SECUREKLOUD

DATABASE MIGRATION SERVICE

Migrating Oracle Database from On-Premises/EC2 to RDS

Table of Contents

Introduction

Managing Oracle Databases in On-Premises/EC2 instances require more resources and cost. Hence moving it to RDS instance will ease our job, optimizing the IT budget and also providing us with various features like Multi-AZ, Scalability, Automatic Backups…etc.

In our case we are migrating 120 GB Oracle Database from EC2 instance to RDS using the DMS service which migrates the data very faster and effortlessly .The task can also be monitored and optimized through the DMS service. The same approach is applicable while migrating the Oracle Database from On-Premises to RDS.

Environment Details

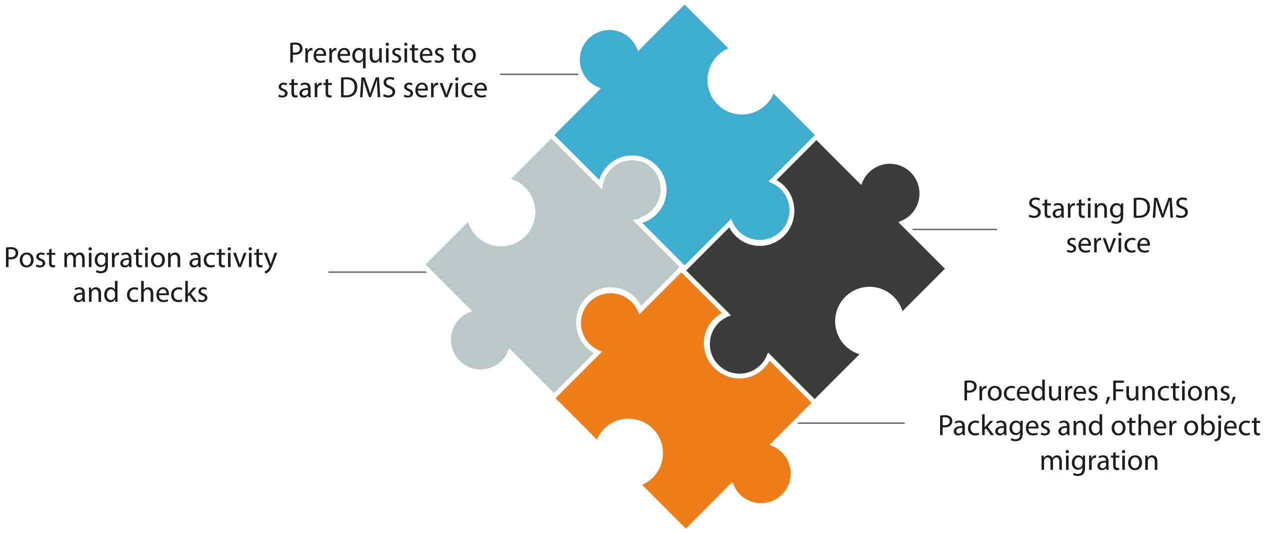
Below are the current EC2 and opted RDS environment details involved in this migration.

EC2 Instance Type	M4.large
Database Size	120 GB
Database Version	11.2.0.4
DB Instance Name	TEST
Schemas to migrate	DOCUMENTS, PROD, HOW,OWS, BACKUP

RDS Instance Type	T2.medium
Allocated Size	200 GB
Database Version	11.2.0.4
RDS Instance Name	PRODTEST

Approach

The below approach is followed to migrate the Database:


Prerequisites to start DMS service
Starting DMS service
Procedures ,Functions, Packages and other object migration
Post migration activity and checks

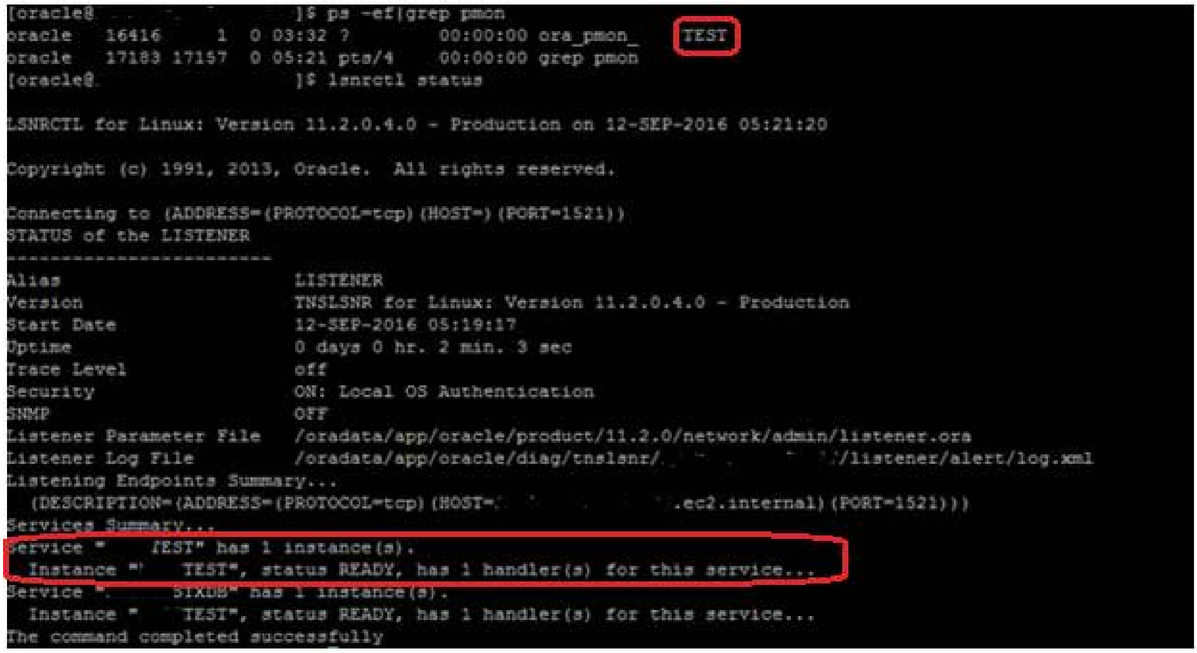
Prerequisites to start DMS service:

a. Source database with Instance and Listener services need to be up and running.
b. Target RDS database should be up and running.
c. Target RDS database should have sufficient storage for data migration.
d. Source database should be in "archive log" mode.
e. Create the necessary tablespaces on the target database.
f. Create schemas on the target database which needs to be migrated.

Below screen shots confirms the prerequisites are met in our migration.

a. Source database

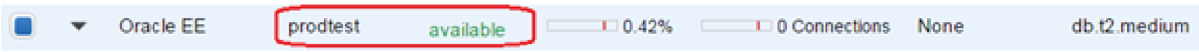
The source database instance “TEST” and the “LISTENER” are up and running fine.



```
[oracle@[redacted]              ]$ ps -ef|grep pmon
oracle   16416     1  0 03:32 ?        00:00:00 ora_pmon_    TEST
oracle   17183 17157  0 05:21 pts/4    00:00:00 grep pmon
[oracle@[redacted]              ]$ lsnrctl status

LSNRCTL for Linux: Version 11.2.0.4.0 - Production on 12-SEP-2016 05:21:20

Copyright (c) 1991, 2013, Oracle.  All rights reserved.

Connecting to (ADDRESS=(PROTOCOL=tcp)(HOST=)(PORT=1521))
STATUS of the LISTENER
------------------------
Alias                     LISTENER
Version                   TNSLSNR for Linux: Version 11.2.0.4.0 - Production
Start Date                12-SEP-2016 05:19:17
Uptime                    0 days 0 hr. 2 min. 3 sec
Trace Level               off
Security                  ON: Local OS Authentication
SNMP                      OFF
Listener Parameter File   /oradata/app/oracle/product/11.2.0/network/admin/listener.ora
Listener Log File         /oradata/app/oracle/diag/tnslsnr/[redacted]/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=[redacted].ec2.internal)(PORT=1521)))
Services Summary...
Service "   TEST" has 1 instance(s).
  Instance "   TEST", status READY, has 1 handler(s) for this service...
Service "     SIXDB" has 1 instance(s).
  Instance "   TEST", status READY, has 1 handler(s) for this service...
The command completed successfully
```

b. Target database

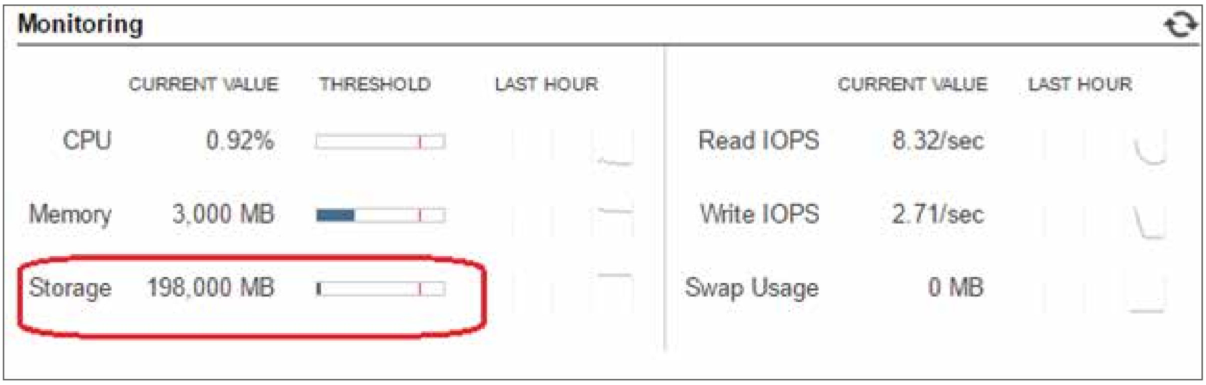
The target RDS instance is up and ready to be used



■	▼	Oracle EE	prodtest	available	0.42%	0 Connections	None	db.t2.medium

c. Storage space in target database.

The target database is equipped with enough storage space.



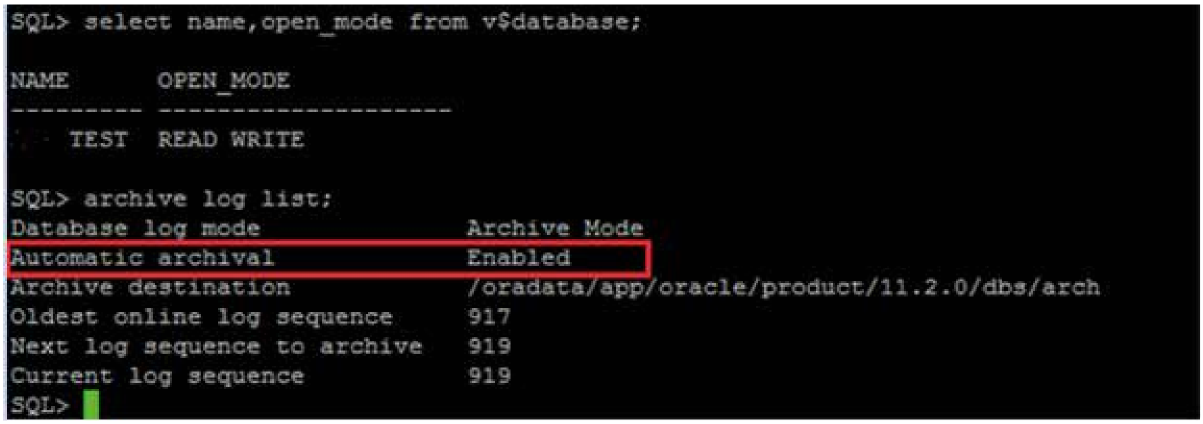
Monitoring

	CURRENT VALUE	THRESHOLD	LAST HOUR
CPU	0.92%		
Memory	3,000 MB		
Storage	198,000 MB		

	CURRENT VALUE	LAST HOUR
Read IOPS	8.32/sec	
Write IOPS	2.71/sec	
Swap Usage	0 MB	

d. Source database in archive log mode.

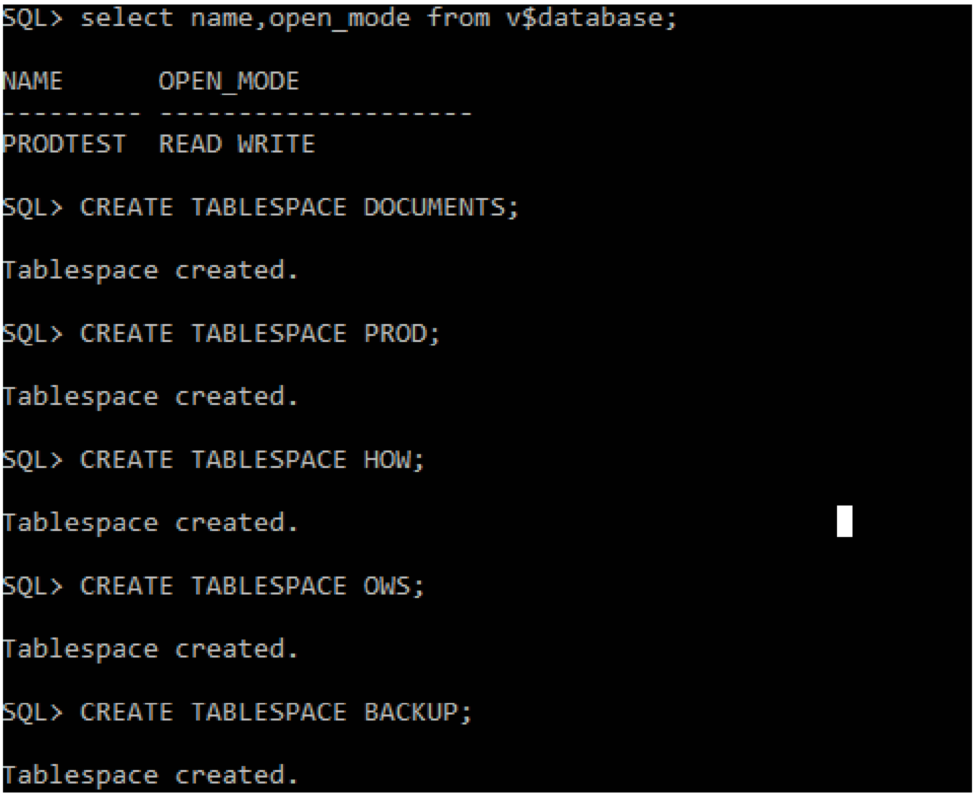
The archive log mode is enabled in the source database.



```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
[redacted] TEST   READ WRITE

SQL> archive log list;
Database log mode              Archive Mode
Automatic archival             Enabled
Archive destination            /oradata/app/oracle/product/11.2.0/dbs/arch
Oldest online log sequence     917
Next log sequence to archive   919
Current log sequence           919
SQL>
```

e. Tablespace creation in the target database.

Tablespaces "DOCUMENTS", "PROD", "HOW", "OWS" and "BACKUP" are created.

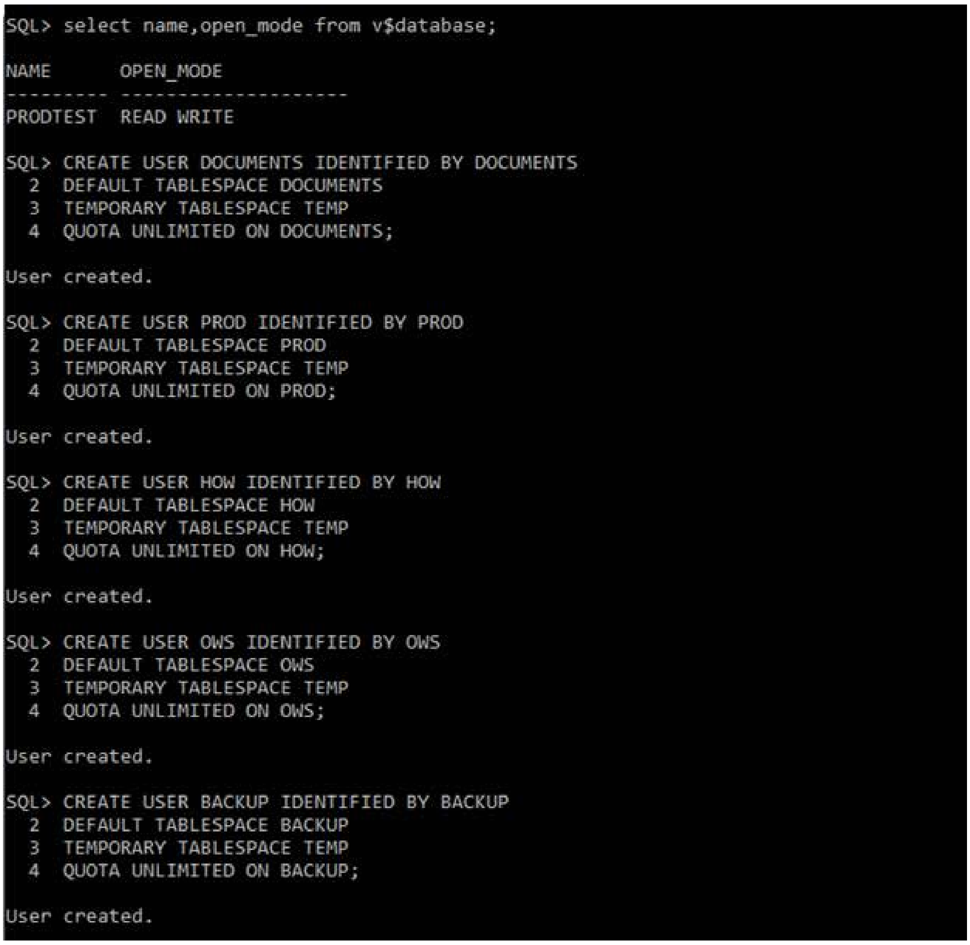


```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
PRODTEST  READ WRITE

SQL> CREATE TABLESPACE DOCUMENTS;

Tablespace created.

SQL> CREATE TABLESPACE PROD;

Tablespace created.

SQL> CREATE TABLESPACE HOW;

Tablespace created.

SQL> CREATE TABLESPACE OWS;

Tablespace created.

SQL> CREATE TABLESPACE BACKUP;

Tablespace created.
```

f. Schema creation and grant privileges in the target database.

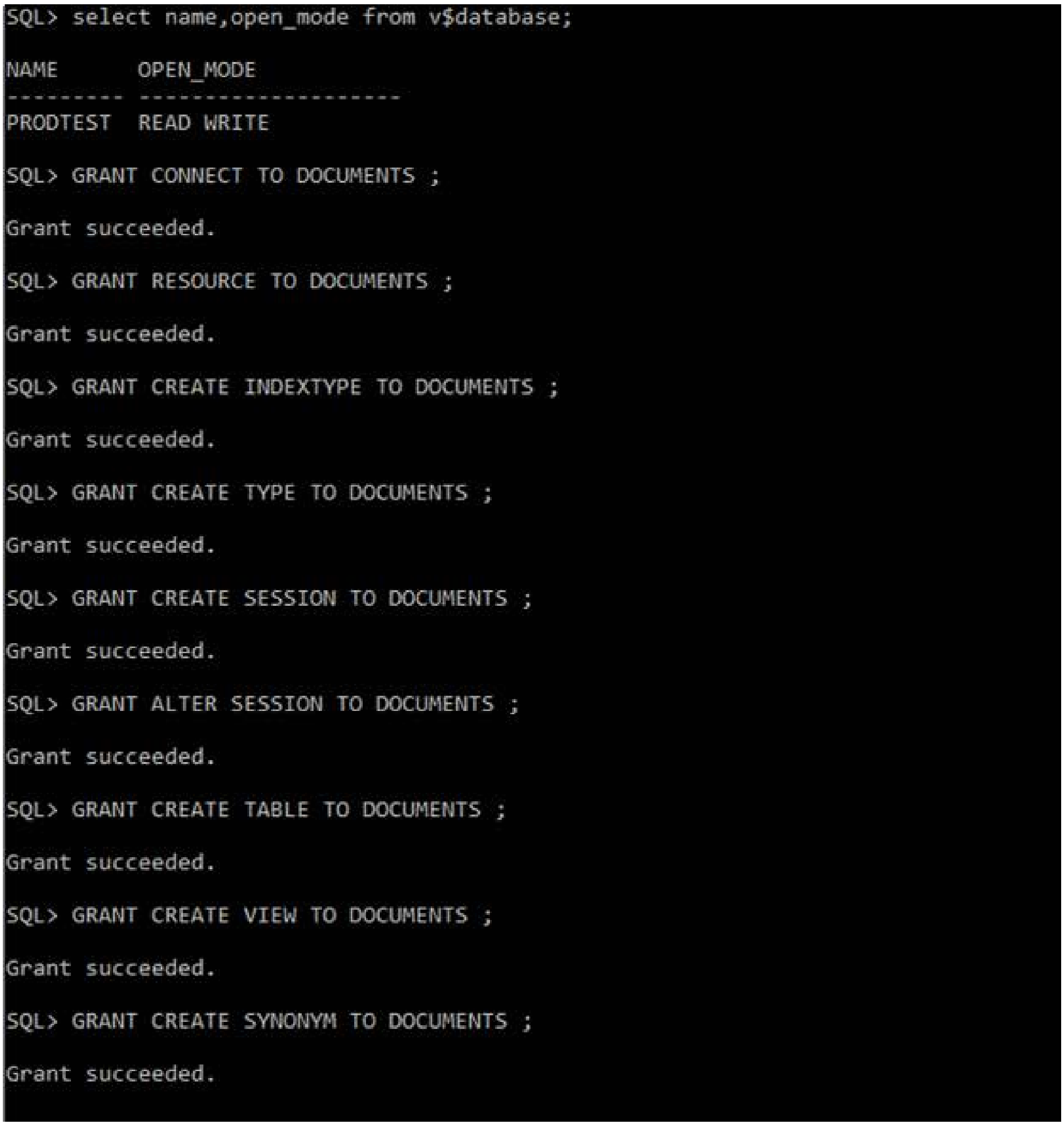
Schemas "DOCUMENTS", "PROD", "HOW", "OWS" and "BACKUP" are created and the required privileges are granted as per the application/user needs.

Schemas are created



```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
PRODTEST  READ WRITE

SQL> CREATE USER DOCUMENTS IDENTIFIED BY DOCUMENTS
  2  DEFAULT TABLESPACE DOCUMENTS
  3  TEMPORARY TABLESPACE TEMP
  4  QUOTA UNLIMITED ON DOCUMENTS;

User created.

SQL> CREATE USER PROD IDENTIFIED BY PROD
  2  DEFAULT TABLESPACE PROD
  3  TEMPORARY TABLESPACE TEMP
  4  QUOTA UNLIMITED ON PROD;

User created.

SQL> CREATE USER HOW IDENTIFIED BY HOW
  2  DEFAULT TABLESPACE HOW
  3  TEMPORARY TABLESPACE TEMP
  4  QUOTA UNLIMITED ON HOW;

User created.

SQL> CREATE USER OWS IDENTIFIED BY OWS
  2  DEFAULT TABLESPACE OWS
  3  TEMPORARY TABLESPACE TEMP
  4  QUOTA UNLIMITED ON OWS;

User created.

SQL> CREATE USER BACKUP IDENTIFIED BY BACKUP
  2  DEFAULT TABLESPACE BACKUP
  3  TEMPORARY TABLESPACE TEMP
  4  QUOTA UNLIMITED ON BACKUP;

User created.
```

Privileges are granted

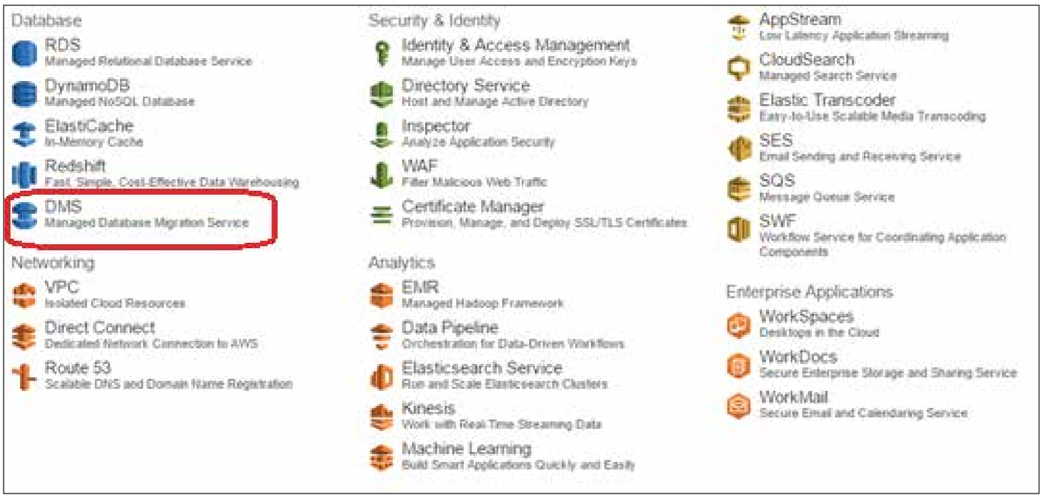


```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
PRODTEST  READ WRITE

SQL> GRANT CONNECT TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT RESOURCE TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT CREATE INDEXTYPE TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT CREATE TYPE TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT CREATE SESSION TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT ALTER SESSION TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT CREATE TABLE TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT CREATE VIEW TO DOCUMENTS ;

Grant succeeded.

SQL> GRANT CREATE SYNONYM TO DOCUMENTS ;

Grant succeeded.
```

Note: Same privileges been granted to all the schemas.

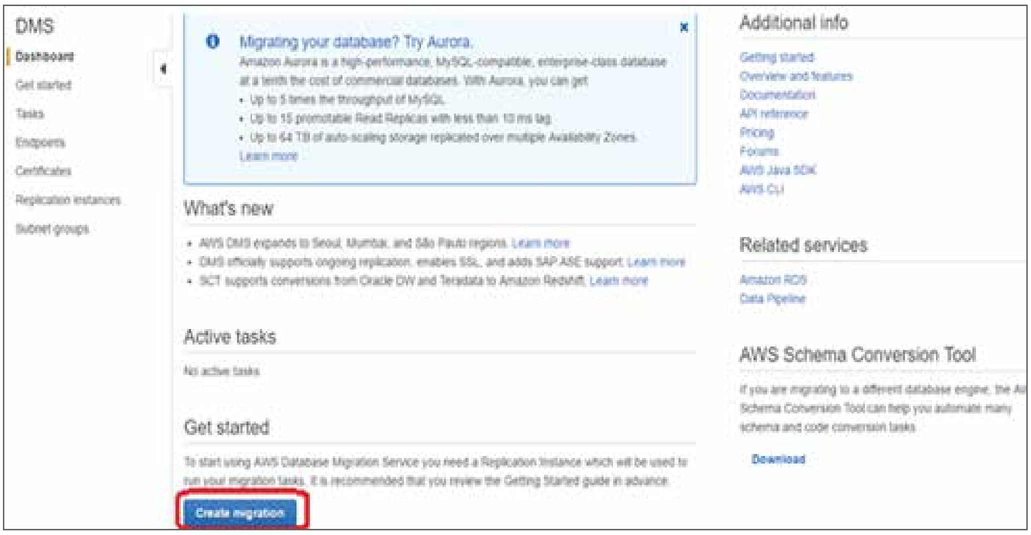
Starting DMS service.

Step 1:
Login to the AWS console and Click on "DMS" option under Database Services.


Database
RDS
Managed Relational Database Service
DynamoDB
Managed NoSQL Database
ElastiCache
In-Memory Cache
Redshift
Fast, Simple, Cost-Effective Data Warehousing
DMS
Managed Database Migration Service
Networking
VPC
Isolated Cloud Resources
Direct Connect
Dedicated Network Connection to AWS
Route 53
Scalable DNS and Domain Name Registration
Security & Identity
Identity & Access Management
Manage User Access and Encryption Keys
Directory Service
Host and Manage Active Directory
Inspector
Analyze Application Security
WAF
Filter Malicious Web Traffic
Certificate Manager
Provision, Manage, and Deploy SSL/TLS Certificates
Analytics
EMR
Managed Hadoop Framework
Data Pipeline
Orchestration for Data-Driven Workflows
Elasticsearch Service
Run and Scale Elasticsearch Clusters
Kinesis
Work with Real-Time Streaming Data
Machine Learning
Build Smart Applications Quickly and Easily
AppStream
Low Latency Application Streaming
CloudSearch
Managed Search Service
Elastic Transcoder
Easy-to-Use Scalable Media Transcoding
SES
Email Sending and Receiving Service
SQS
Message Queue Service
SWF
Workflow Service for Coordinating Application Components
Enterprise Applications
WorkSpaces
Desktops in the Cloud
WorkDocs
Secure Enterprise Storage and Sharing Service
WorkMail
Secure Email and Calendaring Service

Step 2:

Click on "Create Migration" button



Migrating your database? Try Aurora.

Amazon Aurora is a high-performance, MySQL-compatible, enterprise-class database at a tenth the cost of commercial databases. With Aurora, you can get

- Up to 5 times the throughput of MySQL
- Up to 15 promotable Read Replicas with less than 10 ms lag
- Up to 64 TB of auto-scaling storage replicated over multiple Availability Zones

Learn more

What's new

- AWS DMS expands to Seoul, Mumbai, and São Paulo regions. Learn more
- DMS officially supports ongoing replication, enables SSL, and adds SAP ASE support. Learn more
- SCT supports conversions from Oracle DW and Teradata to Amazon Redshift. Learn more

Active tasks

No active tasks

Get started

To start using AWS Database Migration Service you need a Replication Instance which will be used to run your migration tasks. It is recommended that you review the Getting Started guide in advance.

Additional info

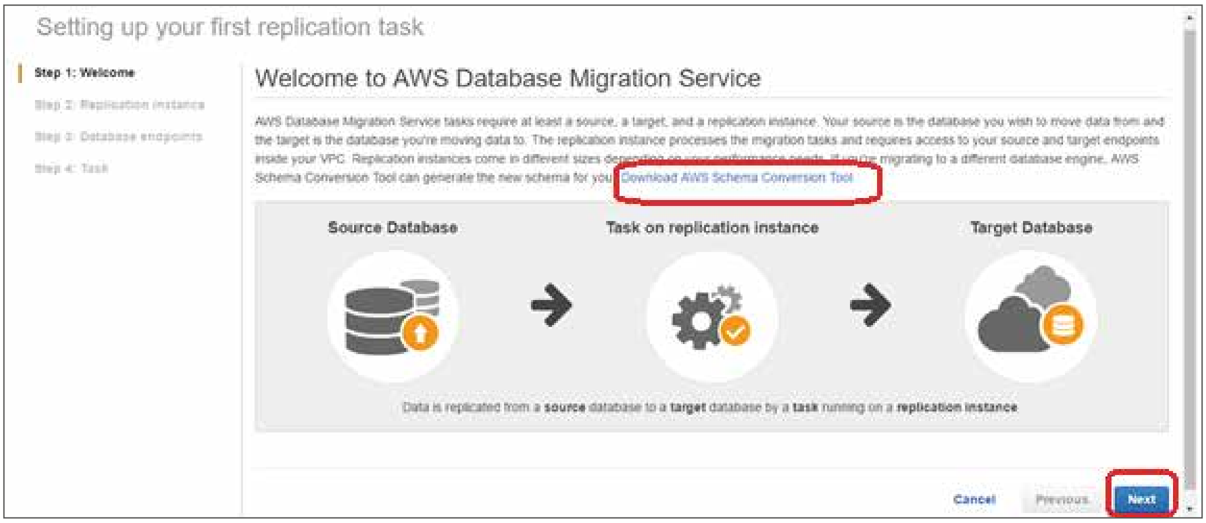
Related services

AWS Schema Conversion Tool

If you are migrating to a different database engine, the AWS Schema Conversion Tool can help you automate many schema and code conversion tasks.

Step 3:

Since this is an Oracle to Oracle database migration, downloading the schema conversion tool is optional. However it is applicable if the migration is heterogeneous. Click on "Next" button.


Setting up your first replication task

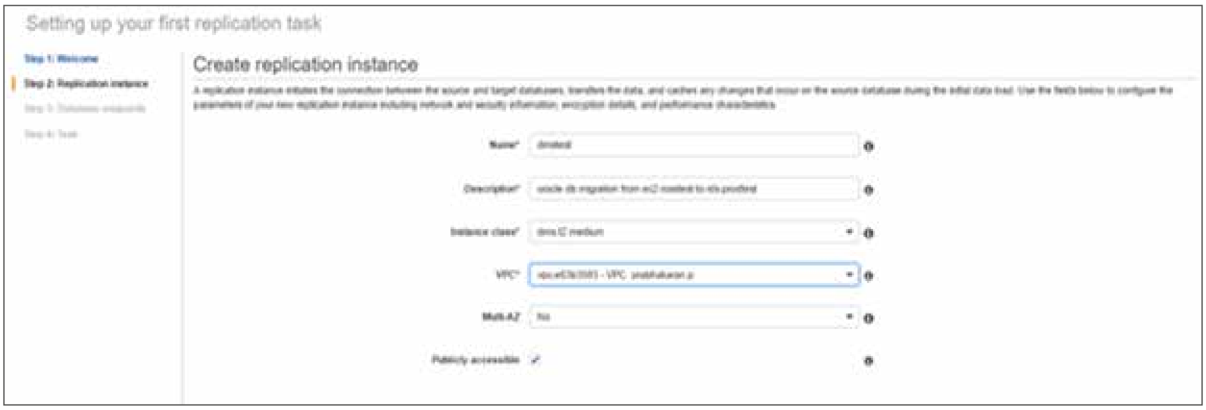
Welcome to AWS Database Migration Service

AWS Database Migration Service tasks require at least a source, a target, and a replication instance. Your source is the database you wish to move data from and the target is the database you're moving data to. The replication instance processes the migration tasks and requires access to your source and target endpoints inside your VPC. Replication instances come in different sizes depending on your performance needs. If you're migrating to a different database engine, AWS Schema Conversion Tool can generate the new schema for you. Download AWS Schema Conversion Tool

Data is replicated from a **source** database to a **target** database by a **task** running on a **replication instance**

Step 4:

Under the "Create replication Instance" window, provide a meaningful replication instance name, description of the migration, Instance class and VPC where the RDS instance must reside. Select Multi-AZ to YES for high availability and redundant replication streaming. Check the publicly accessible box to access the replication instance through internet.


Setting up your first replication task

Create replication instance

A replication instance initiates the connection between the source and target databases, transfers the data, and caches any changes that occur on the source database during the initial data load. Use the fields below to configure the parameters of your new replication instance including network and security information, encryption details, and performance characteristics.

Name* dmstest

Description* oracle db migration from ec2 [illegible] to rds [illegible]

Instance class* dms.t2.medium

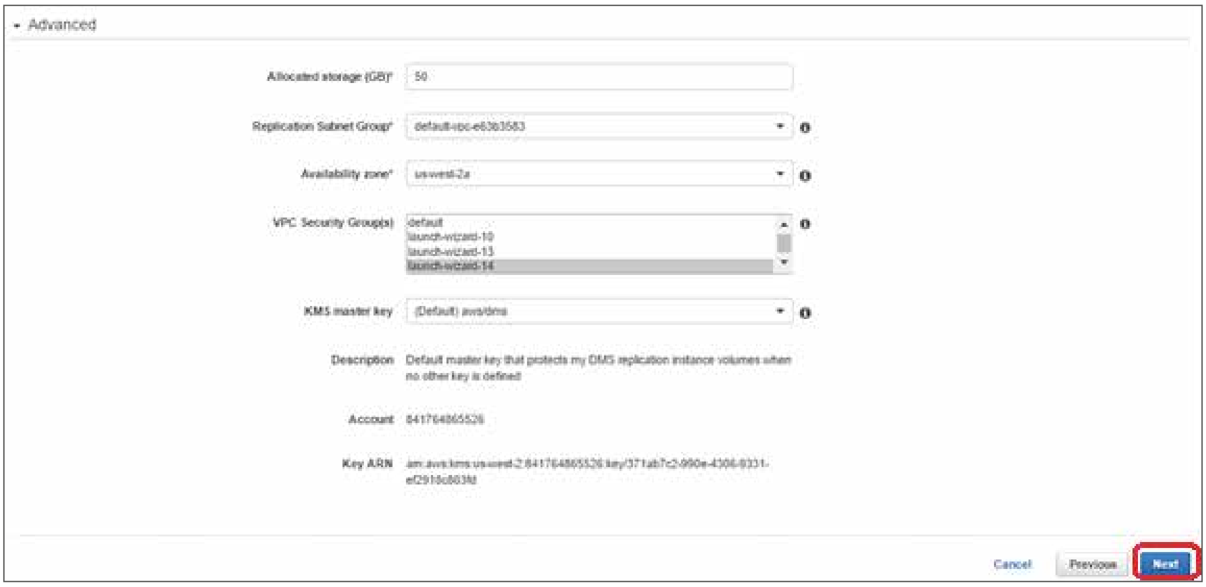
VPC* vpc-e63b3583 - VPC_prabhakaran.p

Multi-AZ* No

Publicly accessible ✓

Step 5:

Under advanced section enter allocated storage for DMS instance, Replication subnet group based on the VPC selected in the previous step, VPC security group(s) to allow inbound/outbound traffic, KMS master key as default if there is no existing key for database volume encryption. Click on "Next" button.



▾ Advanced

Allocated storage (GB)* 50

Replication Subnet Group* default-vpc-e63b3583

Availability zone* us-west-2a

VPC Security Group(s) default
launch-wizard-10
launch-wizard-13
launch-wizard-14

KMS master key (Default) aws/dms

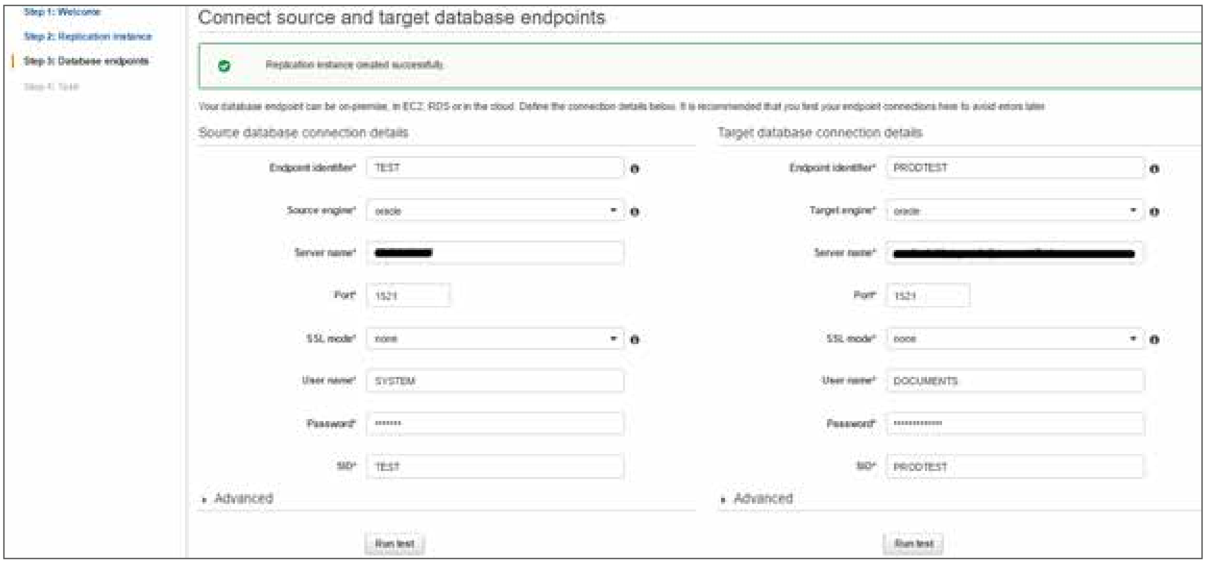
Description Default master key that protects my DMS replication instance volumes when no other key is defined

Account 841764865526

Key ARN arn:aws:kms:us-west-2:841764865526:key/371ab7c2-990e-4306-9331-ef2916c883fd

Step 6:

Under "connect source and target database endpoints" window, enter source and target database details to create endpoints. Provide a meaningful endpoint identifier name, Source and Target engines (Database engines), Server name (Database server IP /end point), Port (Database listening port), SSL mode (To encrypt the connection) which is none for oracle. Username in source identifier should have data dictionary views access privileges and the Username in target identifier should be the schema name which needs to be migrated.



Connect source and target database endpoints

Replication instance created successfully

Your database endpoint can be on-premise, in EC2, RDS or in the cloud. Define the connection details below. It is recommended that you test your endpoint connections here to avoid errors later.

Source database connection details

Endpoint identifier* TEST

Source engine* oracle

Server name* [redacted]

Port* 1521

SSL mode* none

User name* SYSTEM

Password* •••••••

SID* TEST

▸ Advanced

Target database connection details

Endpoint identifier* PRODTEST

Target engine* oracle

Server name* [redacted]

Port* 1521

SSL mode* none

User name* DOCUMENTS

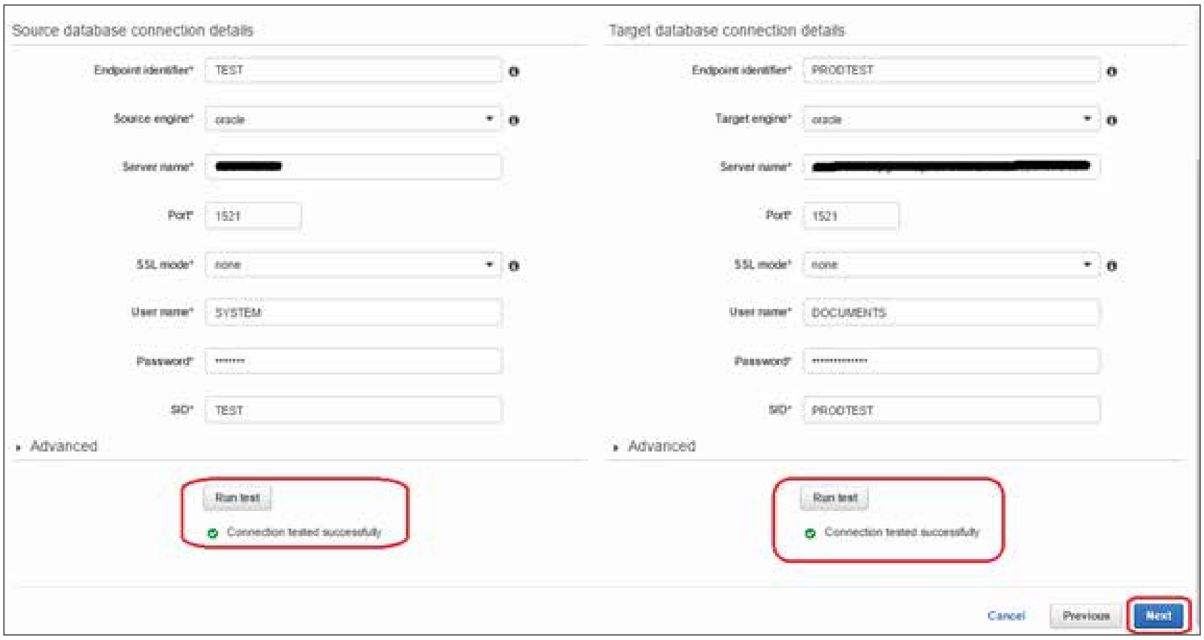
Password* ••••••••••••

SID* PRODTEST

▸ Advanced

In our case the username in the source identifier is "SYSTEM" which by default has all the privileges and the target username is "DOCUMENTS" which needs to be migrated.

Step 7:
Click "Run test" to check the connectivity between replication instance and source, target databases. You should receive a message stating "Connection tested successfully" and click on "Next" button.



Source database connection details

Endpoint identifier* TEST

Source engine* oracle

Server name* [redacted]

Port* 1521

SSL mode* none

User name* SYSTEM

Password* •••••••

SID* TEST

▸ Advanced

Run test

Connection tested successfully

Target database connection details

Endpoint identifier* PRODTEST

Target engine* oracle

Server name* [redacted]

Port* 1521

SSL mode* none

User name* DOCUMENTS

Password* •••••••••••••

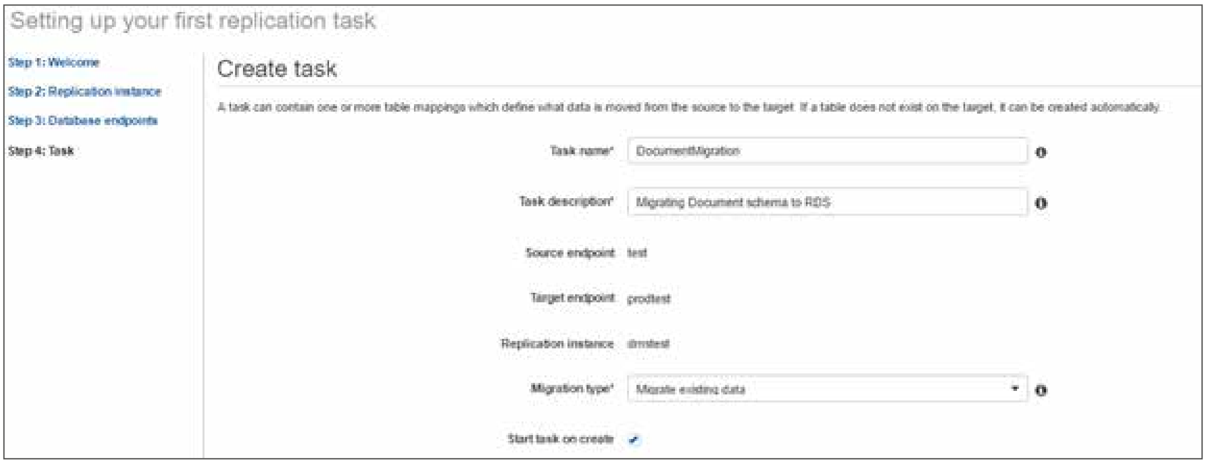
SID* PRODTEST

▸ Advanced

Run test

Connection tested successfully

Step 8:
Under the "Create task" window provide a meaningful task name and task description. Select Migration type as "Migrate existing data" and select the check box "Start task on create" to start the activity automatically post task creation.



Setting up your first replication task

Create task

A task can contain one or more table mappings which define what data is moved from the source to the target. If a table does not exist on the target, it can be created automatically.

Task name* DocumentMigration

Task description* Migrating Document schema to RDS

Source endpoint test

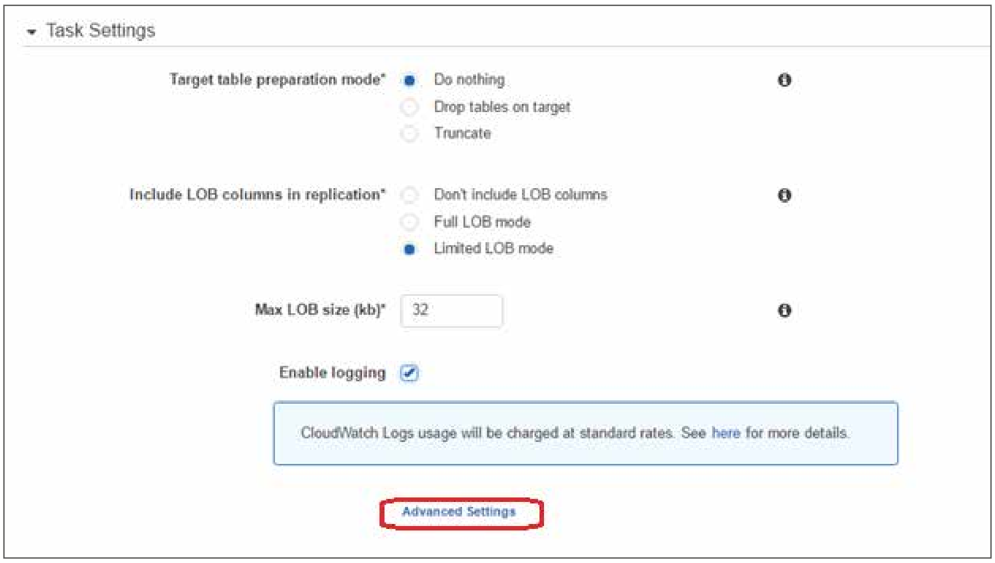
Target endpoint prodtest

Replication instance dmstest

Migration type* Migrate existing data

Start task on create ☑

Step 9:
Under Task settings select the "Target table preparation mode" as "Do nothing" since it is a fresh migration. Select Full LOB mode in "Include LOB columns in replication" if the size of the LOB is unknown and to migrate complete LOBs regardless of size. The option "Limited LOB mode" can be selected if the LOB chunk size is known. The option "Don't include LOB columns" cab be selected to exclude LOB columns. Check "Enable logging" box to capture the errors and warnings in the logs. Select advanced settings to configure "Control Tables" and "Tuning" settings to optimize the data migration.



▾ Task Settings

Target table preparation mode* ● Do nothing ○ Drop tables on target ○ Truncate

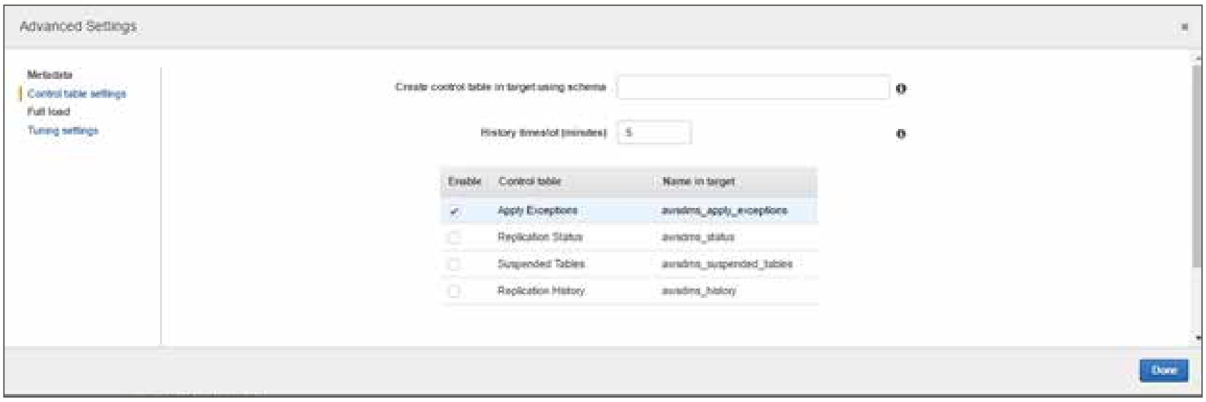
Include LOB columns in replication* ○ Don't include LOB columns ○ Full LOB mode ● Limited LOB mode

Max LOB size (kb)* 32

Enable logging ☑

CloudWatch Logs usage will be charged at standard rates. See here for more details.

Under advanced settings

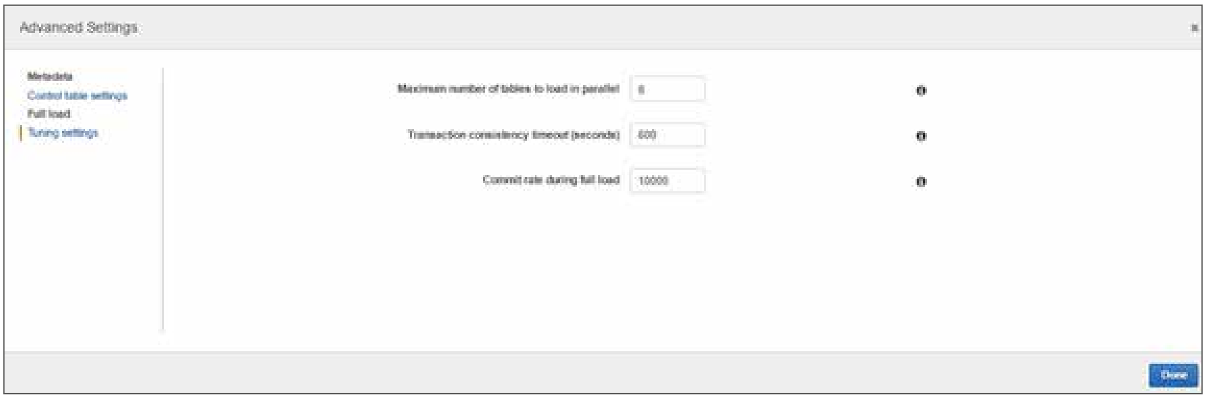


Create control table in target using schema

History timeslot (minutes) 5

Enable	Control table	Name in target
✓	Apply Exceptions	awsdms_apply_exceptions
□	Replication Status	awsdms_status
□	Suspended Tables	awsdms_suspended_tables
□	Replication History	awsdms_history

Under advanced settings



Maximum number of tables to load in parallel 8

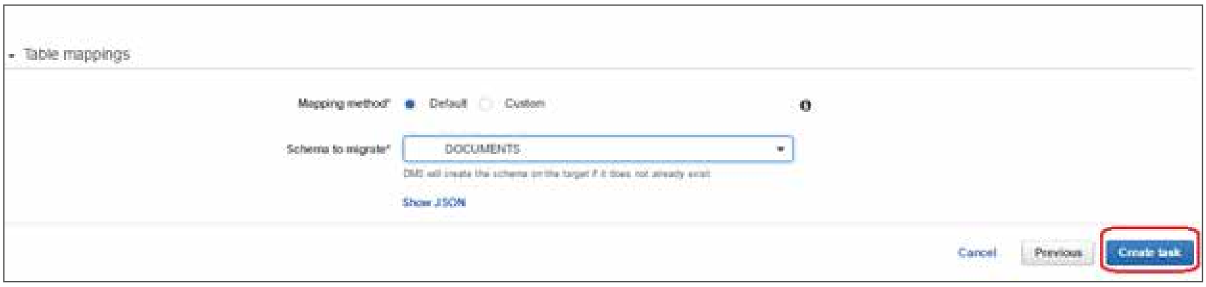
Transaction consistency timeout (seconds) 600

Commit rate during full load 10000

Step 10:

Under Table mappings select the "Mapping method" as default to migrate the table with the same name to target database. To remap with a different table name click on "Custom" and edit the JSON script for relevant mapping. Select the migration schema name from "Schema to migrate" drop down list. Click on "Create task" button.

Table mappings option



Mapping method* ● Default ○ Custom

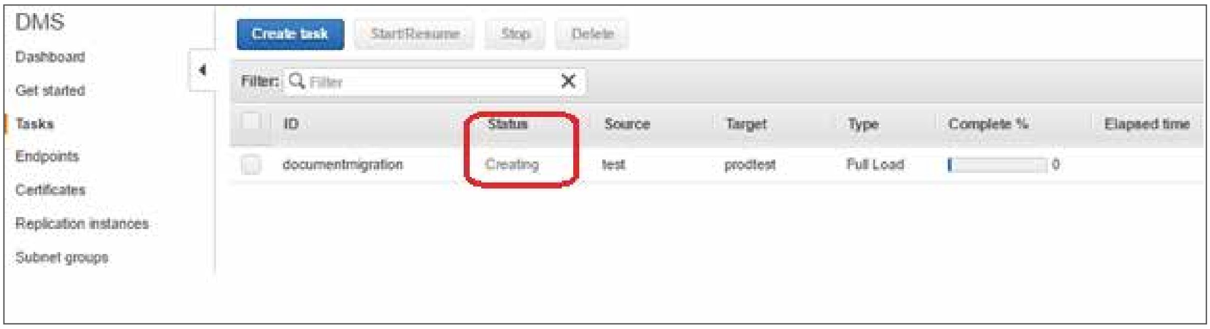
Schema to migrate* DOCUMENTS

DMS will create the schema on the target if it does not already exist

Step 11:

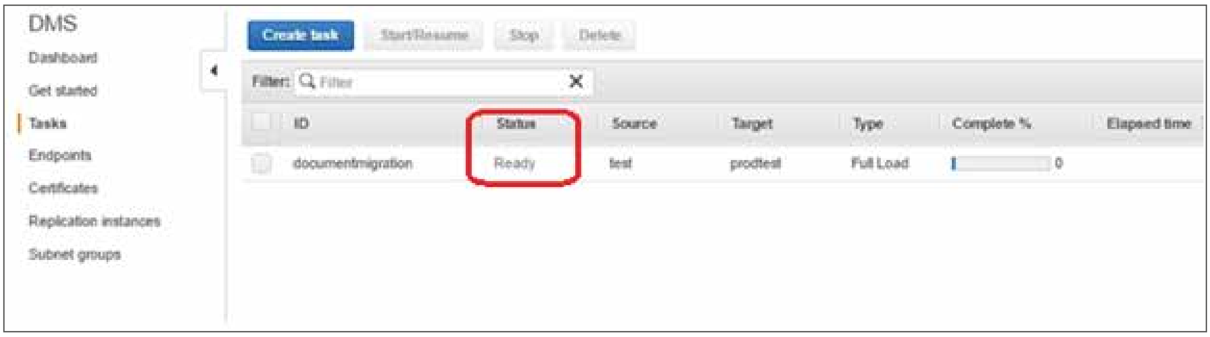
The Task has been created successfully and the status is changed from "Creating" to "Ready".

Task is in creating status



ID	Status	Source	Target	Type	Complete %	Elapsed time
documentmigration	Creating	test	prodtest	Full Load	0	

Task is in ready status

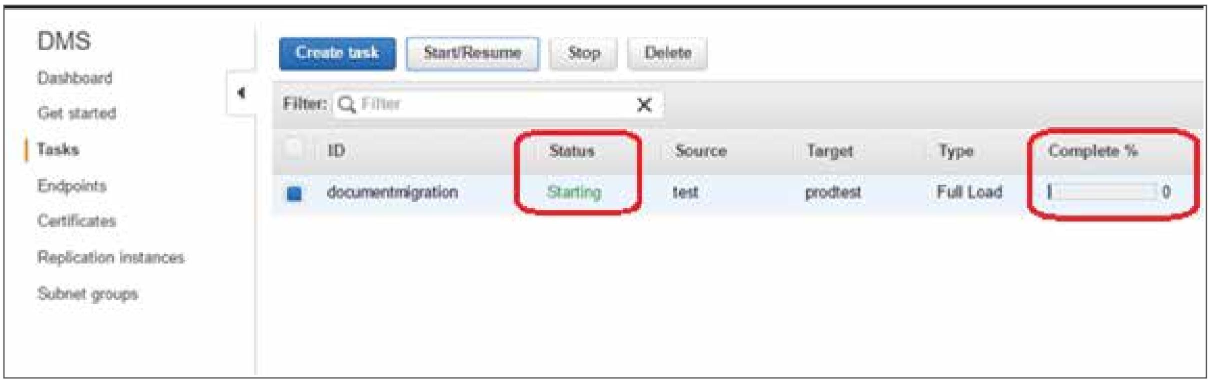


ID	Status	Source	Target	Type	Complete %	Elapsed time
documentmigration	Ready	test	prodtest	Full Load	0	

Step 12:

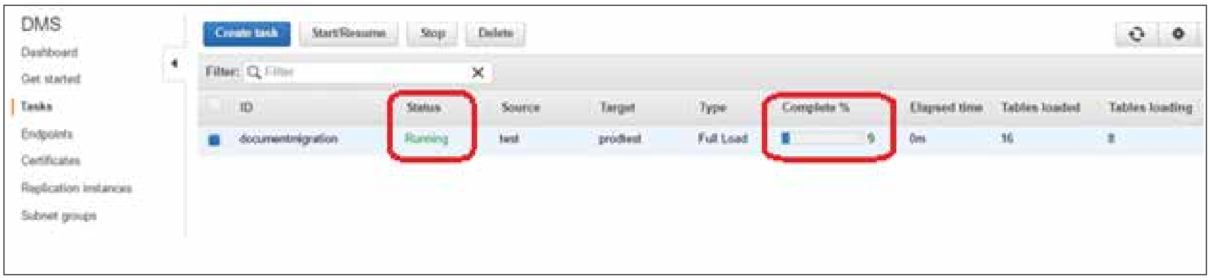
If the task is not started automatically, select the appropriate task and click on "Start/Resume" button to initiate the migration activity. Once the activity is initiated the status will change from "Ready" to "Starting" and then eventually to "Running" state. The progress bar shows the percentage of the task completion.

Task is in starting status



ID	Status	Source	Target	Type	Complete %
documentmigration	Starting	test	prodtest	Full Load	0

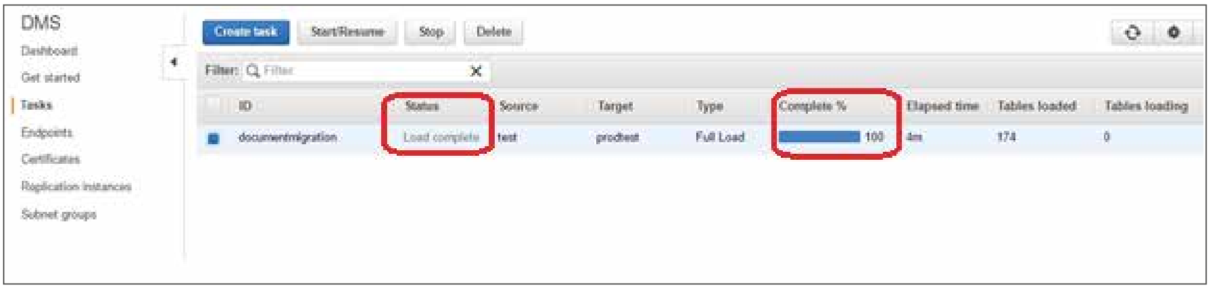
Task is in running status



ID	Status	Source	Target	Type	Complete %	Elapsed time	Tables loaded	Tables loading
documentmigration	Running	test	prodtest	Full Load	9	0m	16	8

Task is in Load complete status

The Progress bar is changed to 100% and the status shows as "Load Complete". This indicates that one schema migration has completed from source to target Database successfully.

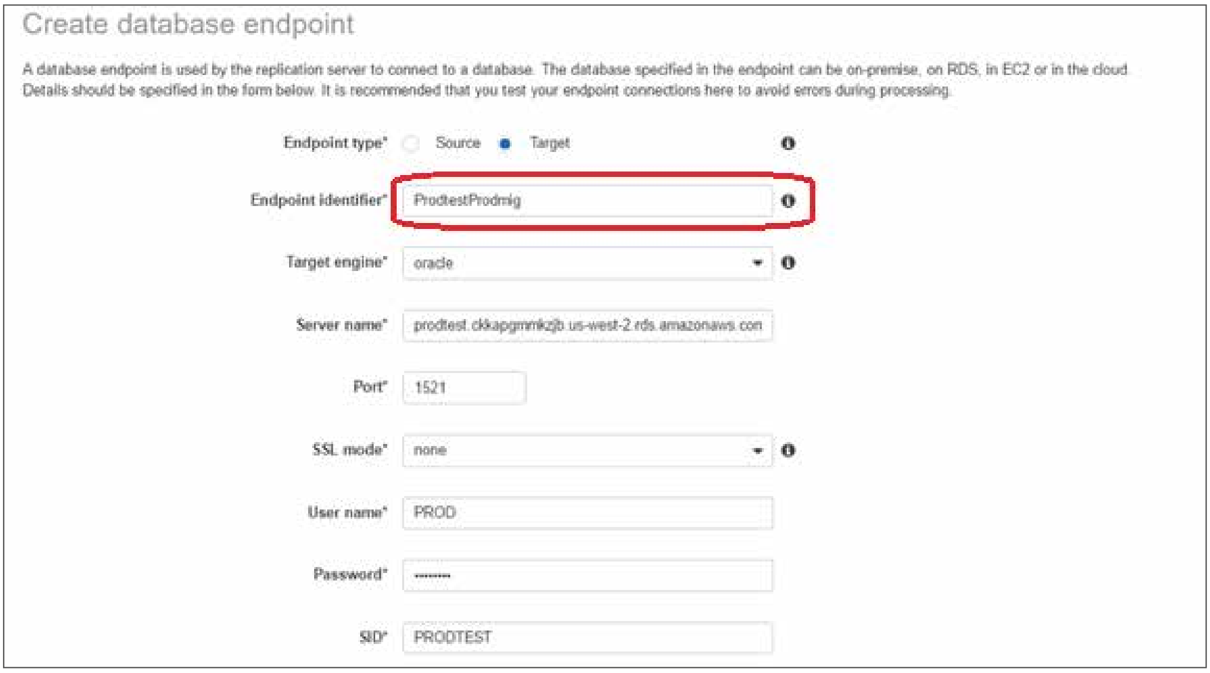


ID	Status	Source	Target	Type	Complete %	Elapsed time	Tables loaded	Tables loading
documentmigration	Load complete	test	prodtest	Full Load	100	4m	174	0

Step 13:

Create a new endpoint, new task and repeat the same steps to migrate all schemas to the target database.

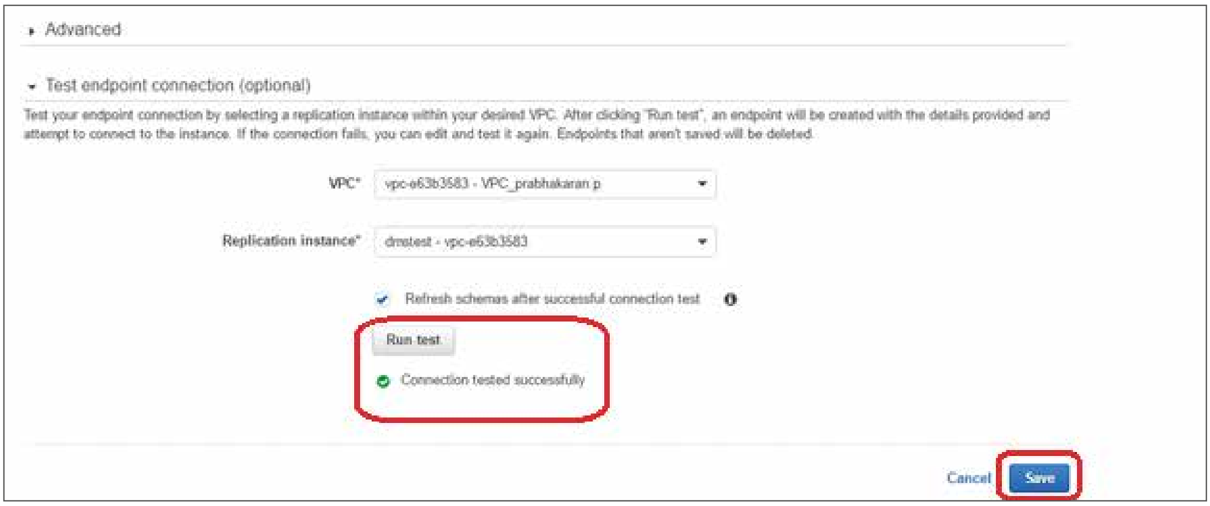
New "ProdtestProdmig" endpoint is created.



Create database endpoint

A database endpoint is used by the replication server to connect to a database. The database specified in the endpoint can be on-premise, on RDS, in EC2 or in the cloud. Details should be specified in the form below. It is recommended that you test your endpoint connections here to avoid errors during processing.

Endpoint type*	○ Source ● Target
Endpoint identifier*	ProdtestProdmig
Target engine*	oracle
Server name*	prodtest.ckkapgmmkzjb.us-west-2.rds.amazonaws.con
Port*	1521
SSL mode*	none
User name*	PROD
Password*	•••••••
SID*	PRODTEST



▸ Advanced

▾ Test endpoint connection (optional)

Test your endpoint connection by selecting a replication instance within your desired VPC. After clicking "Run test", an endpoint will be created with the details provided and attempt to connect to the instance. If the connection fails, you can edit and test it again. Endpoints that aren't saved will be deleted.

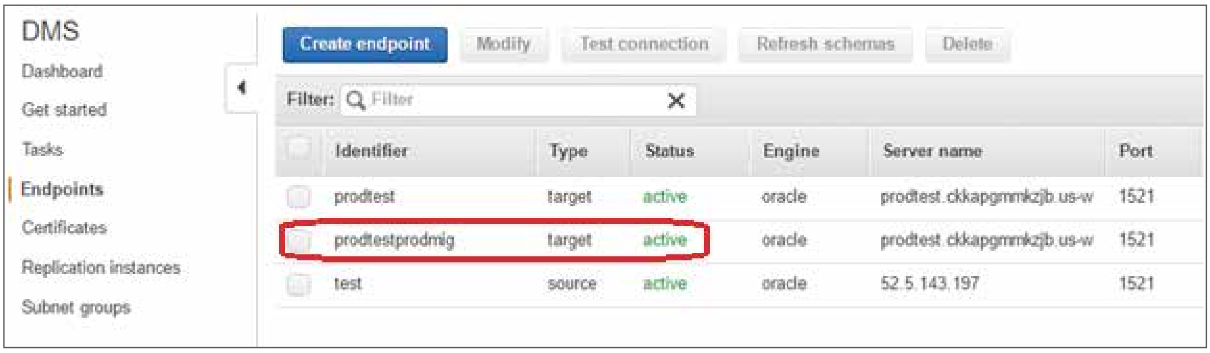
VPC*: vpc-e63b3583 - VPC_prabhakaran.p

Replication instance*: dmstest - vpc-e63b3583

☑ Refresh schemas after successful connection test

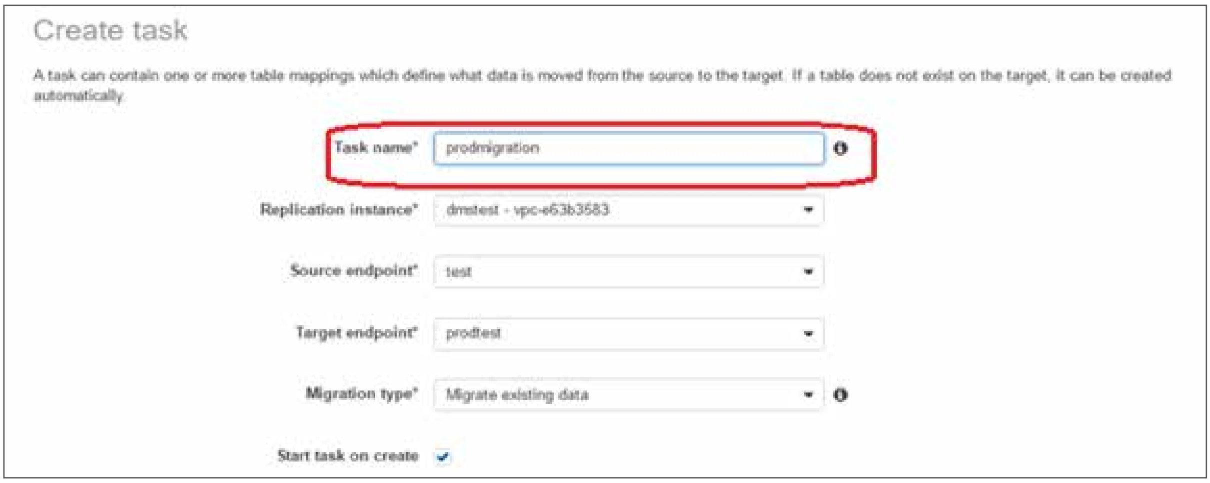
Connection tested successfully

Prodtestprodmig endpoint is in active status



	Identifier	Type	Status	Engine	Server name	Port
□	prodtest	target	active	oracle	prodtest.ckkapgmmkzjb.us-w	1521
□	prodtestprodmig	target	active	oracle	prodtest.ckkapgmmkzjb.us-w	1521
□	test	source	active	oracle	52.5.143.197	1521

New Task "prodmigration" is created.



Create task

A task can contain one or more table mappings which define what data is moved from the source to the target. If a table does not exist on the target, it can be created automatically.

Task name*: prodmigration

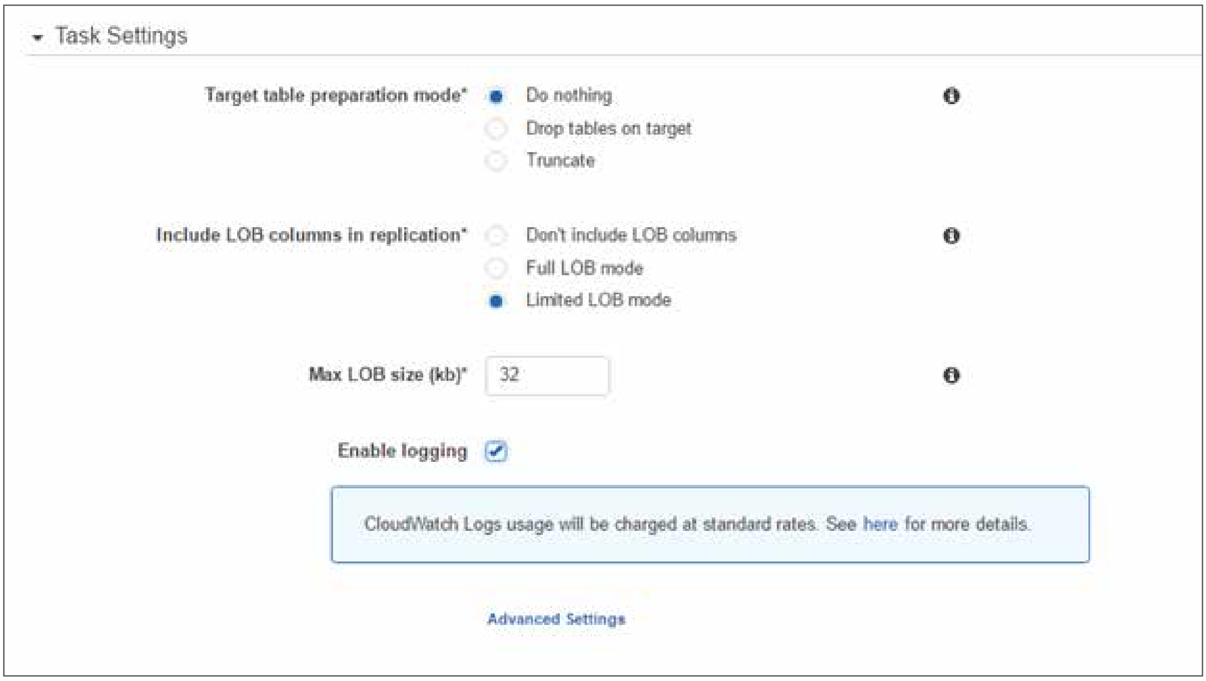
Replication instance*: dmstest - vpc-e63b3583

Source endpoint*: test

Target endpoint*: prodtest

Migration type*: Migrate existing data

Start task on create ☑



▾ Task Settings

Target table preparation mode*: ● Do nothing ○ Drop tables on target ○ Truncate

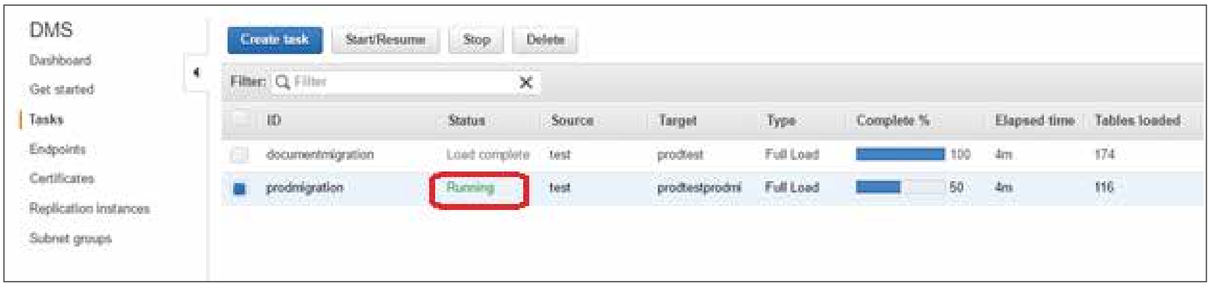
Include LOB columns in replication*: ○ Don't include LOB columns ○ Full LOB mode ● Limited LOB mode

Max LOB size (kb)*: 32

Enable logging ☑

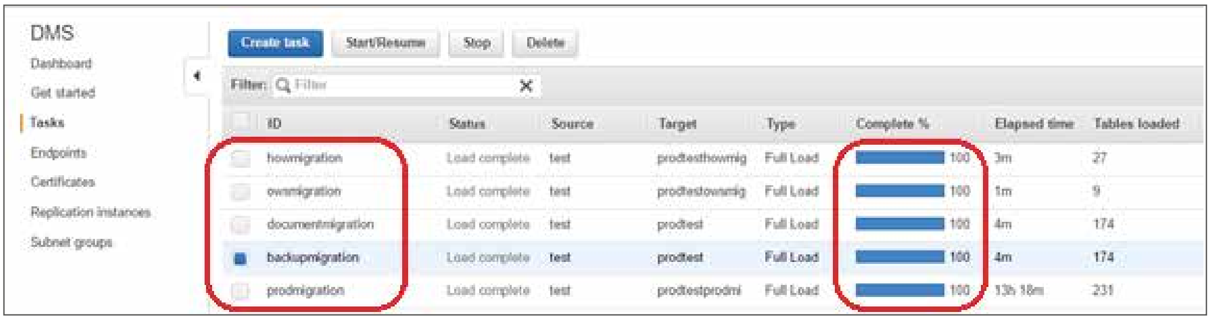
CloudWatch Logs usage will be charged at standard rates. See here for more details.

Prodmigration task is in "Running" state



	ID	Status	Source	Target	Type	Complete %	Elapsed time	Tables loaded
□	documentmigration	Load complete	test	prodtest	Full Load	100	4m	174
■	prodmigration	Running	test	prodtestprodmi	Full Load	50	4m	116

The same way backupmigration, owsmigration, howmigration tasks are created and successfully migrated all the schemas from source to target database.

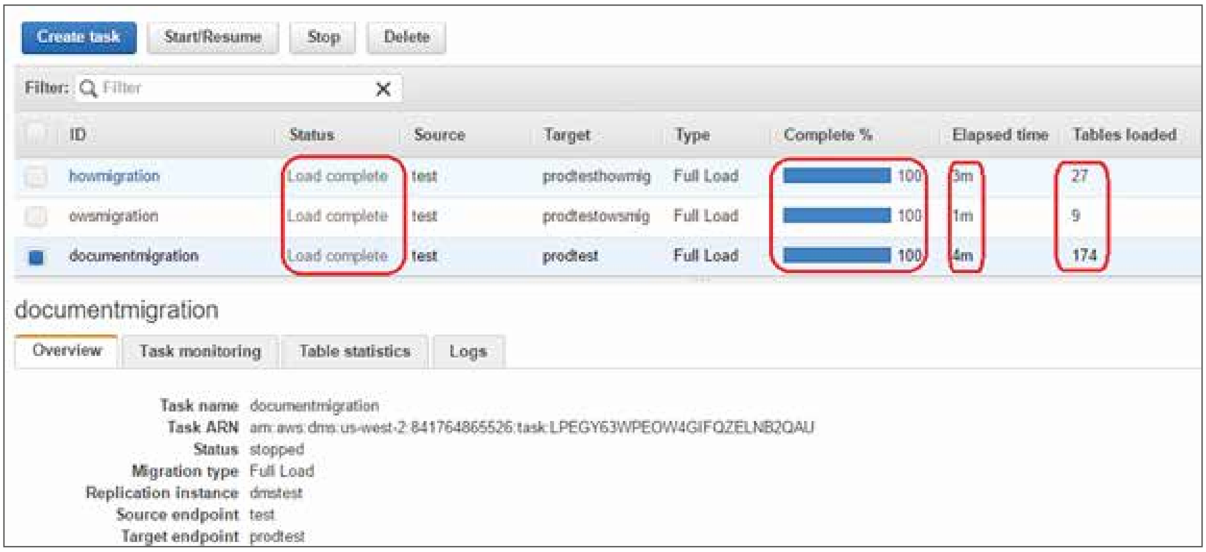


	ID	Status	Source	Target	Type	Complete %	Elapsed time	Tables loaded
□	howmigration	Load complete	test	prodtesthowmig	Full Load	100	3m	27
□	owsmigration	Load complete	test	prodtestowsmig	Full Load	100	1m	9
□	documentmigration	Load complete	test	prodtest	Full Load	100	4m	174
■	backupmigration	Load complete	test	prodtest	Full Load	100	4m	174
□	prodmigration	Load complete	test	prodtestprodmi	Full Load	100	13h 18m	231

Monitoring DMS service Task

The progress of the task and resources used can be monitored through DMS console.

a. Task status, complete %, Elapsed time and table loaded can be monitored.

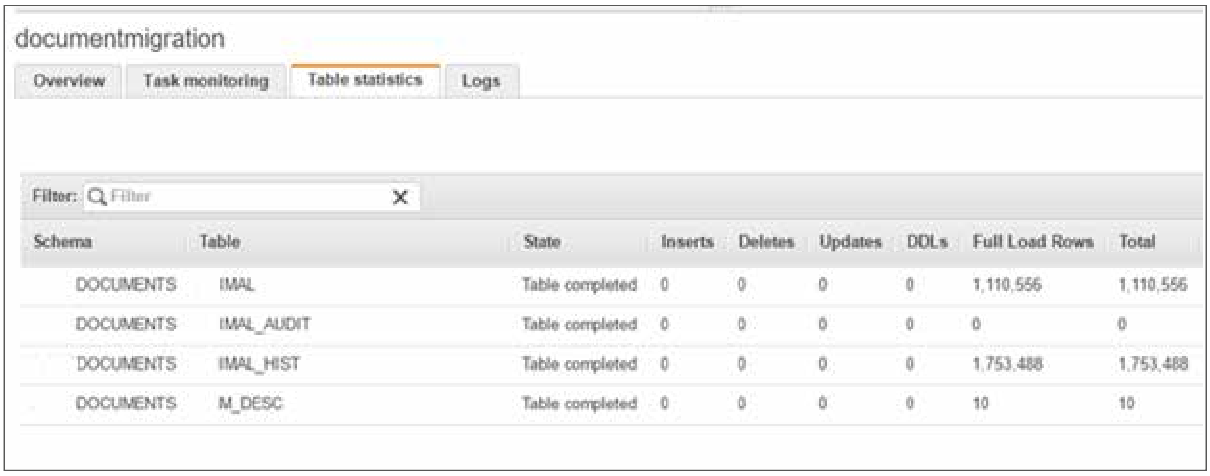


	ID	Status	Source	Target	Type	Complete %	Elapsed time	Tables loaded
□	howmigration	Load complete	test	prodtesthowmig	Full Load	100	3m	27
□	owsmigration	Load complete	test	prodtestowsmig	Full Load	100	1m	9
■	documentmigration	Load complete	test	prodtest	Full Load	100	4m	174

documentmigration

Task name documentmigration
Task ARN arn:aws:dms:us-west-2:841764865526:task:LPEGY63WPEOW4GIFQZELNB2QAU
Status stopped
Migration type Full Load
Replication instance dmstest
Source endpoint test
Target endpoint prodtest

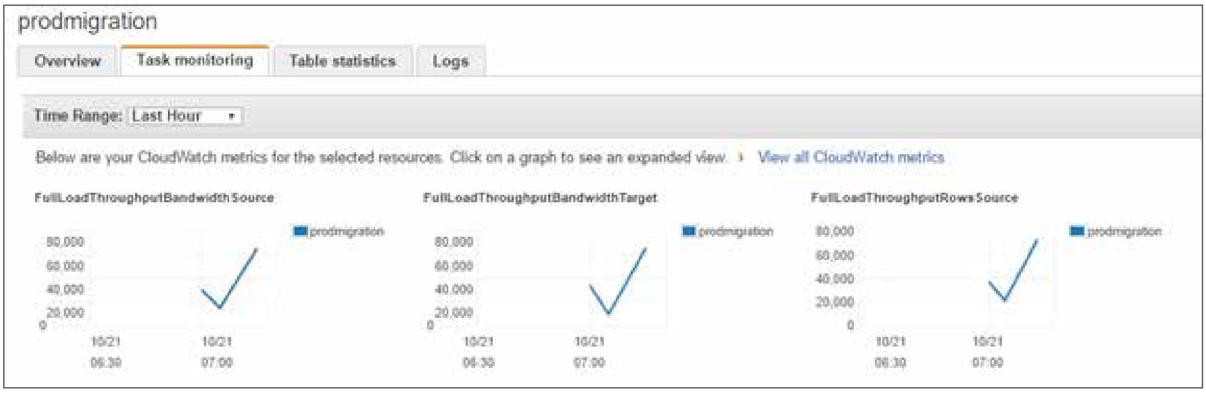
b. Table Statistics tab shows the table migration details as shown below.



documentmigration

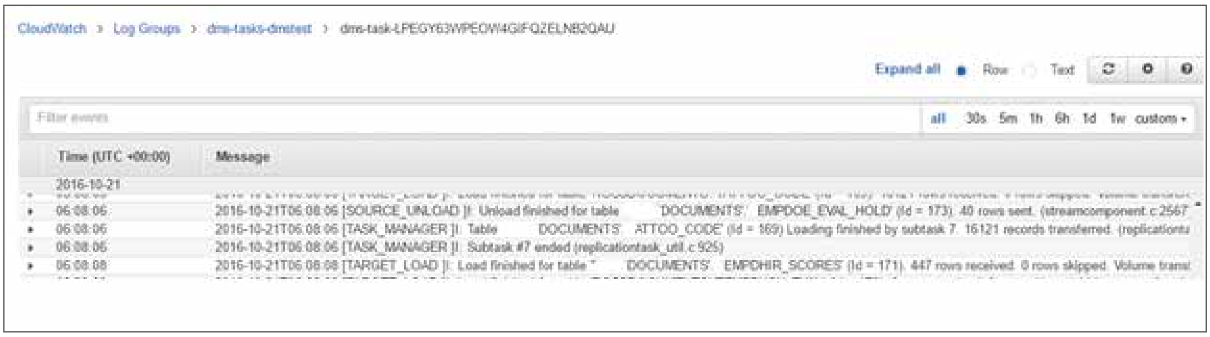
Schema	Table	State	Inserts	Deletes	Updates	DDLs	Full Load Rows	Total
DOCUMENTS	IMAL	Table completed	0	0	0	0	1,110,556	1,110,556
DOCUMENTS	IMAL_AUDIT	Table completed	0	0	0	0	0	0
DOCUMENTS	IMAL_HIST	Table completed	0	0	0	0	1,753,488	1,753,488
DOCUMENTS	M_DESC	Table completed	0	0	0	0	10	10

c. Task monitoring tab shows the detailed cloud watch metrics.



Below are your CloudWatch metrics for the selected resources. Click on a graph to see an expanded view.

d. Migration logs shows the details of the migration, error and warnings with time stamp under the logs tab.


CloudWatch › Log Groups › dms-tasks-dmstest › dms-task-LPEGY63WPEOW4GIFQZELNB2QAU
Expand all
● Row ○ Text
Filter events
all 30s 5m 1h 6h 1d 1w custom ▾

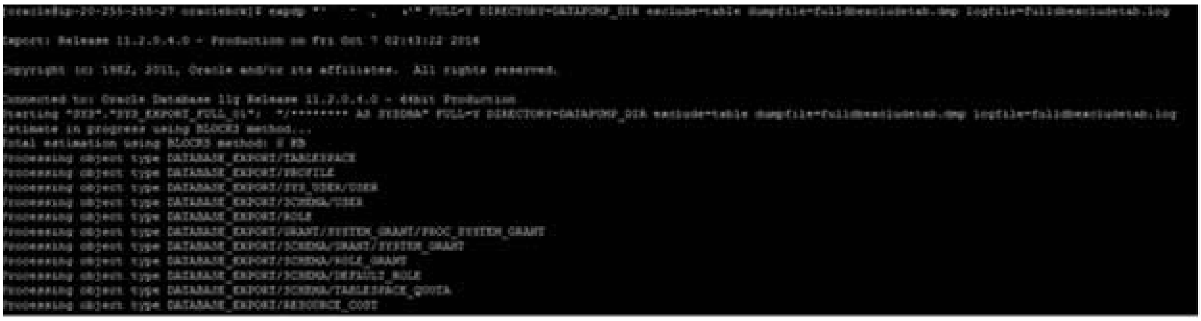
```
Time (UTC +00:00)   Message
2016-10-21
06:08:06   2016-10-21T06:08:06 [SOURCE_UNLOAD ]I: Unload finished for table        'DOCUMENTS'.'EMPDOE_EVAL_HOLD' (Id = 173). 40 rows sent. (streamcomponent.c:2567
06:08:06   2016-10-21T06:08:06 [TASK_MANAGER ]I: Table        'DOCUMENTS'.'ATTOO_CODE' (Id = 169) Loading finished by subtask 7. 16121 records transferred. (replicationta
06:08:06   2016-10-21T06:08:06 [TASK_MANAGER ]I: Subtask #7 ended (replicationtask_util.c:925)
06:08:08   2016-10-21T06:08:08 [TARGET_LOAD ]I: Load finished for table '      'DOCUMENTS'.'EMPDHIR_SCORES' (Id = 171). 447 rows received. 0 rows skipped. Volume transf
```

Procedures, Functions, Packages and other object migration:

All schemas tables are migrated successfully through the DMS service. The below method is followed to migrate the other object types like procedures, functions, packages, package body's, views and indexes.

Step 1:

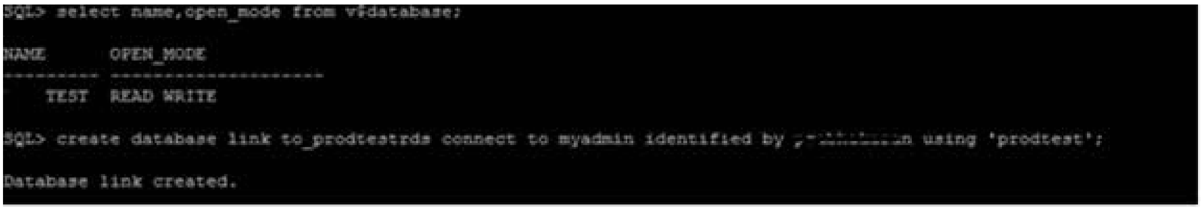
Exporting objects from source database except tables which is already been migrated.



```
[oracle@ip-20-255-255-27 oracledb]$ expdp "'   -  ,    '" FULL=Y DIRECTORY=DATAPUMP_DIR exclude=table dumpfile=fulldbexcludetab.dmp logfile=fulldbexcludetab.log

Export: Release 11.2.0.4.0 - Production on Fri Oct 7 02:43:22 2016

Copyright (c) 1982, 2011, Oracle and/or its affiliates.  All rights reserved.

Connected to: Oracle Database 11g Release 11.2.0.4.0 - 64bit Production
Starting "SYS"."SYS_EXPORT_FULL_01":  "/******** AS SYSDBA" FULL=Y DIRECTORY=DATAPUMP_DIR exclude=table dumpfile=fulldbexcludetab.dmp logfile=fulldbexcludetab.log
Estimate in progress using BLOCKS method...
Total estimation using BLOCKS method: 0 KB
Processing object type DATABASE_EXPORT/TABLESPACE
Processing object type DATABASE_EXPORT/PROFILE
Processing object type DATABASE_EXPORT/SYS_USER/USER
Processing object type DATABASE_EXPORT/SCHEMA/USER
Processing object type DATABASE_EXPORT/ROLE
Processing object type DATABASE_EXPORT/GRANT/SYSTEM_GRANT/PROC_SYSTEM_GRANT
Processing object type DATABASE_EXPORT/SCHEMA/GRANT/SYSTEM_GRANT
Processing object type DATABASE_EXPORT/SCHEMA/ROLE_GRANT
Processing object type DATABASE_EXPORT/SCHEMA/DEFAULT_ROLE
Processing object type DATABASE_EXPORT/SCHEMA/TABLESPACE_QUOTA
Processing object type DATABASE_EXPORT/RESOURCE_COST
```

Step 2:

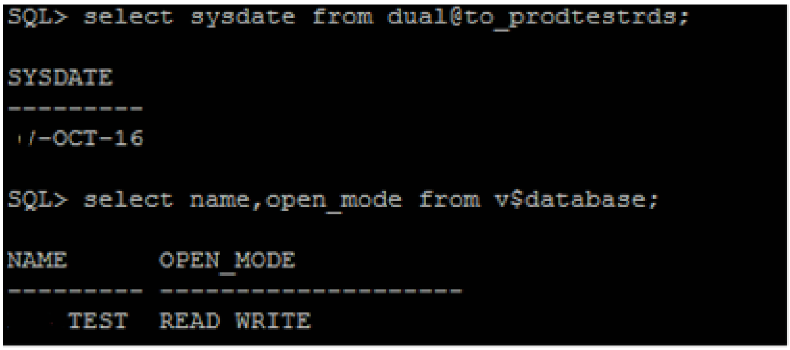
Creating database link from source to target database.



```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
   TEST   READ WRITE

SQL> create database link to_prodtestrds connect to myadmin identified by [redacted] using 'prodtest';

Database link created.
```

Step 3:

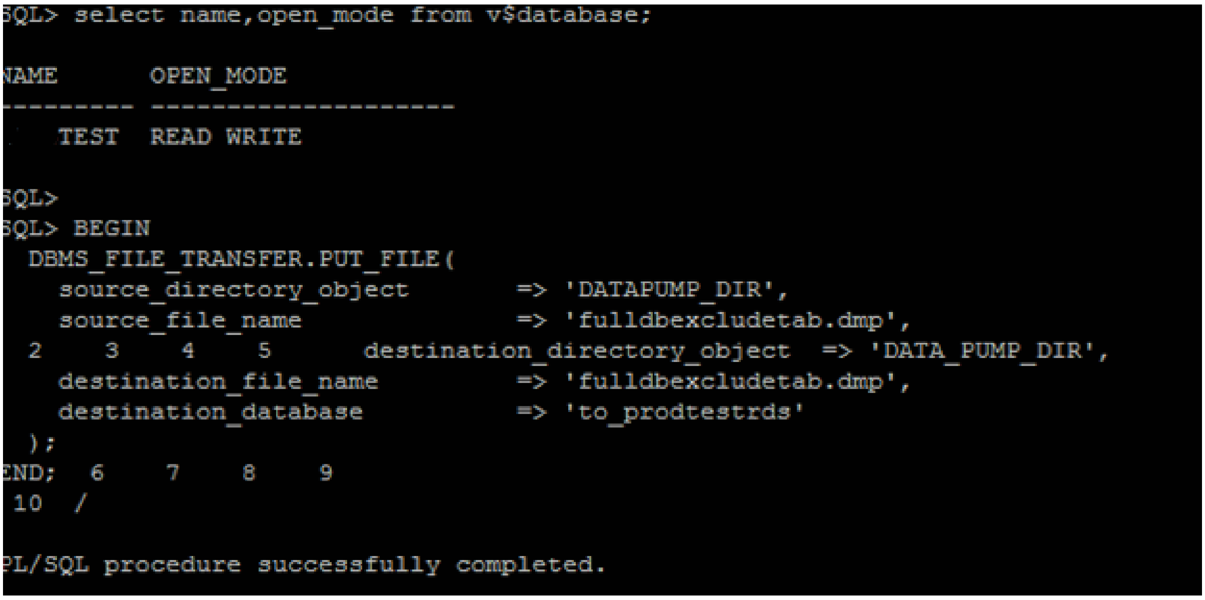
Testing the connection from source to target Database.



```
SQL> select sysdate from dual@to_prodtestrds;

SYSDATE
---------
[illegible]/-OCT-16

SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
   TEST   READ WRITE
```

Step 4:

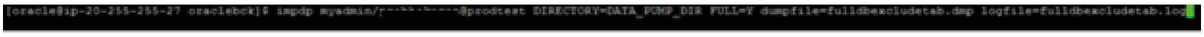
Dump file is transferred from source to target database through DBMS_FILE_TRANSFER.



```
SQL> select name,open_mode from v$database;

NAME      OPEN_MODE
--------- --------------------
   TEST   READ WRITE

SQL>
SQL> BEGIN
  DBMS_FILE_TRANSFER.PUT_FILE(
    source_directory_object       => 'DATAPUMP_DIR',
    source_file_name              => 'fulldbexcludetab.dmp',
  2     3     4     5       destination_directory_object  => 'DATA_PUMP_DIR',
    destination_file_name         => 'fulldbexcludetab.dmp',
    destination_database          => 'to_prodtestrds'
  );
END;   6     7     8     9
 10   /

PL/SQL procedure successfully completed.
```

Step 5:

Importing the Dump file from the source to the target database.



```
[oracle@ip-20-255-255-27 oraclebck]$ impdp myadmin/[redacted]@prodtest DIRECTORY=DATA_PUMP_DIR FULL=Y dumpfile=fulldbexcludetab.dmp logfile=fulldbexcludetab.log
```

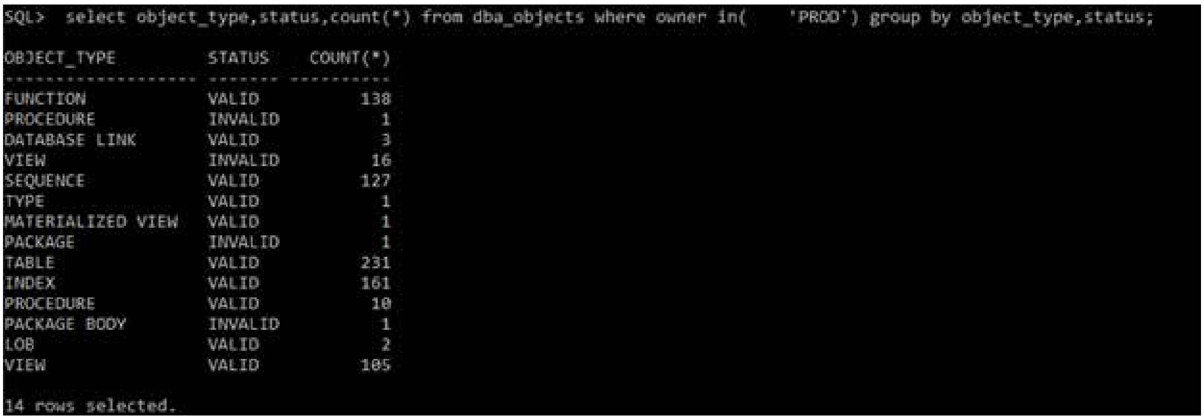
Post migration activity and checks

Performed invalid object compilation and object comparison between source and target databases.

Below command is used to compile the invalid objects in the target RDS database.

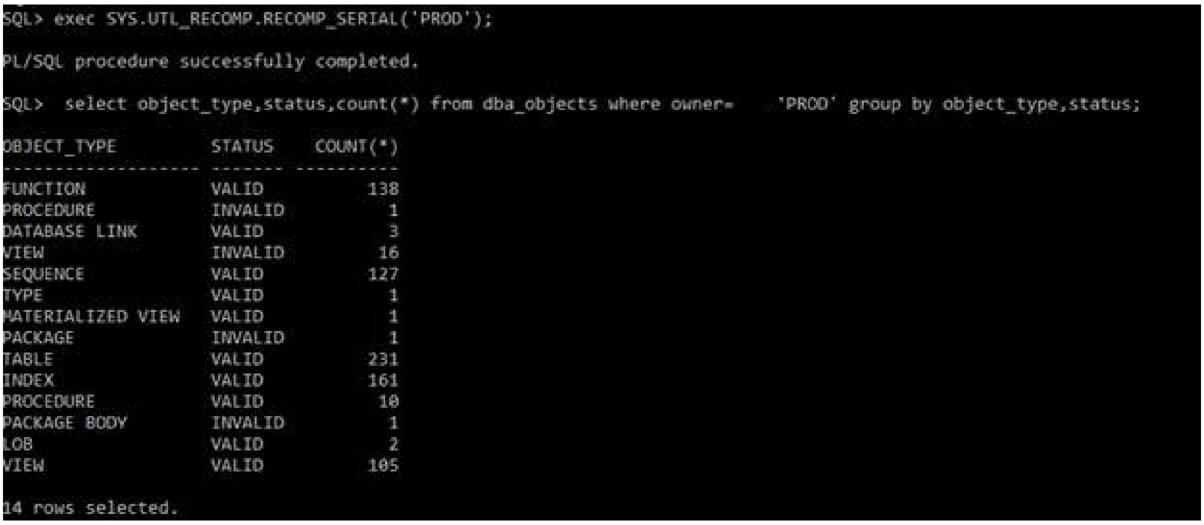
exec SYS.UTL_RECOMP.RECOMP_SERIAL('PROD');

Source database object count:



```
SQL>  select object_type,status,count(*) from dba_objects where owner in(    'PROD') group by object_type,status;

OBJECT_TYPE          STATUS    COUNT(*)
------------------- ------- ----------
FUNCTION             VALID          138
PROCEDURE            INVALID          1
DATABASE LINK        VALID            3
VIEW                 INVALID         16
SEQUENCE             VALID          127
TYPE                 VALID            1
MATERIALIZED VIEW    VALID            1
PACKAGE              INVALID          1
TABLE                VALID          231
INDEX                VALID          161
PROCEDURE            VALID           10
PACKAGE BODY         INVALID          1
LOB                  VALID            2
VIEW                 VALID          105

14 rows selected.
```

Target database object count:



```
SQL> exec SYS.UTL_RECOMP.RECOMP_SERIAL('PROD');

PL/SQL procedure successfully completed.

SQL>  select object_type,status,count(*) from dba_objects where owner=    'PROD' group by object_type,status;

OBJECT_TYPE          STATUS    COUNT(*)
------------------- ------- ----------
FUNCTION             VALID          138
PROCEDURE            INVALID          1
DATABASE LINK        VALID            3
VIEW                 INVALID         16
SEQUENCE             VALID          127
TYPE                 VALID            1
MATERIALIZED VIEW    VALID            1
PACKAGE              INVALID          1
TABLE                VALID          231
INDEX                VALID          161
PROCEDURE            VALID           10
PACKAGE BODY         INVALID          1
LOB                  VALID            2
VIEW                 VALID          105

14 rows selected.
```

The same way the objects can be compared for all the schemas.If there are any missing objects it can be created manually.

Note:

Below are the required source database user privileges to migrate the schemas through DMS. We have used SYSTEM user to migrate all schema's hence granting the below privileges are not required.

SELECT ANY TRANSACTION
SELECT on V$NLS_PARAMETERS
SELECT on V$TIMEZONE_NAMES
SELECT on ALL_INDEXES
SELECT on ALL_OBJECTS
SELECT on DBA_OBJECTS
SELECT on ALL_TABLES
SELECT on ALL_USERS
SELECT on ALL_CATALOG
SELECT on ALL_CONSTRAINTS
SELECT on ALL_CONS_COLUMNS
SELECT on ALL_TAB_COLS
SELECT on ALL_IND_COLUMNS
DROP ANY TABLE
SELECT ANY TABLE
INSERT ANY TABLE
UPDATE ANY TABLE
CREATE ANY VIEW
DROP ANY VIEW
CREATE ANY PROCEDURE
ALTER ANY PROCEDURE
DROP ANY PROCEDURE
CREATE ANY SEQUENCE
ALTER ANY SEQUENCE
DROP ANY SEQUENCE
SELECT on DBA_USERS
SELECT on DBA_TAB_PRIVS
SELECT on DBA_OBJECTS
SELECT on DBA_SYNONYMS
SELECT on DBA_SEQUENCES
SELECT on DBA_TYPES
SELECT on DBA_INDEXES
SELECT on DBA_TABLES
SELECT on DBA_TRIGGERS

Conclusion:

Database migration has been successfully completed from EC2 oracle database to RDS oracle database using DMS service.

About Author:

Prabhakaran Ponnusamy a Cloud Architect at SecureKloud, an Oracle expertise along with multiple database technologies hands-on. Passionate in learning, experimenting and exploring new technologies and making business much more than usual.

San Ramon, CA (HQ)

12647 Alcosta Boulevard,
Suite 450,San Ramon, CA 94583, USA
www.securekloud.com
info@securekloud.com
Direct : 925-270-4800
Toll-Free : 855-856-4537

Chicago, IL

1827 Walden Office Square
Suite #460
Schaumburg, IL 60173
Phone : 708-289-5111

Dallas, TX

17740 Preston Road
Suite #200
Dallas, TX -75252
Phone : 214-272-2404

Chennai, India

Srinivasa Towers
New No.5, Old No. 11,
Cenotaph Road,
Alwarpet,Chennai – 600 018
Phone : +91-44-6602-8000
Fax : +91-44-4300-9049

Ontario, Canada

4 Robert Speck Parkway,
Suite 1500,
Mississauga, Ontario L4Z 1S1
Phone : 416-366-7762

Sharjah, UAE

Q1-05-109/C
SAIF Zone
PO Box 121213
Sharjah-UAE