15-Minute Guide
Unlock Microsoft SQL Server insights with a powerful data foundation

Abstract
There are many paths toward modernizing your Microsoft SQL Server data estate. Designing the right solution that meets today’s needs while laying the foundation for where your business will need to be tomorrow is a critical step in becoming an innovation leader.

This 15-minute guide introduces the Dell Technologies modernization approach to this new era of data abstraction and management, so you can take advantage of next-generation analytics and go behind your data to draw actionable insights.

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A new era in data management is here

For decades, database administrators have been managing the lifecycle of the data in their care. This includes everything from acquiring, validating, storing, protecting and processing data with a focus on ensuring accessibility, reliability and timeliness for users. Yet, databases have remained siloed entities, isolated either by vendor, workload, application or location. Businesses do not need to simply store data — they need to use it, regardless of where it resides. In turn, this has impacted the organization’s ability to extract valuable data insights, leaving them dependent instead on heavy-lift extract, transform and load (ETL) processes.

New advancements in technology, from both a software and hardware perspective, are driving a fundamental and exciting change for application, database and infrastructure owners. We are at the forefront of a new era in data management and Microsoft® SQL Server® is leading the way for many organizations. SQL Server 2019 expands upon previous versions by enabling businesses to draw more actionable insights from data while also empowering business intelligence capabilities and comprehensive advanced analytics.

Microsoft SQL Server strategy

Enable intelligence over all data

Microsoft SQL Server strategy: Enable intelligence over all data

Addressing a growing and diverse database infrastructure

The typical business today is running hundreds of applications, and not all of these applications use the same type of workload. There is a mix of online analytics processing (OLAP), online transaction processing (OLTP) and business analytics. Then there is the addition of test and development environments which require multiple copies of production databases. This means more infrastructure is needed to support multiple databases and workloads, leading to:

- More and more data silos
- An inability to easily search / discover data to perform analytics
- Multiple data copies
- Greater inefficiencies
- Higher latencies
- Increased costs
- Reduced space within the data center

To add to these challenges, over the years as applications have been deployed, so have various versions of SQL Server. Many of these versions still in use are outdated, out of service and provide inconsistent levels of functionality. This has not only led to inefficiencies in terms of resource utilization, obtaining data value and managing the entire data estate, but also put valuable data and business services at risk. Businesses are being exposed to potential weaknesses from hackers and malware and also run the risk of not meeting compliance standards and industry regulations — such as General Data Protection Regulation (GDPR) — both of which can result in costly fines, loss of business and damage to their reputation.

Embracing a unified platform for database virtualization

Data virtualization is changing how we access, ingest and manage data. Data virtualization refers to abstracting data from different sources, locations and formats — without copying it or moving it — into a single layer that allows users to query it in real time from a single, unified interface.

The SQL Server PolyBase technology accesses and combines both non-relational and relational data, residing in different locations, all from within SQL Server. Microsoft has expanded upon this capability with SQL Server 2019, enabling applications and users to query a variety of datastores including MongoDB®, Azure® Cosmos DB, NoSQL, Oracle®, Azure SQL Database, Azure SQL Data Warehouse, relational databases and big data stores in Hadoop® Distributed File System (HDFS), or any open database connectivity (ODBC)—compliant data source via a generic ODBC driver. This ability to query data from a multitude of external data sources removes the boundaries and ETL processes perpetuated by data silos, creating a unified data management platform.

Planning a powerful SQL Server data estate foundation

Data management is not a one-size-fits-all proposition. Outlining a strategy in this new era of data virtualization and abstraction requires a shift in how organizations approach data management. This is a journey that begins with an infrastructure that is optimized to support SQL Server, regardless of version, and capable of supporting next-generation intelligence and analytic capabilities.
Modern infrastructure

Deploying a Dell Technologies infrastructure provides the powerful foundation customers need to unlock insights from their most valuable asset: data. Dell Technologies simplifies deployment, integration and management of SQL environments and accelerates time-to-value for better service delivery and business innovation. Dell EM enables and expands SQL business intelligence application access to structured and unstructured data sources and deeper historical data sets, provides the critical infrastructure for application orchestration and gives the foundation for customers to prepare real-time data for machine learning (ML) and artificial intelligence (AI) applications.

Consolidate mixed workloads to reduce complexities and increase efficiencies

Data center consolidation has been used very effectively to break down application and storage silos. Consolidation has many benefits, the greatest of which is the ability to increase infrastructure utilization without sacrificing performance, while still maintaining the elasticity and agility to respond to new requests. Despite these benefits, many organizations stop short of consolidating mixed databases and workloads. There are many reasons for this hesitation, everything from having multiple versions of SQL Server to concerns as to how consolidation may impact performance, throughput and protection.

SQL Server has addressed the first of these concerns with its database compatibility mode and PolyBase features. SQL Server 2019 is compatible with databases going back to SQL Server 2008. For older SQL Server databases that cannot be upgraded but must remain untouched because of legacy application dependencies, PolyBase can be used to query the data where it resides.

Also, the introduction of faster, more powerful CPUs and new storage technologies has made it possible to consolidate databases while maintaining the availability and performance of business-critical applications with low latency and fewer resources.

Dell EMC PowerEdge servers with Intel® Optane™ DC persistent memory can accelerate insights from the massive amounts of data companies manage today. Intel Optane DC persistent memory can be configured with traditional DRAM acting as a cache to transparently integrate into the memory subsystem, making it appear like DRAM with no changes required to the operating system (OS) or applications. This makes it possible for organizations to double today’s four-socket Dell EMC PowerEdge servers from 6TB DRAM systems to 12TB of usable system memory (3TB per socket), thus enabling consolidation by reducing the number system nodes.

Dell EMC Storage solutions with non-volatile memory express (NVMe) drives introduce new levels of performance and parallelism that is the ideal match for mixed SQL Server database workloads. NVMe drives are designed to overcome the bottlenecks that occur when fast, flash-based storage collides with legacy data transport technologies. NVMe maximizes the power of flash drives and opens the door to the next media disruption with storage class memory (SCM).
Storage data services also play a critical role in database and workload consolidation, which are highly differentiated across the industry with respect to the effectiveness of the data services. Across the Dell EMC product portfolio there are several key data services features that support consolidation strategies including usable capacity, thin provisioning, compression, deduplication and intelligent snapshots.

Upgrade and re-platform to set the stage for what comes next
Companies are looking for more choices when it comes to development languages, data types and OSs, especially when building cloud-native applications. Re-platforming SQL Server to Linux® (or deploying a mixed Windows Server®/Linux platform) opens doors to greater flexibility as it pertains to application development, data integration, containerization and analysis.

By bringing the power of Linux and Linux-based Docker® containers to SQL Server, organizations can enjoy choice of development languages, data types and OSs.

Agile operations
In today’s fast-paced, service-driven environment, IT’s ability to deliver platforms and applications — at the right time and on the right data platforms — is critical. By providing choice in platform deployment and consumption models for SQL Server, Dell Technologies enables greater operational flexibility. From integrated virtualized infrastructure on VMware and Hyper-V®; to multi-cloud and hybrid-cloud deployments with Dell Technologies Cloud, Microsoft Azure and Azure Stack; to containerized applications on Linux and Windows Server, Dell Technologies empowers customers to deliver accelerated response times to the business.

Cloud operating models are not an “either/or” strategy
As modern businesses adapt to the digital economy, IT needs to be prepared with a data management strategy, enabling the business to make use of data that lives in distributed hybrid environments. Designing and building the best solution for your data estate — from edge to core, and from on-premises to hybrid cloud — requires a combination of the right expertise and infrastructure. This is not a one-size-fits-all approach, but a consumable, flexible and scalable approach that builds on current investments while preparing you for a successful digital future.

Dell Technologies offers a broad portfolio of cloud-enabled virtual infrastructure foundations for providing end-to-end optimization for workloads. The Dell Technologies Cloud platform delivers a consistent operating model for the hybrid data center, reducing complexity, lowering administrative burden and operational costs, reducing total cost of ownership compared to native public cloud and improving your business agility when deploying current and future SQL environments. The core of the offering is VMware Cloud Foundation and Dell EMC VxRail hyper-converged infrastructure coupled with implementation and support services designed to ensure a rapid and sustainable path to delivering hybrid-cloud capabilities.

Dell EMC Cloud for Microsoft Azure Stack is a hybrid cloud that delivers an automated, consistent experience for both traditional and cloud-native apps — on-premises and in the public cloud. This is because Azure Stack was built specifically for the cloud and the apps, services and tools are consistent with those available in the Azure public cloud. There is no need to learn new tools to support infrastructure-as-a-service (IaaS) and platform-as-a-service (PaaS) implementations or to administrate, automate and orchestrate lifecycle maintenance and operations tasks.
Intelligent outcomes

As Microsoft continues to advance its data analytic capabilities into a complete business intelligence platform, Dell EMC is responding with foundational solutions that allow customers to accelerate business innovation and achieve competitive advantage. From ingestion and preparation of SQL Server relational data into data lakes, to AI and ML models, this streamlining of architecture lets customers take advantage of next-generation analytics.

Building a container strategy for big data

Containerization with orchestration provides a flexible platform for even the most complex applications and databases. Containerization of SQL Server databases empowers companies to deploy updates and upgrades on the fly, and with the portability needed to build locally, deploy to the cloud and run anywhere. However, containers are designed to be “short-lived” — or stateless. It is for this very reason that when building or updating SQL Server databases in a containerized environment, organizations need to ensure that the data is persistent and will survive through the restart, re-scheduling or deletion of a container.

To effectively address the challenges of stateless containers and the need for persistent storage, Dell EMC storage solutions provide unique Container Storage Interface (CSI) plugins which allow customers to deliver persistent storage for container-based applications for both development and production scale. The combination of the Kubernetes® orchestration system and Dell EMC storage CSI plugins enables simplified provisioning of containers and persistent storage. Organizations can improve productivity by simplifying application portability, making it possible for IT operations teams to build and run applications and databases anywhere there is a compatible OS or control plane, both on-premises and in the cloud.

SQL Server Big Data Clusters brings it all together

Relational databases were not originally designed to perform analytics on the scale of petabytes. Or exabytes or, for that matter, ingest unstructured data. SQL Server 2019 Big Data Clusters (BDC) is a game changer. It was designed to be a big data unified data platform that combines SQL Server, Spark and HDFS across a cluster of servers. This new architecture — including support for Windows Server and Linux OSs, database containerization and PolyBase technology — addresses many of the challenges outlined at the start of this guide. When supported by a Dell EMC infrastructure, optimized for SQL Server BDC, organizations will be able to:

- Enable intelligence over all of their data
- Remove the limitations created from data silos by combining both structured and unstructured data across the entire data estate
- Deploy scalable clusters using Apache Spark, HDFS containers with Kubernetes and SQL Server
- Deliver secure, isolated virtualized containers quickly and easily
- Create persistent storage for stateful applications
- Simplify provisioning, management and orchestration of container storage via CSI plugins
- Benefit from linear scalability for consistent performance and minimal latency
Dell Technologies Consulting Services

The experienced consultants of Dell Technologies Consulting Services can assist organizations in building a foundational set of goals and help to develop a roadmap for modernization. As part of these services, organizations receive a comprehensive assessment that incorporates discovery workshops, interviews and thought leadership to provide organizations with the guidance they need to create the right data management strategy tailored to their unique needs. Services include:

- Assist organizations to identify long-term goals and create an actionable roadmap, benefits analysis and migration priority map based on workload importance. Organizations will document their existing SQL Server environment including the current state of the entire hardware stack, associated workloads and configurations.
- Inventory and classify those applications that align to SQL Server databases and all dependencies, studying connections, integrations, reporting, ETL processes and eventual outcomes.
- Group and prioritize SQL Server databases or instances by application group and develop a near-term modernization plan and roadmap for modernization. At this time, organizations may want to consider their consolidation opportunities.
- Establish a rough order of magnitude for future-state compute, storage and software requirements to support an organization’s modernization plan, as well as provide plans to continue to support end-of-support databases.

In addition, Dell Technologies Consulting Services can migrate an organization’s data to a target of choice, fully aware that the targeted infrastructure stack must be flexible enough to build intelligent applications on any data, any platform, in any language — on-premises and in the cloud. Dell Technologies Consulting Services consultants also assist upgrades, re-platforming and/or consolidating infrastructure to ensure predetermined goals are met.

Taking the journey together

Becoming a digital business means IT organizations must become even more agile and effective in meeting business and application requirements. This requires a new approach to data management. One that replaces monolithic, siloed databases and addresses the disruption caused by new data sources and emerging technologies, like AI and ML.

You do not have to embark on your SQL Server modernization journey alone. Dell Technologies and Microsoft have partnered for over 30 years — from joint development to solution validation to customer support. We have the breadth and depth — from edge to core to cloud — with the services expertise needed to support you every step of the way.

Together we can build a unified SQL Server data estate platform, empowering you to go behind your data to draw actionable insights and accelerate business innovation.

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