



# Spectra® Swarm

## 40Gb/s Ethernet (2-Port) to SAS Accelerated Storage Controller

The storage industry is filled with “end of life” predictions between various storage approaches, devices and interfaces. Ethernet vs. Fibre Channel (FC) is another such debate. While both technologies have their place, Ethernet is clearly gaining ground in some of the more rapidly growing areas of the storage market. With speeds of up to 100 Gb/s, Ethernet has closed the differential in performance with Fibre Channel, but speed is not the driving force behind the broader adoption of Ethernet.

Due in large part to the growth of social media, the IoT and cloud, File and Object Storage are growing at a much faster rate than block storage. Ethernet’s ability to easily handle both storage types (which Fibre cannot) make it an ideal fit for the largest data growth markets today. Other developments such as hyper-converged infrastructure – which combines storage, compute and networking into a single scale-out layer of servers without the need for expensive Fibre switches, also bodes well for the versatility of Ethernet.

The lower cost of Ethernet HBAs and switches, use of existing data center infrastructure and no dedicated personnel needed for Fibre SANs are the final piece of the story. The combination of performance, versatility, ease of use and lower cost have made Ethernet a mainstay in data centers of all types and sizes.

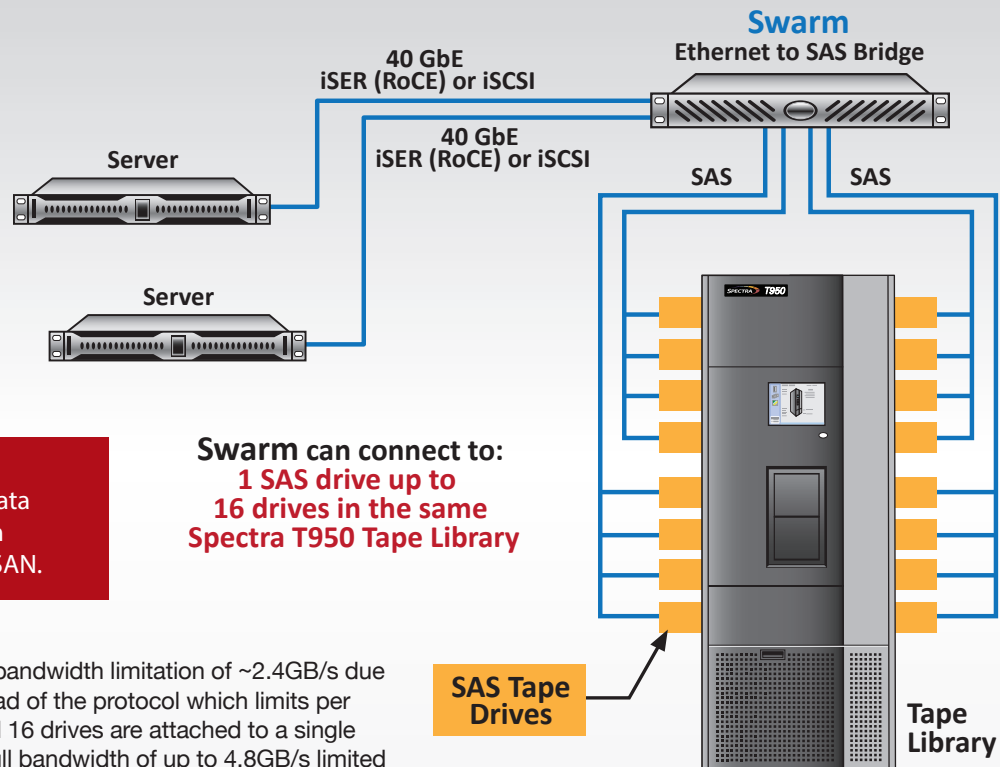
Continuing its role in tape technology innovation, Spectra Logic has introduced Swarm, Ethernet controllers for tape technology. The economic advantages of Ethernet are now available to tape users as well. For datacenters running Fibre Channel simply to support tape, moving to a single protocol and being able to share switches and other infrastructure offers significant cost savings not to mention the overall increased ease of operation and lower management overhead. Spectra Swarm supports LTO-7, LTO-8, LTO-9, IBM TS1160 and TS1170 Enterprise Tape Technology, and all future SAS tape technology.

### Spectra Swarm Overview

Spectra Swarm is a 1U appliance that allows tape users with SAS tape drives to move away from either FC or direct-attach SAS tape drive architecture. An Ethernet to SAS bridge is at the core of the Swarm solution. Swarm provides two 40GbE inbound connections driving up to 16 channels of 12G SAS. SAS tape drives then provide the SAS connectivity on the tape library side. The bridge allows for connections using iSCSI or iSER via RoCE V2 (iSCSI Extensions for RDMA). After initial configuration and driver setup, the bridge is transparent to the host (regardless of iSCSI or iSER), and the host can read or write to the drives as if they were connected directly to the host system.

The Spectra Swarm Storage Controllers are optimized for high performance with multiple hardware acceleration engines which provide industry-leading performance to keep multiple tape drives streaming at maximum throughput. Spectra Swarm enables a common set of services and features and is engineered with an open design that does not alter the data path.

The Spectra Swarm achieves up to 4.8GB/s throughput per controller with only 2 microseconds of added latency. Users can implement solutions with up to 16 SAS tape drives all connected to the same Spectra Swarm controller. Multiple Swarm controllers may be used on a single tape library for connecting to more than 16 tape drives. The bridge performance is dependent on connection interface. The RoCE v2 interface has much less overhead and uses fewer host resources relative to iSCSI and thus provides higher performance when used with drive counts higher than nine.



Spectra Swarm is a simple and elegant solution for data centers moving away from traditional Fibre Channel SAN.

Swarm can connect to:  
**1 SAS drive up to 16 drives in the same Spectra T950 Tape Library**

The bridge currently has an iSCSI bandwidth limitation of ~2.4GB/s due to the additional processor overhead of the protocol which limits per drive bandwidth to ~150 MB/s if all 16 drives are attached to a single bridge. RoCE v2 is able to run at full bandwidth of up to 4.8GB/s limited only by the two 40GbE connections which allows it to stream data to all 16 LTO-9 or IBM® TS1170 SAS drives at sustained write speeds of 400MB/s.

All Spectra tape libraries can be partitioned via Spectra's Shared Library Services (SLS) feature. SLS allows for up to 16 partitions (up to 24 partitions in a multi-unit, Spectra Stack library). Each partition is seen as a virtual, standalone library. Each partition created requires a minimum of one tape drive assigned to that partition. Users may dedicate library partitions to a given tape drive interface, so that SAS, Ethernet and Fibre Channel drives can all be used in a single tape library if desired.

## Specifications

- Up to 4.8GB/s sustained transfer rate
- 2 microsecond end-to-end latency
- Supports up to 16 drives per Swarm controller
  - Multiple Swarm controllers may be used on a single tape library for additional drive support
- Support for current and future SAS tape drives
- Operating systems supported:
  - RoCE - Linux
  - iSCSI - Linux, Windows
- Applications supported:
  - Swarm is transparent to all data mover/backup/archive applications
- Tape Libraries supported:
  - Spectra Stack (up to 42 tape drives/multiple Swarm controllers required)
  - Spectra T380 (up to 12 tape drives)
  - Spectra T950 & T950V (up to 24 tape drives/multiple Swarm controllers required for more than 16 drives)
  - Spectra TFinity\* (up to 144 tape drives/multiple Swarm controllers required)
- Multi-initiator access for all attached storage
- Support for Extended Copy (LID1) to offload CPU, memory and storage fabrics
- Host LUN Mapping initiator to LUN mapping
- Drive Map Director™ patented SAS device mapping
- XstreamVIEW Storage Manager for easy remote configuration, management and diagnostic capabilities
- Built in temperature monitoring
- Dual hot-swappable power supplies
- SNMP and SNMP MIB support
- Top-of-rack controller
- Standard 19" 1U rackmount kit included
  - Rack mount options for top mount of T950 frames available
- No batteries
- Two 40Gb/s Ethernet ports
- Supports iSER (iSCSI Extensions over RDMA) RoCE v2
- Support Hardware Accelerated iSCSI
- Auto negotiates to 40Gb, 10Gb or 1Gb Ethernet
- Distance limits:
  - Swarm imposes no cabling limits. If the host can communicate over Ethernet to the Swarm controller, it can send data to the tape drive(s)
  - The Swarm controller does have to be located within 3 to 4 meters of the library
- Four x 4 12Gb/s Mini-SAS HD connectors (up to 16 physical connections)
- Statistic Reporting for SAS and Ethernet ports
- RoHS Compliant