



White Paper

# THE VALUE OF SOFTWARE-BASED VIDEO CODECS

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S. Ann Earon, Ph.D.  
President, Telemanagement Resources International Inc.

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White Paper  
The Value of Software-Based Video Codec

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# Optimal Audio For Conference Rooms

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## Introduction

With the advent of new video conferencing and collaborative technology products, a discussion has begun to revolve around the value of a software-based architecture versus a hardware based system.

For years, many video conferencing vendors convinced customers that the hardware-based system was the right tool for conferencing and that software-based systems had too many limitations.

However, with the:

- proliferation of bandwidth,
- the flexibility of the Internet protocol,
- increased processing capability of general-purpose processors & standard operating systems,
- the introduction of tablets,
- the capability for general-purpose processors to handle video related tasks, and
- an awareness of contemporary conferencing requirements, vendors have now changed their tune and introduced an open and flexible collaboration platform based on software-based codecs instead of dedicated hardware-based codecs for video conferencing.

The purpose of this paper is to understand the value of software-based codecs as part of today's collaborative tools.

## Meeting Customer Needs

The strongest message received from long-term video conferencing users is that the video conferencing 'talking-heads' experience is not a sufficiently compelling reason to justify installation of video conferencing equipment in

substantially more than a few select conference rooms. Users state that the value in meetings has as much, or more, to do with the information handled in the meetings as it has to do with seeing people. That information might be in the form of PowerPoint presentations, paper handouts, information from a tablet, video clips and photos, or notes on a whiteboard. While vendors have offered peripheral equipment to meet these applications, users feel these needs are not peripheral to their business, but an integral part of their business. As a result, new video conferencing systems have been developed embracing the sharing of meeting content as an equal partner with the transmission of audio and video. But why develop these new systems on software-based codecs?

## The Software-Based Solution

Software-based solutions can be resident on many types of general-purpose devices including PCs, appliances, servers and hand-held devices etc. Software-based H.264 video codecs can be used for conference room, desktop and mobile applications.

Historically, general-purpose devices have been quite lame with respect to handling motion video. It is only in the last few years that graphics and CPU processing power has approached the level of sophistication and power to do justice to quality TV images, an evolution that has recently been driven by the emergence of DVD playback on the PC, video gaming devices, handheld communication devices, and a variety of social media offerings.

The PC is not new to video conferencing. In 1989, VTEL offered the first PC-based video conferencing system. In 1993, PictureTel introduced the System 1000, based on personal computer architecture. In 1997, VCON

invented the first IP-only desktop videoconferencing system for videoconferencing over large organizational networks. However, historically video vendors have been very reserved about exposing the PC inside to the video conferencing user, in part out of concern to protect customers from some of the pitfalls of having a personal computer in a group environment, and in part because until recently the PC learnt itself poorly to the seamless integration of motion video and PC-generated content.

In parallel with the general-purpose devices maturing as a standards-based motion-video platform, the Web has grown to become an indispensable source of information for business. By merging general-purpose processing functionality with video conferencing functionality, and opening the general-purpose device to the conference-room use, the resources on a company's local area network are as accessible in the conference room as when sitting at one's desk. The result is a much better integrated solution than simply attaching a PC as an afterthought to a 'talking heads' video conferencing system.

Web access, access to networked files and databases, and the use of attached devices, such as whiteboards connected with a local or networked printer, provide end users with value from the collaboration system, even for single-room, non-video meetings.

It's economics that led to the development of Telestream's original multi-thousand dollar FlipFactory box. Today, they offer video transcoding workflow solutions as software downloads. And, that is precisely what they are, transcoding solutions, which do not perform as well as using the matching codec employed at the origination site.

Incompatibility between codecs is not going to fade away as technology evolves. Instead, codecs will become more prolific and complex to the point where it comes economically impossible to build chip sets that keep up with software development.

When a system is designed with all these aspects in mind, use of these valuable meeting tools in video calls is a seamless and natural extension of their everyday use in a regular meeting room. Apart from the sheer value of getting more use out of the equipment, this has the added benefit of acclimatizing users to the equipment in conditions other than during a video call, since for some novice or occasional users a video call may be a 'special event' viewed with some trepidation.

## The Value of Software-Based Codecs versus Hardware-Based Codecs

Recent advances in computation power and storage have enabled a variety of general-purpose devices to perform video compression and decompression efficiently in software only formats.

Hardware-based codecs are different between vendors and even between chipsets from the same vendor. This means you don't get the "plug-and-play" portability as you do with software-based codecs.



Hardware-based codecs don't allow you to easily fix interoperability issues and are not as easily programmable as software-based codecs. Software-based codecs and related apps are available everywhere as downloads.

Software-based media-processing solutions do everything from decoding video to managing a touch-screen interface to running Bluetooth, all on a single general-purpose processor. Software encoding offers extremely high quality when compared to hardware encoding, since hardware is usually focused on delivery speed over quality. As processors continue to evolve, future enhancements and applications will be mostly software-based.

The advent of software-based codecs, compared to hardware-based codecs, offers value in many ways. Software-based solutions:

- offer higher scalability and capacity at lower cost than hardware based solutions
- enable faster time to market for new, latest or custom features
- allow easy customization for different needs of vertical markets
- offer easy upgradability and seamless feature additions after the initial investment
- offer more flexibility to expand with business growth
- are more highly secured for IT infrastructure requirements
- allow the use of existing equipment and infrastructure with easier installation and maintenance
- achieve higher Return On Investment with multiple capabilities and applications in a single-box solution
- facilitate easier migration to user-friendly devices (e.g. tablets, phones, MAC, PC, etc.).

Future video/collaboration apps will reside in the "cloud" requiring that a user simply connect to it. Software codecs are not only for collaborative efforts, but are used for a variety of applications when data needs to be compressed and sent to another site. It isn't economically feasible to build codecs for every application. Using software makes changes much easier and faster.

Due to improved coding efficiency and functionality, a number of applications using digital video – video conferencing, video streaming, Internet video games, and digital TV – are emerging on general-



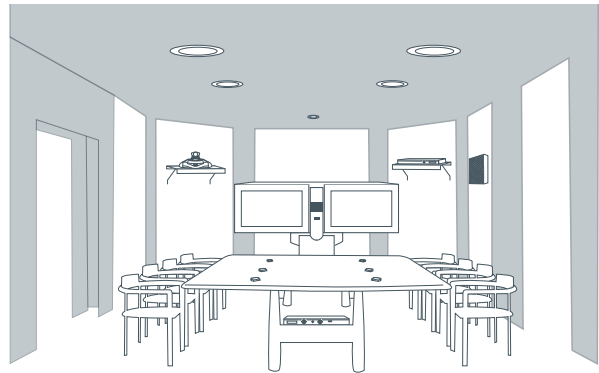
purpose devices, as well as hand-held devices. For each application, efficient software codecs are highly desirable.

## Technology Perceptions

While video conferencing in room environments will always have their place for important group meetings, it is important to realize that many people in the work place do not always have the time to walk down a hall to a conference facility. Using a software-based architecture allows the two dimensions of traditional video conferencing systems – audio and video – to be added by a third dimension – data, as an integral component to make a well-rounded whole. When you compare three dimensional, integrated products to what was known in the past, the old way of communicating seems flat by comparison. People now want the ability to hold video calls and collaborate wherever they are located, including at the desktop or while away from the office.

Because there is no common denominator, the demand for more powerful codecs can only be economically justified with software-based solutions. As the next generation of computing evolves, software codec developers will be able to apply more sophisticated algorithms. As video applications become complex in fields requiring very high resolutions images with 3-D motion for medicine, scientific research, engineering, etc. so too will the codecs that are needed to disseminate, receive and share information.

Software-based codecs, for a variety of reasons as noted above, are here to stay and offer developers and users the flexibility needed to upgrade information and technology as it is needed, thereby eliminating expensive hardware.



*S. Ann Earon, Ph.D., is president of Telemanagement Resources International Inc. and Founding Chairperson of IMCCA, the non-profit industry association for collaborative conferencing. She can be reached via email at [annearon@aol.com](mailto:annearon@aol.com).*



## Clearone Contacts

### North America

Tel: 801-975-7200  
Toll Free: 800-945-7730  
Sales: 800-707-6994  
Fax: 801-977-0087  
sales@clearone.com

### Europe & Oceania

Tel: +44 (0) 1189 036 053  
global@clearone.com

### Asia Pacific

Tel: +852 3590 4526  
global@clearone.com

### Latin America

Tel: 801-974-3621  
global@clearone.com

### Middle East

Tel: +852 3590 4526  
global@clearone.com

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