

# System z Expo

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**Session Title:** VSAM Redirector between z/VSE and z/OS

**Session ID:** zEO05

Speaker Name: Stev Glodowski, Ingo Franzki

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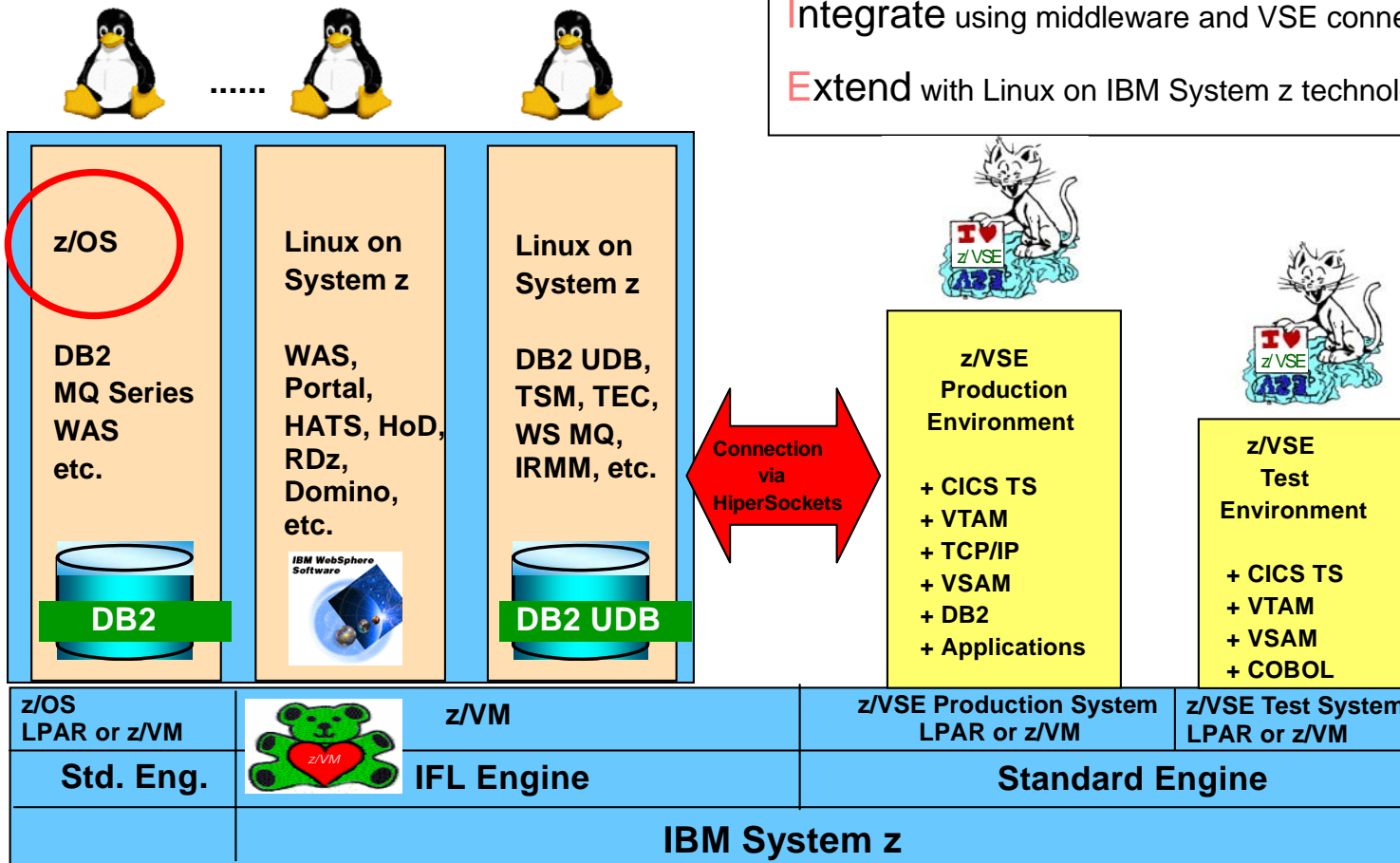
# Agenda

- **What is VSAM Redirector?**
- **NEW Redirector with z/OS**
- **Installation of the Redirector Servers on z/OS**
- **Enabled redirection to DB2 on z/OS**
- **Examples**



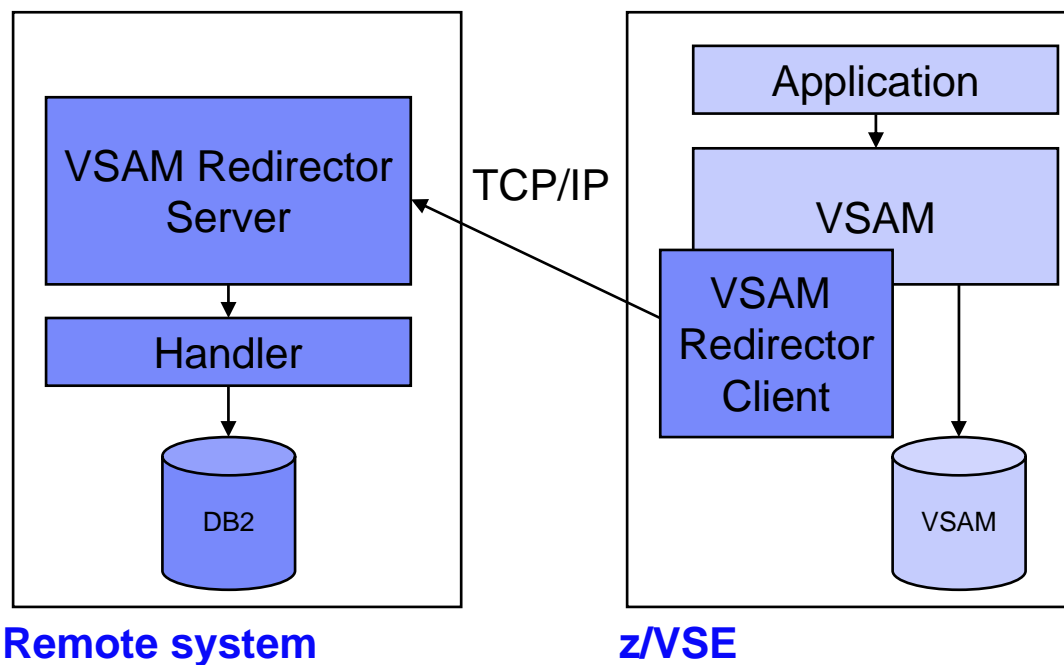
# z/VSE's PIE Strategy on System z

**P**rotect existing VSE investments  
**I**ntegrate using middleware and VSE connectors  
**E**xtend with Linux on IBM System z technology & solutions



# VSAM Redirector

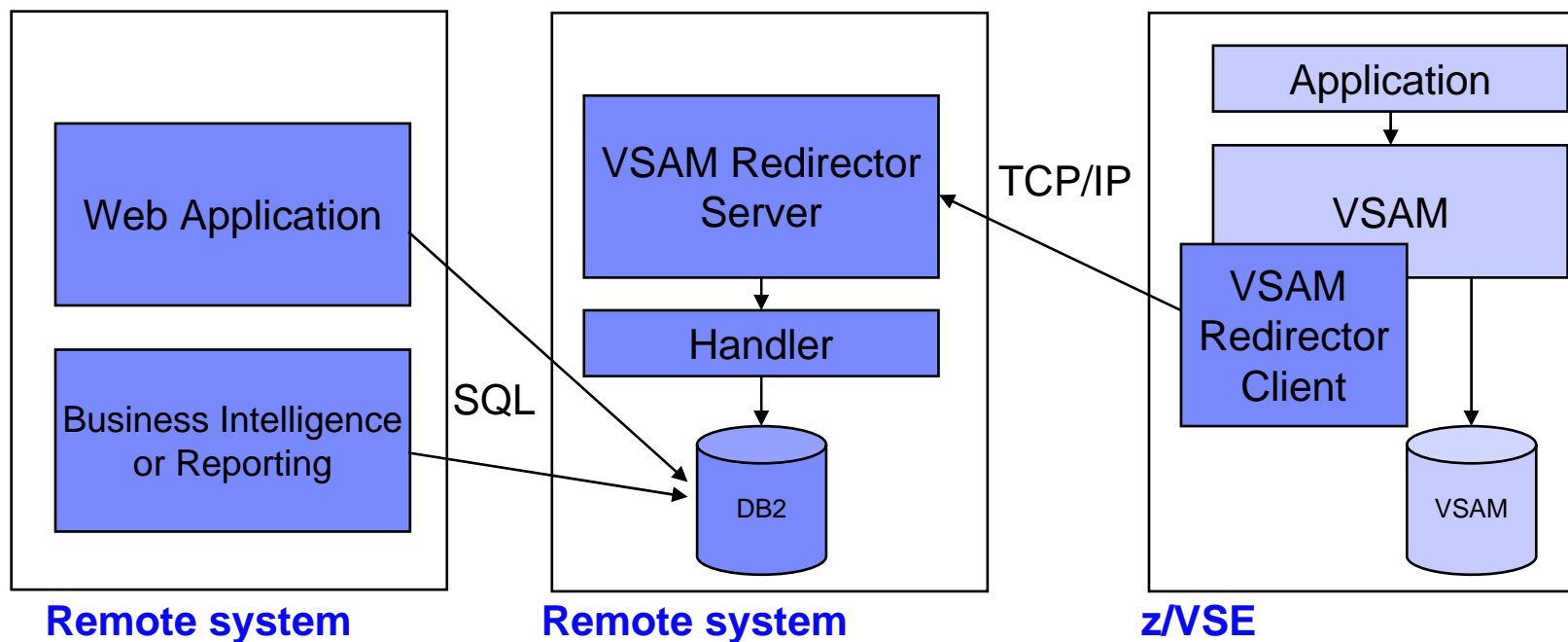
- **Basic functionality of REDIRECTOR:**
  - Redirect VSAM accesses under z/VSE to a Java Server on your workstation.
  - VSAM Data can be moved to or synchronized with a database on a remote system
  - Transparent to user application (no need to change application)



# VSAM Redirector

## Benefits of using REDIRECTOR:

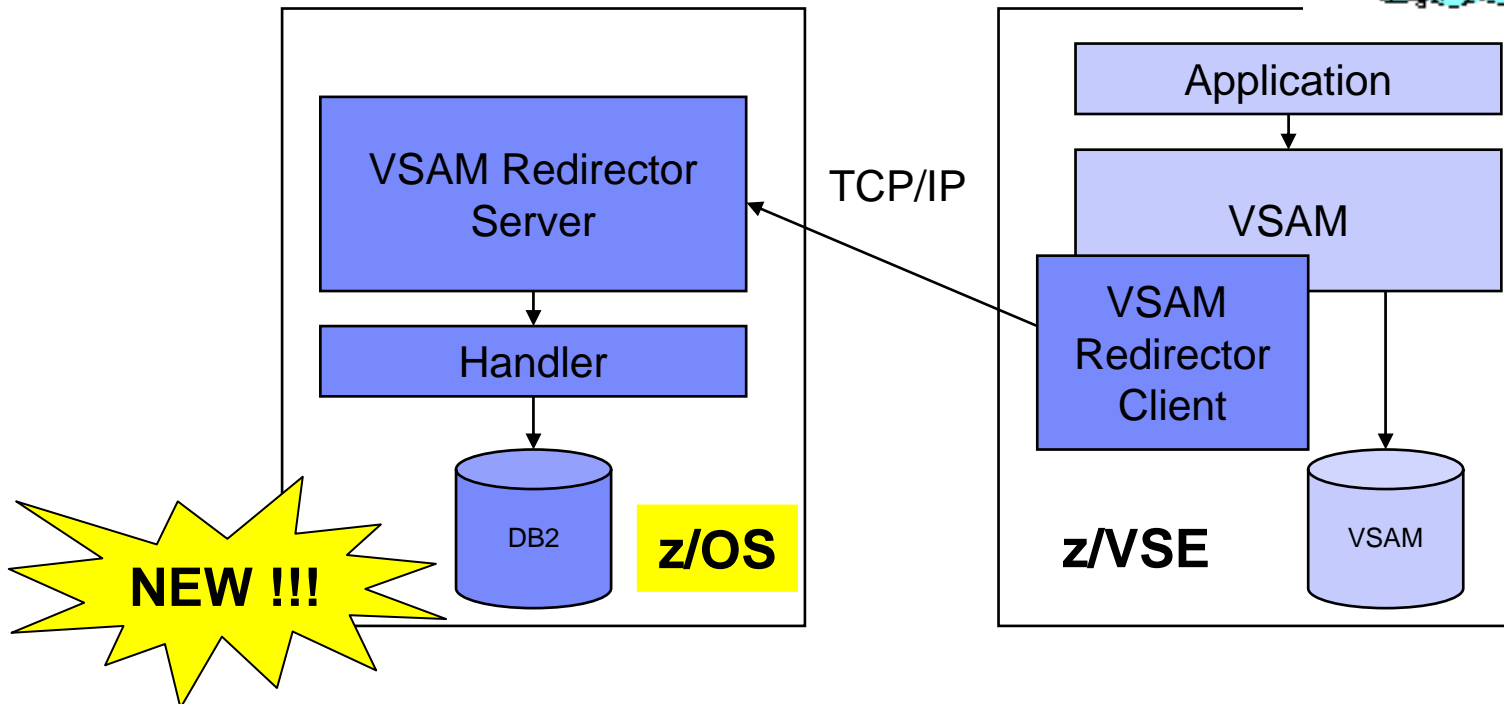
- Many tools available to work with relational data in databases
  - Business Intelligence (e.g. COGNOS), Reporting, Web frontends, SAP, ...
- VSAM data is available to new applications outside of z/VSE
- DB2 (or other databases) run on many different platforms



# VSAM REDIRECTOR enhancements

## What is NEW:

- Installation of the VSAM Redirector Server on z/OS
- Redirect VSAM-File-Access on z/VSE to DB2 under z/OS

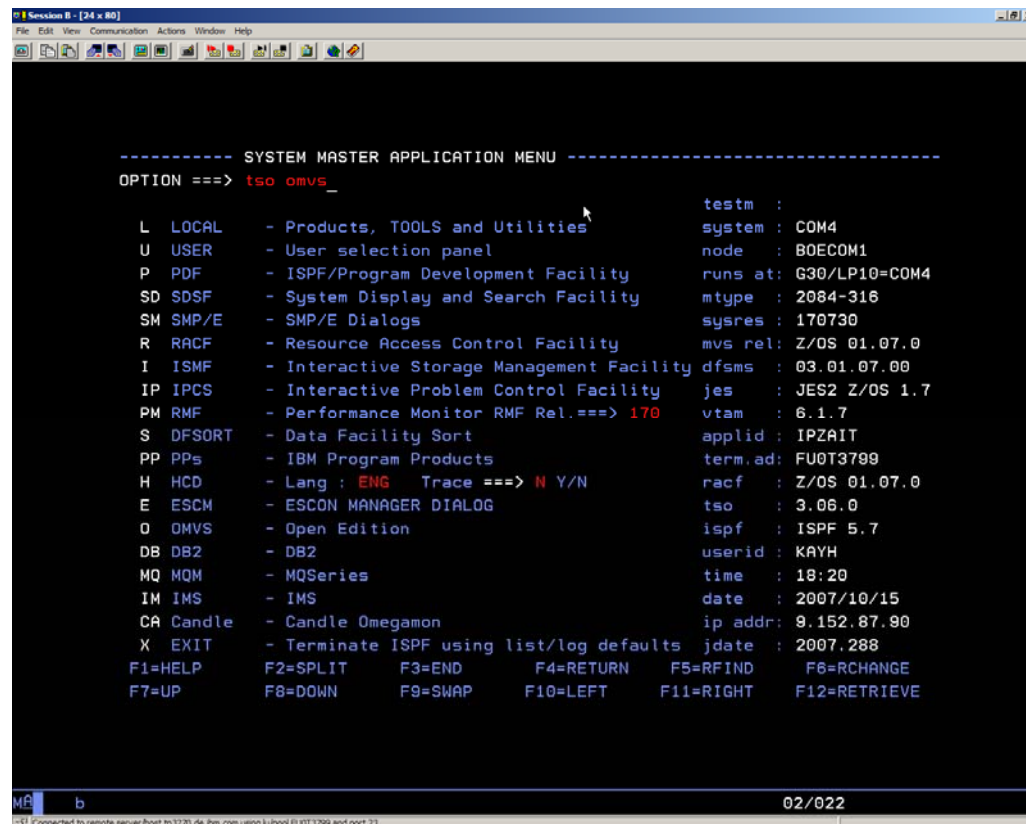


# Installation of the Redirector Servers on z/OS

*User should do the following steps:*

**STEP1** Log on to z/OS

**STEP2** Open Shell under z/OS



```

----- SYSTEM MASTER APPLICATION MENU -----
OPTION ==> tso omvs_

L LOCAL - Products, TOOLS and Utilities
U USER - User selection panel
P PDF - ISPF/Program Development Facility
SD SDSF - System Display and Search Facility
SM SMP/E - SMP/E Dialogs
R RACF - Resource Access Control Facility
I ISMF - Interactive Storage Management Facility
IP IPCS - Interactive Problem Control Facility
PM RMF - Performance Monitor RMF Rel.==> 170
S DFSORT - Data Facility Sort
PP PPs - IBM Program Products
H HCD - Lang : ENG Trace ==> N Y/N
E ESCM - ESCON MANAGER DIALOG
O OMVS - Open Edition
DB DB2 - DB2
MQ MQM - MQSeries
IM IMS - IMS
CA Candle - Candle Omegamon
X EXIT - Terminate ISPF using list/log defaults
F1=HELP F2=SPLIT F3=END F4=RETURN F5=RFIND F8=RCHANGE
F7=UP F8=DOWN F9=SWAP F10=LEFT F11=RIGHT F12=RETRIEVE

testm :
system : COM4
node : BOECOM1
runs at: G30/LP10-COM4
mtype : 2084-316
sysres : 170730
mvs rel: Z/OS 01.07.0
dfsms : 03.01.07.00
jes : JES2 Z/OS 1.7
vtam : 6.1.7
applid : IPZAIT
term.ad: FU0T3799
racf : Z/OS 01.07.0
tso : 3.06.0
ispf : ISPF 5.7
userid : KAYH
time : 18:20
date : 2007/10/15
ip addr: 9.152.87.90
jdate : 2007.288

02/022

```

Connected to remote server/host tn3270.de.ibm.com using lu6ool FU0T3799 and port 23



# Installation of the Redirector Servers on z/OS

## STEP3 Provide Java Environment

### This includes:

- Setting the classpath
- Setting the path
- Integrate JDBC driver (db2jcc.jar)

You can set the classpath in the z/OS Shell using:

```
„export CLASSPATH=$CLASSPATH:/SYSTEM/XXX/XXX/db2jcc.jar“
```

Alternatively all the settings could be saved in a file (*environment.sh* for example):

**Shell:  $\implies$  . *environment.sh*\***

\* Please notice that there is a dot followed by a blank before the filename to make the file executable.

# environment.sh sample

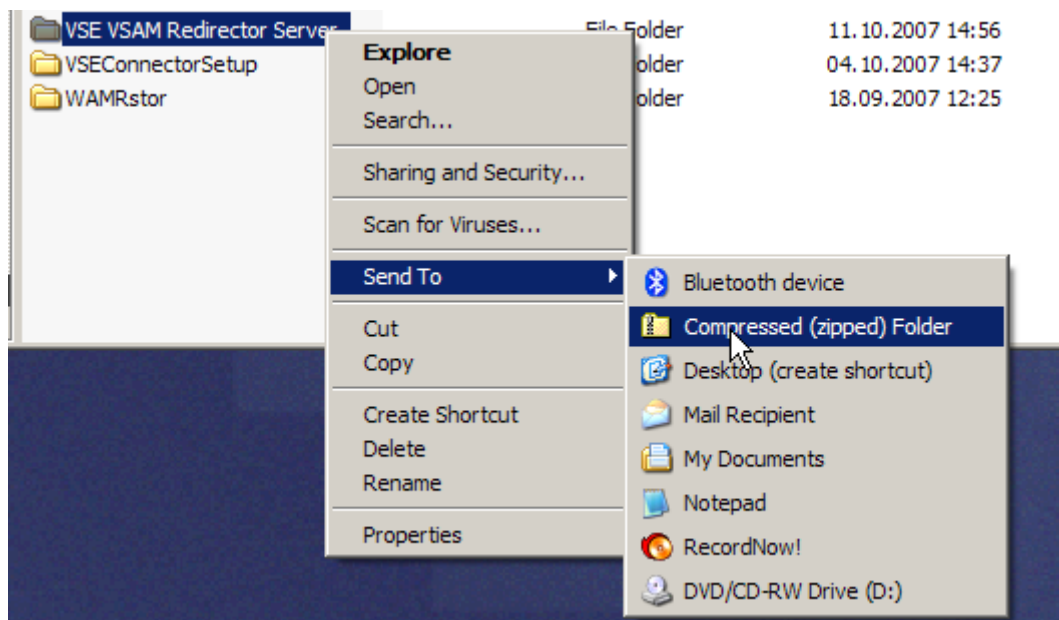
```
echo -----
echo This sets the DB2 Environment on z/OS
echo
cd /
#
# your directory for the redirector files
#
export STEPLIB=$STEPLIB:SYS1.DSN.D843.SDSNEXIT
export STEPLIB=$STEPLIB:SYS1.DSN.V810.SDSNLOAD
export STEPLIB=$STEPLIB:SYS1.DSN.V810.SDSNLOD2
#
echo Finished setting STEPLIB
#
export JCC_HOME="/SYSTEM/local/db2/db2v8/jcc"
export CLASSPATH=${JCC_HOME}/classes/sqlj.zip:$CLASSPATH
export CLASSPATH=${JCC_HOME}/classes/db2jcc_javax.jar:$CLASSPATH
export CLASSPATH=${JCC_HOME}/classes/db2jcc_license_cisuz.jar:$CLASSPATH
export CLASSPATH=${JCC_HOME}/classes/db2jcc.jar:$CLASSPATH
#
echo Finished setting classpath and integrating JDBC driver
#
export LD_LIBRARY_PATH=${JCC_HOME}/lib:$LD_LIBRARY_PATH
export LIBPATH=${JCC_HOME}/lib:$LIBPATH
export PATH=${JCC_HOME}/bin:$PATH
export PATH=/usr/lpp/java/a40/J1.4/bin:$PATH
#
echo Finished setting Library and Application path.
echo
echo Done with settings. Ending.
echo
```

# Installation of the Redirector Servers on z/OS

## STEP4 Create Directory for Redirector Installation

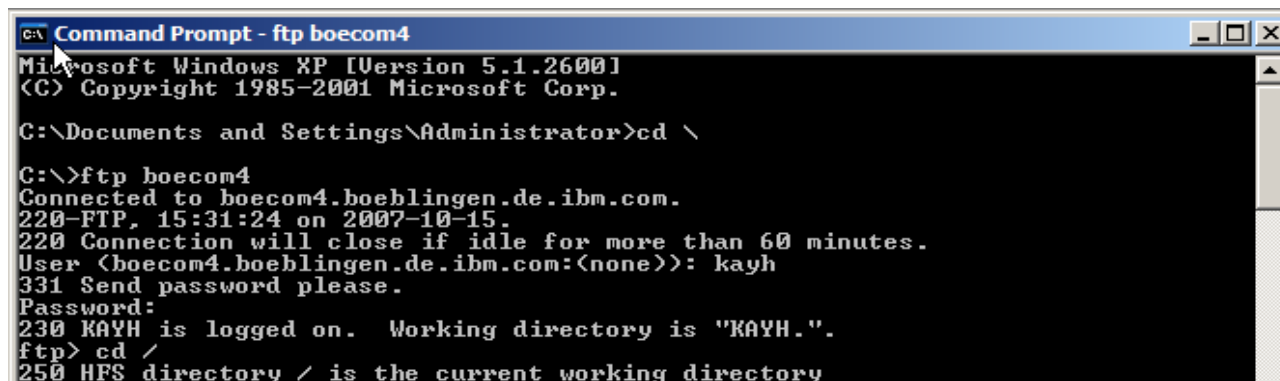
**Shell:** `====> mkdir redir` (*redir – examaple directory name*)

## STEP5 Create Zip File from Redirector Installation under Windows



# Installation of the Redirector Servers on z/OS

## STEP6 Ship the Zip File to z/OS via ftp



```
C:\ Command Prompt - ftp boecom4
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>cd \

C:\>ftp boecom4
Connected to boecom4.boeblingen.de.ibm.com.
220-FTP, 15:31:24 on 2007-10-15.
220 Connection will close if idle for more than 60 minutes.
User (boecom4.boeblingen.de.ibm.com:(none)): kayh
331 Send password please.
Password:
230 KAYH is logged on. Working directory is "KAYH.".
ftp> cd /
250 HFS directory / is the current working directory
```

### Please note:

After having established an ftp connection to an account on z/OS please make sure to use the binary mode to ship the file. Otherwise, ASCII files will be converted to EBCDIC. Enter the directory '/XXX/XXX/XXX/redir' using the 'cd' command. After that, put the ZIPFile to the z/OS system.

*ftp> bin → switch to Unix System Services → ftp> put "ZIP-Filename"  
cd /u/yourhomedir*

# Installation of the Redirector Servers on z/OS

## STEP7 Unzip ZIP-File

**Shell:**  $\Rightarrow$  **unzip "ZIP-Filename"**

```

com.zip
converters
converters.zip
create.bat
create.cmd
create.sh
createwin.ico
createx.gif
db2java.zip
KAYH: /u/kagh/kajjava/redir>dir
dir: FSUM7351 not found
KAYH: /u/kagh/kajjava/redir>ls
CEEDUMP.20071010.114750.1855
CVS
DeltaLoader_sample.cfg
JAVADUMP.20071010.114742.1855.txt
JdbcDriver.cfg
License.txt
MQLoader_sample.cfg
MapperConfigGui.cfg
NapTranslator.class
Readme.txt
RedirLoader_CSVFileHandler_sample.cfg
RedirLoader_DBHandler_sample.cfg
VSAMRedirectorServer.properties
VsamRedir.jar
VsamRedir.zip
_uninst
com
com.zip
converters
converters.zip
create.bat
create.cmd
create.sh
createwin.ico
createx.gif
db2java.zip
KAYH: /u/kagh/kajjava/redir>
===> _
run.bat
run.cmd
run.sh
runloader.bat
runloader.sh
uppercasemap.xml
vsammap.dtd
vsammap.xsl

deltaloader.bat
deltaloader.sh
doc
environment.sh
ibmhandlers.jar
ibmhandlers.zip
images
javadoc
log.txt
mapperconfiggui.bat
mapperconfiggui.jar
mapperconfiggui.sh
mapxml.xml
mqloader.bat
mqloader.sh
redirwin.ico
redirx.gif
run.bat
run.cmd
run.sh
runloader.bat
runloader.sh
uppercasemap.xml
vsammap.dtd
vsammap.xsl

RUNNING
ESC- $\leftarrow$  1-Help      2-SubCmd    3-HlpRetrn  4-Top      5-Bottom   6-TSO
           7-BackScr  8-Scroll    9-NextSess 10-Rfresh  11-FwdRetr 12-Rtrieve
40/007

```

# Installation of the Redirector Servers on z/OS

## STEP8 **Replace \*.sh- and \*.cfg -Files**

This can be accomplished by either FTP

- use ftp – in ASCII mode.
- “prompt off” -- to suppress repeated prompting for file upload confirmation

```
ftp> ASCII → ftp> prompt off → mput *.sh
```

```
ftp> ASCII → ftp> prompt off → mput *.cfg
```

OR convert to IBM-1047 format from ISO8859-1 format

```
iconv -t IBM-1047 -f ISO8859-1 runloader.sh > runloader.sh1
```

---

## STEP9 **Change Access Rights for \*.sh-Files to make them executable**

```
Shell: ==> chmod u+x *.sh
```

# Enabled redirection to DB2 on z/OS

## Mapping Information should be provided for the Redirector Server

In order to make the redirection work, the Redirector Server needs an XML map containing the information of where in your records which data is located.

This kind of map can be produced using ,for example the Maptool.

The XML map and its corresponding DTD have to be uploaded via ftp.

For the former ASCII mode has to be used.  
The latter needs binary mode being turned on.

Mapname: **MapClus1**  
 Catalog: **CATNAME**  
 Cluster: **CLUSNAME**  
 System: **VSEXXX**

Fieldname	Type	Offset	Length
ALTKEY	STRING	0	4
KEY	STRING	4	8
DATA	STRING	12	28

***ftp> ASCII → ftp> mput „XMLMapName“ → ftp> mput „DTDFilename“***

# VSAM Data mapping

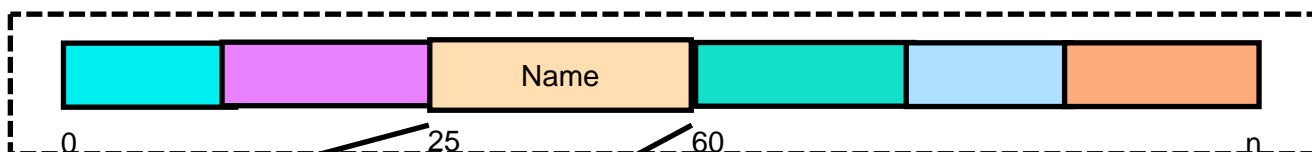
- VSAM does not know the structure of a record
- VSAM only knows
  - the length of a record
  - the position and length of the key (if indexed)
- User applications typically use a COBOL or PL/1 Copybook to describe the fields of a record:

```
03 FLIGHTS-RECORD.  
    05 FLIGHT-NUMBER      PIC 9(8)  COMP.  
    05 START              PIC X(20).  
    05 DESTINATION        PIC X(20).  
    05 DEPARTURE          PIC X(5).  
    05 ARRIVAL            PIC X(5).  
    05 SEATS              PIC 9(8)  COMP.  
    05 RESERVED           PIC 9999.  
    05 PRICE              PIC 9(6)  COMP-3.  
    05 AIRLINE            PIC X(20).
```

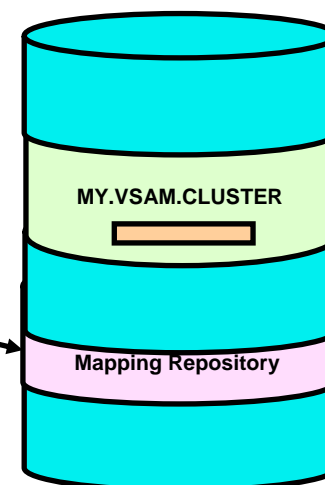


# VSAM Data mapping

VSE/VSAM Record structure from EMPPROG.COBOL



Column:  
 →title: Name  
 →Offset: 25  
 →length: 35  
 →type: STRING  
 →desc: Persons Name



- VSAM Mapping repository stored in VSAM Cluster  
VSE.VSAM.RECORD.MAPPING.DEFS (IESMAPD)
- This is just meta-data, no VSAM data itself is modified

# VSAM Data mapping

- Define the mapping
  - Use IDCAMS RECMAP function
  - Use Java based Connector
  - Use VSE Navigator
  - Use MapTool
  
- Export the XML file needed to send to z/OS

MapToolGui - Flights.cb

Fieldname	Length	Offset	Type	Description
FLIGHTNUMBER	4	0	UNSIGNED	05 FLIGHTNUMBER PIC 9(8) COMP.
START	20	4	STRING	05 START PIC X(20).
DESTINATION	20	24	STRING	05 DESTINATION PIC X(20).
DEPARTURE	5	44	STRING	05 DEPARTURE PIC X(5).
ARRIVAL	5	49	STRING	05 ARRIVAL PIC X(5).
SEATS	4	54	UNSIGNED	05 SEATS PIC 9(8) COMP.
RESERVED	4	58	UZONED	05 RESERVED PIC 9999.
PRICE	4	62	PACKED	05 PRICE PIC 9(6) COMP-3.
AIRLINE	20	66	STRING	05 AIRLINE PIC X(20).

Field options

Append Edit

Insert Delete

Map options

Lookup a field Export

Change map info Insert map

Import new Exit

# Enabled redirection to DB2 on z/OS

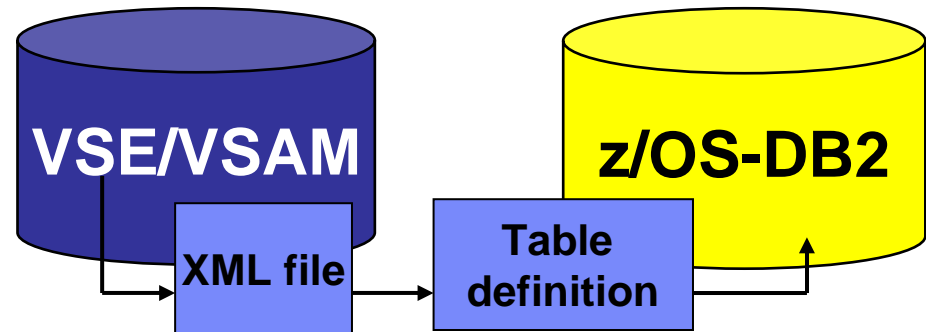
## Run create.sh

First, start the program in the z/OS shell. Then follow its instructions.

Shell: **==>** *create.sh*

The following information is required:

- the filename of the XML map
- the JDBC URL – for example *jdbc:db2:SAMPLE*



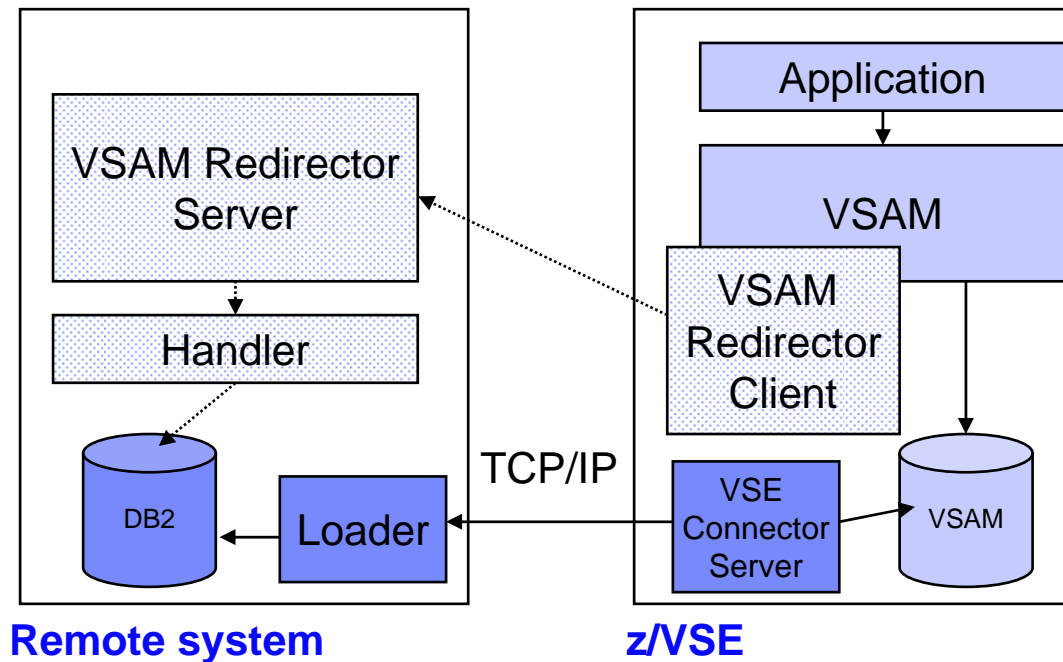
### Notes:

Please make sure the name for the table that will contain the data and the name for the table containing the mapping information are uppercase.

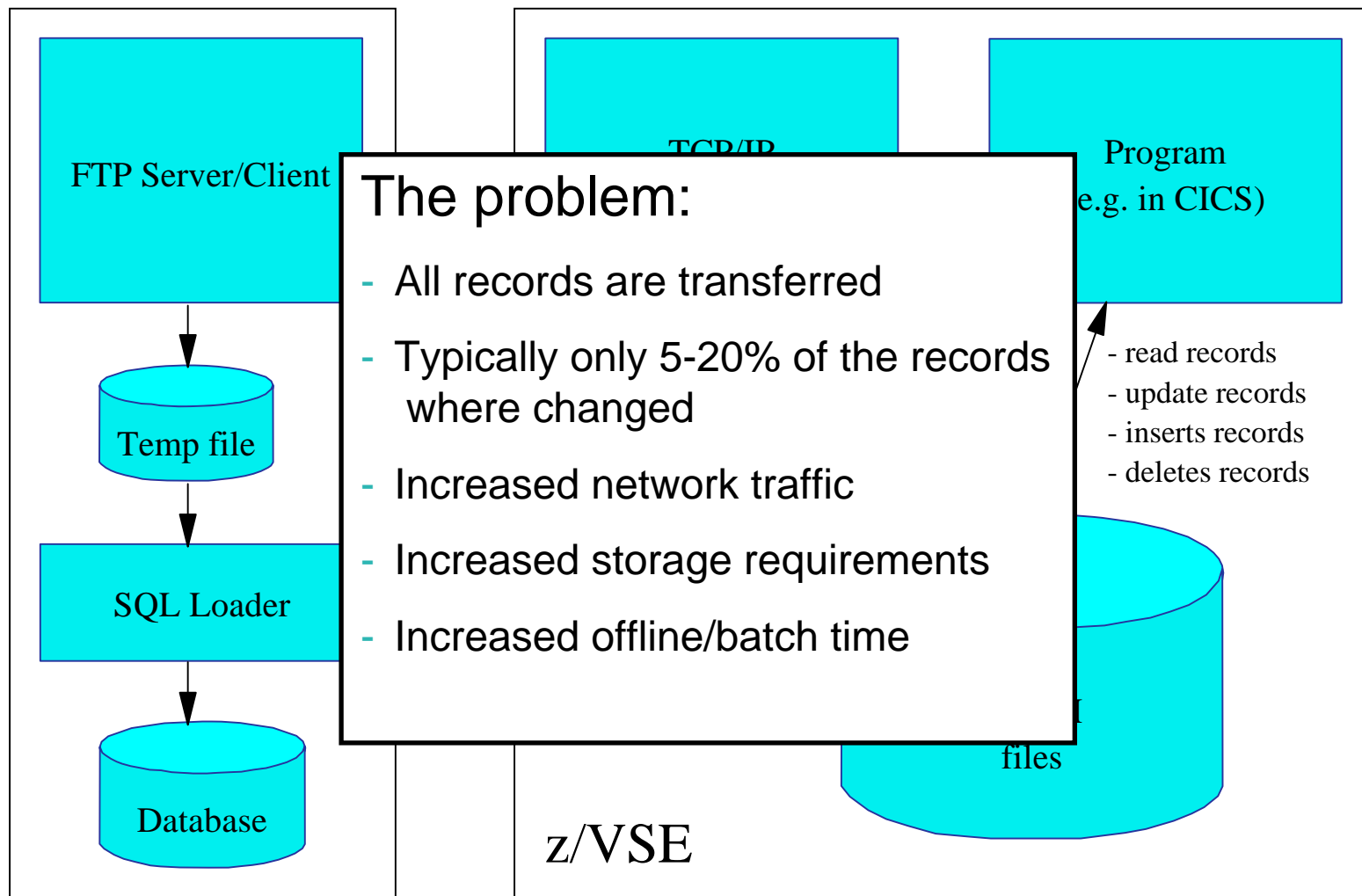
Also double check with your DB2 after completion that the table definition for both tables is complete.

# VSAM Redirector – Other features

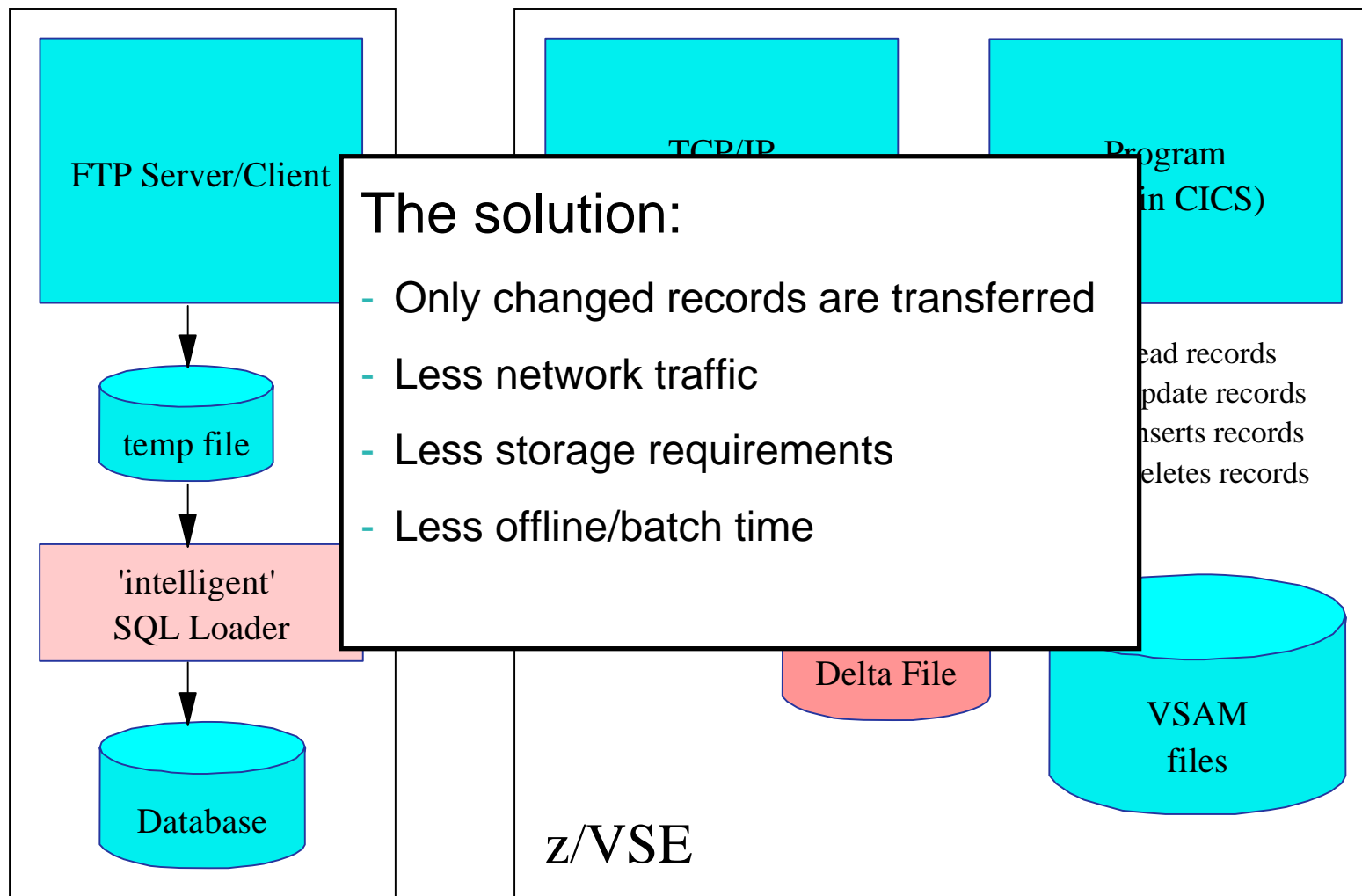
- **LOADERS**
  - For initial load of VSAM data into DB2
  - For re-synchronisation of the data after disaster
  - For nightly batch loads



# VSAM Capture Exit - Motivation - situation today

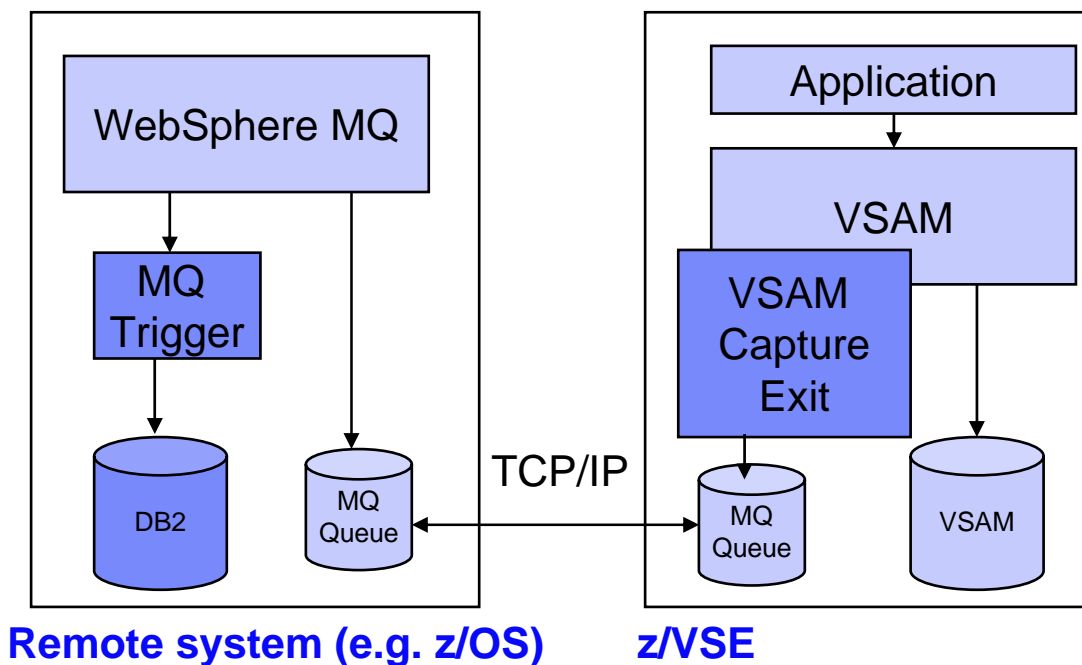


# VSAM Capture Exit - Motivation – better solution



# VSAM Redirector – Capture Exit

- Captures all changes to a VSAM file (UPDATE, INSERT, DELETE)
- Creates **delta records** with header + original data
  - Stored in second VSAM file (delta file)
  - Or creates MQ Series message
- Delta record header contains information about when and by whom the record was changed, and which request
- Allows customers to download the delta file and apply it to a database



# Outlook

- **YOUR Ideas**
- **YOUR Requirements**





## Redirector between z/VSE and z/OS



**QUESTIONS ?**

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