

What Schools should know about IP Video Surveillance Technology

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Abstract

The purpose of this white paper is to provide an overview of IP surveillance including school-specific requirements. This paper also contains a section on potential cost savings involved in using an IP-based video surveillance system for schools.

Overview of IP Surveillance Systems

Many schools today are monitored today with some form of video surveillance. IP Video surveillance systems are becoming much more common in schools because of their ease of expansion. These systems are different and more capable than the original Closed Circuit Television (CCTV) systems. An IP video surveillance system consists of the following:

- One or more digital "network" cameras
- A standard Ethernet network, either shared or dedicated
- A central server
- One or more client viewing stations
- A digital storage unit

Cameras

IP cameras contain a digital CCD or CMOS sensor with an embedded microcomputer to do image processing and interface to the network. Both the digital video output frames from the camera and camera control information flow through a standard Ethernet connector.

Network

The standard computer network that supports the digital video flow and the camera control information are identical to those that support the data flow between office computers, servers, and printers. Network cable, switches and wireless interfaces are standard hardware products, widely available and inexpensive. The network for the IP surveillance cameras is often shared with an existing, installed data network. This is appropriate if the current network is 100base-TX or 1000base. Some schools may desire to run a dedicated network, or a partially dedicated network for the IP surveillance system. Sometimes schools choose to upgrade an older network, providing improved computer functionality as well as supporting networked cameras.

Server

The central sever is often a standard Windows-based desktop computer, typically running the camera server software as a dedicated application. The server may physically connect to the network at any point. A standard mouse, keyboard and computer monitor connected to the server typically function as a real-time monitoring station.

The combination of the server plus storage is often called a Network Video Recorder.

Viewing Stations

The client viewing stations are standard office PCs or laptop computers. The client viewing is either a simple Windows application or a through a standard web browser.

Chicago's Farragut High School was a notoriously violent campus prior to the installation of a surveillance system and the introduction of other security measures in 1995.

According to the school's administrator, within one year of the installation of the surveillance system, major acts of violence, locker break-ins, and vandalism have ceased almost entirely. The system is monitored by trained personnel.

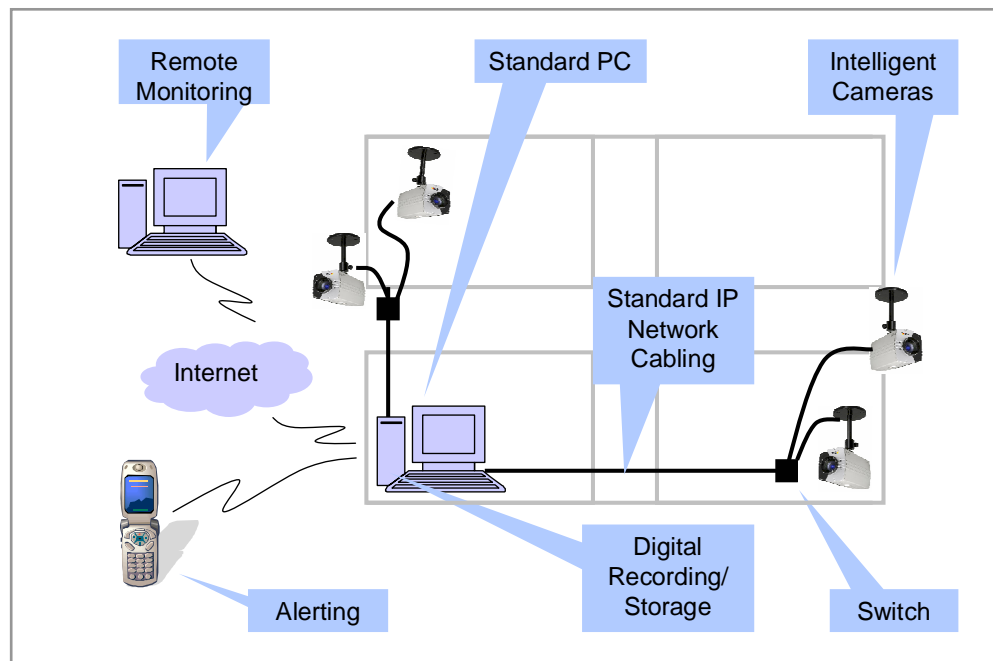
-- Public Video Surveillance: Is it an Effective Crime Prevention Tool?
By Marcus Nieto

Multiple client viewing stations are easily supported anywhere on the network, or anywhere on or off campus, connected to the server via the Internet.

Storage

The digital storage unit is a standard disk subsystem, consisting of one or more disk drives. Often, multiple disks are used to provide fault tolerant video storage and to store many days of video automatically. A RAID-5 system that holds 14 days of video is the most common configuration. The disk subsystem is normally connected to the server; however it may be placed anywhere on the network, or even remotely via the Internet.

Figure 1: IP video surveillance components



The Need for IP Surveillance on School Grounds

Creating an environment where students and faculty feel safe has become increasingly difficult over the last ten years. The hostile acts of students, whether directed against school facilities or against other students, creates an environment of fear and uncertainty and is not conducive to learning. However, hostile acts of students are not the only threat to the learning environment, threats to students or faculty can come from people not involved with the school yet lurking on campus or near campus entrances and exits. For these reasons, more and more schools, from primary grades to colleges, are installing IP surveillance systems.

School Specific Requirements for IP Surveillance

The priority for all schools and educational institutions is student safety. But IP surveillance systems can also be used to discourage vandalism and provide a sense of security for staff and faculty members. Though each school will have its own unique

Independence High School in Columbus, Ohio installed video surveillance in 1995, and within one year break-ins decreased from 10 to none.
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needs based on the size, campus layout, and ages of its students, there are several requirements that are common to many schools.

Ease of Storage and Retrieval

Finding the video sequence that captures an act of vandalism or a fight required a lot of work with older CCTV-video tape based systems because of the sequential nature of the tapes. IP-based systems make it fairly easy to isolate an event based on time and motion detection. In the event of an abduction, time is the most critical factor. A system that shaves hours off of the process of finding the right segment of video can make a difference in life or death.

Connection to Local Law Enforcement

In the worst case scenario for a school, the local law enforcement needs a way to quickly view what is happening on the school grounds and to understand where specifically to send in enforcement personnel. An IP-based surveillance system allows an immediate connection from the cameras at the school to the local law enforcement offices or even to patrol cars in some cases.

Ease of Expansion

Once an IP surveillance system is installed and running, a school often finds that it is invaluable in deterring vandalism and hostile acts by students on campus. It is common for schools to want to expand an installation to include more cameras and additional monitoring capability or even a temporary expansion for big games and other events. IP-based surveillance systems can be easily expanded to meet these needs.

Flexible Monitoring

Cameras placed in a library may need to be monitored by a librarian. However, cameras placed at school entrances and exits may need night-time monitoring from a central district or different campus location. IP surveillance systems allow monitoring from any PC. These systems can be set up so that only certain cameras can be monitored by certain individuals if desired. Using the example of the library premise monitoring, the librarian would only have access to the cameras in the library.

Alerting

For night-time monitoring, in the case where cameras are not monitored in real-time, an IP video surveillance system can be set up to send an alert to a pager or a cell phone when certain cameras detect motion on campus. Alerts are flexible, sophisticated and programmable. Unlike passive motion or noise sensors, camera and computer-based motion detection is able to distinguish between significant events and normal movement. The specialized software allows the set up of "virtual trip wires" to detect such movement as the following

- People traveling the wrong way in crowded environments
- Motion in just one section of the camera view

- People creating motion as opposed to an animal
- An object that is removed from a location
- A new object appearing in a scene, such as a package left under a seat

Cost Justification

Most schools place safety and security above the need to cost justify the purchase of a system, but for some, a proper cost justification must be presented. There are hard cost benefits associated with installing these systems (such as saving on costs to repair vandalism) but also soft costs (such as a feeling of safety for students and faculty) that must be considered, but may be more difficult to quantify.

Calculating Hard Cost Savings

The following costs can be used to evaluate potential savings gained from installing an IP surveillance system:

- Annual cost of repair from acts of vandalism – If you already have costs associated with vandalism, these are very easy to quantify.
- Potential cost of a fire – A fire is a special act of vandalism that can be devastating in impact. Even a small bathroom fire has significant costs associated with repair. It is clear that if the system prevents just one fire, than it can pay for itself many times over.
- Decreased cost of personnel required to monitor school grounds.
- Decreased cost of insurance – Some schools have been able to renegotiate their insurance rates by showing a decreased cost of vandalism for their school when an IP surveillance system is installed. Check with schools in your area that have these systems installed to see if they have successfully renegotiated their insurance rates.

Incorporating Soft Cost Savings

Soft cost savings cannot be directly quantified, but must be considered when justifying an IP surveillance system. These soft costs savings include:

- Students feeling safer and more likely to stay with the school.
- Faculty and employees feeling safer about working late or coming in early in the morning.
- Parents touring a school where there is video surveillance will feel more comfortable that there is a watchful eye on the students.

Equipment Cost Considerations

Before meeting with an installer for an IP surveillance system to understand the costs involved in installing an IP surveillance system on your campus, it is important to consider the following:

- How long will you be storing the video? – Disk space is a key contributor to cost.
- Where is your school at the highest risk for vandalism? – The location and number of cameras will contribute to the cost. Cameras in exposed outdoor areas are more expensive than cameras designed for interior use.
- Do you need to monitor parking areas and pick-up zones? – Special mountings and enclosures may be needed for highly exposed cameras.
- Will you be monitoring the entire campus at night, or just certain locations? – Cameras designed to identify individuals at night are more expensive than those used only for day-time monitoring.
- Will you be monitoring playgrounds? – Specific cameras may be required to provide you with complete coverage of playgrounds.

Summary

IP surveillance systems are being installed in schools around the world in order to provide students with a sense of security and to deter acts of vandalism. Since each school will have specific requirements, it is important to consult with a company that can provide guidance and will design a system that addresses the unique needs of your school.

About Ojo Technology

Ojo Technology is a solution provider and systems integrator with expertise in both security and in data networking. Ojo specializes in complete customer specific solutions for IP surveillance systems in educational institutions, local governments, and manufacturing. Whether developing a completely new IP surveillance solution, or upgrading and enhancing an existing analog video surveillance platform, Ojo Technology delivers the complete solution including consultation, design, hardware, software, data cabling, electrical, installation services, maintenance, and support services. Ojo Technology also provides complete user training. Learn more about Ojo Technology online at www.OjoTech.com.

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