Dell PowerEdge R450 and R550 Servers Are Built to Handle Your Critical Business Application Workloads

Business Applications Are at the Heart of an SMB's Success

You know how important business applications are for managing key operations in a small to medium-sized business (SMB). From inventory and order management to human resources (HR), finance and accounting, payroll or customer relationship management (CRM) systems, these essential applications need to "just work" so that you can focus DevOps on new technologies for generating revenue instead of merely maintaining operations.
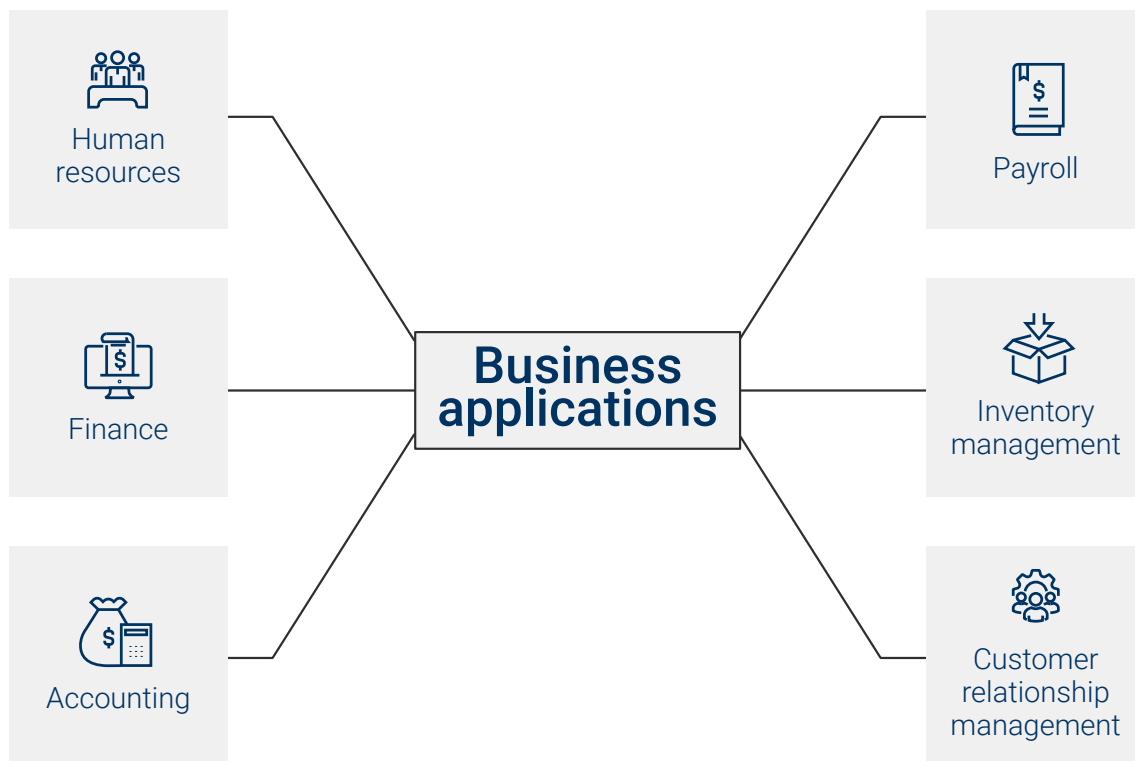

Figure 1. Small to medium-sized businesses rely on critical business applications to keep operations running

In essence, you need to match the flexibility, performance and reliability of much larger enterprise organizations, but within the budgetary and space constraints faced by SMBs. Businesses like yours are typically constrained by a small physical footprint for infrastructure, but they still need horsepower and flexibility to expand or adapt to changing needs.

Just like your larger enterprise counterparts, you rely on strong infrastructure performance to support critical workloads and large datasets. For example, if your organization is like most SMBs, you rely on relational database management systems (RDBMSs) like Microsoft SQL Server to process data for many of your business applications. When database performance lags, the performance of dependent applications suffers, which—in turn—can impact performance for the entire business.

In addition, you require high reliability from infrastructure to help provide uninterrupted operations. If a CRM or order management system goes down due to a server failure, your company could take a major hit from lost revenue. Even worse, your business could suffer from a damaged reputation, leading to an exodus of customers. It can take years to regain that lost trust.

Similarly, security can't be compromised. Sophisticated malware presents a clear danger to small businesses that are frequently targeted for valuable customer data.[1] You need modern levels of protection to help keep hardware, operating systems, applications and data safe from threats.

Meet SMB Business Application Needs with Performance, Reliability and Security

The Dell PowerEdge R450 and Dell PowerEdge R550 platforms are designed and built with SMBs like yours in mind, to help you better support your unique business application needs. These server platforms offer leading-edge technology with affordability, reliability and security. Built on the same powerful foundation, these two servers are powered by a range of Intel Xeon Scalable processors. The PowerEdge R450 server packs these capabilities into a compact 1U form factor. The PowerEdge R550 server is built with a 2U chassis that offers more networking and connectivity options and adds support for larger quantities of storage.
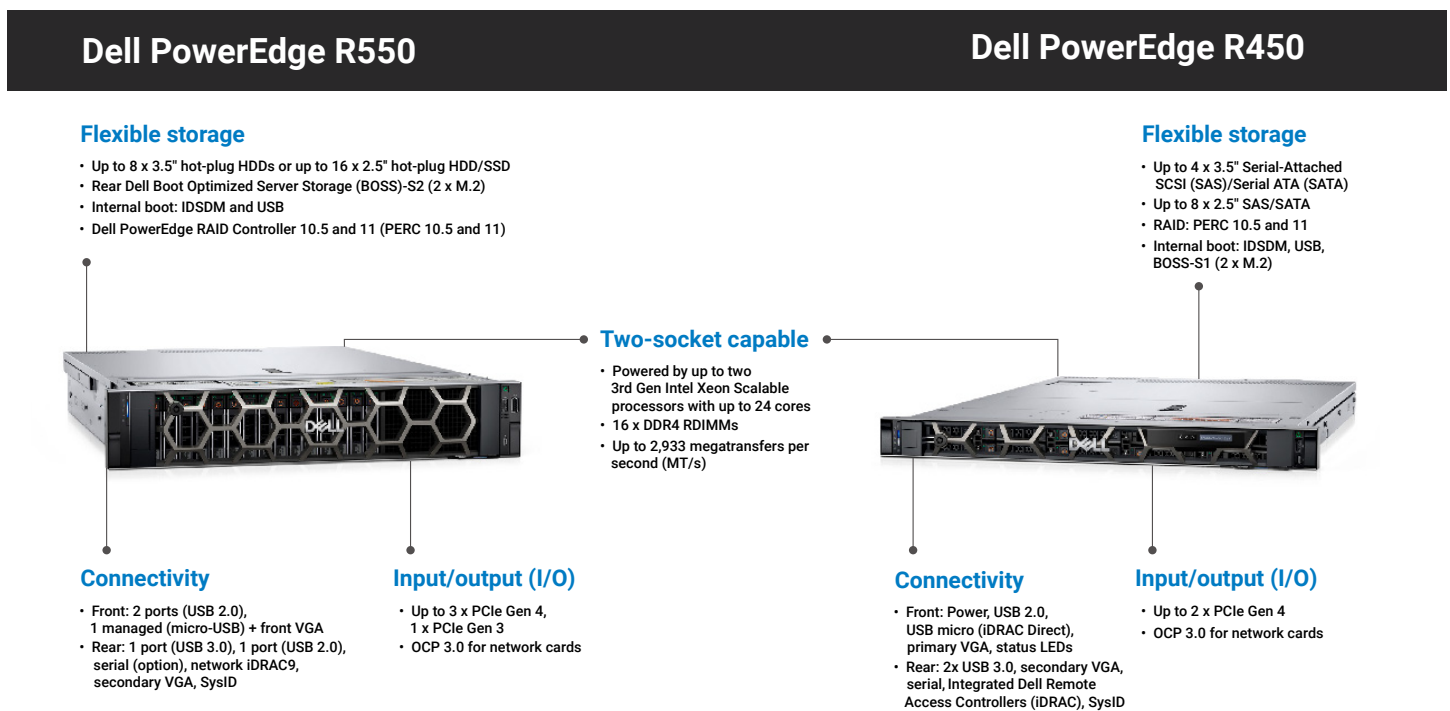
Dell PowerEdge R550 / Dell PowerEdge R450

Flexible storage
- Up to 8 x 3.5" hot-plug HDDs or up to 16 x 2.5" hot-plug HDD/SSD
- Rear Dell Boot Optimized Server Storage (BOSS)-S2 (2 x M.2)
- Internal boot: IDSDM and USB
- Dell PowerEdge RAID Controller 10.5 and 11 (PERC 10.5 and 11)

Flexible storage
- Up to 4 x 3.5" Serial-Attached SCSI (SAS)/Serial ATA (SATA)
- Up to 8 x 2.5" SAS/SATA
- RAID: PERC 10.5 and 11
- Internal boot: IDSDM, USB, BOSS-S1 (2 x M.2)

Two-socket capable
- Powered by up to two 3rd Gen Intel Xeon Scalable processors with up to 24 cores
- 16 x DDR4 RDIMMs
- Up to 2,933 megatransfers per second (MT/s)

Connectivity
- Front: 2 ports (USB 2.0), 1 managed (micro-USB) + front VGA
- Rear: 1 port (USB 3.0), 1 port (USB 2.0), serial (option), network iDRAC9, secondary VGA, SysID

Input/output (I/O)
- Up to 3 x PCIe Gen 4, 1 x PCIe Gen 3
- OCP 3.0 for network cards

Connectivity
- Front: Power, USB 2.0, USB micro (iDRAC Direct), primary VGA, status LEDs
- Rear: 2x USB 3.0, secondary VGA, serial, Integrated Dell Remote Access Controllers (iDRAC), SysID

Input/output (I/O)
- Up to 2 x PCIe Gen 4
- OCP 3.0 for network cards

Figure 2. Dell PowerEdge R450 and PowerEdge R550 server features

Both the PowerEdge R450 and PowerEdge R550 servers offer SMBs an ideal balance of leading-edge technology and cost-effectiveness. The platforms help maximize resource utilization, increase consolidation of workloads, simplify management and harden security to better protect your applications and data.

Consistent Performance Gains for Virtualized Workloads

SMBs commonly rely on virtual machine (VM) deployments to host business applications. That means the underlying infrastructure needs to support multiple VMs running concurrently, with each one supporting critical business workloads.

Testing by Prowess Consulting validated this claim by measuring the ability of these PowerEdge platforms to host large numbers of VM workloads. Engineers spun up as many VMs as possible until the test servers reached first 80 percent, and then 100 percent CPU utilization. 80 percent utilization provides a realistic performance comparison that administrators can use because it leaves headroom for unexpected bursts in utilization. 100 percent shows maximum capacity.

The test results showed that the PowerEdge R550 server, compared to a previous-generation Dell PowerEdge R540 server, was able to run up to 1.46x more VMs before reaching 80 percent utilization, demonstrating significant generational improvements (see Figure 3). At 100 percent utilization, the gains were similar: the PowerEdge R550 supported up to 1.50x more VMs.[2]

The PowerEdge R450 server, compared to a previous-generation Dell PowerEdge R440 server, supported up to 1.37x more VMs at 80 percent utilization, and 1.33x more VMs at 100 percent utilization.[2]

PowerEdge R550 vs. R540:
Up to

1.50x more VMs

at 100 percent utilization

PowerEdge R450 vs. R440:
Up to

1.33x more VMs

at 100 percent utilization

Figure 3. Dell PowerEdge R550 and Dell PowerEdge R450 servers support significantly more VMs than the previous-generation Dell PowerEdge R540 and Dell PowerEdge R440 servers

If your business relies on high-performing, reliable virtualized workloads for your business applications, these results are compelling. By upgrading your infrastructure to newer PowerEdge R550 or PowerEdge R450 servers, you not only help assure strong performance, you also open the door to supporting larger numbers of VMs efficiently, which lets you consolidate your footprint to reduce energy costs. Consolidation leads to other financial gains, as well. Fewer servers can result in lower administrative and software costs and can free up IT admins to focus on strategic initiatives instead of simply keeping the lights on.

Faster Transactions for Relational Databases

It's also common for SMBs like yours to deploy relational databases to hold and process the data needed for many business applications. For example, constantly changing inventory or sales data might be processed in a MySQL or SQL Server database. As a result, it's imperative that your infrastructure is architected to help optimize database transactions that your business applications are dependent on.

Additional testing by Prowess examined online transaction processing (OLTP) performance on the PowerEdge R450 and PowerEdge R550 servers. Using an industry-standard benchmark and workload, the engineers measured consistently high performance for the latest-generation PowerEdge R450 and PowerEdge R550 servers, compared to the previous-generation models. The PowerEdge R550 server performed up to 2.21x better than the PowerEdge R540 server, as shown in Figure 4.[2]
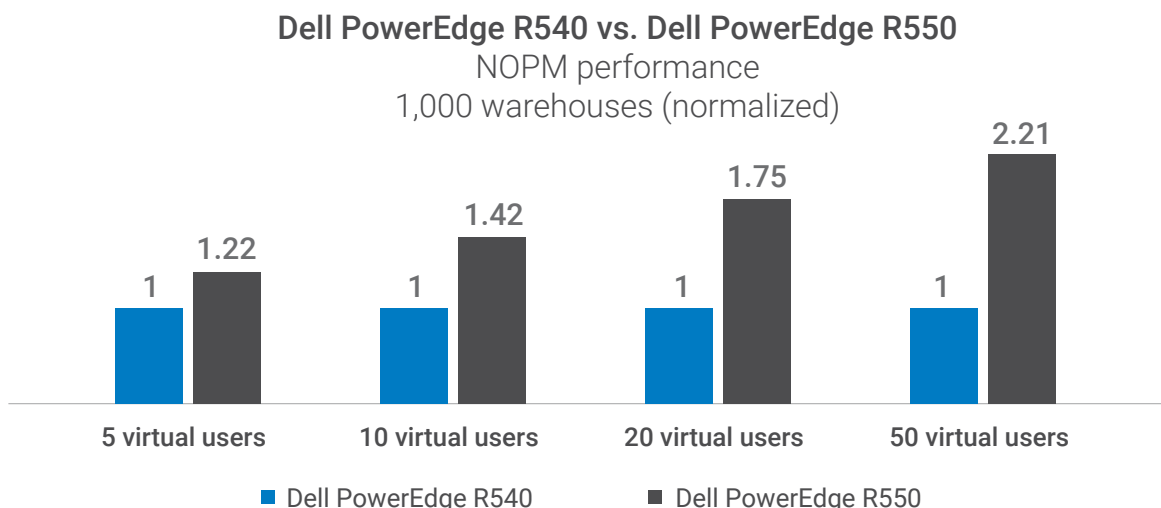
Dell PowerEdge R540 vs. Dell PowerEdge R550
NOPM performance
1,000 warehouses (normalized)

	5 virtual users	10 virtual users	20 virtual users	50 virtual users
Dell PowerEdge R540	1	1	1	1
Dell PowerEdge R550	1.22	1.42	1.75	2.21

■ Dell PowerEdge R540   ■ Dell PowerEdge R550

Figure 4. Database performance with 1,000 warehouses, comparing a Dell PowerEdge R540 server to a Dell PowerEdge R550 server[2]

Similarly, the PowerEdge R450 server outperformed its previous-generation counterpart, the PowerEdge R440 server, as shown in Figure 5.

Dell PowerEdge R440 vs. Dell PowerEdge R450
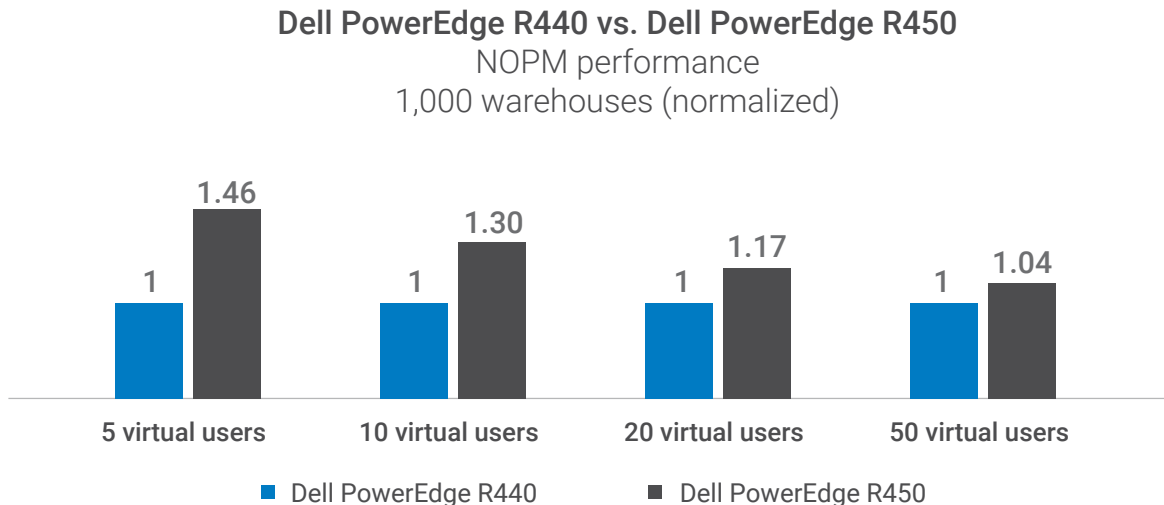NOPM performance
1,000 warehouses (normalized)

Figure 5. Database performance with 1,000 warehouses, comparing a Dell PowerEdge R440 server to a Dell PowerEdge R450 server[2]

The test results show that both the PowerEdge R450 and PowerEdge R550 servers can provide excellent transactional performance for relational database workloads. For businesses like yours, that translates to faster performance for your data-intensive business application workloads. In addition, faster transactional performance for large datasets gives you the ability to run larger or more databases on a single server for efficient consolidation.

Help Manage and Protect Your Workloads and Infrastructure

Performance—while critical—isn't the only factor to consider when choosing infrastructure to power your business applications. The servers also need to be efficient, reliable and secure. Compared to other options, the PowerEdge R450 and R550 platforms offer several features to help SMBs support their business workloads more easily, while better protecting systems and data from ever-present security threats.

Free Your IT Staff for Important Tasks

In the face of small or shrinking budgets, SMBs need to find ways to do more work with limited IT staff. Dell systems-management software allows organizations to deploy, update and manage servers more efficiently so that their IT teams can spend less time supporting infrastructure and more time on higher value, strategic initiatives.

For example, the Integrated Dell Remote Access Controller (iDRAC) is designed for secure local and remote server management, and it helps IT administrators deploy, update and monitor PowerEdge servers anywhere, anytime. The iDRAC also helps maintain security of critical services by providing real-time alerts that include letting you know if someone has tampered with the server or if the server is down. This capability is even more critical when you're running multiple VMs or virtual desktop infrastructure (VDI) sessions from a single server. The iDRAC helps you keep things running smoothly to prevent or reduce downtime for dozens or hundreds of users running VDI or accessing VM workloads.

Improve Efficiency for Power and Cooling

Effective cooling is important for both maintaining server performance and reducing energy costs. When server CPUs and components run at lower temperatures, you can maintain high numbers of workloads, with each one running optimally. PowerEdge servers include innovative power-management capabilities and an enhanced thermal design that can help keep servers running at peak performance while also helping you reduce costs and meet sustainability goals for your business.

Infrastructure power and cooling play major roles in contributing to your company's carbon footprint. Dell Smart Cooling technology uses multi-vector cooling and thermal design capabilities that help you take control of that IT challenge. PowerEdge servers use intelligent thermal algorithms to minimize fan and system power consumption while maintaining reliability. The iDRAC graphical user interface (GUI) gives you total control of custom options to control temperature limits, fan speed limits, acoustic levels and other settings.

You can also make use of Dell OpenManage Enterprise to efficiently manage energy use while improving uptime. While important to all businesses, uptime is all the more critical to SMBs with smaller infrastructure footprints. Just one server going down can have an outsized impact on the bottom line for your business. OpenManage Enterprise can help you avoid the pitfalls of an unplanned outage.

Real-time sensor data can be integrated into OpenManage Enterprise, and a Dell Power Manager plug-in lets you track and control air flow at the rack and data center level. You can even reduce power consumption during off-peak hours with policy automation.

Simplify Systems Management with the Dell OpenManage Enterprise Console

The Dell OpenManage Enterprise console simplifies, intelligently automates and unifies infrastructure-management tasks. OpenManage Enterprise also provides end-to-end infrastructure monitoring capabilities for Dell storage and networking devices, in addition to many third-party hardware solutions. Add Dell OpenManage Mobile to enable IT professionals to receive and take action on both Dell and third-party hardware events anytime, anywhere. And Dell OpenManage integrations enable both hardware and software infrastructure management within third-party consoles, such as VMware vCenter and Microsoft System Center, so you get full capabilities from a single pane of glass.

Built-in Security You Can Count On

You can strengthen security by employing software-based tools to help with threat protection, detection and recovery. But to fully embrace cybersecurity best practices established by the National Institute of Standards and Technology (NIST) Cybersecurity Framework, organizations need to take a more proactive approach. Modern security features, such as confidential computing, go beyond software-based techniques by extending protections into the hardware layer and even into the supply chains of hardware suppliers.

For PowerEdge servers, security begins deep in the hardware layer with a silicon root of trust provided by Intel Xeon Scalable processors. A root of trust helps protect systems from advanced, sophisticated malware attacks by helping ensure that security levels are configured properly and that security keys are protected. This capability helps verify a secure hardware foundation for the firmware and software layers above.

In addition, the iDRAC provides a read-only encryption key that validates that the BIOS or Unified Extensible Firmware Interface (UEFI) drivers are legitimate. This type of cryptographic verification helps meet NIST recommendations for BIOS protection for servers.

Dell Technologies also provides the Dell OpenManage Secure Enterprise Key Manager, which is a comprehensive key-management solution to help secure servers across your business and protect data at rest.

And finally, Dell Technologies goes beyond built-in hardware and software security features by establishing secure supply chains that help prevent tampering with components during manufacturing and shipping. Dell Technologies carefully controls supplier selection, sourcing, production processes and governance by auditing and testing through the Dell Secured Component Verification (SCV) process. By securing the supply chain, Dell Technologies helps prevent compromised server components, thereby closing a critical avenue of firmware attacks.

The best way to harden security for your business application workloads is by ensuring those applications run on secure hardware, firmware and BIOS. The Dell Technologies root of trust, iDRAC cryptographic protections, key management and secure supply chains help keep your systems better protected from advanced threats.

Support Your Business Applications on a Proven Platform

Business applications form the backbone of your SMB by managing operations, supporting sales, tracking inventory and supporting a wide range of other critical tasks. PowerEdge R450 and PowerEdge R550 servers are built to reliably support those workloads with levels of performance, efficiency and security you can count on.

Learn More:

- [Dell PowerEdge R450 server](#)
- [Dell PowerEdge R550 server](#)
- [Dell PowerEdge servers](#)

[1] BusinessTechWeekly.Com. "Why is Cybersecurity Important for Small Businesses?" March 2022. www.businesstechweekly.com/cybersecurity/application-security/why-is-cybersecurity-important/.

[2] Prowess Consulting. "Can Dell™ PowerEdge™ R450 and Dell PowerEdge R550 Servers Meet the Flexibility and Performance Needs of SMBs?" October 2022. www.prowesscorp.com/project/dell-poweredge-r450-r550-meet-needs-of-smbs/.

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