

SQL Server 2016 New Features

Stretch Database

Let Your Database Do the Split Into the Cloud

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About Me

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Profile

DBA and Senior Consultant,
Microsoft Certified Solutions Expert,
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- Working in IT since 1998
- SQL Server since version 7.0
- Focus on SQL Server infrastructure and mission critical systems
- Microsoft Certified Trainer and MCSE: Data Platform
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How Much Free Space Is in Your Garage?

■ Just Give Me a Reason

Why Stretch Database

Ever growing databases

- Massive tables (billions of rows / TBs size)
- Users need to retain data indefinitely
- Cold data accessed infrequently but must be online
- Maintenance and SLA challenges (e.g. re-index and restore times)

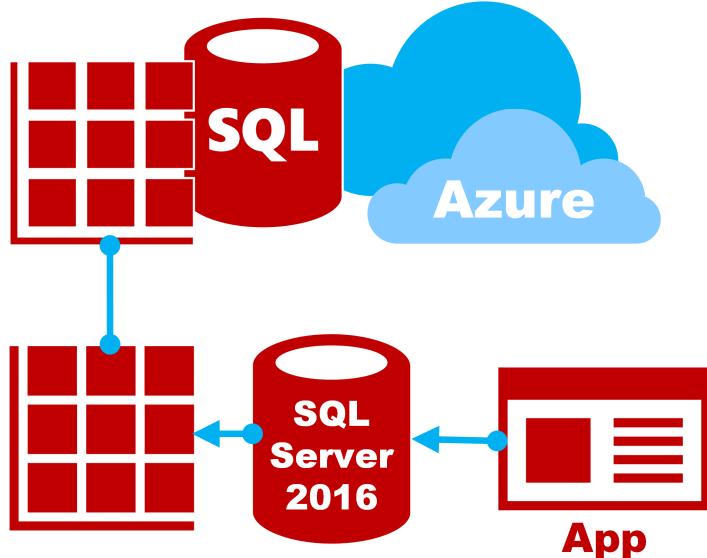


Existing solutions

- Keep adding storage and datacenter capacity
Does not solve maintenance and SLA issues
- Move data to another location (database, flat-files, Big Data, backups, tapes, ...)
Data is near-line or offline
- Delete older data
Unknown if data is valuable / Legal restrictions could apply

The Solution Is Just Around the Corner

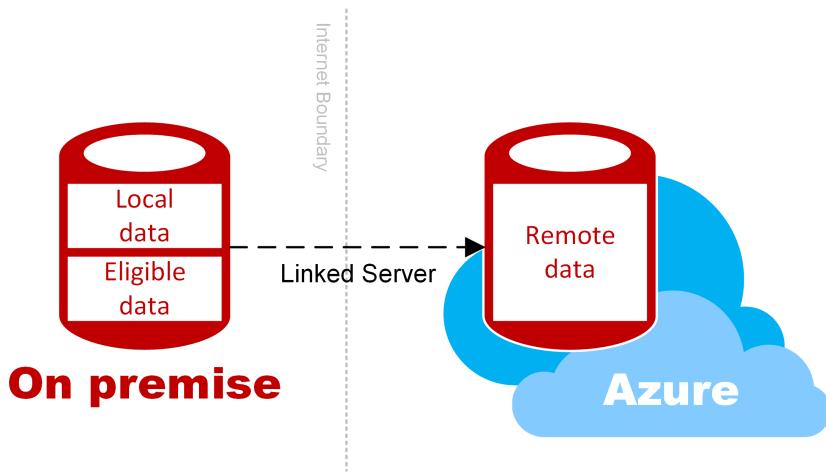
What Is Stretch Database



- Entire table stays online and can be queried
- No application changes needed
- Reduces complexity
- Frees up on premise resources
- Supports Always Encrypted and row-level security
- Great in combination with Temporal Tables

■ Know the Blueprint Before You Start Building a House

Stretch Database Architecture



- Creates a secure linked server in the on premises SQL Server (via secure channel TLS1.1 / 1.2)
- Linked server has the remote database as target
- Tables will be automatically provisioned in the remote database
- Queries run against the local and the remote database
- Watch out for “remote query” operator



Catch the Fish

Technical Deep Dive

■ Use the Right Ingredients

Prerequisites

Before you start

- Be sure the table is eligible for stretching
- You need an Azure account and subscription
- Create a Azure SQL Database Server
- Permit access to the server in Azure

Permissions you need on premise

- SYSADMIN or SERVERADMIN (once per instance)
- ALTER ANY CREDENTIAL (to create credentials)
- DB_OWNER (for databases and tables)



Showtime

Prerequisites



02 - SQL Server 2016 New Features Stretch Database - Prerequisites.ps1

■ Stretch It Out

Enable Stretch Database

Per instance

- Enable Stretch Database feature

Per database

- Create a Database Master Key (DMK)
- Create credentials to connect to the Azure SQL Server
- Enable stretching on database level

Per table

- Configure table for stretching



■ It's Your Choice

Use Filter Predicate

- Filter the data to be migrated to the cloud
 - Is based on inline table-valued functions
 - If your function is slow, data migration is slow
- Filter predicate can be exchanged
- There are some limitations and rules
 - The filtering function has to be deterministic
- Adds complexity to your database
 - Only use when there is no other way

<https://msdn.microsoft.com/en-us/library/mt613432.aspx>



Showtime

Enable Stretching



03 - SQL Server 2016 New Features Stretch Database – Enable Stretching.sql

■ Take a Break

Pause and Resume

- Pause data migration for troubleshooting
- Pause is also good for maximizing network bandwidth
- Applies to each table individually



■ Personal Trainer

Managing the Stretch Database

Remove the authenticated connection

- sys.sp_rda_deauthorize_db

Reestablish the authenticated connection

- sys.sp_rda_reauthorize_db

Reconcile local indexes on the remote table

- sys.sp_rda_reconcile_indexes

Specifies how to query a Stretch Database

- sys.sp_rda_set_query_mode
- DISABLED, LOCAL_ONLY, LOCAL_AND_REMOTE



■ Keep It Healthy

Monitoring and Troubleshooting

Stretch Database configuration

- sys.databases
- sys.tables
- sys.database_scoped_credentials

Remote database and tables

- sys.remote_data_archive_databases
- sys.remote_data_archive_tables

Status of the migration

- sys.dm_db_rda_migration_status
- sys.dm_db_rda_schema_update_status



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Manage
Stretch Database



04 - SQL Server 2016 New Features Stretch Database – Manage Stretch Database.sql

■ Relax

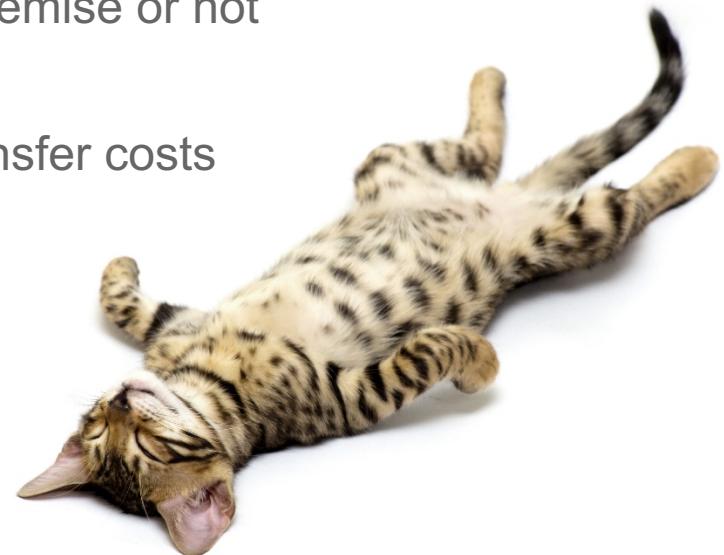
Disable Stretch Database

Per table

- Decide if data is migrated back to on premise or not
- Disable stretching for the table
- Migrate data from cloud incurs data transfer costs
- Does not delete the remote table

Per database

- Check if no more tables are stretched
- Disable stretching for the database
- Does not delete the remote database



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Disable Stretching



05 - SQL Server 2016 New Features Stretch Database – Disable Stretching.sql

■ You Should Have a Plan B

Backup and Restore

- Backup does not include remote data
 - This is called a “shallow backup”
 - Deep backups are not supported yet
- Stretch Database fully supports point in time restore
- After a restore, reauthorize the connection to Azure
 - `sys.sp_rda_reauthorize_db`
- The remote data gets back into a consistent state
 - Runs automatically, no user intervention is required



■ There Are Always Some Glitches

Blocking Issues

- Table properties
 - Tables containing FILESTREAM data, Replicated tables, Memory-optimized tables, ...
- Data types and column properties
 - XML, hierarchyid, timestamp, CLR user-defined types (UDTs), ...
- Column types
 - COLUMN_SET, Computed columns
- Constraints
 - Check constraints, Foreign key constraints, ...
- Indexes
 - Full text indexes, XML indexes, Spatial indexes, ...
- Some other limitations
 - <https://msdn.microsoft.com/en-us/library/mt605114.aspx>



Lets Wrap It Up

Summary

- Has a lot of restrictions
- Keep your configuration simple
 - Try to avoid filter predicates
 - Only DBAs should configure stretching
- Think about security
 - Encrypt your data
 - Secure the Azure SQL Database server
- Good solution for archiving data
- Available in SQL Server 2016 Express Edition



Questions and Answers...

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