

PACKAGE ID - 001075MLTPL00 FORTRAN M

KWIC TITLE - FORTRAN Extensions for Modular Parallel Processing

AUTHORS - Foster, Ian
Argonne National Lab, IL (United States)

Olson, Robert
Argonne National Lab, IL (United States)

Tuecke, Steven
Argonne National Lab, IL (United States)

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

COMPLETION DATE - 03/01/1993 **PUBLICATION DATE** - 08/01/1993

DESCRIPTION - FORTRAN M is a small set of extensions to FORTRAN that supports a modular approach to the construction of sequential and parallel programs. FORTRAN M programs use channels to plug together processes which may be written in FORTRAN M or FORTRAN 77. Processes communicate by sending and receiving messages on channels. Channels and processes can be created dynamically, but programs remain deterministic unless specialized nondeterministic constructs are used.

PACKAGE CONTENTS - Media Directory; Software Abstract; ANL-93/26; MCS-P327-0992; Media Includes Source Code, User's Guide (In Postscript Format), Compilation Instructions, Linking Instructions;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - A preprocessor converts a FORTRAN M source file into FORTRAN 77 and C language source files. FORTRAN M statements are replaced by calls to FORTRAN M libraries, or to FORTRAN or C procedures generated by the FORTRAN M preprocessor.

COMPUTER - MLT-PLTFM

OPERATING SYSTEMS - Machine dependent

PROGRAMMING LANGUAGES - C (80%), Perl (17%), sh scripts (3%)

SOFTWARE LIMITATIONS - In the current implementation not all FORTRAN 77 constructs can be used in FORTRAN M programs. This will be fixed in a future release.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - FORTRAN M supports a modular approach to parallel programming, permits the writing of provably deterministic

PACKAGE ID - 001075MLTPL00 FORTRAN M

UNIQUE FEATURES - (CONT) parallel programs, allows the specification of dynamic process and communication structures, provides for the integration of task and data parallelism, and enables compiler optimizations aimed at communication as well as computation. FORTRAN M provides constructs for creating tasks and channels, for sending messages on channels, for mapping tasks and data to processors, etc. Performance is similar to or better than commonly used communication libraries.

OTHER PROG/OPER SYS INFO - FORTRAN M source files use a .fm extension. Everything needed to install and use FORTRAN M (other than operating system functions, C and FORTRAN compilers) is included.

HARDWARE REQS - Approximately 20 MB of disk space is required to build the software, and about 5MB is needed to install it. There are no additional requirements beyond the standard features of the machines listed above.

TIME REQUIREMENTS - Compilation time is dependent on the size of the FORTRAN M program that is being compiled. This time may range from several seconds to several minutes.

REFERENCES - Ian Foster, Robert Olson, and Steven Tuecke, Programming in FORTRAN M, ANL-93/26, August 1993; Ian Foster and K. Mani Chandy, FORTRAN M: A Language for Modular Parallel Programming, Preprint MCS-P327-0992, October 1992.

ABSTRACT STATUS - Submitted March 8, 1996. Released screened 4/22/96.

SUBJECT CLASS CODE - P

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
F CODES
FORTRAN
PARALLEL PROCESSING
MEMORY MANAGEMENT
DATA PROCESSING

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/ER

PACKAGE TYPE - SCREENED