

Case Study

Aspen 82

Video SMB Elevates Business to New Heights With NAS

Company

Aspen 82

Location

Aspen, Colorado USA

Contact

www.aspen82.com/

Industry

Video production and live television station

At an elevation of nearly 8,000 feet and just across the highway from the famous ski town's single-strip airport, the modest TV production space of **Aspen 82** sits on the floor of a lush valley, bounded by steep hills nestled within a range of snow-capped crags. From the air, Aspen appears impossibly, almost claustrophobically, dwarfed by the Rocky Mountains, an isolated speck of civilization left to fend for itself. This is a fair metaphor for Aspen 82's storage predicament. In a world of towering bandwidth and capacity demands, the little video company—Aspen's only 24x7 TV station—has made do. Like so many other growing businesses around the world, when Aspen 82 needed more storage, it bought another drive. Eventually, the company could boast three small network attached storage (NAS) enclosures and a stack of USB and FireWire drives tall enough to reach the studio's ceiling.

Unfortunately, non-strategy would prove unsustainable for Aspen 82. The video industry has already moved into HD, and 4K is coming up fast. To get the kinds of glossy sports footage people expect from a renowned skiing destination, crews sometimes capture footage at up to 900 frames per second. Aspen may have a population of less than 7,000, but with workloads ranging from a 30-second commercial to two-hour concert videos shot from six cameras,



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Aspen 82's production needs are anything but small-town. With having to capture, edit, manage, and archive ever more terabytes of footage, content was an avalanche slowly burying the little company.

The Real Problems

"As time goes on, we want to keep these projects available for revisiting," said Joel Lee, director of production at Aspen 82. "Year after year, people come in, and they have changes from last year's ad, or they have a new event that they want use old footage from. We have to keep all the stuff somewhere. That's why storage is big for us."

But capacity was only half of Aspen 82's battle. The other crunch came during editing. Aspen 82 had no centralized storage system or, truth be told, even a reliable way of tracking all video assets across its Matterhorn of drives. When the right file was found, staff would transfer it onto one of the small NAS boxes and from there bring it back onto one of the studio's eight editing systems. Because the NAS products were so slow, these transfers were generally started at the end of the day and left to run overnight. In some cases, editors might move the files from NAS to a portable USB drive and walk it across the studio.

These transfers proved necessary since the NAS products were too slow to allow real-time editing. Naturally, all of these delays and added steps added up to countless days of lost productivity. They also contributed to having multiple versions of files floating around the office, which sometimes created a whole new set of woes.

From multiple files, it's only a short jump to multiple drives and the inevitable storage sprawl so common with SMBs.

"We always assumed that a 'serious' storage solution was way too much of a financial leap for us to jump into," said Aspen 82 co-owner Spencer McKnight. "It's much easier to keep on buying drives and make sure we manage the files better. Of course, that never really happens with all the editors having so much going on. You buy the drives and then...stuff happens."

Not least of all, the difficulty of managing assets inevitably led to compromises and sacrifices in the quality of Aspen 82's final products.

"We might get an edit job for a client and assign multiple editors to it," said Lee. "Each editor would have a different piece of this editing puzzle, and the big problem was trying to find all the right pieces. A lot of times, we wouldn't even talk to the other people. We would just put this job together, look at it later, and say, 'Oh, I had much better powder footage than that. I wish I would have

known! I would have dropped it on to a hard drive and walked it the 30 feet to the other editor."

In short, Aspen 82 faced four critical problems:

1. Storage capacity pushed the edge of available capacity.
2. Existing storage architecture made editing a painful, inefficient process.
3. The first two factors led to asset sprawl, with archived content spread across too many drives, often becoming lost.
4. Amidst this storage chaos, Aspen 82 faced outsized risk of disaster. Joel Lee noted how a similarly disorganized studio in Vail, Colorado, flooded and wiped out all 10 TB of the company's video assets—thousands of hours of work. Aspen 82 knew of this but had no plan to mitigate the risk in its own operations.

Aspen 82 co-owner Spencer McKnight noted how an internal drive failed in his editing computer three years ago. Because the group didn't have effective backup and storage management procedures in place, he had several gigabytes of video on that drive that didn't exist anywhere else. Since then, he's had to turn away at least ten clients wanting to reuse pieces of that content in new jobs and inform them that the material was simply gone.

"Most of what we film is irreplaceable," said Lee. "It's one-time events. It's certain things that never happen again, so if we lose it, we lose customers. We lose reputation. We lose our business."

DAS, NAS, and Cloud

While Aspen 82's predicament might appear to be something of a slushy mess, the company's approach to storage is frighteningly common among SMBs. No one sets out to have a "slow sprawl" problem, but most smaller businesses, particularly those staffed by creative professionals, are filled with craftspeople and technicians, not experienced IT staff. Budgets are tight, and storage planning generally looks forward in terms of weeks, not years.

As a result, SMBs often evolve their storage infrastructure with little to no centralization. In the absence of proper planning, storage throughput and overall performance also lags, leading to workflow inefficiencies. Not least of all, data protection is usually inadequate. When any given drive fails, too many businesses are likely to experience permanent data loss since automated, organized backup procedures are not in place.

As you can see, Aspen 82 had two common storage technologies in place: direct-attached storage (DAS, such as

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USB drives) and network-attached storage (NAS, its three underpowered enclosures. Consumer-grade DAS offers fairly low performance in the context of video production—generally in the 100 to 125 MB/s range for USB 3.0. Interestingly, this is also about where many low-end NAS products will top out, which is why Aspen 82 has such trouble juggling multiple multi-gigabyte source files during editing. There was no feasible way to pull and push the necessary files across the network from their NAS in real-time.

Aspen 82's case excepted, NAS generally does offer some significant advantages over DAS. First and perhaps foremost, all NAS enclosures capable of holding at least four drives will support RAID protection through mirroring (at least one drive contains a complete copy of another drive) or parity striping (wherein all active drives in the RAID set contain redundant data from the other drives such that the contents of a failed drive can be reproduced). The object of protective RAID is to anticipate inevitable drive failure and give owners time to replace the stricken unit without permanent loss of data and little to no storage downtime for the organization. With Aspen 82, a single drive failure might not have meant the loss of a full video since the raw files would still be back in the archive, but it might well mean the loss of a day or two of editing work on that footage.

Storage management software also has the ability to “pool” NAS resources. For example, if a business has two four-bay NAS boxes, each fully stuffed with 4 TB drives configured as RAID 5, that leaves an accessible capacity of roughly 12 TB per enclosure. Pooling would allow a storage administrator to conjoin both of these arrays into a single 24 TB logical volume. In many cases, this approach can offer an easy fix to maxed out drive capacities.

Mid-range and higher-end NAS solutions may also offer 10 gigabit Ethernet (GbE) connectivity. Of course, a business would need to have a 10 GbE switch and supporting infrastructure to make the most of this feature, but in cases where many drives are collectively contributing their throughput toward high-speed performance, you don't want to let conventional gigabit pipelines become a bottleneck. A 10 GbE channel can generally supply a sustained transfer rate of 1.2 GB/s, enough to accommodate roughly the combined throughput of a dozen hard drives. This becomes significant when discussing the editing of 4K and/or high dynamic range (HDR) video content.

Many businesses perceive an advantage with DAS in regard to both price and complexity. Without question, DAS is cheaper, at least in terms of up-front costs. Whether these savings pan out over the long-term after figuring in drive failure odds, total productivity, potential data loss, and other factors should be

the subject of close scrutiny. As for complexity, it's true that NAS is more likely to require more configuration and ongoing maintenance than DAS. With more drives and more functionality come more details to manage. However, manufacturers have come a long way with making the SMB NAS setup experience much more like the plug-and-play operation of a DAS device. NAS solutions may come pre-configured and tested from the manufacturer, and users may face little more than running through a quick wizard procedure. The product category has evolved, and worries that were once justified may no longer apply.

“Oftentimes, SMB storage purchases boil down to a simple price decision, getting the most capacity for the dollar,” said Brett Hesterberg, a storage product line manager with Netgear who supervised the Aspen 82 deployment. “The reality is the technology has evolved a great deal over the past couple of years, and some of the advanced functionalities that were previously reserved for enterprise businesses, features maybe offered by EMC or NetApp, some of those enterprise-level tools are now available at SMB prices with only SMB complexity.”

“There is no such thing as a vanilla drive,” adds Joni Clark, NAS segment manager for Seagate. “Each drive is precision engineered to address our customer's usage models. With the new Enterprise NAS HDDs, it's about delivering NAS-optimized performance, only with enterprise-class reliability at a fair price for businesses just like Aspen82.”

The drives selected to run inside the NAS do matter. Desktop-grade drives are designed for sporadic use throughout a limited workday window. Enterprise-grade drives, such as Seagate's Enterprise NAS and Capacity HDDs, are built for much more demanding workloads. Multiple business users may be accessing storage simultaneously for extended periods around the clock. Said differently, it's not only the size or speed, it's about sustaining endurance and reliability under aggressive workloads. Desktop and laptop drives do not meet the same levels of performance on these fronts, and their markedly shorter warranties reflect this. Nearly all DAS products integrate desktop drives in order to keep prices lower. NAS solutions typically ship empty, and buyers must then purchase drives. To save money, they often choose desktop models. Businesses with an eye toward protecting their key assets and spending as little time as possible on drive replacement would be wise to opt for enterprise-grade.

Of course, not even the highest-grade hard drives can withstand a flood. Disaster does strike. This is why offsite replication, at least of the most important data, is essential for any responsibly run business. In years past, this would entail periodically

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creating full backups of the system, then moving the backup to a physically remote location. While this is still an option, most SMBs now turn to secure, cloud-based storage services, such as Seagate’s EVault Cloud back up. Aspen 82 is now weighing whether to opt for cloud backup, a second NAS device located off-site, or perhaps both as the next phase in their storage overhaul.

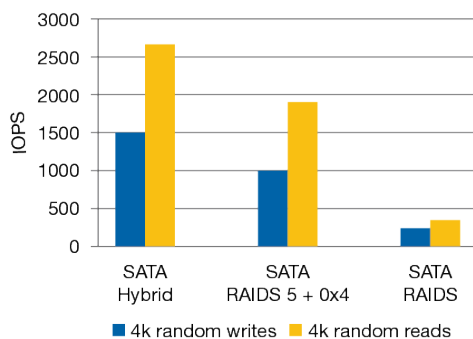
Meet “The Brain”

If change is a response to pain, then the owners at Aspen 82 decided they’d suffered enough. They decided to bring in Netgear’s ReadyDATA 5200, a 12-bay, 2U rackmount NAS running a quad-core Intel Xeon processor and 16 GB of ECC memory. Netgear filled the unit with ten 6 TB Seagate Enterprise NAS HDDs as well as two 200 GB Seagate 1200 SSDs for front-side data caching. Without digging too much into mechanics, SSD caching allows a storage solution to keep the most commonly used data resident in ultra-fast flash memory, which offers far higher performance than any hard drive can match. However, a hybrid solution, such as that used by Aspen 82’s ReadyDATA, offers the best of both worlds: dozens of terabytes of affordable, enterprise-class disk storage plus enough SSD storage to accelerate the majority of NAS operations.

With 60 TB of raw capacity, Aspen 82 had far more storage space than needed for the near future. The company opted to use that extra capacity for protection. Netgear set up the NAS with RAID 5+0 (or just RAID 50), putting half of the drives into a RAID 5, then using the other half to clone the first half. If anything should happen to the first RAID 5, the second is immediately available to slip into its place, leaving Aspen 82 double-protected within the enclosure and facing almost zero chance of downtime or data loss.

Random Read and Write Performance on a Hybrid Volume

The following figure shows that a hybrid volume improves the random performance for both read and write operations.



“Beyond protection, it’s important to know that ReadyDATA works at the block level, which means that if you’re working on an hour-long video file, and only make changes to a few minutes of it, ReadyDATA is going to respond better to looking at the changes within the file as opposed to just the changes in the entire file,” said Netgear’s Hesterberg. “From a pure performance and video management standpoint, ReadyDATA would be the higher-end solution, but also the best bet for high end video editing.”

Almost immediately, the crew at Aspen 82 decided to call their new ReadyDATA “The Brain” since it quickly became the central hub of all their storage activity—as intended. Joel Lee noted that his group didn’t know what to expect upon unboxing the device. The company had prepared to take an entire day off for installation, configuration, troubleshooting, and all of the usual headaches that accompany a major technology overhaul.

“We had everybody on alert that this was going to happen on deployment day,” said Lee. “But we were amazed. Once we put it in the rack and plugged it in, there were only a couple of instructions to follow. We were up and running in no time, like one hour. Honestly, we were just confused about what we were supposed to do with the rest of our day.”

Aspen 82 required no training. The ReadyDATA simply appeared on the network like any of their old consumer-class NAS boxes, all set for mapping and accessing like any local drive. In fact, users reported that it felt like they were using a local drive. The lag and delay of their old NAS products was gone—and that was with only using the first of the ReadyDATA’s two gigabit Ethernet ports. Aspen 82’s next step will be to bring the second port into play once the studio swings into high season and has all ten editing stations blazing. As content resolution increases and the crew needs even more bandwidth, the ReadyDATA 5200 stands ready with a 10 GbE port able to magnify throughput by another 5x.

An hour after unboxing, all Aspen 82 had left to do was decide how to set up folders and organize files. The group was up, running, and ready to start using The Brain for managing a concert performance project the next day.

Of course, there’s always an epilogue to a major upgrade. In the process of revisiting its spire of old hard drives, Aspen 82 frequently found that it had multiple copies of footage spread over multiple drives. The company didn’t want to burn at least 10 TB in The Brain storing duplicate files, so it set to work going through each external drive individually, a understandably arduous process that continues even as of this writing. But, according to Joel Lee, when they’re done, Aspen 82 will have finally achieved a level of organization and productivity that’s been anticipated for over a decade.

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“In the past, we skimmed on price with the drives we used,” added Aspen 82’s McKnight. “When they don’t work, the frustration level and the unknowns about whether your files are lost forever, it’s... I mean, you can’t do that as a business. You just can’t work that way. But now we’ve done it right—the right drives in the right box with the right cloud backup. This has given us peace of mind that we’ve never had before.”

The Realities of ROI

Part of Aspen 82’s fears were not wholly unfounded. A proper, scalable NAS solution will cost thousands of dollars, and that’s no small thing for a small business. But according to Netgear’s Brett Hesterberg, the question becomes much like pondering insurance.

“It’s about how much you’re thinking about the long-term versus the short-term,” he said. “You start putting dollars behind the number of hours that go into your work. Then you start putting dollar figures against those hours. Suddenly, it becomes pretty easy from an ROI standpoint to make a case that investing a little bit more money up front in keeping the data safe when it gets on the box but also keeping it in multiple places for redundant protection makes a lot of sense.”

The part of the Vail flood story that Aspen 82 doesn’t like to recall was that the Vail studio had to send its ruined storage to a recovery company in California. The final bill for rescuing all of their data ended up being \$20,000. Aspen 82’s McKnight had to concede that whatever a full-blown, enterprise-grade NAS solution might cost, it had to be a lot less than that.

There’s much more to storage ROI, though. It’s not just about the cost of lost data. Companies must also consider the cost of lost business. We noted above how a case of drive failure cost Aspen 82 in both revenue and customer confidence over a span of years. But, from a performance standpoint, many companies encounter the problem of having to turn new jobs away because their workflow is too inefficient to handle the load. When an editing job consumes two days when it should only take one, for reasons spanning from data throughput speed to locating misplaced files, eventually those delays accumulate and begin to force new opportunities off of the project calendar.

The right NAS running the right drives means fewer failures, less time lost on replacements, fewer delays, and higher productivity. Good NAS is easy to manage, and its price is inevitably far less than the value it provides. As Aspen 82 discovered, SMB fears over business-class storage are often misinformed and outdated.

“Honestly,” said Joel Lee, “I didn’t think it would be this easy. I don’t have a good reason for why we waited so long. We really dodged a bullet by not getting hurt a lot worse when our risk was so high. We got lucky. But now we don’t need luck anymore.”

“Once we put it in the rack and plugged it in, there were only a couple of instructions to follow. We were up and running in no time.”

Joel Lee
Director of Production
Aspen 82

Solution Specifics

Netgear’s ReadyDATA 5200, a 12-bay, 2U rackmount NAS running a quad-core Intel Xeon processor and 16GB of ECC memory.

Two 200GB Seagate 1200 SSDs with SAS 12Gb/s interface for very fast front-side data caching. Designed for storage arrays with complex, write-intensive workloads typical of multi-user, 24x7 usage environments.

Ten 6TB Seagate Enterprise NAS HDDs with 5-year limited warranty, RV sensors and SATA 6Gb/s interface, for a total of 60TB of storage for video projects.

To Learn More:

For more information on the Seagate NAS portfolio, visit <http://www.seagate.com/products/network-attached-storage/nas-drives/>

For more information on Seagate solid state drives, visit <http://www.seagate.com/products/solid-state-flash-storage/ssd/>

For more information on Netgear ReadyNAS and ReadyDATA solutions, visit <http://www.netgear.com/business/products/storage/>

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