With latest generation Dell PowerEdge servers, you can

### Save on licensing

Analysis showed that consolidating with the PowerEdge R7715 could yield an **80% reduction** in license costs[1]

### Reduce energy consumption and costs

Consolidate up to 7 five-year-old servers into one PowerEdge R7725 server and **save up to 65%** on CPU energy costs and **save up to 34%** in licensing costs[2]

### Boost AI performance

The PowerEdge R7725 ran an AI workload **19% more** effectively than a similarly configured previous gen PowerEdge server[3]

### Improve management and security

Dell OpenManage offered **3.5X** as many security features as a competing server management solution[4]

# Modernizing your data center with Dell and AMD

Amidst global market challenges, such as rising inflation and high interest rates, businesses worldwide have faced significant financial pressures in recent years. In this environment, many organizations are increasingly reconsidering their IT strategies, particularly when it comes to server refresh cycles. While the typical lifespan of most servers ranges from 3 to 5 years,[5] many companies are opting to extend this timeline in an effort to delay capital expenditures (Capex), even as demands on data center capacity continue to grow.

That approach may end up costing more in the long run. Older servers can require more maintenance time and effort, and they may be more susceptible to security breaches or malicious activity. When you consider that the average data breach cost $4.9 million in 2024,[6] the cost of low security starts to seem very high indeed.

In contrast, newer servers are typically more efficient—allowing you to spend less on cooling and power—and offer the latest security features. Newer servers typically also include technologies that increase performance significantly, which can let you consolidate multiple older servers into a single newer one and which can be especially important for resource-intensive artificial intelligence (AI) workloads.

With the latest generation of Dell PowerEdge servers powered by 5th Generation AMD EPYC™ processors, you can modernize your data center to achieve these benefits while tapping into the vast resources, partnerships, and services both companies provide to help your business thrive into the future.

## Introducing Dell PowerEdge servers with AMD EPYC processors

Dell has introduced five PowerEdge servers with 5th Gen AMD EPYC processors to meet the varying needs of data centers. These servers should meet the demands of a wide range of workloads, including everything from business applications to hyper-converged infrastructure (HCI) setups, high-performance computing (HPC), virtualization, virtual desktop infrastructure (VDI), and more. For more details on these servers, see Table 1 and read the PowerEdge rack server spec sheet.

Table 1: The five latest Dell PowerEdge servers with 5th Gen AMD EPYC processors. Source: Dell.[7]

| Server | Suggested workloads | Processor | GPUs | Cooling options |
|---|---|---|---|---|
| PowerEdge R6715 | Virtualization, HCI, and network function virtualization (NFV) | Single-socket 5th Gen AMD EPYC 9005 series | Up to 3x single-width | Air or direct liquid cooling (DLC) |
| PowerEdge R7715 | AI, software defined storage (SDS), dense virtualization, and data analytics | Single-socket 5th Gen AMD EPYC 9005 series | Up to 6x single-width<br>Up to 3x double-width | Air or DLC |
| PowerEdge R6725 | AI, HPC, dense VDI, and virtualization | Dual-socket 5th Gen AMD EPYC 9005 series | Up to 3x single-width | Air or DLC |
| PowerEdge R7725 | AI, data analytics, all-flash SDS, and VDI | Dual-socket 5th Gen AMD EPYC 9005 series | Up to 6x single-width<br>Up to 2x double-width | Air or DLC |
| PowerEdge R7725xd | Software defined storage, data analytics | Dual-socket 5th Gen AMD EPYC 9005 series | N/A | Air |

These servers each come in multiple configurations that you can customize for specific workload needs. With up to 192 cores per processor,[8] even the most compute-intensive workloads should flourish, especially when you add in the PCIe slots that can support multiple GPUs for large AI workloads. As we'll discuss in greater detail later in this analysis, these new servers can help you modernize your data center, promoting consolidation, increased efficiency, improved performance, better security, and cost savings.

Additionally, when you invest in Dell PowerEdge servers, you get more than hardware. Dell offers a broad spectrum of software and services to help you across many facets of server, data center, and workload activities such as planning, designing, implementing, adopting, and scaling operations. These services include architecture design, infrastructure assessment, deployment services, data migration, and more.[9] You can also benefit from robust Dell management solutions, such as OpenManage Enterprise, which according to Dell, "simplifies, unifies, automates, and secures your environment from start to finish."[10]

> We put these claims to the test in a report published in April 2024 that compared Dell OpenManage to Supermicro server management software.[11] We found that OpenManage was superior to the Supermicro management offering, including 3.5 times as many security features as the competitor.[12]

With strong supporting services and software and a wide range of available AMD processors, the latest generation of PowerEdge servers can equip your data center with the latest performance, features, and security to bring your resources up to speed with today's demands.

## Improve the performance of your existing workloads

While buying new servers may seem necessary if you're attempting to add new workloads, migrating existing workloads to new servers can be just as beneficial. Workloads can grow and become more demanding even as servers continue to age and the gap between their capabilities and those of newer servers widens. What was sufficient five years ago may now lack the resources to support a workload with growing datasets or user bases. Equipping your data center with new hardware gives you the opportunity to resize servers properly for tomorrow's workload needs, not yesterday's. You can gain access to larger data capacities, faster processing, and more.

### The bottom line

Modernizing your data center with the latest generation of Dell PowerEdge servers with 5th Gen AMD processors can improve existing workload performance, provide room for growth, and consolidate workloads onto fewer servers. Our testing in past studies showed that these benefits can save you money:

- Reduce Windows Server and Microsoft SQL license costs by up to 80 percent with PowerEdge R7715 servers[13]
- Reduce VMware vSphere license costs by up to 38 percent with PowerEdge R7725 servers[14]
- Save power, space, and cooling costs for transactional database and analytics workloads through consolidation[15]

## Proving it: Analytics databases

### Improve performance

Modernizing your data center doesn't require you to choose between improving existing workloads or adding new ones. In some cases, you can do both. In a May 2025 study, the 96-core PowerEdge R7715 cluster used only 62 percent of its processing power as it reduced the time to complete data analytics on nine databases. With the remaining processing power available, we added six database VMs to the cluster and found that per-VM performance remained comparable (see Figure 1).[16]

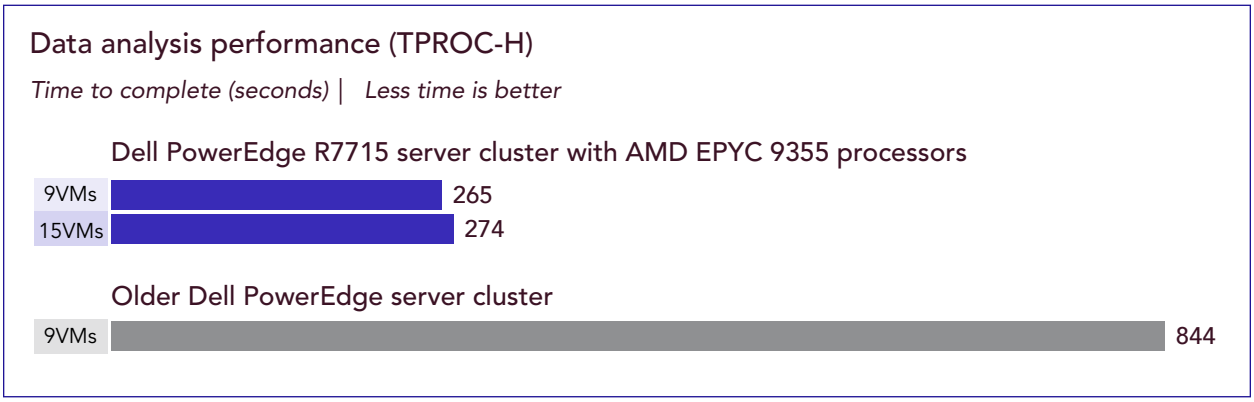


Figure 1: Data analysis performance of the two clusters on the TPROC-H benchmark. Source: PT.

The new 32-core PowerEdge R7715 servers completed all its database queries in 68.6 percent less time than the older servers.[17] This means that if you shifted your current database workloads to the latest generation of Dell PowerEdge servers with AMD processors, you could shrink the time it takes to run your database analysis by more than half. In turn, you could see insights faster or run analysis more frequently to have fresher actionable insights.

### Consolidate onto fewer servers

Room for growth means you can consolidate workloads onto fewer new servers. Server consolidation benefits companies in several ways:

- It can vastly reduce software license requirements and associated costs.
- It boosts data center efficiency and frees room for other hardware investments without expanding your physical data center footprint.
- It can also lower power consumption and improve overall sustainability.

Let's look at the 3-node 32-core PowerEdge R7715 server cluster as an example. For this cluster running analytics workloads, we needed Windows Server 2025 and Windows SQL Server licenses. Both licenses are billed on a per-core basis. Replacing 3 PowerEdge servers with 3 PowerEdge R7715 servers would not change the license counts in that scenario, but replacing 15 R740xd servers and their licenses with just 3 R7715 servers (as shown in Figure 2)[18] would reduce your license requirements—and cost—by 80 percent.[19] When you consider year after year of reduced costs in licensing, power, cooling, and real estate, the ongoing savings that comes with buying new servers could offset the initial capital expense (Capex).

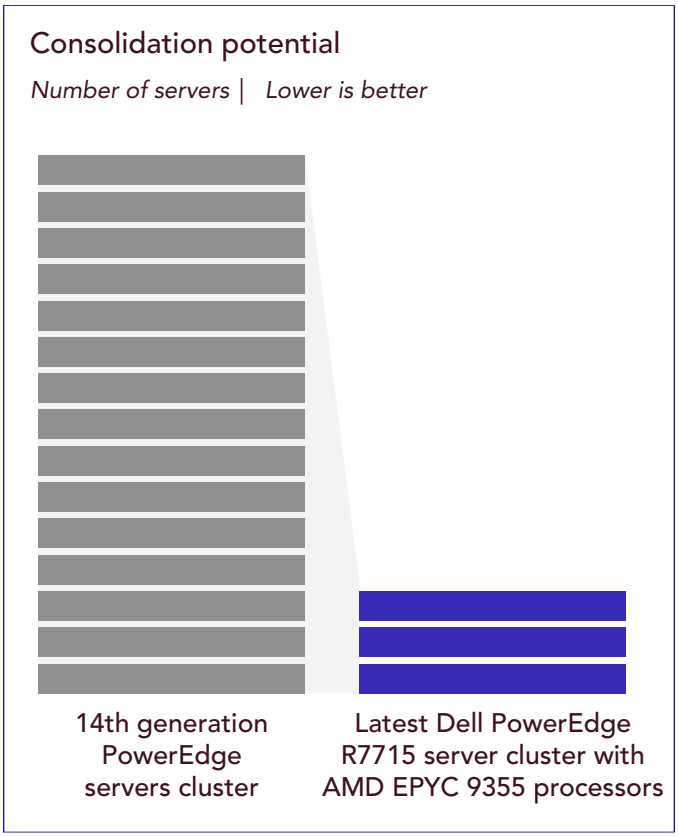


Figure 2: The consolidation potential of upgrading to Dell PowerEdge R7715 servers. Source: PT.

## Proving it: Virtualization

Virtualization may no longer be the new kid in town, but it is still as vital as ever. According to one Red Hat publication, "at least two out of three enterprise applications are hosted as virtual machines and critical for every enterprise."[20] There is little doubt that huge numbers of servers in data centers around the world are dedicated to running virtualized workloads, and increasing the performance of those workloads or supporting more VMs will likely be part of any attempt to modernize the data center. Fortunately, the latest Dell PowerEdge servers with 5th Gen AMD EPYC processors are up to the task. In May 2025, Dell published a world-record VMware VMmark 4.0 benchmark score in the 2-node, 2-socket server category, with 7.28 tiles supported on a solution of Dell PowerEdge R7725 servers with AMD EPYC 9965 processors and Dell PowerMax 8000 storage with 2.2TB NVMe SSDs.[21,22]

## Proving it: Transactional databases

### Improve performance

Are you wondering what other workloads can also yield savings? In a study we published in May 2025, we looked at online transaction processing (OLTP) performance to see if server upgrades and consolidation could save money.[23] This study compared the transactional database performance of an older HPE ProLiant DL380 Gen10 server to that of a latest-generation Dell PowerEdge R7725 server running VMware vSphere VMs with Microsoft SQL Server 2022. Thanks to the 128 cores-per-processor count of the AMD EPYC 9755 processor, the PowerEdge R7725 hosted 50 transactional database VMs—a substantial increase over the 6 transactional database VMs hosted by the ProLiant DL380 Gen10. Per core, the latest-gen PowerEdge server handled 62.9 percent more transactions per minute (TPM) (see Figure 3).

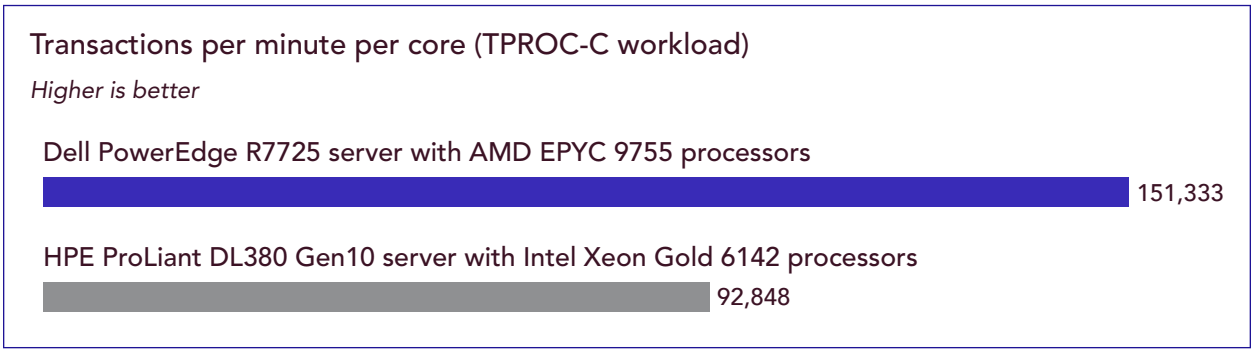


Figure 3: The transactions per minute per core that each solution supported in our testing. Source: PT.

### Consolidate onto fewer servers

The total SQL Server database TPM of the Dell PowerEdge R7725 server with AMD EPYC 9755 processors was 13 times the TPM of the HPE ProLiant DL380 Gen10 server. Based on those numbers, you could potentially replace 13 of those older ProLiant servers with just one PowerEdge R7725 (see Figure 4).[24]

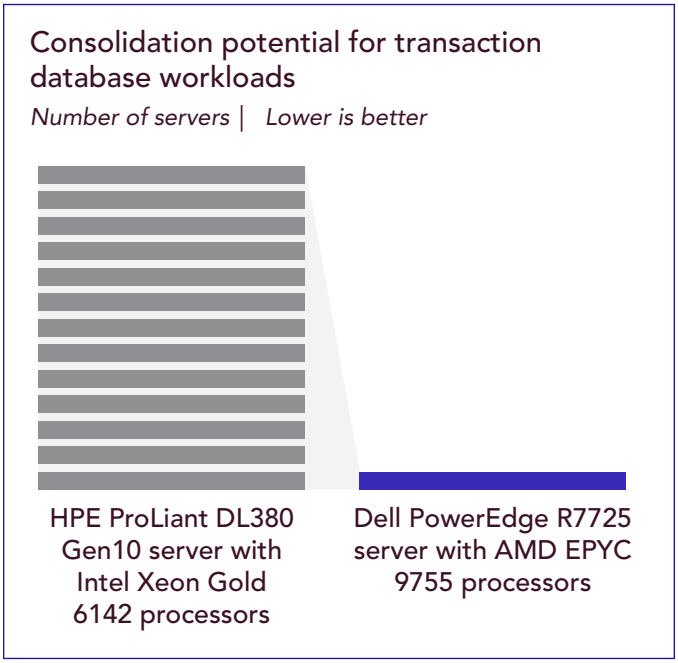


Figure 4: The consolidation potential of upgrading to Dell PowerEdge R7725 servers running OLTP workloads. Source: PT.

As we saw with the analytic database tests, reducing the number of servers required to run the same or increased number of database workloads can save licensing costs. VMware vSphere 8, the virtualization system we used on both servers, licenses on a per-core basis, with a required minimum of 16 licenses per server. Our HPE server had two 16-core processors, requiring 32 VMware vSphere 8 licenses to use all available cores.

In contrast, the Dell PowerEdge R7725 with AMD EPYC 9755 processors contained 2 128-core processors requiring 256 licenses. That may seem like an argument for sticking with your old servers. However, due to the staggering difference in VMs each server supported, you could get much better performance per core license with the Dell PowerEdge servers.

Based on our projection of consolidating 13 older ProLiant DL380 Gen10 servers to 1 PowerEdge R7725, you would shrink your core count supporting transactional database workloads from 416 to 256. That reduction in cores would lead to 38.4 percent fewer licenses—and therefore 38.4 percent lower licensing costs—to host 50 database VMs. As we've shown, investing in new hardware for existing workloads improves performance and can provide room to grow and save money.

## Adopt the latest technologies

One factor that drives the performance and consolidation benefits of new hardware is its ability to bring new and improved technologies to your data center. New servers deliver larger capacities for memory, PCIe lanes, and storage; faster compute; improved security; and more. These improvements help consolidate resources and data, improve power efficiency and cooling techniques for lower costs, and enable new workloads, such as AI.

### The bottom line

The latest Dell PowerEdge servers and 5th Gen AMD EPYC processors combine to provide new and improved features that can boost operational efficiency and help you save money, including:

- Increased AI workload performance to support a growing user base[25]
- Direct liquid cooling (DLC) for better cooling and reduced power consumption on high-performance workloads[26]
- The ability to consolidate workloads onto fewer servers to save on energy costs, such as in one study that showed a potential 61.2 percent savings[27]

## Proving it: Data and AI

### Handle data growth with ease

Companies are collecting and storing more and more data each year: The global data volume is set to increase from 149 zettabytes in 2024 to 394 zettabytes by 2028.[28] That's 2.64 times the data in just four years. While your data may be one drop in that bucket, we can extrapolate that most companies will see some level of data growth in the coming years. To keep up, you will need the capacity to store that data, and you'll need to invest in resources that will allow you to use the data to inform business decisions. New servers often mean upgrades across the technological spectrum that can lead to supporting more or larger drives, thus increasing your storage capacity.

For storage-dense workloads and object storage, the Dell PowerEdge R7725xd offers up to 24 front bays for U.2 Gen5 NVMe SSDs. The 2.5-inch U.2 form factor allows up to 122.88 TB per drive. Each bay connects via a dedicated PCIe Gen5 x4 link to help boost throughput. The server also has 4 PCIe Gen5 x16 slots to enable network throughput for the storage. With all this in mind, you could configure the PowerEdge R7725xd with massive capacity to meet workload storage demands now plus use a storage drive form factor that might see significant capacity increases in the future.

## AI workloads

Newer servers can support more and newer GPUs and provide better performance for AI workloads, as shown by published MLPerf data center inference results. In the data from an MLPerf report, comparing a Dell PowerEdge R7725 with two NVIDIA H100 GPUs to an older Dell PowerEdge R750xa with two NVIDIA H100 GPUs, we see that the newer server outperformed the older by 19 percent on the 3D U-Net-99 benchmark (see Table 2).[29,30,31]

Table 2: Published MLPerf 3D-Unet-99 results of the Dell PowerEdge R750xa and Dell PowerEdge R7725. Source: MLPerf.

| Server | GPU | MLPerf version | 3D-Unet-99 score | Percentage performance increase |
|---|---|---|---|---|
| Dell PowerEdge R750xa | 2x NVIDIA H100 | 3.0 | 9.05 | |
| Dell PowerEdge R7725 | 2x NVIDIA H100 | 5.0 | 10.83 | 19% |

These results show that even with the same GPUs, newer servers can deliver a performance bump due to improvements that increase workload efficiency or provide additional computational power.

## AMD and AI

AMD processors and GPUs can help bring top-tier AI performance to your data center. See how AMD performed on image segmentation and large language model (LLM) AI workloads:

1. In late 2024, a Dell PowerEdge R6715 server equipped with a 5th Gen AMD EPYC 9355P processor got the best TPCx-AI v2 score in the scale factor 10 test group.[32] Created by the TPC benchmark organization, TPCx-AI is a standardized AI workload that measures an end-to-end AI platform. Read more about TPCx-AI.
2. In a May 2025 PT study, a server with just 4 AMD Instinct™ MI300X GPU accelerators supported up to 72 simultaneous Llama 3.1 405B chatbot users in testing with our LLM testing service, PTChatterly. The same server with 8 AMD Instinct MI300X accelerators supported up to 136 simultaneous users of the same very large, high-precision LLM. For more on this testing, read our report and about PTChatterly.

## Proving it: Power efficiency and cooling

As more organizations expand their AI footprints, the need for computational power and storage will rise, which will increase heat generation and energy consumption. According to the US Department of Energy, data centers accounted for 4.4 percent of all US electricity usage in 2023, and they predict it could be as high as 12 percent by 2028.[33] One way to help combat this rising energy consumption is to choose servers with efficient cooling technologies for heat-generating workloads. Dell has aimed to improve cooling efficiency by optimizing cooling options for its latest generation of PowerEdge servers. Most of the servers we have highlighted in this report support both air cooling and direct liquid cooling (DLC).

In addition, PowerEdge cooling options can contribute to your organization's sustainability initiatives as well. Many PowerEdge servers have received the silver rating from the Electronic Product Environmental Assessment Tool (EPEAT), currently the highest achieved rating for servers.[34] "EPEAT-registered products must meet environmental performance criteria that address: materials selection, supply chain greenhouse gas emissions reduction, design for circularity and product longevity, energy conservation, end-of-life management and corporate performance."[35]

### Enhancements for air cooling

Air cooling has been a popular cooling option in servers, in fact the typical choice, and while some customers might take it for granted, Dell has continued to innovate air cooling and introduced new features to help counter the ever-increasing heat generation of modern-day hardware. Dell uses "computational fluid dynamics to discover the optimal airflow configurations for our PowerEdge servers"[36]–incorporating T-shaped motherboards, thermal sensors, and multivector cooling—which can be effective for even high-intensity workloads with robust, high-core processors such as the 500-watt AMD EPYC 9965.[37,38] Additionally, Dell Smart Flow configurations create a middle channel for air flow and use a redesigned backplane that enables more air intake to help further cool PowerEdge configurations equipped with powerful CPUs and GPUs (see Figure 5).[39]

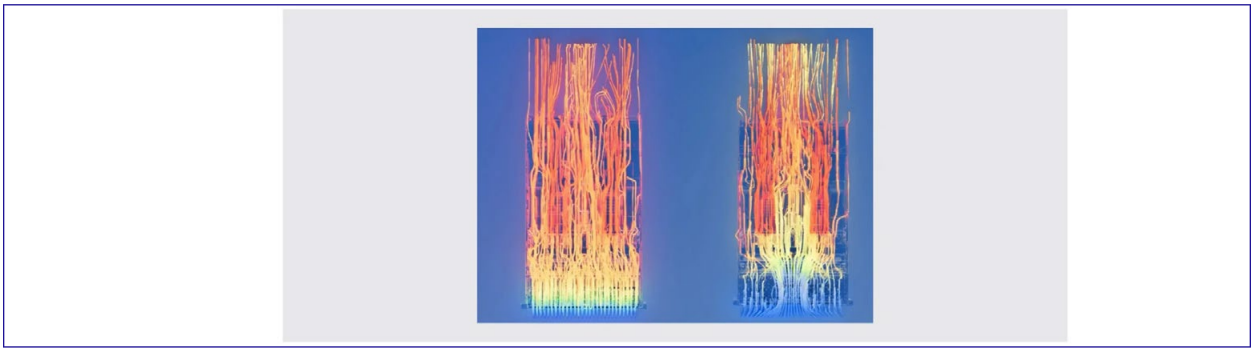

Figure 5: A standard Dell PowerEdge server configuration (left) and a Dell Smart Flow configuration (right). The lines represent temperature, with blue indicating cooler temperatures and red being hotter temperatures. The Smart Flow configuration, on the right, efficiently takes in the cool air from outside the server and creates cooler air around the processors, which leads to cooler exhaust at the back of the server and less heat throughout the server. This configuration offers significantly better thermal efficiency, meaning lower cooling costs and less work for the cooling systems in the data center at large to handle. Source: Dell.

According to Dell testing, a PowerEdge R7625 server in a Smart Flow configuration cooled up to 17 percent more cubic feet per minute than the same server using traditional airflow.[40]

## Benefits of direct liquid cooling (DLC)

If your workload or environment needs more direct cooling than air flow provides, Dell offers DLC options for the latest PowerEdge servers. These servers have cold plates mounted at the biggest sources of heat: the CPUs and GPUs. The cold plates can absorb the heat instantly and transfer it away from critical components. Worried about a possible leak? Sensors that report to the Integrated Dell Remote Access Controller (iDRAC) can alert to potential issues before they escalate and automatically power down a server if required.[41]

DLC-equipped servers can provide several benefits, including higher power efficiency, the ability to deploy servers in warmer environments, and extending the lifespan of components that generate high heat. For servers with high-powered GPUs or CPUs, DLC might even help you control costs. In our analysis, DLC kept CPUs up to 31 percent cooler than an air-cooled server, even in 35°C environments.[42]

## Save power and associated costs

These improvements to cooling technologies mean an increase in power efficiency for newer servers compared to older servers. While using top-end components will likely increase power consumption, the consolidation benefits that we discussed earlier in this report apply to energy efficiency as well. In our report comparing the Dell PowerEdge R7625 to the older HPE ProLiant DL380 Gen10, we found that replacing 7 older HPE servers with a single R7625 server could reduce total power utilization by 61.2 percent (see Figure 6).[43]

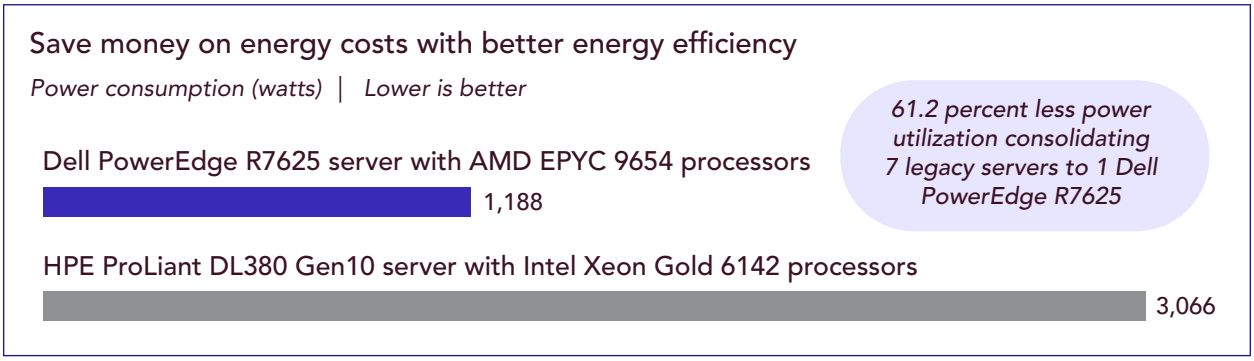


Figure 6: The projected power consumption, in watts, of one Dell PowerEdge R7625 server vs. seven HPE ProLiant DL380 Gen 10 servers. Source: PT.

Investing in new servers means reaping the benefits of new features and innovations. With the latest generation of Dell PowerEdge servers and 5th Gen AMD EPYC processors, you could enhance your data center with more energy-efficient and cost-effective servers.

## Proving it: Cyber resiliency

Modernizing your data center with the latest Dell PowerEdge servers offers cyber resiliency through built-in features. The servers can enable organizations to build a zero-trust framework, and the combination of security features in the servers and processors helps ensure a continuous chain of trust that uses secure boot and silicon-based root of trust (RoT), among other features, to protect systems at multiple levels.[44]

Dell claims PowerEdge servers are engineered with a security-first mindset that aligns with the National Institute for Standards and Technology (NIST) cybersecurity framework (NIST SP 800-193). From design to decommissioning, Dell says it applies a security development lifecycle (SDL) (NIST SP 800-160) approach to help identify and mitigate risks early and continuously, including the following details:[45]

- Firmware can obstruct, oppose, and counter malicious injections throughout the entire product development lifecycle.
- Each stage of firmware development applies secure coding practices.
- The design process includes threat modeling and penetration testing.

Security features of the servers intentionally overlap so if one layer is compromised, another layer can still counter the attack. This "defense in depth" is foundational to Dell PowerEdge Cyber Resilient Architecture, which integrates multi-layered, hardware-embedded controls to enable detection, protection, and recovery at the firmware level to support rapid responses to modern threats.[46] The end-to-end SDL approach helps safeguard sensitive data and intellectual property, strengthening organizational cyber resilience in hybrid and multicloud environments.

The PowerEdge server chain of trust ensures cryptographic verification across components—from silicon to system software—to create a secure foundation for trusted operations. Each server includes a unique silicon-based RoT that validates firmware at every boot or A/C cycle. Starting with version 4.10.10.10, iDRAC verifies the BIOS image before allowing the server to boot. In PowerEdge servers with AMD processors, iDRAC integrates with AMD Platform Secure Boot (PSB) to validate BIOS integrity, extending this verification through the OS bootloader to maintain a continuous chain of trust.[47] iDRAC also uses the Security Protocol and Data Model (SPDM) to validate the authenticity of hardware components and I/O cards,[48] helping ensure a secure and dependable server environment. The servers also contain a Trusted Platform Module (TPM) chip to generate and store cryptographic keys.[49] Dell offers more info about these and other PowerEdge security features.

PowerEdge servers powered by 5th Gen AMD EPYC processors also include AMD Infinity Guard and a dedicated platform security co-processor, adding further protection against firmware- and memory-based attacks.[50] For virtualized environments, AMD Secure Memory Encryption (SME) and Secure Encrypted Virtualization – Encrypted State (SEV-ES) protect data, including residual memory from virtual machine failures. These features don't hurt performance either: In May 2024, we found that enabling them in a Dell PowerEdge R7625 server with AMD processors had essentially no impact on our database workload performance, with the server handling 63,069 orders per minute (OPM) compared to 62,577 OPM with the features disabled.[51] Read our report for more on the testing.

## Benefits for SMBs

As data center modernization with Dell PowerEdge servers offers clear advantages for large enterprises, small and medium-sized businesses (SMBs) can also leverage these innovations to enhance their IT infrastructure. PowerEdge servers can offer scalable performance, cost savings, and more to meet unique workload demands and budget constraints and provide a fast time-to-value with straightforward manageability. Air and direct liquid cooling enhance energy efficiency and system reliability, helping SMBs lower ongoing power and maintenance costs. Moreover, consolidating workloads onto these servers not only helps boost data center efficiency but can reduce licensing expenses, providing immediate and long-term financial benefits. Our May 2025 study on the PowerEdge R7715 might be particularly useful for SMBs because the report demonstrated that a single PowerEdge R7715 could do the data analysis work of 5 older servers while reducing licensing costs by 80 percent.[52]

## Conclusion

Modernizing your data center with the latest generation of Dell PowerEdge servers powered by 5th Gen AMD EPYC processors has the potential to deliver both cost savings via consolidation and serious benefits for performance, efficiency, and security. As testing and real-world benchmarks demonstrate, these servers can accelerate analytics and transactional processing and enable significant workload consolidation that can lead to licensing, power, and cooling savings. Advanced cooling technologies and built-in security features provide additional opportunities to reduce costs while boosting operational efficiency and reducing energy consumption. Together, Dell and AMD offer these solutions to meet today's demanding workloads, such as AI, and help you adapt to future innovations. Investing in this infrastructure can empower you to improve your bottom line over time, optimize resources, safeguard critical data, and attain a competitive advantage in an increasingly complex digital landscape.


1. Principled Technologies, "Propel your business into the future by refreshing with new one-socket Dell PowerEdge R7715 servers with 32-core AMD EPYC 9355 processors," accessed June 11, 2025, https://www.principledtechnologies.com/clients/reports/Dell/Dell-PowerEdge-R7715-server-refresh-0525.
2. Based on Dell analysis comparing the SPECint and SPECFP scores of the AMD EPYC 5th Gen 9755 processor in a Dell PowerEdge R7725 server (2,620 and 2,270) with the SPECint and SPECFP scores for an Intel Xeon 8280 processor in a Dell PowerEdge R740xd (375 and 296). The ratio of the scores shows that 7x R740xd servers would give a total score similar to that for the single R7725. The CPUs in a single R7725 server would have a total thermal design power (TDP) of 1,000W (2x 500W). The CPUs in 7x R740xd servers would have a total TDP of 2,870W (2x 205, 7 times) where each Intel Xeon 8280 processor has a TDP of 205W. The consolidation offers a CPU power reduction, in terms of TDP, of 65 percent. The single R7725 server would have 256 cores compared to the 392 cores in the 7x R740xd servers, which could result in a 34 percent lower licensing cost for software licensed per core. The data from Dell is accurate as of 10/2/2024. Actual performance will vary. See the SPECint results and SPECFP results for the PowerEdge R7725, and see the SPECint results and SPECFP results for the PowerEdge R740xd.
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12. Principled Technologies, "Increase security, sustainability, and efficiency with robust Dell server management tools," accessed June 11, 2025, https://www.principledtechnologies.com/Dell/Management-tools-vs-Supermicro-0424.pdf.
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18. Principled Technologies, "Propel your business into the future by refreshing with new one-socket Dell PowerEdge R7715 servers with 32-core AMD EPYC 9355 processors."
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