Intel® Software Development Products
for Intel Platforms and Technologies

A Shortcut to Success

> "People want to have the ability to view good quality, high resolution video from their own desk or on the move. For ImageCom, providing targeted applications that are specifically optimized with Intel® Integrated Performance Primitives and Intel® C++ Compiler is crucial to enabling this."
>
> **Thomas Dove, CEO**
> **ImageCom**

Moving images speak louder than words

Video imaging capacity is improving as technologies evolve. In the future, consumers expect to download video clips delivered through a network to a variety of devices such as their personal digital assistants (PDAs), set-top boxes, and PCs—this is one-way movement of data. They also want to conduct live meetings through these same devices, which involves two-way data exchange.

Some streams are useful only if they are live or nearly so, for example, meetings, surveillance videos, and "live" newscasts. As Thomas Dove, Chief Executive Officer of ImageCom, says,"High cost and low video quality have been two key factors that have been preventing more widespread adoption of one-way and two-way video. We have found that making use of the Intel® Integrated Performance Primitives (Intel IPP) and Intel® C++ Compiler—with the particular optimizations these give—is vitally important in resolving the cost and quality issues." Intel IPP and Intel C++ Compiler helped ImageCom optimize the performance of its PC Encoder software to more efficiently manage streams of video data.

Intel® IPP and Intel® C++ Compiler speed image codec

The Intel® IPP is a cross-platform signal and multimedia software library with a low-level layer that abstracts functionality from the processor underneath. Intel IPP provides a range of functions for multi-media, audio, video, image processing, signal processing, speech compression, math support routines, and computer vision. Examples of functionality ImageCom utilizes include H.263 and MPEG-4.

The Intel® C++ Compiler is an important part of making software run at top speeds on Intel® Pentium® 4 processor-based systems. Through the use of advanced compiler optimizations, such as support for Streaming SIMD Extensions 2 (SSE2) and the Intel® NetBurst™ microarchitecture, the Intel C++ Compiler can deliver dramatic application performance improvements.

THE APPLICATION

Deliver video on demand, anywhere, anytime

ImageCom, based in Maidenhead, England, develops video compression technology for simultaneous transmission of voice, video, still image, and data over low and medium bandwidth switched and leased digital networks. Their technology is embedded into their customers' applications in the networking, video communications, and wireless video market segments. ImageCom technology has been integrated into products of industry leaders such as PictureTel, BT Group, Reuters, Lockheed Martin, and many others.

ImageCom's business is to keep up with the ability to deliver video on demand—anywhere, anytime, and in some cases, live. 3G and other wireless technologies promise to make this all possible. ImageCom had a customer that wanted to save costs by migrating from ISDN hardware to Internet-ready content for their users. Since the plan was to run their application on an Intel Pentium processor-based server, ImageCom turned to Intel for a solution. Intel engineers proposed the Intel IPP libraries and the Intel C++ Compiler.

THE CHALLENGE

Transcoding video images on the fly

ImageCom's goal was to take incoming Common Interface Format (CIF) video data in digital video format and transcode it on the fly to an H.263 standard format. The significant challenge for their video compression embedded technology was to do it faster than the inbound data rate to avoid bottlenecks, using lower cost Intel Pentium processor-based PCs.

> "Our customers were looking for lower cost solutions for delivery of video streams. The Intel C++ Compiler and Intel IPP libraries allowed ImageCom to meet the customer's expectations for cost and timescales."
>
> **Thomas Dove, CEO**
> **ImageCom**

The process of transcoding an 80-second CIF video stream from a surveillance camera to H.263 format, unaided, typically took 123 seconds. This transcode time was 160% of the maximum allowable time for this activity.

THE ANSWER

Intel IPP and Intel C++ Compiler made the difference

ImageCom installed its video codec software, PC Encoder, on an Intel Pentium 4 processor-based system running at 1.7 GHz. When the unaided ImageCom PC Encoder transcoded the 80-second inbound CIF stream, it took 123 seconds. After adding the Intel IPP—and its ability to load library functions optimized for the features of the Intel Pentium 4 processor—to the ImageCom application, the video codec took only 84 seconds to transcode the stream. This was a 32% reduction in transcode time.

ImageCom PC Encoder Configuration		Intel Pentium 4 processor-based system	
Intel IPP	Intel Compiler	Encode Time for 80-sec clip	Percentage Improvement
		123 sec	0%
Y		84 sec	32%
	Y	69 sec	44%
Y	Y	57 sec	54%

The ImageCom engineers then took the original unaided application code and ran the Intel C++ Compiler. They found the process of transcoding the same 80-second video stream took only 69 seconds—a 44% improvement.

Finally ImageCom applied both Intel IPP and the Intel C++ Compiler to their PC Encoder and found the transcoded time dropped to 57 seconds, a 54% time reduction. This was well within the requirements of their application constraint.

ImageCom could now encode video clips in less than half the time (57 seconds versus 123 seconds) required prior to using the Intel software tools thus enabling ImageCom customers to view live video streams in real time.

THE ADVANTAGE

Better product—new opportunities

The significant performance improvement delivered to the ImageCom PC Encoder software by the Intel Software Developer Tools enabled ImageCom to compete in a new segment of the market. ImageCom can now offer their customers lower cost video solutions in real time. The combination of the faster Intel processor and Intel Software Developer Tools, Intel IPP and Intel C++ Compiler, opened up new business opportunities for ImageCom. As ImageCom's General Manager of Embedded Technology, Paul Carter, says, "Using third party tools, such as the Intel IPP and Intel C++ Compiler, helped ImageCom take a shortcut to success."

Intel provides both the tools and support to enhance the performance, functionality and efficiency of software applications. Compatible with leading Windows* and Linux* development environments, Intel software development products are the fastest and easiest way to maximize the latest features of Intel processors. Designed for use in the full development cycle, Intel software products include Intel software libraries, Intel Compilers (C++, Fortran for Windows and Linux), Intel® VTune™ Performance Analyzer and Intel® Threading Tools (KAP/Pro Toolset, Assure Thread Analyzer). Performance results provided by ImageCom. Performance depends upon the specific computer systems, components and/or measurement methods used; your results will vary.

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