

“I Spy ...”

The Benefits of Using Digital Video Surveillance

By David Evancho, Managing Editor
Larstan Business Reports

A customer on crutches threatens a grocery store manager with a million-dollar lawsuit, contending that he fell on the store's premises 35 days earlier. He is certain that the store's video surveillance system is an antiquated, analog-based system that keeps tapes for only up to a month, so the grocer won't have pictorial proof to dispute an older claim. He's hoping for a quick settlement based on lack of visual proof, but he's made a bad decision — the store recently implemented digital video surveillance which provides high quality images that can be accessed immediately and retained indefinitely. The store can prove the customer's injury, even if real, did not take place on its premises and the only dollar loss here is from the pocket of the opportunist.

Frauds and scams such as the example above are an everyday occurrence in the retail industry. Customers boldly take items off of shelves and attempt to return those same items for a refund during a single visit. Still, by a long shot, simple pilferage remains the largest source of overall loss in retail. Perpetrators rely on and still hedge on the limitations of analog video deployments, which fall short on shelf life, searchability and image quality.

With the continued adoption of digital video surveillance (DVS) solutions, many of the traditional shortcomings of analog-based, closed circuit television (CCTV) deployments have been eliminated completely. What has fueled the accelerated growth in this space, though, is the realization that DVS "functionality" can also provide enterprise environments with a much broader set of applications and uses. Take video analytics for example: A marketing department can now better monitor promotional campaigns and make effective in-store display adjustments based on analyzing the customer foot traffic captured on camera. Overall, what traditionally resided solely in the domain of physical security or loss prevention has now entered into the domain of overall company ROI and business analytics functions.

As with any technological shift, the advent of DVS is changing organizations internally. New digital system deployments often are maintained by information technologists who treat the images as data and manage

content much as they do all other corporate data. This shift of infrastructure control from physical security departments to more centralized information technology department management is the first step to enjoying the significant advantages of DVS solutions.

Improved image quality and more effective retention are only two of the advantages of a digital video solution. Other benefits include easier remote viewing of video and remote control of cameras, plus faster search and playback of recorded footage. Other benefits over the traditional analog systems include the use of Ethernet or wireless networks to transmit video; scalable, flexible storage offerings to cost-effectively maintain large repositories of images; and integration of video surveillance applications into core business systems.

The Digital Evolution

Currently, up to 90 percent of the surveillance solutions remain partially or fully analog. Many of these are standalone and proprietary, using closed circuit televisions to feed images into VHS recorders. The VHS tapes must be replaced every few hours, and then are stored for up to a month before being reused. As VHS-based systems become obsolete and the VCRs themselves are being discontinued, users are forced into a hybrid solution using a Digital Video Recorder (DVR) to digitally record video from analog cameras. But these DVRs still fall short. While they provide higher quality recording and faster playback, they still tend to be proprietary systems with limited scalability.

Now corporations and government agencies are moving to an all-digital component scheme and managing DVS on their information systems infrastructure, making video surveillance just another application on their IT networks. Centrally controlled digital cameras will have IP addresses that can be monitored by several distinct analytical applications, enabling organizations not only to enhance existing physical security, but make more intelligent and even predictive decisions in sales, marketing and supply chain systems as well.

THE DVS Advantage

Upgrading to DVS solutions provide a significant number of advantages:

Major enhancements in image quality provide more precise identification. A completely digital system will provide the highest quality video recording and playback. Improved resolution will support advanced analytics, identity

"A primary driver is that VHS machines are not being made anymore."

— Len Johnson, Digital Media Specialist, IBM

management and access control initiatives that integrate high resolution video and biometrics with to match physical characteristics with badges and network logon IDs.

Megapixel cameras can provide two to 16 times the resolution of traditional analog cameras. Megapixel cameras can cover a larger area than analog cameras while providing superior digital zoom capabilities that show real detail instead of blurred faces.

Better analytics and remote camera control allow fewer security personnel to monitor more cameras. Instead of struggling to stay alert while scanning a dozen monitors showing nothing interesting 95 percent of the time, guards can be alerted automatically to watch cameras detecting motion in a secure area or suspicious behavior. Remote control of cameras lets security watch and control cameras all over the world instead of only cameras in the same building. Comprehensive monitoring of a facility is no longer restricted by the human attention span or coaxial camera cabling limits.

With *on-demand recording*, digital systems can be configured to record only when there is motion or some specified action, rather than recording hours of uneventful video on an endless loop. This reduces both network and storage requirements while enhancing security. For example, cameras can be programmed to record only when a door is opened, an alarm is activated, or a car enters a garage.

DVS solutions require *less manual intervention*, since there is no need for the periodic replacement of videotapes. This not only reduces time and cost, but also reduces the risk of operator error causing the loss of critical images, such as by swapping and overwriting the wrong tape.

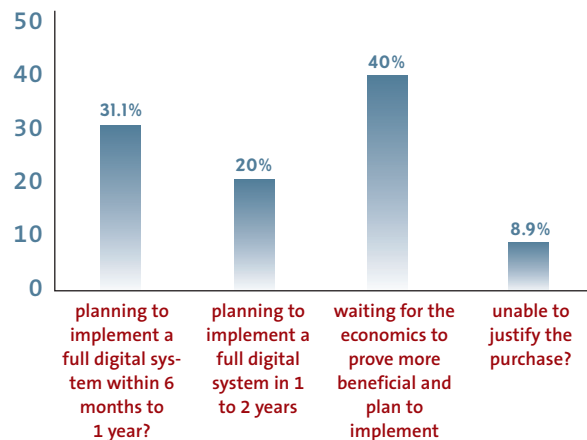
DVS solutions are built on *scalable, flexible storage*. Storage is no longer limited by the number of videotapes or disks that a company can manage. Images can be stored on traditional hard drives when necessary, and virtually otherwise. This storage structure also lends into detailed indexing that enhances search and retrieval, with quicker access to specific images.

Remote accessibility is a core benefit of a DVS solution, in that images can be accessed from any secure computer or workstation in the network, even via wireless connectivity. This enables management to respond to alarms anywhere and remotely monitor activity. It can also allow remote viewers to control functions such as a gate or electronic

lock. Normal network and application security protect access to surveillance footage in the same way they protect all other remote data.

Customers remain, however, in a wait-and-see mode regarding full implementation of DVS solutions. Figure 1 illustrates that almost one third of corporate executives and government managers surveyed in January 2007 by Larstan Business Reports plan to implement a full DVS solution within one year, but the rest are still waiting.

Figure 1: If your system is not fully digital are you



Source: Larstan Business Reports

“In first-generation video surveillance, 95 percent of recorded video is never viewed again,” according to John Kim, Senior Alliance Manager of Content Storage for Sunnyvale-based storage hardware provider Network Appliance Inc. “If something happened the video would be reviewed after the event but only if the event was noticed before the tape was recycled. A guard can watch around the corner without being around the corner, and that’s all.

“Second-generation video-surveillance can be used to reduce crime, reduce liability risk, and discourage lawsuits by detecting problems as they happen,” he further explained. “Third-generation can do all that plus improve traffic-flow, assess merchandising activities and make employees more efficient by monitoring the impact of employee training.”

The new capabilities provided by DVS are useful in conducting the primary function of video surveillance, which is watching remote or high-activity areas from a central location. They also offer important advanced capabilities not available in traditional systems.

“Information from video is being utilized for other purposes — operations, marketing, merchandising, training, and business intelligence,” according to Marty Yost, Loss Prevention Program Manager, Retail Sector Services, IBM.

Readying for More, Robust Applications

A digital video solution can take a traditional approach, such as electronically sending snapshots of an intruder or an evolving incident to law enforcement. It is also possible to authorize outside entities to log onto cameras and view activities directly. A system can generate alerts and send them directly to direct response points. This functionality, coupled with superior imagery, longer term retention and advanced indexing, dramatically improves security. Intelligent software can identify suspicious behavior such as a bag or suitcase left unattended, a vehicle parked for too long in one spot, or the difference between friendly interaction and a violent altercation.

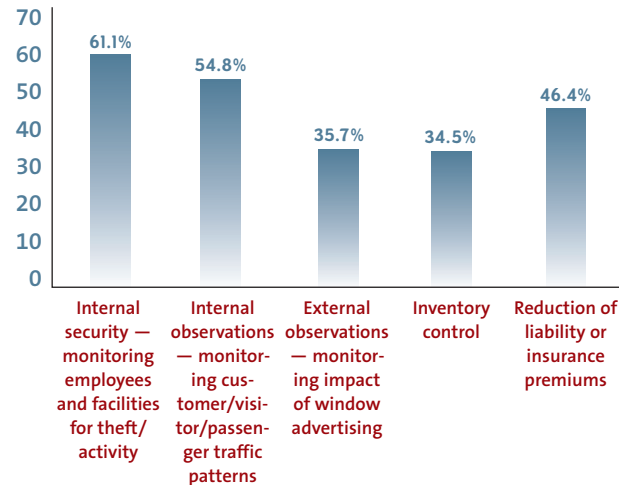
There are additional ways to leverage DVS solutions throughout an enterprise. Systems can be used to monitor customer traffic and assess the effectiveness of in-store advertising. How many customers view an advertisement? And for how long? DVS technology enables real-time assessment, as well as archived activity, which is then obtainable through normal corporate security credentials.

The same remote access that enables users to view images from multiple locations can allow for even more marketing and promotional granularity. Different stores with different displays can be analyzed concurrently, allowing supply chains to respond more quickly with added or reduced product as needed. Using DVS capability to execute various simultaneous pilot studies is a high-value marketing tool that has not been possible with conventional surveillance tools.

Multiple departments can access archival digital video on-demand to analyze past events, and make better decisions based on higher-quality images and rapid retrieval. DVS output can also benefit operations; monitoring the flow of materials and how products are handled can provide important insights into inventory control and distribution. Thus management processes can be improved, and employee training can be significantly enhanced.

Figure 2, with results culled from the same Larstan Business Report survey, clearly demonstrates that a majority of executives perceive the value of DVS beyond standard surveillance activities.

Figure 2: Excluding standard surveillance which of these functions do you think that a DVS could also perform. Check as many as apply.



Source: Larstan Business Reports

DVS Means Convergence (Not Confrontation)

Two core aspects of video surveillance change during digitization and networking. First, DVS is no longer a standalone proprietary system, but part of a broader IT-based strategy. Second, it migrates from control of the physical security staff to the information technology group. This is certainly not the first convergence of technology; however, the impact of video surveillance migration from the unquestioned control of physical security to IT will have organizational ramifications and can be an obstacle toward implementation. Resistance may come from both sides.

When IT hears the term “video,” staffers immediately think of streaming video and its corresponding huge files clogging precious network bandwidth and filling up storage at an alarming rate. Although compression and intelligent video management techniques reduce the volume, it is still substantial, based upon an organization’s corporate requirements, and requires attention and resolution. However, the bottom line for IT is that a DVS solution does add more nodes to the network, as well as additional computational and storage requirements (although not necessarily more devices), so it needs to become involved — and sooner rather than later. In most ways, DVS becomes another application enabled by the network and operationally managed by IT.

The impact on physical security will be more dramatic.

“Historically, the video surveillance guys were at the top of the pyramid. If there was a need to access the video,

everyone had to go through them. All of a sudden, they become data entry clerks for all of the DVS features and functions. Video can be viewed in real time, the role has changed,” according to Len Johnson, a digital media solutions specialist with the IBM Systems and Technology Group.

However, even physical security will benefit from DVS solutions since personnel can now respond more quickly to events as they unfold. Physical access also improves through better imaging than analog provides. Having a “better picture” provides fewer false alarms and allows security to be more efficiently deployed on site. Improved image quality can also be valuable in investigating a crime.

Most organization issues can be mitigated by having IT and security work together in building the new system. Physical security will retain a critical role in risk assessment and in deciding how video surveillance plays into the larger security environment. These are core competencies which will be enhanced, not eliminated, by implementing a full DVS solution. However, this is a story that may not resonate with all security departments.

Raising ROI Expectations

There is little argument that DVS will initially be more expensive than traditional analog systems. It requires investment in back-end systems that might include servers, increased storage and analytic software. Digital cameras can add to the expense, but digitizing video from analog cameras may be sufficient for many installations. However, the return on investment (ROI) rests not with the costs, but with the enhanced value of the data created.

“Customers are beginning to see the value of this capability, which will change the dynamic from needing surveillance because it is an industry standard or is required by the government, to wanting it because there is a business reason and business value to having the data,” IBM’s Johnson said.

A convenience store which has experienced shoplifting losses of a few hundred dollars a year cannot justify the expense of a DVS solution; however, a retail chain that escapes a single lawsuit of \$500,000 annually by investing \$1 million in a DVS solution will find the ROI very attractive. Loss prevention in retail can easily justify this expense as well. Homeland security and other government agencies that utilize the technology to identify and prevent a potentially serious event, whether in criminal investigations or terrorist activity, have an infinite return

on investment — as well as the gratitude of a nation kept out of harm’s way.

Companies applying this video data outside of security will not only increase their value and turn these images into a corporate asset, but they’ll also offer various channels for financial compensation by spreading the investment across several departments’ budgets. Marketing, for instance, may be willing to share in the overall expense if they can monitor pilot studies in product placement. The same goes for supply chain and other operational divisions.

ROI also will vary by installation. New buildings often find setting up a total digital video surveillance system to be more direct and require far less cabling than an analog one. These savings often offset the premiums paid for digital equipment. Installations that require remote video capture monitored from a central location will also provide a high return. Contrarily, a retrofit or replacement will not have these initial cost offsets. In these cases, it is fundamental to assess the corporate value of the video images to justify a DVS acquisition. The higher the value of the video, the quicker the return.

Impact of DVS on Storage

Equipment costs and operational reorientation are two important hurdles a company will face when installing a DVS system. When executive were asked what issues, beside cost, created potential obstacles to DVS implementation, increased storage requirements ranked highest (Figure 3).

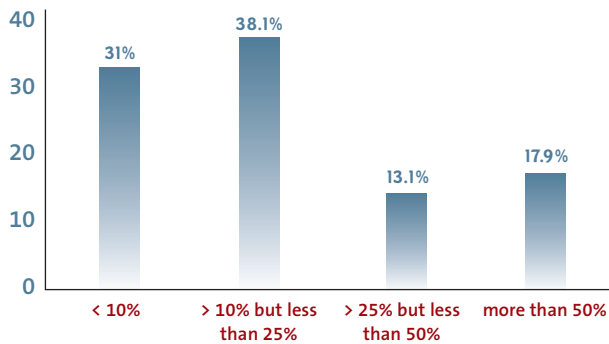
Figure 3: Excluding cost, issues that rank as an obstacle to implementing DVS (1 = low, 5 = high)



Source: Larstan Business Reports

The estimated increased demand of DVS solutions on storage certainly has cost and management ramifications, but it also provides a distinct opportunity for companies that offer storage solutions. Figure 4 suggests that maintaining the DVS video stream is expected by most managers and executives to increase their storage burden by more than 10 percent. Almost a third expect storage needs to grow by more than 25 percent.

Figure 4: DVS would increase the storage demands in your company by



Source: Larstan Business Reports

The rate at which video images accumulate will drive demand for storage that is scalable and flexible.

“DVS is just another infrastructure application — another piece of a larger IT puzzle. The technology focus is less on the front-end and more on the back-end functions of data transfer and data management and with integration with other end points of an IT system,” according to Jim Sara, Global Services Alliance Manager for IBM, a major systems integrator.

Opportunities Abound

DVS is still in its infancy but showing great potential for rapid adoption. Industry analysts at Frost and Sullivan project this market to be worth \$6.49 billion by 2012. Datamonitor estimates that market is growing at a compound annual growth rate (CAGR) of 50 percent. Anticipated key areas of growth are hardware (especially servers optimized as network video recorders), business analytical software, storage and integration.

Products that can extend the capability of DVRs through direct offline storage may provide enough additional flexibility and management for many smaller implementations with lower-value video. That brings up the issue of open systems. Video surveillance traditionally has been provided using proprietary equipment. There are

“Information from video is being utilized for other purposes — operations, marketing, merchandising, training, and business intelligence.”

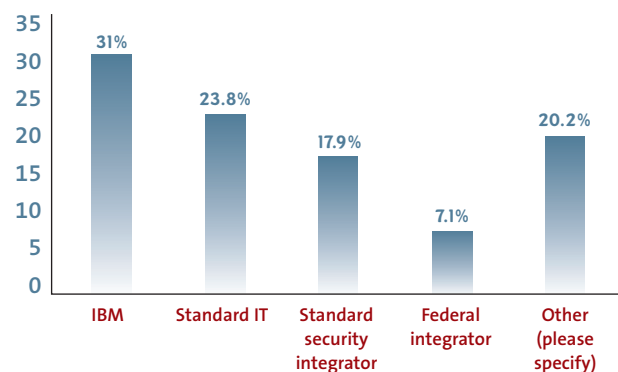
— Marty Yost, Loss Prevention Program Manager, Retail Sector Services, IBM

still products offered into the DVS market that are not fully compatible with open systems; thus, they run counter to DVS as a complete network application.

But for those that do jump in, enthusiasm is growing for the technology’s use in intelligent analytics, sometimes referred to as Business Intelligence (BI). Users can benefit from solutions providing such advanced capabilities. Though many offerings come from a highly fragmented market of primarily startups, the user community can expect the best cutting-edge technology to be absorbed by major market players.

For the time being, however, enterprises have numerous avenues for integrating new or upgraded DVS solutions into their infrastructures. Such integration traditionally has fallen under the purview of security system integrators, now striving to reinvent themselves as IT-capable in order to support DVS. However, the migration from a physical to IT application is changing the type of integrators from which companies may choose. Figure 5 illustrates the growing acceptance of non-security system integrators among executives planning a DVS installation.

Figure 5: What type of integrator are you considering to provide your digital video surveillance solution?



Source: Larstan Business Reports

Less than 18 percent of executives would consider using a standard security integrator to install their DVS solutions.

Source list:

- » Len Johnson
IBM Digital Media Specialist
lajohnson@us.ibm.com

- » John Kim
Senior Alliance Manager of Product Marketing and
Technology Alliances
Network Appliance Inc.
John.Kim@netapp.com

- » Marty Yost
IBM Retail Sector Services
myost@us.ibm.com

- » John Sara
IBM Global Services Alliance Manager, DVS
jsara@us.ibm.com

- » Weston Amberboy
Business Development Manager State and Local
Government Sector
Network Appliance Inc.
Weston.Amberboy@netapp.com

More than 50 percent would call on either IBM or another standard IT integrator for the task.

DVS offers a considerable upgrade in capability over its CCTV replacement. However, it requires more than just an investment in technology; it demands a deeper appreciation for newer ways that video images can add value to virtually every business unit within an enterprise. DVS can easily transcend its monitoring roots to provide proactive assessments to security, thereby elevating this function from purely forensic to predictive — by analyzing marketing campaigns, merchandising strategies and production controls.

Companies must invest in the proper equipment to store and manage these images and learn how to use them to further their business mission. They must also be willing to review and restructure traditional corporate turf issues and reassess and adjust both the physical security and IT functions that will now be required to support it. Once in place, a digital video surveillance solution should come to be considered not only valuable to all, but an indispensable tool to many.

Additional Resources:

Improving University Security through Digital Video Surveillance

http://www-03.ibm.com/industries/education/doc/content/bin/G299-0792-02F_1.pdf

Digital Video Surveillance and Physical Security

<http://www-03.ibm.com/industries/government/doc/content/bin/Digitalsurv-stateloc.pdf>

Marketplace Trends and New Services for Digital Surveillance and Security

<http://www-935.ibm.com/services/us/igs/innovation/files/podcast-marketplace-trends.mp3#spotlight>

About Network Appliance

Network Appliance is an industry-leading provider of storage and data management solutions. It brings simplicity to the complex world of data management through data-center-proven solutions for storing, managing, protecting, and retaining corporate data. It is headquartered in Sunnyvale, Calif. For more information on its vast product offerings, go to <http://www.netapp.com>.

About IBM

IBM is the world's largest information technology company, with 80 years of leadership in helping businesses innovate. Drawing on resources from across IBM and IBM Business Partners, IBM offers a wide range of services, solutions and technologies that enable customers, large and small, to take full advantage of the new era of e-business. For more information about IBM, visit <http://www.ibm.com>.