AWS Database Migration Service

Introduction

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Database Migration Challenges

Cost

Complexity

Application downtime

Engine specific database code

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Migration Patterns

Rehost

- Lift and shift (homogeneous)
- Same database engine and code

Replatform

- Change database engine (heterogeneous)
- Convert the database and application code

Rebuild

- Decompose into smaller, parallel chunks
- Right data storage for your workload

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AWS Database Migration Service

- Start your first migration in *10 minutes or less*
- Keep your *apps running* during the migration
- *Replicate* from within, to, or from AWS
- Move data to the same or *different database* engine

Sources*	Targets*
Oracle	Oracle
SQL Server	SQL Server
Azure SQL	PostgreSQL
PostgreSQL	MySQL
MySQL	Amazon Redshift
SAP ASE	SAP ASE
MongoDB	Amazon S3
Amazon S3	Amazon DynamoDB
IBM DB2	Amazon Kinesis
	Amazon ElasticSearch

Consult CHAP_Source.html and CHAP_Target.html pages for latest DMS sources and targets

Keep your application running during migration

Start a replication instance

Connect to the source and target

Select tables, schemas, or databases

Let DMS create the target objects

Move data and synchronize objects

Switch applications when ready

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Database Migration Options

Load is table by table

- Configurable number of tables in parallel

One time load or Change Data Capture (CDC)

- Read from database log on the source and apply to the target

Filter criteria available for selective loading

- Select only a few tables or a subset of data in your tables

Multiple sources and targets. Mix and match.

- One side of the migration must be in AWS

Ongoing replication support

- Keep your replication going until your application is ready to cutover

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AWS Database Migration Service Pricing

Instance Pricing

Instance pricing from $0.018 / hour on demand

T2	t2.micro	t2.small	t2.medium	t2.large	
C4	c4.large	c4.xlarge	c4.2xlarge	c4.4xlarge	
R4	r4.large	r4.xlarge	r4.2xlarge	r4.4xlarge	r4.8xlarge

Storage Pricing

Each T2 instance type includes 50GB of GP2 network-attached storage.
Each C4 instance type includes 100GB of GP2 network-attached storage for swap space, replication logs and data cache;
You can extend the included storage and pay regional storage rates (starting at $0.115 / GB / Month) if you want to store logs for a longer period of time.

Data Transfer Pricing

All data transfer into AWS Database Migration Service is free, and data transferred between AWS Database Migration Service and databases in Amazon RDS and Amazon EC2 Instances in the same Availability Zone also is free. Standard AWS data transfer rates apply when you migrate your source database to a target database in a different Availability Zone, Region, or outside of AWS. Standard AWS data transfer rates are listed on the EC2 instance pricing page.

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Example Pricing

Workload	Config/region	Instance	Hourly rate	Duration	Total cost
Testing	Single AZ/us-east-1	t2.small	$0.036	14 days	$12.096
Production	Multi AZ/us-east-1	c4.large	$0.308	14 days	$103.488
Total *cost to migrate the example 1TB database*					**$115.584**

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

Pricing on this page serves as an example. Consult the AWS DMS website for up to date pricing.

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AWS Schema Conversion Tool

Makes heterogeneous database migrations predictable by automatically converting the source database schema and a majority of the database code objects, including views, stored procedures, and functions, to a format compatible with the target database

Features

- Database Migration Assessment report for choosing the right target engine
- Automatic conversion for eligible database objects and code
- Code browser to highlight places where manual edits are required

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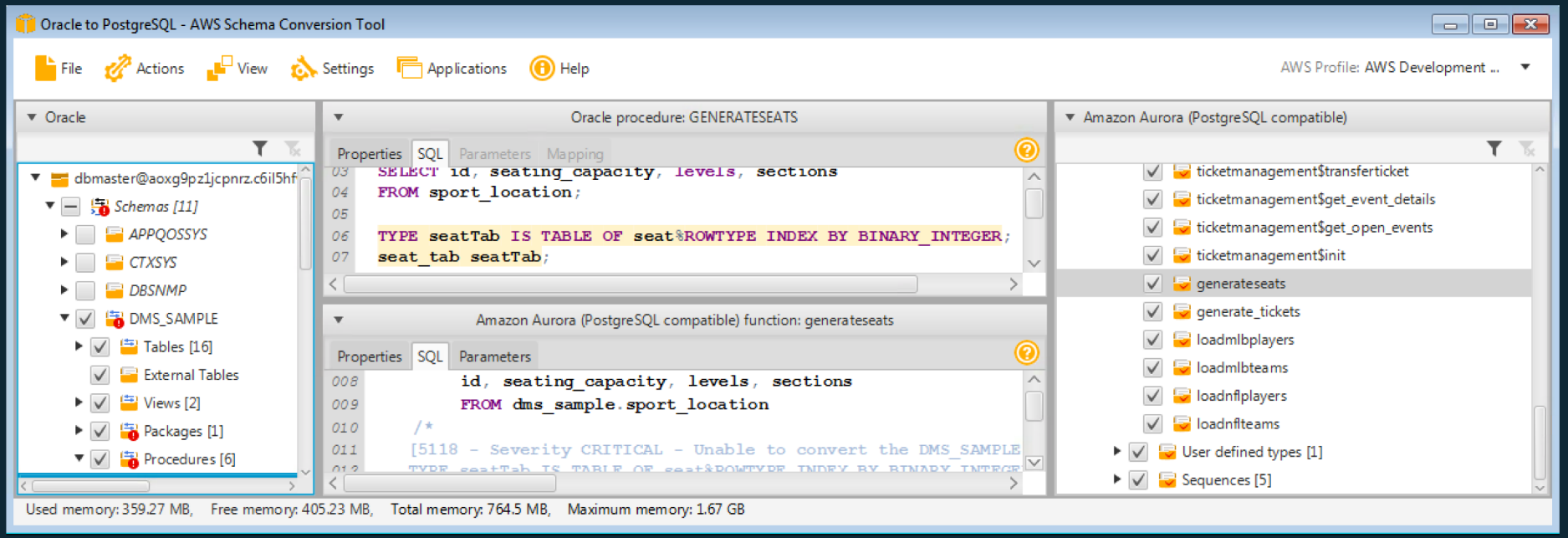
Support for the following conversions

Source* Database	Target* Database on AWS
Oracle database	Amazon Aurora, MySQL, PostgreSQL, Oracle
Oracle data warehouse	Amazon Redshift
Azure SQL	Amazon Aurora, MySQL, PostgreSQL
Microsoft SQL Server	Amazon Aurora, Amazon Redshift, MySQL PostgreSQL
Teradata	Amazon Redshift
IBM Netezza	Amazon Redshift
Greenplum	Amazon Redshift
HPE Vertica	Amazon Redshift
MySQL and Maria DB	PostgreSQL
PostgreSQL	Amazon Aurora, MySQL
Amazon Aurora	PostgreSQL
IBM DB2 LUW	Amazon Aurora, MySQL, PostgreSQL
Apache Cassandra	Amazon DynamoDB

Consult CHAP_Source.html and CHAP_Target.html pages for latest DMS sources and targets

AWS SCT converts objects and code



Pricing and platform support

$0

You can download AWS Schema Conversion Tool for your platform of choice


Microsoft Windows


Apple Mac


Fedora Linux (rpm)


Ubuntu Linux (deb)

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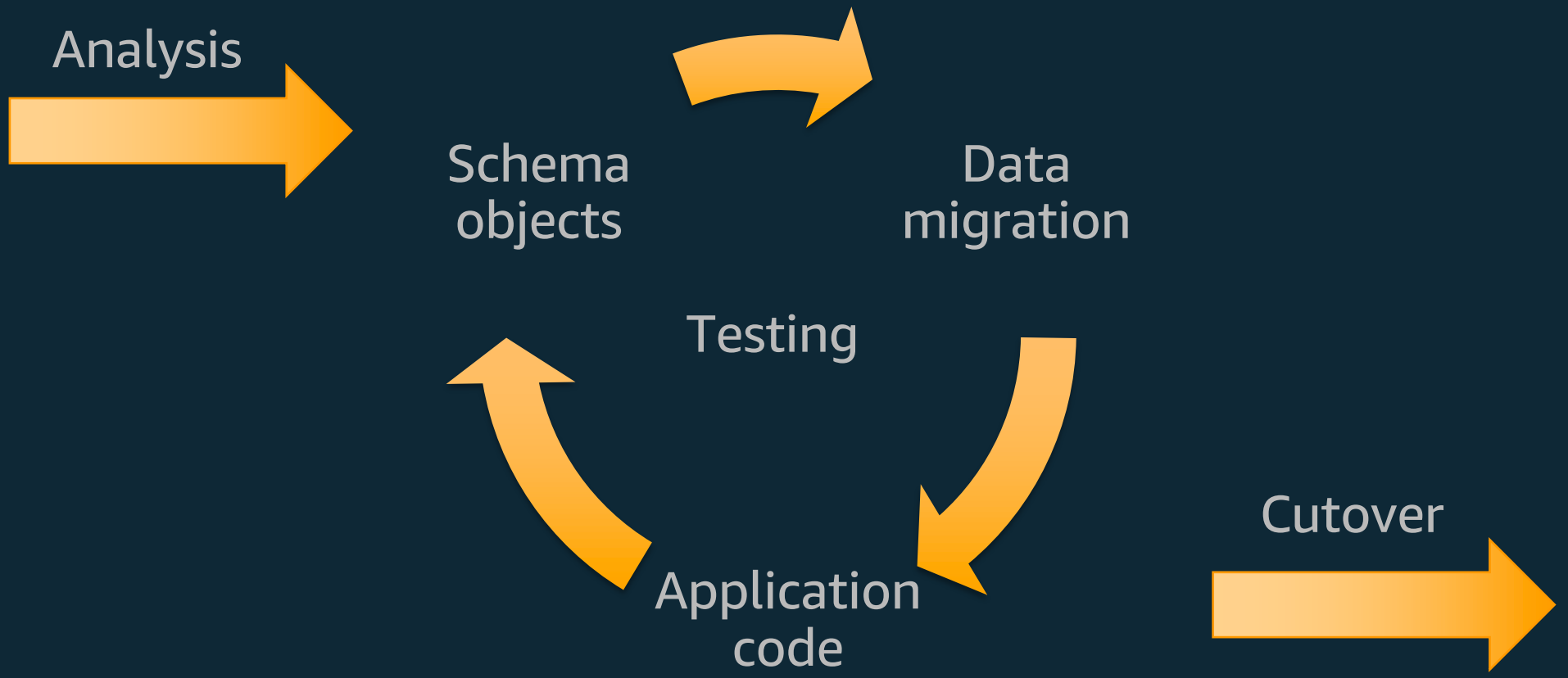
Database Migration Overview



Example migration plan

Analysis		Assessment	2%
		Planning	7%
Schema conversion	TESTING	Database conversion	14%
		Procedure, function, and db script conversion	25%
Application conversion		Application conversion/remediation	5%
		Integration with 3rd party applications	2%
Data migration		Data migration	3%
		Functional end to end testing	28%
		Performance testing	2%
Cutover		Integration and deployment	5%
		Training and knowledge transfer	2%
		Documentation and version control	2%
		Post production support	3%

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Resources and skills required

Database expertise is required

- Working knowledge of target database engine

Basic networking knowledge

- Familiarity with AWS VPC concepts

AWS knowledge is required

Software architecture knowledge is an advantage

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Educate yourself and your team

Getting started

FAQS

Migration best practices

Database migration playbook

Plan your time

- Migration projects can take from several weeks to several months to complete depending on the complexity of the code conversion
- It may take several iterations and may take longer than you anticipate
- Good planning will increase the success and reduce the number of iterations required

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Understand your database

Size

- Uncompressed size
- Number schemas and objects
- Relationships between schema objects
- Number large tables (>500GB)

Datatypes

- LOB column number and size
- Custom or unusual datatypes
- Tables without PKs

Transaction profile

- Transactions per second
- Transaction boundaries

Authentication

- User authentication
- Roles and permissions

Integrations

- ETL jobs, interfaces, applications

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Understand your network

Database access

- Firewalls, tunnels, VPN, Direct Connect

VPC

- Identify the target VPC and subnets you will use

IAM permissions

- Security groups and IAM permissions needed for DMS

Do you have enough bandwidth to move all your data?

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Clarify your requirements

Can you afford downtime?

Do you need the source database to stay alive after migration?

Do you know why you prefer one target engine over another?

What are your high availability requirements?

Does all the data need to move?

Does it need to move to the same place?

Do you understand RDS benefits (backups, HA, etc.)

Do you understand RDS limitations? (storage size, admin user, etc.)

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Create your target schema

DMS

- Creates only tables and primary keys
- Uses transformation rules to convert case, filter, or change schema

SCT

- For heterogeneous migrations
- Orchestrate your migration through SCT by configuring your access keys

Native tools for homogeneous migrations

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Start your data migration

Check prerequisites on the source

Check the logs

Check CloudWatch metrics

Proper instance sizing

Migration can take time, especially if your database is large or your network connection is small

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Things that affect your migration speed

Size of the source

Transaction pressure on the source

- Volume of transactions
- Run length of transactions

Size of the target

DMS task settings (# tasks, # tables, settings)

Bandwidth available

Size of the replication instance

Schema configuration

LOBs in the schema

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When to choose native migration tools

Target supports native replication

Moving ALL the data

No transformations required

Target is a new database

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When to use backup and restore

Database is small

Downtime window is large enough

Moving all the data

No transformations required

Larger database migration

What is large?

- Moving all the data takes longer than you are willing to wait
- > 6 TB is generally considered large

What can I do?

- Use AWS Snowball
- Let AWS Professional Services help you

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Case Studies

Expedia Online Marketplace

World's leading online travel company, with a portfolio that includes 150+ travel sites in 70 countries.

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

- Migrating some databases to Amazon Aurora
- Kuldeep Chowhan, Principal Engineer, Expedia, Inc.:

  "The ease by which we can do this using the AWS Database Migration Service has simplified this process for us and enabled us to accelerate our migration efforts. The ability to closely monitor the process, the detailed logging feature, and the support we received from AWS have given us a great deal of confidence in a successful migration."

Thomas Publishing: Digital Friendly Business

Connecting buyers and suppliers across all industrial sectors, evolving from an industrial trade print publisher into industry's most respected group of digital-friendly businesses.

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

- Needed to grow database footprint but using Oracle would require significant up front investment in both infrastructure and license expense
- Wanted to migrate to Amazon Aurora
- Database Migration Service automated most of the work and dramatically reduced the manual effort involved in the code migration
- Hans Wald, Chief Technology Officer, Thomas Publishing:

  "The AWS Database Migration Service will be a key enabler for our plans to migrate more databases to Amazon Aurora in 2016."

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Partners

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Summary

Migrations are complex

AWS SCT & DMS can automate a lot of the work

Know your environment (existing and new)

Bring the right skills

Allocate enough time

Sometimes native tools are the right choice

Many successful migrations

AWS is here to help

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Questions?