AWS re:Invent

GPSTEC304

Database migration using AWS DMS and AWS SCT

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AWS re:Invent

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aws

Related breakouts

DAT214 Automation framework to migrate relational databases

DAT342 Lessons learnt from migrating Oracle databases to Amazon Aurora

DAT343 Lessons learnt from migrating SQL Server databases to Amazon Aurora

DAT345 Assessing and categorizing your database migrations

DAT360 Analytical use cases with AWS DMS

DAT362-R1 Dive deep into AWS SCT and AWS DMS (Jobvite use case)

DAT363 Migrating your data warehouses to Amazon Redshift

DAT366 Running Oracle on Amazon RDS and migrating to Aurora PostgreSQL

DAT367 Running SQL Server on Amazon RDS and migrating to Aurora PostgreSQL

DAT377 Getting started with AWS DMS and AWS SCT

About Mitchell

Manager, Solutions Architects
AWS

Located in?



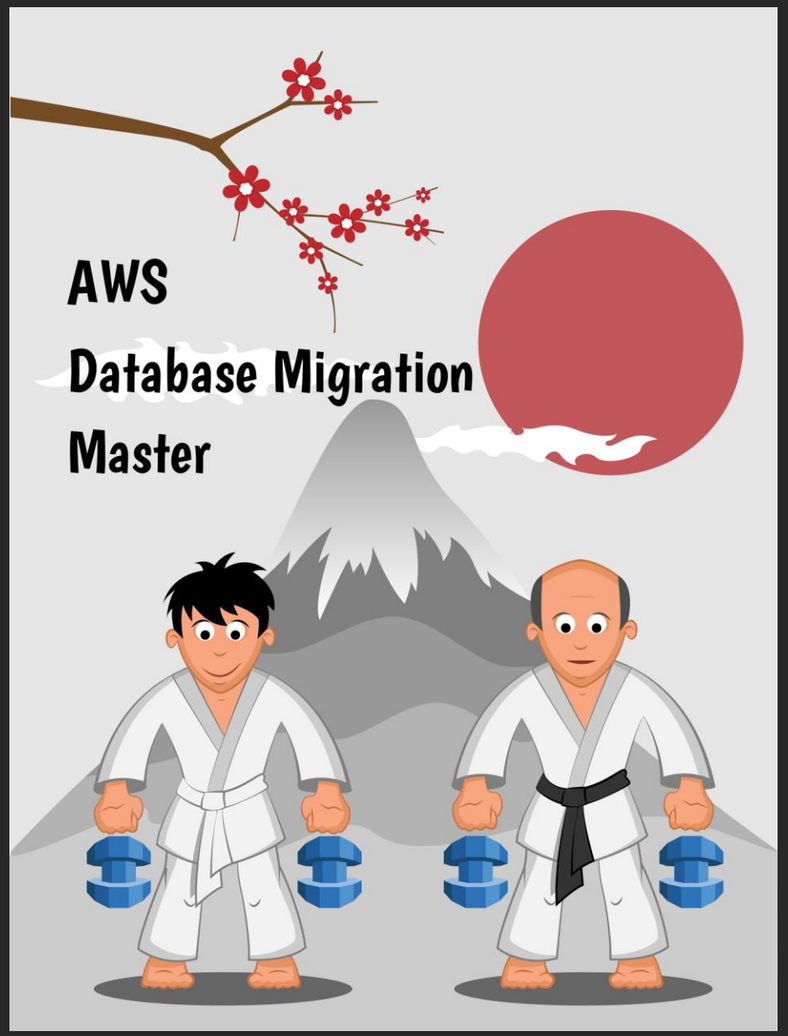
About Ed

Sr. Database Engineer
AWS

Located in?



Earn your sticker



Goal is to learn and have a 5-star session!



- Chalk Talk format/rules, level set: 300 level, new to AWS Database Migration Service (AWS DMS)/AWS Schema Conversion Tool
- We will stay after the presentation for more questions and be available by email
- Your feedback is important to us
- Stickers!
- What’s out of scope for this talk? NoSQL, licensing

Why do we need AWS DMS/ AWS SCT?

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Before migration: My life as a DBA



Before migration: My life as a DBA

Hint: Red is not good!

1	2	3	2	1	2	3	2	1	5
1	1	1	1	1	2	1	1	1	1
1	1	3	1	1	2	3	1	1	5
1	1	3	1	1	2	3	1	1	1
1	1	3	1	4	2	3	2	1	1
2	1	3	2	4	1	3	2	1	1
22	2	1	2	4	1	1	2	1	11
1	1	1	11	1	2	1	11	1	4
1	2	1	1	1	2	1	11	1	4
3	2	1	11	1	2	1	11	1	11
1	2	1	1	1	1	1	1	1	4
1	2	1	11	1	2	1	11	1	1
1	2	1	2	1	2	1	2	5	1
1	1	1	2	4	2	1	2	11	1
1	1	1	2	4	1	1	1	1	1
1	2	1	2	8	2	1	2	1	1
1	1	1	8	1	1	1	8	1	1
1	2	1	1	1	1	1	8	1	1
1	2	2	8	1	2	2	1	2	11

Introduction to AWS DMS and AWS SCT

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What are AWS DMS and AWS SCT?

Our goal: Allow customers the freedom to choose the best data platform for their needs #DBFreedom



AWS Schema Conversion Tool converts your commercial database and data warehouse schemas to open-source engines or AWS-native services, such as Amazon Aurora and Amazon Redshift

AWS Database Migration Service (AWS DMS) easily and securely migrates and/or replicates your databases *and* data warehouses to AWS





AWS DMS

AWS DMS is a HIPAA-certified service

Sources (see documentation link for details)

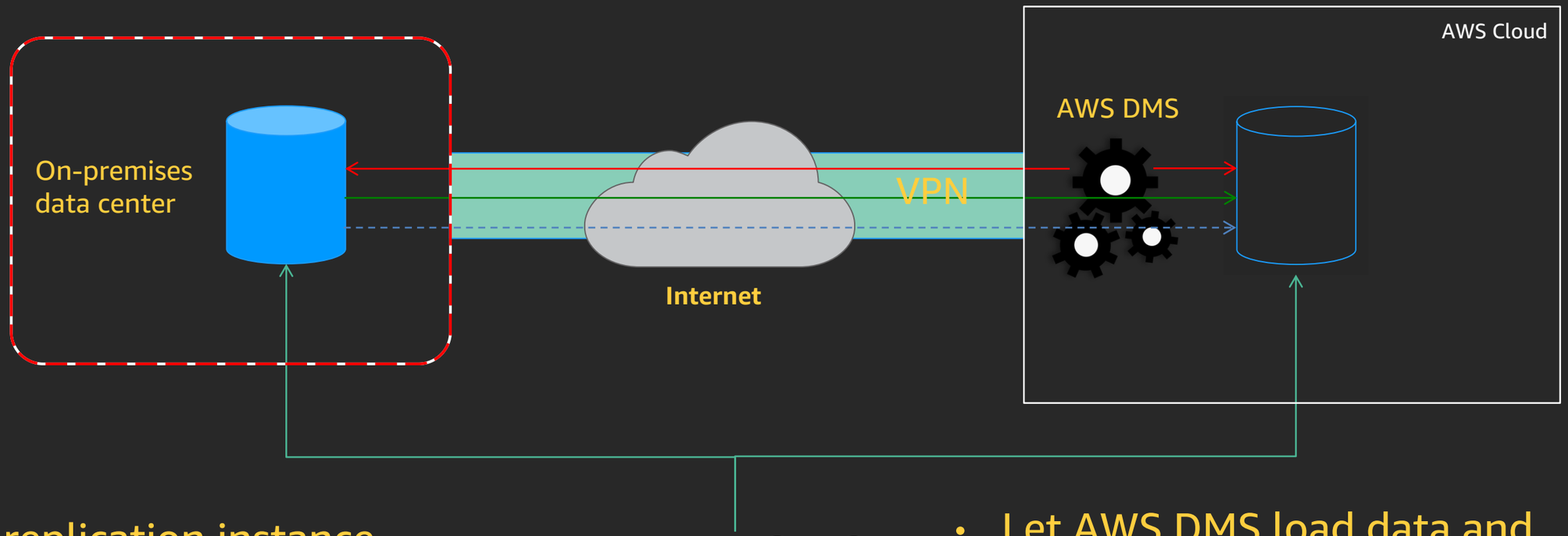
https://docs.aws.amazon.com/dms/latest/userguide/CHAP_Introduction.Sources.html

	Oracle	SQL Server	MySQL
PostgreSQL	MongoDB	ASE	DB2 (LUW)
Azure SQL DB	Amazon Aurora	Amazon S3	MariaDB

Targets (see documentation link for details)

	Oracle	SQL Server	MySQL
PostgreSQL	Amazon DynamoDB	Amazon Redshift	ASE
Amazon ES	Amazon Aurora	Amazon S3	MariaDB
Amazon Kinesis	Amazon DocumentDB		

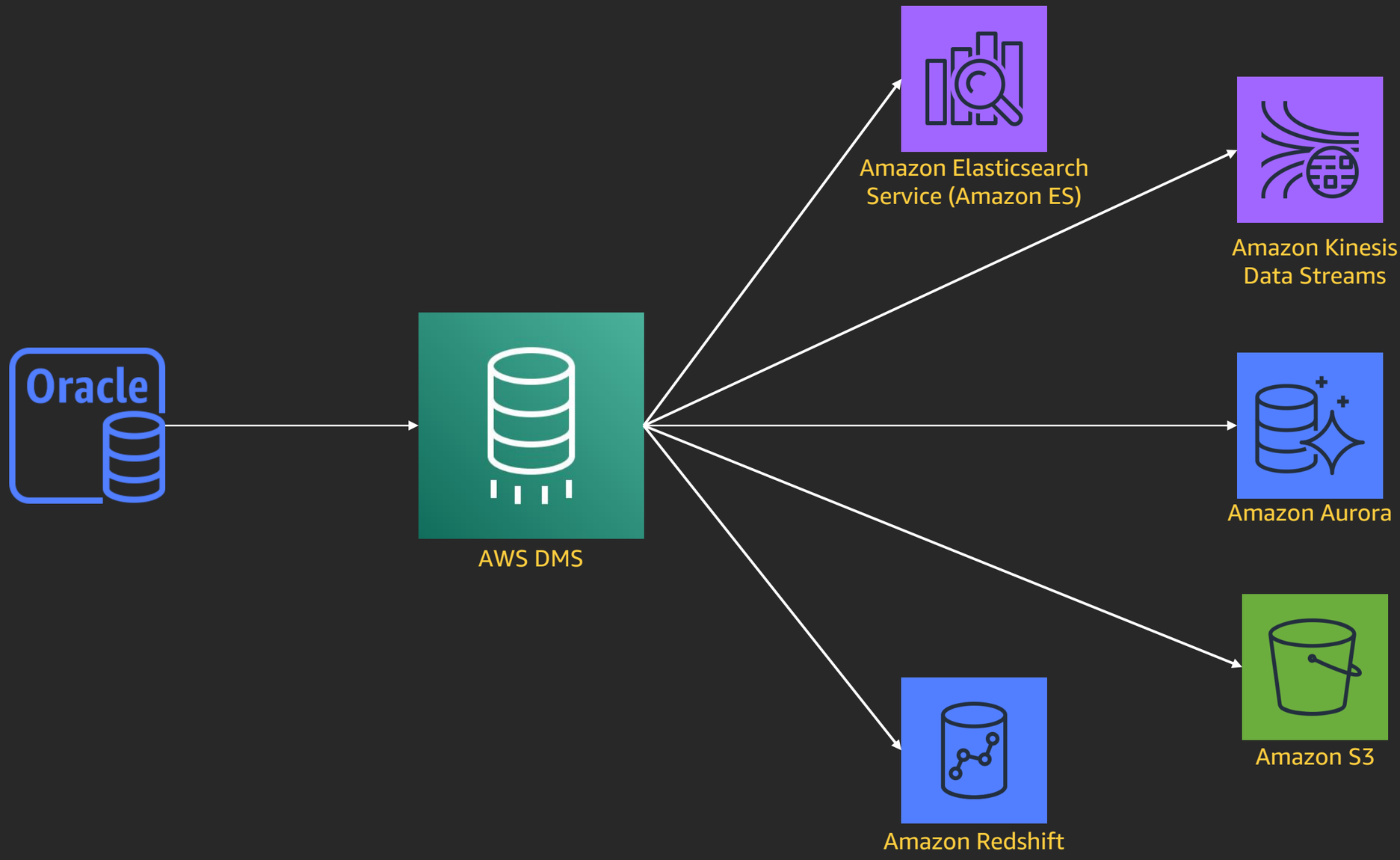
The migration process



- Start a replication instance
- Connect to source and target databases
- Select tables, schemas, or databases

- Let AWS DMS load data and keep them in sync
- Switch applications to the target once in sync at your convenience

Fan out: Microservices architecture

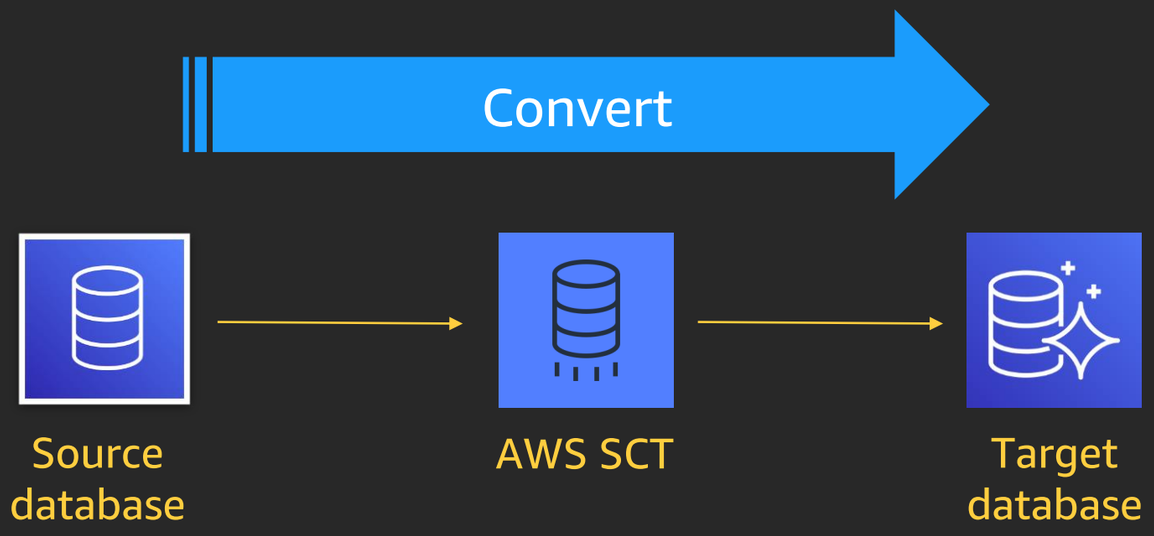


AWS Schema Conversion Tool

The AWS Schema Conversion Tool helps automate many database schema and code conversion tasks when migrating from source to target database engines

Features

- Create assessment reports for homogeneous/heterogeneous migrations
- Convert database schema
- Convert data warehouse schema
- Convert embedded application code
- Code browser that highlights places where manual edits are required
- Secure connections to your databases with SSL
- Service substitutions/ETL modernization to AWS Glue
- Migrate data to data warehouses using AWS SCT data extractors
- Optimize schemas in Amazon Redshift



Database migration assessment

Database migration assessment report

Source database:
DMS_SAMPLE.tharunk@oracle.c435kv7tmkj2.us-west-2.rds.amazonaws.com:8193:TEST
Oracle Database 12c Enterprise Edition 12.1.0.2.0 (64bit Production), Enterprise edition

Executive summary

We completed the analysis of your Oracle source database and estimate that 98% of the database storage objects and 96% of database code objects can be converted automatically or with minimal changes if you select Amazon RDS for PostgreSQL as your migration target. Database storage objects include schemas, tables, table constraints, indexes, types, collection types, sequences, synonyms, view-constraints, clusters and database links. Database code objects include triggers, views, materialized views, materialized view logs, procedures, functions, packages, package constants, package cursors, package exceptions, package variables, package functions, package procedures, package types, package collection types, scheduler-jobs, scheduler-programs and scheduler-schedules. Based on the source code syntax analysis, we estimate 99.8% (based on # lines of code) of your code can be converted to Amazon RDS for PostgreSQL automatically. To complete the migration, we recommend 6 conversion action(s) ranging from simple tasks to medium-complexity actions to significant conversion actions.

Migration guidance for database objects that could not be converted automatically can be found here

Database objects with conversion actions for Amazon RDS for PostgreSQL

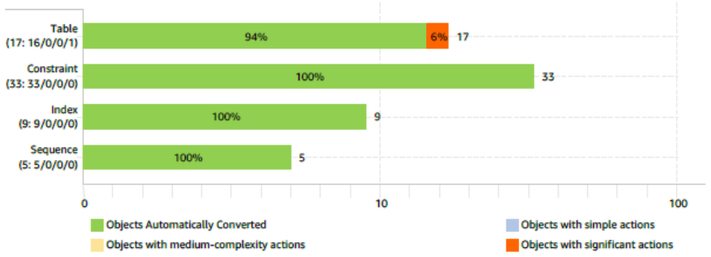
Of the total 64 database storage object(s) and 23 database code object(s) in the source database, we identifed 63 (98%) database storage object(s) and 22 (96%) database code object(s) that can be converted to Amazon RDS for PostgreSQL automatically or with minimal changes.

The target database version is less than PostgreSQL 11.1 (11.1). The converted code might not work properly.

1 (2%) database storage object(s) require 1 significant user action(s) to complete the conversion.

1 (4%) database code object(s) require 1 medium user action(s) to complete the conversion.

Figure: Conversion statistics for database storage objects



Connect AWS SCT to source and target databases

Run assessment report

Read executive summary

Follow detailed instructions

Database migration assessment report

Source database:
DMS_SAMPLE.tharunk@oracle.c435kv7tmkj2.us-west-2.rds.amazonaws.com:8193:TEST
Oracle Database 12c Enterprise Edition 12.1.0.2.0 (64bit Production), Enterprise edition

Package Procedure Changes

Not all package procedures can be converted automatically. Youll need to address these issues manually.

Issue 5584: Converted functions depends on the time zone settings

Recommended action: Review the transformed code, and set time zone manually if necessary.

Issue code: 5584 | Number of occurrences: 2 | Estimated complexity: Simple

Documentation references: http://www.postgresql.org/docs/9.6/static/functions-datetime.html

Schemas.DMS_SAMPLE.Packages.TICKETMANAGEMENT.Private procedures.TRANSFERTICKET: 1463:1469
Schemas.DMS_SAMPLE.Packages.TICKETMANAGEMENT.Public procedures.SELLTICKETS: 1772:1778

Package Function Changes

Not all package functions can be converted automatically. Youll need to address these issues manually.

Issue 5644: Unable automatically convert assign operation of array or global nested table,

Recommended action: Perform a manual conversion.

Issue code: 5644 | Number of occurrences: 1 | Estimated complexity: Medium

Schemas.DMS_SAMPLE.Packages.TICKETMANAGEMENT.Private functions.GET_OPEN_EVENTS: 270:297

Procedure Changes

Not all procedures can be converted automatically. Youll need to address these issues manually.

Issue 5103: Unable to convert hints

Recommended action: Use PostgreSQL methods for performance tuning.

Issue code: 5103 | Number of occurrences: 2 | Estimated complexity: Simple

Documentation references: http://www.postgresql.org/docs/9.6/static/geqo.html

Schemas.DMS_SAMPLE.Procedures.GENERATESEATS: 2041:2089
Schemas.DMS_SAMPLE.Procedures.GENERATE_TICKETS: 290:1184

Quiz

How many unique database systems have been migrated with AWS DMS/AW SCT?

- 75,000
- 90,000
- 100,000
- 170,000
- 200,000

AWS Workload Qualification Framework (AWS WQF)

Assesses and classifies OLTP workloads to determine the ease of migration and staff-hour consumption, and to inform on appropriate target AWS services

- Designed for solutions architects, partners, and consultants
- Assess workloads by evaluating proprietary features, complexity, technology, size, and so on
- Recommends a migration strategy and migration tools
- Gives migration engineers clear and actionable information
- Integrated with AWS SCT and AWS DMS

AWS WQF classifies OLTP workloads into 5 categories:

	Category 1	ODBC/JBDC workloads
	Category 2	Light, proprietary feature workloads
	Category 3	Heavy, proprietary feature workloads
	Category 4	Engine-specific workloads
	Category 5	Nonportable, high-risk, or lift-and-shift

- Migration complexity assessments
- Workload migration strategy
- Migration tools

Database Freedom



Database Freedom is an AWS database and analytics modernization initiative focused on accelerating enterprise migrations from Oracle, Microsoft SQL Server, Teradata, Cassandra, or MongoDB platforms to AWS cloud-native database services

ORACLE

Microsoft
SQL Server

teradata.

cassandra

mongoDB.

Helpful links

- Oracle database 11g/12c to Amazon Aurora with PostgreSQL compatibility (9.6.x): Migration playbook

  https://d1.awsstatic.com/whitepapers/Migration/oracle-database-amazon-aurora-postgresql-migration-playbook.pdf

- Blog: Best practices for migrating an Oracle database to Amazon RDS PostgreSQL or Amazon Aurora PostgreSQL: Migration process and infrastructure considerations

  https://aws.amazon.com/blogs/database/best-practices-for-migrating-an-oracle-database-to-amazon-rds-postgresql-or-amazon-aurora-postgresql-migration-process-and-infrastructure-considerations/

- Blog: New AWS DMS and AWS Snowball Integration enables mass database migrations and migrations of large databased

  https://aws.amazon.com/blogs/database/new-aws-dms-and-aws-snowball-integration-enables-mass-database-migrations-and-migrations-of-large-databases/

- AWS DMS Documentation

  https://docs.aws.amazon.com/dms/index.html#lang/en_us

Thank you!

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