



Net DVR

Video Compression *H.264* Technology Explanation

RV60XX & RV70XX Series

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1. Introduction

Video compression as a subject matter may seem really dull, but the real-world benefits of using the latest technology can radically increase the flexibility of your IP network. Put simply, better compression means greater flexibility - the more efficiently data is handled, the more choices you have with your existing resources. An existing network can support more cameras, better audio-video quality or both.

2. Video compression standards - JPEG / M-JPEG / MPEG-4

For surveillance applications, the 'industry-standard' image compression format is JPEG - which is perhaps best known for digital still photographs. In fact, using JPEG compression a network camera is acting rather like a digital camera - taking 25 (PAL) or 30 (NTSC) pictures per second.

Often referred to as Motion JPEG or M-JPEG, it has relatively low processor demands and has made possible the current generation of network cameras. It's also quite well suited to monitoring applications where it's not always essential to provide a TV-quality frame-rate. On the negative side, the M-JPEG format dates back to the early 90s and since then the technology of compression has advanced considerably...

The other standard form of compression, MPEG-4 is actually a series of standards, developed by ISO/IEC Motion Pictures Expert Group (MPEG), and MPEG-4 Part 2 is supported by most Sony network cameras. In 2006, however, Sony began introducing a more advanced MPEG-4 format known as H.264 (or MPEG-4 Part 10). Specifically developed to provide high-quality video at a much lower bit rate than MPEG-4, it uses a variety of different advanced techniques to achieve this aim - most notably block patterns used to predict movement across video frames.

MPEG-4 compression not only operates on each individual frame (intra-frame compression) but also across a series of frames (inter-frame compression). Since a large amount of data is frequently unchanged between frames, this enables a highly significant increase in compression.

3. Benefits of high-performance video compression technology

H.264 was developed to provide high-quality video at a much lower bit rate than standard MPEG-4 or JPEG. As a result, H.264 compression represents a significant benefit to network security camera operations, offering enhanced images with reduced bandwidth.

The market uptake of this technology has been growing quickly due to its wide use within consumer products and its significant improvement over MPEG-4 in terms of compression ratio. For network cameras designed to work with H.264, less bandwidth is needed. The practical benefits of these varying compression formats can be illustrated quite simply. In the diagram you can see JPEG compression operating at 260Kb/s, while MPEG-4 transmits at 85Kb/s and H.264 transmits at 50Kbps. To put this into perspective, MPEG-4 requires approximately one-third of the bandwidth used by JPEG and H.264 requires just one-fifth. That's almost a 40% saving between standard MPEG-4 and H.264. With better compression, stored files will take up much less room on a server - hence potentially saving significantly sums in network storage requirements

4. H.264 - coding standard of choice

A five-fold increase in the capacity of an IP-based network might seem science fiction, but in a networked digital world it should come as no surprise that there's a huge amount of investment in ensuring the highest possible video quality at the lowest possible bit rate. H.264 technology is currently used in Blu-ray Discs, HDTV broadcasting (including BBC HD and Euro 1080), AVCHD (an HD recording format for HDD and Solid State camcorders) and a wide variety of mobile devices, including Apple's iPhone and Sony's PSP. The format is also commonly used online for high-quality content, for example HD movie trailers and YouTube has also adopted it for its new high-quality mode. This also means most media players, such as QuickTime or VLC, support H.264 encoded content.

Demands in the video surveillance world are increasing for more storage and bandwidth without compromising the high frame rates and high resolutions that are desired for improved security. More effective compression methods are therefore required and H.264 is coming to the rescue.