

Case Study

Financial Services
Data Center



Leading Investment Firm Takes Decision-Making From Milliseconds to Microseconds

Faster transaction speed with high-performance Dell EMC PowerMax platform with Intel® Optane™ SSDs helps boost revenue.

“Guaranteeing performance and reliability to meet the extreme service levels these financial systems demand, is hard to do. There weren’t really any all-flash [storage-class memory as persistent storage] options on the market, so we were excited to take on the challenge of delivering the first.”

—**Marc Royer**
senior pre-sales manager,
Dell EMC

A large financial organization* removed transaction bottlenecks and accelerated critical decision-making while reducing its storage footprint and related costs. It did this by rethinking the entire storage platform to reduce data siloes, boost performance, and achieve fast, reliable results. With help from Intel and Dell EMC, the organization built an innovative end-to-end non-volatile memory express (NVMe) storage platform to support real-time analytics for mission-critical decision-making applications. The Dell EMC PowerMax solution, with Intel® Optane™ SSDs, has increased reliability while reducing transaction time from milliseconds to microseconds.¹ This translates to faster decision-making for the organization, putting it a step ahead of its competitors.

Challenge

In an industry where making decisions quickly leads to competitive advantage, a large European investment firm needed to enhance and accelerate its core decision-making applications. This meant rethinking the existing data storage platform, which was costly to run and maintain. The platform was also made up of multiple siloes of data storage that hindered the investment firm's ability to run multiparallel database calculations and achieve fast, reliable results. The organization needed to consolidate data resources while maintaining high levels of performance and reliability. It also wanted to remove transaction bottlenecks for high-frequency trading decisions to help stay ahead of the competition.

Solution

The organization implemented a new solution based on the Dell EMC PowerMax storage platform, using Intel Optane SSDs for storage-class memory and cache. With end-to-end NVMe support, the platform delivers the compute, storage and networking capabilities required, bringing transaction times down from milliseconds to microseconds while maintaining optimal reliability. This accelerates decision-making for the organization (for example where to invest), meaning it can act more quickly and accurately than its competitors.

Results

The enhanced performance and reliability of the new storage platform means the organization's core applications are able to perform significantly more transactions per day. This represents huge potential business and competitive advantages for the company. Meanwhile, the consolidated solution has helped shrink the organization's storage footprint and related costs.

Business Challenge

For organizations operating in the financial services industry, timely action is critical. Thousands of decisions must be made every day, from large-scale strategic directions like which investment funds generate the best returns, to small-scale operational details, such as which offer to promote to a given customer. Each decision impacts overall business performance and customer satisfaction. Each one must be informed by a complex mix of information, and must be made quickly. In the world of high-frequency online trading, it comes down to a simple formula: Revenue = business intelligence x transactions per second. More knowledge and faster action can result in more money made.

Revenue =

business intelligence x transactions per second

Data is therefore essential. But just having the data is not enough. Immediate, reliable access to the right data at precisely the right moment, is the key. The “hot” data that informs decisions and transactions must be available close to the CPU and with very low latency.

One European financial services organization needed to address this challenge. The platform used to manage and store the data upon which its decision-making relied was aging. The cost of running the system at the high performance level required to address current business needs was becoming too high. With new business requirements creating added pressure, the organization needed to rethink its entire data platform for high-frequency trading.

Key requirements for the new platform were high reliability and high performance. “Guaranteeing performance and reliability to meet the extreme service levels these financial

systems demand, is hard to do,” explains Marc Royer, senior pre-sales manager at Dell EMC, which the organization tasked with helping it architect a solution. “There weren’t really any all-flash [storage-class memory as persistent storage] options on the market, so we were excited to take on the challenge of delivering the first.”

In building the new platform, the financial organization also wanted to take the opportunity to centralize its data estate and address two key pain points. First, it was using siloes of data held on different systems in order to achieve the required high performance and low latency. However, running multiple systems put a heavy burden on the IT team managing the platform, requiring experts in each system to be available 24/7 in case of any issues or outages. This combined to create a high amount of wasted capacity and inefficiency among the team.

The siloes also created a challenge for many of the workloads the organization runs, which use a broad range of multiparallel databases, including SQL, NoSQL and Oracle. By running the same calculation multiple times at once, these programs can build more detailed and nuanced analytics and enable more accurate, reliable decision-making. However, with data siloes running on different systems, each system exhibited slight variations in performance, latency and stability, creating inconsistencies between the calculations that threatened the reliability of the decision made based on each calculation. The organization needed a way to consolidate all this data while supporting a heterogeneous environment of multiple data formats and databases.

Solution Details

The Dell EMC team worked with Intel to deliver the high performance, low latency, consolidated data access the organization needed. The end-to-end NVMe solution is based on the Dell EMC PowerMax storage platform, which uses Intel Optane SSDs for its storage-class memory and capacity tiers (see Figure 1). PowerMax delivers very high



500%

more write input/
output operations
per second (IOPS)²



100%

more bandwidth²



26%

lower latency²

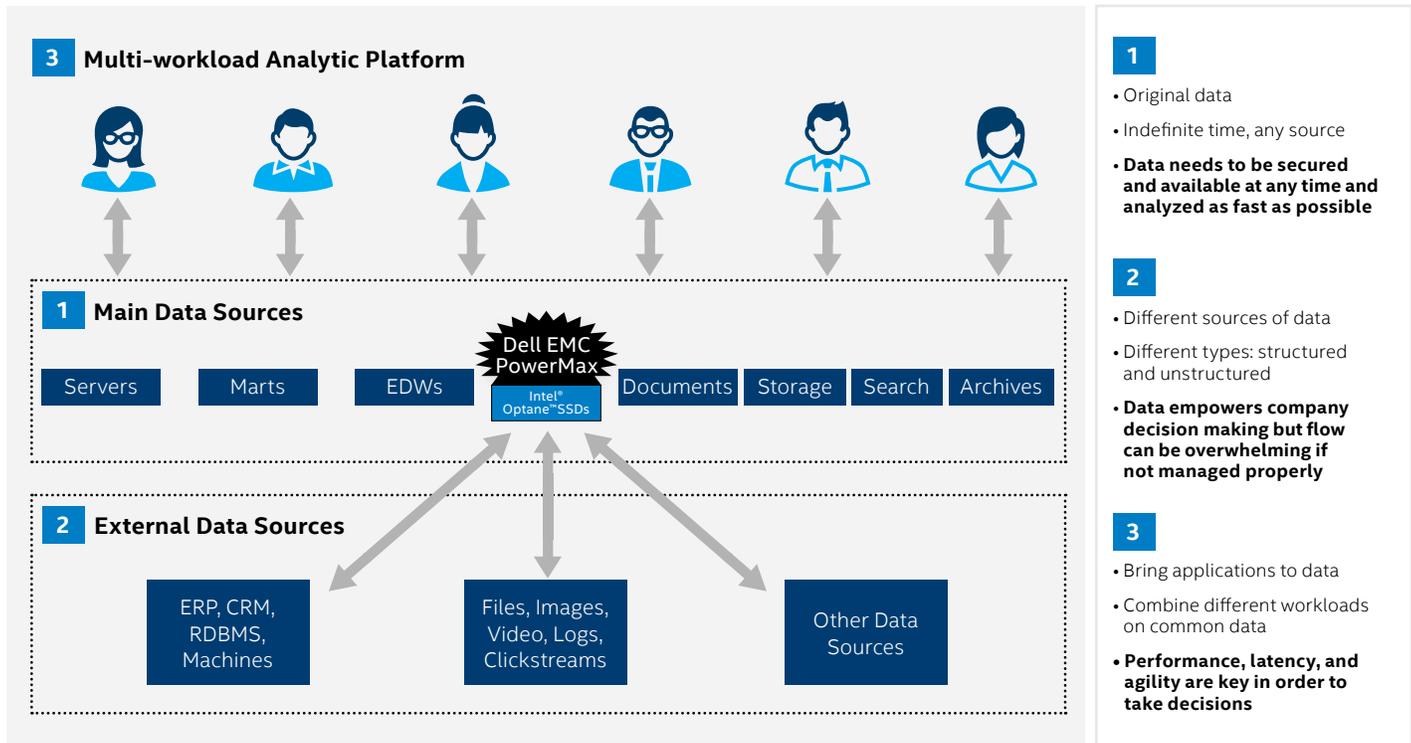


Figure 1. Dell EMC PowerMax with Intel® Optane™ SSDs is a modern scale-out storage system designed for mission-critical workloads. This includes databases and applications as well as real-time analytics that demand uncompromising uptime and extremely low latency

levels of performance, with up to 15 million IOPs³, 350 GB/second bandwidth⁴, and predictable read response times of under 100 microseconds⁵. The platform integrated smoothly with the organization's heterogeneous environment, providing the compute, storage and networking capabilities to support any database types now or in the future.

Intel Optane SSDs were chosen from a number of options due to their consistent high performance compared to 3D NAND storage technology, and strong reliability. "The technology advantages of the combined Dell EMC-Intel solution were not the only reason the organization chose to work with us," says Royer. "It also valued the fact that our companies bring decades of experience and expertise to the table, and that we provide the stable roadmap to ensure we'll be here to support them in the years to come."

The customer carried out its own evaluation of the solution, with the objective of achieving a transaction time of under one millisecond. In fact, after internal testing, the customer reported a time well into microseconds, representing a significant performance improvement.⁶ "A few hundred microseconds might not sound like much of a reduction, but it could represent a huge dollar value in competitive advantage for our customer," explains Royer. "A good analogy is to think of a Formula 1 racing team. If they can engineer their cars to go a couple of seconds faster than their competitors', it will help them win. It could give them an advantage for years until the others catch up."

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Business Results

"It was important to the customer that their new data platform be built on a true end-to-end NVMe architecture over fabric. They saw this as the only way to ensure the data consistency they needed with no latency," says Royer. "As the Dell EMC PowerMax platform with Intel Optane SSDs is built for NVMe, it can offer very high performance without compromising reliability, latency or cost. This is unlike many other options on the market today. Crossing from milliseconds to microseconds is a performance gain of a magnitude we haven't seen since the transition from mechanical drives to flash."

With the new platform up and running in production, the organization confirmed it meets all requirements and has been implemented and rolled out with no surprises. When running such mission-critical systems on which millions of dollars depend every hour, this predictable reliability is especially key.

Technical Components of Solution

- **Dell EMC PowerMax storage platform.** Designed to handle enormous amounts of data quickly and intelligently, with end-to-end non-volatile memory express (NVMe) storage-class memory. This helps eliminate I/O bottlenecks and streamline connection to the CPU and optimize Intel® Xeon® E5 processors' high performance.
- **Intel® Xeon® E5 processor.** Deliver the essential performance and advanced security technologies for entry server solutions, professional workstations, and secure cloud services.
- **Intel® Optane™ SSDs.** Reduce application latency while enabling organizations to consolidate block, file and mainframe workloads to shrink hardware footprint, streamline management and lower costs.
- **Dual port access.** Dell EMC adapted its software to take advantage of dual port Intel Optane SSDs in the PowerMax system. This means the solution benefits not just from high performance, but also from greater reliability with redundant data paths and hot-plug capability for continued data access in the event of a failure.

From a business perspective, the improved performance of the new storage platform means the number of decisions made every hour has significantly increased. This in turn makes a large contribution towards enhancing the organization's profitability and competitive position.

Consolidating the multiple data siloes and storage systems into a single platform has also helped reduce overall costs. "We estimate that the customer's storage footprint has shrunk significantly, without reducing capacity or performance, or risking bottlenecks," says Royer. "Shrinking the physical footprint helps reduce space, power and cooling costs. Meanwhile eliminating the need for many different vendor specialists to be available at all times means the IT team's human resources can operate much more efficiently." [Find the solution that is right for your organization.](#)

Learn More

- **Solution brief:** Dell EMC PowerMax Speeds Data Access with Intel® Optane™ SSDs
- **ESG report:** Dell EMC PowerMax and SCM Powered by Dual-port Intel Optane Technology Combine to Improve Overall System Performance
- **Infographic:** Innovative Storage for Data-driven Needs
- **Website:** Dell EMC PowerMax
- **Website:** Intel® Optane™ SSDs

Contact your Intel representative or visit www.intel.com/optanedatacenter



^{1,6} Source: Financial investment organization internal testing.

² ESG, ESG Technical Validation: Dell EMC PowerMax and SCM Powered by Dual-port Intel Optane Technology Combine to improve Overall System Performance. Commissioned by Dell EMC. September 2019. esg-global.com/validation/esg-technical-validation-dell-emc-powermax-and-scm-powered-by-dual-port-intel-optane-technology.

³ Based on Dell EMC internal analysis of Random Read Hits Max IOPS (within a single array) for the PowerMax 8000, July 2019

⁴ Based on Dell EMC internal analysis of published bandwidth of the PowerMax 8000 versus competitive mainstream arrays. July 2019

⁵ Based on Dell EMC internal analysis of Random Read Hits latency with 8K blocks for the PowerMax 8000. July 2019

* For purposes of data security and client confidentiality, our customer asked us not to disclose their name. But they agreed we could share the story of their success working with the Dell EMC PowerMax platform with Intel® Optane™ SSDs.

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Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

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