

Dear users,

This Beta Support Newsletter brings you all the latest news about Beta and Beta products, provides you with notes and information on the latest product versions, and also keeps you up to date with those all-important PTFs required to keep things running smoothly.

However, this Newsletter only contains a sample of what you might need to know and is no substitute for a call to the Beta product hotline.

We also look forward to receiving suggestions from you and if you have anything to report on your experience working with Beta products, we'd be just as glad to hear it. Maybe you even have some tips and tricks you'd be happy to share with other Beta users

Your ideas are welcome so please contact:

mail to:sieben24@betasystems.com

There are a number of reasons why we've deliberately used simple text for this Newsletter: it's easier to read and easier to distribute. This means that it also supports distribution to 3270-supported mailing systems. We recommend you read the text using the "Courier New" font in 10-point size.

You can find a "Newsletter archive" on our ftp-Server at
<ftp://ftp.betasystems.com/pub/SupportNewsletter>

Very best regards,

The Strategic Support Team:

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News Telegram

- A look back at this year's Technology Days 2004 "Connecting Worlds", held from September 16th to 17th 2004 in Berlin

- A Beta 91 report which provides you with information which you could not get in such detail via the online interface and a new Beta 91 Batch Program for changing definitions retrospectively.

- A Beta 93 program for displaying/analyzing the contents of your Beta 93 SMF records. The program can also be used for other SMF records.

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1. Technology Days 2004 - Connecting Worlds -
from September 16th to 17th 2004 in Berlin

As we announced in the last Newsletter, this year's Technology Days were held on September 16th to 17th in the friendly atmosphere of the centrally located Hotel Berlin under the motto 'Connecting Worlds'.

This year too, new colleagues were present - colleagues from Kleindienst Datentechnik.

They presented their Input Management products, which now belong to Beta Systems' Enterprise Content Management Portfolio.

As well as opportunities for personal and professional contact, there were also many technical events, such as the introductory course on the Beta Web Enabler.

The many technical presentations covered a wide range of subjects such as,
- Development prospects for the SAM Jupiter Identity Management solution
- Users' presentations on using the VIDiDOC Output Management solution
- Presentation by the Compart company on the demands of digital color printing.

Compart has been the OEM partner of Beta Systems since 08.09.2004. Against the background of this partnership Beta Systems has integrated a software component from Compart into the Beta Web Enabler which enables AFP documents to be converted "on the fly" into PDF documents. In this way AFP documents can be viewed on PC Clients for example using Acrobat Reader - an extra AFP viewer is no longer necessary.
(HEF)

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2. Announcing the Harbor Backup Client 6.0 for Windows (20. August 2004)

As part of the ongoing development of Harbor products, there is now a new Harbor Backup Client 6.0 for Windows.
In addition to NSM's existing functions and benefits, which enable users to backup distributed platforms via z/OS, there are also further functionalities, which will be implemented for the first time in the new Client for Windows:

- The remote GUI includes extra functionalities and enables central backup and administration of the Clients from distributed computers in the network for;
 - doing backups, restores, archiving and retrievals
 - monitoring of jobs which have been initiated remotely or via the command line, GUI, or a scheduler
 - disconnecting from and reconnecting to a Client session
- The command line version is now completely integrated into the new remote GUI
- Support for Windows Firewall Service with Windows XP Service Pack 2

The advantage of these new functions is that all administration tasks can be done decentrally with the Remote GUI. This makes the remote GUI a valuable data management tool throughout the enterprise, especially for remote administration and Help Desk support.

More clients supporting the remote GUI will follow.

The prerequisites for using the new clients are the Harbor Network Storage Manager 6.3 z/OS(or higher), or the Harbor Backup Host 5.3 HSPA with zap H53A39 or Harbor NSM 6.5 for Windows
(JHC)

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3. The SAM family of solutions - part 3 - SAM Jupiter - SAM Password Reset (PR)

This time we are reporting on the third member of the SAM family of solutions, the SAM Password Reset (SAM PR) product component. This add-on from SAM Jupiter deals with the subject 'forgotten password - blocked User ID' and their 'unblocking' - a classic for the 'User Helpdesk'. SAM PR enables you to free your User Helpdesk from this unattractive task and unblock user IDs automatically as far as possible without human intervention.

To be able to do this the software has to be able to do 3 things:

- Identify an IT system user
- Authenticate a user without using passwords
- Unblock user IDs and passwords in security systems

Identifying a user:

To identify users automatically you have to give each one a unique ID (e.g. personnel number, email address or other unique identifier). The user must be registered in SAM PR under this unique ID and use it to log on to the system.

Authentication of a user:

The authentication of a user (checking whether the user really is the one who has been identified as such) is done through a set of individual questions (1 - 5 depending on the configuration), which the user must answer correctly and which only this user can answer.

Unblocking user IDs or passwords in security systems:

After users have identified and authenticated themselves, they can tell the system whether they want their ID unblocked or a new password. The system does this immediately so the user can then immediately log on again.

The SAM PR Add-On consists of the following components:

- User database (MS SQL Server)
- Central Server component (MS Windows 200x)
- Distributed Agents (platform-specific)
- User Interface (Web server, browser-based callup)

User database:

This database, which is stored in the MS SQL Server, contains all information on the user that can be used by the system. It contains the identification data, authentication data (1-5 questions with correct answers) and information on which IDs a user has in which target systems so that they can be reset. There is a graphic interface (manual registration of users) for administering the user database and a 'Bulk Interface', a type of Batch Interface for entering bulk data. SAM PR supports an administrator-controlled variant for registering users manually and the option of user 'self-registration'.

Central server component:

The central server component, which is installed as a service on a Windows 200x server, serves to configure the overall system. Here the parameters used to run the system are defined, including how many questions are necessary for authentication, how often these questions have to be renewed, and how many erroneous entries are accepted. The central server component also controls the Agents (see below) on the basis of information from the database, and provides them with all data they need to unblock or reset users in the respective security systems.

Distributed Agents:

SAM PR can be used for all standard mainframe security systems (RACF, ACF2 and Top Secret), Unix systems (AIX, SUN, HP/UX), standard LAN systems (Windows 200x, Windows NT, Novell NetWare), OS/400, and LDAP directories. An Agent must be installed for each platform. These then run as 'Started Tasks' in z/OS, 'Processes' in Unix or 'Services' in Windows and execute the commands to unblock a user or reset their password.

User Interface:

The User Interface consists of several components. There are CGI scripts which communicate with the SAM PR Server and the database. Web HTML pages, which are installed on a Web Server, are used to communication with users. They are XSL/XML based and can be adapted to the company's 'Look & Feel'. The company logo can easily be added to them, for example. The reset functionality is supplied to users and the administration function to administrators via this user interface. There is also a part of the interface which system administrators can use to monitor the software's global usage.

(KLW)

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4. News from the training department - monthly overview November 2004

For the first time participants at our Technology Days in Berlin were offered a free 'introductory course'. This year's subject was the 'Beta Web Enabler'.

The great interest in this course and positive response to it has strengthened our resolve to keep building on these introductory courses in future.

Did we attract your interest in our seminars during the Technology Days? You can view the current courses on offer in the Internet at, <http://www.betasystems.de/training> or give us a call.

4.1 Highlights - November 2004

Beta Query Language - 08.11.-10.11.2004

After completing this course you will have good knowledge of the strategic features of the BSA functionality BQL, and gain an understanding of the design and use of the database and the wide range of query options. You will be able to plan and implement BQL in your daily work with Beta Systems Version 3 mainframe products and Beta 93 UX.

Beta 93 Update - 22.11.-24.11.2004

In this course you will find out about the current Beta 93 product innovations, get to know the new features and fulfilled requirements through numerous examples, and be able to use them efficiently in your work. You will be able to take advantage of our experience of implementing new functions in different customer projects for various enterprises and use these in your work.

4.2. Course planning November 2004, status as of 30.09.2004

Date - from-to	Course ID	Course
08.11.-12.11.04	B93ADM	Beta 93 Administration
08.11.-10.11.04	BQLADM	Beta Query Language
15.11.-16.11.04	B89ADM	Beta 89 Administration
15.11.04	SAMJUA	SAM Jupiter User Administration
16.11.-17.11.04	SAMJSA	SAM Jupiter security administration
17.11.-18.11.04	SAMJDA	SAM Jupiter Delegation of admin. rights
19.11.04	SAMJWA	SAM Jupiter Workflow Configuration
22.10.04	SAMJGC	SAM Jupiter GUI Configuration
23.11.-24.11.04	SAMJFC	SAM Jupiter Workflow Forms Configuration
22.11.-24.11.04	B93UPD	Beta 93 Update

(HEM)

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5. Current product status

5.1. MVS products

Status	Product	Version	PTFlevel	Release	
BSAlevel					
new	Beta BSA	V3R4	PBS9217	23.04.04	0234-03
	Beta 14	V3R1M3	PVP2001	09.09.00	9933-03
	Beta 23	V3R4	PBF1536	13.06.03	0234-01
	Beta 28	V3R4	PSI4000	13.12.02	0234-00
	Beta 48	V3R6	PEJ4080	19.12.03	0234-01
	Beta 55	V3R3M2	new*)	30.05.03	0234-01
	Beta 77	V1R7M8	PSM1960	29.10.99	9924
	Beta 85	V1R10		20.02.04	
	Beta 88***)	V3R6	new	23.04.04	0234-02
	Beta 89	V3R4	PSI4000	13.12.02	0234-00
	Beta 91	V3R3	PQM6543	22.07.03	0234-01
	Beta 92	V3R5	POM8609	13.06.03	0234-01
	Beta 92 EIF	V3R5	POM8609	13.06.03	0234-01
neu	Beta 92 Enterprise	V4R0	POM9177	17.05.04	0234-03
	Beta 93	V3R5	PPM7077	05.08.03	0234-02
	Beta 93-Fast Retrieval	V3R5	PIR1085**)	15.12.03	0234-02

*) only for CA/land RMM

**) formerly Beta 97

***) Beta 88 zSecurity Administrator and zSecurity Auditor

<http://www.betasystems.de/maintenancelevel>

5.2. Beta products for UNIX, Linux, z/Linux, USS, Windows

Status	Product	Version	
Release			
	Beta 48	V3R6 BuildLevel23	19.12.03
	Beta 88 DAF	V3R1M4a	10.01.02
	Beta 88 zSecurity Auditor GUI	V3R4	13.09.02
	*)Beta 92 for Open Systems	V3R41h	10.05.04
	Beta 92 WIF	V3R5	05.05.03
	Beta 92 EUI	V4R0	01.12.03
	Beta 93 - Web Access	V3R4b	20.12.02
	Beta 93 - Extended Output	V3R5	05.08.03
	Beta 93 - Extended Input	V3R5	05.08.03
	Beta 93 - SAP Input	V3R5	05.08.03
	Beta 93 UX	V3R3 SP1	09.01.04
	Beta 93 UX - Web Access	V3R4d	12.11.03
	Beta 93 UX - Archive	V3R3	12.11.03
	Beta 93 UX - TSM Interface	V3R3	12.11.03
	Beta 93 UX - Extended Input	V3R5a	12.11.03
	Beta 93 UX - Extended Output	V3R5a	12.11.03
	Beta 93 UX - SAP Input	V3R5a	12.11.03
	***)Beta 93 - Fast Retrieval Web Access	V3R4 SP2	15.12.03
	Beta 99	V2.2	30.06.04
	Beta 99 - Web Application Builder	V2.2	30.06.04
	Beta Web Enabler	V1.1	08.08.03
	Beta AFP Browser	V1.29j	15.10.03

- *) BETA 92 for Open Systems (formerly Beta 92 EDF and ADF)
- **) Beta 93 - Fast Retrieval Web Access (formerly Beta 97 WIF)

<http://www.betasystems.de/maintenancelevel>

5.3. Harbor products product status

Status	Product	Version	Release
	Harbor NSM z/OS	V6.3. SP2	01.03.04
	Harbor Backup OS/390	V5.3 HSPA	01.05.02
	Harbor HFT	V2.2.0.0	01.07.04

<http://www.betasystems.com/storagesupport>

Please note:

If you are visiting the site for the first time you will be requested to register, which is easy to do.

5.4. SAM products product status

Status	Product	Version	Release
new	SAM Jupiter	V3R2 BuildLevel15	08/2004
	SAM Password Synchronization	V4R4	Jan. 03
	SAM Password Reset	V2R0	Feb. 04
	SAM *)	V2R4 12/2003	Dez. 03
	SAM Request Manager *)	V2R2	Jan. 02

*) SAM 2.4 and SAM Request Manager are no longer being sold and distributed, but maintenance will continue.

For further information please see:
<http://www.betasystems.de/samsupport>

Note:

If you are visiting the site for the first time you will be requested to register: simply send an email to sam.support@betasystems.com, and you will receive your user name and password.

5.5. For information on the availability of Beta and Harbor products for UNIX, Linux, z/Linux, USS, Windows and other different operating systems please see:

[http://www.betasystems.de/g_beta.nsf/\(Docs\)/0503000000](http://www.betasystems.de/g_beta.nsf/(Docs)/0503000000)
(ANR)

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6. Tips and Tricks

6.1. You can now not just write SMF records, but also analyze them yourself!

A Beta program for analyzing SMF records (the program B93AOF SR) has already been briefly introduced to the Beta 93 users group. It will be available to you as a PROTOTYP until the end of this year, providing a small but effective alternative to other SMF analysis tools.

If the relevant description of the records is available, it can also be used to analyze other SMF records (e.g. Beta 92 or IBM).

With the PTFs PPM7577 and PPM7578 for Beta 93 V3R5M1 (you can order these from the Hotline) you receive the current status of B93AOF SR. Suitable SYSIN for the description of the Beta 93 SMF subtypes are under §SMF* in the SAMPLIB.

The program is controlled and the SMF record to be analyzed is described via the SYSIN. In the +LICENSE= SYSIN-Statement you have to specify a 10-day key, which you can read out from the AOF SRKEY SAMPLIB Member. (The SYSIN statements are relatively self-explanatory, but you can also get a detailed technical description from the Hotline if you need one.)

An example of an analysis:

'Who printed how many pages on the DC printer on the 264th day of 2004 (SYSOUT 0) online?' Analysis of the Beta 93 SMF records subtype 01 (SYSIN-Statement +SUBTYPE=01)

```
//G1 EXEC PGM=B93AOF SR,REGION=0M,PARM=' '
//STEPLIB DD DISP=SHR,DSN=BETA93.load
//INSMF DD DISP=SHR,DSN=gedumpte-SMF-datei
//SYSUDUMP DD SYSOUT=*
//OUTPROT DD SYSOUT=*
//OUTSMF DD SYSOUT=*,DCB=(RECFM=VB,LRECL=32756)
//SNAP DD SYSOUT=*
//SYSIN DD *
+LICENSE=0980AB28
+AMOUNT +SEPARATE=PAGE +PROTOCOL
+PROD=93
+TYPE=207
+SUBTYPE=01
+DELIMITER=;
+TITLE
+SELECTION=S01PTYP
+CONDITION=80=J;20=C;10=D;08=V;04=U;
+ANDFILTER
+FILTER=BNAM =ON?
+FILTER=SYS =0
+FILTER=BD =2004.264
+HEADER=04/07
*23456789-123456789-123456789-123 POS# LEN# #
*NRFIELD COMMENT POS# LEN# F
***** HEADER*****
S01BNAM - BUNDLE NAME : 00067 00018 C
```

```

S01BD      - DATE BUNDLE START : 00089 00004 D
S01LPGE    - LIST PAGES        : 00181 00004 B +
S01LHP     - LIST HEADER PAGES : 00189 00004 B +
S01PTYP    - RECORD TYPE       : 00772 00001 X
*FOR SYSOUT-TYPE DCR ONLY:
J01SYS     - SYSOUT CLASS       : 00781 00001 C
J01UID     - SYSOUT USER ID    : 00790 00008 C
//*
```

whereby:

```

+TYPE=      - enter the SMF record number(according to the B93_SMFREC
parameter in the Beta 93-LST member)
+LICENSE=   - current 10-day key (from the SAMPLIB member AOF SRKEY)
```

And here is the result under//OUTPROT DD:

```

SNRNAME_____ COMMENT_____ POS__ LEN__ X RECORD_: 1234+6789_1234+
S01BNAM      - BUNDLE NAME      : 00067 00018 C 0000022: ONLINE-PRINT
S01BD        - DATE BUNDLE START : 00089 00004 D 0000022: 2004.264
S01LPGE      - LIST PAGES       : 00181 00004 B 0000022: 0000000001
S01LHP       - LIST HEADER PAGES : 00189 00004 B 0000022: 0000000000
S01PTYP      - RECORD TYPE      : 00772 00001 X 0000022: 80
J01SYS       - SYSOUT CLASS      : 00781 00001 C 0000022: 0
J01UID       - SYSOUT USER ID   : 00790 00008 C 0000022: HUGO12
```

```

Total number of records in SMFIN:          26 (Processed: 1)
Accumulate for S01LPGE      :              1
Accumulate for S01LHP      :              0
```

Result:

TSO User HUGO12 printed one page online on SYSOUT 0 on this day.

A CSV file with a HEADER record will also be generated in OUTSMF, which can be imported into an Excel table, for example, from which nice bar graphs can then be made.

```

BNAM ;BD ;LPGE ;LHP ;PTYP ;SYS ;UID ;
ONLINE-PRINT ;2004.264;0000000001;0000000000;80;0;HUGO12 ;
```

We would like you hear about your experiences of working with this program and enable your input have a direct influence on the program's further development.

Please send your comments direct to,
wolfgang.muschert@betasystems.com, or to the Beta 93 Hotline.
Thank you for your cooperation.

(WXM)

6.2. Beta 91 Report on job data

Users can only get information on the status of the individual steps (formatted, written, reset) of Beta 91 jobs that have been run and formatted from Option 5 of the Beta 91 online interface. No information on what the job has written in the Beta 91 database (Beta 91 groups, models, keys and fields used), and the status of this data is available. Is the data maybe marked for deletion, or does it still exist at all? It's impossible to say whether a job can be reset or not.

Here is a Beta 91 report B91REP01 as workaround!

This report provides all information on what a Beta 91 job has written in the Beta 91 database and what the status of the data is. The values displayed can be changed manually to backout a job with missing values.

What can n o t be displayed is which job or jobstep has written the last values.

This report could be useful in cases where,

- keys with different retention periods are defined and parts of the keys have already been deleted
- a lot of manual backouts are done
- it is necessary to check what kind of keys and fields a job has written without having to backout the job.

Since the BQL report contains over 400 lines of code, it is available only on our ftp server.

Please feel free to download it from here:

<ftp://ftp.betasystems.com/pub/tools/B91REP01>

You can find the right job here:

<ftp://ftp.betasystems.com/pub/tools/B91JOB01>

(JOB)

6.3. New Batch Utility B91DBEFG for Beta 91 for changing the number of backouts

Under Online Option 1.2, line command MO (Select Models), then MF (Model Fields) users can define the number of generations (Backouts) in Beta 91, i.e., the number of values in this field which are held in the Beta 91 database (Field Descriptions for Group).

Once this value is defined, it can only be changed via the ISPF user interface as long as the model key has not yet been used.

The status of a field is displayed under online option 1.2 in the 'Field Description for Group' panel. The status Use Count=0 means that there are no record fields for the field description.

It can become necessary when working with jobs and their keys to store a larger number of generations of a key.

For this reason the B91DBDEFG Batch Utility will be included in Beta 91 from Version V3R3 on. You can use it to increase the number of generations that can be stored in the work database. A maximum of 365 backouts can be done. The new number of backouts is immediately effective once the change has been made.

The necessary PTFs are available on our ftp-Server. You will find documentation on the utility in the directory ftp://ftp.betasystems.com/pub/documents/B91DBEFG_e.pdf, and it will also be included in the appropriate product documentation (JOB)

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7. PTFs/Updates

From our experience of working with the products and on the basis of recommendations from the product hotlines, we would now like to present you with some important product and BSA PTFs. Please read the accompanying information carefully and install the PTFs where necessary.

Beta 91, V3R3
PQM6452, B91DBEFG
- Batch utility for increasing the generations of backout values

PQM6450, B91FCMD
- STC function for supporting B91DBEFG

You can order these from the relevant product hotlines.
The PTFs published here have been available for download from our FTP server since 30.03.2001.
<ftp://ftp.betasystems.com/pub>

Please install these PTFs with
RECEIVE SYSMODS LIST.

Then you will be able to view the text information from the PTFs in the SMPE log

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8. For collection RPG - Beta 88 Reports - part 6 - Group hierarchies

Part 6 of our series:
Graphical presentation of group hierarchies as a tree diagram!

The following report is designed to show you, among other things, how data generated by the RPG can also be output as a kind of diagram, displaying the groups administered in Beta 88 hierarchically in a tree structure. Since a system 'lives' and changes over the years, this report could be helpful in giving you an occasional overview of all groups and their subgroups.

The report is designed for up to 8 levels of the group hierarchy. It can also be expanded by adding further loops.

Another way of graphically presenting group hierarchies with more than 8 levels is by using the SUPID parameter. Where there are more than 8 levels, these are marked under the relevant group with '- ...'. In this case, you should enter the name of the group in the SUPID parameter (Superior Group) to display all the subgroups of this group.

To get an overview of all the group hierarchies enter the value ZERO - no superior group - for the SUPID parameter. The CPU can be determined by using the CPUID parameter. Both parameters should be fully qualified.

The groups hierarchy will then be shown as a tree diagram in the DD statement RPGTREE.

Report:

```
//B88PRPG JOB 724,'BETA',CLASS=A,MSGCLASS=P,NOTIFY=&SYSUID
//*
//*****
//* PRODUCT : BETA 88 *
//* REPORT : GROUP HIERARCHY AS TREE *
//***-----***
//* NOTE : UP TO LEVEL 8 IN HIERARCHY *
//***-----***
//* MODIFY : - STEPLIB DSN *
// * - SSID *
// * - PARAMETERS *
//*****
//*
//REPORT EXEC PGM=BSS16RPG,REGION=0M
//STEPLIB DD DISP=SHR,
// DSN=BETA.BSA.LOAD
//RPGPARM DD *
SSID=B88P
GEN=01
//RPGTREE DD SYSOUT=*
//RPGSCAN DD SYSOUT=*
//RPGTRACE DD SYSOUT=*
//RPGSUM DD SYSOUT=*
//RPGIN DD *
*
B88_LOGON
*
*===== P A R A M E T E R S =====*
*
*----- VVV ==> CPU-ID (NO MASK)
DEFCHAR CPUID LEN 4 VALUE 'BETA'
*
*----- VVVVVVV ==> SUPERIOR GROUP (NO MASK)
'ZERO' TO GET ALL GROUPS
DEFCHAR SUPID LEN 8 VALUE 'ZERO'
*
*=====*
```

```

*
DEFPCH PCH1 DDNAME 'RPGTREE'
*
DEFCHAR SAVE0 LEN 8 VALUE ' ' DEFNUM RC0 DIGI 4
DEFCHAR SAVE1 LEN 8 VALUE ' ' DEFNUM RC1 DIGI 4
DEFCHAR SAVE2 LEN 8 VALUE ' ' DEFNUM RC2 DIGI 4
DEFCHAR SAVE3 LEN 8 VALUE ' ' DEFNUM RC3 DIGI 4
DEFCHAR SAVE4 LEN 8 VALUE ' ' DEFNUM RC4 DIGI 4
DEFCHAR SAVE5 LEN 8 VALUE ' ' DEFNUM RC5 DIGI 4
DEFCHAR SAVE6 LEN 8 VALUE ' ' DEFNUM RC6 DIGI 4
DEFCHAR SAVE7 LEN 8 VALUE ' ' DEFNUM RC7 DIGI 4
DEFCHAR SAVE8 LEN 8 VALUE ' ' DEFNUM RC8 DIGI 4
DEFCHAR B LEN 8 VALUE ' ' DEFCHAR N LEN 1 VALUE '-'
DEFNUM LEVEL DIGI 2 VALUE 0
*
*** WHILE 0
WHILE RC0 EQ 0
  BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
            WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
            ORDER BY KEY GRPK0'
  PERFORM SET_RC
  IF RC0 EQ 0
    IF SAVE0 NE GRPID
      PUNCH N GRPID TO PCH1
    ENDIF
  MOVE GRPID TO SAVE0 PERFORM NEXT_LEVEL
*** WHILE 1
WHILE RC1 EQ 0
  BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
            WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
            ORDER BY KEY GRPK0'
  PERFORM SET_RC
  IF RC1 EQ 0
    IF SAVE1 NE GRPID
      PUNCH B N GRPID TO PCH1
    ENDIF
  MOVE GRPID TO SAVE1 PERFORM NEXT_LEVEL
*** WHILE 2
WHILE RC2 EQ 0
  BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
            WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
            ORDER BY KEY GRPK0'
  PERFORM SET_RC
  IF RC2 EQ 0
    IF SAVE2 NE GRPID
      PUNCH B B N GRPID TO PCH1
    ENDIF
  MOVE GRPID TO SAVE2 PERFORM NEXT_LEVEL
*** WHILE 3
WHILE RC3 EQ 0
  BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
            WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
            ORDER BY KEY GRPK0'
  PERFORM SET_RC
  IF RC3 EQ 0

```

```

IF SAVE3 NE GRPID
  PUNCH B B B N GRPID TO PCH1
ENDIF
MOVE GRPID TO SAVE3      PERFORM NEXT_LEVEL
*** WHILE 4
WHILE RC4 EQ 0
  BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
            WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
            ORDER BY KEY GRPK0'
  PERFORM SET_RC
  IF RC4 EQ 0
    IF SAVE4 NE GRPID
      PUNCH B B B B N GRPID TO PCH1
    ENDIF
    MOVE GRPID TO SAVE4      PERFORM NEXT_LEVEL
  *** WHILE 5
  WHILE RC5 EQ 0
    BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
              WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
              ORDER BY KEY GRPK0'
    PERFORM SET_RC
    IF RC5 EQ 0
      IF SAVE5 NE GRPID
        PUNCH B B B B B N GRPID TO PCH1
      ENDIF
      MOVE GRPID TO SAVE5      PERFORM NEXT_LEVEL
    *** WHILE 6
    WHILE RC6 EQ 0
      BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
                WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
                ORDER BY KEY GRPK0'
      PERFORM SET_RC
      IF RC6 EQ 0
        IF SAVE6 NE GRPID
          PUNCH B B B B B B N GRPID TO PCH1
        ENDIF
        MOVE GRPID TO SAVE6      PERFORM NEXT_LEVEL
      *** WHILE 7
      WHILE RC7 EQ 0
        BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
                  WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
                  ORDER BY KEY GRPK0'
        PERFORM SET_RC
        IF RC7 EQ 0
          IF SAVE7 NE GRPID
            PUNCH B B B B B B B N GRPID TO PCH1
          ENDIF
          MOVE GRPID TO SAVE7      PERFORM NEXT_LEVEL
        *** WHILE LAST
        WHILE RC8 EQ 0
          BQL_EXEC 'SELECT TABLE GRP FIELDS(*) -
                    WHERE(GRPOCPU LIKE ' CPUID ' AND GRPSUPGR EQ ' SUPID ') -
                    ORDER BY KEY GRPK0'
          PERFORM SET_RC
          IF RC8 EQ 0

```

```

    IF SAVE8 NE GRPID
      PUNCH B B B B B B B N '...' TO PCH1
    ENDIF
    MOVE GRPID TO SAVE8
*** ENDWHILE LAST
    ELSE
      MOVE SAVE6 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 7
    ELSE
      MOVE SAVE5 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 6
    ELSE
      MOVE SAVE4 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 5
    ELSE
      MOVE SAVE3 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 4
    ELSE
      MOVE SAVE2 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 3
    ELSE
      MOVE SAVE1 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 2
    ELSE
      MOVE SAVE0 TO SUPID      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 1
    ELSE
      SUBTRACT 1 FROM LEVEL
    ENDIF
  ENDWHILE
*** ENDWHILE 0
  ENDIF
  ENDWHILE
*
  EXIT
*
  ROUTINE NEXT_LEVEL
    MOVE GRPID TO SUPID      ADD 1 TO LEVEL
  RETURN
*
  ROUTINE SET_RC

```

```

IF LEVEL LE 0
  MOVE $BQLRC TO RC0
ENDIF
IF LEVEL LE 1
  MOVE $BQLRC TO RC1
ENDIF
IF LEVEL LE 2
  MOVE $BQLRC TO RC2
ENDIF
IF LEVEL LE 3
  MOVE $BQLRC TO RC3
ENDIF
IF LEVEL LE 4
  MOVE $BQLRC TO RC4
ENDIF
IF LEVEL LE 5
  MOVE $BQLRC TO RC5
ENDIF
IF LEVEL LE 6
  MOVE $BQLRC TO RC6
ENDIF
IF LEVEL LE 7
  MOVE $BQLRC TO RC7
ENDIF
IF LEVEL LE 8
  MOVE $BQLRC TO RC8
ENDIF
RETURN
*
//*
```

Outline output of the whole groups hierarchy:

```

CPUID ==> BETA
SUPID ==> ZERO
```

Part of RPGTREE:

```

- SYS1
  - [...]
  - STAFF
    - SUPPORT
      - FLSSGRP
        - FLS88GRP
          - ...
      - [...]
      - TSERV
        - TSERVER
      - XSERV
        - CUSTGRP
        - GRP724
  - [...]
```

(ADH)

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