

# Looking at IP Cameras

According to industry analyst J.P. Freeman and Co. Inc., IP cameras are forecast to comprise more than half the security-camera market by 2007, while the global network-video market is expected to reach US\$790 million by 2005. In addition, the movement of giants, such as IBM and Cisco, into the network-security market is determining the future of surveillance.

Submitted by LONGTEK ELECTRONICS . Compiled by YAHAN WU

Understanding the advantages of IP cameras is important in choosing surveillance systems. Not only new users need IP-camera surveillance systems, but also existing users are upgrading systems to add IP cameras while keeping existing analog cameras. The following paragraphs discuss major elements and concerns for IP-camera installation.

One major concern is bandwidth and how it affects video quality. Generally, installations containing only a small number of IP cameras can use existing 100 megabit office networks.

Typical network cameras generate 0.2 megabits to two megabits of traffic depending on size, frame rate and compression used. Larger systems require separate networks for surveillance which is then connected to office networks. This reduces bandwidth constraints over office networks while enabling full control and access. Installers adjust bandwidths so it ranges anywhere from between 0.2 megabits and two megabits.

## Compression Standards

Designing video-compression algorithms and implementing them properly requires art, experience and science. Video is like a series of numbers which are compressed into smaller sets of numbers. Compressed video consists of less data and, therefore, takes up less bandwidth.

When video undergoes significant compression this is called a "lossy" algorithm because some original video may be lost; when compressed video files are played back, they do not exactly match original files and may contain slight distortions. Security professionals should adjust compression so final video is acceptable to users.

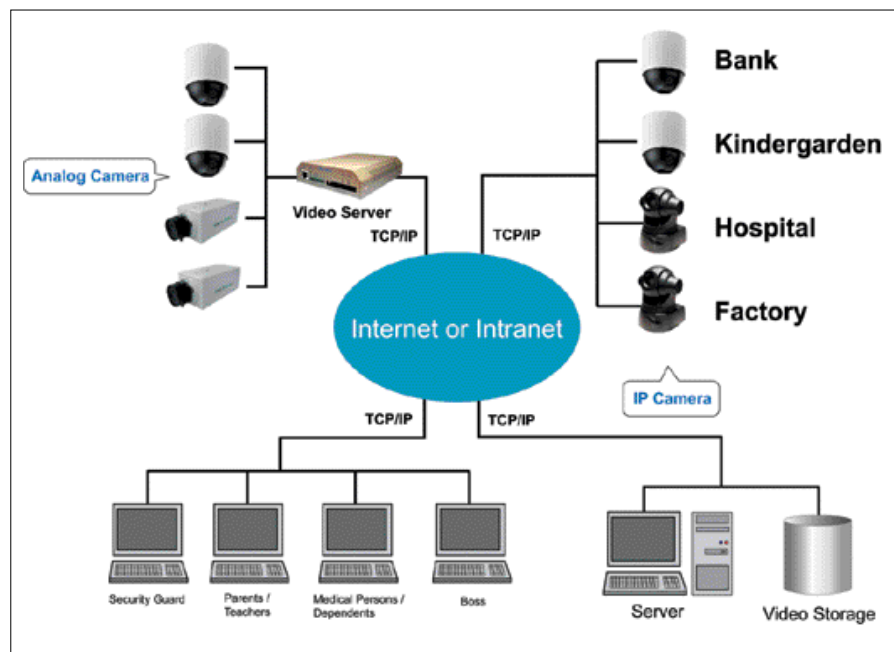
Motion JPEG--the top choice for IP cameras--features inexpensive equipment but at the cost of slightly

higher bandwidth requirements, forcing security professionals to look for other options.

Two major alternatives are MPEG and H.261/H.263. Since the latter was designed for video-conferencing techniques and use of lower bandwidth, video quality does not meet security-surveillance needs.

MPEG can further be divided into MPEG-1, MPEG-2 and MPEG-4. Both MPEG-1 and MPEG-2 were designed for the entertainment industry and are used, respectively, in VCDs and DVDs. MPEG-4 has greater versatility than its "parents" and is better suited to the flexible needs of IP cameras. Primarily designed for videostreams from 4,800 bits to approximately four megabits, it has higher quality compression. Currently, many major players support the MPEG-4 standard for use in IP cameras.

Many have adopted Motion JPEG over MPEG-4 because of cost. MPEG-4 offers many more benefits than other standards and as prices drop, it will see more widespread adoption.



An example of how separate networks are connected to office networks in large systems.

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### Alternatives

Video servers allow conversion of analog cameras into fully-functional IP cameras, providing ability to stream digitized video over office networks like IP cameras.

Video servers can also be connected via modems for access over phones or ISDN connections. With video servers attached to analog cameras, all elements of existing surveillance systems can be upgraded and networked into new IP-surveillance systems.

Do not think, however, that buying video servers and analog cameras is always cheaper since IP cameras give better value for money. As the technology develops, IP-camera prices will drop to the same range as for analog cameras.

### Cost and Scalability

Most offices and facilities today contain 100 megabit wired



Joseph Quinn is an advisor to Longtek Electronics' general manager and has been employed in the Taiwan IT industry for the past two years. Quinn has an indepth knowledge of the IT industry in Asia and an established marketing background.

networks, so absent the need for additional wiring, one major cost associated with CCTV installations is removed from the equation.

With networks connected to the Internet, live or recorded videostreams can be securely accessed and controlled from remote locations. This allows greater ease in accessing correct information any time of the day as well as being able to distribute images when alarms are raised.

In larger installations, IP cameras really come into their own in terms of flexibility and scalability. Installations can easily be upgraded from 100 to 200 plus cameras, something that would cause a lot more trouble within analog systems. It is also becoming more common for airports and government bodies to request enterprise-level IP surveillance solutions over analog systems. **AS**