DELL Technologies

15-Minute Guide

Accelerate the journey to powerful data insights with solutions for Microsoft's data platform.

Abstract

There are many paths toward modernizing your Microsoft SQL Server data platform. 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.

April 2021

Table of Contents

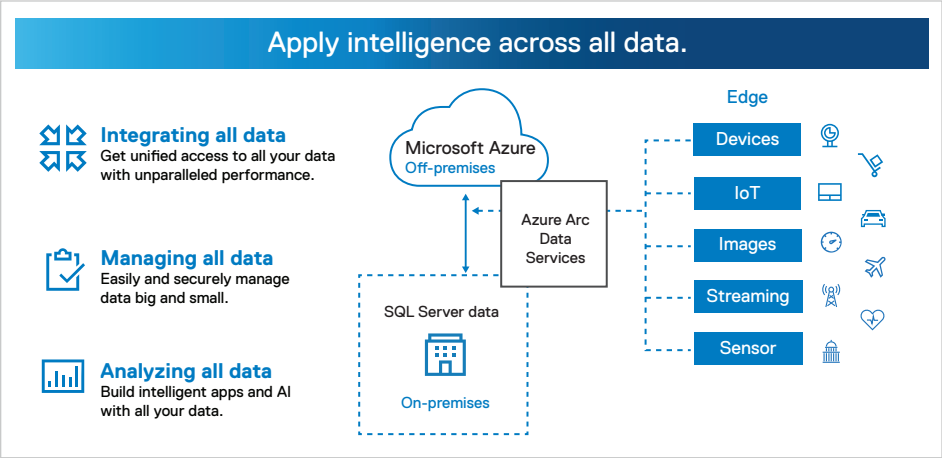
"In 2020, **64.2ZB** of data was created or replicated...The amount of digital data created over the next five years will be greater than twice the amount of data created since the advent of digital storage."[1]

[1] IDC, "Data Creation and Replication Will Grow at a Faster Rate than Installed Storage Capacity, According to the IDC Global DataSphere and StorageSphere Forecasts," March 2021.

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 access and consume it, regardless of where it resides. In turn, this impacts the organization's ability to extract valuable data insights, leaving them dependent instead on heavy-lift extract, transform, load (ETL) processes.

New advancements in both software and hardware technology 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.

Addressing a growing and diverse database infrastructure

The typical business is running hundreds of applications, and not all use the same type of workload. There is a mix of online analytics processing (OLAP), online transaction processing (OLTP) and business analytics. Then there are test and development environments that require multiple copies of production databases, and governance requirements regarding who has access to the data. As a result, supporting these multiple databases and workloads with traditional data strategies and inefficient infrastructure architectures leads to:

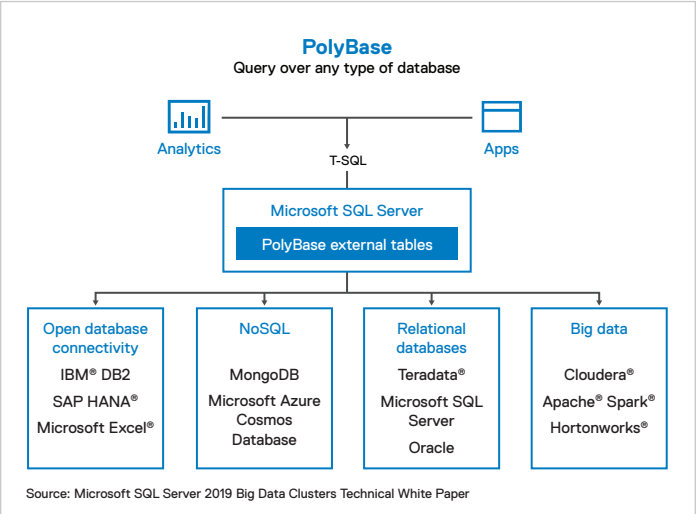
- More and more data silos
- An inability to easily search/discover data to perform analytics
- Multiple data copies
- Greater inefficiencies
- Higher latencies
- Increased costs
- Reduced space within the data center

To add to these challenges, over the years as applications have been deployed, so have various versions of SQL Server. Many of the versions still in use are outdated or 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 has 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 reputation damage.

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.

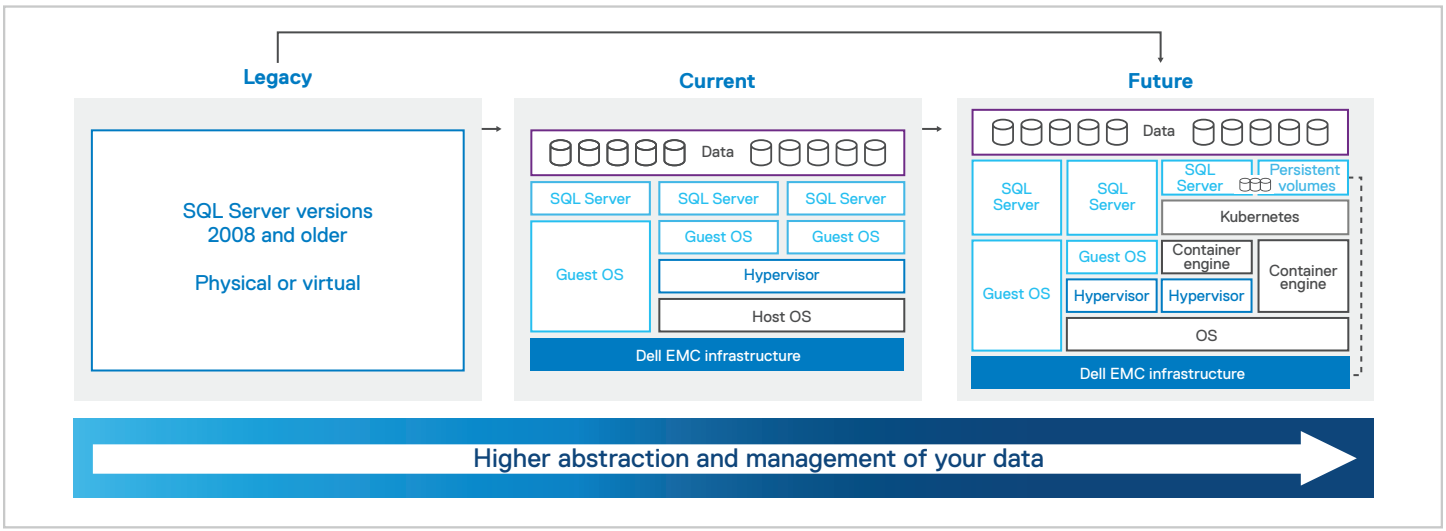
The SQL Server PolyBase technology can access and query both non-relational and relational data, residing in different locations, all from within SQL Server, with T-SQL. Microsoft SQL Server 2019 enables applications and users to query a variety of data stores — including MongoDB®, Azure® Cosmos DB, 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/ELT processes perpetuated by data silos, creating a unified data management platform.



PolyBase enables a SQL Server instance to process Transact-SQL (T-SQL) queries that read data from external data sources.

Planning a powerful Microsoft data platform foundation

Outlining a SQL Server modernization 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.



There are many paths in the SQL Server modernization journey

Redefine IT operations on a modern infrastructure.

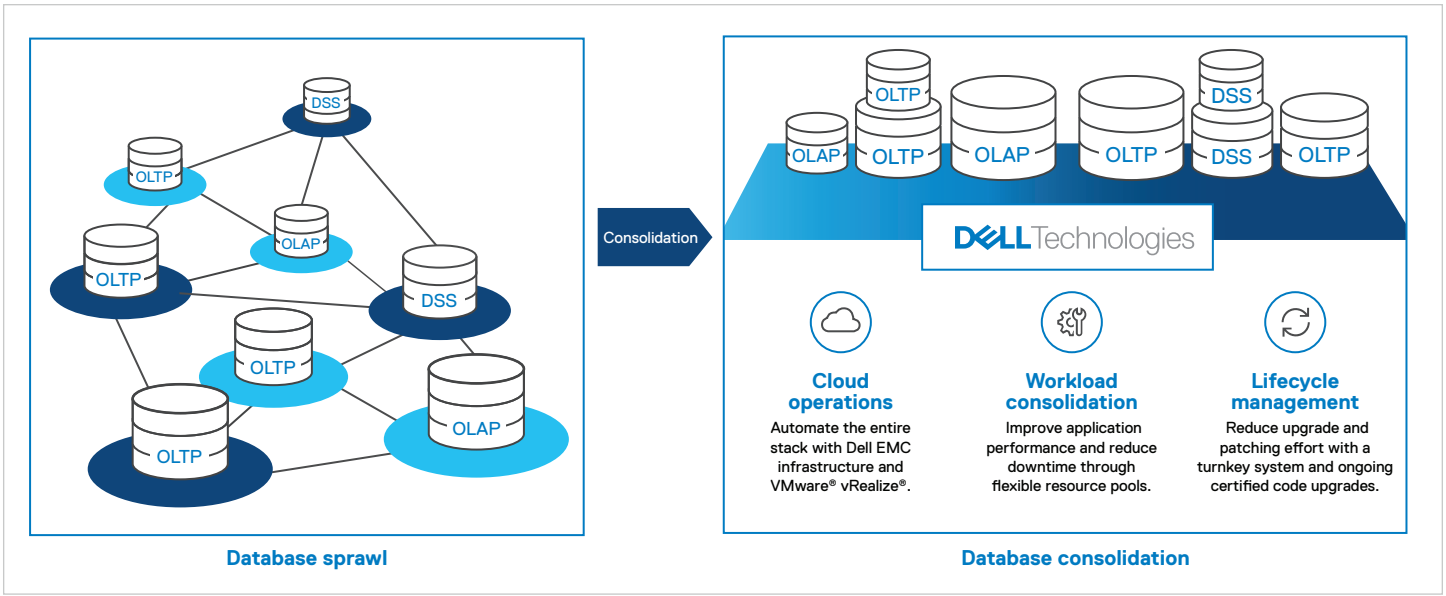
The journey starts with the infrastructure and redefining your IT operations with a focus on gaining greater efficiencies and flexibility. Automating the delivery and lifecycle of IT resources and services, with best-of-breed foundational components, helps to reduce complexity and risk while advancing a hybrid cloud operating model. Dell Technologies solutions for Microsoft SQL Server are best positioned to drive consistency up and down the stack.

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 Technologies solutions for Microsoft SQL Server provide the critical infrastructure needed for SQL Server business intelligence (BI) applications to access structured and unstructured data sources and deeper historical data sets, enabling organizations to prepare and utilize that 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 while not sacrificing performance yet 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, from having multiple versions of SQL Server to concerns about the impact on 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. The introduction of faster, more powerful CPUs and new storage technologies has also made it possible to consolidate databases while maintaining the availability and performance of business-critical applications with low latency and fewer resources.



Database consolidation: Decreased costs and complexities with increased infrastructure efficiency

Dell EMC PowerEdge servers with Intel® Optane™ DC persistent memory can accelerate insights from the massive amounts of data that 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 four-socket PowerEdge servers from 6TB DRAM systems to 12TB of usable system memory (3TB per socket), reducing the number of system nodes and thus enabling consolidation.

Dell Technologies storage solutions are designed for availability, sub-millisecond sustained latency, maximum agility and superior security allowing for the consolidation of data. Dell Technologies storage solutions with non-volatile memory express (NVMe™) drives introduce new levels of performance and parallelism that ideally match mixed SQL Server database workloads. NVMe drives are designed to overcome the bottlenecking that occurs 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 Technologies storage portfolio, there are several key data services features that support consolidation strategies, including usable capacity, thin provisioning, compression, deduplication, intelligent snapshots and quality of service (QoS).

Upgrade and replatform to set the stage for what comes next.

Companies are looking for solutions that support their choice of development languages, data types and OSs, especially when building cloud-native applications. Most organizations have mixed environments when it comes to OS, for example both Windows Server® and Linux®. Linux is used by many development teams for their projects because it is reliable, stable and secure. Microsoft has added support for Linux to SQL Server, allowing for more options in how SQL Server is deployed and leveraged.

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. Linux helps to pave the way for data virtualization, containerization and easier analysis. Additional benefits of running SQL Server on Linux include:

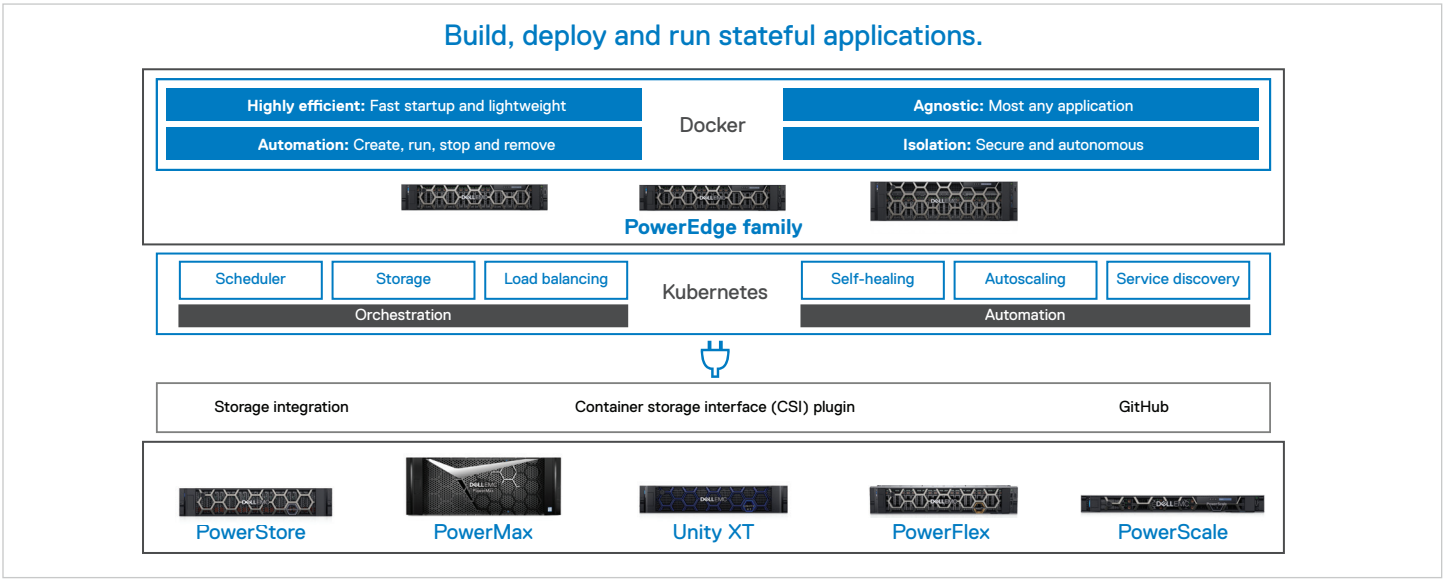
- Driving greater throughput on large complex SQL Server queries
- Accelerating decision support analysis
- Scaling under increasing SQL Server workloads while providing strong storage performance
- Delivering consistently low latency for accessing database data

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.

Build a container strategy.

Containerization, with orchestration, provides a flexible platform for even the most complex applications and databases. It simplifies application portability, making it possible for teams to build and run applications and databases anywhere there is a compatible OS or control plane, both on-premises and in the cloud. 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. 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, rescheduling or deletion of a container.

To effectively address the challenges of stateless containers and the need for persistent storage, Dell EMC storage solutions provide 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 enable simplified provisioning of containers and persistent storage.



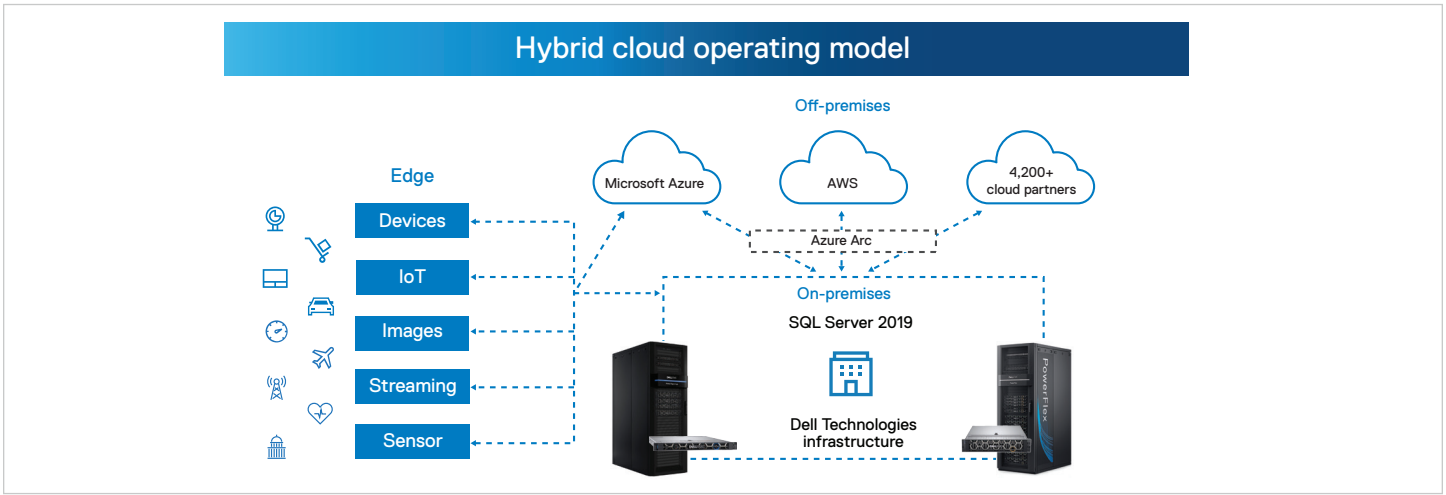
Build, deploy and run stateful applications with persistent storage.

Enable cloud operating models.

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 on-premises, 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 cloud solutions from Dell Technologies deliver a consistent operating model for the hybrid data center, reducing complexity, lowering administrative burden and operational costs, reducing total cost of ownership (TCO) compared to native public cloud, and improving your business agility when deploying current and future SQL Server environments. Dell Technologies has many cloud solutions and support services designed to ensure a rapid and sustainable path to delivering hybrid cloud capabilities.

Dell Technologies also has a solution for Microsoft Azure Stack Hub, an on-premises hybrid cloud platform for delivering infrastructure and Platform-as-a-Service with a consistent Azure cloud experience on-premises or in the field. This is because Azure Stack Hub was built specifically for the cloud and the apps, services and tools are consistent with those available in the Azure public cloud. The Dell Technologies solution enables customers to innovate using one Azure ecosystem with identical tools for users/developers and IT operations teams, all managed with a consistent experience, helping you accelerate your hybrid cloud adoption with confidence.

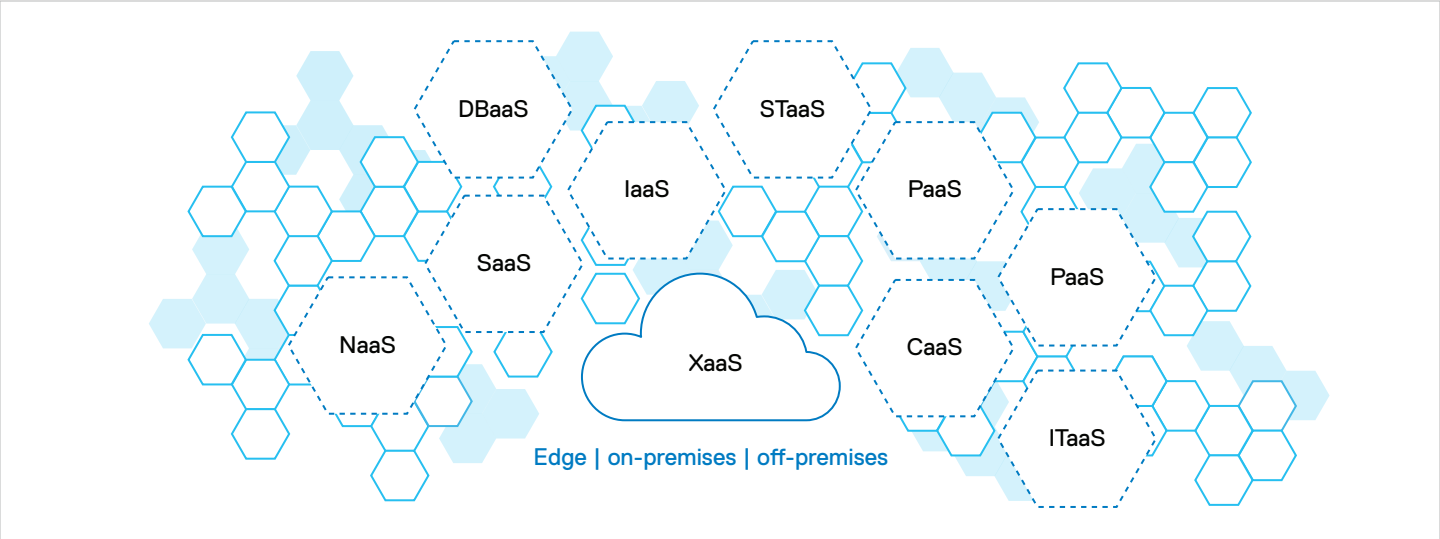


A hybrid cloud approach makes it possible for IT organizations to manage and access data wherever it lives.

Revitalize business processes.

As organizations explore ways to make their data more accessible and enhance productivity, revitalizing business processes by pursing an Everything-as-a-Service (XaaS) first methodology can help to remove data silos and improve collaboration. This approach makes it possible to gain greater business flexibility by empowering employees and partners to innovate more effectively and improve the customer experience.

Whether you are looking to deliver as-a-Service (aaS) to your internal teams or you are looking for solutions to help you consume IT-as-a-Service (ITaaS), Dell Technologies delivers the solutions and services needed to help you with your XaaS strategies.



Pursuing an XaaS-first methodology helps improve scalability, agility and flexibility and accelerates innovation.

Set the foundation.

Dell Technologies solutions help organizations create an elastic, dynamic, scale-out Infrastructure-as-a-Service (IaaS). They enable IT to build templated systems for database administrators (DBAs) and developers to utilize on demand and help set the foundation to expand to additional XaaS strategies. Organization can provide a seamless cloud experience on-premises, off-premises and at the edge with unified data services for consistent operations and infrastructure, such as consuming and deploying storage in a cloud-like manner and protecting data wherever it lives.

ITaaS helps you respond to the needs of business by bringing cloud agility to all parts of your organization. Unlike IaaS, ITaaS is a business and operating model that can radically simplify how your business consumes and delivers IT services — accelerating digital transformation. ITaaS offers on-demand technology, providing the freedom to scale resources quickly in response to changes in the business and services being delivered.

Build and deliver SQL Server-as-a-Service.

Database-as-a-Service (DBaaS) automates the processes needed to provision a database and the underlying infrastructure. Implementing SQL DBaaS streamlines database infrastructure deployments (compute, storage and networking) and enables DevOps teams to develop services/applications faster— accelerating time to market. Dell Technologies has tested and documented the value of deploying SQL Server on Dell Technologies infrastructure, providing the blueprint and enablement artifacts needed to help drive rapid implementation of a new DBaaS offering.

Expand data protection strategies.

Safeguarding data is important to you and your customers, and for many organizations, protecting data begins with snapshots. Snapshots provide local data protection. The snapshot capabilities within Dell Technologies storage solutions provide a method of recovery for data that has been corrupted or accidentally deleted. The snapshots are pointer-based objects that provide point-in-time copies of data that is stored in volumes, volume groups, file systems, thin clones or virtual machines (VMs). However, snapshots are just one level of protection for SQL Server data estate.

Securing sensitive data with encryption is another level of protection. Dell Technologies storage solutions provide data-at-rest encryption (D@RE) enabling organizations to address many business policies and government regulatory requirements. For example, Dell EMC PowerMax combines Thales host encryption with PowerMax back-end D@RE to protect information from any unauthorized access, whether in flight or at rest on hard drives. This end-to-end efficient encryption uses industry-standard AES encryption technology.

On the other hand, the explosion of data growth is causing backup and recovery windows to take even longer than before. Since your SQL Server data platform — and all the data it ingests for analytics and reporting — is at the heart of your business, you cannot afford to lose it or wait long periods of time to gain access to it in the event of unplanned downtime, outages and/or cyberattacks. This is just one reason why a comprehensive backup and disaster recovery strategy is critical to every business.

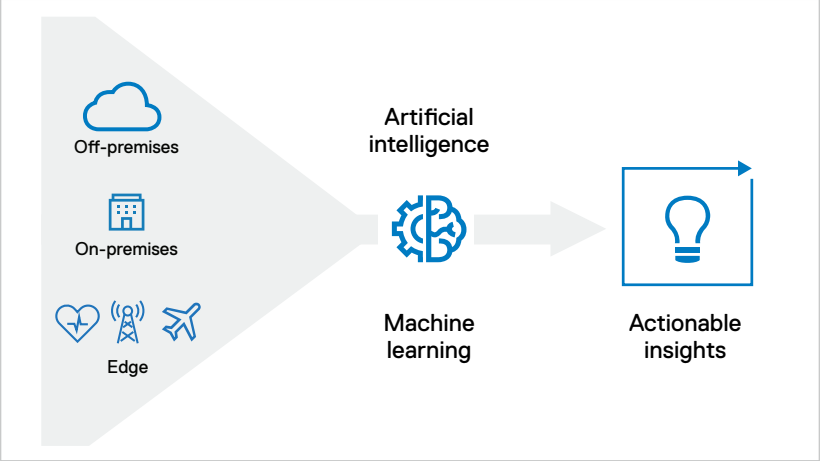
Dell Technologies Data Protection and Cyber Recovery solutions enable data owners to protect, isolate and recover mission-critical SQL Server data, and native/hybrid cloud applications, with self-service capabilities. For example, you can meet stringent service-level objectives (SLOs) and minimize the impact of shrinking backup windows by backing up directly from the application server with client-side deduplication. You can also set up policies and scheduling with notifications for backups, replication and tiering for organizational SLOs that meet your business needs.

When it comes to cyberthreats, the Dell Technologies approach is to start strong, stay strong and outmaneuver threats by building security into supply chain, services, infrastructure and devices. The Dell EMC PowerProtect Cyber Recovery Solution protects and isolates critical data from ransomware and other sophisticated threats. It utilizes a policy-based workflow to securely move business-critical data into an isolated environment, preserving and shielding it from invasive cyberattacks. If a major attack occurs, a copy of your most valuable data is secure and ready to restart your IT operations, letting you resume normal business operations with confidence.

PowerEdge servers have also been designed with a cyber-resilient architecture that detects/protects/recovers as needed. These servers provide several security-related capabilities. For example, right from the start, Dell Technologies Secured Component Verification gives you the confidence of knowing that the server components delivered to your business have not been altered between the time the system is built and the time it is deployed, so you can confidently build your SQL Server data platform on a trusted foundation.

Achieve intelligent outcomes.

This stage of the journey is about accessing and analyzing the data across the enterprise to achieve intelligent outcomes. As Microsoft continues to advance its data analytics capabilities into a complete BI platform, Dell Technologies is responding with foundational solutions and services that allow customers to accelerate business innovation and achieve competitive advantage. By establishing SQL Server as the center of your data fabric, organizations will be able to transform edge, private and public cloud data into actionable information. 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. This enables you to use all your data to drive innovation faster and differentiate your business — without boundaries.



Access and analyze the data across the enterprise to achieve intelligent outcomes.

Bring it all together with unified data management and SQL Server Big Data Clusters.

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

Utilize an AI- and ML-enabling infrastructure.

Regardless of how organizations chart their course to a digital future, there is little question that to thrive, they must become digital organizations, powered by data and running in a multi-cloud world. That means a fundamental shift in how organizations view themselves, but an even larger shift in their relationship with their most important asset: their data. Success means creating information that is more valuable than the collective knowledge of the organization and acting on those findings in the most efficient and effective way. An AI- and ML-enabling infrastructure makes adoption faster, simpler and more collaborative.

Wherever you are in your journey through analytics and AI, we help you align business and IT with a data-first culture by delivering the expertise to improve the data literacy of your entire organization, along with our broad services and technology portfolio that bridges edge, private and public cloud data.

Dell Technologies infrastructure helps optimize workload data placement and accelerate time to insight with purpose-built, high-performance compute and storage to address every AI/ML use case. This infrastructure delivers the throughput, capacity and computational performance critical for these data-intensive workloads across the entire analytics lifecycle — so you can fast-track innovation everywhere.

Unlock data insights.

Leveraging data effectively can provide timely insights and a competitive advantage. Dell Technologies offers two ways to assist your team with the task of unlocking data insights. First, Education and Services empowers data analysts with methods and best practices that are in line with business and technical requirements for modeling, visualizing and analyzing both relational and non-relational data with Microsoft Power BI. Second, our team of Power BI experts can gather requirements for, design a path to, and execute the plan for a Power BI solution that will provide the insights that your leadership needs. The process can even include working alongside your staff to grow their Power BI knowledge so that they can contribute to, support and enhance the solution after completion.

Dell Technologies Services

The experienced consultants of Dell Technologies Services can assist organizations in building a foundational set of goals and help to develop a roadmap for SQL Server data platform modernization. As part of these services, organizations will get 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 a long-term 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.
- Collect reporting and analytics requirements, then, either in a prototyping manner or through wireframes, design and implement Power BI reports and analytics, dashboards and paginated reports based on collected requirements.
- Educate customers about Power BI administration, security, deployment, licensing and governance. Work with customers to ensure that their Tenant Settings are appropriately configured to meet their organizational requirements.
- Assist customer teams who need to learn Power BI by working alongside them and being a sounding board for both technical and design questions.

In addition, Dell Technologies 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, on any platform, in any language — on premises and in the cloud. Dell Technologies Services consultants also assist upgrades, replatforming 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 the edge to the data center to the hybrid 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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