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ISODERE System
Installation Manual

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ISODE System Installation Manual

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PREFACE

The Institute for Simulation and Training (IST) is currently involved in research aimed at investigating Open Systems Interconnection (OSI) network protocols to provide network communication services for real-time Distributed Interactive Simulation (DIS). As a part of this effort, IST has centered its research around the study and dissection of a public domain implementation of some of the protocols defined by ISO. This "quasi-OSI" software application is named the ISO Development Environment (ISODE). This manual will describe how ISODE was obtained, its organization (libraries, databases, etc.), installation procedures, problems encountered, and available documentation. It is hoped that this document will assist the novice with the ISODE installation as well as provide the reader with insight about ISODE's organization and operation.

Revision 1.0, January 3, 1991
1.0 OVERVIEW

The ISO Development Environment (ISODE) is a non-proprietary software implementation of some of the protocols defined by the International Organization for Standardization and International Electrotechnical Commission (ISO/IEC), the International Telegraph and Telephone Consultative Committee (CCITT), and the European Computer Manufacturer Association (ECMA).

ISODE can support several different types of network services below the transport service access point (TSAP). One of these network services is the Department of Defense (DoD) Transmission Control Protocol (TCP), as shown in Figure 1.0-1. This implementation permits the development of higher level protocols in a robust and mature internet environment, while allowing the luxury of not having to recode anything when moving to a network where the OSI Transport Protocol (TP) is used to provide the TSAP. However, this software also operates over pure OSI lower levels of software.
Figure 1.0-1 OSI TRANSPORT SERVICES ON TOP OF THE TCP
1.1 ISODE ORGANIZATION

ISODE implements the upper layers of the ISO protocol stack on top of the TCP, as shown in Figure 1.1-1. These protocols are implemented through a set of libraries and databases written in the C programming language. The libraries implement application protocols and layer services, while the databases contain mappings of application entity information, object identifiers, service descriptions, and network and presentation addresses. A brief description of the libraries and databases follow, as well as a directory structure.
FIGURE 1.1-1 ELEMENTS OF ISODE 6.0
1.1.1 Libraries

Each library name follows the convention `libxxxx` where `xxxx` is the name of a particular ISODE service or facility. For example, the library `libacsap` implements the association control service (acs).

- **libacsap** - implements the Association Control Service (ACS). The Association Control Service Element (ACSE) is concerned with starting and stopping the network for the application. That is, an application uses the ACSE to establish a connection, or an association, between two users. The association binds the two users, which are referred to as the initiator and responder.

- **libdsap** - implements the Directory Access Protocol (DAP) for OSI applications wishing to look up information, or an interactive Directory user-interface.

- **libftam** - implements the filestore-independent parts of the International Standard of the OSI file service, FTAM. Currently supported are: the no-recovery FTAM Quality-of-Service (QOS); the transfer and management service classes; the kernal, read, write, access, limited file management, enhanced file management, grouping, and fadu-locking functional units; and, the kernal, storage, and security attribute groups.

- **libcompat** - is used as an aid for porting ISODE from one system to another.

- **libpepy** - implements and manipulates presentation elements, from either a presentation stream or a presentation list.

- **libpsap** - implements presentation syntax abstractions for machine-independent exchange of data structures. There are two objects which are manipulated: Presentation Elements (PE), which represent a particular, arbitrarily complex, data structure; and, Presentation Streams (PS), which represent an I/O path of these data structures.

- **libpsap2** - implements the presentation service. This library supports whatever session requirements the user wishes to employ, negotiates presentation contexts on connection establishments, and utilizes abstract transfer notations to transmit data structures in a machine-independent manner.
libpsap2-lpp - implements the lightweight presentation protocol for TCP/IP-based internets.

libquipu - provides routines for managing the data returned by the Directory User Agent (DUA) procedure calls.

librosap - implements the Remote Operations Service (ROS). Three service disciplines are implemented: the basic service discipline is used for the ECMA interpretation of ROS; the advanced service discipline implements the CCITT X.400 interpretation of ROS; and, the complete service discipline is used for the new ISO and CCITT MOTIS interpretation. Once an association is established, the initiator requests the responder to perform remote operations. The responder attempts these operations, returning either a result or error.

librosy - implements the run-time environment for applications using the distributed applications paradigm.

librtsap - implements the Reliable Transfer Service (RTS). RTS provides an application with an association for the reliable transfer of data.

libssap - implements the session service.

libtsap - contains a set of routines which implement the Transport Services Access Point (TSAP).

1.1.2 Databases

Each database name starts with isoxxxx where xxxx relates to the type of information contained in the database. For example, the database isobjects contains information about object descriptors and object identifiers.

isialias - contains a simple mapping between user-friendly strings and distinguished names. This database is used by the directory services element when accessing the "higher performance" nameservice.

isointerfaces - contains a simple mapping between application-entity information and presentation addresses. This database is used by the stub-directory service.
isomacros - contains a simple mapping between user-friendly strings and network addresses. This database is used to resolve textual representations of network addresses for use with the network.

isobjects - contains a simple mapping between object descriptors and object identifiers.

isoservices - contains a simple mapping between textual descriptions of services, service selectors, and local programs.

isotailor - contains a simple run-time configuration mechanism for programs loaded with the -lisode library.

isodocuments - contains a simple mapping between textual descriptions of FTAM document types and the various object identifiers which compose each document type.

1.1.3 ISODE Directory Tree

The ISODE software system is distributed as a collection of files which are organized into various directories. Each directory contains the files which are related by a common purpose or function. Figure 1.1.3-1 shows the tree structure for the ISODE directories. See Appendix A for a description of directories by function or purpose.
FIGURE 1.1.3-1 ISODE DIRECTORY TREE
1.2 SYSTEM ENVIRONMENTS FOR ISODE

1.2.1 Operating Systems Platforms

ISODE is written entirely in the C programming language and runs under the following operating systems: Berkeley UNIX, 4.2BSD, 4.3BSD, or 4.4BSD; AT&T UNIX, SVR2 or SVR3; AIX (IBM’s UNIX-based derivative of AT&T System V); HP-UX (HP’s UNIX-like operating system); ROS, the Ridge operating system; and, Pyramid OsX, a Pyramid computer running OsX. ISODE needs either a K&R or ANSI C compiler. There is no support for C++.

ISODE has also been recently ported to a DEC/VMS environment. The ASN.1 compilers, pepy, posy and rosy, have been ported also to a variety of different platforms, including a Macintosh. Information on these projects can be found in Appendix B.

1.2.2 IST Configuration

Currently, IST is running ISODE on two SUN SPARC 1 workstations running Berkeley UNIX and on two Motorola VME Development workstations running AT&T System V UNIX. These computers are connected on the Ethernet network in the Networking and Communications Technology Laboratory (NCTL). The computers running ISODE are shown in Figure 1.2.2-1, which are a part of the NCTL network that is shown in Figure 1.2.2-2.
Figure 1.2.2-1 The IST ISODE Network
NCTL's Internal Developmental Ethernet

Realtime (SIMNET) Ethernet

- HP PC
- HP PC
- HP PC
- HP PC
- HP PC
- HP PC
- HP PC

Sun SparcStation

Motorola VME System

Motorola VME System

----------- Ethernet

--------------- Serial ASCII

To IST/VSL Ethernet & Internet (UUCP)

To SIMNET units

FIGURE 1.2.2-2

Networking and Communications Technology Laboratory
2.0 INSTALLATION PROCEDURES

A set of installation procedures are included with the ISODE and are located in
usr1/isode/isode-6.0/README. This file includes instructions to configure,
generate, and install ISODE. The following sections elaborate on those
instructions. However, the user is advised to review the README file along
with the installation procedures.

According to Marshall Rose, there are some common "Gotcha’s". These
include: C compiler/loader must handle names that are 1) longer than 32
characters, 2) non-unique in first 32 characters, and 3) pre-process must handle
over 3000 defines (also see Section 3.0 Problems Encountered); need fork and
exec to do dynamic servers; need synchronous multiplexing (e.g., select); need
dynamic memory allocation (e.g., malloc); and, need make with 1) -f file
capability and 2) sh expr capability.
2.1 CONFIGURATION

2.1.1 Software

The following sections describe the ISODE installation procedures on a UNIX-based computer. UNIX commands such as cd, ln, %, etc., will be used. However, these commands should be replaced with the appropriate commands for the actual operating environment being used.

The ISODE software is configured for a system by completing the following set of steps in the indicated order.

**Step 1:** Go to the config/ directory

% cd config

**Step 2:** Select the Makefile and include-file skeleton which most closely matches your system. The current choices are:

<table>
<thead>
<tr>
<th>FILE</th>
<th>CONFIGURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>apollo</td>
<td>Apollo</td>
</tr>
<tr>
<td>aux</td>
<td>A/UX release 1.1</td>
</tr>
<tr>
<td>bsd42</td>
<td>generic 4.2BSD UNIX</td>
</tr>
<tr>
<td>bsd43</td>
<td>generic 4.3BSD UNIX</td>
</tr>
<tr>
<td>bsd43-rt</td>
<td>RT/PC with 4.3BSD</td>
</tr>
<tr>
<td>bsd44</td>
<td>4.4BSD UNIX with OSI</td>
</tr>
<tr>
<td>hpux</td>
<td>HP-UX</td>
</tr>
<tr>
<td>mips</td>
<td>MIPS RISC/OS</td>
</tr>
<tr>
<td>osx</td>
<td>Olivette LSX 30xx</td>
</tr>
<tr>
<td>ros</td>
<td>Ridge Operating System</td>
</tr>
<tr>
<td>sunlink3</td>
<td>SunOS release 3 with SunLink OSI release 5.2</td>
</tr>
<tr>
<td>sunlink4</td>
<td>SunOS release 4 with SunLink OSI release 6.0</td>
</tr>
<tr>
<td>sunos3</td>
<td>SunOS release 3</td>
</tr>
</tbody>
</table>
sunos4  SunOs release 4
sys52-exos  SVR2 UNIX with EXOS
sys52-rt  RT/PC with AIX
sys52-sun  SVR2 UNIX emulation on SunOs release 3
sys52-win  SVR2 UNIX with WIN/TCP
sys53  generic SVR3
ultrix  Ultrix 3.1

The Makefile skeleton has the extension .make, whereas the include-file skeleton has the extension .h.

**Step 3:** Copy the Makefile skeleton of your choice to system.make, where "system" is the name of your system. Now edit this file to set the following make variables:

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>DEFAULT</th>
<th>SPECIFIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINDIR</td>
<td>/usr/local/bin</td>
<td>where to install user programs</td>
</tr>
<tr>
<td>ETCDIR</td>
<td>/usr/etc/</td>
<td>where to install administrator files</td>
</tr>
<tr>
<td>INCDIR</td>
<td>/usr/include/isode/</td>
<td>where to install include files</td>
</tr>
<tr>
<td>LIBDIR</td>
<td>/usr/lib/</td>
<td>where to install object libraries</td>
</tr>
<tr>
<td>LINTDIR</td>
<td>/usr/lib/lint/</td>
<td>where to install lint libraries</td>
</tr>
<tr>
<td>LOGDIR</td>
<td>/usr/tmp/</td>
<td>where to install log files</td>
</tr>
<tr>
<td>LSOCKET</td>
<td></td>
<td>libraries to link in (e.g., -Icci)</td>
</tr>
<tr>
<td>MANOPTS</td>
<td></td>
<td>see util/inst-man.sh for detail</td>
</tr>
<tr>
<td>OPTIONS</td>
<td></td>
<td>options to cc and lint(e.g., -I../h)</td>
</tr>
<tr>
<td>SBINDIR</td>
<td>/usr/etc/</td>
<td>where to install administrator pgms</td>
</tr>
</tbody>
</table>

Note: For our application, IST has installed the ISODE under directory usr1.

**Step 4:** Type:

In system.make CONFIG.make

Both of these files are in the usr1/isode/isode-6.0/config/ directory. The latter file is the one which the software uses to configure itself during generation.
Step 5: Copy the include-file skeleton of your choice to system.h, where "system" is the name of your system. Now add any additional definitions you like (usually none). Consult the file config.OPTIONS for a list.

Step 6: Now,

```bash
% ln system.h ../h/config.h
```

The latter file is the one which the software uses to configure itself during generation.

Step 7: Typically, sites run with the default databases used by the OSI directory. These databases include: aliases, services, entities, macros, and objects. To use the default databases, simply copy the default local configuration file to the support/ directory:

```bash
% cp aliases.local ../support/
% cp services.local ../support/
% cp entities.local ../support/
% cp macros.local ../support/
% cp objects.local ../support/
```

If you have local modifications to make, either copy in your own file or edit the existing file (ex: support/aliases.local) as appropriate.

There are a few differences between AT&T and Berkeley UNIX and also some bugs found in version 6.0. It is advisable that you read Section 3.0 (Problems Encountered) before proceeding with the installation.
2.1.2 Hardware

There is no specific hardware configuration in which ISODE can be installed, although there is a set of minimum requirements. A 4.5 Mb hard-disk is required for the initial download of the compressed ISODE system, which decompressed is 14Mb. After ISODE has been compiled and installed, it will require 130 Mb of memory on a SUN Sparc Station with Berkeley UNIX or 275 Mb on a Motorola VME with AT&T UNIX. These minimum requirements are shown in Figure 2.1.2-1.
Figure 2.1.2-1 ISODE Minimum Requirements
2.2 COMPILATION

2.2.1 Generation

Once the ISODE has been configured for your system, it must be compiled.

The following commands are used to generate the ISODE code:

**Step 1:** Go to the `usr1/isode/isode-6.0/` directory,

```bash
% cd usr1/isode/isode-6.0
```

**Step 2:** Now reset the date of the configuration files for the system. This is done only once per source-tree.

```bash
% ./make once-only
```

**Step 3:** Generate the basic system,

```bash
% ./make
```

If you are using SunOs, do not use the make program supplied with the SunPro package. Contrary to any claims, it is not compatible with the standard make facility. Further, note that if you are running a version of SunOs 4.0 prior to release 4.0.3, then you may need to use the make program found in `/usr/old/`, if the standard make you are using is the SunPro make. In this case, you will need to put the old, standard make in `/usr/bin/`, and you can keep the SunPro make in `/usr/bin/`.

If you are using SVR3, then you will probably have to type this command before starting the compilation:

```bash
% ulimit 32768
```

The make command from the top-level directory will cause a complete generation of the basic system. If all goes well, proceed with the installation.

While compiling, some files may produce the messages:

**warning: statement not reached** or
type ObjectDescriptor: Warning: Can’t find file DSE.ph failed

This is normal. Also, when building a loader library, you may see several
ranlib: warning: ../libisode.a(aetdbm.o): no symbol table
messages. This is also normal. Messages like:

*** Error code 1, or perhaps Exit

may also appear. Again, this is normal.

2.2.2 Compilation Time

For a Sun Sparc Station 1, the compilation time is about 45 minutes. For a
Motorola VME System with a MC68030 microprocessor, the compilation time
is about 3 hours.

2.2.3 Files Generated

The following files and libraries are generated on the top-level of the source
tree:

<table>
<thead>
<tr>
<th>FILES</th>
<th>LIBRARIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>libacsap.a</td>
<td>llib-lacsap</td>
</tr>
<tr>
<td>libcompat.a</td>
<td>llib-lcompat</td>
</tr>
<tr>
<td>ldirent.a</td>
<td>llib-ldirent</td>
</tr>
<tr>
<td>libisode.a</td>
<td>llib-lisode</td>
</tr>
<tr>
<td>libpepy.a</td>
<td>llib-lpsap</td>
</tr>
<tr>
<td>libpsap.a</td>
<td>llib-lpsap2</td>
</tr>
<tr>
<td>libpsap2.a</td>
<td>llib-lrosap</td>
</tr>
<tr>
<td>librosap.a</td>
<td>llib-lrosy</td>
</tr>
<tr>
<td>librosy.a</td>
<td>llib-lrtsap</td>
</tr>
<tr>
<td>librtsap.a</td>
<td>llib-lissap</td>
</tr>
<tr>
<td>libssap.a</td>
<td>llib-ltsap</td>
</tr>
<tr>
<td>libtsap.a</td>
<td></td>
</tr>
</tbody>
</table>
Many other files and libraries are created within each of the basic system subdirectories. The basic system is composed of the files in the following subdirectories:

acsap  psap2
compat  rosap
dirent  rosy
dsap    rtsap
hsap    ssap
imisc   support
pepy    tsap
psap

2.3 INSTALLATION

This phase requires the SuperUser capabilities to be executed.

Step 1: First, create the directories defined in the system.make file, i.e., BINDIR, SBINDIR, ETCDIR, LOGDIR, INCDIR, LIBDIR and LINTDIR. The mode of the LOGDIR directory should be 777, the mode of the other directories should be 755.

Step 2: Then, from the usr1/isode/isode-6.0/ directory, type

% ./make inst-all

which will initiate the installation.
2.4 POST-INSTALLATION

After installation, there are two kinds of activities that occur: once-only activities, which are performed the first time the software is installed; and each-time activities, which are performed every time the software is installed. The following once-time and each-time activities should be initiated after ISODE has been installed:

**Step 1:** The tsap daemon, tsapd, is a process that runs in the background of UNIX and handles all incoming connections for ISODE. It is necessary for two machines in the network to be able to communicate with each other using the ISODE connection services. The first once-only activity is to verify that the tsapd daemon will run when the machine goes multi-user. On Berkeley UNIX systems, add these lines to the `usr/etc/rc.local` file:

```bash
if [ -f $(SBINDIR)tsap ]; then
    $(SBINDIR)tsapd & (echo -n ' tsapd') > /dev/console
fi
```

On other systems, a similar procedure is followed. For example, on systems derived from AT&T UNIX, the file `usr/etc/rc2` script might be edited.

**Step 2:** The next once-only activity is to verify that systems with a native `usr1/etc/services` file contain an entry for the tsap service (if you have configured the ISODE to run over TCP). If not, add the line:

```
tsap 102/tcp
```

to the `usr/etc/services` file. If your system does not have such a file, the software automatically compensates for this.

**Step 3:** Next, on Berkeley UNIX systems, add a line to the `/usr/lib/crontab` file to invoke a shell-script that will re-cycle the log files. Usually the line you add looks something like this:
04 * * * su daemon < (SBINDIR)isologs

This means that the shell-script $(SBINDIR)isologs should be invoked at 4:00am each morning. On other systems, a similar procedure is followed. For example, on systems derived from AT&T UNIX, the file /usr/spool/cron/crontabs/root might be edited followed by the command

% crontab root

**Step 4:** The last once-time activity is the installation of manual pages. If you are installing the manual pages into a non-standard area, then set the environment variables $MANDIR accordingly, e.g.,

```
# sentenv MANDIR /usr/local/man
```

**Step 5:** The each-time activity is to kill and restart the tsapd daemon in order to reinitialize correctly. To start the daemon from the CShell, the command might be:

```
# $(SBINDIR)tsapd > & /dev/null
```

The daemon will automatically detach. If you do not redirect the daemon's standard-error, then it will not detach. Instead, the daemon will print messages as to what actions it is taking.

That's about it. This will install everything.

**Step 6:** To clean-up the source tree, use:

% ./make clean

*Note:* If you are planning to generate or install FTAM, VT, or QUIPU, do not clean-up the source tree until after you have finished installing these.

Each time an initiator or a responder program is compiled, it needs to be installed into its proper subdirectory ($(SBINDIR)/local/bin or $(SBINDIR)/etc respectively), otherwise the system will not be able to execute it (see step 3 of section 2.1.1 for SBINDIR definition).
There are additional programs in the isode/isode-6.0/others/ directory. These programs are not an integral part of the system and they assume that the ISODE has been installed. Two of these demo programs are described in Section 4.0 (Sample Programs).

2.5 INSTALLATION TEST

Before proceeding with the installation test, be sure to read Sections 2.1 thru 2.4 for configuration and installation procedures. The isode-test program is located in directory usr1/isode/isode-6.0/. The program is initiated by typing isode-test while in the /isode-6.0 directory. By default, two services are installed. The first service uses program imisc to support utilities such as time, finger, who, ping, and so forth. The second service uses program isoc to test the installation of the ISODE. The script isode-test uses isoc to verify the proper connection of the system. A copy of the isode-test program and its output can found in Appendix C.
3.0 PROBLEMS ENCOUNTERED

3.1 Differences in UNIX

One problem was identified when compiling the ISODE on machines running System V UNIX. Many of the files in the basic system do not include the header file internet.h (UNIX standard library), therefore during compilation errors resulted. The solution was to add the line #include internet.h to those files. A list of those files is located in Appendix D.

Another problem with implementing ISODE on System V UNIX is the maximum length allowed for file names. System V UNIX limits names to 14 characters. During the ASN.1 compilation, files with names longer than 14 characters are truncated, causing duplicate file names. The solution was to shorten the names of the files before compiling them.

3.2 Deamons

The /dev/null is a special directory where all the message dumps directed to it are discarded without comment. The output of the tsapd deamon should be directed to /dev/null when it is run manually, this way the output will not be displayed on the screen. If it is desired that the output be displayed on the screen, then the deamon should be killed before leaving the terminal where the deamon was initiated. This allows the next user the option of redirecting the output.
3.3 Bugs/Questions

Several bugs have been found in version 6.0 of ISODE. These bugs were made apparent by other users of ISODE through the ISODE mail reflector (see Section 5.2 for reporting ISODE bugs). Problems and questions with the code can be found in Appendix D.
4.0 SAMPLE PROGRAMS

Several demo programs are included with the ISODE software. These programs are not an integral part of the system and they assume that the ISODE has been installed. The following sections describe two of the available demo programs. These programs emphasize reliable transfer and remote operations.

The demo programs are located in the usr1/isode/isode-6.0/others directory and are listed in Table 4.0-1.

<table>
<thead>
<tr>
<th>ISODE DIRECTORY</th>
<th>DESCRIPTION OF DEMO PROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>callback/</td>
<td>The ISODE callback demo</td>
</tr>
<tr>
<td>idist/</td>
<td>The ISODE idist utility</td>
</tr>
<tr>
<td>image/</td>
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</tbody>
</table>

Table 4.0-1 ISODE Demo Programs
4.1 RTF

The Reliable Transfer File (RTF) program utilizes the Reliable Transfer service implemented in ISODE to perform bulk data transfer from one host to another.

4.1.1 Description

The RTF program is invoked by typing rtf <host> <get/put> <source> <destination>, with the user supplying the full path to the source and destination file. This transfer process is accomplished through an initiator, which sends/receives a file to/from the remote host using the put/get commands, and a responder, which requests and checks the initiator's password to ensure proper access to the remote host.

The initiator performs four operations: association establishment, operation invocation, association release, and error handling. During association establishment, the application-entity information and presentation address for the desired service are computed, along with the application context and default presentation context information for the service. If the initiator is to send (or put) a file, the source file is opened and the tsap daemon is contacted using the RtBeginRequest routine. If the initiator is to receive (or get) a file, the tsap daemon will be contacted immediately to invoke the responder. If an association is established with the responder, and the initiator is sending a file, the transfer (or operation) is initialized using the RtSetDownTrans routine. The
RtTransferRequest routine is then called to request the reliable transfer of a data structure. When the transfer is complete, the association is released using RtEndRequest.

If the initiator is to receive the file from the remote host, the operation is initialized by the RtSetUpTrans routine. The initiator will then wait for a transmission from the responder with the RtWaitRequest routine. At this point, transmission occurs by managing the turn (or token) between the initiator and responder. The user with the token is permitted to send data to the other user. Two routines are used to synchronize this communication; RtGTurnRequest is used to pass the token to the responder and RtPTurnRequest is used to ask for the token from the responder. When transmission is complete, the association is released using the RtEndRequest routine.

Any time an error is encountered, an adios or advise routine will report the error and terminate if appropriate.

The responder is responsible for three functions: association management, operation response, and error handling. The first action performed by the responder is to set up the association using the RtBInit routine. On a successful call, the responder should either accept or reject the association. This is accomplished using the RtBeginResponse routine. If the association is
rejected, the association is released and the program terminates, otherwise association establishment is completed. If the responder is sending the file, the source file is opened and the transmission is initialized by the \texttt{RtSetDownTrans}. When the user has the token, it can use the \texttt{RtTransferRequest} routine to request the reliable transfer of a data structure. If the responder is receiving the file from the initiator, the transmission is initialized by the \texttt{RtSetUpTrans} routine. The responder waits for an event (usually incoming data) to occur with \texttt{RtWaitRequest}. Transmission occurs by managing the turn (or token) between the initiator and responder. When the transfer is complete, the association is released by the \texttt{RtEndResponse} routine.

Again, error handling is accomplished by the \texttt{adios} and \texttt{advise} routines. These functions report errors and terminate if appropriate.

4.1.2 RTF Flow Diagram

The flow diagram for the RTF program can be found in Figure 4.1.2-1.
Figure 4.2.2-1 Flowchart for Lookup Program
4.2 LOOKUP

The Lookup program makes use of the remote operations services implemented in ISODE. This program requests password information, UserName or UserID, from remote nodes. If the password information is located in the remote node’s password file, it is returned to the initiating node and displayed on the screen. If it is not found, an error message is returned and displayed.

4.2.1 Description

The Lookup program can be invoked several ways: by typing Lookup, which will put the user in an interactive loop allowing the lookup of more than one password; by typing LookupUser username, which allows the user to access password information for one username; or by typing LookupUID userid, which allows the user to access password information for one userid. If the user initiates the program with Lookup, the operations help and quit are also available. This lookup process is accomplished through an interactive initiator, which manages the association and invokes the operations required, and a static responder, which performs the operation.

The initiator performs four operations: association establishment, operation invocation, association release, and error handling. During association establishment, the application-entity information and presentation address for the desired service are computed, along with the application context and
default presentation context information for the service. Also, a session reference identifier is chosen. This is done in the *ryinitiator* routine using the ISODE *AcAssocRequest* routine. At this time, the tsap daemon is contacted to invoke the responder. If an association is established with the responder, the underlying service to be used for the remote operation (the presentation service) is set using routine *RoSetService*.

At this time, either the interactive loop is entered or the lookup operation is invoked. If the interactive loop is entered, a line is read from the input and a search is performed to determine which lookup operation is requested. The invocation is performed through a synchronous interface implemented in routine *RyStub*. The operation will return one of three results: error, done, or the result of the lookup operation. The result of the operation (password or error) is displayed on the screen, and the association is released. If the user has chosen the interactive loop, another username or userid can now be entered. The association will be released when the operation invoked is quit.

Any time an error is encountered, an *adios* or *advise* routine will report the error and terminate if appropriate.

The responder is responsible for three functions: association management, operation response, and error handling. Association management is
implemented in the routine `ryresponder`. After initializing the invoked program, each lookup operation (i.e., LookupUser, LookupUserID, Help, and Quit) is registered with the ISODE `RyDispatch` routine. The routine `isodeserver` is then called to set the addresses of event-handlers and to manage any associations. If the call is to `isodeserver` is successful, then the program may terminate immediately.

When an event associated with a new connection occurs, the event-handler `ros_init` will be invoked. This routine first calls `Aclnit` to re-capture the Association Control Service Element (ACSE)-state. If the initialization is successful, the routine `AcAssocResponse` is called to deal with the incoming association from the initiator. If the association was accepted, the underlying service for remote operations is set using the `RoSetService` routine.

If activity associated with an association occurs, the event-handler `ros_work` will be invoked. This routine sets a global return vector using `setjmp(3)` and then calls ISODE routine `RyWait` to poll for the next operation-related event. This usually results in one of the registered operations being performed (i.e., LookupUser, LookupUserID, Help, or Quit). Next, the operation is attempted. If it is successful, a result is returned to the initiator by the `RyDsResult` routine. Otherwise, the error is returned by the `RyDsError` routine. The `RyWait` will then indicate that no more network activity is pending. If extraordinary conditions
exist for the association, routine *ros_indication* is called. This routine will process any errors that have occurred, cause control to return to the *setjmp* call, and terminate the association.

The *isodeserver* routine uses the *TNetAccept* routine to wait for the next event on existing associations and for new connections. If failure occurs during this operation (i.e., network listening fails), the *ros_lose* routine will be advised. This routine logs the error condition and terminates the operation with one of the *adios* or *advise* routines.

### 4.2.2 Lookup Flow Diagram

The flow diagram for the Lookup program can be found in Figure 4.2.2-1.
Figure 4.1.2-1 Flowchart of RTF Program
5.0 DOCUMENTATION

There is very limited documentation available for ISODE. The following sections list all known sources. Included in the ISODE software are five User Manuals, a set of UNIX manual pages, and a number of notes, papers, and presentations. This documentation is in LaTeX or SLiTeX format and is located in the usr1/isode/isode-6.0/doc/ directory. It is also rumored that Marshall Rose has plans to write an ISODE book.

5.1 THE ISO DEVELOPMENT ENVIRONMENT: USER’S MANUAL

There are five volumes of documentation available for ISODE. The User’s Manuals are in LaTeX format and are located in the usr1/isode/isode-6.0/doc/ directory. A hardcopy of these manuals can also be obtained from the University of Pennsylvania for $375.00 (see Section 5.7).

In Volume One: Application Services, the raw facilities available to applications are described. This includes the following libraries: libacsap(3n), which implements the OSI Association Control Service (ACS); librosap(3n), which implements different styles of the OSI Remote Operations Service (ROS); librtsap(3n) which implements the OSI Reliable Transfer Service (RTS); and, libpsap(3), which implements the OSI abstract syntax and transfer mechanisms.
Volume Two: Underlying Services, describes the services upon which the application facilities are built. This is accomplished with the following three libraries: libpsap2(3n), which implements the OSI presentation service; libssap(3n), which implements the OSI session service; and, libtsap(3n), which implements an OSI transport service access point. The library libpsap2-lpp(3n) is also described, which can replace library libpsap2(3n) when implementing the lightweight presentation protocol for TCP/IP-based internets. This volume also contains information on how to configure the ISODE for your network.

Application programs are contained in Volume Three: Applications. The applications described include: an implementation of the ISO File Transfer, Access and Management (FTAM), which runs on Berkeley or AT&T UNIX; an implementation of an FTAM/File Transfer Protocol (FTP) gateway, which runs on Berkeley UNIX; an implementation of the ISO Virtual Terminal (VT), which runs on Berkeley UNIX; an implementation of the "little services", which are often used for debugging; and, an implementation of a simple image database service.

In Volume Four: The Applications Cookbook, a "cooked" interface for applications using remote operations is described. The following programs and library are described: the rosy(1) compiler, which is a stub-generator for specifications of Remote Operations; the posy(1) compiler, which is a structure-
generator for ASN.1 specifications; the `pepy(1)` compiler, which reads a specification for an application and produces a program fragment which is communicated by that application; and, the `librosy(3n)` library, which is used by applications using the distributed applications paradigm.

In Volume Five: QUIPU, the QUIPU directory is described. This currently consists of the following programs and library: `quipu(8c)`, which is a program for the Directory System Agent (DSA); the `dish(1c)` family of programs, which are a set of Directory SHell commands; and, `libdsap(3n)`, which is a library for applications using the Directory.

5.2 DISCUSSION GROUPS

The Internet discussion group `ISODE@NIC.DDN.MIL` is used as a forum to discuss ISODE. To be added to this list, contact the Internet mailbox `ISODE-Request@NIC.DDN.MIL`. To report bugs use `BUG-ISODE@NISC.PSI.NET`. There is also a discussion group for QUIPU users. To be added to this list, contact `QUIPU-Request@CS.UCL.AC.UK`. X.400/ISODE users can be added to a discussion group by contacting `PP-PEOPLE-Request@CS.UCL.AC.UK`.  

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5.3 BOOKS
The author of ISODE, Marshall Rose, has written the definitive book on OSI, entitled *The Open Book, A Practical Perspective on OSI*. This publication focuses on the pragmatic aspects of OSI: what OSI is, how OSI is implemented, and how OSI is integrated with existing networks. The book also provides examples and references to the ISODE.

5.4 REQUEST FOR COMMENTS (RFCs)
There are three RFCs which further document services utilized by the ISODE. The Lightweight Presentation Protocol for TCP/IP-based internets, as described in Volume Two: Underlying Services, is further documented in RFC1085. The implementation of ISO transport services on top of the TCP is further documented in RFC1006. Documentation on the ISO-TPO bridge between TCP and X.25 can be found in RFC1086. These RFC's are located in the `usr1/isode/isode-6.0/doc/rfcs/` directory.

5.5 ARTICLES
Actual documentation on ISODE is limited to the five user's manuals, however, Marshall Rose has written two articles about ISODE. These articles, entitled *ISODE: Horizontal Integration in Networking and Building Distributed
Applications in an OSI Framework describe the rationale for ISODE and building remote operations with respect to ISODE, respectively. These articles were published in ConneXions, The Interoperability Report Volume 1, No. 1, May 1987 and in Volume 2, No. 3, March 1988.

5.6 TUTORIALS

INTEROP, Inc. offers a tutorial on ISODE internals which has been taught by Marshall Rose.

5.7 ISODE RELEASES

ISODE version 6.0 was released in January 1990. The new release, ISODE 7.0, is due out in 1991. An announcement about the new release will be made in January. The following pages describe the current release and how ISODE can be obtained from the Internet.
ANNOUNCEMENT

The next release of the "ISO Development Environment" will be available on 24 January 1990. This release is called

ISODE 6.0

This software supports the development of certain kinds of OSI protocols and applications. Here are the details:

- The ISODE is not proprietary, but it is not in the public domain. This was necessary to include a "hold harmless" clause in the release. The upshot of all this is that anyone can get a copy of the release and do anything they want with it, but no one takes any responsibility whatsoever for any (mis)use.

- The ISODE runs on native Berkeley (4.2, 4.3) and AT&T (SVR2, SVR3) systems, in addition to various other UNIX-like operating systems. No kernel modifications are required.

- Current modules include:
  OSI transport service (TP0 on top of TCP and X.25; TP4 for SunLink OSI)
  OSI session, presentation, and association control services
  ASN.1 abstract syntax/transfer notation tools, including:
    remote operations stub-generator (front-end for remote operations)
    structure-generator (ASN.1 to C)
    element-parser (basic encoding rules)
  OSI reliable transfer and remote operations services
  OSI file transfer, access and management
  FTAM/FTP gateway
  OSI directory services
  OSI virtual terminal (basic class, TELNET profile)

- ISODE 6.0 consists of final "IS" level implementations with a few exceptions: ROSE and RTSE are current to the last circulated drafts (March, 1988); VT is a DIS implementation. The ISODE also contains implementations of the 1984 X.400 versions of ROS and RTS. ISODE is aligned with the U.S. Government OSI Profile (GOSIP).

- Modules planned for future releases include:
  OSI message handling system
  MHS/SMTP gateway
- Although the ISODE is not "supported" per se, it does have a problem reporting address, Bug-ISODE@NISC.NYSER.NET. Bug reports (and fixes) are welcome by the way.

- The discussion group ISODE@NIC.DDN.MIL is used as an open forum on ISODE. Contact ISODE-Request@NIC.DDN.MIL to be added to this list.

- The primary documentation for this release consists of a five volume User’s Manual (approx. 1000 pages) and a set of UNIX manual pages. The sources to the User’s Manual are in LaTeX format. In addition, there are a number of notes, papers, and presentations included in the documentation set, again in either LaTeX or SLiTeX format. If you do not have LaTeX, you should probably get a hardcopy from one of the distribution sites below.

For more information, contact:

PSI, Inc.
PSI California Office
Attn: Marshall T. Rose
420 Whisman Court
Mountain View, CA 94043-2112
USA

+1-415-961-3380

DISTRIBUTION SITES

1. FTP
   If you can FTP to the Internet, then use anonymous FTP to nisc.nyser.net [192.33.4.10] to retrieve the file isode-6.tar.Z in BINARY mode from the pub/isode/ directory. This file is the tar image after being run through the compress program and is approximately 4.5MB in size.

2. NIFTP
   If you run NIFTP over the public X.25 or over JANET, and are registered in the NRS at Salford, you can use NIFTP with username "guest" and your own name as password, to access UK.AC.UCL.CS to retrieve the file <SRC>isode-6.tar. This is a 14MB tar image. The file <SRC>isode-6.tar.Z is the tar image after being run through the compress program (4.5MB).
3. NORTH AMERICA
For mailings in NORTH AMERICA, send a check for 375 US Dollars to:

University of Pennsylvania
Department of Computer and Information Science
Moore School
Attn: David J. Farber (ISODE Distribution)
200 South 33rd Street
Philadelphia, PA 19104-6314
USA

+1-215-898-8560

The tape will be written in tar format at 1600bpi, and returned with a documentation set. Do not send tapes or envelopes. Documentation only is the same price.

4. EUROPE (tape and documentation)
For mailings in EUROPE, send a cheque or bankers draft and a purchase order for 200 Pounds Sterling to:

Department of Computer Science
Attn: Natalie May/Dawn Bailey
University College London
Gower Street
London, WC1E 6BT
UK

For information only:
Telephone: +44-1-380-7214
Fax: +44-1-387-1397
Telex: 28722
Internet: natalie@cs.ucl.ac.uk, dawn@cs.ucl.ac.uk

Specify either (a) 1600bpi 1/2-inch tape, or (b) Sun 1/4-inch cartridge tape. The tape will be written in tar format and returned with a documentation set. Do not send tapes or envelopes. Documentation only is the same price.

6. EUROPE (tape only)
Tapes without hardcopy documentation can be obtained via the European UNIX User Group (EUUG). The ISODE 6.0 distribution is called EUUGD14.
EUUG Distributions  
c/o Frank Kuiper  
Centrum voor Wiskunde en Informatica  
Kruislaan 413  
1098 SJ Amsterdam  
The Netherlands

For information only:  
Telephone: +31-20-5924121 (or: +31-20-5929333)  
Telex: 12571 mactr nl  
Telefax: +31-20-5924199  
Internet: euug-tapes@cwi.nl

Specify one of:  
- 1600bpi 1/2-inch tape: 130 Dutch Guilders  
- 800bpi 1/2-inch tape: 130 Dutch Guilders  
- Sun 1/4-inch cartridge tape (QIC-24 format): 190 Dutch Guilders  
- 1/4-inch cartridge tape (QIC-11 format): 190 Dutch Guilders

If you require DHL this is possible and will be billed through. Note that if you are not a member of EUUG, then there is an additional handling fee of 300 Dutch Guilders (please enclose a copy of your membership or contribution payment form when ordering). Do not send money, cheques, tapes or envelopes, you will be invoiced.

7. AUSTRALIA and NEW ZEALAND  
For mailings in AUSTRALIA and NEW ZEALAND, send a cheque for 250 dollars Australian to:

CSIRO DIT  
Attn: Andrew Waugh (ISODE DISTRIBUTION)  
55 Barry St  
Carlton, 3053  
Australia

For information only:  
Telephone: +61-3-347-8644  
Fax: +61-3-347-8987  
Internet: ajw@ditmela.oz.au

Please specify the media you desire: (a) 1/2-inch tape at 1600bpi, 3200bpi, or 6250bpi; or (b) Sun 1/4-inch cartridge tape in either QIC-11 or QIC-24 format. The tape will be written in tar format and
returned with a documentation set. Do not send tapes or envelopes. Documentation only is the same price.

8. FTAM on the JANET or PSS
The sources are available by FTAM at the UCL over X.25 using JANET (00000511160013) or PSS (23421920030013) with TSEL "259" (ascii encoding). Use the "anon" user-identity and retrieve the file <SRC>isode-6.tar. This is a 14MB tar image. The file <SRC>isode-6.tar.Z is the tar image after being run through the compress program (4.5MB).

9. FTAM on the Internet
The sources are available by FTAM over the Internet at host osi.nyser.net [192.33.4.20] (TCP port 102 selects the OSI transport service) with TSEL 259 (numeric encoding). Use the "anon" user-identity, supply any password, and retrieve the file isode-6.tar.Z from the pub/isode/ directory. This file is the tar image after being run through the compress program and is approximately 4.5MB in size.

For distributions via FTAM, the file service is provided by the FTAM implementation in ISODE 5.0 or later (IS FTAM).

For distributions via either FTAM or FTP, there is an additional file available for retrieval, called isode-ps.tar.Z which is a compressed tar image (7MB) containing the entire documentation set in PostScript format.
REFERENCES


APPENDIX A

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<td>Copy of a Presentation on OSI Protocols Within an Openly Available, POSIX Conformant, Berkeley UNIX Environment Given in December, 1987</td>
</tr>
<tr>
<td>osi-posix/</td>
<td>Copy of a Presentation on Recent Developments with OSI Implementations</td>
</tr>
<tr>
<td>osi-update/</td>
<td>&quot;Unsupported&quot; Additions and Example Applications</td>
</tr>
<tr>
<td>others/</td>
<td>ASN.1 Compilers</td>
</tr>
<tr>
<td>pepy/</td>
<td>Asynchronous Connection Establishment</td>
</tr>
</tbody>
</table>

50
<table>
<thead>
<tr>
<th>ISODE DIRECTORY</th>
<th>DIRECTORY DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>practical/</td>
<td>Copy of a Tutorial on Practical Perspectives on OSI Given in October, 1989</td>
</tr>
<tr>
<td>psap/</td>
<td>Presentation Abstractions</td>
</tr>
<tr>
<td>psap2/</td>
<td>Presentation Library</td>
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<tr>
<td>psap2-lpp/</td>
<td>Light Weight Presentation Protocol (RFC1085) Library</td>
</tr>
<tr>
<td>quipu/</td>
<td>Describes the Design of the QUIPU Directory</td>
</tr>
<tr>
<td>(doc/quipu/)</td>
<td></td>
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<tr>
<td>quipu/</td>
<td>Directory System Agent (DSA)/Directory User Agent (DUA) Programs</td>
</tr>
<tr>
<td>rdbm/</td>
<td>ISODE Remote DBM Demo Program</td>
</tr>
<tr>
<td>reality/</td>
<td>Copy of a Presentation on TCP/IP, MAP/TOP and the Reality of the ISO Protocols Given in January, 1987</td>
</tr>
<tr>
<td>rfcs/</td>
<td>Request For Comments</td>
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<tr>
<td>rosap/</td>
<td>Remote Operations Service Element (ROSE) Library</td>
</tr>
<tr>
<td>rosy/</td>
<td>RO-Compiler</td>
</tr>
<tr>
<td>rtf/</td>
<td>RT-File Transfer Utility</td>
</tr>
<tr>
<td>rtsap/</td>
<td>Reliable Transfer Service Element (RTSE) Library</td>
</tr>
<tr>
<td>snmp/</td>
<td>Simple Network Management Protocol (SNMP) Library and Programs</td>
</tr>
<tr>
<td>ssap/</td>
<td>Session Library</td>
</tr>
<tr>
<td>support/</td>
<td>Deamons, Databases, etc.</td>
</tr>
<tr>
<td>template/</td>
<td>Program Header Templates</td>
</tr>
<tr>
<td>tmp/</td>
<td>Log Files</td>
</tr>
<tr>
<td>tp0bridge/</td>
<td>ISODE TCP/X.25 TP0 Bridge</td>
</tr>
<tr>
<td>trek/</td>
<td>Copy of a Presentation Made at the IRM Conference</td>
</tr>
<tr>
<td>tsap/</td>
<td>Transport Library</td>
</tr>
<tr>
<td>ISODE DIRECTORY</td>
<td>DIRECTORY DESCRIPTION</td>
</tr>
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<tr>
<td>tsaptalk/</td>
<td>Transcript of the Presentation Given at the MAP/TOP User's Meeting in May, 1986</td>
</tr>
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<td>tsbridge/</td>
<td>ISODE TS-Bridge</td>
</tr>
<tr>
<td>util/</td>
<td>Manual Pages</td>
</tr>
<tr>
<td>vt/</td>
<td>Virtual Terminal (VT) Programs</td>
</tr>
<tr>
<td>whitepages/</td>
<td>Documents for the White Pages Pilot Project</td>
</tr>
</tbody>
</table>
APPENDIX B

ISODE PORTS
Date: Mon, 23 Jul 90 13:50:10 NZS
From: P.Kay@massey.ac.nz
Message-Id: <9007230150.AA12227@sis-a>
To: ISODE@nic.ddn.mil
Subject: VMS port of ISODE

Hi,

I have recently finished some work that I started a couple of years ago. - Porting ISODE to VMS.

Current state is:

ISODE-6.0 - all the libraries up to rosy (including pepy, posy and rosy)
    imisc, isoc, ftam, dish clients
    tsapd (single shot - but in a loop) firing off
    imisd, isod (tsap) and ftamd

Very little effort has gone into VMS'ing any of the programs - they still have their UNIX flavour of what file systems look like.

The port was done by writing a UNIX sockit/syst library to glue ISODE to VMS's system routines. Very few changes were made to the ISODE code itself (mostly cosmetic to get it through the compiler).

The UNIX library only backs on to CMU/TEKs tcp/ip package (v6.4), and perhaps PSI (it certainly did work - but I've lost my-PSI connection so can't test it anymore). I hope a backend to Multinet can be written soon.

The extra software to manage the port is freely available to anyone. The sockit library and ISODE files (extra to the 6.0 distribution) amount to approx 600Kbytes of a compressed tar file. Building the code takes about 11 hours elapsed time of a (single user) 3300, and requires a fair amount of disk space.

We are connected to the Internet, but I doubt the rest of NZ would be happy if everyone grabbed the files from Massey, neither do I have an anonymous account I can use. If you would like the software, then either I can post it to you on an at floppy disk, or if someone would volunteer to put it up on a server thats more central I'd be grateful.

Peter Kay
*** MAIL 2 ***

Date: 27 Jul 90 06:35:35 GMT
From: sdd.hp.com!uakari.primate.wisc.edu!samsung!munnari.oz.au!mel.dit.csiro.au!smart@ucsd.edu (Robert Smart)
Organization: CSIRO DIT (Melb.)
Subject: Re: VMS port of ISODE
Message-ID: <1990Jul27.063535.1732@mel.dit.csiro.au>
References: <9007230150.AA12227@sis-a>
Sender: isode-relay@nic.ddn.mil
To: isode@nic.ddn.mil

In article <9007230150.AA12227@sis-a> P.Kay@MASSEY.AC.NZ writes:

> I have recently finished some work that I started a couple of years ago. - Porting ISODE to VMS.
> Current state is:
> ISODE-6.0 - all the libraries up to rosy (including pepy, posy and rosy)
> imisc, isoc, ftam, dish clients
> tsapd (single shot - but in a loop) firing off imiscd, isod (tsap)
> and ftamd
>
> We are connected to the Internet, but I doubt the rest of NZ would be happy if everyone grabbed the files from Massey, neither do I have an anonymous account I can use. If you would like the software, then either I can post it to you on an at floppy disk, or if someone would volunteer to put it up on a server thats more central I'd be grateful.
>
Peter Kay

This is available for anonymous ftp (and fetchfile) from 128.250.90.81 (ditmela.mel.dit.csiro.au). It is the file isode/vmsisode60_tar_z.vl.
If you don't have a unix machine you might find the VMS versions of compress and tar helpful.

This is for Australian sites and for people overseas who have arranged with Peter Kay to make this available in their part of the world.

Bob Smart
In the near future we will be faced with the task of getting ISODE running under INTERACTIVE's 386/ix Unix. We don't expect too much trouble, but it would be nice to know if anyone else has tried this already, and if so, how things went. Comments anyone??

Thanks in advance,
Eric

--
Eric Rosenquist
rosenqui@crc.skl.dnd.ca
Software Kinetics Limited
65 Iber Road, Stittsville, Ontario
Canada - K2S 1E7 Phone (613) 831-0888

isode-RE NIC 7/28/90
Eric Rosenquist ISODE List 7/27/90 ISODE on 386/ix
Date: 10 Aug 90 13:36:17 GMT
From: mcsun!unido!uni-koeln!a0098@uunet.uu.net (Peter heiligers)
Organization: Regional Computing Center, University of Cologne, F. R. Germany
Subject: ISODE under AIX370
Message-Id: <1990Aug10.133617.19014@rrz.uni-koeln.de>
Sender: isode-relay@nic.ddn.mil
To: isode@nic.ddn.mil

We would like to run ISODE under AIX370. It would be nice to know if someone has already tried this, and how things went.

Thanks in advance

Peter Heiligers, Regional Computing Center, University of Cologne
Robert-Kochstr. 10, D-5000 Koeln 41, West Germany
Internet: a0098@rrz.uni-koeln.DE
Bitnet: a0098@dkOrrzk1
Phone: +49 (221) 478 5578

isode-RE NIC 8/10/90
Peter heiligers isode@nic.ddn.mil 8/10/90 ISODE under AIX370
Date: Fri, 10 Aug 90 22:15:05 EDT
From: Valdis Kletnieks <VALDIS@VTVM1.CC.VT.EDU>
Organization: Virginia Polytechnic Institute
Subject: Re: ISODE under AIX370
To: Peter heiligers
<mcson!unido!uni-koeln!a0098@uunet.uu.net>,
isode@nic.ddn.mil
Message-Id: <900810.221505.EDT.VALDIS@vtvm1.cc.vt.edu>
In-Reply-To: <1990Aug10.133617.19014@rrz.uni-koeln.de>

On 10 Aug 90 13:36:17 GMT you said:
> We would like to run ISODE under AIX370. It would be nice to 
> know if someone
> has
> already tried this, and how things went.
>
> (Second try - I managed to trash out my MUA the first time.)
I've ported ISODE 6.0 to the 3090 side of an AIX/370 cluster.
I'm told my config file works fine on an AIX PS/2 1.1 system
as well, so
it shouldn't be THAT hard to fix it to use hidden directories
 to support
both flavors at once.

Feel free to contact me for details - although as I am leaving
 for SHARE
in New Orleans, I won't be able to reply before August 20 or 
so.

Valdis Kletnieks
Computer Systems
Virginia Tech
eisode-RE NIC 8/11/90

Valdis Kletnieks Peter heiligers 8/10/90*ISODE under
AIX370
To: mcsun!unido!uni-koeln!a0098@uunet.uu.net (Peter heiligers)
Cc: isode@nic.ddn.mil
Subject: Re: ISODE under AIX370
In-Reply-To: Your message of "10 Aug 90 13:36:17 GMT."
        <1990Aug10.133617.19014@rrz.uni-koeln.de>
Date: Fri, 10 Aug 90 23:15:34 -0400
From: Tim.Howes@terminator.cc.umich.edu

> We would like to run ISODE under AIX370. It would be nice to
know if
someone h
- as already tried this, and how things went.

We brought up ISODE and Quipu under aix/370. It went pretty
smoothly. Just
use the makefiles for a system V-ish system. Do not make the
mistake of
trying to use -lbsd to get bsd compatibility. That way
madness lies ...

The only trouble I had was in the BYTE definitions in pepy, I
think it
was. That wasn't hard to solve, though.

ISODE seems to work fine. Quipu also works fine, with the
exception that
it can't make outbound connections for some reason. Since the
DSA we have
running is a second line dsa it only gets referrals from other
dsa's. So,
this hasn't been a big enough problem for me to solve yet...

-- Tim

isode-RE NIC 8/11/90
Tim.Howes@terminator Peter heiligers 8/10/90*ISODE under
AIX370
*** MAIL 7 ***

Date: 2 Oct 90 15:57
From: Bernard Detrembleur
<bernard.detrembleur@ts.info.fundp.rtt.be>
To: <pp-people@cs.ucl.uk.ac.gold-400.gb>
Cc: isode@NIC.DDN.MIL
Message-Id: <752:bernard.detrembleur@ts.info.fundp.rtt.be>
Subject: ISODE 6.0 and PP 5.0 on HP 9000/375

Has somebody already ported ISODE 6.0 and PP 5.0 on HP-UX 7.0 with an X25 interface HP 36941A DIO and the X25 Programmatic interface.

If yes, is there a patch somewhere to install ISODE 6.0 and PP 5.0 on top of X25 for the interface (which is not CAMTEC, UBC X25, SUNLINK X25...)

Thanks in advance for your help.

All the bests,

Bernard Detrembleur
Belgian WEP Manager

+++++++++++++++++++++++++++++++F.U.N.D.P.+++++++++++++++++++++++++++++++
To: Bernard Detrembleur
<bernard.detrembleur@ts.info.fundp.rtt.be>
Cc: pp-people@cs.ucl.uk.ac.gold-400.gb, isode@NIC.DDN.MIL
Subject: Re: ISODE 6.0 and PP 5.0 on HP 9000/375
In-Reply-To: Bernard Detrembleur's message of 2 Oct 90 15:57

<752:bernard.detrembleur@ts.info.fundp.rtt.be>
Date: Wed, 03 Oct 90 12:11:05 +0100
Message-Id: <8314.654952265@cli53an>
From: Sylvain Langlois <sylvain@cli53an.edf.fr>

> Has somebody already ported ISODE 6.0 and PP 5.0 on HP-UX 7.0
> with an X25 interface HP 36941A DIO and the X25 Programmatic
> interface.

It's on my work plan. I hope being able to do it by mid-November. If
you have no other answer, I will be happy to send you my resulting
work. However, if you get any positive acknowledgement to your query, I
would be interested in getting them to. Thanks...

Sylvain

-------------
Sylvain Langlois          "Dogmatic attachment to the
(sylvain@cli53an.edf.fr)   supposed merits
                          of a particular structure hinders
the search              of an appropriate structure" (Robert
Fripp)
Date: Thu, 11 Oct 90 20:06:29 PDT
Message-Id: <9010120306.AA26633@rufus.nosc.mil>
From: Kevin.F.Spalding@code413.nosc.mil
(spalding@code413.nosc.mil)
To: isode@nic.ddn.mil
Subj: ISODE 6.0 on IBM RS6000 Under AIX

I am looking to know if anyone has ported isode 6.0 to AIX running on the IBM RS6000. How much if any real effort is required to get it up and running.

Thanks in advance.

Kevin F. Spalding
email: spalding@code413.nosc.mil

isode-RE NIC 10/12/90
spalding@code413.no isode@nic.ddn.mil 10/11/90 No subject
*** MAIL 10 ***

Date: Sat, 27 Oct 90 18:30:01 MET DST
Cc: isode@nic.ddn.mil
In-Reply-To: <9007271926.AA13806@tony1.skl.dnd&ca>; from "Eric Rosenquist" at Jul 28, 90 7:23 am
Organisation: CSD IMMD IV, University of Erlangen (FAU), W -
Germany
X-Mailer: ELM [version 2.2 PL13]

> In the near future we will be faced with the task of getting
> ISODE
> running under INTERACTIVE's 386/ix Unix. We don't expect
> too much
> trouble, but it would be nice to know if anyone else has
> tried this
> already, and if so, how things went. Comments anyone??

The task of porting isode to 386/ix and SCO is financed by
the DFN and will be done by netCS. Contact
baumgarten@zpl.dfn.dbp.de
for more info.

Toerless Eckert
isode-RE NIC 10/27/90
Toerless Eckert rosenqui@crc.skl.dn 10/27/90*ISODE on
386/ix
APPENDIX C

ISODE TEST PROGRAM AND OUTPUT
run this script through /bin/sh

# isode-6.0/isode-test
# A program to test out the isode services etc.
#
# Pretty simple minded - but gives some indications.
#
# Julian Onions <jpo@cs.nott.ac.uk> 15/1/86

# usage : isode-test [ hostname ]
if [ ! -f support/xisoc ]; then
    PATH=$PATH:/usr/local/bin export PATH
    P1= P2=
else
    P1=support/x P2=imisc/x
fi
error=0 fast=0
if [ "x$l" = "x-lpp" ]; then
    fast=1 S=-lpp
    shift
else
    S=
fi
IMISC=${P2}imisc${s}
ISOC=${P1}isoc
if [ $# -gt 0 ]; then
    host="$l"
echo "Hostname set to $host"
echo "$i:" $IMISC "$host" $i || error='expr $error + 1'
done
for i in utctime gentime time users chargen qotd finger pwdgen
done
for i in ping sink echo
done
if [ $fast = 1 ]; then
for i in echo isode/echo
do
echo "rosap $i:"
$ISOC "$host" rosap $i < /etc/passwd || error='expr $error + 1'
done

for i in echo ros_echo "isode/rtse echo" isode/ros_echo
do
echo "rtsap $i:"
$ISOC "$host" rtsap "$i" < /etc/passwd || error='expr $error + 1'
done

for i in echo isode/echo
do
echo "psap $i:"
$ISOC "$host" psap $i < /etc/passwd || error='expr $error + 1'
done

for i in ssap tsap
do
echo "$i echo:"
$ISOC "$host" $i echo < /etc/passwd || error='expr $error + 1'
done

echo "Test done, Errors: $error"
exit $error
Output generated by Isode-test program

Hostname set to ibis
utctime:
910102211527Z
gentime:
19910102211528.810000Z
time:
Wed Jan 2 16:15:30 1991
users:
zhang console Jan 2 10:50
zhang ttyp0 Jan 2 11:24
shen ttyp1 Jan 2 16:15
root ttyp2 Jan 2 14:32 (falcon)
zhang ttyp3 Jan 2 11:24
zhang ttyp4 Jan 2 11:24
zhang ttyp5 Jan 2 11:24
nee ttyp6 Jan 2 15:39 (condor)
shen ttyp7 Jan 2 15:54 (heron)
chargen:
"%&&'()++-./0123456789;<=?ABCDEFGHIJKLMNOPQRSTUVWXYZ^[\]^'abcdefg
"%&&'()++-./0123456789;<=?ABCDEFGHIJKLMNOPQRSTUVWXYZ^[\]^'abcdefgh
"%&&'()++-./0123456789;<=?ABCDEFGHIJKLMNOPQRSTUVWXYZ^[\]^'abcdefghi
"%&&'()++-./0123456789;<=?ABCDEFGHIJKLMNOPQRSTUVWXYZ^[\]^'abcdefghijkl
"%&&'()++-./0123456789;<=?ABCDEFGHIJKLMNOPQRSTUVWXYZ^[\]^'abcdefghijklm
"()++-.
qotd:
Oh don't the days seem lank and long
When all goes right and none goes wrong,
And isn't your life extremely flat
With nothing whatever to grumble at!
finger:
Login Name TTY Idle When Where
zhang Qian Zhang co 14 Wed 10:50
root Operator p2 5 Wed 14:32 falcon
nee Hai-Lin Nee p6 23 Wed 15:39 condor
shen David T. Shen p7 Wed 15:54 heron
pwdgen:
IBPIRIBO
HUGOIDOV
AWETNATE
ETKEMACE
EPDIDOCO
ATADOWAR
ping:
100 operations in 3.80 seconds (26.32 ops/s); 2 bytes/op for 0.05 Kbytes/s
sink:
100 operations in 3.17 seconds (31.55 ops/s); 1024 bytes/op for 31.55 Kbytes/s
echo:
100 operations in 3.64 seconds (27.47 ops/s); 1024 bytes/op for 27.47 Kbytes/s
rosap echo:
ibis... connected
xisoc: 462 bytes echoed in 0.01 seconds (90.23 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (90.23 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (90.23 Kbytes/s)
rosap isode/echo:
ibis... connected
xisoc: 462 bytes echoed in 0.01 seconds (90.23 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (30.08 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
rosap echo:
ibis... connected
xisoc: 462 bytes echoed in 0.59 seconds (1.51 Kbytes/s)
xisoc: 462 bytes echoed in 0.77 seconds (1.16 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
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xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)

rtsap isode/rtse echo:
ibis... connected
xisoc: 462 bytes echoed in 0.58 seconds (1.56 Kbytes/s)
xisoc: 462 bytes echoed in 0.77 seconds (1.16 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
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xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)

rtsap isode/rtse echo:
ibis... connected
xisoc: 462 bytes echoed in 0.48 seconds (1.85 Kbytes/s)
xisoc: 462 bytes echoed in 0.77 seconds (1.16 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
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xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)

rtsap isode/echo:
ibis... connected
xisoc: 462 bytes echoed in 0.49 seconds (1.84 Kbytes/s)
xisoc: 462 bytes echoed in 0.76 seconds (1.17 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.77 seconds (1.16 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
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xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.78 seconds (1.14 Kbytes/s)

psap echo:
ibis... connected
xisoc: 462 bytes echoed in 0.17 seconds (5.31 Kbytes/s)
xisoc: 462 bytes echoed in 0.04 seconds (18.42 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
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xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)
xisoc: 462 bytes echoed in 0.03 seconds (23.14 Kbytes/s)

psap isode/echo:
ibis... connected

69
ssap echo:
ibis... .connected
xisoc: 462 bytes echoed in 0.10 seconds (9.02 Kbytes/s)
xisoc: 462 bytes echoed in 0.02 seconds (31.12 Kbytes/s)
xisoc: 462 bytes echoed in 0.02 seconds (31.12 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.02 seconds (31.12 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.02 seconds (31.12 Kbytes/s)
xisoc: 462 bytes echoed in 0.01 seconds (47.49 Kbytes/s)
xisoc: 462 bytes echoed in 0.02 seconds (31.12 Kbytes/s)
tsap echo:
ibis... .connected
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (902.34 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
xisoc: 462 bytes echoed in 0.00 seconds (100.26 Kbytes/s)
Test done, Errors: 0
APPENDIX D

ISODE BUG INFORMATION
LIST OF ISODE FILES WHICH NEEDED LIBRARY "INTERNET.H"

acsap:  dse.py
rosap:   ro2ssexec.c
        ro2ssinitiat.c
        ro2ssrespond.c
rtsap:  rt2ssexec.c
        rt2ssinitiat.c
        rt2ssrespond.c
psap2:  psapinitiate.c
ssap:   ssapinitiate.c
        tsdu2spkt.c
tsap:   fd2tpkt.c
        text2tpkt.c
        tsapinitiate.c
compat: general.c
        tailor.c
        servbyport.c
Some weeks ago I sent an article on incompatibility between the isode FTAM implementation and M1/T1/A/111 profile compliant implementation. The isode responder as well as the initiator can generate too big presentation data value for other implementation to decode. I added a test in the code to limit the size of PDV. The files ftam-put.c and ftamd-trans.c in the ftam2 directory are to be modified I used the isode-5.9 code.

in ftam-put.c, in the put() function, after the lines:

```
#ifdef BRIDGE
 bsize = BUFSIZ << 2;
 size = magic >= bsize ? magic : bsize;
 if (size > bsize)
   size -= size % bsize;
#else
 #ifndef MAXBSIZE
 bsize = BUFSIZ;
#else
   bsize = st.st_blksize > 0 ? st.st_blksize : BUFSIZ;
#endif
 size = (1024 <= magic && magic < bsize) ? magic : bsize;
#endif
```

add:

```
/* 90/08/10
 added by Olivier Dubois, BIM, Everberg, Belgium to conform
 to ftam profile T1 or A/111 and derivatives where the
 FTAM user data
 is limited to 7K. Conformant implementation can crash
 receiving to big
 Presentation data value. This prevent from putting files
 bigger than 7K
 to their filestore. This is a simple hack to allow interoperability
 with
```
conformant implementations. The limitation could be done fragmenting presentation element in the FDataRequest library function. It is the file sender which decide the P-Data bound in the transfer, it is safe only to modify the sender functions.

the same modification has to be made to the responder function uxfget in ftamd-trans.c..

the bridge case has to be checked against this problem.

*/

#define FTAM_MAX_USER_DATA 4096 /* I choose 4K as 7k is the maximum decoded user data size, you have to keep a few headroom bytes for the receiver (100 from experience). So why not stay with a power 2 for faster buffering)

*/

if ( size > FTAM_MAX_USER_DATA )
switch (vf - vfs) {
    case VFS_UTF:
        size = FTAM_MAX_USER_DATA + MAGIC_OCTET1;
        break;

    case VFS_UBF:
        default:
            size = FTAM_MAX_USER_DATA + MAGIC_SINGLE;
            break;

}/* end addition */

and apply the some modification in the file ftamd-trans.c in the function ufxget().

I hope someone can find this patch usefull and I always interessted to hear your feelings about that damned file transfer protocol.

Olivier Dubois,
System engineer,
BIM sa/nv, Belgium.
isode-RE NIC 8/11/90
To: old@sunbim.be
Cc: isode@nic.ddn.mil
Reply-To: Bug-ISODE@nisc.nyser.net
Subject: Re: FTAM presentation user data size
In-Reply-To: Your message of 10 Aug 90 14:01:59 +0000.
        <1534@sunbim.UUCP>
Date: Sat, 11 Aug 90 18:15:02 -0700
Message-Id: <5675.650423702@cheetah.nyser.net>
From: Marshall Rose <mrose@cheetah.nyser.net>

You really should use the bug-isode address.

This is the first time I have seen your message.

A fix will be made.

/mtr
isode-RE NIC 8/12/90
Marshall Rose old@sunbim.be 8/11/90*FTAM
presentation user data
Date: Mon, 13 Aug 90 21:41:52 GMT
From: Andy Sykes <asmec!andy@relay.EU.net>
Message-Id: <26c71ea0.asmec@asmec.uucp>
X-Mailer: Mush 6.5.6 (PC R6.2 22-Sep-89)
To: isode@nic.ddn.mil
Subject: Pepy and ACSE
Cc: bug-isode@nisc.nyser.net

First, some background;

ASMEC is a design consultancy specialising in COMMS/OSI related
topics within the Industrial and Scientific fields of the
European Computer Industry. We are currently engaged in the
implementation of
a full function OSI stack on Stratus hardware for ICL Network Systems
Ltd (part of ICL/Fujitsu) to be used as the backbone for an
X.400 message handling system.

Having previously ported ISODE onto other ICL UNIX based kit,
we are
grafting the Presentation and Application layers onto the
Stratus OSI session layer server.

Now the questions; The following is little lengthy, so I
apologise to
anyone who is good natured enough to wade through it. In brief they
concern some questions we have with regard to ACSE and PEPY. Being
new to this conferance I'm not sure whether they should be
aired here
or on bug-ISODE, so I have copied this to both for good measure.
However we would be very interested and gratefull for any help
and/or
comments anyone would care to make.

Association Control User Data
============================

Are there any further details or documentation on the use
of the
User Data fields in the AcAssocRequest and AcAssocResponse calls?
>From the code this seems to be an array of PEs, but there is no details as to what form these should take. Moreover, the AcAssocRequest code specifically rejects PEs with the pe_context field set to PE_DFLT_CTX as in the following fragment from AcAsynAssocRequest.c:-

```c
if (data) {
    register int i;
    register PE *pep;

    for (pep = data, i = ndata; i > 0; pep++, i--)
        if ((*pep) -> pe context == PE_DFLT_CTX)
            return acsaplose (aci, ACS PARAMETER, NULLCP,
                "default context not allowed for user-data at slot %d",
                    pep - data);
}
```

PE_DFLT_CTX, however, is the only value defined for this field in the psap.h header. We are confused. Has anyone actually used User Data during association control? The method of calculation of the slot value in the error message would suggest that this message is rarely if ever seen.

We have our own ideas on implementing ACSE User Data but don't wish to lock ourselves out of future releases of the code.

PEPY Problem No. 1
==================

How does one use the pepy MODULE include feature mentioned all too briefly in the documentation?

PEPY Problem No. 2
==================

It would appear that PEPY has a problem with ASN.1 definitions
which define a CHOICE construct as an OPTIONAL member of another construct. The example below illustrates this with respect to the ContType data element, being part of the X.411 MTS:

ContType ::= CHOICE {
  built-in BuiltInContType,
  external ExternalContType }

RepDlvryArg ::= SET {
  subj-subm-id SubjSubmId,
  cont-id ContId OPTIONAL,
  cont-type ContType OPTIONAL,
  origin-eits OriginEITs OPTIONAL,
  per-recip-flds SEQUENCE OF PerRecipRepDlvryFlds (1..ub-recips),
  returned-cont [0] Cont OPTIONAL }

The PEPY produced code for the RepDlvryArg construct is as follows. Please ignore the asnl_prefix and _f suffix to the function calls. These are present to aid the Stratus build system (Oh for make under VOS!!).

int encode_P3_RepDlvryArg_f (PE *pe , int explicit , integer len , char *buffer , struct type_P3_RepDlvryArg *parm )
{
  struct choice_P3_0 *choice_P3_0;
  struct element_P3_0 *element_P3_0;

  PE p10_z = NULLPE;
  register PE *p10 = &p10_z;

  if ( ( (*pe) = asnl_pe_alloc_f(PE_CLASS_UNIV,
      PE_FORM_CONS,
      PE_CONS_SET) )
      == NULLPE) {
    asnl_advise_f(NULLCP, "RepDlvryArg: %s",
      PEPY_ERR_NOMEM);
    return NOTOK;
  }
  choice_P3_0 = parm -> member_P3_0;
element_P3_0 = parm -> per_recip_flds;

****** Intervening code removed for brevity *****

(*p10) = NULLPE;

********* The following section encodes the ContType data element and should be dependant upon the presence of the choice_P3_0 pointer. *********

{
  int p11;
  switch (p11 = (choice_P3_0 -> offset)) {
    case 1:    /* built-in */
      {
        if (encode_P3_BuiltInContType_f(p10, 0, 
            choice_P3_0 -> un.built_in ) == NOTOK)
          return NOTOK;

        #ifdef DEBUG
        "built-in");
        #endif
      }
    break;
    case 2:    /* external */
      {
        if (encode_P3_ExternalContType_f(p10, 0, 
            NULLINT, NULLCP, 
            choice_P3_0 -> un.external ) == NOTOK)
          return NOTOK;

        #ifdef DEBUG
        "external");
        #endif
      }
  }
}

79
break;

default:
    asnl_advise_f(NULLCP, "member %s%d",
    PEPY_ERR_INVALID_CHOICE,
       p11);
    return NOTOK;
}

#ifdef DEBUG
    (void) asnl_testdebug_f( (*p10), "member");
#endif

}  
if ( (*p10) != NULLPE)
    if (asnl_set_add_f( (*pe), (*p10)) == NOTOK) {
        asnl_advise_f(NULLCP, "RepDlvryArg %s%s", 
        PEPY_ERR_BAD_SET, asnl_pe_error_f( (*pe) -> pe_errno));
        return NOTOK;
    }
    (*p10) = NULLPE;

****** Intervening code removed for brevity *****
    return OK;
}

It will be seen that as things stand the section of code which
encodes the ContType element will be processed regardless.
What
should be present is an if statement as follows:-

    if (choice_P3_0)
        int p11;
        switch (p11 = (choice_P3_0 -> offset)) {
which will provide the desired result.

PEPY Problem No. 3
--------------------

Another problem from the following ASN.1 definition for the
MTS:-
PerRecipientReportDeliveryFields ::= SET{
  actual-recipient-name [0] ActualRecipientName,
  report-type [1] ReportType,
  converted-encoded-information-types
    ConvertedEncodedInformationTypes
  OPTIONAL,
  originally-intended-recipient-name [2]
    OriginallyIntendedRecipientName
  OPTIONAL,
  supplimentary-information [3]
    SupplimentaryInformation OPTIONAL,
  extensions [4] EXTENSIONS CHOSEN FROM {
    redirection-history,
    physical-forwarding-address,
    recipient-certificate,
    proof-of-delivery} DEFAULT {}}

ReportType ::= CHOICE{
  delivery [0] DeliveryReport,
  non-delivery [1] NonDeliveryReport}

DeliveryReport ::= SET{
  message-delivery-time [0] MessageDeliveryTime,
  type-of-MTS-user [1] TypeOfMTSUser DEFAULT public}

NonDeliveryReport ::= SET{
  non-delivery-reason-code [0] NonDeliveryReasonCode,
  non-delivery-diagnostic-code [1]
    NonDeliveryDiagnosticCode OPTIONAL}

One the things PEPY does when dealing with CHOICE constructs which
are members a higher level constructs is to 'pull up' the type
of the CHOICE to the type which references them, in this case a SET.
In this case, therefore, the data element structure should be as
follows:-

SET (PerRecipientReportDeliveryFields)
  +-> [0] actual-recipient-name ActualRecipientName
  [1] report-type SET (ReportType)
    +-> either [0] SET DeliveryReport
      or [1] SET NonDeliveryReport

Other members.
Actually, being a SET, the members can appear in the encoded data in any order.

The decode function produced by PEPY, having found the report-type member, correctly expects to see a SET constructor (ReportType) followed by another SET constructor representing the member of the CHOICE construct. If this is not the case there is a clash of the context specific tags.

Unfortunately the corresponding PEPY encode function does not produce the first SET constructor for the report-type element, possibly because both of the potential members of report-type are themselves of the SET type, though we have done no investigation to confirm this.

So, the questions are;

1. Has anyone encountered the same or similar problems and, if so, are there any solutions, particularly with the PEPY problems.

2. Are there any other related problems with PEPY we should be aware of?

3. Is there any later release of PEPY (> Rel 6.0) available?

Thank you for your persistence if you have got this far. We look forward to any comments with interest.

isode-RE NIC 8/13/90
Andy Sykes isode@nic.ddn.mil 8/13/90 Pepy and ACSE
I am confused about the REAL encoding used in ISODE. It appears that the BER specifies that the mantissa of the real (in binary) is encoded as an unsigned integer. (10.5.5 -- ISO8825) However, pg. 299 of The Open Book, and apparently the ISODE implementation encodes the mantissa as a twos-complement integer. I am interested in clarification/explanation of this inconsistency.
We believe that we have uncovered a bug in the Presentation Layer function info2ppdu when dealing with simply encoded User data.

The User data is passed into this function as an array of PEs. Depending upon the type in the pdu->offset field after checking, the User data is converted into a qbuf list using the info2qb function. For simply encoded data this function is called once for each PE such that the data therein is concatenated into a single qbuf. Fully encoded data is built into a list of qbufs.

The bug relates to the fact the the qbuf is not set up correctly for the simple encoded case. The qb_len feild is left with a value of zero, and the qb_data pointer points to the end of the data held in the qb_base character array due to the manner in which info2qb operates. The qb_len field in the header structre is correct, however.

The upshot of all this is that simply encoded User Data is not included in the encoded PPDU, as qb2prim specifically tests the qb_len field.

A proposed solution is to insert the following just after the processing loop which calls info2qb:

```c
if (pdu->offset == type_PS_User__data_simple)
```
{  
    qb->qb_len = simple->qb_len;
    qb->qb_data = qb->qb_base;
}

return pdu;

This has worked successfully in our tests.

Best Regards
Andy Sykes

Andrew Sykes Micro-Electronics Consultants Ltd.
21 Willow Green, Needingworth, Cambridgeshire, PE17 3SW, UK
Tel/FAX: +44 (0) 480 69771  
E-Mail: andy@asmec.uuup

** MAIL 6 **

To: andy@asmec.UUCP
Cc: Bug-ISODE@nisc.nyser.net, isode@nic.ddn.mil
   Reply-To: Bug-ISODE@nisc.nyser.net
Subject: Re: Bug in info2ppdu
In-Reply-To: Your message of Mon, 20 Aug 90 17:45:58 +0000.
   <26d021d6.asmec@asmec.uucp>
Date: Mon, 20 Aug 90 14:09:34 -0700
Message-Id: <5099.651186574@cheetah.nyser.net>
From: Marshall Rose <mrose@cheetah.nyser.net>

Thanks. Could you

1. Use just the bug-isode list in the future; and,

2. Send a context diff. From your report, I can not deduce what you suggest as the actual fix.

/mtr
   isode-RE NIC  8/20/90
Marshall Rose   andy@asmec.UUCP  8/20/90*Bug in
info2ppdu
Date: 30 Sep 90 00:22:43 GMT
From: agate!linus!linus!mbunix.mitre.org@apple.com (Trei)
Organization: The MITRE Corp., Bedford, MA
Subject: Need some help with NIST ISODE.
Message-Id: <121729@linus.mitre.org>
Sender: isode-relay@nic.ddn.mil
To: isode@nic.ddn.mil

Help!

We seem to have come up against a serious shortcoming in the ISODE 6.0 tsaplisten facility. This is what is happening:

We have two or more processes that want to listen at the same transport address (at mutually exclusive times). But, the first process performs its TNetListen and TNetAccept just fine, but then when it does a TNetClose to stop listening on the transport address, it turns out that the address is still bound, and can't be listened on by another process until the first process exits. This is somewhat of a dilemma for us.

If anyone knows how to work around this problem, please mail to wheeler@mbunix.mitre.org. BTW, we are running ISODE-6.0 on a Sun 3 with SunLink 6.0 (using TP4, not X.25).

Thanks in advance.
isode-RE NIC 10/06/90
Trei isode@nic.ddn.mil 9/30/90 Need some help with NIST ISODE
My apologies if this has already been pointed out, but I've only been reading this group for a few months....

According to the QUIPU manual (ISODE Vol. 5, Ver. 6.0) page 155, dsap_init will ignore all arguments except a "-c dsa_name" pair.

This isn't strictly the case: dsap_init will ignore arguments that occur after "-c dsa_name" IF they are not "-flag" style arguments (i.e. if they are "flag" style), and will reject (i.e. generate an error message and exit your application) any "-flag" style arguments where "-flag" is not one of the ones listed below.

In fact, dsap_init will ignore ANY argument that occurs after a "flag" style argument, including the "-c dsa_name" argument. This is due to a function (tai_args()) called by dsap_init; To be safe and sure, dsap_init should only be passed an argv-style argument of the form:

your_appl_name :-c dsa_name: :-t dsap tailor_style_tailor_file:

OR

two NULL pointers (in which case the only tailoring dsap_init will do is to read your $HOME/.isode_tailor file, if it exists).

(as usual, the : : : : indicate that these arguments are optional).

What will dsap_init do with your options?

------------------------------------------
If you do not pass dsap_init(NULL, NULL), then it will:

1) look in your home directory for
   .your_application_name_tailor,
   an isodetailor-style file, which it will read for various
   tailoring options (log level settings, ETCDIR
   redefinitions).

   If the HOME environment variable is not set, it will try to
   find
   this file in the local directory.

   If it can't find it, it ignores it.

2) set dsa_address to the dsa_name following the '-c' flag;
   subsequent binds will connect to that dsa.

3) read the dsaptailor style file specified after the '-t'
   flag,
   which it will read for dsa addresses and names.

4) read the oidtable specified after '-T' (instead of
   ETCDIR/oidtable).

In case of inaccuracies or omissions in the above, please
e-mail the
correct information to me, and I will repost this article.

Thanks,

Peter W.
pww@bnr.ca
isode-RE NIC 10/11/90
Peter (P.W.) Whitta isode@nic.ddn.mil 10/11/90 ISODE Vol.5
doc error?
Date: 13 Oct 90 04:00:23 GMT
From: van-bc!ubc-cs!kiwi!newshost!morse@ucbvax.Berkeley.EDU
   (Daryl Morse)
Organization: MPR Teltech Ltd., Burnaby, BC, Canada.
Subject: HELP!! Segmentation faults:
Ultrix-4.0/ISODE-6.0/OSIMIS-2.1
Message-Id: <MORSE.900ct12210023@quark.mpr.ca>
Sender: isode-relay@nic.ddn.mil
To: isode@nic.ddn.mil

We are trying to bring up (read: keep up) OSIMIS and ISODE on
DECstation 5000s running Ultrix 4.0, but are encountering
segmentation faults under load, as well as lots of noise due to unaligned
accesses.
We turned off the unaligned access messages with the uac
command, but
the segmentation faults are a brick wall.

My questions are directed at users of OSIMIS and ISODE running
DECstations, as well as DEC software support. We are not sure
whether
the segmentation faults are a result of the software or the
operating
system. The unaligned access messages are clearly caused by
the code.
(The Sun4 compiler has a handy-dandy "-misaligned" flag, which
seems
to have averted problems on that platform.) Ultrix supposedly
fixes-up
problems due to misalignment on the fly, as the numerous error
messages used to indicate before we shut them off. However, we
already
are running a patched version of vm_drum.o, which was
necessary to
enable us to run a well-known 00 development environment
without
crashing the system on a regular basis.

1. Is the runtime fix-up known to be robust under all
circumstances,
or will it break under pathological conditions? Will we know
if it
breaks?

2. Has anyone been able to get OSIMIS and ISODE to run
reliably on a
DECstation (with any version of Ultrix)? If so, did you encounter similar problems?

3. Are there any known problems with Ultrix 4.0 that cause segmentation faults? Are any patches available? (We are desperate!) Could the patch to vm_drum be causing other problems? (Sorry, we received only a compressed binary, without any official documentation (ie. no SPR or patch number). I do have the name and email address of a DEC contact for it, however.)

I will be eternally grateful for any assistance offered. Please reply via email. I will post the solution when I find it. Thanks.

--
Daryl Morse
MPR Teltech Ltd.
8999 Nelson Way, Burnaby, BC
Canada, V5A 4B5
Voice: (604) 293-5476
Fax: (604) 293-5787
E-Mail: morse@quark.mpr.ca
quark.mpr.ca!morse@uunet.uu.net
isode-RE NIC 10/13/90
Daryl Morse
Segmentation faults:
Ul

isode@nic.ddn.mil 10/13/90 HELP!!
Date: 19 Oct 90 17:59:50 GMT
From: van-bc!ubc-cs!news-server.csri.toronto.edu!utgpu!cunews!bnrgate!pww@ucbvax.
Berkeley.EDU (Peter Whittaker)
Organization: Bell-Northern Research, Ltd., Ottawa, Ontario, CANADA
Subject: Re: Problems with str2aei()..
Message-Id: <1990Oct19.175950.19743@bnrgate.bnr.ca>
References: <559@.betaal.UUCP>
Sender: isode-relay@nic.ddn.mil
To: isode@nic.ddn.mil

In article <559@.betaal.UUCP> murthy@betaal.UUCP (C. V. R. Murthy) writes:
> Hello!

> the following entry gives me a core dump:
> static LLog _pgm_log = {
>    "/usr2/isode/isode-5.0/log/logfile", NULLCP, NULLCP,
>    LLOG_FATAL | LLOGEXCEPTIONS | LLOG_NOTICE,
>    -1,
>    LLOGCLS | LLOGCRT | LLOGZER,
>    NOTOK
>  
>  LLog *pgm_log = &_pgm_log;
>
> Thanks in advance
> & waiting eagerly for responses,
>
You need one more line (you took this structure straight from the manual,
without checking the argument count - naughty, naughty :-)).

....... 

LLOG_FATAL | LLOGEXCEPTIONS | LLOG_NOTICE,
LLOG_NONE,     /* no syslog logging */
-1,

....... 

That should do it.
ISODE is really quite neat, and fun to use (not to mention useful, functional, and free.... :@}) but the manuals run at about 75% accurate.

(For further news, join the QUIPU discussion group: QUIPU-REQUEST@cs.ucl.ac.uk
It's not on the Internet at large (as far as I know), but is available as a mail-out to any interested party).

--
Peter W. (pww@bnr.ca)
Hello!

This is our first posting onto this USENET newsgroups; I was looking for a newsgroup concerned with the ISODE. I really do not know if this the right group; appreciate if someone could place this article to a proper people/forum.

WE have recently installed the ISODE Rel 5.0 on our 386 Unix system V with TCP/IP. It works fine; at least quipu DSA and DUA can interact.

I wanted to experiment with the lookup daemon and see how the remote operations(ry) specs can be implemented using the rich tools available under ISODE. I have defined a new service:

```
erent passwdstore 1.17.4.1.7 "" "" #1040
```

in the TOPDIR/etc/isoentities.

I compiled the ros.lookup daemon (had some problems with some call to isodeserver() but I'll explain later) and inst-alled. When I ran ros.quipu daemon, I get the following error:

```
erent-passwordstore: unknown application-entity
```

Then I wanted to confirm this with the acsapptest program; the acsapptest when it was run without any argument, it shows an entry as follows:

```
ISO Entities Database:
...
Entity: ernet-passwordstore (1.17.4.1.7)
AE Info: <1.17.4.1.7,.,.,>
```
Address: '0410'H/
{
    tSelector '0410'H,
    nAddress{}
}
...

But when I run
% acsaptst ernt passwdstore
then I have no luck!

(The ns_enable: field was set to on first then it called
str2aei_dse() and it was set to off in another try;
the net result is same!).
Can anybody suggest me what is going wrong?

2. Further, I do not really understand the isodeserver() mechanism
provided in the ry modules; how should one go about writing
this?
Is there any sample program for the lookup daemon?

3. And lastly, I seem to be having problems with logging messages:
the following entry gives me a core dump:
static LLog _pgm_log = {
    "/usr2/isode/isode-5.0/log/logfile", NULLCP, NULLCP,
    LLOG_FATAL | LLOGEXCEPTIONS | LLOG_NOTICE,
    -1,
    LLOGCLS | LLOGCRT | LLOGZER,
    NOTOK
};
LLog *pgm_log = &_pgm_log;

Thanks in advance
& waiting eagerly for responses,

---Murthy.

--
I sent the following message to bug-isode@nisc.psi.net over a month ago and got no response whatsoever, not even an ack. I tried again a few days ago and still have no response. So I'm forwarding it to the whole list in the hopes that somebody can help me out. This message is partially a bug report about ISODE (at least I think it's a bug, but it might be a "feature"), partially a complaint about what appears to be a bug in the lpp spec, and partially a question about how the asynchronous association feature of ISODE was really meant to be used. If you have something to contribute about any of these issues, please respond to me (I'll summarize responses) or directly to the list, if you think it's of general interest. Thanks.

By the way, I also have a plain old bug report that sent to bug-isode with no ack. I'll forward that to the list in a separate message.

> From solomon Mon Sep 24 06:59:28 1990
> From: solomon (Marvin Solomon)
> Message-Id: <9009241159.AA18696@gjetost.cs.wisc.edu>
> Subject: problems with asynchronous lpp (fwd)
> To: bug-isode@nisc.psi.net
> Date: Mon, 24 Sep 90 6:59:18 CDT
> Cc: nhall (Nancy Hall), solomon (Marvin Solomon)
> X-Mailer: ELM [version 2.2 PL10]
> Hi someone (perhaps Marshall).
> I've been having some problems with the UDP variant of the 1085 code in ISODE 6.0 and hope you can help a bit. At first I thought
it was
> simply a bug report, but now I'm not so sure.
> I want to write a client that probes several servers using udp/lpp.
> Since a server may take a while to respond, I want to use
> AcAsynAssocRequest to "start the ball rolling" and come back later
> with AcAsynRetryRequest to complete the handshake. My first problem
> was that AcAcynAssocRequest was not returning immediately, even though
> I was setting async=1. Upon plowing through the code, I discovered
> that udpopen calls udpretry, which sends the connection request packet
> and then does a select with a timeout of WAITTRIES (30 seconds!). I
> kludged the code to change the timeout to OK (0) if udpopen is called
> with async!=0. [Udpopen doesn't pass the async flag to udpretry and I
> couldn't simply add an argument because of the way udpretry is called,
> so I put the timeout in a global and modified it just before the call.
> Ugly, but effective.]
> With that change in place, AcAsynAssocRequest properly returns
> CONNECTING 1. However, when I later call
> AcAsynRetryRequest, the
> server complains about unexpected PDU 1, and aborts the association.
> It seems that AcAsynRetryRequest also calls udpretry, which retransmits
> the connection request pdu. RFC1085 says that a connection request pdu
> in state WAIT2 or DATA causes the association to be aborted. I would
> argue that that's a mistake; the responder should simply discard the
> duplicates (easily recognized as such because of the connection
> reference). Am I missing something obvious? Be that as it may, I
> can't see how AcAsynRetryRequest can possibly work correctly with the
> current setup. Unless you can point out the error of my ways, I'm
> planing to dig in and simply make udpretry discard the CR
pdu after sending it once. That kills the possibility of using retransmission to recover from lost CR pdu's, but I think that's of marginal utility. anyhow, since the way 1085 is written, it can only recover from lost CR's, not lost (or slow) CC's. Besides, as somebody once said "Low quality means low quality!".

On a related subject, I just can't seem to get the point of TSelectMask and friends. The little tutorial on asynchronous requests in section 4.2.3 of Vol II says in a couple of places "At some point in the future call TSelectMask to get an argument for xselect". In the case of udp, TSelectMask actually does selects of its own, so it appears to me that you can't just call TSelectMask once immediately after the ConnRequest and squirrel away the result for use later. But doesn't "polling" TSelectMask for each of the relevant td's kind of defeat the purpose of xselect? Suppose I want to fire off a bunch of connect requests and then sit back and wait until one of them completes (or I get keyboard input, or a message from the X server or an RPC message from another process or any of a variety of other things). When should I call TSelectMask? What I'm doing now is to manually build a big select mask including all the file descriptors I care about that are unrelated to ISODE, as well as all the td's (or sd's or whatever) I know about from AcAsynConnRequest or AcInit. If one of the latter shows any activity, I do AcAsynRetryRequest or RyWait, depending on my idea of the state of the connection. I don't use ?SelectMask at all. It seems to more-or-less work, but I still have the feeling I'm doing something very naughty. A word or two of advice would be much appreciated.
> Sorry for the long-winded questions. I'll try not to bug you too often
> (not more once every few months). Thanks for any light you can shed on
> this matter.
> --Marvin
>
> isode-RE NIC 10/25/90
Marvin Solomon isode@nic.ddn.mil 10/25/90 problems with
asynchronous
lpp
The following is a bug in ISODE 6.0. Marshall, don't tell me to RTFM and and send it to bug-isode. I did and received no response.

Forwarded message:

> From: solomon@cs.wisc.edu (Marvin Solomon)
> Message-Id: <9009261031.AA23208@gjetost.cs.wisc.edu>
> Subject: uninitialized variable
> To: bug-isode@nisc.psi.net
> Date: Wed, 26 Sep 90 5:31:38 CDT
> Cc: solomon (Marvin Solomon)
> X-Mailer: ELM [version 2.2 PL10]
> 
> Reference: isode 6.0, compat/dgram read_dgram_socket
> Description: The variable mask is used but never initialized

> Fix: about line 394, replace
> FD_ZERO (&ifds);
> by
> FD_ZERO (&mask);
>
isode-RE NIC 10/25/90
Marvin Solomon isode@nic.ddn.mil 10/25/90 uninitialized variable (fwd)
Hello, we're running ISODE 6.1+ patches on SUNs (4.0.3) and HP-UX 6.5, and we seem to be having memory leakage problems.

We are already aware of certain memory leaks in the QUIPU-specific code (entry.c, oper_act.c, update.c) but these problems seem to be more at the Transport Layer of ISODE.

The leaks were discovered by a test case that attempts several thousand bind/unbind operations. On a SUN with 65 Meg, it takes between 10- and 20 000 of these operations for the DSA to fail, while a DUA on an H/P with 8 - 16 M fails after about 6000 operations. Furthermore, when the DUA starts its binding, it manages 3 or 4 bind/unbind pairs a second. After about an hour, it's down to 1 every 3 or 4 seconds (i.e. the DUA grows and grows, becoming more and more of a load on machine resources, esp. pager and swapper).

The transport layer is suspected for two reasons:

i) there's a synching problem with the ISODE stack as well:

    if three DUAs on three separate machines all attempt the bind/unbind tests simultaneoulsy, one will invariably "win out", and complete its bind/unbinds in 'normal' time. The other two will 'lock' their TCP connections, and not 'hang' until they, or the DSA, are killed. (This 'winning out' usually manifests itself after about 60 minutes - roughly 500 binds per DUA).

    (All data in the TCP exchange is good (no bad packets, dropped packets,
or collisions): this thanks to a LanAnalyzer.)

The DSA writes in its stats.log that it received a ds_unbind-request,
and that the connection was dropped, but the connection
persists.

So, we suspect that somewhere in the application stack a routine
'forgets' to either set or clear some data object.

ii) Because the bind/unbind operations do not involve any other DUA/DSA
operations, there is a minimal amount of ASN.1/BER manipulation going
on, so the presentation and session layers aren't suspected: ergo, transport layer.

(a third circumstantial reason is that the first error reported when the
DUAs fail is A-ASSOCIATE.REQUEST out of memory, accompanied by

TAsynConnRequest: Congestion at TSAP :out of memory:
SAsynConnRequest(pseudo): Congestion at SSAP
ppktlose :Temporary congestion:
PAsynConnRequest(pseudo): Temporary congestion

The 'circumstantial evidence' is that the transport function
is the first that reports an error.)

Has anyone else had similar problems with ISODE?

Thanks,

Peter W.

isode-RE NIC 10/29/90
Peter (P.W.) Whitta isode@nic.ddn.mil 10/29/90 Memory leaks in ISODE stack.
To: PWW@bnr.ca (Peter Whittaker, P.W.)
Cc: quipu-support@cs.ucl.ac.uk
Reply-To: quipu-support@cs.ucl.ac.uk
Cc: isode@nic.ddn.mil
Subject: Re: Memory leaks in ISODE stack.
In-Reply-To: Your message of Mon, 29 Oct 90 09:57:00 -0500.

Date: Mon, 29 Oct 90 14:18:34 -0800
Message-Id: <25201.657238714@cheetah.ca.psi.com>
From: Marshall Rose <mrose@cheetah.ca.psi.com>

There were a few memory leaks in 6.0+. These are believed to be fixed in the current beta, 6.6

/mtr
isode-RE NIC 10/30/90
Marshall Rose Peter Whittaker, P. 10/29/90*Memory leaks in ISODE stack.
Date: Wed, 31 Oct 90 08:54:10 -0500
From: sean@dsl.pitt.edu (Sean McLinden)
Message-Id: <9010311354.AA02173@cadre.dsl.pitt.edu>
To: PWW@BNR.ca, isode@NIC.DDN.mil, quipu-request@cs.ucl.ac.uk

Subject: Re: Memory leaks in ISODE stack.

I, too, have experienced memory leaks on DEC3100 (MIPS) running
Ulrix 3.1, 3.2, and 4.0. At first I thought that it was due to
problems with the MIPS C compiler, and was going to try compiling
with GNU, but with warnings enabled I got nearly 200 pages of
possible problems and gave up trying to find out where they all
were. Most of our problems stem from running QUIPU. It would run
about 18 hours and then die. Restarting got to be a problem because
the startup DSA gets overwritten once the data is fetched from the
master, but what is fetched cannot be used to restart the DSA. If
there are patches to the QUIPU code, that might help. I had always
assumed that the problem was there because we could run the rest of
the ISODE for days without problems (but then, nothing banged on it
as much as QUIPU).

Sean McLinden
Decision Systems Laboratory
University of Pittsburgh
isode-RE NIC 10/31/90
Sean McLinden PWW@BNR.ca 10/31/90*Memory leaks in ISODE stack.