Lawrence Livermore National Laboratory

2009 Award Winner

ROSE: Making Compiler Technology More Accessible

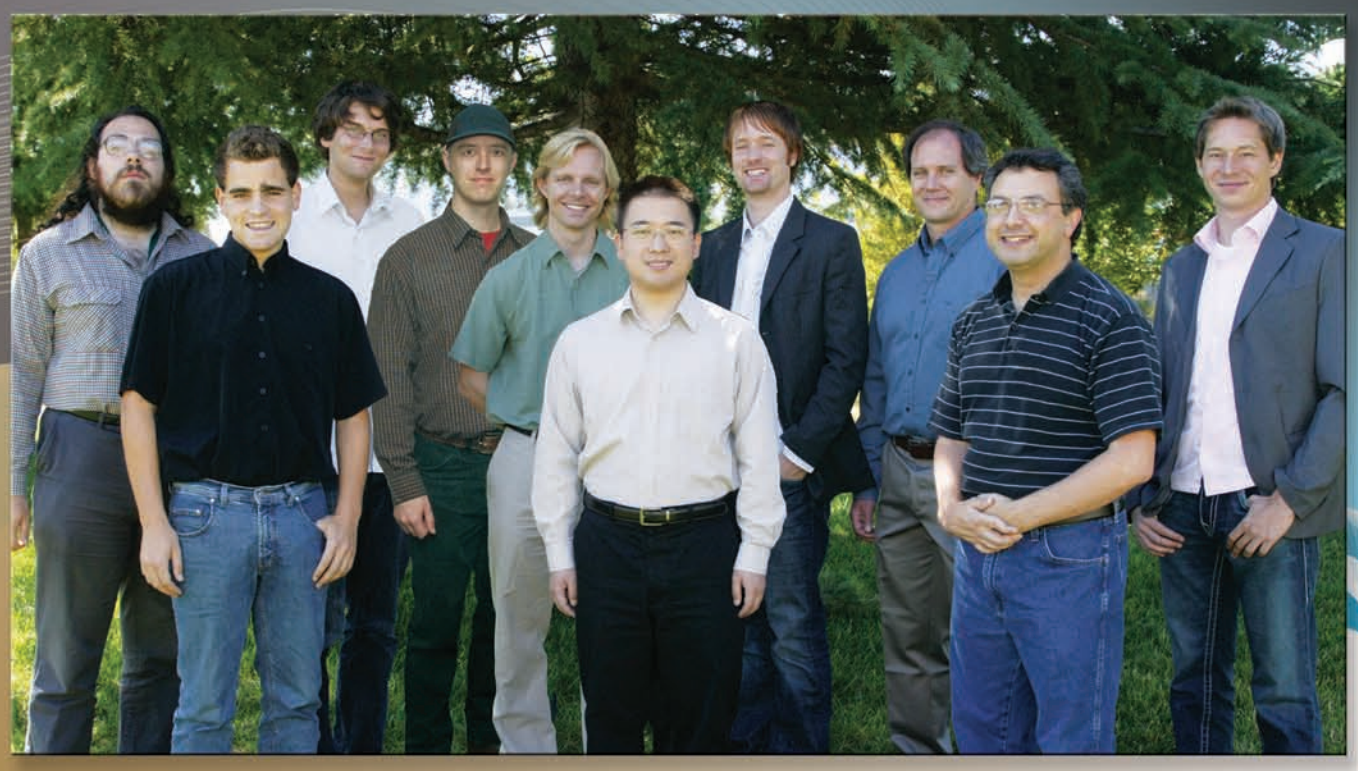
Computer scientists at Livermore have radically altered the programming landscape by creating ROSE, an open-source customizable compiler infrastructure that gives all programmers easy access to complex, automated compiler technology and assistance. ROSE accepts code in today's most common programming languages, including C, C++, Fortran, OpenMP and UPC. Millions of lines of source code can be scanned to optimize code performance and find errors. ROSE returns these improvements to the user in revised source code rather than in the form of machine-readable binaries.

Strong Tools, Easy to Use

Only ROSE offers such a rich set of analysis, debugging, and transformation capabilities that even novice software developers can build their own expert tools. Beyond this, more advanced ROSE users can create compiler-like tools specific to their individual needs with an easy interface. The ability to directly optimize one's own source code is especially significant. The new source-to-source capability is a strong draw to ROSE users, which allows them not only to be in control of their programs but also develop and apply various cutting-edge optimizations regardless of platform. Without this tool, developers are forced to rely on compilers to optimize their code or have the experts do it for them.

Free and Easy: Open for Business

The open-source ROSE compiler software is available to use at no cost on the project's Web site (www.rosecompiler.org). Future applications of ROSE are limited only by the imagination of developers using the software's public interfaces.



Development team for ROSE (from left): Peter Collingbourne, Martin Bauer (formerly of Livermore), Thomas Heller (formerly of Livermore), Robb Matzke, David Hamilton, Chunhua Liao, Andreas Saebjornsen, Daniel Quinlan, Jeffrey Keasler, and Thomas Panas.

R&D 100

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