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Security and Surveillance Product Information for Architects and Engineers

## Video Storage in the Era of HD/Megapixel

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Migration from analog to digital content derived from megapixel cameras; higher quality footage; and longer retention rates – these are some of the most common demands of today's video surveillance applications. This reality, whether driven by compliance regulations or corporate mandates, is driving the convergence of security and information technology (IT) teams to meet these requirements. What's the best way to meet these challenges? Some prefer a multi-vendor, best-of-breed solution, while others prefer a purpose-built system solution from one main vendor. In this installment of Pelco Consultant, we consider the merits of each approach.

### New Requirements to Support 24/7 Video Surveillance Applications

IP video surveillance applications consume significant storage. Capacity requirements are projected to increase as camera technology continues to move toward higher and higher resolutions and resulting bit-rates. With capacities typically measured in petabytes instead of gigabytes, protecting the recorded footage in a RAID array is paramount. A cost-effective surveillance storage system needs to support different types and sizes of cameras, provide significantly more writes versus reads of data, and offer enterprise-class data protection.

### Shift from Read/Write to Write/Read Based Systems

Approximately 95% of video surveillance I/O operations are write-based; however, most enterprise-class storage systems are designed to support faster read access, and write times are often compromised due to data protection considerations. Streaming video, unfortunately, does not tolerate response latencies, and a delayed write operation may result in loss of invaluable video footage. The RAID controller must accommodate high throughput and provide the flexibility to tune the throughput to writes or reads.

### Protect Data and Avoid Drive Failure at any Costs

Video surveillance data is a one-time event that cannot be duplicated. This data can be required for investigations and generating evidence; therefore, protecting it is critical. Hard disk drives can fail due to heat, vibration, drive quality, specified bit-error rates, or even drive theft. Today's large capacity 1TB and 2TB drives make it likely that a write error will be encountered before the drive is full. How systems deal with these errors is vital for long-term dependability, so use of an intelligent RAID controller that can recover from these bad sectors on a drive improves the reliability of the video storage system.

### Considering the Best-of-Breed Approach

Some customers prefer the flexibility of a software-only video management solution. Potentially, these solutions allow customers to select from a wide variety of IP cameras as well as their choice of data servers for video storage. Often, such a customer seeks to use commercial off-the-shelf (COTS) data servers from a large national manufacturer.

## The Growth of Video Data

### An Example:

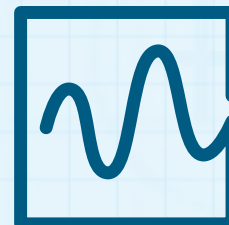
A 640x480 resolution image at 15IPS produces roughly 4Mbps of bit-rate that needs to be stored. Simple multiplication yields the following result:

$$\begin{aligned} &4\text{Mbps} * 60 \text{ sec/min} \\ &*60 \text{ min/hr} *24 \text{ hr/day} * \\ &7 \text{ days} * 1/8 \text{ byte/bit} \\ &= 302\text{GB}. \end{aligned}$$

In this scenario, each camera will require 302GB of storage to meet retention requirements. When you add the storage requirements for

**100** cameras,  
the total capacity  
needed becomes

**30.20TB**



## About RAID

Selecting the right RAID level to support 24/7 operation is also key, as array uptime should be maximized.

Pelco chose to move to RAID 6 and provide double parity protection, giving administrators ample time to replace failed hard disk drives before data is compromised. The array can automatically rebuild in the background using a new drive that makes maintenance for failed drives transparent.

The NSM5200 maintains the performance of the system under a rebuild condition – something that is crucial, as a facility typically does not tolerate any downtime for service and repair. With the NSM5200, Pelco customers are guaranteed the same performance levels regardless of the health of the system.



The apparent low cost of COTS storage can be very appealing, particularly if the video system will have large storage requirements. But let's weigh this option against the considerations delineated above. First and foremost, is the storage built for the extreme rigors of mission-critical, full-motion video? Most COTS storage solutions are designed and built for data – and not for real-time video.

Economical, commoditized storage may make off-the-shelf solutions seem a wise choice. But the price tag on such storage does not include all of the costs of a true system. Software licenses, service agreements and related fees all have to be added in. How much are you paying now? Weighing the importance of business risk, what's the cost of losing video or the cost of not responding to an emergency that the video system missed?

Even if the storage is the best available off-the-shelf, there are still network issues. A large existing storage farm is very likely to be centralized and not distributed. All video traffic has to be crammed onto the backbone, crowding its way back to the central storage facility, leading to bottlenecks, delays, and losses, in both video and data. What's more, scaling a server farm as storage needs increase can be very expensive.

By assembling a multi-party, "best-of-breed" solution, customers are increasing the complexity they'll face when dealing with any problems or issues in their system. This may be an issue for customers without sufficient in-house IT personnel. Imagine a design where operating system, video management system, cameras, storage hardware, switches, user interface, all come from different vendors. When something goes wrong and you can't isolate the problem, whom do you call?

Compatibility between all of these vendors is a serious consideration. While a COTS storage solution might work with the rest of your security system today, in six months or a year, when other system components have issued new software versions, you'll have to re-qualify that storage equipment to make sure it's still compatible with the rest of the system.

## Considering a Full System Solution

Because video is a specialized application with unique system demands, some customers may prefer to forego the complications of cumbersome integration, selecting instead a purpose-built video storage and management solution. Designed to meet the rigors of video storage, such systems may carry a higher upfront cost – compared to COTS storage – but with guaranteed performance and easier management, they can deliver superior performance and significantly lower cost of ownership and operation over the life of a system.

One such purpose-built storage system is the Endura NSM5200 from Pelco. The NSM5200 integrates the functions traditionally spread across three disparate servers – NVR functionality, storage, and storage pool manager – into one cost-effective and energy efficient unit.

*For more information on these or any consulting or specification issue, please contact Pelco A&E Business Development Manager, Don Tennyson at: [dtennyson@pelco.com](mailto:dtennyson@pelco.com)*