Envivio* Brings Video Encoding Innovation to Multicore with Intel® Parallel Studio

Case Study

Intel® Parallel Studio

Video, Broadcasting

"Intel® Parallel Studio globally speeds up our software products on time-to-market."

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

Introduction

As the only company to offer convergence solutions supporting the "three screens" of video (TVs, PCs, and mobile phones), Envivio makes IP video a reality over any type of network and to any multimedia device from mobile to HD. Creating IP video convergence encoding solutions for telcos and broadcasters in an industry where performance expectations are high, the innovative Envivio knows the difference the right software tools can make. Faced with challenges encoding HD video on single core platforms, Intel® Parallel Studio parallelism tools for Windows* is a natural fit. The enhanced development capabilities will benefit Envivio's customers as well—service providers worldwide rely on its solutions to reduce operational costs, while offering subscribers the most compelling and highest quality video services anytime and anywhere.

Challenge	▪ Delivering IP video over any type of network, anytime ▪ A single core is insufficient for real-time encoding of HD video from MPEG2 to H.264
Solution	▪ Intel® Parallel Inspector and Intel® Parallel Amplifier help develop and optimize parallel applications to perform real-time encoding ▪ Support is simplified during early stages of the development lifecycle by preventing memory misuses and thread concurrency

Parallelism is Key to Real-Time Encoding

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.

Depending on the formats, several cores are required to perform a single encoding. In particular, 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, a high-video-quality level 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 channels) 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 the parallelization balance of this module.

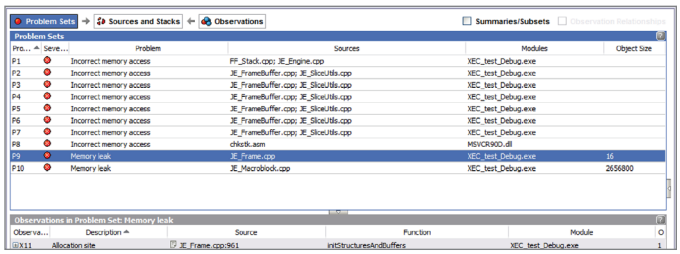
"For HD content repurposing from MPEG2 to H.264, a single core is not enough to achieve the encoding task in real time."

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

Solving Problems Throughout the Development Lifecycle

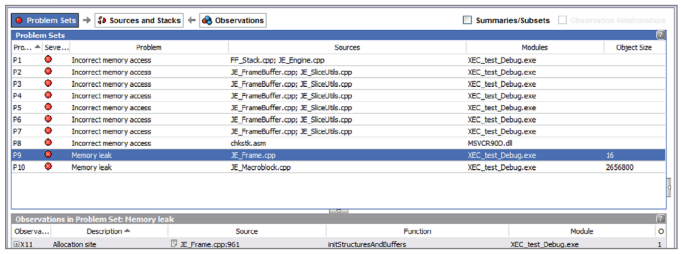
The error and memory checking capabilities of Intel® Parallel Inspector were critical in finding and solving memory leaks early in the implementation of new code sections. The memory leak tool found a few unresolved memory accesses within the core part of the H264 Codec. Envivio Vice President of Engineering, 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 lifecycle.

Intel® Parallel Inspector Result Summary



Intel Parallel Amplifier played an important role, by helping to confirm the hotspots within the H264 Codec. The tool was easy to use and provided accurate and useful information. Envivio also sees Intel Parallel Amplifier playing a special role by accelerating 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 lifecycle.

Intel® Parallel Amplifier Result Summary



Conclusion

Intel Parallel Studio is helping Envivio to deliver compressed video quality at the lowest bit rate for mobile TV, Internet TV, IPTV, and broadcast applications. Intel Parallel Studio is becoming an essential part of Envivio's application development toolset, helping to streamline the lifecycle and eliminate errors. The saved costs and improved productivity support Envivio's efficient business model and can be passed along to Envivio's customers who, in turn, depend on delivering low-cost, high-quality service.

"Intel's new analysis and profiling tools makes the new Envivio* 4Caster Series Transcoder development faster and more efficient. In particular, the use of Intel® Parallel Inspector and Intel® Parallel Amplifier shortens overall software development time by increasing the code reliability and the performance in a multicore, multithreaded environment. At the qualification stage, the number of dysfunctions is reduced due to a safer implementation, and the bug tracking becomes easier too."

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

To learn more about Intel Parallel Studio, visit www.intel.com/software/parallelstudio

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