

The Trusted Foundation for Storage



Executive Summary

In a turbulent computing era that is being redefined by highly virtualized environments, solid state storage and cloud-based architectures, unprecedented advancements in storage networks are needed to respond to the IO strains of increased complexity. In order for enterprise data centers to keep pace with these changes, the right network architecture must be implemented to prevent consolidated and low latency IO from driving bottlenecks within the storage network. Fibre Channel helps to alleviate IO discrepancies and extends the underlying benefits of evolving IT trends.

Fibre Channel's Distinct Advantages:

- Data center-proven, purpose-built storage
- Non-stop networking minimizes operational outages and down time
- Integrated diagnostics, monitoring and availability, simplify management and increase resiliency
- Low overhead and low latency removes IO bottlenecks and unleashes the full performance of flash, SSD, and 16 Gbps-capable storage
- Backward-compatibility with existing infrastructure minimizes the need to rip and replace

Fibre Channel: Supporting Evolving Storage Requirements

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Greater processing power, growing virtualization densities, increasing Virtual Desktop Infrastructure (VDI) deployments and implementations of flash technology are among key IT trends helping enterprise computing to evolve. Yet these trends depend on a robust and reliable storage infrastructure to be leveraged effectively. With predictable performance and simple scalability, Fibre Channel is a purpose-built storage solution designed to unlock the potential and progress of cutting-edge computing innovations. The advantages of Fibre Channel extend beyond performance and higher throughput. Fibre Channel delivers many capabilities that take SAN reliability, availability, and management simplicity to the next level, driving down operational costs. It is these advantages that enable enterprise data centers to unleash the full potential of evolving technologies.

A Purpose-built Storage Architecture

Data integrity, reliable and consistent data center connectivity are paramount concerns for enterprises. By utilizing its underlying, state-of-the-art fabric, Fibre Channel ensures both. With high-speed links Fibre Channel consolidates necessary ports to eliminate port count requirements of other protocols. This not only streamlines storage access, but it also reduces the number of necessary host bus adapters (HBAs), switches and end devices, substantially lowering IT costs, power and cooling requirements. Fibre Channel's credit-based flow control – one of the exclusive features of Fibre Channel that make it so well suited for block-level storage data networks – delivers data as fast as the destination buffer is able to receive it, without dropping frames or losing data. With an exceptionally efficient encoding scheme Fibre Channel reduces overhead, adding further to both overall value and reliability.

Fibre Channel's predictable performance is enhanced by its exclusive diagnostic, error-detection and correction tools. They enable consistent, uninterrupted data accessibility, ensuring that data remains accurate and consistent throughout its lifecycle. These tools also simplify and reduce management costs, eliminating the manually intensive, error-prone tasks that can obstruct or jeopardize data and storage connectivity performance.

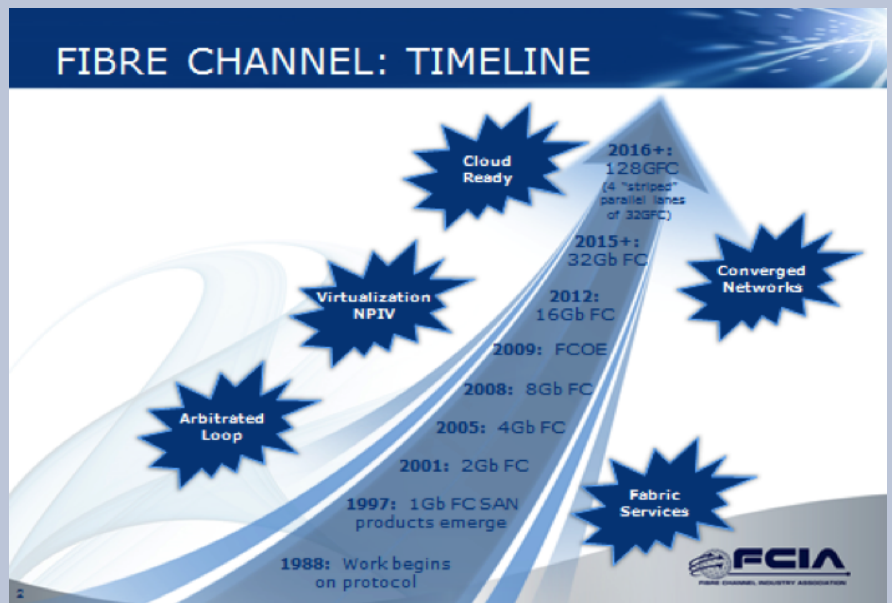
The reliable server-to-storage connectivity afforded by Fibre Channel can largely be attributed to its resiliency. Multi-port traffic isolation, heterogeneous interoperability, credit-based flow control to ensure data can be delivered as fast as the destination buffer is able to receive it, are among the unique features lending to Fibre Channel's unparalleled stability. Flat and simple, with the elasticity to accommodate scaling as needed, Fibre Channel is ready to meet the fluctuating demands of businesses and data centers as servers become increasingly consolidated and server utilization rates rise. Fibre Channel's simplified scalability allows enterprises to avoid costly bottlenecks and preserve an exceedingly reliable server-storage connection that never hinders data center availability.

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Not only is Fibre Channel the fastest and most reliable storage connectivity solution, it is also one of the most widely deployed and trusted. The unique heritage, ubiquity and evolving progression of Fibre Channel are huge advantages for enterprises that deploy it. All the major OEMs and prominent networking companies are participating in standards-based development and working toward common roadmap goals. That roadmap is comprised of specific enhancements and innovations to meet the growing need for fast, scalable and reliable storage networks. This includes Forward Error Correction (FEC) to improve the reliability of data transmissions through automatic detection and recovery from bit errors that occur in high-speed networks. FEC also helps minimize or avoid data stream errors that can lead to application performance degradation and even outages.

Another enhancement is for energy efficiency; Fibre Channel lowers energy consumption by allowing optical connectors to operate in standby mode, or “nap,” multiple times each second and allows for the ports to be “woken up” when data transmission is necessary. Lastly, by listening to customer’s needs, the development of 32GFC has been announced and represents the fastest single-lane serial transmission speed of any copper or optical storage interconnect in history. With 128GFC to follow by aggregating four parallel 32Gb Fibre Channel lanes between servers and storage devices on a single link Fibre Channel will enable the world’s fastest storage networking protocol. The next generation of Fibre

Channel will be referenced as Generation 6 or Gen 6. The name was created to move away from speed-based naming to technology generation-based naming. Gen 6 Fibre Channel is based on the 6th generation (1, 2, 4, 8, 16, 32 Gbit/s).



Fibre Channel is fortified by an industry coalition dedicated to designing compatible products that work together seamlessly with optimum interoperability and management simplicity, ultimately saving enterprises substantial time deploying, managing, and scaling systems. Fibre Channel’s forward and backward compatibility protects IT investments by allowing growing enterprises to forgo expensive “rip and replace” scenarios.

Conclusion

Server and storage technology advances are pushing up demand for greater SAN bandwidth, including application and storage capacity growth, high-density server virtualization, 16Gb Fibre Channel storage arrays, and Solid State Drive (SSD) or flash-based storage. Fibre Channel unleashes the full potential of computing innovations and enables organizations to fully leverage existing and new IT investments to solve their most difficult business challenges and address the evolving requirements of today’s data center. Higher throughput is important for keeping up with the many server and storage technology advancements, but the true value of Fibre Channel goes well beyond faster links. While exceptional speed and low-latency performance have long been Fibre Channel’s hallmarks, it also extends predictable performance, assured data integrity, reliable connectivity, management simplicity and maximum scalability to its customers. These innovative, breakthrough technologies within Fibre Channel dramatically simplify SAN deployment and management and drive down operational costs. Fibre Channel allows enterprises to proceed with confidence in their endeavors, and to rest assured that they can accommodate any industry trend, no matter what the storage environment demands.