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AWS Database Migration Service

Database Modernisation with Minimal Downtime

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Agenda

- How does the cloud help?
- How do I get there?
- When should I use it?
- How does it work?
- What else can I do?
- What have others done?



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Cloud benefits

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Amazon RDS



- Multi-engine support: Amazon Aurora, MySQL, MariaDB, PostgreSQL, Oracle, SQL Server
- Automated provisioning, patching, scaling, backup/restore, failover
- High availability with RDS Multi-AZ
 99.95% SLA for Multi-AZ deployments















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The journey

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How can I get to the cloud?

How will my on-premises data migrate to the cloud?

How can I make it transparent to my users?

Afterwards, how will on-premises and cloud data interact?

How can I integrate my data assets within AWS?

Can I get help moving off of commercial databases?

Migration used to be cost + complexity + time

Commercial data migration and replication software

Complex to set up and manage

Application downtime

Database-engine-specific application code

What are DMS and SCT?

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





AWS Schema Conversion Tool (SCT) converts your commercial database and data warehouse schemas to open-source engines, Amazon Aurora and Redshift. Converts and loads data warehouse data into Amazon Redshift

We have migrated over 25,000 unique databases. And counting...

Migration options

If you're not switching engines and can take downtime:

- SQL Server: bak file import
- MySQL: read replicas
- Oracle SQL Developer, Data Pump, Export/Import
- PostgreSQL: pg_dump
- SAP ASE: bcp



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When should I use it?





When to use DMS and SCT?

Modernise



Modernise your database tier -

- Commercial to open-source
- Commercial to Amazon Aurora

Modernise your Data Warehouse -

Commercial to Redshift

Migrate



- Migrate business-critical applications
- Migrate from Classic to VPC
- Migrate data warehouse to Redshift
- Upgrade to a minor version
- Consolidate shards into Aurora

Replicate



- Create cross-regions Read Replicas
- Run your analytics in the cloud
- Keep your dev/test and production
- environment sync

When to use DMS and SCT? Modernise

Modernise your Database Tier

- Commercial to open-source
- Commercial to Amazon Aurora
- Amazon S3 target





Modernise your Warehouse

Commercial to Amazon Redshift







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Why use DMS and SCT?



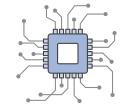


Remove Barriers to Entry

Near-Zero Downtime



Secure



Easy to Use, but Sophisticated...



Allow DB Freedom



Keep a Leg in the Cloud



Cost Effective

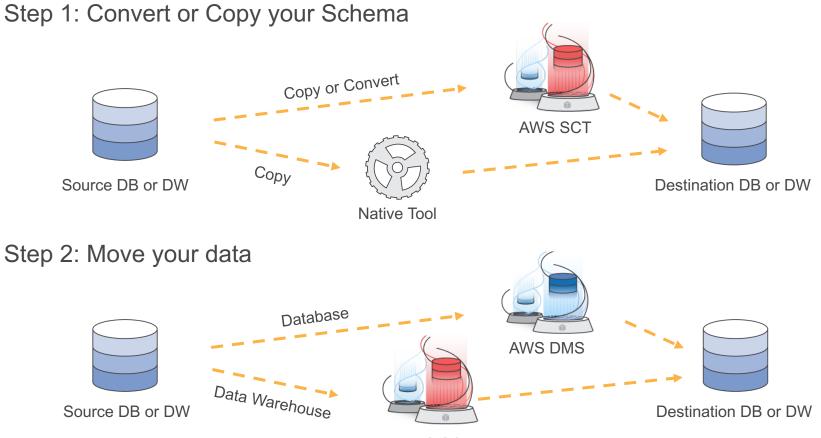


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How does it work?

webservices

Database migration process

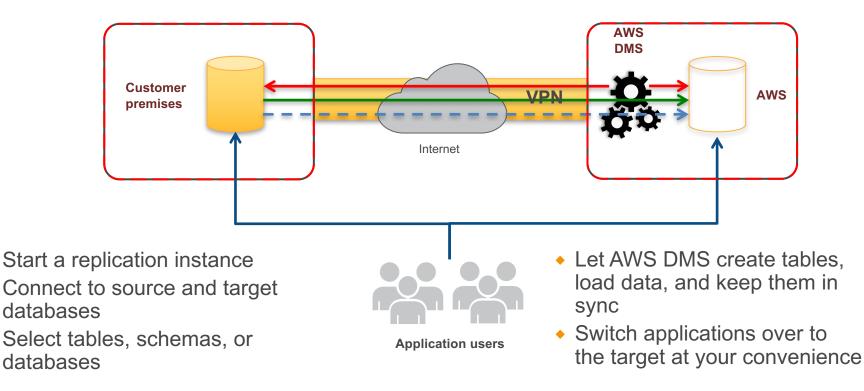


AWS SCT

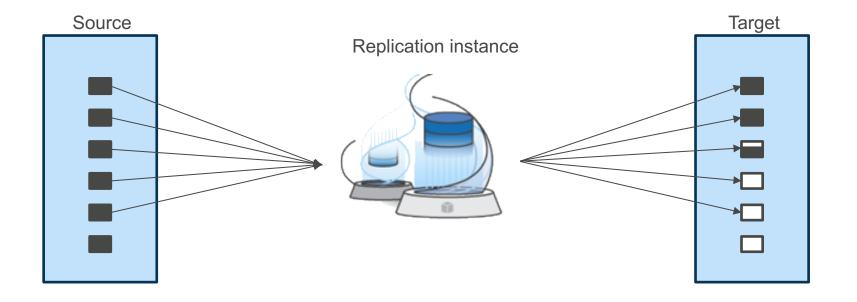
AWS Schema Conversion Tool

Summary Action Bens	M Save to CSV	Seve to PDF		
Database Migration Assessment Report		mazon		
Source Durbase Microal 932, Berre 2014 - 12.0 4422.0 (XK4) Auf 27.0015 16.56:19 Copyright (1) Microal Corporation Express Edition (64-bit) on Windows NT 6.1 -XK4> (Build 7601: Service Pack 1) (Hypervisor)				
Executive Summary				
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Database Objects with Conversion Actions for MySQL	File 🔗 Actions 📲 View 💩 Settings 🔞 He			
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Table(19)- 19	CAPTURESTOREDPROGRAMS	G Issue: 331: MySQL doesn't support a global user exception Recommended action: Use another method for this functionality.		► 🗹 🔤 SS2K5ALLPLATFORM\$RI
Colume(17)- 90	 CAPTURETABLELEVELCKCONSTRAINT CAPTURETABLES 	No. of occurrences: 2 Documentation reference: https://dev.mysql.com/doc/refman/5.	6/en/stored-programs-views.html	 SS2K5ALLPLATFORM\$SE SS2K5ALLPLATFORM\$U
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4.000000000000000000000000000000000000	CAPTUREVIEWS GOANDWRITEERROR	No. of occurrences: 128 Documentation reference:https://dev.mysql.com/doc/refman		 ▼ SYB12ALLPLATFORM\$G ▼ SYB12ALLPLATFORM\$G
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	🕨 📝 📸 LOGINFO	02 IS 03 errMsg Varchar2(4000) := NULL;	09 [340 - Severity CRITICAL - MySQL doesn't supp	SYB12ALLPLATFORM\$C
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	SETSTATUS	05 NULL;	11 */; 12 CALL SS2K5ALLPLATFORM\$LOGINFO (NUL	SYB12ALLPLATFORM\$C
	UPDATESCRATCHMODEL	06 EXCEPTION	13 END;	SYB12ALLPLATFORM\$FI
	Private functions [3]	07 08 WHEN OTHERS THEN	14	SYB12ALLPLATFORM\$FI
	V Private types	09 DBMS_OUTPUT.put_line('Exception in FixIndexes	15 IF (@SS2K5ALLPLATFORM\$InitCheck IS NULL) T	SYB12ALLPLATFORM\$FI
	 Private collection types [4] 	<pre>10 errMsg := LOCALSUBSTRB(LOCALSUBSTRB(DBMS_UTIL</pre>	16 CALL SS2K5ALLPLATFORM\$Init ();	► ✓ 🥃 SYB12ALLPLATFORM\$FI
	Private variables [8]	11 LogInfo(NULL, sev_err, 'FixIndexes Failed: out	17 END IF;	 SYB12ALLPLATFORM\$FI SYB12ALLPLATFORM\$FI
	 Private constants [6] 	12 END FixIndexes;	19 BEGIN	 SYB12ALLPLATFORM\$FI SYB12ALLPLATFORM\$FI
	Private cursors		20 END;	SYB12ALLPLATFORM\$FI SYB12ALLPLATFORM\$FI SYB12ALLPLATFORM\$FI
	Private exceptions [1]	< >	<>	

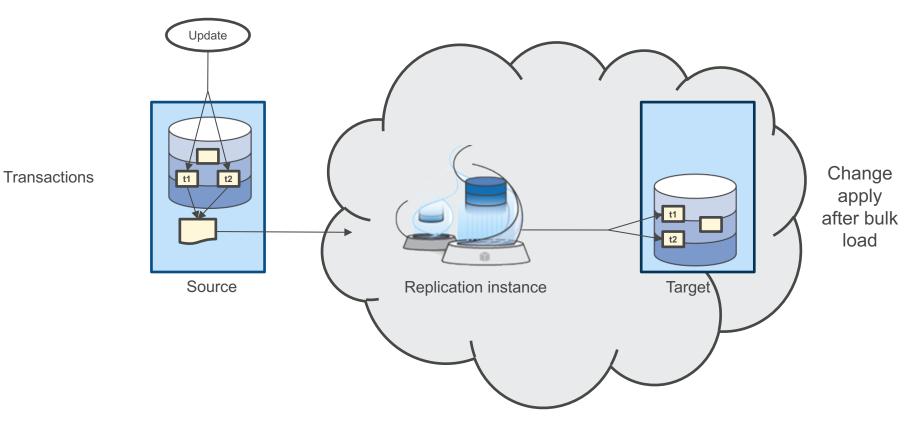
Keep your apps running during the migration



Load is table by table



Change data capture (CDC) and apply





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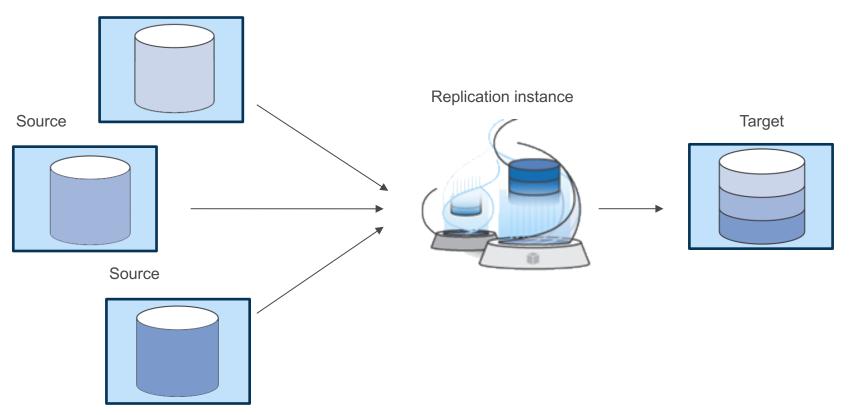
What else can I do?

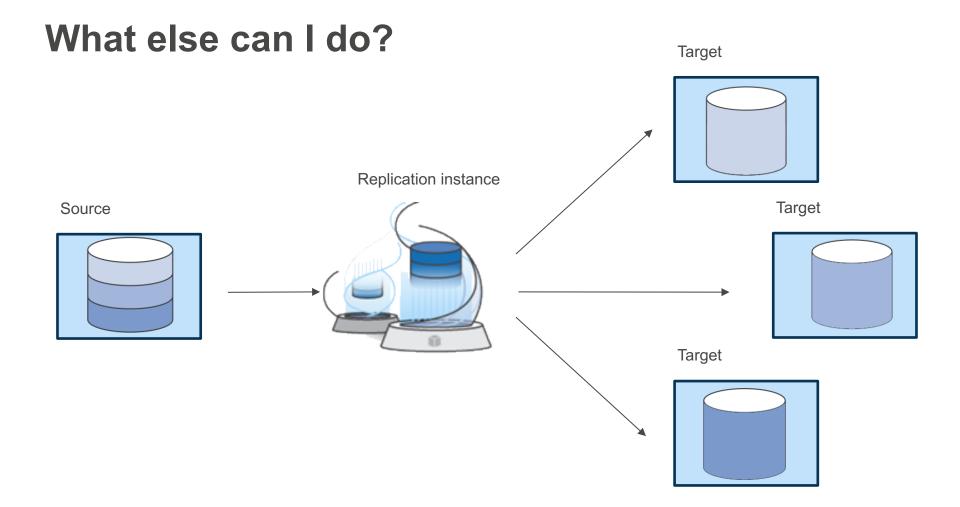




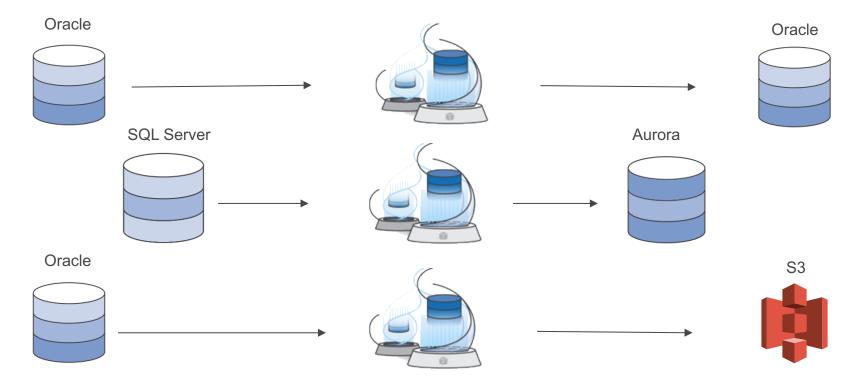
What else can I do?

Source





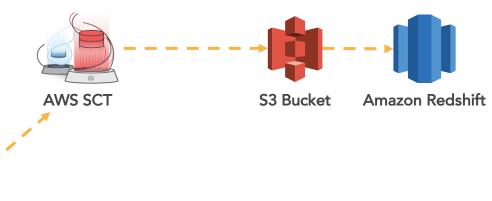
Homogenous or heterogeneous



New SCT data extractors

Extract Data from your data warehouse and migrate to Amazon Redshift

- Extracts through local migration agents
- Data is optimized for Redshift and Saved in local files
- Files are loaded to an Amazon S3 bucket (through network or Amazon Snowball) and then to Amazon Redshift





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New NoSQL support

Migrate to AWS

- Move from MongoDB to Amazon DynamoDB
- Move from MongoDB to relational db's





Move between NoSQL and SQL

- Change technologies
- ORACLE

Amazon Aurora





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What have others done?





Heterogeneous migration



Oracle private DC to RDS PostgreSQL migration Used the AWS Schema Conversion Tool to convert their database schema

Used on-going replication (CDC) to keep databases in sync until they reached the cutover window

Benefits:

- Improved reliability of the cloud environment
- Savings on Oracle licensing costs
- SCT Assessment Report let them understand the scope of the migration

Scale-up migration



RDS MySQL to Amazon Aurora Migration Used DMS with on-going replication (CDC) to migrate the data Benefits:

- Aurora handles their larger data storage requirements. Per regulations they are storing 120 TB of data for 2 years
- Reduced cost and improved performance when compared to large MySQL instances

Homogeneous migration



RDS MySQL on EC2 Classic to VPC Database ran an end-user application so could not take downtime 70 RDS instances have been migrated Benefits:

- Leveraging CDC, they could decrease outage per database to less than 5 mins
- 70 RDS instances have been seamlessly migrated

Split migration



35 million members on it's site

Many interdependent applications built over the last 15 years with unique High IOPS requirements

Migration from legacy cloud service to AWS

Combination of migration to MySQL on EC2 and Amazon Aurora

Benefits:

- DMS reduced the time required to migrate our databases by 40 percent
- Realized 55 percent cost savings by moving some db's to Amazon Aurora



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Wrapping up



Other database migration use cases

Migration of business-critical applications Migration from Classic to VPC Cheap Read Replicas for Oracle Read Replicas for other engines Cross-region Read Replicas for Oracle and SQL Server Analytics in the cloud Dev/test and production environment sync Ongoing replication for BI Minor version upgrade

AWS database migration partners





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Thank you!

aws.amazon.com/dms

webservices