



Running SQL Server 2025 on Lenovo ThinkAgile HX V4 and FX V4 Servers with Intel Xeon 6 Processors

Planning / Implementation

A Modern Relational Data Platform for Mission-Critical Workloads, Analytics, and AI

In today's data-driven enterprises, organizations must manage rapidly growing volumes of structured and transactional data while ensuring consistency, performance, and security. Core business applications such as ERP, CRM, and financial systems continue to depend on relational databases for accurate and real-time operations. As data ecosystems evolve, enterprises are also integrating these systems with analytics and AI-driven insights. This creates a need for a platform that can handle both traditional workloads and modern data demands without compromising reliability or governance.

Microsoft SQL Server 2025 addresses these needs as a modern, enterprise-grade relational data platform designed for mission-critical workloads across on-premises and private cloud environments. With its proven adoption, robust transactional integrity, and advanced query processing capabilities, SQL Server delivers predictable performance at scale. Built-in high availability, security, and seamless integration with analytics and data services make it a foundational component for enterprise data strategies, enabling organizations to efficiently manage, analyze, and derive value from their data.

Lenovo ThinkAgile HX V4 and FX V4 with Intel Xeon 6 Processors

The Lenovo ThinkAgile HX650 V4 and FX650 V4 are 2-socket, 2U systems and The Lenovo ThinkAgile HX630 V4 and FX630 V4 are 2-socket, 1U systems. These hyperconverged systems feature the Intel Xeon 6 processors (formerly code named "Granite Rapids"). ThinkAgile HX V4 and FX V4 hyperconverged systems are designed for deploying industry-leading hyperconvergence software from Nutanix on Lenovo enterprise platforms.



Figure 1. ThinkAgile HX650 V4 (top) and HX630 V4 (bottom) designed for Nutanix hyperconverged infrastructure

The Nutanix Cloud Platform (NCP) delivers cloud-scale advantages to enterprise applications and databases by combining ThinkAgile HX V4 and FX V4 and public cloud infrastructure. It provides robust enterprise storage, integrated data protection, built-in resilience, unified management, advanced analytics, and end-to-end security and consistent performance for mission-critical workloads.

ThinkAgile FX offers a unique, industry first flexibility for software-defined approach to hyper convergence, leveraging the ability to move between hypervisors of your choice to deliver compute, storage and management in a tightly integrated software stack and future-proof your investment with seamless HCI software transitions.



Figure 2. ThinkAgile FX650 V4 (top) and FX630 V4 (bottom) designed for flexible hyperconverged infrastructure

Combining performance and flexibility, the ThinkAgile HX V4 and FX V4 Hyperconverged systems deliver fully validated and integrated Lenovo hardware and firmware, certified and preloaded with licensed Nutanix software. The systems offer a broad selection of processors, memory and drives, and offers high performance features that industries such as finance, healthcare and telco need. Outstanding reliability, availability, and serviceability (RAS) and high-efficiency design can improve your business environment and can help save operational costs.

Lenovo ThinkAgile HX V4 and FX V4 Hyperconverged systems running Nutanix software provide a robust foundation for Microsoft SQL Server 2025 by combining compute, storage, and virtualization in a unified hyperconverged platform. This architecture supports higher consolidation, efficient scaling, and resilient infrastructure, while allowing SQL Server to take advantage of high core-count processors and large

memory capacity for strong performance in transactional and analytical workloads.

Nutanix Database Service (NDB) enables businesses to register, provision, clone, and administer all SQL Server 2025 databases on one or more Nutanix clusters using deployment profiles. As database volumes expand, NDB enables online storage expansion without introducing downtime or requiring manually reconfigured volume mappings. It also seamlessly supports high-availability clusters and integrated protection domains

SQL Server 2025 Features

Microsoft SQL Server 2025 continues to serve as a relational database platform both on-premises and in private cloud infrastructures. It provides mechanisms for handling high-throughput transactional workloads, maintaining data integrity, and supporting integration with broader data ecosystems. With built-in capabilities for availability, security, and workload management, SQL Server is commonly adopted as a foundational component in enterprise infrastructure to support stable and scalable data operations.

SQL Server 2025 provides the following new features:

- **Native Vector Data Type, Vector Functions, and Vector Search**

Supports native vector storage, vector functions, and approximate vector indexing/search to support semantic search, recommendations, and RAG-style AI applications directly inside the database engine.

- **Built-in AI Model Integration from T-SQL**

Adds external AI model objects, embedding generation, chunking, and REST endpoint invocation, enabling T-SQL workloads to interact with Azure OpenAI, REST APIs, Azure Functions, GraphQL endpoints, and other services.

- **Enhanced Intelligent Query Processing**

New IQP capabilities include cardinality estimation feedback for expressions, Optional Parameter Plan Optimization, DOP feedback enabled by default, Query Store for readable secondaries

- **Optimized Locking for High-Concurrency OLTP**

Optimized locking reduces blocking, lock memory consumption, and lock escalation, improving concurrency for transaction-heavy applications.

- **Native JSON Data Type and JSON Indexing**

Supports native JSON data type, JSON indexing, and additional JSON functions.

- **Microsoft Fabric Mirroring and Hybrid Cloud Integration**

Supports mirroring to Microsoft Fabric, allowing on-premises SQL Server data to be continuously replicated into Fabric for analytics. Azure connected services also include Azure extension for SQL Server, Microsoft Entra integration, pay-as-you-go billing, and disaster recovery integration.

- **Stronger Availability, Security, and Manageability**

SQL Server 2025 improves Always On availability groups, failover behavior, backup options, TLS 1.3 support with TDS 8.0, PBKDF password hashing, managed identity integration, and time-bound Extended Events sessions.

Performance Testing Details and Results

Our testing used HammerDB, an open-source database transactional and analytics load testing/benchmarking tool for databases. The OLTP workload is derived from the TPC-C Benchmark standard, and it is not comparable to published TPC-C and do not comply with the TPC-C benchmark standards. The testing described below used HammerDB instance running on a separate server.

The testing was performed using a four-node ThinkSystem HX650 V4 cluster with the following configuration parameters. SQL Server 2025 was deployed in a virtual machine running Windows Server 2025. The test was done on single node with four virtual machines.

Table 1. ThinkAgile HX650 V4 Cluster Configuration

Component	Description
Server platform	4x Lenovo ThinkAgile HX650 V4
Processor per host	2x Intel Xeon 6767P 64C 350W 2.4GHz Processor
Memory	1 TB (16 x ThinkSystem 64GB TruDDR5 6400MHz (2Rx4) RDIMM)
Storage	2x ThinkSystem M.2 7450 PRO 480GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD 8x ThinkSystem 2.5" U.2 PM9D3a 1.92TB Read Intensive NVMe PCIe 5.0 x4 HS SSD
Network	2x Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-port PCIe Ethernet Adapter
Nutanix Software	AHV 10.3.0.1, AOS 7.3.0.5
CVM configuration	16 VCPUs, 64 GB RAM

Table 2. SQL Server 2025 Configuration and TPC-C Benchmark Results

Component	Description
Database	SQL Server 2025 Enterprise
OS	Windows Server 2025 Datacenter
VM Configuration	32 vCPUs, 64 GB Memory, 2 TB disk
Number of Nodes	1
Number of VMs	4
Drive Configuration	OS Disk + TempDB = 512 GB DATA Disk = 512 GB LOG Disk = 512 GB Backup Disk = 512 GB
Database Size	800 Warehouse, 80 GB
Virtual Users	150
Ramp up	5 mins
Transactions Per Minute	11.42 million
Host CPU Usage	85%
Average IOPS	91K IOPS (75% Reads 25% Writes)

Best Practices for Running SQL Server on ThinkAgile HX/FX V4

For a high-performance SQL Server solution, implement the following best practices:

- Configure UEFI (Bios) settings to set Operating mode to Maximum performance.
- Configure power profile in Windows Server to 'High performance'.
- SQL server database and log drives are recommended to be formatted with 64KB NTFS cluster size.
- SQL server database and log files should be on separate physical drives.
- The OS and SQL server binary drives are recommended to be formatted with standard 4KB NTFS cluster size.
- SQL Server consumes all memory allocated to virtual machines and it is recommended to set maximum memory consumed by SQL server instance by leaving sufficient memory of OS and system processes.
- TempDB is shared by many processes and users as a temporary working area and should be configured appropriately. Default configuration will be suitable for most workloads.
- If the server is dedicated to the SQL Server workload, use the default dynamic memory management model or follow Microsoft SQL documentation guidelines for manually configuring memory options if finer grain control is desired.

Bill of Materials: ThinkAgile HX650 V4

Table 3. Bill of Materials: ThinkAgile HX650 V4

Part number / Feature code	Product Description	Quantity
7DG4CTO1WW	Server: Lenovo ThinkAgile HX650 V4 Hyperconverged System	1
C6TQ	ThinkAgile HX650 V4 Base	1
B15S	Nutanix Software Stack on Nutanix AHV	1
BVKV	Nutanix Cloud Platform (NCP) Pro Software License with Mission Critical Support	1
C5QY	Intel Xeon 6767P 64C 350W 2.4GHz Processor	2
B15S	ThinkSystem 64GB TruDDR5 6400MHz (2Rx4) RDIMM	16
C26V	ThinkSystem M.2 RAID B545i-2i SATA/NVMe Adapter	1
C46P	ThinkSystem 2U V4 8x2.5" NVMe Backplane	2
B0SW	Nutanix Flash Node Config	1
C2BR	ThinkSystem 2.5" U.3 7500 PRO 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	6
BKSR	ThinkSystem M.2 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	2
BN2T	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1
C0U3	ThinkSystem 2000W 230V Titanium CRPS Premium Hot-Swap Power Supply	2
6400	2.8m, 13A/100-250V, C13 to C14 Jumper Cord	2
BVKV	Nutanix Cloud Platform (NCP) Pro Software License with Mission Critical Support	1
SCJC	XClarity One - Managed Device, Per Endpoint w/1 Yr SW S&S	1

References

For more information, see these resources:

- ThinkAgile HX Solutions
<https://lenovopress.lenovo.com/datasheet/ds0019-lenovo-thinkagile-hx-solutions>
- ThinkAgile FX Series
<https://lenovopress.lenovo.com/datasheet/ds0203-thinkagile-fx-series>
- Lenovo ThinkAgile HX630 V4 Hyperconverged System
<https://lenovopress.lenovo.com/lp2132-lenovo-thinkagile-hx630-v4-hyperconverged-system>
- Lenovo ThinkAgile HX650 V4 Hyperconverged System
<https://lenovopress.lenovo.com/lp2133-lenovo-thinkagile-hx650-v4-hyperconverged-system>
- Lenovo ThinkAgile FX650 V4 Hyperconverged System
<https://lenovopress.lenovo.com/lp2338-lenovo-thinkagile-fx650-v4-hyperconverged-system>
- Lenovo ThinkAgile FX630 V4 Hyperconverged System
<https://lenovopress.lenovo.com/lp2337-lenovo-thinkagile-fx630-v4-hyperconverged-system>
- Reference Architecture for Workloads using Lenovo ThinkAgile HX and FX Series
<https://lenovopress.lenovo.com/lp0665-thinkagile-hx-and-fx-series-reference-architecture>
- Microsoft SQL Server Documentation
<https://learn.microsoft.com/sr-latn-rs/sql/?view=sql-server-ver16>

Author

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Related product families

Product families related to this document are the following:

- [Microsoft SQL Server](#)
- [ThinkAgile FX Series](#)
- [ThinkAgile HX Series for Nutanix](#)

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