

the pelco consultant

Security and Surveillance Product Information for Architects and Engineers

Taming IP Latency

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No one would argue the benefits the IP revolution is bringing to video security – enhanced image quality, dramatically more efficient search and retrieval of video, and flexibility in system design and implementation. However, as any experienced user of an analog video matrix can tell you, IP video systems can still lag behind their analog forebears when it comes the responsiveness and control of cameras – critical functions for the live viewing security mission. This installment of The Pelco Consultant explores the sources of IP video latency and what Pelco has done to mitigate them in the Endura IP video system.

Breaking It Down

From the operator's point of view, latency is the time lag between the camera and the display. At any trade show, pretty much every visitor to a booth will do his own test by waving his hand in front of a camera and noting how quickly that hand movement appears on a monitor. In day-to-day security operations, latency is usually most noticeable when an operator is moving a joystick or mouse to command a camera to follow a moving subject.

Between camera and display, a video signal goes through multiple processes, each of which is a potential source of latency. To address latency effectively, it's helpful to understand the path that video follows.

Video capture is the first step, and it takes place at the camera. Once the camera's lens and imager capture the image, the image must be encoded using a video codec to create a data stream (i.e., MJPEG, MPEG-4, H.264). This encoding takes place inside an IP camera, or if the camera is analog, inside a video encoder. The power of the encoding processor and the choice of video codec play a major role in how quickly this processing takes place. The slower the encoding, the more latency is introduced.

Once encoded into a data stream, the encoded video travels along the network. Like any network traffic, a video data stream is segmented into packets, which go across a network and then are reassembled at their destination. Network traffic introduces its own measure of delay as packets are routed. Obviously, the design of a network will have an impact on how quickly and efficiently data moves on it.

Display Success

Pelco Full HD Monitors

The Pelco end-to-end HD system captures and manages high-definition video unlike any other. And Pelco Full High Definition monitors let you view HD video as it's meant to be seen.

A perfect complement to your investment in megapixel imaging and performance.

Available in 42-, 47- and 52-inch models, Full HD monitors deliver 1920x1080p full resolution HD. Compatible with both Pelco and third-party megapixel cameras, they deliver optimal performance, the truest color reproduction available, and a superior visual experience, with clarity and image recognition second to none. And when used with other, lower-resolution camera systems, Pelco Full HD displays can easily and seamlessly scale down to 720p, ensuring detailed and crisp images even when megapixel cameras are not deployed.

Today's control room designs demand efficiency and flexibility. With Pelco Full HD Monitors, users can easily customize video walls to adapt to the changing nature of security, delivering the viewing configuration that suits their particular installation.

By taking advantage of these large-format displays, users have the ability to arrange multiple video streams on

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a single monitor, significantly reducing your installation's power requirements. Using the latest low-power components, Pelco Full HD displays are energy-conscious systems that have met with full regulatory compliance and approval.

Unlike competing general-use monitors, Pelco full HD displays have been designed to meet the rigorous demands of security professionals and their applications. Around-the-clock, day-in and day-out operation will not dull the picture quality, brightness or clarity of these high-definition units.

Pelco backs these fully tested systems with a two-year warranty.



Models

- PMCL542F (42" FHD)
- PMCL547F (47" FHD)
- PMCL552F (52" FHD)

Specs

- Number of Pixels: 1920 (H) x 1080 (V) x RGB
- Pixel Pitch: 484.5 um x 484.5 um
- Color Depth: 1.07 Billion 16.7M
- Viewing Angle: 89/89/89/89 (L/R/U/D)
- Contrast Ratio: Typ. 1300 : 1 Typ. 5000 : 1
- Response Time: 5ms (G-G)
- Average Brightness: Typ. 500 cd/ m2
- Refresh Rate: 60Hz
- Lamp Life-time (Minimum): More than 50,000 Hours

Once all of those video data packets reach their destination, they must be reassembled, in proper order and decoded into a format that can be viewed on a monitor or display. This step takes place at a decoder. Just as with the encoder, the power of the processor and the choice of codec significantly impact the efficiency of this step. One important note about decoding – it's harder than encoding. And as more megapixel cameras start flooding networks with their larger datastreams, decoders will have even more heavy lifting to do.

Once decoded, the video streams travel to a display to be viewed. Increasingly, displays in today's video security control rooms are LCD monitors. While LCDs offer many benefits over traditional CRT displays, LCDs do introduce a bit a latency as well, as the decoded video must be deinterlaced before displaying.

Finally, if an operator is "driving" the system with a keyboard and joystick, that keyboard controller can introduce some latency when it sends its control signals across the network.

Speeding It Up

In the design of the Endura IP video system, Pelco has worked diligently to minimize latency in every component. The Pelco design team has paid extra attention to the encoder and decoder, tuning these components to operate in sync. Oftentimes in software-only video management solutions, where encoders and decoders may come from different vendors, the output and input buffers of these components operate at different thresholds, making it difficult or impossible to optimize latency. A decoder may constantly be waiting for more packets from an encoder, or an encoder may be putting out packets too fast for the decoder to ever catch up. The advantage of the Endura systemized solution is components that are tuned to work with each other at optimal performance.

Pelco has also calibrated Endura Keyboards to provide maximum control and minimal latency, delivering a virtual matrix experience that is as close as possible to the touch and feel of the traditional analog video system. Here again, Endura systemization ensures the user experience.

Design of the underlying network itself also plays a key role in the latency of a system. The 24/7 nature of video security places extreme demands on a network – demands that are drastically different from typical network loads. Clear understanding of network traffic and bandwidth requirements are critical to effective design of IP video networks. With predictable bandwidth streams, the Endura IP video systems makes it easier to plan for network requirements. And Pelco offers design support to integrators for the proper planning and implementation of video networks.