



**WHITE PAPER**

# **Converting an Analog CCTV System to IP-Surveillance**

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## 1. Introduction

*Digital video recording has been around for a while now—there are hundreds of DVRs on the market today. It used to be that only large installations or Fortune 1000 companies could afford digital. But according to a recent report from industry analysts Frost and Sullivan, demand for digital systems surpassed that for analog systems sometime in 2002. Digital technology has shown its superiority, but in the last two years it's become a commodity. What's the next step, beyond the DVR, for end users to take their security systems digital?*

IP-Surveillance solutions have emerged as an attractive alternative to the DVR as it provides a bridge to enter the digital world with the ultimate solution of a high-performance, low-cost digital video surveillance and monitoring. In this paper, we will provide a guide for the end user who is interested in making the transition from a current analog system to a digital one. We'll demonstrate how this move can be undertaken in a progressive, step-by-step manner and review the many benefits that come from implementing digital technology. Finally, we'll examine three specific applications of digital IP-Surveillance technology. Now is the right time to take the step towards digital surveillance and monitoring—let's see how.

## 2. Benefits of going digital

For the past 20 years, monitoring and surveillance applications have been served by analog technology. CCTV has traditionally been recorded to VCRs (video cassette recorders), and because of its perceived ease of use and manageable price point, analog was probably the right choice at the time of purchase. However, the rise of digital has laid bare analog's many shortcomings. Analog CCTV systems are generally maintenance intensive, offer no remote accessibility, and are notoriously difficult to integrate with other systems. Despite these obvious deficiencies, the end user who has invested in cameras, cables, and more, and is satisfied with the current quality is right to ask, "Why buy new equipment?"

Implementing a digital system does not require throwing away those trusted (and already paid-for) cameras. With IP-Surveillance, you can still use all the cameras, lenses, and cables in place through this step-by-step migration to digital technology. And if this is not enough reason to seriously consider an upgrade, examine the TLV, or time-lapse video, recording component. These systems are highly labor intensive because of the need to change tapes and perform system maintenance. Tape wear and tear is an ever-present problem. Furthermore, the actual quality of the images recorded is often unsatisfactory, particularly if used for official investigations. With the introduction of digital video recorder (DVR) technology, the storage media are no longer dependent on operator intervention or tape quality. And with IP-Surveillance technology, the video server and network server represent the next level of improvement by connecting existing cameras to the network with a video server and then storing the images on the network server.

**Digital's many benefits.** With the spread of digital recording technology, its many advantages have become apparent: ease of use, advanced search capabilities, simultaneous record and playback, no image degradation, improved compression and storage, integration potential, and so on. But with digital technology as its core, IP-Surveillance provides all these advantages and many more:

**Remote accessibility.** The main benefit from connecting those analog cameras to a network is that the user can now see surveillance images from any computer on the network—without the need and expense of additional hardware or software. If you have a port to Internet, you can securely connect from anywhere in the world to view a chosen facility or even a single camera from your surveillance system. By using a Virtual Private Network (VPN) or the company intranet, you can manage password-protected access to images from the surveillance system. Similar to secure payment over the Internet, a user's images and information are kept secure and viewed only by approved personnel.

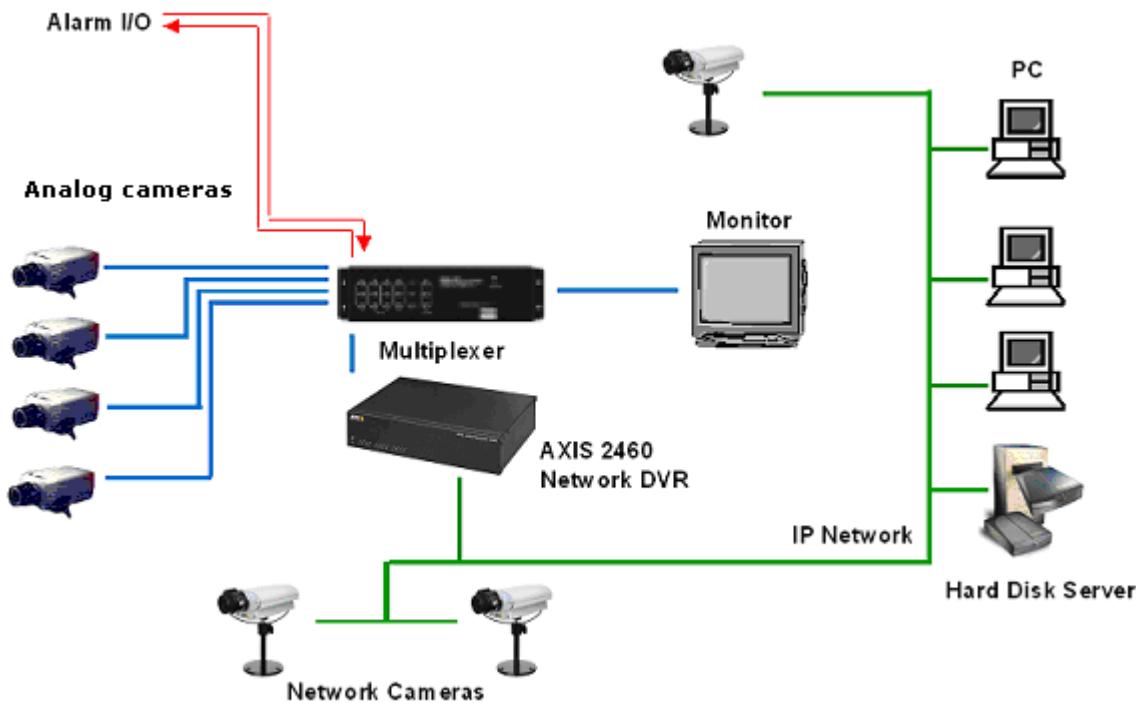
**Unlimited, secure storage.** Store as many hours of images as you want—provided you have hard disk capacity. And store and view images off-site in any location in cases where monitoring and storage are mission critical or need back up.

**Flexible, pro-active image distribution.** Take snapshots of an intruder or incident and send by e-mail to police or appropriate authorities. Also, police or other password-approved parties can log on to cameras and view activities around a user's facilities.

**Automatic alerts.** The video server can automatically send an e-mail with an alarm image to selected e-mail addresses, so the right people have the information they need to take timely action.

**Total cost of ownership and performance.** At the beginning of this section, we listed the many advantages of digital technology, but it bears repeating that with no further need of time-lapse video equipment, no more tapes and no more tape changing and cataloging are required. Maintenance costs go way down. And while system performance and results markedly increase, total cost of ownership over time will continue to decrease.

IP-Surveillance provides all the superior functionality of digital technology, plus the tremendous benefits of increased accessibility, storage and distribution of images, and a superior cost-benefit picture. At this point, analog owners are convinced it's time to make the switch, but what factors bear consideration?



**Figure 1:** Analog and digital systems working in parallel

### 3. Factors to consider: The move to digital

At this point, we've seen that the transition from an existing analog system to a high-functioning digital IP-Surveillance system can be done step by step and in a cost-effective manner, but there are still a number of factors to consider. What about network bandwidth, bandwidth connections (network, xDSL, ISDN, cellular phone etc.), hard disk storage requirements and software?

#### 3.1 Network Bandwidth

If you are using a local network, cameras can be patched through a special dedicated router for the camera, thus eliminating most concerns about bandwidth. However, if images are sent by PSTN, bandwidth considerations do come into play. To get a performance of 30 frames per second, you need a minimum bandwidth of 120 kB/s.

#### 3.2 Hard disk space

Hard disk storage requirements are dependent on the frame rate of the video you want to store. If you want to store all video at 30 frames per second (30 fps) as opposed to 1 fps, then that requires 30 times the amount of storage. Each application has different recording and storage needs in terms video fps, and hard disk storage requirements will differ accordingly.

#### 3.3 Software application

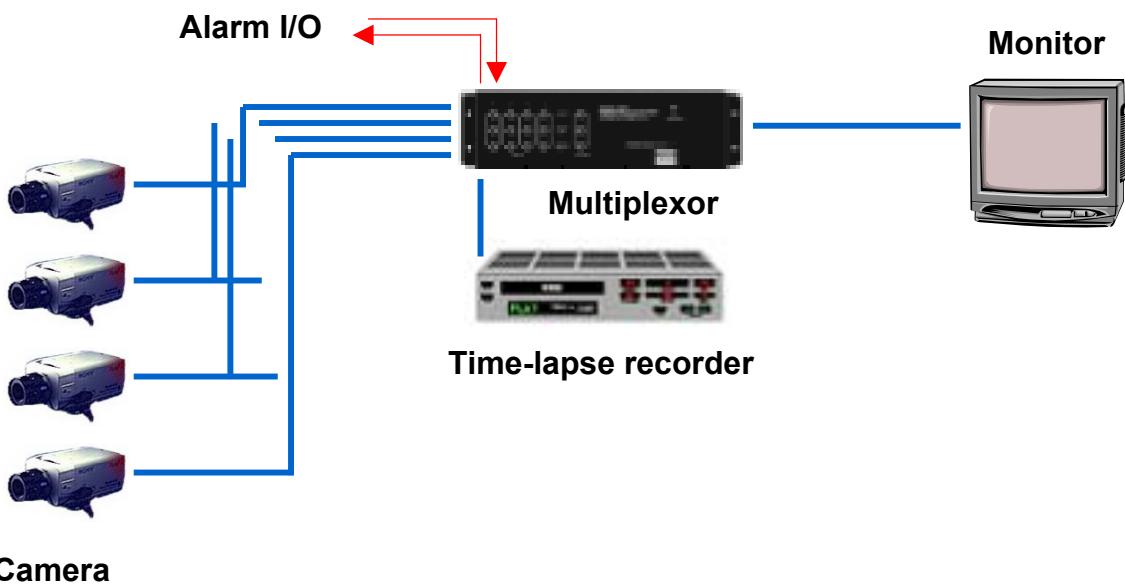
A wide variety of software applications can be used. What software to use is governed by the end-user application and their specific needs. An example of application software is Milestone's Xprotect Business product, an advanced and highly scalable video

surveillance software with built motion detection, intelligent PTZ patrolling features, high capacity recording and remote access via the Web. Another is a management software from SeeTec, a software for remote camera configuration and management, direct or automatic control of cameras and accessory equipment, image representation, display and message forwarding. A third is the Softsite32 from JDS Digital Security Systems. Softsite32 is a stand-alone application that enables viewing, recording and management of video streams and snapshots. It is highly scalable and robust, with quick installation and setup. JDS has a growing worldwide install base, public and private implementations, as well as custom solutions.

## 4. Analog CCTV to IP-Surveillance: Case studies

### 4.1 Today's analog CCTV system

Current analog CCTV systems, like the one shown below, now have few advantages beyond familiarity and cost. Analog CCTV relies on time-lapse technology. Storage is limited to low-tech tapes, which make maintenance high and search capabilities low. Analog has low integration potential and provides no opportunity for remote access. It's an old and familiar system, and its time for retirement is now.



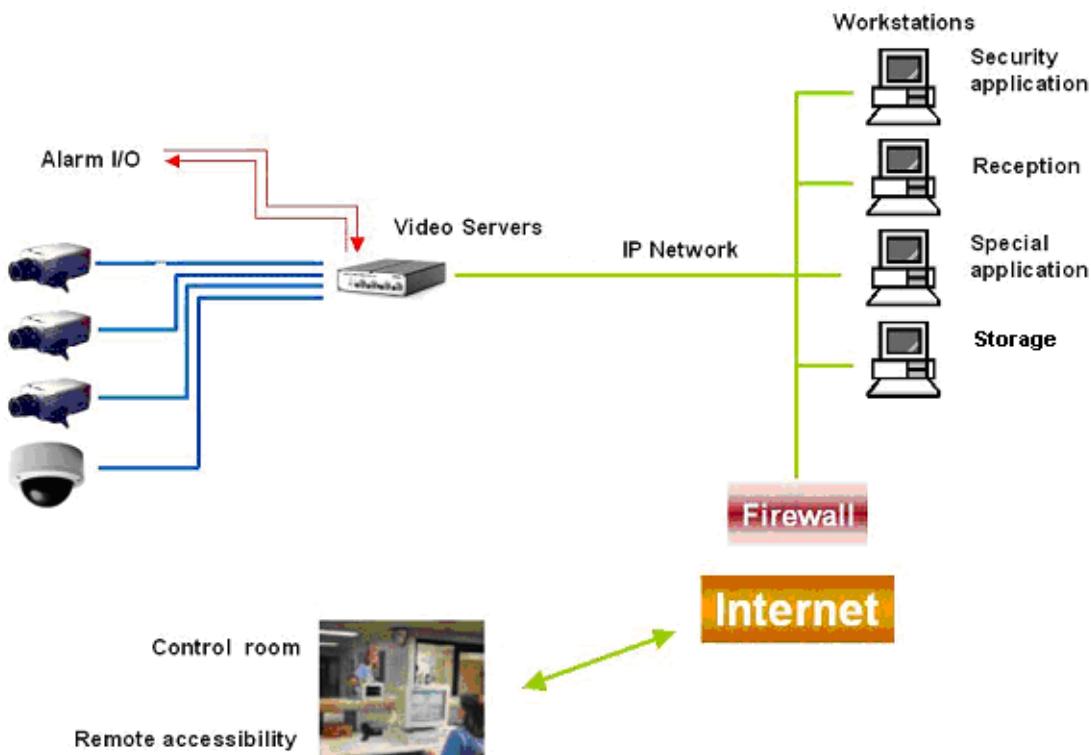
**Figure 2: Analog CCTV Systems**

### 4.2 The digital revolution upgrade: video server technology

In the configuration below, the video server provides the connection between the analog cameras and the network. With the simple addition of this technology, a whole new list of features and functions becomes available:

- Remote access of images utilizing the computer network—eliminating the need for dedicated security monitors in a central office
- Password-protected access anywhere there is an Internet connection

- Connect to a remote control station to view what is going on and control cameras and other aspects of the surveillance system
- Ease of integration with other systems and applications
- Lower TCO (total cost of ownership) by leveraging existing network infrastructure and legacy equipment
- Creates a future-proof system, so no more complete system overhauls



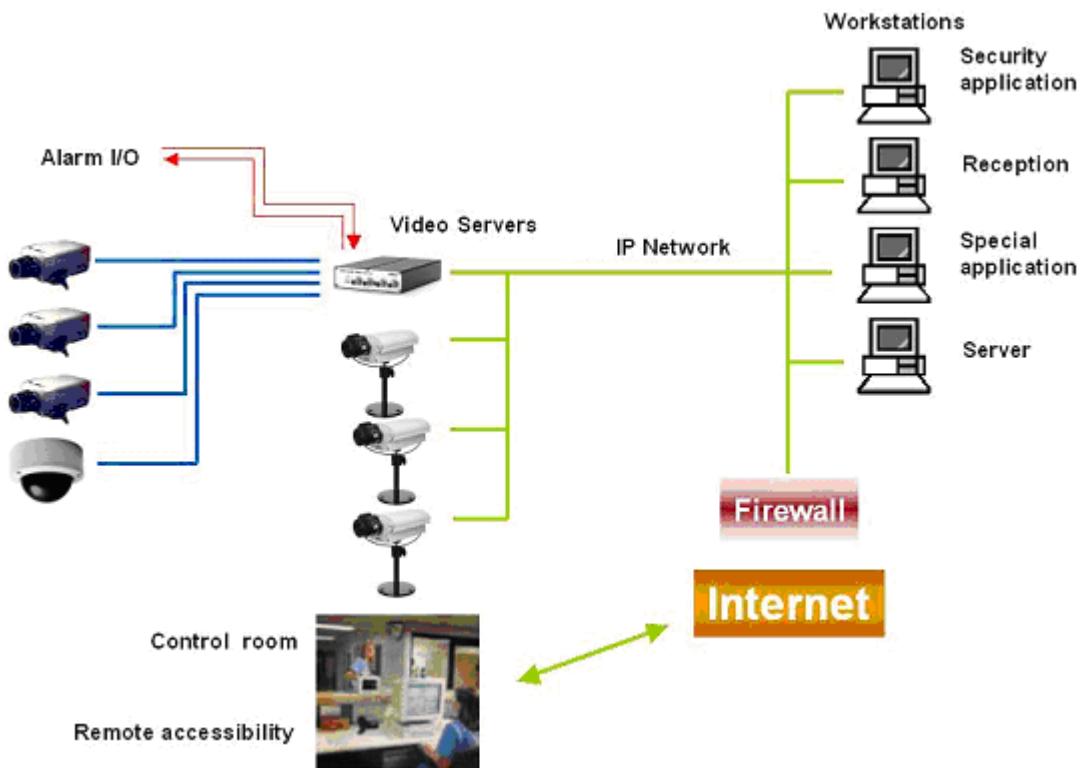
**Figure 3: Upgrade: The ongoing digital revolution**

#### 4.3 Expand the benefits over time: the network camera

But we don't need to stop with the first-level upgrade described above. The digital revolution's video server and camera technology enables us to expand the system and its advantages. With a digital system, you can connect as many cameras as you want. You can attach each new camera directly to the network. This provides a new set of added benefits:

- Viewing access can be restricted to only authorized persons, or live video can be posted on a company's Web site for the entire world to see.
- If the building is equipped with an IP network, then the necessary infrastructure already exists to add network cameras without high installation costs.
- Network cameras perform many of the same functions as a standard analog CCTV camera, but with greater functionality and at a substantial cost saving.
- Network cameras plug directly to the existing network, yielding substantial savings because the coaxial cabling required for analog cameras isn't needed.
- When computers are already in place, no additional equipment is needed to view the video output from a network camera.

- Output can be viewed in its simplest form in a Web browser at the computer monitor, and in more complex security solutions, with the aid of dedicated software.



**Figure 4:** The ongoing digital revolution

## 5. Conclusion

The digital solution is easier and cheaper than you think. Even with the enormous growth of CCTV and the recent acceleration in migration to digital video technology, significant hurdles remain for a majority of users in making the switch from analog to digital video recording. Many end users are still not aware that there is a step-by-step path available to transform existing analog security systems to digital technology. In terms of education, most end users still need a deeper understanding of the benefits and possibilities of digital and network-based surveillance systems. It is also important to know that in the transition from analog to digital surveillance systems, no system is too small or too tightly tied to analog technology, to benefit from digital technology. Even a single analog camera connected to a video server will provide the user with the full range of advantages that come from digital, networked surveillance.

Consider the ease and cost-effectiveness of a progressive, step-by-step move to digital with IP-Surveillance. Now is the right time to take the digital step.

## Axis Communications

Axis increases the value of network solutions. The company is an innovative market leader in network video and print servers. Axis' products and solutions are focused on applications such as security surveillance, remote monitoring and document management. The products are based on in-house developed chip technology, which is also sold to third parties.

Axis was founded in 1984 and is listed on the Stockholmsbörsen (XSSE:AXIS). Axis operates globally with offices in 14 countries and in cooperation with distributors, system integrators and OEM partners in 70 countries. Markets outside Sweden account for more than 95% of sales. Information about Axis can be found at [www.axis.com](http://www.axis.com)

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