



## IP Video CCTV Systems Choosing the Right Path

**With IP Video technology set to dominate CCTV over the next few years, it's becoming increasingly important that end-users understand the difference between 'single' and 'multi-vendor' IP Video Systems. This article will discuss the advantages and disadvantages of each approach and their impact on choosing a system.**

Do any standards for IP Video systems exist? Can you buy products from different manufacturers and expect them to work together? This article seeks to clarify some of these questions and sets out the key considerations when choosing an IP-based digital CCTV system.

### The Standards Myth

Many people in the industry believe that so called 'open' or 'multi-vendor' IP Video systems achieve their interoperability through the use of open industry standards. This is a myth. There are a number of aspects to IP Video that are genuinely standards based. One of these is video compression: MPEG-2, MPEG-4, H.263, H.264 and jpeg2000 are all ratified standards and commonly used in the IP CCTV industry. These formats only cover digital compression and decompression of analog video, not the live streaming of the digital video.

IP Video systems require digital video to be transmitted in real-time around the network and for this a transmission and control protocol is required. These protocols are transmitted using the Ethernet IP network standard, which allows IP Video to co-exist with other network traffic such as general computer information. There are many transmitters on the market that use standard video compression yet depend on proprietary streaming protocols. It is the transmission and control protocol that is the most non-standard element in the system, however, it is this element that allows many of the advanced features found in IP Video systems to be realized.

The protocol contains a number of basic commands that, for example, allow the video recording to be started and stopped, an alarm to be sent or a camera to be panned. Every manufacturer uses their own protocols and without them the system cannot work. Add video analytics to an IP system and the complexity of the protocol is dramatically increased. There is a similar situation with analog video systems where the video transmission is standard but the PTZ and matrix controls are proprietary. The reality of 'open' systems is that the video management software has to interface to each of the different vendor's equipment using separate proprietary protocols – far from a standards based solution.

### 'Single-Vendor' or 'Multi-Vendor'?

All IP CCTV systems are made up of three basic components: transmission hardware, recording hardware and video management software. Some manufacturers have taken the 'complete solution' approach and are 'single-vendor', with all software and hardware designed, tested and sold as a single integrated system. Other manufacturers have chosen the so-called 'open' approach and are 'multi-vendor', such that a single video management software application can communicate with various manufacturers' equipment - transmitters, IP cameras etc.

This has many advantages:

- Ability to source from multiple manufacturers
- Lower pricing on hardware components
- Standalone software providers often sell across a wider market so the end user can benefit from this investment and resulting features
- The user is not locked into any one hardware manufacturer's 'agenda', e.g. development roadmap or application bias
- Ability to upgrade installed IP Video systems with new third party hardware
- Ability to choose the most suitable manufacturer for the specific application, e.g. a particular type of IP camera that may be most suitable

While the 'multi-vendor' approach seems at first to be the most sensible solution, and is indeed often appropriate, it also has some drawbacks.



### **'Multi-vendor' systems are effectively single sourced**

'Multi-vendor' usually means buying video management software from an independent software vendor that can communicate with equipment from a number of transmitter/IP camera manufacturers. The hardware is 'open', but the end-user is still tied to a single software developer. So, instead of being single-sourced on the whole solution, they remain single-sourced on the video management software. This would be fine but the independent software vendor has far less control over the hardware from the multiple manufacturers they support. Therefore, in the absence of real standards, they are less able to deploy a system with optimum performance compared with a 'single-vendor' that controls the entire solution from end-to-end.

### **'Multi-vendor' systems have limited interoperability**

There is an opinion that using 'multi-vendor' software applications will allow the user to seamlessly and inexpensively source the transmission hardware from any manufacturer. However, there are many limitations in 'multi-vendor' systems that make it difficult to freely mix and match between different manufacturers. The system is only as good as the worst performing component – the lowest common denominator - and this can lead to a reduction in overall functionality. In reality many IP Video systems based on 'multi-vendor' solutions actually only use hardware from one manufacturer in order to reduce these limitations, effectively making the system 'dual-vendor'!

Many IP CCTV systems require hardware-to-hardware communication, e.g. streaming from transmitter to hardware decoder, an important element in the so-called 'virtual matrix' that provides IP Video systems with their flexibility and scalability. No amount of software will allow these two components to be integrated and so a key component of an IP 'virtual matrix' – a link from anywhere to anywhere – is negated.

### **'Multi-vendor' systems can be more expensive**

In terms of development, the most expensive component in an IP CCTV system is the video management software, although the true costs are often hidden. By sourcing from an independent software vendor, the user is simply tying themselves down to the most expensive component in the system. Also, the need to incorporate the control protocols from many vendors' equipment into one software application further increases the development cost. This is why 'multi-vendor' support is often priced at a premium and means that the customer is being charged for supporting hardware that they do not use.

### **'Multi-vendor' systems have more complex support issues**

The video management software is required to interface to several different technologies and this increased complexity can affect the reliability of the system and highlight the problems with support. 'Multi-vendor' systems depend on strong strategic alliances from many different companies to maintain the integrated support. And if something were to go wrong, who does the end user blame? Who takes responsibility for what revision of firmware should be used in an IP camera when a new version of the video management software is released? With a 'single-vendor' complete solution responsibility for performance lies clearly in one place, and the end user need only point one finger!

## **Integration and Choice with 'Single-Vendor' Systems**

With a 'single-vendor' solution all the IP Video components are sourced from a single manufacturer, reducing the end-user's choice. However, in reality many components can still be selected from other vendors. IP Video systems often use a combination of analog cameras connected to transmitter modules, as opposed to dedicated IP cameras – as is the case with set-top boxes and TVs for home entertainment. In this case the end user can choose any manufacturer's camera based on cost, specification or brand. Similarly, many manufacturers enable their NVR software to run on any IT configuration, allowing the user to choose anything from a low-cost PC to a multi-raid server setup. IP Video systems also provide multiple interfaces to other manufacturers' equipment such as display monitors, keyboards and joysticks, further expanding choice.

Another misconception is that integrating to third part equipment is more easily achieved with 'multi-vendor' IP Video systems, as 'single-vendor' systems are perceived to be 'closed'. This is far from the truth. In many cases integrating IP Video with other types of systems, such as intruder alarm and access control, is more easily achieved with 'single-vendor' solutions. This is because control of the different components and software in the system is in the hands of one company, ensuring the integration is seamless throughout.



## An Analogy with the IT World

The 'split' within the IP Video market into 'multi-vendor' versus 'single-vendor' is mimicking, to some extent, what happens in the IT networking world. Small organizations are quite likely to use multiple manufacturers of network equipment, changing their selection from day to day based mainly on price. Medium and large organizations, on the other hand tend to run 'all Cisco' or 'all HP', etc, because that gives them a much higher overall performance and a lower total cost of ownership. The same is true in IP Video, where medium to larger users are tending to choose the 'single-vendor' route, for the very same reasons.

## Integrating Video Analytics

IP-based video management systems provide the ideal platform for powerful analytics to be completely integrated into the system, making them a core and integral part of its operation. Leading IP Video solutions support analytics that can be performed in two fundamental modes: live (to detect events as they occur) and post processing (to test various scenarios on recorded footage).

The optimum place to locate live analytics is obviously at the camera, as it is the only truly scalable solution and also doesn't use up network bandwidth. Central real time processing will eventually run out of steam, whereas every camera can have dedicated processing. For example a camera with built-in analytics can monitor scene activity and transmit only on specified events (e.g. a person moving the wrong way through airport security).

The optimum place to locate post-processing analytics is obviously on a central server within the video management software, so that recorded video can be searched many times, with different parameters. Both types of systems can perform these post-event analytics functions perfectly well in the video management software. However, implementing real-time analytics at the camera in 'multi-vendor' systems becomes very difficult because of the extra complexity required within the numerous control protocols that interface to the video management software.

## Summary

At first glance, the 'open' or 'multi-vendor' solution appears to be the best approach when selecting a CCTV system, offering the end user more choice and the opportunity of not being tied to one manufacturer. However, after closer inspection a 'complete solution' or 'single-vendor' approach also has many benefits – potentially more robust, more feature-rich, simpler support and, in many cases, less expensive.

The debate between 'single' and 'multi-vendor' will of course continue but it is interesting to note that most of the biggest names in the IP Video industry supply 'single-vendor' systems, capable of higher performance. The biggest proponents of 'multi-vendor' systems are invariably the independent vendors of video management software.

## Intercon's Partner of Choice

IndigoVision is a leading manufacturer of complete end-to-end IP video and alarm management solutions for CCTV surveillance applications. IndigoVision is widely chosen for projects in airports, city centers, ports, mines, road and rail systems, education, banking, casinos, prisons, government and the military. These enterprise-class systems improve organizations' operational efficiency, enhance public safety and enable timely emergency response.

IndigoVision has thousands of major installations worldwide including two Olympic Games, the 2006 Soccer World Cup, 7 major rail networks, 2 of the world's top 5 banks and 28 airports. IndigoVision completely develops its technology in-house, including a rich suite of hardware products and 'Control Center', its flagship video and alarm management software.

The focus on redundant, resilient and secure systems, coupled with integrated video analytics to support investigation, is what sets IndigoVision apart in providing enterprise network solutions. Whether the requirement is for a small site, a large site, an enterprise, or an alarm receiving centre, all are provisioned by IndigoVision.

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