SQL Server 2025's General Availability Announcement:

Reference: https://techcommunity.microsoft.com/blog/sqlserver/sql-server-2025-is-now-generally-available/4470570

Overview

- SQL Server 2025 is now generally available (announced Nov 18 2025).
- This release continues Microsoft's "one consistent SQL" promise — meaning a consistent engine/platform across on-premises, cloud, and SaaS.
- Emphasis is on being an AI-ready enterprise database built on top of SQL Server's foundations of security, performance, and availability.
- The product has already seen broad participation: ~10,000 organizations in the public preview and ~100,000 active SQL Server 2025 databases.

Key innovations / major new features

1. **AI built-in**
   - AI features are integrated directly into the engine: semantic search, natural language experiences across enterprise data.
   - Model management built into T-SQL: supports Microsoft Foundry, Azure OpenAI Service, OpenAI, Ollama and more.
   - Support for vector embedding, text chunking, DiskANN indexing—enabling AI-powered apps using familiar T-SQL.
   - Integration with frameworks like LangChain and Semantic Kernel to speed dev of AI-powered applications.

2. **Made for developers**
   - Enhancements: Native JSON support, REST APIs, RegEx, fuzzy string matching.
   - Change event streaming (captures change-data to Azure Event Hubs) for real-time, event-driven apps with lower overhead compared to CDC.
   - Tooling improvements:
     - SQL Server Management Studio (SSMS 22) now generally available, with ARM64 support and AI-assistance via GitHub Copilot workload.
     - The Microsoft Python Driver for SQL Server (mssql-python) is now generally available, with Entra ID authentication.

3. **Security, performance, availability**
   - Builds upon SQL Server's reputation for security (noted as "most secure database in the last decade").
   - Modern identity/encryption: Microsoft Entra managed identities for credential management.
   - Performance improvements: optimized locking (reduces lock memory consumption, less blocking, higher concurrency).

- o Tempdb space resource governance to improve reliability.
- o Optional parameter plan optimization (OPPO) to lessen parameter-sniffing issues.
- o Availability groups enhancements: faster failover, improved diagnostics, hybrid flexibility.
- o Preliminary benchmarks: On AMD EPYC + HPE hardware, SQL Server 2025 shows new record performance and ~4% better price-performance in the 3 TB category compared to previous results.

4. **Cloud and hybrid enhancements**
   - o Support for database mirroring into Microsoft Fabric (near real-time analytics without ETL).
   - o Azure Arc integration for unified management, security, governance across on-premises, cloud.
   - o On Linux:
     - ▪ New support for RHEL 10 and Ubuntu 24.04.
     - ▪ TLS 1.3 support, custom password policies, signed container images.
     - ▪ Performance improvements: tmpfs support for tempdb, container-based deployments, generic ODBC data sources via PolyBase.
   - o On Azure VMs: All editions of SQL Server 2025 (Standard, Enterprise, Enterprise Developer, new Standard Developer edition) supported; optimized VM families; Premium SSD v2 / Ultra Disk storage options.

5. **Product changes / editions**
   - o Standard edition: increased resource limits — up to 32 cores and 256 GB memory. Resource Governor now available in Standard edition.
   - o Introduction of a new *Standard Developer* edition: full feature parity with Standard edition, designed for development/testing.
   - o Express edition: maximum database size increased to **50 GB** per database. Express Advanced mode consolidated into a single Express edition with all former abilities.
   - o Discontinuation of Web edition: SQL Server 2022 is the final version with Web edition; supported until January 2033 under Microsoft's fixed lifecycle policy.
   - o As part of reporting/analytics changes: On-premises reporting solution moves toward integration with Power BI Report Server (unifying paginated + interactive reports for paid licences).

Why this matters for you (Ani)

- As someone interested in SQL Server replication, clustering, AlwaysOn, log shipping etc., this release introduces enhancements to availability and performance (e.g., availability groups faster failover).
- Since you're interested in patching and DB admin tasks: new editions, enhanced tooling (SSMS 22, Python driver), and cloud/hybrid support will affect upgrade/patch planning, especially moving workloads to cloud or hybrid.

- For developers and administrators, the AI built-in features and developer productivity enhancements (JSON, REST APIs, RegEx, fuzzy match) open new opportunities for modernising database apps.
- If you are using Linux, containers, hybrid environments, the enhancements in SQL Server 2025 for Linux and Azure VMs make it more viable for those non-Windows deployments.
- The increased resource limits in Standard edition (and Express's 50 GB DB size) may affect your environment architecture choice and licensing decisions.

Detailed breakdown of new and changed features in SQL Server 2025 (17.x) that are especially relevant for you as a DBA working with replication, log shipping, availability/failover (Always On), patching/upgrade planning, hybrid environments, and administration. Annotated **what's new or changed**, **implications**, and **what to test/prepare**.

✅ Availability / High Availability / Disaster Recovery

These are key given your interest in clustering, Always On, log shipping etc.

What's new / improved

- The official "What's New" doc identifies *Availability* as one of the feature-highlight areas. [Microsoft Learn](#)
- Improved support for availability groups (AGs) — more secondaries, better failover options, enhanced diagnostics & routing. For example: "Always On Availability Groups now support more secondary replicas and faster failovers, delivering better resilience for mission-critical workloads." [Nova DBA+1](#)
- Backups on secondary replicas have improved (in some reports full/differential backups can now be done on any secondary, not just copy-only) and new compression (Zstandard) supported. [Hynellis+1](#)
- Enhanced failover behaviour: e.g., asynchronous page request dispatch by default / faster recovery / new health-check options. [Hynellis+1](#)
- For hybrid/cloud connectivity: Better integration with Azure Arc and hybrid management. [SQLServerCentral+1](#)
- Edition changes matter (for HA licensing/planning): The Standard edition now supports up to 32 cores & 256 GB RAM. [Brent Ozar Unlimited®+1](#)

Breaking / changed behaviour to watch

- The "Breaking changes" doc specifically flags AG/HA features: e.g., changes to encryption and connectivity for linked servers/AGs and others. [Microsoft Learn](#)
- For log shipping: Remote log-shipping monitoring can break if a remote monitor is a SQL Server 2025 instance and other instances are older. [Microsoft Learn](#)
- For replication: If you have a remote distributor, replication components might fail unless you configure trusted certificates. [Microsoft Learn](#)
- Some deprecated features: For example, database mirroring is deprecated (and replaced by AGs / Fabric mirroring). [Microsoft Learn+1](#)

Implications & what to prepare/test

- **Failover testing**: Set up a test AG on SQL 2025 and verify failover behaviour under load, test the health-check options, investigate how asynchronous page request dispatch works in your hardware environment.
- **Secondary backups**: If you plan to offload backups to a secondary, test backup/differential/full on those secondaries to ensure it works as expected.
- **Hybrid scenarios**: If you use on-prem + cloud or Azure Arc, test connectivity, monitoring/integration with Azure Portal.

- **Licensing/edition planning**: Because Standard edition now has higher limits, you may review whether you can use Standard instead of Enterprise (depending on your HA/DR requirements).
- **Breaking change mitigation**: For log shipping / replication / linked servers ensure certificates/trust settings are in place. Specifically verify that remote monitor or distributor topologies won't break after upgrade.
- **Deprecation planning**: If you're still using database mirroring or other deprecated features, plan to migrate off them (e.g., move to AGs).
- **Monitoring & diagnostics**: Update your monitoring tools/scripts to support the new features and ensure you can read the new health and routing diagnostics.

🔄 Replication & Log Shipping

Given your interest in replication and log shipping, these deserve special focus.

Replication

- The breaking changes doc states: "Replication components might fail after upgrade if publisher is SQL Server 2025, distributor is remote, and isn't configured with trusted certificate." [Microsoft Learn](#)
- The general "What's New" doc doesn't list many *positive* new replication features — the emphasis is more on availability, performance, AI etc. [Microsoft Learn](#)
- So for replication your focus is primarily on the upgrade/compatibility and encryption/trust configuration.

Log Shipping

- The breaking changes doc includes: "Remote log shipping monitoring can break if the monitor is a remote SQL Server 2025 instance when other instances in the topology use a previous version." [Microsoft Learn](#)
- Again, fewer headline *new features* for log shipping, but this means the upgrade path and monitoring compatibility are the risk areas.

Implications & what to prepare/test

- For replication: In your test upgrade, replicate from a pre-2025 publisher/distributor to a 2025 subscriber (and reverse) and monitor for failures. Confirm that your linked servers/distributor configurations use trusted certificates or set trust_distributor_certificate as appropriate.
- For log shipping: If you use a monitor on a remote server, test that the monitoring database and alerting still function when one side is on 2025 and the other older.
- Verify that your replication and log shipping monitoring/alerting tools are supported/updated for SQL 2025.
- Consider whether you might migrate replication to a newer high-availability paradigm (for instance, AGs or change-event streaming) if appropriate.

🛠 Patching, Upgrade & Administration

Your interest in patching, DBATools, and installing is well aligned with new changes in this version.

What's new / improved

- The "What's New" doc includes: edition changes, breaking changes, etc. [Microsoft Learn](#)

- Increase in Standard edition capacity: up to 32 cores and 256 GB memory. [Microsoft Learn+1](#)

- Breaking changes to connectivity: e.g., default encryption, new client provider (Microsoft.Data.SqlClient), TDS 8.0 default. [Hynellis+1](#)

- For Linux/deployment: New support for Red Hat 10, Ubuntu 24.04 etc. (mentioned in blog) though I don't have a detailed item here.

- Improved performance/governance: e.g., tempdb resource governance, improved locking, etc. While not strictly "patching", it affects admin workflows. [Hynellis+1](#)

Implications & what to prepare/test

- **Upgrade planning**: Build a test environment with SQL 2025 and run your DBATools scripts, patching workflows, monitoring, automation, etc, in it.

- **Client connectivity testing**: Update your clients, scripts, SSIS/PowerShell etc to use Microsoft.Data.SqlClient and ensure encryption/trust settings do not cause failures with legacy tooling.

- **Tempdb and resource governance**: If you run multi-tenant or heavy loads, test the new tempdb governance features to prevent runaway tempdb use.

- **Monitoring & tooling compatibility**: Ensure that your third-party/hand-rolled monitoring, backup/restore scripts, log shipping, replication monitoring all support SQL 2025.

- **Patching cadence**: Since this is a major version, consider how cumulative updates and service packs will roll out. Also review deprecated/removed features early (so your automation doesn't attempt to call them).

- **Testing of hybrid/cloud integration**: If you use on-prem + Azure/hybrid, test connectivity/integration via Azure Arc, managed identities etc.

☁ Hybrid / Cloud / Analytics

While your primary interest is DBA/HA/replication, the hybrid/cloud aspects also impact architectures.

What's new / improved

- Tighter integration with Microsoft Fabric: Databases can mirror into Fabric / OneLake for analytics. [SQLServerCentral+1](#)

- Azure Arc support for unified management of on-prem + cloud instances. [Microsoft Learn](#)

- On Linux and containers: improved support (new OS releases, TLS 1.3, signed images, tmpfs for tempdb) though this is more infrastructure than just DBA. [Microsoft Learn+1](#)

Implications & what to prepare/test

- If you have hybrid or cloud-linked workloads, test the end-to-end path (e.g., on-prem SQL 2025 → Mirror/Feed into Fabric/OneLake) and measure latency, security, data sovereignty.

- Check that your backup/DR strategy accounts for hybrid cloud movement and remote monitoring/integration.

- For container or Linux-based deployments, if you use them, test SQL 2025 on those platforms (and check any changes to tempdb and storage behaviour).
- Consider whether new features (e.g., mirroring to Fabric) might allow you to rethink your DR/analytics pipeline.

📋 **Summary Table: Key Areas & What You Need to Do**

Area	What's new/changed	What you should test / prepare
Availability / AGs	More secondaries, faster failovers, better diagnostics, backup on secondaries	Set up AG test bench, check failover speed, backup on secondaries, revise HA plan
Replication	Breaking changes around encryption/trust, remote distributors	Test replication topologies with SQL 2025, update certificates/trust settings
Log Shipping	Monitoring may break if mixed versions	Test log shipping & monitoring in mixed version environment, update monitoring tools
Patch & Upgrade	New edition limits, client provider change, stricter encryption defaults	Test upgrade path, update client libraries, validate scripts/automation
Hybrid/Cloud	Fabric integration, Azure Arc, container/Linux improvements	Test hybrid workloads, container/OS compatibility, cloud connectivity & security
Deprecation	Some features removed or deprecated (e.g., Web edition, MDS, DQS)	Inventory your usage of deprecated features and plan migration ahead of upgrade

https://www.sqldbachamps.com/

Complete SQL Server 2025 Pre-Upgrade Checklist (DBA-Focused)

Designed specifically for replication, AlwaysOn/AGs, log shipping, HA/DR, patching, automation, and hybrid cloud environments.

✅ **SQL Server 2025 Pre-Upgrade Checklist (DBA Master Version)**
(A practical, field-ready checklist you can copy into your upgrade SOPs.)

1. Pre-Assessment & Inventory Phase

🔍 **1.1 Inventory all SQL Server components**

- SQL Server Engine versions, editions, CU levels
- SSRS / SSIS / SSAS
- Replication components (Publisher, Distributor, Subscriber)
- Log Shipping primary / secondary / monitor
- Availability Groups (synchronous/asynchronous replicas, read-routing)
- SQL Server Agent jobs
- Linked servers
- SQL client versions (ADO.NET, ODBC, JDBC, PowerShell modules)

🔒 **1.2 Identify deprecated / removed features**

SQL Server 2025 deprecates/removes:

- **Web Edition** (2022 last version)
- **Database Mirroring** (fully deprecated)
- **DQS / MDS** removal
- Report Server changes (Power BI Report Server shift)
- Legacy encryption settings & legacy TLS
- Older client libraries not supporting **TDS 8.0**

If your environment uses any of the above:

- Plan replacement/migration

2. HA/DR Upgrade Readiness

🟣 **2.1 Availability Groups (AlwaysOn)**

SQL 2025 introduces *new AG internals*, *faster failovers*, *secondary backup flexibility*.
Validate:

- Primary + secondary replicas version/edition compatibility
- If using **read-routing**, validate routing URLs (encryption defaults changed)
- Test failover under workload
- Validate seeding (encrypted transport changes)
- Validate Distributed AG topologies

Special to test:

- **Secondary backups** (verify differential + full allowed and consistent)
- **Synchronous commit + HADR_SYNC_COMMIT behavior** after upgrade

🔵 **2.2 Log Shipping**

SQL Server 2025 introduces breaking changes for remote monitors.

Check:

- Monitor server version compatibility
- Alerts (job failures, restore latency)
- Backup compression (especially ZStandard compression tests)
- Application failover runbook is still valid
- Log shipping cleanup job (new retention rules)

🟠 **2.3 SQL Replication**

Breaking change: **remote distributor or mixed-version topology requires trusted certificates**.

Check:

- Are any Publishers < 2025?
- Is Distributor remote?
- Do all servers have matching **trust certificates** installed?
- Re-run: sp_validatemergepublication / sp_replmonitorhelppublisher
- Snapshot agent encryption test
- Validate Distribution Agent with encryption=required

3. Security, Connectivity & Certificates

🔒 **3.1 Encryption upgrade readiness**

SQL 2025 changes default client/server encryption:

- TLS 1.2/1.3 supported everywhere
- Update old JDBC/ODBC/ADO.NET providers
- Update PowerShell SQL Providers
- Update connection strings that rely on *TrustServerCertificate=yes*

❇️ **3.2 Linked Server Connectivity**

SQL 2025 enforces:

- stronger certificate checks
- new provider defaults

Checklist:

- Test every linked server connection
- Ensure all remote providers use Microsoft OLE DB Driver 19+
- Validate RPC OUT procedures
- Validate distributed transactions (MSDTC TLS enforcement)

4. Performance & Database Engine Readiness

⚡ **4.1 Check new 2025 Engine behaviors**

SQL 2025 introduces:

- Optimized locking
- TempDB resource governance
- Optional Parameter Plan Optimization (OPPO)
- Default TDS 8.0 protocol

Checklist:

- Compare existing workload baseline
- Enable/disable OPPO per database depending on workload pattern
- Check TempDB file size & governance compatibility
- Validate memory clerk changes under your workload

- Measure latch waits, lock waits before/after upgrade

🧪 4.2 Pre-Upgrade Workload Testing

- Restore production copy into SQL 2025 test instance
- Run production workload replay (Distributed Replay / OSTRESS / HammerDB)
- Validate performance regressions
- Validate plan stability
- Capture Query Store baselines pre-upgrade

5. Application & Client Compatibility

🖥️ 5.1 Application testing

Test apps using:

- .NET, Java, PHP, Python, PowerShell
- SSIS packages
- Linked servers
- Vendors (SAP, Dynamics, Oracle gateways, etc.)

Checklist:

- Update drivers to latest versions supporting SQL 2025
- Test MARS, connection pooling, encryption
- Validate failover logic in client apps

📦 5.2 SSRS / SSIS / SSAS

- SSIS packages using old providers must be updated
- SSRS moving toward Power BI Report Server
- SSAS Tabular compatibility mode validation

6. Backup, Restore & Maintenance

🟢 6.1 Backup testing

- Test FULL + DIFF + LOG backup chains
- Validate ZStandard compression performance
- Validate restore speed
- Validate CHECKDB performance changes
- Rebuild maintenance plans using 2025 new rules

🟣 6.2 Validate Monitoring Systems

- SCOM monitoring
- Idera / RedGate / SolarWinds / Quest Spotlight
- Custom alert scripts using legacy DMVs

7. Edition & Licensing Review

SQL Server 2025 introduces:

- Standard Edition: **32 cores + 256 GB RAM**
- Express Edition: **50 GB per database**
- Web Edition removed

Checklist:

- Recalculate licensing impact
- Evaluate if Enterprise edition can be replaced with Standard

- Update VM sizing
- Validate NUMA node distribution (important for 32-core Standard)

8. Automation, Jobs & Maintenance

🤖 8.1 SQL Agent Jobs

- Rerun/validate all jobs
- Confirm SSIS package version compatibility
- Check log shipping jobs post-upgrade
- Validate replication agent jobs

🧰 8.2 PowerShell / DBATools

- Update DBATools to latest
- Test Install-DbaInstance and Update-DbaInstance for SQL 2025
- Validate Kerberos/Managed Identity login flows
- Validate SMO compatibility with SQL 2025

9. Final Go-Live Preparation

📁 9.1 Pre-Go-Live Runbook

- Final Change Document approved
- Step-by-step rollback plan
- Snapshot of configs (sp_configure, sys.configurations, AG configs)
- Script out logins, jobs, credentials, linked servers

🚨 9.2 Go-Live Validation

After upgrade:

- Validate AlwaysOn Dashboard
- Validate Log Shipping latency
- Validate Replication Monitor
- Validate DB integrity with DBCC CHECKDB
- Run application smoke tests
- Monitor waits, CPU, IO

10. Final Post-Upgrade Checklist

- Update compatibility level if required
- Update statistics
- Enable Query Store hints (if using)
- Reconfigure backup compression level
- Update monitoring dashboards
- Capture new performance baseline

Source: Internet