A large multinational telecommunications products and services provider had developed a trade-secret proprietary processor, targeted at their core market. This internally developed custom chip was built on a segmented address space, fast shared RAM and highly-parallel, multi-core processor architecture. The new device delivered a significant competitive advantage, enabling their end-customers to design higher performance networking and communication applications. To develop on this unique device, the company needed to deliver a robust embedded software development toolchain that could effectively complement this unique hardware.
CUSTOM TOOLCHAIN FOR A CUSTOM NETWORK PROCESSOR

CHALLENGE

To enable a large number of embedded developers on the device, one of the key requirements was support for programmability in a high-level language, such as C/C++. The target application for the chip was internet routing, with router performance being the most critical item. It was imperative to not only provide just a functional compiler but a high quality, architecture-aware fully performance-optimized toolchain (compiler, debugger, simulator). However, the company’s core competencies were in hardware design and they needed a knowledgeable partner to deliver a robust embedded software development environment.

SOLUTION

Mentor Embedded partnered with the company’s ASIC engineering team to perform an initial assessment of the project. As part of this, the Professional Services team delivered a comprehensive report scoping the project, along with a list of technical requirements.

The next stage involved development of the toolchain. This effort entailed the creation of an important and exhaustive 100-page processor-specific application binary interface (psABI) document. Mentor's engineers have deep knowledge and experience in open-source software and hold leadership roles in the community. Leveraging this technical expertise, the team worked on enhancing the GNU compiler (GCC) to (1) Extend support for language syntax relevant to the unique architecture (e.g. Segmented address space) and (2) Deliver targeted optimizations to take full advantage of the processor. Similar enhancements were made to GDB, including support for multi-core development.

DELIVERING TOOLCHAINS FOR CUSTOM PROCESSORS

Mentor Embedded delivered the custom toolchain ahead of schedule and on budget, enabling the company’s 50+ engineers to focus on their market differentiating value; developing core networking applications. Mentor Embedded Professional Services delivery was about one year ahead of any other possible solution and thereby helped gain approximately 600 man-months (50 application engineers * 12 months) of potential lost productivity.

DELIVERING CUSTOM TOOLCHAIN FOR CUSTOMER PROCESSOR, AHEAD OF SCHEDULE AND ENABLING CUSTOMER TO ENTER MARKETS FASTER!

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