storage:** Set the allocated storage size (e.g., 100 GiB for moderate use).

**Step 4: Choose Network and Redundancy Options**

1. **VPC:** Choose the same VPC as your Amazon RDS database for easy network access.
2. **Multi-AZ deployment:**
   * Enable this for long-term, highly available database synchronization.
   * Skip this if you're doing a one-time migration.
3. **Publicly accessible:**
   * **No:** If your source and target databases are in the same VPC.
   * **Yes:** If your source database is outside the VPC or AWS.

**Step 5: Configure Security and Advanced Options**

1. **Security groups:**
   * Use the same security group attached to your Amazon RDS database.
   * This allows the replication instance to connect to the database.

**Step 6: Create the Replication Instance**

1. Click **Create**.
2. Wait for the replication instance’s **Status** to change from **Creating** to **Available**.

**Step 7: Update Security Group**

1. Navigate to the **Amazon EC2 Console** > **Security Groups**.
2. Find the security group used for your replication instance and RDS database.
3. Click **Edit inbound rules**.
4. **Update rules:**
   * Remove existing IP-based rules.
   * Add a rule to allow access by the **security group name** used by the replication instance and database.

**Step 8: Save Security Group Rules**

1. Click **Save rules** to apply the updated settings.

**Step 9: Verify Replication Instance**

1. Return to the AWS DMS console.
2. Ensure the replication instance’s **Status** is **Available**.

**Creating source and target endpoints for a replication task in AWS DMS**

Here’s a step-by-step guide to creating source and target endpoints for a replication task in AWS DMS:

**Step 1: Open the AWS DMS Console**

1. Log in to the [AWS Management Console](https://aws.amazon.com/console/).
2. Navigate to **Database Migration Service (DMS)**.
3. Go to the **Endpoints** section.

**Step 2: Create a Target Endpoint**

1. Click **Create endpoint** to start the endpoint creation wizard.
2. **Endpoint type:** Select **Target endpoint**.
3. **Target database location:** Choose **Select RDS DB instance**.
4. From the dropdown, select the Amazon RDS database you previously created.  
   This auto-fills most of the endpoint configuration fields.
5. Near the bottom of the form:
   * Enter the **password** for the target database.
   * Specify the **database name**.

**Step 3: Test the Target Endpoint Connection**

1. Scroll to the **Test endpoint connection** section.
2. Select the replication instance you created earlier.
3. Click **Run test**.
4. Wait for the test to complete:
   * If the **Status** is **Successful**, your endpoint is configured correctly.
   * If not, verify your security group settings and credentials.
5. After a successful test, click **Create endpoint** to save.

**Step 4: Create a Source Endpoint**

1. Click **Create endpoint** to create another endpoint.
2. **Endpoint type:** Select **Source endpoint**.
3. Since the source database is not on RDS, manually provide the following:
   * **Endpoint identifier:** Enter a name for this source endpoint.
   * **Endpoint type:** Select the database engine type (e.g., MySQL, Oracle, etc.).
   * **Server name/IP address:** Enter the endpoint address of your source database.
   * **Port number:** Provide the database port (e.g., 3306 for MySQL).
   * **Username** and **password:** Enter the credentials for the source database.
4. Scroll down and test the connection:
   * Choose the replication instance and click **Run test**.
   * Ensure the **Status** is **Successful**.

**Step 5: Verify Network Access for the Source Database**

1. If your source database is on **Amazon EC2**:
   * Allow traffic from the **replication instance security group** into the **source database security group**.
   * Update the inbound rules of the security group to allow the necessary port (e.g., 3306 for MySQL).
2. If your source database is outside AWS:
   * Ensure the source database allows traffic from the replication instance's public IP or security group.

**Step 6: Confirm and Save the Source Endpoint**

1. Once the connection test for the source endpoint is **Successful**, click **Create endpoint** to save it.

**Step 7: Verify Both Endpoints**

1. In the **Endpoints** section of the AWS DMS console, ensure both the source and target endpoints have been created.
2. Confirm that you can successfully connect to both databases by re-testing the connections if needed.

You now have two endpoints ready:

1. **Source endpoint**: Connects to your source database.
2. **Target endpoint**: Connects to your target Amazon RDS database.

**Creating a replication task in AWS DMS**

**Step 1: Open the AWS DMS Console**

1. Log in to the [AWS Management Console](https://aws.amazon.com/console/).
2. Navigate to **Database Migration Service (DMS)**.
3. Go to the **Database migration tasks** section.

**Step 2: Create a New Replication Task**

1. Click **Create task** to open the replication task creation wizard.

**Step 3: Configure the Task**

1. **Task identifier**: Enter a unique name for your replication task.
2. **Replication instance**: Select the replication instance you created earlier.
3. **Source database endpoint**: Choose the endpoint for your source database.
4. **Target database endpoint**: Choose the endpoint for your Amazon RDS target database.

**Step 4: Select the Migration Type**

1. Choose one of the following migration types:
   * **Migrate existing data**: Copies all existing data from the source database to the target database (one-time).
   * **Replicate ongoing changes**: Captures ongoing changes in the source database and updates the target database in near real-time.
   * **Migrate existing data and replicate ongoing changes**: Combines both options to ensure all data is copied and changes are kept in sync.
2. For this example, select **Migrate existing data**.

**Step 5: Configure Table Mappings**

1. In the **Table mappings** section:
   * Use the **Schema selection** dropdown to specify which schemas to include.
   * Enter the table names to migrate. Use % as a wildcard to migrate multiple tables or schemas (e.g., my\_schema. % to migrate all tables in my\_schema).
2. Confirm the mapping rules to ensure the right tables are included.

**Step 6: Additional Task Settings (Optional)**

1. **Include LOBs (Large Objects)**: Enable this option if your tables contain large objects like BLOBs or CLOBs.
2. **Enable logging**: Turn on task logging to monitor the replication process.
3. **Pre-migration assessment**: Optionally, perform a pre-migration assessment to identify potential issues.

**Step 7: Create the Task**

1. Review all configurations.
2. Click **Create task** to start the task.

**Step 8: Monitor the Task**

1. In the **Database migration tasks** section, locate your task.
2. Observe the **Status** of the task:
   * **Creating**: The task is being initialized.
   * **Starting**: The task is starting the replication process.
   * **Load complete, replication ongoing**: The initial data migration is complete, and changes from the source database are being replicated to the target.

**Step 9: Validate the Migration**

1. Perform a row count comparison between the source and target databases to ensure all data was migrated successfully.
2. Check sample records in both databases to confirm data consistency.
3. If using ongoing replication, make a small update to the source database and verify that the change appears in the target database.

**Step 10: Next Steps**

1. Once the migration is complete and validated, you can proceed to switch your application to use the target database in Amazon RDS.
2. In the next module, you will clean up unused AWS resources.

**Step 1: Ensure the Migration is Complete**

1. Confirm that the initial data migration is complete and all ongoing changes are synchronized.
2. Validate the data in your new target database by:
   * Comparing row counts between the source and target databases.
   * Checking a few sample records to ensure accuracy.

**Step 2: Switch to Your New Database**

1. **Option 1**: **Confident Migration**
   * Update your application’s database configuration to point to the new Amazon RDS database.
   * Ensure all read and write operations use the new database.
2. **Option 2**: **Cautious Approach**
   * Configure your application to read from and write to both the source and target databases.
   * Monitor and compare results for a period before fully switching.

**Step 3: Stop the Migration Task**

1. Go to the **Database migration tasks** section in the AWS DMS console.
2. Select your migration task.
3. Click **Stop** to stop the task.
   * Wait until the task status changes to **Stopped**.

**Step 4: Delete the Migration Task**

1. Once the task is stopped, select it again.
2. Click **Delete** to remove the migration task.

**Step 5: Delete Endpoints**

1. Navigate to the **Endpoints** section of the AWS DMS console.
2. Select both your **source endpoint** and **target endpoint**.
3. Click **Delete** to remove the endpoints.

**Step 6: Delete the Replication Instance**

1. Go to the **Replication instances** section in the AWS DMS console.
2. Select your replication instance.
3. Ensure it is not being used by any other tasks.
4. Click **Delete** to remove the replication instance.

**Step 7: Terminate the Source Database (Optional)**

1. If you no longer need your source database:
   * If it’s running on Amazon EC2, terminate the EC2 instance:
     + Go to the **EC2** console.
     + Select the instance and click **Terminate**.
   * If it’s hosted elsewhere, follow the appropriate procedure to decommission it.

**Step 8: Test the New Database Thoroughly**

1. Run your application using the new database.
2. Monitor performance, response times, and data accuracy.
3. Perform load tests if applicable to ensure stability under production usage.

**Step 9: Clean Up Additional AWS Resources (Optional)**

1. Review and delete any unused resources related to the migration (e.g., IAM roles, security groups).
2. Monitor your AWS billing console to ensure no unexpected charges.