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CICS Update

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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/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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Modern CICS application development

For the most part, CICS applications are very similar to other applications in your system. Hopefully, they pass through the twelve stages of development – conceive, architect, design, edit code, translate, compile, link-edit or bind, create CICS resource definitions, test, debug, deploy, and maintain. The main differences occur where the environment demands a different architecture – for example batch, where the norm is to repeat some set of functions on a whole file, compared with the on-line transactional environment, where the program normally deals with discrete record(s) from a keyed file or row(s) from a relational database table. A CICS application's life cycle often lasts more than 20 years, so, not surprisingly, most money is spent in changing and maintaining the business function to keep it in line with regulatory or business focus rather than on the initial implementation.

Today, there is a wide range of extremely powerful and versatile tools, which application developers can use to address each of the development phases. This article highlights some of the options, especially within the edit, compile, and debug areas.

ADVANCES IN DEBUGGING ON MAINFRAMES

In the early days of CICS application development, the ultimate debugging tool was the printed hexadecimal (hex) dump! Once the EXEC CICS interface was added in 1976, it gave the CICS developers the ability to build the CICS Execution Debug Facility, more normally known by its transaction name CEDF. This facility allowed the application programmer to view and change program data as it was passed from the application to CICS and on its return to the application from CICS, and also the condition code allowing the testing of the various error paths. What is particularly powerful about CEDF is that it is non-intrusive, so nothing particular has to be done to the application to use it – therefore it can be used immediately on failing production code. The CEDF functionality was increased in Transaction Server 1.2 with the addition of a new transaction identifier, CEDX,

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which performs in the same way without having to be anchored to the transaction being debugged.

Fortunately, matters have moved forward since then, especially for the application developers. Through the '80s, the dump was superseded by a 3270 terminal as a line-by-line device to look at the source and the values of variables, and then by a full GUI running on a desktop system such as Windows NT or OS/2 connected to your application transaction running within CICS.

A MODERN DEVELOPMENT ENVIRONMENT

If you wish to use your mainframe as the development environment, the latest IBM compilers supply all the technology to perform remote edit, compile, and debug within a CICS address space from a workstation running the VisualAge Remote Debugger. You can debug applications interactively using a full-screen interface or in batch mode using a predefined command file. The following IBM high-level language compilers work with this Debugger:

- IBM COBOL for MVS and VM
- IBM C/C++ for MVS and VM
- IBM OS/390 C/C++
- IBM PL/I for MVS and VM
- VisualAge for Java, Enterprise Edition for OS/390 (remote debug only)
- IBM COBOL for VSE/ESA
- IBM C for VSE/ESA
- IBM PL/I for VSE/ESA.

The facilities provided include single-stepping through each statement of your transaction, inserting break points, or tracing a specific variable. The Debugger can also be dynamically invoked when an error condition occurs, for example when a transaction abend is about to happen. The Debugger displays the source statement at the point of failure, and provides facilities for diagnosing and correcting the

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problem. You can change variables and re-execute the code that previously failed without leaving the debug session.

An excellent Web site can be found on this topic at http://www.S390.ibm.com/dt . This site contains various scenarios, detailing where to perform the various tasks, and identifying each task's benefits and costs. More importantly, it lays out all the levels of prerequisite software and the TCP/IP and SNA APPC connectivity options.

Another approach to CICS application development is for each developer to be completely independent on a Windows NT or OS/2 workstation using IBM VisualAge COBOL Enterprise Edition 2.2 or IBM VisualAge PL/I Enterprise Edition 2.1. Each of these products contains a VisualAge CICS Enterprise Application Development Version 3.1 (which is functionally equivalent to CICS/ESA Version 4.1 and is Year 2000 compliant).

LANGUAGE CAPABILITY

On the language side, there are many major facilities besides the compiler. Firstly, there is a WorkFrame, a configurable project-oriented application development environment, which increases the effectiveness of all the tools.

There is a context sensitive editor, which is able to automatically parse COBOL, PL/I, C/C++, and Java source code – for example, language keywords, comments, and string literals – and display them in different colours and fonts as the program is being created, so saving extra compiles to find just syntax errors.

The Data Assistant simplifies the job of writing syntactically correct SQL by using a point-and-click method on selected database columns, which will then automatically produce the required SQL statements and an Interactive Debug.

Y2K ANALYSIS AND RESTRUCTURING TOOLS

The Millennium Language Extensions (MLE) are part of the set of Redevelopment Tools particularly aimed at understanding your current

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source and providing a Year 2000 analysis by chasing the values returned from known time/date constructs through the code or by looking for matches in identifier names, for example a pattern *YYDDD*. Other maintenance work, resulting from having to upgrade to the COBOL ANSI 85 level, can be performed automatically in most cases. Your source code can also be restructured to improve readability and understanding and also to highlight non-reachable code.

ENTERPRISE VISUALAGE COBOL AND PL/I

These extremely powerful desktop packages each contain VisualAge CICS, which runs on Windows NT and OS/2. It is remarkably simple to install, configure, and use. VisualAge CICS' dynamic resource definition allows application programmers to add new resources while CICS is running, and share these with other programmers on a LAN. Besides being a simple CICS, equivalent to a CICS mainframe address space, it can also support other configurations:

- FEPI (Front End Processing Interface), allowing interconnection with IMS/ESA and CICS/ESA systems as a secondary LU0 and LU2.
- TCP3270, giving native connection of TCP boxes to test and run 3270 applications without having to build/use an SNA network.
- MRO (Multiple Region Operation), supporting multiple CICS images on a desktop box.
- ISC (Inter Systems Coupling) with other CICS implementations over SNA LU6.2 and TCP/IP with other VisualAge CICS.

A key ease-of-use characteristic is that all the internal data can be held in System/390 formats, so ASCII to EBCDIC and Intel to System/390 data conversions can be a thing of the past. As a result, already existent user data on CICS hosts is available for use immediately with the remote development environment.

The VisualAge package can also be used to remotely edit/compile/debug on your mainframe so, depending upon the needs and goals of your installation, you have an extremely flexible set of ways to build, debug, and maintain your COBOL and PL/I applications.

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For more information on application development for CICS/390, visit our Web site at http://www.software.ibm.com/ad/.

CICS CLIENT

The CICS client has existed for quite a few years, executing on DOS, Windows 3.1, Windows 95, Windows NT, AIX, Sun Solaris, and OS/2 and connecting over SNA LU6.2, TCP/IP, TCP6.2, and NetBIOS, depending on the operating system. The connectivity options are quite complicated, varying by operating system. They are set out clearly in http://www.software.ibm.com/ts/client.

The client provides four basic interfaces to connect an end-user workstation to a mainframe or distributed CICS:

- The External Call Interface (ECI) is a programmable interface that provides the capability to pass a CICS COMMAREA to a CICS server and receive the reply. Various options are provided for different levels of data integrity and the network interactions parallel those of CICS' Distributed LINK.
- The External Presentation Interface (EPI) is a programmable interface that allows a user application to intercept CICS 3270 data streams. As we will see later, this interface is the basis for putting a GUI on already existing CICS green-screen applications.
- The CICS 3270 emulator will run 3270 CICS server applications without writing any user code.
- The External Security Interface (ESI) is a programmable interface that allows the passing of the user-id and password to a CICS server application.

These client interfaces can be used from COBOL, PL/I, C/C++, and Java applications. Each language has a VisualAge Assistant to make writing CICS client ECI programs easy with their in-built user-friendly editors, compilers, and debuggers.

Recently, IBM has acquired an application development product, which is now shipped as VisualAge Interspace Version 6.0, to work in the CICS client to CICS mainframe rapid application development space.

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VISUALAGE INTERSPACE

VisualAge Interspace allows the programmer to build the client side of the application using the tools listed below:

- Microsoft Visual BASIC
- Microsoft ActiveX
- Any Java Integrated Development Environment (IDE), including VisualAge for Java
- Any C or C++ IDE, including VisualAge C++
- Sybase PowerBuilder.

The server systems can be:

- CICS
- MQSeries
- WebSphere
- VisualAge Generator.

It guarantees the ‘handshaking’ between the front-end and back-end applications and so adds significant productivity throughout the application development life-cycle.

In addition to generating client code, VisualAge Interspace generates skeletons for CICS and MQ in C/C++, COBOL, and Java languages.

SERVICE CATALOG

The core building block of VisualAge Interspace is its catalog, which enables server applications to be turned into re-usable application components. Every message that flows between two programs has a message signature with the name of the program or service and the corresponding set of input and output fields; and it is this signature that is stored in the catalog.

The catalog contains meta-definitions of these message signatures, independent of any particular tool, language, or middleware, thereby

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making them highly re-usable. Because these messages are defined in the catalog, VisualAge Interspace can guarantee the ‘handshaking’ between these programs in all its environments.

The catalog can be populated from many sources, including COBOL copybooks and BMS maps. VisualAge Interspace also provides a 3270 ‘sniffer’, which catalogs a complete CICS 3270 flow and data simply by running the application through the emulator provided. This allows the mining of a 3270 application, where there is no access to BMS maps. Moreover, because the structure and syntax of the catalog are documented, it is relatively easy to create custom import and export utilities.

STUB GENERATOR

A typical middleware application is composed of building blocks called clients and services. A service is much like a function or procedure or even a ‘method’. A client makes a request to invoke the service. Each client and service has business logic within it; however, surrounding this business logic is a middleware-specific ‘wrapper’ that forms the buffer between the middleware and the business logic. These wrappers can be complex and difficult to code.

Through its stub generator, VisualAge Interspace provides a utility program that automatically creates these wrappers from information held in its catalog. This allows front and back-end developers to concentrate exclusively on their own business logic.

The stub generator is driven by templates that can be customized to reflect application-specific processing, such as error management, security, or logging. Because they are based on these templates, the resulting wrappers have this logic embedded within them. This structure guarantees that architecture and processing will be uniformly enforced across application components.

The stub generator supports a broad range of languages. At the client there’s Java, C/C++, Visual BASIC, and PowerBuilder. At the server there’s C/C++, COBOL, and Java. Stubs created with this utility can be imported into IBM tools such as VisualAge for Java, VisualAge

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C++, VisualAge COBOL, and VisualAge Generator to enhance developer productivity in building new server-side applications.

API

The VisualAge Interspace API offers a consistent programming interface, semantically and syntactically similar to the API of the particular development tool being used, and covers the full set of functions of the underlying middleware.

TESTER

Testing in a heterogeneous development environment is often a problem. Developers using PowerBuilder, for example, are unlikely to have the equivalent skills to write a COBOL middleware program or *vice versa*. If both are being developed in parallel, they are unlikely to proceed exactly in step. VisualAge Interspace addresses these problems elegantly, because its tester allows end-to-end testing without end-to-end knowledge. Through the information in the catalog, the tester automatically generates driver programs on both the front and back end, thereby allowing any developer to complete an end-to-end test. The tester works in a live environment – it uses the front-end tool and the actual middleware and connectivity to identify errors as early as possible in the development process.

SERVICE INTERFACE PAINTER

The Service Interface Painter provides a well-integrated, graphical development environment, and is (apart from the API) the primary interface to VisualAge Interspace, offering features for catalog viewing and management, including importing data, stub generation, and testing.

So in conclusion, I believe CICS application development in all its forms has come a long way from punched cards, a line-by-line TSO editor, and a hex dump!

Andy Krasun
IBM (USA)
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Submit jobs from CICS to batch

With this program you are able to submit jobs from CICS to batch via a central application, which is called CSSUBMI.

The procedure AFPBATCH, in the job embedded in this program, logs in to TSO in batch, and the job specified by other parameters in the COMMAREA is then submitted to run in batch. This means that the submission of the job, which will run in batch, is carried out by the procedure AFPBATCH.

The JCL is stored in a CA-PANVALET library, but you can also define each job in this program directly or use another product similar to CA-PANVALET.

To avoid deadlocks in batch, an 'EXEC CICS SYNCPOINT' concludes the logical unit of work.

Originally, the application was designed to submit jobs for a graphic print by IBM's AFP, but a more universal use is obviously possible.

AFPBATCH.TXT

```
*
* This procedure (AFPBATCH) uses standard TSO/ISPF to
* login to TSO in batch and submit a specified job(stream) via
* the TSO/batch environment.
*
PROC 2 USERID DEST P1() P2() P3() P4() P5() P6() P7() P8() P9()
ISPEXEC FTOPEN
ISPEXEC FTINCL JOB
ISPEXEC FTCLOSE
EXIT
```

CSSUBMI.TXT

```
*ASM XOPTS(CICS,NOEDF)
         PUNCH ' MODE AMODE(31),RMODE(ANY) '
CSSUBMI  TITLE 'Program to submit jobs from CICS to batch'
         SPACE
DFHEISTG DSECT
```

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```
         SPACE
* ********************************************************************* *
*                                                                       *
*                     D E S C R I P T I O N                             *
*                    ----------------------                             *
*                                                                       *
*                                                                       *
* You can call the program via "EXEC CICS XCTL" or "EXEC CICS LINK",    *
* the COMMAREA has the following construction:                          *
*                                                                       *
*      Column        Content                                            *
*      1 -   8       Name of the job, which should be submitted from    *
*                    the CA-PANVALET library.                           *
*            9       Constant ",".                                      *
*     1Ø -  12       Column 5 to 7 from the name of the submituser.     *
*           13       Constant ",".                                      *
*     14 -  19       Name of the printer(JES)/destination on which      *
*                    the output should be printed.                      *
*     2Ø - 649       Optional. Type up to nine parameter which should   *
*                    be changed temporarily in the job(stream) from     *
*                    the CA-PANVALET separated with a comma and         *
*                    start with a comma on column 2Ø.                   *
*                                                                       *
* There are no low-values allowed in the COMMAREA.                      *
*                                                                       *
*                                                                       *
* The LUW is finished after calling the CSSUBMI-program (syncpoint)     *
* and there is no direct notification to the                            *
* client application, so it will be useful to keep the calling          *
* application recoverable.                                              *
*                                                                       *
*                                                                       *
* The name of the submituser has the following construc-                *
* tion:                                                                 *
*  Column            1   = "T", "V" or "P" for the TEST- or PROD-       *
*                          CICS or for a CICS between both ("V").       *
*  Column       2 -  4   = Constant "SUB".                              *
*  Column       5 -  7   = Three-digit shorthand expression for the     *
*                          project to which the calling application     *
*                          is added.                                    *
*                                                                       *
*                                                                       *
* RACF:                                                                 *
*                                                                       *
* Allow your CICS-regionuser to submit jobs from the CICS via the       *
* racfclass SURROGAT                                                    *
*                                                                       *
* ********************************************************************* *
```


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```
         EJECT
* ********************************************************************* *
*                                                                       *
*              D E F I N I T I O N S                                    *
*                                                                       *
* ********************************************************************* *
         SPACE
OUTAREA  DS    CL8Ø               JCL-OUTPUT-AREA
OUTMSG   DS    CL6Ø               MSG-OUTPUT-AREA
TOKEN    DS    CL8
RESPONSE DS    F
STOR7    DS    CL1
         SPACE
SYSID    DS    ØCL4
         DS    CL1
ENVIRON  DS    CL1
         ORG   SYSID+4
         SPACE
USERID   DS    ØCL8
USERCL7  DS    CL7
         ORG   USERID+8
         SPACE
COMMAR   DS    ØCL649
PANMEM   DS    CL8
KOMMA1   DS    CL1
USER     DS    CL3
KOMMA2   DS    CL1
DRUCKER  DS    CL6
REST     DS    CL63Ø
         ORG   COMMAR+649
         SPACE
SUBUSER  DS    CL7
EYECATO  DS    CL4Ø
OLDEIB   DS    CL85
JOB      EQU   *
         ORG   JOB+(JOBEND-JOBSTART)
         SPACE
* ********************************************************************* *
*                                                                       *
*              M A I N P R O G R A M                                    *
*                                                                       *
* ********************************************************************* *
         SPACE
CSSUBMI  DFHEIENT CODEREG=(R4),DATAREG=R12
CSSUBMI  AMODE ANY
CSSUBMI  RMODE ANY
         SPACE
         EXEC CICS SYNCPOINT
```

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```
         SPACE
         EXEC CICS ADDRESS COMMAREA(R2) RESP(RESPONSE)
         SPACE
         CLC   RESPONSE,DFHRESP(NORMAL)
         BNE   INVCOMMA
         CLC   EIBCALEN,=H'19'
         BL    INVCOMMA
         CLC   EIBCALEN,=H'649'
         BH    INVCOMMA
         LA    RØ,COMMAR
         LH    R1,EIBCALEN
         LR    R3,R1
         MVCL  RØ,R2
         CLI   KOMMA1,C','
         BNE   INVCOMMA
         CLI   KOMMA2,C','
         BNE   INVCOMMA
         CLI   REST,C' '
         BNH   TRUCOMM
         CLI   REST,C','
         BNE   INVCOMMA
         CLI   REST+1,C'P'
         BE    TRUCOMM
         SPACE
INVCOMMA EQU   *
         MVC   OUTMSG,MSGØØ4
         BAS   R6,SENDMSG
         BAS   R6,ABEND
         B     RETURN
         SPACE
TRUCOMM  EQU   *
         LA    R8,COMMAR
         LH    R9,=Y(L'COMMAR)
         SPACE
TRUCA1ØØ EQU   *
         CLI   Ø(R8),X'ØØ'
         BNE   TRUCA2ØØ
         MVI   Ø(R8),X'4Ø'
         SPACE
TRUCA2ØØ EQU   *
         LA    R8,1(R8)
         BCT   R9,TRUCA1ØØ
         SPACE
         EXEC CICS ASSIGN SYSID(SYSID)                                 *
                          USERID(USERID)                               *
                          RESP(RESPONSE)
         SPACE
         CLC   RESPONSE,DFHRESP(NORMAL)
```


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```
         BE    TRUASSI
         MVC   OUTMSG,MSGØØ5
         BAS   R6,SENDMSG
         BAS   R6,ABEND
         B     RETURN
         SPACE
TRUASSI  EQU   *
         LA    RØ,JOB
         LH    R1,JOBLEN
         BCTR  R1,Ø
         LA    R8,JOBSTART
         LR    R9,R1
         MVCL  RØ,R8
         MVI   OUTMSG,C' '
         MVC   OUTMSG+1(L'OUTMSG-1),OUTMSG
         MVC   SUBUSER(1),ENVIRON
         MVC   SUBUSER+1(3),=C'SUB'
         MVC   SUBUSER+4(L'USER),USER
         MVC   JOB+2(L'USERCL7),USERCL7                    CARD Ø1
         MVC   JOB+175(L'SUBUSER),SUBUSER                  CARD Ø3
         MVC   JOB+281(L'SUBUSER),SUBUSER                  CARD Ø4
         MVC   JOB+355(L'PANMEM),PANMEM                    CARD Ø5
         MVC   JOB+128Ø(L'USERCL7),USERCL7                 CARD 17
         MVC   JOB+1288(L'DRUCKER),DRUCKER                 CARD 17
         CLI   REST,C' '
         BNH   SPOOLO
         BAS   R6,PARM
         SPACE
SPOOLO   EQU   *
         SPACE
         EXEC CICS SPOOLOPEN OUTPUT                                *
                             USERID('INTRDR')                      *
                             NODE('INTRDR')                        *
                             TOKEN(TOKEN)                          *
                             RESP(RESPONSE)
         SPACE
         CLC   RESPONSE,DFHRESP(NORMAL)
         BE    SPOOLWRT
         MVC   OUTMSG,MSGØØ1
         BAS   R6,SENDMSG
         BAS   R6,ABEND
         B     RETURN
         SPACE
SPOOLWRT EQU   *
         LA    R1Ø,JOB
         SPACE
SPOOLWRØ EQU   *
         MVC   OUTAREA,Ø(R1Ø)
```

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```
         SPACE
SPOOLWR1 EQU   *
         SPACE
         EXEC CICS SPOOLWRITE                                          *
                           TOKEN(TOKEN)                                *
                           FROM(OUTAREA)                               *
                           RESP(RESPONSE)
         SPACE
         CLC   RESPONSE,DFHRESP(NORMAL)
         BE    SPOOLWR2
         MVC   OUTMSG,MSGØØ2
         BAS   R6,SENDMSG
         BAS   R6,ABEND
         B     SPOOLCLS
         SPACE
SPOOLWR2 EQU   *
         CLC   OUTAREA(5),=C'/*EOF'
         BE    SPOOLCLS
         LA    R1Ø,8Ø(R1Ø)
         B     SPOOLWRØ
         SPACE
SPOOLCLS EQU   *
         SPACE
         EXEC CICS SPOOLCLOSE                                          *
                           TOKEN(TOKEN)                                *
                           RESP(RESPONSE)
         SPACE
         CLC   RESPONSE,DFHRESP(NORMAL)
         BE    RETURN
         MVC   OUTMSG,MSGØØ3
         BAS   R6,SENDMSG
         BAS   R6,ABEND
         SPACE
RETURN   EQU   *
         CLI   OUTMSG,C' '
         BNE   RET999
         MVC   OUTMSG,MSG999
         MVC   OUTMSG+45(L'SUBUSER),SUBUSER
         BAS   R6,SENDMSG
         SPACE
RET999   EQU   *
         EXEC  CICS RETURN
         EJECT
* ************************************************************** *
*                                                                *
*              S U B R O U T I N E S                             *
*                                                                *
* ************************************************************** *
```


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```
         SPACE
SENDMSG  EQU   *
         MVC   EYECATO,EYECATI
         MVC   OLDEIB,DFHEIBLK
         EXEC CICS WRITE OPERATOR TEXT(OUTMSG) RESP(RESPONSE)
         CLC   RESPONSE,DFHRESP(NORMAL)
         BER   R6
         BAS   R6,ABEND
         B     RETURN
         EJECT
ABEND    EQU   *
         EXEC CICS ABEND ABCODE('SUBM')
         BR    R6
         EJECT
PARM     EQU   *
         LA    R5,JOB+136Ø
         LA    R7,REST+1
         ST    R7,STOR7
         XR    R8,R8
         SPACE
PARM1ØØØ EQU   *
         CLI   Ø(R7),C')'
         BNE   PARM2ØØØ
         LA    R8,1(R8)
         L     R3,STOR7
         BCTR  R8,Ø
         EX    R8,MOVE
         LA    R7,1(R7)
         CLI   Ø(R7),C','
         BNE   PARM9ØØØ
         LA    R7,1(R7)
         ST    R7,STOR7
         XR    R8,R8
         LA    R5,8Ø(R5)
         SPACE
PARM2ØØØ EQU   *
         LA    R7,1(R7)
         LA    R8,1(R8)
         B     PARM1ØØØ
         SPACE
PARM9ØØØ EQU   *
         BR    R6
         SPACE
MOVE     MVC   Ø(Ø,R5),Ø(R3)
         EJECT
* ********************************************************************* *
*                                                                       *
*              C O N S T A N T S                                        *
```

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```
*                                                                     *
* ******************************************************************* *
         SPACE
MSG001   DC    CL60'CSSUBMI-001 Error during SPOOL-OPEN  |'
MSG002   DC    CL60'CSSUBMI-002 Error during SPOOL-WRITE |'
MSG003   DC    CL60'CSSUBMI-003 Error during SPOOL-CLOSE |'
MSG004   DC    CL60'CSSUBMI-004 Invalid COMMAREA detected|'
MSG005   DC    CL60'CSSUBMI-005 Invalid ASSIGN detected  |'
MSG999   DC    CL60'CSSUBMI-999 Submit orderly finished for User xxxxxx*
               x |'
EYECATI  DC    CL40'*** EYE-CATCHER *** OLD EIB-CONTENT ***'
         SPACE
JOBSTART DC  CL80'//B999999A JOB (0000,00000000,00,000,000),        '
         DC  CL80'//*            KOMMENTAR-KARTE                    '
         DC  CL80'//             XSUBXXX,REGION=8000K,CLASS=H,      '
         DC  CL80'//             MSGCLASS=X,RESTART=*,USER=XSUBXXX  '
     DC  CL80'//JOBREAD  EXEC PGM=PANRETRV,PARM=''S9999999,EXPAND'' '
         DC  CL80'//PANLIB   DD  DSN=NLV.PANLIB.JCL,DISP=SHR        '
         DC  CL80'//D001OS   DD  DSN=&&TEMP(JOB),                   '
         DC  CL80'//             DISP=(NEW,KEEP,KEEP),              '
         DC  CL80'//             SPACE=(TRK,(10,10,5)),             '
         DC  CL80'//             DCB=(RECFM=FB,LRECL=80)            '
         DC  CL80'//ISPBATCH EXEC ISPBATCH                          '
         DC  CL80'//TMPSLIB  DD  DSN=&&TEMP,DISP=SHR                '
         DC  CL80'//ISPFILE  DD  SYSOUT=(A,INTRDR),                 '
         DC  CL80'//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)'
         DC  CL80'//SYSTSIN  DD  *                                  '
         DC  CL80'ISPSTART CMD(%AFPBATCH +                          '
         DC    CL80'B999999 D99999                                    *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                              +'
         DC    CL80'                                                  *
                             )'
```


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```
         DC  CL8Ø'/*EOF                                                '
JOBEND   EQU   *
JOBLEN   DC    Y(JOBEND-JOBSTART)
BLANK    DC    CL6Ø' '
         SPACE
         EQUREG
         EJECT
* ****************************************************************** *
*                                                                    *
*              L I T E R A L S                                       *
*                                                                    *
* ****************************************************************** *
         SPACE
         LTORG
         SPACE
         DC    C' '
         END   CSSUBMI
```

Claus Reis
CICS Systems Programmer
Nuernberger Lebensversicherung AG (Germany) © Xephon 2000

Monitoring CICS activity – part 2

This month we conclude the article describing how to keep an on-line and historical view of what's happened inside CICS.

WHAT TO DO IF YOU ARE GOING TO RECYCLE CICS

This is where the process is not automatic any more. The operator should remember to start a special job right before CICS is brought down. The job is the same daily job that was started by the scheduler.

WHAT TO DO IF CICS WAS CANCELLED

Of course if CICS is cancelled this is not the right time to lose your system/application logs.

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In order to prevent it, a different job must be run. This ‘post mortem’ job will look at the data from the non-active CICS. It should be run right after a CICS crash, but not necessarily before a new CICS is started. In order to save some space, I’m only showing the first two steps of the JCL – all the rest are equivalent to the job that is run from the scheduler.

This job takes advantage of the fact that in SDSF after the CRDATE command is used, the DDnames are sorted in the same order as in the job.

```
//EXEC  PGM=SDSF,PARM='++24,131'
//ISFOUT  DD SYSOUT=T
//ISFIN   DD *

//ISFOUT  DD SYSOUT=T
//ISFIN   DD *
PREFIX SS5ØCICP
H
SORT CRDATE D
FIND SS5ØCICP
++?
FIND DCPMJNA
++S
PRINT ODSN  'SYSO.DCPMJNA' * MOD
PRINT
PRINT CLOSE

//EXEC  PGM=SDSF,PARM='++24,131'
//ISFOUT  DD SYSOUT=T
//ISFIN   DD *
PREFIX SS5Ø*
DA
FIND SS5ØCICP
++?
SORT DSID D
FIND DCPMJNF
DOWN 1
FIND DCPMJNF
++S
PRINT ODSN  'SYSO.DCPMJNF' * MOD
PRINT
PRINT CLOSE
```


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The following programs are used to automate the switching process – xeasm1, xeasm2, and xecto.

Xeasm1

```
* THIS PROGRAM ENABLES DYNAMIC DEALLOCATION OR ALLOCATION OF
* EXTERNAL TD-QUEUES.
* IT IS ACTIVATED BY THE FOLLOWING INPUT
*      TDYN FREE  DDNAME(DDNAME)           (UNALLOC ASSUMED)
* (OR) TDYN ALLOC DDNAME(DDNAME) SYSOUT(M) (STATUS SHR ASSUMED)
* UNLIKE  ADYN, IT  IS NOT A CONVERSATIONAL TRANSACTION
* EG IT CAN BE USED WITH MVS MODIFY COMMAND.
* THE PROGRAM USES DYNAMIC ALLOCATION DIRECTLY.
* IN THE CICS-SAMPLE-GUIDE THERE ARE EXAMPLES OF HOW TO
* USE DYALLOC FROM CICS.
* WITH SOME MODIFICATION IN THE DYNAMIC ALLOCATION TEXT UNITS
* THIS PROGRAM MAY BE USE TO ALLOC/DE-ALLOC DSNAMES.
* THIS PROGRAM MUST BE LINKED WITH AMOD AND RMOD 24.
* THE  TRANSACTION THAT STARTS THIS PROGRAM SHOULD BE DEFINED WITH
* TASKDATAKEY=CICS.
RNAME    EQU   5
RLEN     EQU   6
RWK      EQU   4
RRC      EQU   7
RBAL     EQU   8
R1       EQU   1
R15      EQU   15
DFHEISTG DSECT
ECB99    DS    A
TCB99    DS    A
*
TPADYN3  DFHEIENT CODEREG=3,DATAREG=1Ø,EIBREG=11
*
         MVC   MSG(29),MSG1
         MVI   TEXT,C' '
         MVC   TEXT+1(89),TEXT
         LA    RWK,9Ø
         STH   RWK,TEXTLEN
         EXEC CICS RECEIVE INTO(TEXT) LENGTH(TEXTLEN)
         CALL  JHTRT,(TEXTLEN,FREELEN)      * IS IT A FREE CALL
         LTR   R15,R15                      * IF IT DOES GO EXECUTE
         BZ    EXFREE
         CALL  JHTRT,(TEXTLEN,ALLOCLN)      * IS IT AN ALLOCATION
         LTR   R15,R15                      * IF IT DOES GO EXECUTE
         BZ    EXALLOC
*                                           * ELSE IT IS AN ERROR
         MVC   MSG(29),MSG5                 * ACTION NOT SPECIFIED
```

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```
         B     BRTRN
EXFREE   BAL   RBAL,DDSRCH                  * GO CHECK FOR DDNAME
         LTR   RRC,RRC                     * IF NO DDNAME FOUND
         BP    NOTIFY                      * IT IS AN ERROR
         BCTR  RLEN,Ø
         EX    RLEN,DDCHK                 * GO TO EXECUTE MVC
         MVI   CIC99VRB,X'Ø2'          VERB CODE FOR UNALLOCATION
         MVC   CIC99TLA,=A(CIC99UTU)   ADDR OF LIST OF UNALLOC
         XR    R15,R15
         LA    R1,CIC99PTR             SVC 99 PARAMETER LIST ADDRESS
         DYNALLOC
         CH    R15,HØ4             CHECK SVC 99 RC
         BL    BRTRN               Ø. GO SEND SUCCESS MESSAGE
         BH    FAILED              8-12. GO SEND GENERAL ERROR
         CLC   CIC99ERR,H1Ø56      4. IS IT X'42Ø'
         BNE   FAILED              4. NO-SEND GENERAL ERROR
         B     NOTOPEN             4. YES-SEND NOT OPEN
EXALLOC  BAL   RBAL,DDSRCH              GO LOOK FOR THE DDNAME
         LTR   RRC,RRC                * IF BAD RC FROM DDSRCH
         BP    NOTIFY
         BCTR  RLEN,Ø
         EX    RLEN,DDCHK
         MVI   CIC99VRB,X'Ø1'      VERB CODE FOR ALLOCATION
         MVC   CIC99TLA,=A(CIC99ATU) ADDR OF LIST OF ALLOC TEXT UNITS
         XR    R15,R15
         LA    R1,CIC99PTR         SVC 99 PARAMETER LIST ADDRESS
         DYNALLOC
         LTR   R15,R15
         BNZ   FAILED
         B     BRTRN
FAILED   MVC   MSG(29),MSG4         ACTION FAILED
         B     BRTRN
NOTOPEN  MVC   MSG(29),MSG6         ACTION FAILED - NOT OPEN
         B     BRTRN
NOTIFY   CH    RRC,=H'8'
         MVC   MSG(29),MSG2         DDNAME NOT SPECIFIED
         B     BRTRN
RC12     MVC   MSG(29),MSG3         DDNAME TOO LONG
BRTRN    DS    ØH
         EXEC CICS SEND FROM(MSG) LENGTH(29)
         EXEC CICS RETURN
DDSRCH   CALL  JHTRT,(TEXTLEN,DDNLEN)     LOOK FOR DDNAME KEWORD
         LTR   R15,R15                    NO DDNAME IN INPUT
         BNZ   NONAME
         LA    RWK,7(R1)                  RWK POINT TO TEXT
         LR    RNAME,RWK
         BCTR  RWK,Ø
NEXT1    LA    RWK,1(RWK)                 RWK POINT TO NEXT CHAR
         CLC   Ø(1,RWK),HYP               IS IT THE END OF DDNAME
         BNE   NEXT1                      NO CHECK NEXT CHAR
```


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```
         SR    RWK,RNAME                  YES CHECK IF VALID LENGTH
         LTR   RWK,RWK                    CHECK IF DDNAME EXIST
         BZ    NONAME                   ELSE RWK CONTAIN DDNAME LENGTH
         CH    RWK,=H'8'                  IF DDNAME IS TOO LONG
         BH    TOOLONG
         LR    RLEN,RWK                   RLEN CONTAIN STRING LENGTH
         SR    RRC,RRC SET RRC TO ZERO
         BR    RBAL RETURN TO CALLER
NONAME   LA    RRC,8            DDNAME MISSING
         BR    RBAL
TOOLONG  LA    RRC,12           DDNAME TOO LONG
         BR    RBAL
TEXTLEN  DS    H
TEXT     DS    CL9Ø
FREELEN  DC    H'4'
FREE     DC    CL4'FREE'
ALLOCLN  DC    H'5'
ALLOC    DC    CL5'ALLOC'
DDNLEN   DC    H'7'
DDNAME   DC    CL7'DDNAME('
HYP      DC    CL1')'
MSG      DS    CL29
MSG1     DC    CL29'ACTION SUCCESSFULL          '
MSG2     DC    CL29'DDNAME NOT SPECIFIED        '
MSG3     DC    CL29'DDNAME TOO LONG             '
MSG4     DC    CL29'ACTION FAILED               '
MSG5     DC    CL29'ACTION NOT SPECIFIED        '
MSG6     DC    CL29'ACTION FAILED FILE IS OPEN  '
HØ4      DC    H'4'
H1Ø56    DC    H'1Ø56'
*                              SVC 99 PARAMETER LIST
CIC99PTR DC    X'8Ø',AL3(CIC99RB)  REQUEST BLOCK POINTER
CIC99RB  DS   ØF                 REQUEST BLOCK
         DC    AL1(2Ø)           LENGTH OF REQUEST BLOCK
CIC99VRB DS    X                 VERB CODE
         DC    2X'Ø'             FLAGS
CIC99ERR DC    XL2'Ø'            ERROR REASON CODE
         DC    XL2'Ø'            INFORMATION REASON CODE
CIC99TLA DS    A                 ADDR OF LIST OF TEXT UNIT PTRS
         DC    F'Ø'              RESERVED
         DC    4X'Ø'             FLAGS FOR AUTHORIZED FUNCTIONS
*
CIC99ATU DS   ØF                 ALLOC TEXT UNIT POINTER LIST
         DC    X'ØØ',AL3(CICDDNAM)
         DC    X'ØØ',AL3(CICSYSOU)
         DC    X'8Ø',AL3(CICSPINS)
*
CIC99UTU DS   ØF                 UNALLOC TEXT UNIT POINTER LIST
         DC    X'8Ø',AL3(CICDDNAM)
*                                TEXT UNITS
```

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```
CICDDNAM DC    X'ØØØ1',HL2'1',HL2'8',CL8'        '  DDNAME
CICDNUM  EQU   *-8
CICSYSOU DC    X'ØØ18',HL2'1,1',X'D4'              SYSOUT(M)
CICSPINS DC    X'8Ø13',HL2'1,1',X'8Ø'            PRINT IMMEDIATELY
DDCHK    MVC   CICDNUM(Ø),Ø(RNAME)
         END
```

Xeasm2

```
JHTRT    START
         BEGIN EQUR=YES
         L     R3,Ø(R1)            * LOAD STRING ADDRESS
         L     R4,4(R1)            * LOAD SUBSTRING ADDRESS
         LH    R5,Ø(R3)            * LOAD LENGTH OF STRING
         LH    R6,Ø(R4)            * LOAD LENGTH OF SUBSTRING
         LA    R8,Ø(R3,R5)         * R8 POINT AT END OF STRING
         BCTR  R5,Ø                * MAKE LENGTH FOR EX COMMAND
         BCTR  R6,Ø                * MAKE LENGTH FOR EX COMMAND
         CR    R5,R6               * IS STRING SHORTER THEN SUBSTRING ?
         BL    TOOLONG             * YES ? GO TELL CALLER
         CH    R5,=H'255'          * IS LENGTH OVER ALLOWED LENGTH ?
         BH    TOOLONG             * YES ? GO TELL CALLER
         CH    R6,=H'255'          * IS LENGTH OVER ALLOWED LENGTH ?
         BH    TOOLONG             * YES ? GO TELL CALLER
         LA    R3,2(R3)            * LOAD ADDR FIRST CHAR OF STRING
         LA    R4,2(R4)            * LOAD ADDR FIRST CHAR OF SUBSTRING
         XC    TAB(256),TAB        * CLEAR TRT TABLE
         XR    R1,R1               * CLEAR REGISTER
         IC    R1,Ø(R4)            * FIRST CHAR OF SUBSTRING
         LA    R2,TAB              * LOAD TAB ADDRESS
         LA    R2,Ø(R1,R2)         * OFFSET OF FIRST CHAR OF SUBSTRING
         STC   R1,Ø(R2)            *  INSERT INTO TAB FOR TRT
EXTRT    DS    ØH                  *
         EX    R5,TRT              * EX TRT
         BZ    NOTFOUND            * NOT FOUND ? GO TO END
         CR    R1,R8               * TRT STOP AFTER STRING LIMIT ?
         BH    NOTFOUND            * NOT LOW ? NOT FOUND
         EX    R6,CLC              * EX CLC
         BE    FOUND               * YES ? GO TO END
         LR    R9,R1               * SAVE TRT ADDRESS
         SR    R1,R3               * R1 = TRT ADVANCE IN BYTES
         SR    R5,R1               * HOW MUCH LEFT
         CR    R5,R6               * LEFT < SUBTRING LENGTH
         BL    NOTFOUND            * YES ? NOT FOUND
         LTR   R5,R5               *
         BZ    NOTFOUND            *
         LA    R3,1(R9)            * POINT NEXT CHAR
         B     EXTRT               *
NOTFOUND DS    ØH                  *
         LA    R15,8               *
```


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```
         B     BRTRN               *
TOOLONG  DS    ØH                  *
         LA    R15,12              *
         B     BRTRN               *
FOUND    DS    ØH                  *
         XR    R15,R15             *
BRTRN    DS    ØH                  *
         L     R13,4(R13)          *
         L     R14,12(R13)         *
         LM    R3,R12,32(R13)      *
         MVI   12(R13),X'FF'       *
         BR    R14                 *
TRT      TRT   Ø(*-*,R3),TAB       *
CLC      CLC   Ø(*-*,R1),Ø(R4)     *
TAB      DC    256X'ØØ'            *
         END   JHTRT
```

Xecto

```
*****************************************************************
* THIS ROUTINE FREE & ALLOC DDNAME DCPMJN? IN CICS WHEN ?=T L F A
* ACTIVATED BY RULE - CICSTDQ
* AFTER THIS PROGRAM IS RUN - A NEW GENERATION OF CICS ARCHIVE
* LOG IS CREATED - AND THE REPLACED LOG IS ARCHIVED INTO TAPE.
*****************************************************************

  TRACE ON
  MAXCOMMAND 9999
  TIMEOUT 9999
  LOGON APPLID CICSOLIB SESSID KSØ1
  IFVAR %VTAMRC EQ '48' GOTO CICS_DOWN
  CURSOR POS 1 8
  IFSCREEN 'WELCOME TO CICS' GOTO SIGN_ON
  GETSCREEN
*
LABEL SIGN_ON
  CLEAR
  TYPE 'CESN USERID=MCPCTO,PS=%A1'
  ENTER
  CURSOR POS 1 11
  IFSCREEN 'SIGN-ON IS COMPLETE' GOTO START_PROG
  GOTO SIGN_NOTOK
*
LABEL START_PROG
   SETVAR %DJN1 DATA 'DJNA'
   SETVAR %DJN2 DATA 'DJNF'
   SETVAR %DJN3 DATA 'DJNL'
   SETVAR %DJN4 DATA 'DJNT'
   SETVAR %NO_DJN DATA '4'
  SETVAR %DCPMJNX_STAT DATA 'FREE'
```

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```
   GOTO NEXT_DJN
*
LABEL NEXT_DJN
  IFVAR %NO_DJN EQ 'Ø' GOTO END_PROG
  IFVAR %NO_DJN EQ '1' GOTO DJN1
  IFVAR %NO_DJN EQ '2' GOTO DJN2
  IFVAR %NO_DJN EQ '3' GOTO DJN3
  IFVAR %NO_DJN EQ '4' GOTO DJN4
*
LABEL DJN1
   SETVAR %N_D DATA 'DJNA'
   SETVAR %JN DATA 'JNA'
   GOTO TDQ
*
LABEL DJN2
   SETVAR %N_D DATA 'DJNF'
   SETVAR %JN DATA 'JNF'
   GOTO TDQ
*
LABEL DJN3
   SETVAR %N_D DATA 'DJNL'
   SETVAR %JN DATA 'JNL'
   GOTO TDQ
*
LABEL DJN4
   SETVAR %N_D DATA 'DJNT'
   SETVAR %JN DATA 'JNT'
   GOTO TDQ
*
LABEL TDQ
  SETVAR %NO_DJN DATA '%NO_DJN %%MINUS 1'
  SETVAR %ACT DATA 'CLOSE'
  PFØ3
  CLEAR
  TYPE 'CEMT S TDQ(%N_D) CL                          '
  ENTER
  CURSOR POS 1 15
  SETVAR %DJN SCREEN 1 12 4
  CURSOR POS 23 14
  IFSCREEN 'NORMAL' GOTO DO_ADYN
  GOTO TDQ_NOTOK
*
LABEL TDQ_NOTOK
  SHOUT TO TSO-SØ1Ø TEXT 'CTO - CICS TDQ %ACT FOR %DJN IS NOT NORMAL'
  SHOUT TO TSO-SØØ4 TEXT 'CTO - CICS TDQ %ACT FOR %DJN IS NOT NORMAL'
  GOTO END_PROG
*
LABEL DO_ADYN
  PFØ3
  CLEAR
```


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```
  TYPE 'ADYN                                    '
  ENTER
  CURSOR POS 9 1
  IFSCREEN 'ENTER' GOTO DO_FREE
  GOTO DO_OPEN
*
LABEL DO_FREE
  CURSOR HOME
  TYPE 'FREE DDNAME(DCPM%JN) UNALLOC                '
  ENTER
  CURSOR POS 9 41
  IFSCREEN '0000' GOTO DO_ALLOC
  SETVAR %DCPMJNX_STAT DATA 'FREE'
  GOTO RC_NOTOK
*
LABEL RC_NOTOK
  SHOUT TO TSO-S01Ø TEXT 'CTO - CICS FREE DCPM%JN NOT OK'
  IFVAR %DCPMJNX_STAT EQ 'ALLOC' GOTO DO_OPEN
*
LABEL DO_ALLOC
  PFØ3
  CLEAR
  TYPE 'ALLOC DDNAME(DCPM%JN) SYSOUT(M)              '
  ENTER
  CURSOR POS 9 41
  IFSCREEN '0000' GOTO DO_OPEN
  SETVAR %DCPMJNX_STAT DATA 'ALLOC'
  GOTO RC_NOTOK
*
LABEL DO_OPEN
  CURSOR HOME
  SETVAR %NUL DATA '                                                '
  TYPE '%NUL'
  ENTER
  PFØ3
  CLEAR
* CURSOR HOME
  TYPE 'CEMT S TDQ(%N_D) OP                         '
  ENTER
  CURSOR POS 23 14
  IFSCREEN 'NORMAL' GOTO NEXT_DJN
  SETVAR %ACT DATA 'OPEN'
  GOTO TDQ_NOTOK
*
LABEL SIGN_NOTOK
  SHOUT TO TSO-S01Ø TEXT 'cics sign-on failed'
  GOTO END_PROG
*
LABEL CICS_DOWN
  SETOGLB %%DOWN%A2 = 48
*
```

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```
LABEL END_PROG
  PFØ3
  CLEAR
  TYPE 'LOGOFF                          '
  ENTER
  LOGOFF
  END
```

Uri Cohen
CICS Systems Programmer (Israel)
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Contributing to *CICS Update*

Although the articles published in Xephon *Updates* are of a very high standard, the vast majority are not written by professional writers, and we rely heavily on our readers themselves taking the time and trouble to share their experiences with others. Many have discovered that writing an article is not the daunting task that it might appear to be at first glance. They have found that the effort needed to pass on valuable information to others is more than offset by our generous terms and conditions and the recognition they gain from their fellow professionals. Often, just a few hundred words are sufficient to describe a problem and the steps taken to solve it.

If you have ever experienced any difficulties with CICS, or made an interesting discovery, you could receive a cash payment, a free subscription to any of our *Updates*, or a credit against any of Xephon's wide range of products and services, simply by telling us all about it. For a copy of our *Notes for Contributors*, which explains the terms and conditions under which we publish articles, please write to the editor, Trevor Eddolls, at any of the addresses shown on page 2, or e-mail him on trevore@xephon.com.

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Finding DFHCSD duplicates and DFH$* groups

This article includes JCL to find duplicate entries in DFHCSD and also a procedure to remove DFH$* groups in your production DFHCSD. Included is a PL/I program to delete such keys, but you could also unload VSAM, edit the unloaded dataset and delete records, and then upload.

CSDDUPL

This is the JCL to find duplicate entries in DFHCSD:

```
//TSHVRA JOB (),'CSDDUPL',CLASS=A,MSGCLASS=X,NOTIFY=TSHVR
//*FIND DUPLICATES IN DFHCSD
//*Ø1-Ø8:NAME OF GROUP
//*13-14:TYPE OF RESOURCE
//*  ØXØØØ1 GENERAL
//*  ØXØØØ5 IBM PROTECTED GROUP   IBMINITIAL
//*  ØXØØØ6 GROUP
//*  ØXØØØD LIST
//*15-22:NAME OF RESOURCE
//*EXAMPLE OF OUTPUT:
//* HDFTERM      4AIXØ       ØØØØØ1
//* DFHMRODR     4CICA       ØØØØØB  (B=ØXC2=ØXF2 = 2)
//* DFH$FILA      FILEA      ØØØØØC  (C=ØXC3=ØXF3 = 3)
//* DFHCOMP1     EDFHRTY     ØØØØØD  (D=ØXC4=ØXF4 = 4)
//SORT1   EXEC SORT
//SORTIN  DD DISP=SHR,DSN=CICS41Ø.PX.DFHCSD
//SORTOUT DD SYSOUT=X
//SYSIN   DD *
* FOR RECFM=VB:OFFSETS SHOULD INCLUDE 4 BYTE RDW-FIELD
   OPTION  EQUALS
   INREC  FIELDS=(1,26,3X,C'ØØØØØ1')
   INCLUDE COND=((17,2,CH,NE,X'ØØØ1'),AND,
                 (17,2,CH,NE,X'ØØØ5'),AND,
                 (17,2,CH,NE,X'ØØØ6'),AND,
                 (17,2,CH,NE,X'ØØØD'))
   SORT FIELDS=(17,1Ø,CH,A)
   SUM    FIELDS=(3Ø,6,ZD)
//
//
```

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HVPVS01

This is the PL/I program to delete VSAM records:

```
* PROCESS LANGLVL(OS,SPROG),SYSTEM(MVS);
 /*HVPVSØ1:ACTIONS ON VSAMS                                          */
 /* AUTHOR:HVIERENDEELS@WWW.POSTMASTER.CO.UK                         */
 /* ---------------------------------------------------------------- */
 /*  ACTIONS ON VSAM DATASETS                                        */
 /* ---------------------------------------------------------------- */
 /* MAINTENANCE:                                                     */
 /* Ø9.94 COMMANDO M(OVE)  DELETE+MOVE NAAR BACKUP                   */

 HVPVSØ1: PROCEDURE (PARM) OPTIONS (MAIN);
 DCL $ERRPROG CHAR(16) STATIC INIT('*ERROR* HVPVSØ1:'),
     $NOTFOUND BIN FIXED STATIC INIT(51),
     $INV_CARD BIN FIXED STATIC INIT(999),
     $ACT_FAIL BIN FIXED STATIC INIT(998),
     $CMDINFORM  CHAR(1) STATIC INIT('I'),
     $COMMENT  CHAR(1) INIT('*'),
     $DELETE   CHAR(1) INIT('D'),
     $MOVE     CHAR(1) INIT('M'),
     $PRINT    CHAR(1) INIT('P'),
     $SET      CHAR(1) INIT('S'),
     $ERR_IND  CHAR(1) INIT('E'),  /* ERROR INDICATIE */
     $MESS_KEYLEN CHAR(16) INIT('INVALID KEYLEN'),
     $TRUE     BIT(1)  STATIC INIT('1'B),
     $FALSE    BIT(1)  STATIC INIT('Ø'B);
 /* EXTERNAL ENTRIES */
 /*HVPSHWC : CALL SHOWCAT */
 DCL HVPSHWC EXTERNAL ENTRY OPTIONS(ASM INTER  RETCODE);
 /*HVPDYNA  DYNALLOC PROG */
 DCL HVPDYNA  ENTRY OPTIONS(ASM INTER RETCODE);
 /* EXTERNAL ENTRIES END */
 DCL   PARM                  CHARACTER (1ØØ) VARYING ;
 %INCLUDE BUILTIN;
 DCL     SYSIN              FILE RECORD INPUT,
         EOF_SYSIN            BIT (1) INIT ('Ø'B) ;
 DCL     CARDIN CHAR(3ØØ) VARYING ;
 DCL     PTR_CARD POINTER ;
 DCL     1   CARDIN_REDEF  UNALIGNED BASED(PTR_CARD),
             2    LEN             BIN FIXED,
             2    CARD,
              3    CODE           CHAR (1),
              3    GENKEY         CHAR (1),   /* ' ' G */
              3    RESERVED1      CHAR (14),
              3    DDNAME         CHAR (Ø8),
              3    KEYLEN         PIC '999',
              3    RESERVED2      CHAR (53);
 DCL     CARD_TELLER BIN FIXED INIT(Ø);
 DCL     BACKUP     FILE RECORD OUTPUT;
 DCL     MASTER     FILE RECORD UPDATE KEYED ENV (VSAM GENKEY);
```


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```
DCL     EOF_MASTER         BIT (1) INIT ('Ø'B) ;
DCL     SYSPRINT           FILE PRINT OUTPUT;
DCL     ACTUAL_FILENAME CHAR(8) INIT(' '),
        ACTUAL_BACKUPNAME CHAR(8) INIT('BACKUP'),
        FULLKEY CHAR(255),
        MAXCC BIN FIXED(31) INIT(Ø),
        MYRC  BIN FIXED(31) INIT(Ø),
        KEYLEN_BI            BIN FIXED(15),
        IXRKP    BIN FIXED(15) INIT(Ø),
        IXKL     BIN FIXED(15) INIT(Ø),
        ONCODE_SAV           BIN FIXED,
        DATA_MAXRECL BIN FIXED(31);
DCL GENREC@ POINTER;
DCL GENREC CHAR(8Ø) BASED(GENREC@);
DCL VSAMREC CHAR(*) VARYING CONTROLLED;
DCL ERRCODE BIN FIXED(31) INIT(Ø);
DCL ERRMESS CHAR(8Ø) INIT(' ');
DCL SW_MOVE BIT(1) ;
 ON ERROR BEGIN;
         /* 1ØØ9 INVALID FILE OPERATION EG DEL KEY ON ESDS */
   ON ERROR SYSTEM;
   MYRC = ONCODE;
   PUT SKIP EDIT($ERRPROG,MYRC,'RAISED IN',ONLOC)
               (X(1),A,X(1),F(4,Ø),X(1),A,X(1),A);
   IF MYRC=9 THEN DO;
    IF (ERRCODE ¬=Ø & ERRMESS¬='') THEN
     PUT SKIP EDIT('ERRCODE=',ERRCODE,'ERRMESS=',ERRMESS)
                 (X(1),A,F(4),X(1),A,A);
     ELSE PUT SKIP EDIT('SEE PRECEDING PUT SKIP LISTS FOR PROGRAM')
                 (X(1),A);
   END;
   /* IF SUBROUTINE */
   GOTO L_RETURN;
 END;
        ON KEY (MASTER) BEGIN;
         ONCODE_SAV = ONCODE;
        END;
        ON UNDEFINEDFILE(MASTER) BEGIN;
         ONCODE_SAV = ONCODE;
        END;
        ON ENDFILE (SYSIN) BEGIN;
         EOF_SYSIN = $TRUE;
        END;
        ON ENDFILE (MASTER) BEGIN;
         EOF_MASTER = $TRUE;
        END;
PROGRAM_START:
PTR_CARD=ADDR(CARDIN);
OPEN FILE(SYSIN);
CALL S_GET_SYSIN_RECORD;
DO WHILE(¬EOF_SYSIN);
```

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```
 IF CARD.CODE=$SET    THEN SETCODE: DO;
  CALL PERFORM_SET;
 END SETCODE;
 ELSE NOT_SETCODE: DO;
  CALL S_OPEN;
  IF IXKL>KEYLEN_BI THEN CARD.GENKEY='G';
  SW_MOVE=$FALSE;
  IF      CARD.CODE=$DELETE THEN CALL PERFORM_DELETE;
  ELSE IF CARD.CODE=$PRINT  THEN CALL S_PRINT;
  ELSE IF CARD.CODE=$MOVE   THEN DO;
   IF CARD.GENKEY¬='G' THEN DO;
    PUT SKIP EDIT('E','MOVE REQUIRES GENKEY IN #',CARD_TELLER)
    (A(1),X(1),A(5Ø),X(1),F(4));
    MAXCC=MAX($INV_CARD,MAXCC);
   END;
   ELSE DO;
    SW_MOVE=$TRUE;
    CALL PERFORM_DELETE;
   END;
  END;/* MOVE */
  ELSE DO;
   PUT SKIP EDIT('E','INVALID CARDCODE IN CARD #',CARD_TELLER)
   (A(1),X(1),A(5Ø),X(1),F(4));
   MAXCC=MAX($INV_CARD,MAXCC);
  END;/*INVALID CARD CODE */
 END  NOT_SETCODE;
 CALL S_GET_SYSIN_RECORD;
END;/* DO WHILE(¬EOF_SYSIN)*/
MYRC=MAXCC;
L_RETURN:
ON ERROR SYSTEM;  /* AVOID ERROR LOOP */
CALL PLIRETC(MYRC);
RETURN;

/* SUBROUTINES */
S_OPEN:PROC;
 IF ACTUAL_FILENAME ¬= CARD.DDNAME THEN DO;
  IF ACTUAL_FILENAME¬='' THEN CLOSE FILE(MASTER);
  ACTUAL_FILENAME=CARD.DDNAME;
  OPEN FILE (MASTER) TITLE(ACTUAL_FILENAME);
  /* IF SYSOUT FILE : ØC4 ABEND */
  IF ONCODE_SAV ¬= Ø THEN DO;
   PUT SKIP EDIT('E','OPEN FAILED',ACTUAL_FILENAME,
    'IN CARD #',CARD_TELLER)
   (A(1),X(1),A(21),A(Ø8),A(21),X(1),F(4));
   SIGNAL ERROR;
  END;/*IF ONCODE_SAV ¬= Ø */
  CALL S_DSNINFO;
  IF ALLOCATION(VSAMREC)=Ø THEN DO;
   ALLOC VSAMREC CHAR(DATA_MAXRECL);
  END;
```


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```
  ELSE DO;
   IF LENGTH(VSAMREC) < DATA_MAXRECL THEN DO;
    FREE VSAMREC;
    ALLOC VSAMREC CHAR(DATA_MAXRECL);
   END;
  END;
 END;/*IF ACTUAL_FILENAME ¬= CARD.DDNAME*/
END S_OPEN;
/**/
S_DSNINFO:PROC;

 DCL 1 HVPSHWCCL UNALIGNED,
      2 JCLLEN     BIN FIXED(15) INIT(CSTG(JCLPARM)),
      2 JCLPARM,
       3 IPO CHAR(9) INIT('001000000'),
       3 @SHWCPDS POINTER INIT(ADDR(SHWCPDS));

 DCL 1 SHWCPDS ,
      2 SHWNAME  CHAR(44),
      2 DTCSZ    BIN FIXED(31),
      2 IXCSZ    BIN FIXED(31),
      2 DTMLR    BIN FIXED(31),
      2 IXMLR    BIN FIXED(31),
      2 SHWRKP   BIN FIXED(15),
      2 SHWKL    BIN FIXED(15),
      2 RES      CHAR(44),
      2 SHWOUT,
       3 SHWLEN1  BIN FIXED(15) INIT(CSTG(SHWINFOSET)),
       3 SHWLEN2  BIN FIXED(15),
       3 SHWACBP  BIN FIXED(31),
       3 SHWTYPE  CHAR(1),
       3 SHWINFOSET ,
        4 SHWINFOSET1 CHAR(512);

  DCL 01 HVPDYNAP,
      02 DYNAIPO ,
       03 IPOIII    CHAR(3) INIT('000'),
       03 IPOPPP ,
        04 PPP1 CHAR(1) INIT('0'),
        04 PPP2 CHAR(1) INIT('0'),
        04 PPP3 CHAR(1) INIT('0'),
       03 IPOOOO    CHAR(3) INIT('000'),
      02 DYNADUMM   CHAR(3) INIT(' '),
      02 DYNAPL     BIN FIXED(15) INIT(STG(HVPDYNAP)),
      02 DYNAPCMD   CHAR(1),  /*INPUT:A(LLOC)/U(NALLOC)*/
      02 DYNAPDSN   CHAR(44), /*INPUT */
      02 DYNAPMBR   CHAR(8),  /*INPUT */
      02 DYNAPDDN   CHAR(8),  /*INPUT . OUTPUT: IF INPUT BLANKO */
      02 DYNAPDSP   CHAR(4),  /*INPUT:SHR/OLD/MOD/NEW */
      02 DYNAPDSORG CHAR(4),  /*OUTPUT */
      02 DYNAPLRECL BIN FIXED(15) INIT(-1),  /*OUTPUT:IF MEMBER*/
```

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```
      Ø2 DYNAPBLKSI BIN FIXED(15) INIT(-1),  /*OUTPUT:IF MEMBER*/
      Ø2 DYNAPERRC  BIN FIXED(15) INIT(-1),  /*OUTPUT */
      Ø2 DYNAPINFC  BIN FIXED(15) INIT(-1);  /*OUTPUT */

  DYNAPCMD=$CMDINFORM;
  DYNAPDSN=' ';
  DYNAPMBR=' ';
  DYNAPDDN=CARD.DDNAME;
  DYNAPDSP='SHR';
  DYNAPDSORG=' ';
  CALL HVPDYNA(HVPDYNAP);
  MYRC=PLIRETV();
  IF MYRC¬=Ø THEN DO;
   PUT SKIP EDIT($ERRPROG,'RC=',MYRC,' ON INFORM OF ',CARD.DDNAME)
    (A,A,F(5),A,A);
   SIGNAL ERROR;
  END;
  SHWNAME=DYNAPDSN;
  CALL HVPSHWC(HVPSHWCCL);
  MYRC=PLIRETV();
  IF MYRC¬=Ø THEN DO;
   PUT SKIP EDIT($ERRPROG,'RC=',MYRC,' ON SHOWCAT ',SHWNAME)
    (A,A,F(5),A,A);
   SIGNAL ERROR;
  END;
  IXRKP=SHWRKP;
  IXKL=SHWKL;
  DATA_MAXRECL=DTMLR;
END S_DSNINFO;
/**/
PERFORM_DELETE:PROC;
 FULLKEY=LOW(CSTG(FULLKEY));
 SUBSTR(FULLKEY,1,KEYLEN_BI)=SUBSTR(CARD.RESERVED2,1,KEYLEN_BI);
 IF CARD.GENKEY='G' THEN MYRC=S_DELGENKEY(KEYLEN_BI);
  ELSE DELETE FILE (MASTER) KEY (FULLKEY);
 IF ONCODE_SAV  = Ø         THEN DO;
  PUT SKIP EDIT('I','DELETED      ',ACTUAL_FILENAME,
  'CARD #',CARD_TELLER)
  (A(1),X(1),A(21),A(Ø8),A(21),X(1),F(4));
 END;
 ELSE IF ONCODE_SAV  = $NOTFOUND THEN DO;
  PUT SKIP EDIT('W','NOTFOUND     ',ACTUAL_FILENAME,
  'IN CARD #',CARD_TELLER)
  (A(1),X(1),A(21),A(Ø8),A(21),X(1),F(4));
  ONCODE_SAV=Ø;
 END;/*IF ONCODE_SAV ¬= Ø */
 ELSE IF ONCODE_SAV ¬= Ø THEN DO;
  PUT SKIP EDIT('E','DELETE FAILED',ACTUAL_FILENAME,
  'IN CARD #',CARD_TELLER)
  (A(1),X(1),A(21),A(Ø8),A(21),X(1),F(4));
  MAXCC=MAX($ACT_FAIL,MAXCC);
```


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```
  ONCODE_SAV=Ø;
  RETURN;
 END;/*IF ONCODE_SAV ¬= Ø */
END;/* PERFORM_DELETE*/
/**/
S_DELGENKEY: PROC(KEYLEN_BI) RETURNS(BIN FIXED(31));

DCL KEYLEN_BI BIN FIXED(15);
DCL DEELKEY VARYING CHAR(KEYLEN_BI) ;
DCL MYRC BIN FIXED(31);
  EOF_MASTER=$FALSE;
  DEELKEY=FULLKEY;
  IF KEYLEN_BI>Ø THEN
   /*READ FILE (MASTER) KEY(DEELKEY) SET(GENREC@)*/
   READ FILE (MASTER) KEY(DEELKEY) INTO(VSAMREC);
  ELSE
   /*READ FILE (MASTER) SET(GENREC@)*/
  READ FILE (MASTER) INTO(VSAMREC);
  IF ONCODE_SAV  = Ø THEN;
  ELSE IF ONCODE_SAV  = $NOTFOUND THEN DO;
   /*
   PUT SKIP EDIT('W','NOTFOUND G   ',ACTUAL_FILENAME,
   'IN CARD #',CARD_TELLER)
   (A(1),X(1),A(21),A(Ø8),A(21),X(1),F(4))
   */
   RETURN(MYRC);
  END;/*IF ONCODE_SAV ¬= Ø */
  ELSE  DO;
   ERRCODE=ONCODE_SAV;
   ERRMESS='READ GENKEY'||DEELKEY;
   SIGNAL ERROR;
  END;
  DO WHILE(¬EOF_MASTER &
           SUBSTR(VSAMREC,IXRKP+1,KEYLEN_BI)=DEELKEY);
           /*SUBSTR(GENREC,IXRKP+1,KEYLEN_BI)=DEELKEY)*/
   /*FULLKEY=SUBSTR(GENREC,IXRKP+1,IXKL)*/
   FULLKEY=SUBSTR(VSAMREC,IXRKP+1,IXKL);
   PUT SKIP EDIT('I','WILL BE DELETED:',FULLKEY)
     (A(1),X(1),A(16),A(54) );
   IF SW_MOVE THEN DO;
    WRITE FILE(BACKUP) FROM(VSAMREC);
   END;
   DELETE FILE (MASTER) KEY (FULLKEY);
   IF ONCODE_SAV ¬=Ø THEN DO;
    ERRCODE=ONCODE_SAV;
    ERRMESS='DELETE '||DEELKEY;
    SIGNAL ERROR;
   END;
   /*READ FILE (MASTER)  SET(GENREC@)*/
   READ FILE (MASTER)  INTO(VSAMREC);
   IF ONCODE_SAV ¬=Ø THEN DO;
```

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```
    ERRCODE=ONCODE_SAV;
    ERRMESS='READ GENKEY'||DEELKEY;
    SIGNAL ERROR;
   END;
  END;/*DO WHILE(SUBSTR(VSAMREC,IXRKP+1,KEYLEN_BI)=DEELKEY)*/
 RETURN(MYRC);
END S_DELGENKEY;
/**/
S_PRINT: PROC RETURNS(BIN FIXED(31));

DCL RECORDS_READ BIN FIXED(31) INIT(Ø);

ONCODE_SAV=Ø;
EOF_MASTER=$FALSE;
PUT SKIP EDIT(' BEGIN OF LIST OF KEYS.')(A);
/* POSITIONERING IS NIET ECHT NODIG DENK IK */
/* JE KAN OOK DIRECT SEQ. BEGINNEN LEZEN */
/* READ VAN ØØØØ ZET BESTANDSPOINTER TERUG NAAR BEGIN */
IF IXKL>Ø THEN DO;
 FULLKEY=LOW(IXKL);
 READ FILE (MASTER) KEY(FULLKEY) SET(GENREC@);
 IF ONCODE_SAV  = $NOTFOUND THEN DO;
  ONCODE_SAV=Ø;
  READ FILE (MASTER)              SET(GENREC@);
 END;
END;
ELSE DO;
 READ FILE (MASTER)               SET(GENREC@);
END;
DO WHILE(¬EOF_MASTER );
 IF ONCODE_SAV  ¬= Ø THEN DO;
  PUT SKIP DATA(ONCODE_SAV);
  SIGNAL ERROR;
 END;
 RECORDS_READ=RECORDS_READ+1;
 PUT SKIP EDIT(SUBSTR(GENREC,IXRKP+1,IXKL))(A);
 READ FILE (MASTER)  SET(GENREC@);
END;/*DO ¬EOF*/
PUT SKIP EDIT(' END   OF LIST OF KEYS.')(A);
PUT SKIP EDIT(' RECORDS READ:',RECORDS_READ)(A,F(9));
END S_PRINT;
/**/
S_GET_SYSIN_RECORD:PROC;
 DCL TEMPBUF CHAR(3ØØ) VARYING;
 DCL KEY_BYTES_READ BIN FIXED;
 DCL BYTES_READ BIN FIXED INIT(Ø);
 DCL CARDIN_POS BIN FIXED INIT(1);

 L_READ:
 CARDIN='';
 READ FILE (SYSIN) INTO (TEMPBUF);
```


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```
 IF ¬EOF_SYSIN THEN DO;
  CARD_TELLER=CARD_TELLER+1;
  IF ADDR(TEMPBUF)->CARD.CODE=$COMMENT THEN  GOTO L_READ;
  /**/
  IF ADDR(TEMPBUF)->CARD.DDNAME=' ' THEN DO;
   PUT SKIP EDIT('E','NO DDNAME IN CARD #',CARD_TELLER)
     (A(1),X(1),A(5Ø),X(1),F(4));
   SIGNAL ERROR;
  END;/*IF CARD.DDNAME=' ' */
  IF ADDR(TEMPBUF)->KEYLEN='' THEN KEYLEN_BI=Ø;
  ELSE DO;
   IF VERIFY(ADDR(TEMPBUF)->KEYLEN,'Ø123456789') > Ø THEN DO;
    PUT SKIP EDIT($ERR_IND,$MESS_KEYLEN,'IN CARD',CARD_TELLER)
     (A(1),X(1),A(16),X(1),A(7),X(1),F(4));
    SIGNAL ERROR;
   END;/*IF VERIFY(KEYLEN,'Ø123456789')*/
   KEYLEN_BI=ADDR(TEMPBUF)->KEYLEN;
   IF KEYLEN_BI>256 THEN DO;
    PUT SKIP EDIT($ERR_IND,$MESS_KEYLEN,'IN CARD',CARD_TELLER)
     (A(1),X(1),A(16),X(1),A(7),X(1),F(4));
    SIGNAL ERROR;
   END;
  END;/*KEYLEN<>''*/
  KEY_BYTES_READ=LENGTH(TEMPBUF)-27;
  DO WHILE(KEY_BYTES_READ<KEYLEN_BI & ¬EOF_SYSIN);
   CARDIN=CARDIN||SUBSTR(TEMPBUF,1,LENGTH(TEMPBUF));
   READ FILE (SYSIN) INTO (TEMPBUF);
   IF ¬EOF_SYSIN THEN KEY_BYTES_READ=KEY_BYTES_READ+LENGTH(TEMPBUF);
  END;/* */
  IF KEY_BYTES_READ<KEYLEN_BI THEN DO;
   PUT SKIP EDIT($ERRPROG,'EOF ON SYSIN WHILE READING FOR ',
     KEYLEN_BI,' KEY BYTES|')
    (A,A,F(5),A);
   SIGNAL ERROR;
  END;
  CARDIN=CARDIN||SUBSTR(TEMPBUF,1,LENGTH(TEMPBUF));
 END;/*IF ¬EOF_SYSIN */
END S_GET_SYSIN_RECORD;
/**/
PERFORM_SET:PROC;
 DCL     1   CARDIN_SET    UNALIGNED BASED(PTR_CARD),
             2    LEN            BIN FIXED,
             2    CARD,
              3    CODE           CHAR (1),
              3    WHAT           CHAR (8),
              3    RESERVED1      CHAR (Ø7),
              3    DDNAME         CHAR (Ø8);
 IF CARDIN_SET.WHAT='BACKUP' THEN SET_BACKUP: DO;
  IF ACTUAL_BACKUPNAME ¬= CARD.DDNAME THEN DO;
   CLOSE FILE(BACKUP);
   ACTUAL_BACKUPNAME=CARDIN_SET.DDNAME;
```

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```
   END;
   OPEN FILE(BACKUP) TITLE(ACTUAL_BACKUPNAME);
  END SET_BACKUP;
  ELSE SET_UNKNOWN: DO;
   PUT SKIP EDIT('E','INVALID SET CODE IN CARD #',CARD_TELLER)
   (A(1),X(1),A(5Ø),X(1),F(4));
   SIGNAL ERROR;
  END  SET_UNKNOWN;
 END PERFORM_SET;
 /**/
 END HVPVSØ1;
```

HVJVS01

The following is an example of JCL to execute HVPVS01:

```
//TSHVRA  JOB (),'HVJVSØ1',CLASS=A,MSGCLASS=X,NOTIFY=&SYSUID
//* USE CAPS OFF BECAUSE OF KEY VALUES IN SYSIN
//VSPLI     EXEC PGM=HVPVSØ1
//* TSHVR.CMPLNK.TOOLS(HVPVSØ1)
//* TSHVR.SOURCE.TOOLS(HVPVSØ1)
//STEPLIB DD DISP=SHR,DSN=TSHVR.PGM.TOOLS
//SYSPRINT DD SYSOUT=X,OUTLIM=2ØØØØ
//*BACKUP:LRECL SHOULD BE GREAT ENOUGH TO RECEIVE RECORD
//*           DISP=MOD/SHR
//BACKUP   DD DISP=MOD,DSN=TSHVR.OUTPUT#8
//KSDS     DD DISP=SHR,DSN=TSHVR.TEST.DFHCSD#
//SYSIN    DD *
*POS1:*=COMMENT D=DELETE P=PRINT M=MOVE TO BACKUP
*        S=SET
*POS2:G=THIS IS A GENKEY  GENERIC
*POS17:DDNAME OF VSAM
*POS25-POS27(L):GIVEN KEYLEN
*POS28-:KEY IF KEY DOES NOT FIT IN RECORD: CONTINUE ON NEXT CARD.
*Ø              1       2 22
*2              7       5 78
*              DDDDDDDDLLLKKKKKKKKKKK.. may be continued on next card
SBACKUP         BACKUP
MG              KSDS    ØØ8DFH$IVPL
P               KSDS
/*
//
//
//*
//*
DG              KSDS    ØØ1c
P               KSDS
D               KSDS    999//TSHVRA  JOB
(),'HVJVSØ1',CLASS=A,MSGCLASS=X,NOTIFY=
TSHVR
```


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```
MG              KSDS    ØØ8DFH$ACCT
MG              KSDS    ØØ8DFH$AFLA
MG              KSDS    ØØ8DFH$BMSP
MG              KSDS    ØØ8DFH$CFLA
MG              KSDS    ØØ8DFH$CTXT
MG              KSDS    ØØ8DFH$DFLA
MG              KSDS    ØØ8DFH$DLIV
MG              KSDS    ØØ8DFH$VTAM
```

HVPSHWC

The following is the SHOWCAT macro required by HVPVS01:

```
* HVPSHWC : GET INFO ON VSAM VIA SHOWCAT
*
* DOEL  : IIVDTCSZ IIVIXCSZ IIVDTMLR IIVIXMLR IIVIXRKP IIVIXKL
* INPUT :
*  PARMS: IIIPPPOOONAME
*   III INPUT
*    ØØØ NAME TAKE VALID NAME
*    ØØ1 NAME IS 4 LONG AND TAKE POINTER FILLED BY SHWCPDS
*   PPP PROCESSING
*    ØØØ SHOWCAT   ON DATA INDEX
*    ØØ1 SHOWCAT   ENKEL SHOWCAT ON NAME
*   OOO OUTPUT
*    ØØØ OUTPUT FROM SHOWCAT IN REXX
*    ØØ1 RETURN WITH SHWCPDS
*  FILES:
* OUTPUT:
*  FILES  :
*   LAYOUT:
* WIJZIGINGEN:
* ABENDS     :
* | OPM |    :
*  ARGUMENT (OA PARMLIST) FOR SHOWCAT MUST FOLLOW BELOW
*  OP MOMENT FOR SHOWCAT R13 MUST POINT NEAR SA BELOW
* REG EQUS
SVCREGØ  EQU  RØØ     DO NOT TAKE NEAR BASE OF INDEX
SVCREG1  EQU  RØ1
SVCREG2  EQU  RØ2
BASER    EQU  RØ3     BASE REGISTER
SP       EQU  RØ4     STACK POINTER
WORKØ1   EQU  RØ5
WORKØ2   EQU  RØ6
WORKØ3   EQU  RØ7
WORKØ4   EQU  RØ8
R_SHWCPDS EQU R1Ø
R_PRMDS EQU R11
PLITCAR  EQU  R12     PL/1 TCA
R_SA     EQU  R13     SAVE AREA OF CALLER / OWN SAVE AREA
```

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```
R_RA     EQU  R14     RETURN ADDRESS
R_EP     EQU  R15     ENTRYPOINT / RC
*
* OTHER EQUS
OBJCLUS  EQU   C'C'               CLUSTER OBJECT
OBJDATA  EQU   C'D'               DATA COMPONENT
OBJAIX   EQU   C'G'               AIX OBJECT
OBJINX   EQU   C'I'               INDEX COMPONENT
OBJPATH  EQU   C'R'               PATH
OBJUPGR  EQU   C'Y'               UPGRADE SET
*
         COPY HVREGS     REGISTER EQUATES
         COPY HVRMACS    EIGEN MACROS
*
PARMLIST DSECT
         DS ØA
PRMIII   DS CL3
PRMPPP   DS CL3
PRMOOO   DS CL3
PRM_END1 DS ØC
PRMNAME  DS CL44                 MAY BE DD
         ORG PRM_END1
PRMSHWCPDS@ DS CL4    ADDRESS
*
SHWCPDS DSECT
               DS ØA
SHWNAME        DS CL44   I
DTCSZ    DS    F         O
IXCSZ    DS    F         O
DTMLR    DS    F         O
IXMLR    DS    F         O
IXRKP    DS    H         O
IXKL     DS    H         O
RES      DS    CL44      R
SHWOUT         DS ØC     W
SHWLEN1  DS    H         W
SHWLEN2  DS    H         W
SHWACBP  DS    A         W
SHWTYPE  DS    CL1       W
SHWINFOSET EQU *         W
SHWATTR  DS    XL1       W
SHWASSØ  DS    H         W
SHWASSOCØ      DS ØC     W
SHWATYPØ DS    CL1       W
SHWACØ   DS    AL3       W
         ORG   SHWINFOSET     W
         DS    X   RESERVED   W
SHWRKP   DS    H              W
SHWKEYLN DS    H              W
SHWCISZ  DS    FL4            W
SHWMREC  DS    FL4            W
```


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```
SHWASS1  DS    H              W
SHWASSOC1      DS ØC          W
SHWATYP1 DS    CL1            W
SHWAC1   DS    AL3            W
*
HVPSHWC1 CSECT
         ENTRY HVPSHWC     PLI CONVENTIE
         DC    C'HVPSHWC'
         DC    AL1(7)
HVPSHWC  DS    ØH
         SAVE  (14,12),,HVPSHWC1.&SYSTIME..&SYSDATE
         BALR  RØ3,Ø
         USING *,RØ3
*        LR    RØ3,R15
*        USING HVPSHWC1,RØ3
* GETMAIN WORKING STORAGE
         LR    R_PRMDS,RØ1   SAVE PARM ADDRESS
         L     RØ6,WS_FIX_LEN
         STORAGE OBTAIN,LENGTH=(RØ6),ADDR=(RØ1),                       *
               LOC=(BELOW,ANY)
         ST    R13,4(Ø,1)    SAVE 13 IN OWN SAVE
         ST    RØ1,8(Ø,13)   SAVE ADR. OF SAVE IN PREV. SAVE
         LR    R13,RØ1
         USING WS,R13
         ST    R_PRMDS,PARMADR
* END GETMAIN WORKING STORAGE
         LA    SP,STACK
         SR    SVCREGØ,SVCREGØ
         ST    SVCREGØ,RC
         MVI   FMSHWCPDS,C'Ø'     NO FREEMAIN
*        OPEN (SNAPDMP,OUTPUT)
****
* ANY PARMS ?
*        JCLLIKE PARMS
         L     R_PRMDS,Ø(Ø,R_PRMDS)
         LTR   R_PRMDS,R_PRMDS
         BNM   L_REXX_PARMS      HIGH ORDER BIT OFF
         XR    WORKØ4,WORKØ4
         ICM   WORKØ4,B'ØØ11',Ø(R_PRMDS)
         LA    R_PRMDS,2(Ø,R_PRMDS)  BUMP LEN HW . HW IS NOT COUNTED
         B     L_ANYPARMSE
L_REXX_PARMS EQU *
*        REXXLIKE PARMS .  PARMADR ALWAYS FILLED BY REXX .
*        RØ1-> DTPTR -> DATA
*              LNPTR -> LEN
         L     RØ1,PARMADR       RELOAD RØ1
         L     R_PRMDS,Ø(Ø,RØ1)  POINTER TO DATA POINTER
         L     WORKØ4,4(Ø,RØ1)   POINTER TO LENGTH POINTER
         LTR   R_PRMDS,R_PRMDS
         BM    L_INV_XP1             HIGH ORDER BIT SHOULD BE OFF
         LTR   WORKØ4,WORKØ4         HIGH ORDER BIT SHOULD BE ON
```

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```
         BNM   L_INV_XPØ             IF NOT
         L     WORKØ4,Ø(Ø,WORKØ4)    LENGTH
         L     R_PRMDS,Ø(Ø,R_PRMDS)   POINTER TO DATA
L_ANYPARMSE   EQU  *
         ST    WORKØ4,#PRMS
         ST    R_PRMDS,@PRMS
*                        WORKØ4:LENGTH R_PRMDS -> BUFFER
* ANY PARMS ?  END
****
*        OPEN (SYSPRINT,OUTPUT)
BEGIN    EQU   *
         LA    WORKØ1,PRM_END1-PARMLIST
         CR    WORKØ4,WORKØ1
         BL    L_BAD_PARML
         USING PARMLIST,R_PRMDS
         L     R_PRMDS,@PRMS
         CLC   PRMIII,=CL3'ØØØ'
         BE    L_III_ØØØ
         CLC   PRMIII,=CL3'ØØ1'
         BE    L_III_ØØ1
         B     L_INVIPO
L_III_ØØ1 EQU *
***    PRMSHWCPDS@ NAGAAN
         LR    RØØ,WORKØ4     LENGTH PARM
         SR    RØØ,WORKØ1  LEN PARM - 9 =   LENGTH ADDRESS
         LTR   RØØ,RØØ
         BNP   L_BAD_PARML
         LA    WORKØ1,L'PRMSHWCPDS@
         CR    RØØ,WORKØ1
         BH    L_BAD_PARML
         ICM   R_SHWCPDS,B'1111',PRMSHWCPDS@
         USING SHWCPDS,R_SHWCPDS
         B     L_PROCESS
L_III_ØØØ EQU *
***    SHWNAME NAGAAN
         LR    RØØ,WORKØ4     LENGTH PARM
         SR    RØØ,WORKØ1  LEN PARM - 9 =   LENGTH NAME
         LTR   RØØ,RØØ
         BNP   L_BAD_PARML
         LA    WORKØ1,L'SHWNAME
         CR    RØØ,WORKØ1
         BH    L_BAD_PARML
         STH   RØØ,#PRMNAME
***    ACQUIRE STORAGE FOR SHWCPDS
         LH    WORKØ1,L_AREA_REST
*        STH   WORKØ1,L_SHWOUT
         STH   WORKØ1,SHWLEN1   STORAGE NOT YET AVAILABLE
         LA    WORKØ1,L'SHWNAME(Ø,WORKØ1)
***      LA    WORKØ1,SHOWCAT_LSTF_END-SHOWCAT_LSTF(Ø,WORKØ1)
         STH   WORKØ1,L_SHWCPDS
        STORAGE OBTAIN,LENGTH=(WORKØ1),ADDR=(R_SHWCPDS),LOC=(BELOW,ANY)
```


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```
*        ST    R_SHWCPDS,@SHWCPDS
         MVI   FMSHWCPDS,C'1'     FREEMAIN
         USING SHWCPDS,R_SHWCPDS
         SHOWCAT MF=(B,SHOWCAT_LSTF)  INIT AREA
         INITB SHWNAME,C' '
         INITB TYPECI,X'ØØ'
         INITB TYPEOK,C'Ø'
***      SHWNAME INVULLEN
         LA    WORKØ2,SHWNAME
         LA    WORKØ1,PRMNAME
         LH    WORKØ3,#PRMNAME
         BCTR  WORKØ3,RØØ    -1 FOR EXECUTE
         EX    WORKØ3,L_EXECØ1
*
*        LH    WORKØ1,L_SHWOUT
*        STH   WORKØ1,SHWLEN1
*
L_PROCESS EQU  *
         LA   WORKØ2,SHWOUT
         LA   WORKØ3,SHWNAME
         LA   RØ1,SHOWCAT_LSTF
         SHOWCAT ACB=Ø,AREA=(WORKØ2),NAME=(WORKØ3),MF=(E,(RØ1))
         ST   R15,RC
         LTR  R15,R15
         BNZ  RETURN
         CLC  PRMPPP,=CL3'ØØ1'
         BE   L_OUTPUT
L_LOOP   EQU  *
* DEBUG
*        LA   WORKØ2,SHWOUT
*        LH   WORKØ3,SHWLEN2
*        LA   WORKØ3,Ø(WORKØ2,WORKØ3)
*        BCTR WORKØ3,Ø
*        SNAP DCB=SNAPDMP,ID=1,PDATA=(REGS),STORAGE=((WORKØ2),(WORKØ3))
* DEBUG
*        WHICH TYPE ?
         CLI  SHWTYPE,OBJCLUS
         BNE  L_AIX
         MVI  CLOK,C'1'
         LH   WORKØ1,SHWASSØ
         LA   WORKØ2,SHWASSOCØ
         B    L_ASSOCS
L_AIX    EQU  *
         CLI  SHWTYPE,OBJAIX
         BNE  L_DATA
         MVI  AXOK,C'1'
         LH   WORKØ1,SHWASSØ
         LA   WORKØ2,SHWASSOCØ
         B    L_ASSOCS
L_DATA   EQU  *
         CLI  SHWTYPE,OBJDATA
```

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```
         BNE  L_INDEX
         MVI  DTOK,C'1'
         MVC  DTCSZ,SHWCISZ
         MVC  DTMLR,SHWMREC
         LH   WORKØ1,SHWASS1
         LA   WORKØ2,SHWASSOC1
         B    L_ASSOCS
L_INDEX  EQU  *
         CLI  SHWTYPE,OBJINX
         BNE  L_BAD_TYPE
         MVI  IXOK,C'1'
         MVC  IXCSZ,SHWCISZ
         MVC  IXMLR,SHWMREC
         MVC  IXRKP,SHWRKP
         MVC  IXKL,SHWKEYLN
         LH   WORKØ1,SHWASS1
         LA   WORKØ2,SHWASSOC1
         B    L_ASSOCS
L_ASSOCS EQU  *
         CLI  Ø(WORKØ2),OBJCLUS
         BNE  L_A_AIX
         MVC  CLCI,1(WORKØ2)
         B    L_VERHOOG_ASSOC
L_A_AIX  EQU  *    THERE MAY BE MORE AIXS
         CLI  Ø(WORKØ2),OBJAIX
         BNE  L_A_DATA
         MVC  AXCI,1(WORKØ2)
         B    L_VERHOOG_ASSOC
L_A_DATA EQU  *
         CLI  Ø(WORKØ2),OBJDATA
         BNE  L_A_INDEX
         MVC  DTCI,1(WORKØ2)
         B    L_VERHOOG_ASSOC
L_A_INDEX EQU  *
         CLI  Ø(WORKØ2),OBJINX
         BNE  L_VERHOOG_ASSOC
         MVC  IXCI,1(WORKØ2)
L_VERHOOG_ASSOC  EQU *
         LA   WORKØ2,4(Ø,WORKØ2)
         BCT  WORKØ1,L_ASSOCS
* DEBUG
*        LA   WORKØ3,TYPECI
*        LH   WORKØ4,=H'4Ø'
*        LA   WORKØ4,Ø(WORKØ3,WORKØ4)
*        BCTR WORKØ4,Ø
*        SNAP DCB=SNAPDMP,ID=2,PDATA=(REGS),STORAGE=((WORKØ3),(WORKØ4))
* DEBUG
*        WHAT NEXT ?         EACH AIX OR CL HAS DATA
         XR   RØØ,RØØ
         CLI  DTOK,C'1'
         BE   L_IX_OK
```


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```
          ICM  RØØ,B'Ø111',DTCI
          LTR  RØØ,RØØ
          BNZ  L_SHOWCAT1
          CLI  IXOK,C'1'  1E SHOWCAT INDEX
          BNE  L_INDEKNOOP
          B    L_SHOWCL  1E SHOWCAT ON INDEX
L_IX_OK   EQU   *    ONLY IF DATA OK
          CLI  IXOK,C'1'
          BE   L_OUTPUT
          ICM  RØØ,B'Ø111',IXCI
          LTR  RØØ,RØØ
          BNZ  L_SHOWCAT1
          CLI  CLOK,C'1'  1E SHOWCAT ON CL AND  NO INDEX
          BE   L_OUTPUT   NO INDEX
*         CLI  AXOK,C'1'  1E SHOWCAT ON AIX AND NO INDEX-> ERROR
*         BE   L_OUTPUT
          CLI  DTOK,C'1'  1E SHOWCAT DATA
          BNE  L_INDEKNOOP
          B    L_SHOWCL   1E SHOWCAT ON INDEX
L_SHOWCL  EQU   *         SHOWCAT ON CLUSTER
          ICM  RØØ,B'Ø111',CLCI
          LTR  RØØ,RØØ
          BZ   L_SHOWAX
          B    L_SHOWCAT1
L_SHOWAX  EQU   *         SHOWCAT ON CLUSTER
          ICM  RØØ,B'Ø111',AXCI
          LTR  RØØ,RØØ
          BZ   L_INDEKNOOP
          B    L_SHOWCAT1
L_SHOWCAT1     EQU   *
*         SHOWCAT ON CI
          SHOWCAT MF=(B,SHOWCAT_LSTF)  INIT AREA
*         LH   WORKØ1,L_SHWOUT
*         STH  WORKØ1,SHWLEN1
          LA   WORKØ2,SHWOUT
          STCM RØØ,B'Ø111',WORKCI
          LA   WORKØ3,WORKCI
          LA   RØ1,SHOWCAT_LSTF
          L    RØØ,SHWACBP
          SHOWCAT ACB=(RØØ),AREA=(WORKØ2),CI=(WORKØ3),MF=(E,(RØ1))
          ST   R15,RC
          LTR  R15,R15
          BNZ  RETURN
          B    L_LOOP
L_OUTPUT  EQU   *
RETURN    EQU   *
*         CLOSE SNAPDMP
*         CLOSE  SYSPRINT
***     FREE    STORAGE FOR SHWCPDS
          CLI   FMSHWCPDS,C'Ø'     FREEMAIN  N/Y
          BE    L_156
```

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```
         LH    WORKØ1,L_SHWCPDS
         STORAGE RELEASE,LENGTH=(WORKØ1),ADDR=(R_SHWCPDS)
         DROP   R_SHWCPDS
L_156    EQU   *
         L  WORKØ3,RC       LOAD RC BEFORE RESTORING R13
         L  WORKØ1,SAVEAREA+4    PRECEDING SAVE AREA
         L  WORKØ2,WS_FIX_LEN
         STORAGE RELEASE,LENGTH=(WORKØ2),ADDR=(R13)
         LR R13,WORKØ1
         LR R15,WORKØ3
         RETURN (14,12),RC=(15)
*
L_EXECØ1  MVC  Ø(Ø,WORKØ2),Ø(WORKØ1)
*
L_NO_PARMS  EQU *
         L      R15,=F'4Ø95'
         ST     R15,RC
         B      RETURN
L_BAD_PARML EQU *         PARM LENGTE
         ICM    R15,B'1111',PARMLIST
         ICM    WORKØ2,B'1111',PARMLIST+4
         ABEND  4Ø94,DUMP,REASON=(R15)
L_INVIPO EQU *
         ICM    R15,B'1111',PARMLIST
         ICM    WORKØ2,B'1111',PARMLIST+4
         ABEND  4Ø93,DUMP,REASON=(R15)
L_BAD_TYPE  EQU *         PARM LENGTE
         L      R15,=F'4Ø92'
         ST     R15,RC
         B      RETURN
L_INDEKNOOP EQU *         IN DE KNOOP
         L      R15,=F'4Ø91'
         ST     R15,RC
         B      RETURN
L_INV_XP1    EQU *
         L      R15,=F'4Ø9Ø'
         ST     R15,RC
         B      RETURN
L_INV_XPØ    EQU *
         L      R15,=F'4Ø89'
         ST     R15,RC
         B      RETURN
* KONSTANTEN
WS_FIX_LEN DC  A(WS_FIX_END-WS)
L_AREA_DI  DC  H'64'    LENGTE VVOR D EN I
L_AREA_REST DC H'512'   LENGTE VOOR REST   VANAF SHWACBP
*
* STATIC STORAGE
**SNAPDMP DCB DDNAME=SNAPDMP,DSORG=PS,MACRF=W,RECFM=VBA,
**               LRECL=125,BLKSIZE=1632
* DYNAMIC STORAGE
```


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```
WS       DSECT
SAVEAREA  DS 18F
PARMADR   DS   A
RC        DS   F
*@SHWCPDS  DS   A
@PRMS     DS   A
#PRMS     DS   F
L_SHWCPDS DS   H
*L_SHWOUT  DS   H
#PRMNAME  DS   H
FMSHWCPDS DS   C
WORKCI   DS    CL3
TYPECI   DS    ØCL12
CLCI     DS    CL3
AXCI     DS    CL3
DTCI     DS    CL3
IXCI     DS    CL3
TYPEOK   DS    ØCL4
CLOK     DS    CL1
AXOK     DS    CL1
DTOK     DS    CL1
IXOK     DS    CL1
         DS    ØA
SHOWCAT_LSTF EQU *        SHOULD BE BELOW
         SHOWCAT MF=L
SHOWCAT_LSTF_END EQU *
*******   DON'T PUT ANYTHING BEHIND STACK
STACK    DS 18F
********
WS_FIX_END EQU *
HVPSHWC1 CSECT
         LTORG
         END
```

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

Herman Vierendeels
Systems Programmer (Belgium)

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As a free service to subscribers and to remove the need to rekey the scripts, code from individual articles of *CICS Update* can be accessed on our Web site, www.xephon.com/cicsupdate.html.

Subscribers need the user-id printed on the envelope containing their *Update* issue and a copy of the printed issue itself. Once they have registered, any code requested will be e-mailed to them.

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Dynasty Technologies has announced Version 4 of its DDE DYNASTY Development Environment.

Among the new features is improved OO functionality with added support for interceptors, enabling developers to intercept messages and add rules and conditions.

There are said to be better facilities for component development, with the addition of the concept of an interface class, enabling developers to break their application into components more easily than before.

What's more, the bridge between DYNASTY and Rational's Rose product has been improved to allow greater interaction and changes have been made to speed up the generation process.

I18N support allows the application to have multiple language support and the server processes will act accordingly. This makes it possible, for example, for one application to support Japanese, Swedish, and English clients, with the server transferring data appropriately.

There's also native support for OS/390, CICS, and DB2 plus Microsoft Repository support during the development process.

Finally, fixed decimal support is expected to enhance the product's appeal for financial applications development.

For further information contact:
Dynasty Technologies, 101 Redwood Shores Parkway, #200 Redwood Shores, CA 94065, USA.
Tel: (650) 631 5430.
http://www.dynasty.com.

* * *

Advanced Software Products Group has acquired Command CICS from APT of America (APT Software International). The software translates macro-level code to command-level code.

It translates code immediately at execution time, so there's no need to allocate resources to rewrite or recompile applications to use command-level calls and conventions needed to migrate to the new CICS Transaction Server.

The software is said to offer the same performance as programs that are manually converted.

For further information contact:
ASPG, 3185 Horseshoe Drive South, Naples, FL 34104, USA.
Tel: (941) 649 1548
URL: http://www.aspg.com.

* * *