

Intrinsic Mirroring™

Raising the bar on NEXIO® SAN bandwidth



Intrinsic Mirroring™ was developed to provide industry-leading storage protection and added resilience to the already robust NEXIO® shared storage system. An important benefit derived from Intrinsic Mirroring is that it can provide increased bandwidth versus a single SAN configuration. This document explains how to take advantage of this feature when configuring a NEXIO storage system.

Intrinsic Mirroring enables NEXIO clients (servers, editors, gateways) to utilize two NEXIO SAN systems as a single, mirrored, storage space. Below the level of user application visibility, the NEXIO client is connected to two identical SANs. Data is written simultaneously to both SANs, eliminating the need for an external NEXIO Mirror Manager server. The elimination of external mirroring removes a single point of failure, the latency of delivering data to the second SAN, and a source of logical synchronization issues. Data is read from both SANs, with data reads roughly balanced between them by the NEXIO clients during normal operation.

The ability to read from either SAN provides bandwidth that exceeds a single SAN configuration — read bandwidth is effectively doubled with Intrinsic Mirroring. If all data I/O are read operations, then the full bandwidth of both SANs is available, and total bandwidth doubles. If all I/O is writing, which is performed in parallel to both SANs, then no additional bandwidth is available. Real-world operations will fall somewhere between these two extremes, as illustrated in Figure 1 with an example based on 8,348 Mb/s single-SAN bandwidth and required write bandwidth of 5,000 Mb/s.

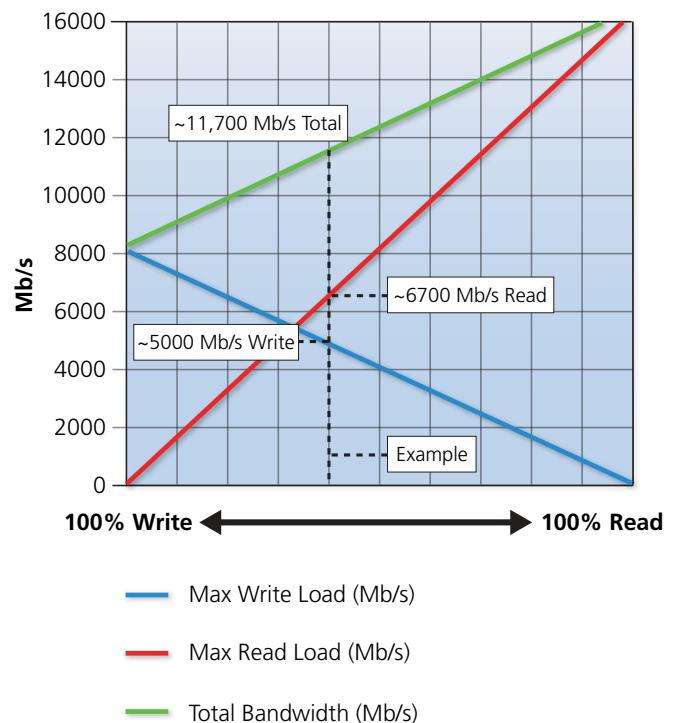


Figure 1

The chart in Figure 1 is based on a single-SAN bandwidth of 8,348 Mb/s, the current maximum bandwidth for a 48-drive volume. The same principle applies to smaller volumes or other storage configurations with different bandwidths, but 8,348 Mb/s will be the maximum single-SAN bandwidth in most situations. To determine overall bandwidth, use the chart or the following equations, where B equals maximum single-SAN bandwidth, W equals maximum write load, and R equals maximum available read bandwidth:

$$R = 2 \times (B - W)$$

and

$$\text{Total Available Bandwidth} = R + W$$

As an example, let's say that the predicted write load for a system is 5,000 Mb/s. In a single SAN using 48-drive volumes, that leaves 3,348 Mb/s for read/playout. Using the chart in Figure 1, draw a vertical line where the maximum write load equals 5,000 Mb/s to see that the associated maximum read load is approximately 6,700 Mb/s and the total bandwidth is about 11,700 Mb/s. The equations yield a resulting read bandwidth of 6,696 Mb/s and total available bandwidth of 11,696 Mb/s. That's a lot of additional bandwidth available for playout, archiving or editing — double the read bandwidth that would be available from a single SAN.

There are a couple of important caveats to bear in mind:

1. The second SAN provides both bandwidth and redundancy, but those features are linked. If one SAN fails (unlikely, but possible), then the additional bandwidth also becomes unavailable. A plan should be developed for utilizing the maximum single-SAN bandwidth (likely 8,348 Mb/s) in the event of a SAN failure. This may mean temporarily delaying archive file transfers, reducing NLE access, or reducing a number of redundant playout channels.
2. Start with the maximum anticipated write load. This cannot exceed the maximum bandwidth of a single SAN. Be conservative, but plan for real-world use cases. If high read loads are always going to be required at a different time from high write loads, for instance, then size the system with both scenarios in mind.

In conclusion, Intrinsic Mirroring does more than provide the highest level of storage protection for NEXIO SANs. It also allows you to extend NEXIO storage to support bandwidth requirements that are otherwise not achievable with a single storage domain.

For more information, please visit www.broadcast.harris.com.

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