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Technical Report: S2-106 Multi-User™ Tuning Tools for SYSTEM 2000® Software

Release 11.6 under IBM OS and CMS

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Preface

This technical report, *S2-106 Multi-User Tuning Tools for SYSTEM 2000 Software, Release 11.6 under OS and CMS,* discusses the tuning tools available for displaying Multi-User performance information.

The report assumes that you are familiar with the Multi-User Accounting Log and Diagnostic Log and that the base SAS System is available at your site.

The report is divided into four chapters.

Chapter 1, "Introduction," gives an overview of the tuning tools feature.

Chapter 2, "MUSTATS Console Operator Commands," describes the new Multi-User status console commands, which you can issue to display the status of activities that are occurring during a Multi-User session.

Chapter 3, "Accounting Log Tuning Tools," shows you how to extract data from the Multi-User Accounting Log, create SAS data sets, and generate reports and graphics from the extracted data. These procedures require the SAS System as well as SAS/GRAPH software for the graphics output.

Chapter 4, "Diagnostic Log Tuning Tools," shows you how to extract data from the Multi-User Diagnostic Log, create SAS data sets, and generate reports from extracted data. These procedures require the SAS System.

Chapter 1
Introduction

The Multi-User tuning tools feature has several components. The tuning tools consist of

- Multi-User status (MUSTATS) console commands (see Chapter 2, "MUSTATS Console Operator Commands")
- Accounting Log reports and graphics (see Chapter 3, "Accounting Log Tuning Tools")
- Diagnostic Log reports (see Chapter 4, "Diagnostic Log Tuning Tools").

The MUSTATS operator console commands allow you to display details about Multi-User threads, scratch pads, buffers, queues, and so on. These commands are available from the master console or an alternate console.

To provide flexibility, the tuning tools procedures extract data from the Accounting Log and the Diagnostic Log and create SAS data sets. You can also select subsets of data to be extracted.

All reports are generated with SAS procedures that use SAS data sets. The detailed records are then summarized into historical SAS data sets for more general monthly, quarterly, or annual reports.

Some reports display information about the overall performance of SYSTEM 2000 software; others concern specific jobs or job types within the system. The resulting reports range from the general overview to the detailed exceptions.

The Accounting Log graphics procedures use SAS/GRAPH software to represent information pictorially. The graphs allow you to review the output and to decide whether you need to run more detailed reports for specific jobs or time periods.

The information from the MUSTATS console commands, the reports, and the graphics can show you contention for resources and the resources used by specific transactions or jobs. You can then analyze the time spent waiting for resources held by others. To tune your system you can increase the available resources (buffers, threads, and so on) or reduce the contention by including, for example, more COMMITs in PLEX programs or by decreasing the number of updates.

Chapter 2

MUSTATS Console Operator Commands

The Multi-User status (MUSTATS) commands display details about buffers, data bases, users, threads, scratch pads, and queues. You can submit these commands from the master console or from an alternate console.

Here is a summary of the MUSTATS commands:

Command	Description
BUFFERS	displays information about buffers
DBNS	displays the names of open data bases
DBN=	displays information about a specific data base
DBNU=	displays users of a data base
DBSTAT=	displays data base permissions and holds
HELP	displays a list of available MUSTATS commands
MLH=	displays local holds on a specific data base
PADS	displays scratch pad information
POOLS	displays information about buffer pool usage
QUEUES	displays the length of the four Multi-User work queues
THREADS	displays information about thread usage
USER=	displays information about a user
WHY=	displays the reason for a user wait

MUSTATS COMMAND SYNTAX

The general format for MUSTATS console commands appears below. SEND MUSTATS can be abbreviated with a pound sign (#).

```
|SEND MUSTATS command
|# command
```

If you submit MUSTATS commands from the master console under MVS, you must precede each command with one of the following. Alternate consoles do not need these identifiers.

```
|MODIFY jobname,
|F jobname,
```

In the first two examples, $MU is the Multi-User jobname.

```
F $MU, #DBNU=                          master console under MVS
MODIFY $MU, SEND MUSTATS DBNU=         master console under MVS
#DBNU=                                 alternate console
SEND MUSTATS DBNU=                     alternate console
```

The individual commands are described in alphabetical order, beginning on the next page. If the keyword for a command is plural, the command does not require any parameters. If the keyword for the command is singular, the command requires a parameter value.

REPEATING A CONSOLE COMMAND

If you are using S2OP as an alternate console, you can use the plus sign (+) to repeat the previous MUSTATS command. In fact, the plus sign repeats any Multi-User console operator command, for example, the D A, S command. The plus sign must be the only character on the line. Note: the plus sign cannot be used from the master console.

The example below illustrates repeating the MUSTATS DBNS command.

```
#DBNS
  ...        ...        ...        ...
+
  ...        ...        ...        ...
```

BUFFERS COMMAND

The BUFFERS command displays information about current buffer usage. This command has no parameters. To request buffer information, enter

```
#BUFFERS
```

The output consists of one line of information for each defined buffer.

```
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
-BUFFERS                                    I L S D M L
-                                           O O C B O O
- P#    OWNER      PAGE             AGE     P K R   D G
  1       2          3               4      5 6 7 8 9 10
><><><><><><><><><><><><><><><><><><><><><><><><><><><><>
```

1 is the pool number of the pool that contains this buffer.

2 is the entity this buffer is assigned to, for example, data base File 6. UNUSED means the buffer is not in use. If this field contains an eight-digit hexadecimal number, the buffer is being used for some general purpose, such as an internal array or control block.

3 is the page number of the page currently in the buffer, for example, the page number of one of the data base files.

4 is a relative measure of time elapsed since this buffer was assigned. The oldest buffers have the smallest numbers. In fact, 0 means the buffer was assigned when the Multi-User software was initialized. Buffers assigned more recently have higher numbers.

5 indicates whether an I/O is in progress. Y means YES.

6 indicates whether the buffer is locked against reassignment to another use. Y means YES.

7 indicates whether the buffer is assigned to a scratch file. Y means YES.

8 indicates whether the buffer is assigned to a data base file. Y means YES.

9 indicates whether any data on this page has been modified. Y means YES.

10 indicates whether this page (if modified) needs to be written to the Update Log.

DBNS COMMAND

The DBNS command displays the names of all data bases currently open in the Multi-User environment. This command has no parameters.

```
#DBNS
```

The output is a list of data base names in the following format:

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-DBNS        1        -2                1      -2
<><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the name of a data base that is currently open in the Multi-User session.

2 indicates whether the data base is defined as small or large. S means small, and L means large.

DBN= COMMAND

The DBN= command displays information about a specific data base that is open in the Multi-User environment. DBN= requires one parameter, the name of a data base.

#DBN=data base name

The information displayed for the specified data base is shown below. One line appears for each data base file. Six lines always appear for data base Files 1 through 6. Seven lines appear if update logging is activated (File 7). Eight appear if rollback is enabled (File 8).

```
+++++++++++++++++++++++++++++++++++++++++++++++++++
-DBN= 1
 #   BLK    CURR   IOCOUNT   P/ALLOC   P/USED   RPM   WPM
 2    3      4        5         6         7       8     9
 LAST SAVE/CREATE  10
   11
 RESET RB AT  12 PAGES/  13%/  14 SYNCHPOINTS
 APPLY LEGAL -   15 LOG -   KEEPFILE = 16
 MLH ENABLED - OF   17 ENTRIES    18 ARE USED
<><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 displays the data base name, the current cycle number, and the date and time of the last update.

2 identifies the data base file number for the information displayed on the line.

3 is the block size (page size) for this data base file.

4 is the number of buffers currently assigned to this data base file.

5 is the number of I/O operations that were performed against this data base file.

6 is the number of pages formatted in the underlying data set.

7 is the number of logical pages used in this data base file.

8 is the rate of reads-per-minute for this data base file if XBUF is enabled. If the XBUF software is not enabled, this field contains blanks. If the rate is too old, asterisks appear.

9 is the rate of writes-per minute for this data base file if XBUF is enabled. If the XBUF software is not enabled, this field contains blanks. If the rate is too old, asterisks appear.

10 is the cycle, date, and time at the last save of this data base or at the creation of this data base.

11 contains the message DATA BASE IS DAMAGED if this data base is damaged.

12 is a threshold number of pages for File 8 (the Rollback Log). This number is calculated from the percentage shown in Field 13. If the threshold is exceeded, the Rollback Log will be reset. If rollback is disabled, the message ROLLBACK LOG NOT ENABLED appears on this line.

13 is a threshold percentage of pages used (Field 12) divided by total pages in File 8. If this threshold is exceeded, the Rollback Log will be reset. The default is 50%.

14 is a threshold number of synchpoints. If the number of synchpoints encountered exceeds this threshold, the Rollback Log will be reset. The default is 999,999.

15 indicates whether update logging is indirect or direct. If update logging is not activated, the message UPDATE LOG NOT ACTIVE appears on this line.

16 is the volume serial number of the Keepfile.

17 is the maximum number of entries that the multiple holds buffer can contain. If multiple local holds are not allowed, the message MLH NOT ENABLED appears on this line.

18 is the current number of multiple local holds.

DBNU= COMMAND

The DBNU= command displays users on a given data base in the Multi-User environment. DBNU= requires one parameter, the name of a data base.

```
#DBNU=data base name
```

The following information is displayed for the specified data base:

```
DUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUDUD
-DBNU= 1
 2          2          2          2          2
<><><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 displays the data base name, the current cycle number, and the date and time of the last update.

2 is the userid of a user who has this data base open.

DBSTAT= COMMAND

The DBSTAT= command displays the various data base permissions currently in effect for the specified data base. DBSTAT= requires one parameter, the name of a data base.

```
#DBSTAT=data base name
```

The output shows the following information:

```
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
-DBSTAT= 1
          SCF  PLEX RETV SCF-T LHSES LHOLD
COUNT       2     3    4     5     6     7
----------------------------------------------------
     LOCK    ROLBAK     HOLD    UPDAT NKUPD
USER    8         9       10       11    12
----------------------------------------------------
    UT  U HT  H RT  R SS  F SO PO RB  L LS LH NK
PEND13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
 28           29 30          28       29 30
<><><><><><><><><><><><><><><><><><><><><><><><><><>
```

1 displays the data base name, the current cycle number, and the date and time of the last update.

2 is a count of SCF users who have this data base open.

3 is a count of PLEX users who have this data base open.

4 is a count of users doing retrievals.

5 is a count of SCF users currently in a thread.

6 is a count of users attempting to initiate a local hold session.

7 is a count of users who have a local hold.

8 is the userid that has exclusive use of this data base. (The PLEX syntax is OPEN/LOCK.)

9 is the userid that has rollback permission on this data base, that is, the userid that triggered rollback processing.

10 is the userid that has a global hold on this data base.

11 is the userid that has update permission on this data base.

12 is the userid that has non-key update permission on this data base.

13 is Y if a user is in a thread waiting for update permission.

14 is Y if a user is in the suspend queue waiting for update permission.

15 is Y if a user is in a thread waiting for global hold permission.

16 is Y if a user is in the suspend queue waiting for global hold permission.

17 is Y if a user is in a thread waiting for retrieval permission.

18 is Y if a user is in the suspend queue waiting for retrieval permission.

19 is Y if an SCF user is waiting to start a session.

20 is Y if a user is in the suspend queue waiting for frame permission.

21 is Y if an SCF user is waiting for permission to open this data base.

22 is Y if a PLEX user is waiting for permission to open this data base.

23 is Y if a user is waiting for permission to roll back this data base.

24 is Y if a user is waiting to open this data base for exclusive use (or OPEN/LOCK in PLEX).

25 is Y if a user is waiting for local hold session permission prior to obtaining a local hold.

26 is Y if a user is waiting to establish a local hold on this data base.

27 is Y if a user is waiting for non-key update permission on this data base.

28 is the userid that has at least one local hold on this data base.

29 is a unique value (logical address) assigned to each record in a data base. The user identified in Field 28 either has a local hold on this record (and possibly others) or is waiting for a local hold on this record (depending on the status of Field 30).

30 is an asterisk (*) or a blank. An asterisk means the userid in Field 28 is waiting for a local hold on the record identified in Field 29. A blank means the record identified by Field 29 is the last record held by the userid identified in Field 28.

HELP COMMAND

The HELP command displays the new MUSTATS (Multi-User status) commands.

```
#HELP
```

The output from the HELP command is shown below.

```
:::::::::::::::::::::::::::::::::::::::::::::::::::
 BUFFERS -- DISPLAY INFORMATION ABOUT BUFFERS
 DBNS    -- DISPLAY OPEN DATA BASE NAMES
 DBN=    -- DISPLAY INFORMATION ABOUT A DATA BASE
 DBNU=   -- DISPLAY USERS ON A DATA BASE
 DBSTAT= -- DISPLAY DATA BASE PERMISSIONS/HOLDS
 MLH=    -- DISPLAY LOCAL HOLDS ON A DATA BASE
 PADS    -- DISPLAY SCRATCH PAD INFORMATION
 POOLS   -- DISPLAY BUFFER POOL USAGE
 QUEUES  -- DISPLAY QUEUE LENGTHS
 THREADS -- DISPLAY THREAD USAGE
 USER=   -- DISPLAY INFORMATION ABOUT A USER
 WHY=    -- DISPLAY REASON FOR USER WAIT
<><><><><><><><><><><><><><><><><><><><><><><><><><
```

MLH= COMMAND

The MLH= command displays the maximum number of multiple local holds allowed and the number of local holds currently in effect for all users of a specified data base. The output also shows a list of the records held and the userid for each record held. MLH= requires one parameter, the name of a data base.

```
#MLH=data base name
```

The output shows the following information:

```
-------------------------------------------------------
-MLH= 1
   MAX =       2    CURRENT =       3
        4   5            4   5            4   5
<><><><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the name of the specified data base, the current cycle number, and the date and time of the last update.

2 is the maximum number of multiple local holds that can be contained in the buffer assigned to hold local hold information for this data base. If the maximum is exceeded, PLEX users receive Return Code 110.

3 is the number of local holds currently in effect by all users of the specified data base.

4 indicates a record that has a local hold on it. This field contains a unique number (logical address) assigned to each record in the data base. Field 5 shows the userid with the hold on this record.

5 is the userid of the user holding the record identified in Field 4.

Note: if the multiple local holds option is disabled for this data base, the message MULTIPLE LOCAL HOLDS NOT ACTIVE appears.

PADS COMMAND

The PADS command displays information about scratch pads. This command has no parameters.

```
#PADS
```

The output shows the following information for each scratch pad defined:

```
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
-PADS
  PAD1   USE          2          3%  HI       4        5%
     BLKSIZE    # AU'S   BLKS/AU      AU'S   PAGES
        6          7         8          9      10
     PRIMARY    SECONDARY  UNIT        EXT
        11         12       13          14
     DEVICE     TOTAL CYL   T/C         P/T
        15         16       17          18
<><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the scratch pad number.

2 is the number of allocation units in use.

3 is the highest percentage of space ever used for this scratch pad.

4 is the highest number of allocation units ever used for this scratch pad.

5 is the percentage of the whole scratch pad that one allocation unit represents.

6 is the block size for scratch pads.

7 is the number of allocation units specified for the scratch pad.

8 is the number of blocks per allocation unit.

9 is the number of allocation units formatted. This field is the same as Field 7 unless secondary extents are used.

10 is the number of pages formatted.

11 is the primary allocation, expressed in the units shown in Field 13.

12 is the secondary allocation, expressed in the units shown in Field 13.

13 is the type of unit for Field 11 and Field 12, that is, CYL for cylinders, TRACK for tracks, BLOCK for blocks, or UNKNWN for unknown.

14 is 0 or 1. A zero means no secondary extents have been used. A one means one (or more) secondary extents have been used.

15 is the device assigned to this scratch pad.

16 is the total number of cylinders on this device.

17 is the number of tracks per cylinder for the device assigned to this scratch pad.

18 is the number of pages per track.

POOLS COMMAND

The POOLS command displays information about pool definitions and usage. This command has no parameters.

```
#POOLS
```

Each line of output displays information about one defined pool.

```
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-POOLS #    BLK  NUM  FREE USE     SIZE   RPM   WPM   DPM
       1     2    3    4    5        6     7     8     9
<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><<
```

1 is the pool number of a pool defined in the S2KPARMS file.

2 is the block size of the buffers in the pool.

3 is the number of buffers defined for the pool.

4 is the number of unassigned buffers in the pool.

5 is the usage defined for the buffers in the pool. Position 1 is S, D, or B for scratch files, data base files, or both. Position 2 is either E for exact fit only or a blank for accepting a request for a buffer of this size or smaller.

6 is the size of the pool in bytes, that is, block size (Field 2) times the number of buffers in the pool (Field 3).

7 is the rate of reads-per-minute to the pool if XBUF software is enabled.

8 is the rate of writes-per-minute to the pool if XBUF software is enabled.

9 is the rate that buffers are being reused in the pool (drops-per-minute) if XBUF software is enabled.

Note: Fields 7, 8, and 9 contain blanks if the XBUF software is not enabled. If the rate is too old, asterisks appear.

QUEUES COMMAND

The QUEUES command shows how many users are in the four Multi-User work queues. This command has no parameters.

```
#QUEUES
```

The output contains the information shown below.

```
-------------------------------------------------
-QUEUES SVC =  1 INT = 2  SUSPEND =  3 I/O =  4
<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is a count of users in the SVC queue. These users have not been serviced by Multi-User software because of a shortage of CPU cycles or threads.

2 is a count of users in the internal dispatch queue. These users have completed an I/O operation or were suspended, waiting for data base permission; they have now been acquitted to request the permission again. The users in this queue have not been serviced by Multi-User software because of a shortage of CPU cycles or threads.

3 is a count of users who have been suspended because the data base permission that they requested could not be granted. The users in this queue will be moved to the internal dispatch queue when it becomes possible that the permission they require can be granted.

4 is a count of users who are waiting for an I/O operation to complete.

THREADS COMMAND

The THREADS command displays current and high thread usage. This command has no parameters.

```
#THREADS
```

The output contains the information shown below.

```
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
-THREADS 1-32   12345678901234567890123456789012
  HIGH( 1)      2..............................2
 THREADS 33-63  3456789012345678901234567890123
                2.............................2
<><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the thread number of the highest thread that the Multi-User software attempted to schedule.

2 shows current thread usage.

- C indicates the current thread, which is very often the S2OP command.
- E indicates a thread that has an assigned user with the user's request executing.
- A hyphen (-) means the thread is defined but not in use.

USER= COMMAND

The USER= command displays information about a specified user. USER= requires one parameter, a userid.

#USER=userid

The output contains the information shown below.

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
-USER= 1              2               3             4
  5           6           7     /         8
 ->DEP(  9  )      ->MU(  10   )       CC= 11
 QUEUE= 12        THREAD= 13           AGE= 14 15
                                            (optional line: see Note 1)
 CALLS= 16            IO= 17           DB#= 18
                                            (optional line: see Note 2)
 ETIME= 19            CPU= 20                  (if Accounting Log active)
 DATE= 21       V= 22     23       PGM= 24     (if PLEX job)
 OP= 25   RC= 26      MAX= 27      28          (if PLEX job)
                                            (optional line: see Note 3)
   29                                          (if PLEX job)
     30                                        (if PLEX job)
 31
 32 31                                         (if SCF/TP or ALTCON)
<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><>
```

1 is the user's job name.

2 is the user's step name.

3 is the user's program name.

4 is the user's terminal name.

5 is the type of user job, that is, PLEX, SCF, SCF/TP, TPI, SAS, or ALTCON. ALTCON is an alternate console for Multi-User operator commands. TPI is SYS2KTPI.

6 is TSO if the user is running under TSO.

7 is ACTIVE REQUEST if the user is currently presenting a request to Multi-User software for processing; set by the interface that resides in the dependant region.

8 indicates the user's status within the Multi-User system. This field contains EXECUTING, INACTIVE, NO ACTIVITY, or U.P.ACTIVITY (which means the user is waiting for a response in the dependent region to some request that Multi-User software has made); set by Multi-User software.

9 indicates what the user is doing or what the Multi-User software needs to communicate to the user. This field contains the code (interpreted) in the user's Event Control Block (ECB), for example, UNUSED, WAITING, CMD DONE.

10 either indicates what the user expects of Multi-User software or is the user's response to Multi-User's last user partition request. This field contains the last code (interpreted) that the user sent to Multi-User software, for example, CMD DONE.

11 is the condition code (in hex) if the user has been terminated.

12 indicates which work queue the user is on, that is, SUSPEND, SVC, INTERNAL, I/O, or NONE.

13 is the number of the thread assigned to this user.

14 is the count of users who were dispatched prior to this user being placed on a queue. This field is a relative measure of when this user was placed on the queue.

15 is the resource that this user is waiting for if the user is on the suspend queue.

16 is the number of calls that this user has presented to Multi-User software.

17 is the number of I/Os performed for this user.

18 is the number of data bases that this user has open.

19 is the elapsed time since this user job identified itself to Multi-User software. The line containing this field appears only if the Accounting Log is enabled.

20 is the amount of CPU time charged to this user (for PLEX users). The line containing this field appears only if the Accounting Log is enabled.

21 is the date and time that the PLEX program was processed by the PLEX processor. This field pertains to PLEX jobs only.

22 is the SYSTEM 2000 version number of the PLEX processor that processed this PLEX program.

23 indicates which language was used in this PLEX program, PLI, PLIF, COB, FORT, or ASM, for PL/I, PL/I, COBOL, FORTRAN or Assembler, respectively. This field pertains to PLEX jobs only.

24 is the alternate interface name that was recognized by the PLEX processor, if present. This field pertains to PLEX jobs only.

25 is the operation code (in hexadecimal) of the last command presented to the Multi-User software. It comes from the S2KDUM control block in the user's PLEX program. This field pertains to PLEX jobs only.

26 is the last return code returned to S2KDUM in the user's PLEX program. This field pertains to PLEX jobs only.

27 is the number of Locate Files requested by the PLEX program in the START S2K command. This field pertains to PLEX jobs only.

28 is the last PLEX command sent to Multi-User software by the PLEX program. This field is the interpreted form of the operation code shown in Field 24. For example, if Field 24 is 50 (hexadecimal), then Field 27 contains MODIFY. This field pertains to PLEX jobs only.

29 is the data base name for the last PLEX command, taken from the COMMBLOCK in the PLEX program. This field pertains to PLEX jobs only.

30 is the subschema name for the last PLEX command, if present. This field pertains to PLEX jobs only.

31 is the first 48 bytes of the last SCF command presented to Multi-User software. If the job is SCF/TP or ALTCON, this field is preceded by Field 32 (the terminal ID of the user).

32 is the terminal ID of the user if the job is SCF/TP or ALTCON.

Note 1: after the QUEUE= line, an additional line might appear saying TERM IN EXUSER, TERM IN STAE, or CANCELLATION PENDING.

Note 2: if PQA=PRTY is specified in the SYSTEM 2000 execution parameters, the line shown below appears after the CALLS= line.

```
PQA=PRTY      JOB PRTY= x     DISP= y          ADJ= z      -
```

where

- x is the user's current priority.
- y is the number of dispatches since the user was put on the queue.
- z is the amount the user's priority has been raised due to excessive time on the queue.

Note 3: if the operation code that Multi-User software is processing differs from the one in S2KDUM, an additional line appears after the OP= line for PLEX jobs only.

```
PIOP= opcode   text
```

The operation code displayed is in hexadecimal. The text is the English equivalent of the opcode.

For example, PLEX inserts are queued. The next command on a different stack causes the inserts to be processed. In this situation, PIOP is the INSERT opcode, but OP in the previous line of output is the command in the other stack.

User swapped out For an SCF/TP user who is swapped out to the S2KUSERS file, the following output appears for the USER= command:

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
-USER= 1      2      SCF/TP
  DBN= 3
                   4
<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the user's terminal ID.

2 is the user's job name.

3 is the current data base name.

4 can be one of the following messages:

```
FORCED EXIT
USER HOLDS LOCKS
SWAP IN PROGRESS
CANCEL REQUEST
```

Userid not found If the userid that you specified in the USER= command cannot be found, the following output appears.

```
/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/\/
-USER= 1                        USER NOT FOUND
<><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the user's job name.

WHY= COMMAND

The WHY= command displays the reason for this user wait. WHY= requires one parameter, the userid of a user who is waiting.

```
#WHY=userid
```

The following wait information is displayed for the specified user:

```
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
-WHY= 1          2                3           4
  5                        6
<><><><><><><><><><><><><><><><><><><><><><><><><><><
```

1 is the userid that is waiting.

2 is the step name.

3 is the program name, if available.

4 is the type of permission for which this userid is waiting.

5 is the reason why the userid is waiting for the permission shown in Field 4.

6 is more information about the reason (Field 5), such as a userid or a count of local holds.

Chapter 3

Accounting Log Tuning Tools

This chapter describes how to produce reports and graphics from data collected on the SYSTEM 2000 Multi-User Accounting Log. The Accounting Log tuning tools members were installed at your site with Release 11.6 of SYSTEM 2000 software. They contain comments that show you how to modify default settings of various options. Also, sample JCL is provided. You can list and edit each member as necessary.

To produce reports and graphics, you run members that

- extract the data from the Multi-User Accounting Log
- create the SAS data sets containing Accounting Log information
- Generate the reports and graphics.

Accounting Log Reports on page 3-3 describes the members that produce reports, the user-exits invoked, and the output generated. Output consists of reports and SAS data sets.

Accounting Log Utilities on page 3-24 discusses two Accounting Log utility members that allow you to describe the contents of the ACT and PDB data sets and to modify user-defined formats.

Accounting Log Graphics on page 3-25 describes the members that produce Accounting Log graphics.

SAS Data Sets for the Accounting Log on page 3-30 describes the SAS data sets created for the Accounting Log information.

Member names can be up to eight characters long. Most member names follow the naming conventions shown here.

Characters 1 - 2	are TT, which indicates a tuning tools member.
Characters 3 - 5	are ACT or ACG for members related to the Accounting Log. TTACT members extract the Accounting Log data, create the SAS data sets, and generate reports. TTACG members generate graphics output.
Characters 6 - 7	are numeric if the member is normally run on a regular basis. If characters 6 and 7 are alphanumeric, the member will probably be used only occasionally, perhaps at installation time or to change defaults.
Character 8	is numeric if present. An eight-character name means the member is a user exit.

The members are discussed in the order you would normally run them to produce the reports and graphics.

ACCOUNTING LOG REPORTS

This section discusses the members that generate the reports listed below.

Multi-User Session Reports (TTACT02 member)
- History of Multi-User Sessions
- Accounting Log Dump Tapes
- History of S2KMANX/S2KMANY Dumps by ACTUTIL
- Multi-User Availability Report
- Multi-User Up Time Report

Displaying the Accounting Log Records (TTACT03 member)
- List Accounting Records - MU Session Records
- List Accounting Records - MU Init Records
- List Accounting Records - MU Term Records
- List Accounting Records - Lost Data Records
- List Accounting Records - Accounting Log Tapes
- List Accounting Records - Dump Header Records
- List Accounting Records - Dump Trailer Records
- List 40 Accounting Records - PLEX Segment Records
- List 40 Accounting Records - SCF/TP Segment Records
- List 40 Accounting Records - SCF/Batch Segment Records
- List 40 Accounting Records - User Termination Records

Poor Performance Reports (TTACT05 member)
- Summary Accounting Data by Day
- Summary Accounting Data by Program
- Summary Accounting Data as Selected by User Exit TTACT050/The Dog Report
- Repeat Offenders Report/ Programs that Occur Frequently on the Dog Report

PLEX Op Code Usage Reports (TTACT06 member)
- Data Base Usage Report/(data from PLSEG Accounting Information)
- S2K Operation Report/(data from PLSEG Accounting Information)
- S2K Operations by Program/(data from PLSEG Accounting Information)

SCF/TP and SCF/Batch Reports (TTACT07 member)
- SCF/TP Sessions Report - Summary
- SCF/TP Sessions Report - List
- SCF/TP Sessions Report - Detail
- SCF/Batch Sessions Report - Summary
- SCF/Batch Sessions Report - List
- SCF/Batch Sessions Report - Detail

Historical Summaries and Reports (TTACT08 member)
- Multi-User Availability Report
- Multi-User Up Time Report/Prime Shift as Defined by TTACT020
- Accounting Log Dump Tapes
- History of S2KMANX/S2KMANY Dumps by ACTUTIL
- Daily Transaction Counts
- SCF/TP Sessions Report - Summary
- SCF/Batch Sessions Report - Summary

To run the members for the Accounting Log reports you must have

- an Accounting Log from a SYSTEM 2000 Multi-User session
- the base SAS System.

The order in which you normally run these members is set by the procedure steps given next.

1. Pre-allocate the ACT, PDB, and SASLIB library files
2. Sort the Accounting Log by time and date
3. Predefine the PDB (Performance Data Base) data sets.
4. Create the ACT library of SAS data sets containing the Accounting Log data.
5. Generate the reports and maintain the PDB data sets containing historical data.

The members are discussed according to their order in this sequence of events.

Pre-Allocate the ACT, PDB, and SASLIB Libraries

Before you extract any data from the Accounting Log, you must pre-allocate the ACT, PDB, and SASLIB libraries. The SAS data sets in the ACT library contain data extracted from the Accounting Log records. The SAS data sets in the PDB (Performance Data Base) library contain historical Accounting Log data. The SASLIB library contains formats for running the reports and graphics.

For sample JCL to pre-allocate these three data libraries, see S2K.R116.SAMPLIB.

Sort the Accounting Log (TTACT00)

The TTACT00 member dumps the label (characteristics) of the Accounting Log tape. This job step also sorts the Accounting Log records by time and date. You must sort the Accounting Log before you create the SAS data sets with the TTACT01 member.

For sample JCL, see S2K.R116.SAMPLIB.

Predefine the PDB Data Sets (TTACT0A)

The TTACT0A member predefines the SAS data sets in the PDB (Performance Data Base) library and builds user formats. TTACT0A calls the user exits shown next, which you can list and edit if necessary.

TTACT0A0 formats the sys-id.

TTACT0A1 formats the job classes.

For sample JCL, see S2K.R116.SAMPLIB.

Create the SAS ACT Data Sets (TTACT01)

The TTACT01 member reads an Accounting Log tape that has been sorted by time-of-day and builds a data library of SAS data sets containing Accounting Log data. The fileref for this SAS data library is ACT. See **SAS Data Sets for the Accounting Log** on page 3-30 for a description of the SAS data sets created by TTACT01.

After building the SAS data sets, you can run the TTACT0C utility member to obtain a description of the files created. See **Describe the ACT and PDB SAS Data Sets (TTACT0C)** on page 3-24.

TTACT01 invokes user exits that limit or reformat the records written to the SAS data sets in the ACT library. You can list and edit these user exits.

TTACT0A2	specifies headers and footers.
TTACT010	breaks transactions into job classes.
TTA000	controls the number of Multi-User initialization records (record type 0) to be stored in SAS data set ACT.A000.
TTA002	controls the number of Accounting Log header records (record type 2) to be stored in SAS data set ACT.A002.
TTA003	controls the number of Accounting Log trailer records (record type 3) to be stored in SAS data set ACT.A003.
TTA004	controls the number of Accounting Log user termination records (record type 4) to be stored in SAS data set ACT.A004.
TTA005	controls the number of Accounting Log PLEX segment records (record type 5) to be stored in SAS data set ACT.A005.
TTA006	controls the number of Accounting Log SCF/TP segment records (record type 6) to be stored in SAS data set ACT.A006.
TTA007	controls the number of Accounting Log lost data records (record type 7) to be stored in SAS data set ACT.A007.
TTA008	controls the number of Accounting Log SCF/BATCH segment records (record type 8) to be stored in SAS data set ACT.A008.
TTA012	controls the number of Multi-User termination records (record type 12) to be stored in SAS data set ACT.A012.
TTAMUSES	controls the number of MUSES records (record types 0 and 12 plus transaction, I/O, and CPU time counts) to be stored in SAS data set ACT.MUSES.
TTATAPE	controls the number of TAPE records (low_date, high_date, record counts, and so on) to be stored in SAS data set ACT.TAPE.

For sample JCL, see S2K.R116.SAMPLIB.

Reports: Multi-User Session Information (TTACT02)

The TTACT02 member generates five reports about Multi-User sessions. Each report is written to a different print unit, as shown below. The input to TTACT02 comes from the ACT.MUSES, ACT.TAPE, and ACT.ACTUTIL data sets. TTACT02 also merges data into the historical PDB.MUSES and PDB.TAPE data sets.

TTACT02 invokes the following user exits, which you can list and edit.

TTACT0A2	specifies the headers and footers.
TTACT020	defines the prime shift for the Multi-User Up Time report.
TTACT021	annotates the Multi-User Up Time report.

TTACT02 writes five reports to the print units shown below.

Print Unit	Report Title
FT20F001	History of Multi-User Sessions
FT21F001	Accounting Log Dump Tapes
FT22F001	History of S2KMANX/S2KMANY Dumps by ACTUTIL
FT23F001	Multi-User Availability Report
FT24F001	Multi-User Up Time Report

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.

History of Multi-User Sessions 16:58 WEDNESDAY, AUGUST 24, 1988 1

System ID=MU test

OBS	Start Date/Time	Termination Date/Time	S2K Version	Trans Count	IO Count	Total CPU
1	10AUG1988:05:41:55.47	11AUG1988:00:28:55.61	11.6	212,229	1,386,042	1:05:01.82
.	. .	. .	.	.	.	.
.	. .	. .	.	.	.	.
.	. .	. .	.	.	.	.

History of Multi-User Sessions
(print unit FT20F001)

Accounting Log Dump Tapes 16:58 WEDNESDAY, AUGUST 24, 1988 2

OBS	Earlest Date/Time	Latest Date/Time	Number of Tapes	Vol/Ser	Data Set Name	File Seq Number	Tape Label
1	09AUG1988:03:21:54.74	15AUG1988:18:07:28.46	1	M00007	SASVVV.AUG.WEEK2	1	sl

OBS	Year Created	Julian Day Created	Date Created	Year Expires	Julian Day Expires	Date Expires	Device Type
1	88	196	14JUL88	0	0	14JUL89	7800080000007FF800000000

OBS	A000 Count	A002 Count	A003 Count	A004 Count	A005 Count	A006 Count	A007 Count	A008 Count	A012 Count	Record Count
1	16	40	40	1,050,583	1,517	5,586	0	3,175	16	1,060,971

Accounting Log Dump Tapes
(print unit FT21F001)

History of S2KMANX/S2KMANY Dumps by ACTUTIL 16:58 WEDNESDAY, AUGUST 24, 1988 3

OBS	Dump Start Date/Time	Dump End Date/Time
1	09AUG88:03:21:45.17	09AUG88:03:21:45.43
.	.	.
.	.	.
.	.	.

History of S2KMANX/S2KMANY Dumps by ACTUTIL
(print unit FT22F001)

Multi-User Availability Report 11:59 THURSDAY, AUGUST 25, 1988 585

MU System ID=MU prod

Outage Begins At	Outage Ends At	Outage Duration	MU Session Begins At	Multi-User Session Ends At	MU Session Duration
FRI, AUG 12, 88 01:26:13	FRI, AUG 12, 88 03:14:09	88:18:07:28.			
			FRI, AUG 12, 88 03:14:09	SAT, AUG 13, 88 01:29:58	22:15:49
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

Multi-User Availability Report
(print unit FT23F001)

Multi-User Up Time Report — 11:59 THURSDAY, AUGUST 25, 1988 585
Prime Shift as Defined by TTACT020

---------------------------MU System ID=MU test ---------------------------

Date	Hours Multi-User Was Up	Hours in Prime Shift	Multi-User Session Count	Percentage Available	Message
FRI, AUG 12, 88	9:26:52	10:00:00	2	94.48	exception
SAT, AUG 13, 88	10:00:00	10:00:00	1	100.00	
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

Multi-User Up Time Report
Prime Shift as Defined by TTACT020
(print unit FT24F001)

Reports: Accounting Log Records (TTACT03)

The TTACT03 member displays the data stored in the various SAS data sets in the ACT library, which is created by the TTACT01 member.

TTACT03 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers. Nine reports are written to the print units shown below.

Print Unit	Report Title
FT30F001	List Accounting Records - MU Session Records
FT31F001	List Accounting Records - MU Init Records
	List Accounting Records - MU Term Records
FT32F001	List Accounting Records - Lost Data Records
FT33F001	List Accounting Records - Accounting Log Tapes
FT34F001	List Accounting Records - Dump Header Records
	List Accounting Records - Dump Trailer Records
FT35F001	List 40 Accounting Records - PLEX Segment Records
FT36F001	List 40 Accounting Records - SCF/TP Segment Records
FT37F001	List 40 Accounting Records - SCF/Batch Segment Records
FT38F001	List 40 Accounting Records - User Termination Records

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.

List Accounting Records - MU Session Records — 11:59 THURSDAY, AUGUST 25, 1988 5

OBS	Start Date/Time	Termination Date/Time	System ID	S2K Version	Trans Count	IO Count	Total CPU
5	10AUG1988:03:41:55.47	11AUG1988:00:28:35.61	MU test	11.6	212,229	1,386,042	1:05:01.82
.	. .	. .	.	.	.	.	.
.	. .	. .	.	.	.	.	.
.	. .	. .	.	.	.	.	.

List Accounting Records - MU Sessions Records
(print unit FT30F001)

List Accounting Records - MU Init Records 11:59 THURSDAY, AUGUST 25, 1988 5

OBS	MU System ID	Record Type	Record Date/Time	S2K Version	MU Region	SID	Threads	User	TPTHREAD	TPSCRUNS	POOL0 Size	POOL0 Count
1	MU prod	0	12AUG1988:02:29:44.78	11.6	0	1	5	32	16	180	2016	15
2	MU prod	0	12AUG1988:23:43:46.45	11.6	0	1	5	32	16	180	2016	15

OBS	POOL1 Size	POOL1 Count	POOL2 Size	POOL2 Count	POOL3 Size	POOL3 Count	POOL4 Size	POOL4 Count	POOL5 Size	POOL5 Count	POOL6 Size	POOL6 Count	POOL7 Size	POOL7 Count	COPYAREA1 Size (k)	COPYAREA1 Count	COPYAREA2 Size (k)
1	6440	8	19040	15	0	0	0	0	0	0	0	0	0	0	1	8	2
2	6440	8	19040	15	0	0	0	0	0	0	0	0	0	0	1	8	2

OBS	COPYAREA2 Count	COPYAREA3 Size (k)	COPYAREA3 Count	COPYAREA4 Size (k)	COPYAREA4 Count	COPYAREA5 Size (k)	COPYAREA5 Count	COPYAREA6 Size (k)	COPYAREA6 Count	PAD00 Au's	PAD00 Au Size	PAD01 Au's	PAD01 Au Size
1	8	0	0	0	0	0	0	0	0	480	40	0	0
2	8	0	0	0	0	0	0	0	0	480	40	0	0

List Accounting Records - MU Init Records
(print unit FT31F001)

List Accounting Records - MU Term Records 11:59 THURSDAY, AUGUST 25, 1988 9

OBS	Termination Date/Time	System ID	Record Type	S2K Version
1	12AUG1988:03:25:32.47	MU prod	12	11.6
2	15AUG1988:03:25:49.74	MU prod	12	11.6

List Accounting Records - MU Term Records
(print unit FT31F001)

List Accounting Records - Lost Data Records 11:59 THURSDAY, AUGUST 25, 1988 10

OBS	System ID	Record Type	Record Date/Time	Lost Data Date/Time	S2K Version	# of Records Lost
1	MU test	7	16AUG1988:15:00:00.10	16AUG1988:12:59:59.10	11.6	600
2	MU test	7	16AUG1988:16:01:05.10	16AUG1988:13:50:45.05	11.6	12

List Accounting Records - Lost Data Records
(print unit FT32F001)

List Accounting Records - Accounting Log Tapes 11:59 THURSDAY, AUGUST 25, 1988 11

OBS	Earlest Date/Time	Latest Date/Time	Number of Tapes	Vol/Ser	Data Set Name	File Seq Number	Tape Label
1	09AUG1988:05:21:54.74	15AUG1988:18:07:28.46	1	M00007	SASVVV.AUG.WEEK2	1	sl

OBS	Year Created	Julian Day Created	Date Created	Year Expires	Julian Day Expires	Date Expires	Device Type
1	88	196	14JUL88	0	0	14JUL89	7800808000007FF800000000

OBS	A000 Count	A002 Count	A003 Count	A004 Count	A005 Count	A006 Count	A007 Count	A008 Count	A012 Count	Record Count
1	16	40	40	1,050,583	1,517	5,586	0	3,173	16	1,060,971

List Accounting Records - Accounting Log Tapes
(print unit FT33F001)

List Accounting Records - Dump Header Records 11:59 THURSDAY, AUGUST 25, 1988 13

OBS	System ID	Record Type	Record Date/Time	S2K Version
1		5	09AUG1988:01:13:24.58	
2		5	10AUG1988:01:05:51.75	
.		.	.	
.		.	.	
.		.	.	

List Accounting Records - Dump Header Records
(print unit FT34F001)

List Accounting Records - Dump Trailer Records 11:59 THURSDAY, AUGUST 25, 1988 13

OBS	System ID	Record Type	Record Date/Time	S2K Version
1		5	09AUG1988:01:13:26.66	
2		5	10AUG1988:01:07:31.25	
.		.	.	
.		.	.	
.		.	.	

List Accounting Records - Dump Trailer Records
(print unit FT34F001)

```
                         List 40 Accounting Records - PLEX Segment Records      11:59 THURSDAY, AUGUST 25, 1988   14

  OBS   Job Name   Program      Start Date/Time             Termination          Elapse
                   Name                                     Date/Time            Time

   1      ME1       MEAA     10AUG1988:05:41:53.87    10AUG1988:05:42:11.42    0:00:17.55
   2      ME1       MEAA     10AUG1988:05:42:21.35    10AUG1988:05:42:57.56    0:00:36.21
   .       .         .          .         .              .        .              .
   .       .         .          .         .              .        .              .
   .       .         .          .         .              .        .              .

  OBS   System        DB   Scratch    CPU Time    Priority   OP Code    Data     Subschema
        ID            IO     IO                                         Base

   1    MU prod      765     62     0:00:01.78      0          10      SALES1
   2    MU prod    1,213    157     0:00:04.55      0          10      SALES1
   .       .          .       .          .          .           .        .
   .       .          .       .          .          .           .        .
   .       .          .       .          .          .           .        .
```

List 40 Accounting Records - PLEX Segment Records
(print unit FT35F001)

```
                       List 40 Accounting Records - SCF/TP  Segment Records    11:59 THURSDAY, AUGUST 25, 1988   16

OBS   Job Name   Program      Start Date/Time          Termination          Elapsed    System    DB   Scratch    CPU Time
                 Name                                  Date/Time            Time       ID        IO     IO

 1      XME       SA1     10AUG1988:06:01:12.39   10AUG1988:06:01:14.09   0:00:01.70   MU test   21     0      0:00:00.03
 .       .         .         .         .            .         .             .           .        .      .          .
 .       .         .         .         .            .         .             .           .        .      .          .
 .       .         .         .         .            .         .             .           .        .      .          .
                                                                                                                     0.04
OBS    Priority     Step      SCF Text
                    Name

 1        0       RUNSTEP     DBN IS SALES:  PRINT ENTRY WHERE MONTH EQ AUGUST AND YEAR EQ 1988:
 .        .          .           .
 .        .          .           .
 .        .          .           .
```

List 40 Accounting Records - SCF/TP Segment Records
(print unit FT36F001)

```
                       List 40 Accounting Records - SCF/BATCH  Segment Records                     18
                                                                              11:59 THURSDAY, AUGUST 25, 1988
  OBS    Job Name    Program      Start Date/Time           Termination        Elapsed
                     Name                                   Date/Time          Time

   1     PRODAA1     S2KPGM    09AUG1988:17:02:07.62    09AUG1988:17:02:08.29   0:00:00.67
   .        .           .          .         .              .        .              .
   .        .           .          .         .              .        .              .
   .        .           .          .         .              .        .              .

  OBS    System      DB    Scratch    CPU Time     Priority              SCF Text
         ID          IO      IO

   1     MU prod     6       0       0:00:00.03       0       DBN IS CARS: LIST C1, C2:
   .        .        .       .           .            .           .
   .        .        .       .           .            .           .
   .        .        .       .           .            .           .
```

List 40 Accounting Records - SCF/Batch Segment Records
(print unit FT37F001)

```
                          List 40 Accounting Records - User Termination Records    11:59 THURSDAY, AUGUST 25, 1988   20

OBS Job Name Program  Terminal    Start Date/Time          Termination          Elapsed    System   DB Total  CPU Time  Trans
             Name     ID                                   Date/Time            Time       ID       IO  IO              Type

  1 SYSA2K11 S2KPGM           09AUG1988:17:02:07.62 09AUG1988:17:02:15.91 0:00:08.29 MU prod  86   86  0:00:00.64 SCF/Batch
  .    .       .                    .       .          .        .            .          .      .    .       .         .
  .    .       .                    .       .          .        .            .          .      .    .       .         .
  .    .       .                    .       .          .        .            .          .      .    .       .         .
```

List 40 Accounting Records - User Termination Records
(print unit FT38F001)

Store Transaction Summary Data (TTACT04)

The TTACT04 member produces summary data about the transactions recorded in the ACT.A004 data set (created by the TTACT01 member). TTACT04 executes PROC SUMMARY and stores the output in SAS data sets in the historical PDB library. The output from PROC SUMMARY includes program name, transaction type and count, system ID, date, and mean/max I/O and elapsed time. This information is used by other TTACT members to generate historical reports and summaries.

For sample JCL, see S2K.R116.SAMPLIB.

Reports: Poor Performance Transactions (TTACT05)

The TTACT05 member generates the following reports: summary data displayed by day or by program, the Dog Report of transactions that performed poorly, and a Repeat Offenders report about programs that occur frequently on the Dog Report. Also, TTACT05 moves the summary data to the SAS data sets in the PDB library. The input for TTACT05 comes from the PDB.SUM, PDB.TRANS, and PDB.DOGS data sets.

You must execute the TTACT01 and TTACT04 members before you execute the TTACT05 member. You can list and edit the user exits to specify your own headers and footers and to control the number of dogs and repeat offenders.

TTACT0A2 specifies headers and footers.

TTACT050 specifies acceptable response times and, therefore, determines which transactions are "dogs" having poor performance times.

TTACT051 limits the repeat offenders report.

The following TTACT05 reports depend on the summary data produced by the TTACT04 member.

Print Unit	Report
FT50F001	Summary Accounting Data by Day
FT51F001	Summary Accounting Data by Program
FT52F001	Summary Accounting Data as Selected by User Exit TTACT050/ The Dog Report
FT53F001	Repeat Offenders Report/ Programs that Occur Frequently on the Dog Report

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.

Summary Accounting Data by Day 11:59 THURSDAY, AUGUST 25, 1988 21

System ID=MU test

Date	Transaction Count	Mean Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV
MON, AUG 15, 88	242,170	0:00:05.49	9:21:53.12	0:00:00.02	8.64	580,836	351.31	6039.48
WED, AUG 17, 88	186,758	0:00:09.13	9:57:13.65	0:00:00.02	9.68	299,266	442.85	4852.25
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.

Summary Accounting Data by Day
(print unit FT50F001)

Summary Accounting Data by Program 11:59 THURSDAY, AUGUST 25, 1988 23

------------------------------------- System ID=MU test Date=SUN, AUG 7, 88 Trans Type=Batch -------------------------------------

Program Name	Transaction Count	Mean Elapsed Time	Min Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV	Day's Total %	Type Total %
ABBX10	13	0:00:00.29	0:00:00.04	0:00:01.78	0:00:00.01	0.54	7	0.46	156.89	37.14	86.67
BBBX12	2	0:00:05.82	0:00:02.44	0:00:09.20	0:00:00.09	89.50	179	4.78	82.13	5.71	13.33
------	--										
TP	15										

----------------------------------- System ID=MU test Date=SUN, AUG 7, 88 Trans Type=SCF/Batch -----------------------------------

Program Name	Transaction Count	Mean Elapsed Time	Min Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV	Day's Total %	Type Total %
SYS2KABC	20	0:05:24.00	0:00:00.01	0:54:18.33	0:00:28.07	10,056.85	106,825	851.23	262.72	57.14	100.00

------------------------------------ System ID=MU test Date=MON, AUG 8, 88 Trans Type=SCF/TP ------------------------------------

Program Name	Transaction Count	Mean Elapsed Time	Min Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV	Day's Total %	Type Total %
S2K1	11	0:45:05.62	0:01:04.33	4:41:32.57	0:00:00.17	149.55	844	5066.80	187.27	0.00	100.00
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.

Summary Accounting Data by Program
(print unit FT51F001)

Summary Accounting Data as Selected by User-Exit TTACT50
The Dog Report 11:59 THURSDAY, AUGUST 25, 1988 23

------------------------------------- System ID=MU test Date=SUN, AUG 7, 88 Trans Type=Batch -------------------------------------

Program Name	Transaction Count	Mean Elapsed Time	Min Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV	Day's Total %	Type Total %
AAABB2	1	7:00:01:20	7:00:01.20	7:00:01.20	0:00:00.46	126.00	126			5.88	25.00

----------------------------------- System ID=MU test Date=SUN, AUG 7, 88 Trans Type=SCF/Batch -----------------------------------

Program Name	Transaction Count	Mean Elapsed Time	Min Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV	Day's Total %	Type Total %
SYS2AAB1	7	0:00:49.90	0:00:00.66	0:03:49.23	0:00:05.72	3,062.85	11,000	81.20	162.70	41.18	100.00
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.

Summary Accounting Data as Selected by User Exit TTACT050
The Dog Report
(print unit FT52F001)

```
                              Repeat Offenders Report                    16:58 WEDNESDAY, AUGUST 24, 1988   1
                       Programs that Occur Frequently on the Dog Report

------------------------------------------- system id=MU prod trans type=batch ------------------------------------------------------

                Transaction  Days of Poor      Days of    % Of History
                              Performance      History         Kept
                                                 Kept

                   SYSA1          19             27          70.37
                   SYSXC          11             27          40.74

------------------------------------------- system id=MU prod trans type=scf/tp------------------------------------------------------

                Transaction  Days of Poor      Days of    % Of History
                              Performance      History         Kept
                                                 Kept

                   PROD1           8             25          30.77
                   TESTA           7             25          26.92
```

Repeat Offenders Report
Programs that Occur Frequently on the Dog Report
(print unit FT53F001)

Reports: PLEX Op Code Usage (TTACT06)

The TTACT06 member produces reports about the usage of SYSTEM 2000 PLEX op codes. The reports display timings by op codes, by program, and by data base.

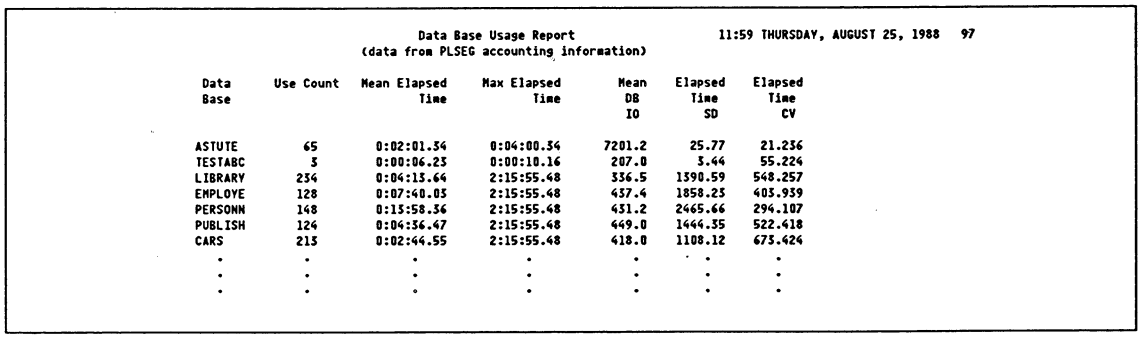
The input for the reports comes from the ACT.A005 data set, which is created by executing the TTACTA00 and TTACT01 members. The amount of data depends on what you specify in the TTA005 user exit used by the TTACT01 member. The default is all PLSEG records.

You can modify headers and footers by listing and editing user exit TTACT0A2.

TTACT06 generates the following reports:

Print Unit	Report
FT60F001	Data Base Usage Report/(data from PLSEG accounting information)
FT61F001	S2K Operation Report/(data from PLSEG accounting information)
FT62F001	S2K Operations by Program/(data from PLSEG accounting information)

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.



Data Base Usage Report (data from PLSEG accounting information) 11:59 THURSDAY, AUGUST 25, 1988 97

Data Base	Use Count	Mean Elapsed Time	Max Elapsed Time	Mean DB IO	Elapsed Time SD	Elapsed Time CV
ASTUTE	65	0:02:01.54	0:04:00.34	7201.2	25.77	21.256
TESTABC	5	0:00:06.23	0:00:10.16	207.0	3.44	55.224
LIBRARY	254	0:04:13.64	2:15:55.48	336.5	1390.59	548.257
EMPLOYE	128	0:07:40.05	2:15:55.48	437.4	1858.25	405.939
PERSONN	148	0:13:58.36	2:15:55.48	431.2	2465.66	294.107
PUBLISH	124	0:04:36.47	2:15:55.48	449.0	1444.35	522.418
CARS	215	0:02:44.55	2:15:55.48	418.0	1108.12	673.424
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

Data Base Usage Report
(data from PLSEG accounting information)
(print unit FT60F001)

S2K Operation Report 11:59 THURSDAY, AUGUST 25, 1988 98
(data from PLSEG accounting information)

S2K OP Code	Use Count	Mean Elapsed Time	Max Elapsed Time	Mean DB IO	Elapsed Time SD	Elapsed Time CV
getl/hold where	21	0:00:04.91	0:00:15.81	264.76	3.61	73.525
getl where	369	0:05:49.58	2:15:55.48	531.26	1609.01	460.276
locate where	1001	0:03:41.25	2:15:55.48	1669.15	1204.78	544.535
order by	101	0:00:15.96	0:01:19.61	685.94	14.21	89.055
rollback	25	0:00:12.93	0:00:49.22	580.16	10.77	83.294
	====					
	1517					

S2K Operation Report
(data from PLSEG accounting information)
(print unit FT61F001)

S2K Operations by Program 11:59 THURSDAY, AUGUST 25, 1988 99
(data from PLSEG accounting information)

-- Program Name=LIBA1 --

Data Base	S2K OP Code	Use Count	Mean Elapsed Time	Max Elapsed Time	Mean DB IO	Elapsed Time SD	Elapsed Time CV
LIBRARY	locate where	3	0:02:19.79	0:02:25.59	8275.67	6.39004	4.57117

-- Program Name=SALES1 --

Data Base	S2K OP Code	Use Count	Mean Elapsed Time	Max Elapsed Time	Mean DB IO	Elapsed Time SD	Elapsed Time CV
AUTOS1	getl where	60	0:04:51.42	2:15:55.48	559.167	1472.65	505.334
CARSALE	locate where	87	0:07:53.12	2:15:55.48	257.241	1908.02	403.286
CARSALE	order by	1	0:00:04.45	0:00:04.45	216.000		
CARSALE	get last	65	0:02:28.08	2:15:55.48	595.385	1008.73	681.195
CARS1	locate where	46	0:17:48.90	2:15:55.48	289.413	2774.95	259.608
CARS1	get first	70	0:15:49.99	2:15:55.48	585.029	2606.98	274.422
CARS1	getd next	31	0:30:46.32	2:15:55.48	312.935	3463.66	187.598
CARS1	order by	3	0:00:08.28	0:00:09.55	391.000	1.10	13.326
CARS1	get first	72	0:05:57.87	2:15:55.48	507.458	1637.32	457.513
AUTOS	locate where	34	0:04:06.89	2:15:55.48	435.794	1397.41	566.010
AUTOS	get last	64	0:02:27.61	2:15:55.48	589.250	1016.88	688.892
AUTOS	geta	106	0:03:58.38	2:15:55.48	368.538	1357.60	569.513
--------		---					
PGM_NAME		639					

-- Program Name=MONSAL --

Data Base	S2K OP Code	Use Count	Mean Elapsed Time	Max Elapsed Time	Mean DB IO	Elapsed Time SD	Elapsed Time CV
CARS1	getl/hold where	6	0:00:03.61	0:00:03.91	208.50	0.175547	4.8606
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

S2K Operations by Program
(data from PLSEG accounting information)
(print unit FT62F001)

Reports: SCF/TP and SCF/Batch Sessions (TTACT07)

The TTACT07 member produces reports on SCF/TP and SCF/Batch sessions, giving command and session level statistics. You can modify headers and footers with user exit TTACT0A2.

The input for the reports comes from the ACT.A004, ACT.A006, and ACT.A008 data sets, which are created by executing the TTACTA00 and TTACTA01 members. The amount of data depends on what you specify in the TTA004, TTA006, and TTA008 user exits. (See **Create the SAS ACT Data Sets (TTACT01)** on page 3-5.) The defaults are all user termination records and all SCF/TP and SCF/Batch records.

TTACT07 generates the following reports:

Print Unit	Report
FT70F001	SCF/TP Sessions Report - Summary
FT71F001	SCF/TP Sessions Report - List
FT72F001	SCF/TP Sessions Report - Detail
FT73F001	SCF/Batch Sessions Report - Summary
FT74F001	SCF/Batch Sessions Report - List
FT75F001	SCF/Batch Sessions Report - Detail

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.

```
                                SCF/TP Sessions Report - Summary          11:59 THURSDAY, AUGUST 25, 1988  109
                              (data from TPSEG accounting information)

---------------------------------------------------------- System ID=MU prod ----------------------------------------------------------

 OBS    Date      Count   Mean Elapsed     Max Elapsed      Mean          Mean Elapsed    Max Elapsed
                              Time             Time        CPU          Time -          Time -
                                                           Time         Commands        Commands

   1   14AUG88     29      2:34:14.46      15:29:49.47     0:00:01.06     0:05:45.10     2:46:47.92
   .      .        .          .               .              .              .              .
   .      .        .          .               .              .              .              .
   .      .        .          .               .              .              .              .

 OBS   Mean Commands     Max Commands     Mean Total     Max Total     Mean Command
          / Session        / Session          IO             IO      Elapsed Time

   1       121.72           5,550          388.21         4,069      0:00:02.84
   .          .               .              .              .              .
   .          .               .              .              .              .
   .          .               .              .              .              .
```

SCF/TP Sessions Report - Summary
(print unit FT70F001)

SCF/TP Sessions Report - List 11:59 THURSDAY, AUGUST 25, 1988 110
(data from TPSEG accounting information)

--- System ID=MU test ---

Name	Program Name	Session Start Time	Session Elapsed Time	Session Think Time	Command Elapsed Time	Session CPU Time	Session DB IO	Session Total IO	Unaccounted DB IO	Commands in Session
SYS2AA10	S2KU	10AUG88:08:56:58.51	0:03:39.83	0:03:35.82	0:00:04.01	0:00:00.95	28	28		1
SYS2AA10	S2KN	10AUG88:15:49:48.71	0:26:27.85	0:26:25.18	0:00:02.67	0:00:00.21	59	59		2
SYS2AA11	S2KN	10AUG88:16:41:49.98	0:04:38.05	0:04:36.10	0:00:01.95	0:00:00.12	107	107		5
SYS2BB12	S2KU	10AUG88:17:12:46.39	0:05:09.22	0:05:00.86	0:00:09.03	0:00:00.28				5
.	.	.	.	.	.	.	.	.	.	
.	.	.	.	.	.	.	.	.	.	
.	.	.	.	.	.	.	.	.	.	

SCF/TP Sessions Report - List
(print unit FT71F001)

SCF/TP Sessions Report - Detail 11:59 THURSDAY, AUGUST 25, 1988 406
(data from TPSEG accounting information)

--- System ID=MU test ---

OBS	Job Name	Program Name	Start Date/Time	Session Elapsed Time	Session DB IO	Total IO	Session CPU Time	Record Type
1	SXYZBB11	SYS2KTPI	10AUG1988:02:00:15.30	0:14:24.04	15,300	15,300	0:01:15.62	S
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.

OBS	Command Elapsed Time	Command DB IO	Scratch IO	Command CPU Time	SCF Text
1	0:00:00.01	0	0	0:00:00.00	PRINT C1, C2:
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

SCF/TP Sessions Report - Detail
(print unit FT72F001)

SCF/Batch Sessions Report - Summary 11:59 THURSDAY, AUGUST 25, 1988 387
(data from NLSEG accounting information)

--- System ID=MU test ---

OBS	Date	Session Start Time	Count	Mean Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean Elapsed Time - Commands
1	09AUG88	09AUG88	20	0:05:24.00	0:54:18.33	0:00:28.07	0:02:40.94
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

OBS	Max Elapsed Time - Commands	Mean Commands / Session	Max Commands / Session	Mean Total IO	Max Total IO	Mean Command Elapsed Time
1	0:35:56.89	5.40	65	10,056.85	106,825	0:00:29.80
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

SCF/Batch Sessions Report - Summary
(print unit FT73F001)

```
                                   SCF/Batch Sessions Report - List          11:59 THURSDAY, AUGUST 25, 1988  389
                                 (data from NLSEG accounting information)

----------------------------------------------------- System ID=MU test -----------------------------------------------------

  Name      Program        Session         Session    Session    Command    Session   Session  Session  Unaccounted  Commands
            Pame            Start          Elapsed     Think     Elapsed      CPU      DB IO    Total      DB IO         in
                             Time           Time       Time       Time       Time                IO                   Session

SYSTEMA1  SYS2KPGM  10AUG88:17:02:08.94  0:00:07.33 0:00:00.04 0:00:07.29 0:00:00.61     80       80                    65
   .         .         .         .           .          .          .          .          .        .                     .
   .         .         .         .           .          .          .          .          .        .                     .
   .         .         .         .           .          .          .          .          .        .                     .
```

SCF/Batch Sessions Report - List
(print unit FT74F001)

```
                                   SCF/Batch Sessions Report - Detail        11:59 THURSDAY, AUGUST 25, 1988  406
                                 (data from NLSEG accounting information)

----------------------------------------------------- System ID=MU test -----------------------------------------------------

      OBS    Job Name   Program       Start Date/Time        Session     Session    Total     Session     Record
                        Name                                 Elapsed     DB IO      IO         CPU        Type
                                                              Time                             Time

       1     $XYZAA23   SYS2KPGM   11AUG1988:01:00:14.34   1:14:24.04   113,399   114,274   0:02:17.67     s
       .        .          .          .        .               .           .         .          .          .
       .        .          .          .        .               .           .         .          .          .
       .        .          .          .        .               .           .         .          .          .

      OBS    Command     Command    Scratch    Command     SCF Text
             Elapsed     DB IO        IO         CPU
              Time                               Time

       1    0:00:00.01        0         0     0:00:00.00   DBN IS LIBRARY:
       .        .             .         .          .             .
       .        .             .         .          .             .
       .        .             .         .          .             .
```

SCF/Batch Sessions Report - Detail
(print unit FT75F001)

Reports: Historical Summaries (TTACT08)

The TTACT08 member produces reports from the historical data in the PDB library. **SAS Data Sets in the PDB Library** on page 3-31 describes the historical data that are maintained and shows which members store data in the PBD data sets.

TTACT08 invokes the following user exits, which you can list and edit:

TTACT0A2	specifies the headers and footers.
TTACT020	defines the prime shift for the Multi-User Up Time report.
TTACT021	annotates the Multi-User Up Time report.

TTACT08 generates the following historical reports on the print units shown below.

Print Unit	Report
FT80F001	Multi-User Availability Report
FT81F001	Multi-User Up Time Report (Prime Shift as Defined by TTACT020)
FT82F001	Accounting Log Dump Tapes
FT83F001	History of S2KMANX/S2KMANY Dumps by ACTUTIL
FT84F001	Daily Transaction Counts
FT85F001	SCF/TP Sessions Report - Summary
FT86F001	SCF/Batch Sessions Report - Summary

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.

```
                                        Multi-User Availability Report            11:59 THURSDAY, AUGUST 25, 1988  585

Outage                       Outage                  Outage Duration  MU Session                    Multi-User Session  MU Session
Begins                       Ends                                     Begins At                     Ends At             Duration
At                           At

FRI, AUG 12, 88 01:26:13 FRI, AUG 12, 88 03:14:09 88:18:07:28.
                                                                      FRI, AUG 12, 88 03:14:09  SAT, AUG 13, 88 01:29:58  22:15:49
 .        .       .     .      .          .         .          .       .        .          .             .           .
 .        .       .     .      .          .         .          .       .        .          .             .           .
 .        .       .     .      .          .         .          .       .        .          .             .           .
```

Multi-User Availability Report
(print unit FT80F001)

```
                         Multi-User Up Time Report              11:59 THURSDAY, AUGUST 25, 1988  585
                        Prime Shift as Defined by TTACT020

----------------------------------------------System ID=MU test ----------------------------------------------

        Date          Hours Multi-User   Hours in   Multi-User   Percentage   Message
                            Was Up        Prime      Session     Available
                                          Shift       Count

   FRI, AUG 12, 88        9:26:52        10:00:00       2           94.48      exception
   SAT, AUG 13, 88       10:00:00        10:00:00       1          100.00
         .                   .               .          .              .          .
         .                   .               .          .              .          .
         .                   .               .          .              .          .
```

Multi-User Up Time Report
Prime Shift as Defined by TTACT020
(print unit FT81F001)

```
                                    Accounting Log Dump Tapes            11:59 THURSDAY, AUGUST 25, 1988  585

OBS   Vol/Ser   Earliest Date/Time       Latest Date/Time      Number        Date          File Seq   Label   Year Created
                                                                  of          Set          Number
                                                                Tapes         Name

 1    M00007   10AUG1988:03:21:34.74   15AUG1988:18:07:28.46     1       SASVVV.AUG.WEEK2     1        sl          88

OBS   Julian Day   Date Created   Year Expires   Julian Day   Date Expires        Device            A000 Count
       Created                                    Expires                          Type

 1      196         14JUL88           0              0         14JUL89     7800808000007FF800000000      16

OBS   A002 Count   A003 Count   A004 Count   A005 Count   A006 Count   A007 Count   A008 Count   A012 Count   Record
                                                                                                             Count

 1       40           40        1,050,583      1,517        5,586          0           3,173         16      1,060,971
```

Accounting Log Dump Tapes
(print unit FT82F001)

```
                     History of S2KMANX/S2KMANY Dumps by ACTUTIL        11:59 THURSDAY, AUGUST 25, 1988  586

                     OBS      Dump Start             Dump Term
                               Date/Time              Date/Time

                      1   09AUG88:03:21:45.17   09AUG88:03:21:45.43
                      .      .         .            .         .
                      .      .         .            .         .
                      .      .         .            .         .
```

History of S2KMANX/S2KMANY Dumps by ACTUTIL
(print unit FT83F001)

Daily Transaction Counts 11:59 THURSDAY, AUGUST 25, 1988 587

--- System ID=MU test ---

Date	Transaction Count	Mean Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean IO	Max IO	Elapsed Time SD	Elapsed Time CV
MON, AUG 15, 88	212,224	0:00:05.81	9:53:21.28	0:00:00.02	6.53	224,135	332.05	5712.72
.	.	.	.	.	.	.	.	.

Daily Transaction Counts
(print unit FT84F001)

SCF/TP Sessions Report - Summary 11:59 THURSDAY, AUGUST 25, 1988 590
(data from TPSEG accounting information)

--- System ID=MU prod ---

OBS	Date	Count	Mean Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean Elapsed Time - Commands
1	15AUG88		2:34:14.46	15:29:49.47	0:00:01.06	0:05:45.10
.	.		.	.	.	.
.	.		.	.	.	.
.	.		.	.	.	.

OBS	Max Elapsed Time - Commands	Mean Commands / Session	Max Commands / Session	Mean DB IO	Max DB IO	Mean Command Elapsed Time	Count
1	2:46:47.92	121.72	3,530	388.21	4,069	0:00:02.84	29
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

SCF/TP Sessions Report - Summary
(print unit FT85F001)

SCF/Batch Sessions Report - Summary 11:59 THURSDAY, AUGUST 25, 1988 592
(data from NLSEG accounting information)

--- System ID=MU prod ---

OBS	Date	Count	Mean Elapsed Time	Max Elapsed Time	Mean CPU Time	Mean Elapsed Time - Commands	Max Elapsed Time - Commands
1	15AUG88		0:00:45.02	0:12:04.06	0:00:01.56	0:00:44.88	0:12:03.97
.	.		.	.	.	.	.
.	.		.	.	.	.	.
.	.		.	.	.	.	.

OBS	Mean Commands / Session	Max Commands / Session	Mean DB IO	Max DB IO	Mean Command Elapsed Time	Session Start Time	Count
1	6.11	68	1,704.37	28,537	0:00:07.35	15AUG88	19
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

SCF/Batch Sessions Report - Summary
(print unit FT86F001)

ACCOUNTING LOG UTILITIES

Describe the ACT and PDB SAS Data Sets (TTACT0C)

The TTACT0C member invokes the SAS CONTENTS procedure for all SAS data sets on the ACT and PDB libraries. The output from PROC CONTENTS includes information such as the file's name, size, type, and creation date as well as information about the variables in the SAS data sets. You must run the TTACT01 and TTACT0A members before you run TTACT0C. The PROC CONTENTS output goes to print unit FT12F001.

For sample JCL, see S2K.R116.SAMPLIB.

Rebuild the User-Exit Formats (TTACT0B)

The TTACT0B member rebuilds all user-exit formats if you modify the user exits. You do not need to run TTACT0B if you use all default settings. TTACT0B calls the following user exits, which you can list and edit:

TTACT0A0	formats the sys_id.
TTACT0A1	formats the job classes.
TTACT0A2	formats the headers and footers.
TTACT0A3	formats the PLEX op codes.
TTACT0A4	formats the tape label information.

For sample JCL, see S2K.R116.SAMPLIB.

Purge Data from the PDB Library (TTACT0D)

The TTACT0D member purges data from the PDB data sets according to a cutoff date you specify. TTACT0D retains all data for one year (default) prior to the cutoff.

TTACT0D invokes one user exit, TTACT0D0, which you can list and edit at your site. You can specify three macro variables: END_D, AGE, and PERIOD. The default for PERIOD is "month," and the default for AGE is "12," which means the retaining period is 12 months. END_D specifies the ending retaining date; by default END_D is today's date.

When calculating the retaining period, TTACT0D backs up to the first day of the month specified in END_D. For example, if END_D is today's date and today is 16dec88, the purge date would be 01dec87. Data for 30nov87 and before would be deleted.

TTACT0D purges data from all PDB data sets except PDB.SUM. (PDB.SUM is recreated each time you run the TTACT04 member; therefore, the data do not need to be purged.)

For sample JCL, see S2K.R116.SAMPLIB.

ACCOUNTING LOG GRAPHICS

This section discusses the members that produce the Accounting Log graphics listed below.

Plots of Elapsed Time Versus Time of Day (TTACG02 member)

Plots of Elapsed Time and Transaction Rate Versus Time of Day (TTACG03 member)

Charts of Transaction Count and Mix Versus Date (TTACG04 member)

Charts of Mean Elapsed Time Weighted by Transaction Count (TTACG05)

Charts of SCF Command Elapsed Time Versus Date (TTACG06)

To produce the graphics, the following data sets and software must be available:

- the SAS data sets in the ACT and PDB libraries containing Accounting Log data from one or more Multi-User sessions
- the base SAS System and SAS/GRAPH software.

The data from one or more Accounting Log tapes must be stored in the SAS data sets in the ACT and PDB libraries. Normally you would create the SAS data sets and generate the Accounting Log reports before running any graphics members.

If you have not generated the reports or created the SAS data sets, you must allocate the ACT, PDB, and SASLIB library files and run members TTACT01, TTACT04, TTACT05, and TTACT07, which create and maintain the ACT and PDB data sets. These members and the JCL to run them are discussed in **Accounting Log Reports** on page 3-3.

After you create the ACT and PDB libraries, you can run the graphics members. The graphics are all produced with SAS/GRAPH software.

Three Methods for Running Graphics

You can generate the graphics by three methods: batch mode, interactive mode, or a combination of batch mode and interactive graphics display. The sample JCL in this manual is set up for batch mode. Submit the batch jobs, and the output goes to the specified plotter.

If you want to run the members interactively from your terminal, use the Display Manager. Include the appropriate graphics member, wait for it to execute, and see the graphics results on your terminal screen.

The third method of running the graphics members combines a batch job with terminal displays. Submit the members in batch mode, using the GOUT parameter to send the graphics output to a specified SAS GCAT data set. After the jobs execute, use the GREPLAY procedure to display the GCAT data set at your terminal.

On the following pages, the graphics members are discussed in the order you would usually run them.

Set Up the Graphics Parameters (TTACG00)

The TTACG00 member sets up the basic graphics parameters. You must include this member in any step that generates Accounting Log plots or charts. TTACG00 invokes user exit TTACG000, which you can list and edit to override defaults for the graphics parameters.

The graphics parameters assume the following values unless you change them with the TTACG000 user exit:

color1	=	blue;	first color to use
color2	=	red;	second color to use
color3	=	yellow;	third color to use
color4	=	blue;	fourth color to use
color5	=	magenta;	fifth color to use
color6	=	pink;	sixth color to use
color7	=	green;	seventh color to use
color8	=	white;	eight color to use max_c
	=	00:01:00.00;	ceiling for max elapsed time
max_i	=	00:00:10.00;	axis increment for max elapsed time
max_t	=	900;	max transactions / minute
mean_c	=	00:00:03.00;	ceiling for mean elapsed time
freq	=	3;	drop transaction if frequency is less than this value
skip	=	2;	keep every nth - used to sample data and reduce volume of processing
count	=	4000;	threshold level before a transaction will be reported on
end_d	=	current date;	ending date for date axes
age	=	30;	time period the graphic should include
period	=	day;	units age is expressed in
device	=	tcx4107;	your device type
gout	=	work.gseg;	catalog that holds graphics output

Refer to your SAS/GRAPH manual and your local systems programmers for the exact parameters to use for the device at your site. Three members that specify goption information are provided with Release 11.6 (see below). You can have several members of this type in the library and specify which one to use by giving the member name in user exit TTACG000.

The following members are provided with Release 11.6:

HP7550	goptions for the HP 7550 plotter
IBM3279	goptions for the IBM3279 terminal
TCX4107	goptions for the Techtronix 4107 terminal

For sample JCL, see S2K.R116.SAMPLIB.

Create the ACT.GRAPHIC Data Set (TTACG01)

The TTACG01 member creates the ACT.GRAPHIC data set, which is used by the TTACG02 and TTACG03 graphics members. TTACG01 reads the ACT.A004 data set created by the TTACT01 member. The only output from TTACG01 is the SAS data set ACT.GRAPHIC.

For sample JCL, see SA2K.R116.SAMPLIB.

Elapsed Time Versus Date/Time (TTACG02)

The TTACG02 member plots mean and maximum elapsed time of PLEX/TP segment data versus time of day, using a linear scale and a logarithmic scale. Also, if your data are for more than one Multi-User system, TTACG02 produces a plot for each system ID.

The input SAS data set is ACT.GRAPHIC, which is created by TTACG01. TTACG02 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers. The TTACG02 member invokes the GPLOT procedure to produce the following plots:

Maximum Elapsed Time versus Time of Day - PLEX/TP
(duplicate time values are averaged - linear scale 00:01: 00.00 ceiling)
System ID=your system ID

Maximum Elapsed Time versus Time of Day - PLEX/TP
(duplicate time values are averaged - logarithmic scale)
System ID=your system ID

Mean Elapsed Time versus Time of Day - PLEX/TP
(duplicate time values are averaged - linear scale 00:01: 00.00 ceiling)
System ID=your system ID

Mean Elapsed Time versus Time of Day - PLEX/TP
(duplicate time values are averaged - logarithmic scale)
System ID=your system ID

For sample JCL, see S2K.R116.SAMPLIB.

Elapsed Time and Transaction Rate Versus Time (TTACG03)

The TTACG03 member plots mean and maximum elapsed time and transaction rate versus time of day. If your data are for more than one Multi-User system, TTACG03 produces a plot for each system ID.

The input SAS data set is ACT.GRAPH, which is created by TTACG01. TTACG03 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers. The TTACG03 member invokes the GPLOT procedure to produce the following plots:

Mean and Max Elapsed Time Versus Time of Day
(mean elapsed time = yellow; max elapsed time = red - PLEX/TP with ceiling)
System ID = your system ID

Mean Elapsed Time and Transaction Rate Versus Time of Day
(mean elapsed time = yellow; transaction rate = blue - PLEX/TP with ceiling
System Id = your system ID

Max Elapsed Time and Transaction Rate Versus Time of Day
(max elapsed time = red; transaction rate = blue - PLEX/TP with ceiling
System Id = your system ID

For sample JCL, see S2K.R116.SAMPLIB.

Transaction Count and Mix Versus Date (TTACG04)

The TTACG04 member produces charts of transaction count and mix versus date. If your data are for more than one Multi-User system, TTACG03 produces a plot for each system ID.

The input SAS data sets are PDB.DAY and PDB.TRANS, which are created by TTACT05 (see **Accounting Log Reports** on page 3-3). TTACG04 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers. The TTACG04 member invokes the GCHART procedure to produce the following charts:

Multi-User Transaction Count Versus Date
(weekday only)
System ID = your system ID

Transaction Mix Versus Date
(weekday only)
System ID = your system ID

Transaction Mix Versus Date
(for program names occurring more than n times per weekday)
System ID = your system ID; trans type = a trans type (one chart per trans type)

For sample JCL, see S2K.R116.SAMPLIB.

Mean Elapsed Time Weighted by Transaction Count (TTACG05)

The TTACG05 member charts mean elapsed time weighted by transaction count. TTACG05 produces one chart for each transaction type and a chart for all transaction types. Also, if your data are for more than one Multi-User system, TTACG05 produces a plot for each system ID.

The input SAS data set is PDB.TRANS, which is created by TTACT05 (see **Accounting Log Reports** on page 3-3). TTACG05 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers.

The TTACG05 member invokes the GCHART procedure to produce the following chart:

Mean Elapsed Time Versus Date (weighted by transaction count)

For sample JCL, see S2K.R116.SAMPLIB.

SCF Mean Elapsed Time Weighted by Transaction Count (TTACG06)

The TTACG06 member charts SCF/TP and SCF/Batch command elapsed time weighted by transaction count. The input SAS data sets are PDB.SCF_TP and PDB.SCF_B, which are created by TTACT07 (see **Accounting Log Reports** on page 3-3). TTACG06 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers.

The TTACG06 member invokes the GCHART procedure to produce the following charts:

SCF/TP Command Elapsed Time Versus Date

SCF/Batch Command Elapsed Time Versus Date

For sample JCL, see S2K.R116.SAMPLIB.

SAS DATA SETS FOR THE ACCOUNTING LOG

The Accounting Log tuning tools system creates many SAS data sets, stored in two SAS data libraries named ACT and PDB. The SAS ACT library contains a SAS data set for each type of Accounting Log information. The SAS PDB library contains SAS data sets that hold performance data over a period of time.

The SAS data sets in the ACT and PDB libraries are briefly described here. To obtain more detailed information about these SAS data sets, run the TTACT0C utility member (**Accounting Log Utilities** on page 3-24). TTACT0C displays the SAS variable names, lengths, labels, and formats for the SAS data sets in both the ACT library and the PDB library.

SAS Data Sets in the ACT Library

The ACT library contains a SAS data set for each type of Accounting Log record. These data sets contain information extracted from a specified Accounting Log; they are used as input for the members that produce Accounting Log reports and graphics.

The SAS data sets in the ACT library are named ACT.Annn, where nnn corresponds to the record type. For example, the SAS data set named ACT.A000 contains Multi-User initialization data (record type 0). (The record type occurs at offset +4 in each Accounting Log record, as described in the *SYSTEM 2000 Product Support Manual.*) In addition, three other SAS data sets are created: ACT.ACTUTIL, ACT.TAPE, and ACT.MUSES.

You create the ACT data sets with the TTACT00 and TTACT01 members. By default, all Accounting Log records are extracted and stored in the data sets. You can select subsets of data to be extracted by modifying specific user exits invoked by TTACT01. (See **Create the SAS ACT Data Sets (TTACT01)** on page 3-5.)

SAS Data Set	Source of Data
ACT.A000	Multi-User initialization records (type 0).
ACT.A002	Accounting Log header records (type 2).
ACT.A003	Accounting Log trailer records (type 3).
ACT.A004	Accounting Log user termination records (type 4).
ACT.A005	Accounting Log PLEX segment records (type 5).
ACT.A006	Accounting Log SCF/TP segment records (type 6).
ACT.A007	Accounting Log lost data records (type 7).
ACT.A008	Accounting Log SCF/Batch segment records (type 8).
ACT.A012	Multi-User termination records (type 12).

continued on next page

SAS Data Set	Source of Data (continued)
ACT.MUSES	Multi-User session data collected from Accounting Log record types 0 and 12 along with transaction, I/O, and CPU time counts. (See also PDB.MUSES data set.)
ACT.TAPE	information about each Accounting Log tape read by the tuning tools system, for instance, low_date, high_date, record counts. (See also PDB.MUSES data set.)
ACT.ACTUTIL	ACTUTIL dump header and trailer information (Accounting Log record types 2 and 3). See also PDB.ACTUTIL data set.
ACT.GRAPH	summary data about ACT.A004 observations; created by TTACG01 for Accounting Log graphics members.

SAS Data Sets in the PDB Library

The data in the SAS PDB library represent summary data or historical data. Some SAS data sets in the ACT library have direct equivalents in the PDB library (MUSES, TAPE, and ACTUTIL). Other PDB data sets are historical summaries by day (PDB.DAY), by transaction (PDB.TRANS), or by transaction type (PDB.SCF_B and PDB.SCF_TP). The rest of the PDB data sets are summary or work data sets that are kept to facilitate restart and step independence.

SAS Data Set	Source of Data
PDB.MUSES	contains historical ACT.MUSES records from each Accounting Log that was processed by the tuning tools system. The TTACT02 member maintains this data set using data from the ACT.MUSES data set.
PDB.TAPE	contains historical ACT.TAPE records from each Accounting Log that was processed by the tuning tools system. The TTACT02 member maintains this data set using data from the ACT.TAPE data set.
PDB.ACTUTIL	contains historical ACT.ACTUTIL records from each Accounting Log that was processed by the tuning tools system. The TTACT02 member maintains this data set using data from the ACT.ACTUTIL data set.
PDB.SUM	contains output from PROC SUMMARY run on the ACT.A004 data set. The TTACT04 member maintains this data set. Saving the summary data avoids rerunning TTACT04 in later steps.
PDB.DAY	contains historical summary information organized by day. The TTACT05 member maintains this data set. The input SAS data set is PDB.SUM.
PDB.TRANS	contains historical summary information organized by transaction. The TTACT05 member maintains this data set. The input SAS data set is PDB.SUM.

continued on next page

SAS Data Set	Source of Data (continued)
PDB.DOGS	contains historical transactions exhibiting poor performance. The TTACT05 member maintains this data set. The input SAS data set is PDB.SUM.
PDB.SCF_B	contains historical SCF/Batch segment information organized by day. The TTACT07 member maintains this data set. The input SAS data sets are ACT.A004 and ACT.A008.
PDB.SCF_TP	contains historical SCF/TP segment information organized by day. The TTACT07 member maintains this data set. The input SAS data sets are ACT.A004 and ACT.A006.

Chapter 4

Diagnostic Log Tuning Tools

This chapter describes how to produce reports from data collected on the SYSTEM 2000 Multi-User Diagnostic Log. The Diagnostic Log tuning tools members were installed at your site with Release 11.6 of SYSTEM 2000 software. The members contain comments that show you how to modify default settings of various options. Also, sample JCL is provided. You can list and edit each member as necessary.

To produce the reports, you run members that

- extract the data from the Multi-User Diagnostic Log
- create the SAS data sets containing Diagnostic Log information
- generate the reports.

Diagnostic Log Reports on page 4-2 describes the members, the user-exits invoked, and the output generated. Output consists of reports and SAS data sets.

SAS Data Sets for the Diagnostic Log on page 4-12 discusses a Diagnostic Log utility member (TTDIA0C) that describes the contents of the DIA data sets. This section also lists the names of the SAS data sets on the DIA library with a brief comment about the information in each data set.

To run the members for the Diagnostic Log reports, you must have

- a Diagnostic Log from a SYSTEM 2000 Multi-User session
- the base SAS System.

DIAGNOSTIC LOG REPORTS

Member names can be up to eight characters long. Most member names follow the naming conventions shown here.

Characters 1 - 2	are TT, which indicates a tuning tools member.
Characters 3 - 5	are DIA for members related to the Diagnostic Log members. TTDIA members extract the Diagnostic Log data, create the SAS data sets, and generate reports.
Characters 6 - 7	are numeric if the member is normally run on a regular basis. If characters 6 and 7 are alphanumeric, the member will probably be used only occasionally, perhaps at installation time or to change defaults.
Character 8	is numeric if present. An eight-character name means the member is a user exit.

The members are discussed in the order you would normally run them. They produce the following reports:

Multi-User Event Reports (TTDIA02 member)
- Summary of Recorded Events
- High Water Marks and Counts
- User Waits
- Data Base Activity
- Workload Mix Report
- Summary of Unusual Conditions

Dump of the Diagnostic Log Records (TTDIA03 member)

Diagnostic Log Summary Reports (TTDIA04 member)
- Job Suspension Summary
- Command Suspension Summary
- Data Base Permissions/Suspension Summary
- Command/Data Base Permission Summary
- Job Interaction Summary

Pre-Allocate the DIA and SASLIB Libraries

Before you extract any data from the Diagnostic Log, you must pre-allocate the DIA and SASLIB libraries. The SAS data sets in the DIA library contain data extracted from the Diagnostic Log records. The SASLIB library contains formats for running the reports.

For sample JCL to pre-allocate these data libraries, see S2K.R116.SAMPLIB.

Build the Message Number Formats (TTDIA0A)

The TTDIA0A member builds the message number formats for the Diagnostic Log reports and stores the output on the SASLIB library. You must run this member before creating the SAS data sets for the Diagnostic Log. TTDIA0A calls user exit TTDIA0A0, which sets up the formats for the Diagnostic Log message numbers.

For sample JCL, see S2K.R116.SAMPLIB.

Create the SAS DIA Data Sets (TTDIA01)

The TTDIA01 member reads a Diagnostic Log and builds a data library of SAS data sets containing Diagnostic Log data. The name of this SAS library is DIA. See **SAS Data Sets for the Diagnostic Log** on page 4-12 for a description of the SAS data sets created by TTDIA01. After building the SAS data sets, you can run the TTDIA0C utility member to obtain a description of the files created (see **Describe the Diagnostic Log Data Sets (TTDIA0C)** on page 4-12).

TTDIA01 invokes the user exits shown below. You can list and edit these user exits if you want to reformat the data, change headers or footers, or select subsets of data.

TTACT0A2 specifies headers and footers.

TTDIA010 formats record data and time.

TTDnnnn controls the number of selected Diagnostic Log records, where nnnn is a specific message number written to the Diagnostic Log. There is a separate user exit for each message number. The message numbers correspond one-to-one with the SAS data set names on the DIA library. For example, user-exit TTD0212 controls the number of 0212 records stored in data set DIA.D0212. The user exits are

TTD0001 through TTD0020, TTD0031

TTD0100 through TTD0103

TTD0200 through TTD0217

TTD0300 through TTD0304

TTD0399.

Note: Record IDs 20 through 30 are treated as a single record type (record type 20).

The event data for these message numbers are described in the *SYSTEM 2000 Product Support Manual.*

For sample JCL, see S2K.R116.SAMPLIB.

Reports: Multi-User Events (TTDIA02)

The TTDIA02 member generates reports about Multi-User events. TTDIA02 invokes user exit TTDIA02, which you can list and edit if you want to specify your own headers and footers.

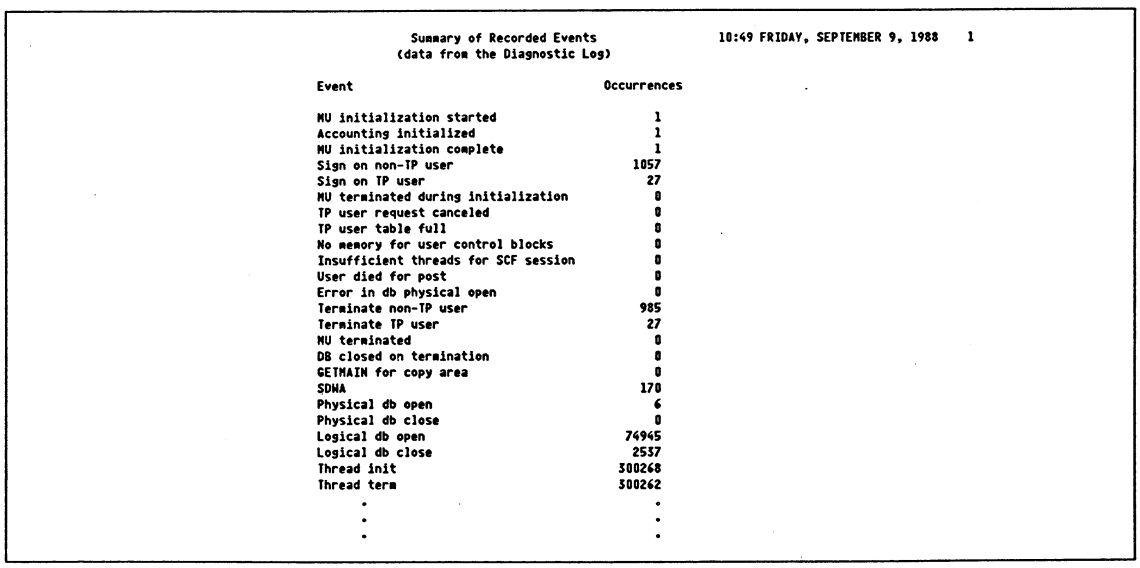
TTDIA02 writes the reports to the print units shown below.

Print Unit	Report
FT20F001	Summary of Recorded Events
FT21F001	High Water Marks and Counts
FT22F001	User Waits
FT23F001	Data Base Activity
FT24F001	Workload Mix
FT25F001	Summary of Unusual Conditions

The input to TTDIA02 comes from the SAS data sets on the DIA library. To capture the most complete set of data for these reports, specify the following LOGLEVEL parameters for the Multi-User session:

	UINIT	POPEN	LOPEN	TSTRT	TSPIO	USPND	TSPND	USEGM
FT20F001	X	X	X	X	X	X	X	X
FT21F001	X			X				
FT22F001						X	X	
FT23F001	X	X	X		X			
FT24F001							X	
FT25F001	X							

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.



```
                    Summary of Recorded Events                10:49 FRIDAY, SEPTEMBER 9, 1988    1
                    (data from the Diagnostic Log)

Event                                                  Occurrences

MU initialization started                                        1
Accounting initialized                                           1
MU initialization complete                                       1
Sign on non-TP user                                           1057
Sign on TP user                                                 27
MU terminated during initialization                              0
TP user request canceled                                         0
TP user table full                                               0
No memory for user control blocks                                0
Insufficient threads for SCF session                             0
User died for post                                               0
Error in db physical open                                        0
Terminate non-TP user                                          985
Terminate TP user                                               27
MU terminated                                                    0
DB closed on termination                                         0
GETMAIN for copy area                                            0
SDWA                                                           170
Physical db open                                                 6
Physical db close                                                0
Logical db open                                              74945
Logical db close                                              2537
Thread init                                                 300268
Thread term                                                 300262
      .                                                         .
      .                                                         .
      .                                                         .
```

Summary of Recorded Events
(print unit FT20F001)

```
                USERS= nn High Water Mark                                      8
               (data from the Diagnostic Log)             10:49 FRIDAY, SEPTEMBER 9, 1988

                 User    Occurrences
                  ID
                  57        22
                  58         9
                   .         .
                   .         .
                   .         .
```

```
              TPTHREADS = nn High Water Mark                                   8
               (data from the Diagnostic Log)             10:49 FRIDAY, SEPTEMBER 9, 1988

                 User    Occurrences
                  ID
                  1         25
                  2          2
                            ==
                            27
```

```
          Count of Times that TPSCRUN Was Exceeded                             8
               (data from the Diagnostic Log)             10:49 FRIDAY, SEPTEMBER 9, 1988

                       Occurrences

                            1
```

```
        Count of Times That COPYAREAs Were Insufficient                        8
               (data from the Diagnostic Log)             10:49 FRIDAY, SEPTEMBER 9, 1988

                 Size    Occurrences

                 2000        1
                             =
                             1
```

```
                THREADS = NN High Water Mark                                   8
               (data from the Diagnostic Log)             10:49 FRIDAY, SEPTEMBER 9, 1988

                Thread    Occurrences
                Number
                  1           1
                              =
                              1
```

```
  Count of Times That SCF Session Failed Due to Thread Shortage                8
               (data from the Diagnostic Log)             10:49 FRIDAY, SEPTEMBER 9, 1988

                       Occurrences

                            1
```

High Water Mark and Count Reports
(print unit FT21F001)

```
             User Wait for Data Base Contention           10:49 FRIDAY, SEPTEMBER 9, 1988   10
               (data from the Diagnostic Log)

        Permission    Data          Occurrences
                      Base
                      Name

          FRAME       LIBRARY          1768
          HOLD        EMPLOYEE           65
          UPDATE      EMPLOYEE         4393
            .            .                .
            .            .                .
            .            .                .
```

```
                   Summary of User Waits                  10:49 FRIDAY, SEPTEMBER 9, 1988   10
               (data from the Diagnostic Log)

        Event                            Occurrences

        Wait on buffer                        1
        Wait on database                     14
        Wait on overlay                       1
        Wait on tape                          1
        Wait for I/O                       1391
        Wait for thread in pad                1
        Wait in thread for Update Log      1229
        Wait on db contention             50098
                                          =====
                                          52736
```

User Wait Reports
(print unit FT22F001)

```
                    Summary of Data Base Open and Close          10:49 FRIDAY, SEPTEMBER 9, 1988   14
                      (data from the Diagnostic Log)

Event                              Data          Occurrences
                                   Base
                                   Name

Physical db open                   LIBRARY              1
Physical db open                   LIBCOPY              1
Physical db open                   EMPLOYEE             1
Physical db open                   CARS                 1
Physical db open                   COMPANY              1
Physical db open                   SALES                1
Physical db close                  TRUCKS               1
Logical db open                    LIBRARY            493
Logical db open                    LIBCOPY            497
Logical db open                    EMPLOYEE             8
Logical db open                    CARS                 1
Logical db close                   LIBRARY            334
Logical db close                   LIBCOPY              1
Logical db close                   EMPLOYEE             1
Logical db close                   CARS                97
Logical db close                   COMPANY            565
Logical db close                   SALES                1
DB closed on termination           PUBLISH              1
Reset Rollback Log                 PUBLISH              1
                                                      ====
                                                      2007

                    I/O Activity                         10:49 FRIDAY, SEPTEMBER 9, 1988   14
                      (data from the Diagnostic Log)

Fileref     IO    Occurrences

LIBRARY1    I            1
LIBCOPY7    I            1
EMPLOYEE1   I            1
EMPLOYEE1   O            2
EMPLOYEE2   I            1
EMPLOYEE6   I           30
EMPLOYEE6   O           41
EMPLOYEE7   I            1
EMPLOYEE7   O            3
EMPLOYEE8   O           40
      .     .            .
      .     .            .
      .     .            .

                  I/O Activity by Data Base              10:49 FRIDAY, SEPTEMBER 9, 1988   14
                    (data from the Diagnostic Log)

    Fileref    Occurrences

    LIBRARY          2
    EMPLOYEE       158
       .             .
       .             .
       .             .

                Rollback Log Resets by Data Base         10:49 FRIDAY, SEPTEMBER 9, 1988   14
                  (data from the Diagnostic Log)

      Data      Occurrences
      Base
      Name

   PASSWORD          1
                     =
                     1
```

Data Base Activity Reports
(print unit FT23F001)

```
                    Workload Mix                          10:49 FRIDAY, SEPTEMBER 9, 1988   16
             (data from the Diagnostic Log)

Event                                  Occurrences

PLEX commands                                1
SCF/tp segments                            310
SCF/non-tp Command File records              3
                                           ===
                                           314
```

```
                    SYSTEM 2000 Command Usage             10:49 FRIDAY, SEPTEMBER 9, 1988   16
             (data from the Diagnostic Log)

----------------------------------------------------- OPcode=getl where ------------------------------------------------------

                    Data       Occurrences
                    Base
                    Name

                  PASSWORD          1
                                    =
                                    1
```

Workload Mix Reports
(print unit FT24F001)

```
                    Summary of Unusual Conditions         10:49 FRIDAY, SEPTEMBER 9, 1988   17
             (data from the Diagnostic Log)

Event                                      Occurrences

MU terminated during initialization              1
TP user table full                               1
No memory for user control blocks                1
Insufficient threads for SCF session             1
User died for post                               1
Error in db physical open                        1
GETMAIN for copy area                            1
SDWA                                           170
                                               ===
                                               177
```

Summary of Unusual Conditions
(print unit FT25F001)

Reports: Diagnostic Log Records (TTDIA03)

The TTDIA03 member displays the data stored in the DIA library's SAS data sets. You must execute the TTDIA0A and TTDIA01 members before running these reports. TTDIA03 invokes user exit TTACT0A2, which you can list and edit to specify your own headers and footers. Also, user exit TTDIA030 can be used to limit the dump of the Diagnostic Log.

The reports are written to print unit FT30F001.

To capture the most complete set of data for these reports, specify the following LOGLEVEL parameters for the Multi-User session:

	UINIT	POPEN	LOPEN	TSTRT	TSPIO	USPND	TSPND	USEGM
FT30F001	X	X	X	X	X	X	X	X

For sample JCL, see S2K.R116.SAMPLIB.

```
                                    Dump SYSTEM 2000 Diagnostic Log          15:13 THURSDAY, SEPTEMBER 8, 1988    8

Sequence     Record Date/Time       Job Name   User   Thread   Record                                Data        Size   Text
 Number                                         ID    Number    Type                                 Base
                                                                                                     Name

   1      06MAY1988:00:30:27.19                  0      00     mu initialization started                          .
   2      06MAY1988:00:30:27.19                  0      00     accounting initialized                             .
   3      06MAY1988:00:30:27.19                  0      00     mu initialization complete                         .
   4      06MAY1988:00:30:27.20     CICSFACT     6      00     sign on non-tp user                                .
   8      06MAY1988:00:30:27.20     CICSFACT     6      01     physical db open                      PASWORD      .
   9      06MAY1988:00:30:27.20     CICSFACT     6      01     logical db open                       PASWORD      .
  10      06MAY1988:00:30:27.20     CICSFACT     6      01     wait for physical io in thread                     .
  11      06MAY1988:00:30:27.20     CICSFACT     6      01     disp after physical io                             .
   .           .         .           .       .       .                .                        .            .
   .           .         .           .       .       .                .                        .            .
   .           .         .           .       .       .                .                        .            .


Priority  # of Dispatches   Pool  Permission  Overlay  Fileref   DB Page   IO  Pad  OPcode  Subschema  Text  User Dispatched
                                                                  #             #           Record


  4040                                                            404040              .
  4040                                                            404040              .
  4040                                                            404040              .
  4040                                                            404040              .
  4040                                                            404040              .
  4040                                                            404040              .
  4040                                                 PASWORD1   F0F0F0    I         .
  F0F0          00                                                404040              .
   .             .                                        .          .      .         .
   .             .                                        .          .      .         .
   .             .                                        .          .      .         .
```

Dump SYSTEM 2000 Diagnostic Log
(print unit FT30F001)

Reports: Diagnostic Log Summaries (TTDIA04)

The TTDIA04 member generates summary reports about job, command, and data base suspension, data base and command permissions, and job interaction. You must execute the TTDIA0A and TTDIA01 members before executing the TTDIA04 member. You can list and edit the TTACT0A2 user exit to specify your own headers and footers.

TTDIA04 writes the reports to the print units shown below.

Print Unit	Report
FT40F001	Job Suspension Summary
FT41F001	Command Suspension Summary
FT42F001	Data Base Permissions/Suspension Summary
FT43F001	Command/Data Base Permission Summary
FT44F001	Job Interaction Summary

To capture the most complete set of data for each of these reports, specify the following LOGLEVEL parameters for the Multi-User session:

	UINIT	POPEN	LOPEN	TSTRT	TSPIO	USPND	TSPND	USEGM
FT40F001	X					X		X
FT41F001				X		X		
FT42F001						X	X	
FT43F001						X		X
FT44F001								X

For sample JCL, see S2K.R116.SAMPLIB. To omit one or more of the reports, comment out the DD statements for those print units in the JCL.

Job Suspension Summary 10:49 FRIDAY, SEPTEMBER 9, 1988 18
(data from the Diagnostic Log)

Job Name	Number of Job Starts	Number of Commands	Commands Suspended	Number of Suspensions	Percentage Suspended	Mean Elapse Time of Suspensions
X100	2	62	0	0	0.00	0:00:00.00
X105	1	10	1	1	10.00	0:51:27.82
X218	1	300	15	17	.33	0:00:55.17
X309	1	174	26	86	.57	0:00:55.14
X313	4	192	19	44	.52	0:00:45.66
X416	3	138	20	72	.72	0:00:48.69
X521	2	103	17	69	.97	0:01:10.92
X524	1	2	0	0	0.00	0:00:00.00
X529	5	90	6	8	1.11	0:00:07.53
X532	1	9	0	0	0.00	0:00:00.00
X537	1	9	0	0	0.00	0:00:00.00
X540	1	11	1	1	9.09	0:00:03.21
X545	1	127	16	31	0.79	0:00:22.56
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.

Job Suspension Summary
(print unit FT40F001)

Command Suspension Summary 10:49 FRIDAY, SEPTEMBER 9, 1988 21
(data from the Diagnostic Log)

Opcode	Number of Commands	Commands Suspended	Number of Suspensions	Percentage Suspended	Mean Elapsed Time of Suspensions
getl/hold where	127	16	46	12.60	0:01:25.19
getd/hold first	4	0	0	0.00	0:00:00:00
getl/where	661	36	40	5.45	0:00:19:44
geta	25	1	1	4.00	0:00:25:20
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

Command Suspension Summary
(print unit FT41F001)

Data Base Permissions/Suspension Summary 10:49 FRIDAY, SEPTEMBER 9, 1988 22
(data from the Diagnostic Log)

Permission	Number of Suspensions	Mean Elapsed Time to Grant Request
FRAME	1,836	0:00:00.75
HOLD	12,385	0:00:24.69
HOLDL	1,372	-0:05:31.11
LHSES	1,307	-0:02:43.63
NKUPD	2,798	0:09:38.30
RETR	2,971	-0:00:28.86
UPDATE	7,441	-0:01:19.44

Data Base Permissions/Suspension Summary
(print unit FT42F001)

Command/Data Base Permission Summary 10:49 FRIDAY, SEPTEMBER 9, 1988 23
(data from the Diagnostic Log)

TABLE OF OP BY REQ

OP(Command)	REQ(Permission)						
FREQUENCY	FRAME	HOLD	HOLDL	LHSES	NKUPD	RETR	UPDATE	TOTAL
getl first	0	91	0	5	5	15	823	939
getl where	1836	12294	1372	1302	2795	2958	6618	29175
TOTAL	1836	12385	1372	1307	2798	2971	7441	30110

FREQUENCY MISSING = 3201

Command/Data Base Permission Summary
(print unit FT43F001)

Job Interaction Summary (data from the Diagnostic Log) 10:49 FRIDAY, SEPTEMBER 9, 1988 24

TABLE OF JOB_NAME BY USER

JOB_NAME(Releasing Job) USER(Released Job)

FREQUENCY / COL PCT	XA02	X500	X505	X508	X509	X513	X516	X521	X524	X529	X532	X537	TOTAL
XA0212ME	0	1	0	0	0	0	0	0	0	0	0	0	4
	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
XA0213ME	0	655	0	5	0	0	7	0	560	1	484	0	6650
	0.00	67.95	0.00	2.53	0.00	0.00	2.13	0.00	64.52	0.24	61.58	0.00	
X500	1	0	7	3	2	5	4	3	4	10	6	6	382
	0.11	0.00	2.19	1.52	2.86	1.52	1.22	1.18	0.46	2.43	0.76	1.43	
X505	0	1	0	0	7	5	3	4	2	2	1	8	280
	0.00	0.10	0.00	0.00	10.00	1.52	0.91	1.57	0.23	0.49	0.13	1.90	
X508	6	1	1	0	0	6	4	0	4	4	6	4	253
	0.64	0.10	0.31	0.00	0.00	1.83	1.22	0.00	0.46	0.97	0.76	0.95	
X509	0	8	6	0	0	8	0	0	6	8	0	7	219
	0.00	0.83	1.88	0.00	0.00	2.44	0.00	0.00	0.69	1.94	0.00	1.66	
X513	1	0	6	0	0	0	1	3	0	4	0	8	224
	0.11	0.00	1.88	0.00	0.00	0.00	0.30	1.18	0.00	0.97	0.00	1.90	
X516	26	2	2	5	0	2	0	6	11	3	6	18	342
	2.78	0.21	0.63	2.53	0.00	0.61	0.00	2.36	1.27	0.73	0.76	4.28	
X521	0	1	3	1	0	4	0	0	4	11	6	10	278
	0.00	0.10	0.94	0.51	0.00	1.22	0.00	0.00	0.46	2.67	0.76	2.38	
X524	18	9	7	4	3	5	16	3	0	11	18	6	557
	1.93	0.93	2.19	2.02	4.29	1.52	4.88	1.18	0.00	2.67	2.29	1.43	
X529	0	4	1	2	1	9	3	7	5	0	3	17	335
	0.00	0.41	0.31	1.01	1.43	2.74	0.91	2.76	0.58	0.00	0.38	4.04	
X532	4	15	0	13	0	16	10	9	16	5	0	8	429
	0.43	1.56	0.00	6.57	0.00	4.88	3.05	3.54	1.84	1.21	0.00	1.90	
X537	0	3	10	1	2	10	2	7	5	17	1	0	282
	0.00	0.31	3.13	0.51	2.86	3.05	0.61	2.76	0.58	4.13	0.13	0.00	
TOTAL	935	964	320	198	70	328	328	254	868	412	786	421	30096

(CONTINUED)

Job Interaction Summary
(print unit FT44F001)

SAS DATA SETS FOR THE DIAGNOSTIC LOG

Describe the Diagnostic Log Data Sets (TTDIA0C)

The TTDIA0C member invokes the SAS CONTENTS procedure for all SAS data sets on the DIA library. The output from PROC CONTENTS includes information such as the file's name, size, type, and creation date as well as information about the variables in the SAS data sets. You must run the TTDIA0A and TTDIA01 members before you run TTDIA0C.

For sample JCL, see S2K.R116.SAMPLIB.

Overview of Diagnostic Log Data Sets

The Diagnostic Log tuning tools system creates many SAS data sets, which are stored in the DIA library. The DIA library contains one SAS data set for each type of Diagnostic Log message. The data sets are named DIA.Dnnnn, where nnnn corresponds to a message number on the Diagnostic Log.

The SAS data sets in the DIA library are listed here and briefly annotated. For more details about the variables in these data sets, run the TTDIA0C utility member, which invokes the CONTENTS procedure for all data sets in the DIA library. Message numbers and the event data are described in detail in the *SYSTEM 2000 Product Support Manual.*

SAS Data Set	Subject of Messages
DIA.D0000	Diagnostic Log reset
DIA.D0001	Multi-User initialization started
DIA.D0002	Accounting initialized
DIA.D0003	Multi-User initialization complete
DIA.D0004	Sign on for non-TP user
DIA.D0005	Sign on for TP user
DIA.D0006	Multi-User terminated during initialization
DIA.D0007	TP user request canceled
DIA.D0008	TP user table full
DIA.D0009	No memory for user control blocks
DIA.D0010	SCF session not allowed, not enough threads

continued on next page

SAS Data Set	Subject of Messages (Continued)
DIA.D0011	User died for post
DIA.D0012	Error in physical open of data base
DIA.D0013	Terminate non-TP user
DIA.D0014	Terminate SCF/TP user
DIA.D0015	Multi-User terminated
DIA.D0016	Data base closed on termination
DIA.D0017	GETMAIN for copy area
DIA.D0020	SDWA (contains record IDs 20 through 30)
DIA.D0031	LOGLEVEL modified
DIA.D0100	Physical open for data base
DIA.D0101	Physical close for data base
DIA.D0102	Logical open for data base
DIA.D0103	Logical close for data base
DIA.D0200	Thread initialized
DIA.D0201	Thread terminated
DIA.D0202	Wait for buffer
DIA.D0203	Wait for data base
DIA.D0204	Wait for overlay
DIA.D0205	Wait for tape
DIA.D0206	Dispatch after buffer or I/O wait
DIA.D0207	Dispatch after data base wait
DIA.D0208	Dispatch after overlay wait
DIA.D0209	Dispatch after tape wait
DIA.D0210	Wait for I/O
DIA.D0211	Wait for physical I/O in thread

continued on next page

SAS Data Set	Subject of Messages (Continued)
DIA.D0212	Dispatch after physical I/O in thread
DIA.D0213	Reset Rollback Log
DIA.D0214	Wait for pad allocation units
DIA.D0215	Dispatch after pad allocation wait
DIA.D0216	Wait in thread for indirect Update Log
DIA.D0217	Dispatch after indirect Update Log wait
DIA.D0300	PLEX segment start
DIA.D0301	SCF/TP segment start
DIA.D0302	SCF/non-TP segment start
DIA.D0303	Wait for data base contention
DIA.D0304	Dispatch after data base contention
DIA.D0399	Secondary data base names on FRAME command

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