Kalray and eSOL Collaborate to Develop Products for the Manycore Market

eSOL eMCOS Manycore RTOS Running on Kalray's Manycore Processor to be Demonstrated at Embedded World 2015

Tokyo, Japan, February 24, 2015 – Kalray , the inventor of supercomputing on a chip™ for embedded high-performance computing applications, and eSOL, a leading developer of real-time embedded software solutions, announced today that they have agreed to establish a strategic partnership to jointly develop products that aim to improve the efficiency of system development and accelerate time-to-market. Their first solution, the eSOL eMCOS real-time operating system (RTOS) running on the MPPA1-256, the first generation of Kalray manycore processor (codename Andey), will be demonstrated at eSOL's booth, No.4-157 in Hall 4, at the embedded world Exhibition & Conference 2015, February 24-26 in Nurnberg, Germany.

The combination of eSOL eMCOS RTOS and Kalray's innovative MPPA$^{®}$ programmable manycore processor achieves extremely high computing performance and energy efficiency with low latency and predictable response times. It is a perfect fit for applications requiring image/voice processing, encryption/signal processing, and real-time processing such as in high-end automotive ADAS. Further applications enabled by this combination include video surveillance equipment, medical devices, augmented-reality (AR) devices, satellite systems, factory automation/industry equipment, and other high-performance embedded systems.

The MPPA$^{®}$-256 is the leading-edge 256-core processor, featuring 16 compute clusters of

16 processing cores, 4 I/O subsystems with high-speed interfaces including Ethernet 10Gb, DDR3, PCIe Gen3, and the Kalray NoC eXtension (NoCX) protocol for direct connection to FPGA or other MPPA® processors. The MPPA® core implements an innovative 32-bit Very Long Instruction Word (VLIW) architecture that combines the efficiency of a DSP with the ease of programming of a CPU.

eMCOS employs distributed microkernel architecture that is totally different from any existing RTOS architecture. The highly scalable OS supports a single-core up to 1024-core processors, with or without a cache-coherency mechanism. Moreover, the patent-pending eMCOS Semi-priority-based Scheduling™ algorithm ensures the high performance and scalability that is expected from manycore processors, and the fast real-time response that is essential for embedded systems. There is no need for application developers to consider CPU cores, since the eMCOS employs the same programming model as that of other multi-core RTOSes, including eSOL's eT-Kernel Multi-Core Edition. eMCOS OS APIs are provided with the familiar C function interface, and message-passing behavior is conducted within APIs. Therefore, developers can develop software the same way they usually do.

For application development, Kalray's C/C++/Fortran GCC-based tool chain, MPPA® Accesscore and the eSOL eMCOS IDE Plug-in tools that work as plug-ins for the Kalray tool chain are available. The eSOL eMCOS IDE plug-in consists of eMCOS-specific system analysis tools and utility software. In the second quarter of 2015, eSOL will launch the eSOL eMCOS SDK, the evaluation kit for MPPA® processor, which includes eMCOS, the IDE Plug-in, and middleware components such as network protocol stacks, file

systems, and USB stacks. The evaluation kit permits quick evaluation of MPPA® and eMCOS. Since eMCOS supports T-Kernel and POSIX APIs, developers can evaluate their Linux, μITRON, and T-Kernel software assets on a manycore processor. Furthermore, eSOL will provide professional services – consisting of engineering services, such as driver and application porting, and consulting services.

eSOL chairs the Software-Hardware Interface for the Multi-Many-Core (SHIM) working group in the Multicore Association® (MCA), and takes on the position of Vice-President for the Embedded Multicore Consortium, which leads multi-core technology in Japan.

"We believe that collaboration with eSOL, a leading company in manycore technology for embedded use, will accelerate the development and promotion of innovative manycore products," said Benoît Dupont de Dinechin, Chief Technology Officer of Kalray. "eSOL's eMCOS, which employs the distributed microkernel architecture, will maximize the performance of our MPPA® processor, and enable development of more integrated power-efficient systems. We expect that the combined solution will be used in image processing such as video surveillance equipment and AR devices, plus communication devices and satellite systems."

"Kalray has the unique technology to achieve extremely high computing performance and energy efficiency. In contrast to server processors, the MPPA® processor can be utilized in real-time systems," said Masaki Gondo, Software Chief Technology Officer and General Manager of Technology Headquarters at eSOL. "The combination of Kalray's processor and our eMCOS allows system development with high computing capability

and real-time performance, providing platforms for the next-generation of intelligent

embedded systems."

About Kalray

Kalray is a fabless semiconductor company and pioneer in developing many-core processor solutions. Kalray's supercomputing on a chip™ technology is a unique architecture for a new generation of high-performance, low-power, real-time C/C++ processors. The company's IP, processors and acceleration boards ideally address the growing needs of large and important markets such as cloud computing, automotive, telecom and aerospace.
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For more information, please visit http://www.kalrayinc.com

About eSOL

eSOL is a leading embedded software developer that enables customers to accelerate

the development of applications based on high-end embedded processors, including

multi-core. eSOL's advanced, scalable, and multi-profiled real-time operating systems are

tightly integrated with development tools and middleware components to create flexible

development platforms used by OEMs and ODMs worldwide in competitive vertical

markets such as automotive, consumer electronics, industrial and medical equipment,

and aerospace. Founded in 1975, eSOL is based in Tokyo, Japan.

For more information, please visit http://www.esol.com/