

# **It's an IP video future So say goodbye to traditional CCTV**

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Is the life expectancy of digital video recorders (DVRs) shorter than we first thought? Might Internet Protocol (IP) surveillance solutions eventually take over the market? Should IP technology even be called Closed Circuit Television (CCTV)?

DVR or IPTV? It's a question many end-users are considering or will be considering in the near future. Both systems offer high-resolution digital imaging and storage, Internet and remote viewing, video motion detection, and many other standard features. But that's where the similarities end.

## **THE DVR**

The DVR is one of the most innovative technologies in the surveillance industry since the camera itself. It provides the ability to store video without degradation, along with highly advanced search capabilities, making video review fast and highly effective. The DVR has also incorporated advanced features such as video motion, multi-user remote monitoring, and pan/tilt/zoom (PTZ) control into a single platform. By eliminating the need for multiple, adjunct peripheral components to perform similar functions, the DVR has become the system of choice for the surveillance industry. But with greater penetration of digital video recording technology, the DVRs' limitations have begun to emerge.

DVRs are built encompassing a server (computer) with physical analog video inputs, via co-axial cabling, directly from the cameras the same way standard analog systems are connected. DVRs have a limited number of control inputs and outputs for interfacing and integrating to various systems and devices. The majority of DVR software has non-standard digitalization and compression and closed source codes to limit third party application development and high-level integration. Most digital video recorders on the market today have little or no matrix functionalities and do not offer multiple monitor outputs for security communication and surveillance control centers. When a DVR unit's video inputs are full, you need to add another unit, usually in groups of 8, 16 or 32 video input capacities. All of these limitations adversely affect total cost of ownership (TCO) as the security environment grows and changes.

## **IPTV**

What about video over IP? Network video servers (NVS), network video storage servers (NVSS), and other IP solutions overcome the DVR's lack of flexibility. For systems exceeding 16 cameras in size (or multiples of 16) or with multiple site installation and centralized recording and monitoring, the user can reduce costs by not needing to add video servers for just a few more video inputs. Using IP networking allows some installations the advantage of leveraging existing network backbones — as opposed to directly connecting cameras to a DVR.

When transmitting video over a network, there are two basic formats to consider: Motion JPEG (Joint Photographic Experts Group) and MPEG4 (Moving Picture Experts Group). MJPEG is a user-friendly, browser-based Web solution, but requires heavy bandwidth per video stream. The MPEG4 format has lower bandwidth requirements per stream, but needs a codex or applet for Web browser viewing. Lower bandwidth requirements give MPEG4 IP systems an advantage

over MJPEG systems, and both IP compression methodologies offer advantages over most DVRs.

The configuration for both IP formats uses encoders and decoders, thus creating a matrix system that can take any video input and display it on any output. Through the use of NVS type systems, we can create very sophisticated virtual matrix systems at a substantially reduced cost over traditional CCTV matrix switchers.

Most IP solutions use software licensing to overcome the hardware limitations we see with a DVR. Licensing allows the IP solution owner to choose the quality of the server and the amount of hard drive space needed. It also enables expansion of server requirements without proprietary and expensive hardware upgrades. As a software solution with standardized digitalization and compression and (usually) open software source codes, the IP video system provides for easy integration of third party software solutions. Integration possibilities include full function single interfaces for CCTV, access control, HVAC (heating ventilation and air-conditioning), and others.

The advantages of IP surveillance systems over DVR technology make a strong case to be the system of choice for today's enterprise-level surveillance solutions. Beyond technology and integration advantages are the cost savings from IP.

### **THE IP ADVANTAGE: ONE NETWORK**

Today's network convergence technology enables the operation of all or most aspects of the business operation under one manageable network — access control, intrusion detection, IP video, fire alarm, phones, computers, temperature control and many more. Thus, by having only one infrastructure to maintain, cost of ownership can be further reduced.

Having a single network infrastructure also gives the IT manager and his staff the ability to assist the security department in the maintenance of the surveillance infrastructure, servers, and archive storage, further increasing the cost efficiency of an enterprise class surveillance solution. So, what might this new video over IP, or what I call an IPTV, system look like?

### **THE HYBRID SOLUTION: BEST OF BOTH WORLDS**

The figure on the facing page is a typical “hybrid” IPTV virtual matrix surveillance solution. In a true IP solution, cameras would connect directly into the Ethernet switch. I prefer a hybrid approach with analog cameras and encoder, allowing for a wider selection of cameras and a reduced cost of ownership through more cost-effective future upgrades or replacement of cameras. Also, integrating other systems into the network can be accomplished by using the serial RS-232, RS-422 or RS-485 communications in the encoders and decoders, thus reducing the need for access control and other systems serial backbones.

Within this solution lies a managed layer three-network switch, which provides the QoS (Quality of Service) for the video stream and multi-cast. I have incorporated a fiber optic backbone to meet the higher bandwidth requirements throughout all systems using the network. In the data center, there is a NVS for local administration and archiving of video, which, in some IP solutions, can be recorded at a different frame rate from the frame rate for viewing the video stream.

Such a solution also has capabilities for Internet and intranet access to the system. In the security center, there are video decoders that are connected to surveillance monitors to create a virtual matrix that can switch any video stream to any decoder. The ability to add as many decoders as needed makes this a very powerful monitoring center.

The data center also has a remote user station on a computer for additional viewing, reviewing and system control such as PTZ, alarms and video switching. We can also add any standard printer to make hard-copy prints from captured video.

### **MEETING FUTURE NEEDS TODAY**

In the fast-paced technology arena, end-users need to position themselves to avoid the need to upgrade major equipment every few years. IP surveillance has been around for several years, but until recently, this technology had not successfully penetrated the mainstream security market, due mainly to initial bandwidth requirements and resistance from IT managers protecting their networks. Newer compression formats have solved most of the bandwidth problems and IT managers have come to view IP's integration potential very favorably.

Now is the time to capture the cost savings and enhanced capabilities of this new and innovative technology. With all this IP video technology coming on stream, should we continue to call it CCTV? Or should we move firmly into the future and start talking about IPTV, the new surveillance technology?

### **FOR THE RECORD**

#### **ABOUT THE AUTHOR**

James Gompers is founder of Gompers Technologies Design Group Inc. and Gompers Technologies Testing and Research Group Inc. He has more than 20 years of expertise in the security industry as a consultant from the end-user perspective. This is another in a series of columns he is writing for **Access Control & Security Systems**.