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What Is Meant by Dual Stream? Does ACTi's Multi-Stream Offer A Similar Solution?

Many IP solution manufacturers claim to have products that offer dual- or tri-stream. One such design is generally useful when different video streams at different qualities and bit rates are necessary for different clients.

ACTi offers a similar solution with up to four unique video streams, hence the term *multi-stream*. Aside from supplying more unique, concurrent streams, ACTi's solution also provides more advantages than industry standard such as:

- Guaranteed superior video quality
- Ease of custom software design
- Extremely low bit rate
- Simple solution design and maintenance

This support package tells you

- A. What is referred by the term dual stream by the IP surveillance industry
- B. What ACTi has that offer a similar solution

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Chapter I. Dual Stream in IP Surveillance

Definition of Dual Stream

While there is no specific standard for the term, “dual stream” usually denotes the ability of a video server to provide two (hence “dual”) or more types of video streams that inherit different properties. In most cases, dual video streams can be differentiated by three methods:

- **Compression type (MPEG4, Motion JPEG, etc.)**
- **Resolution**
- **Frame rate**

There is currently no standard for defining a dual stream device. For the purpose of this document, any device that meet the above definition is considered dual-stream-capable.

Why Dual Stream

The purpose of dual stream is to provide video streams to multiple downloading applications and/or devices at different bit rates. As bandwidth of an existing network environment is rarely unlimited, it becomes especially important to monitor and constrain the amount of traffic each streaming device uses. Examples of this include, but are not limited to:

- **Live preview at higher quality, record at lower, and vice versa**
- **Better quality within a LAN, lower via the Internet**
- **Live preview via MPEG4, record via Motion JPEG**

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Chapter II. Types of Dual Stream

Dual Stream by Compression Type

A common method to create two different video streams is to provide streams that make use of two video compression types. IP video devices that incorporate such a method generally stream MPEG-4 and Motion JPEG video. Their advantages and disadvantages are listed below:

Table 1. Motion JPEG vs. MPEG-4

	Motion JPEG	MPEG-4
Bit Rate	Very High	Low
Maximum Single-Picture Quality	High	Medium

As seen from the table above, it is logical to assume that Motion JPEG is ideal for high-quality picture requests. However, due to its extremely high bit rate requirement, a much lower frame rate than real-time video must be used to make video streaming on an IP network practical. MPEG-4, as a general consensus, gives slightly poorer image quality, yet has much more suitable bit rate for motion video.

Dual Stream by Resolution

At times, it may be ideal for the IP video device to stream out video at two different resolutions. The lower-resolution stream is usually useful for applications or mobile devices that are only capable of handling such streams. However, sacrificing resolution is generally considered impractical for the purpose of video surveillance.

Dual Stream by Frame Rate

Reducing the frame rate is perhaps the easiest way to reduce the bit rate of a video stream. While the motion is not as fluid as full-frame video, no details are lost. Again, for professional video surveillance, video quality and resolution is valued over frame rate.

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Common Dual Stream Methods

The table below shows the number of unique video streams that the video server of a manufacturer can have, and the uniqueness of each stream.

Table 2a) Dual Steam Comparison Template

Brand	Stream #	Compression	Frame Rate		Resolution
			NTSC	PAL	

Available Frame Rate in Different Video Systems

Manufacturer's Brand Name

Unique Video Streams

Methods of Compression

Resolution vs. Other Streams

Table 2b) Dual Steam Comparison

Brand	Stream #	Stream Type	Frame Rate		Resolution
			NTSC	PAL	
ACTi	#1	MPEG-4	30	25	Constant
	#2	MPEG-4	6	5	Constant
	#3	MPEG-4	3	3	Constant
	#4	MPEG-4	1	1	Constant
Axis	#1	MPEG-4	Unchangeable		Variable
	#2	Motion JPEG	Variable	Variable	Variable
Bosch	#1	MPEG-4	Unchangeable		Variable
	#2	MPEG-4	Unchangeable		Variable
	#3	Motion JPEG	Unchangeable		Variable

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Chapter III. ACTi and Multiple Stream

Of the different aforementioned methods, ACTi video servers incorporate “dual stream by different frame rate”. While others offer two, rarely three video streams, we can offer numerous video streams that consist of four unique stream types, hence the term “multi-stream”. The advantages are as follow:

Video Streams with Different Bit Rates, Saves Bandwidth by Multi-Streaming

With 4 simultaneous, different frame rate streaming types, ACTi video servers allow for versatile system integration. Streams with different bit rates are given, while single-frame video quality is guaranteed. This is especially useful for large solutions where different network devices and environments are being incorporated. Table 3 shows the number of simultaneous, unique streams that a product can support.

Table 3) Name Brand Products and Number of Unique Streams

Brand	# of Stream Types
<i>ACTi</i>	4
Axis	2
Bosch	3
Verint	2

Ease of Integration, Ease of System Management

Much of a video server or IP camera’s functions are determined by the software that is used to control it. As useful as the ACTi in-house software is, there often exists the need for specific applications that must be developed by second or third parties. Allowing for a large number of variables such as different compression methods makes software integration difficult. Additionally, in complex systems, the usage of different compression methods makes both integrating and using it more confusing than it needs to be.

Easy to Use, No Server-Side Configuration Necessary

While dual stream solutions in existence offer two different types of video streams with different properties, they usually need to be pre-defined prior to deployment. With ACTi’s multi-stream, all four different streams are readily available for use at the client side, without any additional setting at the server side.

Guaranteed Video Quality, Guaranteed Low Bit Rate

In a surveillance environment, video quality and resolution are almost always of the

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highest concern. ACTi has always been outspoken for the importance of high resolution at low bit rate. Observing the analog surveillance industry where the resolution only improves, it is evidently not ideal to reduce video quality for the purpose of clarity and identification. Reducing bit rate via frame rate difference achieves the desired effect while retaining this ideal.

Table 4) Bandwidth Consumption at Equal Video Quality

Brand	Frame Rate	Stream Type	Bit Rate
ACTi	30	MPEG-4	3 Mbps
	6	MPEG-4	1.5Mbps
	3	MPEG-4	750Kbps
	1	MPEG-4	250Kbps
Axis	30	MPEG-4	6 Mbps
	30	Motion JPEG	12 M bps
Bosch	30	MPEG-4	6 Mbps
	30	MPEG-4	6 Mbps
	30	Motion JPEG	3Mbps*

* Bosch Motion JPEG settings are unchangeable; the stream is default at lower quality, lower frame rate, and is approximate 3Mbps on average.

Summary

ACTi's multi-stream has the following advantages

- Minimizes bandwidth while maintaining high video quality.
- Up to four different types concurrent video streams.
- In an IP surveillance industry, a complete, simple, effective, and versatile solution is key to success