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Video compression: getting the best out of your bandwidth

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Life in the modern world is characterised by the fact that devices are continuously becoming smaller and smaller, typical examples being the mobile phone, photo and video cameras, and even motor vehicles. Technological developments seem to follow the anecdote that less is more. Or perhaps it's just driven by our desire to cram in as much as possible in the little space we have available.

Whatever the reason behind this general trend, it remains one of the developments that have benefitted the video surveillance industry most.

Without compression techniques, it would not be possible to transfer video footage over any network in a practical timeframe. For instance, one second of uncompressed TV picture is 165 MB. That translates into 9.9 GB for one minute of video; 594 GB for one hour and 14,246 GB for 24 hours - the equivalent of fourteen 80 GB hard drives. The fact that video surveillance applications often share the IT network with other bandwidth-intensive applications does not help the situation.

Compression, just as the word implies, is all about reducing image data, and consequently reducing image size. There are two basic compression types: lossless and lossy. In lossless compression, no pixels are changed, so the image looks exactly the same after decompression as before it. GIF is a well-known lossless compression format. Though lossless compression is adequate for still digital picture compression, its major disadvantage is that it doesn't reduce the data by very much and is, therefore, impractical for video.

Most video compression is based on the lossy format, a much more sophisticated process that reduces those elements that appear invisible to the human eye. With lossy, it's possible to achieve compression rates of between 50 to 95 percent with no visible difference.

Different video compression standards reduce data by different means, and hence, results differ in bit rate, quality and latency.

The two basic compression standards are JPEG and MPEG. Broadly speaking, JPEG is for compressing still digital pictures, whereas MPEG is for digital video sequences. But the traditional JPEG image formats also come in variations for digital video – Motion JPEG and Motion JPEG 2000. The group of MPEG standards encompasses MPEG-1, MPEG-2, MPEG-4 and H.264, the latest addition to the MPEG standard.

When designing a networked digital surveillance application, developers need to initially consider the following factors:
- Is a still picture or a video sequence required?
- What is the available network bandwidth?
- What image degradation is allowed due to compression?
- What is the budget for the system?

Only when the answers to these questions have been answered, can the system developer decide which compression standard is best suited for the system. Choosing the right compression standard can be just as important as choosing the right camera for the surveillance scenario.

Even though the compression industry is fairy mature, one can still expect to see even better compression techniques and standards, such as the new H.264 standard, that will bring us better images transmission at even lower bandwidth consumption rates.

About Axis Communications
Axis is an IT company offering network video solutions for professional installations. The company is the global market leader in network video, driving the ongoing shift from analog to digital video surveillance. Axis products and solutions focus on security surveillance and remote monitoring, and are based on innovative, open technology platforms. Axis is a Swedish-based company, operating worldwide with offices in more than 20 countries and cooperating with partners in more than 70 countries. Founded in 1984, Axis is listed on the NASDAQ OMX Stockholm, under the ticker AXIS. For more information about Axis, please visit our website at www.axis.com.

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