2009 System z Expo

October 5 – 9, 2009 – Orlando, FL

Session Title: VSAM News and tools

Session ID: ZEG11

Speaker Name: Wilhelm Mild

Trademarks

The following are trademarks of the International Business Machines Corporation in the United States, other countries, or both.

Not all common law marks used by IBM are listed on this page. Failure of a mark to appear does not mean that IBM does not use the mark nor does it mean that the product is not actively marketed or is not significant within its relevant market.

Those trademarks followed by ® are registered trademarks of IBM in the United States; all others are trademarks or common law marks of IBM in the United States.

For a complete list of IBM Trademarks, see www.ibm.com/legal/copytrade.shtml:

*, AS/400®, e business(logo)®, DBE, ESCO, eServer, FICON, IBM®, IBM (logo)®, iSeries®, MVS, OS/390®, pSeries®, RS/6000®, S/30, VM/ESA®, VSE/ESA, WebSphere®, xSeries®, z/OS®, zSeries®, z/VM®, System i, System i5, System p, System p5, System x, System z, System z9®, BladeCenter®

The following are trademarks or registered trademarks of other companies.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.
Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.
Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.
Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
UNIX is a registered trademark of The Open Group in the United States and other countries.
Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.
IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency, which is now part of the Office of Government Commerce.

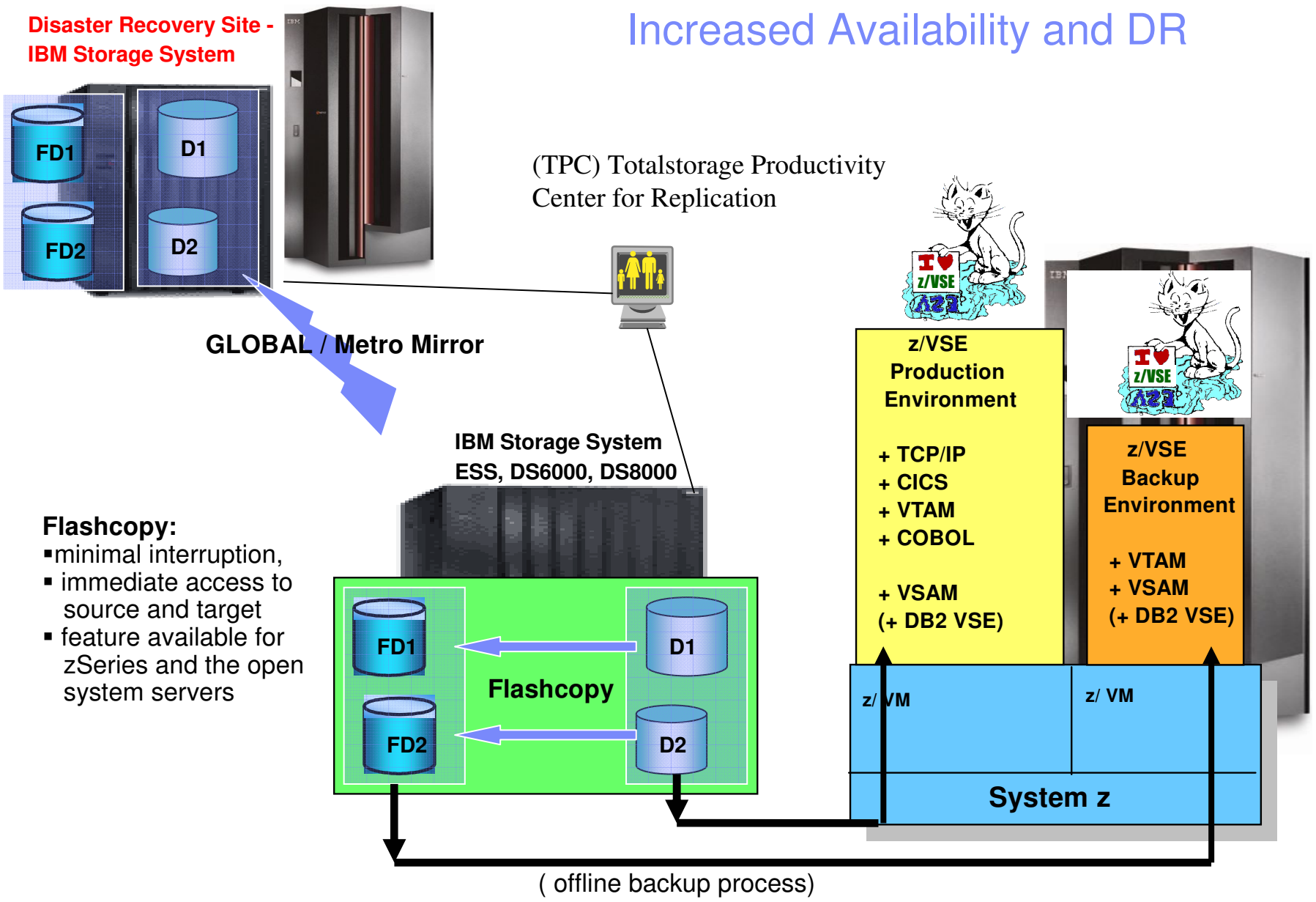
* All other products may be trademarks or registered trademarks of their respective companies.

Notes:
Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.
IBM hardware products are manufactured from new parts, or new and serviceable used parts. Regardless, our warranty terms apply.
All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.
This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.
All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.
Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.
Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

Agenda

- IDCAMS SNAP Command Enhancements
- Backup/Restore Enhancements
- VSAM Meaningful Cluster Names
- Preventing Duplicate Candidate Volumes
- New VSAM Extent Prodexit
- Task ID for VSAM Lock requests x'A8'
- New VSAM Redirector AIX Support
- VSAM data Encryption / Protection
- Tools

Increased Availability and DR



IDCAMS SNAP command Enhancements

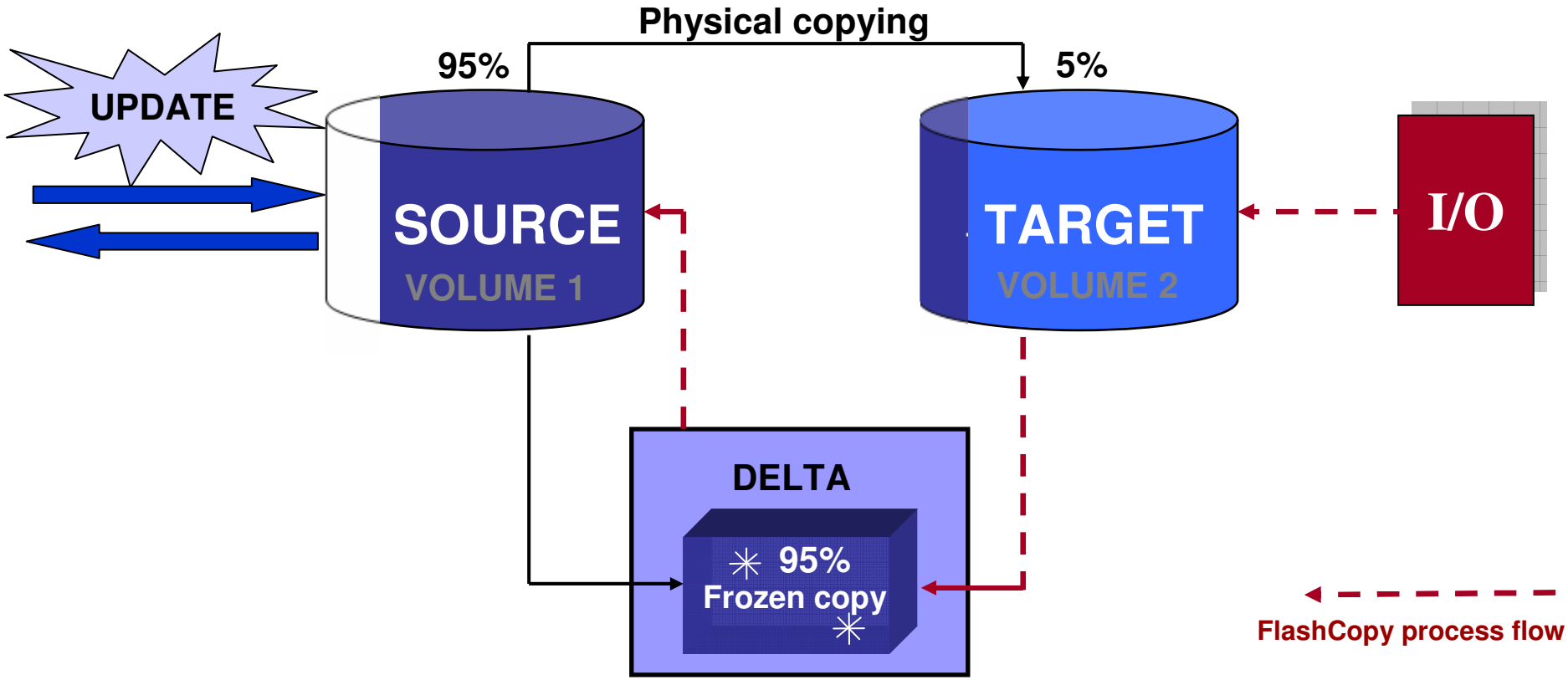
The IDCAMS SNAP command provides an interface to the FlashCopy feature.

- **New NOCOPY parameter of the IDCAMS SNAP command creates the FlashCopy. The physical copying of data to target volumes is not performed.**
- **New DDSR parameter of the IDCAMS SNAP command terminates the FlashCopy relation between the source and target volumes and frees the used resources.**
- **New parameter COPY of the IDCAMS SNAP command is now specified explicitly.**
- **Provided an opportunity to administrate user access rights to the IDCAMS SNAP command using the Basic Security Manager (BSM).**

See New Chapter 10, “Performing an IDCAMS SNAP (FlashCopy)” “VSE/VSAM User’s Guide and Application Programming”.

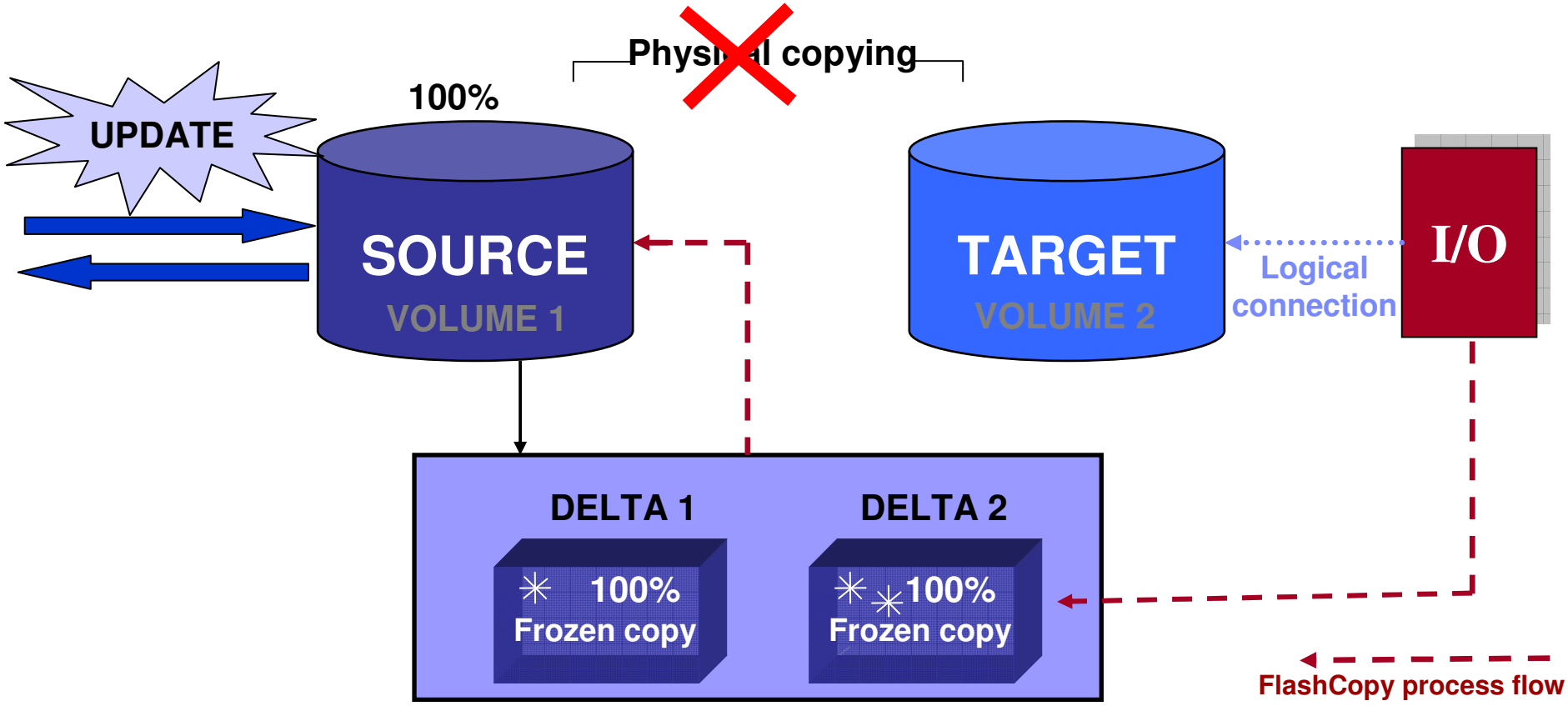
IDCAMS SNAP COPY parameter

Explicit specification of the default COPY parameter of the IDCAMS SNAP command, facilitates referencing to it by other z/VSE components.



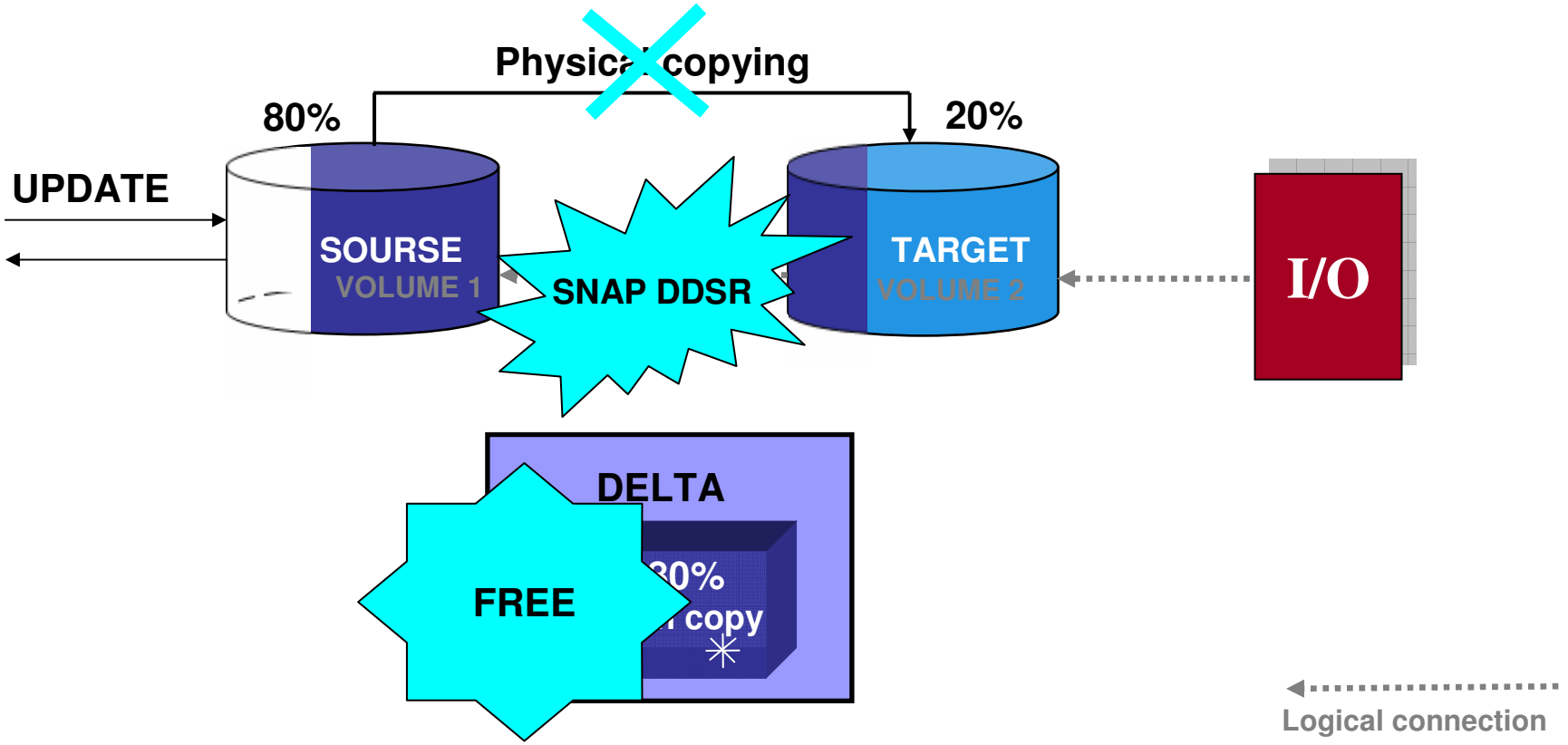
IDCAMS SNAP NOCOPY parameter

The NOCOPY parameter of the IDCAMS SNAP command allows the user to eliminate real copying of source volumes to the target volumes for temporary FlashCopy and thus eliminate the superfluous I/O activity.



IDCAMS SNAP DDSR parameter

The DDSR (Deleted Data Space Release) parameter of the IDCAMS SNAP command allows the user to delete FlashCopy relations and thus to stop unnecessary managing of a Delta File and to release internal ESS resources as soon as they are no longer needed.



Sample of SNAP COPY, NOCOPY, DDSR

COPY

```
SNAP SVOL(VSE222) TARGETVOLUMES(VSE444) COPY NOPROMPT

IMPORT CONNECT -
    OBJECTS((COPY.UCAT VOLUMES(VSE444) DEVT(3390))) -
    CAT(VSAM.MASTER.CATALOG)

BACKUP (FILE1) BPFILE(BF) SYNONYMLIST( -
      SOURCEVOLUMES(VSE222) TARGETVOLUMES(VSE444) -
      CATALOG(UCAT) SYNCATALOG(COPY.UCAT))

RESTORE OBJECTS(FILE1) BPFILE(BF) CAT(UCAT)

SNAP TARGETVOLUMES(VSE444) DDSR NOPROMPT

EXPORT COPY.UCAT   DISCONNECT
```

NOCOPY

```
SNAP SOURCEVOLUMES(VSE222) TVOL(VSE333) NOCOPY NOPROMPT

IMPORT CONNECT -
    OBJECTS((NOCOPY.UCAT VOLUMES(VSE333) DEVT(3390))) -
    CAT(VSAM.MASTER.CATALOG)

BACKUP (FILE1) BPFILE(BF) SYNONYMLIST( -
      SOURCEVOLUMES(VSE222) TARGETVOLUMES(VSE333) -
      CATALOG(UCAT) SYNCATALOG(NOCOPY.UCAT))

RESTORE OBJECTS(FILE1) BPFILE(BF) CAT(UCAT)

SNAP TARGETVOLUMES(VSE333) DDSR NOPROMPT

EXPORT NOCOPY.UCAT DISCONNECT
```

Output of SNAP COPY, NOCOPY, DDSR

COPY

```
SNAP SVOL(VSE222) TARGETVOLUMES(VSE444) COPY NOPROMPT
IDC32204I RACROUTE RESOURCE NOT PROTECTED OR BATCH SECURITY=OFF
IDC0935I IXFP/SNAPSHOT FUNCTION COMPLETED SUCCESSFULLY
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IMPORT CONNECT -
      OBJECTS((COPY.UCAT VOLUMES(VSE444) DEVT(3390))) -
      CAT(VSAM.MASTER.CATALOG)
IDC0603I  CONNECT FOR USER CATALOG  COPY.UCAT SUCCESSFUL
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

BACKUP (FILE1) BPFILE(BF) SYNONYMLIST( -
      SOURCEVOLUMES(VSE222) TARGETVOLUMES(VSE444) -
      CATALOG(UCAT) SYNCATALOG(COPY.UCAT))
IDC01300I BACKUP FILE CREATED ON XX/XX/2008 AT XX:XX:XX
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

RESTORE OBJECTS(FILE1) BPFILE(BF) CAT(UCAT)
IDC01301I RESTORE'S BACKUP FILE CREATED ON XX/XX/2008 AT XX:XX:XX
IDC01304I SUCCESSFUL DEFINITION OF FILE1
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

SNAP TARGETVOLUMES(VSE444) DDSR NOPROMPT
IDC32204I RACROUTE RESOURCE NOT PROTECTED OR BATCH SECURITY=OFF
IDC0935I IXFP/SNAPSHOT FUNCTION COMPLETED SUCCESSFULLY
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

EXPORT COPY.UCAT   DISCONNECT
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
```

NOCOPY

```
SNAP SOURCEVOLUMES(VSE222) TVOL(VSE333) NOCOPY NOPROMPT
IDC32204I RACROUTE RESOURCE NOT PROTECTED OR BATCH SECURITY=OFF
IDC0935I IXFP/SNAPSHOT FUNCTION COMPLETED SUCCESSFULLY
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

IMPORT CONNECT -
      OBJECTS((NOCOPY.UCAT VOLUMES(VSE333) DEVT(3390))) -
      CAT(VSAM.MASTER.CATALOG)
IDC0603I  CONNECT FOR USER CATALOG  NOCOPY.UCAT SUCCESSFUL
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

BACKUP (FILE1) BPFILE(BF) SYNONYMLIST( -
      SOURCEVOLUMES(VSE222) TARGETVOLUMES(VSE333) -
      CATALOG(UCAT) SYNCATALOG(NOCOPY.UCAT))
IDC01300I BACKUP FILE CREATED ON XX/XX/2008 AT XX:XX:XX
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

RESTORE OBJECTS(FILE1) BPFILE(BF) CAT(UCAT)
IDC01301I RESTORE'S BACKUP FILE CREATED ON XX/XX/2008 AT XX:XX:XX
IDC01304I SUCCESSFUL DEFINITION OF FILE1
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

SNAP TARGETVOLUMES(VSE333) DDSR NOPROMPT
IDC32204I RACROUTE RESOURCE NOT PROTECTED OR BATCH SECURITY=OFF
IDC0935I IXFP/SNAPSHOT FUNCTION COMPLETED SUCCESSFULLY
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0

EXPORT NOCOPY.UCAT DISCONNECT
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
```

The FLASHCOPY VSAM CATALOG/FILES dialog

The „FLASHCOPY VSAM CATALOG / FILES“ dialog (fastpath 3719) is enhanced to allow user to choose the option to create a FlashCopy of the source volumes on the target volumes

```
 DSF$SNP2                FLASHCOPY VSAM CATALOG / FILES

 Enter the required data and press ENTER.

Enter  all entire  Source  Disk  Volumes where the CATALOG and all its Datasets
reside and the  Target  Volumes to which the  FlashCopy has to be done.

SOURCE VOLUME 1.............. ______     Enter the Volume-id where the CATALOG
                                        resides
TARGET VOLUME 1.............. ______     Enter the Volume-id to which  Flash
                                        Copy has to be done
MORE VOLUMES................. 2          Enter  1 to add more volumes.
                                        Otherwise, enter  2
COPY/NOCOPY.................. 1          Enter  1 to initiate a FlashCopy
                                        relation and copy source to target
                                        volumes, otherwise, enter  2
                                        to initiate a FlashCopy relation
                                        with option NOCOPY.


 PF1=HELP       2=REDISPLAY  3=END
```

IDCAMS SNAP using the Basic Security Manager

z/VSE administrator enabled to control the usage of the IDCAMS SNAP command.

SAMPLE (z/VSE console):

r rdr,pausebg

0 exec bstadmin
BG 0000 1S54I PHASE BSTADMIN IS TO BE FETCHED FROM IJSYSRS.SYSLIB
BG-0000 BST901A ENTER COMMAND OR END

everybody is allowed to use SNAP…COPY command

0 add facility vsam.snap.**copy** uacc(read)
BG 0000 BST904I RETURN CODE OF ADD IS 00
BG-0000 BST901A ENTER COMMAND OR END

everybody is allowed to use SNAP…DDSR command

0 add facility vsam.snap.**ddsr** uacc(read)
BG 0000 BST904I RETURN CODE OF ADD IS 00
BG-0000 BST901A ENTER COMMAND OR END

nobody is allowed to use SNAP…NOCOPY command

0 add facility vsam.snap.**nocopy** uacc(none)
BG 0000 BST904I RETURN CODE OF ADD IS 00
BG-0000 BST901A ENTER COMMAND OR END
0 end
BG-0000
0

IDCAMS SNAP using the Basic Security Manager

Administering the usage of the IDCAMS SNAP command can be done with the following

Basic Security Manager Facilities:

VSAM.SNAP.COPY for IDCAMS SNAP COPY

VSAM.SNAP.NOCOPY for IDCAMS SNAP NOCOPY

VSAM.SNAP.DDSR for IDCAMS SNAP DDSR

If no BATCH security is enabled in the zVSE system (**SYS SEC=NO**) or it is enabled but no **VSAMSNAP.[COPY|NOCOPY|DDSR] RACROUTE** facility was defined using **BSTADMIN,** then the **IDCAMS SNAP [COPY|NOCOPY|DDSR]** statements are executed as requested but with a warning:

```
IDC32204I RACROUTE RESOURCE NOT PROTECTED OR BATCH SECURITY=OFF
```

If BATCH security is enabled and the corresponding VSAMSNAP Facility has been defined to the BSM, then an ID statement has to be supplied in the job to identify the user.

If at least one of the following is true:

- ✓ *the user has at least **READ** access for the corresponding VSAMSNAP Facility related to the issued **IDCAMS SNAP** command,*
- ✓ *the **VSAMSNAP** Facility is defined with universal access,*
- ✓ *the supplied user ID is an administrator ID and, therefore, the user has access to all the **BSTADMIN** resources,*

then the appropriate **IDCAMS SNAP** function is executed, accompanied by the following message:

```
IDC32200I RACROUTE (AUTH) SUCCESSFUL
```

In all the other cases the requested IDCAMS SNAP function is suspended.

Backup/Restore Enhancements

- **Producing cross-reference listings using the RESTORE command**
- **Producing cross-reference listings without objects being restored**
- **Correct identification of compressed files in cross-reference listings**
- **Correct identification of empty files in cross-reference listings**

Backup/Restore Enhancements Invocation and Description

VSE/VSAM Backup/Restore provides a new capability to produce cross-reference listings of objects backed up and their place on the tape or disk volumes as a result of the RESTORE command processing.

For a backup file on *tape*, the following two listings are produced:

- ***Volume cross-reference listing***
- ***Object cross-reference listing***

For a backup on *disk*, the following three listings are produced:

- ***Extent cross-reference listing***
- ***Object cross-reference listing***
- ***Extent list***

Note: Thus, the same set of cross-reference listings are produced by both the BACKUP command and the RESTORE command.

Backup/Restore Enhancements Invocation and Description

NOXREF|XREF|XREFONLY

Specify whether the cross-reference listings are to be produced.

- **NOXREF** specifies that the cross-reference listings will not be produced but objects restoration will be performed.

Abbreviations: NXREF

- **XREF** specifies that both the cross-reference listings will be produced and objects restoration will be performed.

Abbreviations: None

- **XREFONLY** specifies that only the cross-reference listings will be only produced and thus objects restoration will not be performed.

Abbreviations: XREFY

- **Default: NOXREF**

Backup/Restore Enhancements Sample

XREFONLY

RESTORE

```
RESTORE OBJECTS(*) XREFY
IDC01301I RESTORE'S BACKUP FILE CREATED ON XX/XX/2008 AT 13:38:25
IDCAMS SYSTEM SERVICES                                  TIME: 13:38:38         XX/XX/2008   PAGE   2


BACKUP EXTENT CROSS-REFERENCE LISTING (BECR)
        EXTSEQ    VOLSER    OBJECT NAME                                    OBJECT TYPE   SEGMENT TYPE
        001       WRK002    VSMCKD.KSDS.KEY8.A.C001 ....................   KSDS    CMP   ONLY
                            VSMCKD.KSDS.KEY8.A.C002 ....................   KSDS          ONLY
                            VSMCKD.KSDS.KEY8.A.C003 ....................   KSDS          ONLY
                            VSMCKD.KSDS.KEY8.A.C004 ....................   KSDS          ONLY
                            VSMCKD.KSDS.KEY8.A.C005 ....................   KSDS    CMP   EMPTY
                            VSMCKD.KSDS.KEY8.A.C006 ....................   KSDS    CMP   ONLY
                            VSMCKD.KSDS.KEY8.A.C007 ....................   KSDS    CMP   ONLY
                            VSMCKD.KSDS.KEY8.A.C008 ....................   KSDS    CMP   ONLY

IDCAMS  SYSTEM SERVICES                                 TIME: 13:23:45         XX/XX/2008   PAGE   3
```

Backup/Restore Enhancements Sample

```
BACKUP OBJECT CROSS-REFERENCE LISTING (BOCR)
       OBJECT NAME                                  OBJECT TYPE   EXTSEQ    VOLSER    SEGMENT TYPE
       VSMCKD.KSDS.KEY8.A.C001  ..................  KSDS    CMP   001       WRK002    ONLY
       VSMCKD.KSDS.KEY8.A.C002  ..................  KSDS          001       WRK002    ONLY
       VSMCKD.KSDS.KEY8.A.C003  ..................  KSDS          001       WRK002    ONLY
       VSMCKD.KSDS.KEY8.A.C004 ...................  KSDS          001       WRK002    ONLY
       VSMCKD.KSDS.KEY8.A.C005 ...................  KSDS    CMP   001       WRK002    EMPTY
       VSMCKD.KSDS.KEY8.A.C006 ...................  KSDS    CMP   001       WRK002    ONLY
       VSMCKD.KSDS.KEY8.A.C007 ...................  KSDS    CMP   001       WRK002    ONLY
       VSMCKD.KSDS.KEY8.A.C008 ...................  KSDS    CMP   001       WRK002    ONLY
IDCAMS  SYSTEM SERVICES                             TIME: 10:10:06        XX/XX/2008   PAGE   4

       BACKUP EXTENT LIST
       EXTSEQ    VOLSER    LOW LIMIT   HIGH LIMIT
       001       WRK002    00010005    0043000E

       DISK ADDRESS LAST USED : 000100050B
IDCAMS  SYSTEM SERVICES                             TIME: 10:10:06        XX/XX/2008   PAGE   5
IDC0001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
```

Restore Cross Reference Listing

- The Restore VSAM File dialog (fastpath 3714) is enhanced to allow user to choose the option to produce cross-reference listings of objects backed up and their place on the tape or disk volumes as a result of the RESTORE command processing.

  A new section has been introduced in the following **IUI dialog: Fastpath 3714**

```
DSF$RES1                          RESTORE VSAM FILE

Enter the required data and press ENTER.

CATALOG TYPE.................. 3           Enter  1 to restore into the
                                          MASTER catalog, or enter  2 to
                                          restore into a USER catalog, or enter
                                           3 to restore MULTIPLE catalogs.
Enter  the  identification of the user catalog if you specify  2 for USER in
the CATALOG TYPE field.
      ________        ________        ________        ________        ________

RESTORE ALL................... _           Enter  1 to restore EVERYTHING from
                                          your backup file. Otherwise enter
                                           2 to restore SELECTED files only.
INPUT MEDIUM.................. 2           Enter  1 for DISK or 2 for TAPE or
                                           3 for Virtual Tape.
XREFERENCE LISTINGS.......... 2           Enter  1 to restore objects or  2 to
                                          produce cross-reference listings or
                                           3 to do both.
```

VSAM Meaningful Clusternames

If not specified explicitly by the user, meaningful cluster names are now generated by VSAM for AIX/Cluster data and index component.

The generated data component and index component names will use:

- **the specified clustername + .DATA or .D for the data component**
- **the specified clustername + .INDEX or .I for the index component**

Old VSAM generated names

Up to now, VSAM generated the 44-characters name of the data and index components using the following data:

- **the current value of bits 0-55 of the time-of-date (TOD) clock at the moment of the name creation,**
- **the year and the day of creation,**
- **inserting in the name some constants and the period signs.**

Example of the OLD NAME Format:

part 1	part 2	part 3	part 4	part 5
T99EFB7B.	VSAMDSET.	DFD08086.	TC05B8EF.	T99EFB7B

The TOD clock value (bits 0-63) stored by STCK instruction: C05B8EF9 9EFB7B40

New VSAM Meaningful Clusternames

- **If the last qualifier of the name is CLUSTER** : **CLUS.TESTNAME.CLUSTER**

  Generated data name = CLUS.TESTNAME.**DATA**

  Generated index name = CLUS. TESTNAME.**INDEX**

- **If the cluster name <= 38 characters** : **DEPTABC.TEST.INFO**

  Generated data name = DEPTABC.TEST.INFO.**DATA**

  Generated index name = DEPTABC.TEST.INFO.**INDEX**

- **If the cluster name is between 39 and 42 characters inclusive** : **DEPTABCD.RESOURCE. ABCDEFGH.DATA1234.STUFF**

  Generated data name = DEPTABCD.RESOURCE.ABCDEFGH.DATA1234.STUFF.**D**

  Generated index name = DEPTABCD.RESOURCE. ABCDEFGH.DATA1234.STUFF.**I**

- **If longer than 42 characters, and the last qualifier is not CLUSTER** :

  COMPANY.DEVISION.DEPT.DLREPORT.DECADE.MONTH

  Generated data name = COMPANY.DEVISION.DEPT.DLREPORT.**D99EFB7B**

  Generated index name = COMPANY.DEVISION.DEPT.DLREPORT.**I1A12FAE**

VSAM Meaningful Clusternames

Note:

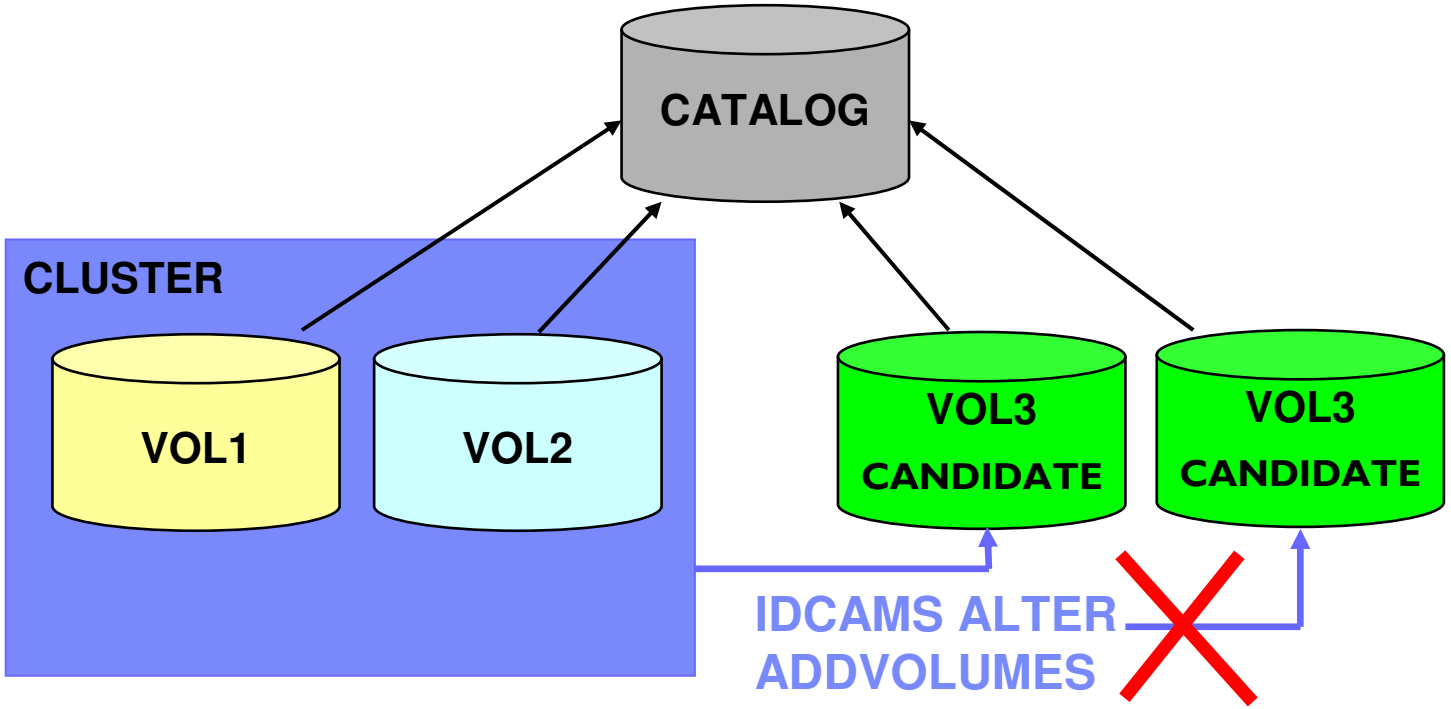
-In 4.2 the name of DATA and INDEX portion generated by VSAM is always the same

-In releases before the name for DATA and INDEX portion generated by VSAM was always a different one because of the timestamp

-This may affect your IDCAMS ALTER / REDEFINE strategy since ALTER of the Base Cluster name is no longer enough in order to redefine a VSAM Cluster

Preventing Duplicate Candidate Volumes

The IDCAMS ALTER command will allow to add any volume as candidate only once.



New error message

If the candidate volume is already present in the list of object candidate volumes, the request will be rejected with IDCAMS Return Code 60 and new Reason code 40

IDC3009I ** VSAM CATALOG RETURN CODE IS *nnn* **– REASON CODE IS IGG0CL***xx* **–** *mmm*

Return code	Reason code	Explanation
60	40	**Explanation:** An attempt was made to add a volume to the object which already has this volume as candidate. Request rejected.

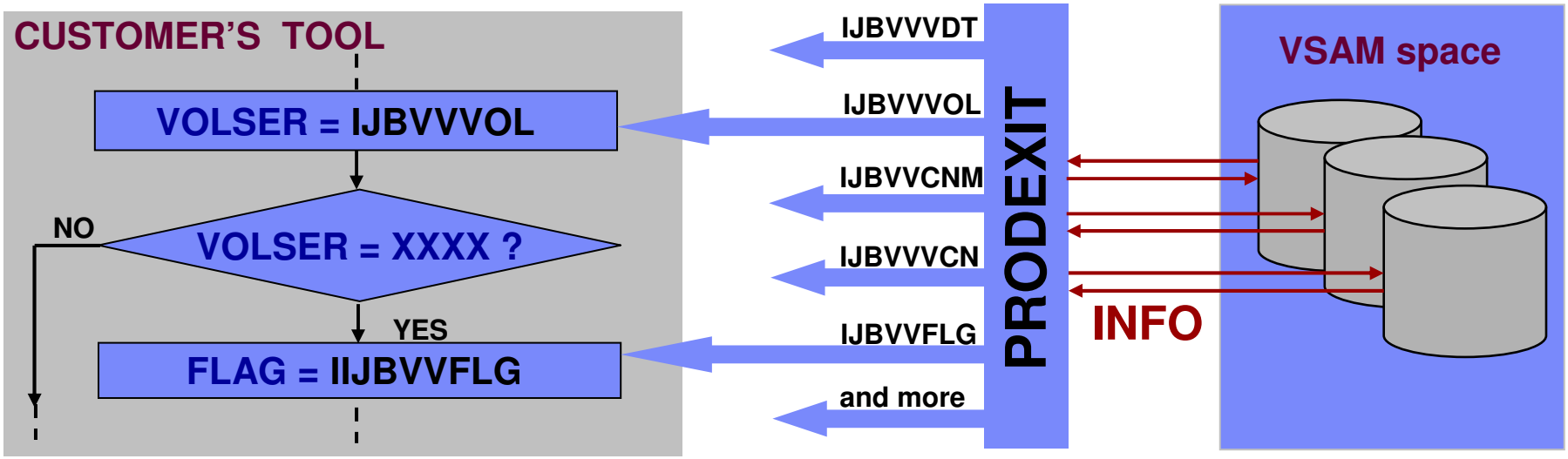
- See “z/VSE Messages and Codes Volume 2”.

New VSAM Extent PRODEXIT

- New IJBVVEXU VSAM PRODEXIT allows monitoring of allocations of VSAM data space extents and the suballocation of VSAM cluster extents.

Advantages:

- The PRODEXIT provides to the customers facilities to create his own tools to monitor VSAM events and optimize DASD space usage.



New VSAM Extent PRODEXIT

IJBVINF points to the communication area (input area). The area holds the information shown in the following table at exit entry.

Field	Size	Description
IJBVLENV	H	Length of area
IJBVPIK	H	Updated by supervisor. PIK of current task
IJBVTIK	H	Updated by supervisor. TIK of current task
	H	Reserved
IJBVVVER	X	Version of the vendor info block, currently x'00'
IJBVVFLG	X	Flags with values as follows:
IJBVVDEL X'80' – ON		if extent is to be deleted, otherwise extent is to be allocated
IJBVVCYL X'40' – ON		if extent is specified in cylinders, otherwise allocation units are tracks
IJBVVFBA X'20' – ON		if extent is on an FBA device
IJBVVSE X'10' – ON		for anonymous data space extents, otherwise extent is suballocated for a named cluster component
IJBVVVOL	CL6	Volume serial number
IJBVVVCT	0XL4	Device class and type as after the GETVCE macro
IJBVVVD1	X	Device operational character (as DCTUFLG)
IJBVVVD2	X	Device optional features (as DCTUOPT)
IJBVVVDC	X	Device class (as DCTUDCL), X'21' for FBA devices
IJBVVVDT	X	Device type (as DCTUTYP)
IJBVVVCN	F	Number of cylinders on the volume.
IJBVVVTN	H	Number of tracks per cylinder
IJBVVVBN	H	Number of blocks per track on FBA disks or number of bytes per track on ECKD
IJBVVEXB	F	Extent begin, number of starting allocation unit (*** track or cyl)
IJBVVEXS	F	Extent size, number of allocation units
IJBVVCNM	CL44	Catalog name
IJBVVDNM	CL44	If is OFF – data set name of the cluster component as appeared in LISTVTOC, otherwise one of the following strings: "DEFINE CATALOG", "DEFINE SPACE","DELETE CLUSTER","DELETE SPACE"

New VSAM Extent PRODEXIT

Notes:

- Any return code setting in IJBVRC is ignored
- At catalog creation, the catalog components which appeared in the LISTCAT as VSAM.CATALOG.BASE.INDEX and VSAM.CATALOG.BASE.DATA are reported by the exit as a single extent named VSAM.CATALOG.BASE
- When a catalog is deleted, the exit reports that as a single event. Since the catalog deletion can cause deletion of several data space extents on several volumes, the fields IJBVVVOL, IJBVVVCT, IJBVVVTN, IJBVVVTN, IJBVVVBN are set to binary zeroes, the fields IJBVVEXB and IJBVVEXS are set to -1.

New VSAM Extent PRODEXIT

How to use PRODEXIT:

- Prepare a program, which receives PRODEXIT data and is using it (for example, print it)
- Generate a phase and put it into SVA
- Enable PRODEXIT (using an enabling program)
- Run a test, which is to be investigated by VSAM PRODEXIT
- Disable PRODEXIT

New VSAM Extent PRODEXIT

SAMPLE OUTPUT:

```
BG 0000 VEXU: 10 VSE300 0000000F 00000087 UCAT          DEFINE CATALOG
BG 0000 VEXU: 00 VSE300 0000000F 0000004B UCAT          VSAM.CATALOG.B
BG 0000 VEXU: 10 VSE300 00000096 000005DC UCAT          DEFINE SPACE
BG 0000 VEXU: 00 VSE300 00000096 0000012C UCAT          SAMESDS.DATA
BG 0000 VEXU: 80 VSE300 00000096 0000012C UCAT          SAMESDS.DATA
BG 0000 VEXU: 90 VSE300 00000096 000005DC UCAT          DELETE SPACE
BG 0000 VEXU: 90        FFFFFFFF FFFFFFFF UCAT          DELETE CATALOG
```

- Please find the information about macros for PRODEXITs in “Preparing a product for VSE”.
  http://publibz.boulder.ibm.com/epubs/pdf/iespve10.pdf
  Updated with 4.2.1 Refresh

Task ID for VSAM Lock requests

- **For VSAM X'A8 Lock requests the task id of the owner of the lock will be returned in case the lock cannot be acquired because the resource is locked already by another task.**

Advantages:

- **This information will help to find the reason for locked tasks without the necessity to use the LOCKTRACE on all VSAM locking activities.**

Examples:

Trying to open a file, which is already in use within 1 VSE system:

```
Y2 0047 4228I FILE OPEN ERROR X'A8'(168) CAT=IJSYSCT
(OPNH1-45) FILE ALREADY OPEN IN ANOTHER PARTITION, RC X'04' TASK X'0020'
```

Trying to open a file, which is locked on a different VSE system (shared system):

```
Y1 0045 4228I FILE OPEN ERROR X'A8'(168) CAT=
(OPNH1-45) FILE ALREADY OPEN IN ANOTHER PARTITION, RC X'04' TASK X'FFFF'
```

VSAM data Encryption / Protection

z/VSE V4.2 Additional Enhancements

Planned availability: July 17, 2009

- **Parallel Access Volume (PAV)** feature of System Storage series DS8000 and DS6000
  - I/O performance improvements

- IBM **DS8000 Full Disk Encryption**
  - Highest security for business-critical data

- IBM Virtualization Engine TS7700 Release 1.5 including support for the **TS7720 virtual tape system**
  - Support includes disk-only virtual tape systems with up to 70 TB of disk cache

- Encryption Facility for z/VSE V1.2 supporting the **OpenPGP** format
  - Flexible and highly secure data exchange with business partners and peers

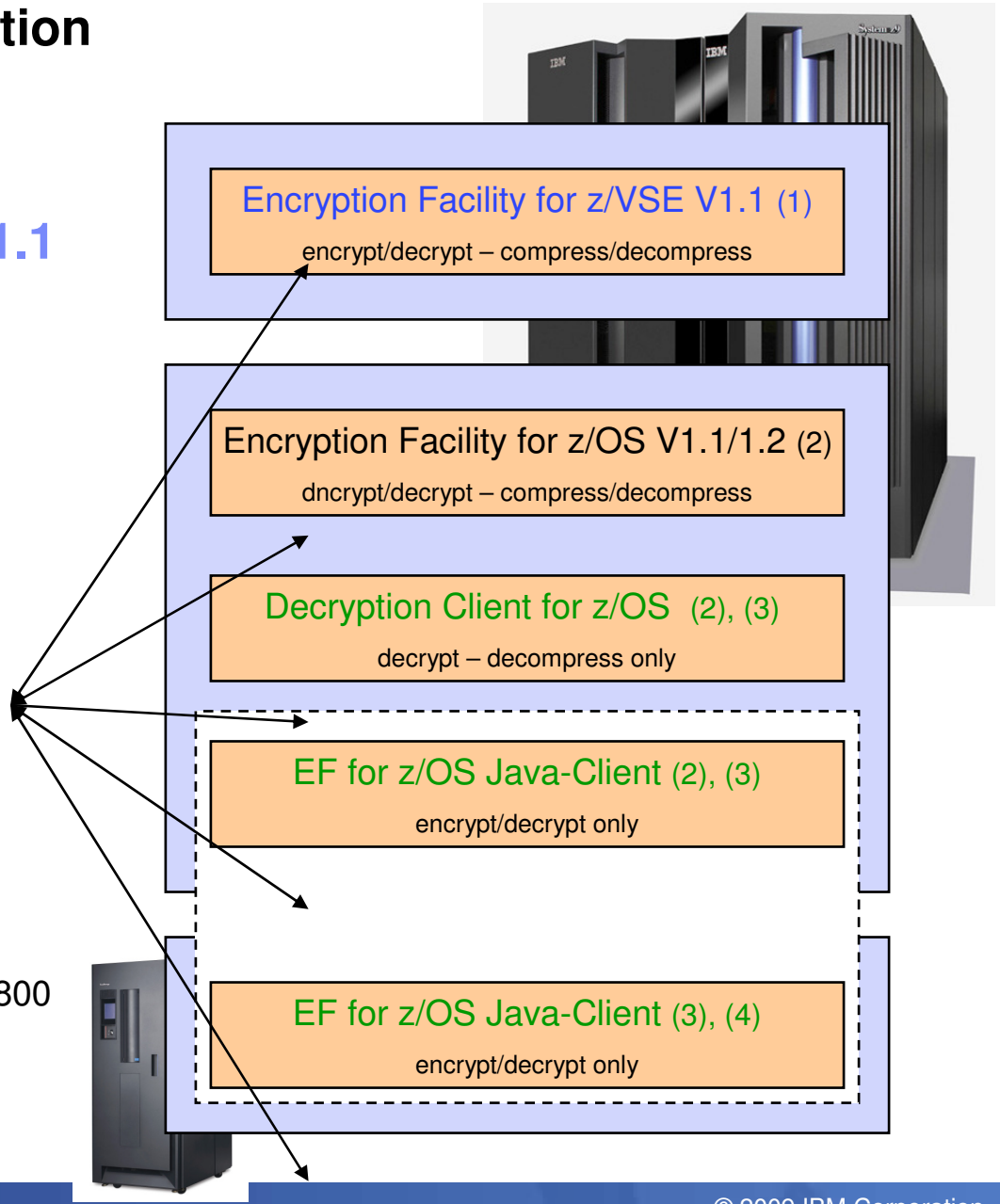
- IBM **Rational COBOL Runtime** for z/VSE V7.5
  - Execute modern **Enterprise Generation Language (EGL)** developed with **Rational Business Developer**

- IBM **WebSphere MQ** for z/VSE V3.0
  - Improved interoperability on distributed and mainframe platforms

VSAM data Encryption / Protection

z/VSE V4.2 tool:

Encryption Facility for z/VSE V1.1



Note 1: z10 EC, z9 EC, z9 BC, z990/890

Note 2: z10 EC, z9 EC, z9 BC, z990/890, z900/800

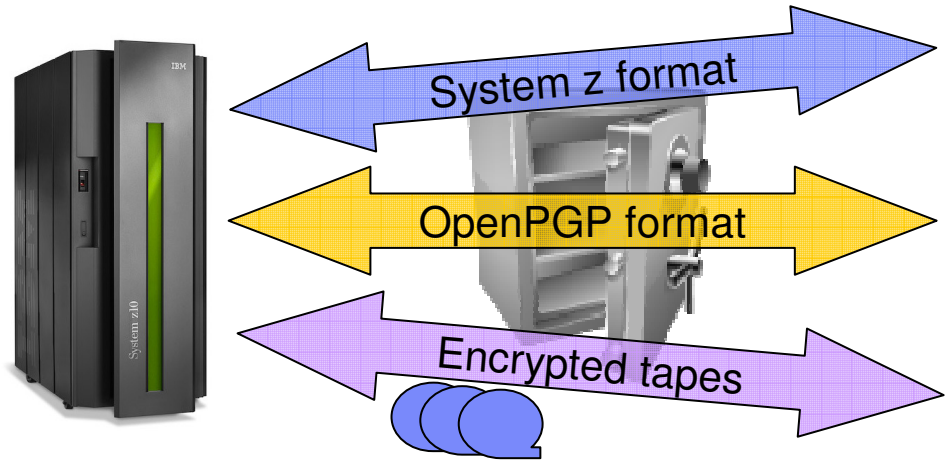
Note 3: No charge, downloadable from web

Note 4: Any Java-capable platform

VSAM data Encryption / Protection

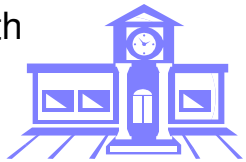
Encryption Facility for z/VSE V1.2 (EF)

- **OpenPGP**
  - Complies with selected OpenPGP standard (RFC 4880) requirements
  - Encryption of SAM files, VSE/VSAM files, VSE library members, tapes, or virtual tapes
- **Choice of two formats:**
  - System z format (introduced with EF for z/VSE V1.1) - compatible with EF for z/OS
  - OpenPGP - compatible with other products that are OpenPGP-compliant
- **EF is an optional priced feature for VSE Central Functions V8**
  - Requires z/VSE V4.1 or later
  - MWLC-eligible
- **Exploits hardware encryption technology: CPACF (CP Assist for Cryptographic Function) and Crypto Express2**



- Data exchange with IBM System z servers

- Data exchange with external business partners



- High volume backup/ archive

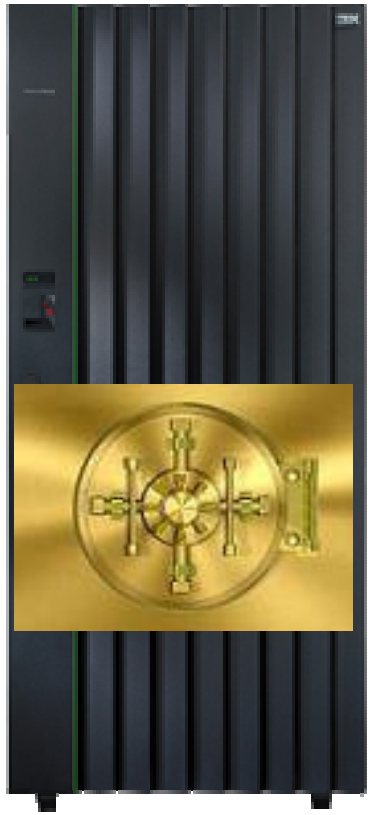
TS1120
TS1130

VSAM data Encryption / Protection

Full Disk Encryption on DS8000

- **Encrypted data on DS8000 series storage controller**
  - Capability to install encrypted 146 GB, 300 GB, and 450 GB 15,000 rpm Fibre Channel drives
  - Full Disk Encryption drive sets are optional to DS8000 series
  - Available only as plant order
  - Transparent to applications
  - Can be used by z/VSE V3.1 or later

- **Helps to mitigate the threat of**
  - **Theft**
  - **Data-mis-management**
  - **Loss of critical data**



VSAM data Encryption / Protection

IBM System Storage TS7700 Virtualization Engine Release 1.5

- **TS7720 is a new member of IBM's family of virtualization products**
  - Virtual tape system designed for use in a mainframe environment
  - Tape Volume Cache capacity up to 70 TB but without a physical tape library for back-end processing
- **TS1130 Model E06 and Model EU6 Tape Drive support**

The TS7700 Virtualization Engine tape solution is well suited for

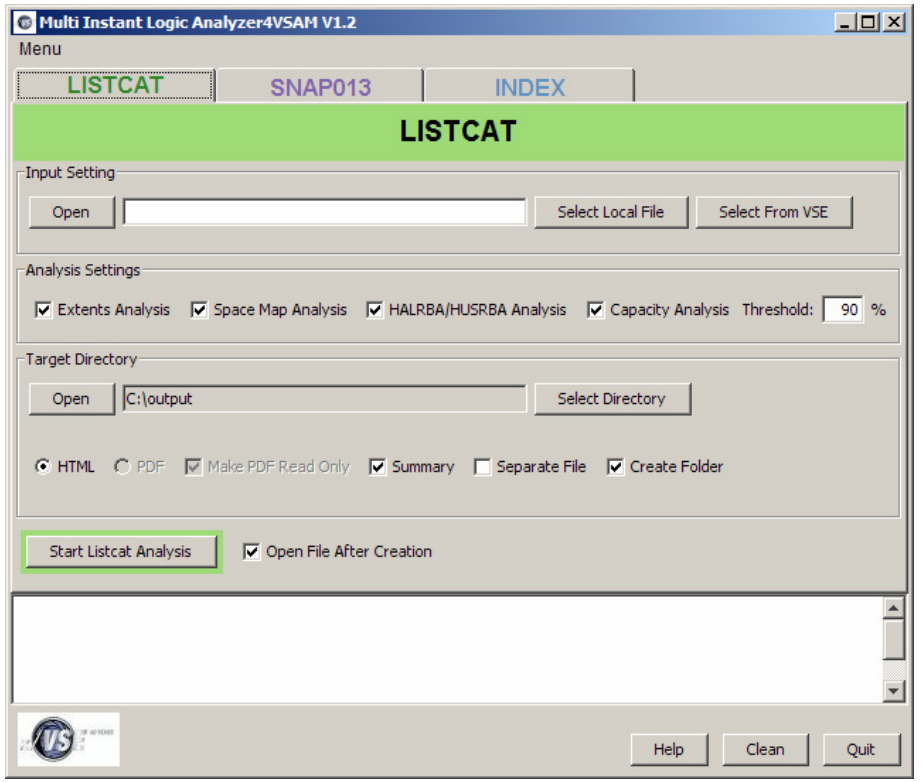
- **Disaster recovery**
- **Data consolidation**
- **Data protection**
- **Data sharing**

Agenda

Tools for VSAM data

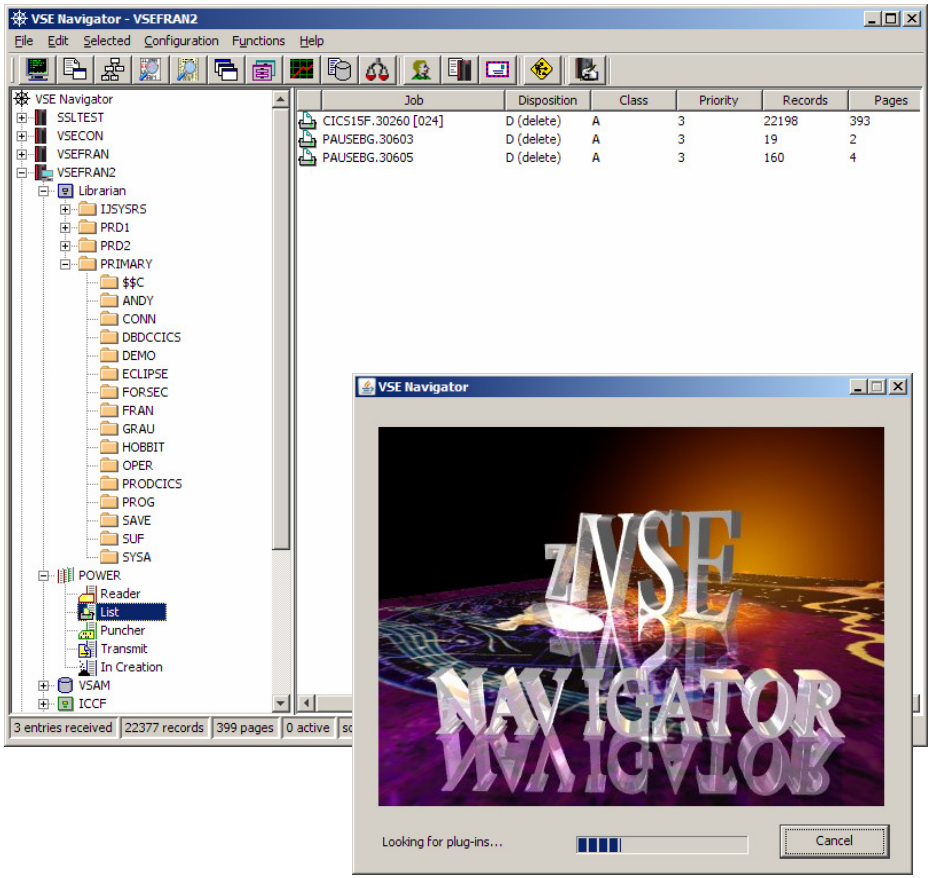
Multi Instant Logic Analyzer4VSAM

- **The Multi Instant Logic Analyzer4VSAM combines several VSAM analysis tools:**
  - **Extent analysis**
  - **Space map analysis**
  - **HALRBA/HUSRBA analysis**
  - **Capacity analysis**
  - **The SNAP013 analysis:**
    - **Extracts Snap013 trace tables from a given hex dump.**
  - **INDEX analysis tool:**
    - **Error analysis**
    - **Index component capacity analysis providing reorganization indicator**

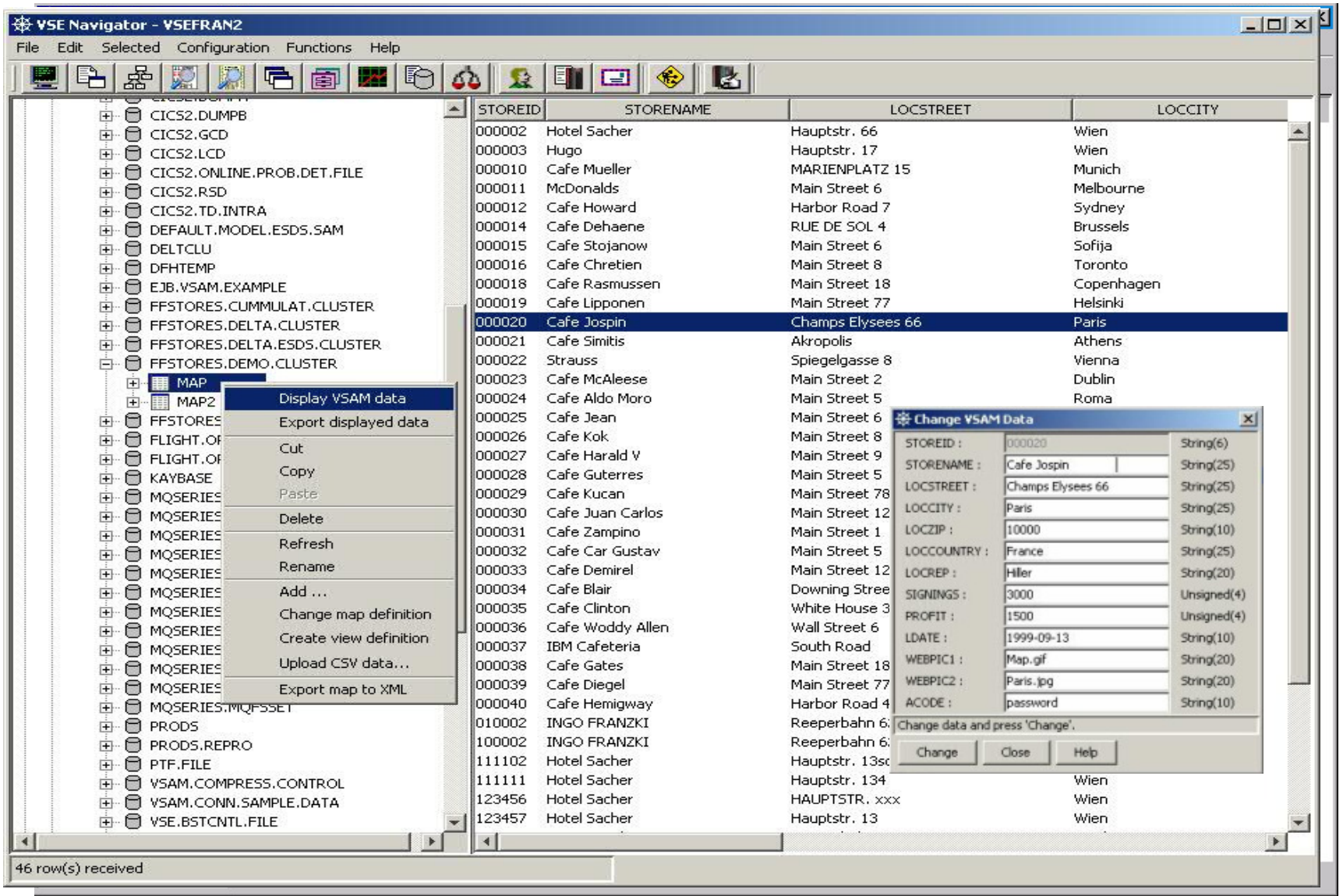


VSE Navigator

- Graphical user interface for z/VSE
  - Look and feel similar to Windows Explorer
- Based on functions provided by VSE Connector Client
- Browse VSE libraries, POWER queues, ICCF libraries, VSAM catalogs
- Copy members via Drag & Drop
- Display and edit members with your favourite editor
- Display and change VSAM data
- Provides graphical system management functions
  - System activity,
  - Retrace MSHP history file
  - ... and many more

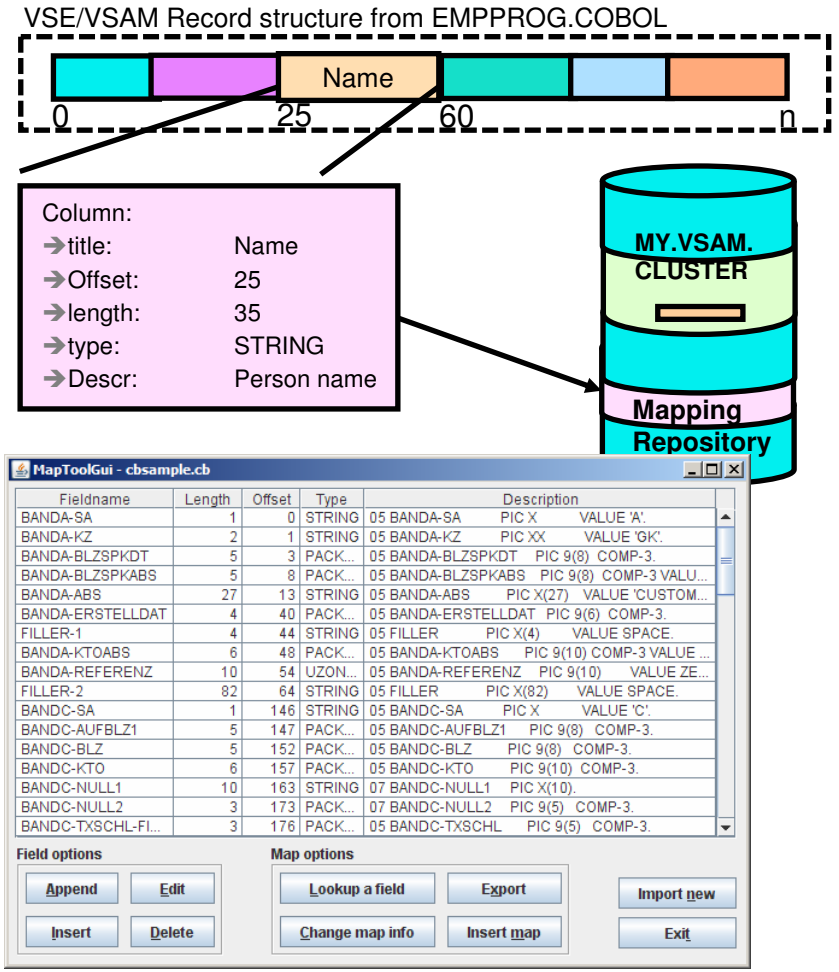


z/VSE Navigator: Windows-like VSE Interface

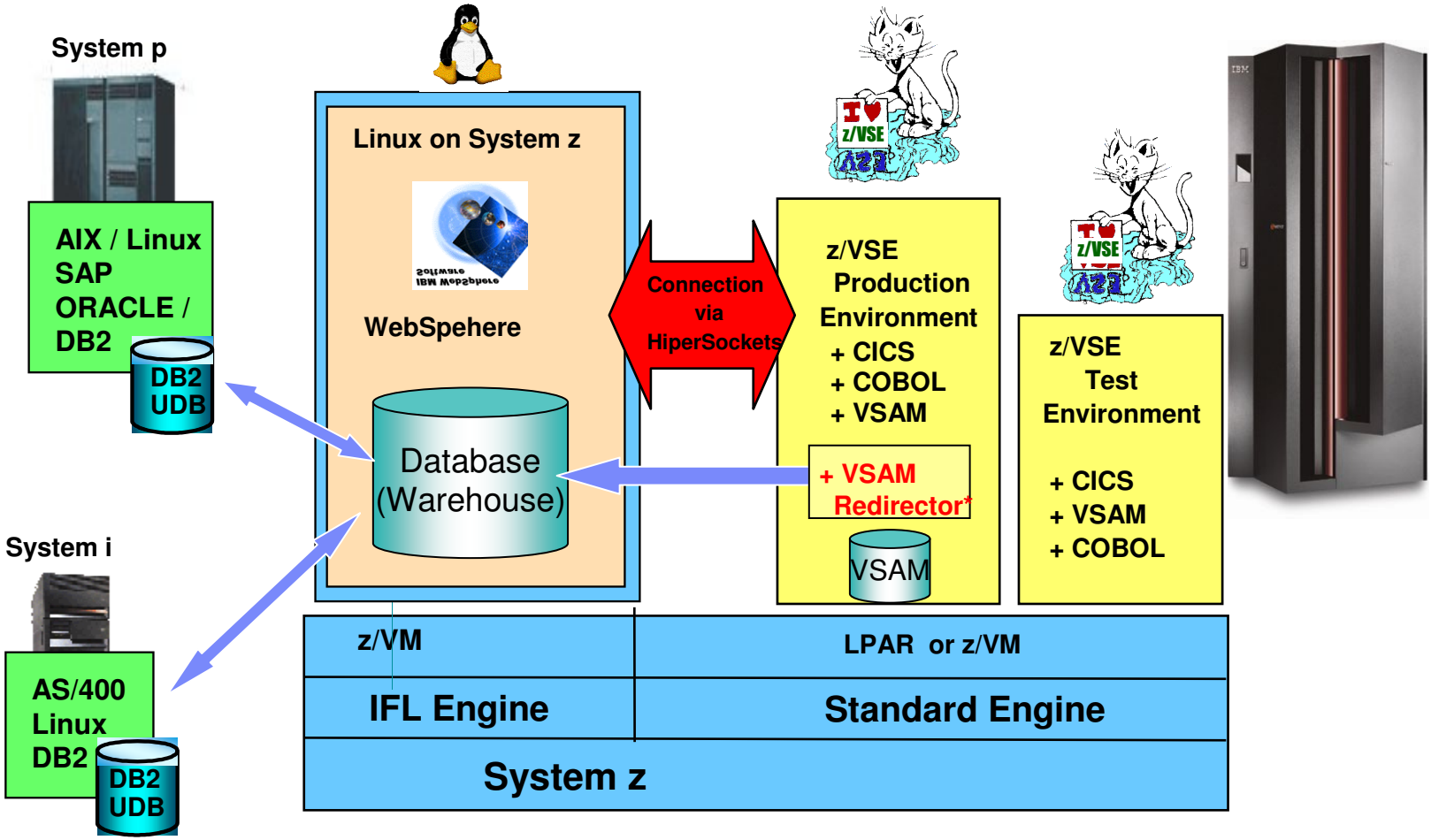


VSAM Maptool

- Assists you in creating a mapping of your VSAM files
  - Mapping is used by VSE Connector Client and VSAM Redirector
  - Mapping can also be created using the IDCAMS RECMAP command.
- Import Cobol ot PLI copybook to create the mapping from it
- Import (receive) a given map from a given z/VSE system
- Export a map to a VSE system (send it to z/VSE)
- Import a map from a XML file
- Export a map to a XML file
- Create a Java source file from a given map. The Java program can get all records from the related VSAM file via the given map.

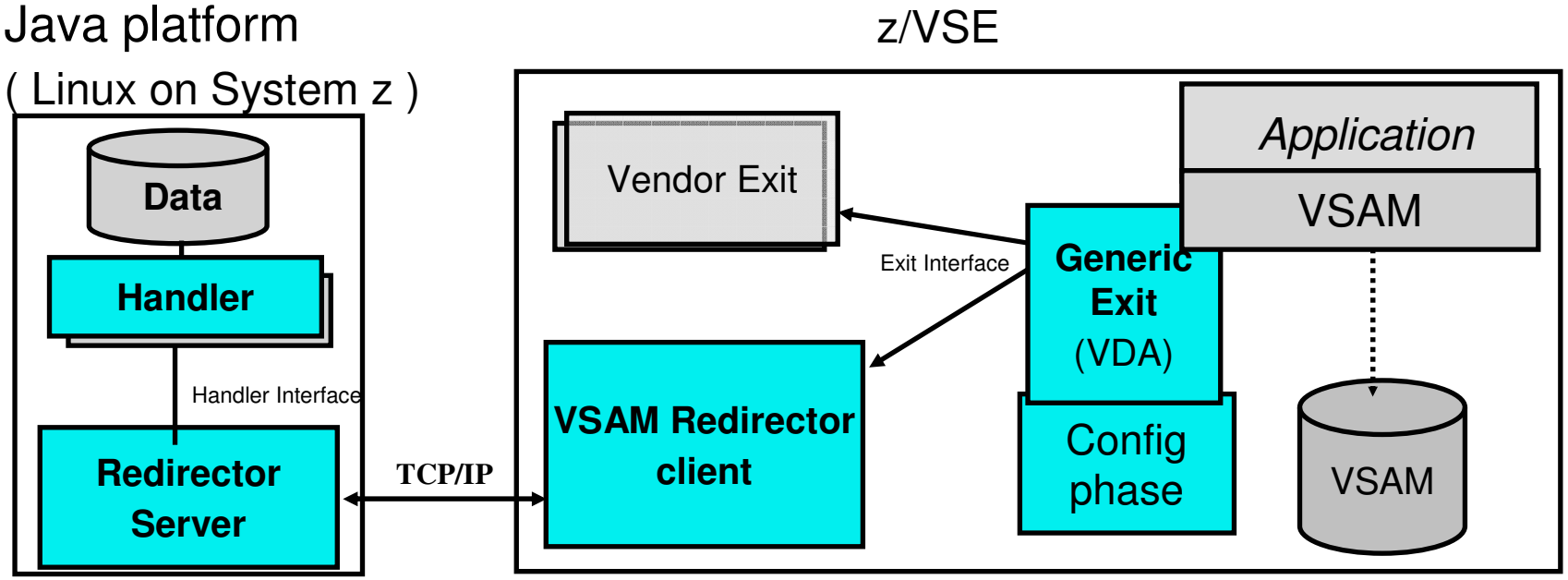


VSAM Programs with DB2 UDB on Linux on System z



(*) VSAM Redirector – Common data store solution – with DB2 on Linux on zSeries Solutions without changes to VSAM programs

VSE/VSAM Redirector - functional view

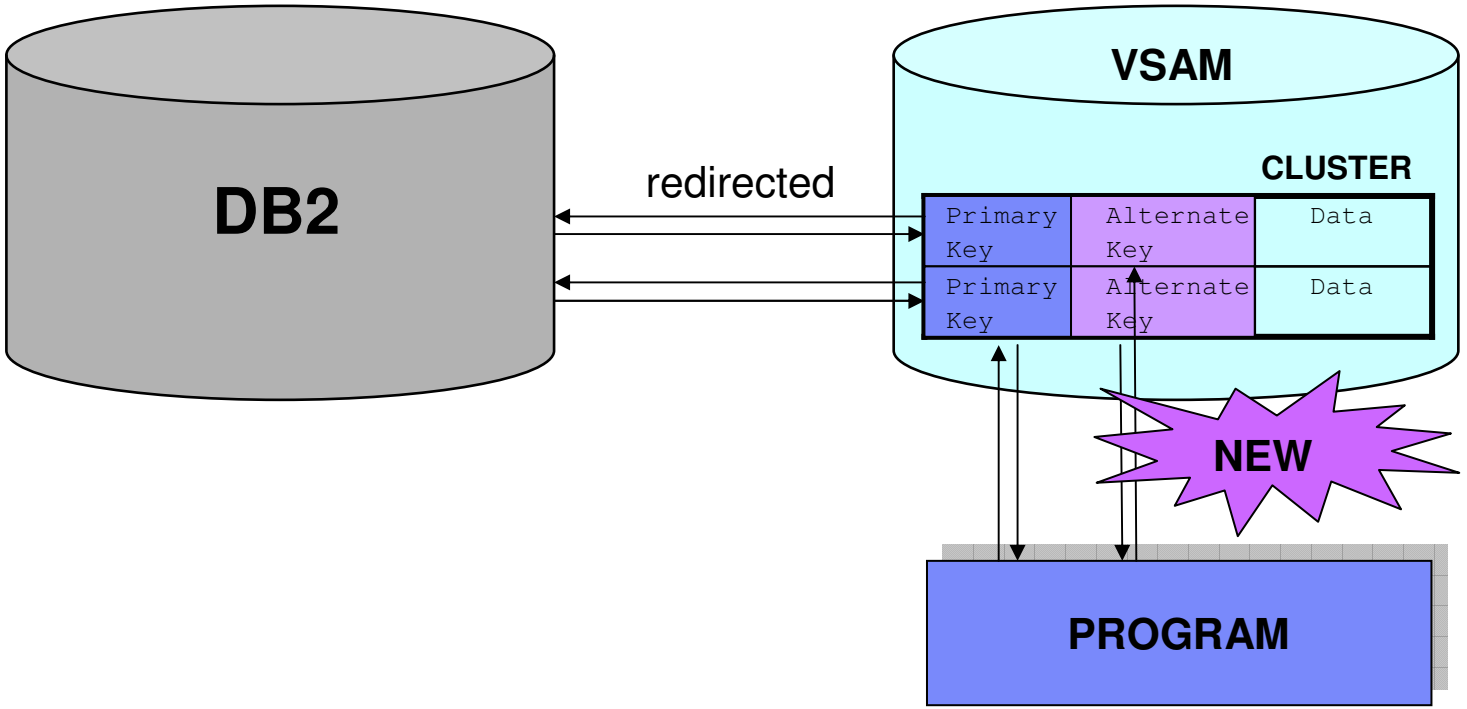


- **Redirector Components:**

- **Generic Exit is based on VSAM Data Access Exit (VDA)**
- **Config phase – contains the redirection properties**
- **Redirector client (SVA phase)**
- **Redirector server – manages the connections (Java component)**
- **Handler – takes care of data processing (Javav component)**

New VSAM Redirector AIX Support

- **VSE/VSAM redirector provides the capability to perform output requests to redirected KSDS cluster over the PATH using AIX.**



New VSAM Redirector AIX Support

To perform output requests to redirected KSDS cluster over the PATH using AIX, user should perform the following tasks:

1. **DEFINE and BUILD AIX right after loading cluster with DUMMY record**

2. **Indicate AIX key field in the MAP file for redirected cluster**

3. **Point AIX key field while creating DataBase Tables (Create DBTables program 'create.bat')**

Mapname: **TSTKSDS**
Catalog: **CATNAME**
Cluster: **CLUSNAME**
System: **VSEXXX**

Fieldname	Type	Offset	Length
prefix	STRING	0	4
aix1	STRING	**0**	**6**
key	STRING	4	8
aix2	STRING	9	3
suffix	STRING	12	28

New VSAM Redirector AIX Support

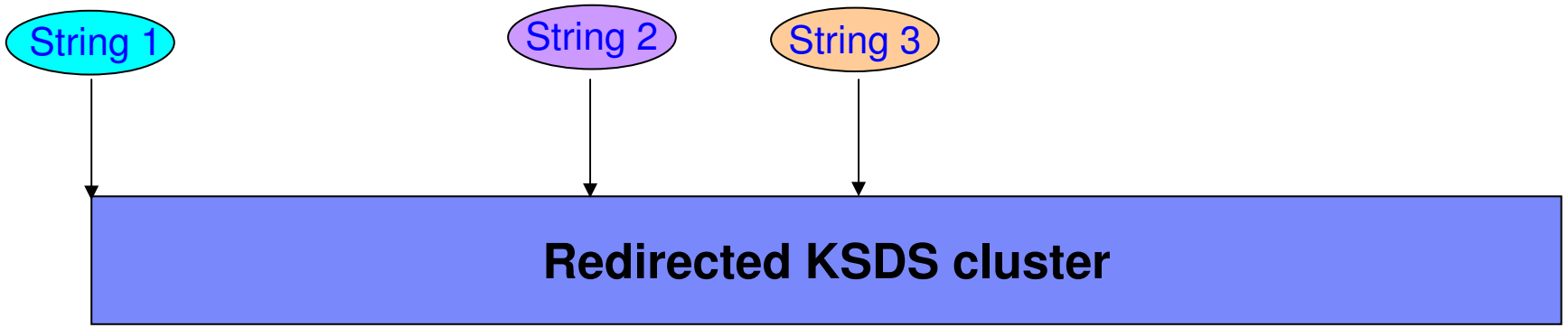
- **Support of concurrent access with multiple strings to Redirected KSDS clusters is provided (over base cluster or path).**

Advantage:

User is capable to keep separate positioning information for each string.

Notes:

- **User should specify the number of strings with STRNO parameter of ACB macro.**
- **MAX 255 strings.**
- **User can not use primary and AIX at the same time.**



Latest Service for z/VSE 4.2.1 VSAM (01C)

- **DY46995**/UD53455 I/O Error at End of 1st Extent on 2nd Volume of SAM ESDS
- **DY46983**/UD53455 BACKUP/RESTORE PAV Compatibility PTF
- **DY46972**/UD53434 SDUMP Issued Due to Wrong PLHXEO Index Offset Value
- **DY46996**/UD53431 Error Message was not Issued When Implicitly Defined SAM ESDS File Exceeds 4 GB Limit
- **DY47012**/UD53452 Implicit DEFINE Can Specify Incorrect Cluster Names
- **DY46954**/UD53402 IDCAMS SNAP Abended When More Than 10 Pairs of Volumes Specified
- **DY46946**/UD53386 IDCAMS SNAP Terminated with IDC32020I VOLUME SERIAL ..... DOES NOT EXIST
- **DY46937**/UD53376 OPEN ERROR RC=x'74' Instead of RC=x'76'
- **DY46985**/UD53419 File defined as DSN with Multiple AIXs gets Corrupted AIX with Large Amounts of data
- **DY46919**/UD53360 Repro of a Catalog Failed Due to Incorrect Index Level
- **DY46980**/UD53416 No Record Found Due to Incorrect Index Level
- **DY46979** ENDREQ Does Not Help Alleviate Record Not Found (RNF) Situation with LSR

- **z/VSE VSAM 4.1 included already in z/VSE 4.2**
- **DY46960**/UD53394 BLDINDEX for Redirected CLUSTER Hangs
- **DY46956**/UD53391 MSG0S24I MSG0S29I SDUMP Issued by VSE/VSAM Unnecessarily
- **DY46943**/UD53371 0C4 Pgm Check when Processing a Dummy USB Entry After AIX Failed open
- **DY46942**/UD53370 Performance Degradation with Certain Applications
- **DY46918**/UD53365 LOOP Between CICS/TS and VSE/VSAM attempting to retry Exclusive Control Error
- **DY46836** Program Check in IKQAIX attempting Journaling on Alternate Index
- **DY46913**/UD53354 RESTORE Hang After Secondary Allocation Failure by Specifying a High Number of Data Buffers
- **DY46859**/UD53356 SNAP13 for Redirector