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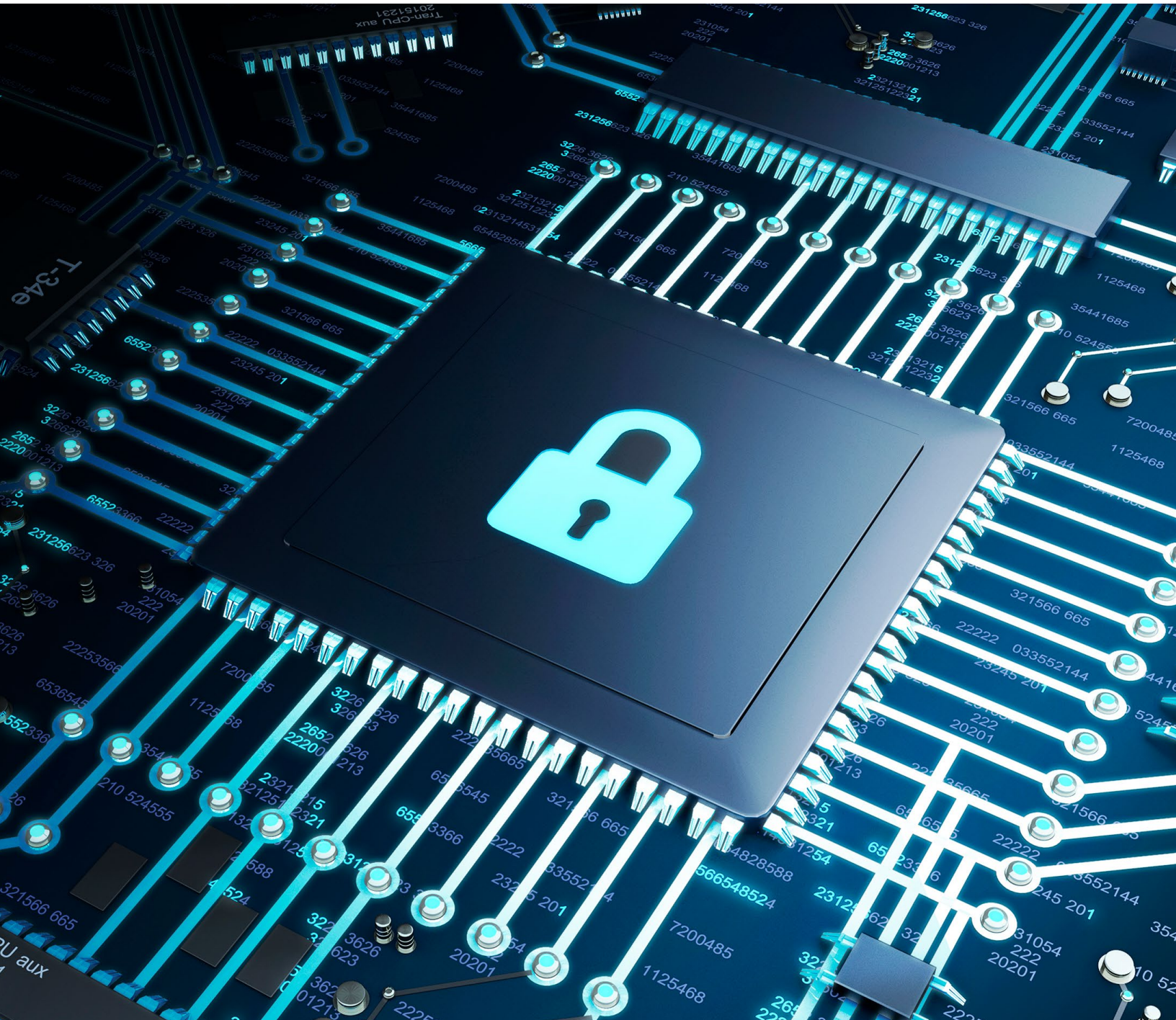
Microsoft

White Paper

Enhance End-to-End Data Security with Microsoft SQL Server, Dell™ PowerEdge™ Servers and Windows Server 2022



With the huge shift to remote work across many sectors, companies are adjusting to the new normal and making security more of a priority than ever before. In 2021, most business leaders said remote work will continue for the foreseeable future.[1] And with more employees spread out geographically in more areas than ever, with multiple vulnerable endpoints, enterprise IT managers need to take a more holistic approach to security.

> 88 percent of IT leaders surveyed expect some form of remote work to continue, and the use of multiple content repositories is likely to remain a problem in the short term.[1]

IT teams can improve data security across the enterprise by taking a "whole stack" approach in the data center: from hardware to database application to operating system. Modernizing infrastructure and consolidating data on the latest version of Microsoft SQL Server on Dell™ PowerEdge™ servers and Windows Server 2022 gives enterprises a strong foundation to protect data end-to-end in a changing workplace landscape.

Security Challenges Facing Enterprises Today

The rise of remote work has exacerbated the ways that enterprises are already vulnerable to cyberattacks:

- **Content sprawl.** Content sprawl is the natural result of many employees accessing and using enterprise data and applications throughout the day for years. Data ends up being stored in different locations, and across multiple repositories. And data keeps growing. IDC estimates that data will continue increasing at a rate of 24 percent compound annual growth rate (CAGR) over the next five years.[2] More than half of IT leaders surveyed (52 percent) say their companies have at least 10 file-storage repositories.[1] Just as having a lot of items within a house can lead to clutter and risk of loss, content saved or duplicated across multiple servers and databases can place data at risk.

> 41 percent of IT leaders say their top concern with content sprawl is the increased risk of data breaches and leaks.[1]

- **Bring your own device (BYOD) and shadow IT.** Increased security risks from content sprawl are exacerbated by BYOD policies, in which organizations allow the use of personal smartphones and tablets for work. These devices might not be updated regularly with the latest security patches, and they might be used on unsecured Wi-Fi networks. "Shadow IT," or the reliance on the self-proclaimed security features of cloud-based apps, is another potential attack vector for hackers due to the inherent lack of internal controls and visibility.
- **Different security patching schedules.** Many organizations use SQL Server as their data platform, but over time they end up with different versions of the database software, complicating data management and security patching. And because patching can slow systems and require server downtime, IT teams must determine the ideal timeframe to patch each version, which can delay updates.
- **Different employee access levels.** IT administrators must try to maintain permission settings as employees are hired or leave an organization. When not set appropriately or updated in a timely manner, someone in the organization can accidentally or intentionally expose company and customer data to ransomware and hackers.

Modernize Data Management on a Secure Foundation

Running SQL Server on Dell PowerEdge servers and Windows Server 2022 helps IT administrators overcome these challenges and secure business-critical workloads on modern infrastructure at the hardware, operating system (OS) and software levels.

65 percent of CIOs and other IT leaders suspect files and documents with sensitive information are saved locally to employees' personal devices.[1]

Dell PowerEdge Servers

Dell PowerEdge servers help enterprises defend against the risks inherent in today's environment with a security-enabled infrastructure that supports a full range of modern workloads and objectives. PowerEdge servers are designed to speed deployment and improve performance for database applications, high-performance computing (HPC), virtualization environments and edge compute. And Dell™ OpenManage™ tools help IT administrators manage large clusters easily and effectively.

PowerEdge servers are built on an immutable, silicon-based root of trust, and they enable security functions like end-to-end boot verification, including Unified Extensible Firmware Interface (UEFI) Secure Boot customization, trusted BIOS, firmware chain of trust and verified OS bootloader. Firmware is protected according to National Institute of Standards and Technology (NIST) guidelines, including signed firmware updates, and certificate management is simplified through automatic renewal.

PowerEdge servers also provide data-at-rest protection using Secure Enterprise Key Manager (SEKM) and data-in-use protection with confidential-compute CPU technologies. To mitigate threats like counterfeit components, malware and firmware tampering, Dell Technologies takes a comprehensive approach to supply-chain security with tools for counterfeit avoidance, manufacture chain of custody, code signing, chassis intrusion and tamper-evident packaging. Further, Secured Component Verification (SCV) extends supply-chain security by verifying server component integrity.

As one of Microsoft's largest partners, Dell Technologies has worked closely with Microsoft for nearly four decades to develop industry-leading, security-enabled hardware and software solutions. With this collaboration, Microsoft software, such as Windows Server and SQL Server, runs optimally on Dell PowerEdge servers.

Windows Server 2022

Windows Server 2022 features a secured-core server based on Windows that uses hardware, firmware and OS capabilities to protect against current and future threats. Secured-core servers use processor support for Dynamic Root of Trust for Measurement (DRTM) technology to isolate firmware, so that any breach has less chance of affecting firmware code. In addition, virtualization-based security (VBS) isolates critical parts of the OS, such as the kernel, from the rest of the system to protect applications and data while helping ensure that servers remain devoted to running critical workloads.

This secured-core functionality helps proactively defend against and disrupt many of the paths that attackers use to exploit systems. Multiple Microsoft security technologies are standard or supported on secured-core servers, including hypervisor-protected code integrity in VBS, Trusted Platform Module (TPM) 2.0, BitLocker Drive Encryption, and UEFI Secure Boot.

For more information about the advanced protection capabilities of Windows Server 2022 on Dell PowerEdge servers, read the white paper, "Gain Advanced Security Protection with the Combined Capabilities of Windows Server 2022 and Next-Generation Dell EMC PowerEdge Servers."

Protect Data at the Database Application Level

SQL Server is built with security in mind. However, as previously mentioned, many enterprises are running several versions of SQL Server, and IT departments are seeking a simpler, consolidated database strategy.

In addition, SQL Server 2012 extended support ends in July 2022, which makes database consolidation on the latest version of SQL Server a more urgent issue. While older SQL Server database versions will continue working, a manufacturer-supported fix will not be available if problems arise. Patches or security updates also will not be provided, which could leave systems vulnerable to malicious attacks.

The most straightforward, practical path to consolidation for many enterprises is upgrading to the latest version of SQL Server and running older versions in compatibility mode. Database administrators can simply back up a legacy SQL Server database, then load and launch it in SQL Server 2019/2022 in compatibility mode. This approach can be a quick and simple way to upgrade if full regression testing isn't necessary. SQL Server 2019 (with a compatibility level of 150) can support versions back to SQL Server 2008 R2 (compatibility level of 100).

Best Security Practices

To further protect data, IT teams might want to ensure they're following security best practices for SQL Server (for more on these best practices and ways to implement them, read the Microsoft blog post, "Securing SQL Server"). These security best practices apply to all levels of data center infrastructure, including the hardware and OS, and they include:

- **Enhance physical security.** Physical security strictly limits access to the physical server and hardware components. This means using locked rooms with restricted access to servers and networking devices. Access to backup media is limited by storing it at a secure offsite location. Taking a layered approach is recommended: preventing access or requiring a keycard/approval at the facility's perimeter, at the building's perimeter, inside the building and on the data center floor.

- **Keep the OS updated.** OS service packs and upgrades include important security enhancements. Updates and upgrades to the OS can be applied after they are tested with database applications.

- **Use firewalls.** Firewalls increase security at the OS level by providing a chokepoint where security measures can be focused.

- **Reduce the surface area.** Limit the areas that are vulnerable to breaches by turning off or disabling features and components that aren't being used. The surface area of SQL Server can be reduced by running required services that have "least privilege" and that grant services and users rights at the appropriate level.

- **Implement role-based access control (RBAC) to "securables."**[3] Securables include components such as the server, database and objects the database contains. Securables are the resources to which the SQL Server Database Engine authorization system regulates access.

- **Encrypt data at all levels.** This includes application and storage data encryption.

- **Create and use certificates.** Certificates are software keys that enable two servers to communicate securely. In SQL Server, certificates enhance object and connection security.

- **Restrict access to OS files used by SQL Server.**

- **Use strong passwords organization-wide.** This is a simple but often underprioritized security practice.

- **Conduct audits.** Ensure recovery after backup works as expected, and that access is applied appropriately.

- **Use Microsoft Defender for SQL Server databases.** Microsoft Defender for SQL Server databases scans databases for vulnerabilities. It detects anomalies that indicate unusual and potentially harmful attempts to access or exploit databases. These anomalies include suspicious database activities, potential vulnerabilities, SQL injection attacks and anomalous database access and query patterns.

Finally, each new version of SQL Server includes new security features that enhance data protection. The new ledger feature, announced for SQL Server 2022, helps protect data integrity by creating an immutable track record of data modifications over time. This can help protect data from tampering by malicious actors, and it's beneficial for scenarios such as internal and external audits.

SQL Server Ledger

- Uses an immutable ledger to protect data from tampering by malicious actors
- Establishes digital trust in a centralized system using blockchain technology
- Attests to other parties that data integrity has not been compromised

Consolidate and Protect from Hardware to Database

The role of IT will only increase along with the growth of data in the digital enterprise. And because that wealth of data is accompanied by smarter and more frequent cyberattacks, IT teams should adopt a data-security strategy that helps protect infrastructure at all levels. Upgrading to the latest version of SQL Server and Windows Server on Dell PowerEdge servers can help businesses protect sensitive company and customer data.

Take a security-first approach to your infrastructure. Learn more about how Dell and Microsoft solutions can help: www.dell.com/en-us/dt/solutions/microsoft-data-platform/index.htm.

Read "Gain Advanced Security Protection with the Combined Capabilities of Windows Server 2022 and Next-Generation Dell EMC PowerEdge Servers."

[1] Egnyte. "2021 Data Governance Trends: Predictions, pitfalls and technologies for the future of digital work." 2021. www.egnyte.com/sites/default/files/2021-09/2021DataGovernanceTrendsReport.pdf.
[2] 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. www.idc.com/getdoc.jsp?containerId=prUS47560321.
[3] For more on securables, read https://docs.microsoft.com/en-us/sql/relational-databases/security/securables.

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Modernize with Windows Server 2022.
The cloud-ready operating system that boosts on-premises investments with hybrid capabilities.