Debugging CLIO/S

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Preface

This document describes some methods that can help you understand what is happening as CLIO/S processes initialize and move data. It also describes some common problems and the means to correct them.

This document is for CLIO/S Version 2 Release 2, PTF 3. Some problems with earlier levels are also described.

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Contents

Preface iii

Chapter 1. General debugging tips 1

Chapter 2. Tracing CLIO/S processes 3
The CLIO/S debug messages 3
clftp and clplink traces 3
Turning on the clftp trace under version 2.2. 3
Using GTF to trace channel problems 4
Using GTF to trace CLIO/S calls 4
SYS1.LOGREC 4
Tracing an adapter 4

Chapter 3. Debugging the Installation and Configuration 5

Chapter 4. Installation Problems 7

Chapter 5. Debugging CLFTP and CLPLINK 13

Chapter 6. Miscellaneous problems 19

Chapter 7. Tape Server and Tape Pseudo Device Driver Problems 21

Chapter 8. Debugging Intermittent, Hardware or Network Problems . . . 23

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Chapter 1. General debugging tips

- Make sure you have all the latest maintenance for CLIO/S and the channel adapter device drivers and microcode. See **CLIO/S and Related Software Maintenance** for details.
- Don't forget that parts of CLIO/S run on both the MVS host and the RS/6000 workstation or SP node. It's important to debug from *both* sides of the network.

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Chapter 2. Tracing CLIO/S processes

The CLIO/S debug messages

Refer to **Setting CLIO/S Environment Variables** in the user's guide for information on setting CLIODEB to generate debug messages, and using CLIODFILE, CLIOEFILE, CLIODFILEPID, and CLIOEFILEPID to direct the debug and error output to files.

clftp and clplink traces

clftp and clplink have their own traces separate from the CLIO/S debug messages. The traces are intended for use by IBM service personnel and are generally difficult to interpret.

Turning on the clftp trace under version 2.2.

clftp and clplink support two command line options that control tracing.

To turn on tracing at the client, use `-D level<,file_prefix>`

`level` is a number that determines what level of tracing should be done:

- 1 - Important information like errors and set up
- 2 - Procedure calls and returns
- 3 - Important information plus procedure calls and returns
- 7 - Important information, procedure calls and returns, and flow and data information.
- 15 - All that is specified in 7, plus information that is contained in loops that may be executed many times. This will generate much information, so only use it if you are desperate.
- 16 - Trace calls to user specified conversion and I/O routines.
- 31 - Trace everything. Only use this when you are desperate.

`file_prefix` is a file prefix that indicates where AIX tracing information should be written. The file name that each process writes its tracing information in is a concatenation of the file_prefix and the process id that is writing the messages. (See the example below). On MVS, the file_prefix is ignored, and tracing information is always written to stdout.

For example, `clftp -D 7,clx kn1mvs` turns on level 7 tracing. Supposing that the 4 processes of the client are 10001, 10002, 10003, and 10004, then the trace output would be written to files clx10001, clx10002, clx10003, and clx10004.

To turn on tracing at the servers, use `-Y level<,file_prefix>`

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`level` and `file_prefix` are as described for the `-D` option.

If intermediate nodes are used, `-Y` turns on tracing at the intermediate nodes also.

`-D` and `-Y` can be used together.

Using GTF to trace channel problems

From time to time it may be helpful to use the MVS GTF function to trace channel problems. Typically there is a 'proc' in SYS1.PROCLIB called GTF. That proc usually points to a parameter data set. Here are some suggested GTF parameters for tracing CLIO/S over channel-to-channel connections:

```
TRACE=IOP,CCWP,SSCHP,HSCH,CSCH
IO=SSCH=(xxx,yyy)
CCW=(SI,CCWN=100,DATA=100,IOSB)
```

where xxx and yyy are the MVS device addresses of the channel adapter on the RS/6000.

Using GTF to trace CLIO/S calls

GTF can also be used to trace CLIO/S internal functions such as subchannel allocation and tape allocation and I/O. Use the parameter `TRACE=USR`. The CLIO/S GTF identifier is `xF42`

Send the output to CLIO/S service for analysis.

SYS1.LOGREC

The MVS file **SYS1.LOGREC**, created by the Environmental Record Editing and Printing Program (EREP), can help identify hardware problems.

Tracing an adapter

During problem determination, IBM support may ask you to trace channel adapter activity. To start and stop microcode or device driver traces, use SMIT: `SMIT esca`, then choose `Problem determination`. (Use `SMIT blkmux` for block mux channels.)

Send the results to IBM support.

It can happen that the device driver trace gets too large for the default file system. In this case, start the trace from the command line, and specify the output file path:

```
trace -a -j <trace_id> -o tracedata
(run the application)
trcstop
trcrpt tracedata > tracereport
```

`<trace_id>` should be set to 452 for ESCON, 350 for block mux under AIX 3.2, and 358 for block mux under AIX 4.x. “tracedata” and “tracereport” are arbitrary file names.

Chapter 3. Debugging the Installation and Configuration

Many CLIO/S problems are the result of incorrect or incomplete installation or configuration. If you can get the sample programs provided with CLIO/S to run successfully in both directions between AIX and MVS over a CTC connection, all the necessary components of CLIO/S are working properly. Testing the installation between RS/6000s could miss problems that exist in the MVS-RS/6000 configuration.

If the sample programs work, but your own applications do not, the problem is probably with your applications.

We will use FCFIDUM as a representative member of the samples. You should be able to successfully run FCFIDUM from both MVS and AIX.

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Chapter 4. Installation Problems

Symptom U4083 abend starting CLIO/S job after new install or PTF.

Try This This situation is described in informational APAR II10770. Here is the text of that APAR.

```
apar number =     II10770
AB     ABENDU4083

ABENDU4083 RC5 STARTING CLIO/S JOB AFTER NEW INSTALL OR PTF

Users have experienced Abendu4083 ( abend 4083 U4083 ) RC5 ( rc 05)
when starting a clio/s job after a new install or ptf application.

The 'classic symptom' is a PSW at abend equal to: 078D2000 9928C4AC
with an interrupt code of x'10' (segment exception)
but other PSWs are possible.     This psw may only show up in the
system trace table, due to LE/370 error handling & Estae routines.

Most cases are traced back to bad linkedits in the smp/e APPLY
step, usually due to a confusion of which datasets to allocate
to smp/e DD DEFs.

Here is a summary of DD DEFS for customers using C/370 and PL/I
run time libraries

DDNAME              System Dataset
SEDCBASE            SYS1.SEDCBASE         C/370 Linkedit Library
SIBMBASE            SYS1.SIBMBASE         Pl/I  Linkedit Library
SIBMLINK            SYS1.SIBMLINK         PL/I  Run Time Library

When starting the CLIO/S jobs, using the above DDDEFS, the datasets
SYS1.SEDCLINK and SYS1.SIBMLINK must be in the STEPLIB DD concatenation,
or the system LINKLIST. (LINKLST)


Here is a summary of DD DEFS for customers using LE/370
run time libraries

DDNAME              System Dataset
SEDCBASE            CEE.SCEELKED         LE/370 Linkedit Library
SIBMBASE            CEE.SCEELKED         LE/370 Linkedit Library
SIBMLINK            CEE.SCEERUN          LE/370 Run Time Library

When starting the CLIO/S jobs, using the above DDDEFS, the dataset
CEE.SCEERUN must be in the STEPLIB DD concatenation,
or the system LINKLIST. (LINKLST)
```

Symptom The FCFIDUM executable doesn't exist or won't run.

Try This Check the installation procedure. On MVS, repeat FCFSAMP, checking for errors. On AIX, verify that /usr/lpp/fcf/bin/fcfidum exists. If it does not, then check the results of the installp process. Also make sure that /usr/lpp/fcf/bin/fcfidum is in your AIX search path.

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Symptom FCFIDUM runs but generates error message `fcfidum: Error -1 from OPNSRV.`

Try This Both **parsrv** (AIX) and **FCFPARSR** (MVS) should be running. See **Starting the PARSRV Server** in the user's guide for more information on starting these programs.

Or This Make sure that both the local and remote systems are running the same level of CLIO/S. Mismatched versions, releases, or ptfs will not work together.

Or This On MVS, a likely explanation is that the servant copy of FCFIDUM was started but failed before it could contact the master. Inspect the operator log or held output for traces of the servant job. The default behavior of FCFREXX is to copy the JCL into the SYSTSPRT DD of the FCFPARSR process. This makes it easy to find and inspect the JCL.

Look for JCL errors, incorrect userid or password, or other problems. JCL errors can be corrected by modifying FCFREXX. The userid and password are read from the .netrc file on AIX and passed to MVS. Make sure that the .netrc file is correct.

Or This Error messages such as "`EDC5032I An error was detected in the input string passed to the system() function.`" or "`EDC5057I The open mode string was invalid.`" indicate a mismatch in maintenance levels between the FCFIDUM executable and the FCFPARSR process. Verify that all current maintenance has been installed on all systems in your CLIO/S network and that all CLIO/S components are running from the same load library.

Or This For the AIX-to-AIX environment, or during the Installation Verification Program on AIX, make sure that **rexec** is working properly. Try an **rexec** command such as

```
rexec <targetnode> date
```

If this fails, find and fix the problem with **rexec** before proceeding with CLIO/S debugging.

Symptom FCFIDUM runs but generates error message `Sorry, can't find info about` *targetnode*

Try This The local parconf file does not contain an entry for *targetnode* or the entry has an invalid address. Check the debug messages that are generated when CLIO/S reads the parconf file; they often contain clues to the exact problem. Focus on debug messages from the **readconf** routines.

Can you **ping** the internet address specified in the parconf file? This demonstrates that you have a valid network address in the parconf file.

Symptom FCFIDUM runs and debug messages indicate attempted contact with target, but connection fails with message `OPNSRV select failed. rc=0`

Try This The local .netrc file may have an incorrect password for the target system. You can test this by **ftp**ing to the target host. If you are prompted for your password when you **ftp** to the target with the current .netrc file, your password is not in the .netrc file.

Or This The parsrv process on the remote system must be able to locate the FCFIDUM executable or program. On AIX, make sure that the executable is in your $PATH, or in a directory listed in one of $CLIOBIN, $CLIOPATH, or $CLIOSYS. On MVS, make sure the FCFPARSR JCL has been modified to match your installation's values. Also, make sure that FCFREXX names the data set containing the MVS executable of FCFIDUM. The CLIO/S Program Directory describes how to modify the JCL for FCFIDUM. For more information on generating JCL with FCFREXX, see **Appendix D, Controlling How CLIO/S Servers Are Started** in the user's guide.

Symptom Various TCP/IP failures on MVS. Messages such as `EZY3744E RC=1011 ON IUCV_CONNECT TO TCPIP` may be seen.

Try This Make sure that the TCP/IP started task is running.

Or This Make sure that all processes use the correct TCP/IP jobname. If you have more than one instance of TCP/IP running at the same time, make sure that all CLIO/S jobs are using the same TCP/IP instance. As discussed in the 'IBM TCP/IP for MVS Customization and Administration Guide', Version 3.x, there is a SYSTCPD DD entry that can be used for every job that uses TCP/IP services. SYSTCPD points to the TCPIP.DATA dataset, which contains 'TCPIPJOBNAME', which must be set correctly.

If FCFPARSR or any other CLIO/S job requires this statement, then all the other jobs that use CLIO/S will also need it. You can add it to the batch jobs that you submit directly. For the JCL that FCFPARSR dynamically generates and submits, you will have to edit the DD card section of FCFREXX.

Note that the the SYSTCPD DD card only works with TCP/IP 3.x. If you have an earlier version of TCP/IP, refer to TCP/IP documentation for assistance.

Symptom Other strange TCP/IP problems or very slow TCP/IP activity on MVS.

Try This Make sure that you are running with the same level of TCP/IP that you linked CLIO/S with. A mismatch will not work.

Symptom FCFIDUM runs successfully but debug messages say `Protocol=TCPIP`

Try This CLIO/S didn't read the parctc file. Check the debug messages from the AIX side for one of these problems:

- CLIO/S can't find the parctc file in your **$HOME** directory or in **/etc/parctc**.

  Put parctc in one of these directories.

- CLIO/S is not looking for the parctc file because the parconf entry specifies the TCP/IP protocol.

  Fix the parconf entry.

Or This CLIO/S read the parctc file, but didn't find a valid entry for the CTC connection desired. Messages indicating this problem include:

```
CTC_OPN_0: readconf- No /dev/cat entries found in parctc
```

or

```
CTC_OPN_0: readconf- No /dev/esca entries found in parctc
```

Possible causes for this include incorrect syntax in the parctc entry, or an incorrect local or remote node name. The local name should be the host name of the local machine, which is probably NOT the name of the channel adapter interface.

There is a 'looking for match' message which specifies the exact local and remote addresses that CLIO/S is expecting to find, for example:

```
CTC_OPN_0: readconf- looking for match: remote host=129.40.92.14 \
and local host=129.40.92.15
```

Fix the parctc entry and try again.

Symptom CLIO/S reads the parctc file and attempts to open a subchannel, but fails.

Try This Refer to the **Channel Connection Configuration Cross-Reference** to ensure that the configuration is correct.

Or This The subchannels are not configured. An example of a message indicating this problem is:

```
OPCA   _0: opca    - Subchannel 0x3 is not authorized
```

Here "not authorized" merely means that there is no configuration for that subchannel address (i.e. no subchannel definition for that address, or the subchannel definition for that address is not listed in the cable/fiber definition).

Correct the subchannel definition and retry.

Or This Check the debug messages from both AIX and MVS for one of these conditions:

- Can't find the adapter on the AIX side.

  Is the adapter defined and available?

- No available subchannels on the AIX side.

  Are other applications (possibly CLIO/S processes) using the adapter?

- Can't allocate subchannels on MVS side.
  - Are correct subchannels defined in parctc?
  - Are IOCP definitions correct?
  - Is the esoteric name correctly defined?
  - Are subchannels online and available?

Or This With CLIO/S V2 R2, PTF 1, device UCBs must be below the line.

Or This With CLIO/S V2 R2, PTF 0, devices addresses greater than 7FFF are not handled correctly and cannot be allocated.

Or This With CLIO/S V2 R1, 4-character devices addresses are not handled without extra CLIO/S maintenance.

Or This With CLIO/S V2 R1, the MVS subchannels (devices) must be defined as static. To verify that this is the case, use IPCS. In the DEFAULTS panel, set `SOURCE ==> ACTIVE` In the COMMAND panel, issue the command `LISTUCB xxxx` where 'xxxx' is the device. See IPCS documentation for details on IPCS usage.

You should see something like: `Device is installation-static`. If the device is dynamic CLIO/S V2 R1 will not be able to use it.

Symptom FCFIDUM gets channel connection if one TCP/IP path is used, but not if another one is used. For example, a TCP/IP connection over ethernet results in a working channel-to-channel connection, but if the TCP/IP connection is made via ESCON the channel-to-channel connection cannot be created.

Try This There must be a different parctc entry for each TCP/IP route that is used. Add a parctc entry with a 'remote host' field matching the address of the TCP/IP path used. Set CLIODEB=8192 and check the 'looking for match' message to see what the remote address should be.

Symptom FCFIDUM runs successfully over the channel, but performance is poor.

Try This See **CLIO/S Performance Considerations** for discussion of factors affecting CLIO/S performance.

Or This (V2 R2 PTF0) There is an undocumented 'ack' (for acknowledgement) field at the end of the parctc entry. If the field is blank, then the default ack value of 2147483647 (2**32 - 1) is used. However, there is a bug which appears in some AIX environments that causes the ack value to be set to 4096 if the field in the parctc file is blank. Transfers still work, but transfer rates are slowed substantially.

The debug trace shows this with a 'ctc_opn' message that contains `Ackint=4096`

V2R2 PTF 1 fixes the problem. To work around the problem with V2R2 PTF0, explicitly set the ack value to 2147483647 in the parctc entry:

```
escmvsa  node01    /dev/esca0 1    6c2-6cf  2147483647
```

Chapter 5. Debugging CLFTP and CLPLINK

Clftp and clplink are more complicated than fcfidum because they use multitasking and use TCP/IP to communicate between subtasks.

Symptom clftp or clplink terminate with condition code 0030.

Try This Condition code 0030 is due to the failure of a socket() call. This will always indicate a severe TCP/IP problem. Determine and correct the problem with TCP/IP.

Symptom clftp hangs during initialization on MVS.

Try This Look for an LE370 V1R5 bug. The symptoms include:

- LE370 V1R5 ptf UN90158 has been applied.
- clftp is looping, using cpu.
- cancel, dump shows ceeev03 was executing
- if clftp trace is used, one of the last messages is prefixed with `csfs_start`

See APAR PN81922 for details on the problem with UN90158. A new ptf, UN94075, fixes the problem. UN94075 'prereqs' UN90158.

Symptom clftp, clplink, or fcffserv on MVS terminate immediately during initialization, with message `tinit failed - -7`

Try This The C multitasking facility must be allocated to CLIO/S. In a clftp batch job, add an EDCMTF DD card pointing to the CLIO/S load library:

```
//EDCMTF   DD   DSNAME=SYS1.SFCFLOAD,DISP=SHR
```

This must also be added to the DD card section of FCFREXX.

If you experience this during a TSO session, issue something similar to:

```
ALLOC DD(EDCMTF) DSN(SYS1.SFCFLOAD) SHR REUSE
```

These considerations are discussed in **IBM C/C++ for MVS/ESA C/MVS Programming Guide**, SC09-2062, under the heading 'Running Programs That Use MTF'.

Symptom clftp, clplink, or fcffserv on MVS terminate immediately during initialization, with message `tinit failed - -16`

Try This This is due to a subtask abending. It could be due to a link problem, or possibly a lack of storage. Try giving the job a bigger region.

Symptom clplink terminates with a message referring to signal 13.

Try This Signal 13 is SIGPIPE, defined in /usr/include/sys/signal.h as: `#define SIGPIPE 13 /* write on a pipe with no one to read it */` This indicates that the application on the other end of the named pipe from clplink has died or closed the pipe unexpectedly. This type of problem must be debugged from the application side, not the clplink side.

Occasionally other signals will be referred to by clplink messages. Use /usr/include/sys/signal.h to help understand the problem.

Symptom Files transferred from MVS to AIX seem to have been truncated

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Try This Check that the dataset characteristics specified for the file transfer match the allocation parameters of the dataset.

Or This Make sure that your AIX editor is showing the entire file.

Symptom Clftp allocation failures for tape datasets even when clplink allocation for the same dataset succeeds

Try This For AIX clients, MVS clftp servers run under TSO (via IKJEFT01). Make sure that the TSO userid the MVS job is running under has the authority to mount tapes.

Symptom Clftp batch jobs SYSIN DD cards are not long enough for commands with long file names

Try This There is no way to continue a SYSIN DD card to the next line. However, the `LOCSITE` subcommand can be used to set the MVS dataset name:

```
locsite alloc='dsname=hlq.mlq.llq shr'
put dd: aixfile
```

Also, the `CD` subcommand can be used to handle long AIX paths in shorter pieces.

Symptom CLIO/S V2 R2, PTF 2 (and earlier levels) clftp and clplink cannot read or write AIX files larger than 2 gigabytes.

Try This Get PTF 3, UQ14204.

Symptom Large file transfers to AIX fail consistently after a large amount amount of data (often 1 gigabyte) has been transmitted.

Try This Check the AIX `ulimit` (ksh) or `limit` (csh) parameters. These set the maximum size of user files. Change them as necessary.

Or This Make sure that the file system has enough space.

Symptom Strange clftp problems when running in batch mode

Try This Check the SYSIN DD * card and the format of the following commands. If a password is supplied, it must have no preceding blanks. Also, the 'quit' subcommand must be included.

Symptom clftp and clplink return with no messages, no work done

Try This This is probably due to serious TCP/IP or buffer problems. Activate the clftp trace to get more detail.

Symptom Extra parsrv and fcffserv processes spontaneously appear on AIX

Try This To create a new server, parsrv does a fork -> clio_create() -> rexec, and the forked parsrv waits until the new server is done before dying. So, if the server has trouble starting (namely fcffserv not being able to connect to itself), then each new attempt to create a clftp session to AIX will result in a new parsrv process and 1 or more fcffserv processes. In some cases CLIO/S is not able to terminate these processes, and then these have to be cleaned up by hand. The most common cause for this is incorrect TCP/IP addresses due to incorrect CLIO/S or TCP/IP installation.

Symptom clftp 'ls' function on MVS server fails immediately

Try This Make sure that the FCFFLIST REXX exec is available to FCFFSERV. It is originally installed in SFCFSAMP.

Symptom clftp 'ls' function on MVS is very slow

Try This This function is inherently slow, and if you attempt to display a large list of files, it will take a long time.

Symptom Various return codes from clplink processes

Try This There is no documentation for clftp and clplink return codes. What follows is the .h sections for return codes used by clplink and clftp. Clftp usually hides these errors.

Some of the return codes are used only internally within the code. Others can be returned by clplink. If you are seeing a code returned and don't know what it means send to IBM CLIO/S service for explanation.

```
#define CSFOk             0 /* No errors */
#define CSFErrMAlloc      1 /* Error allocating memory */
#define CSFErrSMAlloc     2 /* Shared memory allocation error */
#define CSFErrTInit       3 /* tinit function failed. */
#define CSFErrTSched      4 /* tsched function failed. */
#define CSFErr2Open       5 /* A file is already open */
#define CSFErrAlloc       6 /* Error while allocating file. */
#define CSFErrOpen        7 /* Error while opening file. Check errno
                               value for more info */
#define CSFErrExists      8 /* Attempt to open an existing file for
                               output without specifying replace */
#define CSFErrClose       9 /* Error while closing file. Check errno
                               value for more info */
#define CSFErrRead       10 /* Error while reading file. Check errno
                               value for more info */
#define CSFErrTruncate   11 /* Record truncated while writing */
#define CSFErrWrite      12 /* Error while writing to file. Check errno
                               value for more info */
#define CSFErrWatWait    13 /* Error in WATWait function */
#define CSFErrWatPost    14 /* Error in WATPost function */
#define CSFErrSequence   15 /* Calls have been made out of sequence */
#define CSFErrParse      16 /* Error while parsing */
#define CSFErrShmGet     17 /* Error in Shared Memory Get (shmget) */
#define CSFErrPipeRd     18 /* Error in pipe read */
#define CSFErrPipeWr     19 /* Error in pipe write */
#define CSFErrParm       20 /* Invalid parameter */
#define CSFErrDupDir     21 /* Specified directory already exists */
#define CSFErrMkDir      22 /* The directory could not be created */
#define CSFErrNoPrefix   23 /* No prefix specified for MVS output file */
#define CSFErrConcAbend  24 /* The concurrent task has abended */
#define CSFErrSSelect    25 /* Socket select failed */
#define CSFErrSRead      26 /* Socket read failed */
#define CSFErrSWrite     27 /* Socket write failed */
#define CSFErrSAccept    28 /* Socket accept failed */
#define CSFErrSInvCom    29 /* Invalid command to KIL */
#define CSFErrSSocket    30 /* Socket socket call failed */
#define CSFErrSConn      31 /* Socket connect failed */
#define CSFErrSBind      32 /* Socket bind failed */
#define CSFErrSGetSockName 33 /* getsockname failed */
#define CSFErrSListen    34 /* Socket listing failed */
#define CSFErrSGetHostByName 35 /* gethostbyname failed */
#define CSFErrSSetSockOpt 36 /* setsockopt failed */
#define CSFErrSWrongSocket 37 /* KIL returns wrong socket */
#define CSFErrSTimeOut   38 /* Timeout while waiting for something */
```

```
#define CSFErrMstPort   39 /* No MstPort on clio_create started process */
#define CSFErrMstHid    40 /* No MstHid on clio_create started process */
#define CSFErrInvPort   41 /* Invalid port specified */
#define CSFErrDead      42 /* The process has been killed */
#define CSFErrCD        43 /* The directory could not be changed */
#define CSFErrPWD       44 /* We could not get the working directory */
#define CSFErrDelete    45 /* We could not delete a file */
#define CSFErrStat      46 /* stat call failed */
#define CSFErrDirectory 47 /* Attempt to treat directory as normal file */
#define CSFErrInternal  48 /* Internal error */
#define CSFErrInvPDSMem 49 /* Invalid PDS member */
#define CSFErrDirEmpty  50 /* Specified .. on CD with directory empty */
#define CSFErrRWMismatch 51 /* CLPLINK -r/-w id didn't mtch clnt directn */
#define CSFErrSystemFunc 52 /* error in the system() function  */
#define CSFErrDynam     53 /* DYNAM returned with an error  */
#define CSFErrChmod     54 /* chmod returned with an error  */
#define CSFErrChr       55 /* Not allowed to write over chr device */
#define CSFErrBlk       56 /* Not allowed to write over blk device */
#define CSFErrEOT       57 /* Attempt to write past end of tape */
#define CSFErrNoCanApp  58 /* Unable to append to the specified file */
#define CSFErrNoData    59 /* Command successful but no data found   */
#define CSFErrDDNoAlloc 60 /* DD: specified with no alloc= string */
#define CSFErrFprintf   61 /* fprintf failed */
/* The following are for release 2.2.*/
#define CSFErrKilPost   62 /* KIL has posted the main CSF process */
#define CSFErrOffsetEOF 63 /* EOF while skipping to offset */
#define CSFErrLenFile1  64 /* CSFHdrLength file invalid beginning */
#define CSFErrLenFile2  65 /* CSFHdrLength file invalid */
#define CSFErrHdrAscii  66 /* CSFHdrLength file invalid with ascii */
#define CSFErrHdrFakeIO 67 /* CSFHdrLength file invalid with fakeio */
#define CSFErrNotPipe   68 /* An existing file was specified for a pipe */
#define CSFErrPermit    69 /* A pipe can't be accessed : permission */
#define CSFErrMknod     70 /* mknod() failed */
#define CSFErrPipeFail  71 /* Pipe almost made but is not really a pipe */
#define CSFErrNoMore    72 /* No more of something */
#define CSFErrTimeOut   73 /* Time out */
#define CSFErrOutOfOrder 74 /* Out of order */
#define CSFErrStarted   75 /* An operation has started but not finished */
#define CSFErrEnv       76 /* Invalid environment for an operation */
#define CSFErrEnd       77 /* Something ended */
#define CSFErrBsamRead  78 /* A BSAM read macro failed */
#define CSFErrBsamWrite 79 /* A BSAM write macro failed */
#define CSFErrBsamPoint 80 /* A BSAM point macro failed */
#define CSFErrBsamNote  81 /* A BSAM note macro failed */
#define CSFErrBsamCheck 82 /* A BSAM check macro failed */
#define CSFErrEOF       83 /* End of file */
#define CSFErrDesc      84 /* Invalid descriptor */
#define CSFErrOverflow  85 /* Something has overflowed */
#define CSFErrFormat    86 /* Something is in the wrong format */
#define CSFErrLseek     87 /* lseek failed */
#define CSFErrBufAvail  88 /* A buffer is not available */
#define CSFErrPause     89 /* Pause a transfer */
#define CSFErrUsrConv   90 /* Conversion error */
#define CSFErrUsrProto  91 /* Protocol error during conversion or user IO */
#define CSFErrUsrProg   92 /* Program error during conversion or user IO */
#define CSFErrUsrNoRecov 93 /* Translation or IO does not support recovery */
#define CSFErrUsrUnexp  94 /* Unexpected return code from conversion or IO */
#define CSFErrUsrAlloc  95 /* Memory alloc error in conv. or IO */
```

```
#define CSFErrUsrEOF    96 /* End of file during recovery in user IO */
#define CSFErrUsrFAlloc 97 /* Error allocating file in user IO */
#define CSFErrUsrOpen   98 /* Error opening file in user IO */
#define CSFErrUsrRead   99 /* Error reading file in user IO */

#define RSFErrMAlloc       101  /* Error allocating memory */
#define RSFErrPop          102  /* Error in popchain function. */
#define RSFErrPut          103  /* Error in RSFPut */
#define RSFErrGet          104  /* Error in RSFGet */
#define RSFErrOpen         105  /* Error while opening file. Check errno
                                   value for more info */
#define RSFErrSequenc      106  /* Command sequence error  */
#define RSFErrCliowrite    107  /* Error in clio_write   */
#define RSFErrClioclose    108  /* Error in clio_close */
#define RSFErrClioread     109  /* Error in clio_read */
#define RSFErrCreat        110  /* Error in RSFCreat  */
#define RSFErrFree         111  /* Error in RSFDestr  */
#define RSFErrClion2h      112  /* Clio n2h error  */
#define RSFErrCliotcp      113  /* clio tcp_connect error */
#define RSFErrCliocnt      114  /* clio_connect error */
#define RSFErrClioaccept   115  /* clio_accept error */
#define RSFErrGetStat      116  /* GetStat error */
#define RSFErrRptErr       117  /* Error in ReportErr */
#define RSFErrDestr        118  /* RSFDDestry error   */
#define RSFErrPSsock       119  /* RSFCParSrv socket error   */
#define RSFErrPScreat      120  /* RSFCParSrv clio_create error   */
#define RSFErrPSlist       121  /* RSFCParSrv listen error   */
#define RSFErrPSAcc        122  /* RSFCParSrv accept error   */
#define RSFErrPSread       123  /* RSFCParSrv read error   */
#define RSFErrParm         124  /* Invalid parameter */
#define RSFErrPSwrite      125  /* RSFCParSrv write error */
#define RSFErrStartUp      126  /* Error during startup */
#define RSFErrNoNetRC      127  /* User id not found in .netrc */
#define RSFErrDelete       128  /* Generated by RSFNDelete when it
                                   gets CSFErrExists from CSFDelete */
#define RSFErrIncompat     129  /* Incompatible client and server */
/* Codes for V2.2 */
#define RSFErrBufSeq       130  /* Buffer sequence error */

#define CSFErrUsrWrite 151 /* Error writing file in user IO */
#define CSFErrUsrClose 152 /* Error closing file in user IO */
#define CSFErrUsrUnall 153 /* Error unallocating file in user IO */
#define CSFErrUsrFormat 154 /* Error in a file format */
#define CSFErrUsrZeroLen 155 /* Attempt to write zero len rec not allowed */
#define CSFErrUsrUnknown 156 /* Unknown return code from user */
#define CSFErrUsrNoRecApp 157 /* Can't use recovery and append together */
#define CSFErrMount    158 /* Error in user mount shell */
#define CSFErrNoPw     159 /* Password not available for operation */
#define CSFErrFileRec  160 /* Using recovery with invalid type of file */
#define CSFErrNotThere 161 /* Something isn't there */
#define CSFErrRecurs   162 /* Recursive definition of something */
#define CSFErrUsrInvTrunc 163 /* User IO returns trunc when not writing */
#define CSFErrInvTrans 164 /* Invalid translate table or MVS end of line */
#define CSFErrPSRecurs 165 /* Recursive definition in parconf */
#define CSFErrChrRec   166 /* Can't recover with raw logical volumes */
#define CSFErr2GLoad   167 /* Can't load greater than 2G functions */
```

```
#define FCFTErrFork           200 /* Fork failed */
#define FCFTErrTInit          201 /* tinit failed */
#define FCFTErrTSched         202 /* tsched failed */
#define FCFTErrFcftpAbend     203 /* Signal or abend in fcftp */
#define FCFTErrFcftpMainAbend 204 /* Signal or abend in fcftpMain */
#define FCFTErrRSFSMainAbend  205 /* Signal or abend in RSFSMain */
#define FCFTErrFcftpUsage     206 /* fcftp wrong number of parms */
#define FCFTErrFcftpHost      207 /* fcftp host name */
#define FCFTErrRSFSMainUsage  208 /* Usage error on RSFSMain */
#define FCFTErrRSFSMainSTMAix 209 /* Attempt to use STM on AIX */
#define FCFTErrRSFSMainPort0  210 /* RSFSMain started with port of 0 */
#define FCFTErrFcftservAbend  211 /* Signal or abend in fcftserv */
#define FCFTErrGets           212 /* The gets() function failed */
#define FCFTErrChainMismatch  213 /* Chains do not match */
#define FCFTErrMvsPassWd      214 /* Couldn't get MVS password */
#define FCFTErrSignal         215 /* Program ended because of signal */
#define FCFTErrPLinkArgs      216 /* CLPLINK arguments are bad */
#define FCFTErrSubTAtt        217 /* Unable to attach subtask shared mem */
#define FCFTErrMonKill        218 /* Monitor is killing something */
#define FCFTErrMonEnd         219 /* Monitor is ending */
#define FCFTErrExec           220 /* execvp failed */
```

Chapter 6. Miscellaneous problems

Symptom CLIO_INFO106_TR messages in AIX `errpt -a` output, with the `DIAGNOSTIC EXPLANATION` field containing `ESCA_START`

Try This This is probably due to CLIO/S on AIX attempting to open a subchannel which is already in use. Normally this will not happen since the corresponding MVS subchannel has already been allocated by this time and the AIX subchannel should be available.

The problem is probably due to a defunct process (probably a CLIO/S process) that is holding on to a subchannel. Use the command `ListOpens escon0` to display any processes using the adapter. The commands `ps -ef | grep cl` or `ps -ef | grep fcf` may also help to find any defunct CLIO/S processes. Kill any unwanted processes.

Symptom Various MVS allocation failures with messages referring to text units.

Try This Use the MVS supervisor services manual sections on SVC99 to decode the 'text unit' messages. This will help identify the portion of the allocation parameter string that MVS is objecting to.

Symptom Intermittent failure to create MVS servers.

Try This Set the CLIOTMO variable to a high enough value to consistently allow time for the servers to initialize.

Or This If there is an intermediate node between the local and remote system, the intermediate node does not inherit the CLIOTMO value from the client process. Use FCFSHELL to explicitly set CLIOTMO at the intermediate node.

Or This Make sure there are enough MVS initiators to handle the CLIO/S servers.

Or This If you have many MVS CLIO/S jobs running simultaneously, or if some jobs take a long time to finish, it could happen that a new CLIO/S job will be submitted with the same name as one that is already running. MVS will make the new job wait until the first one with the same name completes.

The default FCFREXX routine generates takes the MVS userid and appends one character from the string BCDEFGHIJKLMNOPQRSTUVWXYZ0123456789. Thus there are 35 different job names used in sequence. If this is not enough for your environment, adapt FCFREXX to create a longer sequence of names.

Symptom Tape jobs abend if tape device not available.

Try This Use the FLAGS parameters to request that MVS have the job wait until a tape device is available. See **Appendix E, Dynamic Device Allocation on MVS** in the users guide for details. Note that the MVS job must be authorized to request this function.

Symptom MVS userid.CLIOENV file entries not being handled properly

Try This Note that when MVS is the server, the MVS CLIOENV entries are not used. Also, when MVS is the client, a CLIOENV DD card overrides a userid.CLIOENV dataset. When the userid.CLIOENV dataset is used, the file structure must be fixed 80, blksize 80.

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Symptom Simultaneous MVS jobs sometimes fail to get CTC connections.

Try This There is a small window which can lead to failure during subchannel (device) allocation. Subchannels are allocated by esoteric name. This process seems to actually allocate all available subchannels, and those not desired are deallocated. If a subsequent job tries to allocate before the first has deallocated, it may fail.

There are 2 workarounds for this problem.

- Stagger the job submissions so the subchannel allocations do not overlap.
- Set up multiple esoteric names, one per subchannel (device), so that the allocation process will only work with one subchannel at a time. Change the AIX parctc file accordingly, creating one entry for each esoteric/subchannel combination.

Symptom Allocation parameter 'unitc' is rejected by MVS.

Try This This is a typo in the user's guide. The correct parameter is 'unic', not 'unitc'. This is mapped to the SVC99 parameter DALUNCNT.

Chapter 7. Tape Server and Tape Pseudo Device Driver Problems

Symptom openx error when issuing cltalloc

Try This Make sure that the cltclntd daemon is running. This can be done with SMIT or with the mkdev and cltclntd commands.

Symptom Various severe errors soon after writing to pseudo tape connected to MVS

Try This Make sure that 'maximum block size' in the SMIT tape pseudo device driver configuration is not greater than 32768. This is an MVS limitation and causes abends and other serious errors. The setting can be changed via SMIT.

Symptom Can't do `rmdev` of pseudo tape device

Try This The ODM lock may be held. Erase or rename /etc/objrepos/config_lock

Symptom 'mst0' device not available message when cltalloc or cltclntd commands are issued.

Try This Configure the pseudo tape device: SMIT -> devices -> tape drive -> configure

Symptom DB2 PE backup/restore does not work with tape pseudo device driver

Try This Use the 'buffer' parameter on the backup and restore commands. For example:

```
db2 restore database tpcdb from /dev/pst0 buffer 8
```

The buffer parameter must correspond to the CLIO/S TPDD maximum blocksize defined in SMIT. In the example above, "buffer 8" is specified because 8 pages (32768 bytes) corresponds to the CLIO/S TPDD maximum blocksize defined for 32768 bytes.

DB2 PE V1R1 requires ptf U441759 to make this work. V1R2 has it built in.

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Chapter 8. Debugging Intermittent, Hardware or Network Problems

This section assumes that the installation verification program has succeeded and that CLIO/S is able to run at least some of the time over CTC connections between MVS and AIX.

Symptom MVS CLIO/S jobs work fine sometimes, but seem to fail at random.

Try This Make sure that the job is running on the correct system, with SFCFLOAD, TCP/IP, and all the other resources that it needs. The SYSAFF parameter of the JOBPARM statement can be used to control this. If you are starting the process from AIX, then FCFREXX must be modified to add the JOBPARM statement.

Symptom ESCON or block mux tcp/ip connections disappear fairly quickly

Try This Make sure the missing interrupt handler is set properly. See **Adding a Missing Interrupt Handler Entry** in the CLIO/S user's guide, or the ESCON adapter user's guide.

Symptom FCFIDUM sometimes runs successfully over the channel, but intermittent errors occur. Intermittent errors can be detected by:

- One or both ends of the transmission 'hanging' while waiting for I/O from the other.
- CLIO/S debug messages indicating a mismatch between the actual number of bytes transmitted and what was expected.
- Explicit CLIO/S debug messages indicating channel or adapter problems.

  For example, the message "resource temporarily unavailable" indicates that you need additional mbufs for an ESCON adapter.
- Explicit error messages in the AIX `errpt -a` output.

These errors are more likely to occur with large data transfers or rapid switching between reading and writing.

Try This Verify that the correct microcode and device driver levels are installed, and that all current maintenance has been applied. For current information on maintenance, contact your IBM representative, or look at **CLIO/S and Related Software Maintenance** on the CLIO/S web page.

Or This Make sure there are sufficient mbufs and clusters. If the output of the **netstat** –**m** command consistently shows "requests for memory denied" you may need additional mbufs. Sufficient mbufs and clusters must be available for the ESCON adapter card to operate properly. See *AIX Performance Monitoring and Tuning Guide*, SC23-2365, for discussion of mbufs and clusters.

Or This Disable the missing interrupt handler.

If the missing interrupt handler is not disabled, channel retries occur. Debug messages containing the following will be produced on MVS:

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```
OCTC   _0: octc ADDR=0023D000 - CCW=C3000000 20000001 - IDAW=0000 0000
OCTC   _0: octc - WT rc=4
OCTC   _0: octc - CSW=0023D008 0E000001
OCTC   _0: octc - SENSE=00800000
OCTC   _0: octc - WT retrying
```

Disable the missing interrupt handler by adding an entry as described in the user's guide.

Or This If you have written code using the CLIO/S APIs, make sure the logic in your application is correct. When using the DPI or CMI, the amount of data read by one side must be the same as the amount sent by the other side. Otherwise, hangs can occur.

Symptom Failure to open ESCON subchannels, with 'status=D0' message.

Try This Status=D0 means that there is unread data left on the adapter from an earlier process. Make sure that you have the latest level of CLIO/S, and if writing your own application using the CLIO/S APIs, check your code to make sure that all data is read.