207

CICS update

February 2003

In this issue

CICS Update

Published by

Xephon
27-35 London Road
Newbury
Berkshire RG14 1JL
England
Telephone: 01635 38342
From USA: 01144 1635 38342
E-mail: trevore@xephon.com

North American office

Xephon
PO Box 350100
Westminster, CO 80035-0100
USA
Telephone: 303 410 9344

Subscriptions and back-issues

A year's subscription to *CICS Update*, comprising twelve monthly issues, costs £175.00 in the UK; $270.00 in the USA and Canada; £181.00 in Europe; £187.00 in Australasia and Japan; and £185.50 elsewhere. In all cases the price includes postage. Individual issues, starting with the December 1999 issue, are available separately to subscribers for £16.00 ($24.00) each including postage.

CICS Update on-line

Code from *CICS Update*, and complete issues in Acrobat PDF format, can be downloaded from our Web site at http://www.xephon.com/cics; you will need to supply a word from the printed issue.

Editor

Trevor Eddolls

Disclaimer

Readers are cautioned that, although the information in this journal is presented in good faith, neither Xephon nor the organizations or individuals that supplied information in this journal give any warranty or make any representations as to the accuracy of the material it contains. Neither Xephon nor the contributing organizations or individuals accept any liability of any kind howsoever arising out of the use of such material. Readers should satisfy themselves as to the correctness and relevance to their circumstances of all advice, information, code, JCL, and other contents of this journal before making any use of it.

Contributions

When Xephon is given copyright, articles published in *CICS Update* are paid for at the rate of £170 ($260) per 1000 words and £100 ($160) per 100 lines of code for the first 200 lines of original material. The remaining code is paid for at the rate of £50 ($80) per 100 lines. In addition, there is a flat fee of £30 ($50) per article. To find out more about contributing an article, without any obligation, please download a copy of our *Notes for Contributors* from www.xephon.com/nfc.

Printed in England.

Communication between batch and CICS

It is often necessary to communicate between a CICS transaction and a batch process, or for a CICS transaction to launch a batch process (a JOB).

It is possible to link a batch program with a CICS program by using the EXCI interface. However, if the process is long or costly, it is preferable to launch a CICS transaction from batch, and to separate both processes.

It is also possible to launch a batch JOB from a CICS program. This makes it possible to execute a process with a lower priority in batch and avoid penalizing the general response times of CICS.

LAUNCH A CICS TRANSACTION FROM BATCH

To launch a CICS transaction from batch, the JCL must include the following MVS commands:

```
//BTCHCICS JOB (Ø,Ø), .......
//*
//PAS   EXEC   PGM=IEFBR14
//  COMMAND 'F CICSX,TTTT'
//*
```

In this example, the command is executed immediately by JES2, without waiting for the completion of PAS. An EXEC is necessary to avoid the message “JOB NOT RUN - JCL ERROR”. In the command, TTTT it is the transaction to execute in CICSX. The command must be placed between quotes.

So that the command is executed to the completion of a step, it must be written in the following form:

```
//JOBBTCH   JOB ......
//PAS1    EXEC ......
//   --------
//PAS2    EXEC ....
//   --------
//PAS3    EXEC  PGM=IEBGENER
//SYSPRINT    DD   SYSOUT=X
```

```
//SYSUT1  DD   DATA,DLM=@@
//*
//BTCHCICS  JOB ……
//PAS       EXEC  PGM=IEFBR14
//  COMMAND 'F CICSX,TTTT'
@@
//SYSIN   DD   DUMMY
//SYSUT2  DD   SYSOUT=(A,INTRDR)
```

Thus the JOB BTCHCICS is sent to the internal reader in PAS3 and is executed after PAS2.

So that CICS accepts commands from batch, one must define the terminal CJCL that supplies CICS in the group DFH$CNSL of DFHCSD.

If the transaction has restricted access to a given user, ie it requires a SIGN-ON, the following will be added as the first command with the transaction CESN:

```
//BTCHCICS  JOB ……
//PAS  EXEC  PGM=IEFBR14
//  COMMAND 'F CICSX,CESN USERID=UUUUUUUU,PS=PPPPPPPP'
//  COMMAND 'F CICSX,TTTT'
```

To avoid having the password appear in the JCL, it can be coded using only the userid:

```
 //  COMMAND 'F CICSX,CESN USERID=UUUUUUUU'
```

CICS will ask the operator to enter the password on the console:

```
@NN DFHCE3523   CICSX PLEASE TYPE YOUR PASSWORD.
```

The answer on the console would be the password, ie:

```
NN PPPPPPPP
```

It is also possible to assign a userid to the terminal CJCL.

Data can be sent to the CICS program from batch by adding the following command:

```
//  COMMAND 'F CICSX,TTTT,DATA TO RECEIVE BY THE PROGRAM'
```

The program CICS will use is:

```
EXEC CICS RECEIVE INTO(W-DATOS) LENGTH(W-LONG) END-EXEC
```

and W-DATOS is defined, for example, by:

```
Ø1   W-DATOS  VALUE SPACES..
         Ø2   COD-TRANS     PIC X(4).
         Ø2   FILLER   PIC X.
         Ø2   DATA     PIC X(4Ø).
     Ø1   W-LONG            PIC S99 COMP  VALUE Ø.
```

The program can send a message (OS/390 SYSLOG) to the terminal CJCL, for example :

```
     Ø1   W-MESSAGE     PIC X(22)
                        VALUE  .TRANS TTTT STARTED OK..
---------
     MOVE 22  TO W-LONG
     EXEC CICS SEND TEXT FROM(W-MESSAGE) LENGTH(W-LONG)
         TERMINAL FREEKB ALARM ERASE END-EXEC
```

Another transaction that can be sent from batch by a command is the CICS transaction CMSG, which sends a message from a JOB to one terminal or to several terminals.

An example is to notify a terminal of the successful completion of a batch process:

```
//JOBBTCH   JOB ......
     //   --------
     //   --------
     //IFOK   IF RC = Ø  THEN
//PASOK    EXEC  PGM=IEBGENER
     //SYSPRINT    DD   SYSOUT=X
     //SYSUT1  DD   DATA,DLM=@@
     //*
     //BTCHCICS  JOB ……
     //PAS        EXEC  PGM=IEFBR14
     // COMMAND 'F CICSX,CMSG MSG=''Job JOBBTCH OK'',R=TERM,SEND'
     @@
     //SYSIN   DD   DUMMY
     //SYSUT2  DD   SYSOUT=(A,INTRDR)
     //IFOKEND    ENDIF
```

The CICS reply is:

```
+M R S OK  MESSAGE HAS BEEN ROUTED
```

Error messages that occur most frequently are described below.

If the CICS does not exist:

```
IEE341I CICSX             NOT ACTIVE
```

If the transaction does not exist:

```
DFHAC2ØØ1  CICSX TRANSACTION 'TTTT' IS NOT RECOGNIZED. CHECK THAT THE
TRANSACTION NAME IS CORRECT.
```

If the transaction is disabled:

```
DFHAC2ØØ8  CICSX TRANSACTION TTTT HAS BEEN DISABLED AND CANNOT BE USED.
```

LAUNCH A BATCH JOB FROM CICS

To launch a batch JOB from CICS one must define a TD QUEUE EXTRAPARTITION and write to it the JCL to execute in JES2.

The definition of a TD QUEUE is:

```
CEDA  View TDqueue( BTCH )
  TDqueue         : BTCH
  Group           : DCTGEN
  DEscription     :
  TYPE            : Extra               Extra | INTra | INDirect
 EXTRA PARTITION PARAMETERS
  DAtabuffers     : ØØ1                 1-255
  DDname          : JOBBTCH
  DSname          :
  Sysoutclass     :
  Erroroption     : Ignore              Ignore | Skip
  Opentime        : Initial             Initial | Deferred
  REWind          :                     Leave | Reread
  TYPEFile        : Output              Input | Output | Rdback
  RECORDSize      : ØØØ8Ø               Ø-32767
  BLOCKSize       : ØØØ8Ø               Ø-32767
  RECORDFormat    : Fixed               Fixed | Variable
  BLOCKFormat     : Blocked             Blocked | Unblocked
  Printcontrol    :                     A | M
  DIsposition     : Shr                 Shr | Old | Mod
 INTRA PARTITION PARAMETERS
    ……….
```

Add in the PROCEDURE to start in CICS a DD with a name equal to the parameter DDNAME of the defined TDQUEUE:

```
    //JOBBTCH  DD SYSOUT=(A,INTRDR),
    //        DCB=(RECFM=FB,LRECL=8Ø,BLKSIZE=8Ø)
```

To make it more dynamic to launch a batch JOB, it is preferable to launch a standard PROCEDURE that reads a member of a library with the JCL to execute. In this way the programs contain the name of the member to launch and this avoids having to modify the programs after each change to the JCL.

The CICS program that writes in the TDQUEUE will be more or less as shown below.

In the WORKING STORAGE SECTION put:

```
Ø3  W-JCLJOB             PIC X(8Ø)  VALUE
'//JLAUNCH  JOB (Ø,Ø),CICSBATCH,CLASS=A,MSGCLASS=Y'.
         Ø3  W-JCLEXEC          PIC X(8Ø)  VALUE
              '//PAS EXEC PGM=IEFBR14'.
Ø3   W-JCLSTRT.
Ø5   FILLER            PIC X(14)    VALUE '  S PLAUNCH,J='.
Ø5   W-MEMBER   PIC X(8)      VALUE SPACES.
Ø5  FILLER             PIC X(58)    VALUE SPACES.
         Ø3   W-JCLEOF            PIC X(8Ø)     VALUE '/*EOF'.
```

In the PROCEDURE DIVISION put:

```
         MOVE +8Ø TO W-LONG.
         MOVE 'name of member'  TO W-MEMBER.
         EXEC CICS WRITEQ TD QUEUE(W-CUA) FROM(W-JCLJOB)
         LENGTH(W-LONG)   END-EXEC.
         EXEC CICS WRITEQ TD QUEUE(W-CUA) FROM(W-JCLEXEC)
         LENGTH(W-LONG)   END-EXEC.
         EXEC CICS WRITEQ TD QUEUE(W-CUA) FROM(W-ARRANQUE)
         LENGTH(W-LONG)   END-EXEC.
         EXEC CICS WRITEQ TD QUEUE(W-CUA) FROM(W-JCLEOF)
         LENGTH(W-LONG)   END-EXEC.
         EXEC CICS WRITEQ TD QUEUE(W-CUA) FROM(W-JCLEOF)
         LENGTH(W-LONG)   END-EXEC.
```

This will launch a batch JOB JLAUNCH, which starts the PROC PLAUNCH. The command with the data W-JCLEOF is sent twice to force the execution of the JOB in the internal reader immediately.

The PROC PLAUNCH is:

```
         //PROD   PROC  J=MEMBER
//PASO1 EXEC PGM=IEBGENER
//SYSPRINT    DD SYSOUT=Y
//SYSUT1 DD DSN=JCL.LIBRARY.DATA(&J),DISP=SHR
//SYSIN   DD DUMMY
//SYSUT2 DD SYSOUT=(A,INTRDR)
```

where JCL.LIBRARY.DATA is the dataset where each member is a JOB.

In the OS/390 SYSLOG the following messages will appear:

```
$HASP1ØØ JLAUNCH   ON INTRDR  CICSBATCH  FROM STCØ1998 CICSX
```

and:

```
IEFC165I // S  PLAUNCH,J=MEMBER
```

The JOB in member is executed afterwards.

Juan Tormo
Systems Manager
Sidmed SA (Spain)

CICSPlex SM API – REXX EXECs (run-time interface)

INTRODUCTION

The CICSPlex SM Applications Programming Interface (API) is an exceptionally versatile interface for the management of CICS regions, CICS resources, and CICSPlex SM itself.

What makes the CICSPlex SM API so versatile and flexible is the ability to specify a context, a scope within the context, and criteria within the scope.

The context is the name of a CICSPlex SM Address Space (CMAS) or CICSplex.

If the context is a CICSplex, the scope further qualifies the context by specifying that the scope is the CICSplex itself, a CICS system group, or a specific CICS system. If the context is a CMAS, the scope has no meaning and is ignored.

The criteria option enables the filtering of resource tables using simple expressions, eg for a PROGRAM resource:

```
PROGRAM=PROG1.
```

and complex, compound logical expressions, eg for a LOCTRAN resource:

```
(TRANID=P* AND PROGRAM=PROG1 AND STATUS=ENABLED) AND
((USECOUNT>Ø AND STGVCNT>Ø) OR NOT RESTARTCNT=Ø).
```

See *CICSPlex SM Resource Tables Reference* for details of the possible attributes for each resource table. The attributes are obtained from a number of sources – CICSPlex SM services, CICS Systems Programming Interface (SPI) INQUIRE and STATISTICS, and also CICS Monitoring Facility (CMF) performance class records.

The ability to specify filter expressions is an enormous improvement when compared with the CICS SPI, where for example you have to ‘browse’ through all the resource table entries, compare the fields yourself, and, when you have found what you are looking for, issue a SET command. With the CICSPlex SM API you can select based on your criteria, and process the required action in a single command. This makes programming with the CICSPlex SM API simpler and also enables you to easily write very ‘open’ and flexible programs.

The CICSPlex SM API has two interfaces – a command-level interface for programs written in Assembler, PL/I, COBOL, or C, and a run-time interface, which supports programs written as REXX EXECs.

This article concentrates on programs written as REXX EXECs for the run-time interface.

THE RUN-TIME INTERFACE

The CICSPlex SM API run-time interface is supplied with CICSPlex SM as a REXX function package and a host command. For information about installing the REXX function package and host command environment see *CICS Transaction Server for OS/390: Installation Guide*.

There was an article in *CICS Update* In January 2002 by Dr Paul Johnson about the CICSPlex SM API run-time interface (*CICSPlex SM API program written in REXX*) and there is also a CICS SupportPac *CS13 – CICSPlex SM Sample API* by Iain Coles.

One advantage of the run-time interface is that it is ideal for experimenting with the CICSPlex SM API – you can write your REXX and execute it immediately for immediate results. Some of the REXX EXECs in this article were later re-written as Assembler programs, so they were, to a certain extent, a development ‘stepping stone’ to test that the CICSPlex SM API commands were achieving the desired results.

THE REXX EXECS

There are four external subroutines, which are used by all the

REXX EXECs:

- CPSMINIT – initialize the CICSPlex SM API environment
- CPSMCONN – connect to CICSPlex SM
- CPSMDISC – disconnect from CICSPlex SM
- CPSMTERM – terminate the CICSPlex SM API environment.

There are seven main REXX EXECs:

- CPSMTIME – performs RESETTIME for CICS regions
- CPSMTASK – displays CICS task information
- CPSMTRNC – displays CICS transaction class information
- CPSMTSQI – displays CICS temporary storage queue (TSQ) information
- CPSMTSQD – deletes CICS TSQs
- CPSMNEWC – performs CICS program PHASEIN
- CPSMAPGM – performs CICS program PHASEIN for all ‘application’.

CPSMINIT

```
/****************************** REXX *********************************/
/*  MODULE NAME : CPSMINIT                                           */
/*  MODULE TYPE : REXX Executable (external subroutine)              */
/*  DESCRIPTION : CICSPlex SM  -  Initialize REXX/API                */
/*                Initializes the CICSPlex SM REXX/API environment.  */
/*  INVOCATION  : CPSMINIT                                           */
/*  RETURN      : Parameters returned in the variable "result":-     */
/*                retc      = return code                            */
/*********************************************************************/
Trace
rexx_name = 'CPSMINIT'
retc = Ø
api = EYUINIT()
if api <> Ø
  then
    do
      msg = 'Failure initializing CPSM REXX/API environment. RC='api
      say rexx_name msg
      retc = 16
    end
return retc
```

CPSMCONN

CPSMCONN was written for the release of CICSPlex SM supplied as a component of CICS Transaction Server for OS/390 Version 1 Release 3. If you have a later release of CICSPlex SM and require access to additional resource table attributes available in that later release, you will have to change the VERSION option of the CONNECT command in CPSMCONN.

```
/******************************* REXX *********************************/
/*  MODULE NAME : CPSMCONN                                            */
/*  MODULE TYPE : REXX Executable (external subroutine)               */
/*  DESCRIPTION : CICSPlex SM  -  CONNECT                             */
/*                Establishes a connection to CICSPlex SM using       */
/*                the context and scope provided at invocation.       */
/*  INVOCATION  : CPSMCONN w_context, w_scope                         */
/*                w_context = name of a CMAS or CICSplex              */
/*                w_scope   = name of CICSplex, CICS system group     */
/*                            or CICS system within w_context         */
/*  RETURN      : Parameters returned in the variable "result":-      */
/*                retc      = return code                             */
/*                w_thread  = CICSPlex SM token                       */
/**********************************************************************/
Trace
rexx_name = 'CPSMCONN'
retc = Ø
Parse Upper Arg w_context, w_scope

Address CPSM 'CONNECT CONTEXT('w_context')',
             'SCOPE('w_scope')',
             'THREAD(w_thread)',
             'VERSION(Ø14Ø)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK)
  then
    do
      msg = 'Failure CONNECTing to CPSM:'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
    end
result = retc w_thread
return result
```

CPSMDISC

```
/****************************** REXX *********************************/
/*  MODULE NAME : CPSMDISC                                           */
/*  MODULE TYPE : REXX Executable (external subroutine)              */
/*  DESCRIPTION : CICSPlex SM  -  DISCONNECT                         */
/*                Disconnects from CICSPlex SM using the thread      */
/*                specified at invocation.                           */
/*  INVOCATION  : CPSMDISC w_thread                                  */
/*                w_thread  = CICSPlex SM token                      */
/*  RETURN      : Parameters returned in the variable "result":-     */
/*                retc      = return code                            */
/*********************************************************************/
Trace
rexx_name = 'CPSMDISC'
retc = Ø
Parse Upper Arg w_thread
Address CPSM 'DISCONNECT THREAD(w_thread)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK)
  then
    do
      msg = 'Failure DISCONNECTing from CPSM:'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
    end
return retc
```

CPSMTERM

```
/****************************** REXX *********************************/
/*  MODULE NAME : CPSMTERM                                           */
/*  MODULE TYPE : REXX Executable (external subroutine)              */
/*  DESCRIPTION : CICSPlex SM  -  Terminate REXX/API                 */
/*                Terminates the CICSPlex SM REXX/API environment.   */
/*  INVOCATION  : CPSMTERM                                           */
/*  RETURN      : Parameters returned in the variable "result":-     */
/*                retc      = return code                            */
```

```
/**********************************************************************/
Trace
rexx_name = 'CPSMTERM'
retc = Ø
api = EYUTERM()
if api <> Ø
  then
    do
      msg = 'Failure terminating CPSM REXX/API environment. RC='api
      say rexx_name msg
      retc = 16
    end
return retc
```

CPSMTIME

CPSMTIME does not use criteria, it simply processes the EXEC CICS PERFORM RESETTIME command for the CICS regions within the context and scope specified.

```
/****************************** REXX **********************************/
/*  MODULE NAME : CPSMTIME                                            */
/*  MODULE TYPE : REXX Executable                                     */
/*  DESCRIPTION : CICSPlex SM - RESETTIME                             */
/*                Synchronizes the CICS date and time-of-day with     */
/*                the system date and time-of-day for the CICS        */
/*                regions within the context and scope specified.     */
/*                This is particularly useful for the transition      */
/*                from summer-time (daylight saving time) to          */
/*                winter-time and vice versa.                         */
/*  INVOCATION  : CPSMTIME w_context w_scope                          */
/*                w_context = name of a CMAS or CICSplex              */
/*                w_scope   = name of CICSplex, CICS system group     */
/*                            or CICS system within w_context         */
/*  RETURN      : retc      = return code                             */
/**********************************************************************/
Trace
rexx_name = 'CPSMTIME'
retc = Ø
w_context = ''
w_scope = ''
msg = 'Invoked on 'DATE()' at 'TIME()'.'
say rexx_name msg
Parse Upper Arg w_context w_scope .
if w_context = '' | w_scope = ''
  then
    do
      msg = 'Context and scope MUST be specified.'
      say rexx_name msg
      retc = 8
      signal RETURN_CONTROL
    end
msg = 'Invoked with parameters:-'
say rexx_name msg
msg = 'Context  : 'w_context
say rexx_name msg
msg = 'Scope    : 'w_scope
say rexx_name msg
/*********************************************************************/
/*  Call external subroutine CPSMINIT to initialize the CICSPlex SM  */
/*  REXX/API environment. If the return code from CPSMINIT isn't     */
/*  zero then terminate with the return code.                        */
/*********************************************************************/
Call CPSMINIT
  if result <> Ø
    then
      do
        retc = result
        Signal RETURN_CONTROL
      end
/*********************************************************************/
/*  Call external subroutine CPSMCONN to establish a connection to   */
/*  CICSPlex SM using the context and scope specified. If the        */
/*  return code from CPSMCONN isn't zero then terminate the          */
/*  CICSPlex SM REXX/API environment and terminate this REXX with    */
/*  the return code. If the return code is zero use the CICSPlex SM  */
/*  token "w_thread" for all subsequent commands.                    */
/*********************************************************************/
Call CPSMCONN w_context, w_scope
Parse Var result w_retc w_thread .
  if w_retc <> Ø
    then
      do
        retc = w_retc
        Call CPSMTERM
        Signal RETURN_CONTROL
      end
/*********************************************************************/
/*  PERFORM the ACTION(RESETTIME) for the OBJECT(CICSRGN) with no    */
/*  additional parameter requirements. If the response code from     */
/*  CICSPlex SM is not OK then issue diagnostic messages and set     */
/*  return code before disconnecting and terminating. If the         */
/*  response code is OK then issue a message with the number of      */
/*  CICS regions affected.                                           */
/*********************************************************************/
Address CPSM 'PERFORM OBJECT(CICSRGN)',
             'ACTION(RESETTIME)',
             'COUNT(w_count)',
             'RESULT(w_result)',
             'THREAD(w_thread)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK)
  then
    do
      msg = 'Failure PERFORMing ACTION(RESETTIME):'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
      Signal CPSM_DISCONNECT
    end
msg = 'PERFORMed ACTION(RESETTIME) for 'w_count' CICS regions.'
say rexx_name msg
/*********************************************************************/
/*  Obtain information about the CICSRGN object, ie the length       */
/*  of the object records. If the response code from CICSPlex SM     */
/*  is not OK then issue diagnostic messages and set the return      */
/*  code before disconnecting and terminating. If the response code  */
/*  is OK then issue a message with the number of bytes per record   */
/*  for the object.                                                  */
/*********************************************************************/
Address CPSM 'QUERY OBJECT(CICSRGN)',
             'THREAD(w_thread)',
             'RESULT(w_result)',
             'DATALENGTH(w_into_objectlen)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK)
  then
    do
      msg = 'Failure QUERYing OBJECT(CICSRGN):'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
      Signal CPSM_DISCONNECT
    end
msg = 'Each OBJECT(CICSRGN) record is 'w_into_objectlen' bytes.'
say rexx_name msg
/*********************************************************************/
/*  Loop through the CICSRGN results and translate the output        */
/*  into displayable characters. Issue a message for each CICS       */
/*  region affected. If the CICSPlex SM commands receive a response  */
/*  other than OK then issue diagnostic messages and set the return  */
/*  code before disconnecting and terminating.                       */
```

```
/*********************************************************************/
do iii = 1 to w_count
  Address CPSM 'FETCH INTO(w_into_object)',
               'LENGTH(w_into_objectlen)',
               'POSITION('iii')',
               'RESULT(w_result)',
               'THREAD(w_thread)',
               'RESPONSE(w_response)',
               'REASON(w_reason)'
  if w_response <> EYURESP(OK)
    then
      do
        msg = 'Failure FETCHing record:'
        say rexx_name msg
        retc = 16
        msg = 'Response = 'EYURESP(w_response),
              'Reason = 'EYUREAS(w_reason)
        say rexx_name msg
        Signal CPSM_DISCONNECT
      end
  Address CPSM 'TPARSE OBJECT(CICSRGN)',
               'PREFIX(cicsrgn)',
               'STATUS(w_response)',
               'VAR(w_into_object.1)',
               'THREAD(w_thread)'
  if w_response <> 'OK'
    then
      do
        msg = 'Failure parsing record. Status='w_response
        say rexx_name msg
        retc = 16
        Signal CPSM_DISCONNECT
      end
  /*******************************************************************/
  /*  Format the display information for the CICSRGN results.        */
  /*  cicsname JOBNAME(        ) APPLID(        ) MVS(    )          */
  /*******************************************************************/
  msg = '   'cicsrgn_eyu_cicsname' JOBNAME(        )',
        'APPLID(        ) MVS(    )'
  msg = 'OVERLAY'(cicsrgn_jobname,msg,21)
  msg = 'OVERLAY'(cicsrgn_applid,msg,38)
  msg = 'OVERLAY'(cicsrgn_mvssysid,msg,52)
  say rexx_name msg
end iii
```

CPSM_DISCONNECT:

```
/*********************************************************************/
/*  Call external subroutine CPSMDISC to disconnect from CICSPlex SM */
/*  using the CICSPlex SM token "w-thread". Regardless of the         */
/*  return code from CPSMDISC termination processing continues        */
/*  normally.                                                         */
/**********************************************************************/
Call CPSMDISC w_thread
/**********************************************************************/
/*  Call external subroutine CPSMTERM to terminate the CICSPlex SM    */
/*  REXX/API environment. Regardless of the return code from          */
/*  CPSMTERM termination processing continues normally.               */
/**********************************************************************/
Call CPSMTERM
RETURN_CONTROL:
/**********************************************************************/
/*  Return control with a return code - this is the only exit point  */
/**********************************************************************/
msg = 'Terminated with return code: 'retc
say rexx_name msg
exit (retc)
```

The following example performs RESETTIME for all CICS regions in the CICS system group TEST in CICSplex TPLEX:

```
CPSMTIME TPLEX TEST

CPSMTIME Invoked on 18 Nov 2ØØ2 at Ø9:43:59.
CPSMTIME Invoked with parameters:-
CPSMTIME Context  : TPLEX
CPSMTIME Scope    : TEST
CPSMTIME PERFORMed ACTION(RESETTIME) for 3 CICS regions.
CPSMTIME Each OBJECT(CICSRGN) record is 88Ø bytes.
CPSMTIME    CICSTAØ1 JOBNAME(CICSTAØ1) APPLID(APPLTAØ1) MVS(TEST)
CPSMTIME    CICSTAØ2 JOBNAME(CICSTAØ2) APPLID(APPLTAØ2) MVS(TEST)
CPSMTIME    CICSTTØ1 JOBNAME(CICSTTØ1) APPLID(APPLTTØ1) MVS(TEST)
CPSMTIME Terminated with return code: Ø
```

CPSMTASK

CPSMTASK displays ‘basic’ information about CICS tasks based on the context, scope, and criteria specified. The CICSPlex SM TASK resource table has a large number of attributes that could be used as criteria. The CPSMTASK example shows that there are no less than 1,536 bytes of information available for each active task.

```
/****************************** REXX **********************************/
/*  MODULE NAME : CPSMTASK                                            */
/*  MODULE TYPE : REXX Executable                                     */
/*  DESCRIPTION : CICSPlex SM  -  TASK Resource Information           */
/*                Displays information about CICS tasks             */
/*                based on the parameters provided.                  */
/*  INVOCATION  : CPSMTASK w_context w_scope w_criteria              */
/*                w_context = name of a CMAS or CICSplex             */
/*                w_scope   = name of CICSplex, CICS system group    */
/*                            or CICS system within w_context        */
/*                w_criteria= the criteria to be used to filter      */
/*                            the TASKs selected                     */
/*  RETURN      : retc      = return code                            */
/*********************************************************************/
Trace
rexx_name = 'CPSMTASK'
retc = 0
w_context = ''
w_scope = ''
w_criteria = ''
msg = 'Invoked on 'DATE()' at 'TIME()'.'
say rexx_name msg
Parse Upper Arg w_context w_scope w_criteria
if w_context = '' | w_scope = '' | w_criteria = ''
  then
    do
      msg = 'Context, scope and criteria MUST be specified.'
      say rexx_name msg
      retc = 8
      Signal RETURN_CONTROL
    end
msg = 'Invoked with parameters:-'
say rexx_name msg
msg = 'Context  : 'w_context
say rexx_name msg
msg = 'Scope    : 'w_scope
say rexx_name msg
msg = 'Criteria : 'w_criteria
say rexx_name msg
/*********************************************************************/
/*  Call external subroutine CPSMINIT to initialize the CICSPlex SM  */
/*  REXX/API environment. If the return code from CPSMINIT isn't     */
/*  zero then terminate with the return code.                        */
/*********************************************************************/
Call CPSMINIT
  if result <> 0
    then
      do
        retc = result
        Signal RETURN_CONTROL
      end
/*********************************************************************/
/*  Call external subroutine CPSMCONN to establish a connection to   */
/*  CICSPlex SM using the context and scope specified. If the        */
/*  return code from CPSMCONN isn't zero then terminate the         */
/*  CICSPlex SM REXX/API environment and terminate this REXX with    */
/*  the return code. If the return code is zero use the CICSPlex SM  */
/*  token "w_thread" for all subsequent commands.                    */
/*********************************************************************/
Call CPSMCONN w_context, w_scope
Parse Var result w_retc w_thread .
  if w_retc <> Ø
    then
      do
        retc = w_retc
        Call CPSMTERM
        Signal RETURN_CONTROL
      end
/*********************************************************************/
/*  GET the TASK objects based on the context, scope, and additional */
/*  criteria specified at invocation. If the CICSPlex SM response    */
/*  is not OK and not NODATA, then issue diagnostic messages and set */
/*  return code before disconnecting and terminating. A response of  */
/*  NODATA is not an error because this response indicates that no   */
/*  tasks matched the criteria specified within the context and      */
/*  scope. Issue a message that zero records were retrieved,         */
/*  disconnect, and terminate. If the response is OK then process    */
/*  the task records.                                                */
/*********************************************************************/
w_criteria = w_criteria||"."
w_criterialen = 'LENGTH'(w_criteria)
Address CPSM 'GET OBJECT(TASK)',
             'CRITERIA(w_criteria)',
             'LENGTH('w_criterialen')',
             'COUNT(w_count)',
             'RESULT(w_result)',
             'THREAD(w_thread)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK) & w_response <> EYURESP(NODATA)
  then
    do
      msg = 'Failure GETting TASK:'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
      Signal CPSM_DISCONNECT
    end
msg = 'GET retrieved 'w_count' OBJECT(TASK) records.'
say rexx_name msg
if w_response = EYURESP(NODATA)
  then Signal CPSM_DISCONNECT
```

```
/*********************************************************************/
/*  Obtain information about the TASK object, ie the length         */
/*  of the object records. If the response code from CICSPlex SM    */
/*  is not OK then issue diagnostic messages and set the return     */
/*  code before disconnecting and terminating. If the response code */
/*  is OK then issue a message with the number of bytes per record  */
/*  for the object.                                                  */
/*********************************************************************/
Address CPSM 'QUERY OBJECT(TASK)',
             'THREAD(w_thread)',
             'RESULT(w_result)',
             'DATALENGTH(w_into_objectlen)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK)
  then
    do
      msg = 'Failure QUERYing OBJECT(TASK):'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
      Signal CPSM_DISCONNECT
    end
msg = 'Each OBJECT(TASK) record is 'w_into_objectlen' bytes.'
say rexx_name msg
/*********************************************************************/
/*  Loop through the TASK results and translate the output into     */
/*  displayable characters. Issue a message for each CICS task. If  */
/*  CICSPlex SM commands receive a response other than OK then      */
/*  issue diagnostic messages and set the return code before        */
/*  disconnecting and terminating.                                   */
/*********************************************************************/
do iii = 1 to w_count
  Address CPSM 'FETCH INTO(w_into_object)',
               'LENGTH(w_into_objectlen)',
               'RESULT(w_result)',
               'THREAD(w_thread)',
               'RESPONSE(w_response)',
               'REASON(w_reason)'
  if w_response <> EYURESP(OK)
    then
      do
        msg = 'Failure FETCHing record:'
        say rexx_name msg
        retc = 16
        msg = 'Response = 'EYURESP(w_response),
              'Reason = 'EYUREAS(w_reason)
        say rexx_name msg
        Signal CPSM_DISCONNECT
      end
  Address CPSM 'TPARSE OBJECT(TASK)',
               'PREFIX(task)',
               'STATUS(w_response)',
               'VAR(w_into_object.1)',
               'THREAD(w_thread)'
  if w_response <> 'OK'
    then
      do
        msg = 'Failure parsing record. Status='w_response
        say rexx_name msg
        retc = 16
        Signal CPSM_DISCONNECT
      end
  /*******************************************************************/
  /*  Format the display information for the TASK results.           */
  /*  cicsname TASK(       ) TRAN(    ) USER(        ) TERM(    ) st */
  /*******************************************************************/
  msg = '   'task_eyu_cicsname' TASK(ØØØØØØØ) TRAN(    )',
        'USER(        ) TERM(    )'
  pos = 25 - 'LENGTH'(task_task)
  msg = 'OVERLAY'(task_task,msg,pos)
  msg = 'OVERLAY'(task_tranid,msg,32)
  msg = 'OVERLAY'(task_userid,msg,43)
  msg = 'OVERLAY'(task_termid,msg,58)
  msg = 'OVERLAY'(task_runstatus,msg,64,3)
  say rexx_name msg
end iii
CPSM_DISCONNECT:
/*********************************************************************/
/*  Call external subroutine CPSMDISC to disconnect from CICSPlex SM */
/*  using the CICSPlex SM token "w-thread". Regardless of the        */
/*  return code from CPSMDISC termination processing continues       */
/*  normally.                                                        */
/*********************************************************************/
Call CPSMDISC w_thread
/*********************************************************************/
/*  Call external subroutine CPSMTERM to terminate the CICSPlex SM   */
/*  REXX/API environment. Regardless of the return code from         */
/*  CPSMTERM termination processing continues normally.              */
/*********************************************************************/
Call CPSMTERM
RETURN_CONTROL:
/*********************************************************************/
/*  Return control with a return code - this is the only exit point  */
/*********************************************************************/
msg = 'Terminated with return code: 'retc
say rexx_name msg
exit (retc)
```

CPSMTASK could, for example, be used to display all CICS tasks with a specific or generic transaction identifier, or user identifier, or priority, or any combination of those and many other attributes.

The following example displays all CICS tasks in the CICS system group TEST within the CICSplex TPLEX with a transaction identifier beginning with ‘C’ and which are suspended because of MQSeries:

```
CPSMTASK TPLEX TEST TRANID=C* AND SUSPENDTYPE=MQS*

CPSMTASK Invoked on 18 Nov 2ØØ2 at 1Ø:15:14.
CPSMTASK Invoked with parameters:-
CPSMTASK Context  : TPLEX
CPSMTASK Scope    : TEST
CPSMTASK Criteria : TRANID=C* AND SUSPENDTYPE=MQS*
CPSMTASK GET retrieved 2 OBJECT(TASK) records.
CPSMTASK Each OBJECT(TASK) record is 1536 bytes.
CPSMTASK CICSTAØ1 TASK(ØØØØØ31) TRAN(CKTI) USER(CICSRGN ) TERM(    ) SUS
CPSMTASK CICSTAØ2 TASK(ØØØØØ29) TRAN(CKTI) USER(CICSRGN ) TERM(    ) SUS
CPSMTASK Terminated with return code: Ø
```

CPSMTRNC

CPSMTRNC displays information about CICS transaction classes based on the context, scope, and criteria specified. The CICSPlex SM TRANCLAS resource table has a number of attributes that could be used as critieria. The CPSMTRNC example shows that there are 104 bytes of information available for each transaction class instance.

If you are using CICS TS 1.3 ensure that the PTF UQ61178 for APAR PQ55708 is applied.

```
/****************************** REXX ********************************/
/*  MODULE NAME : CPSMTRNC                                          */
/*  MODULE TYPE : REXX Executable                                   */
/*  DESCRIPTION : CICSPlex SM  -  TRANCLAS Resource Information     */
/*                Displays information about TRANCLAS resources     */
/*                based on the parameters provided.                 */
/*  INVOCATION  : CPSMTRNC w_context w_scope w_criteria             */
/*                w_context = name of a CMAS or CICSplex            */
/*                w_scope   = name of CICSplex, CICS system group   */
/*                            or CICS system within w_context       */
/*                w_criteria= the criteria to be used to filter      */
/*                            the TRANCLAS objects                   */
/*  RETURN      : retc      = return code                            */
/*********************************************************************/
Trace
rexx_name = 'CPSMTRNC'
retc = 0
w_context = ''
w_scope = ''
w_criteria = ''
msg = 'Invoked on 'DATE()' at 'TIME()'.'
say rexx_name msg
Parse Upper Arg w_context w_scope w_criteria
if w_context = '' | w_scope = '' | w_criteria = ''
  then
    do
      msg = 'Context, scope and criteria MUST be specified.'
      say rexx_name msg
      retc = 8
      Signal RETURN_CONTROL
    end
msg = 'Invoked with parameters:-'
say rexx_name msg
msg = 'Context  : 'w_context
say rexx_name msg
msg = 'Scope    : 'w_scope
say rexx_name msg
msg = 'Criteria : 'w_criteria
say rexx_name msg
/*********************************************************************/
/*  Call external subroutine CPSMINIT to initialize the CICSPlex SM  */
/*  REXX/API environment. If the return code from CPSMINIT isn't     */
/*  zero then terminate with the return code.                        */
/*********************************************************************/
Call CPSMINIT
  if result <> 0
    then
      do
        retc = result
        Signal RETURN_CONTROL
      end
/*********************************************************************/
/*  Call external subroutine CPSMCONN to establish a connection to   */
/*  CICSPlex SM using the context and scope specified. If the        */
/*  return code from CPSMCONN isn't zero then terminate the          */
/*  CICSPlex SM REXX/API environment and terminate this REXX with    */
/*  the return code. If the return code is zero use the CICSPlex SM  */
/*  token "w_thread" for all subsequent commands.                    */
/*********************************************************************/
Call CPSMCONN w_context, w_scope
```

```
Parse Var result w_retc w_thread .
  if w_retc <> Ø
    then
      do
        retc = w_retc
        Call CPSMTERM
        Signal RETURN_CONTROL
      end
/*******************************************************************/
/*  GET the TRANCLAS objects based on the context, scope, and       */
/*  criteria specified at invocation. If the CICSPlex SM response   */
/*  is not OK and not NODATA, then issue diagnostic messages and set */
/*  return code before disconnecting and terminating. A response of  */
/*  NODATA is not an error as this response indicates that no       */
/*  transaction class objects matched the criteria specified within  */
/*  the context and scope. Issue a message that zero records were    */
/*  retrieved, disconnect and terminate. If the response is OK then  */
/*  process the transaction class records.                           */
/*******************************************************************/
w_criteria = w_criteria||"."
w_criterialen = 'LENGTH'(w_criteria)
Address CPSM 'GET OBJECT(TRANCLAS)',
             'CRITERIA(w_criteria)',
             'LENGTH('w_criterialen')',
             'COUNT(w_count)',
             'RESULT(w_result)',
             'THREAD(w_thread)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK) & w_response <> EYURESP(NODATA)
  then
    do
      msg = 'Failure GETting TRANCLAS:'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
      Signal CPSM_DISCONNECT
    end
msg = 'GET retrieved 'w_count' OBJECT(TRANCLAS) records.'
say rexx_name msg
if w_response = EYURESP(NODATA)
  then Signal CPSM_DISCONNECT
/*******************************************************************/
/*  Obtain information about the TRANCLAS object, ie the length     */
/*  of the object records. If the response code from CICSPlex SM    */
/*  is not OK then issue diagnostic messages and set the return     */
/*  code before disconnecting and terminating. If the response code  */
/*  is OK then issue a message with the number of bytes per record   */
/*  for the object.                                                  */
/*********************************************************************/
Address CPSM 'QUERY OBJECT(TRANCLAS)',
             'THREAD(w_thread)',
             'RESULT(w_result)',
             'DATALENGTH(w_into_objectlen)',
             'RESPONSE(w_response)',
             'REASON(w_reason)'
if w_response <> EYURESP(OK)
  then
    do
      msg = 'Failure QUERYing OBJECT(TRANCLAS):'
      say rexx_name msg
      retc = 16
      msg = 'Response = 'EYURESP(w_response),
            'Reason = 'EYUREAS(w_reason)
      say rexx_name msg
      Signal CPSM_DISCONNECT
    end
msg = 'Each OBJECT(TRANCLAS) record is 'w_into_objectlen' bytes.'
say rexx_name msg
/*********************************************************************/
/*  Loop through the TRANCLAS results and translate the output into  */
/*  displayable characters. Issue a message for each TRANCLAS. If    */
/*  CICSPlex SM commands receive a response other than OK then       */
/*  issue diagnostic messages and set the return code before         */
/*  disconnecting and terminating.                                   */
/*********************************************************************/
do iii = 1 to w_count
  Address CPSM 'FETCH INTO(w_into_object)',
               'LENGTH(w_into_objectlen)',
               'RESULT(w_result)',
               'THREAD(w_thread)',
               'RESPONSE(w_response)',
               'REASON(w_reason)'
  if w_response <> EYURESP(OK)
    then
      do
        msg = 'Failure FETCHing record:'
        say rexx_name msg
        retc = 16
        msg = 'Response = 'EYURESP(w_response),
              'Reason = 'EYUREAS(w_reason)
        say rexx_name msg
        Signal CPSM_DISCONNECT
      end
  Address CPSM 'TPARSE OBJECT(TRANCLAS)',
               'PREFIX(tcl)',
               'STATUS(w_response)',
               'VAR(w_into_object.1)',
               'THREAD(w_thread)'
  if w_response <> 'OK'
    then
      do
        msg = 'Failure parsing record. Status='w_response
        say rexx_name msg
        retc = 16
        Signal CPSM_DISCONNECT
      end
  /*******************************************************************/
  /*  Format the display information for the TRANCLAS results.      */
  /*  cicsname TCL(        ) MAX(    ) ACT(    ) PUR(    ) QUE(    ) */
  /*******************************************************************/
  msg = '   'tcl_eyu_cicsname' TCL(        ) MAX(ØØØØ)',
        'ACT(ØØØØ) PUR(ØØØØ) QUE(ØØØØ)'
  msg = 'OVERLAY'(tcl_name,msg,17)
  max_pos = 35 - 'LENGTH'(tcl_maxactive)
  msg = 'OVERLAY'(tcl_maxactive,msg,max_pos)
  act_pos = 45 - 'LENGTH'(tcl_active)
  msg = 'OVERLAY'(tcl_active,msg,act_pos)
  pur_pos = 55 - 'LENGTH'(tcl_purgethresh)
  msg = 'OVERLAY'(tcl_purgethresh,msg,pur_pos)
  que_pos = 65 - 'LENGTH'(tcl_queued)
  msg = 'OVERLAY'(tcl_queued,msg,que_pos)
  say rexx_name msg
end iii
CPSM_DISCONNECT:
/*********************************************************************/
/*  Call external subroutine CPSMDISC to disconnect from CICSPlex SM */
/*  using the CICSPlex SM token "w-thread". Regardless of the        */
/*  return code from CPSMDISC termination processing continues       */
/*  normally.                                                        */
/*********************************************************************/
Call CPSMDISC w_thread
/*********************************************************************/
/*  Call external subroutine CPSMTERM to terminate the CICSPlex SM   */
/*  REXX/API environment. Regardless of the return code from         */
/*  CPSMTERM termination processing continues normally.              */
/*********************************************************************/
Call CPSMTERM
RETURN_CONTROL:
/*********************************************************************/
/*  Return control with a return code - this is the only exit point  */
/*********************************************************************/
msg = 'Terminated with return code: 'retc
say rexx_name msg
exit (retc)
```

CPSMTRNC could, for example, be used to display all CICS transaction class instances where transactions were queued or where transactions had to be purged, or any combination of attributes.

The following example displays all CICS transaction class instances in the CICSTT01 region within the CICSplex TPLEX with a transaction class name that does not begin with ‘DFH’.

```
CPSMTRNC TPLEX CICSTTØ1 NAME^=DFH*

CPSMTRNC Invoked on 18 Nov 2ØØ2 at 1Ø:22:42.
CPSMTRNC Invoked with parameters:-
CPSMTRNC Context  : TPLEX
CPSMTRNC Scope    : CICSTTØ1
CPSMTRNC Criteria : NAME^=DFH*
CPSMTRNC GET retrieved 1Ø OBJECT(TRANCLAS) records.
CPSMTRNC Each OBJECT(TRANCLAS) record is 1Ø4 bytes.
CPSMTRNC    CICSTTØ1 TCL(TCLI    ) MAX(ØØ15) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCLP    ) MAX(ØØØ5) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCLQ    ) MAX(ØØ15) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCLU    ) MAX(ØØ1Ø) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCLX    ) MAX(ØØ2Ø) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCL1    ) MAX(ØØ15) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCL2    ) MAX(ØØØ5) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCL3    ) MAX(ØØ15) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCL4    ) MAX(ØØ1Ø) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC    CICSTTØ1 TCL(TCL5    ) MAX(ØØ2Ø) ACT(ØØØØ) PUR(ØØØØ)
QUE(ØØØØ)
CPSMTRNC Terminated with return code: Ø
```

Editor’s note: this article will be concluded in the next issue.

Carl Wade McBurnie
IT Consultant (Germany)

Monitoring CICS resources online – part 2

This month we conclude the code that allows users to check on the status of various resources in their CICS systems and send messages to the appropriate people when the resources are not available.

```
     WHEN DDNAM
          IF CURR-OBS = DFHVALUE(CLOSED) AND
             LAST-OBS(I) = DFHVALUE(CLOSED)
           PERFORM P21ØØ-BUILD-MSG THRU P21ØØ-BUILD-MSG-EXIT
          ELSE MOVE CURR-OBS TO LAST-OBS(I)
           PERFORM P22ØØ-OK THRU P22ØØ-OK-EXIT
         END-IF
     WHEN OTHER
       IF LAST-OBS(I) = CURR-OBS AND
           LONG-RUNNING-FLAG = ZERO
           PERFORM P21ØØ-BUILD-MSG THRU P21ØØ-BUILD-MSG-EXIT
      ELSE MOVE CURR-OBS TO LAST-OBS(I)
          MOVE ZERO TO TOTAL-ELAPSED(I) LONG-RUNNING-FLAG
           PERFORM P22ØØ-OK THRU P22ØØ-OK-EXIT
      END-IF
     END-EVALUATE.
     MOVE SPACES TO TS-TABLE.
     MOVE RESOURCE-CHECKS(I) TO TS-RES-NAME.
     MOVE MQ-LIMIT(I) TO TS-DESIRED
     MOVE LAST-OBS(I) TO TS-LAST-OBS.
     MOVE TOTAL-ELAPSED(I) TO TS-TOTAL-ELAPSED.
     MOVE SINCE-CHECKED(I) TO TS-SINCE-CHECKED.
     MOVE STATUS-FLAG(I) TO TS-STATUS-FLAG.
     COMPUTE H = I + 1.
     EXEC CICS WRITEQ TS QUEUE('S5ØPRESC')
       FROM(TS-TABLE) ITEM(H) REWRITE
     END-EXEC.
     GO TO P2ØØØ-PROC-EXIT.
 P2Ø1Ø-CONN.
     EXEC CICS INQUIRE CONNECTION(RES-NAME(I))
           CONNSTATUS(CURR-OBS)
     END-EXEC.
*    IF CURR-OBS = DFHVALUE(ACQUIRED)
*       MOVE DFHVALUE(AVAILABLE) TO LAST-OBS(I)
*    ELSE IF CURR-OBS = DFHVALUE(AVAILABLE)
*       MOVE DFHVALUE(ACQUIRED) TO LAST-OBS(I)
*    END-IF.
 P2Ø1Ø-CONN-EXIT.
     EXIT.
 P2Ø1Ø-TRAN.
```

```
           MOVE ZERO TO LONG-RUNNING-FLAG.
           EXEC CICS COLLECT STATISTICS TRANSACTION(RES-NAME(I))
               SET(ADDRESS OF DFHXMRDS)
           END-EXEC.
           MOVE XMRAC TO CURR-OBS.
       P2Ø1Ø-TRAN-CONT.
           IF RES-NAME-4(I) = 'I9IH' OR
              RES-NAME-4(I) = 'I9IJ' OR
              RES-NAME-4(I) = 'I9IK' OR
              RES-NAME-4(I) = 'I9IY' OR
              RES-NAME-4(I) = 'I9MR'
           PERFORM P5ØØØ-INQUIRE THRU P5ØØØ-INQUIRE-EXIT.
       P2Ø1Ø-TRAN-EXIT.
           EXIT.
       P2Ø1Ø-TX.
           MOVE ZERO TO LONG-RUNNING-FLAG.
           EXEC CICS COLLECT STATISTICS TRANSACTION(RES-NAME(I))
               SET(ADDRESS OF DFHXMRDS)
           END-EXEC.
           MOVE XMRAC TO CURR-OBS.
       P2Ø1Ø-TX-CONT.
           PERFORM P5ØØØ-INQUIRE THRU P5ØØØ-INQUIRE-EXIT.
       P2Ø1Ø-TX-EXIT.
           EXIT.
       P2Ø1Ø-PU.
           EXEC CICS HANDLE CONDITION NOTFND(P2Ø1Ø-PU-COLLECT-UP)
           END-EXEC.
           MOVE RES-NAME(I) TO PU-ID.
           MOVE ZERO TO PU-NO.
           PERFORM P2Ø1Ø-PU-COLLECT THRU P2Ø1Ø-PU-COLLECT-EXIT
             1ØØ TIMES.
           GO TO P2Ø1Ø-PU-EXIT.
       P2Ø1Ø-PU-COLLECT.
            EXEC CICS COLLECT STATISTICS TERMINAL(TERM-ID)
                SET(ADDRESS OF DFHAØ6DS)
            END-EXEC.
            MOVE AØ6TEOT TO NUM-TRAN-X.
            ADD   NUM-TRAN-N TO CURR-OBS.
       P2Ø1Ø-PU-COLLECT-UP.
            ADD 1 TO PU-NO.
       P2Ø1Ø-PU-COLLECT-EXIT.
           EXIT.
       P2Ø1Ø-PU-EXIT.
           EXIT.
Ø8564Ø P2Ø1Ø-MQS.
           MOVE MQ-LIMIT(I) TO WS-MQ-DEPTH-X.
           MOVE 'MQ' TO KEY24Ø2-ZIHUY-MASHAV
           MOVE RES-NAME(I)           TO KEY24Ø2-SHEM-LOGI.
           MOVE KEY24Ø2-KEY          TO TAB24Ø2-KEY.
           PERFORM P4ØØØ-READ-DPT.
```

```
Ø16ØØØ     IF TAB24Ø2-REPLY  = ZERO
             NEXT SENTENCE
           ELSE GO TO P2ØØØ-PROC-EXIT.
Ø85650*-------------------------------------------------------------
           MOVE TAB24Ø2-QUEUE-NAME   TO MQOD-OBJECTNAME
           MOVE MQMD-REPLYTOQMGR     TO MQOD-OBJECTQMGRNAME.
Ø857ØØ     MOVE MQOO-INQUIRE              TO WØ3-OPTIONS.
Ø858ØØ     CALL  'MQOPEN'  USING WØ3-HCONN ,
Ø859ØØ                         MQM-OBJECT-DESCRIPTOR,
Ø86ØØØ                         WØ3-OPTIONS ,
Ø861ØØ                         WØ3-HOBJ ,
Ø862ØØ                         WØ3-COMPCODE ,
Ø863ØØ                         WØ3-REASON.
Ø864ØØ
           IF WØ3-COMPCODE NOT = MQCC-OK
             IF WØ3-COMPCODE = MQRC-UNKNOWN-OBJECT-NAME
                GO TO P2ØØØ-PROC-EXIT
             END-IF
             MOVE WØ3-COMPCODE   TO TEXT4-COMP
             MOVE WØ3-REASON   TO TEXT4-REASON
             MOVE TEXT4 TO LOGTEXT
             MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
             EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
              LENGTH(TD-BUFFLEN)
             END-EXEC
             MOVE TAB24Ø2-QUEUE-NAME TO TEXT4A-Q-NAME
             MOVE TEXT4A TO LOGTEXT
             MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
             EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
              LENGTH(TD-BUFFLEN)
             END-EXEC
             GO TO P2ØØØ-PROC-EXIT
           END-IF.
Ø872ØØ
Ø873ØØ     MOVE MQIA-Q-TYPE               TO SELECTORS(1).
Ø874ØØ     MOVE MQIA-CURRENT-Q-DEPTH      TO SELECTORS(2).
Ø875ØØ     MOVE MQCA-Q-DESC               TO SELECTORS(3).
Ø876ØØ
Ø877ØØ     CALL  'MQINQ'  USING WØ3-HCONN ,
Ø878ØØ                        WØ3-HOBJ ,
Ø879ØØ                        SELECTORCOUNT ,
Ø88ØØØ                        SELECTORS-TABLE ,
Ø881ØØ                        INTATTRCOUNT ,
Ø882ØØ                        INTATTRS-TABLE ,
Ø883ØØ                        CHARATTLENGTH ,
Ø884ØØ                        CHARATTRS ,
Ø885ØØ                        WØ3-COMPCODE ,
Ø886ØØ                        WØ3-REASON.
Ø887ØØ
           IF WØ3-COMPCODE NOT = MQCC-OK
```

```
             MOVE WØ3-COMPCODE   TO TEXT5-COMP
             MOVE WØ3-REASON   TO TEXT5-REASON
             MOVE TEXT5 TO LOGTEXT
             MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
             EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
              LENGTH(TD-BUFFLEN)
             END-EXEC
             MOVE TAB24Ø2-QUEUE-NAME TO TEXT4A-Q-NAME
             MOVE TEXT4A TO LOGTEXT
             MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
             EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
              LENGTH(TD-BUFFLEN)
             END-EXEC
             IF WØ3-COMPCODE = MQRC-SELECTOR-NOT-FOR-TYPE
                GO TO P2Ø1Ø-MQ-CLOSE
             END-IF
             GO TO P2Ø1Ø-MQ-CLOSE
           END-IF.
           MOVE INTATTRS(2)           TO CURR-OBS.
       P2Ø1Ø-MQ-CLOSE.
           CALL 'MQCLOSE' USING WØ3-HCONN
                                WØ3-HOBJ
                                MQCO-NONE
                                WØ3-COMPCODE
                                WØ3-REASON.
           IF WØ3-COMPCODE NOT = MQCC-OK
             MOVE WØ3-COMPCODE   TO TEXT6-COMP
             MOVE WØ3-REASON   TO TEXT6-REASON
             MOVE TEXT6 TO LOGTEXT
             MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
             EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
              LENGTH(TD-BUFFLEN)
             END-EXEC
             MOVE TAB24Ø2-QUEUE-NAME TO TEXT4A-Q-NAME
             MOVE TEXT4A TO LOGTEXT
             MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
             EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
              LENGTH(TD-BUFFLEN)
             END-EXEC
           END-IF.
           IF CURR-OBS            >= WS-MQ-DEPT9
             PERFORM P5ØØØ-INQUIRE THRU P5ØØØ-INQUIRE-EXIT.
Ø894ØØ P2Ø1Ø-MQS-EXIT.
Ø895ØØ     EXIT.
Ø894ØØ P2Ø1Ø-FILE.
           EXEC CICS HANDLE CONDITION FILENOTFOUND(P2Ø1Ø-FILE-EXIT)
            END-EXEC.
           EXEC CICS INQUIRE FILE(RES-NAME(I)) OPENSTATUS(CURR-OBS)
           END-EXEC.
Ø894ØØ P2Ø1Ø-FILE-EXIT.
```

```
Ø895ØØ     EXIT.
       P2ØØØ-PROC-EXIT.
           EXIT.
       P21ØØ-BUILD-MSG.
             MOVE ALT-STAT TO LOG-STAT
             IF STATUS-FLAG(I) = STATUS-CLOSED
               MOVE STATUS-OPEN TO STATUS-FLAG(I)
               MOVE 'IS INACTIVE' TO MQ-MSG
                MOVE 'OPEN ' TO MQ-EVENT
             ELSE
               MOVE STATUS-STILL-OPEN TO STATUS-FLAG(I)
               MOVE 'STILL-INACTIVE' TO MQ-MSG LOG-STAT
                MOVE 'STILL' TO MQ-EVENT
             END-IF
             ADD VALID-INTERVAL TO TOTAL-ELAPSED(I)
             PERFORM P3ØØØ-SEND-MQ THRU
                   P3ØØØ-SEND-MQ-EXIT.
       P21ØØ-BUILD-MSG-EXIT.
           EXIT.
       P22ØØ-OK.
             IF STATUS-FLAG(I) = STATUS-OPEN OR STATUS-STILL-OPEN
                MOVE STATUS-CLOSED TO STATUS-FLAG(I)
                MOVE 'NOW ACTIVE' TO MQ-MSG LOG-STAT
                MOVE 'CLOSE' TO MQ-EVENT
             PERFORM P3ØØØ-SEND-MQ THRU
                   P3ØØØ-SEND-MQ-EXIT
           END-IF.
       P22ØØ-OK-EXIT.
           EXIT.
       P25ØØ-DELAY.
           IF SHOW-HR = 23
            IF SHOW-MIN >= 58
               PERFORM P27ØØ-END-OF-DAY THRU P27ØØ-END-OF-DAY-EXIT
                            VARYING I FROM 1 BY 1
                            UNTIL I > NUM-ACTIVE
               MOVE 1 TO FIRST-TIME-FLAG
               EXEC CICS RETURN
               END-EXEC
             END-IF
           END-IF.
           EXEC CICS DELAY FOR MINUTES(DAY-TIME)
           END-EXEC.
       P25ØØ-DELAY-EXIT.
           EXIT.
       P27ØØ-END-OF-DAY.
           IF RES-NAME(I) = 'TIMESKED'
              OR RES-NAME-STAR(I) = '*'
              GO TO P27ØØ-END-OF-DAY-EXIT
           END-IF.
           IF STATUS-FLAG(I) = STATUS-OPEN OR STATUS-STILL-OPEN
```

```
        MOVE STATUS-CLOSED TO STATUS-FLAG(I)
        MOVE 'END OF DAY' TO MQ-MSG LOG-STAT
        MOVE 'CLOSE' TO MQ-EVENT
        PERFORM P3ØØØ-SEND-MQ THRU
           P3ØØØ-SEND-MQ-EXIT
     END-IF.
 P27ØØ-END-OF-DAY-EXIT.
     EXIT.
 P3ØØØ-SEND-MQ.
     IF RES-TYPE(I) = MQS
        MOVE CURR-OBS TO MQ-DEPTH
        MOVE 'Q DEPTH = ' TO MQ-DEPTH-CONST
     ELSE MOVE SPACES TO MQ-MQS-ONLY.
     MOVE SHOWDATE             TO MQ-DATE.
     MOVE SHOWTIME             TO MQ-TIME.
     MOVE SYS-ID               TO MQ-SYSID.
     MOVE RES-NAME(I)          TO MQ-RES-NAME LOG-NAME.
     MOVE RES-TYPE(I)          TO MQ-RES LOG-TYPE.
     MOVE TOTAL-ELAPSED(I)     TO LOG-TIME.
     MOVE SAVEQ                TO MQMD-REPLYTOQ.
     MOVE MQMD-REPLYTOQ        TO MQOD-OBJECTNAME.
     MOVE MQMD-REPLYTOQMGR     TO MQOD-OBJECTQMGRNAME.
     MOVE MQMT-REPLY           TO MQMD-MSGTYPE.
     MOVE MQFMT-STRING         TO MQMD-FORMAT.
     MOVE SPACES               TO MQMD-REPLYTOQMGR.
     MOVE LOW-VALUES           TO MQMD-MSGID.
*    COMPUTE MQPMO-OPTIONS = MQPMO-SYNCPOINT +
*                            MQPMO-PASS-IDENTITY-CONTEXT.
*    MOVE WØ3-HOBJ-CHECKQ TO MQPMO-CONTEXT.
     MOVE LENGTH OF VANTIVE-MSG TO WØ3-BUFFLEN.
     CALL 'MQPUT1' USING WØ3-HCONN
                         MQOD
                         MQMD
                         MQPMO
                         WØ3-BUFFLEN
                         VANTIVE-MSG
                         WØ3-COMPCODE
                         WØ3-REASON.
     MOVE TEXT2 TO LOGTEXT.
     MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN.
     EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
        LENGTH(TD-BUFFLEN)
     END-EXEC.
     IF WØ3-COMPCODE NOT = MQCC-OK
       MOVE WØ3-COMPCODE-X TO TEXT3-COMP
       MOVE WØ3-REASON-X TO TEXT3-REASON
       MOVE TEXT3 TO LOGTEXT
       MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
       EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
        LENGTH(TD-BUFFLEN)
```

```
             END-EXEC
           END-IF.
           EXEC CICS SYNCPOINT
           END-EXEC.
       P3ØØØ-SEND-MQ-EXIT.
           EXIT.
      *------------------------------------------------------------
       P4ØØØ-READ-DPT.
      *------------------------------------------------------------
           MOVE 'EQ'              TO TAB24Ø2-CODE.
           PERFORM 42Ø-READ-DPT.
ØØ6ØØØ P4ØØØ-READ-DPT-EXIT.
ØØ6Ø1Ø     EXIT.
Ø144ØØ
Ø154ØØ*-------------------------------------------------------------
Ø155ØØ 42Ø-READ-DPT.
Ø156ØØ*------------------------------------------------------------
Ø157ØØ     CALL   'DPTACCS'  USING  DFHEIBLK
Ø158ØØ                              TAB24Ø2-PARMS
Ø159ØØ                              TAB24Ø2-ENTRY.
Ø16ØØØ     IF TAB24Ø2-REPLY  = ZERO
Ø125ØØ     MOVE TAB24Ø2-QUEUE-NAME TO MQOD-OBJECTNAME.
Ø163ØØ
Ø164ØØ 42Ø-READ-DPT-EX.
           EXIT.
       P5ØØØ-INQUIRE.
      *----------------------------------------------------------------
      *  ISSUE INQUIRE TASK LIST
      *----------------------------------------------------------------
            IF RES-TYPE(I) = MQS AND MQ-TRAN(I) = SPACES
               MOVE ZERO TO LONG-RUNNING-FLAG
               GO TO P5ØØØ-INQUIRE-EXIT.
      *EXEC-INQ-TASK-LIST.
             EXEC CICS INQUIRE TASK LIST LISTSIZE(TASK-LIST-SIZE)
                                 SET(TASK-NUMB-POINTER)
                                 SETTRANSID(TASK-LIST-POINTER)
                                 RESP(W-RESP)
              END-EXEC.
              PERFORM P5Ø1Ø-INQUIRE TASK-LIST-SIZE TIMES
              GO TO P5ØØØ-INQUIRE-EXIT.
       P5ØØØ-LONG-RUNNING.
              MOVE 1 TO LONG-RUNNING-FLAG.
       P5ØØØ-INQUIRE-EXIT.
              EXIT.
       P5Ø1Ø-INQUIRE.
               SET ADDRESS OF TRAN-ID-STR  TO TASK-LIST-POINTER
              IF RES-TYPE(I) = TRAN
               IF  WORK-TRAN-ID = RES-NAME-4(I)
                   GO TO P5ØØØ-LONG-RUNNING
               END-IF
              END-IF.
              IF RES-TYPE(I) = MQS
               IF  WORK-TRAN-ID = MQ-TRAN(I)
                   GO TO P5ØØØ-LONG-RUNNING
               END-IF
              END-IF.
               ADD LENGTH OF TRAN-ID TO TASK-LIST-POINTER-REDEF.
       P5Ø1Ø-INQUIRE-EXIT.
              EXIT.
       P8ØØØ-INIT.
           EXEC CICS ASSIGN SYSID(SYS-ID)
           END-EXEC.
           EVALUATE SYS-ID
           WHEN TEST-SYS
             MOVE 'MQST' TO MQMD-REPLYTOQMGR
             MOVE 'VAN.EVENT_LOG_SYS1' TO MQMD-REPLYTOQ
           WHEN Z-SYS
             MOVE 'MQST' TO MQMD-REPLYTOQMGR
             MOVE 'VAN.EVENT_LOG_SYS1' TO MQMD-REPLYTOQ
           WHEN QA-SYS
             MOVE 'MQSV' TO MQMD-REPLYTOQMGR
             MOVE 'VAN.EVENT_LOG_SYS1' TO MQMD-REPLYTOQ
           WHEN SYST-SYS
             MOVE 'MQST' TO MQMD-REPLYTOQMGR
             MOVE 'VAN.EVENT_LOG_SYS1' TO MQMD-REPLYTOQ
           WHEN TS13-SYS
             MOVE 'MQST' TO MQMD-REPLYTOQMGR
             MOVE 'VAN.EVENT_LOG_SYS1' TO MQMD-REPLYTOQ
           WHEN PROD-SYS
             MOVE 'MQSC' TO MQMD-REPLYTOQMGR
             MOVE 'VAN.EVENT_LOG_SYS3' TO MQMD-REPLYTOQ
           END-EVALUATE.
           MOVE MQMD-REPLYTOQ TO SAVEQ.
           EXEC CICS IGNORE CONDITION QIDERR
           END-EXEC.
           EXEC CICS DELETEQ TS QUEUE('S5ØPRESC')
           END-EXEC.
           EXEC CICS HANDLE CONDITION QIDERR
           END-EXEC.
           MOVE 1 TO I.
           MOVE DFHVALUE(OPEN) TO STAT-1.
           EXEC CICS SET TDQUEUE('RESC') OPENSTATUS(STAT-1)
             END-EXEC.
           EXEC CICS HANDLE CONDITION QZERO(P8ØØØ-FIN)
            END-EXEC.
           MOVE ZERO TO I.
           EXEC CICS WRITEQ TS QUEUE('S5ØPRESC')
             FROM(TABLE-HEADER)
           END-EXEC.
           PERFORM P8Ø5Ø-READ THRU P8Ø5Ø-READ-EXIT 8ØØ TIMES.
```

```
 P8ØØØ-FIN.
     MOVE DFHVALUE(CLOSED) TO STAT-1.
     EXEC CICS SET TDQUEUE('RESC') OPENSTATUS(STAT-1)
       END-EXEC.
     MOVE HIGH-VALUES TO RESOURCE-TABLE(I).
     MOVE TEXT1 TO LOGTEXT
     MOVE LENGTH OF LOGHEADR TO TD-BUFFLEN
     EXEC CICS WRITEQ TD QUEUE('DJNS') FROM(LOGHEADR)
      LENGTH(TD-BUFFLEN)
     END-EXEC.
 P8ØØØ-INIT-EXIT.
     EXIT.
 P8Ø5Ø-READ.
     EXEC CICS READQ TD QUEUE('RESC') INTO(RESOURCE-RECORD)
     END-EXEC.
     IF REC-TYPE = '*' GO TO P8Ø5Ø-READ.
     IF REC-TYPE = NA
         ADD 1 TO I
         MOVE INPUT-DATA TO RESOURCE-CHECKS(I)
         MOVE I TO NUM-ACTIVE
         MOVE ZERO TO TOTAL-ELAPSED(I) LAST-OBS(I)
             SINCE-CHECKED(I)
         MOVE STATUS-CLOSED TO STATUS-FLAG(I)
         MOVE SPACES TO TS-TABLE
         MOVE RESOURCE-CHECKS(I) TO TS-RES-NAME
         MOVE MQ-LIMIT(I) TO TS-DESIRED
         MOVE LAST-OBS(I) TO TS-LAST-OBS
         MOVE TOTAL-ELAPSED(I) TO TS-TOTAL-ELAPSED
         MOVE SINCE-CHECKED(I) TO TS-SINCE-CHECKED
         MOVE STATUS-FLAG(I) TO TS-STATUS-FLAG
*P8Ø5Ø-WRITE-Q.
     EXEC CICS WRITEQ TS QUEUE('S5ØPRESC')
       FROM(TS-TABLE)
     END-EXEC
     ELSE  IF REC-TYPE = DA
         IF REC-TITLE = HOLIDAY MOVE INPUT-DATA TO
           RESOURCE-TIMES(I, 8)
           GO TO P8Ø5Ø-READ
         ELSE MOVE 1 TO Q
              GO TO P8Ø5Ø-LOOP
         END-IF
     END-IF.
 P8Ø5Ø-LOOP.
         IF RES-DAY-NUM(Q) > Ø AND
            RES-DAY-NUM(Q) < 9
           MOVE RES-DAY-NUM(Q) TO X
           MOVE INPUT-DATA TO RESOURCE-TIMES(I, X)
           EVALUATE X
           WHEN 1
           MOVE SUNDAY TO DAY-NAME(I, X)
```

```
                WHEN 2
                MOVE MONDAY TO DAY-NAME(I, X)
                WHEN 3
                MOVE TUESDAY TO DAY-NAME(I, X)
                WHEN 4
                MOVE WEDNESDAY TO DAY-NAME(I, X)
                WHEN 5
                MOVE THURSDAY TO DAY-NAME(I, X)
                WHEN 6
                MOVE FRIDAY TO DAY-NAME(I, X)
                WHEN 7
                MOVE SATURDAY TO DAY-NAME(I, X)
                WHEN 8
                MOVE HOLIDAY TO DAY-NAME(I, X)
                END-EVALUATE
                ADD 1 TO Q
                GO TO P8Ø5Ø-LOOP
              ELSE GO TO P8Ø5Ø-READ
              END-IF.
      P8Ø5Ø-READ-EXIT.
          EXIT.
      P9999-RETURN.
          EXEC  CICS  RETURN         END-EXEC.
```

Shalom Wasserman
CICS Systems Programmer (Israel)

CICSPlex SM dynamic workload management – workloads

In this article we will look at the various types of workload that can be balanced using dynamic workload management. CICS, along with CICSPlex SM, provides the ability to route many types of CICS request. In the following sections we will discuss each of these in turn.

In the Figures we have two layers of regions: TORs and AORs. The lines connecting each region correspond to CICS connections. Workload management criteria have been defined via WLMDEF, TRANGRP, WLMGROUP, WLMSPEC, and associated system groups. That information is illustrated in the top left-hand corner of the diagrams. The RDO attributes that control dynamic routing are identified to the right of the diagram.

DYNAMIC TRANSACTION ROUTING

- Available since: CICS 3.3
- Routing model: DTRPGM
- SystemGroup: AORSET
- SystemGroup: TORSET.

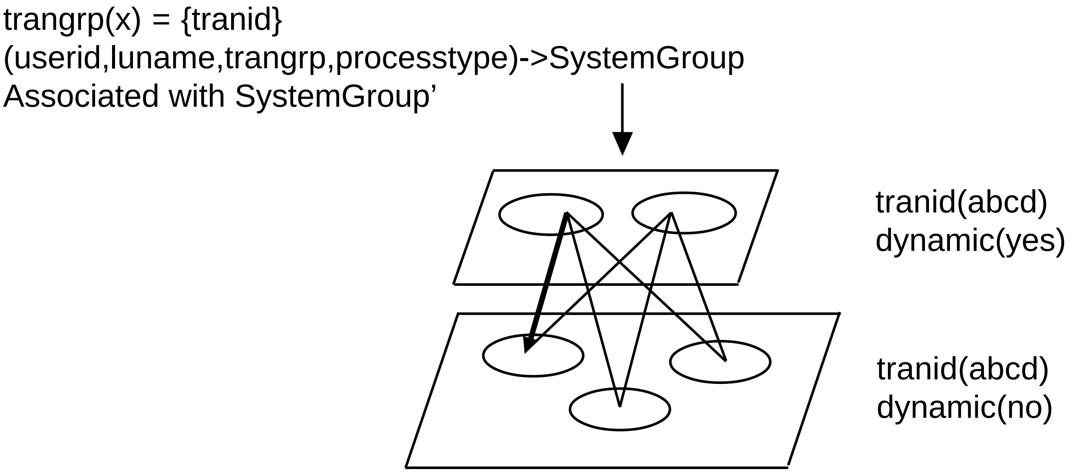

trangrp(x) = {tranid}
(userid,luname,trangrp,processtype)->SystemGroup
Associated with SystemGroup'
tranid(abcd)
dynamic(yes)
tranid(abcd)
dynamic(no)

Figure 1: Dynamic transaction routing

Requestors are out in the network, TORs are routers, and AORs are targets.

In Figure 1 we see an invocation of a transaction by an end user. Since the transaction is defined as dynamic (or not defined and controlled by the SIT parm), routing is invoked. CICS passes tranid, userid, and luname to the routing exit. First the associated trangroup is identified (specific or default). If an affinity exists, the target is returned to CICS. Next, via the separation criteria, the target AORs are identified. Weights are then calculated and the region with the lowest weight chosen. If an affinity is defined but not active, an affinity element is created. The load count for the specific region is incremented. The target is then returned to CICS, which routes the request to the target region.

On completion of the transaction in the AOR, control is passed back to the AOR and routing is invoked again (terminate or abend termination). The load count for the region is decremented, and any abend is noted for use by abend avoidance.

EXEC CICS START TERMID

- Available since: CICS TS 1.3
- Routing model: DTRPGM
- SystemGroup: AORSET

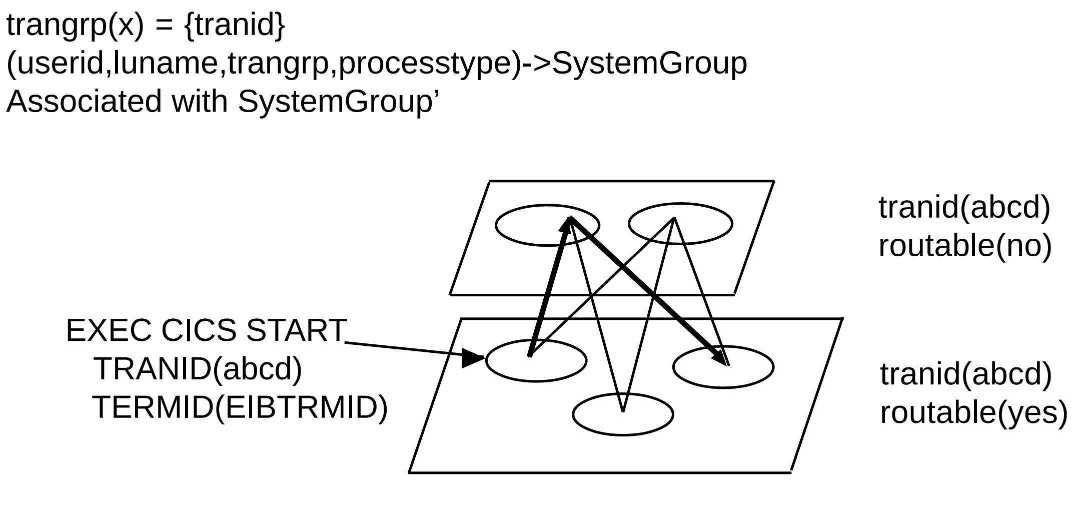


Figure 2: EXEC CICS START TERMID

- SystemGroup: TORSET.

AORs are requestors, TORs are routers, and AORs are targets.

The ability to route START TERMID requests was provided in CICS TS 1.3. Prior to that, state data was maintained by CICS in the requesting region. Consequently, the work had to be routed back to the same AOR. In CICS TS 1.3, the state data is shipped to the TOR and dynamic routing can occur. This therefore requires that all CICS regions in Figure 2 are at CICS TS 1.3 level.

EXEC CICS START:

- Available since: CICS TS1.3
- Routing model: DSTRPGM
- SystemGroup: AORSET
- SystemGroup: AORSET.

AORs are requestors, routers, and targets.

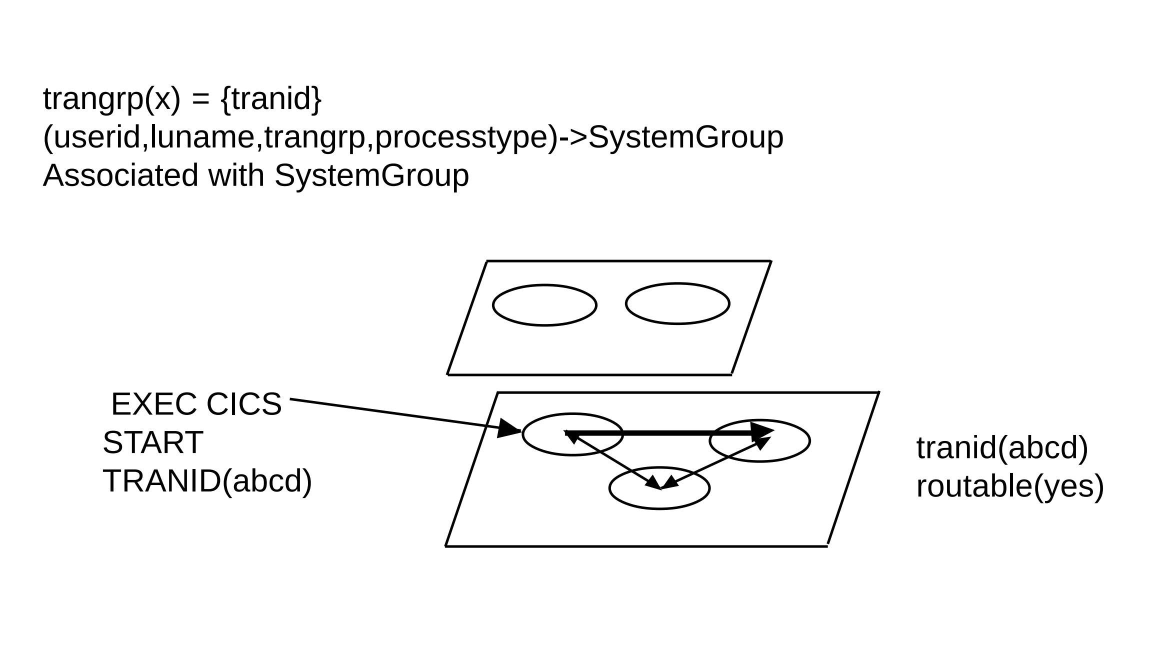

trangrp(x) = {tranid}
(userid,luname,trangrp,processtype)->SystemGroup
Associated with SystemGroup
EXEC CICS
START
TRANID(abcd)
tranid(abcd)
routable(yes)

Figure 3: EXEC CICS START

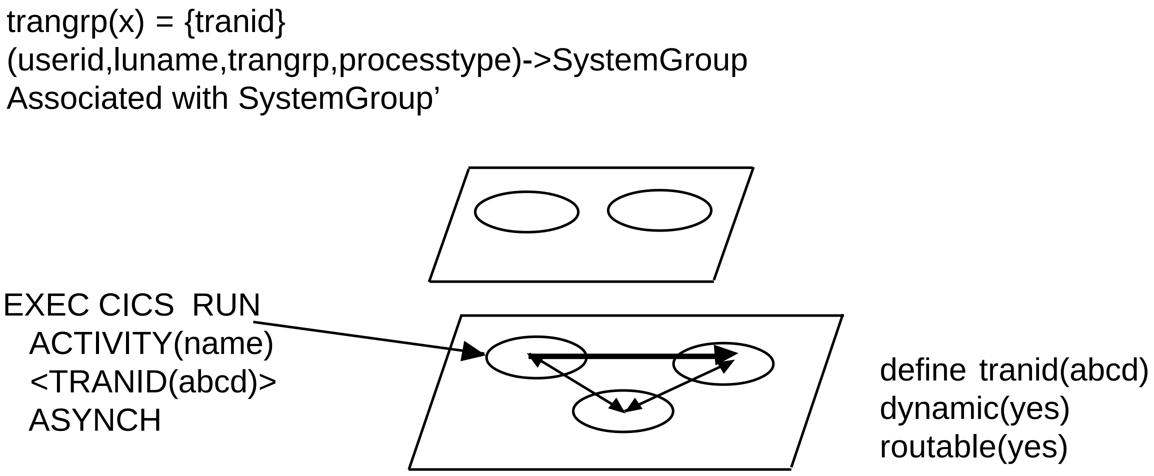
Dynamic routing of EXEC CICS START requests was introduced in CICS TS 1.3. Here we have an application requesting a START. If we assume that the AORs are clones of each other, then every region is a potential requestor, router, and target! All regions must be at least CICS TS 1.3 level.

In Figure 3, we have a requestor who requests execution of an asynchronous request. After the request, he has no idea of when that request is processed because CICS could dispatch the START later and no termination flow comes back to the requestor. The load count is incremented just prior to dispatch in the target (rtinit) and decremented at the target on termination (rtterm/ rtabd).

There is also the concept of originating region, ie one cannot daisychain requests. Once a routing decision has been made to a target, that target cannot invoke dynamic routing yet again.

CICS BUSINESS TRANSACTION SERVICES REQUESTS:

- Available since: CICS TS 1.3



trangrp(x) = {tranid}
(userid,luname,trangrp,processtype)->SystemGroup
Associated with SystemGroup'

EXEC CICS RUN
ACTIVITY(name)
<TRANID(abcd)>
ASYNCH

define tranid(abcd)
dynamic(yes)
routable(yes)

Figure 4: CICS Business Transaction Services Requests

- Routing model: DSTRPGM
- SystemGroup: AORSET
- SystemGroup: AORSET.

AORS are routers, requestors, and targets.

In Figure 4, CBTS RUN ASYNCH requests result in calls to routing and a target is chosen. This may also occur when an activity is paged back into CICS following the triggering of an event.

DYNAMIC PROGRAM LINK

- Available since: CICS TS1.3
- Routing model: DTRPGM
- SystemGroup: AORSET
- SystemGroup: TORSET.

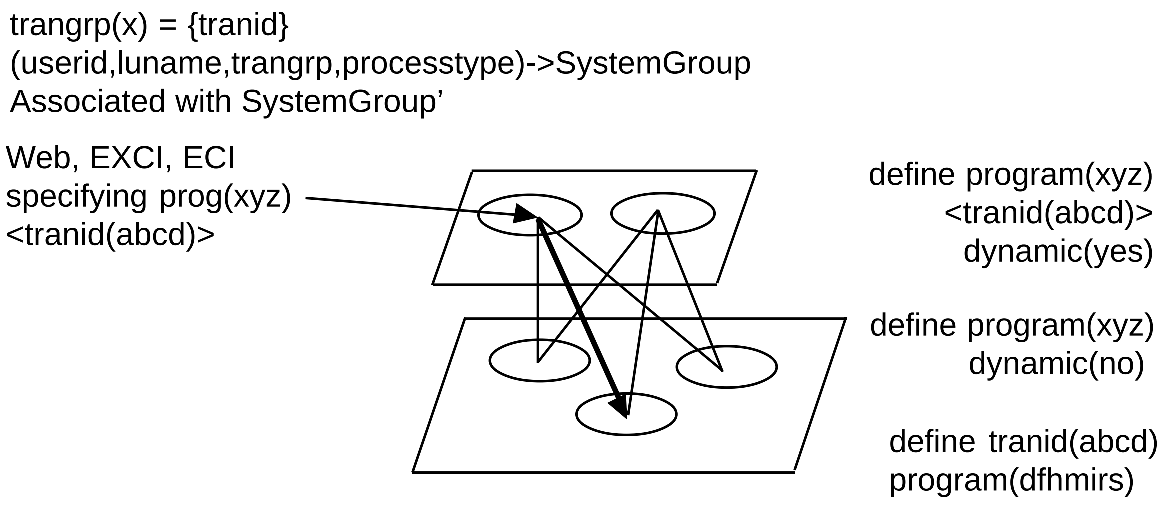


Figure 5: Dynamic Program Link

Requestors are out in the network, TORs are routers, and AORs are targets.

The ability to dynamically route DPL requests was introduced in CICS TS 1.3. However, unlike the other types, only the router/requester is affected. The targets can be older systems (eg CICS 4.1). Since this is a way for Web traffic entering into CICS, and Web is so unpredictable in volume, the introduction of a CICS TS1.3 TOR is all that's required to dynamically balance this type of workload.

Note that CICSPlex SM defines routing criteria with respect to transaction ids, not program names. CICS associates tranids with the program by the following priority of tranid on request; tranid on program definition; CSMI. Note that if the tranid is not CSMI, then there must be a transaction definition for that tranid resolving to the mirror program in the target regions. This is illustrated in Figure 5.

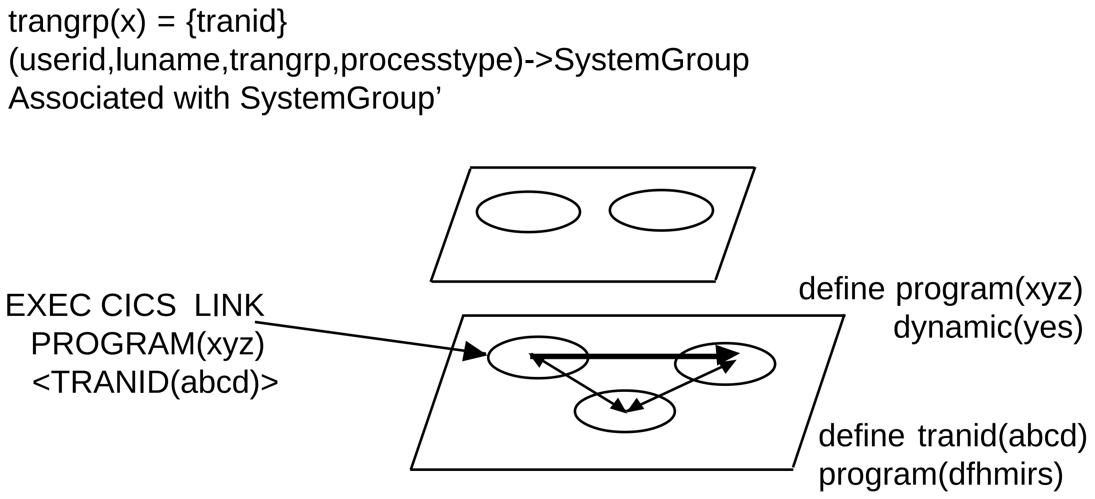


Figure 6: Peer-to-peer dynamic DPL

PEER-TO-PEER DYNAMIC DPL

- Available since: CICS TS1.3
- Routing model: DTRPGM
- SystemGroup: AORSET
- SystemGroup: AORSET.

AORs are requestors, routers, and targets.

Although Figure 6 is topologically equivalent to earlier examples, there are some differences. Routing occurs as above. The differences are in goal management.

Goal management is by tranid (both within CICSPlex SM and MVS WLM). Mapping of program to tranid is performed by CICS. Prior to the invocation of routing, CICS classifies the tranid via a call to the MVS WLM. For simple inbound DPLs, it is reasonable to assume that the goal for this tranid is the goal for the program (ie one in one out). A Performance Index can therefore be meaningfully calculated.

In the peer-to-peer case, one cannot make such an assumption, since the classification is of the invoking transaction (ie the requestor), not the invoked program. Clearly the requestor could invoke the program many times during one invocation of the requesting transaction, therefore for peer-to-peer, performance indexes are not calculated. Inbound or peer-to-peer is determined by inspection of EIBTRNID. If this is the routing tranid, then the request is inbound.

There is also the concept of originating region, ie one cannot daisychain requests. Once a routing decision has been made to a target, that target cannot invoke dynamic routing yet again.

DYNAMIC WORKLOAD MANAGEMENT OF ENTERPRISE JAVA BEANS

- Available since: CICS TS2.1
- Routing model: DSRTPGM

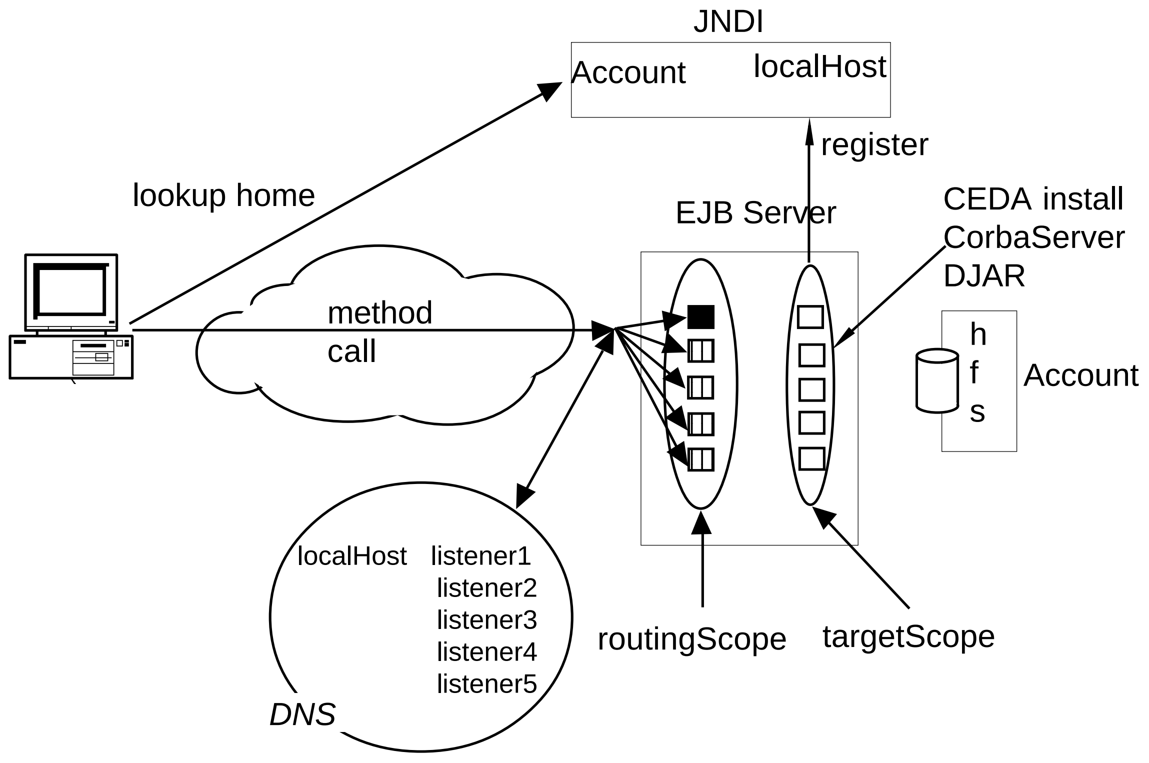


Figure 7: Dynamic Workload management of EJBs

- SystemGroup: AORSET
- SystemGroup: TORSET.

Requestors are out in the network, TORs are routers, and AORs are targets.

In CICS TS 2.1 the ability to execute Enterprise Java Beans in a logical CICS server was introduced. EJBs are installed into AORs and the generic listener TCP/IP address published in the JNDI namespace. Client code can therefore look up the EJB home and be session managed via a DNS to a specific CICS listener region. Dynamic routing of the request to the chosen AOR occurs. This mechanism is somewhat analogous to VTAM generic resource balancing and DSRTPGM dynamic routing. Identification of the target is a two-stage process, as we shall see

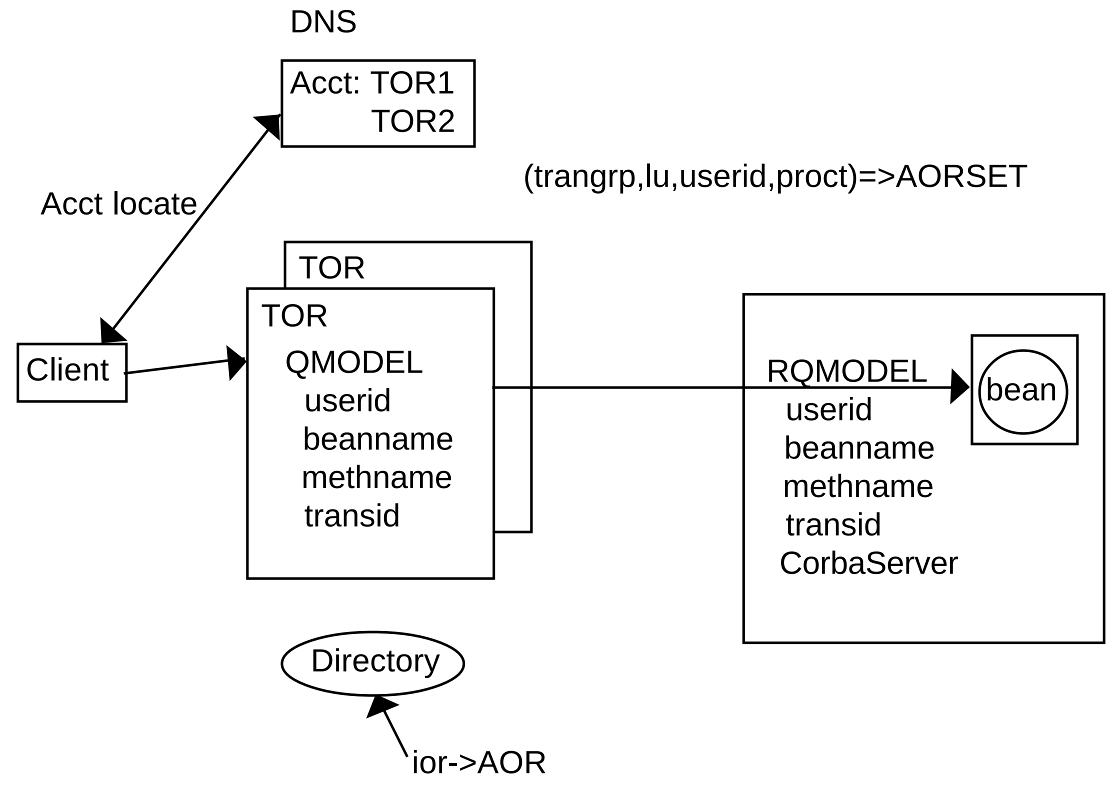


Figure 8: Listener region

in Figure 7.

In the listener region a tranid is associated with the bean method via information contained in a Requestmodel definition. This provides the tranid used for making the routing decision. On arrival at the target region, since there may be multiple Corbaservers, the specific CorbaServer is identified again with reference to the requestmodel definition. This is illustrated in Figure 8.

Only the initial invocation is a request to routing to balance (rtsel). If state is maintained in the AOR, then CICS maintains this relationship and subsequent routing calls are made to simply tell routing the load implication (rtntfy).

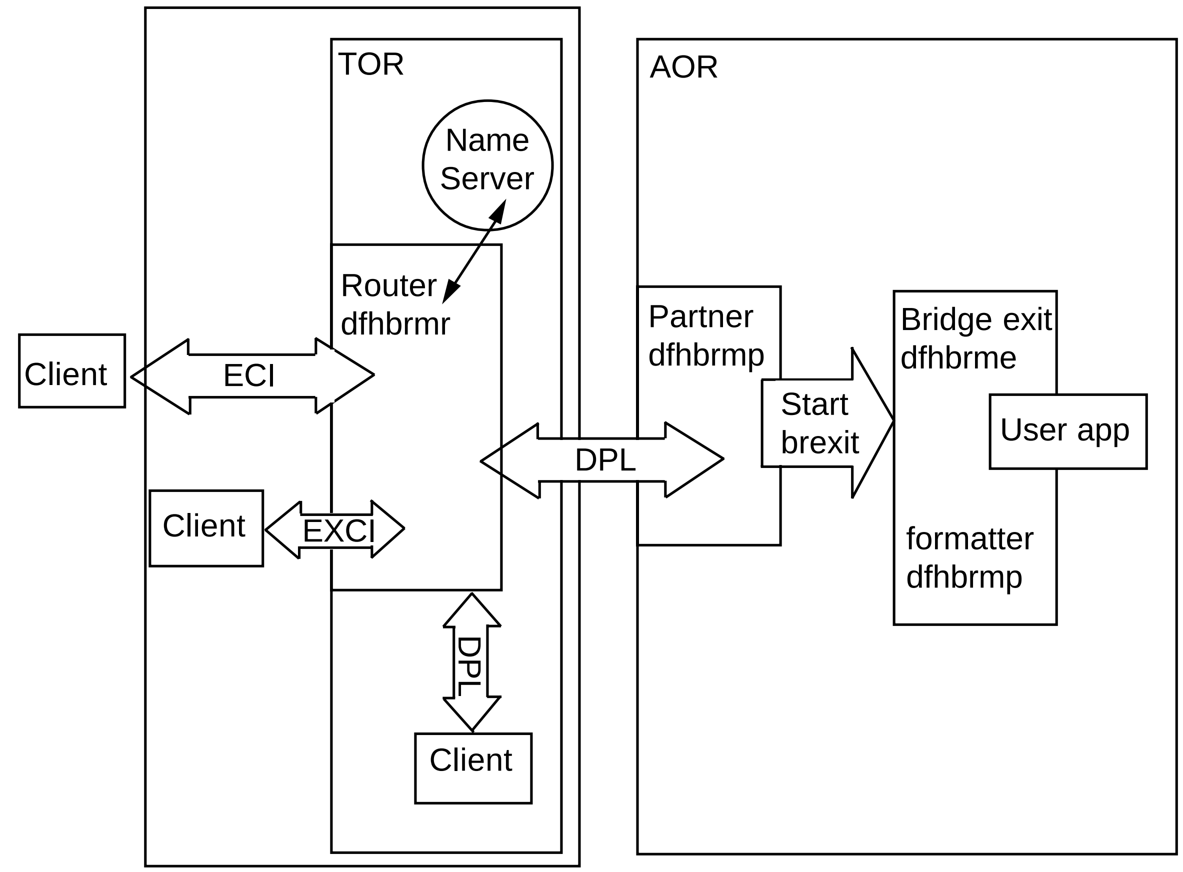


Figure 9: Dynamic Bridge requests

DYNAMIC BRIDGE REQUESTS:

- Available since: CICS TS2.2
- Routing model: DTRPGM
- SystemGroup: AORSET
- SystemGroup: TORSET.

Requestors are out in the network, TORs are routers, and AORs are targets.

CICS TS 2.2 introduced the ability to route dynamic bridge requests. Workload separation is supported via trangroup and

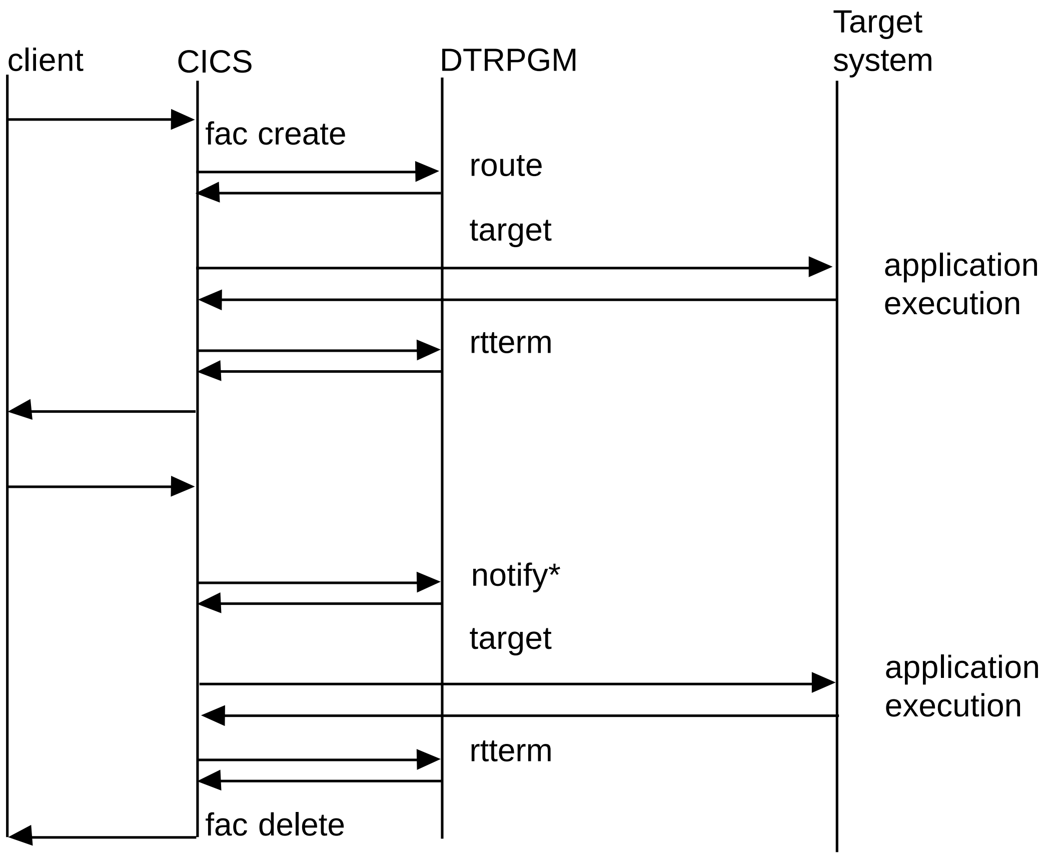


Figure 10: Dynamic Bridge requests

Workload type	*Router*	*Target*
DTR	3.3	4.1
DPL	5.3	4.1
START	5.3	5.3
CBTS	5.3	5.3
EJB	6.1	6.1
Bridge	6.2	6.1

Figure 11: CICS Releases summary

userid, but Luname is not predictable unless the customer site codes an exit that makes it so. BRIDGE affinities managed by CICS code CICSPlex SM are initially called for route select. Thereafter only for route notify. See Figures 9 and 10.

ROUTER AND TARGET RELEASES

In all the above we have identified the minimum release that a CICS system needs to be to support the routing function. What happens if this is not satisfied? As part of the potential target determination, CICSPLex SM checks the target systems release level. If that release level is not appropriate, then it is removed from the potential target list. A summary of CICS Releases is provided in Figure 11.

NEXT ARTICLE

In the next article we will look at implementing dynamic workload management in a running CICS environment.

Dr Paul Johnson
CICS Transaction Server Systems Management Planning/Development
IBM (UK)

Book review – *Murach's CICS Desk Reference*

Murach's CICS Desk Reference, written by Raul Menendez and Doug Lowe, is published by Mike Murach and Associates. The 592-page book is aimed squarely at experienced programmers who write or maintain CICS programs. It focuses on CICS TS 1.3 and 2.2, because IBM has dropped (or is dropping) support for earlier versions.

The book is divided into four main sections. The first provides CICS programming guidelines and has chapters on program design, programming fundamentals, JCL, testing and debugging, and model programs.

The second section is a CICS command reference, looking at the syntax of commands and then over 270 pages looking at the actual commands themselves. This includes the code itself, the syntax, and a description of the options. There's also exceptional conditions, notes and tips, and coding examples.

The third section looks at Basic Mapping Support (BMS), focusing on definitions for 3270 displays and creating HTML documents from BMS maps.

The third section, some 50 pages, comprises useful AMS commands, CICS resource definition, service transactions (CEMT commands, etc), and a handy reference table.

All in all, a very useful reference book.

CICS questions and answers

Q Is there a way to get the Jobname CICS is running under?

A EXEC CICS INQUIRE SYSTEM JOBNAME(jobname).

Q I operate SAP R/2 at CICS/MVS ESA 4.1. I want to prevent a single user logging on to CICS with the same user ID several times. How can I do this?

A The SIT parameter SNSCOPE allows you to prevent the same user multi-logging on to CICS. Setting SNSCOPE=CICS will only allow each userid to sign on once in each CICS region.

Q What's the difference between CICS Web Support and CICS Web Support with WebServer plug-in?

A CICS Web Support uses CICS as a Web server, accepting HTTP requests from and sending HTTP responses to Web clients through a TCPIPSERVICE. This uses a URM as an analyser, and the Web task runs under a Web alias transaction. CICS Web Support with WebServer plug-in uses the plug-in instead of the analyser. This plug-in runs in the HTTP Server for OS/390, then uses EXCI to access the CICS Business Logic Interface. This will run under a mirror transaction. CICS Web Support connects directly into CICS, allowing the data input and output to exceed the 32KB limit by using the Web API. However, CWS with the WebServer plug-in, because it uses EXCI with a COMMREA, still has the 32KB limitation. The direct connection uses the analyser within CICS to determine the format of the request, whereas the plug-in uses directives within the configuration file of the HTTP Server. Essentially, the first turns CICS into a WebServer, whereas the second opens CICS up to EXCI requests from the WebServer.

If you have any CICS-related questions, please send them in and we will do our best to find answers. Alternatively, e-mail them directly to cicsq@xephon.net.

CICS news

NEON Systems has announced that its Shadow JDBC Adapter for mainframe integration has passed the WebSphere Self-Testing process and will be added to IBM's Self-Tested Software support page. The IBM-sponsored programme facilitates self-testing of WebSphere complementary software through an IBM-endorsed testing process.

Shadow software can be deployed with WebSphere to provide JCA or JDBC access to mainframe data sources and transaction environments, supporting DB2, CICS/TS, IMS/TM, IMS/DB, VSAM, ADABAS, Natural/ACI, flat files, IDMS, and other z/OS mainframe data and transactional sources.

For further information contact:
NEON Systems, 14100 Southwest Freeway, Suite 500, Sugarland, TX 77478, USA.
Tel: (281) 491 4200.
URL: http://www.neonsys.com.

* * *

As an alternative platform for running CICS, UMX Technologies has announced Mainframe in a Box, a small to medium-sized mainframe running on a specially designed Intel-based UMX Server using Microsoft Windows 2000 or XP as the graphical user interface.

The installed software mainframe is UMX Virtual Mainframe V4.2 microcode engine, which functions between the IBM operating system and the common Intel-based hardware to 'virtualize' the hardware to the software.

Mainframe in a Box uses the original IBM operating system and existing applications, without a single modification. All operating systems (OS/390, z/OS, VM, z/VM, and VSE) and CICS, PL/I, IMS, COBOL, and DB2 applications run on this new mainframe.

PCI add-in cards support ESCON and Parallel Channel extension technologies to provide mainframe connectivity to legacy devices and other mainframes.

For further information contact:
UMX Technologies, Kruislaan 400 NL-1098 SM, Amsterdam, The Netherlands.
Tel: (+31)20 888 4044.
URL: http://www.umxtech.com/index0.html.

* * *

IBM has released Tivoli System Automation for OS/390 (SA OS/390) under the Tivoli Environment-Managed Licensing Model, which means pricing and licensing are based on what is managed rather than how the software is implemented.

The software is designed to automate I/O, processor, and system operations and includes canned automation for CICS, IMS, IBM Tivoli Workload Scheduler, and DB2.

Key functions include Parallel Sysplex application automation, policy-based self-healing, integration, processor operations (ProcOps) and I/O operations, and SAP R/3 high-availability automation.

For further information contact your local IBM representative.
URL: http://www.tivoli.com/products.

* * *