Cisco SAN Analytics
Deployment Overview

Seamless, Cost-Effective End-to-End Visibility across SAN Fabrics
Cisco SAN Analytics Overview

Recent innovations in the Cisco MDS 9700 32-Gbps Fibre Channel module and the Cisco MDS 9000 32-Gbps switch family have fully enabled Cisco SAN Analytics. It offers a proactive and predictive architecture using on-module traffic access point (TAP) and Network Processing Unit (NPU) to offer a true switch-integrated solution. The SAN Analytics architecture comprises three key components:

- Traffic inspection of application read and write data and capture of Fibre Channel and SCSI headers by the latest generation Fibre Channel port ASICs.
- Processing of Fibre Channel and SCSI header data and Initiator-Target-LUN (ITL) flow metric calculation by an on-board Network Processing Unit (NPU).
- Streaming of flow metrics to an external analytics and visualization engine such as Cisco DCNM for end-to-end visibility.

As a result, SAN Analytics enables organizations to gain complete visibility across their entire Fibre Channel SANs for every flow at line rate and without any performance degradation. Customers can now analyze Fibre Channel exchanges in real time using reports on various metrics, thereby gaining comprehensive and continuous monitoring of application behavior to identify any deviation and any potential performance issues in the network. With hardware-based analytics, there is no performance impact on SAN data flows. As a result, SAN administration can evolve from reactive to proactive processes and permit making of informed operational decisions.

A major benefit of the switch-integrated feature of Cisco SAN Analytics is scalability. SAN Analytics natively scales up with growth in the size of the SAN. Whether it is a small SAN of a single switch or a large SAN with thousands of ports, you get full visibility for each end-device that is connected to your SAN.
Cisco SAN Analytics can be easily, incrementally and cost-effectively deployed due to its being a switch-integrated capability. The functionality can be enabled out-of-the-box on the MDS 9700 32-Gbps Fibre Channel module and the MDS 9000 32-Gbps switch family. End-to-end monitoring of specific workloads can be accomplished through inspection of associated SCSI flows having at least one MDS 9700 32-Gbps module or MDS 9000 32-Gbps switch in the Initiator-Target-LUN (ITL) flow data path.

Cisco SAN Analytics is agnostic to the server or storage infrastructure vendor or architecture. In addition, full end-to-end visibility into I/O flows can be accomplished irrespective of the actual line speeds supported by flow initiator and target devices for additional deployment flexibility. Specifically, even if the initiator server and/or target storage devices use 2/4/8/16/32-Gbps SAN connections, end-to-end analytics capabilities for the flows will be supported as long as the flows traverse at least one MDS 9700 32-Gbps module or MDS 9000 32-Gbps switch in the SAN. As a result, it can be deployed without forklift upgrades for optimal return on investment (ROI).

SAN Analytics Deployment Highlights

SAN Analytics is also fully supported for SCSI flows traversing multi-vendor SAN infrastructure assuming that a MDS 9700 32-Gbps module or MDS 9000 32-Gbps switch is also in the flow data path. The N port identifier virtualization (NPIV) feature of Cisco MDS directors and switches enables full interoperability with Brocade SAN infrastructure running in Access Gateway (AG) mode. SAN Analytics can be enabled on either the storage array port on the MDS 9700 32-Gbps module or MDS 9000 32-Gbps switch, or the uplink 32-Gbps port from the Brocade SAN switch on the MDS switch/director for full visibility into all the flows.

SAN Analytics supports a number of deployment options to address the full range of MDS SAN customer environments. Taken together, these deployment options enable the real-time visibility and analytics offered by SAN Analytics to seamlessly scale to every server and storage end-device of the SAN fabric using a simple and affordable approach, while helping maintain peak performance and enabling proactive troubleshooting.
Overview
Cisco Public

32-Gbps FC Deployment at Storage Edge
The importance of I/O performance at the SAN storage edge has never been greater due to the explosive growth of server virtualization, adoption of all-flash storage and larger server workloads, while at the same time, IT continues to experience spending pressures. Use of MDS 9700 32-Gbps modules with in-place MDS 9700 directors is ideal at the storage edge. It enables SAN administrators to consolidate workloads from hundreds of high-performance virtual machines and scale them with incremental updates as the SAN grows, while protecting the existing investment.

Deployment of MDS 9700 32-Gbps modules at the storage edge while initiators and ISL links may continue to utilize in-place 16-Gbps links enables organizations to also cost-effectively gain full end-to-end visibility into the SAN infrastructure. Specifically, SAN Analytics functionality can be utilized for all flows having 32-Gbps modules deployed at the storage edge in their data path regardless if the initiator or ISL links utilized by such flows using 16-Gbps. Further, MDS 9700 32-Gbps modules and MDS 9000 32-Gbps switches in such deployments can utilize 16-Gbps optics as needed for cost-effectively supporting 16-Gbps server initiator and ISL connections.

SAN Analytics Deployment Options

- Closest to storage
- 32-Gbps FC module in data path for all flows
- Best for existing MDS 9700 deployment

- High capacity core with 32-Gbps FC speed
- 32-Gbps FC module in data path for all flows
- Best for existing MDS 9700 deployment

- Best model for end-to-end visibility and correlation
- 32-Gbps FC module in data path for all flows
- Best for upgrading from MDS 9500 or Heterogeneous SANs

MDS 9700 32G FC Module must be in flow data path
For more than a decade, the Cisco MDS 9500 series of switches has consistently enabled deployment of resilient, high-performing, and operationally efficient SANs. Over the same period, the demand for storage, bandwidth, and scale have also increased steadily and we have seen unprecedented growth as we step into the era of virtualization, application proliferation, and affordable “all-flash” arrays. That is why more and more businesses have chosen migrating from the Cisco MDS 9500 product line to deploying end-to-end 32-Gbps SAN fabrics enabled by Cisco MDS 9700 Series and MDS 9000 32-Gbps family of SAN switches.

In addition, administrators of heterogeneous SANs are frequently faced with the need for improved storage capacity, speed and return on investment. They require high-performance and redundant SAN networks that can both meet their current demands and scale for growth in the future. To accommodate these new requirements, SAN administrators often need to migrate from their existing heterogeneous storage networks to 32-Gbps SANs enabled by the MDS 9000 32-Gbps switch and MDS 9700 directors with 32-Gbps modules which are recognized for their reliability, flexibility, performance, and investment protection.

For both of the above scenarios, end-to-end 32-Gbps SAN deployment is ideal for also enabling SAN fabric-wide visibility into Fibre Channel traffic due to the SAN Analytics being natively integrated into MDS 9700 32-Gbps modules and MDS 9000 32-Gbps series of multilayer switches as well as fully supporting SAN flows traversing multi-vendor SAN infrastructure.

Specifically, SAN Analytics enabled on any of the 32-Gbps ports supported by a MDS 9700 32-Gbps module or MDS 9000 32-Gbps multilayer switch allows full visibility into all of the flows using such ports. In this manner, pervasive visibility can be provided across the 32-Gbps SAN.
Conclusion

Cisco SAN Analytics can be easily, incrementally and cost-effectively deployed due to its being an integrated capability of MDS 9700 32-Gbps modules and MDS 9000 32-Gbps switch family. The functionality can be enabled out-of-the-box and end-to-end monitoring of specific workloads can be accomplished through inspection of associated SCSI flows having at least one MDS 9700 32-Gbps module or MDS 9000 32-Gbps switch in the flow data path.

SAN Analytics supports a number of deployment options to address the full range of MDS SAN customer environments. Taken together, these deployment options enable the real-time visibility and analytics offered by SAN Analytics to seamlessly scale to every server and storage end device of the SAN fabric using a simple and affordable approach, while helping maintain peak performance and troubleshoot problems proactively.