



Azure SQL Database Migration

Module 6



Learning Units covered in this Module

- Lesson 1: Steps to migrate your database to Azure SQL Database
- Lesson 2: Is your database ready to move to Azure SQL database?
- Lesson 3: Fix database migration compatibility issues
- Lesson 4: Identify the right Azure SQL Database SKU
- Lesson 5: Migrate a compatible SQL Server database to Azure SQL Database

Lesson 1: Steps to migrate your database to Azure SQL Database

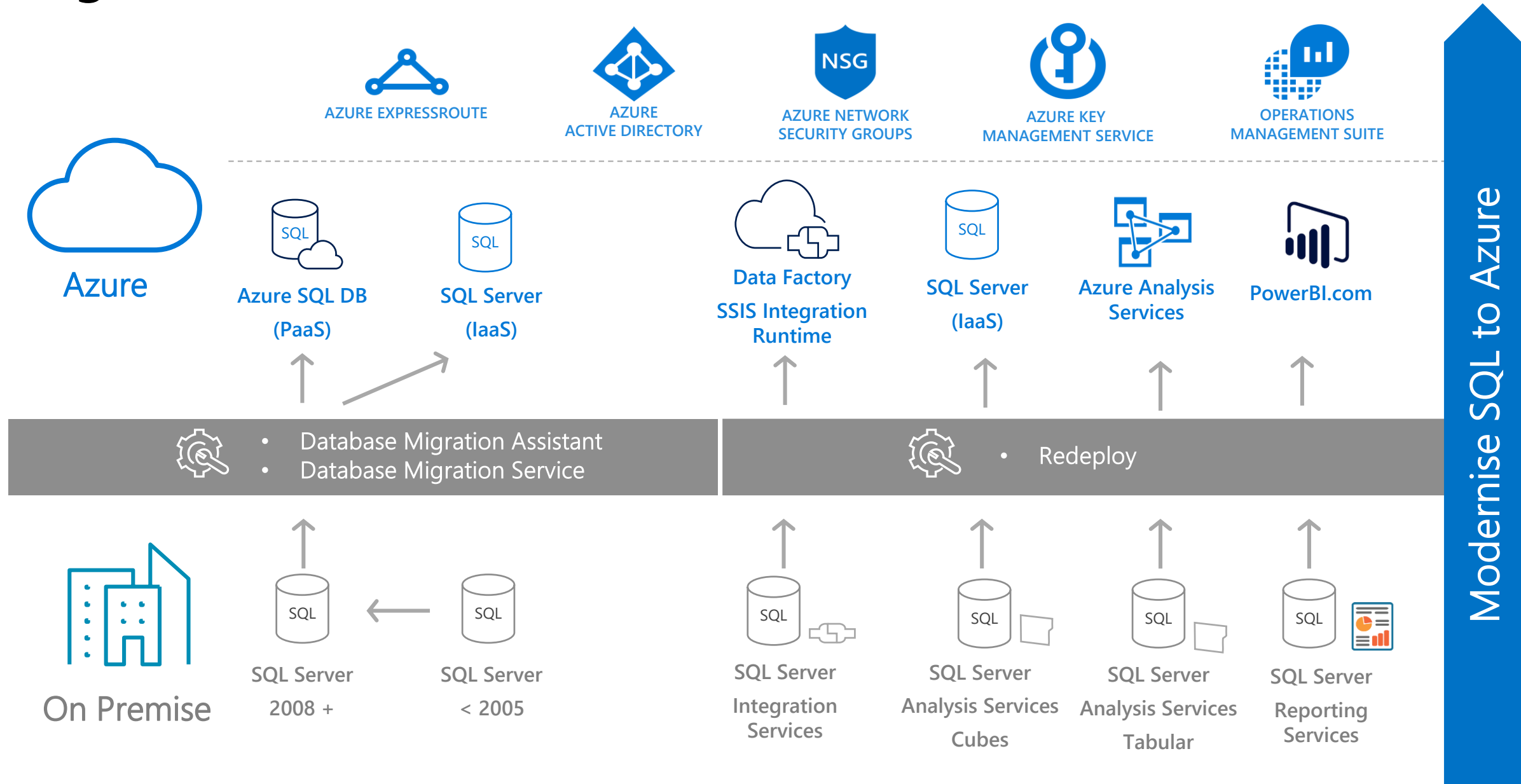
Objectives

After completing this learning, you will be able to:

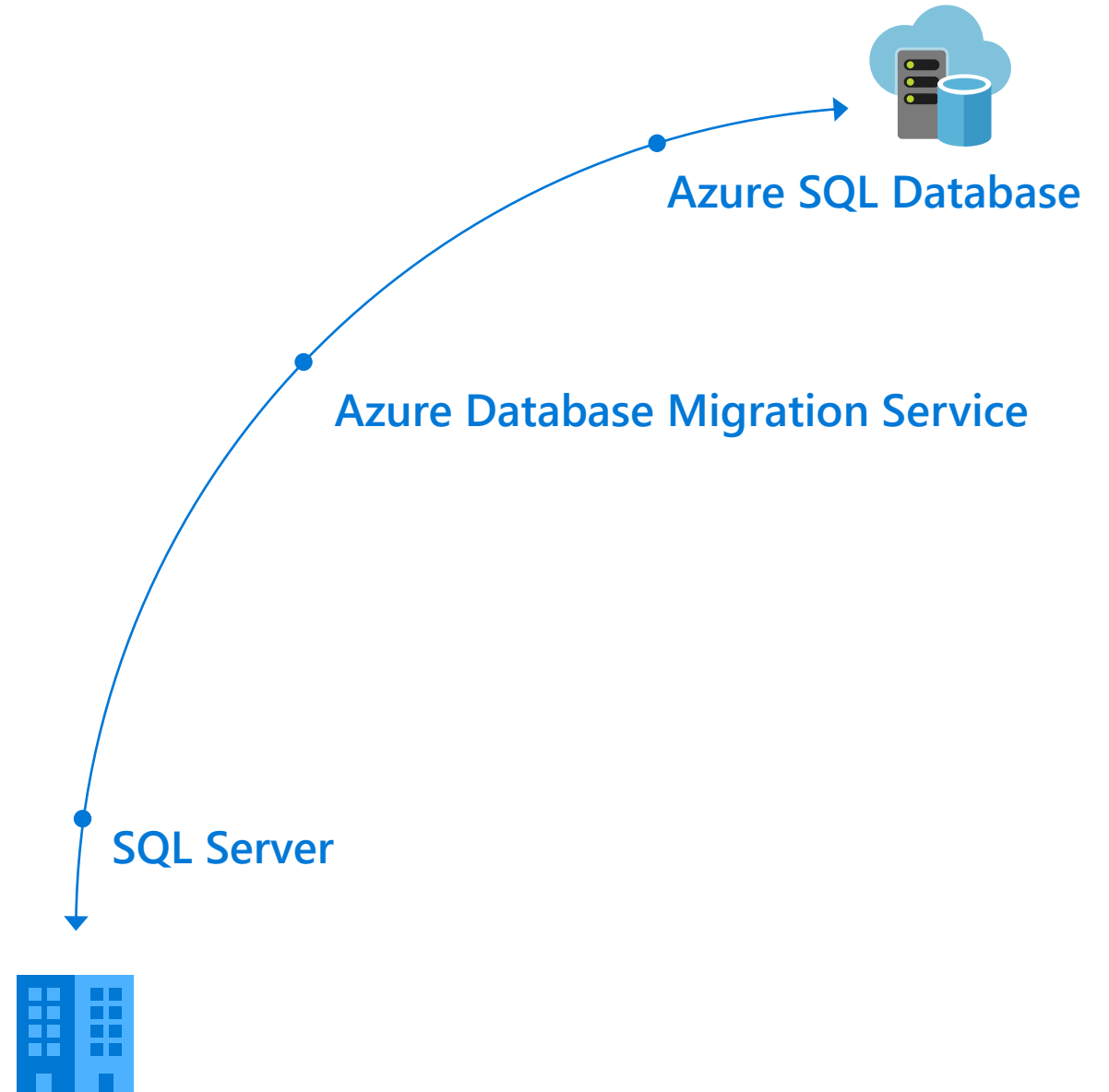
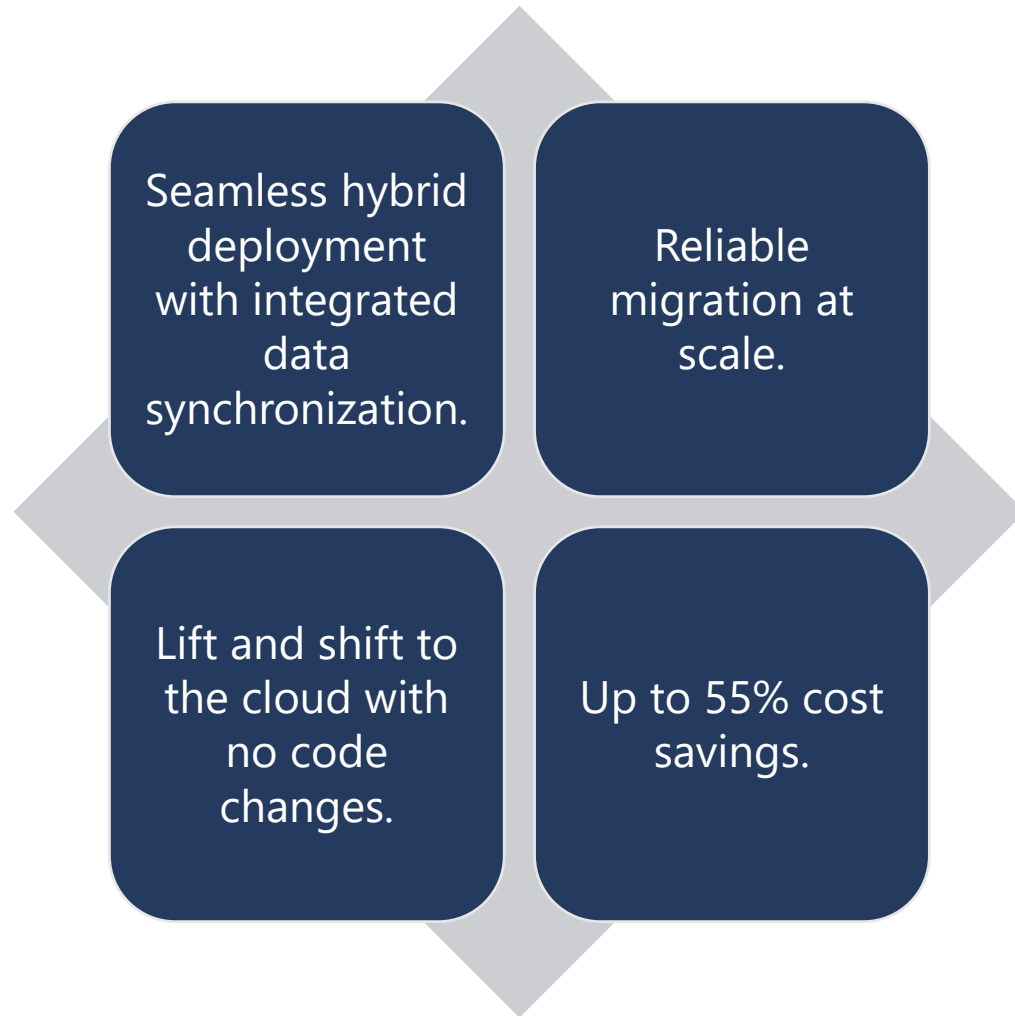
- Get an overview of the migration steps. We will discuss these steps further in this module.



Migration of SQL Server to Azure - Overview



A hybrid Journey to the Cloud



Migration Steps

Assess the database

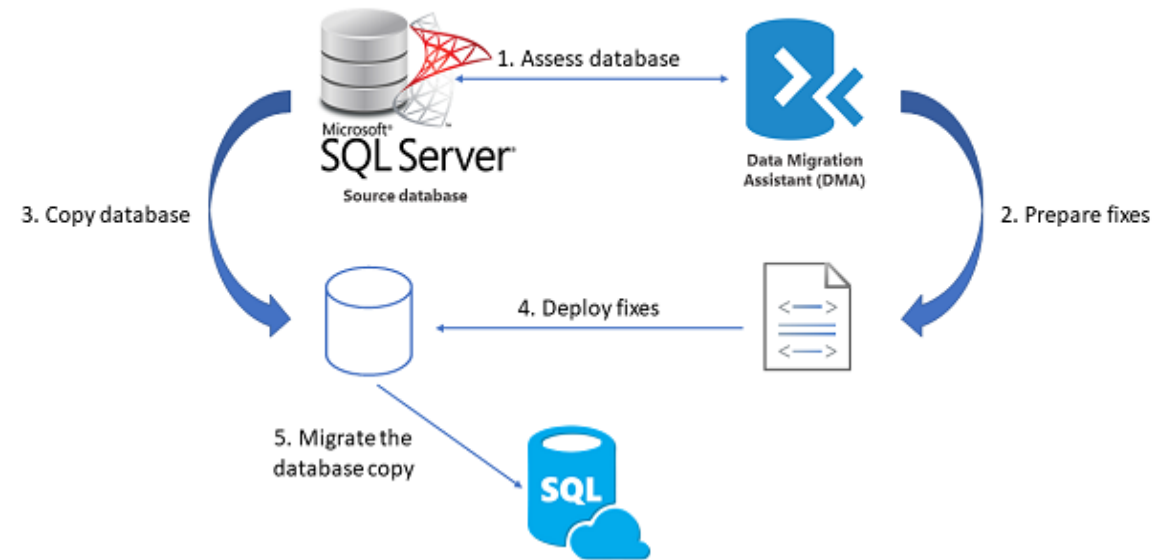
Prepare any necessary fixes as Transact-SQL scripts.

Make a transitionally consistent copy of the source database.

Deploy the Transact-SQL scripts to apply the fixes to the database copy.

Migrate the database copy to a new Azure SQL Database.

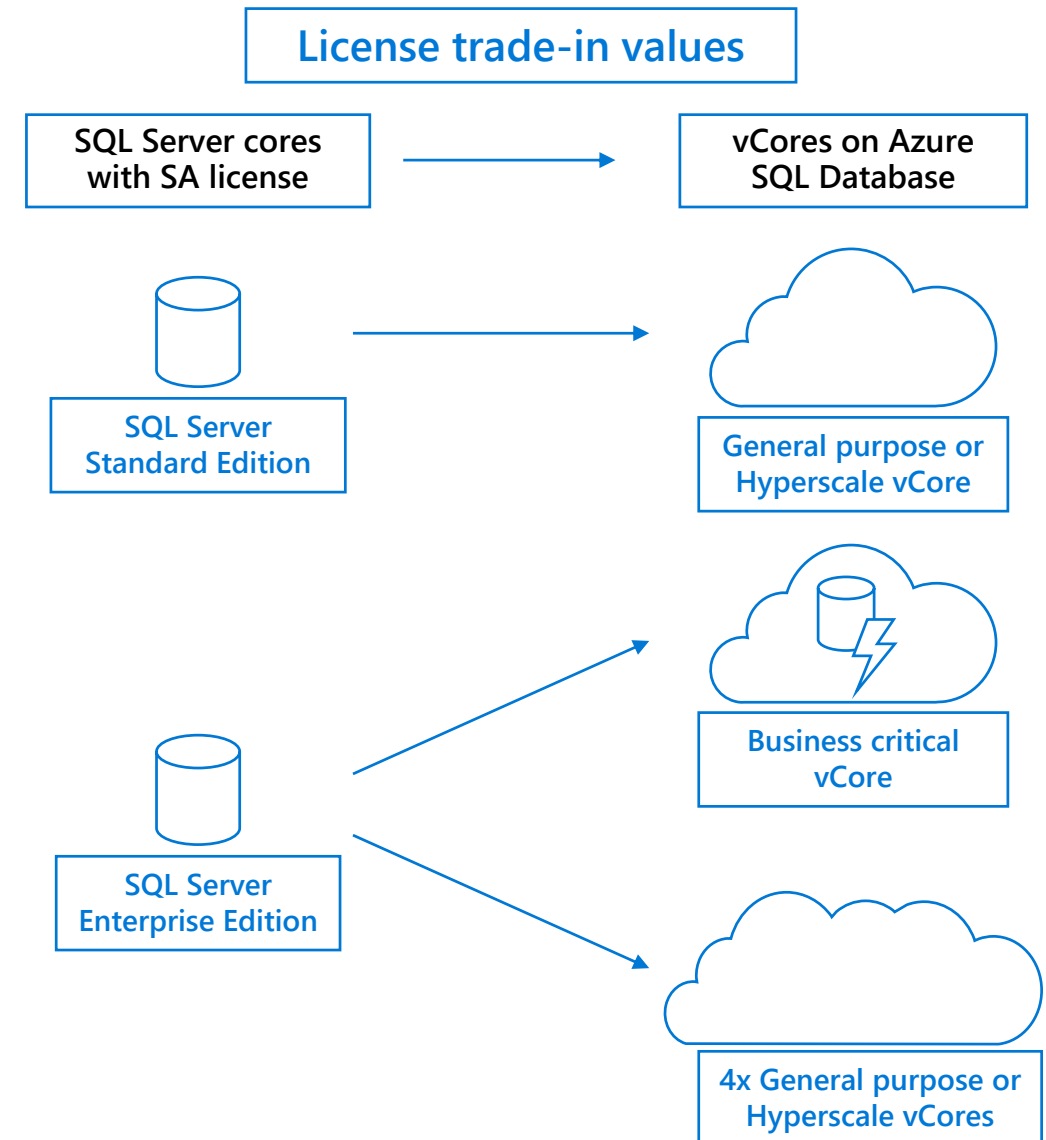
Azure SQL Database migration



Azure Hybrid Benefit for SQL Server

Take an inventory of on-premises licenses to determine potential for conversion. Convert on-premises cores to vCores to maximize value of investments.

- 1 Standard license core = 1 General Purpose or Hyperscale core.
- 1 Enterprise license core = 1 Business Critical core.
- 1 Enterprise license core = 4 General Purpose or Hyperscale cores (virtualization benefit).



Questions?



Lesson 2: Is your database ready to move to Azure SQL database?

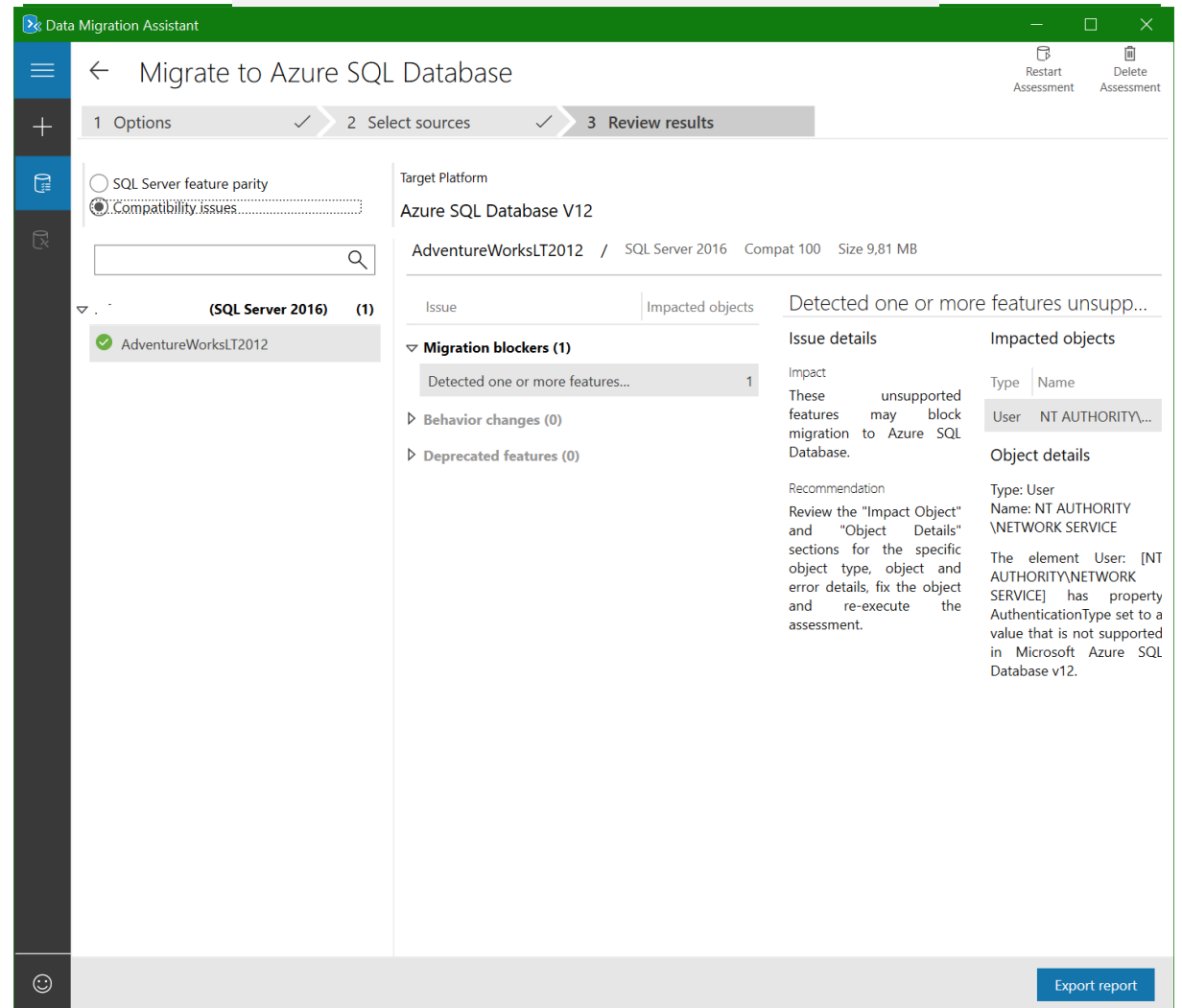
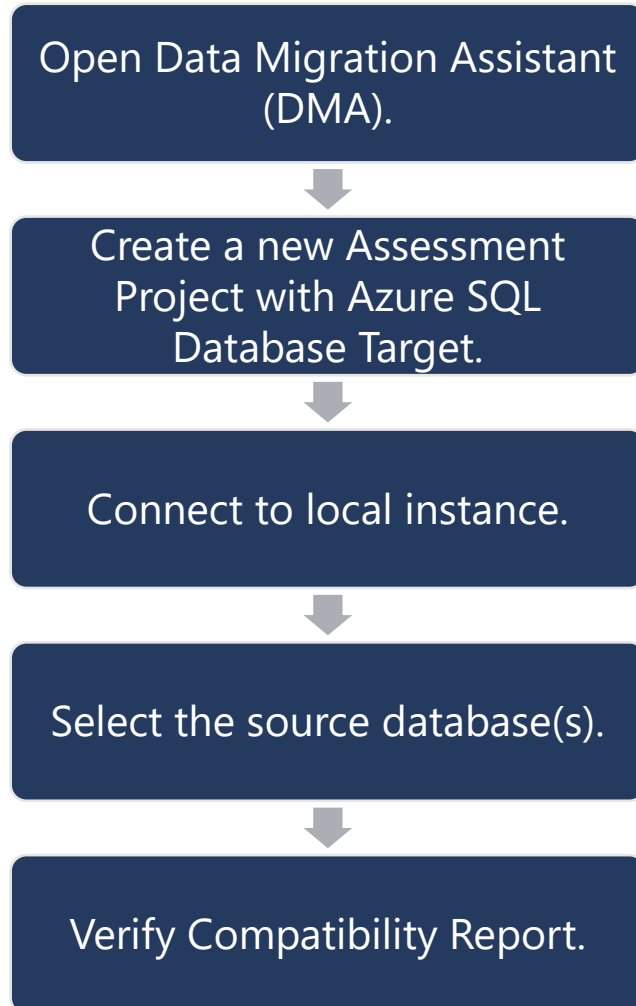
Objectives

After completing this learning, you will be able to:

- Analyze if your database is compatible for migration to Azure SQL Database.



Determine Compatibility with DMA



Demonstration

Verify your database for compatibility issues with DMA.



Questions?



Lesson 3: Fix database migration compatibility issues

Objectives

After completing this learning, you will be able to:

- Choose which tools you can use to fix compatibility issues.



Fix Database Migration Compatibility Issues

Compatibility issues must be fixed before proceeding with the SQL Server Database migration.

You can use DMA + Extended Events to evaluate any ad hoc or dynamic SQL queries or any DML statements initiated through the application data layer.

A wide variety of compatibility issues.

Use the following resources:

- [SQL Server database features not supported in Azure SQL Database](#)
- [Discontinued Database Engine Functionality in SQL Server 2019](#)
- [Discontinued Database Engine Functionality in SQL Server 2017](#)
- [Discontinued Database Engine Functionality in SQL Server 2016](#)
- [Discontinued Database Engine Functionality in SQL Server 2014](#)
- [Discontinued Database Engine Functionality in SQL Server 2012](#)
- [Discontinued Database Engine Functionality in SQL Server 2008 R2](#)

Questions?



Lesson 4: Identify the right Azure SQL Database SKU

Objectives

After completing this learning, you will be able to:

- Right size your Azure SQL Database using the current SQL Server metrics.



Azure SQL SKU Recommendations

Console Command – Pre-requisites

1

Download and install the latest version of [DMA](#). If you already have an earlier version of the tool, open it, and you'll be prompted to upgrade DMA.

2

Install the minimum version [.NET Core 3.1](#) on the tools machine where the SKU recommendations console application is running.

3

Ensure the account used to connect to your SQL Server on-premises source has sysadmin permission.

Azure SQL SKU Recommendations

Console Command - Setup

Navigate to the SQL Assessment Console Folder

- `CD "C:\Program Files\Microsoft Data Migration Assistant\SQLAssessmentConsole"`

Collect Performance Data (Replace <instancename> with your SQL Server name. This step will take 15-20 minutes.

- `.\SqlAssessment.exe PerfDataCollection --sqlConnectionStrings "Data Source=<instancename>; Initial Catalog=master; Integrated Security=True;" --outputFolder C:\Output`

Azure SQL SKU Recommendations

Console Command – Reports

To get assessment for Azure SQL Database

- `.\SqlAssessment.exe GetSkuRecommendation --outputFolder C:\Output --targetPlatform AzureSqlDatabase`

To get assessment for Azure SQL Managed Instance

- `.\SqlAssessment.exe GetSkuRecommendation --outputFolder C:\Output --targetPlatform AzureSqlManagedInstance --elasticStrategy true`

To get assessment for Azure SQL Virtual Machine

- `.\SqlAssessment.exe GetSkuRecommendation --outputFolder C:\Output --targetPlatform AzureSqlVirtualMachine`

Identify the right Azure SQL Database SKU for your on-premises database

Database Migration Assistant: (DMA)

- Provides SKU recommendations in a user-friendly output based on performance counters collected from the computer(s) hosting your databases.
- It has several deployment options, including:
 - Single database
 - Elastic pools
 - Managed instance

Azure SQL DB SKU Recommendations

We have analyzed 3 databases. For each database, we have identified the minimum recommended Azure SQL DB SKU based off of the performance counters collected from your instances. For more detailed information about the predictions, please refer to one of the text-based output formats.

The sliders below can be used to adjust the compute level and the maximum data size for each database. After configuring the databases and entering the subscription information, click "Generate Provisioning Script" to generate a powershell script that can be used to provision the databases.

Subscription information

Subscription Id:	<input type="text"/>	Resource Group:	<input type="text"/>	Server Admin Username:	<input type="text"/>
Region:	<input type="button" value="West US"/>	Server Name:	<input type="text"/>	Server Admin Password:	<input type="text"/>

Configure Databases

Provision	Database Name	Pricing Tier	Compute Level	Max Data Size	Est. Cost Per Month
<input checked="" type="checkbox"/>	edw_3g	<input type="button" value="Premium"/>	P1 (125 DTU) <cost> <div><div></div></div>	Max Data Size: 40 Gb <cost> <div><div></div></div>	<cost>
<input checked="" type="checkbox"/>	mydb	<input type="button" value="Premium"/>	P1 (125 DTU) <cost> <div><div></div></div>	Max Data Size: 5 Gb <cost> <div><div></div></div>	<cost>
<input checked="" type="checkbox"/>	tpcds1g	<input type="button" value="Premium"/>	P1 (125 DTU) <cost> <div><div></div></div>	Max Data Size: 5 Gb <cost> <div><div></div></div>	<cost>
Total Estimated Monthly Cost					<cost>

NOTE: Price refresh failed for region West US. Prices shown are approximate. For the latest price, please consult the Azure Portal or retry with the proper authentication options enabled at a later time.

☐ I already have a SQL Server License (up to 55% savings).

Identify the right Azure SQL Database SKU for your on-premises database (continued)

This feature provides recommendations related to:

- pricing tier
- compute level
- max data size
- estimated cost per month.

Furthermore, it offers the ability to bulk provision single databases and managed instances in Azure for all recommended databases.

Azure SQL MI SKU Recommendations

We have analyzed 3 databases. For the collection of databases, we have identified the minimum recommended Azure SQL MI SKU based off of the performance counters collected from your instances. For more detailed information about the predictions, please refer to one of the text-based output formats.

The sliders below can be used to adjust the compute level and the maximum data size for each database. After configuring the databases and entering the subscription information, click "Generate Provisioning Script" to generate a powershell script that can be used to provision the databases.

Subscription information

Subscription Id:

Resource Group:

Region:

West US

Instance Name:

Instance Admin Username:

Instance Admin Password:

VNet Name:

SubNet Name:

Configure Databases

Provision	Database Name(s)	Pricing Tier	Compute Level	Max Data Size	Est. Cost Per Month
<input checked="" type="checkbox"/>	edw_3g, mydb, tpeds1g	General Purpose Gen 5	8 VCores < cost>	Max Data Size: 64 Gb < cost>	< cost>
				Total Estimated Monthly Cost	< cost>

NOTE: Price refresh failed for region West US. Prices shown are approximate. For the latest price, please consult the Azure Portal or retry with the proper authentication options enabled at a later time.

☐ I already have a SQL Server License (up to 55% savings).

Reset All to Recommended

Generate Provisioning Script

Demonstration

SQL SKU Assessment Console

Using the Assessment Console to get a recommendation on correct Azure SQL SKU.



Questions?



Lesson 5: Migrate a compatible SQL Server database to Azure SQL Database

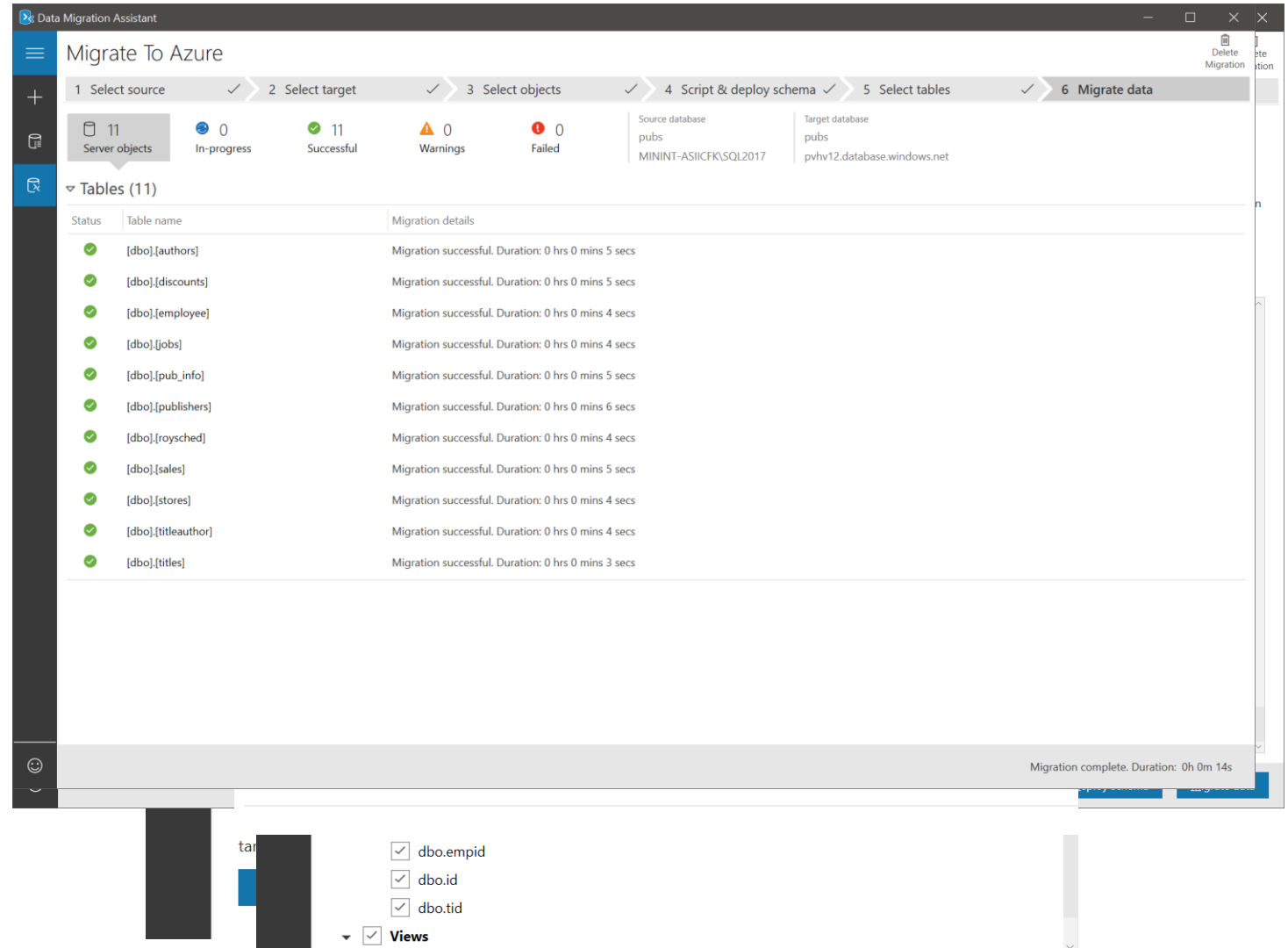
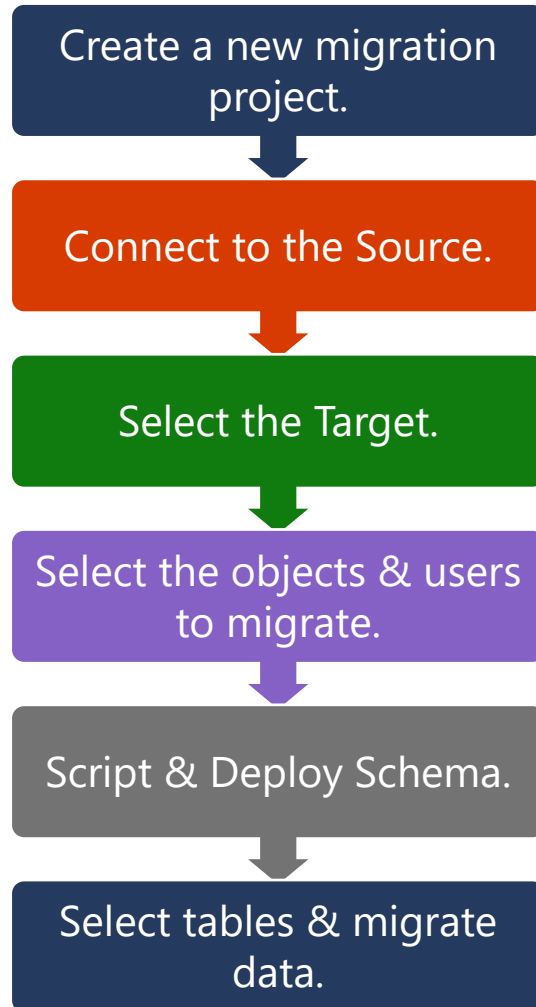
Objectives

After completing this learning, you will be able to:

- Migrate your compatible on-premises database to Azure SQL Database.



Migration Methods – DMA

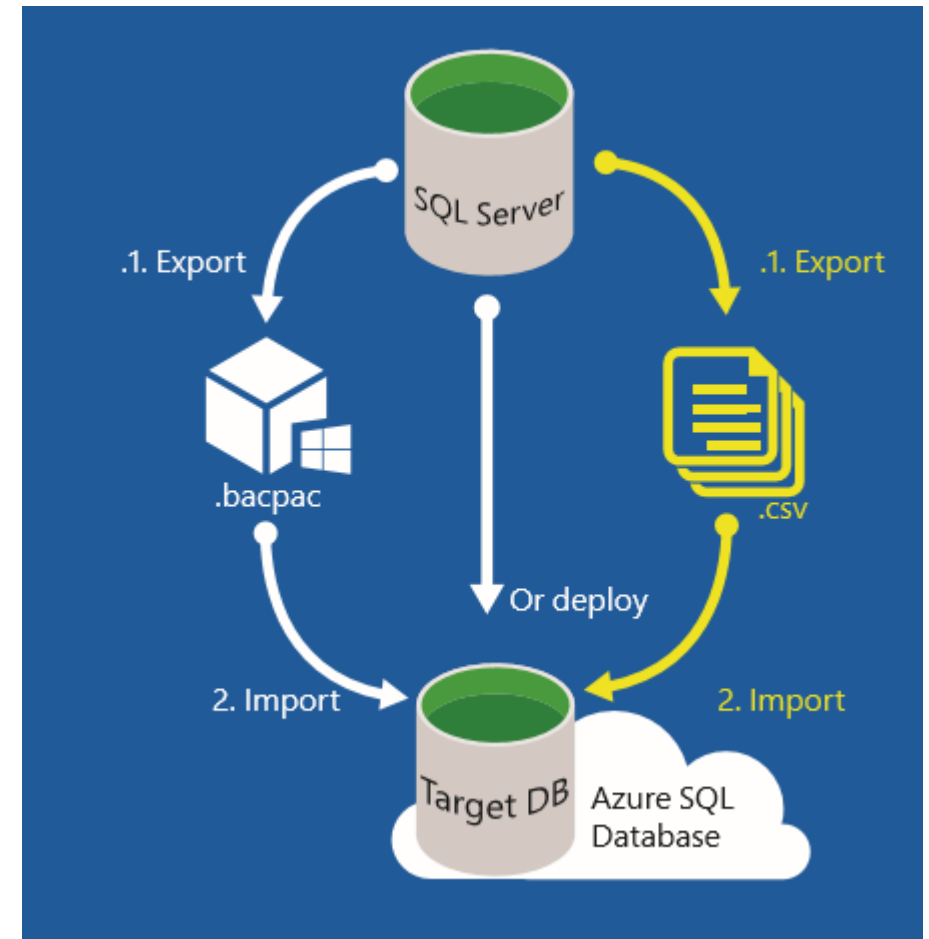


Migration Methods – Export/Import with DACPAC File and BCP

Used for much larger databases to achieve greater parallelization for increased performance.

Migrate the schema and the data separately:

- Export the schema only to a DACPAC file.
- Import the schema only from the DACPAC File into SQL Database.
- Use BCP to extract the data into flat files and then parallel load these files into the Azure SQL Database.
- Investigate using SQLPackage.exe



Transactional Replication

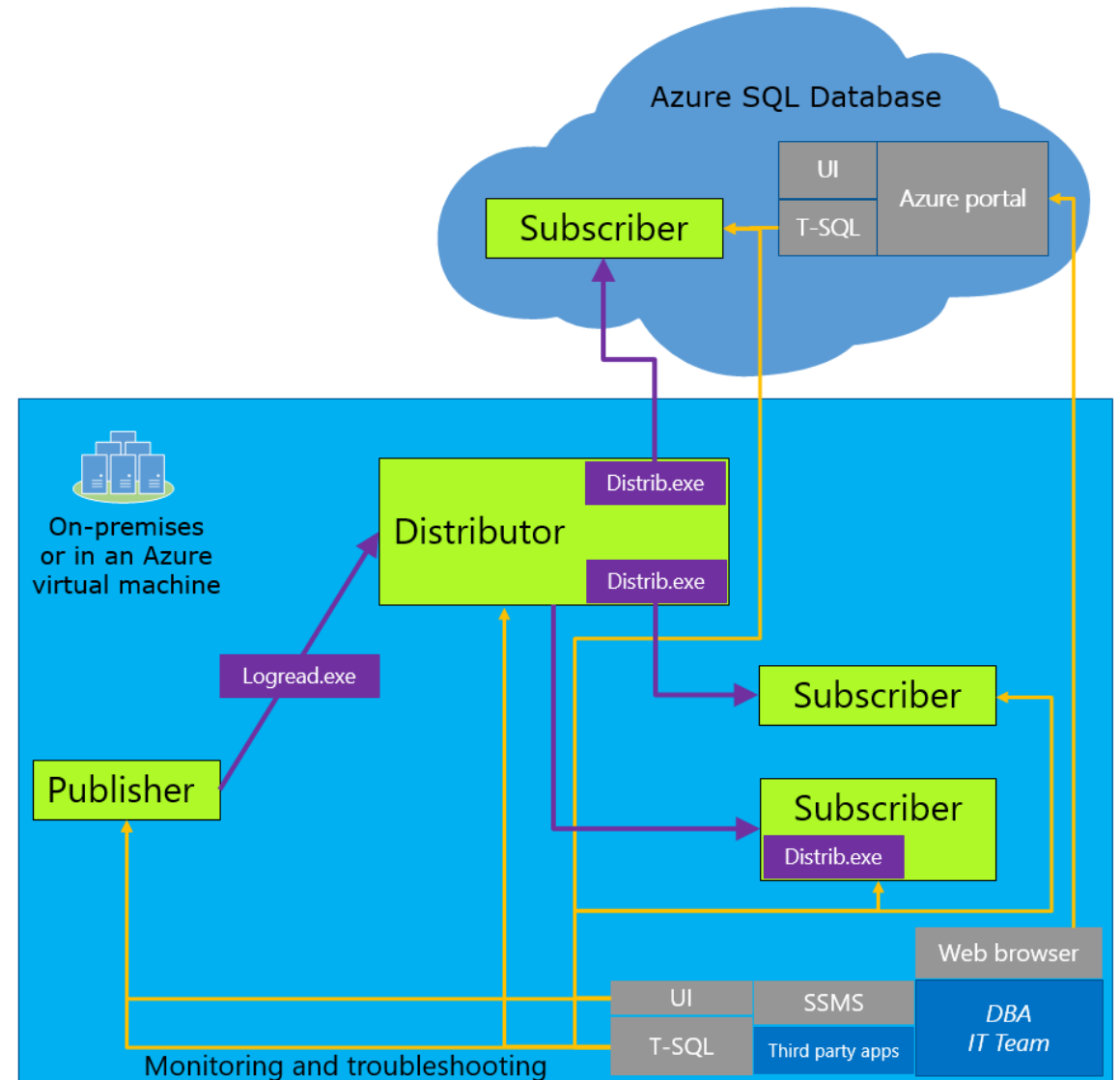
Used will have minimal downtime during migration.

Configure your Azure SQL Database as a subscriber.

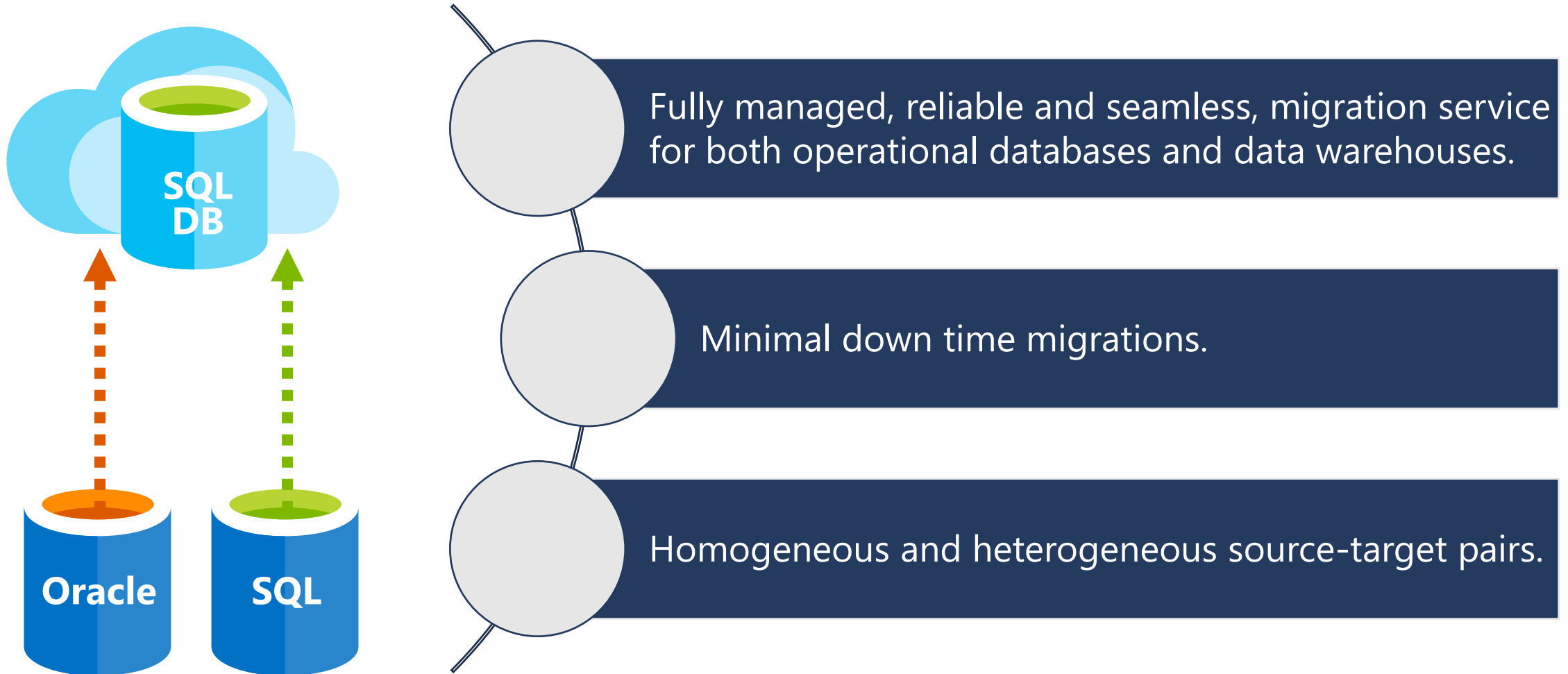
All changes to your data or schema show up in your Azure SQL Database.

Synchronization is complete – change the connection string of your application.

Remove Replication.



Migration Methods – Data Migration Service



Migration Methods – DMS

Register the resource provider.

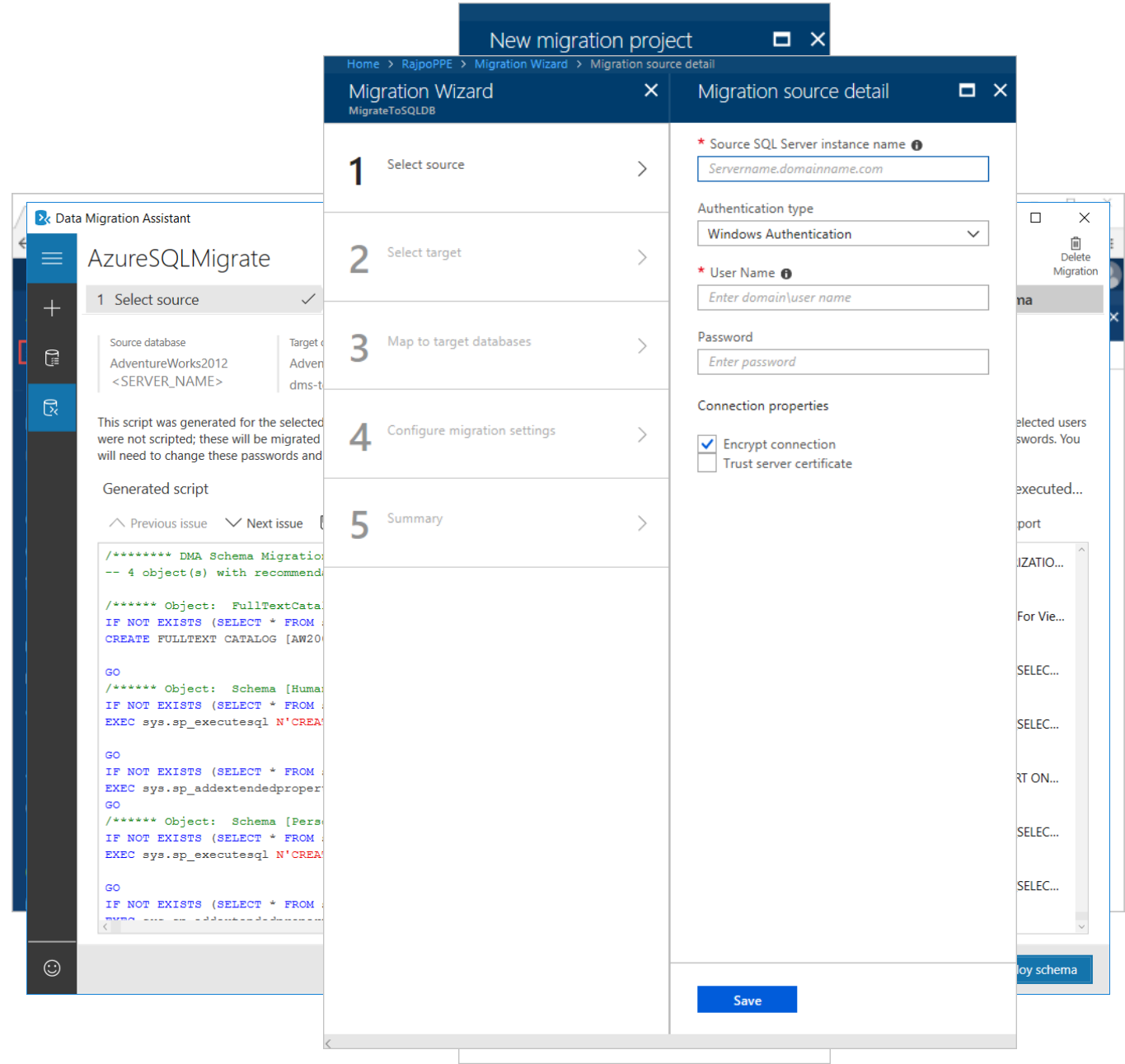
Create an instance of the service.

Assess your on-premises database.

Migrate the sample schema.

Create a Migration Project.

Specify Source Details.



Migration Methods – DMS (continued)

Specify Target Details

Map to Target Databases

Choose validation Option

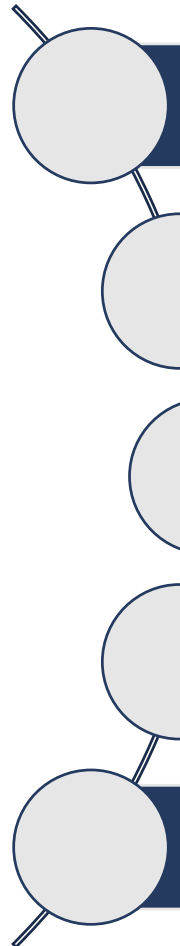
Run the Migration

Monitor the Migration

The screenshot displays the 'Migration Wizard' interface for 'MigrateToSQLDB'. The breadcrumb trail is 'Home > RajpoPPE > Migration Wizard > Migration summary > Choose validation option'. The main window is titled 'Choose validation option' and contains the following elements:

- Progress Bar:** A vertical bar on the left shows five steps: 1. Select source, 2. Select target, 3. Map, 4. Configure, and 5. Summary. Step 5 is currently selected.
- Validation Options:** Two radio buttons are present: 'Do not validate my database(s)' (unselected) and 'Validate my database(s)' (selected). Below them, under 'Validation options:', the 'Schema comparison' checkbox is checked.
- Information Panel:** A grey box with an information icon states: 'Please consider upgrading your Azure SQL Database to Premium tier (for example P11 or P15 for singleton databases) if DTU purchase model is used or Business critical tier (for example 8 or 16 GBRS instance for 6 GBRS model)'. Below this, a dark header bar reads 'testmigration'. The panel includes buttons for 'Delete migration', 'Stop migration', 'Refresh', and 'Download report'.
- Source and Target Details:**
 - Source server:** <source server>
 - Source version:** SQL Server 2012 11.0.7462.6
 - Target server:** <target server>
 - Target version:** Azure SQL Database 12.0.2000.8
- Databases:** A list showing '1' database.
- Search and Table:** A search bar with the placeholder 'Search to filter items...'. Below it is a table with columns: NAME, STATUS, SIZE, MIGRATION ..., and DURATION. The table contains one row: 'AdventureWork...' with status 'Completed', size '552.13 MB', and duration '00:03:48'.
- Footer:** A light blue box contains the text 'Validation option' and 'Configure required settings' with a right arrow. At the bottom are 'Run migration' and 'Save' buttons.

Optimizing data transfer performance during migration

- 
- Choose the highest service level and performance tier.
 - Minimize the distance between your BACPAC file and the destination data center.
 - Disable auto-statistics during migration.
 - Partition tables and indexes.
 - Drop indexed views and recreate them once finished.

Demonstration

Migration Methods – DMA

- Migrate your on-premises database with DMA.
- Migrate your on-premises database with DMS Hybrid mode.



Migrate a Compatible SQL Server Database to Azure SQL Database

- **Exercise 1:** Analyze your SQL Server Database for compatibility issues
- **Exercise 2:** Fix database migration compatibility issues
- **Exercise 3:** Migrate a database to Azure with Data Migration Assistant
- **Exercise 4:** Migrate a database to Azure with SSMS
- **Exercise 5:** Migrate a database to Azure with Transactional Replication



Questions?



Knowledge Check

What are the different migration methods that you can use to migrate your on-premises database to Azure SQL Database?

How is the fully managed service designed to enable seamless migrations called?

"I want to migrate my on-premises database to Azure SQL Database. The migration downtime can only be a few minutes." Which migration method should I use?

Module Summary

