

Lenovo Smart Designs for

# Microsoft SQL Server Database

## Reduce time to value with pretested hardware configurations

### Support for Transactional and Data Warehouse Applications

The volume and complexity of data is increasing everywhere, and the ability to capture and use it is becoming more important for organizations across almost every industry. Digital transactions and experiences are expected to be available across geographies and time zones. With this data volume increase and its geographic proliferation, the ability to analyze data for operational results and market trends is of paramount importance to businesses large and small.

To address both of these needs, Lenovo has developed validated design based solutions with the breadth of scope that allows them to easily accommodate both transactional database and Decision Support Systems (data warehouse) database workloads. With their unified architecture approach, these cost-effective solutions include all the infrastructure components and hardware resources optimized to address both types of workloads in order to address the needs of enterprises and smaller businesses.

The principle components of these validated designs include Lenovo ThinkSystem and ThinkAgile servers, ThinkSystem all flash storage arrays as well as Microsoft SQL Server software.

### Faster Time to Deploy

These Microsoft SQL Server designs are faster and easier to deploy using pre-tested/certified hardware configurations. The resulting pre-tested solutions employ the infrastructure configuration details required for Microsoft SQL Server. These solutions enable businesses to accelerate their Microsoft SQL Server deployment and quickly provision infrastructure resources in a repeatable and consistent manner.

### Reduce Equipment and Operating Costs

Designing and sizing a Microsoft SQL Server solution is not a trivial task. It is common for data warehouse architects to over provision hardware and software systems anticipating future growth and peak demands not accounting for the latest features, performance and capabilities. This typically results in higher hardware costs, software costs and maintenance costs. These Lenovo solutions solve this business problem. They are validated configurations that include compute, storage and networking elements that can be easily deployed, managed, configured and reconfigured as business and application needs change.

## Highlights

- Deploy an on-line transaction processing (OLTP) or Decision Support Systems (data warehouse) database architecture for Microsoft SQL Server
- Leverage Azure Services for additional capabilities that complement your SQL Server database
- Minimize deployment time and cost with pre-tested and optimized infrastructure configurations
- Scale the design easily based on workload requirements.

### Microsoft SQL Server 2022

As one of the fastest growing database platforms, Microsoft SQL Server deployments are becoming increasingly critical to organizations. They are used in everything from departmental databases to business-critical workloads, including enterprise resource planning, customer relationship management and business intelligence. But SQL Server is rapidly becoming much more than just a relational database. Microsoft SQL Server 2022 builds on previous releases to grow SQL Server as a platform that gives you choices of development languages, data types, on-premises or cloud environments, and operating systems. With the release of Microsoft SQL Server 2022, you can now:

- Get insights in near real-time by integrating operational and analytical stores
- Achieve your security and compliance goals by using the database rated as least vulnerable over the last 10 years<sup>1</sup>
- Make better predictions by ingesting and prepping data and then training, storing and operationalizing machine learning models all in one system
- Easily deploy your database using Linux containers on a Kubernetes cluster

### Lenovo Solutions for On-Premises SQL Server with Microsoft Azure Services

Lenovo has developed a wide range of solutions utilizing Microsoft SQL Server in both transactional and data warehouse environments. The configurations integrate a variety of Lenovo systems, robust storage options and the capabilities of Microsoft SQL Server to improve time to value, optimize performance and provide a faster return on investment.

In addition, Lenovo has developed the following solutions leveraging Microsoft Azure services. These Azure services are available through Lenovo as a Microsoft Cloud Solutions Provider.

- Ensure business continuity with fully managed disaster recovery in the cloud through [Azure Backup](#)
- Gain a more unified and streamlined management experience on premises for Microsoft SQL Server databases with Microsoft [Azure Arc for Data Services](#) on Lenovo ThinkAgile MX systems ( [technical brief](#), [deployment guide](#) )
- Process data aggregated from scores of IoT devices locally using Microsoft [Azure SQL Edge](#) on Lenovo ThinkEdge servers for increased security and reduced latency
- Keep Microsoft SQL Server workloads and data safe and available online during planned and unplanned downtimes with Microsoft [Azure Stack HCI stretched cluster](#) high availability and disaster recovery solution on Lenovo ThinkAgile MX
- Leverage Azure Stack HCI on Lenovo ThinkAgile MX to integrate Microsoft SQL Server with [Azure Site Recovery](#) service and provide a cloud-based migration, restoration, and protection solution for your organization's data that is reliable and secure



Padua College, a Catholic day school in Australia, runs many of its critical business systems on a Lenovo ThinkAgile MX cluster, with some applications deployed to the Azure cloud. The school takes advantage of Azure Backup services to protect its virtual machines, workloads and data using the cloud. [Read the case study.](#)

### Additional Azure Services from Microsoft

Users utilizing Lenovo ThinkAgile MX with Azure Stack HCI gain additional flexibility by harnessing the power of the cloud along with the added benefits of Azure Services from Microsoft. These Azure services are also available through Lenovo as a Microsoft Cloud Solutions Provider.

These Azure services allow users to:

- Overcome data silos by managing and governing your entire data estate using [Microsoft Purview](#)
- Monitor the health of your SQL Servers with SQL assessment and bring enhanced security capabilities through [Microsoft Defender for Cloud](#)
- Modernize SQL Server applications with a managed, always-up-to-date SQL instance in the cloud with [Azure SQL Managed Instance](#)
- Utilize a suite of fully managed, secure, and intelligent SQL database services that support a wide range of application patterns with [Azure SQL](#)
- Easily migrate your SQL Server workloads and retain full compatibility with SQL Server and access to the operating system level with [SQL Server on Azure VMs](#)
- Support modern cloud applications on an intelligent, managed database service, that includes serverless compute with [Azure SQL Database](#)

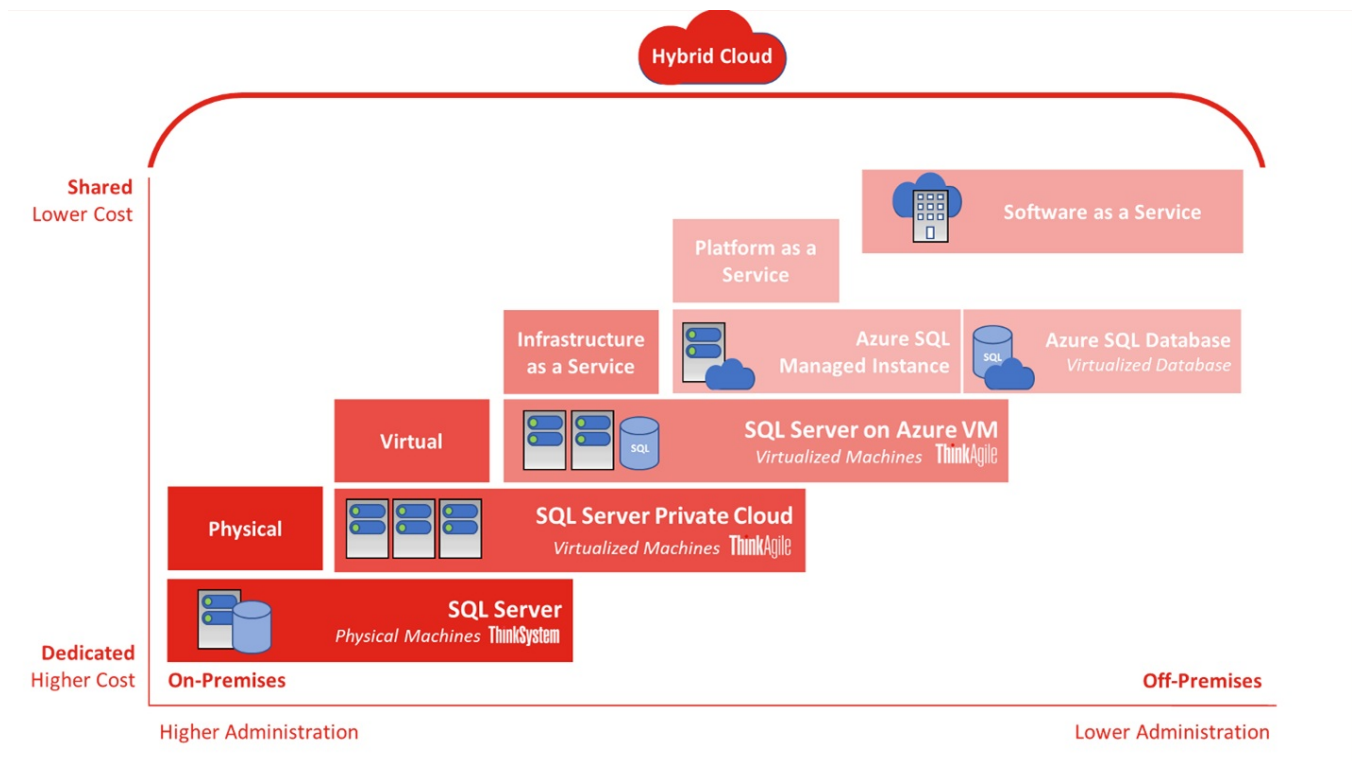


Figure 1. Microsoft SQL Server Deployment Options

**Powered by Lenovo**

The Lenovo Database Validated Configurations enable businesses to deploy Microsoft SQL Server solutions for edge, high performance and hybrid cloud applications with Lenovo ThinkSystem and ThinkAgile platforms, including the following:



ThinkSystem SR650 V3 Server



ThinkAgile MX HCI



ThinkSystem SR250 Server



ThinkEdge SE350 Server

- ThinkSystem SR650 V3 - A 2U, 2-socket server that delivers the performance and reliability you require today, with the scalability and versatility you'll need in the future.
- ThinkAgile Platforms - Designed for easy deployment and manageability in scale-out clusters, the Lenovo ThinkAgile portfolio combines software from industry-leading hyperconverged ISVs with Lenovo's highly reliable and scalable servers. These appliances ship fully integrated, tested, and configured so that you can dramatically accelerate your time to value and reduce your infrastructure maintenance.
- ThinkSystem SR250 V2 - A compact 1U/1-processor server that delivers enterprise-grade power ideal for small and medium businesses.
- ThinkEdge SE350 - A 1U, 1-socket server is a rugged compact-sized Edge solution with a focus on smart connectivity, security, and manageability for harsh environments.

All Lenovo ThinkSystem servers are high performance systems, consistently holding numerous world performance benchmarks. Engineered for always-on productivity, ThinkSystem servers are [consistently ranked #1 in x86 server reliability](#).

A sample of the Lenovo Smart Designs for Microsoft SQL Server are listed in the following tables:

**SQL Server 2022**

Platform	SQL Server Version	Workloads	Availability	Document
ThinkAgile MX650 V3	SQL Server 2022	DW & OLTP	Simplex	<a href="#">Link</a>
ThinkSystem SR665 V3	SQL Server 2022	DW & OLTP	Simplex	<a href="#">Link</a>
ThinkSystem SR650 V3	SQL Server 2022	DW & OLTP	Simplex	<a href="#">Link</a>
ThinkSystem SR650 V2	SQL Server 2022	DW & OLTP	Simplex	<a href="#">Link</a>

**SQL Server 2019**

Platform	SQL Server Version	Workloads	Size or Scalability	Availability	Document
ThinkSystem SR650 & DM7100F	SQL Server 2019	DW	70TB	HA	<a href="#">Link</a>
ThinkSystem SR665	SQL Server 2019	DW	125TB	Simplex	<a href="#">Link</a>
ThinkSystem SR860 V2	SQL Server 2019	DW	150TB	Simplex	<a href="#">Link</a>
ThinkSystem SR250 V2	SQL Server 2019	Both	12TB	Simplex	<a href="#">Link</a>
ThinkSystem SR650 V2	SQL Server 2019	Both	100TB	Simplex	<a href="#">Link</a>
ThinkEdge SE350	SQL Server 2019	OLTP	Up to 2 nodes	Simplex or HA	<a href="#">Link</a>
ThinkSystem SR650 with PMem	SQL Server 2019	OLTP	Up to 2 nodes	Simplex or HA	<a href="#">Link</a>
ThinkSystem SR650 with Containers	SQL Server 2019	OLTP	Up to 2 nodes	Simplex or HA	<a href="#">Link</a>
ThinkAgile MX	SQL Server 2019	OLTP	2 to 16 nodes	HA	<a href="#">Link</a>

### Attached Storage Arrays

All configurations support either on-board storage or attached storage with the Lenovo ThinkSystem DM7000F or DE6000F Series Storage Arrays. These all-flash arrays offer a range of connectivity options, minimizing latency and maximizing performance. The DM Series provides strong data management with block and file support. The DE Series provides maximum performance for block storage at an affordable price.

Connecting the servers to the data and storage networks can be easily accomplished with network switches. Options include 10, 25 and 100 GbE switches as well 16 and 32 Gb Fibre Channel switches.

### Complementary Software

Lenovo offers a wide range of complementary software offerings for your Microsoft SQL Server environments.

Whether you desire to run Microsoft SQL Server on Linux, Windows or containers, Lenovo can provide you with the OS software. Lenovo offers Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server (SLES) Linux distributions, and the current and previous versions of Windows Server.

System management is achieved through Lenovo XClarity Administrator, a centralized resource management solution that is aimed at reducing complexity, speeding response, and enhancing the availability of Lenovo server systems and solutions. Lenovo XClarity Administrator provides agent-free hardware management for Lenovo servers, storage, and network switches, and integrates with Microsoft Windows Admin Center for single pane of glass control.

The Veeam Availability Suite provides SQL Server database deployments with the protection and recovery performance necessary to meet recovery point objective and recovery time objective goals. Veeam provides reliable, agentless, image-level backup for Microsoft SQL Server databases that run any supported operating system and hypervisor, with transaction log backup and replay capability so that you can restore your Microsoft SQL Server database to a precise point in time — even to a specific transaction.



The Wilkins Group, a packaging manufacturer in Europe, deployed a hyperconverged infrastructure with Lenovo ThinkAgile HX to achieve 100% uptime for its applications including Microsoft SQL Server, ensuring that its manufacturing lines can run 24/7. [Read the case study.](#)

### Tying It All Together with Services

The solutions can be installed and configured with the help of Lenovo Services. Lenovo Services can help you:

- Drive Digital Transformation. Select the best architectures suited to your unique needs.
- Foster Innovation. Free up your internal resources to focus on initiatives that grow your business.
- Simplify Your Support Experience. Gain a trusted partner who understands your systems and solutions to fully support and optimize your data center.

### ThinkAgile Advantage Services

Included with your ThinkAgile systems are ThinkAgile Advantage Services, which deliver proactive, solution-oriented support for your Lenovo ThinkAgile systems. This includes end-to-end case management and problem resolution, with a dedicated Lenovo phone number for expedited response. Lenovo ThinkAgile Advantage services extend these benefits with 24x7 support, allowing your IT team to focus on developing proficiencies that give your business a competitive edge. It's an efficient way to keep your investment working for you, with minimal disruption to your staff resources.

### Why Lenovo

Lenovo is a leading provider of x86 servers for the data center. Featuring rack, tower, blade, dense and converged systems, the Lenovo server portfolio provides excellent performance, reliability and security. Lenovo also offers a full range of storage, software, solutions, and comprehensive services supporting business needs throughout the IT lifecycle.

### For More Information

To learn more about Lenovo Database Validated Designs for Microsoft SQL Server Database, contact your Lenovo Business Partner or visit: [lenovo.com/solutions/database](https://lenovo.com/solutions/database)

Lenovo ThinkSystem servers with Microsoft SQL Server software provide high performance, cost effective transactional or data warehouse solutions.



<sup>1</sup>[National Institute of Standards and Technology Comprehensive Vulnerability Database](#) as of September, 2022

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