RISC-DSP Software Development Kit

ORGANIZATION:

Samsung Electronics Company – a worldwide producer of various electronic devices

INDUSTRY:

Electronic Devices Production Company

PROBLEM STATEMENT:

The customer had an existing Software Development Kit for the target RISC core. This development kit was created by a 3rd party company at the customer's request. The customer used the product in internal projects and as part of hardware solutions in sales to Samsung clients.

Compiler and Simulation environment performance of the existing SDK were not enough to work effectively on this platform. And the customer made the decision to create a new software development kit for the processor.

Therefore, Samsung was looking for an offshore development company capable of creating an SDK with the required performance and quality.

SOLUTION:

One of the main reasons Samsung selected our team as the offshore partner for this project was that we had our own platform for C/C++ compilers creation. This platform has numerous advantages over the competition:

- Universal architecture description allows prototypes of compiler to be generated automatically, reduces the time and cost of developing and retargeting the SDK component
- Closed source code of C/C++ compiler allows resolving commercial security problem and problems with direct, separate sales of SDK
- The universal platform allows the client to reduce the cost of SDK development.
- Ready to use testing environment allows for a reduced stabilization phase of new compiler development

Target SDK plan to include the following features:

- C Compiler,
- Target Assembler, Linker and Librarian;
- Cycle Accurate Simulator and Instruction accurate simulator;
- Debugger capable of working with Simulators and Hardware emulators;
- Graphical Integrated Development Environment.

At the agreement stage, the client decided to use our Universal C Compiler (existing solution) as a target compiler, GNU Binutils package for Assembler, Linker, and Librarian functionality, GNU GDB package as a debugger and create the Simulator software from scratch, Emulator interfaces, and Integrated Development Environment. (In the project scope, the Universal C Compiler and GNU packages was retargeted to customer platform).

Integrated Development Environment						
Compiling Tools				Debugger		
Astrosoft C Complier	GNU Assembler	GNU Linker	GNU Librarian	Simulator	JTAG Emulator Support	Profiling

For the purposes of debugging and testing, the original hardware the customer had supplied was used. It reduced the time for implementation and helped to provide the customer with high-quality products in time.

RESULT:

Our team has successfully completed work on the release version of the product, with all planned functionality to be ready for further product sales. The existing version of the product supports all the required functionality. The main target goal resulted in a 25% decrease in (generated) code size compared to the previous version of the SDK. Developed SDK used by internal and external Samsung customers and product extensions currently in progress.

The client was satisfied with the results of the project and continues work on the SDK extension (new optimizations, IDE functionality extension, profiling, attaching new hardware emulators).

Our expertise in the C/C++ Compiler technology, along with the experience in embedded systems and other aspects of the internal side of software development, makes it competitive among companies able to design and develop such kinds of systems effectively / efficiently. Collaborating with us gave the client competitive advantages in issuing new products with new features well in advance of others.

TECHNOLOGIES:

- Microsoft Visual Studio.NET 2003; C/C++ language
- Win32 API; STL; COM
- GNU GDB
- GNU BinUtils
- JIT Compilation
- BCGLib
- Boost library
- Yacc, Bison

STATISTIC:

Project Team:

- Project Manager
- 3 System Architect
- 7 Developers
- 4 Testers
- Technical Writer

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