

PACKAGE ID - 000607SPARC01 OSC 12.9.1.P

KWIC TITLE - Optimizing Sisal Compiler; Sisal Compiler and
Running System

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LIMITATION CODE -UNL **AUDIENCE CODE** - UNL

COMPLETION DATE - 11/11/1992 **PUBLICATION DATE** - 11/12/1992

DESCRIPTION - OSC is a compiler and runtime system for the functional language Sisal. Functional languages are based on mathematical principals, and may reduce the cost of parallel program development without sacrificing performance. OSC compiles Sisal source code to binary form, automatically inserting calls to the Sisal runtime system to manage parallel execution of independent tasks. Features include support for dynamic arrays, automatic vectorization, and automatic parallelization. At runtime, the user may specify the number of workers, the granularity of tasks, and other execution parameters.

PACKAGE CONTENTS - Media Directory; Software Abstract; UCRL-MA-110800; UCRL-1024400, Rev.1 PREPRINT; M-146 Rev.1; M-154 Rev.1; Media Includes Source Code, Compilation Instructions, Sample Problem Input Data, Test Suites;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 QIC Cartridge

METHOD OF SOLUTION - The Sisal compiler consists of four components. The first component is a LL1 parser that translates source code to the intermediate form IF1. The second component performs a series of optimizations, eventually translating the first intermediate form into a second intermediate form IF2. Third, the code generator translates IF2 to C, inserting calls to the Sisal runtime system where necessary. Finally, the native C compiler is called to generate machine code. The Sisal runtime system is a microtasking execution environment that supports dataflow computing on conventional multiprocessor systems.

COMPUTER - SUN SPARC

OPERATING SYSTEMS - Unix

PROGRAMMING LANGUAGES - C

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - OSC compiles Sisal source files for execution on conventional multiprocessor systems. It automatically vectorizes

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UNIQUE FEATURES - (CONT) and parallelizes source code as appropriate for the target machine. OSC includes sophisticated analysis and optimization routines that reduce the overhead of functional semantics. The compiler essentially eliminates all copying and preallocates memory for all aggregate objects. OSC enables users to realize the benefits of functional programming without sacrificing performance.

RELATED SOFTWARE - OSC is a code-in-development, new versions occur frequently. When major milestones are achieved the code is released to the Energy Science and Technology Software Center (ESTSC) for general distribution. No special software is required other than standard Unix functions and C libraries.

OTHER PROG/OPER SYS INFO - All programming and file extensions adhere to standard C and Unix conventions. OSC is available on either 3.5 Diskettes or a QIC cartridge.

HARDWARE REQS - Minimum installation requires 7.5 MBytes (5 MBytes persistent).

TIME REQUIREMENTS - The compilation time for a 100 line source file on a SGI Iris 340 is approximately 33 seconds.

REFERENCES - D.C. Cann, The Optimizing SISAL Compiler: Version 12.0, UCRL-MA-110080, April 2, 1992; J. McGraw, S. Allan, S. Skedzielewski, R. Oldehoeft, J. Glauert, C. Kirkham, B. Noyce, and R. Thomas, SISAL: Streams and Iteration in a Single Assignment Language, Language Reference Manual Version 1.2, M-146 Rev.1, March 1, 1985; J.T. Feo, D.C. Cann, and R.R. Oldehoeft, A Report on the Sisal Language Project, UCRL-102440, Rev.1 Preprint, July 1990; S. Skedzielewski and R.K. Yates, Fibre: An External Format for SISAL and IF1 Data Objects VERSION 1.1, April 4, 1988.

ABSTRACT STATUS - Submitted September 1993. Released screened May 31, 1994. Package installs, compiles, and links without error.

SUBJECT CLASS CODE - P

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
O CODES
EXECUTIVE CODES
REAL TIME SYSTEMS
PARALLEL PROCESSING
VECTOR PROCESSING
PROGRAMMING LANGUAGES
ARRAY PROCESSORS

EDB SUBJECT CATEGORIES -
990200

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