



Best Practices for Migrating from SQL Server to Amazon Aurora

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Agenda – Part 2

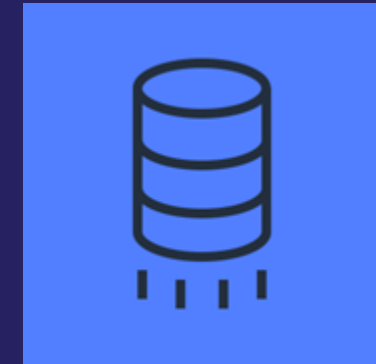
- ❑ AWS SCT – Best Practices
- ❑ SQL Server as Source
 - Multi Server Assessment
 - Demo
- ❑ DMS Best Practices - Tasks
 - Validation
 - Extra Connection Attributes,
 - Logging & Troubleshooting
- ❑ AWS DMS – Overview
 - Demo
- ❑ Best Practices and Lessoned Learned by Datavail
- ❑ Q&A



AWS

SCT – Schema Conversion Tool

DMS – Database Migration Service



AWS migration tooling

- **Our goal:** Allow customers the freedom to choose the best data platform for their needs [#DBFreedom](#)



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



AWS Schema Conversion Tool (AWS SCT)

Aws SCT 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

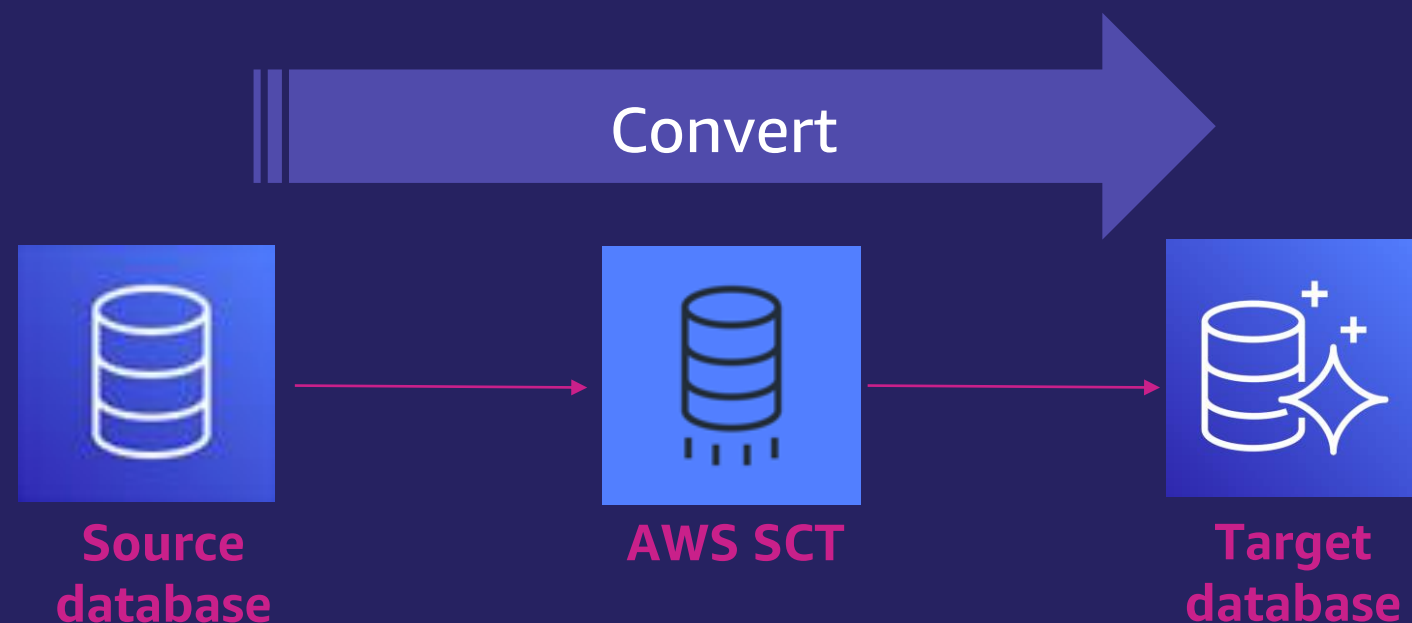
Code browser that highlights places where manual edits are required

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



AWS SCT – Schema Conversion Tool

Assessment Reports

- Generate for single or multiple sources
- Storage Objects
- Code Objects
- Playbooks

[Learn more >](#)

Conversion Actions

- High occurrence, Simple Actions
- Breakdown Code Objects to their essence

[Learn more >](#)

Apply to Database

- Apply directly using the UI.
- Save DDL Scripts and execute directly on the target database

[Learn more >](#)

AWS Schema Conversion Tool

2

1

3

4

5

The screenshot displays the AWS Schema Conversion Tool interface. At the top, the title bar reads "AWS Schema Conversion DB Mod Week 2022 -- AWS Schema Conversion Tool". The menu bar includes "File", "Actions", "Assessment Report view", "Settings", "Applications", "Help", "Add source", and "Add target". The "AWS profile" is set to "Cedrick_AWS".

The main window is divided into several sections:

- Left Panel (Tree View):** Shows a hierarchical view of the source database. Under "LocalDevInstance", "Databases [11]" is expanded to "AdventureWorks2019", which is further expanded to "Schemas [6]". The "dbo" schema is selected, and a context menu is open with options like "Create mapping...", "Create report", "Convert schema", "Register agent", "Compare schema", "Load schema", "Hide schema", "Refresh from database", "Collect statistics", "Upload statistics", "Create DMS task", "Create Local & DMS task", "Create Local task", "Add virtual partitioning", "Save as SQL", "Aggregate functions", "Synonyms", "Sequences", "Types [6]", "Table types", "User-Defined Types", "XML Schema Collections", "HumanResources", "Person", "Production", "Purchasing", "Sales", "Database triggers [1]", "AmazonCat1", and "ChangeManagement".
- Top Center (Issues):** A list of conversion issues. The first issue is "Issue: 7634: PostgreSQL doesn't support the SCHEMABINDING option. Automatic conversion ignores this clause". Other issues include "Issue: 7679: A computed column is replaced by the triggers", "Issue: 7681: PostgreSQL doesn't support clustered indexes", and "Issue: 7791: PostgreSQL doesn't support the DATA_COMPRESSION option in indexes".
- Bottom Center (SQL Code):** Two panes showing the source and target SQL. The source pane shows a Microsoft SQL Server procedure: "Source Microsoft SQL Server procedure: uspSearchCandidateResumes". The target pane shows the converted Amazon Aurora (PostgreSQL compatible) procedure: "Target Amazon Aurora (PostgreSQL compatible) procedure: uspsearchcandidateresumes".
- Right Panel (Tree View):** Shows the target database structure. Under "Servers", "<PostgreSQL (virtual)>" and "<Aurora_PostgreSQL (virtual)>" are listed. The "Schemas [6]" folder is expanded, showing "adventureworks2019_dbo" with sub-items for "Tables [3]", "Views", "Procedures [7]", "Functions [11]", "Sequences", "Domains [6]", "User defined types", and "Foreign Servers".

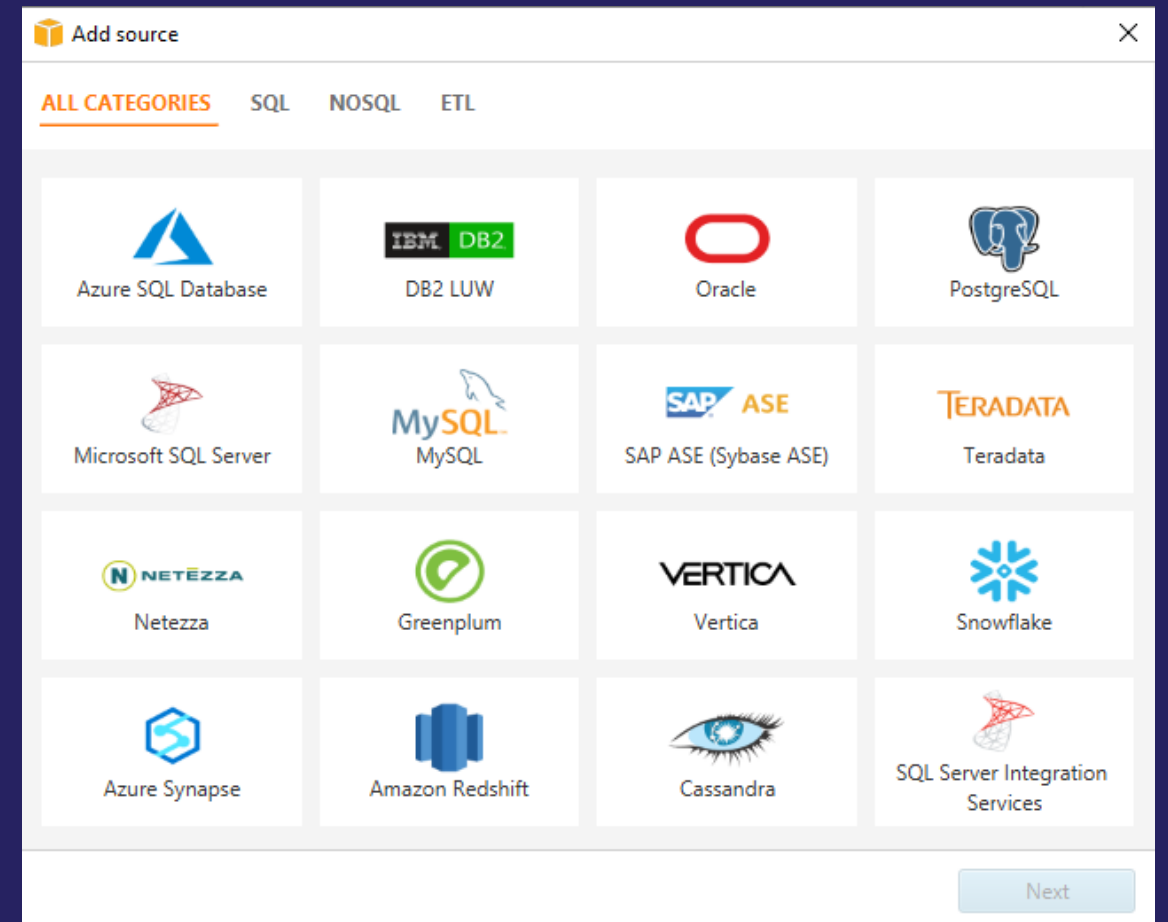
At the bottom of the window, memory usage statistics are displayed: "Used memory: 1.28 GB, Free memory: 3.74 GB, Total memory: 5.02 GB, Maximum memory: 7.11 GB".



AWS SCT – Advanced Demo

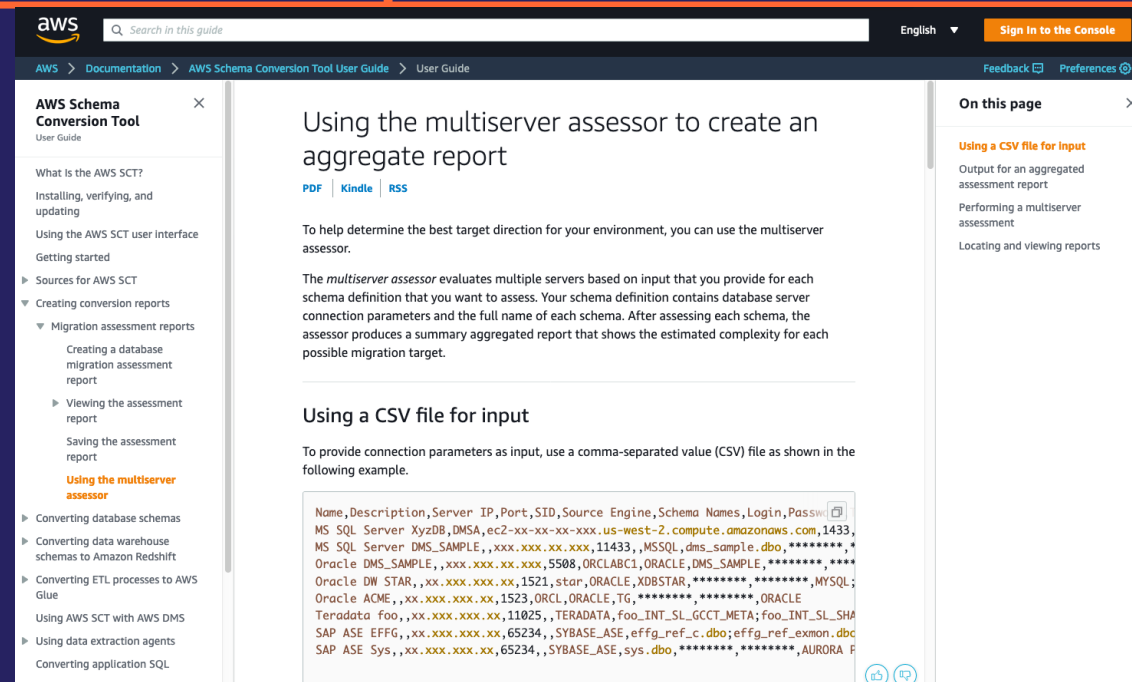
- SCT Multi server navigation
- Mapping Rule and View
- Virtual Targets
- Assessment Report
 - Minor Issues , Major Problems: 9996, 9997
- Object Conversions
 - Application Code Module
 - SQL File - Trigger

New in 6.57



SCT Best Practices - Assessment

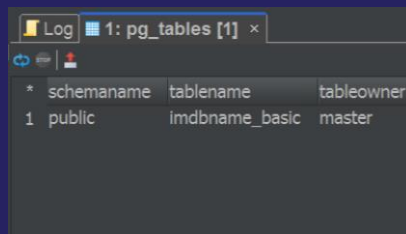
- Use the new SCT Multi-server Assessment feature
- This makes it easier to run assessments against multiple databases and schemas on multiple servers.
- https://docs.aws.amazon.com/SchemaConversionTool/latest/userguide/CHAP_AssessmentReport.Multiserver.html



SCT Best Practices - Conversion

- Don't treat the target like the source. Understand your differences.
- Some Basic Examples:

Hint: Just getting started with PostgreSQL? Check out the "Introduction to PostgreSQL" chapter in the AWS PostgreSQL Immersion Day: <https://rdspg.workshop.aws/>



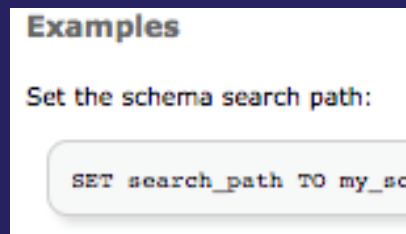
* schemaname	tablename	tableowner
1 public	imdbname_basic	master

PostgreSQL is a lowercase data dictionary & is case sensitive

Select FirstName from Person

!=

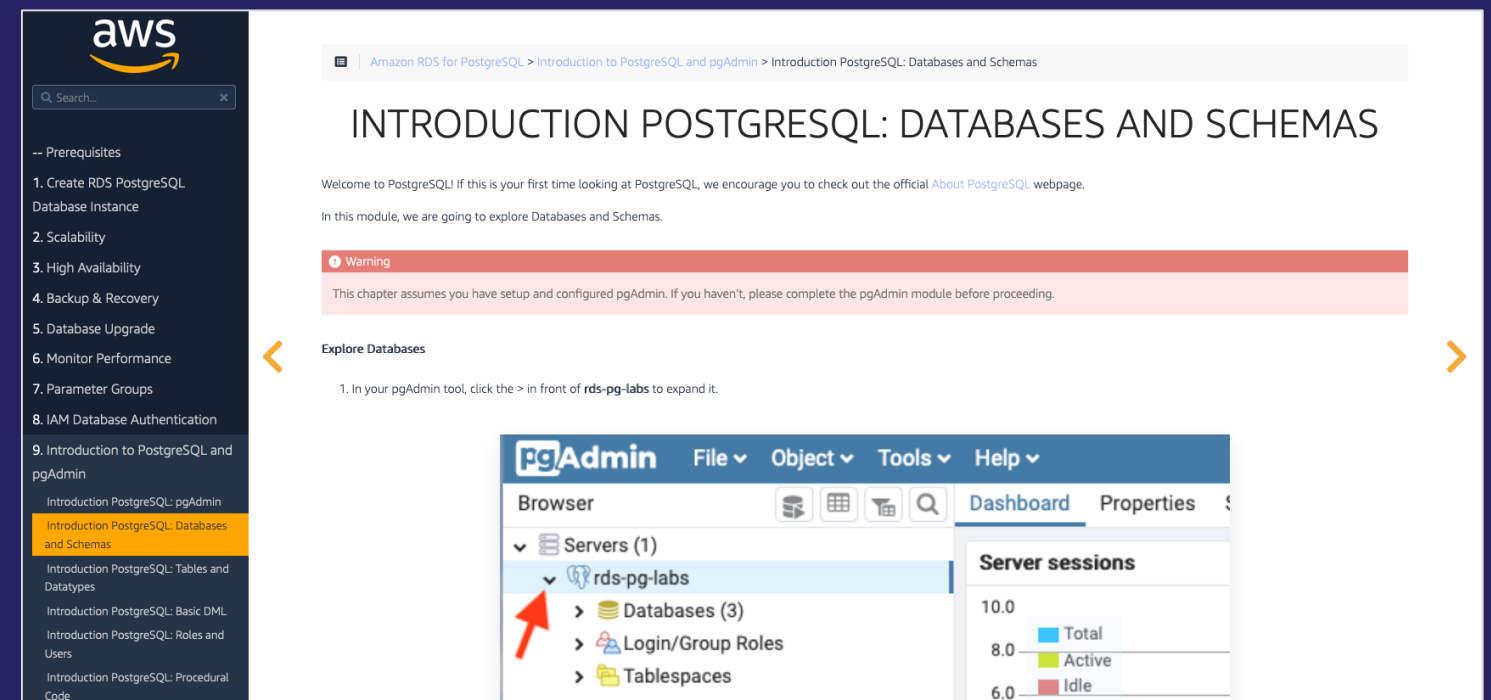
Select firstname from person



search_path replaces fully qualified object names and synonyms

PostgreSQL doesn't support hints on inline SQL statements.

Remove hints such as with NOLOCK or with OPTION RECOMPILE



The screenshot shows the AWS PostgreSQL Immersion Day documentation page titled "INTRODUCTION POSTGRESQL: DATABASES AND SCHEMAS". It includes a table of contents on the left and a main content area with a warning message and instructions to explore databases. Below the documentation is a screenshot of the pgAdmin interface showing a server tree with "rds-pg-labs" selected, and a "Server sessions" panel on the right.



AWS DMS

Database Migration Service

DMS – Database Migration Service

Replication Instance

- DMS Replication Instances are ec2 hosts with migration software preinstalled.
- Choose the right Instance Type
- Accessible through the AWS Console or the AWS CLI and APIs

[Learn more ›](#)

Endpoints

Endpoints can be:

- Relational
- NoSQL
- File Based(s3)

[Source Types](#)

[Target Types](#)

[Learn more ›](#)

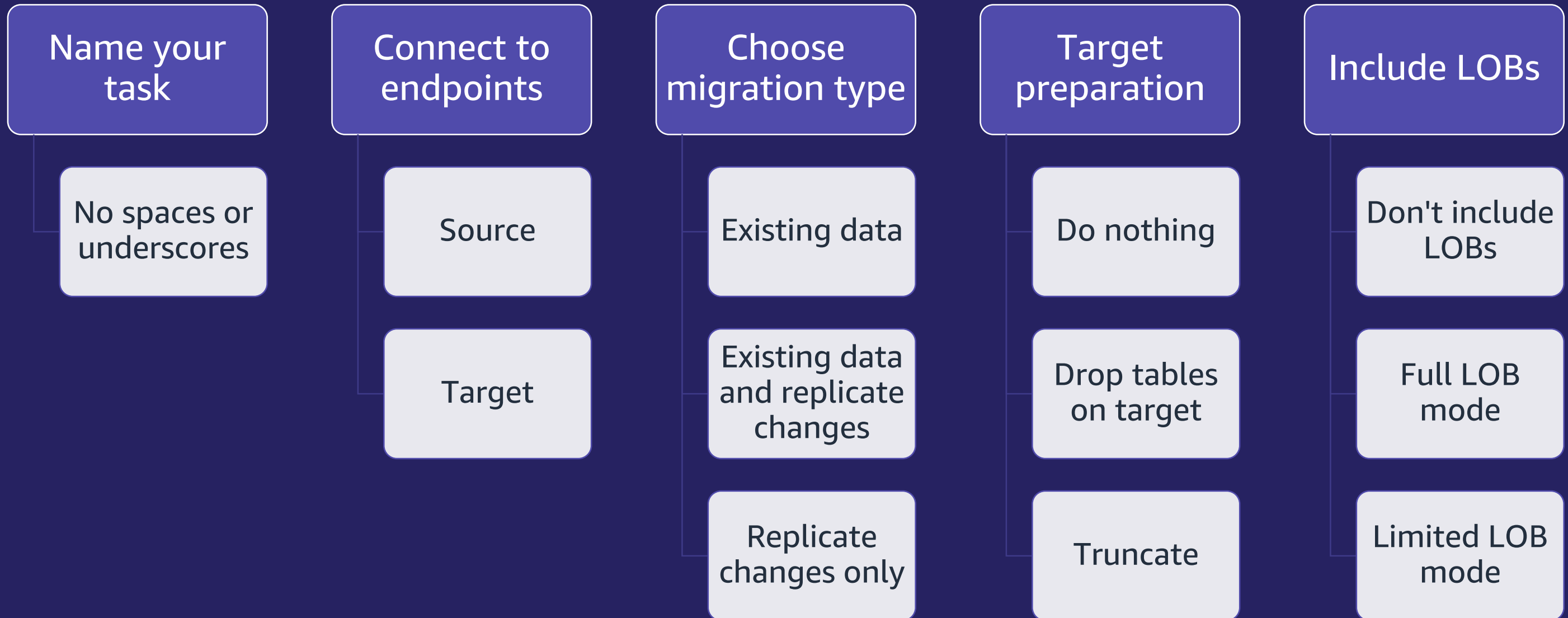
Tasks

- Migration type
- Target Preparation
- Include LOBs
- Extra Connection Attributes
- Logging & Troubleshooting
- Validation

[Learn more ›](#)

DMS – Database Migration Service

Task



AWS DMS – SQL Server as a Source

- Start Here: Limitations and Prerequisites
- Working With Always On Availability Groups
 - Server and Database Maintenance
- Extra Connection Attributes
 - MultiSubnetFailover=Yes
 - alwaysOnSharedSynchedBackupsEnabled
 - MultiSubnetFailover=Yes
- Data Types
 - LOBS, CLOBS, NCLOBS = VARCHAR, NVARCHAR, XML
 - Full LOB vs Inline LOB Mode
- DEMO
- https://docs.aws.amazon.com/dms/latest/userguide/CHAP_Source.SQLServer.html





Thank you!

Cedrick Hoodye

Database Migration Accelerator Team



Datavail's TechBoost Modernization Journey from SQL Server to Amazon Aurora PostgreSQL

Trevor Banks, Datavail

AWS Advanced Tier Consulting Partner

- **AWS Certifications**

- Cloud Practitioner
- Technical Certifications
- AWS Solution Architects Associate and Professional
- AWS SysOps Associate Admin
- AWS Developer Associate
- AWS Database Specialty

- **Competencies**

- Windows Workloads Competency
- Migration*

- **Service Delivery Partner**

- Amazon RDS
- Amazon EC2
- AWS Database Migration Service*

- **Programs**

- Aurora Optimization Program
- Babelfish Program
- Database Freedom Program
- Windows Rapid Migration Program
- Windows Modernization Program
- Well Architected Review Program

*competency and SD in process



Advanced Consulting Partner

Microsoft Workloads

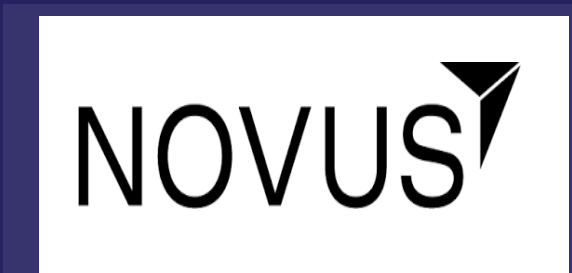
AWS Public Sector Partner

Amazon EC2 for Windows Server

Amazon RDS

Immersion Day Program

Examples of Datavail Modernization Customers



What is TechBoost?

Overview:

Datavail's TechBoost is our multi-tenant cloud-based SaaS platform that collects and analyzes database metrics in near real-time, assists database administrators through useful insights, performs auto-remediation and assists with root-cause analysis .

Broad Database Support:

Datavail TechBoost is currently helping more than 400 customers monitor 400,000 databases and resolve 2 million incidents.

Business Drivers for Modernization

Cost, Scalability, and Reliability

- No RDBMS license fees
- Autoscaling with demand
- Multi-AZ reliability and durability

Integration of Aurora PostgreSQL

- IAM authentication
- CloudWatch monitoring
- S3 backups

Tools and Technology

- AWS SCT
- AWS DMS
- Some manual code conversion based on SCT output

Our Response

1

Inventory Expected Changes

We determined the changes we would likely need to make.

2

Build Target Database

Using AWS SCT's output, build the target database schema in AWS Aurora PostgreSQL.

3

Change Application Code

Convert SQL Server code to PostgreSQL

4

Migrate Data

Rigorous testing first, then the migration.

Outcomes/Lessons Learned:

- Performance has improved.
- Case sensitivity differences should be tested.
- Table constraint consistency.
- Migration with minimal production downtime can be challenging, but is doable.
- AWS DMS and SCT are invaluable tools, but do benefit from manual testing alongside them.



Thank you!