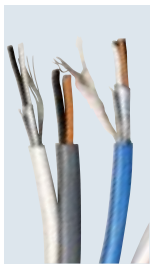
HIGH-QUALITY VIDEO WITH LOW BIT RATE:
The Promise of H.264 Comparing H.264 and Mjpeg Bandwidth Usage Over Security Networks



As more video surveillance manufacturers start to implement H.264 compression technology in their cameras, encoders and digital video recorders, end-users are hoping the technology can decrease the effects of multiple video streams over the network while significantly increasing storage capacity.

Also known as MPEG-4 Part 10, H.264 is a digital video codec standard finalized in 2003 that promises to compress video data to a very low bit rate while maintaining high-quality video. Today, many video surveillance systems are forced to sacrifice bandwidth and costly network storage. However, if the promise of H.264 is realized, the same resources being used today will be capable of transmitting and storing more video streams with higher frame rates and resolution.

Anixter's Infrastructure Solutions Lab recently conducted several tests to compare the differences in bandwidth consumption between H.264 and MJPEG video streams using a single camera from a manufacturer that supports both compression technologies.

Findings

The Lab found significant differences in network consumption between the two compression methods. When the camera viewed little or no motion, the H.264 compressed video stream required roughly 10 percent of an equivalent MJPEG compressed video stream's network bandwidth. In tests with a high degree of motion, the H.264 stream used more bandwidth, resulting in a smaller, but still substantial, difference in network consumption. The biggest potential difference in network utilization is seen in tests with higher frame rates. At lower frame rates, the differences are not quite as large.

Video Quality Observations

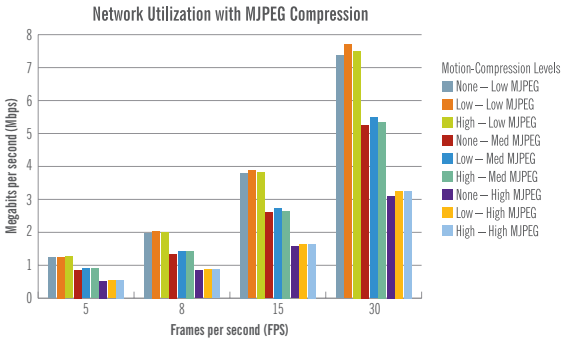
The same camera, lens and monitor were used to observe the video produced via the two different compression schemes. In the qualitative assessment by The Lab's engineers, there was a slight difference in the video quality produced using the two different technologies. The Lab estimates the H.264 video quality was approximately 95 percent as good as the video produced by the MJPEG compression method.

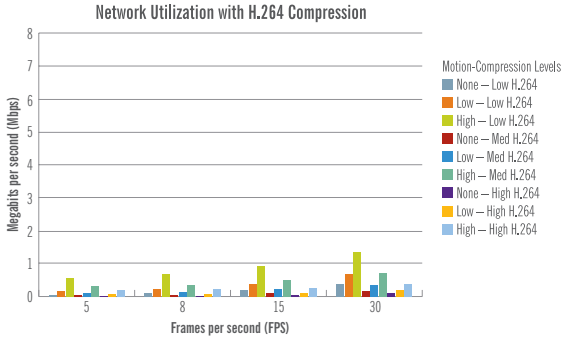
The Lab also observed that a strobe effect of certain striped or checkered patterns could cause the data rate of the H.264 compressed video stream to increase dramatically over scenes without such patterns. If these patterns consumed a significant portion of the camera's field of view, they seemed to represent a large area of motion to the camera's encoding engine and caused the amount of data required to transmit the image to spike. However, these unusual spikes did not reach the level of resources required to transmit and store an equivalent MJPEG stream.

Conclusions

Video streams encoded with H.264 compression methods resulted in significantly reduced network storage requirements over MJPEG compressed streams. Even though these tests did not measure the amount of storage required to save these images, there is a direct correlation between the amount of network bandwidth required to transmit the compressed data across the network and the amount of space required to store the data. For IT and security system managers, The Lab recommends using H.264 compression technology to reduce the bandwidth load of network video streams and increase storage space for the same number of video streams.

Bottom Line:
In tests with little or no motion, the video stream used only 10 percent of an equivalent MJPEG video stream's bandwidth. In tests with a high degree of motion, the difference in network bandwidth consumption was smaller but still substantial.





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