ESG SHOWCASE

Dell Technologies and Microsoft SQL Server: Optimized and Validated with Security in Mind

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ABSTRACT: IT has become more complex than ever, thanks to increasing demands on organizations to maximize the value of their business data while making every effort to ensure its security. To this end, modern applications such as Microsoft SQL Server play a vital role. But to deliver optimal results, a SQL Server environment needs the right infrastructure supporting it. The good news is that Dell Technologies offers an industry-leading compute-centric-infrastructure portfolio enabled by Intel®— helping organizations unlock the value within their SQL data estate.

Overview

Digital information has become one of the most valuable resources a modern business can possess. But for the most part, one group, the IT organization, bears responsibility for protecting that data from a range of bad actors while helping the rest of the business to maximize its potential value. There's a lot at stake: Becoming a digital business is now a pervasive goal among corporate leaders. Nearly every business understands the importance of digital transformation, as 95% of organizations surveyed by ESG are either digitally mature, in process, just beginning, or planning their digital transformation initiatives.[1]

In a digital transformation initiative, modern applications play a vital role. They enable the business to maximize the value of its data—again, the number-one goal—while providing capabilities that increase data's security. Microsoft SQL Server 2019 is an example of an application that supports digital transformation in these ways. Microsoft devised and embedded numerous features into SQL Server 2019 that not only enable a business to analyze its multiple data types more effectively, but also improve the platform's performance and scalability.

However, even the most advanced business application can't fully deliver on those promises if the underlying IT infrastructure is not capable of handling the demands of the application. Architecting an infrastructure that is optimal for satisfying the business's digital demands is a complex and daunting task. However, the IT organization can make the task easier for itself with the help of the Dell EMC PowerEdge server portfolio. Dell EMC PowerEdge servers deliver the reliable infrastructure that IT organizations need in the areas of security, automation, and simplicity to maximize a SQL Server environment's great potential.

Digital Transformation, Application Modernization, and Security Issues Create IT Complexity

Why is IT more complex than ever? Because data is at the core of the modern business' competitive advantage. Businesses now expect their IT organizations to deliver new opportunities and directly drive revenue, all via data. Among IT decision makers surveyed by ESG, nearly two-thirds (64%) said they believe IT is more complex now compared with two years ago, and 17% said it is *significantly* more complex. Contributing factors (see Figure 1) include IT-specific issues such as higher
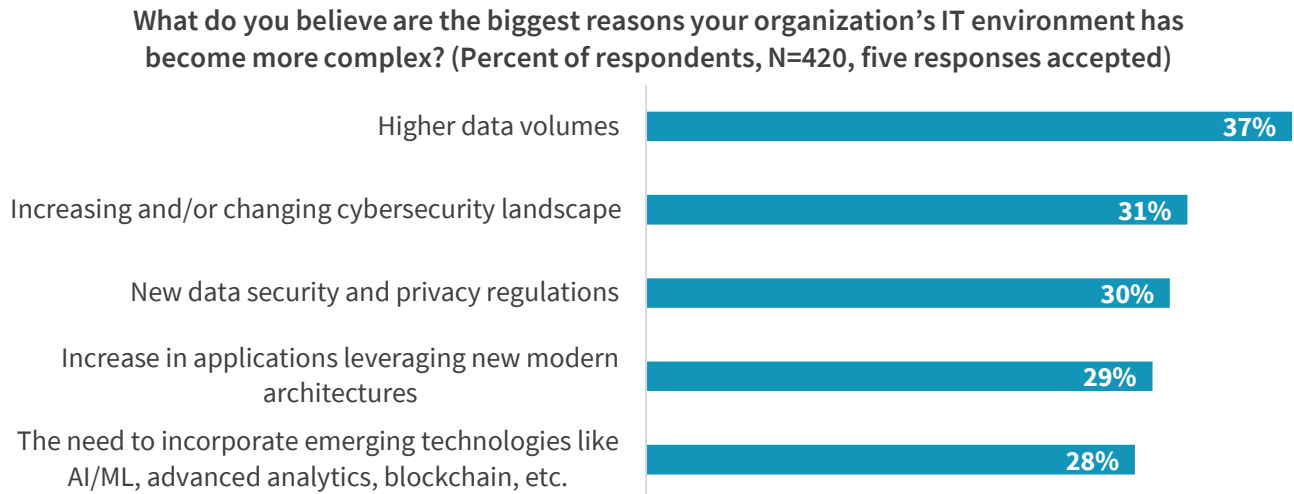
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[1] Source: ESG Master Survey Results, *2020 Technology Spending Intentions Survey*, January 2020. All research references and charts in this showcase have been taken from this master survey results set.

data volumes, the need to incorporate emerging technologies, pervasive cyber threats, and increases in applications that leverage newer architectures such as containers.

Figure 1. Top Five Drivers of IT Complexity

What do you believe are the biggest reasons your organization's IT environment has become more complex? (Percent of respondents, N=420, five responses accepted)

Higher data volumes	37%
Increasing and/or changing cybersecurity landscape	31%
New data security and privacy regulations	30%
Increase in applications leveraging new modern architectures	29%
The need to incorporate emerging technologies like AI/ML, advanced analytics, blockchain, etc.	28%

Source: Enterprise Strategy Group

Marketplace macro-trends also contribute to IT complexity—trends such as today's increasingly mobile, remote workforces, and the new privacy laws that are now cropping up across the globe. But digital transformation itself also produces complexity. At organizations surveyed by ESG, those with mature digital transformation initiatives were three times more likely than those without digital transformation initiatives (29% versus 9%) to report that IT has become *significantly* more complex for them today.

Data Security Plays a Major Role in Modern IT

Cybersecurity has come to play a dominant role in both modern IT and modern business. ESG has found that strengthening cybersecurity is the most commonly identified business initiative expected to drive technology spending over the next 12 months—it was cited by 40% of respondents. On a related note, 44% of IT organizations also report experiencing chronic skill shortages in the area of cybersecurity.

How Microsoft SQL 2019 Fits into a Landscape of IT Complexity

Modern enterprises must leverage data distributed across a variety of database environments accessing both structured and unstructured data sets. As the breadth of data types that can be analyzed increases, an enterprise's access to insight and understanding improves. Microsoft endeavored to design its SQL Server 2019 database software to enable businesses to better analyze all their data, wherever it may live. It comes with Apache Spark, the open source computing framework and unified analytics engine for big data clusters. Other modern features in SQL Server 2019 include:

- Support for big data clusters.
- In-memory database technology.
- Enhanced PolyBase connectors for SQL Server, Oracle, Teradata, and MongoDB to process queries that read data from external data sources.
- Advanced machine learning with R and Python.
- Improved performance and scalability to support rising demands for business insights. But as mentioned, SQL 2019 still must have the right IT infrastructure in place behind it.

Why Dell EMC PowerEdge Is the Smart Choice for Microsoft SQL: The Differentiators

Specific technologies that Dell Technologies has incorporated into its PowerEdge servers should maximize the value of SQL Server 2019 to businesses that are trying to thrive in a digital world. They are high-level innovations tied to the server's hardware, its monitoring tools, and interestingly, even to Dell Technologies' own human capital expertise: Remember that Dell is a decades-long industry leader in developing computing solutions and also has a long relationship with Microsoft—the kind of tightknit relationship essential to ensuring that SQL software and server hardware are optimized and validated to work together.

Both vendors are clearly forward-focused. Recently, they have worked together to ensure the new generation of Dell EMC PowerEdge servers are optimized for the direction in which Microsoft is taking SQL Server … and where Dell Technologies customers are hoping that SQL Server will take them.

Designed with Security in Mind

Cybersecurity is only as good as its weakest element. To that end, IT organizations need to ensure that both the application and the supporting hardware, including the firmware, were built to make the safety of data a priority. PowerEdge servers boast a number of security-related capabilities, including:

- **In-chip authentication and dual silicon-based root of trust** (a set of functions in the computing module always trusted by the computer's operating system) to authenticate firmware during the boot process. It is an effective means to protect against malicious attacks.
- **Firmware that is cryptographically signed** to ensure security. Enabled by iDRAC technology, PowerEdge servers and OpenManage, a comprehensive systems management tool, offer a system lockdown feature to prevent configuration or firmware changes/tampering. It identifies configuration changes/offers remediation, and it detects physical intrusions and interference, even when the equipment is in transit between locations—all with detailed event logging as part of the capability.

Dell Technologies and Intel® Have Ensured Hardware Is Optimized for Modern SQL Server Demands

Today, many companies are seeing increased and often unpredictable demands by their workers and customers for business insights. A rise in near-real-time reporting for analytics is also evident today. Those trends are placing higher demands on the database platform, which the server needs to be able to support. Fortunately, there is another player to take note of in regard to the Dell/Microsoft vendor partnership—**Intel®**.

Impressive performance is possible, thanks in large part to the Intel® Optane™ persistent memory within PowerEdge servers. Intel® Optane™ persistent memory is a new type of memory technology that straddles the line between classic computer memory and storage (including NAND flash NVMe SSDs), helping to accelerate data-intensive applications. Intel® Optane™ persistent memory offers a low-latency, high-performance pool of non-volatile storage directly on the memory bus, close to the processor. According to Dell EMC's analysis, a Dell EMC PowerEdge R740xd server using Intel® Optane™ persistent memory delivered 2.2 times the Microsoft SQL Server 2019 performance of a two-NVMe drive configuration and improved performance even more significantly over SATA SSDs—delivering 11.3 times the transactions per minute.[2]

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[2] Based on Principled Technologies Report commissioned by Dell EMC, "Watch your transactional database performance climb with Intel® Optane™ persistent memory. Dell EMC PowerEdge R740xd servers with Intel® Optane™ persistent memory handled more transactions per minute than configurations with NAND flash NVMe drives or SATA SSDs," November 2019, comparing a Dell EMC PowerEdge R740xd with Optane™ Memory to the same system with SSDs and NVMe drives. Actual result will vary.

A Validated Modern Architecture Supported by a Decades-long Relationship

There is great value in the longstanding Dell/Microsoft relationship. Both vendors put tremendous effort into testing, validating, tuning, and optimizing the server hardware to maximize the efficiency and usefulness of the SQL Server database software. Consider that:

- Dell Technologies developed Ready Solutions for Microsoft SQL, which takes the guesswork out of designing an infrastructure for a SQL Server environment.
- Nearly a third (32%) of IT organizations surveyed by ESG report having problematic IT architecture and planning skill shortages, and Dell Technologies and Microsoft are providing relief in that area. Such help is so important now because containers are now an option for SQL Server deployment. If container-related IT architecting expertise is not available in-house, Dell Technologies offers validation guidance for SQL Server 2019 on Linux containers.

Lastly, it is worth remembering Dell's reputation for optimizing price/performance. According to Dell Technologies, the PowerEdge R740xd server with Intel® Optane™ persistent memory is rated number-one for price/performance based on Dell EMC testing using TPCx-Big Bench for Scale Factor 10000.

The Bigger Truth

Dell EMC PowerEdge servers have been the number-one x86 platform on the market practically forever. And SQL Server has been one of the most-used and reliable database platforms on Earth for just as long. Together, the two technologies are used together more than any other server/database combination, according to Dell Technologies. Dell aims to provide value at each layer of the IT stack when it comes to SQL Server, and the server layer represents an outstanding example of that value.

Additionally, the lengthy partnership between Dell and Intel® sets the Dell EMC PowerEdge servers apart from those made by other major server vendors, not to mention the smaller vendors who sell white boxes. These aren't just commodity x86 servers we are talking about. They are the result of a lot of innovation and effort, with particular focus on engineering security directly into the fabric of the box.

Arguably, the biggest takeaway could be that Dell EMC has, among its engineers, an incredible level of SQL Server expertise. The depth of their SQL-based knowledge is perhaps second only to the knowledge possessed by the SQL software designers employed by Microsoft itself. Experts at Dell Technologies really understand exactly how SQL works. And that's why they also understand how best to design a hardware platform to maximize the performance of SQL database.

 Learn more about PowerEdge servers for Microsoft SQL: http://DellTechnologies.com/Servers-for-SQL

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