



***Videography***  
**Facilis Technology's Storage Building Blocks**  
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Facilis Technology has been in the business of developing shared storage products for just a few short years, but in that time, its TerraBlock systems have earned the respect of small, medium and large media facilities alike. When companies consider shared storage solutions, Facilis Technology is offered as an option on par with Avid Unity and Apple Xsan.

**SAN Basics**

SANs (storage area networks) are a common choice for facilities implementing shared media storage. A typical SAN consists of storage arrays, host adapter cards, servers, a hardware switch and SAN software. Storage hardware comprises multiple sets of hard drive arrays that are configured into various RAID (redundant array of independent drives) structures depending on the level of data protection (redundancy) and throughput required.

The two most common RAID schemes are RAID-1 (mirroring) and RAID-5 (striped set with distributed parity blocks). The mirroring method cuts your available storage in half because all of the data is duplicated exactly on two or more disks. RAID-1 is useful for setups where data integrity is more important than using the disks' maximum storage capacity. RAID-5 is somewhat less secure than mirroring, but you gain a lot more useable storage space because RAID-5 allocates a smaller portion of the array for parity data needed to rebuild missing data in the case of a drive failure. RAID-5 is dependent on the RAID controller for its integrity because the controller is the component that actually performs the rebuild. All of the drives share portions of the media data, so the SAN software uses the parity data to rebuild the missing pieces after a defective drive is replaced with a new, raw drive. TerraBlock performs its rebuilds in software for greater flexibility.

Most modern SANs move media files between the editing computer (network client) and storage arrays over Fibre Channel instead of SCSI or Ethernet, so each computer needs a PCI, PCI-X or PCIe Fibre Channel host adapter card. The systems are connected by cables (typically fiber optic cable, though twisted-pair copper wire may also be used) and the signal is routed through a hardware switch that controls the data flow and throughput of the system to avoid data collisions. Finally, SANs include a separate server (connected via Ethernet to the clients) to run the applications that administer the network and control user permissions, profiles, etc.

The server is supposed to prevent any impact on the entire network in the event that a single client computer should crash. SANs often run a unique internal file structure that can offer either file- or volume-level control, so there is no guarantee that a SAN is inherently cross-platform. In the case of Apple's Xsan, incorporating PCs into the

network mix requires the addition of third-party products, such as those from ADIC. Facilis uses volume-level control, which requires no integration with third-party software.

### **Simplification Plus Performance**

Installing a storage network can be a complex process that falls outside the budget and comfort zone of facilities without an experienced IT department. Facilis Technology has simplified the process of installing a networked storage architecture by offering direct-connection TerraBlock systems, which provide the Fibre Channel switch, server and storage in a single, integrated, rack-mounted unit. Metadata and media data both pass over the single Fibre Channel cable between a client and the TerraBlock. The actual storage arrays come in various configurations, typically ranging from 2TB to 18TB, but since they offer extremely high performance (as much as 600MB/s per server), TerraBlock units can also be used in lieu of local storage for such high-bandwidth environments as digital intermediate post for film. In fact, AJA Video and Assimilate have qualified TerraBlock storage for use with AJA Kona 3, AJA Xena and Assimilate Scratch. To translate these specs into performance terms, Facilis Technology's Web site shows a TerraBlock 24D system handling 60 streams of DV25, 16 streams of 8-bit uncompressed SD, 20 streams of DVCPRO HD, four streams of uncompressed 1080/30i or two streams of 4:4:4 1080/30i.

### **TerraBlock 2.0**

The key to a good SAN is its software, which the SAN administrator uses to create volumes and establish user profiles with specific read/write permissions. This year, Facilis Technology released version 2.0 with new features, such as Dyna-RAID and Tandem Volume Spanning. Dyna-RAID lets the administrator dynamically change the data protection structure-such as from mirrored to RAID-5 or to unprotected-on a volume-by-volume basis.

James McKenna, Facilis Technology vice president, explains, "We're unique in that there is no drive formatting internal to the TerraBlock. No striping or RAID building time whatsoever. When you create a virtual volume, though, you do have to format. The native file systems of NTFS, Mac OS Extended, FAT32, etc., are as cross-platform as the OS lets them be. To add a virtual volume, you simply create one of any size in the Manager application, then assign it to any user or multiple users. There's normally a chunk of leftover space within which to allocate new volumes, or, if you need to, simply delete an older volume (or delete protection without losing data) to free up space. It's a one-minute process start to finish, including formatting."

Volumes can correspond to users, rooms or projects; there is a system limit of 256 volumes. Tandem Volume Spanning, introduced in TerraBlock 2.0, is a volume spanning architecture that uses a combination of servers in a virtual pool of storage to meet the high bandwidth requirements of multiple 2K and HD players. It permits facilities to connect up to four TerraBlock systems and configure them so they appear as a single drive to client systems. Tandem Volume Spanning allows a TerraBlock network to distribute bandwidth of more than 2GB/s, ideal for collaborative 2K DPX film work, multi-stream 1080i 4:4:4 video, or color correction workflows with 4K 24fps film playback.

### **Users**

There are no typical TerraBlock users, since these systems can be found in both large and small installations. One example is AlphaDogs, a Burbank post house that handles

commercials, feature films and a variety of television shows, including SD and HD reality shows for Discovery.

The company recently updated and expanded its systems to provide a greater range of HD services to its clients. While deciding how to reconfigure their storage infrastructure for a more streamlined workflow, the AlphaDogs team had several key requirements. The ideal solution had to work seamlessly across platforms, attach compatibly to their Avid and Apple workstations and have low administrative upkeep. Most importantly, the AlphaDogs team wanted an affordable system.

According to founder and president Terence Curren, "We looked at both the Avid Unity and Apple Xsan solutions, but neither fit our facility needs. Unity is great but costly, and there have been some issues with Pro Tools connectivity for some users. Xsan takes too much IT support. It just isn't the typical Apple plug-and-play product. Our facility was already wired for Fibre Channel so we could connect our edit suites to their local arrays, which we placed in the machine room. Fibre Channel allowed us to use a patch bay to mix and match rooms and drives.

"Adding TerraBlock was an easy decision and an easier installation. I can teach someone how to run it in five minutes. TerraBlock's volume-based sharing is ideal for our operation, since we typically don't have multiple editors working simultaneously on the same project. Instead, our workflow usually involves capturing on the Avid Media Composer Adrenaline and then accessing that media from the TerraBlock in our Avid Symphony suites for finishing. For feature work, the 4Gb/s bandwidth allows us to handle uncompressed 10-bit HD to maintain quality. Some of these projects end up going to film, so that resolution is important."

AlphaDogs' mix of connected client systems includes Digidesign Pro Tools, graphics workstations and Apple Final Cut Pro high-definition edit suites, as well as Avid Symphony Nitris, Media Composer Adrenaline HD and Symphony Meridien suites. All told, AlphaDogs hosts 10 seats of mixed Mac and PC clients connected to a 9TB TerraBlock unit configured as RAID-5. A TerraBlock system can be connected using 2Gb/s or 4Gb/s Fibre Channel, and AlphaDogs uses both. The company's Final Cut and Symphony Nitris high-definition suites are connected using the 4Gb/s pipes, since these are the most likely to work with uncompressed HD.

At the other end of the spectrum is Orange TV, a television operation owned by the Orange County government in Orlando, Fla. Orange TV operates two channels that produce about 30 half-hour episodes of original content each month, including Orange TV (meetings and county-related programming) and Vision (arts and entertainment). Additionally, Orange TV is an important component in the county's emergency management services. This is especially true during hurricane season, when Orange TV's cameras provide the television pool feed for emergency announcements and press conferences. To better support this mission-critical role, Orange TV was able to upgrade to new facilities with expanded hardware that includes Facilis Technology TerraBlock storage. Profile East, an Orlando and Ft. Lauderdale systems integrator that has sold and installed about 25 TerraBlock systems in Florida, handled this installation.

Michael Seif, operations manager for Orange TV, took me on a tour. "We are an all-Final Cut facility and have ten edit bays connected to two of the TerraBlock 24D units. They are all connected using 4Gb/s Fibre, plus we have the option of combining the two units

with Tandem," Seif explains. "We mainly cut our projects at DV25, so our editors have yet to do anything that would max out the bandwidth. This means that at various times they are hitting up to ten streams of DV in any of the rooms without any issues. We have entered into an agreement with the local PBS affiliate and will be contributing programming to one of their digital channels, WMFE-CFAN, so HD is definitely in our future. One of our bays is set up to do HD, so it includes an AJA Kona LHe card and a redundant high-performance Rorke Galaxy array as local storage, in addition to its TerraBlock connection. Occasionally we work on some greenscreen projects, and by capturing uncompressed, we get a much higher quality key than we could using DV. We can also use the Kona to capture an uncompressed 10-bit signal to the TerraBlock, and this footage can then be accessed by producers in any of the suites."

"Even though we are using Macs, TerraBlock is cross-platform, so I can administer the system from the PC on my desk. We could have purchased any SAN option on the market or even have had the county's IT department build us a SAN, but TerraBlock made the most sense for us because it isn't IT-centric. Our folks are editors and producers, so by going with a Mac environment, we remain an island outside of the county's IT structure, which is best for our needs. TerraBlock fits neatly into that mix. "Like most Final Cut facilities, we used a lot of FireWire drives. The SAN has eliminated all the sneaker-netting that we used to do, so it's been a real timesaver. Our systems are also connected using a second Ethernet LAN that communicates with the server part of the TerraBlock. To that we have connected 600GB of local storage left over from before, which is used to store common files, like stock music and graphics. These two networks-the SAN and the Ethernet network-give us maximum flexibility. Our studio feeds are recorded to a Thomson Grass Valley M-series recorder. This is a network-connected device, so our studio shows can be pulled across the network into the TerraBlock in a totally tapeless workflow. File-based post with shared storage has really improved the efficiency of our operation."