

## ESG SHOWCASE

# Redefining Modern Enterprise Storage for Mission-critical Workloads

**Date:** May 2021 **Authors:** Scott Sinclair, Senior Analyst; and Monya Keane, Senior Research Analyst

**ABSTRACT:** As digital business has evolved, so too has the definition of “mission-critical, enterprise-grade” data storage. Enterprises are faced with greater digital needs and are putting more pressure on IT. Therefore, IT organizations must demand more from their IT vendors. Dell Technologies, a leader in modern enterprise storage, continues to innovate and evolve its technology to meet the mission-critical needs of the most demanding IT environments.

## Overview

The digital business demands being placed on enterprise-scale IT organizations are now so extreme that IT infrastructure, especially storage, must evolve to help meet them. According to ESG research, 98% of IT organizations have digital transformation activities on their roadmap. Digital transformation goals fuel multiple business opportunities, including becoming more operationally efficient (reported by 56%), developing innovative new products and services (38%), and even developing entirely new business models (25%).<sup>1</sup> In modern environments, IT infrastructure ties directly to revenue creation, cost avoidance, and risk reduction.

As IT success and business success grow more intertwined, maintaining resilient, efficient operations becomes essential. Minutes or even seconds of downtime quickly become costly. Infrastructure technologies such as the right data storage can deliver a business advantage. Not surprisingly, 71% of surveyed organizations told ESG that they consider the role that data storage technology plays in their organization to be strategic and having an effective storage strategy is critical to achieving a competitive advantage.<sup>2</sup>

Modern storage systems must adapt to the increased demands of enterprise organizations and deliver greater flexibility, such as in how they scale, how they support data movement, what applications they support, and how they support infrastructure modernization.



**75%** say that IT is more complex than it was just two years ago

Certain mission-critical applications, however, have unique needs that extend beyond even what modern storage systems can provide. Some examples of these workloads include flight reservation systems, core banking operations or billing applications, and critical healthcare applications—all are which are vital to the organization and cannot go offline ever. They must always perform at a high level and demand maximum resiliency and fault tolerance even during a software

<sup>1</sup> Source: ESG Research Report, [2021 Technology Spending Intentions Survey](#), January 2021.

<sup>2</sup> Source: ESG Master Survey Results, [2019 Data Storage Trends](#), November 2019.

upgrade. They also need to scale greatly without compromising any services, and they must be highly secure. Failure to meet those requirements can result in severe negative financial, legal, and regulatory impacts to the whole organization.

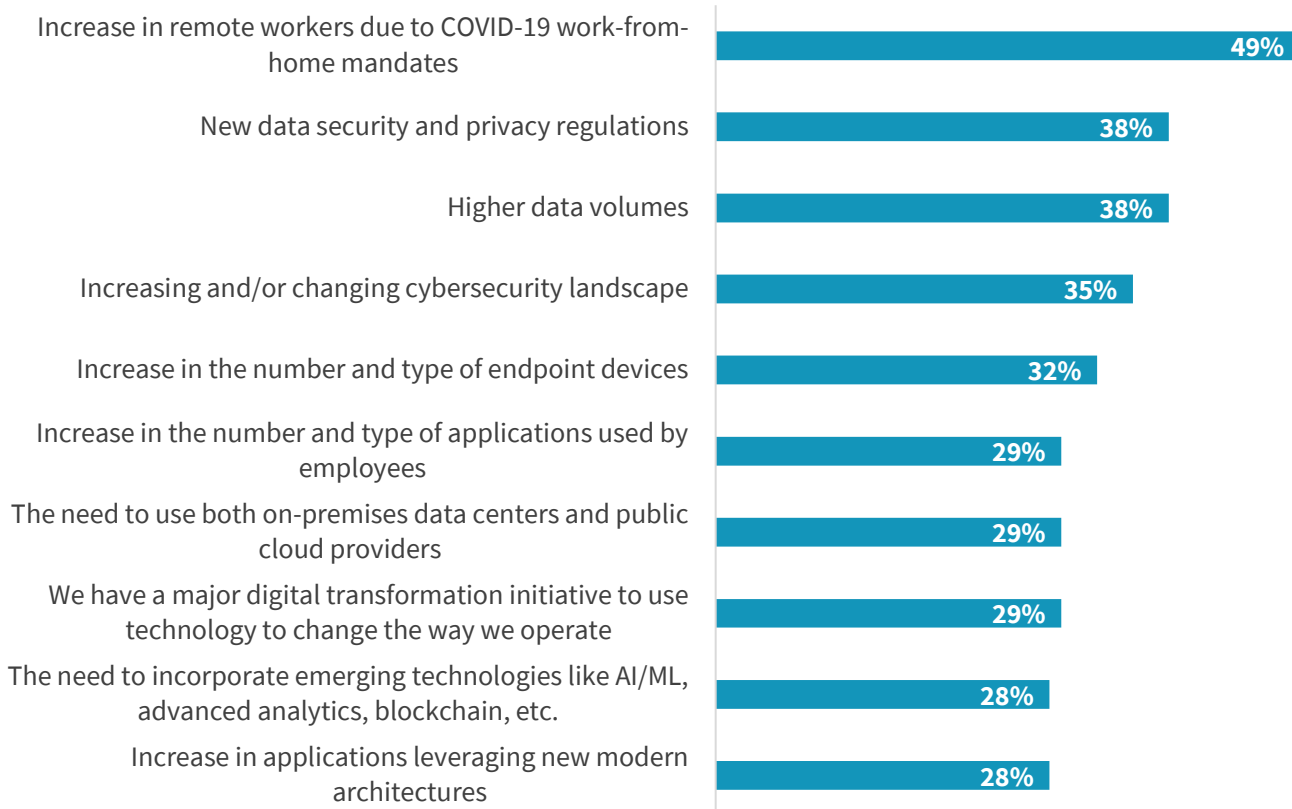
## Modern Digital Enterprises are Redefining Storage for Mission-critical Workloads

ESG has conducted extensive research into the evolving data storage needs of IT organizations. The results show why mission-critical storage infrastructure needs to be held to a higher standard.

A digital enterprise produces a considerable amount of IT complexity: 75% of respondents identified that their IT environments are more complex than they were just two years ago. Figure 1 depicts the complexity drivers most frequently mentioned by respondents.<sup>3</sup>

**Figure 1. Top Ten Most Common 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=496, five responses accepted)**



Source: Enterprise Strategy Group

Increased digital demands are driving the need for new requirements for modern enterprise storage, especially for mission-critical application environments, which have obviously become more dynamic and diverse. Drivers of increased complexity include increases in the number and types of applications (cited by 29%) and increases in applications using modern architectures such as containers (cited by 28%).

Large enterprises are also prime targets for security breaches. The highest levels of cybersecurity and strict adherence to regulatory compliance mandates are both must-haves to reduce risk. New security and privacy regulations (cited by 38%) and an ever-changing security landscape (cited by 35%) are both major sources of complexity.

<sup>3</sup> Source: ESG Research Report, [2021 Technology Spending Intentions Survey](#), January 2021.

And in general, a larger business has a greater potential opportunity to capitalize on a digital initiative, but it also can incur higher opportunity costs for technical personnel allocated to perform routine infrastructure tasks. ESG has conducted extensive studies of the IT skill shortages prevalent within modern IT organizations. One finding: 48% of IT decision makers identified having shortages of cybersecurity expertise, and 34% are experiencing shortages of IT architecture and planning experts.<sup>4</sup>

## Mission-critical Application Environments Become More Diverse and Complex

ESG research reinforces how important it is to support dynamic, diverse application environments. Enterprise application environments already encompass mainframes, bare metal disk/servers, virtual machines, containers, and more. And they are still evolving. Forty-one percent of surveyed storage decision makers report that their organizations are using containers for production applications. An additional 33% of organizations use containers for dev/test and pre-production applications, with a plan to use them in production in the following 12 months.<sup>5</sup>



**41% of storage decision makers report using containers for production applications**

Emerging technologies like containers present new challenges, especially in regard to performance and cloud integration. For example, respondents were more than twice as likely (36% versus 17%) to identify poor performance as a challenge in

containers environments compared to traditional block storage environments.<sup>6</sup> And 70% indicated that their container-based applications are or would be deployed in a combination of public clouds and private data centers,<sup>7</sup> which adds another layer of complexity when performance problems arise.

## Security, Resiliency, and Risk Avoidance Are More Important than Ever

Organizations running mission-critical workloads have very high-level data protection/replication requirements—they're looking for capabilities such as active/active metro, active/active backups to a third site, and two-site/three-site/four-site synchronous/asynchronous configurations, for example.

They're also looking for excellent security features—security is an essential component of any storage infrastructure purchase today. In a recent ESG research study, strengthening cybersecurity arose as the top IT initiative expected to drive IT spending in 2021 (cited by 47% of respondents).<sup>8</sup> That is unsurprising, considering that in 2020 during the COVID-19 pandemic, 47% of IT organizations saw an increase in cyber-attacks.<sup>9</sup>

## Redefining the Storage Requirements of Mission-critical Applications

Modern, mission-critical application environments demand a lot from their storage infrastructures, including:

- **Massive scale and performance without compromise**, i.e., the ability to scale linearly all while delivering consistent, low-latency performance and availability to each application environment. The storage architecture must scale out with multiple active-active controllers and leverage end-to-end NVMe, which will reduce bottlenecks and ensure a consistent performance experience from the application environment's perspective because demands tend to shift quickly.

<sup>4</sup> Source: ESG Research Report, [2021 Technology Spending Intentions Survey](#), January 2021.

<sup>5</sup> Source: ESG Master Survey Results, [2019 Data Storage Trends](#), November 2019.

<sup>6</sup> *ibid.*

<sup>7</sup> Source: ESG Master Survey Results, [Trends in Modern Application Environments](#), December 2019.

<sup>8</sup> Source: ESG Research Report, [2021 Technology Spending Intentions Survey](#), January 2021.

<sup>9</sup> Source: ESG Research Report, [The Impact of the COVID-19 Pandemic on Remote Work, 2020 IT Spending, and Future Tech Strategies](#), June 2020.

- **Highest levels of workload flexibility**, providing the broadest support for a variety of operating systems and data types, including mixed open systems, mainframe, block, and file environments. This enables IT to deliver robust data services and high availability with a consolidated infrastructure and simplified experience.
- **Always-on availability and resiliency**, including sophisticated multi-site resiliency, nondisruptive operation, and fast nondisruptive upgrades. The storage must be validated/proven to be able to support state-of-the-art IT environments, and it must be able to integrate with public cloud platforms.
- **Advanced data protection and security**, as security and resiliency take the form of advanced end-to-end encryption, the ability to generate multiple copies across multiple sites, and granular snaps and rollbacks. For mission-critical environments, the storage must be able to manage massive levels of snaps and copies. Otherwise, it cannot support the scale required in a practical manner. Being able to create secure snaps is particularly important.

These extreme needs go above and beyond what most enterprise storage systems in the market are capable of providing. Delivering a high IOPS performance statistic or listing multi-petabyte scale on a data sheet is not sufficient to meet the requirements of mission-critical applications. They need a higher-class storage, or **enterprise-plus storage**, that's capable of delivering extreme performance and scale with no downtime or disruption to operations.

## Dell Technologies PowerMax—Modern, Enterprise-plus Storage

The key capabilities of Dell EMC PowerMax line up well with today's mission-critical infrastructure requirements. Dell was careful to align PowerMax's key features to the tenets of modern enterprise-plus storage:

- **Multi-controller scale out**—PowerMax uses an all-NVMe, always-on architecture. It is a multi-controller system where all controllers operate as active/active, engaging in I/O requests for all volumes presented by the array to deliver extreme, consistent performance at scale. In addition to NVMe-based drives, NVMe over fabric is also available for application server connectivity.
- **Support for diverse application environments**—PowerMax supports mainframe workloads, massive consolidation capabilities, bare-metal systems, VMs, containers, and an architecture that ensures a consistent application experience on a large scale. PowerMax supports open systems, mainframes, the IBMi operating system, file systems, and mixed environments on the same array.

With Cloud Mobility for Dell EMC, PowerMax extends its storage to the public cloud (AWS and Microsoft Azure) and to a private cloud (Dell EMC ECS and Dell EMC PowerScale). IT can assign policies to automatically schedule snapshots to the cloud of their choice for long-term retention and secondary data processing. The snapshots can be browsed via a catalog and recovered to the PowerMax, Amazon block storage, or a VMware vSphere environment.

- **Mission-critical security, availability, and resiliency**—PowerMax offers nondisruptive operations and virtually instantaneous in memory operating system upgrades, mission-critical availability/performance, and massive scalability without compromising services. It offers support for three million snapshots from granular rollbacks, as well as efficient end-to-end data encryption from the host to PowerMax, data-at-rest encryption, and secure snapshots. PowerMax is architected to provide 99.9999% availability. And its SRDF disaster recovery software is backed by decades of innovation: It is the gold standard for replication, with an active/active, multi-controller architecture that provides the foundation for resiliency.

- **Streamlined operations with intelligent infrastructure**—PowerMax offers built-in machine learning to ensure optimal performance, reducing the burden on IT admins. PowerMax uses AI/ML to automatically move data between storage class memory (SCM) and nonvolatile NAND flash for ideal performance versus cost. Its data-reduction feature automatically places data in memory versus drives, in either compressed or uncompressed format based on data I/O to provide consistent performance at scale. This array is always learning and making good decisions in order to deliver the best performance.

## End-users Describe How They View Modern Enterprise-plus Storage

To further validate both the importance of its mission-critical storage capability as well as the value that PowerMax delivers in these environments, ESG was provided the opportunity to speak with two PowerMax customers. The following sections offer insights on their environments, their rationale for selecting PowerMax over other storage options, and how they define enterprise storage for their mission-critical applications.

### User Environment #1: Director of Storage Architecture - Oil and Gas Enterprise

This enterprise standardized on PowerMax for their SAN-based application environment, an environment that spanned multiple enterprise-level database environments, heavy transactional applications, and thousands of virtual servers. The scale of data stored on the PowerMax ranged between two and a half to three petabytes.

When asked why the organization selected PowerMax, the director of storage architecture highlighted challenges with a previous product from another vendor, saying, “We were using another vendor’s product, and we were having a lot of issues with availability and reliability of the product, even though it was classified as a tier one array... because of poor quality assurance (QA) bad code, it became very, very unstable.”

**“I don't have sleepless nights anymore.”**

Director of Storage Architecture - Oil and Gas Enterprise

The decision to go with PowerMax started with its architectural advantages. The director of storage architecture identified PowerMax’s ability to support multiple active controllers as a key factor for the decision. Delivering predictable, low-latency performance was an essential requirement for their environment. The most important factor, however, was PowerMax’s resiliency. Qualifying the benefit, he said, “I don't have sleepless nights anymore. I don't have to go into a maintenance window worrying... in the old world I went in knowing it was going to be an all-nighter. With PowerMax, it's a non-event.”

When asked if his organization valued the ability to get multiple data center systems, such as servers and storage, from the same vendor, the answer was a resounding yes. “That absolutely resonates with us,” he said, “We are moving to Dell servers. It makes more sense because of that end-to-end. When you get into some of these advanced troubleshooting things and you are on a support call, it just makes life a lot simpler, you know you don't have these handoffs.”

When describing the difference between tier-one mission-critical enterprise-plus storage and alternative all-flash systems, he said, “We used to have so many outages. We would buy multiple smaller arrays and that was expensive and it was more difficult to manage. More parts, upgrades took longer because there were more systems, and more complexity because of the fear. We have been able to compact that environment (with PowerMax) because we have confidence that the system will stay up, we have confidence that our snapshots and replication are going to work, our code upgrades are going to work.”

Summing up his view on PowerMax, the director of storage architecture said he would recommend PowerMax to others and continued, “I think a lot of us that have been around for a long time in the storage industry when we think of PowerMax, we think of EMC tier one. We think of it as super expensive. We think it is very complicated to manage and set

up. Those things *aren't true anymore*. The arrays are far more simplistic to manage now than they have ever been. They have a lot more capability. Non-disruptive data movement is a biggie. They're not as expensive, with all the different data reduction technologies.”

## User Environment #2: Enterprise Storage Engineer - Financial Services Organization

For this financial services organization, PowerMax technology provided the foundation for its business and mission-critical application environment. When asked about the role of PowerMax, the enterprise storage engineer replied, “It’s the mainstay of what we call tier-one or platinum applications. . . we have quite a large SAN; we span the globe with our SAN network. The overwhelming majority of our tier-one applications reside on the PowerMax arrays.” When asked why the organization selected PowerMax, the engineer talked about PowerMax’s resiliency. “[These applications] cannot fail. They are critical for our business.”

**“I have been testing the VMAX and PowerMax models for over a decade now. And they have been the most reliable, the most-consistent performing, the highest-performing, the lowest-latency boxes.”**

Enterprise Storage Engineer - Financial Services Organization

Elaborating further on his organization’s rationale for using PowerMax, he said, “I have been testing the VMAX and PowerMax models for over a decade now. And they have been the most reliable, the most consistent performing, the highest-performing, the lowest-latency boxes. . . We like where they are. If our tier-three support people cannot resolve it, then I get involved and when that happens, EMC, now Dell, has always stepped up.”

Through standardizing on PowerMax, the storage team has stayed up to speed on the competitive storage options available. The enterprise storage engineer described his perspective on the competitive landscape by saying, “Other products we have seen are not as easy to use, and they are not as easy to train our teams to use.” He went on to say, “We have checked out some of the other options from other vendors and they do not match what we consider as a top-tier enterprise box. . . They can’t get to the size we need.” In this case, he elaborated that size was not just an issue of achieving a certain capacity level on a specification sheet, rather capacity is determined by the ability to deliver a consistent performance experience and ensure resiliency. By standardizing on PowerMax, he said, “We have built PowerMax architectures that have tremendously speeded up our response time and our consistency.”

**“It is a very mature product and EMC, [now Dell], will go to the ends of the Earth to support you.”**

Enterprise Storage Engineer - Financial Services Organization

When asked whether he would recommend PowerMax to others, the storage engineer said, “Not only is the array top notch, the hardware is top notch, the operating system is top notch. It is a very mature product and EMC, [now Dell], will go to the ends of the Earth to support you.”

## The Bigger Truth

Building a mission-critical storage infrastructure is more than what’s found on a data sheet. Just adding SSDs or scaling to a multi-petabyte capacity without the right architecture, resiliency, and support is akin to trying to build a high-performance race car by just taking any car off the street and adding in a larger engine. The top IT architects at some of the world’s largest organizations understand this difference all too well and that is why they choose Dell EMC PowerMax.

For your business' mission-critical workloads, look beyond the performance and scale metrics. A high IOPS number is meaningless if you cannot deliver consistent low-latency access to every application client. Massive scale is pointless if you cannot protect or secure the data or cannot manage the snapshots. Also remember that mission-critical storage may start with the architecture, but it does not end there. If there is not a trusted and capable support organization behind it, one that will work with you, regardless of where the root cause resides, then it can't be mission-critical storage.

Any organization with workloads that are truly critical to their business should have Dell Technologies and PowerMax on their short list of solutions to consider.

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of The Enterprise Strategy Group, Inc., is in violation of U.S. copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at 508.482.0188.



**Enterprise Strategy Group** is an IT analyst, research, validation, and strategy firm that provides market intelligence and actionable insight to the global IT community.



[www.esg-global.com](http://www.esg-global.com)



[contact@esg-global.com](mailto:contact@esg-global.com)



508.482.0188