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What to Look for in Video Management Software

Beyond the GUI, ways to differentiate between products

By [Tom Galvin](#)

If you've looked at different video management software products lately, you might have a sense of déjà vu. On the surface, many of them look the same. Video management software products record compressed video streams from network cameras and encoders and intelligently route video to video monitors. They also provide camera and user administration. The products display live video in graphical user interfaces (GUIs), provide PTZ camera control and enable searching for recorded video.

But a closer look below the user interface reveals some key differences with a wide variance in product features, usability and, of course, price. Product differentiators include scalability, network management, fault tolerance, operating system, browser-based software clients and the use of standard conventions and protocols.

Ultimately, the best product selection will depend on your system requirements and your budget.

Questions to Start

Before you begin hunting for the right software features, think long and hard about your system needs. Keep the following questions in mind as you compare products.

- Will the system primarily be used for live video surveillance or for forensic evidence?
- How many cameras will be managed now and in the future?

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- How many concurrent users will the system support?
- Is system redundancy required?
- Must the system support legacy CCTV equipment such as PTZ cameras, keyboards, matrix switches, DVRs and analog monitors?
- What are the IT department's requirements?
- Will third-party systems like access control, point of sale (POS), ATM or video analytics be integrated with the system?
- Will browser access be the primary interface to live and recorded video?
- Does the system require audio? Megapixel cameras?
- What is the budget?

Open or Closed?

“Open architecture” defines the scope of interoperability with other manufacturers’ network cameras and encoders, as well as commercial servers and storage systems from such vendors as Dell, HP and IBM. An open-architecture system allows the implementation of best-of-breed components from a wide selection of manufacturers. The video management software pulls the system together by integrating the various IP camera and encoder products.

Figure 1 on page 32 is a representation of an open-architecture system. In this example, the video management software is hosted by a Dell workstation and server. The system integrates with network cameras from Axis, megapixel cameras from IQinVision, and encoders from Verint.

Closed or proprietary IP video systems provide a complete turnkey package from a single manufacturer. For example, Pelco's Endura system platform provides a complete package of video management software, encoders, storage and servers in a single, proprietary system. Proprietary systems offer the benefit of one-stop shopping at the cost of eliminating options to add other manufacturers' products to the system.

Live Video Viewing

Video systems that are built around live video surveillance—such as many casino applications—will typically require very responsive PTZ control and fast, automated video switching based on events.

PTZ control is a mixed bag with most IP video systems. If all you need for GUI control is a mouse or a joystick, you can provide remote, point-and-click PTZ access over networks. The downside: Manual PTZ control over networks can be slow and choppy compared to classic CCTV keyboard implementations using 485 control buses.

Virtual matrix switch features will automatically route video to monitors or PDAs upon internal or external system events. Events may include video motion and triggers from access control systems, intrusion, fire systems and POS systems. The system may use video pop-ups, text alerts and audible alerts to notify operators of events in real time and receive immediate access to live video. Some products accompany live video pop-ups with instant replay of the event.

Many multi-facility organizations, like large school systems and campuses, use these capabilities to reduce security staffing levels by intelligently routing alarms and video over WANs to remote security guards. This is the case in a North American homeland security application, where Genetec's Omnicast software provides remote video monitoring of 12 facilities over a WAN. This particular

application saves more than \$500,000 in annual labor costs.

Video Review and Video Forensics

Retail stores and banks tend to migrate toward playback-centric video systems. While live video is important, the primary application is often forensic, requiring good tools for video searches coupled with intuitive interfaces to quickly export watermarked video for investigations or legal evidence.

Products with advanced video search tools can make it much easier to sort through large video archives.

Some products, such as Verint's Nextiva software, will tag video recordings with metadata that can be searched with a software tool. Metadata can be described as "data that describes data." For digital video systems, metadata sources can include motion detection events, access control events or data from POS systems.

As metadata is provided to the system, it is indexed and recorded along with the digital video. The video search tools allow the user to define the parameters of the search. For example, the search may seek video in which there is motion at a specific time within a specific region of the building across several cameras. For transaction-oriented systems like access control, the search may seek video associated with a particular employee's movement through a facility.

Once the desired video clip is retrieved through a search, it is important to have VCR-type controls for event viewing, such as stop, fast-forward, rewind and frame-by-frame. The precision and ease of use of these controls varies widely from application to application and can vary by the compression method used. For example, some leading products have excellent tools that work with MJPEG sources but do not function well with MPEG-4 compression.

The software should have a video export tool that bookends the time frame of the event video and quickly exports the video clip to a CD or DVD for forensic evidence. The product should watermark the video during recording and then export that watermark to CD to eliminate the possibility of tampering.

Network Video Recording

Network video recording is the process of indexing and recording compressed video and audio streams to a storage system.

Most network video recording software will digitally sign each video frame as a watermark to protect against tampering or modification. Digital signatures can help the video hold up as forensic evidence in legal proceedings.

Most NVRs do a good job of emulating important DVR features, such as using events and schedules to trigger recording and bump video quality.

Open-architecture software will use the operating system's (Windows or Linux) file system to store video clips. Typically, any storage system that can be mapped as an operating system drive can be used for video storage. This open approach provides tremendous flexibility in the choice of the storage system. Internal disks, direct-attached storage (DAS), network-attached storage (NAS) and storage area networks (SAN) can all be arranged in RAID configurations and provided by storage vendors such as EMC, IBM and HP. Closed systems generally don't support commercially available storage systems.

Administration and Configuration

Video management systems manage users, devices and events. Device management begins with the task of adding cameras and encoders. Software products that support auto-discovery protocols reduce the complexity of adding new devices by recognizing new devices on the network and presenting them in a GUI for configuration. Most products provide the ability to configure basic

compression and video quality settings. Fewer software products provide the ability to configure more complex settings like on-board motion detection. Instead, the GUI usually offers a hyperlink to the camera's on-board Web server, allowing you to use the device's built-in user interface for configuration.

Event management is one of the most difficult human-factor challenges for video management software developers. This involves providing an intuitive method of mapping system events like motion detection to actionable system responses like event recording, PTZ presets, video pop-ups and operator alerts. These user interfaces are often complex and require some degree of training.

The ability to copy a configuration from one camera to multiple cameras is handy for the administration of larger systems.

Size Matters: Scale & Redundancy

Systems can scale in numbers of cameras and in numbers of concurrent users. If your system will have a large number of concurrent live video viewers, you may want to consider a software product that supports network multicasting. Multicasting is a way of efficiently transmitting video to a select group of people, much like a conference call.

Instead of sending information in individual packets to each recipient, a single message is sent to a multicast group, which includes all the people that want to participate. Transmitting a single video stream instead of a stream for each video user will reduce the load on the network, the host servers and the network cameras.

A single server can support a limited number of cameras for NVR recording. This maximum number will vary by software product and the capabilities of the host server. Some products will support failover recording and recording redundancy across multiple machines to protect against disk drive or other system failures.

Supported IP Devices

Network cameras have evolved to provide an interesting mix of value-added features, such as two-way audio transmission, megapixel resolution, motion detection and embedded video analytics. However, the level of integration with management software varies widely. Unlike analog video cameras, network cameras must be individually integrated with each software product, resulting in inconsistent levels of support from product to product. Using these features requires a careful marriage of software with the selected network camera or encoder.

IT Friendliness

For many installations, the video system has become one more application supported by the IT infrastructure. In response, many software products are becoming more IT friendly by adopting standards for managing users, devices and network security.

Many products now integrate with Microsoft's Active Directory so that video system users can be managed within an organization's existing user management system. User names and associated access privileges to cameras and PTZ control can all be managed with a single sign-on to the network.

Fewer products will report system health and diagnostics using standard tools and protocols. One such standard is Simple Network Management Protocol (SNMP). Products can use SNMP to report system failures such as video loss and disk drive crashes to common health monitoring tools such as HP OpenView or IBM's Tivoli .

Before deploying a system, many IT managers will want to understand how well video will pass through their network firewalls. Some Microsoft-based products use network ports that are considered susceptible to viruses and other hacker attacks. For example, most enterprise firewalls will block use of port 135, used by

Microsoft's DCOM protocol for remote procedure calls. If you plan to access video from across your WAN or from the Internet, you will need to understand what network ports are used by the software.

Web browser access makes video very accessible and easy to maintain. Any PC with a browser can access the video. Instead of loading and updating software on client PCs, vendor software updates are performed on the server. Products provide a broad range of support for browser access. For example, Broadware's entire user interface is built for Web access, while other products provide limited or no browser functionality relative to their installed client software. Broadware's product works on the Linux operating system, providing one of the few alternatives to a Microsoft operating system.

Adding Value with Integration

Capturing video with transaction-oriented systems like access control, ATM and POS can multiply the value of a security system. Many software products have ready-to-go integrations with access control systems. The level of integration and the scope of supported systems vary from product to product.

Typically, integration with POS and other business systems must be customized using a video management software development kit (SDK). Most leading products have SDKs that can be used by software developers to search and pull live or recorded video from the system to be tied with transactions.

Integration of video with POS exceptions is proven to reduce shrinkage as a loss prevention tool. For example, Milestone's XProtect product is integrated with the ERP system Navision from Microsoft Business Solutions to provide a loss prevention tool for the IKEA pilot store in the Netherlands .

Preserving Capital Investment

When you're retrofitting existing analog or DVR systems to NVR systems, it is often important to leverage the existing infrastructure of analog fixed and PTZ cameras. Most software products will control legacy PTZs through network encoders. The level of PTZ protocol support varies widely across software products, making it necessary to determine if a particular software product will support the PTZ cameras at your facility.

Some security directors prefer to maintain the existing CCTV keyboard and monitor interfaces for their security guards. Genetec's Omnicast is one of the few systems that will use network decoders to accept CCTV keyboard input and route compressed video to analog monitors.

Money, Money, Money

Most video management software products are licensed by the number of camera inputs. List prices range from \$250 to \$1,000 per camera, with a median list price of \$350 per camera. Smaller systems with reduced functionality and scale are available at lower prices.

Ultimately, the best video management software is the product that best fits your needs and budget. Once you know how the system will be used, do your homework and ask tough questions about how well the software meets your operational model and integrates with your existing surveillance system, IT infrastructure, third-party systems and choices for network cameras and encoders.

Tom Galvin of NetVideo Consulting (www.netvideoconsulting.com) is a video management software specialist who provides product evaluations and training programs focused on IP video solutions. Mr. Galvin recently published a competitive study of open-architecture video management software products.

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