Technical Research Study

PROWESS

# Looking to Streamline IT Transformation? Here's How.

Prowess Consulting researched how hardware, software, and licensing strategies can save time, increase flexibility, and reduce costs.

## The Need to Streamline IT

IT organizations have transformed themselves to support hybrid work and new ways of fulfilling customer demand. And IT leaders continue to innovate. To capture the business potential of cloud computing, artificial intelligence (AI), and advanced analytics, IT leaders are investing in infrastructure, applications, and new skillsets for staff. But as IT teams focus on making new initiatives successful, they also continue to manage day-to-day operations like keeping users productive, addressing security threats, and managing software licensing. Because IT teams might work with lean staff and constrained budgets, this combination of challenges creates the need to simplify IT operations wherever and whenever possible.

## How to Get Started

Prowess Consulting explored how enterprises can streamline IT operations. For this analysis, we put together a series of assumptions based on real-world IT environments, and we then examined practical steps that organizations can take to save time, increase flexibility, and reduce costs for their environments. Finally, we posited an AI use case that illustrates how to apply our recommendations: deploying Windows Server® 2022 with Windows® containers to build an AI-driven inspection system.

Through this study, we determined that three key strategies for streamlining IT are to:

1. Get technologies that are prepared for modern workloads by taking advantage of tech refresh cycles to upgrade servers
2. Increase flexibility by deploying a secondary operating system (OS)
3. License software in the most cost-effective way

**Figure 1 |** Prowess Consulting evaluated how to streamline IT operations for an AI-driven inspection system

We focused our analysis on Dell™ PowerEdge™ servers because these servers are purpose-built for edge and AI use cases, offer intelligent automation for management, and are cyber-resilient, offering zero-trust capabilities. These PowerEdge servers also support sustainable computing through power-efficient performance.

We also examined the benefits of running Windows Server 2022 with multi-layer security (see Figure 2) within a virtualized server cluster. We assumed the use of Dell™ VxRail™ HCI system software, a hyperconverged infrastructure (HCI) solution, preinstalled in a PowerEdge server.

Finally, we compared Dell Technologies OEM licensing with Microsoft volume licensing to determine the right licensing strategy to streamline IT.


**Figure 2 |** Windows Server® 2022 offers multi-layer security: certified Secured-core hardware from OEM partners, a hardware root-of-trust, firmware protection, and more

# Take Advantage of Tech Refresh Cycles

Organizations refresh servers for one of two reasons:

1. They deploy new servers when their old servers become unwieldy with age: performance degrades, disk space becomes lacking, or warranties expire.
2. They also deploy new servers to get access to the newest technologies and to support higher performance. This performance can be needed for data-intensive workloads like AI or data analytics, which form the basis for many new business initiatives. Modern workloads need high-performance servers with higher core-count processors, higher-speed PCIe® 5.0 interface buses, and next-generation double data rate 5 (DDR5) memory.

We created a checklist (Table 1) of server attributes that organizations should keep in mind when upgrading. Software tools that support automation, security, and manageability technology should be an integral part of the server offering to ensure that organizations get the most out of their hardware investment.

**Table 1 |** Server attribute checklist

| Attribute | What to Look For |
|---|---|
| Automation | Does the server come with end-to-end tools you can use to automate processes? |
| Security | How robust is the supply-chain verification tool? Does the server offer multi-layer hardware and firmware protection? Does it offer identity and access management? |
| Manageability | Does the server come with tools for full lifecycle management? How does one connect with the server? Does the management solution integrate with third-party solutions? |
| Scalability | Does the server's processor architecture support scalability? |
| Sustainability | What kind of tools (such as a carbon-emission usage calculator) and reports (reports that provide insights on underutilized servers and power usage, for example) are available? |
| Support for modern workloads | Does the server have performance capabilities to support AI, advanced analytics, or other modern workloads? |

We evaluated PowerEdge servers against our list (see Table 2). The goal was to identify areas in which adopting these servers would streamline IT by saving time, increasing flexibility, or reducing costs.

We found that the Dell™ OpenManage™ Enterprise tool offers fundamental automation, security, and manageability technology to help ensure that PowerEdge servers are easy to deploy and manage. A few highlights of this technology's benefits include:

- An intuitive graphical user interface (GUI) dashboard that is easy to use and reduces training time
- Intelligent automation for managing up to 8,000 servers, which can save significant time
- The flexibility to stage firmware updates to ensure the latest security patches are in place
- Easy-to-use management using Integrated Dell™ Remote Access Controller (iDRAC) connections

**Figure 3 |** Dell™ OpenManage™ Enterprise tools help configure Dell™ PowerEdge™ servers and set policies

PowerEdge servers scale through the addition of processors or memory. Furthermore, the processors in these servers support Compute Express Link™ (CXL™) capabilities. CXL enables the deployment of additional memory tiers to scale memory bandwidth or capacity.

The servers also offer an efficient cooling design that helps reduce energy costs and supports sustainability initiatives. They deliver on performance for data-intensive workloads by supporting high core count processors, the PCIe 5.0 high-speed interface bus, and DDR5 DRAM, which helps feed data more quickly to the processor cores.

**Table 2 |** Dell™ PowerEdge™ server features

| Attribute | Dell™ PowerEdge™ Server Features |
|---|---|
| Automation | IT teams can save time with automated fleet-level endpoint, cluster configuration, and policy settings in the Dell™ OpenManage™ Enterprise tool for PowerEdge servers. |
| Security | A silicon root of trust is the foundation of PowerEdge server security features. Security is built into these PowerEdge servers in every step of Dell's Secure Development Lifecycle (SDL). |
| Manageability | PowerEdge servers work with OpenManage, a comprehensive server-management tool. The physical remote-management communication is done through Integrated Dell™ Remote Access Controller (iDRAC) connections. |
| Scalability | PowerEdge servers support a range of processors with ever-higher core counts. |
| Sustainability | PowerEdge servers come with a carbon-emission calculator and report the location of underutilized servers and how much power is used. These servers have an efficient cooling design that helps reduce energy costs by intelligently directing airflow. |
| Support for modern workloads | PowerEdge servers ship with the latest industry processors from AMD and Intel (4th Generation AMD EPYC™ processors and 4th Gen Intel® Xeon® Scalable processors, respectively), PCIe® 5.0, which doubles bandwidth as compared to PCIe 4.0, and DDR5 memory, with bandwidth of 4,800 megatransfers per second (MT/s). These processors also support the CXL™ standard. |

## Increase Flexibility with Software

IT teams build out solutions by selecting the right OS to create a virtualized environment. For example, a popular approach is to procure a platform such as Dell VxRail HCI system software that's built for VMware. HCI for virtualization has traditionally reduced IT complexity by offering simpler deployments, increased flexibility, and decreased cost of ownership.

When upgrading to a new server or server fleet with virtualization software preinstalled, organizations need to procure a flexible OS to run within the virtual environment on which business applications can be deployed. Prowess Consulting created a list of questions that IT teams can use to evaluate this secondary OS (see Table 3).

**Table 3 |** Screening questions to use in selecting a secondary OS

| Attribute | What to Look For |
|---|---|
| Security | Does the OS define a validated set of hardware, firmware, and driver requirements that must be satisfied? Is there a secure hardware store for keeping sensitive information such as cryptographic keys and data? Does the OS have a method for securing firmware? |
| Management and hybrid capabilities | How will you manage your server OS? What type of user interface (UI) does the management tool support? Is there a way to automate tasks? Are hybrid and multicloud capabilities supported? |
| Container support | What size container image can be used? How many containers can you run per server? How do you containerize applications? |
| Licensing options | How is the OS licensed? What is the support model? |

Prowess Consulting evaluated the Windows Server 2022 OS against this checklist. Windows Server 2022 allows IT teams to design their infrastructures around specific needs and workloads. For example, IT can use Windows Server 2022 to run infrastructure servers (such as Domain Name System [DNS] servers) or file servers. An IT team that is tasked with deploying an email, calendaring, contact, scheduling, and collaboration platform can deploy Microsoft® Exchange on top of Windows Server 2022. If an organization plans to deploy transaction processing, business intelligence, or analytics, then its IT team can deploy Microsoft® SQL Server® on top of Windows Server 2022. Or if an organization plans to run one or more of the applications within the Microsoft Dynamics 365® portfolio, IT can configure infrastructure for these to run on top of Window Server 2022.

Figure 4 illustrates how business applications run on top of Windows Server 2022 Datacenter in a highly virtualized enterprise server cluster.

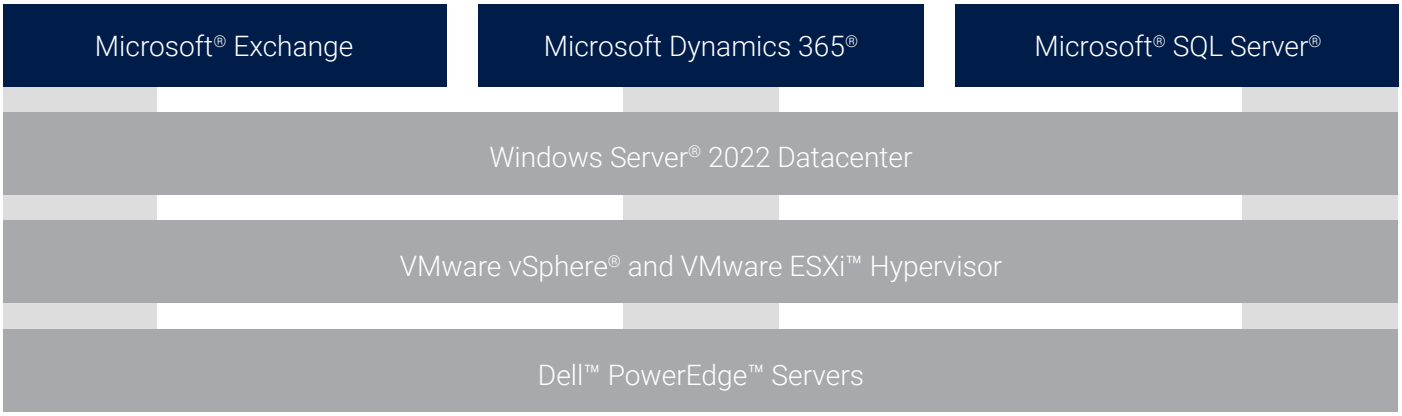


**Figure 4 |** A secondary OS like Windows Server® 2022 Datacenter is needed to run business applications

Table 4 illustrates three editions of Windows Server 2022. Prowess Consulting selected Windows Server 2022 Datacenter for this research because it is designed for highly virtualized data centers, and it supports an unlimited number of virtual machines (VMs). This makes it a good choice for scalability and modern workload needs.

**Table 4 |** Windows Server 2022 options

| Windows Server® 2022 Edition | Ideal For | Licensing Model |
|---|---|---|
| Datacenter* | Datacenter edition is ideal for highly virtualized and software-defined data center (SDDC) environments. It includes SDDC features in the host and unlimited Windows Server containers with and without Hyper-V® isolation. | Core-based |
| Standard* | Standard edition is ideal for customers with low-density or non-virtualized environments, and it includes unlimited Windows Server containers without Hyper-V isolation and two Windows Server containers with Hyper-V isolation. | Core-based |
| Essentials | Essentials edition is for small businesses with up to 25 users and 50 devices. It allows smaller organizations to extend data centers to the cloud. | Speciality servers (server licenses)** |

*Datacenter and Standard edition pricing is for 16 core licenses.
**Up to 10 cores and 1 VM on single-socket servers.

Prowess Consulting evaluated the Windows Server 2022 Datacenter OS against the OS checklist in Table 3 to see how its use can save time, increase flexibility, or reduce costs. Table 5 illustrates the results of our evaluation.

Windows Server 2022 offers multi-layer security through a Trusted Platform Module (TPM) located within the hardware or firmware. The OS also offers protection during the boot process. Multi-layer security helps organizations avoid security breaches that can consume valuable time and result in unexpected expenses.

Windows Server 2022 allows IT admins to manage on-premises servers through the Microsoft Azure® portal, and it comes with other automation software to simplify day-to-day tasks. Management simplicity helps streamline IT operations.

The OS supports container-based applications, where code and workload can run on on-premises servers or on Azure without needing any changes. Finally, the OS comes in three editions, allowing IT teams to optimize infrastructure for their workloads.

**Table 5 |** Windows Server® 2022 options

| Attribute | Windows Server® 2022 Features |
|---|---|
| Security | The Secured-core functionality of Windows Server 2022 deployed on a Dell™ PowerEdge™ server uses a firmware-based TPM available in either 4th Generation AMD EPYC™ processors or 4th Gen Intel® Xeon® Scalable processors. The TPM is the basis of hardware root of trust, and it is used to store encryption keys, certificates, and other digital signatures, checksums, and hashes.<br><br>During the boot process, Windows Server 2022 measures each block of software and verifies it using Dynamic Root of Trust for Measurement (DRTM) technology. The OS isolates driver access to memory with Direct Memory Access (DMA) protection. |
| Management and hybrid capabilities | Windows® Admin Center in Microsoft Azure® lets IT teams manage on-premises Windows Server 2022 instances from their Azure portal. Azure Automanage configures Azure services to help enhance the reliability, security, and management of VMs. |
| Container support | Windows Server 2022 simplifies deploying these containers in Microsoft-centric infrastructures. Containers are a favorite means of delivering modern workloads like AI models for production. Developers or data scientists can bundle up all of an AI app's dependencies in one package that will run the same anywhere. |
| Licensing options | Windows Server 2022 comes in multiple editions, as shown in Table 4. Windows Server 2022 Datacenter edition supports an unlimited number of VMs, which is important in highly virtualized environments. |

## License Software Cost-Effectively

Prowess Consulting examined the advantages of purchasing an OEM license from Dell Technologies, compared to purchasing a volume license directly from Microsoft, with the goal of identifying cost and time savings.

When purchasing a PowerEdge server and virtualized software from Dell Technologies, the Windows Server 2022 OS can be conveniently attached to Dell VxRail, Dell vSAN Ready Nodes, or VMware virtualized PowerEdge servers. The ability to pivot between running workloads directly within virtualized environments using solutions like VMware Tanzu™ and Kubernetes® or running workloads on top of an OS like Windows Server 2022 within the same virtualized environment increases flexibility.

Dell Technologies ships the Windows Server 2022 OS preconfigured with the correct BIOS plug-ins for the server hardware, another time saver for IT organizations. The cost of purchasing through Dell Technologies OEM licensing is up to 28 percent less than purchasing through the Microsoft volume licensing channel.[1]

Dell Technologies offers a single source of both hardware and software support for Windows Server 2022 Datacenter through its Dell ProSupport™ program. This support can help save time for IT teams because having a single source of support is more efficient than juggling multiple hardware and software contacts.

## Use Case: AI Deployed at the Edge

Prowess Consulting applied its three strategies for streamlining IT to an AI use case to illustrate the benefits. AI has enormous business upsides across many industries. Organizations that are achieving superior growth and business transformation with AI can attribute nearly 30 percent of their total revenue to AI, on average.[2]

We specifically selected computer vision, a subset of AI, for our analysis because of this technology's potential to save time and improve quality in scenarios like manufacturing inspection. Computer vision enables systems to gain insights from visual inputs—and to take action after analyzing that data.

In the case of an inspection system, computer vision trains a machine to perform the same functions as a human inspector, but in much less time, using cameras, data, and algorithms instead of human eyes and a nervous system. A computer vision system trained to inspect products on a manufacturing line can analyze thousands of products a minute, noticing tiny defects and quickly surpassing human capabilities.

For this scenario, we selected a Dell PowerEdge edge server well suited to powering AI model execution. We chose the Windows Server 2022 Datacenter OS to deploy the AI model.

The size of its server-core image in Windows Server 2022 Datacenter has been reduced by up to 33 percent, compared to Windows Server 2019. With a reduced image size, Windows containers can start more quickly than in the previous generation.[3]

Table 6 summarizes the benefits of using the right server, OS, and licensing strategy.

**Table 6 |** Save time with the right server, software, and licensing strategy

| Requirement | Selection | How Is Time Saved? |
|---|---|---|
| Take advantage of tech-refresh cycles | Dell™ PowerEdge™ edge server | • Manageability tools for remote updates<br>• Security monitoring and alerts<br>• Automation of monitoring |
| Increase flexibility with the right software | VMware ESXi™ hypervisor, Dell™ VxRail™ HCI, Windows Server® 2022 Datacenter edition | • Less time setting up the server: the server can be purchased with virtualization software preinstalled and Windows Server 2022 shipped "in the box"<br>• A single source of 24/7 support for both hardware and software |
| License software cost-effectively | OEM licensing | • Less time to get the server up and running: the OS software comes pre-validated and preconfigured within the server<br>• Up to 28 percent less cost than when purchasing through volume licensing[1] |

## Streamline Your IT Transformation

For IT teams looking to streamline IT transformation, Prowess Consulting recommends three strategies:

1. Upgrade servers to support specific business goals and current and future workloads. In the case of deploying an AI application at the edge, it's important to select a server with the performance to support the AI model, in addition to automation and manageability, which save valuable time. The ability to monitor power usage gives organizations the ability to work toward sustainability goals.
2. Carefully choose an OS for highly virtualized environments. In the use case of AI apps at the edge, we recommend Windows Server 2022 Datacenter, as the environment is highly virtualized and this OS license allows unlimited numbers of VMs. Additionally, the size of the Windows Server 2022 container image has decreased compared to the previous generation, making it faster to start up applications.
3. License software cost-effectively. We determined that OEM licensing through Dell Technologies can enable faster deployment and lower-cost licensing with a single source of support for hardware and software.[1]

## To learn more about streamlining your IT transformation with OEM licensing from Dell Technologies, visit

www.dell.com/en-us/dt/solutions/microsoft-oem/index.htm

DELL Technologies

Microsoft

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

[1] Prowess Consulting. "Testing the Value of Dell™ PowerEdge™ R750 Servers with Windows Server 2022 Preinstalled." 2022. www.prowesscorp.com/wp-content/uploads/2022/08/210046-Testing-the-Value-of-Dell-PowerEdge-R750-Servers-with-Windows-Server-2022-Preinstalled.pdf.

[2] Accenture. "The art of AI maturity." www.accenture.com/us-en/insights/artificial-intelligence/ai-maturity-and-transformation.

[3] Microsoft. "What's new for Windows Containers in Windows Server 2022." 2022. https://learn.microsoft.com/en-us/virtualization/windowscontainers/about/whats-new-ws2022-containers.



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