

Enhancement of IDE Functionality for Embedded Software



CUSTOMER: JSC ICC Milandr



INDUSTRY: Electronics and Hardware

The Russian company Milandr is a microelectronics manufacturer whose products are widely used by other companies in a number of embedded systems and devices. Milandr developed a unique integrated development environment (IDE) named CM-LYNX, which allows programming processors to perform various tasks.

PROBLEM STATEMENT:

Milandr constantly upgrades its production: microcircuit assemblies, modules, microcontroller units (MCU), and other devices. The multicrystal assembly "Flip-Chip", consisting of four highly efficient signal processors, required enhanced IDE functionality, as it did not support creating multithreaded applications. Turning to Grovety, a leading software company, Milandr asked for help to expand and enhance the existing IDE.

SOLUTION:

To get the desired functionality, the Grovety team performed the following:

- CM-LYNX IDE functionality was extended with a debugging tool for multiprocessor systems,
- Real-time operating system for multi-agent coherent systems (MACS RTOS) was ported and adjusted for Milandr microprocessors,
- In order to provide programming multithreaded applications on multiprocessor systems, an LLVM Clang based compiler was developed, and OpenMP standard support was implemented for 1967BH processors,
- MACS RTOS was enhanced by providing support of the symmetrical multiprocessing (SMP) mode in accordance with POSIX standard,
- Profiling stack and visualization tools for MACS RTOS events were developed and integrated into CM-LYNX IDE.

Grovety provided functionality for multiprocessing debugging via IDE graphical user interface (GUI). Debugging on several processors simultaneously is now available.

Milandr chose MACS RTOS as the standard operating system for its MCUs, even though it had not been used for signal digital processing before. Grovety implemented support of the operating system and provided SMP mode for it. Now Milandr clients can develop software using the simplest way of scaling computing systems – by increasing processor numbers with OpenMP technology. A MACS RTOS profiler for multiprocessing systems was integrated into the IDE. The profiler collects the performance parameters of a multithreaded application and displays them in graphical and textual views. Now developers can produce software based on a Russian RTOS, which is included in the IDE package delivered by a domestic signal processor manufacturer. The enhanced CM-LYNX IDE provides extended functionality of Milandr products and is helping to create a Russian development environment that can match its prominent foreign counterparts.

TOOLS & TECHNOLOGIES:

- Real-Time Operating System MACS (Grovety)
- Portable operating system interface (POSIX) standards
- Symmetric Multiprocessing (SMP)
- OpenMP standards
- LLVM Clang

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