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Xephon
27-35 London Road
Newbury
Berkshire RG14 1JL
England
Telephone: 01635 38030
From USA: 01144 1635 38030
E-mail: trevore@xephon.com

North American office

Xephon/QNA
1301 West Highway 407, Suite 201-405
Lewisville, TX 75077-2150
USA
Telephone: 940 455 7050

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Editor

Trevor Eddolls

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RDO displays sorted by date

'Sort changed' is one of the most commonly used commands in TSO. When using RDO, the ability to list RDO entities by descending date and timestamp can be useful. Support staff often need to check whether a known change has been made and, during problem determination, whether a change has been made in error. This is particularly useful at sites where access to CEDA is widely available (which is often the case in development systems).

The utility presented here provides this function for entries within RDO Groups and Lists. It was developed under CICS Version 4 in an OS/390 environment.

The first map allows selection of the CSD (see Figure 1). This particular implementation assumes that a single CSD is shared across an environment. The three allowable environments are DEV, ACC, and PRD.

```
SYDQ Partition: DEVL — CICS Region: CLCBALF DATE: 23/09/1999 TIME: 07:27:44
                     — cccccccc —

                     RDO Sorted Displays

                     DEV, ACC or PRD?   DEV
                     RDO Entry?   __
                     From Date?                 (eg 1999.001 or leave blank)
                     Please Enter RDO Group or List Name
                     To exit press Clear or PF3
```

Figure 1: Selection screen

The RDO entry is assumed to be a Group Name. Lists are recognized by using the convention that list names are of the form xxxCICS. The logic in program SYDRDQ close to the label GDISP will need to be changed to suit your own List naming convention. The RDO Group Name entered can be generic – for example 'PDLA*' would expand all groups beginning with PDLA within the sorted display.

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The ‘From Date’ is provided to restrict the displayed entries to those entries changed or added after the specified date. There is an upper limit on the number of RDO entries that can be selected because the response area from DFHEDAP is restricted to 30,000 bytes.

A detail screen is given in Figure 2, showing the RDO entries in descending date and timestamp order.

```
SYDP Partition:  DEVL  — CICS Region: CLCBALF  DATE: 23/Ø7/1999 TIME: Ø7:58:43
                       — cccccccc —            JULIAN: 1999.2Ø4
                                                    CSD:   DEV
                          RDO Display By Date
     Name         Type             GROUP      Date     Time
     SYLONG       PROGRAM          P###SYS  1999.179  Ø9.27.24
     SYSHUT       PROGRAM          P###SYS  1999.179  Ø9.27.24
     SYG8         PROGRAM          P###SYS  1999.179  Ø9.27.23
     SYG9         PROGRAM          P###SYS  1999.179  Ø9.27.23
     SYMSYG8      MAPSET           P###SYS  1999.179  Ø9.27.23
     SYMSYG9      MAPSET           P###SYS  1999.179  Ø9.27.23
     SYMLONG      MAPSET           P###SYS  1999.179  Ø9.27.Ø3
     DFHXTENF     PROGRAM          P###SYS  1999.175  16.Ø6.54
     SYSGMT       PROGRAM          P###SYS  1999.154  15.31.16
     SYCPLTCO     PROGRAM          P###SYS  1998.335  16.54.Ø1
     SYSDMPCO     PROGRAM          P###SYS  1998.247  13.Ø6.44
     SYC24SL      PROGRAM          P###SYS  1998.216  15.16.37
     SYC24EP      PROGRAM          P###SYS  1998.141  17.Ø8.Ø4
     SYC24EU      PROGRAM          P###SYS  1998.141  17.Ø8.Ø4
     SYC24EZ      PROGRAM          P###SYS  1998.141  17.Ø8.Ø4
+    SYC24EB      PROGRAM          P###SYS  1998.141  17.Ø8.Ø4

     Results: 1  To   16  Of   68
                        To exit press Clear or PF3              PF8(FWD)
```

Figure 2: Sorted RDO displays – detail screen

The current Julian date is shown in the heading for comparison with the group entries. The year is shown in YYYY format, although the data returned from DFHEDAP contains only a two-digit year. This is to enable the sorted displays to continue beyond the millennium (the code assumes that years before 50 are after 2000).

PF7 and PF8 can be used to page backwards and forwards through the

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display. PF7 and PF8 only appear as options on the bottom line when they are available.

ERROR MESSAGES

The following error messages may be encountered:

- 'Group xxxxx not found' – a group name has been entered that does not exist.
- '! Maximum reached. Narrow your search' – the 30,000 byte limit has been exceeded.
- 'Someone is using CEDA – try later' – the requested CSD is already in use and cannot be allocated.

INSTALLATION INSTRUCTIONS

To install this utility:

- Assemble the maps SYMDRDP and SYMDRDQ and programs SYDRDP and SYDRDQ into an appropriate library in your CICS RPL chain.
- Add RDO definitions for the above maps and programs. The programs are DATALOCATION(ANY).
- Add RDO transaction definitions for SYDP and SYDQ, pointing to programs SYDRDP and SYDRDQ respectively.

PROGRAM SYDRDQ – SORTED RDO DISPLAY TOP LEVEL

Adjust the constants at the bottom of this program to your own CSD dataset names. The logic will need slight adjustment if you use a convention other than a single CSD for DEV, ACC, and PRD.

The LPAR name arrived at in section SNDMAP0 is also site-dependent.

```
*ASM XOPTS(SP)
SYDRDQ  RMODE ANY
         TITLE 'SYDRDQ - RDO FRONT END    '
*
```

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```
*
R1        EQU  1
R2        EQU  2
R3        EQU  3
R4        EQU  4       WORK REGISTER
R5        EQU  5
R6        EQU  6
R7        EQU  7
DATAREG   EQU  8       DATA REGISTER
EIBREG    EQU  9       EIB REGISTER
RA        EQU  1Ø      LINK REGISTER
BASE      EQU  11      PROGRAM BASE REGISTER
          COPY DFHAID
DFHEISTG  DSECT
APPL      DS   CL8
ATIME     DS   PL8
TSTAT     DS   CL1
SUBMENV   DS   CL4
SUBMENT   DS   CL28
CSDDSN    DS   CL44
          COPY SYMDRDQ
SYDRDQ    DFHEIENT CODEREG=(BASE),EIBREG=(EIBREG),DATAREG=(DATAREG)
          B    BEGIN
          DC   CL12'PROGRAM ID: '
          DC   CL8'SYDRDQ '
          DC   CL4';   '
          DC   CL24'ASSEMBLY TIME AND DATE:'
          DC   CL8'&SYSTIME'
          DC   CL8'&SYSDATE'
BEGIN     DS   ØH
          CLC  EIBCALEN,=H'Ø'         Any COMMAREA?
          BNE  BEGINØ                 Been here before
          B    SNDMAPØ                Send Map
BEGINØ    DS   ØH
          L    R1,DFHEICAP            Address COMMAREA
          MVC  TSTAT,Ø(R1)            Overlay TSTAT
        EXEC CICS HANDLE AID PF3(RETURN1) CLEAR(RETURN1)
BEGIN1    DS   ØH
          MVI  TSTAT,X'ØØ'
        EXEC CICS RECEIVE MAP('SYMDRDQ')
        EXEC CICS HANDLE CONDITION INVREQ(BUSY)
*
* Display by Date Processing
*
          MVC  CSDDSN,DEVCSD
          CLC  ENVREI,=C'DEV'
          BE   ASSCSD
          MVC  CSDDSN,ACCCSD
          CLC  ENVREI,=C'ACC'
```


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```
          BE   ASSCSD
          MVC  CSDDSN,PRDCSD
          CLC  ENVREI,=C'PRD'
          BE   ASSCSD
          MVC  ENVREO,=C'???'
          B    SNDMAPØ
ASSCSD    DS   ØH
          MVC  SUBMENV,ENVREI
        EXEC CICS SET FILE('DFHCSD') DSNAME(CSDDSN)
          CLC  PROPEI(2),=C'__'            Nothing entered
          BE   SNDMAPØ
          MVC  SUBMENT,SPACES
          MVC  SUBMENT+2Ø(8),JDATEI        Pass date if entered
          CLC  PROPEI+3(4),=C'CICS'        List ?
          BNE  GDISP
          MVC  SUBMENT(16),SUBMENTL  LIST(  )
          MVC  SUBMENT+5(8),PROPEI
          B    DRDPCAL
GDISP     DS   ØH
          MVC  SUBMENT(16),SUBMENTG        GROUP(        )
          MVC  SUBMENT+6(8),PROPEI
DRDPCAL   DS   ØH
        EXEC CICS ASSIGN APPLID(APPL)
          CLC  APPL+3(1),=C'C'             PROD is C
          BNE  DRDPCAM
          MVC  SUBMENV,=C'PROD'
DRDPCAM   DS   ØH
        EXEC CICS RETURN TRANSID('SYDP') IMMEDIATE                      *
               COMMAREA(SUBMENV) LENGTH(DRDPCLEN)
SNDMAPØ   DS   ØH
        EXEC CICS ASSIGN APPLID(APPL)
          MVC  REGIO,APPL                  Move Applid to Map
          MVC  PARTIO,=C'DEVL'
          CLC  APPL+3(1),=C'C'             PROD is C
          BNE  GTIME
          MVC  PARTIO,=C'PROD'
GTIME     DS   ØH
        EXEC CICS ASKTIME ABSTIME(ATIME)
        EXEC CICS FORMATTIME ABSTIME(ATIME) DDMMYYYY(DATEO)             *
               TIME(TIMEO) DATESEP TIMESEP
        EXEC CICS SEND MAP ('SYMDRDQ') ERASE FREEKB
*
* Return but come back
*
RETURNØ   DS   ØH
        EXEC CICS RETURN TRANSID(EIBTRNID)                              *
               COMMAREA(TSTAT) LENGTH(COMMAL)
*
* Return and finish
```

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```
*
RETURN1  DS   OH
* Reset CSD to ALF on Exit
       EXEC CICS HANDLE CONDITION INVREQ(BUSY)
         MVC  CSDDSN,ACCCSD
       EXEC CICS SET FILE('DFHCSD') DSNAME(CSDDSN)
       EXEC CICS SEND CONTROL ERASE FREEKB
       EXEC CICS RETURN
*
* Return when CEDA in use
*
BUSY     DS   ØH
       EXEC  CICS SEND TEXT                                          *
              FROM(QMESS)                                            *
              ERASE WAIT
       EXEC CICS RETURN
*
* Constants
*
COMMAL   DC   H'1'
DRDPCLEN DC   H'32'
SUBMENTG DC   CL16'GROUP(        ) '
SUBMENTL DC   CL16'LIST(        )  '
SPACES   DC   CL32' '
DEVCSD   DC   CL44'xxx.xxxxxxxx.DFHCSD' <===
ACCCSD   DC   CL44'xxx.xxxxxxxx.DFHCSD' <=== Change to appropriate DSNs
PRDCSD   DC   CL44'xxx.xxxxxxxx.DFHCSD' <===
QMESS    DC   CL5Ø'Someone is using CEDA - try later      '
         LTORG
         END   SYDRDQ
```

MAP SYMDRDQ – USED BY PROGRAM SYDRDQ

You should add your own company name where indicated.

```
MAPSET3  DFHMSD TYPE=&SYSPARM,MODE=INOUT,CTRL=FREEKB,LANG=ASM,         *
             TIOAPFX=YES
SYMDRDQ  DFHMDI SIZE=(24,8Ø),LINE=1,COLUMN=1,MAPATTS=(COLOR)
         DFHMDF POS=(Ø1,1),LENGTH=4,COLOR=GREEN,                       *
             INITIAL='SYDQ'
         DFHMDF POS=(Ø1,Ø6),LENGTH=11,COLOR=NEUTRAL,                   *
             INITIAL='Partition :'
PARTI    DFHMDF POS=(Ø1,18),LENGTH=4,COLOR=NEUTRAL,                    *
             INITIAL='rrrr'
         DFHMDF POS=(Ø1,23),LENGTH=17,COLOR=NEUTRAL,                   *
             INITIAL='– CICS Region :'
REGI     DFHMDF POS=(Ø1,41),LENGTH=7,COLOR=NEUTRAL,                    *
             INITIAL='rrrrrrr'
         DFHMDF POS=(Ø1,49),LENGTH=5,COLOR=BLUE,INITIAL='DATE:'
```


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```
DATE     DFHMDF POS=(Ø1,55),LENGTH=1Ø,COLOR=BLUE,INITIAL='XX.XX.XXXX'
         DFHMDF POS=(Ø1,66),LENGTH=5,COLOR=BLUE,INITIAL='TIME:'
TIME     DFHMDF POS=(Ø1,72),LENGTH=8,COLOR=BLUE,INITIAL='XX.XX.XX'
         DFHMDF POS=(Ø2,23),LENGTH=2Ø,COLOR=NEUTRAL,                   *
             INITIAL='- cccccccc -   '       <=== Company Name Here
         DFHMDF POS=(Ø4,23),LENGTH=2Ø,COLOR=NEUTRAL,                   *
             INITIAL='RDO Sorted Displays '
         DFHMDF POS=(Ø6,23),LENGTH=16,COLOR=BLUE,                      *
             INITIAL='DEV, ACC or PRD?'
ENVRE    DFHMDF POS=(Ø6,4Ø),LENGTH=3,COLOR=RED,ATTRB=(FSET),           *
             INITIAL='DEV'
         DFHMDF POS=(Ø6,44),LENGTH=1
         DFHMDF POS=(Ø7,23),LENGTH=1Ø,COLOR=BLUE,                      *
             INITIAL='RDO Entry?'
PROPE    DFHMDF POS=(Ø7,34),LENGTH=8,COLOR=RED,ATTRB=(FSET,IC),        *
             INITIAL='__      '
         DFHMDF POS=(Ø7,44),LENGTH=1
         DFHMDF POS=(Ø8,23),LENGTH=1Ø,COLOR=BLUE,                      *
             INITIAL='From Date?'
JDATE    DFHMDF POS=(Ø8,34),LENGTH=8,COLOR=RED,ATTRB=(FSET),           *
             INITIAL='        '
         DFHMDF POS=(Ø8,46),LENGTH=3Ø,COLOR=BLUE,                      *
             INITIAL='(eg 1998.ØØ1 or leave blank)'
PROMPT   DFHMDF POS=(Ø9,23),LENGTH=4Ø,COLOR=NEUTRAL,                   *
             INITIAL='Please Enter RDO Group or List Name     '
         DFHMDF POS=(1Ø,23),LENGTH=26,COLOR=BLUE,                      *
             INITIAL='To exit press Clear or PF3'
         DFHMSD TYPE=FINAL
         END
```

PROGRAM SYDRDP – SORTED RDO DISPLAY DETAIL

The LPAR name arrived at in section SNDMAP2 is site-dependent.

```
*ASM XOPTS(SP)
SYDRDP  RMODE ANY
    TITLE 'SYDRDP - Sorted RDO Displays'
*
*      This program will display the RDO GROUP or LIST
*      PASSED in the COMMAREA sorted into change date/time
*      order. The display is scrollable.
*
R4       EQU  4       WORK REGISTER
R5       EQU  5       WORK REGISTER
R6       EQU  6       WORK REGISTER
R7       EQU  7       WORK REGISTER
DATAREG  EQU  8       DATA REGISTER
EIBREG   EQU  9       EIB REGISTER
RA       EQU  1Ø      WORK REGISTER
```

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```
BASE     EQU  11      PROGRAM BASE REGISTER
         COPY DFHAID
DFHEISTG DSECT
INLENG   DS   H
WKDET    DS   CL57
COMMAS   DS   ØH               COMMAREA start for SYDRDP
CURPOS   DS   H
MOREBWD  DS   X
MOREFWD  DS   X
TOTFROM  DS   PL3
RDOENV   DS   CL4
RDOCMD   DS   CL22
RDODAT   DS   CL8
*                              COMMAREA end
TOTTO    DS   PL3
TOTALL   DS   PL3
ATIME    DS   PL8
APPL     DS   CL8
OUTCTR   DS   CL6
CEDAPARM DS   ØF               COMMAREA Start FOR CEDA call
CEDAPRM1 DS   F                RDO Command Address
CEDAPRM2 DS   F                RDO Command Length Address
CEDAPRM3 DS   F                RDO Mode Indicator Address
CEDAPRM4 DS   F                RDO Response Address
CEDAPRM5 DS   F                RDO Response Length Adress
         COPY SYMDRDP
HERE     DS   F
COMRES   DS   CL3ØØØØ
COMEND   DS   CL6Ø
SYDRDP   DFHEIENT CODEREG=(BASE),EIBREG=(EIBREG),DATAREG=(DATAREG)
         B    BEGIN
         DC   CL12'PROGRAM ID: '
         DC   CL8'SYDRDP '
         DC   CL4';   '
         DC   CL24'ASSEMBLY TIME AND DATE:'
         DC   CL8'&SYSTIME'
         DC   CL8'&SYSDATE'
BEGIN    DS   ØH
         MVC  HERE,=C'HERE'          Eyecatcher
         CLC  EIBCALEN,=H'32'        COMMAREA of 32?
         BE   BEGIN1                 First time through
         CLC  EIBCALEN,=H'41'        COMMAREA not 41?
         BNE  RETURN1                Reject entry
         L    RA,DFHEICAP            Valid entry
         MVC  COMMAS(41),Ø(RA)       Move into dynamic
       EXEC CICS HANDLE AID PF3(RETURN1) CLEAR(RETURN1)                *
             PF7(PAGEBWD) PF8(PAGEFWD)
       EXEC CICS RECEIVE LENGTH(INLENG)
         B    SNDMAPØ
BEGIN1   DS   ØH
```


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```
         MVC  RDOCMD(2),=C'E '
         L    RA,DFHEICAP             Address COMMAREA
         MVC  RDOENV,Ø(RA)            Passed Environment
         MVC  RDOCMD+2(28),4(RA)      Passed Command
         MVI  MOREFWD,X'ØØ'
         MVI  MOREBWD,X'ØØ'
         XC   CURPOS,CURPOS           Zeroize start position
         ZAP  TOTFROM,=P'1'
SNDMAPØ  DS   ØH
         ZAP  TOTTO,TOTFROM
         SP   TOTTO,=P'1'             Believe me!
         MVI  T1AO,C' '               BWD not available
         CLI  MOREBWD,X'FF'
         BNE  SNDMAP2
         MVI  T1AO,C'+'               BWD available
SNDMAP2  DS   ØH
       EXEC CICS ASSIGN APPLID(APPL)
         MVC  REGIO,APPL              Move Applid to Map
         MVC  PARTIO,=C'DEVL'
         CLC  APPL+3(1),=C'C'         PROD is C
         BNE  GTIME
         MVC  PARTIO,=C'PROD'
GTIME    DS   ØH
         MVC  ENVO,RDOENV
       EXEC CICS ASKTIME ABSTIME(ATIME)
       EXEC CICS FORMATTIME ABSTIME(ATIME) DDMMYYYY(DATEO)            *
             TIME(TIMEO) DATESEP TIMESEP
       EXEC CICS FORMATTIME ABSTIME(ATIME)                            *
             YYYYDDD(JDATO) DATESEP('.')
         LA   R4,RDOCMD               Set up parameter List with...
         ST   R4,CEDAPRM1             (1) Address of command
         LA   R4,RDOCMDL
         ST   R4,CEDAPRM2             (2) Address of command length
         LA   R4,MODEIND
         ST   R4,CEDAPRM3             (3) Address of mode indicator
         LA   R4,COMRES
         ST   R4,CEDAPRM4             (4) Address of response area
         LA   R4,COMRESL
         ST   R4,CEDAPRM5             (5) Address of response length
*
* Call RDO to action the command
*
       EXEC CICS LINK PROGRAM('DFHEDAP') COMMAREA(CEDAPARM)
*
* Check for good response
*
         LA   R4,COMRES+16            Contains NAME if good
         CLC  Ø(4,R4),=C'NAME'
         BE   GOODRET
         MVC  TITLO(18),8(R4)         Move response
         CLC  TITLO(4),=C'List'
```

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```
         BE   SNDMAPF
         MVC  TITLO(24),8(R4)         Move group response
         B    SNDMAPF
*
* Sort details into Descending Timestamp Order
*
GOODRET  DS   ØH
         MVC  TITLO,HEDR              Move heading
         MVC  TITLO+24(5),22(R4)
         MVC  FDATEO,SPACES
         CLC  RDODAT,SPACES
         BE   NODATE
         MVC  FDATEO(22),=C'Changes Since '
         MVC  FDATEO+14(8),RDODAT
NODATE   DS   ØH
         LA   R4,COMRES+72            First entry
*
* This is the long-awaited fix for the so-called millennium bug!
* It will stop working in 2Ø51, you have been warned
*
DFIX     DS   ØH
         CLI  Ø(R4),X'ØØ'             End?
         BE   DLOOPØ                  Go to Sort
         MVC  33(2,R4),=C'19'         Add 19nn to year
         CLC  35(2,R4),=C'5Ø'
         BH   DFIX1
         CLI  35(R4),X'ØØ'            Bad date returned
         BE   DFIX1
         MVC  33(2,R4),=C'2Ø'         Year 2ØØØ and beyond
DFIX1    DS   ØH
         LA   R4,57(R4)               Next entry
         B    DFIX
DLOOPØ   DS   ØH
         LA   R4,COMRES+72            First entry
         ZAP  TOTALL,=P'Ø'
DLOOP1   DS   ØH
         CLI  Ø(R4),X'ØØ'             End of sort?
         BE   SNDMAP1                 Send the Map
         LA   R5,57(R4)               Next entry
         AP   TOTALL,=P'1'            Count them
DLOOP2   DS   ØH
         CLI  Ø(R5),X'ØØ'             End of pass?
         BNE  COMPARE                 No
         LA   R4,57(R4)               Move on
         B    DLOOP1                  Around again
COMPARE  DS   ØH
         CLC  33(18,R4),33(R5)        Compare dates
         BL   SWAP                    Found a higher one
DLOOP3   DS   ØH
         LA   R5,57(R5)               Move on
```


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```
         B    DLOOP2                  Around again
SWAP     DS   ØH
         MVC  WKDET,Ø(R4)             Save old highest
         MVC  Ø(57,R4),Ø(R5)          Replace with new
         MVC  Ø(57,R5),WKDET          And put back in pool
         B    DLOOP3
SNDMAP1  DS   ØH
*
* Move response to Map
*
         LA   R4,COMRES+72            First entry
         AH   R4,CURPOS               Add current offset
         LA   R5,T1O                  First output field
         LA   R6,T16AO                Last output field
         MVI  Ø(R5),C' '              Clear more FWD
         MVI  MOREFWD,X'ØØ'           Clear in COMMAREA
MAPLOOP  DS   ØH
         CLC  33(8,R4),RDODAT         Compare will passed date
         BL   MAPBLOW
         CLI  Ø(R4),X'ØØ'             End of response?
         BE   MAPBLOW                 Send the Map
         MVC  Ø(51,R5),Ø(R4)          Move details
         AP   TOTTO,=P'1'
         CR   R5,R6                   Last line?
         BH   MAPBLOW
         LA   R4,57(R4)               Next response field
         LA   R5,54(R5)               Next line
         CR   R5,R6                   Last line?
         BNE  MAPLOOP                 No
         CLI  57(R4),X'ØØ'            More to come?
         BE   MAPLOO1                 No
         MVI  Ø(R5),C'+'              Show more FWD
         MVI  MOREFWD,X'FF'           Indicate in COMMAREA
MAPLOO1  DS   ØH
         LA   R5,4(R5)                Offset position
         B    MAPLOOP
MAPBLOW  DS   ØH
         CLC  CURPOS,=H'29ØØØ'        Prevent overrun
         BNH  SNDMAPE
         MVC  4(36,R5),=C'Maximum reached, narrow your search  '
         MVI  Ø(R5),C'!'              Show limit reached
SNDMAPE  DS   ØH
         MVC  OUTCTR,EDPAT
         ED   OUTCTR,TOTFROM
         MVC  TLINO,OUTCTR+1
         MVC  OUTCTR,EDPAT
         ED   OUTCTR,TOTTO
         MVC  BLINO,OUTCTR+1
         MVC  OUTCTR,EDPAT
         ED   OUTCTR,TOTALL
```

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```
         MVC  TALLO,OUTCTR+1
         MVC  PF1O,=C'        '
         MVC  PF2O,=C'        '
         CLI  MOREBWD,X'FF'
         BNE  CHKFWD
         MVC  PF1O,=C'PF7(BWD)'
CHKFWD   DS   ØH
         CLI  MOREFWD,X'FF'
         BNE  SNDMAPF
         MVC  PF2O,=C'PF8(FWD)'
SNDMAPF  DS   ØH
       EXEC CICS SEND MAP ('SYMDRDP') ERASE FREEKB
*
* RETURN BUT COME BACK
*
RETURNØ  DS   ØH
       EXEC CICS RETURN TRANSID(EIBTRNID)
*
              COMMAREA(COMMAS) LENGTH(COMMAL)
RETURN1  DS   ØH
       EXEC CICS SEND CONTROL ERASE FREEKB
RETURN   DS   ØH
*
       EXEC CICS RETURN TRANSID('SYDQ') IMMEDIATE
*
PAGEBWD  DS   ØH
         CLI  MOREBWD,X'FF'           Backward allowed?
         BNE  SNDMAPØ                 No, so ignore
         SP   TOTFROM,=P'16'
         LH   R4,CURPOS
         SH   R4,=H'912'              Page backward offset
         STH  R4,CURPOS
         LTR  R4,R4                   Back to start?
         BNZ  SNDMAPØ
         MVI  MOREBWD,X'ØØ'           Indicate in COMMAREA
         B    SNDMAPØ
PAGEFWD  DS   ØH
         CLI  MOREFWD,X'FF'           Forward allowed?
         BNE  SNDMAPØ                 No, so ignore
         AP   TOTFROM,=P'16'
         MVI  MOREBWD,X'FF'           Indicate in COMMAREA
         LH   R4,CURPOS
         AH   R4,=H'912'              Page forward offset
         STH  R4,CURPOS
         B    SNDMAPØ
*
* Constants
*
COMMAL   DC   H'41'                   COMMAREA length
RDOCMDL  DC   H'22'                   Length of Command Area
```


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```
COMRESL  DC   H'30000'                Length of Response Area
MODEIND  DC   X'00'                   Not terminal attached
EDPAT    DC   X'402020202120'
HEDR     DC   CL49'Name     Type       xxxx      Date    Time  '
SPACES   DC   CL22' '
         LTORG
         END  SYDRDP
```

MAP SYMDRDP – USED BY PROGRAM SYDRDP

You should add your own company name where indicated.

```
MAPSET3  DFHMSD TYPE=&SYSPARM,MODE=INOUT,CTRL=FREEKB,LANG=ASM,         *
             TIOAPFX=YES
SYMDRDP  DFHMDI SIZE=(24,80),LINE=1,COLUMN=1,MAPATTS=(COLOR)
         DFHMDF POS=(01,1),LENGTH=4,COLOR=GREEN,                      *
             INITIAL='SYDP'
         DFHMDF POS=(01,06),LENGTH=11,COLOR=NEUTRAL,                  *
             INITIAL='Partition :'
PARTI    DFHMDF POS=(01,18),LENGTH=4,COLOR=NEUTRAL,                   *
             INITIAL='rrrr'
         DFHMDF POS=(01,23),LENGTH=17,COLOR=NEUTRAL,                  *
             INITIAL='- CICS Region :'
REGI     DFHMDF POS=(01,41),LENGTH=7,COLOR=NEUTRAL,                   *
             INITIAL='rrrrrrr'
         DFHMDF POS=(01,49),LENGTH=5,COLOR=BLUE,INITIAL='DATE:'
DATE     DFHMDF POS=(01,55),LENGTH=10,COLOR=BLUE,INITIAL='XX.XX.XXXX'
         DFHMDF POS=(01,66),LENGTH=5,COLOR=BLUE,INITIAL='TIME:'
TIME     DFHMDF POS=(01,72),LENGTH=8,COLOR=BLUE,INITIAL='XX.XX.XX'
         DFHMDF POS=(02,23),LENGTH=20,COLOR=NEUTRAL,                  *
             INITIAL='- cccccccc -    '    <=== Company Name Here
         DFHMDF POS=(02,49),LENGTH=7,COLOR=BLUE,INITIAL='JULIAN:'
JDAT     DFHMDF POS=(02,57),LENGTH=8
         DFHMDF POS=(03,49),LENGTH=4,COLOR=BLUE,INITIAL='CSD:'
ENV      DFHMDF POS=(03,54),LENGTH=4
         DFHMDF POS=(04,23),LENGTH=20,COLOR=NEUTRAL,                  *
             INITIAL='RDO Display By Date '
FDATE    DFHMDF POS=(04,44),LENGTH=22,COLOR=NEUTRAL,                  *
             INITIAL='                      '
TITL     DFHMDF POS=(05,03),LENGTH=49,COLOR=BLUE,INITIAL=' '
T1A      DFHMDF POS=(06,01),LENGTH=1,COLOR=RED,INITIAL=' '
T1       DFHMDF POS=(06,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T2       DFHMDF POS=(07,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T3       DFHMDF POS=(08,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T4       DFHMDF POS=(09,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T5       DFHMDF POS=(10,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T6       DFHMDF POS=(11,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T7       DFHMDF POS=(12,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T8       DFHMDF POS=(13,03),LENGTH=51,COLOR=YELLOW,INITIAL=' '
```

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```
T9       DFHMDF POS=(14,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T1Ø      DFHMDF POS=(15,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T11      DFHMDF POS=(16,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T12      DFHMDF POS=(17,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T13      DFHMDF POS=(18,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T14      DFHMDF POS=(19,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T15      DFHMDF POS=(2Ø,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
T16A     DFHMDF POS=(21,Ø1),LENGTH=1,COLOR=RED,INITIAL=' '
T16      DFHMDF POS=(21,Ø3),LENGTH=51,COLOR=YELLOW,INITIAL=' '
         DFHMDF POS=(23,Ø3),LENGTH=8,COLOR=BLUE,INITIAL='Results:'
TLIN     DFHMDF POS=(23,12),LENGTH=5,COLOR=NEUTRAL
         DFHMDF POS=(23,18),LENGTH=2,COLOR=NEUTRAL,INITIAL='To'
BLIN     DFHMDF POS=(23,21),LENGTH=5,COLOR=NEUTRAL
         DFHMDF POS=(23,27),LENGTH=2,COLOR=NEUTRAL,INITIAL='Of'
TALL     DFHMDF POS=(23,3Ø),LENGTH=5,COLOR=NEUTRAL
         DFHMDF POS=(24,23),LENGTH=26,COLOR=NEUTRAL,                   *
             INITIAL='To exit press Clear or PF3'
PF1      DFHMDF POS=(24,5Ø),LENGTH=8,COLOR=NEUTRAL
PF2      DFHMDF POS=(24,59),LENGTH=8,COLOR=NEUTRAL
         DFHMSD TYPE=FINAL
         END
```

Mick Masters
Senior Consultant (UK)
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Cold start next time – revisited

Cold start next time, *CICS Update*, Issue 167, October 1999, discussed how to ensure that a CICS region cold starts next time and is also under the control of the CICS systems programmer. It closed with the question 'So what else is required?'

What follows is a possible answer to this question – a REXX that creates the required COLDNEXT dataset to force this cold start.

The REXX can be passed a mask covering all the required regions, instead of a single one, and also gives you the option to edit the list of regions that it has determined need a COLDNEXT dataset to be created, prior to actually creating them.

Although it has to be site-specific to enable it to determine CICS levels (eg test, live, etc) and the format of the DFHGCD dataset, all the code

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that should need changing to enable the REXX to work at another site has been grouped together in one section.

The REXX is currently designed to work on CICS regions with the format:

```
CIxpp1A
```

where ‘x’ is the level (eg T for test) and ‘pp’ are the project letters. In this way COLDNEXT can be run with a mask of ‘CIT’, to create datasets for all test regions, or ‘CITpp’, to cold start only a particular applications region.

A search is done for all DFHGCD datasets to determine the regions that match this mask. Our GCD datasets have the form:

```
CIC<l>.<region>.CICS410.DFHGCD
```

So, using the third character of the supplied mask to get the ‘CIC<l>’ prefix, a search of ‘CIC<l>.<mask>.CICS410.DFHGCD’ will produce a list of regions for which to create COLDNEXT datasets.

If you change this site-specific section to determine the GCD format for your standards based in the supplied mask, the rest of the REXX doesn’t need changing.

The COLDNEXT dataset is created only if it doesn’t already exist and is deleted when the system is started. Therefore, the existence of the COLDNEXT dataset indicates that the system hasn’t been started since its creation date. The REXX highlights this by issuing the message ‘<region> ignored. COLDNEXT already exists’.

COLDNEXT

```
/* REXX ***************************************************************/
/*                                                                    */
/* EXEC           : COLDNEXT                                          */
/* Called by      :                                                   */
/* Purpose        : create COLDNEXT datasets                          */
/* Parameters     : Mask of which regions need cold starting          */
/*                    must be a minimum of 3 characters               */
/* Return Codes   : 0 - OK                                            */
/*                  8 - severe error (eg file access problems)        */
/*                                                                    */
/* REXX ***************************************************************/
```

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```
start:
 PARSE ARG mask
 total = Ø
 region.Ø = Ø
/*********************************************************************/
/* Site-specific details - may need changing depending on naming     */
/*  standards etc.                                                   */
/*********************************************************************/
 if LENGTH(mask) < 3 then do
    say 'Invalid mask entered - must be minimum of 3 characters'
    exit Ø
  end
  list_dsn = userid()  '.COLDNEXT.LIST'
  level = substr(mask,3,1)
  gcdmask = 'CIC'   level   '.'   mask   '*.CICS*.DFHGCD.DATA'
  temp_start = "start = index(gcddsn,'.',1) + 1"
  temp_end   = "end   = index(gcddsn,'.',start)"
 temp_level = "level = substr(temp_reg,3,1)"
 temp_cold = "cold_dsn='CIC'  level  '.'  temp_reg  '.CICS41Ø.COLDNEXT'"
/*********************************************************************/
/* Does an output list from previous run, if it already exists and   */
/*   is waiting to be processed.                                     */
/*********************************************************************/
 if SYSDSN("'"list_dsn"'") = 'OK' then do
   say 'Output dataset 'list_dsn' already exists'
   say 'Do you wish to process from this ? (Y/N)'
   PULL answer
   if answer = 'Y' then do
      CALL read
      CALL create
      exit Ø
   end
 end
/*********************************************************************/
/* Determine list of regions that match entered mask                 */
/*********************************************************************/
 say 'The following regions will be included in this run.'
 say 'After which you will have the option to create any required
 say 'COLDNEXT datasets or output the list for editing.'
 say
 address ispexec "LMDINIT LISTID(LISTID) LEVEL("gcdmask")"
 address ispexec "LMDLIST LISTID("listid") OPTION(LIST) DATASET(gcddsn)"
  do while rc = Ø
   INTERPRET temp_start
   INTERPRET temp_end
   length = end - start
   temp_reg  = substr(gcddsn,start,length)
   INTERPRET temp_level
   INTERPRET temp_cold
```


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```
   total = total + 1
   result = SYSDSN("'"cold_dsn"'")
   if result = 'OK' then do
     say temp_reg ' ignored. COLDNEXT dataset already exists.'
   end
   else do
     say temp_reg ' included. COLDNEXT dataset required.'
     count = region.Ø + 1
     region.Ø = count
     region.count = temp_reg
   end
   address ispexec "LMDLIST LISTID("listid")OPTION(LIST)DATASET(gcddsn)
 end
 if region.Ø = Ø then do
    say
    say '*** There are no regions to be cold started ***'
    say
 end
 else do
/*********************************************************************/
/* Create COLDNEXT datasets immediately or write regions to dataset  */
/*********************************************************************/
    say 'Do you wish to edit region list before executing (Y/N)?'
    PULL answer
    if answer = 'N' then
      call CREATE
    else if answer = 'Y' then
      call OUTPUT
    else
      say 'Processing terminated with no actions'
 end
 exit Ø
/*********************************************************************/
/* Read in regions from dataset created in previous run of REXX      */
/*********************************************************************/
 READ:
 say 'Do you want to run from this dataset? (Enter 'YES' to con
 PULL answer
 if answer  = 'YES' then exit Ø
 say
 say 'Data being read in from ' list_dsn '. Please wait.'
 address tso "ALLOCATE DA('"  list_dsn  "') FI(innput) SHR"
 address tso "EXECIO * DISKR innput (FINIS stem region."
 address tso "FREE FI(innput)"
 if rc > Ø then
 do
     say
 "*************************************************************
     say " ERROR on allocation of file " list_dsn
     say
```

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```
 "*************************************************************
     exit 8
 end
 say 'Finished reading input'
 total = region.0
 return
/*********************************************************************/
/* Create a COLDNEXT dataset for each region matching the mask       */
/*********************************************************************/
 CREATE:
 count = 0
 do loop =1 to region.0 by 1
    temp_reg = strip(region.loop)
    INTERPRET temp_level
    INTERPRET temp_cold
    if SYSDSN("'"cold_dsn"'") = 'OK' then do
      say strip(region.loop) ' ignored. COLDNEXT already exists.'
     end
    else do
      address tso "ALLOCATE DA('"  cold_dsn  "') FI(OUTPUT) NEW",
          "DSORG(PS) RECFM(F,B) LRECL(80) BLKSIZE(0)"
      address tso "FREE FILE(OUTPUT)"
      count = count + 1
      say strip(region.loop) ' - COLDNEXT dataset created.'
    end
 end
 say
 say 'Total number of regions processed    = ' total
 say 'Number of COLDNEXT datasets required = ' count
 return
/*********************************************************************/
/* Write regions matching mask to output dataset for post processing */
/*********************************************************************/
 OUTPUT:
 if SYSDSN("'"list_dsn"'") = 'OK' then
   address tso "DELETE '"list_dsn"'"
 address tso "ALLOCATE DA('"  list_dsn  "') FI(OUTLIST) NEW",
        "DSORG(PS) RECFM(F,B) LRECL(80) BLKSIZE(0)"
 address tso "EXECIO" region.0 "DISKW OUTLIST (FINIS Stem region."
 address tso "FREE FILE(outlist)"
 say
 say 'Region list written to ' list_dsn
 say
 return
```

Phil Wilton
Systems Programmer
Norwich Union (UK)

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NEWCOPY of programs in an MRO environment

Amendments to heavily-used application programs can often result in moments of panic, when a newly-implemented program has to be backed out as quickly as possible and refreshed in the CICS system in which it is active.

In our CICS Version 4.1.0 MRO environment, we typically have many AORs connected to a single TOR. We have provided a method for a user signed on to the TOR to initiate tasks to refresh a program in all attached AORs and get a prompt and visible response to the command on a scrolling list of AORs. This development also permits the CICS systems programmer to devolve the responsibility of issuing NEWCOPY commands to the group responsible for implementing (or backing out) the program.

It consists of three transactions (NCOP, NCO1, and NCO2, two of which run in the TOR only), four programs (MRONCOPY, MRONCOP1, MRONCOP2, and MROIDSYS), plus one BMS screen map (NEWCOPY).

Having entered the transaction NCOP, the user will see a scrolling list of all AORs attached to the TOR. It allows for up to fifty systems to be connected in MRO (although this could easily be extended). The user can enter the name of the program to be refreshed and, by depressing ENTER repeatedly, will see the results of the 'SET PROGRAM PHASEIN' command that is issued to all connected AORs. Because we use auto-install for programs at our installation (PGAIPGM=ACTIVE in the SIT), if the program has not been loaded into an application region, the message 'PROGRAM NOT FOUND' will be displayed against the region's SYSID on the screen display. This can also be a useful method for determining the usage of programs across your MRO configuration.

MRONCOPY

```
*ASM XOPTS(SP)
         TITLE 'MRONCOPY  -  MRO NEWCOPY INITIAL SCREEN SEND'
         LCLC  &REL
```

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```
&REL     SETC  '4.1'
         DFHREGS
SYSREG   EQU   6
         DFHEISTG
ACQUIRED EQU   C'A'
RELEASED EQU   C'R'
************************
SYSCNT   DS    F
SYSIDS   DS    5ØCL5                  max number of SYSIDS = (49 + 1)
************************
SAVE14   DS    F
CRES     DS    F
LENF     DS    H
TSMSG    DS    CL(MSSGL)
CMPGMID  DS    CL8
NAME     DS    CL8
         COPY  DFHAID                 AID key definitions
         COPY  DFHBMSCA               BMS attribute definitions
*********************************************
*        Screen Map                         *
*********************************************
         COPY  NEWCOPY
NEXTSYS  EQU   (LINEØØ5L-LINEØØ4L)    length of detail line
MSSGL    EQU   L'MSGARØ4O
MAXSYS   EQU   14              maximum number of SYSID lines on screen
MRONCOPY CSECT
         B     START
         DC    C'MRONCOPY '
         DC    C'R: &REL  '
         DC    C'&SYSDATE '
         DC    C'&SYSTIME '
*****************************************
*        Set up screen area               *
*****************************************
START    DS    ØH                                 .
         MVC   QNAME(4),EIBTRMID                  .
         MVC   QNAME+4(4),=C'NCPY'                .
         EXEC  CICS READQ TS QUEUE(QNAME) ITEM(1)  + .
           INTO(PGMID)                            + .
           RESP(CRES)                               .
         BAL   R14,GETSYS                         .
*****************************************
*  RETRIEVE and display any messages       *  .
*****************************************   .
         LA    RØ,L'MSGLINEO                    .
         STH   RØ,LENF                          .
         EXEC  CICS RETRIEVE INTO(MSGLINEO) LENGTH(LENF)   + .
           RESP(CRES)
                                  .
*****************************************
```


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```
*        Delete any old TS queue and       *  .
*        SEND ERASE on first screen        *  .
*******************************************
SEND1ST  DS    ØH                            .
         EXEC  CICS DELETEQ QUEUE(QNAME)                    +
           RESP(CRES)
         EXEC  CICS SEND MAP('NEWCOPY') MAPSET('NEWCOPY')   +
           WAIT                                             +
           ERASE                                            +
           ALARM
*******************************************
*        RETURN                            *
*******************************************
 RETURN  EXEC  CICS RETURN TRANSID(NEXTRAN)
*******************************************
* Subroutines                              *
*******************************************
**                                         **
**—————————————— GETSYS ——————————————————**
*        Find attached systems             *
*******************************************
GETSYS   DS    ØH
         ST    R14,SAVE14
         LA    RØ,(4+5Ø*5)
         STH   RØ,LENF
         EXEC  CICS LINK PROGRAM('MROIDSYS') +
                COMMAREA(SYSCNT)             +
                LENGTH(LENF)
         L     R2,SYSCNT                     number of MRO systems
         LA    SYSREG,SYSIDS                 point to first SYSID
         LA    R7,SYSIDØ4O                   point to map start field
         CH    R2,=Y(MAXSYS)                 do not exceed screen
         BNH   SYSLOOP                       limits
         LA    R2,MAXSYS
SYSLOOP  DS    ØH
         MVC   Ø(4,R7),Ø(SYSREG)             complete SYSID
         MVI   TSMSG,X'4Ø'                   clear message area
         MVC   TSMSG+1(MSSGL-1),TSMSG
         CLI   4(SYSREG),RELEASED            is this system available?
         BNE   STARTASK
         MVC   TSMSG(L'NOTAVBL),NOTAVBL      no - send unavailable mssg
STARTASK DS    ØH
         MVC   (MSGARØ4O-SYSIDØ4O)(MSSGL,R7),TSMSG     display message
         LA    SYSREG,L'SYSIDS(,SYSREG)      increment SYSID
         LA    R7,NEXTSYS(,R7)               increment map pointer
         BCT   R2,SYSLOOP                    loop until last AOR
         L     R14,SAVE14.
         BR    R14
*******************************************
*        CONSTANTS
*
```

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```
*******************************************
NEXTRAN  DC    C'NCO1'
NOTAVBL  DC    C' — SYSTEM NOT AVAILABLE    — '
         END
*************************** Bottom of Data ****************************
```

MRONCOP1

```
*ASM XOPTS(SP)
         TITLE 'MRONCOP1  -  MRO NEWCOPY RETURN MESSAGES'
         LCLC  &REL
&REL     SETC  '4.1'
         DFHREGS
COMMREG  EQU   5
SYSREG   EQU   6
         DFHEISTG
ACQUIRED EQU   C'A'
RELEASED EQU   C'R'
************************
SYSCNT   DS    F
SYSIDS   DS    5ØCL5              max number of SYSIDS = (49 + 1)
************************
SAVE14   DS    F
CRES     DS    F
LENF     DS    H
ITNUM    DS    H
************************
TQNAME   DS    CL8
TSREC    DS    ØCL(12+MSSGL)
TSSYSID  DS    CL4
TSPGMID  DS    CL8
TSMSG    DS    CL(MSSGL)
************************
CMAREA   DS    ØCL12
CMPGMID  DS    CL8
CMSCLINE DS    FL4
************************
STRTREC  DS    ØCL12
STRTSYS  DS    CL4
STRTTSQ  DS    CL8
STRTRECL EQU   *-STRTREC
************************
MSGLINE  DS    CL35
         COPY  DFHAID             AID key definitions
         COPY  DFHBMSCA           BMS attribute definitions
*********************************************
*        Screen Map                          *
*********************************************
         COPY  NEWCOPY
NEXTSYS  EQU   (LINEØØ5L-LINEØØ4L)    length of detail line
```


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```
MSSGL    EQU   L'MSGARØ4O
MAXSYS   EQU   14               maximum number of SYSID lines on screen
MRONCOP1 CSECT
         B     START
         DC    C'MRONCOP1 '
         DC    C'R: &REL  '
         DC    C'&SYSDATE '
         DC    C'&SYSTIME '
*********************************************
*        Program flow                       *
*********************************************
START    DS    ØH
         MVC   TQNAME(4),EIBTRMID              set up TS queue name
         MVC   TQNAME+4(4),=C'REMQ'
         MVC   STRTTSQ(8),TQNAME               QNAME passed to AOR
*********************************************
*    AIDs : ENTER  refresh screen           *
*           PF3    return to first screen   *
*           PF4    return                   *
*           PF8    scroll forward           *
*********************************************
         EXEC  CICS HANDLE AID                 +
            PF3 (GOBACK)                       +
            PF4 (RETURN)                       +
            PF8                                +
            ENTER                              +
            ANYKEY (INVKEY)
*
         EXEC  CICS IGNORE CONDITION MAPFAIL
         EXEC  CICS RECEIVE MAP('NEWCOPY') MAPSET('NEWCOPY') ASIS
*************************************************
* If returning from screen send, we have COMMAREA    *
*************************************************
         OC    EIBCALEN,EIBCALEN              is there a COMMAREA?
         BZ    NOCOMM                         no - first time thru
         L     COMMREG,DFHEICAP               address of COMMAREA
         MVC   CMAREA(L'CMAREA),Ø(COMMREG)    restore COMMAREA
NOCOMM   DS    ØH
         BAL   R14,GETSYS                     fill in system-ids
         OC    CMPGMID,CMPGMID                have we a program-id?
         BZ    GETPGMID                       no
         MVC   CMDINPO(L'CMDINPO),CMPGMID     restore screen prog-id
         MVI   CMDINPA,DFHBMPRO               protect program-id field
         BAL   R14,READTSQ                    read message queues
         B     SENDMAP
GETPGMID DS    ØH
         CLI   EIBAID,DFHPF8                  are we scrolling?
         BE    SENDMAP                        go to next screen
         OC    CMDINPI,CMDINPI                PGMID entered?
         BZ    NOINPUT                        tell them if not
```

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```
         MVI   CMDINPA,DFHBMPRO               protect program-id
         MVC   CMPGMID,CMDINPI                and store it
         BAL   R14,STRTALL                    start NEWCOPY tasks
         XC    CMSCLINE,CMSCLINE              reset scroll to zero
******************************************
*        Send map and return here         *
******************************************
SENDMAP  DS    ØH
         EXEC  CICS SEND MAP('NEWCOPY') MAPSET('NEWCOPY')      +
           FROM(NEWCOPYS)                                      +
           LENGTH(=AL2(NEWCOPYL))
*
         EXEC  CICS RETURN TRANSID(EIBTRNID)                   +
           COMMAREA(CMAREA) LENGTH(12)
******************************************
*        Error conditions                 *
******************************************
NOINPUT  DS    ØH
         MVI   MSGLINE,X'4Ø'
         MVC   MSGLINE+1(L'MSGLINE-1),MSGLINE
         MVC   MSGLINE(L'NOPROG),NOPROG
         B     GOBACK
*
INVKEY   DS    ØH
         MVI   MSGLINE,X'4Ø'
         MVC   MSGLINE+1(L'MSGLINE-1),MSGLINE
         MVC   MSGLINE(L'IKMSG),IKMSG
         B     GOBACK
************************************************
* Go back to initial screen with optional message *
************************************************
GOBACK   DS    ØH
         EXEC  CICS START TRANSID('NCOP')             +
               FROM(MSGLINE) LENGTH(35)               +
               TERMID(EIBTRMID)
******************************************
*     Return                             *
******************************************
RETURN   DS    ØH
         EXEC  CICS RETURN
******************************************
*        SUBROUTINES                      *
******************************************
**                                      **
**------------------ GETSYS ------------------**
*        Find attached systems            *
******************************************
GETSYS   DS    ØH
         ST    R14,SAVE14
         LA    RØ,(4+5Ø*5)
         STH   RØ,LENF
```


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```
         EXEC  CICS LINK PROGRAM('MROIDSYS')           +
               COMMAREA(SYSCNT)                        +
               LENGTH(LENF)
         L     R2,SYSCNT                number of MRO systems
         L     R14,CMSCLINE             current start line
         CLI   EIBAID,DFHPF8            are we scrolling?
         BNE   GETSYS1
         LA    R14,MAXSYS(R14)          add 1 pageful
         ST    R14,CMSCLINE             save start line
         SR    R2,R14                   is there a next page to go to?
         BP    GETSYS1                  yes - so go scroll
         L     R2,SYSCNT                get number of systems
         XC    CMSCLINE,CMSCLINE        reset scroll amount to zero
GETSYS1  DS    ØH
         L     R14,CMSCLINE             get current start line
         MH    R14,=Y(L'SYSIDS)         get disp into SYSIDS
         LA    SYSREG,SYSIDS(R14)
         LA    R7,SYSIDØ4O              point to map start field
         CH    R2,=Y(MAXSYS)            do not exceed screen
         BNH   SYSLOOP                  limits
         LA    R2,MAXSYS
SYSLOOP  DS    ØH
         MVC   Ø(4,R7),Ø(SYSREG)        complete SYSID
         MVI   TSMSG,X'4Ø'              clear message area
         MVC   TSMSG+1(MSSGL-1),TSMSG
         CLI   4(SYSREG),RELEASED       is this system available?
         BNE   STARTASK
         MVC   TSMSG(L'NOTAVBL),NOTAVBL no - send unavailable mssg
STARTASK DS    ØH
         MVC   (MSGARØ4O-SYSIDØ4O)(MSSGL,R7),TSMSG      display message
         LA    SYSREG,L'SYSIDS(,SYSREG)  increment SYSID
         LA    R7,NEXTSYS(,R7)           increment map pointer
         BCT   R2,SYSLOOP                loop until last AOR
         L     R14,SAVE14
         BR    R14
**                                              **
**———————————————————— STRTALL ————————————————**
* Start tasks to refresh program in all regions *
************************************************
STRTALL  DS    ØH
         ST    R14,SAVE14
         L     R2,SYSCNT                 get number of systems
         LA    SYSREG,SYSIDS             get first SYSID
         LA    R5,1                      set up counter reg
         LA    R7,SYSIDØ4O               point to map start field
         MVC   STRTSYS,SYSIDS
STLOOP   DS    ØH
         XC    TSREC,TSREC               clear TS rec
         CLI   4(SYSREG),RELEASED        is this system available?
         BE    STRTEND                   no further action
         MVC   TSMSG(L'REFMSG),REFMSG    set up default message
```

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```
         MVC   TSSYSID(4),Ø(SYSREG)      move in this SYSID
         MVC   TSPGMID(8),CMPGMID        move in program name
**    Delete TS queue   **
         EXEC  CICS DELETEQ TS QUEUE(TQNAME)          +
           SYSID(Ø(SYSREG))                           +
           RESP(CRES)
**    Write new TS queue   **
         EXEC  CICS WRITEQ TS QUEUE(TQNAME) FROM(TSREC)   +
           LENGTH(7Ø)                                 +
           SYSID(Ø(SYSREG))
**    Start transaction    **
         EXEC  CICS START TRANSID('NCO2')             +
           INTERVAL(2)                                +
           FROM(STRTREC)                              +
           LENGTH(=Y(STRTRECL))                       +
           SYSID(Ø(SYSREG))
STRTEND  DS    ØH
         LA    R5,1(,R5)                 increment count
         LA    SYSREG,L'SYSIDS(,SYSREG)  next SYSID
         LA    R7,NEXTSYS(,R7)           next message line
         BCT   R2,STLOOP                 process next record
         L     R14,SAVE14
         BR    R14
**                                          **
**———————————————— READTSQ ————————————————**
* Read TS queues and send messages to screen  *
*********************************************
READTSQ  DS    ØH
         ST    R14,SAVE14
         LA    RØ,1
         STH   RØ,ITNUM                  get first item
         L     R2,SYSCNT                 get number of systems
         XR    R14,R14
         CLI   EIBAID,DFHPF8             are we scrolling?
         BNE   NOSCRL
         L     R14,CMSCLINE              get current start line
         SR    R2,R14
         MH    R14,=Y(L'SYSIDS)          get disp into SYSIDS
NOSCRL   DS    ØH
         LA    SYSREG,SYSIDS(R14)
         LA    R7,SYSIDØ4O               point to map start field
         CH    R2,=Y(MAXSYS)             do not exceed screen
         BNH   READLOOP                  limits
         LA    R2,MAXSYS
READLOOP DS    ØH
         CLI   4(SYSREG),RELEASED        is this system available?
         BNE   STRTREAD
         MVC   TSMSG(L'NOTAVBL),NOTAVBL  send unavailable mssg
         B     READEND                   no further action
STRTREAD DS    ØH
         XC    TSREC,TSREC               clear TS rec
```


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```
         EXEC  CICS READQ TS QUEUE(TQNAME)                    +
           ITEM(ITNUM)                                        +
           INTO(TSREC)                                        +
           SYSID(Ø(SYSREG))                                   +
           RESP(CRES)
READEND  DS    ØH
         MVC   (MSGARØ4O-SYSIDØ4O)(MSSGL,R7),TSMSG display message
         LA    SYSREG,L'SYSIDS(,SYSREG)            next SYSID
         LA    R7,NEXTSYS(,R7)                     next message line
         BCT   R2,READLOOP                         process next record
         L     R14,SAVE14
         BR    R14
*********************************************
*        CONSTANTS
*
*********************************************
NOPROG   DC    C'Enter PROGRAM to NEWCOPY'
IKMSG    DC    C'Function not available  '
NOTAVBL  DC    C' — SYSTEM NOT AVAILABLE    — '
REFMSG   DC    C' — NEWCOPY COMMAND ISSUED  — '
         END
***************************** Bottom of Data ****************************
```

MRONCOP2

```
*ASM XOPTS(SP)
         TITLE 'MRONCOP2  -  MRO NEWCOPY INVOKE PHASEIN COMMAND'
         LCLC  &REL
&REL     SETC  '4.1'
         DFHREGS
         DFHEISTG
LSYSID   DS    CL4
STRTREC  DS    ØCL12
STRTSYS  DS    CL4
STRTTSQ  DS    CL8
STRTRECL EQU   *-STRTREC
LENSTA   DS    H
TSREC    DS    ØCL(12+MSSGL)
TSSYSID  DS    CL4
TSPGMID  DS    CL8
TSMSG    DS    CL(MSSGL)
TSRECL   EQU   *-TSREC
CRES     DS    F
LENTSQ   DS    H
ITNUM    DS    H
*********************************************
*  Screen Map                                *
*********************************************
         COPY  NEWCOPY
```

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```
MSSGL    EQU   L'MSGARØ4O
MRONCOP2 CSECT
         B     START
         DC    C'MRONCOP2 '
         DC    C'R: &REL  '
         DC    C'&SYSDATE '
         DC    C'&SYSTIME '
******************************************
*        Retrieve commands               *
******************************************
START    DS    ØH
         LA    R6,STRTRECL
         STH   R6,LENSTA
         EXEC  CICS RETRIEVE INTO(STRTREC) LENGTH(LENSTA)
         EXEC  CICS ASSIGN SYSID(LSYSID)
         XC    TSREC,TSREC                    clear input
         LA    R6,TSRECL
         STH   R6,LENTSQ
         EXEC  CICS HANDLE CONDITION ITEMERR(TSEXIT)
         EXEC  CICS READQ TS QUEUE(STRTTSQ) INTO(TSREC)     +
           LENGTH(LENTSQ)                                   +
           ITEM(1)
*
         XC    TSMSG(MSSGL),TSMSG              clear input
******************************************
*        Let's refresh the program       *
******************************************
REFRESH  DS    ØH
         EXEC  CICS SET PROGRAM(TSPGMID) PHASEIN           +
               RESP(CRES)
*
         CLC   CRES,DFHRESP(PGMIDERR)          program not found
         BE    NOPGM
         CLC   CRES,DFHRESP(NOTAUTH)           unauthorized user
         BE    NOTAUTH
         CLC   CRES,DFHRESP(NORMAL)
         BNE   BADCOPY                         unspecified error
         MVC   TSMSG(L'GDINPUT),GDINPUT
         B     GOAWAY
BADCOPY  DS    ØH
         MVC   TSMSG(L'MSG1),MSG1
         B     GOAWAY
NOPGM    DS    ØH
         MVC   TSMSG(L'MSG2),MSG2
         B     GOAWAY
NOTAUTH  DS    ØH
         MVC   TSMSG(L'MSG3),MSG3
         B     GOAWAY
OTHERR   DS    ØH
         MVC   TSMSG(L'MSG4),MSG4
         B     GOAWAY
```


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```
TSEXIT   DS    ØH
         MVC   TSMSG(L'QERROR),QERROR
         B     GOAWAY
GOAWAY   DS    ØH
         LA    RØ,1
         STH   RØ,ITNUM
         EXEC  CICS WRITEQ TS QUEUE(STRTTSQ) FROM(TSREC)   +
           LENGTH(LENTSQ)                                  +
           ITEM(ITNUM)                                     +
           REWRITE
*
         EXEC  CICS RETURN
*********************************************
*        CONSTANTS                           *
*********************************************
GDINPUT  DC    C' – NEWCOPY SUCCESSFUL      – '
MSG1     DC    C' – NEWCOPY PROBLEM         – '
MSG2     DC    C' – PROGRAM NOT FOUND       – '
MSG3     DC    C' – NOT AUTHORIZED          – '
MSG4     DC    C' – PROGRAM IN USE/RESIDENT – '
QERROR   DC    C' – NO MESSAGE ON QUEUE     – '
         END
***************************** Bottom of Data ****************************
```

MROIDSYS

```
*ASM XOPTS(SP)
         TITLE 'MROIDSYS  -  FIND NUMBER OF ATTACHED AORS'
         LCLC  &REL
&REL     SETC  '4.1'
         DFHREGS
COMMREG  EQU   4
SYSREG   EQU   6
         DFHEISTG
ACQUIRED EQU   C'A'
RELEASED EQU   C'R'
CONNECT  DS    F
CONACC   DS    F
STATUS   DS    F
SAVE14   DS    F
MROIDSYS CSECT
         B     START
         DC    C'MROIDSYS '
         DC    C'R: &REL  '
         DC    C'&SYSDATE '
         DC    C'&SYSTIME '
*********************************************
*        Retrieve any COMMAREA               *
*********************************************
START    DS    ØH
         OC    EIBCALEN,EIBCALEN       is there a COMMAREA?
```

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```
         BZ    RETURN                  no
         L     COMMREG,DFHEICAP        address of COMMAREA
         USING COMMDSCT,COMMREG
         BAL   R14,GETSYS
RETURN   DS    ØH
         EXEC  CICS RETURN
******************************************
*      Subroutines                        *
**                                        **
**---------GETSYS-------------------------**
*      Get SYSIDs of all connected AORs    *
******************************************
GETSYS   EQU   *
         ST    R14,SAVE14
         LA    R2,1
**    get the SYSID of the region we are in  **
         EXEC  CICS ASSIGN SYSID(SYSIDS)
         LA    SYSREG,SYSIDS+L'SYSIDS
         XC    CONACC,CONACC
         EXEC  CICS HANDLE CONDITION END(CONEND)
         EXEC  CICS INQUIRE CONNECTION START
CONLOOP  EXEC  CICS INQUIRE CONNECTION(CONNECT)     +
           ACCESSMETHOD(CONACC)                     +
           CONNSTATUS(STATUS)                       +
           NEXT
         CLC   CONACC,DFHVALUE(XM)
         BNE   CONLOOP
         LA    R2,1(,R2)
         MVC   Ø(4,SYSREG),CONNECT                  save SYSID
         MVI   4(SYSREG),ACQUIRED                   set system indic
         CLC   STATUS,DFHVALUE(ACQUIRED)            system available?
         BE    CONLOOP1
         MVI   4(SYSREG),RELEASED                   it seems not
CONLOOP1 DS    ØH
         LA    SYSREG,L'SYSIDS(,SYSREG)
         B     CONLOOP
CONEND   EXEC  CICS INQUIRE CONNECTION END
         ST    R2,SYSCNT
         L     R14,SAVE14
         BR    R14
******************************************
*        Record maps                      *
******************************************
COMMDSCT DSECT
SYSCNT   DS    F
SYSIDS   DS    CL5
         END
***************************** Bottom of Data *****************************
```


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NEWCOPY

```
NEWCOPY  DFHMSD TYPE=DESCT,MODE=INOUT,TERM=3270-2,                     X
         CTRL=(PRINT,L80,FREEKB,FRSET),                                X
         TIOAPFX=YES
NEWCOPY  DFHMDI SIZE=(24,80),LINE=1,COLUMN=1,JUSTIFY=LEFT,             X
         MAPATTS=COLOR,DSATTS=COLOR,COLOR=BLUE
MSGLINE  DFHMDF POS=(1,3),ATTRB=(PROT,BRT),LENGTH=35,                  X
         INITIAL='                    ',COLOR=DEFAULT
TITLE1   DFHMDF POS=(2,30),ATTRB=(PROT,BRT),LENGTH=20,                 X
         INITIAL='MRO NEWCOPY FACILITY',COLOR=DEFAULT
TITLE2   DFHMDF POS=(3,30),ATTRB=PROT,LENGTH=20,COLOR=BLUE,            X
         INITIAL='----------'
CMDLIN   DFHMDF POS=(5,1),ATTRB=(PROT,BRT),LENGTH=13,                  X
         INITIAL='PROGRAM ==>',COLOR=DEFAULT
CMDINP   DFHMDF POS=(5,14),ATTRB=(UNPROT,IC),LENGTH=8,                 X
         INITIAL='  ',                                                 X
         COLOR=RED
CMDEND   DFHMDF POS=(5,23),ATTRB=(ASKIP,PROT),LENGTH=1,                X
         INITIAL='*',COLOR=DEFAULT
LINE001  DFHMDF
POS=(6,1),ATTRB=PROT,LENGTH=80,                                        X
         INITIAL='--------------------------------------------------------X
                  ----------------',                                   X
         COLOR=BLUE
LINE002  DFHMDF POS=(7,1),ATTRB=PROT,LENGTH=17,                        X
         INITIAL='SYSID  | RESULTS',                                   X
         COLOR=BLUE
LINE003  DFHMDF POS=(8,1),ATTRB=PROT,LENGTH=80,                        X
         INITIAL='--------------------------------------------------------X
         ----------------',                                           X
         COLOR=BLUE
LINE004  DFHMDF POS=(9,1),ATTRB=PROT,LENGTH=17,                        X
         INITIAL='       |       ',                                   X
         COLOR=BLUE
SYSID04  DFHMDF POS=(9,2),ATTRB=PROT,LENGTH=4,                         X
         COLOR=BLUE
INPUT04  DFHMDF POS=(9,10),ATTRB=(PROT,BRT),LENGTH=5,                  X
         INITIAL='     ',COLOR=DEFAULT
END004   DFHMDF POS=(9,16),ATTRB=(ASKIP,PROT),LENGTH=1,               X
         INITIAL=' '
MSGAR04  DFHMDF POS=(9,20),ATTRB=(PROT,BRT),LENGTH=58,                 X
         INITIAL=' ',COLOR=DEFAULT
LINE005  DFHMDF POS=(10,1),ATTRB=PROT,LENGTH=17,                       X
         INITIAL='       |       ',                                   X
         COLOR=BLUE
SYSID05  DFHMDF POS=(10,2),ATTRB=PROT,LENGTH=4,                        X
         COLOR=BLUE
INPUT05  DFHMDF POS=(10,10),ATTRB=(PROT,BRT),LENGTH=5,                 X
         INITIAL='     ',COLOR=DEFAULT
END005   DFHMDF POS=(10,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
```

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```
         INITIAL=' '
MSGAR05  DFHMDF POS=(10,20),ATTRB=(PROT,BRT),LENGTH=58,                X
         INITIAL=' ',COLOR=DEFAULT
LINE006  DFHMDF POS=(11,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |        ',                                  X
         COLOR=BLUE
SYSID06  DFHMDF POS=(11,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT06  DFHMDF POS=(11,10),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
END006   DFHMDF POS=(11,16),ATTRB=(ASKIP,PROT),LENGTH=1,             X
         INITIAL=' '
MSGAR06  DFHMDF POS=(11,20),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINE007  DFHMDF POS=(12,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |        ',                                  X
         COLOR=BLUE
SYSID07  DFHMDF POS=(12,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT07  DFHMDF POS=(12,10),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
END007   DFHMDF POS=(12,16),ATTRB=(ASKIP,PROT),LENGTH=1,             X
         INITIAL=' '
MSGAR07  DFHMDF POS=(12,20),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINE008  DFHMDF POS=(13,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |          ',                               X
         COLOR=BLUE
SYSID08  DFHMDF POS=(13,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT08  DFHMDF POS=(13,10),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
END008   DFHMDF POS=(13,16),ATTRB=(ASKIP,PROT),LENGTH=1,             X
         INITIAL=' '
MSGAR08  DFHMDF POS=(13,20),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINE009  DFHMDF POS=(14,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |        ',                                  X
         COLOR=BLUE
SYSID09  DFHMDF POS=(14,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT09  DFHMDF POS=(14,10),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
END009   DFHMDF POS=(14,16),ATTRB=(ASKIP,PROT),LENGTH=1,             X
         INITIAL=' '
MSGAR09  DFHMDF POS=(14,20),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINE010  DFHMDF POS=(15,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |         ',                                 X
         COLOR=BLUE
SYSID10  DFHMDF POS=(15,2),ATTRB=PROT,LENGTH=4,                       X
```


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```
         COLOR=BLUE
INPUT1Ø  DFHMDF POS=(15,1Ø),ATTRB=(PROT,BRT),LENGTH=5,                 X
         INITIAL='     ',COLOR=DEFAULT
ENDØ1Ø   DFHMDF POS=(15,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR1Ø  DFHMDF POS=(15,2Ø),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINEØ11  DFHMDF POS=(16,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |        ',                                 X
         COLOR=BLUE
SYSID11  DFHMDF POS=(16,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT11  DFHMDF POS=(16,1Ø),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
ENDØ11   DFHMDF POS=(16,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR11  DFHMDF POS=(16,2Ø),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINEØ12  DFHMDF POS=(17,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |      ',                                   X
         COLOR=BLUE
SYSID12  DFHMDF POS=(17,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT12  DFHMDF POS=(17,1Ø),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
ENDØ12   DFHMDF POS=(17,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR12  DFHMDF POS=(17,2Ø),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINEØ13  DFHMDF POS=(18,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |       ',                                  X
         COLOR=BLUE
SYSID13  DFHMDF POS=(18,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT13  DFHMDF POS=(18,1Ø),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
ENDØ13   DFHMDF POS=(18,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR13  DFHMDF POS=(18,2Ø),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
LINEØ14  DFHMDF POS=(19,1),ATTRB=PROT,LENGTH=17,                      X
         INITIAL='       |         ',                                X
         COLOR=BLUE
SYSID14  DFHMDF POS=(19,2),ATTRB=PROT,LENGTH=4,                       X
         COLOR=BLUE
INPUT14  DFHMDF POS=(19,1Ø),ATTRB=(PROT,BRT),LENGTH=5,                X
         INITIAL='     ',COLOR=DEFAULT
ENDØ14   DFHMDF POS=(19,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR14  DFHMDF POS=(19,2Ø),ATTRB=(PROT,BRT),LENGTH=58,               X
         INITIAL=' ',COLOR=DEFAULT
```

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```
LINE015  DFHMDF POS=(20,1),ATTRB=PROT,LENGTH=17,                       X
         INITIAL='       |          ',                                 X
         COLOR=BLUE
SYSID15  DFHMDF POS=(20,2),ATTRB=PROT,LENGTH=4,                        X
         COLOR=BLUE
INPUT15  DFHMDF POS=(20,10),ATTRB=(PROT,BRT),LENGTH=5,                 X
         INITIAL='     ',COLOR=DEFAULT
END015   DFHMDF POS=(20,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR15  DFHMDF POS=(20,20),ATTRB=(PROT,BRT),LENGTH=58,                X
         INITIAL=' ',COLOR=DEFAULT
LINE016  DFHMDF POS=(21,1),ATTRB=PROT,LENGTH=17,                       X
         INITIAL='       |        ',                                  X
         COLOR=BLUE
SYSID16  DFHMDF POS=(21,2),ATTRB=PROT,LENGTH=4,                        X
         COLOR=BLUE
INPUT16  DFHMDF POS=(21,10),ATTRB=(PROT,BRT),LENGTH=5,                 X
         INITIAL='     ',COLOR=DEFAULT
END016   DFHMDF POS=(21,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR16  DFHMDF POS=(21,20),ATTRB=(PROT,BRT),LENGTH=58,                X
         INITIAL=' ',COLOR=DEFAULT
LINE017  DFHMDF POS=(22,1),ATTRB=PROT,LENGTH=17,                       X
         INITIAL='       |          ',                                 X
         COLOR=BLUE
SYSID17  DFHMDF POS=(22,2),ATTRB=PROT,LENGTH=4,                        X
         COLOR=BLUE
INPUT17  DFHMDF POS=(22,10),ATTRB=(PROT,BRT),LENGTH=5,                 X
         INITIAL='     ',COLOR=DEFAULT
END017   DFHMDF POS=(22,16),ATTRB=(ASKIP,PROT),LENGTH=1,              X
         INITIAL=' '
MSGAR17  DFHMDF POS=(22,20),ATTRB=(PROT,BRT),LENGTH=58,                X
         INITIAL=' ',COLOR=DEFAULT
LINE018  DFHMDF POS=(23,1),ATTRB=PROT,LENGTH=80,                       X
         INITIAL='────────────────────────────────────────────────────X
         ────────────',                                                X
         COLOR=BLUE
LINE019  DFHMDF POS=(24,1),ATTRB=PROT,LENGTH=79,                       X
         INITIAL='ENTER - NEWCOPY   PF3 - REFRESH SCREEN   PF4 -       X
         RETURN     PF8 - SCROLL FWD  ',                               X
         COLOR=BLUE
         DFHMSD TYPE=FINAL
         END
***************************** Bottom of Data ****************************
```

John Hall
CICS Systems Programmer
Cooperative Insurance Society (UK)
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National language sort in CICS

Temporary storage queues are usually used in CICS programs to store the results of the read/fetch of two or more rows from a file or database, so the end user can browse through the list of records retrieved according to his selection criteria.

If we want to present the result to the end user in sorted form (usually by surname, first name, primary key code, etc), the ORDER BY statement (DB2) must be part of the EXEC SQL statement that fetches records, or the records should be retrieved by using the index (index is always a sorted structure). It sounds so simple. But can you always do so and is the record order always correct? In fact, you cannot always use the system sort.

In DB2, there are cases when the ORDER BY statement cannot be used. There are also cases when the ORDER BY statement leads to internal execution of your query producing so called 'view materialization' and your query executes for ages. In DL/I and VSAM, you can only use sort by retrieving the records using the index and/or using the bank definition (segments are defined to be sorted).

Can you sort records if they are retrieved from different sources or different objects? And can you sort records by using, for example, the second column in the index?

NATIONAL LANGUAGES AND CODE PAGES

It is really easy if English is your national language – in every code page (EBCIDIC, ASCII) the letters are positioned according to their position in the English alphabet. So, if you want to sort two words, the system easily translates characters to their numeric values and compares the numeric representation of the characters on specific positions in the words.

But what about other national languages? When code pages were adapted to non-English languages the same logic for positioning non-English letters in the code page was not applied to the non-English alphabets. English letters were kept in the same places in the code page and positions of infrequently-used characters (eg square bracket)

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were used to record non-English letters. Because those characters are randomly spread across the code page, it is not possible to sort by simply translating characters to their numeric values.

IBM has proposed some solutions for enabling a correct sort (eg FIELDPROC in DB2) but this is far from being a general and easy solution, especially if you retrieve records from different sources. Anyone who has tried to get a correct non-English sort soon comes to the same opinion – it is just not possible! DB2, for example, doesn't have as nice an interface as Oracle, where you can specify in which language the sort should be done and the system retrieves records in the correct order.

Another possible problem is that some letters in non-English alphabets actually consist of two or more characters (eg 'NJ' in Croatian). And what if two characters should be treated as if they are the same character even though they have different numeric representations (eg 'u' and 'ü' in German)?

SORT USING THE CROATIAN ALPHABET

Although I will describe my solution for sorting words according to the Croatian alphabet, anyone who has a similar problem can easily translate the solution for their own national language sort. The Croatian alphabet consists of the following letters:

A B C ? ? D D? ? E F G H I J K L LJ M N NJ O P R S ? T U V Z ?

Where '?' represents letters that do not exist in the English alphabet. There are also some letters in the English alphabet that don't exist in the Croatian alphabet (eg Q, W), and other letters that consist of two characters (eg LJ).

The numeric values for 'C' and 'D' are whole numbers and the difference is equal to 1. So how can we specify that letters '?' and '?' are between those letters? The only way is to assign not the actual numeric value from the code page, but, instead, a decimal value that is greater than the numeric value of the letter 'C' and smaller than the numeric value of letter 'D'. Also, the decimal value of the first letter '?' must be less than the decimal value of the second letter '?', if we want to have the correct order.

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What about the letter ‘NJ’, which consists of two characters and is positioned just after the letter ‘N’? This means that whenever we find an occurrence of ‘N’ in a string, we have to check whether the next character is ‘J’. If it is not ‘J’, we use the numeric value of letter ‘N’; if it is ‘J’, we assign to the letter ‘N’ a decimal value that is between the numeric value of ‘N’ and the numeric value of ‘O’.

Finally, what about the English letter ‘W’, which is not part of the Croatian alphabet but is sometimes found in names? According to the Croatian sort, it should be treated as ‘V’. This means that whenever we find an occurrence of the character ‘W’ in the string, we must not use the numeric value of ‘W’ but instead use the numeric value of the character ‘V’.

THE SOLUTION

The following requirements are fulfilled by the solution given in this article:

- When the user specifies search criteria, rows and records are fetched under CICS from different sources (DB2, DL/I, VSAM) and stored in a CICS temporary storage queue.
- The items in the temporary storage queue should be sorted before being displayed to the user.
- Sort criteria can be by item (full sort) or by specific item fields.
- The sort order can be ascending or descending.
- Records with the same value of sort criteria can be kept or removed from the temporary storage queue.
- The sort technique that is used should be efficient and should require as few system resources as possible.
- All programmers should use a standard program that will cover all requirements and can be called from their CICS programs.

To satisfy these requirements, I have created the CICS program called SRTC0010 that programmers link to from their CICS programs.

The usual user program that links sort programs looks like the following:

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```
PROG: PROC OPTIONS(MAIN);
...
%INCLUDE SRTK0001;        /* SORT COMMAREA */
%INCLUDE SRTR0001;        /* SORT DEFAULTS */
...
SORT_VARS.TS_NAME=...
SORT_VARS.ITEM_NUMBER=...
SORT_VARS.ITEM_LENGTH=...
...
EXEC CICS LINK PROGRAM('SRTC0010') COMMAREA(SORT_STR);
...
END PROG;
```

As you can see from the program source, two members should be included before linking the sort program. They should be stored in the PDS where they can be read-only accessed by programmers. Member SRTK0001 contains the structure describing the COMMAREA that is an interface between the user and the sort program. Member SRTR0001 contains sort defaults that can be overridden before linking to the sort program.

SORT COMMAREA SRTK0001

```
/*****************************************************************/
/* SORT TS COMMAREA DEFINITION ***********************************/
/*****************************************************************/
   DCL SORT_PTR PTR;
   DCL SORT_STR CHAR(128) BASED(SORT_PTR);
   DCL 1 SORT_VARS BASED(SORT_PTR),
       2 TS_NAME                CHAR(8),
       2 ITEM_NUMBER            BIN FIXED(15),
       2 ITEM_LENGTH            BIN FIXED(15),
       2 SORT_ORDER             CHAR(1),
       2 DELETE_DUPLICATE       CHAR(3),
       2 FIELD_SORT             CHAR(3),
       2 FIELD_NUMBER           BIN FIXED(15),
       2 START_POSITION(10)     BIN FIXED(15),
       2 FIELD_LENGTH(10)       BIN FIXED(15),
       2 ITEMNO_PRESERVED       BIN FIXED(15),
       2 ITEMNO_DELETED         BIN FIXED(15);
```

SORT DEFAULTS SRTR0001

```
/*****************************************************************/
/* SORT VARIABLES INITIALIZATION - DEFAULTS **********************/
/*****************************************************************/
   DCL SORT_TMP CHAR(128) INIT(' ');SORT_PTR=ADDR(SORT_TMP);
   SORT_VARS.FIELD_SORT='NO ';               /* TS ITEM FULL SORT  */
```


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```
SORT_VARS.SORT_ORDER='A';                    /* ASCENDING ORDER    */
SORT_VARS.DELETE_DUPLICATE='NO ';            /* KEEP DUPLICATES    */
```

After including these members, you can specify sort parameters before linking the sort program. The sort parameters are:

- SORT_VARS.TS_NAME – the temporary storage queue of items that should be sorted. This is mandatory with no default.
- SORT_VARS.ITEM_NUMBER – the number of items in temporary storage that should be sorted. This is mandatory with no default.
- SORT_VARS.ITEM_LENGTH – the length of items in temporary storage that should be sorted. This is mandatory with no default.
- SORT_VARS.SORT_ORDER – the required sort order of the items in temporary storage. This is mandatory. Permitted values are 'A' (Ascending) and 'D' (Descending). The default is A.
- SORT_VARS.DELETE_DUPLICATE – whether to delete or keep items that have the same sort criteria. This is mandatory. The permitted values are 'NO' (keep duplicates) and 'YES' (delete duplicates). The default is NO.
- SORT_VARS.FIELD_SORT – whether to sort items or specific field(s) in the items. This is mandatory. The permitted values are 'NO' (full item sort) and 'YES' (field(s) sort). The default is NO.
- SORT_VARS.FIELD NUMBER – the number of fields that describe the sort criteria. This is mandatory if SORT_VARS.FIELD_SORT = YES. The permitted values are 1 to 10. There is no default.
- SORT_VARS.START_POSITION(n) – the starting position of the 'nth' field in the item. This is mandatory if SORT_VARS.FIELD_SORT=YES and n is less than or equal to SORT_VARS.FIELD_NUMBER. The permitted values are 1 to SORT_VARS.ITEM_LENGTH. There is no default.
- SORT_VARS.FIELD_LENGTH(n) – the length of the 'nth' field in the item. This is mandatory if SORT_VARS.FIELD_SORT = YES and n is less than or equal to SORT_VARS. FIELD_NUMBER. The permitted values are 1 through to

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SORT_VARS.ITEM_LENGTH – SORT_VARS.START_POSITION(n) + 1. There is no default.

- SORT_VARS.ITEMNO_PRESERVED – the sort program returns the number of items after the sort. This can be different from SORT_VARS.ITEM_NUMBER if SORT_VARS.DELETE_DUPLICATE *= YES.
- SORT_VARS.ITEMNO_DELETED – the sort program returns the number of items that are deleted during the sort. This can be other than zero if SORT_VARS.DELETE_DUPLICATE *= YES.

This might look complicated, but if the sort to be performed is 'simple', as it usually is, it is enough to specify the temporary storage queue name, the number of items, and the item length. After the sort, the temporary storage queue will contain all items sorted in ascending order.

SRTC0010

The source of the sort program SRTC0010 follows:

```
* PROCESS INCLUDE, XOPTS(CICS);
 SORT:PROC(SORT_PTR) OPTIONS(MAIN,NOEXECOPS) REORDER;

 /* INCLUDE STATMENTS OF COMMAREA DEFINITION */
 %INCLUDE SRTKØØØ1;

 /* DECLARATIONS OF BUILTIN FUNCTIONS */
 DCL (ADDR,DECIMAL,CSTG,STG,SUBSTR) BUILTIN;

 /* DECLARATIONS OF BASE ENGLISH LANGUAGE CHARACTERS */
 /* THAT IMMEDIATELY PRECEED THE NATIONAL CHARACTERS */
 DCL CCC CHAR INIT('C');DCL CC BIT(8) BASED(ADDR(CCC));
 DCL CCD CHAR INIT('D');DCL CD BIT(8) BASED(ADDR(CCD));
 DCL CCL CHAR INIT('L');DCL CL BIT(8) BASED(ADDR(CCL));
 DCL CCN CHAR INIT('N');DCL CN BIT(8) BASED(ADDR(CCN));
 DCL CCS CHAR INIT('S');DCL CS BIT(8) BASED(ADDR(CCS));
 DCL CCV CHAR INIT('V');DCL CV BIT(8) BASED(ADDR(CCV));
 DCL CCZ CHAR INIT('Z');DCL CZ BIT(8) BASED(ADDR(CCZ));

 /* DECLARATIONS OF VARIABLES AND CONSTANTS */
 DCL (I,J,K,RASPON,RECNOPOM,POS1) BIN FIXED(15);
 DCL BFNUL BIN FIXED(15,3) INIT(Ø.Ø);
 DCL (CMPLN) BIN FIXED(15) INIT(Ø);
 DCL 1 SRT,
     2 SORT_LENGTH            BIN FIXED(15) INIT(Ø),
     2 NO_CHANGES             BIN FIXED(15) INIT(Ø),
```


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```
    2 NO_WRITEQ               BIN FIXED(15) INIT(Ø);
/* CALCULATING THE LENGTH OF SORT FIELDS */
IF SORT_VARS.FIELD_SORT='YES' THEN DO;
   DO I=1 TO 5;
      IF (SORT_VARS.FIELD_NUMBER>=I) THEN
         SRT.SORT_LENGTH=SRT.SORT_LENGTH+SORT_VARS.FIELD_LENGTH(I);
   END;
END;
ELSE SRT.SORT_LENGTH=SORT_VARS.ITEM_LENGTH;
/* SORT AREA DECLARATION AND ALLOCATION */
DCL TSREC(Ø:SORT_VARS.ITEM_NUMBER-1) CHAR(SORT_VARS.ITEM_LENGTH) CTL;
DCL TSRECNO(Ø:SORT_VARS.ITEM_NUMBER-1) BIN FIXED(15) CTL;
DCL (CMPS1,CMPS2) CHAR(SRT.SORT_LENGTH) CTL;
DCL STRPOM CHAR(SORT_VARS.ITEM_LENGTH) CTL;
ALLOCATE TSREC;
ALLOCATE TSRECNO;
ALLOCATE CMPS1;ALLOCATE CMPS2;
ALLOCATE STRPOM;

/* STORING TS ITEMS INTO SORT AREA */
DO I=1 TO SORT_VARS.ITEM_NUMBER;
   J=I-1;
   EXEC CICS READQ TS QUEUE(SORT_VARS.TS_NAME) ITEM(I)
               INTO(TSREC(J));
   TSRECNO(J)=J;
END;

/* SORTING */
SORT_VARS.ITEMNO_PRESERVED=SORT_VARS.ITEM_NUMBER;
SORT_VARS.ITEMNO_DELETED  =Ø;
RASPON=SORT_VARS.ITEM_NUMBER/2;
DO WHILE(RASPON>Ø);
   I=RASPON;
   DO WHILE(I<SORT_VARS.ITEM_NUMBER);
      J=I-RASPON;
      DO WHILE(J>=Ø &
               J+RASPON<=SORT_VARS.ITEM_NUMBER-1 &
               (SORT_VARS.SORT_ORDER='A' & STRCMP(J,J+RASPON)>BFNUL |
                SORT_VARS.SORT_ORDER='D' & STRCMP(J,J+RASPON)<BFNUL));
         SRT.NO_CHANGES=SRT.NO_CHANGES+1;
         STRPOM=TSREC(J);
         TSREC(J)=TSREC(J+RASPON);
         TSREC(J+RASPON)=STRPOM;
         RECNOPOM=TSRECNO(J);
         TSRECNO(J)=TSRECNO(J+RASPON);
         TSRECNO(J+RASPON)=RECNOPOM;
         J=J-RASPON;
      END;
      I=I+1;
   END;
   RASPON=RASPON/2;
```

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```
END;
/* DELETING DUPLICATES IF SPECIFIED AND OVERWRITING TS */
IF (SORT_VARS.DELETE_DUPLICATE='YES') THEN DO;
   EXEC CICS DELETEQ TS QUEUE(SORT_VARS.TS_NAME);
   CMPS2='"';
   DO I=1 TO ITEM_NUMBER;
      J=I-1;
      IF (SORT_VARS.FIELD_SORT='YES') THEN DO;
         POS1=1;
         DO K=1 TO FIELD_NUMBER;
            SUBSTR(CMPS1,POS1,SORT_VARS.FIELD_LENGTH(K))=
               SUBSTR(TSREC(J),
               SORT_VARS.START_POSITION(K),
               SORT_VARS.FIELD_LENGTH(K));
            POS1 = POS1 + SORT_VARS.FIELD_LENGTH(K);
         END;
      END;
      ELSE CMPS1=TSREC(J);
      IF (CMPS1¬=CMPS2) THEN DO;
         SRT.NO_WRITEQ=SRT.NO_WRITEQ+1;
         EXEC CICS WRITEQ TS QUEUE(SORT_VARS.TS_NAME)
                   FROM(TSREC(J));
         CMPS2=CMPS1;
      END;
   END;
   SORT_VARS.ITEMNO_PRESERVED=SRT.NO_WRITEQ;
   SORT_VARS.ITEMNO_DELETED=SORT_VARS.ITEM_NUMBER-
                            SORT_VARS.ITEMNO_PRESERVED;
END;
ELSE DO;
   DO I=1 TO ITEM_NUMBER;
      J=I-1;
      IF (TSRECNO(J) ¬= J) THEN DO;
         SRT.NO_WRITEQ=SRT.NO_WRITEQ+1;
         EXEC CICS WRITEQ TS QUEUE(SORT_VARS.TS_NAME) ITEM(I)
                   FROM(TSREC(J)) REWRITE;
      END;
   END;
END;

/* PROCEDURE THAT COMPARES TWO STRINGS ACCORDING TO THE */
/*           NATIONAL ALPHABET                          */
STRCMP: PROCEDURE(RN1, RN2) RETURNS(BIN FIXED(15,3));
DCL (RN1, RN2) BIN FIXED(15);
DCL (CH1, CH2) BIN FIXED(15,3);
DCL (NXTC1,NXTC2) CHAR;
DCL (C1,C2) CHAR;
DCL J BIN FIXED(15);
DCL POSITION BIN FIXED(15) INIT(1);
IF (SORT_VARS.FIELD_SORT='YES') THEN DO;
   DO J=1 TO FIELD_NUMBER;
```


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```
      SUBSTR(CMPS1,POSITION,SORT_VARS.FIELD_LENGTH(J))=
         SUBSTR(TSREC(RN1),
                SORT_VARS.START_POSITION(J),
                SORT_VARS.FIELD_LENGTH(J));
      SUBSTR(CMPS2,POSITION,SORT_VARS.FIELD_LENGTH(J))=
         SUBSTR(TSREC(RN2),
                SORT_VARS.START_POSITION(J),
                SORT_VARS.FIELD_LENGTH(J));
      POSITION=POSITION+SORT_VARS.FIELD_LENGTH(J);
   END;
END;
ELSE DO;
   CMPS1=TSREC(RN1);
   CMPS2=TSREC(RN2);
END;
DO J=1 TO SRT.SORT_LENGTH;
   IF (J=SRT.SORT_LENGTH) THEN DO;
      NXTC1='-';
      NXTC2='-';
   END;
   ELSE DO;
      NXTC1=SUBSTR(CMPS1,J+1,1);
      NXTC2=SUBSTR(CMPS2,J+1,1);
   END;
   C1=SUBSTR(CMPS1,J,1);
   C2=SUBSTR(CMPS2,J,1);
   CH1=Ø;CH2=Ø;
   IF (C1¬=C2 | NXTC1¬=NXTC2) THEN DO;
      CH1=CTN(C1,NXTC1);
      CH2=CTN(C2,NXTC2);
      IF (CH1 ¬= CH2) THEN RETURN(CH1-CH2);
   END;
END;
RETURN(BFNUL);
END STRCMP;

/* PROCEDURE THAT ASSIGNS VALUES TO THE CHARACTERS ACCORDING TO THE */
/*           NATIONAL ALPHABET                                      */
CTN: PROCEDURE(CH,NXTC) RETURNS(BIN FIXED(15,3));
   DCL (CH,NXTC) CHAR;
   DCL V BIT(8) BASED(ADDR(CH));
   DCL BF BIN FIXED(15,3);
   BF=V;
   SELECT(CH);
      WHEN ('?') BF=CC+.5;                  /* C < ? (¬) <  D */
      WHEN ('?') BF=CC+.7;          /* C < ? (¬) < ? (?) <  D */
      WHEN ('D') DO;                       /* D < D? (D|) < E */
         IF (NXTC='?') THEN BF=CD+.5;
      END;
      WHEN ('?') BF=CD+.7;         /* D < D? (D|) < ? (?) < E */
      WHEN ('L') DO;                           /* L < LJ < M */
```

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```
         IF (NXTC='J') THEN BF=CL+.5;
      END;
      WHEN ('N') DO;                          /* N < NJ < M */
         IF (NXTC='J') THEN BF=CN+.5;
      END;
      WHEN ('?') BF=CS+.5;                 /* C < ? (?) <  D */
      WHEN ('W') BF=CV;                    /* W = V          */
      WHEN ('?') BF=CZ+.5;                 /* C < ? (|) <  D */
      OTHERWISE;
   END;
   RETURN (BF);
END CTN;

/* FREEING SORT AREA */
FREE TSREC;
FREE TSRECNO;
FREE CMPS1;FREE CMPS2;
FREE STRPOM;

/* UNCOMMENT THE FOLLOWING IF YOU WANT TO TEST AND TRACE SORT */
/* DCL ISPVAR CHAR(255) INIT(' ');
DCL 1 ISP BASED(ADDR(ISPVAR)),
    2 HD   CHAR(21),
    2 BØ1  CHAR(Ø1),
    2 VØ1  CHAR(Ø8),
    2 LØ1  CHAR(Ø8),
    2 BØ2  CHAR(Ø1),
    2 VØ2  CHAR(12),
    2 LØ2  PIC'(5)9',
    2 BØ3  CHAR(Ø1),
    2 VØ3  CHAR(12),
    2 LØ3  PIC'(5)9',
    2 BØ4  CHAR(Ø1),
    2 VØ4  CHAR(11),
    2 LØ4  CHAR(3),
    2 BØ5  CHAR(Ø1),
    2 VØ5  CHAR(13),
    2 LØ5  PIC'(5)9',
    2 BØ6  CHAR(Ø1),
    2 VØ6  CHAR(11),
    2 LØ6  CHAR(1),
    2 BØ7  CHAR(Ø1),
    2 VØ7  CHAR(17),
    2 LØ7  CHAR(3),
    2 BØ8  CHAR(Ø1),
    2 VØ8  CHAR(17),
    2 LØ8  PIC'(5)9',
    2 BØ9  CHAR(Ø1),
    2 VØ9  CHAR(15),
    2 LØ9  PIC'(5)9';
ISP.HD='** SORT VARIABLE ** ';
```


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```
ISP.VØ1='TS_NAME:';
ISP.LØ1=SORT_VARS.TS_NAME;
ISP.VØ2='ITEM_NUMBER:';
ISP.LØ2=SORT_VARS.ITEM_NUMBER;
ISP.VØ3='ITEM_LENGTH:';
ISP.LØ3=SORT_VARS.ITEM_LENGTH;
ISP.VØ4='FIELD_SORT:';
ISP.LØ4=SORT_VARS.FIELD_SORT;
ISP.VØ5='FIELD_NUMBER:';
ISP.LØ5=SORT_VARS.FIELD_NUMBER;
ISP.VØ6='SORT_ORDER:';
ISP.LØ6=SORT_VARS.SORT_ORDER;
ISP.LØ7=SORT_VARS.DELETE_DUPLICATE;
ISP.VØ7='DELETE_DUPLICATE:';
ISP.VØ8='ITEMNO_PRESERVED:';
ISP.LØ8=SORT_VARS.ITEMNO_PRESERVED;
ISP.VØ9='ITEMNO_DELETED:';
ISP.LØ9=SORT_VARS.ITEMNO_DELETED;

EXEC CICS WRITEQ TS QUEUE(' ') FROM(ISPVAR) NOHANDLE; */

EXEC CICS RETURN;
END SORT;
```

The sort program uses the bubble-sort procedure. If you want to change the sort program for use with your national language alphabet, it is sufficient to specify at the beginning of the program the English language characters that immediately precede the national language characters and change the procedure CTN that assigns the decimal value to the characters.

IMPORTANT

It might be useful to program the sort program in Assembler – I think this might work even faster.

You should check the CICS initialization parameter that specifies how much processor time can be spent in the program between two EXEC CICS statements. If the time is too short, the sort program will abend when the sort is very big. You are free to increase it.

Josip Ivancic
Database Administrator (Croatia)
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IBM has announced Version 3.1 of its CICS Universal Clients and CICS Transaction Gateway, with new hardware support for IBM Network Stations, Netfinity Servers, and Sun Sparc Ultra 5 and Ultra 10 machines.

The Universal Clients provide the basis for IBM's Application Mining initiative, providing the means to access CICS applications users' desktops via CICS servers on all platforms. The Transaction Gateway, used where multiple users are required, replaces the CICS Internet Gateway and the CICS Gateway for Java.

Besides new hardware support, the Universal Clients get enhancements to C++ and COM programming interfaces, EPI extensions to support extended terminal attributes and sign-on capable terminals, and improved supplied sample programs, including support for PL/I for NT.

The gateway gets the same improvements plus enhancements to Java programming interfaces and Common Connector Framework classes for CICS. It can also be enabled to run as an NT service and there's new support for OS/390 Unix with enhanced security and performance. Also new is support for OS/390 System Secure Sockets Layer (SSL), user authentication via an X.509 client certificate, and mapping of client certificates to RACF user-ids.

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

* * *

HDS has announced its iSuite set of integrated e-business solutions. The suite's built around Skyline Trinium and Pilot Series mainframes, as well as Freedom Storage 7700E disk arrays.

Its IntraPlex creates a complete Parallel Sysplex configuration within a single Skyline Trinium. Key elements include dynamic transaction routing, application data sharing for CICS, DB2, IMS, and VSAM environments, and the development and implementation of an overall strategy.

For further information contact your local HDS representative.
URL: http://www.hds.com.

* * *

Candle has announced immediate support for OS/390 Version 2.8 in all relevant products. It also has expanded participation in the IBM SystemPac programme.

Candle also unveiled a new version of its Candle Command Center product for CICS Version 200, including enhanced usability and additional support for Parallel Sysplex and data sharing analysis, such as support for VSAM record-level sharing.

There's also OMEGAMON II Version 500 for CICS with a range of new features including analysis of various types of Web-based connections in CICS, and new flexible user profile controls.

For further information contact:
Candle, 2425 Olympic Blvd, Santa Monica, CA 90404, USA.
Tel: (310) 829 5800.
Candle Services, 1 Archipelago, Lyon Way, Frimley, Camberley, Surrey, GU16 5ER, UK.
Tel: (01276) 414700.
URL: http://www.candle.com.