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REDUCE Installation Guide
for Cray 1/X-MP Systems running COS

(Version 3.3)

TABLE OF CONTENTS

Abstract

This guide describes the CRAY/COS REDUCE distribution tape and the procedures for installing, testing and maintaining REDUCE on a CRAY 1 or CRAY X-MP running COS. This document was derived from the corresponding document for Vax/Unix prepared by A. C. Hearn and L. R. Seward, The Rand Corporation, Santa Monica, publication CP84.

1. INTRODUCTION

This guide describes the CRAY/COS REDUCE distribution tape and procedures for installing, testing and maintaining REDUCE on a CRAY 1 or X-MP running COS. REDUCE is based on Standard LISP, and this version requires the availability of Portable Standard Lisp (PSL), version 3.4 or later. The PSL files necessary to run REDUCE are included on the system tape. This is not however a complete PSL system and in particular does not include PSL sources. A complete PSL (version 3.4), if needed, is available separately from CRAY Research Inc. by contacting your Cray representative.

2. DESCRIPTION OF THE CRAY/COS REDUCE DISTRIBUTION TAPE

First of all, please decide which ownership-value is appropriate for the REDUCE system at your site. The easiest way is to run installation procedure using this OWN value.

The distribution tape is in COS internal (transparent) format, and recorded at a density of 800 bpi. The tape was written on the IOS tape drive. It contains about 60 files. Their contents are described below.

The binary files (file# 1 and file# 2) must reside on CRAY disk during the installation procedure. The "→" remark for those files is the recommended name and id. Please run the installation procedure using the ownership, which is planned to be the final REDUCE ownership.

— a bare PSL34   File# 0 → PDN= PSL34,ID= PSL
  a binary REDUCE   File# 1 → PDN= REDUCE

— 1 binary file, which must be installed in any case:
  REMARK: CHOOSE THE OWNERSHIP OF THIS FILE SO THAT ANY USER
        MAY ACCESS IT.

          File# 2 → REDUCELIB,ID= PSL,PAM= R.

— sample job INSTALL for installing appropriate id's and ownerships

          File# 3

—documentation (ASCII control characters)

   File# 4 Installation guide (this manual)
     5 User's Manual (about 200 pages)
     6 Addendum to the User's Manual (about 200 pages)
     7 User's Guide (< 10 pages)
     8 bugs33 (about 1 page, described below)

—sources

File# 9	alg1
10	alg2
11	bfloat
12	boot
13	build
14	compat
15	entry
16	factor
17	hephys
18	int
19	matr
20	mkfasl
21	rend
22	rlisp
23	solve
24	algint
25	anum
26	arith
27	excalc
28	ezgcd
29	gentran
30	groebner
31	prolog
32	rcref
33	rsltnt
34	spde
35	symflags
36	util

— 7 interactive lessons

    File# 37 — File# 43

— samplejobs for maintenance

File# 44   COMPILE   full bootstrap of REDUCE from PSL
       45   COMPILE1 single compilation on base of REDUCE
       46   BUILDJOB building REDUCE from precompiled modules
       47   MKCOMP   REDUCE compiler for COMPILE1

— 12 Testjobs

File# 48   standard REDUCE test
       49   test Bfloat
       50   test Integration package
       51   test Factorization
       52   test solver
       53   test algint
       54   test anum
       55   test complex
       56   test excalc
       57   test gentran
       58   test groebner
       59   test spde

3. INSTALLING REDUCE

REDUCE is stored in the system as a binary executable disk file plus a library of loadable modules (automatically loadable at runtime) called REDUCELIB. A standard version of both files is undumped from tape to disk. The file REDUCE needs a little bit of configuration. To create a REDUCE with appropriate values for your installation use the sample job INSTALL from file# 3. The file reducelib needs no extra configuration, it contains all binaries which are needed for REDUCE. It MUST be present on line, otherwise the system cannot work correctly.

In almost any cases the undumping of files 0-4 (plus the documentation files) and running job INSTALL will be the only activity necessary to get REDUCE running, EXCEPT: Please be careful with heapsizes above 4 mega words, it is not quite clear what will happen. On the other hand, it is possible to use memory sizes above the 4 m boundary, please call for help if you must use such heapsizes.

It is impossible to relink the underlying PSL unless you have got a full PSL34 too. Therefore the CFT and IO lib modules are taken from our installation into the absolute binary and can never be changed, which should not cause any problems. If you run into problems with that please call for help, (address below).

If you are rebuilding REDUCE from PSL using the reducelib modules, PLEASE use the jobs provided for that (BUILDJOB), otherwise you will definitely not get the system up again anymore.

During the building of the REDUCE binary, a message saying that ZEROP has not been defined is normal, and can therefore be ignored.

4. PRINTING DOCUMENTS

The distributed documents are paginated and formatted with standard ASCII control characters. A maximum of sixty print lines per page is assumed. The left margin offset must be supplied by the user.

5. TESTING REDUCE

For testing the REDUCE implementation testjobs are provided in files 48 - 59. The REDUCE standard test should be done in any case, it should consume approximately 1 CPU second on an X-MP and 1.5 seconds on an CRAY 1 (without garbage collection time).

If the test does not run, please check the installation procedure, and if this will not resolve the problem, call for help.

6. RUNNING REDUCE PROGRAMS

Reduce can be invoked by:

ACCESS,DN= REDUCE,OWN= YOU must set this (unless OWN= SYSTEM).
REDUCE.

REDUCE will respond with some banner lines and welcome messages printed to $OUT and then prompt for the first line from file $IN:

    REDUCE 3.3, 15-Jul-87 ...

    1:

Prototypical instructions for using the CRAY/COS implementation of REDUCE are available in the user's guide. You should edit this to reflect your site specific implementation before issuing it to users. System independent instructions for the use of REDUCE are given in the REDUCE User's Manual.

7. WORKING WITH MINIMAL DISK SPACE

Many of the REDUCE system files are not necessary for running REDUCE. In situations where disk space is at a premium, (which is true for CRAY disks normally), the following files may be deleted from disk and stored on frontend disks instead:

— the bare PSL34 file (file# 0)

— the files containing sources, documentation and tests
    (files 3-end)

Only the absolute binary reduce (after running job INSTALL) and the library reducelib must reside on disk. You may even get the idea to reorganize the reducelib by deleting some members like rlisp, rend, entry, alg1, alg2, and fast-big which are needed only at rebuild time and not from a running REDUCE application. Please be careful, you must read about the library feature first. (see H. Melenk and W. Neun: Portable Standard LISP, Implementation for CRAY X-MP computers, ZIB publication 86.4)

8. REBUILDING REDUCE FASL FILES

Because of its organization into independently compilable modules, the current REDUCE system is fairly easy to maintain. If any source updates are necessary, they can be incorporated into the appropriate files using a convenient editor. Once any of the system source files have been updated, it is necessary to rebuild (compile) the equivalent load modules in order to utilize the changes. With the CRAY version, the binary load modules should be held in a library.

To rebuild any of the REDUCE fasl files please use the job COMPILE1 provided for this as a sample.

If any of the binaries in building the REDUCE system are changed (alg1, alg2, entry, rend, rlisp), the reduce binary image will need to be rebuilt, please use BUILDJOB!

A separate job COMPILE is available for completely rebuilding all of the REDUCE binaries. This should normally never be required and is included only in case the system becomes so corrupted that it is no longer possible to rebuild even single modules with the COMPILE1 procedure, or with an upgrade of the PSL compiler.

9. INQUIRIES AND REPORTING OF ERRORS

All bugs and problems in REDUCE 3.3 known to the authors of REDUCE are listed in the bugs33 document. We would appreciate hearing about any other bugs you encounter or questions you may have regarding the assembly or the operation of the system. Also deficiencies in the installation process are of interest for us. Suspected errors should be accompanied by the relevant job output and a copy of the input source. Corrections for documented problems or other improvements to the system are also welcomed.

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