

10 New Features in SQL Server 2025

That aren't AI





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Session Aim

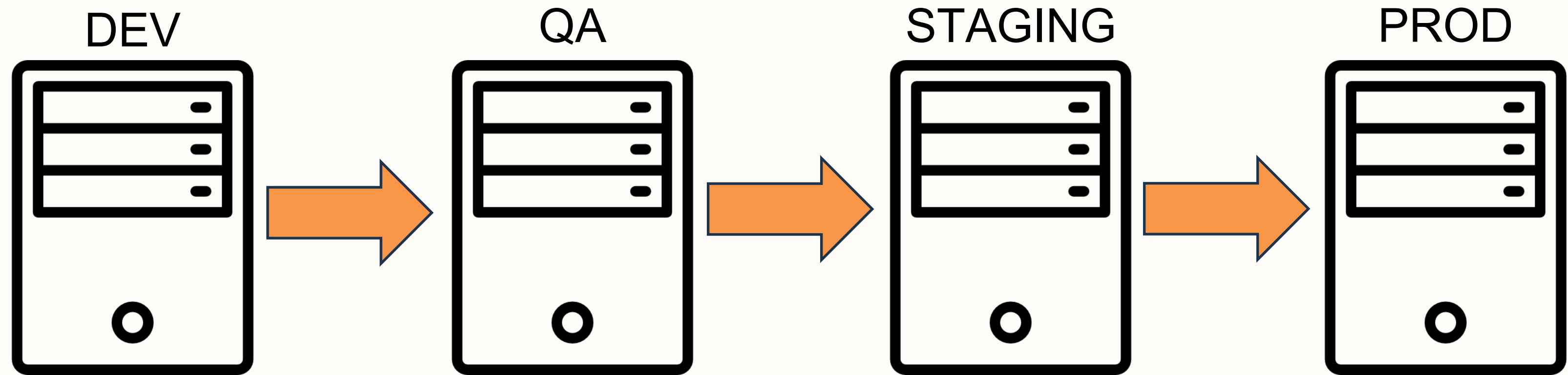
To explore the new features in SQL Server 2025

Agenda

- Query execution
- tempdb
- Extended Events
- Backups
- Brand-new capability

New Developer Editions

Release Pipelines



Developer Edition now available as....

- Standard Developer edition
- Enterprise Developer edition

Extended Events

Time-bound event sessions

Extended events are awesome!

Gives us the ability to capture as much (or as little) data as we want when monitoring/troubleshooting SQL Server

However, up until now, they must be stopped manually

Who here has forgotten to stop an extended event?

```
CREATE EVENT SESSION [FailedQueries] ON SERVER
ADD EVENT sqlserver.error_reported(
    ACTION(sqlserver.database_name, sqlserver.sql_text, sqlserver.username)
    WHERE ([package0].[greater_than_int64]([severity], (10))))
ADD TARGET package0.event_file(SET
    FILENAME=N'F:\XEvents\FailedQueryies.xel')
WITH (MAX_DURATION = 60 MINUTES)
```

Query Execution

Query Execution

Optimized Locking

Abort Query

`sp_executesql`

Optimized Locking

Requires Accelerated Database Recovery to be enabled

Reduces memory for locking as few locks are held

Avoid lock escalation

Allows more concurrent access to the table

Composed of two components:

Transaction ID (TID) Locking

- Unique identifier of transaction
 - Rows labelled with last TID
- Single lock on TID

Lock after qualification (LAQ)

- Predicates checked on row without taking any locks
- If predicate is satisfied, a lock is taken

Aborting Problematic Queries

Ever had one query come in and consume all resources or block other queries?

Wish I'd had this feature YEARS ago

Gives the ability to block the execution of specific queries

```
EXEC sys.sp_query_store_set_hints @query_id = XX,  
    @query_hints = N'OPTION (USE HINT (''ABORT_QUERY_EXECUTION''))';
```

```
Msg 8778, Level 16, State 1, Procedure dbo.TerribleProc, Line 4 [Batch Start Line 0]  
Query execution has been aborted because the ABORT_QUERY_EXECUTION hint was specified.
```

Updates to `sp_executesql`

Previously, identical SQL statements executed via *sp_executesql* would place their own copies of a plan into cache, resulting in duplicate entries

With this feature enabled, compilation of batches via *sp_executesql* becomes identical to stored procedures!

```
ALTER DATABASE SCOPED CONFIGURATION SET OPTIMIZED_SP_EXECUTESQL = ON;
```

tempdb

tempdb Enhancements

Accelerated Database
Recovery

Resource Governor

Run on tmpfs

Accelerated Database Recovery

Now available for tempdb!

Transactions involving temp tables, table variable etc. can cause long rollback & high log usage

ADR brings the following to tempdb:

- instantaneous transaction rollback
- aggressive log truncation

```
ALTER DATABASE [tempdb] SET ACCELERATED_DATABASE_RECOVERY = ON;
```

Space Resource Governance

Ever had queries completely fill up tempdb?

Resource governor can now limit the amount of space consumed by tempdb per workload group

Any query exceeding the limit will be aborted!

Limits set via:

- GROUP_MAX_TEMPDB_DATA_MB
- GROUP_MAX_TEMPDB_DATA_PERCENT

Tmpfs for tempdb on Linux

XFS and ext4 filesystems are the traditional supported filesystems for SQL Server on Linux

But there is also tmpfs, which is a file system that keeps all of its files in memory

So completely nonpersistent...like tempdb!

This can improve performance for tempdb heavy workloads...but test!

Also, do NOT put user databases on tmpfs, you will lose them! 😊

HammerDB Benchmark Scripts for SQL Server

This repository contains automated HammerDB benchmark scripts for running TPC-C (TPROC-C) and TPC-H (TPROC-H) workloads against Microsoft SQL Server using Docker containers.

Full blog post here: <https://www.nocentino.com/posts/2025-09-06-hammerdb-containers/>

Overview

The scripts provide a streamlined way to:

- Automatically set up SQL Server 2025 container
- Build TPC-C and TPC-H schemas
- Run benchmark tests with configurable parameters
- Extract and format test results

All configuration is managed through environment variables, making it easy to adjust parameters without modifying the scripts.

<https://github.com/nocentino/hammerdb>

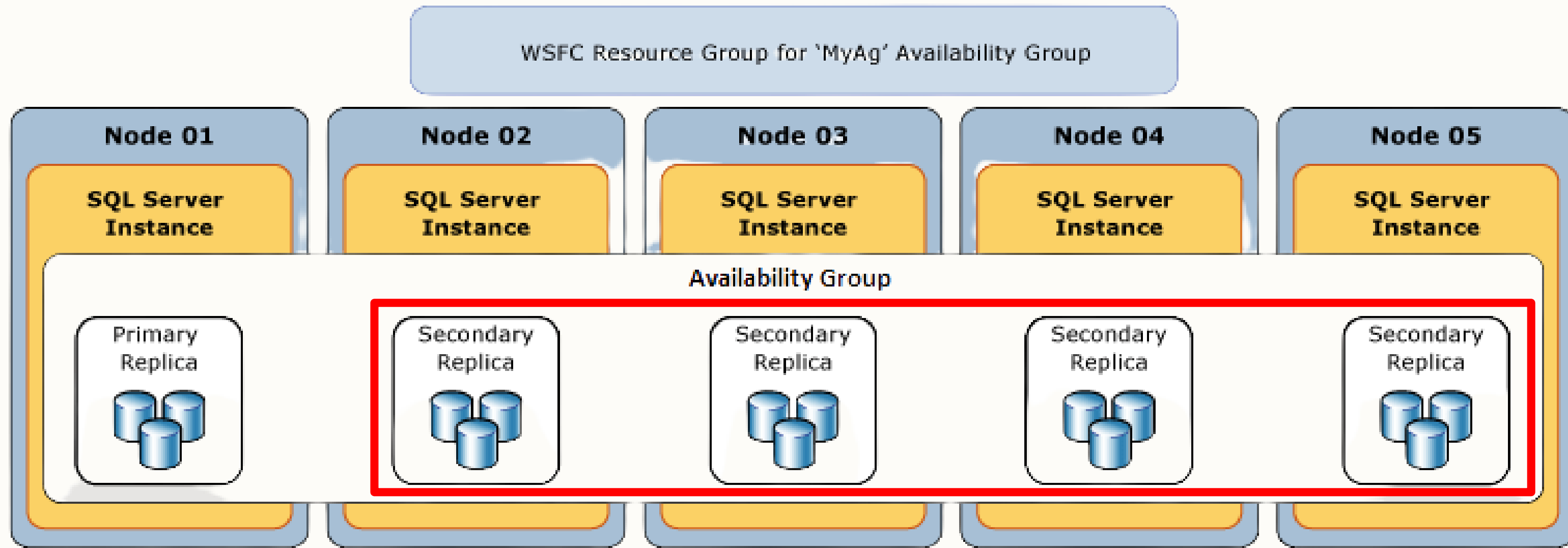
Backups

New backup compression algorithm

```
BACKUP DATABASE [TPCC-500G] TO
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_1.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_2.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_3.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_4.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_5.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_6.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_7.bak' ,
DISK = '\\backuplocation\share\TPCC-500G_ZSTD_8.bak'
WITH FORMAT
      COMPRESSION (ALGORITHM = ZSTD, LEVEL=LOW|MEDIUM|HIGH);
```

Algorithm	Duration	Throughput	Backup Size	Compression Ratio
ZSTD (LOW)	465.941	854.767 MB/sec	266	1.46
ZSTD (MEDIUM)	1298.694	306.670 MB/sec	210	1.85
ZSTD (HIGH)	2453.688	162.315 MB/sec	209	1.86
MS_EXPRESS	889.294	447.852 MB/sec	218	1.78

Backups on secondary AG nodes



No longer limited to only COPY_ONLY and LOG backups on secondary nodes of an availability group

Backups on secondary AG nodes

```
DECLARE @DBNAME SYSNAME = 'testdatabase'

IF (sys.fn_hadr_backup_is_preferred_replica(@DBNAME) != 1)
BEGIN
    SELECT 'Backups can only be performed on a secondary replica, exiting';
END
BACKUP DATABASE [testdatabase] TO DISK = 'F:\SQLBackup1\testdatabase.bak'
GO
```

Requires more configuration in backup jobs to determine where the backups are taken

There is no enforcement of automated backup preference settings

Use the `sys.fn_hadr_backup_is_preferred_replica` function in backup scripts!

Where should backups occur?

☐ Prefer Secondary

Automated backups for this availability group should occur on a secondary replica. If there is no secondary replica available, backups will be performed on the primary replica.

☒ Secondary only

All automated backups for this availability group must occur on a secondary replica.

☐ Primary

All automated backups for this availability group must occur on the current primary replica.

☐ Any Replica

Backups can occur on any replica in the availability group.

External REST Endpoints

New stored procedure

sp_invoke_external_rest_endpoint

Invokes an external HTTPS REST Endpoint

HAS to be a HTTPS endpoint, HTTP is not supported

Allows for SQL to hit external resources, with the potential for transference of sensitive data – use with caution!

Credentials can be used to stored authentication info for external endpoint

<https://learn.microsoft.com/en-us/sql/relational-databases/system-stored-procedures/sp-invoke-external-rest-endpoint-transact-sql>

Example Implementation

```
DECLARE @pods NVARCHAR(MAX);
```

```
EXEC sp_invoke_external_rest_endpoint
```

```
@url = 'https://api.dbafromthecold.local/api/v1/namespaces/default/pods',
```

```
@headers = '{"Authorization":"Bearer eyXXXXX....XXXX"}',
```

```
@method = 'GET',
```

```
@response = @pods OUTPUT
```

```
SELECT
```

```
    pod_name,  
    namespace,  
    container_image,  
    pod_ip,  
    status
```

```
FROM OPENJSON(@pods, '$.result.items')
```

```
WITH (
```

```
    pod_name NVARCHAR(100)        '$.metadata.name',  
    namespace NVARCHAR(100)       '$.metadata.namespace',  
    container_image NVARCHAR(100) '$.spec.containers[0].image',  
    pod_ip NVARCHAR(50)           '$.status.podIP',  
    status NVARCHAR(50)           '$.status.phase'
```

```
);
```

Let's check that xevent!

Other Cool Features...

Other things to check out!

Regex Support

Removal of memory optimised filegroups

Persisted statistics on readable secondaries

Query Store for readable secondaries

Actually, a whole bunch of AG improvements!

And of course, all the AI features 😊



Resources



<https://github.com/dbafromthecold/sql2025newfeatures>