

ESG SHOWCASE

Optimize, Accelerate, and Simplify SANs Non-disruptively with Cisco MDS

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ABSTRACT: As businesses rely more on their data, increased pressure is placed on IT organization and the underlying infrastructure to accelerate the business' access to data. This pressure makes modernizing the SAN a priority. Fortunately, Cisco, a leader in Ethernet and Fibre Channel networks, offers compelling innovations to non-disruptively modernize SAN fabric while empowering organizations to maximize the value of the existing infrastructure assets. Cisco can help any SAN with health check services that span Cisco fabric environments as well as those from other vendors.

Market Landscape

The rise of “the digital business” is creating pressure for IT organizations. That pressure stems from the fact that the relationship between competitive business success and efficient, accelerated IT operations is intensifying. The rapid growth of data and the increased diversity of application environments in particular are creating mounting levels of IT complexity. Additionally, the increased adoption of new technologies—such as high-performance storage systems with NVMe-based flash to support newer application environments—is shifting more performance pressure to the storage network.

As the mounting complexity burdens IT, admins still must ensure that each application consistently gets the performance it needs. And admins still must isolate and resolve issues and anomalies as quickly as possible after they arise. That's hard to do without the right SAN network technology.

Fibre Channel continues to serve as an essential component of enterprise SAN fabrics. 53% of Fibre Channel SAN users expect to accelerate their investments moving forward. That percentage is in addition to 41% of users that expect to maintain their current Fibre Channel spending levels.¹



53% of storage decision makers expect to accelerate their spending on Fibre Channel SAN technology

[Cisco](#), a leader in Ethernet and Fibre Channel IT networks understands these pressures and has been working to help organizations alleviate them. Cisco can accelerate modern application environments, with the ability to non-disruptively modernize SAN environments intelligently and efficiently, maximizing the value of existing infrastructure investments.

The Essential Role of the Storage Network in Modern IT

ESG research validates the rise in IT complexity and the importance of deploying technology similar to what Cisco offers. Today, practically every business is a digital business. In a recent ESG research study, nearly every (98%) IT organization

¹ Source: ESG Research Report, [Data Storage Trends in an Increasingly Hybrid Cloud World](#), March 2020.

surveyed said they are in some phase of digital transformation.² That need to transform has placed increased levels of pressure and demands on IT teams that often have little to no extra personnel resources.

Not surprisingly under these circumstances, 75% of surveyed IT decision makers told ESG they believe IT is more complex than it was just two years ago. Multiple factors are responsible for these recent increases in IT complexity, with 38% of respondents identifying concerns over higher data volumes and 29% reporting major digital transformation activities underway as the reasons driving the increased complexity.³

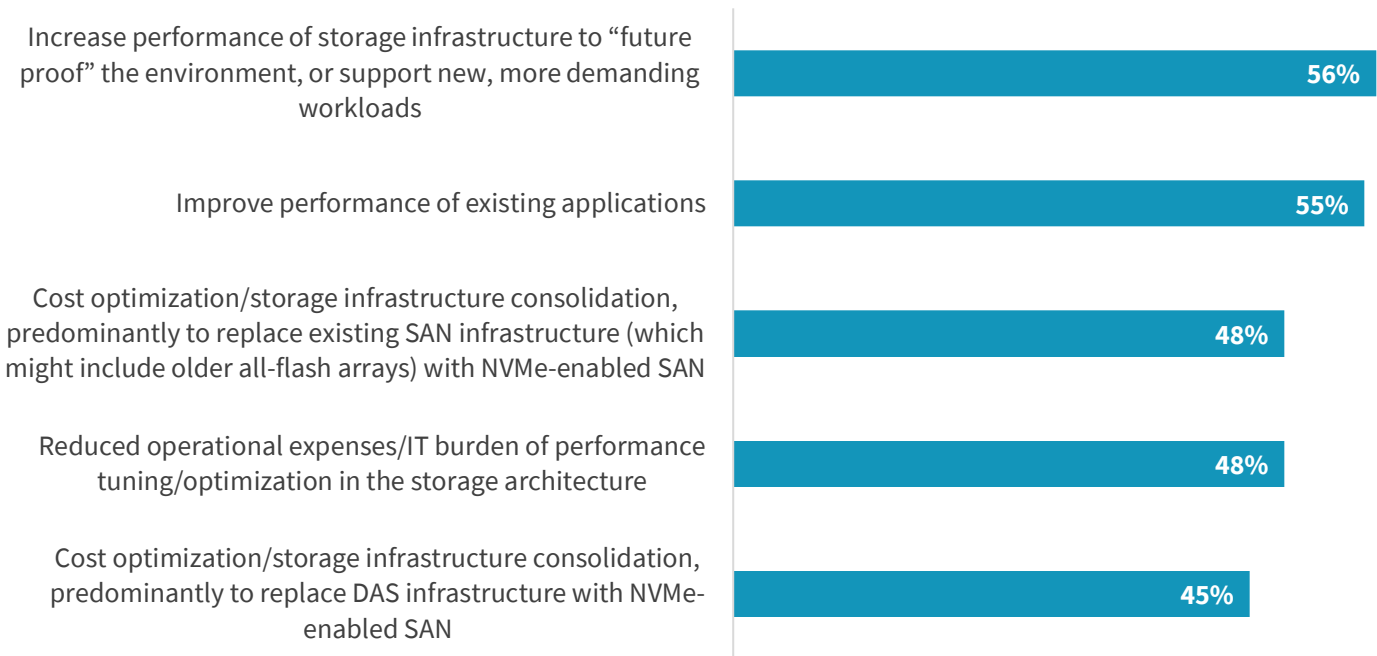


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Performance improvement is also becoming more crucial for application environments in general (see Figure 1). It is just one of many factors that is fueling the rise in interest and adoption of flash and NVMe-based flash storage.⁴

Figure 1. Drivers Fueling Interest in NVMe Technology

Which of the following objectives are driving your organization’s use of or interest in on-premises NVMe-based flash storage? (Percent of respondents, N=305, multiple responses accepted)



Source: Enterprise Strategy Group

The NVMe protocol extends the high performance with low-latency benefits of flash storage across the SAN environment and to the application. When storage decision makers were asked to identify the factors driving their interest in and adoption of NVMe storage technology, more than half identified the desire to accelerate existing applications (55%) or future proof their storage infrastructure environment (56%). In addition, 48% identified the desire to improve consolidation

² Source: ESG Research Report, [2021 Technology Spending Intentions Survey](#), January 2021.

³ Ibid.

⁴ Source: ESG Research Report, [Data Storage Trends in an Increasingly Hybrid Cloud World](#), March 2020.

within their SAN environment.⁵ All of these goals increase the pressure on and the importance of modernizing the SAN network to deliver both in terms of consistent low-latency performance and high bandwidth.

Cisco Storage Fabric Technology Modernizes SANs Non-disruptively with 64 Gb/s NVMe

Cisco MDS has established itself as an industry leader in storage networking, both Fibre Channel and Ethernet. The Cisco MDS Storage Fabric architecture is designed to ensure investment protection, offering 64Gb-capable Fibre Channel connectivity with support for NVMe-over Fibre Channel. This investment protection offers more than a financial advantage; it also simplifies the operational burden of delivering high performance data access to enterprise application environments. In addition to the investment protection afforded by its support for the latest storage protocols, Cisco offers several other innovations that can dramatically simplify IT operations, including:

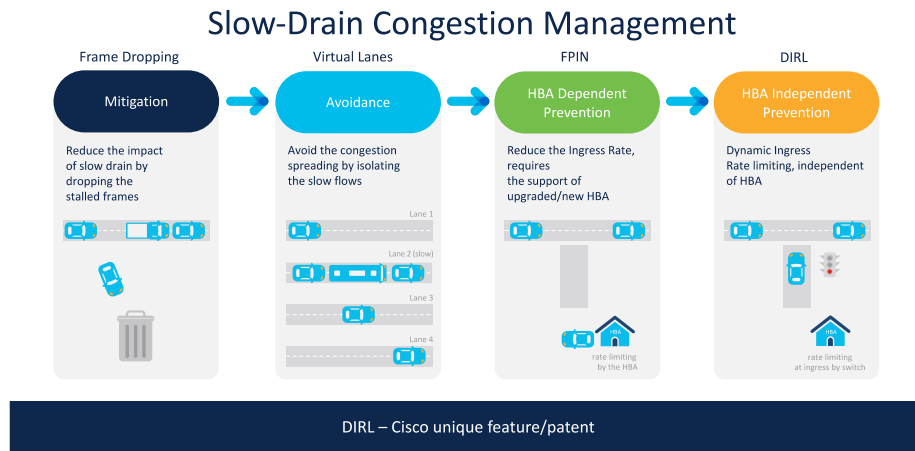
- **Supporting Multiple Speeds (16G, 32G, 64G) with Existing Cisco MDS 9700 Directors** - The never-ending evolution of next generation technology has IT leaders often challenged with disruptive upgrades. With Cisco MDS directors, you now have the ability to use existing chassis and existing optics to provide full investment protection. The Cisco MDS directors provide the ability to deploy non-disruptive upgrades to next generation speed rather than replace the entire chassis. Customers can now add new 64G line rate ports into the existing chassis on as-needed basis without any forklifts. Cisco's new 64G line card provides further consolidation of the hardware. Thus, less power is required, and the analytics-gathering capability is enhanced with on-chip hashing engine. In addition, there is another dedicated analytics NPU that processes the line rate NVMe/SCSI flow information and makes it available via CLI or to external collector SAN Insights for detailed time-based historical or live analysis.
- **Accelerating SAN performance with Active SAN Congestion Management** - Slow-drain congestions are one of the main reasons for SAN performance degradation. Now with faster NVMe arrays and higher Fibre Channel speed mismatch (16G/32G/64G), it is important to control the slow-drain congestion at the end devices. Customers require non-disruptive ways to control the slow-drain-induced congestion spread. Cisco is now offering enhanced features to prevent slow-drain congestion from spreading.

To address this, Cisco implements congestion isolation and automatic recovery using virtual lanes (see Figure 2). This approach is targeted to eliminate the slow-drain congestion often seen as a main reason for SAN performance degradation. Cisco introduced its patented innovation, Dynamic Ingress Rate Limiting (DIRL), an agentless, fabric-centric approach that is compatible with hosts and targets of any vendor and any generation, controlled and governed by the embedded intelligence of MDS 9000 devices. The following are also notable items to consider:

- Cisco supports Fabric Performance Impact Notification. (HBA vendors are just starting to include FPIN.)
- Cisco's patented Dynamic Ingress Rate Limiting feature does not require an HBA upgrade.
- Cisco's DIRL solution works with existing servers and storage solutions; it is not dependent upon any HBA model or HBA firmware revision.

⁵ Ibid.

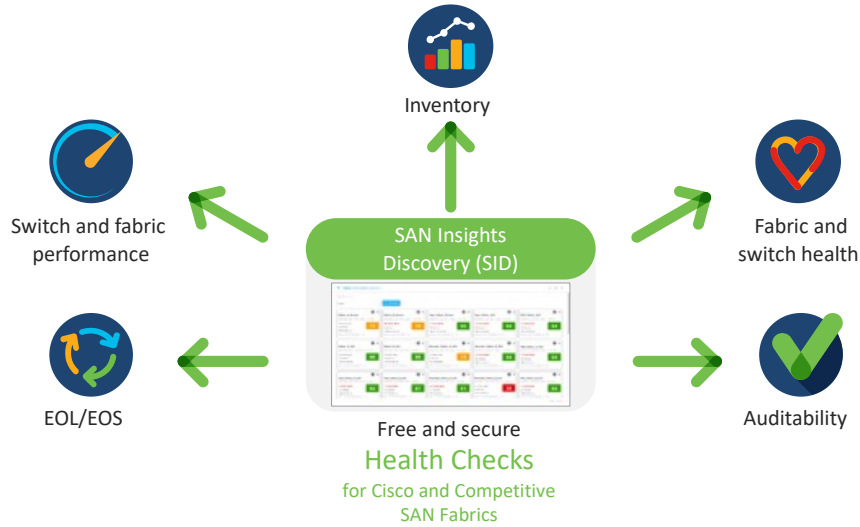
Figure 2. Accelerating SAN Performance with Congestion Management and Prevention



Source: Cisco

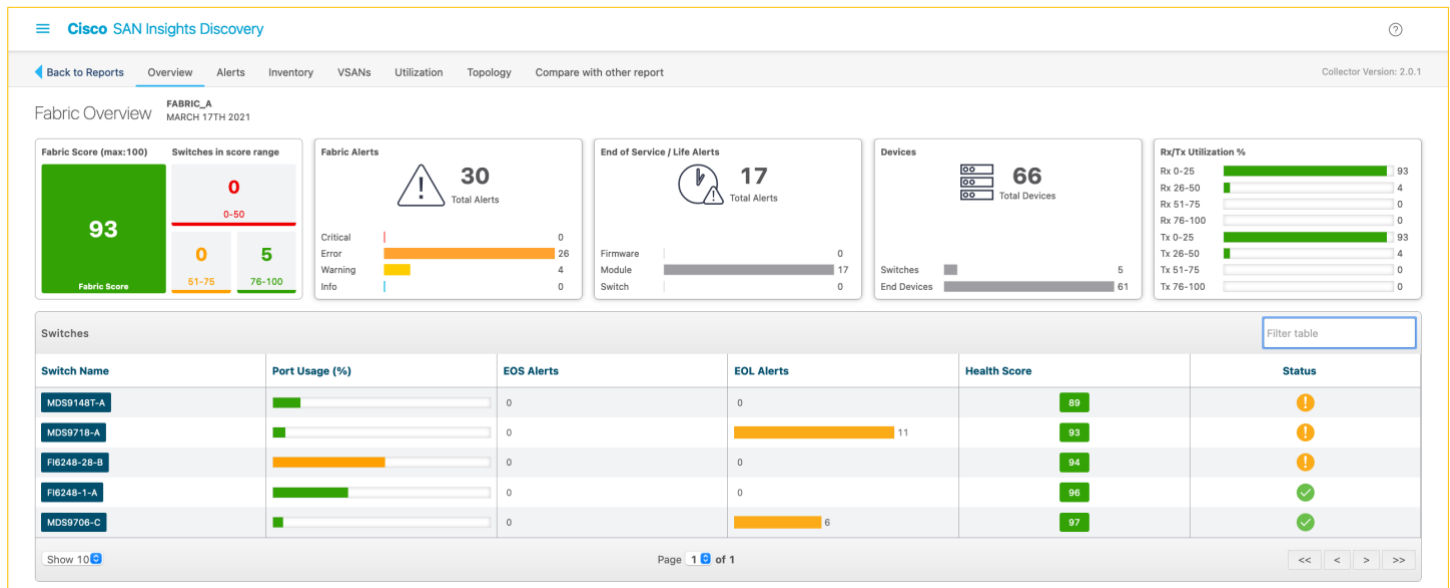
- Delivering Automation to SAN Operations** - Cisco enables IT automation via Ansible modules for multiple SAN activities. Ansible is an open-source automation designed to accelerate DevOps, including VSAN automation, device-alias automation, and zoning automation. Cisco support and adoption of Ansible allows the Cisco Storage Fabric to leverage industry API calls to gain real-time insights and data to make configuration changes on Cisco devices. This functionality allows for automated configuring/unconfiguring VSANs, as an example. Also, Cisco Data Center Network Manager (DCNM) provides a uniform platform to manage both MDS on Fibre Channel, as well as NXOS-based Nexus Ethernet fabrics. Cisco DCNM finds the slowest storage and host devices, identifies the busiest storage and host devices, determines if an application is slow due to storage access issues, pinpoints the exact location of the slow down, provides visibility into Cisco UCS Servers and vHBA traffic, optimizes storage ports, and automatically learns the performance health of storage infrastructure.
- Cloud-based SAN Health Tool** - Cisco offers a SAN Health Check service to assist in optimizing SAN environments. The newly introduced Cisco SAN Insights Discovery (SID) tool provides a holistic health check at the fabric and switch level, displays end-of-life or end-of-service notifications, and assesses the fabric from a secure, cloud-hosted portal (see Figure 3 and Figure 4). The tool collects, visualizes, and recommends what is needed for an optimal environment. This health check provides insights on Cisco deployments as well as other technologies in the customer’s ecosystem. To maintain the health of the SAN, IT needs insights into inventory, health, performance, and end-of-sale and end-of-life information to quickly and easily understand the current health of the fabric.

Figure 3. Cisco SAN Insights Discovery – Modern Fabric Health Check



Source: Cisco

Figure 4. Cisco SAN Insights Discovery – Report Overview



Source: Cisco

- Integrated Security** - Configuration with automation is an important part of the Cisco Storage Fabric, but equally important is its integration with anti-counterfeit (ACT2) security and secure-boot technology. The ACT2 ensures the Cisco platforms are configured with a genuine, unmodified Cisco software image. This means the Cisco software has a digital fingerprint called a secure unique device identifier (SUDI) implemented during the manufacturing process. This SUDI is included with the platform but also ensures that the Cisco platform has appropriate security-built in.
- SAN Analytics and Insights** - Cisco SAN Analytics is the industry’s first and only solution to provide visibility into Fibre Channel block storage traffic by inspecting frames natively on Fibre Channel switches without any external taps, probes, or appliances (see Figure 5). On-chip analytics, combined with a network processor, streams high-fidelity data at scale for every flow. The real-time visibility and analytics offered by Cisco SAN Analytics helps to maintain peak performance and

troubleshoot problems proactively. If SAN or storage are blamed for performance issues, organizations now have the data to prove this right or wrong.

Figure 5. Cisco SAN Analytics – Visibility into Fibre Channel Block Storage Traffic



Source: Cisco

Cisco MDS is helping to simplify and automate the SAN experience, enabling IT organizations to better support increasing and more dynamic application demands while reducing the burden on IT administrators.

The Bigger Truth

As businesses become more digital, the job of the storage administrator becomes more difficult. The responsibilities of provisioning resources, optimizing and maintaining the existing ecosystem, and addressing issues as they arise only get harder as application environments scale and become more diverse. In addition, admins and their IT organization are under increased pressure by business teams to accelerate and deliver more digital services. To keep pace, IT needs faster, smarter, and more capable technology. Cisco's approach to the Storage Fabric offers the simplicity IT admins need, helping to accelerate or automate existing activities while allowing storage administrators to focus on new and innovative projects.

Cisco simplifies infrastructure modernization with its ability to non-disruptively upgrade an organization's SAN fabric, while maximizing the value the organization can maintain from their existing storage investments. As a leader in both Fibre Channel and Ethernet technologies, Cisco is prepared to address the future of SAN fabric technology. With its health-check services, Cisco opens the door for any SAN admin to see what potential value Cisco MDS could offer for their environments. If you are looking to accelerate and optimize the management of your SAN environment, I would encourage you to contact Cisco and see what they have to offer.



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