

# **eSOL eMCOS Many-Core Real-Time OS Runs on a 64-core Processor**

## **Proved on a Renesas Electronics' RH-850 Microcontroller-based Many-core MCU Simulator**

Tokyo, Japan. May 13, 2014 – eSOL, a leading developer of real-time embedded software solutions, has verified that its eMCOS many-core real-time OS (RTOS) functions on a 64-core processor using a Renesas Electronics' RH-850 microcontroller-based many-core MCU simulator. eSOL will demonstrate eMCOS running on the simulator in its booth at the Embedded Systems Expo (ESEC) on May 14-16, 2014, in Tokyo, Japan.

Many-core processors are increasingly being selected for high-performance embedded computing applications such as cloud networking equipment and professional-quality, high-definition (HD) video devices. Professional-quality HD video applications include microsurgical instruments as well as industrial robots and semiconductor manufacturing equipment utilizing advanced computer vision technology.

eMCOS is the world's first commercial many-core RTOS for embedded systems. Its unique distributed microkernel architecture enables optimal use of many-core processors because that does not require the cache coherency mechanism.

Conventional RTOSes for single-core and multi-core processor—those containing up to four cores—virtually do not work on many-core processors since they have only one kernel to provide OS services making the best use of cache coherency mechanism.

In eMCOS's distributed microkernel architecture—unlike any other existing RTOS—a microkernel is allocated to each individual core to offer basic services, including inter-core message passing, local thread scheduling, and thread management. High-level OS services—including device drivers plus file system and network services—are provided by distributed server threads on several cores within a many-core processor. Since the cores do not need to share much data using eSOL's architecture, eMCOS can offer scalable system performance on many-core processors without a cache coherency mechanism. eSOL's unique, patent-pending scheduling algorithm ensures the real-time capability required in embedded systems as well as the high throughput and scalability expected from many-core processors.

eMCOS uses the same programming model as existing single- and multi-core RTOSes like eSOL's eT-Kernel Multi-Core Edition, so application developers do not need to worry about which core(s) will execute their programs. eMCOS APIs take the form of well-known C functions familiar to developers, while eMCOS also supports POSIX and T-Kernel APIs. In addition, eMCOS does not require developers to recognize message-passing behavior that is conducted internally and automatically within APIs.

eSOL eMCOS IDE plug-in tools can be used for application development alongside the Eclipse-based IDE provided by many-core semiconductor manufacturers. eMCOS IDE plug-ins include dedicated system analysis tools and utility software. eSOL is now developing an eSOL eMCOS SDK that will integrate the eMCOS RTOS, IDE plug-in tools, and middleware components—including network protocol stacks, file systems, and USB

stacks.

To help drive innovation in many-core technology, eSOL actively works with both academic institutions and industry groups. eSOL's Software Chief Technology Officer, Masaki Gondo, chairs the Software-Hardware Interface for the Multi-Many-Core (SHIM) working group in the Multicore Association® (MCA). eSOL is working with Waseda University to develop software parallelization support services for Waseda's Optimally Scheduled Advanced Multiprocessor (OSCAR) parallelizing compiler.

"The many-core industry welcomes the verification of eSOL's eMCOS performance scalability on our RH850-based 64-core MCU simulator," said Tadaaki Yamauchi, General Manager of Core Technology Business Division, Renesas Electronics Corporation. "eSOL and Renesas have been collaborating in many-core technology R&D and in making the best use of semiconductor and OS advances. We will continue this good relationship to lead and promote many-core innovation."

"eSOL is actively working on verification and improvement of eMCOS performance and functions," said Masaki Gondo, Software Chief Technology Officer and General Manager of Technology Headquarters at eSOL. "We have continued to port eMCOS on a variety of many-core processors with different numbers of cores and types of architectures, including the Renesas RH850-based 64-core MCU simulator and Tiler's 36-core TILE-Gx8036™ processor. We are committed to the continuous development and proliferation of many-core technologies for practical use."

**About eSOL**

eSOL is a leading embedded software developer that enables customers to accelerate development of applications based on high-end single-core, multi-core, and many-core embedded processors. eSOL's advanced, scalable, 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.

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