Developing an NVMe over Fibre Channel Strategy

Most All-Flash Arrays (AFA) are setup as block devices connected via a Fibre Channel (FC) Storage Area Network (SAN). The deterministic nature of FC and its inherent low latency are an ideal match for AFAs. As data centers begin to implement NVMe AFAs the trend of connecting these systems via FC is likely to continue. Organizations, however, need to make sure that their infrastructures are NVMe-ready so as they implement NVMe AFAs they will realize the full potential of these systems.
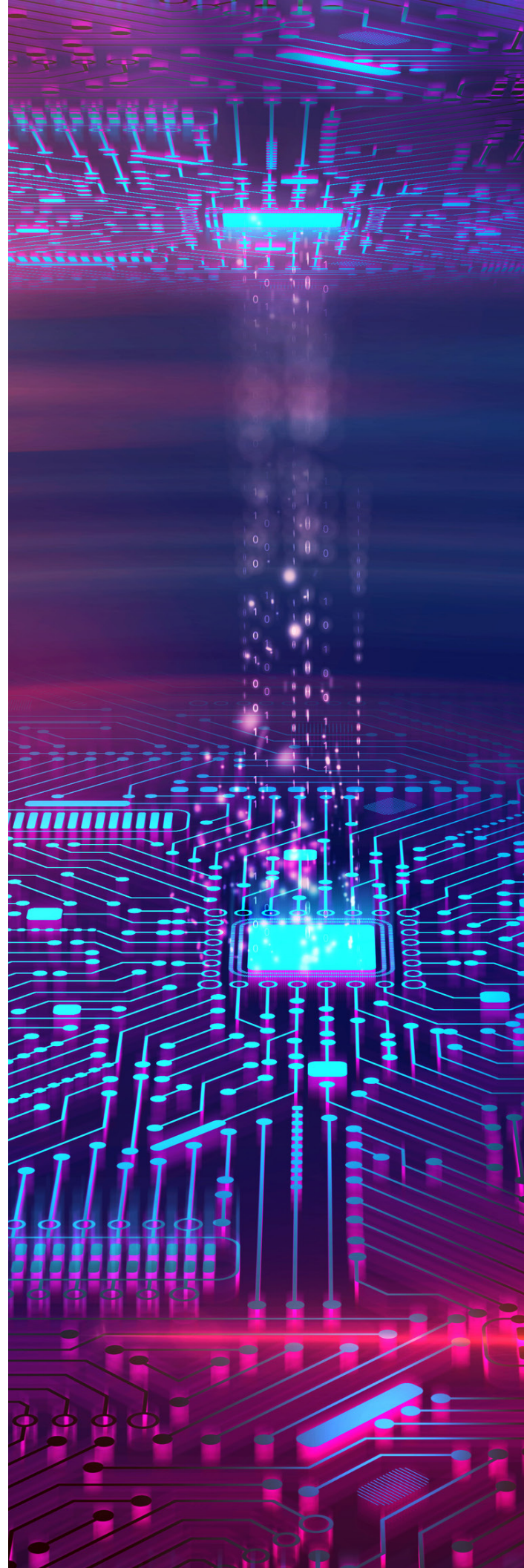
PREPARING THE INFRASTRUCTURE FOR NVME AFAS

Network infrastructures are the circulatory system of the data center and it is very difficult to rip and replace a circulatory system. A gradual transition to NVMe is a better practice but that gradual transition needs to keep in mind the eventual goal of an end-to-end NVMe fabric. The first step, which data centers should already have underway, is to make sure that any new Director-class or modular switch purchase fully supports NVMe-oF/FC. The organization may not use the NVMe protocol right away but they want to make sure that as many components support it as possible.

BANDWIDTH MATTERS

In a FC-SCSI based environment the latency of SCSI may cause some IT professionals to question the need to increase overall bandwidth performance. 16Gps FC and certainly 32Gbps may seem like more than enough. Applications that need more performance than more traditional data center applications, like large-scale databases, NoSQL, Analytics, Artificial Intelligence, Machine Learning, and Deep Learning applications, often end up with architectures that use direct attached storage to eliminate as much network overhead as possible.

NVMe-oF/FC changes the direct attached reality by providing all the benefits of shared storage with low latency that rivals direct attached storage. A direct result of NVMe-oF/FC is a demand for higher bandwidth, especially in next generation applications. While most of these applications are in proof of concept or early production stages today, the move into a mainstream production will increase the need for higher bandwidth. IT organizations need to look for the ability to start with 32Gbps today but upgrade to 64Gbps as that demand hits, without a forklift upgrade to their infrastructure.

PROVING PERFORMANCE

Another area IT needs to prepare for is defending against complaints about infrastructure performance. In most cases, most applications won't, initially, be able to take full advantage of NVMe performance. Performance will improve, often dramatically, but possibly not to the expectations set by NVMe-AFA vendors. As is almost always the case, the tendency is to blame storage and the storage infrastructure first. IT needs data to troubleshoot any performance issue and to explain when and why storage infrastructure is not the problem.

AUTOMATED PROVISIONING

End-to-End NVMe capabilities will spur dramatic growth in compute and applications, because the storage infrastructure has the capability to respond to significantly more IO requests than ever before. Requests for additional server, network and storage resources will come fast and frequently. In order to keep up, IT professionals need end-to-end automation that can provision not only compute resources, but also align networking resources and provision storage system capacity.

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CISCO PROVIDES INVESTMENT PROTECTION FOR NEXT GENERATION SAN

Cisco recently announced that its MDS 9000 Directors, the MDS 9706, MDS 9710 and MDS 9718 are 64Gbps ready. For new data centers, customers can deploy a 64Gbps ready modular SAN fabric. For existing install base, customers can seamlessly upgrade their existing MDS modular fabric to 64Gbps ready fabric with upgrading the fabric modules without any downtime. Down the road 64Gbps line cards will be available for these chassis. This upgrade path is ideal for organizations as they continue to scale-out their existing application infrastructure and begin to onboard NVMe/FC workloads. The Cisco Directors are built for scale, supporting up to 40,000 flows in a single Director.

Cisco also announced that their built in telemetry ASIC, that provides real-time analysis of all network IO, also now supports NVMe/FC traffic simultaneously along with FC-SCSI. Again, as IT implements NVMe AFA systems, IT professionals need better tools to not only diagnose performance problems but also to prove that the storage infrastructure is performing as it should. The environment automatically learns performance baselines and as well as deviations. The always-on visibility enables IT to troubleshoot and even proactively prevent problems because abnormalities are always detected. The speed of this infrastructure requires real-time telemetry. A polling approach to data collection may miss some important metrics.

The Cisco solution works with the company's own visualization engine as well as third parties. It can also send telemetry data to a customer's data lake. Once in the data lake, the organization can use its own tools to analyze the information.

Finally, Cisco also announced that it is extending its DevOps support for IT automation by supporting ANSIBLE, a popular Linux-based automation engine commonly found in large data centers and cloud providers. The ANSIBLE integration enables customers to automate the provisioning of new applications from the compute tier through the storage infrastructure.

STORAGESWISS TAKE

NVMe-oF eliminates the disadvantages of direct attach storage and brings all the advantages of traditional shared storage. Those shared storage advantages are even more critical as AI/ML/DL workloads become more mainstream. The key is for organizations to be able to upgrade their infrastructure at the right pace and not be required to rip and replace it. It is also critical that the infrastructure provides real-time monitoring as well as being automatable.

With its latest announcement, Cisco hits all the NVMe-oF/FC check boxes giving customers a seamless roadmap to an end-to-end NVMe future. The built in, always on, real-time monitoring capabilities of the solutions become increasingly critical in these high performance environments.

THE FIRM

Storage Switzerland is the leading storage analyst firm focused on the emerging storage categories of memory-based storage (Flash), Big Data, virtualization, and cloud computing. The firm is widely recognized for its blogs, white papers and videos on current approaches such as all-flash arrays, deduplication, SSD's, software-defined storage, backup appliances and storage networking. The name "Storage Switzerland" indicates a pledge to provide neutral analysis of the storage marketplace, rather than focusing on a single vendor approach.

THE PARTNER

Cisco is the worldwide leader in networking for the Internet. The company was founded in 1984 by two computer scientists from Stanford University seeking an easier way to connect different types of computer systems. Cisco's networking solutions connect people, computing devices and computer networks, allowing people to access or transfer information without regard to differences in time, place or type of computer system.

As you explore the possibilities for your business, start at the beginning. Cisco Systems built the Internet so we know exactly what it takes to get your business online. Take advantage of our experience and knowledge to get the Internet working effectively for your business.