

From MJPEG to H.264, what's right for the job?



TECH TIP

QUESTION: I just purchased several of your new IP cameras and encoders and was pleasantly surprised to see several compression engines available within each peripheral. Can you shed some light on typical applications for each compression?

ANSWER: Although most of our cameras and encoders support H.264 and MPEG-4 compression, our new high-definition HD MegaPX series supports simultaneous H.264 and MJPEG encoding, while the MegaPX 2M IP camera supports all three. There's detailed information on the Internet about these types of compression, therefore, our objective here is to concentrate on which one to select for the different applications you may encounter in the field.

Let's start with some background information.

MJPEG

Most of you probably know that MJPEG is one of the hungriest in terms of bandwidth because it generates relatively high volumes of data and encodes every frame individually. In terms of quality, though, it's still a strong performer and is used by several IP cameras on

the market. Since compressing MJPEG is very easy on the CPU of the IP device, it is ideal as a second stream compression, albeit using much lower resolution and frame rate settings. At the viewing station, there is no need for plug-ins or codecs, as there is no licensing for this compression. Another advantage is that there is very minimal impact on the computer's resources when displaying several MJPEG streams simultaneously.

MPEG-4

MPEG-4 is very good at reducing IP video traffic on your network. As a temporal compression engine, it consumes significantly less bandwidth than MJPEG in still scenes. Most security camera views typically have little to no motion during several hours of the day, making MPEG-4 an excellent performer. When our IP devices are set to MPEG-4, you also have control of the bit-rate and can choose between constant, average, variable or even adaptive streaming.

This provides you with great flexibility in locking in the amount of bandwidth used versus controlling the image quality or simply letting the device automatically regulate its data rate to fit the available bandwidth. Selecting MPEG-4 also allows more streaming capabilities by allowing you to use RTP and RTPS protocols.

H.264

The latest compression engine, H.264, improves on MPEG-4 with even more bandwidth reductions through new advanced prediction techniques, although increased processing power on the IP device is required to achieve it. When video compression and video analytics are used simultaneously, they will have even more of an impact on your IP device's processing power. For this reason, a resource counter has been introduced in our devices to help you keep an eye on your camera or encoder's CPU load. At the client end, you will also note an increase in the computer's resources required to decompress the video, leaving you with a limited number of live H.264 streams you can display simultaneously on your monitor.

Now that we are armed with some knowledge, let's take a look at a few applications.

Scenario 1

Limited Storage and network bandwidth

The majority of cameras are located inside a large warehouse with 24-hour operations. It is imperative to identify small packages as well as every worker within a camera's field of view,

even from a distance. You have restricted network bandwidth to work with as the IP devices are connected to the main LAN. The IP devices are recording on 4000 C Series NVRs hosting 16 analog cameras, so the impact on the existing storage must be taken into consideration. The customer has also requested the use of video motion detection from the analytics portfolio on each of the new IP devices being added.

SOLUTION 1

The request for image detail at a distance calls for our new 1080p HD MegaPX IP camera using H.264 encoding. With only one analytic required, the impact on the IP device's CPU will be minimal, which translates to higher resolution and frame rate settings, all while keeping bandwidth usage low and minimizing the impact on the NVR's storage.

Scenario 2

Nearly Unlimited Storage and a Gigabit network

You are monitoring several parking lots around a building where suspicious activities are taking place just a few feet away from the cameras. The customer would like to use several of the analytics, such as loitering and perimeter detection to alert his security team to the presence of intruders. A new gigabit network has recently been installed, so bandwidth is not an issue. The security station, where the guards view all live cameras, must be able to display a live feed from every IP camera on their video wall.

SOLUTION 2

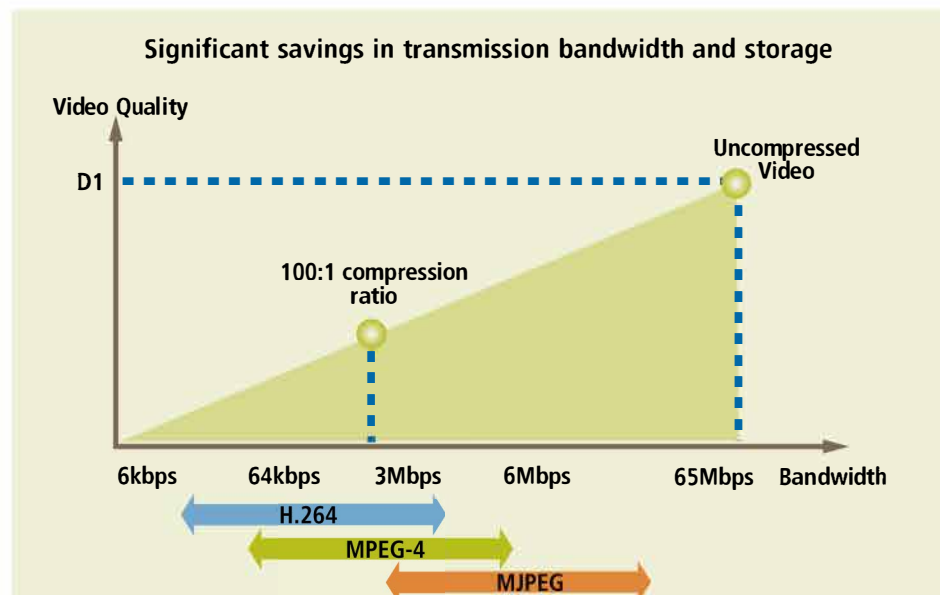
In this scenario, MPEG-4 could be an ideal compression using the CamPX IP camera. Selecting variable bit-rate, you can simply preset the quality and frame rate settings at their highest on the camera. Although having an outdoor field of view with a lot of motion will indeed consume bandwidth, in this scenario the network is more than capable of handling the traffic. It will also be easier to fill the video wall using this compression as it will be less taxing on the computer CPU than H.264.

What about dual streaming capabilities?

What if your scenario is neither of the ones presented here, or perhaps it is a combination of both. Regardless of the application, the dual streaming of our IP devices provides you with the ability to stream live at MJPEG CIF resolution during normal business activities, scale that to Full D1 during a video motion detection alarm, all while recording using H.264 compression on another stream.

Conclusion

So whether you are using our IP devices with the NVR family of recorders or streaming to a central location to our Video Management Software residing on a Windows 2008 Server, the flexibility in choosing the right compression, along with the appropriate number of streams, will allow you to conquer the most stringent network traffic restrictions, while maintaining an impressive image quality. 🌟



March Networks' new high-definition HD MegaPX series supports simultaneous H.264 and MJPEG encoding, while the MegaPX 2M IP camera also supports MPEG-4.

Dual streaming from edge devices such as IP cameras or encoders delivers the optimum video compression for each application in order to meet video quality, bandwidth and storage requirements.

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