# Moving from Fibre Channel SAN Solutions to Avid ISIS:

## A Simple Guide

## Introduction

When it comes to storage performance and data availability there is almost no more demanding application than broadcast and post-production video editing. These applications require isochronous performance in a collaborative, shared-storage environment. Without it, ingest, edit, and play-to-air functions would fail, even if it means dropping only a single frame.

Avid has pioneered real-time shared-storage for full resolution editing since the introduction of Unity MediaNetwork in the late 1990's. Unity was built upon a Fibre Channel SAN infrastructure, the state-of-the-art at the time. As powerful as Fibre Channel is in terms of bandwidth, it is not without limitations and can become unwieldy and costly to grow in support of even a few dozen or more clients.

While serving Ethernet-attached clients from a SAN-attached server is not unique in the datacenter, it is unique when the Ethernet clients are able to perform real-time high resolution media operations. Again, pioneering system architecture and software from Avid has enabled this capability. Connecting clients to real-time shared-storage through Ethernet leverages the benefits of that IT environments have known for years. Ethernet is a ubiquitous interconnection medium that is well-known by system administrators, supported by a myriad of hardware vendors, and is common in today's facilities.

The introduction of Avid® ISIS® marked a huge leap forward in the delivery of real-time content over Ethernet, enabling high resolution workflows for hundreds of connected users, adding unparalleled redundancy and scalability, and minimizing the factors that drive up Total Cost of Ownership (TCO).

ISIS storage technology is now the basis of three distinct offers:

ISIS 7000: Developed to support high volume broadcast and post production operations with full redundancy, linearly scalable capacity and performance to over 1PB, capable of accommodating hundreds of simultaneous high resolution editing clients.

ISIS 5000: Designed for small to mid-sized post production, education, and government operations that need to scale capacity and performance linearly to ninety simultaneous clients.

ISIS 2000: Nearline class of storage providing ready access to data without performance characteristics offered by ISIS 5000 and ISIS 7000. ISIS 2000 features a fast near-archive capability, lower aggregate storage cost, and expansion of both storage capacity and workflow options at an economical cost per Terabyte.

Until the introduction of Avid ISIS, Avid Unity™ MediaNetwork was the preferred facility-class shared storage system in the industry. Based on Fibre Channel connectivity, it was relatively easy to install and use, and provided adequate bandwidth for most workflows. The coexistence of ISIS and Avid Unity MediaNetwork continued until the introduction of ISIS 5000 in 2010.

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## ISIS 5000: ISIS for Facility Class Users

Today, ISIS 5000 offers Avid Unity MediaNetwork owners an important opportunity to upgrade to a much more modern, open, and scalable shared storage solution. Its flexible Ethernet infrastructure is easy to set up and provides the scalable capacity and bandwidth that media and entertainment professionals need. With highly acclaimed tools for managing and monitoring an ISIS system from a web browser on any machine on the network, storage can easily be added or removed from the system without interrupting workflows while data is redistributed evenly across the added or remaining engines, providing even, predictable performance. With RAID 5 media protection and a hot spare drive in every engine, ISIS 5000 offers a level of protection not previously available.

ISIS 5000 utilizes standardized hardware to provide the ISIS network file system functionality, ease of setup, and levels of performance not previously available to more price-sensitive facilities.

## Ethernet vs. Fibre Channel for Shared Storage

Before the advent of Gigabit Ethernet, Fibre Channel SANs were the only infrastructure choice for high performance shared storage. Now, Ethernet offers a less expensive and more flexible alternative for media applications.

## Host Connectivity

The performance needs of most offline editing applications are met by 1 Gb Ethernet (2 streams of up to DNxHD 220), and most modern workstations and laptops come equipped with one or more 1 GbE NICs. 1 GbE NICs can be added to a host at a fraction of the cost of a Fibre Channel HBA. ISIS client software enables the use of two NICs on a host for increased performance. For workflows that require even higher performance, ISIS supports the use of 10 GbE NICs.

## Performance

This chart details the performance differences between a single engine MediaNetwork configuration (4Gb Fibre Channel connected clients) versus a single engine ISIS 5000 configuration (Ethernet connected clients):

| Streams Per Client | | | | |
|---|---|---|---|---|
| Resolution | 4Gb Fibre Channel connection (MediaNetwork) | 1Gb Ethernet connection (ISIS 5000) | Dual 1Gb Ethernet connection (ISIS 5000) | 10Gb Ethernet connection (ISIS 5000) |
| XDCAM 50 | 2* | 4* | 4* | 4* |
| AVC-Intra 100 | 2* | 4* | 4* | 4* |
| DNxHD145 | 4 | 3 | **8** | **10+** |
| DNxHD220 | 3 | 2 | **5** | 8 |
| Uncompressed 720p 10bit | 2 | 0 | 1 | 2 |
| Uncompressed 1080i 10bit | 2 | 0 | 1 | 2 |
| RGB 10bit (1080i) | 1 | 0 | 0 | 1 |

*= more streams may be supported with higher specification client CPU's

For most workflows, 4 streams of XDCAM 50 and AVCI-Intra-100 or 8 Streams of DNxHD 145 or 5 streams of DNxHD220 is more than sufficient. Customers requiring more streams for uncompressed resolutions can add 10Gb ports as needed- it's all about flexibility.

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## Cabling

Many organizations do not realize that the optical cabling used for Fibre Channel connectivity is the same that is used for optical Ethernet networks. Thus, operations with an existing Fibre Channel SAN solution can use the same optical cabling infrastructure for all ISIS products, since they are compatible with optical Ethernet switches and network adapters. Below are the specifications for optical cabling in Fibre Channel and Ethernet environments:

| | | Distances supported | |
| --- | --- | --- | --- |
| Cable type | Fibre Channel | 1Gb Ethernet | 10Gb Ethernet |
| MMF 62.5 micron cable | 200 MHz-km: 0.5 – 70 m<br>160 MHz-km, 0.5 – 55 m | 200 m | 26-33m |
| MMF 50 micron cable | 2000 MHz-km, 0.5 – 270 m<br>500 MHz-km, 0.5 – 150 m<br>400 MHz-km, 0.5 – 130 m | 500 m | 300 m |
| SMF 9 micron cable | 2m – 1.4m | 10 km | 10 km |

*Optical cabling used for Fibre Channel is fully compatible with optical Ethernet switches and Network adapters. As noted above, optical Ethernet connections allow for connectivity at longer distances.*

Organizations often have concerns about the connector types for Fibre Channel and Gigabit Ethernet. The SC (Standard Connector) is typically used for Fibre Channel HBAs and switches, while the smaller LC connector is the most common connector for optical Ethernet interfaces. These connectors are not compatible, but a simple converter (cost ~$60 USD) or patch cable with appropriate connectors (typical cost ~$30 USD) can be used to reuse installed infrastructure optical fibre runs.

## Switching:

8Gb Fibre Channel switch vs. 1Gb Ethernet switch costs:

| Qty: | Model | Description | Unit price | $ per Port | Notes | Source |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | QLogic 5802V Switch Bundle | Includes 20 SFP+'s for switch ports | $9,755 | $487.75 | Switches are bundled with optics | CDW-G |
| 1 | Dell Force10 S25 | Includes 24 1Gb copper connections | $6,000 | $125.00 | 10Gb modules and optics sold separately | |

## Client Connections:

Most modern workstations and laptops today have 1Gb Ethernet built in. For Fibre Channel connectivity, an expensive Host Bus Adapter (HBA) is required on workstations. Even when an add-in Ethernet Network Interface Card (NIC) is required, the costs are significantly different:

8Gb/s Fibre Channel HBA vs. 1Gb Ethernet NIC cost:

| HBA/NIC Qty | Model/description | Unit price | Source |
|---|---|---|---|
| 1 | FC-81EN, Atto Celerity 8Gb single channel HBA (Fibre) | $1,118 | CDW |
| 1 | 10G-PCIE-8B-S, Myricom 10Gb NIC | $378 | CDW |
| 1 | Intel Pro 1000 PT dual 1Gb Network Adapter (Ethernet) | $193 | CDW |

8Gb Fibre Channel Host Bus Adapters (HBA's) are more than 5X the cost of a dual 1Gb Ethernet NIC (comparison uses CDW prices)

*Note that most laptops have a built in Ethernet connection but not Fibre Channel.*

Total connectivity cost per connection for Fibre Channel vs. Ethernet (Port cost + HBA or NIC):

| Technology | Cost | Vendor |
|---|---|---|
| 8G Fibre Channel | $1,606 | CDW |
| 10Gb Ethernet | $1,793 | CDW |
| 1Gb Ethernet | $249 | CDW |

*CDW used as a representative price, this is a discounted 'street' price

**Avid Global reference Price

The cost per connection for 8Gb Fibre channel is 6X the cost of 1Gb Ethernet connections. Since most editing workflows can be accomplished over 1Gb or dual 1Gb Ethernet, Ethernet offers a significant price advantage over 8Gb Fibre Channel

## Support

There are significant support advantages for Ethernet technology and for Avid. Ethernet has been broadly adopted across all industries, with a far larger pool of supporting resources and tools than any other network connection technology offers.  It is also important to note that Avid Service and Support professionals offer deep expertise not only in applications of Avid storage systems, but are industry-best problem solvers with their broad understanding of creative tools, management systems, and workflows used in media production.

## Conclusion

Ethernet is the predominant networking technology with a scale of research, development, and choice that dwarfs that of any other. Not only for mainstream information technology, Ethernet is, and continues to be the standard IT infrastructure deployed throughout broadcast and post production facilities worldwide. The broad acceptance of Avid ISIS systems, based on flexibility, cost-effectiveness, and proven performance in the most demanding content creation applications, underscore why Ethernet is the preferred interconnection choice for real-time media networks.

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