

Success Brief

Intel® Developer Products

Intel® Parallel Studio for
Microsoft Visual Studio*

Video, Broadcasting

“Intel® Parallel Studio globally speeds up our software products’ time-to-market.”

*Eric Rosier
Vice President, Engineering
Envivio, Inc.*

Bringing video encoding innovation to multicore

Envivio* turns to Intel® Parallel Studio to overcome the challenges and limitations of encoding HD video on single-core platforms

Company	Established in 2000, Envivio, Inc.* is the leader in IP video convergence solutions that make IP video a reality over any type of network and to any multimedia device—from 3G to xDSL, and from mobile TV to HDTV. Envivio supports a wide range of network protocols, resolutions, codecs, bit rates, and devices to serve telcos, ISPs, broadcasters, cable operators, and enterprises worldwide. Constantly innovating, Envivio is the only company able to offer IP video convergence solutions that deliver industry-leading video quality at the lowest bit rate for the “three screens” of video (TVs, PCs, and mobile phones).
Mission	Envivio is committed to helping create a converged world by continuously striving to introduce advanced compression products for traditional and emerging media via global access to video information.
Product	Envivio’s 4Caster C4* is a real-time transcoding application. It currently supports one channel of high-definition or multiple channels of standard-definition encoding for IPTV, Internet TV encoding up to VGA resolution, and 3G Mobile TV encoding. For IPTV applications, C4 can be delivered in either Premium Compression or Extreme Compression encoding configurations using Envivio’s new flexible encoding core.
Challenge	Deliver IP video over any type of network at any time, while overcoming the limitations of a single core in the real-time encoding of HD video from MPEG2 to H.264.
Results	Results include delivery of compressed video quality at the lowest bit rate for mobile TV, Internet TV, IPTV, and broadcast applications, streamlining of the life cycle, and elimination of errors.
Impact	Envivio was able to solve problems throughout the development life cycle, saving costs and improving productivity.

Challenge: why Envivio products benefit from utilizing parallelism

Depending on the formats, several cores are required to perform a single encoding. For HD content repurposing from MPEG2 to H.264, a single core is not enough to achieve the encoding task in real time. In that case, both multicore and multiprocessor (DP) technologies are required to provide the minimum horsepower for the application. For SD contents, high-quality video is required for the broadcast market segment. This level of quality is obtained using heavy processing algorithms, while keeping the real-time constraint. At the same time, in order to keep a modular level of density (i.e., 2/4 SD channels per platform), a parallelization (2/4 cores per channel) schema is mandatory to take advantage of the platform capabilities. The density problematic is induced by the economic equation of the BOM cost: More channels per platform lead to smaller COGS. In Envivio applications, the H.264 Codec is the most “time-critical” software component. Particular care is taken to achieve the parallelization balance of this module.

Intel® Parallel Studio brings comprehensive parallelism to C/C++ Microsoft Visual Studio* application development.

Parallel Studio was created in direct response to the concerns of software industry leaders and developers. From the way the products work together to support the development life cycle to their unique feature sets, Parallel Studio makes parallelism easier and more viable than ever before.

The tools are designed so those new to parallelism can learn as they go, and experienced parallel programmers can work more efficiently and with more confidence. Parallel Studio is interoperable with common parallel programming libraries and API standards, such as Intel® Threading Building Blocks (Intel® TBB) and OpenMP*, and provides an immediate opportunity to realize the benefits of multicore platforms.

Build Applications for Multicore

Intel® Parallel Composer is part of the larger Intel® Parallel Studio and brings an unprecedented breadth of parallelism development options for developers using Microsoft Visual C++*. Its combination of compilers, libraries, and an extension to the Microsoft Visual Studio debugger supports easier, faster multithreading of serial and parallel applications.

Easily Find Memory and Threading Errors

Intel® Parallel Inspector combines threading and memory error checking into one powerful error checking tool. It helps increase the reliability, security, and accuracy of C/C++ applications from within Microsoft Visual Studio. Intel Parallel Inspector uses dynamic instrumentation that requires no special test builds or compilers, so it's easier to test code more often.

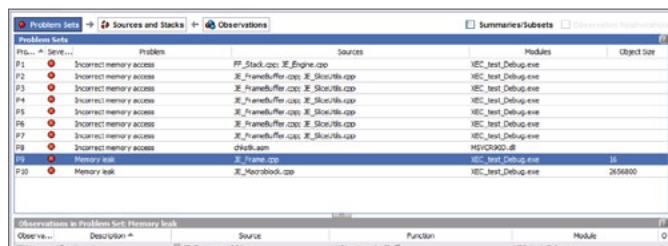
Optimize Performance and Scalability

Intel® Parallel Amplifier makes it simple to quickly find multicore performance bottlenecks without needing to know the processor architecture or assembly code. Parallel Amplifier takes away the guesswork and analyzes performance behavior in Windows* applications, providing quick access to scaling information for faster and improved decision making.

Results

The error and memory checking capabilities of Intel® Parallel Inspector were critical in finding and solving memory leaks early in the implementation of new code sections. The memory leak tool found a few unresolved memory accesses within the core part of the H.264 Codec. Envivio Vice President of Engineering, Eric Rosier, found Intel Parallel Inspector “more than easy to set up and use, providing fast and efficient bug prevention mechanisms.” Preventing memory misuses and thread concurrency also made support easier during early stages of the development life cycle.

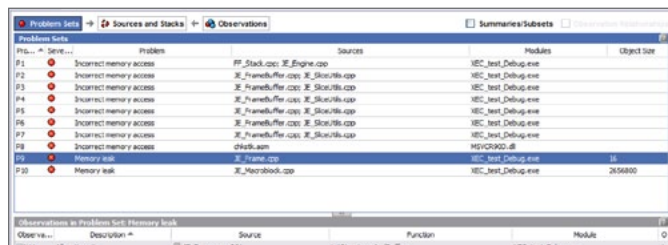
Intel® Parallel Inspector Result Summary



Problems	Problems	Sources	Modules	Object Size
P1	Incorrect memory access	FF_Stack.cpp; XE_Engine.cpp	XCCTest_Debug.exe	
P2	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P3	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P4	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P5	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P6	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P7	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P8	Incorrect memory access	chrtk.am	MPVC9KDD.dll	
P9	Memory leak	XE_Frame.cpp	XCCTest_Debug.exe	16
P10	Memory leak	XE_MacroBook.cpp	XCCTest_Debug.exe	2636800

Intel® Parallel Amplifier played an important role by helping to confirm the hotspots within the H.264 Codec. The tool was easy to use and provided accurate and useful information. Intel Parallel Amplifier accelerated parallelism development for teams that are not experienced with Intel® VTune™ Performance Analyzer, perhaps benching new modules to develop before sending them to integration. Intel Parallel Amplifier can then highlight areas where code improvements can be made, before continuing the module life cycle.

Intel® Parallel Amplifier Result Summary



Problems	Problems	Sources	Modules	Object Size
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P5	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P6	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
P7	Incorrect memory access	XE_FrameBuffer.cpp; XE_Stack.cpp	XCCTest_Debug.exe	
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How Intel Parallel Studio Assisted

Intel's new analysis and profiling tools makes the new Envivio 4Caster Series Transcoder* development faster and more efficient. Intel Parallel Inspector and Intel Parallel Amplifier help develop and optimize parallel applications to perform real-time encoding. Specifically, use of these tools shortens overall software development time by increasing the code reliability and the performance in a multicore, multithreaded environment. During the early stages of the development, life cycle support is simplified by preventing memory misuses and increasing thread concurrency. At the qualification stage, the number of dysfunctions is reduced due to a safer implementation and bug tracking becomes easier. The enhanced development capabilities, saved costs, and improved productivity will also benefit Envivio's customers who rely on its solutions to reduce operational costs.

Optimization Notice

Intel® compilers, associated libraries and associated development tools may include or utilize options that optimize for instruction sets that are available in both Intel® and non-Intel microprocessors (for example SIMD instruction sets), but do not optimize equally for non-Intel microprocessors. In addition, certain compiler options for Intel compilers, including some that are not specific to Intel micro-architecture, are reserved for Intel microprocessors. For a detailed description of Intel compiler options, including the instruction sets and specific microprocessors they implicate, please refer to the “Intel® Compiler User and Reference Guides” under “Compiler Options.” Many library routines that are part of Intel® compiler products are more highly optimized for Intel microprocessors than for other microprocessors. While the compilers and libraries in Intel® compiler products offer optimizations for both Intel and Intel-compatible microprocessors, depending on the options you select, your code and other factors, you likely will get extra performance on Intel microprocessors.

Intel® compilers, associated libraries and associated development tools may or may not optimize to the same degree for non-Intel microprocessors for optimizations that are not unique to Intel microprocessors. These optimizations include Intel® Streaming SIMD Extensions 2 (Intel® SSE2), Intel® Streaming SIMD Extensions 3 (Intel® SSE3), and Supplemental Streaming SIMD Extensions 3 (Intel® SSSE3) instruction sets and other optimizations. Intel does not guarantee the availability, functionality, or effectiveness of any optimization on microprocessors not manufactured by Intel. Microprocessor-dependent optimizations in this product are intended for use with Intel microprocessors.

While Intel believes our compilers and libraries are excellent choices to assist in obtaining the best performance on Intel® and non-Intel microprocessors, Intel recommends that you evaluate other compilers and libraries to determine which best meet your requirements. We hope to win your business by striving to offer the best performance of any compiler or library; please let us know if you find we do not.

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