PACKAGE ID - 001172MLTPL00 RSL

KWIC TITLE - Runtime System Library for Parallel Weather Modules

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

COMPLETION DATE - 06/01/1995 **PUBLICATION DATE -** 03/01/1997

DESCRIPTION - RSL is a Fortran-callable runtime library for use in implementing regular-grid weather forecast models, with nesting, on scalable distributed memory parallel computers. It provides high-level routines for finite-difference stencil communications and inter-domain exchange of data for nested forcing and feedback. RSL supports a unique point-wise domain-decomposition strategy to facilitate load-balancing.

PACKAGE CONTENTS - Media Directory; Software Abstract; ANL/MCS-TM-197; Media Includes Source Code;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - While not a solver in itself, the software supports neaest neihbor and scatter-gather comunication patterns used by the explicit solvers found in weather models, and relieves the programmer of the need to write explicit message passing code.

COMPUTER - MLT-PLTFM

OPERATING SYSTEMS - Unix

PROGRAMMING LANGUAGES - C (95%0 and FORTRAN-77 (5%)

SOFTWARE LIMITATIONS - The software is limited to regular grid models; grid size maximum limits are re-confirurable by recompilation if necessary.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - RSL is tailored specifically to the requirements of parallel weather modes. High-level constructs for finite-difference stencilcommunication, inter-domain communication for nest forcing and feedback, irregular decompositions of work to processors to facilitate load-balancing, automatic and independent decomposition of multiple grids in a simulation, allow irregularly shaped nested domains.

RELATED SOFTWARE - The RSL library provides high-level access to the message-passing mechanisms of a target parallel computer in a way

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RELATED SOFTWARE -(CONT) that is specific to the needs of the application. It is not a message-passing mechanism in itself, therefore, programs using RSL must also link to the appropriate underlying message-passing layer (vendor specific or standard MPI).

OTHER PROG/OPER SYS INFO - RSL is a link-time program library; the name of the link library is ibrl.a. Programs using RSL should also include a header file, rsl.inc, that is part of the distribution package.

HARDWARE REQS - Memory and other hardware requirements are typically dictated by the model using the RSL library, whose additional needs are nominal.

REFERENCES - J. Michalakes, Runtime System Library for Parallel Finite Difference Models with Nesting, ANL/MCS-TM-197, March 1997.

ABSTRACT STATUS - Submitted 8/7/97. Released AS-IS MARCH 25, 1998

SUBJECT CLASS CODE - PR

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
R CODES
WEATHER
FINITE DIFFERENCE METHOD
LIBRARIES
PARALLEL PROCESSING
COMPUTERIZED SIMULATION

EDB SUBJECT CATEGORIES -
990200 540110 580000

SPONSOR - DOE/ER

PACKAGE TYPE - AS - IS