

## Speeding up Face Recognition

“ The shorter the response time for any verification or identification process the better the user acceptance. The initial effort to implement Intel IPP was definitely worth the time and money. ”

**Alfredo Herrera Hernández,**  
Managing Director Cognitec



### BIOMETRICS NEEDS POWER

Biometric technologies such as facial recognition are increasingly important in tasks such as border control, security checks and identifying individuals in crowds. Such applications need to be fast and accurate, so top performance is essential. As an industry-leading provider of facial recognition systems, Cognitec is constantly looking for ways to speed up its award-winning FaceVACS\* technology.

When Cognitec adopted the Intel® Integrated Performance Primitives (Intel® IPP) library it achieved enormous gains in the performance of FaceVACS while at the same time achieving cross-platform, cross-processor support.

### INTEL® IPP OPTIMISES PROCESSOR USAGE

The Intel® IPP software library provides a broad range of signal, image, graphic, multimedia, and numeric processing functions, highly optimized across Intel® architectures. Intel® IPP enhances performance by providing programmers with optimized, processor-specific functions. Developers write to a single application programming interface (API) supporting the Intel® Pentium® 4, Intel® Xeon™, Intel® Itanium® processors, and Intel® PCA application processors based on the Intel® Xscale™ microarchitecture.

Developers no longer need to write processor-specific code. When new Intel® processors are introduced, developers simply update and recompile. Intel® IPP enables developers to incorporate value-added features and performance into their applications, reduces engineering costs, and improves time-to-market.

### THE APPLICATION Spotting faces quickly

The emerging technology of face recognition is one of the most important fields of development and has been pioneered by Cognitec. The FaceVACS products can positively identify a given face, and select a correctly matching face from a given portfolio. High performance is crucial because facial recognition needs to be fast and accurate. At present FaceVACS leads the market.<sup>1</sup> Cognitec's technical systems offer people help and support in what can otherwise be a manual process. They use a similar approach to the way human beings recognise each other – a method that is familiar and easily embedded into existing human-operated identification systems. The result is a semi-automated process, which is comfortable and easy for operators and for individuals who are undergoing the recognition process.

Cognitec provides applications for:

- Physical access control and border control
- Searching identities within large face databases
- Identifying individuals in a crowd

## THE CHALLENGE

### Efficient processor usage

The major challenge for FaceVACS was to deliver a rate of numerical calculations that exceeded the capabilities of fast processor-based systems. "The faster the calculations are performed the quicker the response time for any verification or identification process, and the better the user acceptance," says Alfredo Herrera Hernández, Managing Director at Cognitec. Additionally, Cognitec was looking for a powerful, cross platform library that would separate the application from the specific underlying hardware.

## THE ANSWER

### Overcoming the challenges

Due to its highly optimised routines and its cross platform support, Intel IPP turned out to be the library that met Cognitec's expectations. As a result, all Cognitec core development tasks are constantly analysed and reviewed to look for calculation performance improvements. The team recognised that most processor time was spent performing numerical calculations. The adoption of Intel IPP offered a superb solution to overcome the speed challenge. "By incorporating the Intel Integrated Performance Primitives library Cognitec's software precisely optimises processor usage for massive numerical operations," says Alfredo Herrera Hernández.

In proprietary benchmarking<sup>2</sup>, Cognitec carried out the typical task of finding a face in a picture, extracting relevant features, elaborating, and storing the data in a database. The results were:

	C++ code without Intel IPP	With Intel IPP	Performance Improvement
Execution time (avg)	54.2 sec	37.2 sec	31 %

System configuration: Intel® Pentium® 4, 2.8 GHz, FSB533 Single/2 GB RDRAM 800 (D850EMV2)

Separately a 10x speed improvement was achieved (500,000 comparisons per second compared with 50,000 comparisons per second without Intel IPP) on the same system.

"The final results in terms of throughput increase are enormous. Rewriting C++ source code for using the Intel IPP library required a significant investigation of time and effort, but it was well worth it because the final results were so impressive," says Alfredo Herrera Hernández.

“By incorporating Intel Integrated Performance Primitives library Cognitec's software precisely optimises processor usage for massive numerical operations.”

Alfredo Herrera Hernández,  
Managing Director Cognitec

## THE ADVANTAGE

### Customer satisfaction boosts sales

The tremendous performance improvements in FaceVACS as a result of implementing Intel IPP has created significant market opportunities for Cognitec. "The speed gains and performance improvements after the Intel IPP library had been introduced are quite extraordinary," says Alfredo Herrera Hernández. "The shorter the response time for any verification or identification process the better the user acceptance. The initial effort was definitely worth the time and money."

Cognitec is determined to move ahead with using Intel IPP as a basis for future development and enhancement. Improved performance means improved user satisfaction and the potential for a growing customer base in security, access, border control and other applications for face recognition. "Cognitec is very pleased with Intel IPP benefits and will definitely stick to it.

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).

The Intel Premier Customer Support Web site provides expert technical support, product updates and related downloads for all Intel software products.

For product and purchase information visit [www.intel.com/software/products](http://www.intel.com/software/products)

**Performance.  
Compatibility.  
Support.**



Intel, the Intel logo, Itanium, Pentium, Intel Xeon, Intel XScale, and VTune are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

\*Other brands and names may be claimed as the property of others.

Copyright © 2003 Intel Corporation. All rights reserved. 008/03

253959-001

Software Products Division- Cognitec (IPP) Case Study

Part Number: CS03-2003/E