VSE/VSAM
advanced functions

z/VM, VSE, and Linux on zSeries Tech Conference
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Agenda

VSAM advanced functions for a modern IT:

- Hardware Compression
- Extralarge KSDS files (XXL)
- Buffer hashing
- VSAM redirector
- VSAM 24X7 availability
- Snapshot/Flashcopy
- Virtual tape in VSAM Space
- VSAM access via JAVA and the VSE e-business connectors

Hardware Compression

Characteristics:

- to avoid 4GB limit size
- transparent for all applications
- using dynamic Compression Dictionary
  (build at load mode time - Sampling)
  - max 64 KB uncompressed data
  - each record is sampled separately and can be stored at disc compressed or uncompressed
- compression dictionary unique per VSAM cluster - CAR (Compression Attribute Record)
  - stored in CCDS (Compression Control Data Set)
  - Catalog defined in IUI will define CCDS (one per catalog)
- LISTCAT shows CAR and compression status
- IKQCPRED -Compression prediction tool

Extralarge KSDS

Characteristics:

- avoids 4 GB limitation
- file size up to Terra Bytes
  - 4.2 billions Control intervals = 140 TB
  - depends on physical disk architecture
    - 3390-9 approx 1.2 TB for a VSAM data set
- for KSDS with keyed access only (no RBA and CNV access)
- transparent for all applications
- easy switch from traditional to XXL KSDS using redefine of KSDS and REPRO for data
- LISTCAT shows XXL KSDS type

Buffer Hashing

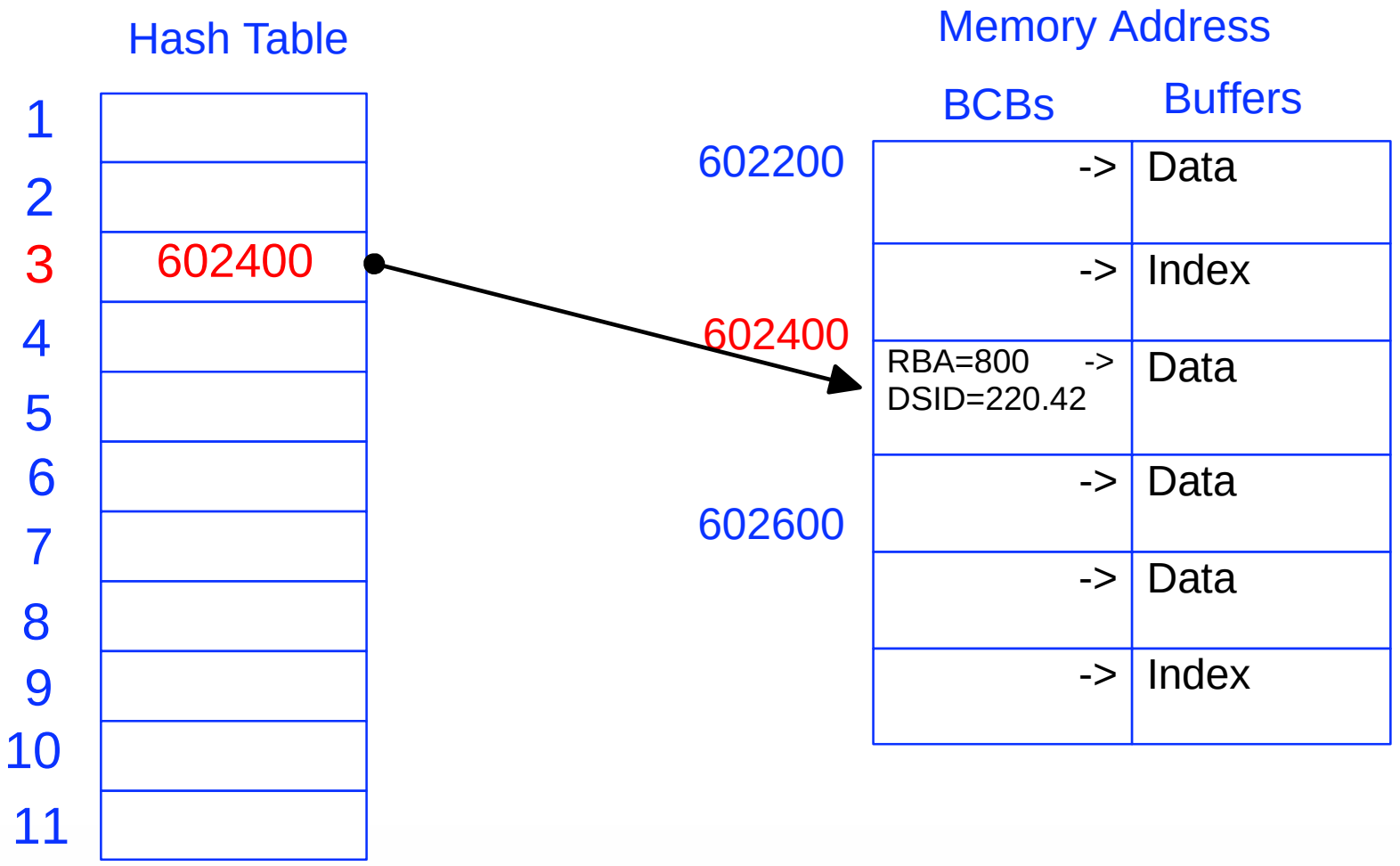
Characteristics:

- new technique, to replace the current buffer management for applications using the *LSR (Local Shared Resource)* option.
- No more sequential search through the buffer pool.
- allocated/deleted by VSAM with the VSAM LSR pool allocation
- The dimension of the hash table is calculated from the number of buffers.
- The new technique means:

direct buffer access using a hashing algorithm.

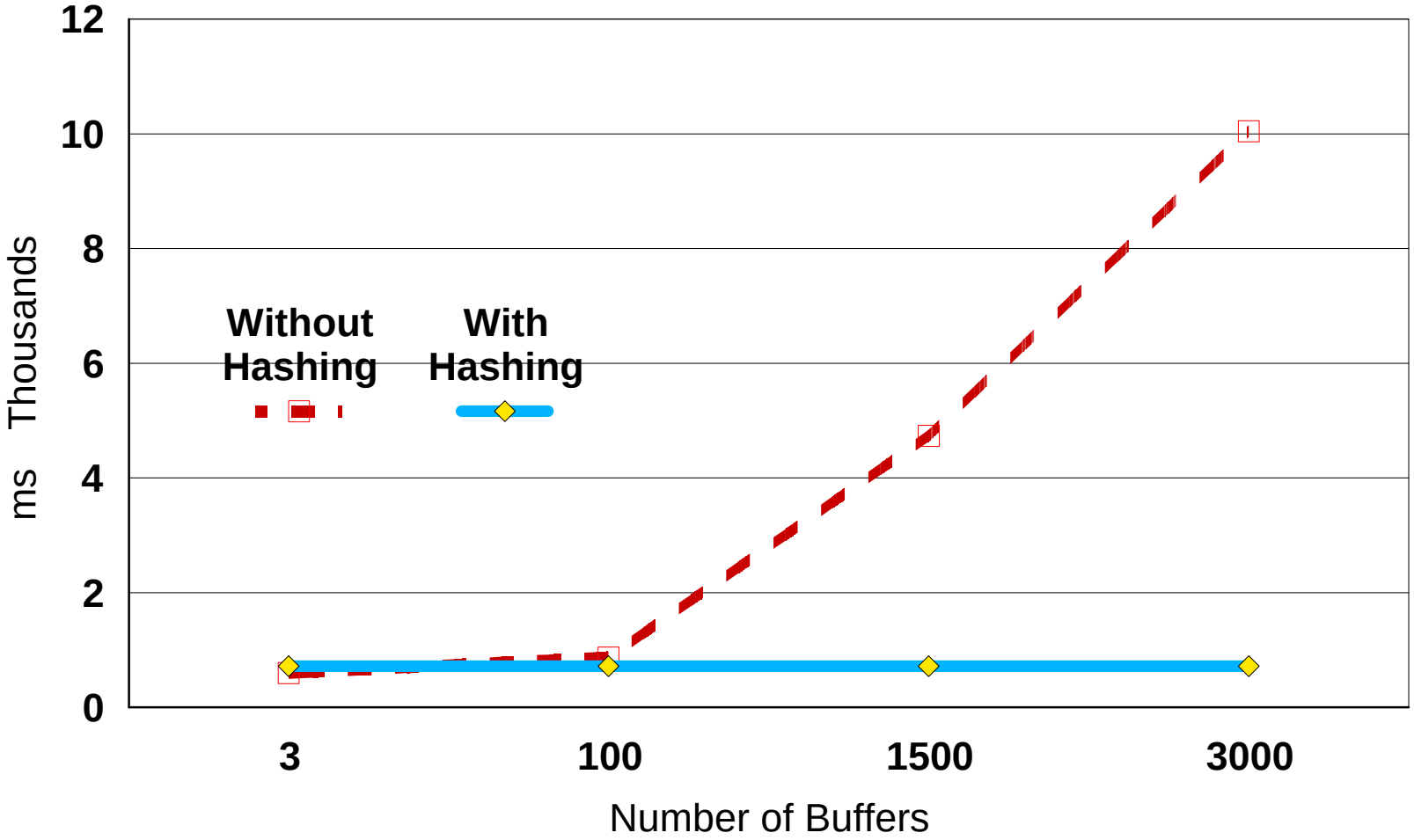
Example

Third entry in the hash table points to the requested Buffer Control Block



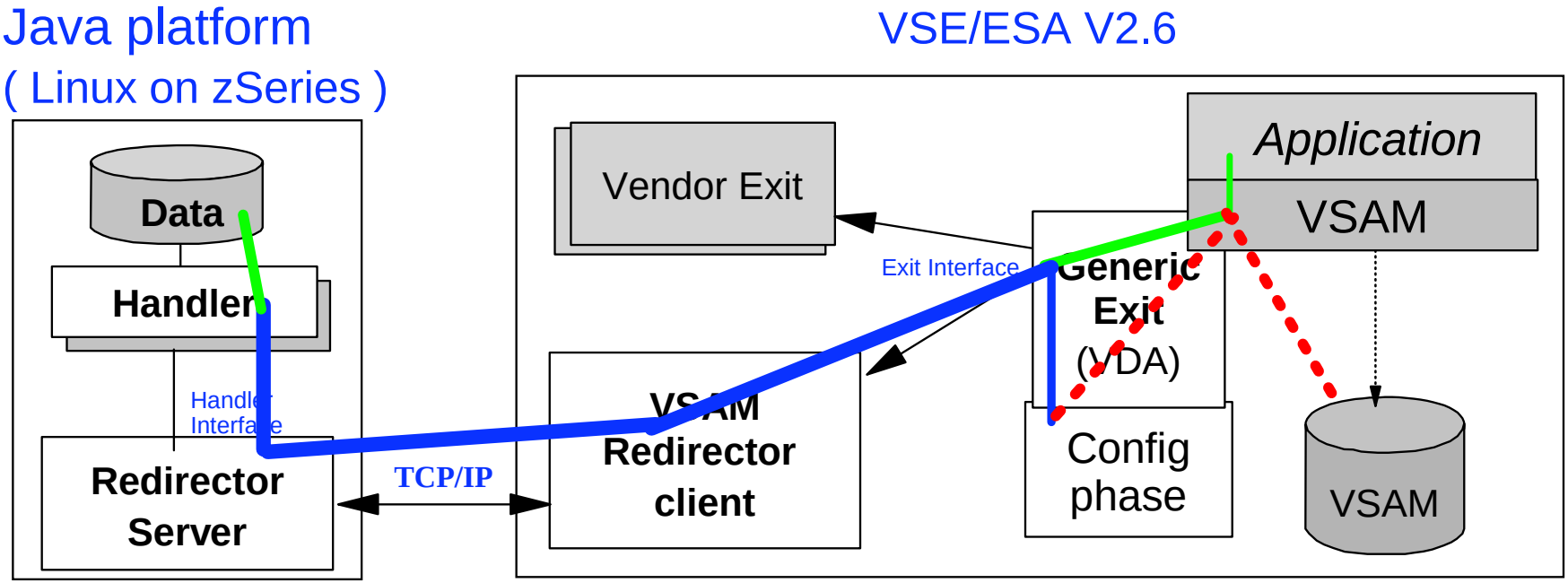
Simplified Performance Measurement

Runtime when Executing 10,000 Reads *



* Data in Memory

VSE/VSAM Redirector - functional view



- Redirector Components:

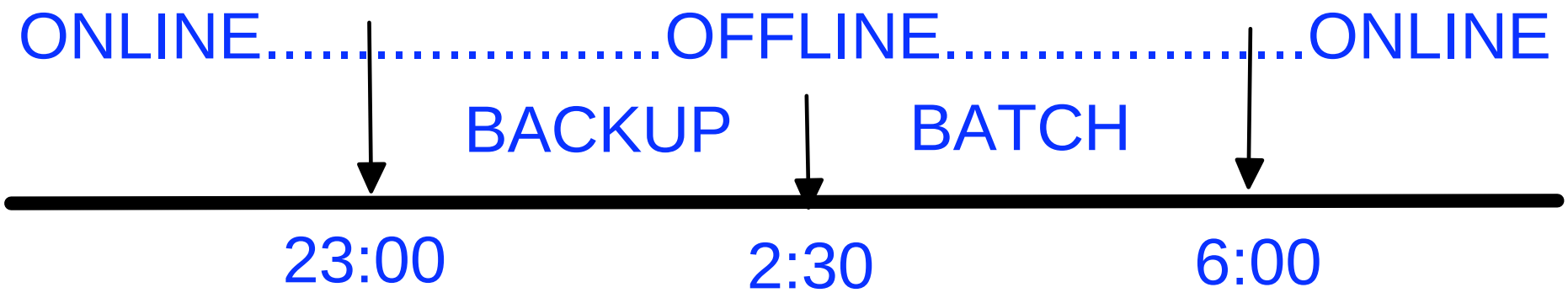
- Generic Exit is based on VSAM Data Access Exit (VDA)
- Config phase - redirection properties
- Redirector client
- Redirector server
- Handler

Customer - Benefits

- **VSE access to** various remote file systems without changing the programs
  - OWNER = REDIRECTOR
- **migration** of VSAM data to another file system
  - OWNER = REDIRECTOR and REPRO to redirected cluster
- **synchronization** of VSAM data with data on another platform (independent of file organizations)
  - OWNER = VSAM
- **transparent** for CICS or Batch

VSAM 24 X 7

- ✘ inhibitors of online processing time
  - backup-window
  - batch-window



✓ Eliminate the Backup-window

VSAM backup using
FlashCopy (ESS)
SnapShot (RVA)

What is "FlashCopy" and "SnapShot"?

- **The DASD architectures** *RAMAC Virtual Array Storage (RVA)* **and** *Shark (ESS)* **allow copy of DASD's with the utilities** *"SnapShot"* **respectively** *"FlashCopy"* **.**
- **The COPY process takes few seconds instead of hours !**
- **From OP system view the copy is a real copy of data.**
- **From the DASD controller view it is a virtual copy of data.**

VSAM-Restrictions in a VSE system

- Duplicate VOLIDs (DASD names) not allowed on a VSE System !

- Duplicate VSAM Catalog names not allowed on a VSE System !

Difficulties in using FlashCopy or SnapShot for VSAM Datasets

FlashCopy / SnapShot for VSAM Datasets would mean: .....

►.... duplicate VOLID'S and/or duplicate VSAM Catalog names on the system ....

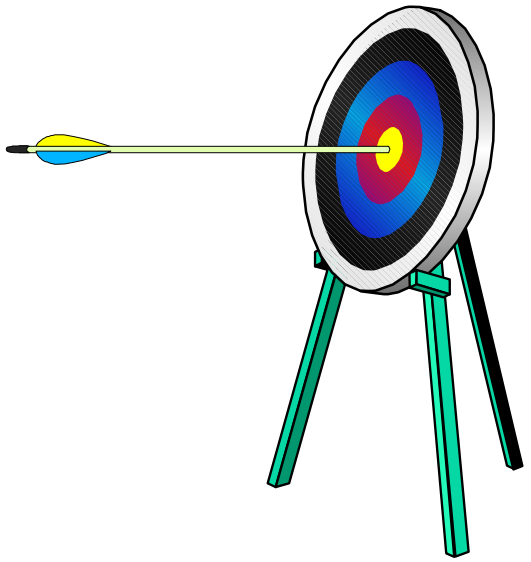
➡ **unpredictable Results!**

Difficulties in using FlashCopy or SnapShot for VSAM Datasets

- ..... or many changes required in the copied VSAM catalog regarding new VOLID'S (i.e. volume list for each dataset) and Catalog names.

- performance
- increased error risk
- possible lose of data

Support for FlashCopy / SnapShot for VSAM Datasets



1. IDCAMS SNAP Utility

2. IDCAMS "Synonym" BACKUP

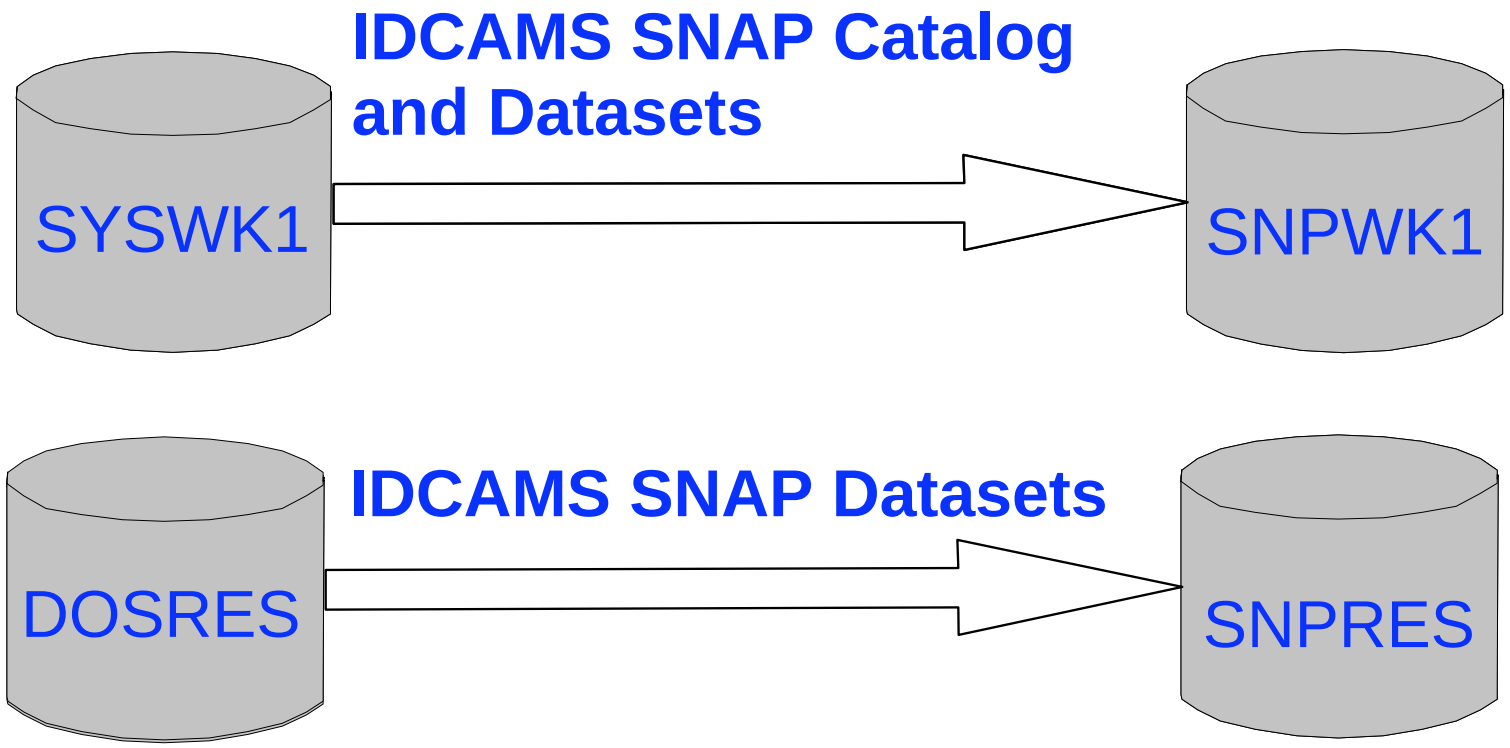
1. IDCAMS SNAP Utility Program

- IDCAMS SNAP makes copies of entire DASD volumes (VSAM catalog- and VSAM data- volumes).

- IDCAMS SNAP changes the names of the copied volumes (VOLID).

- After IDCAMS SNAP all copied volumes are **ONLINE** available for backup!

Step 1: IDCAMS SNAP - copy all DASD's and give new Volid's



After Step 1, the DASD's and catalogs copied are identical, but cannot be used.

Few seconds later:

- IDCAMS SNAP finished.
- Online applications can be restarted (CICS).
- The catalog and the datasets on the snaped (copied) volumes are identical with the original volumes

(only VOLID's are different),

➡ but the copied datasets can not be used, because .....

VSAM-Restrictions in a VSE system

- Duplicate VOLIDs (DASD names) not allowed on a VSE System !
  - SNAP changed the VOLID'S

- Duplicate VSAM Catalog names not allowed on a VSE System !

Step 2: IMPORT CONNECT a new catalog name

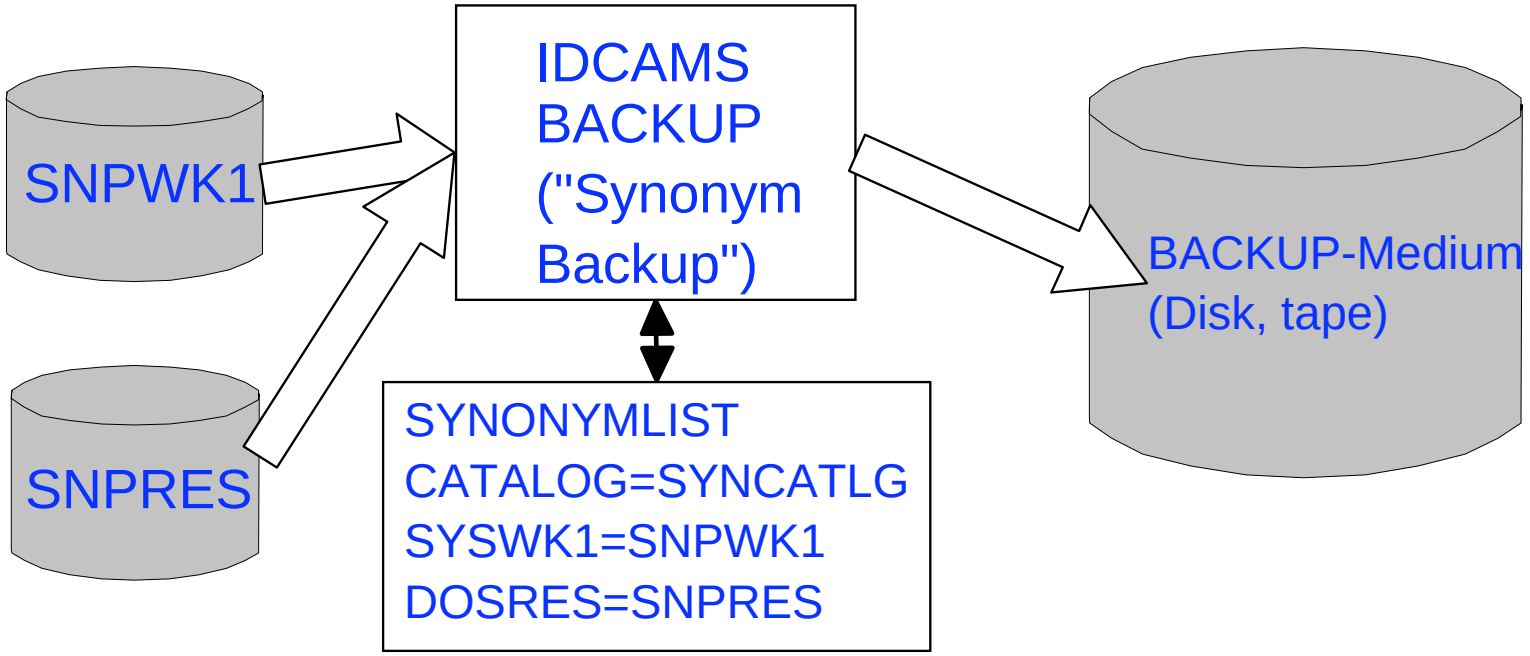
The catalog on the snaped volume needs a new name.

➡ **we simulate a new catalog name with IDCAMS IMPORT CONNECT ,**

➡ **a *synonym catalog name*.**

Step 3: Backup VSAM datasets from snapped volumes (the VSE system is online)

only "Synonym Backup" can read VSAM data from SNPWK1 and SNPRES !



After Step3: a "normal Backup medium" was created

What is "Synonym Backup"? (1)

- a synonym list is used, to redirect VSAM to the snaped volumes (with the synonym catalog name) and execute the BACKUP from the copied Datasets.

- VSAM controls the "synonym connection" to the snaped (renamed) catalog and datasets.

- Only "Synonym Backup" can read the VSAM datasets from the copied volumes.

What is "Synonym Backup"? (2)

- With the exception of using the new synonym list, the backup process is unchanged.
- That means, all functions of IDCAMS BACKUP can be used
- IDCAMS BACKUP produces a normal Backup-Medium for IDCAMS RESTORE.

Backup with synonym list

```
EXEC IDCAMS
 BACKUP  ( ..................)    -
  SYNONYMLIST                      -
   (SOURCEVOLUMES(SYSWK1,DOSRES)  -
    TARGETVOLUMES(SNPWK1,SNPRES)  -
                                  -
    CATALOG(VSESP.USER.CATALOG)   -
    SYNCAT(VSESP.SNAP.CATALOG))
```

Sample job: SNAP AND VSAM BACKUP

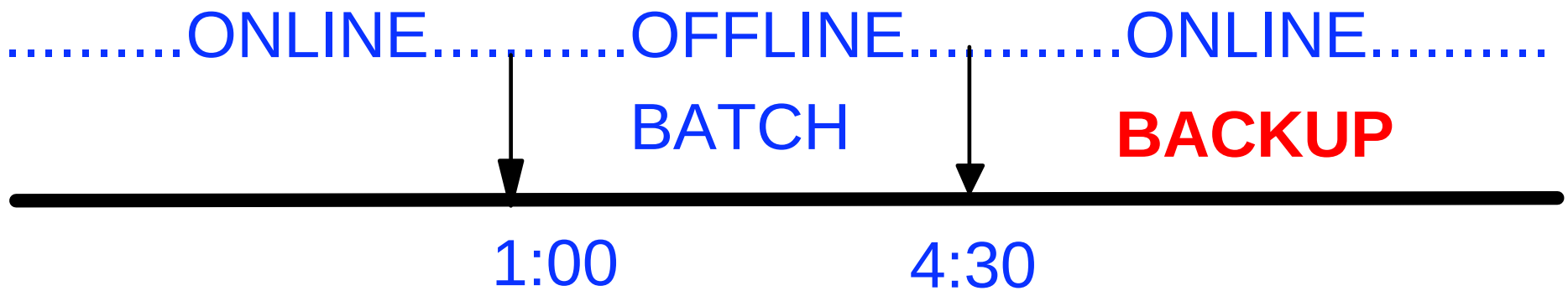
```
// JOB SNAP AND BACKUP FROM SNAPPED VOLUMES
// ASSGN SYS005,180
// DLBL IJSYSUC,'VSESP.SNAP.CATALOG',,VSAM
// EXEC IDCAMS,SIZE=AUTO
 /* STEP 1: DO THE SNAPSHOT */                          -
  SNAP                                                  -
    SOURCEVOLUMES(SYSWK1,DOSRES)                        -
    TARGETVOLUMES(SNPWK1,SNPRES)
 /* AFTER STEP 1 THE ONLINE SYSTEM MAY BE STARTED */
 /* STEP 2: SYNONYM NAME FOR THE SNAPPED CATALOG  */-
  IMPORT CONNECT OBJECTS((VSESP.SNAP.CATALOG            -
    VOLUMES(SNPWK1) DEVT(3390)))                       -
    CATALOG(VSAM.MASTER.CATALOG)
 /* STEP 3: BACKUP FROM SNAPPED VOLUMES */             -
  BACKUP (*)                                            -
     SYNONYMLIST(                                       -
    SOURCEVOLUMES(SYSWK1,DOSRES)                       -
    TARGETVOLUMES(SNPWK1,SNPRES)                      -
    CATALOG(VSESP.USER.CATALOG)                        -
    SYNONYMCATALOG(VSESP.SNAP.CATALOG) )
/*
/&
```

Conclusion FlashCopy/Snapshot

Steps for online VSAM Backup using FlashCopy/Snapshot

- **Close online applications (shutdown CICS)**
- **FlashCopy the DASD's (datasets/databases, catalogs**
  - eventually run batch job streams
- **restart CICS and the online applications**
- **Backup your VSAM data during Production**

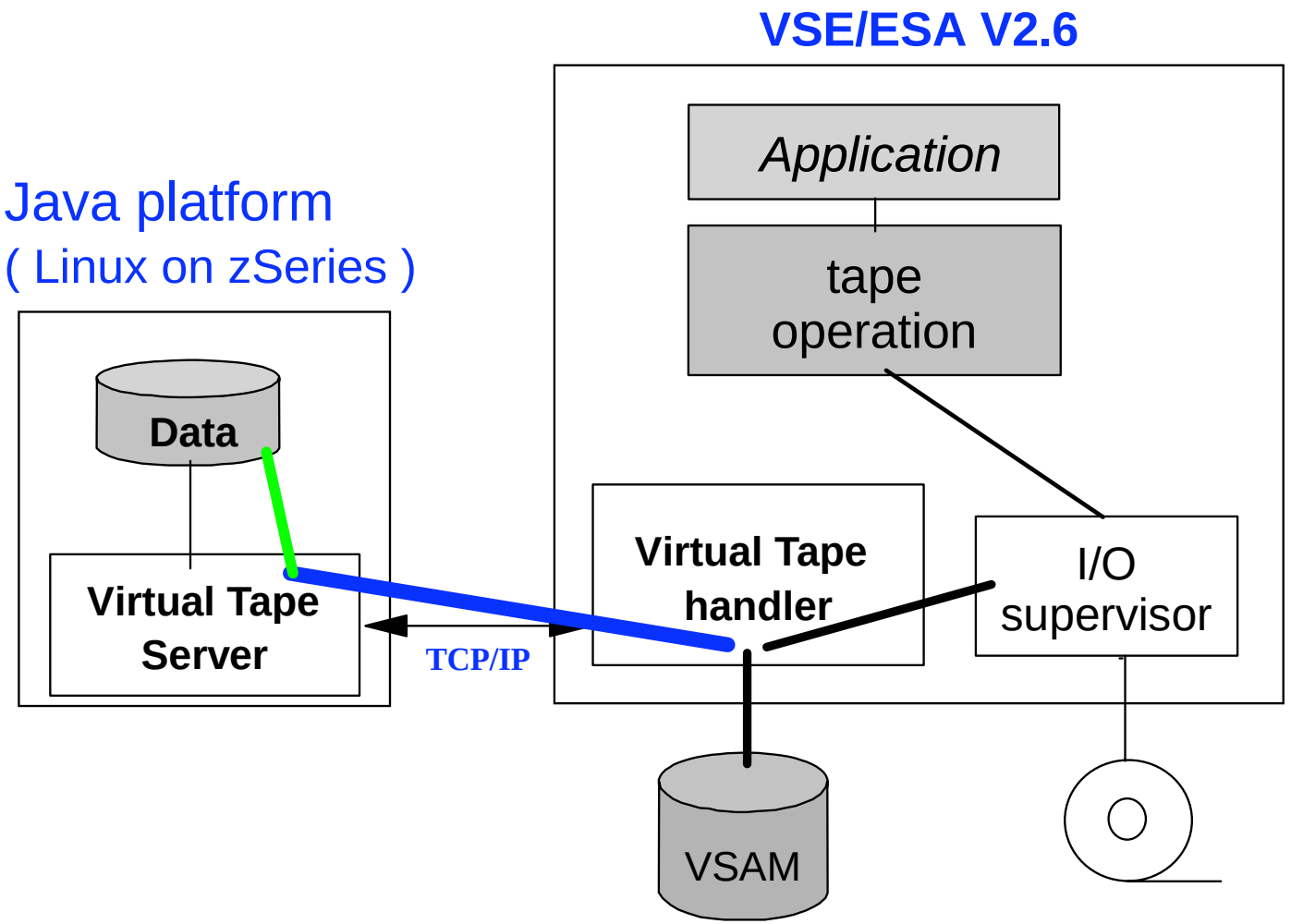
VSAM Backup and Online system in paralel with VSE/ESA 2.5 and 2.6



✓ Integrate VSE Backups in standard processes

Use of VSE/ESA 2.6 Virtual tape support to integrate VSE Backup media into general, automatic Backup processes

Virtual Tape support



- simulates a real tape (tape operation supported)
- transparent for applications

Virtual tape in VSAM Space

Characteristics

- VSE Virtual Tape support is part of VSE/ESA 2.6
- NOT: Virtual Tape Server (VTS) Hardware
- Emulates a tape with multiple tape files
- Uses a tape image file instead of a physical tape
- Tape image file can reside in
  - VSAM ESDS
  - Remote file (e.g. on a workstation)
- Tape Image file has AWSTAPE format

known from P/390, R/390, Flex-ES

- A tape CUU can be switched to virtual with:

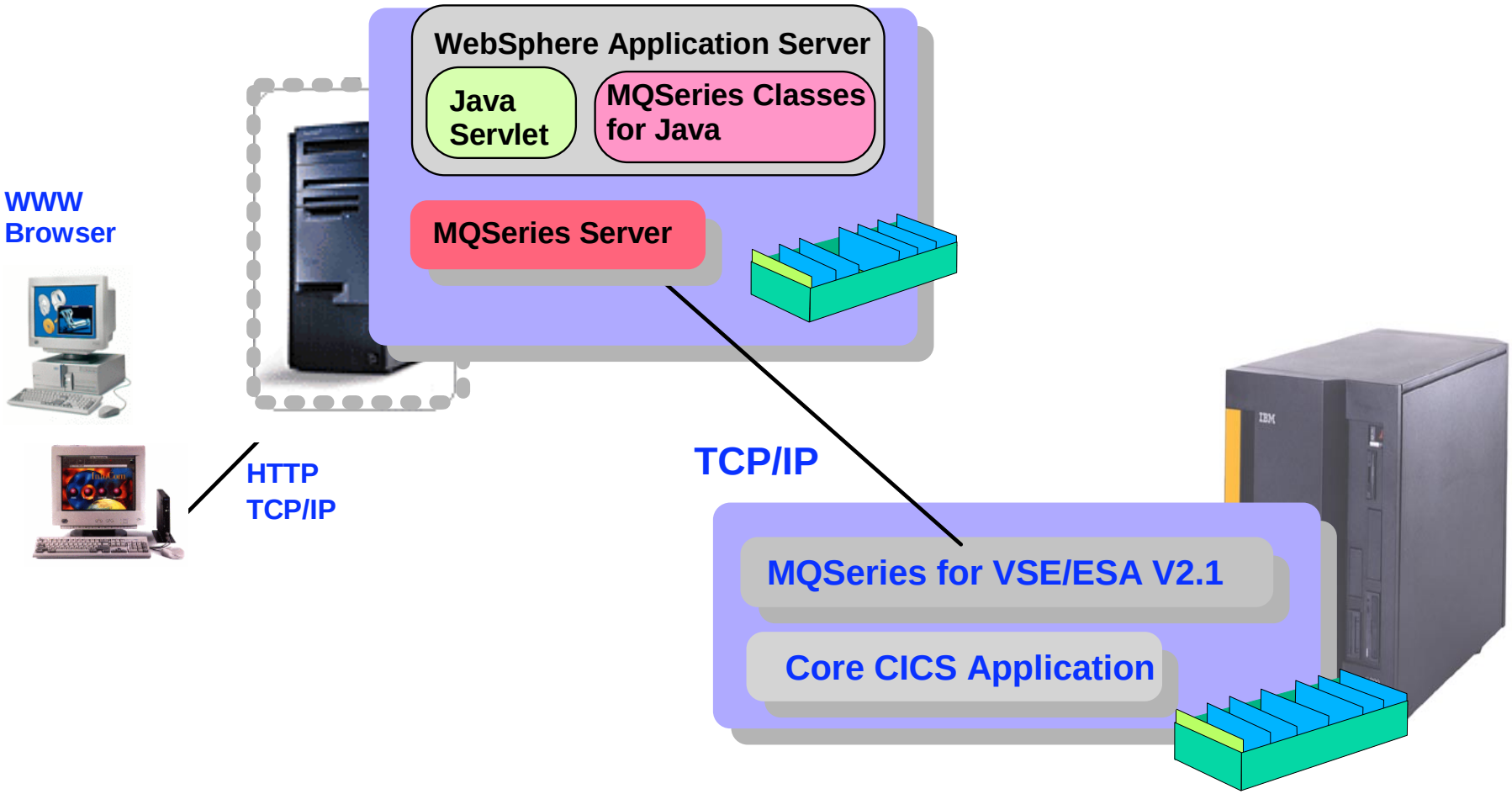
  VTAPE START,UNIT=cuu ...

  VTAPE STOP,UNIT=cuu

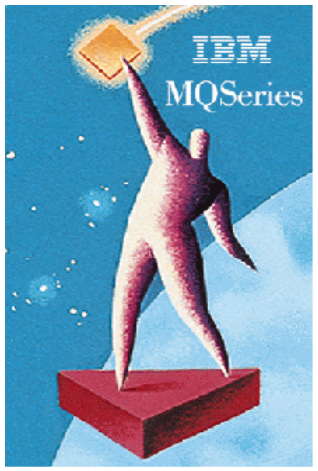
✓ Batch-window solutions

Use of MQ Series and
the new e-business connectors
to avoid Production downtime

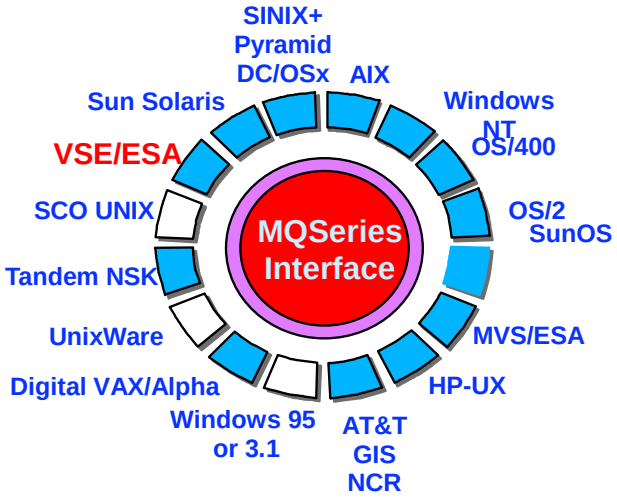
Asynchroneous work with MQSeries



MQSeries and MQSeries Clients



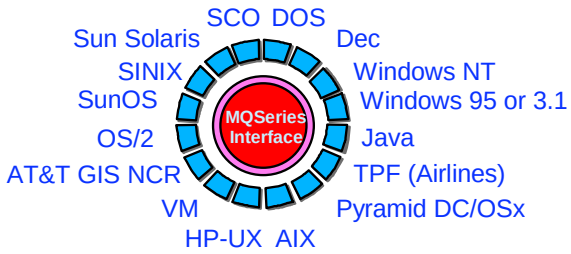
Servers

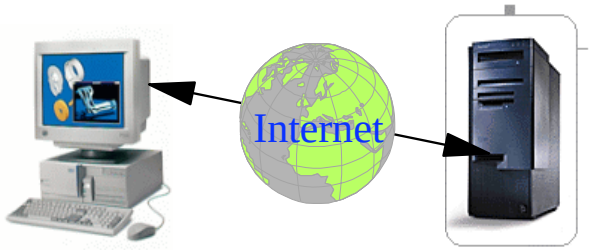


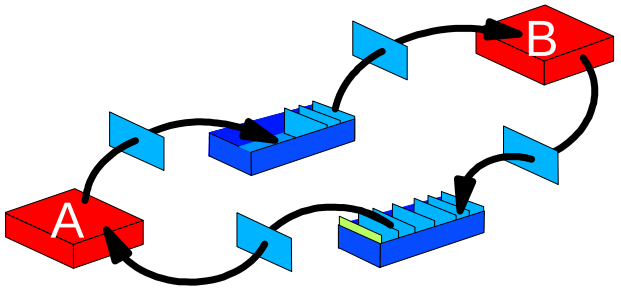
Server with Client support

MQI Channel

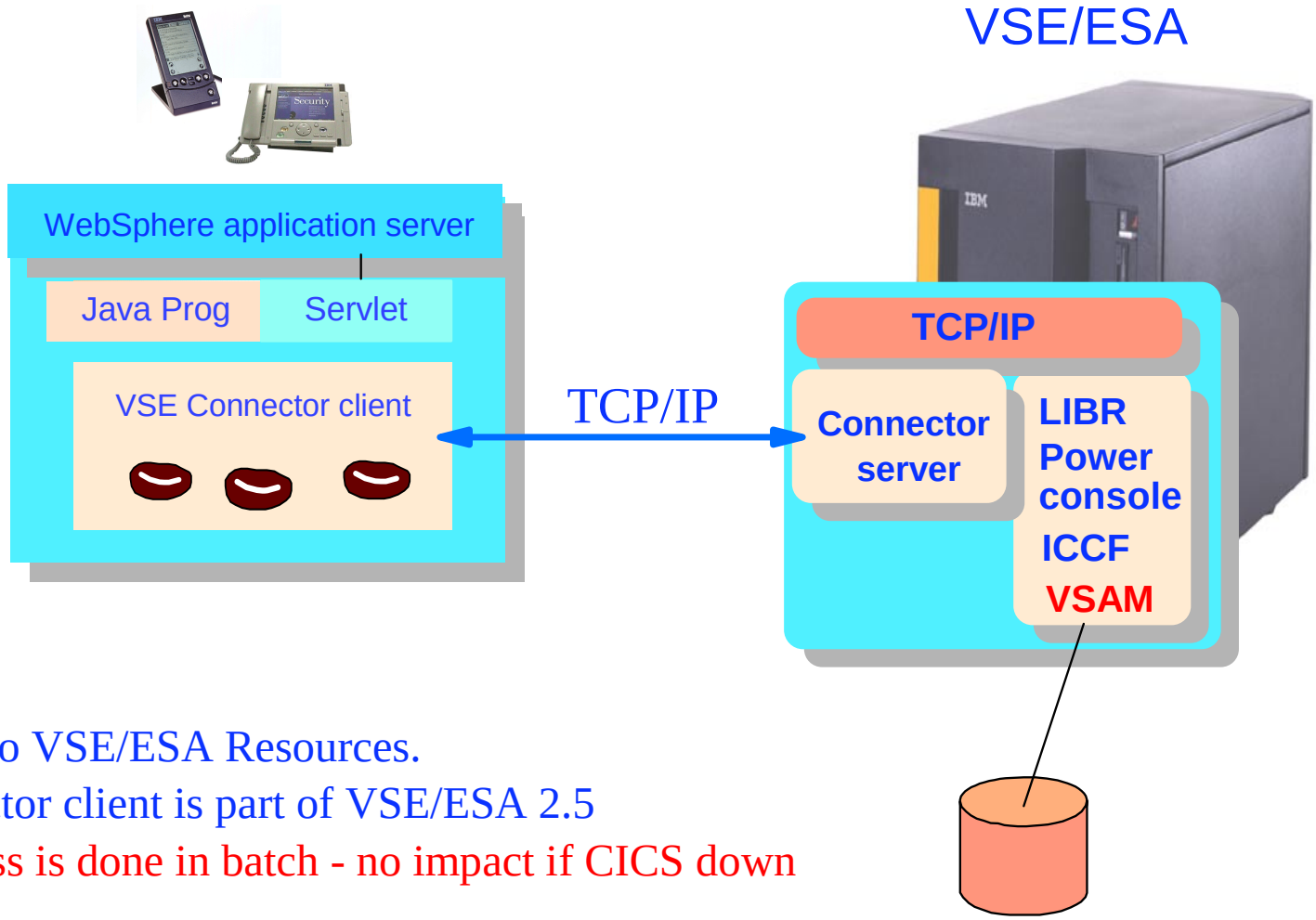
Clients







Java-based Connector

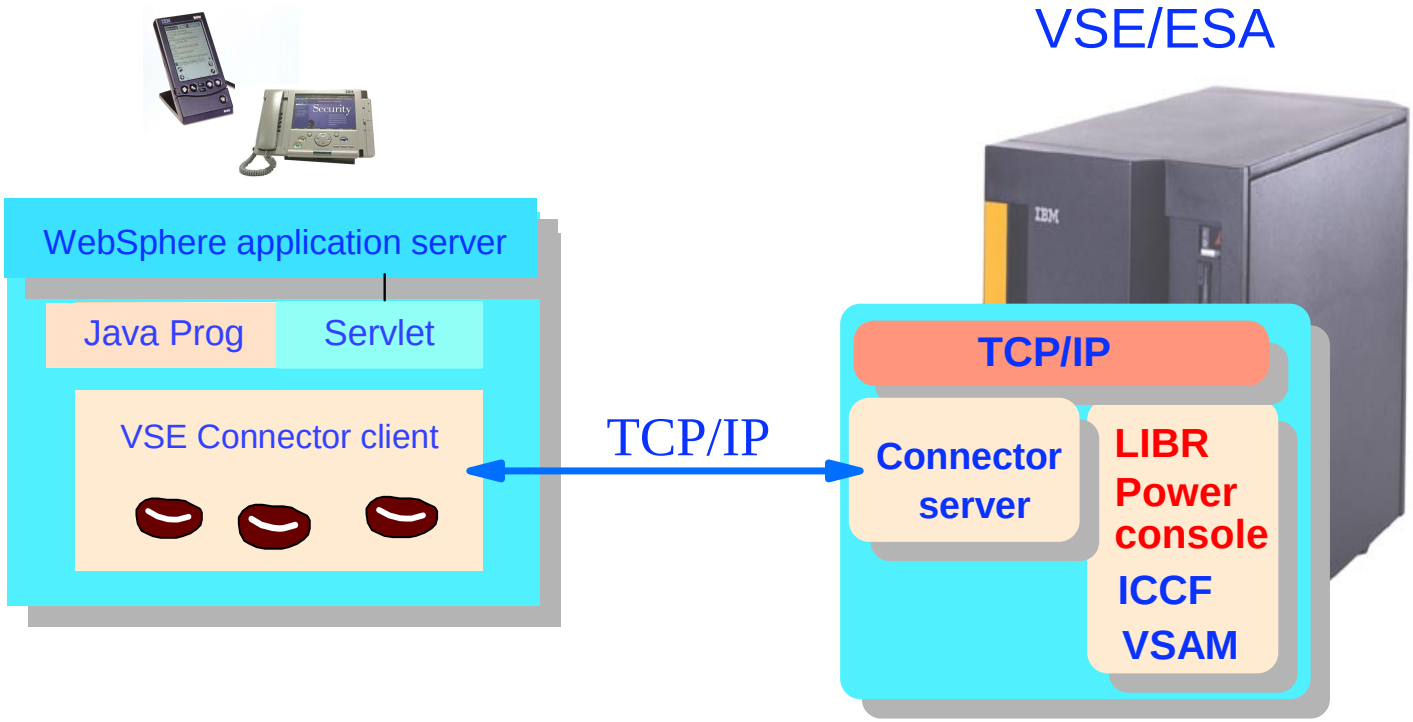


- Java access to VSE/ESA Resources.
- VSE Connector client is part of VSE/ESA 2.5
- VSAM access is done in batch - no impact if CICS down

✓ Automation and remote control

Use the new e-business connectors for automation and remote system management

Java-based Connector



- Java access to VSE/ESA Resources.
- VSE Connector client is part of VSE/ESA 2.5

Java-based Console support tool for VSE/ESA (JConVSE)

JConVSE Overview

The application reacts on VSE messages and additionally, has a time controlled component.

This solution helps you, automate the VSE environment and integrate the VSE system with other platforms such as Linux for zSeries.

JConVSE Benefits

- Reduce your operating time
- Eliminates complex client software
- Easy to use
- Platform independent
- Protects the investment in mainframe-based systems

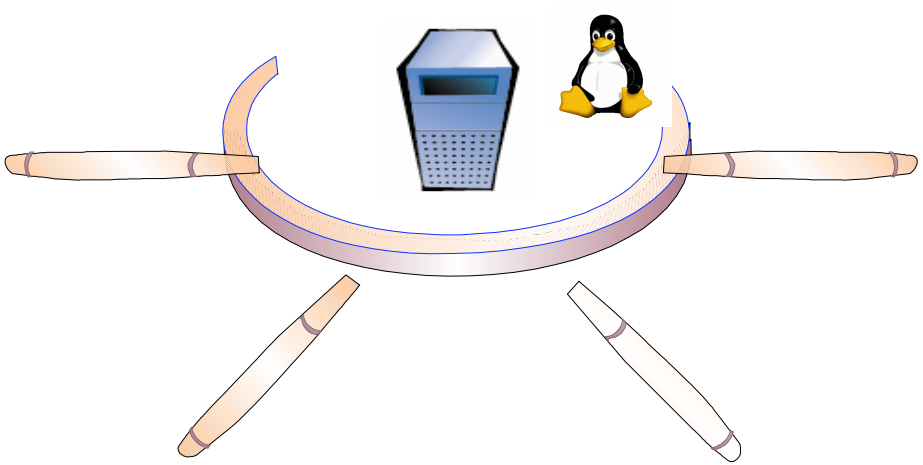
JConVSE major control

- **Message controlled**
- **Event controlled (on schedule)**

JConVSE Panel

JConVSE Installation

JConVSE Admin
TCP/IP
JDK 1.2.2
Connector Client



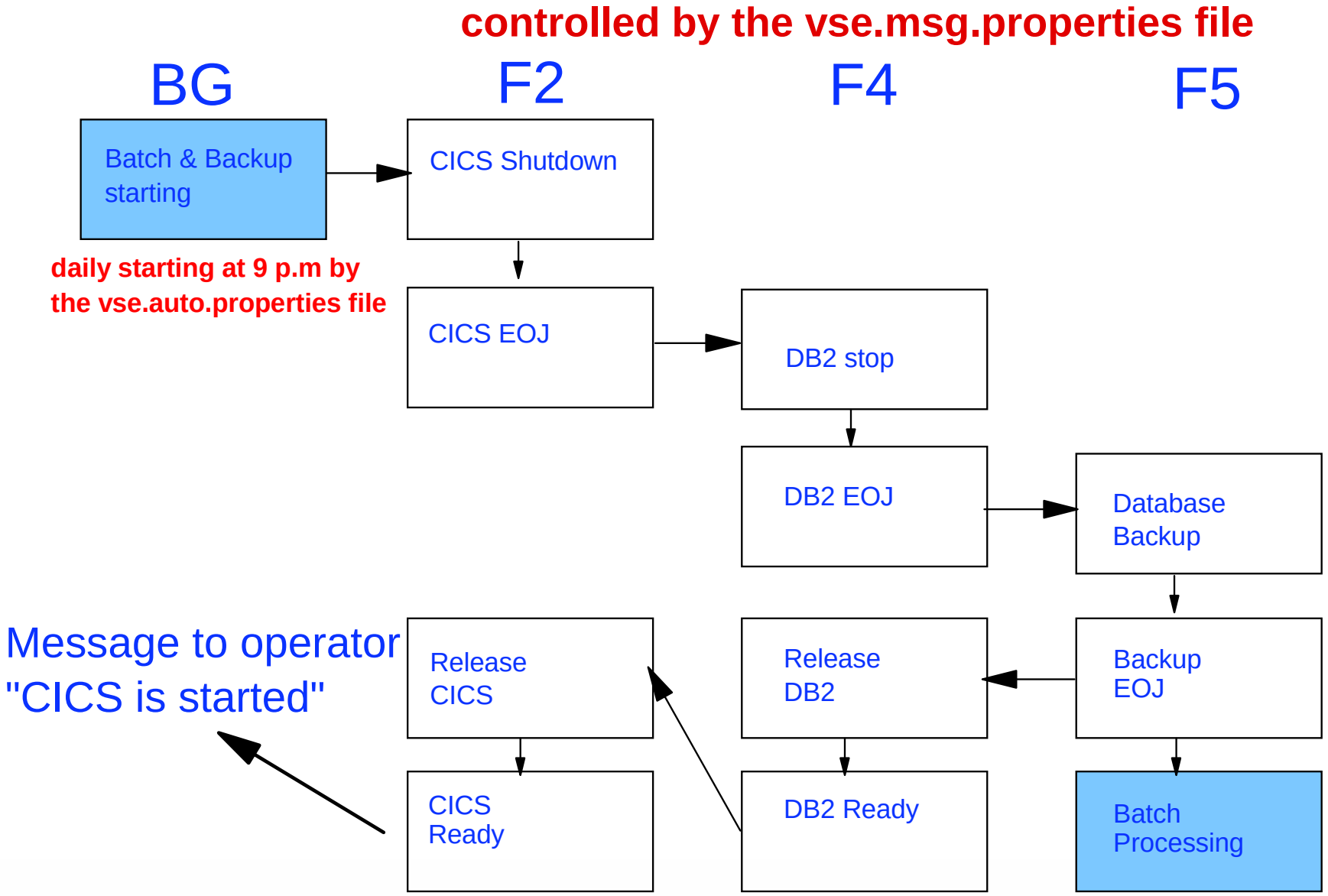
VSE/ESA 2.5
TCP/IP
Connector Server

VSE/ESA 2.5
TCP/IP
Connector Server

VSE/ESA 2.5
TCP/IP
Connector Server

VSE/ESA 2.5
TCP/IP
Connector Server

JConVSE Sample



JConVSE Properties Files

- **VSE.PROPERTIES** customize the VSE system
- **VSE.MSG.PROPERTIES** customize the messages
- **VSE.AUTO.PROPERTIES** customize the timed actions
- **VSE.MISC.PROPERTIES** customize the JConVSE panel

You can be as flexible as you want to be

JConVSE vse.msg.properties

```
# Starting Backup
msg.4=0000 // PAUSE BATCH WILL NOW RELEASED
msg.4.delay=10 s
msg.4.action=Vmsg f2

msg.5=0109
msg.5.action=V109 cemt p shut,i

msg.6=0002 EOJ
msg.6.delay=15 s
msg.6.action=Vmsg f4

msg.7=0004 ARI0062A SQLDS
msg.7.delay=5 s
msg.7.action=V4 sqlend quick
```

JConVSE vse.auto.properties

```
# Start Test CICS
action.1.cmd.1=msg f2
action.1.cmd.2=109 cemt p shut, i

# Starting Batch
action.2=Release Batch
action.2.days=1 2 3 4 5
action.2.time=18:0:00
action.2.cmds=1
action.2.cmd.1=r rdr,batchstr
```

Never
Nightshift
again !!

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