
AWS
re:Invent

DAT312

Dive deep into AWS Schema Conversion Tool and AWS DMS

John Winford

Senior Manager

AWS

AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Agenda

Introduction to AWS Database Migration Service (AWS DMS) and AWS Schema Conversion Tool (AWS SCT)

Product highlights

New features

Demo

Migration resources



© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

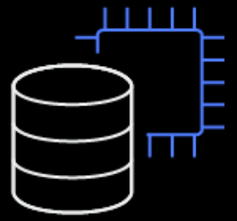
Introduction



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Drivers for migration



Infrastructure

- Hardware end of life
- Lack of redundancy or automation
- Failure at different layers

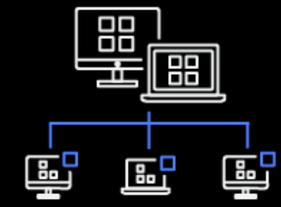


Cost optimization

- Pay for what you use
- Open source options, license savings
- Fully managed databases

Scalability

- Change instance sizes as required
- Scale across regions as required



Innovation

- Modernize your database tier
- Choose the right database for your workload



AWS migration tooling



AWS Schema Conversion Tool (AWS SCT) 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



Over 350,000 databases migrated with AWS DMS



Product overview



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

When to use AWS DMS and AWS SCT

Modernize



Migrate

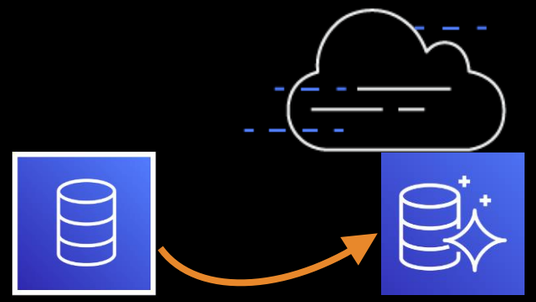


Replicate



General use cases

Migrate



Migrate business-critical applications

Migrate data warehouses to Amazon Redshift

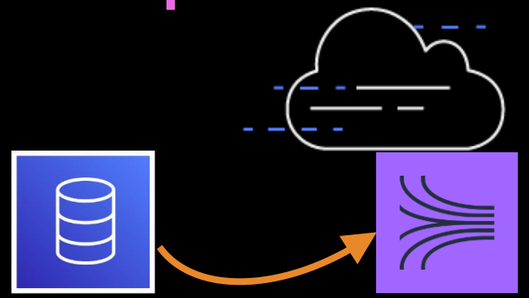
Upgrade to a minor / major version

Consolidate shards into Amazon Aurora

Archive old data to Amazon S3

Migrate from NoSQL to SQL, SQL to NoSQL, or NoSQL to NoSQL

Replicate



Create cross-region read replicas

Run your analytics in the cloud

Hydrate your data lakes

Replicate to streaming platforms

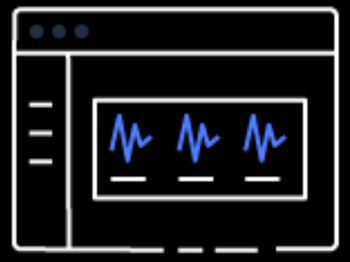
AWS DMS product highlights



Secure



Assess



Validate



AWS Snowball integration



Monitor



Stream data



Low cost



Multiple options

AWS Schema Conversion Tool (AWS SCT)

Modernize



- **Modernize your database**

  Convert your Oracle, SQL Server, Sybase ASE, or Db2 for Linux, Unix, and Windows (Db2 LUW) database to

  PostgreSQL, MySQL, or Amazon Aurora

- **Modernize your data warehouse**

  Convert your Oracle, SQL Server, Netezza, Greenplum, Vertica, or Teradata data warehouse to Amazon Redshift



MySQL



Amazon Aurora

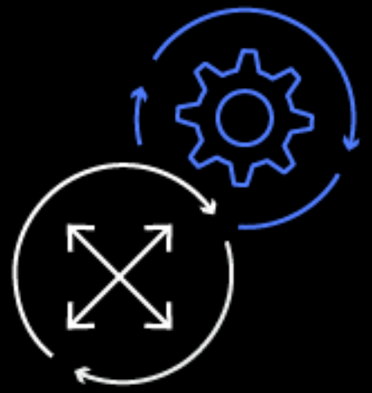


PostgreSQL

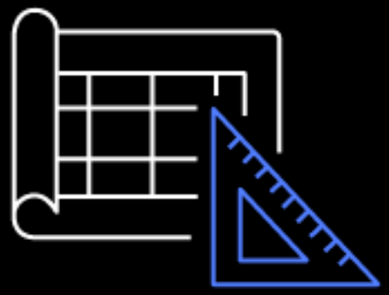


Amazon Redshift

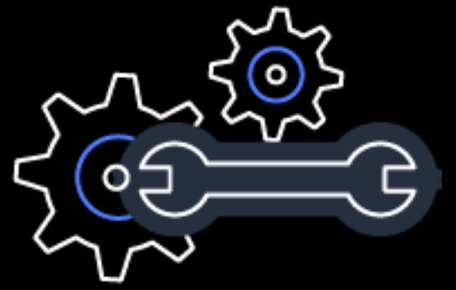
AWS SCT product highlights



Assess



Plan



Convert schema and code



Optimize



Migrate data warehouses

Database migration assessment

Database migration assessment report

Source database:

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

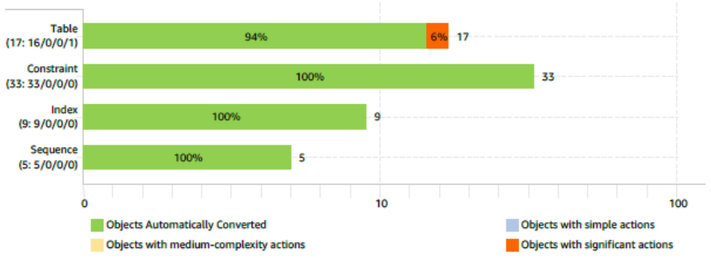
Of the total 64 database storage object(s) and 23 database code object(s) in the source database, we identifed 63 (98%) database storage object(s) and 22 (96%) database code object(s) that can be converted to Amazon RDS for PostgreSQL automatically or with minimal changes.

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:

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

AWS SCT data extractors

EXTRACT DATA FROM YOUR DATA WAREHOUSE AND MIGRATE TO AMAZON REDSHIFT

Extract data through local migration agents

Data is optimized for Amazon Redshift and saved in local files

Files are loaded to an Amazon S3 bucket (through network or Snowball Edge) and then to Amazon Redshift

VERTICA

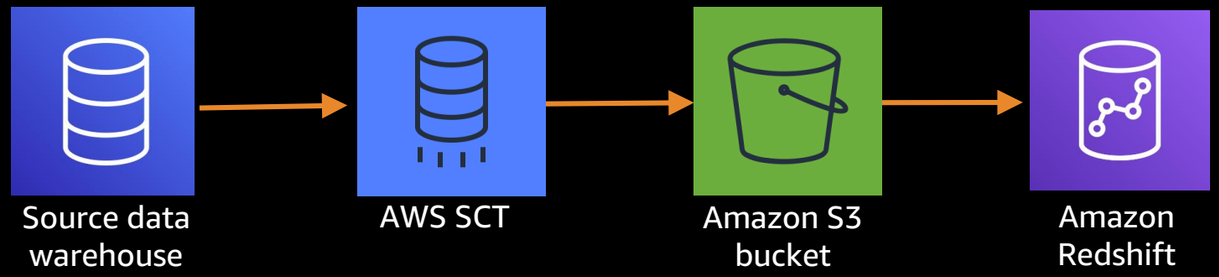
ORACLE

Microsoft SQL Server

Greenplum

Teradata

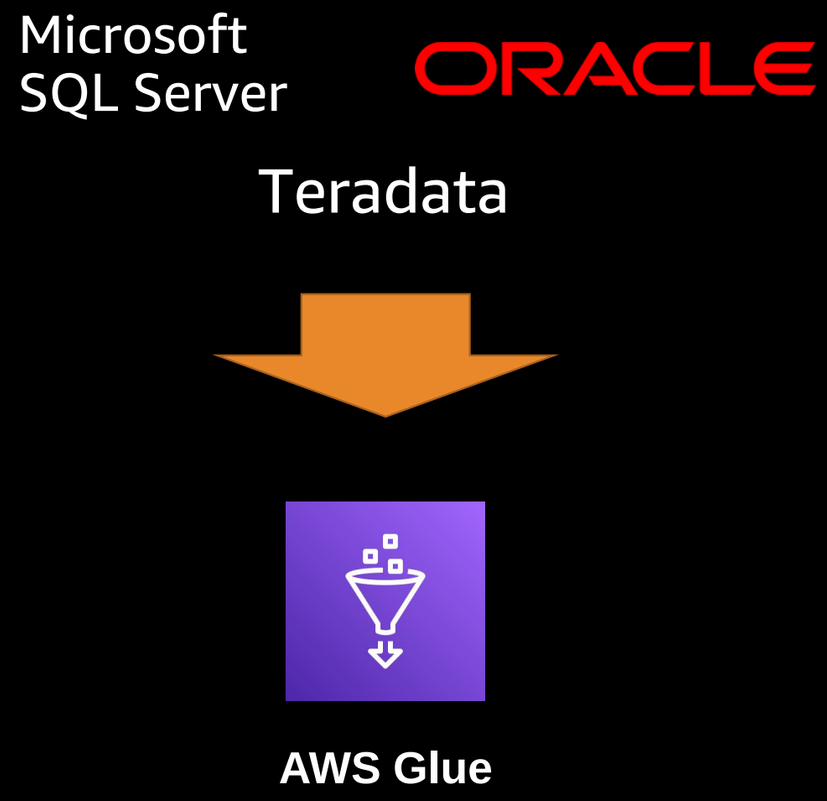
Netezza



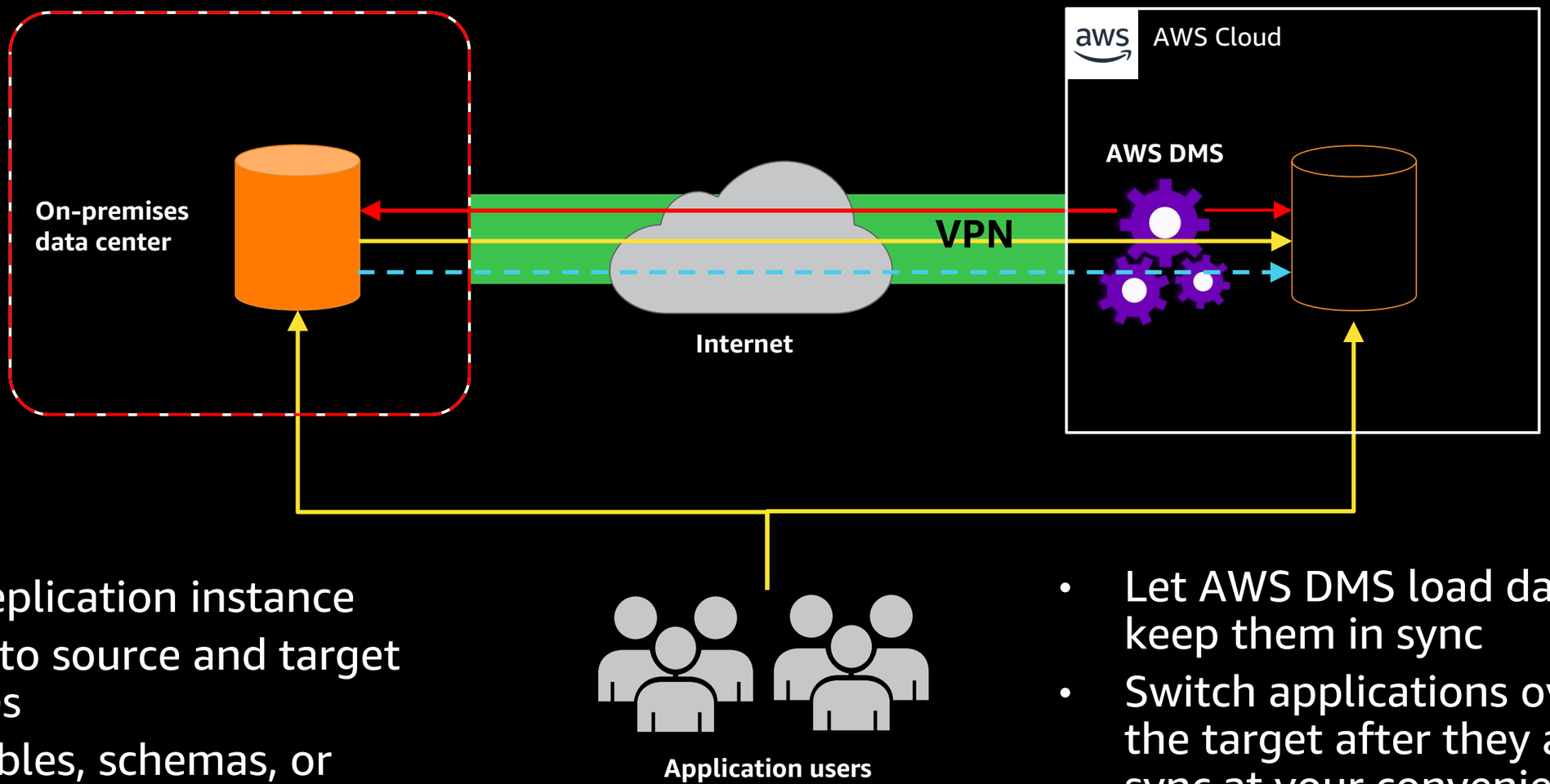
Extract, transform, and load (ETL) modernization

CONVERT DATA WAREHOUSE ETL INTO EQUIVALENT SCRIPTS ON AWS GLUE

- Assessment of modernization complexity
  - Prioritize what can and should be migrated
- Inventory of existing ETL packages
- Re-architect current ETL packages to leverage AWS native services, such as AWS Lambda and Amazon EMR
- Automated testing to validate the performance and functionality of the converted packages
- Sources: Oracle (Oracle Data Integrator) and Teradata (BTEQ), SQL Server SSIS



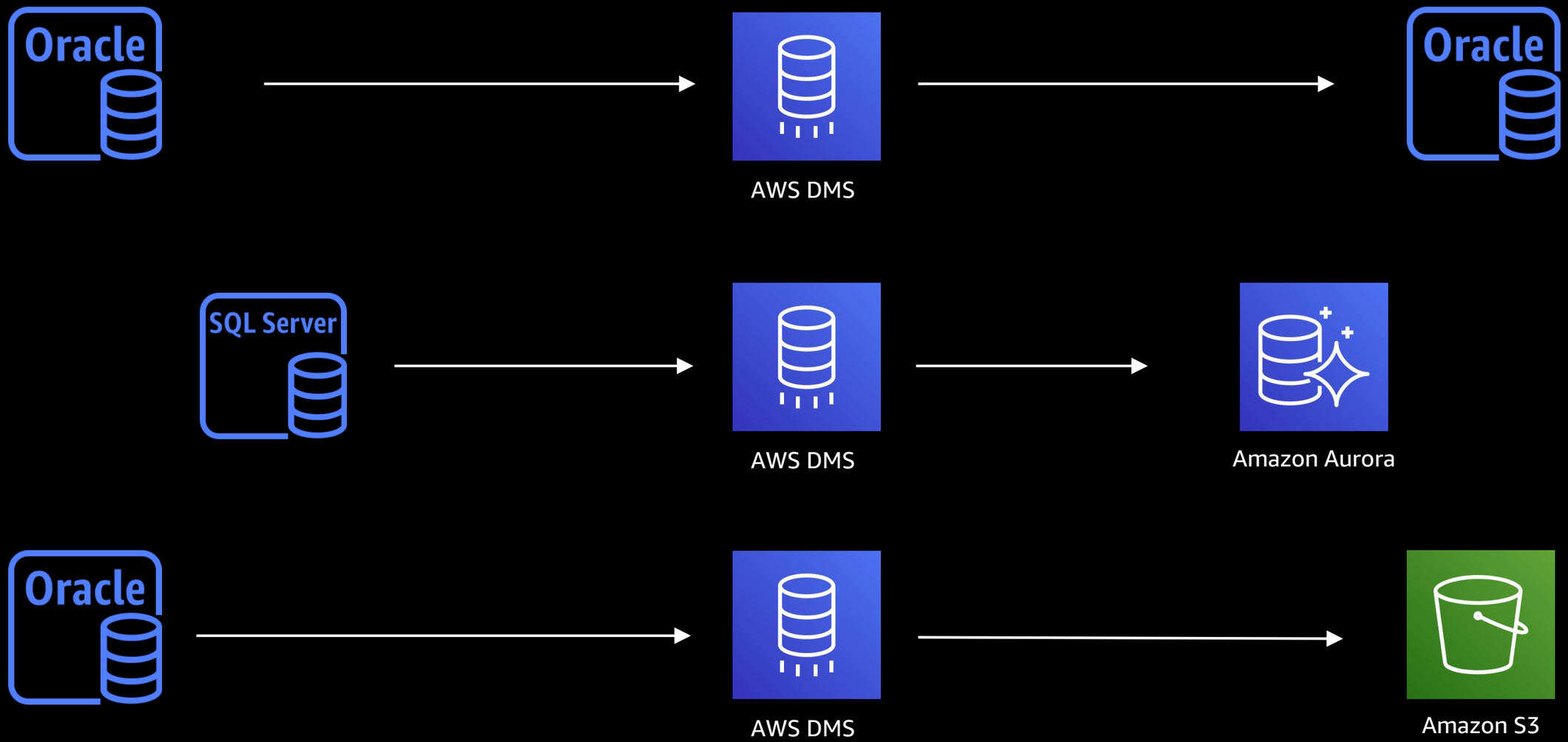
The data migration process



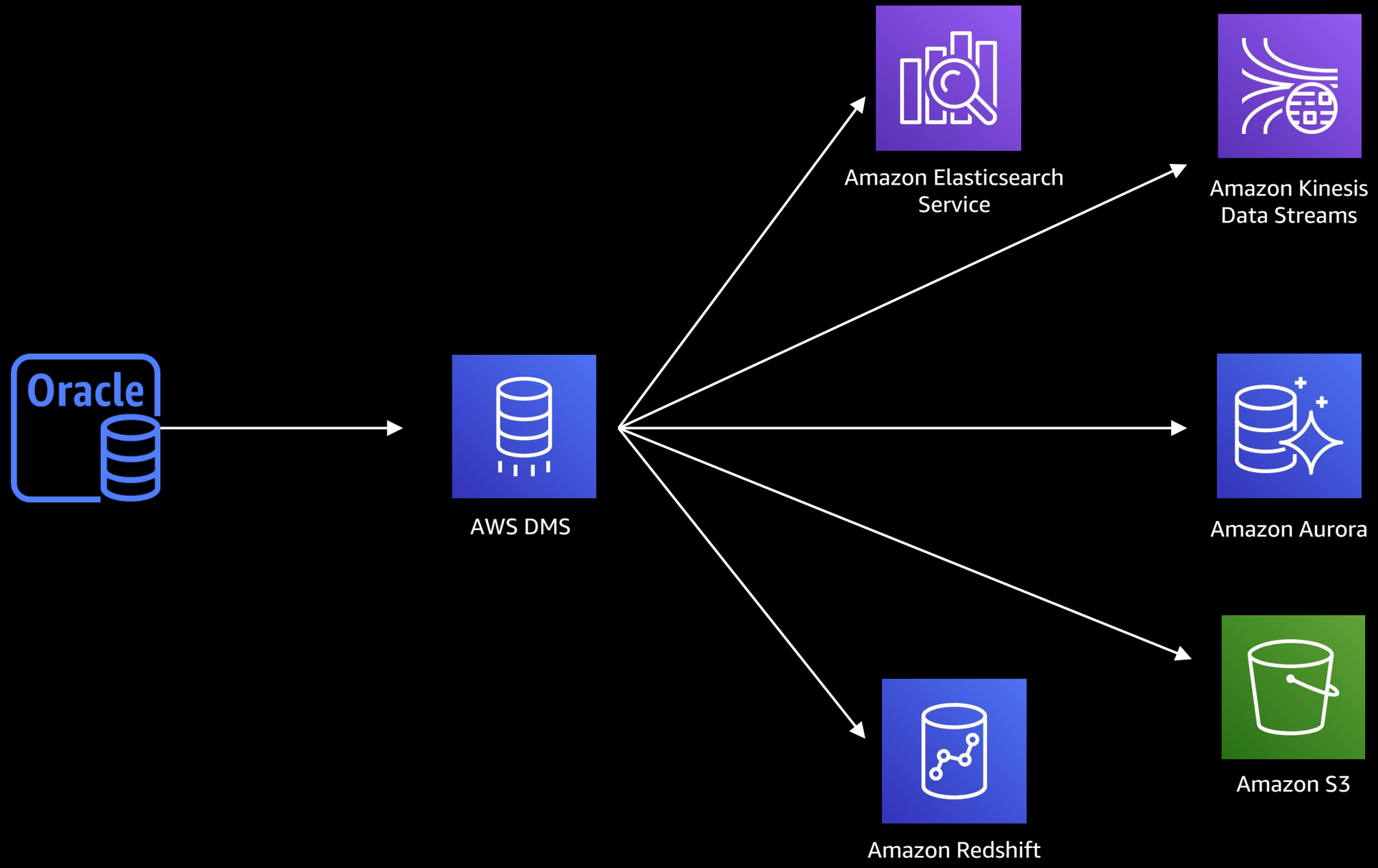
- Start a replication instance
- Connect to source and target databases
- Select tables, schemas, or databases

- Let AWS DMS load data and keep them in sync
- Switch applications over to the target after they are in sync at your convenience

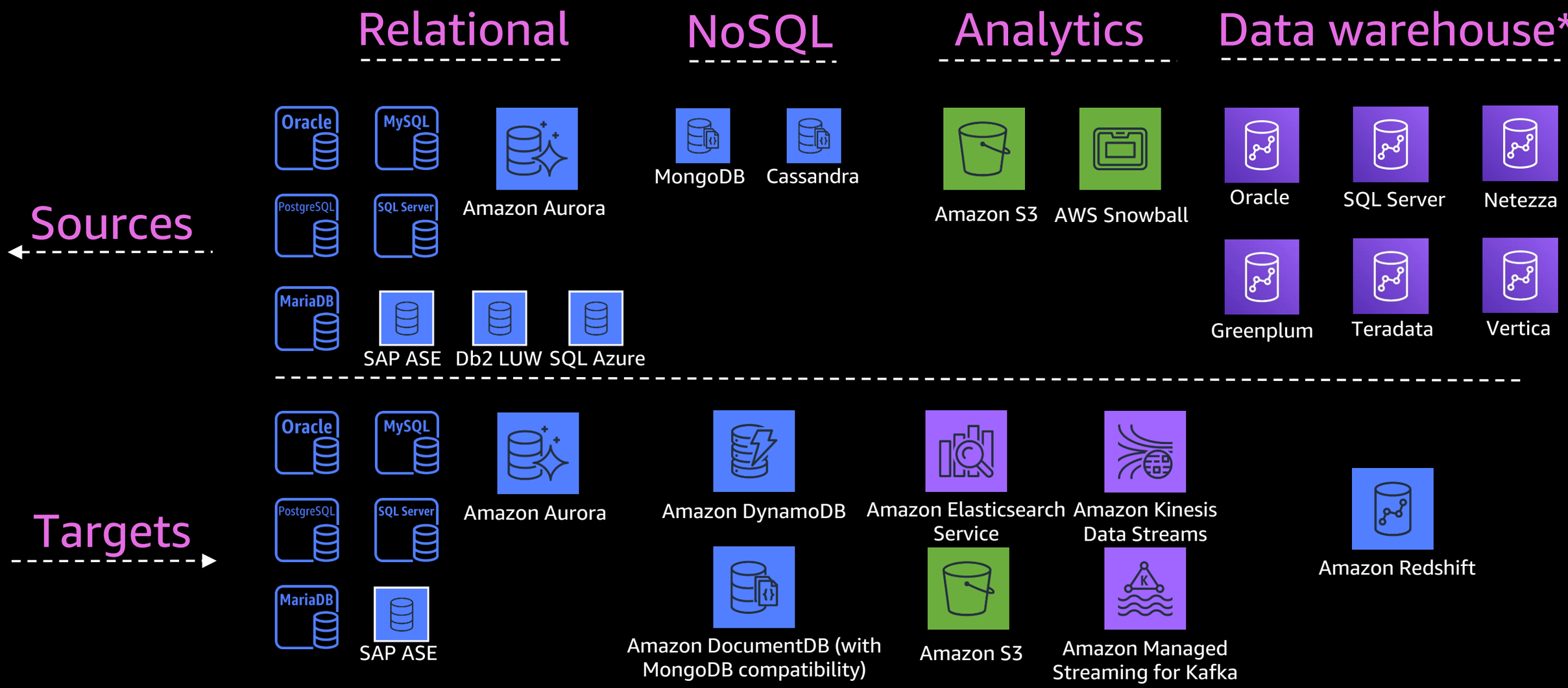
Homogeneous or heterogeneous



Fan out: Microservices architecture



Supported source and targets



* Supported via AWS SCT data extractors

New features



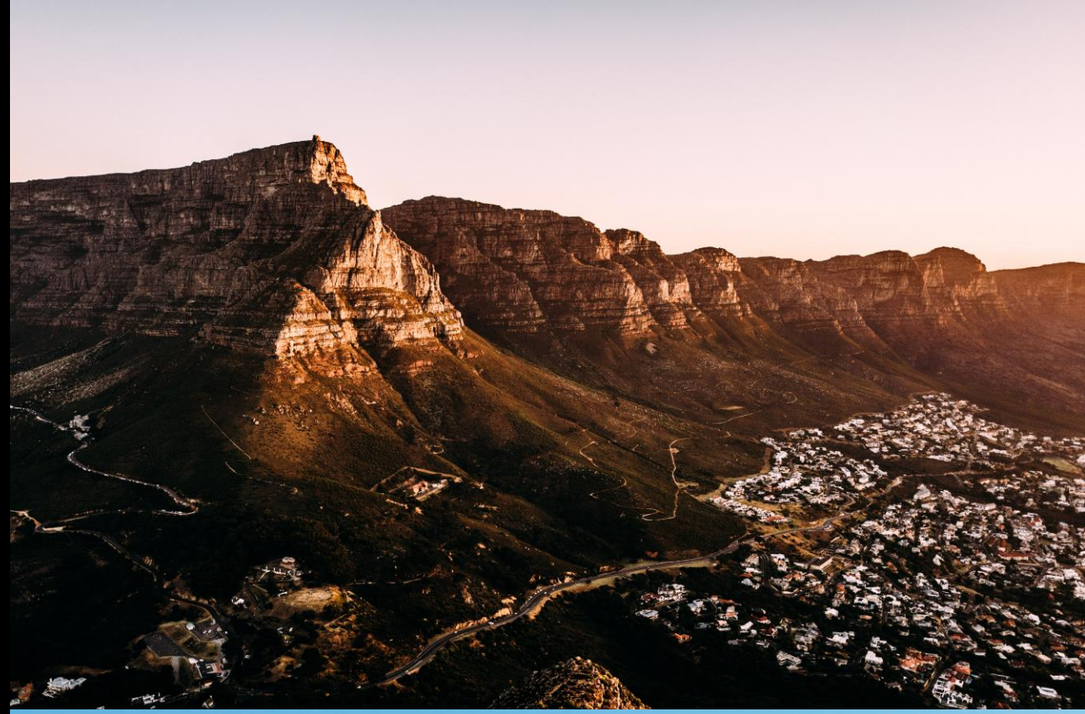
© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

New features

WHAT HAVE WE RELEASED SINCE THE LAST RE:INVENT?

Location

- R5, C5, and T3 instances
- Availability in Africa (Cape Town) and Europe (Milan) regions





New features

WHAT HAVE WE RELEASED SINCE THE LAST RE:INVENT?

Choice

- Oracle 19c
- SQL Server 2019
- MySQL 8
- PostgreSQL 12
- Amazon Neptune (target)
- Amazon MSK (target)
- MongoDB (source)

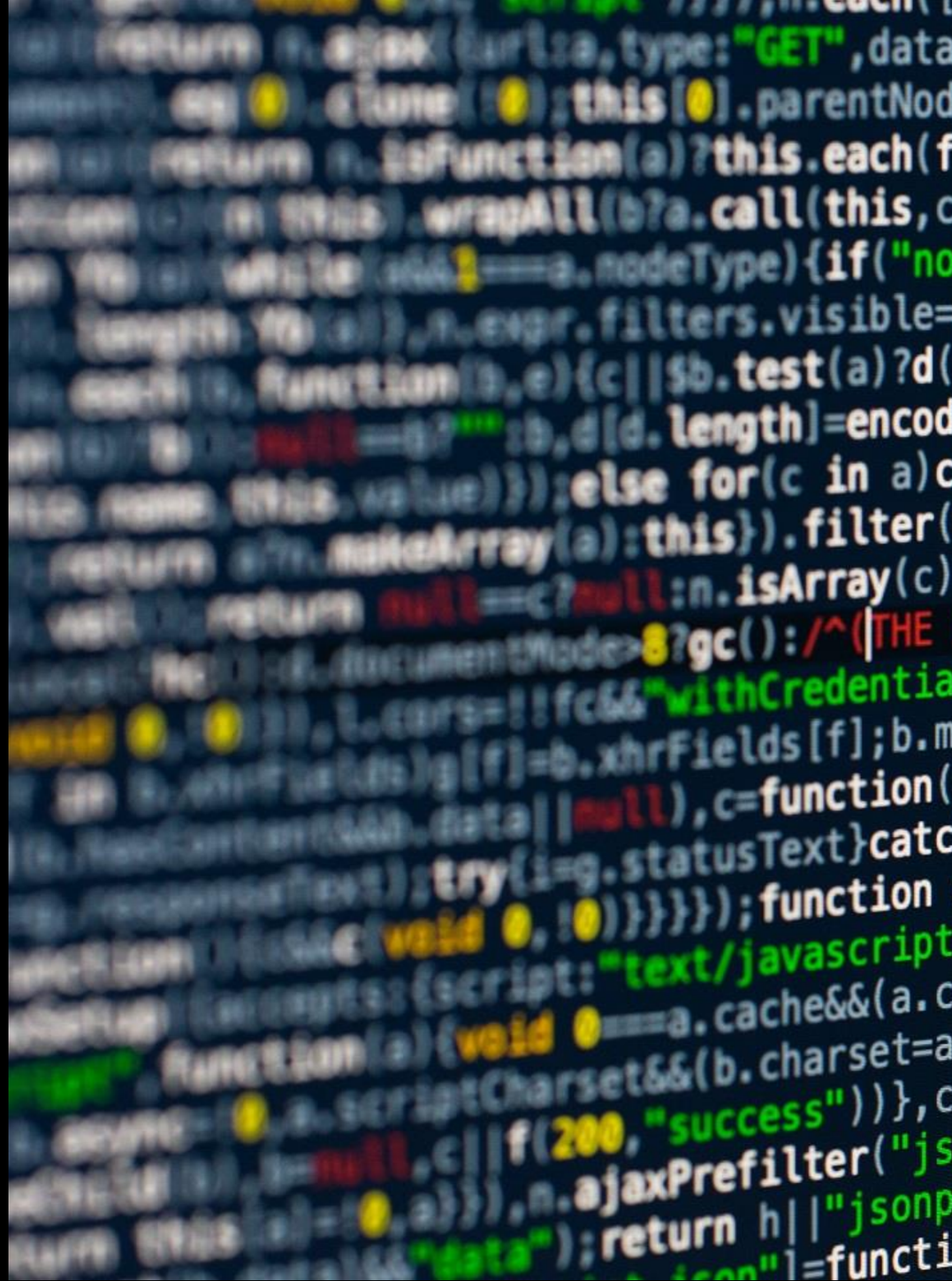


New features

WHAT HAVE WE RELEASED SINCE THE LAST RE:INVENT?

Data

- Spatial data type support
- Improved LOB handling
- Data transformation
- Data validation



New features

WHAT HAVE WE RELEASED SINCE THE LAST RE:INVENT?

Security and manageability

- TLS 1.2
- New console
- Replication task pre-validation
- Improved replication instance reliability and recovery
- On-premises diagnostic tooling
- Updated documentation
- Improved error messages



Demo



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Migration resources



© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.

Database Freedom



Database Freedom is an AWS database and analytics modernization initiative focused on accelerating enterprise migrations from commercial platforms to cloud-native AWS database services

AWS database migration partners

































This is only a representative sample of these partners and is not a complete list.
Current as of October 2020.

Resources

Getting started guide: Review technical documentation

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

DMS Homepage: Highlights DMS features and benefits

https://aws.amazon.com/dms/

Pricing: Prices for replication instances, storage, and data transfer

https://aws.amazon.com/dms/pricing

Support: Post your questions to our support forum

https://forums.aws.amazon.com/forum.jspa?forumID=216

AWS SDK: Java-based API for creating and managing data migration tasks

https://docs.aws.amazon.com/dms/latest/APIReference/Welcome.html

AWS Command Line Interface: Manage replication tasks with simple commands

https://docs.aws.amazon.com/cli/latest/reference/dms/index.html

Related sessions

DAT202

What's new in Amazon RDS?

DAT204

Beyond AWS DMS: Programs and partners to ace your migration

DAT301

Deep Dive on Amazon Aurora with PostgreSQL compatibility

DAT308

Migrating your databases to Amazon DocumentDB

Thank you!



AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.



Please complete the session survey

AWS re:Invent

© 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved.