# Exercise 2 - Source SQL Server Configuration, and using AWS Schema Conversion Tool (SCT) to convert source schema to target Aurora MySQL schema

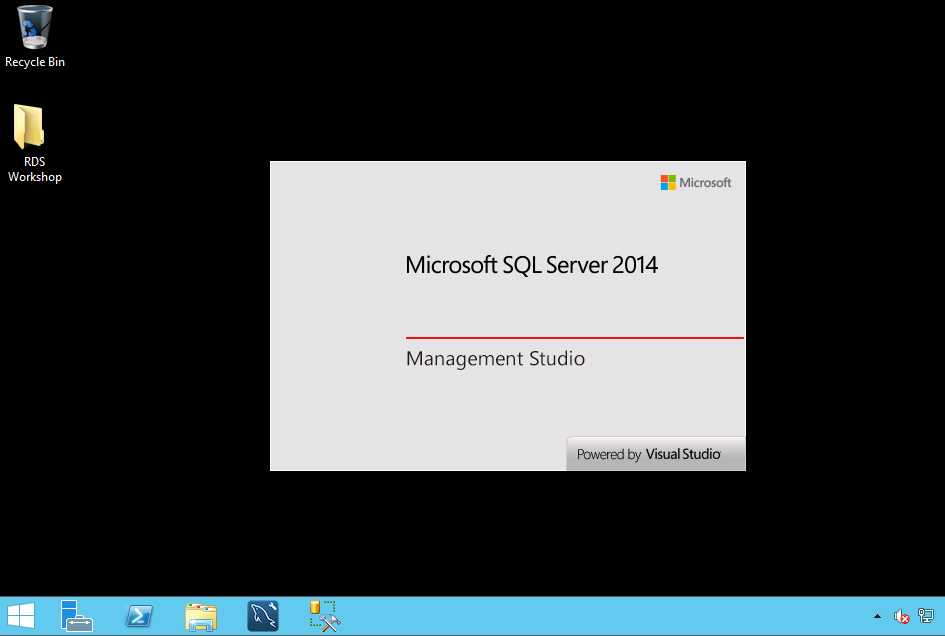
In this exercise, you will configure source SQL server on EC2 instance, inspect database tables, setup for replication and use AWS Schema Conversion Tool (SCT) to convert source schema for SQL server football database to target Aurora MySQL and apply the schema to the target database.

AWS Schema Conversion Tool (SCT) makes heterogeneous database migrations easy by automatically converting the source database schema and a majority of the custom code to a format compatible with target database. Custom code the tool converts includes views, stored procedures and functions. Any code that the tool cannot convert automatically is clearly marked so that you can convert it yourself. For additional documentation on AWS SCT, please refer to documentation here: <http://docs.aws.amazon.com/SchemaConversionTool/latest/userguide/Welcome.html>

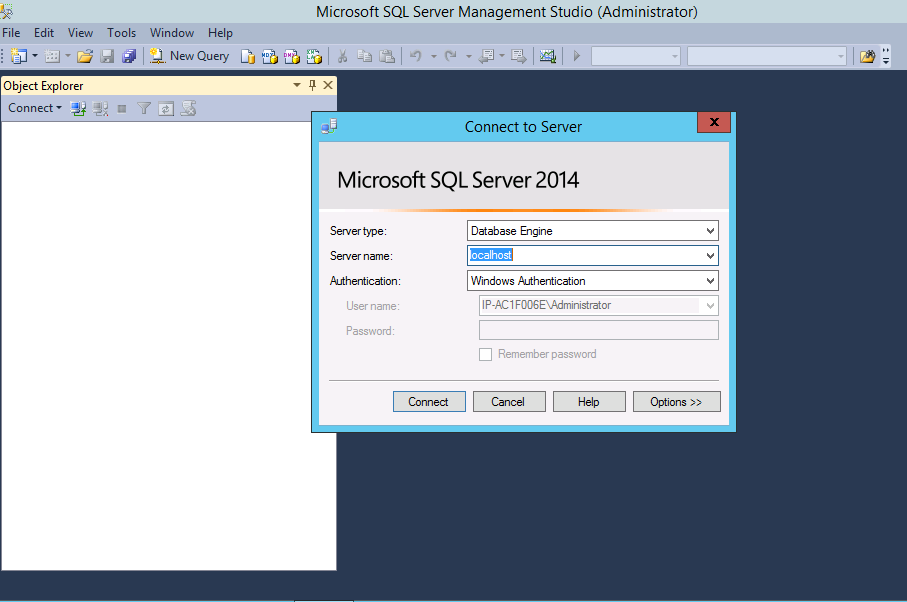
**Pre-requisite:** Ensure you are logged in via Remote Desktop to your EC2 Instance from the previous exercise. If you are not logged in, please complete the steps from Exercise 1.

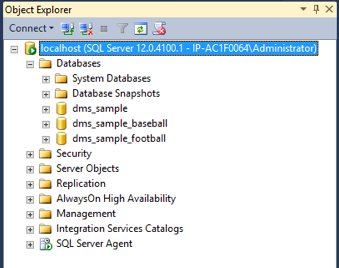
**Step 1:**

* Once logged into the server, launch SSMS (SQL Server Management 2014 Studio) by clicking on the icon displayed on the tool bar



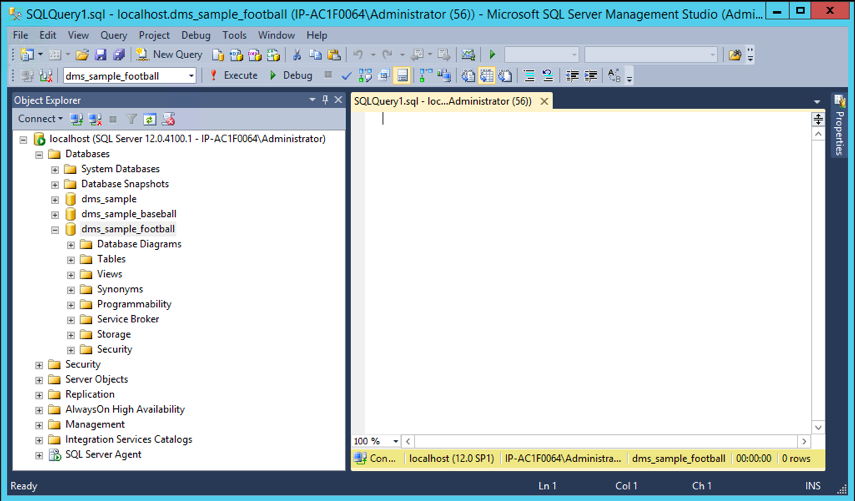
* On the SQL server authentication screen, use Server name: **localhost,** Authentication: **Windows Authentication**, and click **Connect**



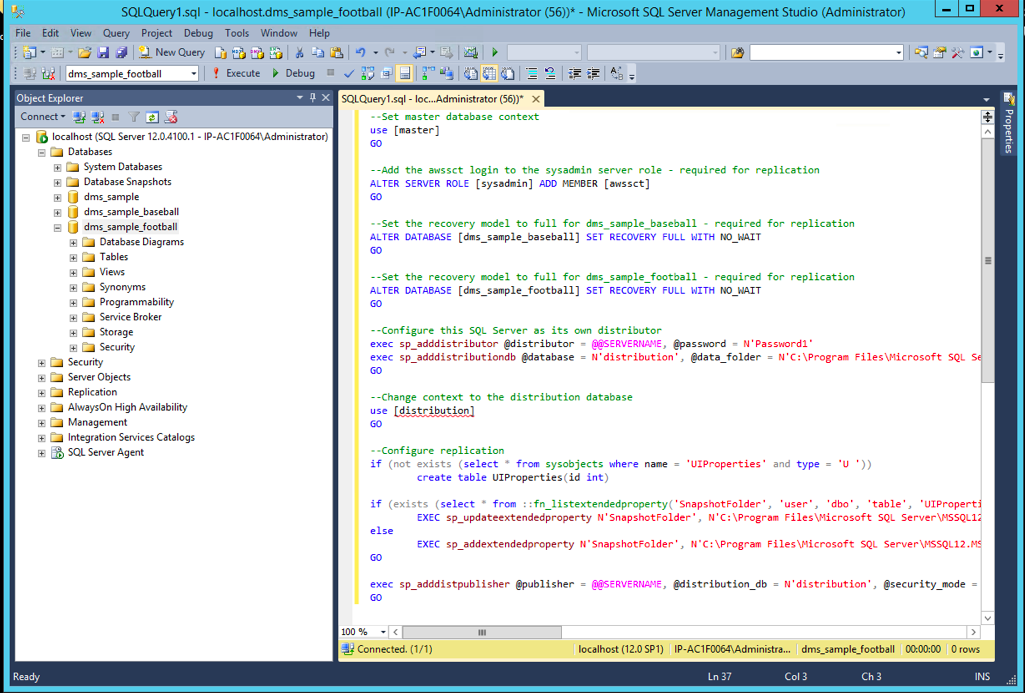
* Expand **Databases** folder on Object Explorer to inspect databases that are available. You should see 3 databases: **dms\_sample**, **dms\_sample\_football**, **dms\_sample\_baseball**. For the remainder of this workshop, we will be working on **dms\_sample\_football** and **dms\_sample\_baseball** datasets.
* We will use **dms\_sample\_football** database, convert schema and apply schema to target Amazon Serverless Aurora database.

**Step 2:**

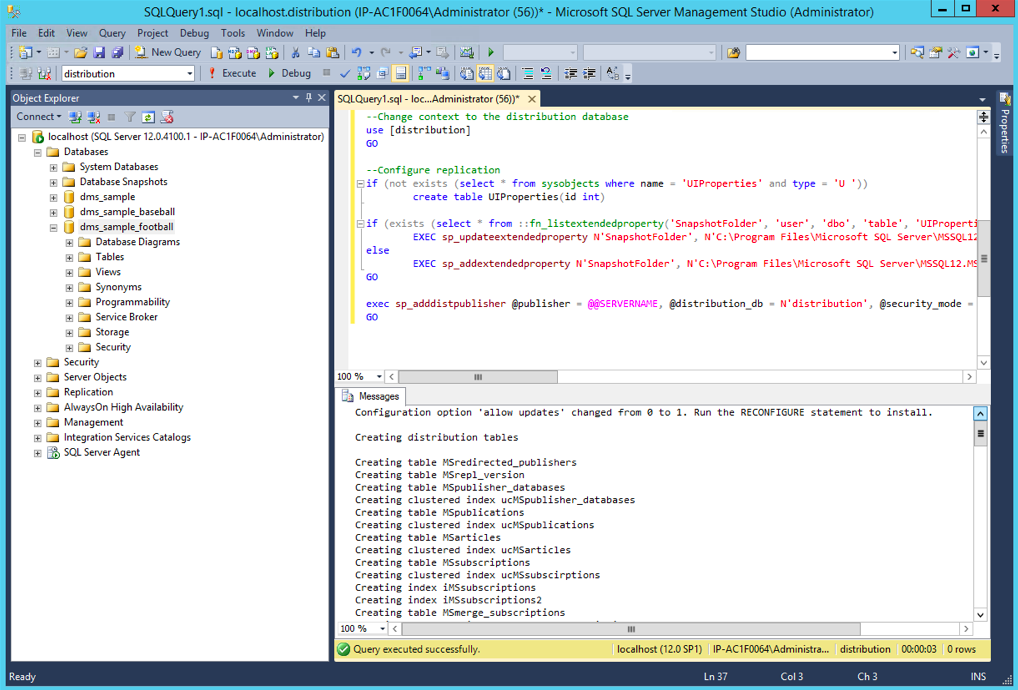
* In order to replicate football databases to Amazon S3 and Serverless Aurora respectively, we need to prepare the source database for replication. This is done by configuring the database for full recovery and setting it as distribution database. For additional detailed information, please refer to documentation link here: <http://docs.aws.amazon.com/dms/latest/userguide/CHAP_Source.SQLServer.html#CHAP_Source.SQLServer.Configuration>
* Right click **dms\_sample\_football** database and select **New Query**. A blank query window should open up to the right as shown:



* We will use the provided SQL server script from the zip file you downloaded in exercise 1 to configure for replication. Open the provided **ConfigureSQLServer.sql** script using a text editor, copy and paste the script into the blank Query editor on the SQL server



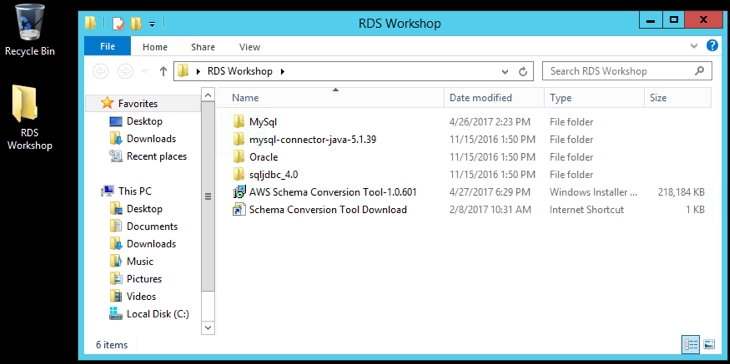
* Click on **Execute** button on the top bar to run the commands for replication setup
* Once the query is executed, you should see successful query execution message on the right window as shown below:



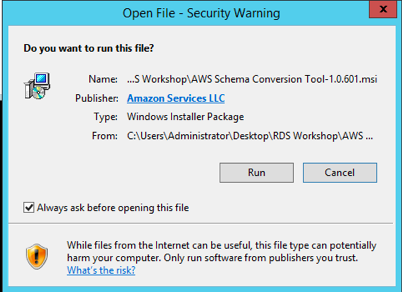
* Minimize SSMS window

**Step 3:**

* Click on **RDS Workshop folder** and launch **AWS Schema Conversion Tool** file within the folder



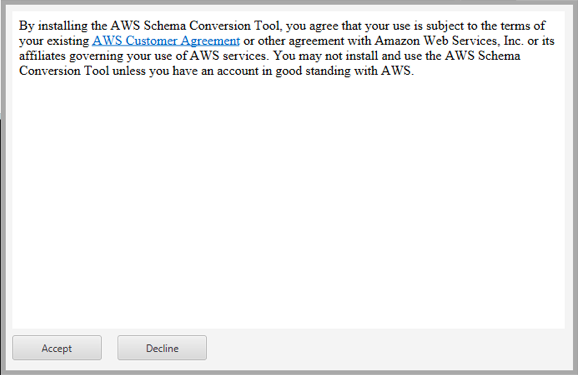
* After clicking AWS Schema Conversion Tool, wait for a minute for the tool to launch, click **Run** and install AWS Schema Conversion Tool.



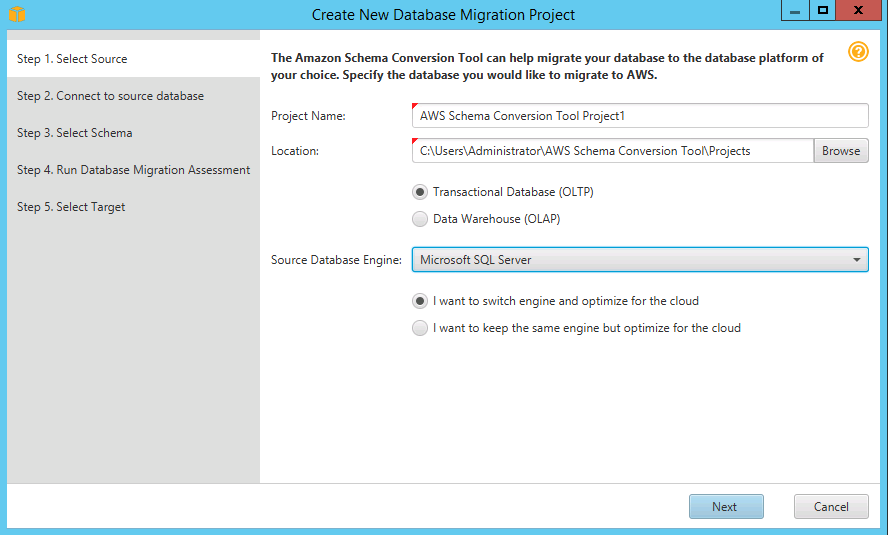
* Once installed, **be aware there will be no confirmation message** of the installation.
* Click on Windows Icon button, and start typing **AWS Schema Conversion Tool** as seen below:



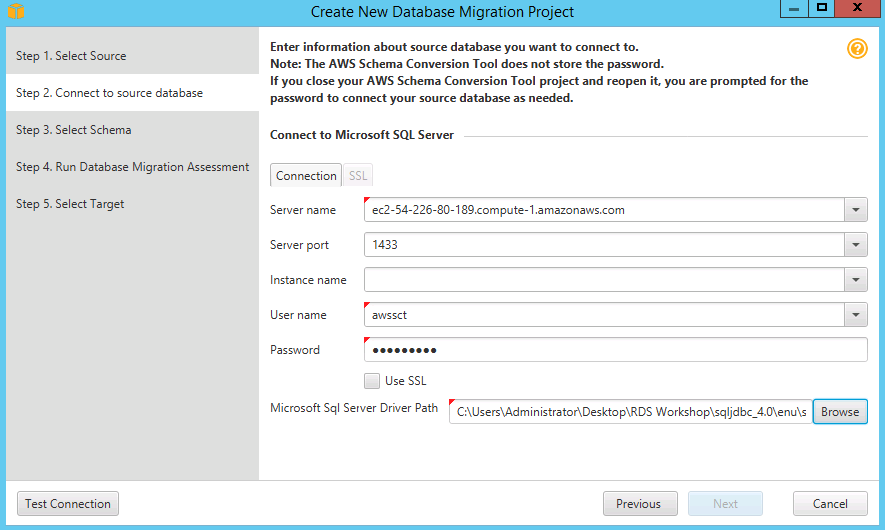
* Click on Schema Conversion Tool to open the application. If you may see a message that asks to download new version, click **Not now, Maybe later** button and proceed.
* Accept Customer Agreement



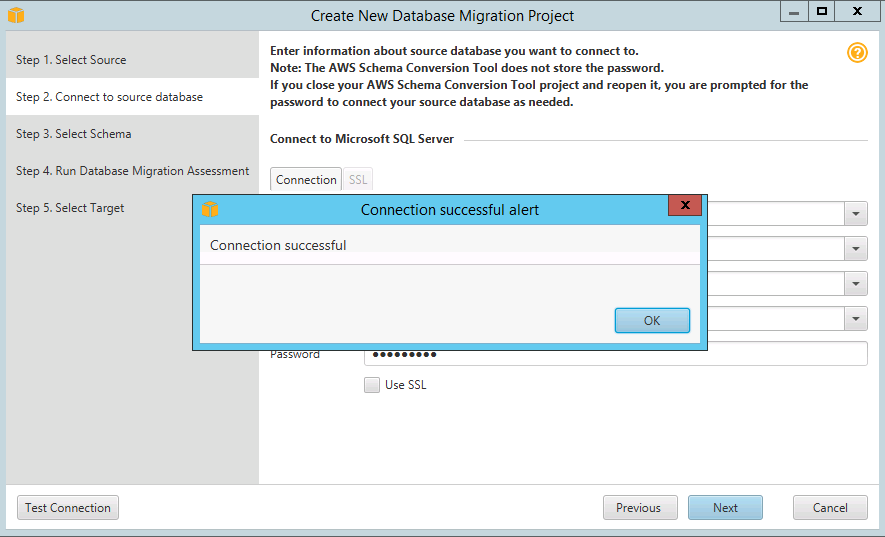
* A New Database Migration Project page opens
  + Provide a Project Name
  + Do not change Location
  + Select **Transactional Database (OLTP)**
  + Change Source Database Engine: **Microsoft SQL Server**
  + Select **I want to switch engine and optimize for the cloud** radio button
  + Click **Next**.



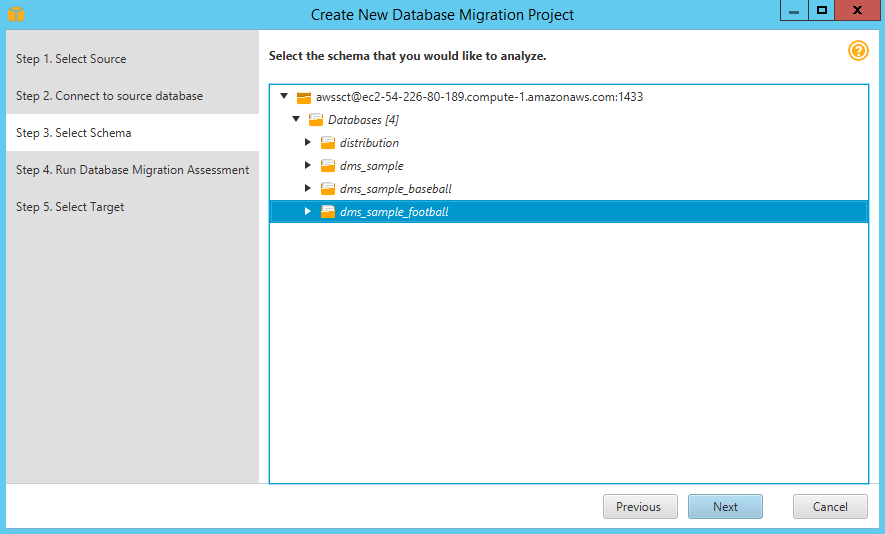
* Under **Connect to Microsoft SQL Server**, enter the following connection values. Note server name will vary for you based on EC2 host name assigned at launch.
  + Server name: Enter EC2 SQL server public DNS hostname (IPv4) from the CloudFormation Output
  + Server port: **1433**
  + Leave Instance name blank
  + User name: **awssct**
  + Password: **Password1**
  + Do not check Use SSL button
  + Microsoft SQL Server Driver Path: click Browse, select Desktop folder -> RDS Workshop -> sqljdbc\_4.0 -> enu -> sqljdbc4.jar and click **Open**



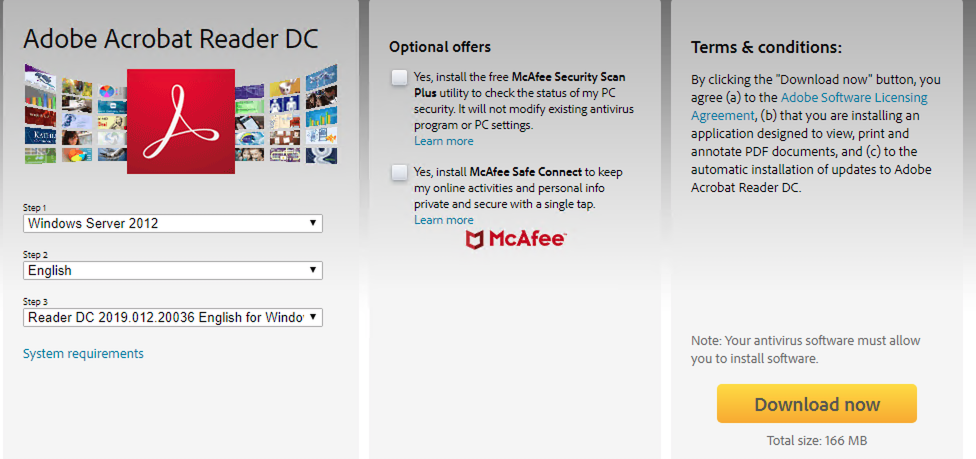
* Click **Test Connection**. The connection should be successful for SCT to be able to connect to source SQL Server database. Click **OK**.



* Click **Next**
* On this screen, the schema for source database is listed, select **dms\_sample\_football** and click **Next**.



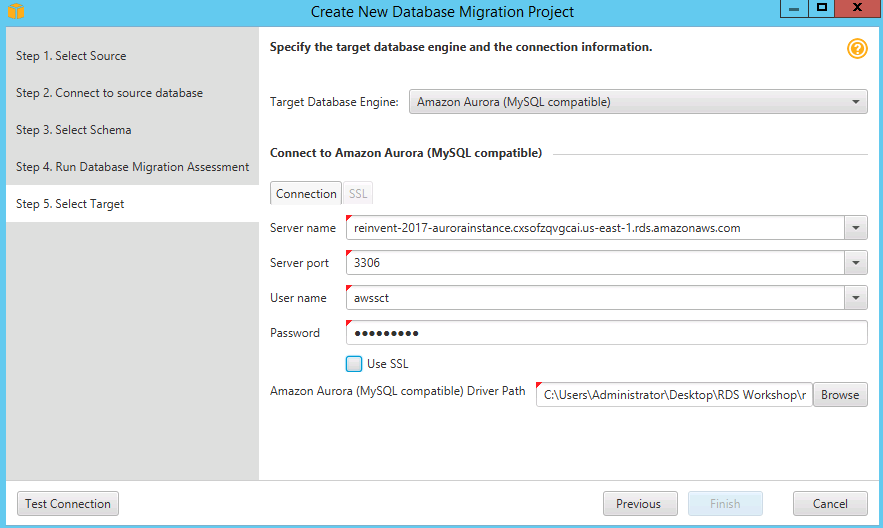
* SCT will now connect to the source database, and analyze **dms\_sample\_football** objects and will produce a Database Migration Assessment Report.
* Scroll through the report and look at objects that SCT can automatically convert and provides detail report on objects that can be converted automatically and require manual efforts.
* **Optional step:** Download and analyze the full report: Download the report by clicking on Save to PDF. Note - Adobe PDF reader is not installed by default on the server. You will need to download Adobe PDF:
  + Launch Internet Explorer
  + Go to your favorite web browser and type in “Download Adobe PDF Reader”.
  + In the Adobe Acrobat Reader DC page, select Windows Server 2012 as your Operating system and select the appropriate options from the dropdown menus.
  + Click on Download Now



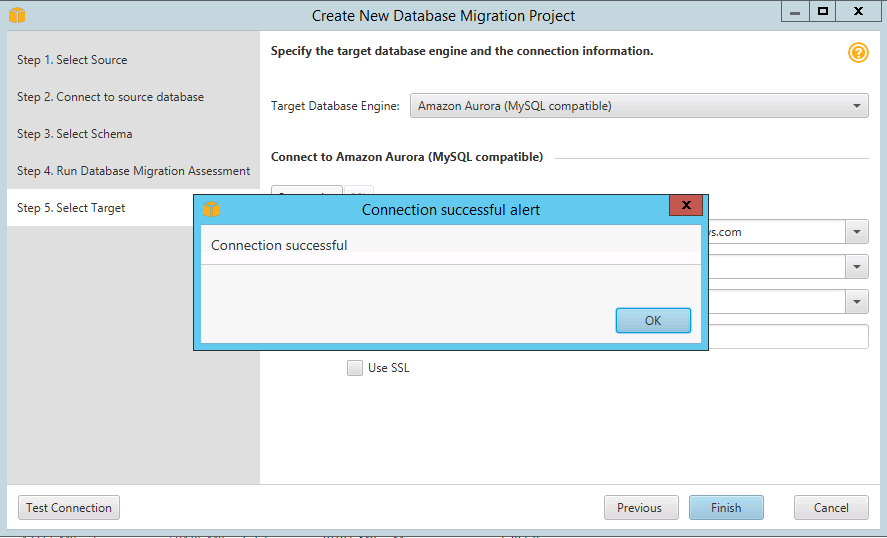
Once the Adobe Acrobat reader installation is complete, you can then open the SCT report that you downloaded in the previous step.

Next - Configure the Target endpoint in Schema Conversion Tool:

* Click **Next** in the Schema Conversion Tool window. Ensure you are at “Step 5. Select Target” on the left hand menu.
* We now will enter values for target Amazon Aurora MySQL database:
  + On the target database engine drop down, select Amazon Aurora (MySQL compatible)
  + Server name: Enter Aurora MySQL database endpoint name from the CloudFormation Output
  + Server port: **3306**
  + User name: **awssct**
  + Password: **Password1**
  + Do not check SSL
  + Amazon Aurora (MySQL compatible) Driver Path: click Browse -> Select Desktop folder -> RDS Workshop -> mysql-connector-java-5.1.39 -> select **mysql-connector-java-5.1.39-bin.jar** and click **Open**



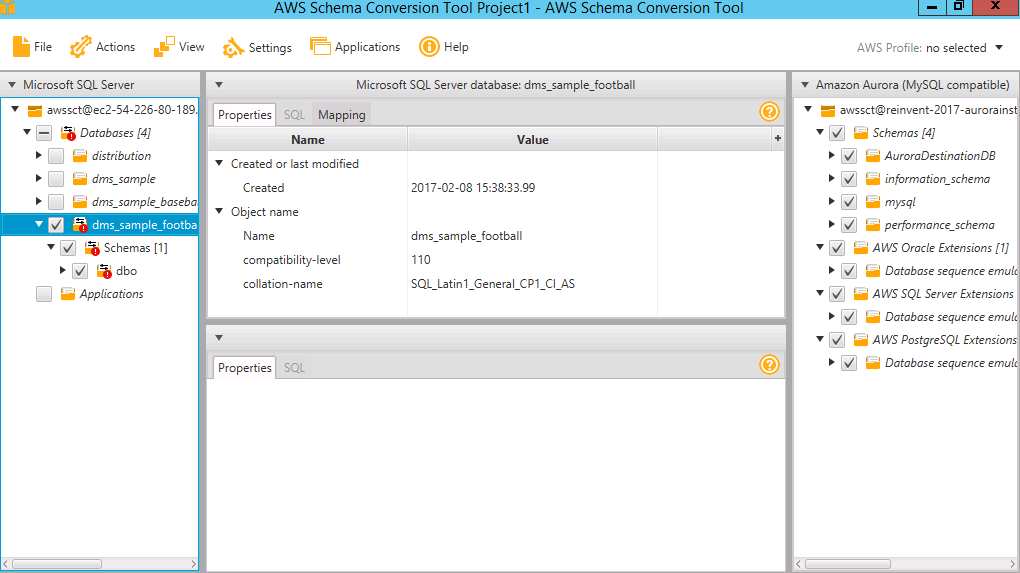
* Click **Test Connection**. The connection should be successful for SCT to be able to connect to target Aurora MySQL database. Click **OK**.



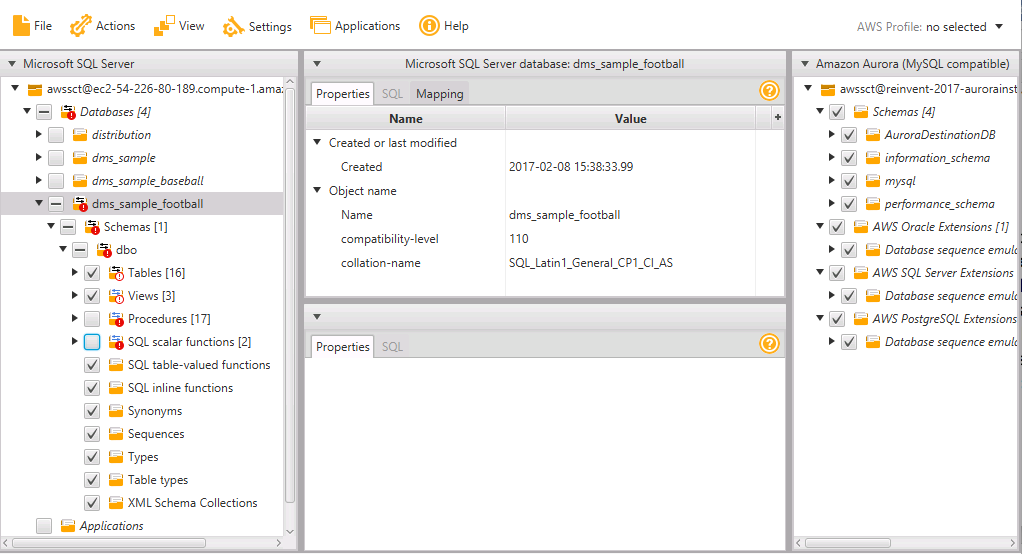
* Click **Finish**

**Step 4:**

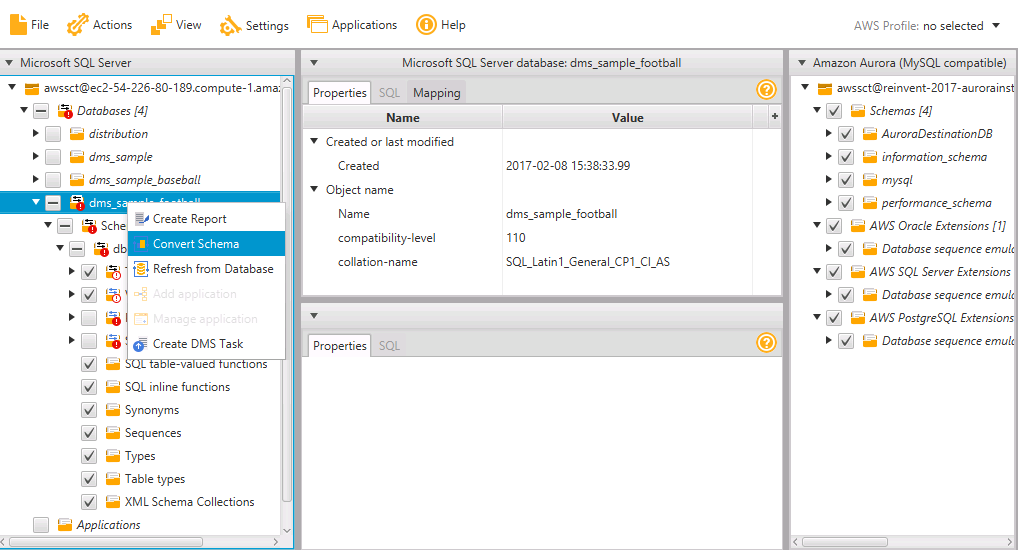
* We will now use SCT to extract source schema from **dms\_sample\_football** database and apply to target Amazon Aurora MySQL database
* On the left panel, click on **dms\_sample\_football**, then click on **Schemas** to see the **dbo** schema. On the left you will see source SQL Server schema, on the right panel is Amazon Aurora MySQL schema.
* On the left panel, uncheck Databases and Applications. Then click on **dms\_sample\_football** to select the database and schema as shown below.



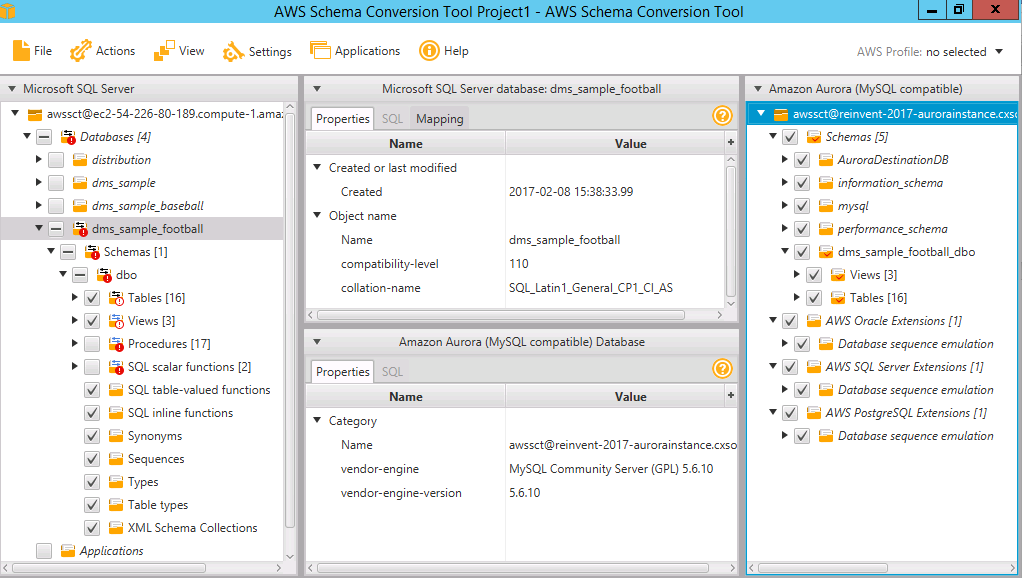
* Inspect the schema by expanding **Schemas -> dbo** and look at **Tables**, **Views** and other DB objects
* You will see red circles for **Procedures** and **SQL Scalar functions**. This means those objects cannot be automatically converted by SCT to target database and would require manual effort.
* For this workshop, we do not need Procedures and SQL scalar functions, so we can skip it. Uncheck **Procedures** and **SQL scalar functions box.**



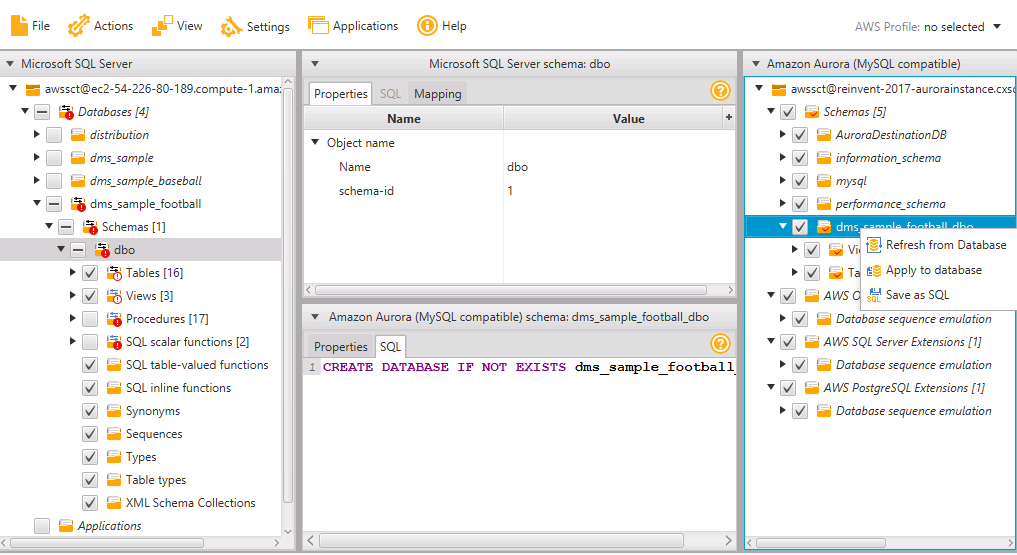
* Right-click on **dms\_sample\_football** database, and click **Convert Schema** as shown below



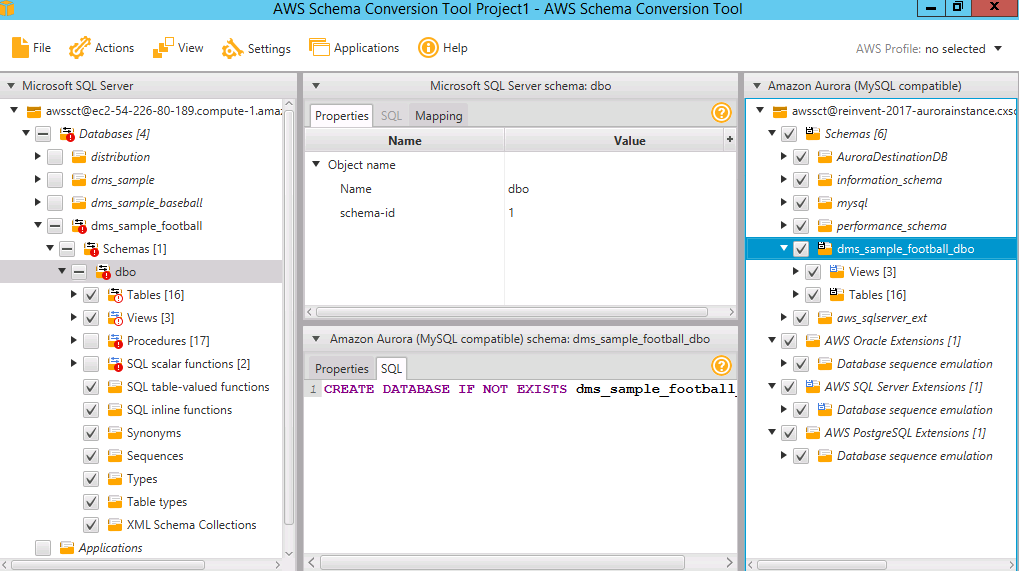
* The convert schema will indicate operation will be partially performed, click **OK**. It will also indicate Objects may already exist in target database. Click **Yes**. This means the source schema will be copied to be applied to target database
* You should now see **dms\_sample\_football\_dbo** schema on the target Amazon Aurora panel on the right
* Expand the schema on the right and inspect objects
* You should see Views and Tables on the target schema as below



* We are now ready to apply the schema to the target database. Right-click **dms\_sample\_football\_dbo** on the Amazon Aurora database on right panel and select **Apply to Database** as shown below



* The screen will indicate “You chose to apply schema definition for dms\_sample\_football\_Dbo”. Click **Yes**
* The schema is now applied to the target Aurora database



**Exercise Recap:**

* In this exercise, you identified databases on source SQL server EC2 instance
* Setup source SQL server for replication to target Amazon Aurora database
* Used AWS Schema Conversion Tool (SCT) to convert source SQL server schema to target Amazon Aurora MySQL compatible schema