



STORAGE IN TRANSITION

We take a fresh look at IP-SAN storage as the shift to IP technologies for broadcasters gathers momentum

BY SATYAM NAGWEKAR

The transition to IP technologies for video is getting a lot of attention in the broadcast world as IP calls a considerable shift in conventional video production and transmission technologies and moving to the video-over-IP format. Broadcasters' stor-

age systems handle terabyte upon terabyte of data as multi-media software from companies such as Adobe, Avid, Grass Valley, and Image Systems and other video, film, and audio editing applications frequently require direct high-speed shared access to drives. In addition to the everyday demands of multimedia are capacity limitations and back-up, among other issues.

THE CONTENDERS

Fibre-channel storage area network (FC-SAN) solutions are usually expensive and complex, frequently requiring two different networks and qualified engineers. Network-attached-storage (NAS) systems are easier to manage but are much slower using 50 to 70 percent of the available IP bandwidth. Elvin

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Jasarević, technical director (Asia & Pacific) at Ardis Technologies, said, “As NAS systems are file aware, they operate at a higher layer and, therefore, introduce more latency into the read/write process.” With the introduction of the AVFS/Internet Small Computer Systems Interface (iSCSI) system by Ardis Technologies, however, companies can now use SAN with NAS simplicity and functionality to great effect.

This brings us to internet-protocol storage area network (IP SAN), which is a dedicated storage area network that allows multiple servers to access pools of shared block storage devices using storage protocols that depend on the Internet Engineering Task Force.

IP storage has evolved over the past five years and its role within the post and broadcast markets has increased greatly. Alex Grossman, CEO of Symply, said, “The advent of lower-cost 10GbE to the desktop and the lower cost of 10GbE switched infrastructure has facilitated the rapid expansion of IP-based workflow and the acceptance of IP-based storage for many functions within a post and broadcast workflow. For the most part, IP storage is still dominated by NAS presentation rather than IP SAN due to the lower cost and simpler configuration and management, and overall performance requirements in the application people use it for.”

While IP may not be ideal for such high resolution multi-stream raw editing applications, many of the areas where multiple fibre-channel ports were cost prohibitive such as transcode farms, review stations, delivery, and acquisition stations are now served by IP connectivity and directly with IP storage.

Added Alan Cheng, director of A/P channel sales and FAE department (except Japan



“WITH IP-BASED STORAGE, SANs WILL USE STANDARD IP NETWORKS SUCH AS GIGABIT ETHERNET. ETHERNET-BASED LANS HAVE LONG BEEN THE INDUSTRY STANDARD AND THE IDEA OF CREATING A SAN WITH ETHERNET HOLDS GREAT APPEAL FOR MANY IT ORGANISATIONS.”

– ALAN CHENG, DIRECTOR OF A/P CHANNEL SALES AND FAE DEPARTMENT (EXCEPT JAPAN AND CHINA), PROMISE TECHNOLOGY

and China), Promise Technology, “With IP-based storage, SANs will use standard IP networks such as gigabit Ethernet. Ethernet-based LANs have long been the industry standard and the idea of creating a SAN with Ethernet holds great appeal for many IT organisations.”

IP SAN does, however, enjoy many benefits over other storage technologies. Said Cheng, “IP storage has grown to be viewed as extremely cost effective, easier to

manage, and a less complex storage solution compared to direct-attached storage (DAS) or FC SAN. In IP SAN, iSCSI can transfer the traditional high performance.”

“The biggest benefit is the cost advantage of the infrastructure, closely followed by IT organisations’ familiarity with the workings of Ethernet. In an environment where copper cable can be utilised, the complete end-to-end cost is very appealing,” Grossman pointed out. Where fibre connections are required, the cost is similar to FC but without the benefit of lower overhead that relates directly to lower latency. IP still lags FC in overall performance when you factor in the lower latency and the ability to deliver many uninterrupted streams for editing and EFX work, he said.

The biggest challenge most users experience is delivering consistent performance in deadline-driven environments where a dropped frame has more ramifications than the lower cost of the IP connectivity.

IP SAN VERSUS FC SAN

IP SAN and FC SAN are both block-based storage networks. While FC offers guaranteed in-order delivery of data with no packetisation, IP SAN is mostly based in iSCSI that places the SCSI protocol layer on an IP transport layer. “If the environment includes an iSNS server such as a pure Windows environment and, assuming the switch is optimised for iSCSI traffic, results are similar to FC. In many real-world cases, however, you have Mac, Linux, and Windows and we find that iSCSI is less than half the true transfer rate of FC once you figure in the much higher latency forced by Apple’s lack of an iSNS server in the OS and other relative overhead issues associated with large-block iSCSI transfers,” Grossman pointed out.

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▲ Broadcasters' storage systems handle tons of data as multi-media software and video, film, and audio editing applications frequently require direct high-speed shared access to drives.

Cheng had a different view. "The natural addition to IP networks is a storage network. All benefits of a higher-cost FC SAN can be provided by IP SAN. It is only a matter of time before FC SAN is finally replaced by IP SAN." He, however, added that FC SAN usually could provide a more reliable storage network than IP SAN and that most of the mission-critical storage is FC SAN in the rich-media field.

Another question for many broadcasters is whether existing storage systems in video infrastructure can easily adapt to IP SAN.

"The answer is a mix of hardware and software capabilities and best practices in designing the infrastructure. For the most part, it also has to do with the users' performance requirements and the number of



users," said Grossman. Cheng asserted that if the existing storage could support iSCSI, it could be adapted to IP SAN easily.

Of late, the importance of IP SAN software is becoming apparent.

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— ALEX GROSSMAN, CEO, SYMPLY

"Software and hardware need to work in unison. The software and its feature set are key," Grossman said, "to smooth-running SAN operations and handling problems when they crop up." Knowing what is hap-

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can be used



AS ONE DDP



with linear scaling in capacity and bandwidth

Without changes at the front and any DDP can be expanded at the back and both with capacity and bandwidth

Without changes at the front and DDPs can be added here, there and elsewhere for linear scaling both in capacity and bandwidth

load balancing, SSD caching, mirroring

PROJECTS ALWAYS MATCH CAPACITY

No unused capacity
No shrinking/expanding necessary due to folder volumes



FOLDER VOLUMES ACCESS CONTROL

Groups/users access control:
none, r/w, ro, wo and r/w
no delete via integrated Workflow Manager



SMB ACCESS

DDP volumes and folder volumes can be accessed via SMB



BACKUP ARCHIVE, SYNCHRONIZE

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“ISCSI STORAGE, AN IP-SAN-BASED SOLUTION, REPRESENTS THE BEST OF BOTH WORLDS FROM ONE BOX AND ON ONE ETHERNET NETWORK. IT ALLOWS FULL PROJECT AND FILE-LEVEL-BASED SHARING USING NEARLY 100% OF THE AVAILABLE ETHERNET BANDWIDTH.”

— ELVIN JASAREVIĆ, TECHNICAL DIRECTOR (ASIA & PACIFIC), ARDIS TECHNOLOGIES

pening in the SAN and how to work around it and ultimately fix it is the key. Reliability is usually driven by the software, he added.

Cheng said that the software was critical owing to the adoption of IP storage solutions, off late, in midsize and even small organisations replacing DAS and supporting Windows-based business applications.

The iSCSI protocol has emerged as a popular alternative to FC for block-based SAN. Over the past five years, the adoption of iSCSI in production systems, in companies of all sizes and industries, has grown dramatically. AVFS uses the iSCSI protocol instead of FC to accelerate data access. Unlike an FC SAN, AVFS works over Ethernet infrastructure carrying SCSI commands over the IP network, allowing data transfers over intranets and over long distances, said Jasarević. “iSCSI can leverage existing network infrastructure to provide block-level storage access. It provides an easy way to adapt to IP-SAN storage,” Cheng added.

HYBRID FUTURE

Although most IP SAN deployments have been traditionally to replace legacy DAS, the trend in the recent past has seen IP SAN replacing first-generation FC SAN. Cheng concurred. “Legacy SAN is approaching the end of its lifecycle. The customer needs a more cost-effective solution requiring less admin support. The applications do not need the additional bandwidth of an upgraded FC SAN solution.”

“It’s really a process,” said Grossman, “that happens over time as more people in the industry begin to feel more familiar with the technology and have better results with it. Today, while many vendors offer products, not many are true end-to-end solutions. Even with the shrinking number of switch vendors, the FC SAN ecosystem delivers better overall consistency from installation to installation as the variables in IP-based SAN are greater.”

Often, people will be forced to use very high-end components to get the best and most consistent results, he said. “Moreover, hybrid or converged systems that offer FC and IP NAS often provide a better experience than pure IP SAN. The hybrid solution gives the user high throughput low latency fibre connections where needed and low-cost 1 and 10GbE connectivity for most of its users.”

Said Jasarević, “iSCSI storage, which is an IP-SAN-based solution, represents the best of both worlds from one box and on one Ethernet network. It allows full project and file-level-based sharing using nearly 100% of the available Ethernet bandwidth.”

As opposed to most of the NAS systems, IP SAN is ideal for post production and broadcast as iSCSI storage drives behave in the same way as local drives with an inherent lack of latency. The jury may still be out on IP SAN but it looks like it’s here to stay. ■



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