IBM IT Education Services

VSE Connectors Workshop

Basic Setup of VSE e-business Connectors

WAVV 2004

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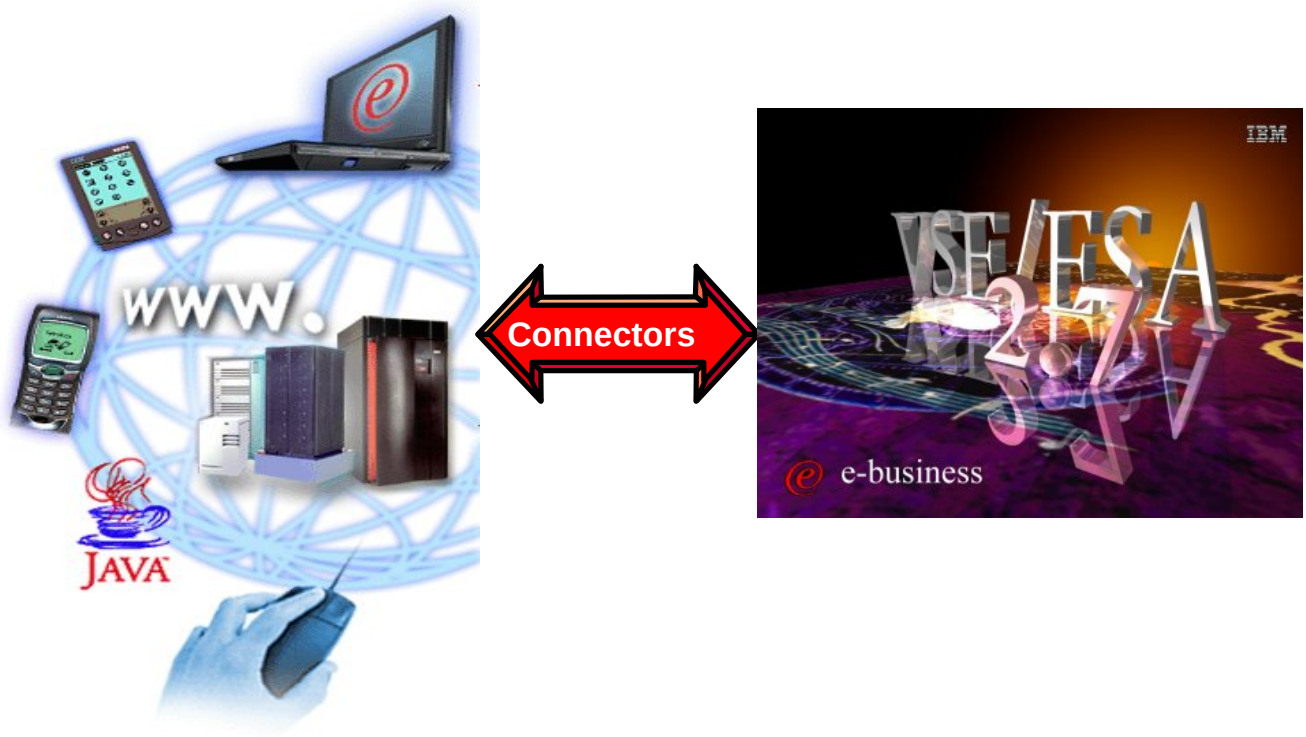

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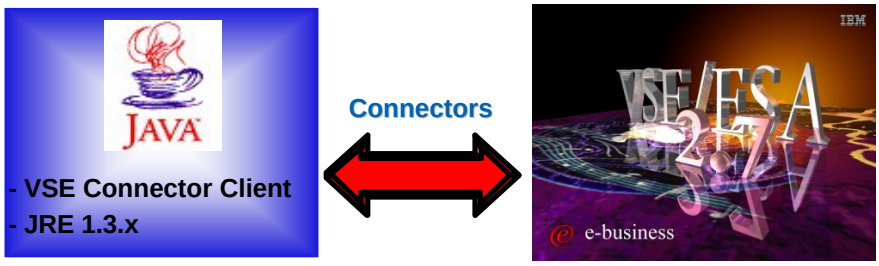
VSE/ESA
e-business Connectors

Real time access to various VSE resources is implemented using Connector technologies to embed the VSE/ESA services. These implementations are needed by today's heterogeneous IT environments. The Connector technology implements a software component on the remote system and an access component on the VSE/ESA host.



The VSE e-business Connectors included in VSE/ESA are platform independent because the remote software component is written in Java. These e-business Connectors are fully compatible with WebSphere technologies, and provide real time access to:

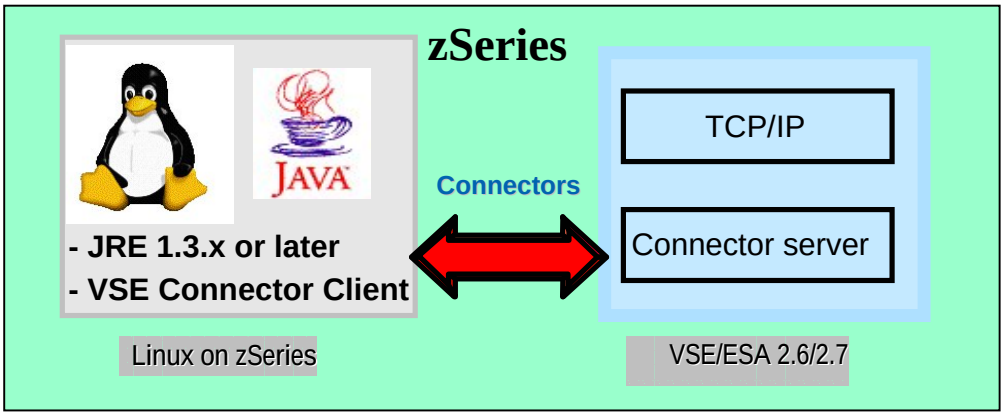
- VSAM
- Power queues
- Librarian
- Console
- ICCF
- DL/I (VSE 2.7)

In Addition to the functions of these Connectors, the VSE/ESA 2.6 applications can:

- Transparently access remote data
- Synchronize different data stores
- Use the Virtual Tape support delivered with VSE/ESA 2.6/2.7

By using Java technologies these Connectors enable the integration of VSE data into distributed processes and Web transactions in a heterogeneous environment and exploit the advanced functions of the IBM WebSphere Application Server.

Setup for Java-Based Connector



To be able to work with VSE e-business Connectors we have to setup:

❖**VSE/ESA**

1. VSE Connector server

The VSE Connector server is the software component handling incoming requests from remote VSE e-business Connector programs.

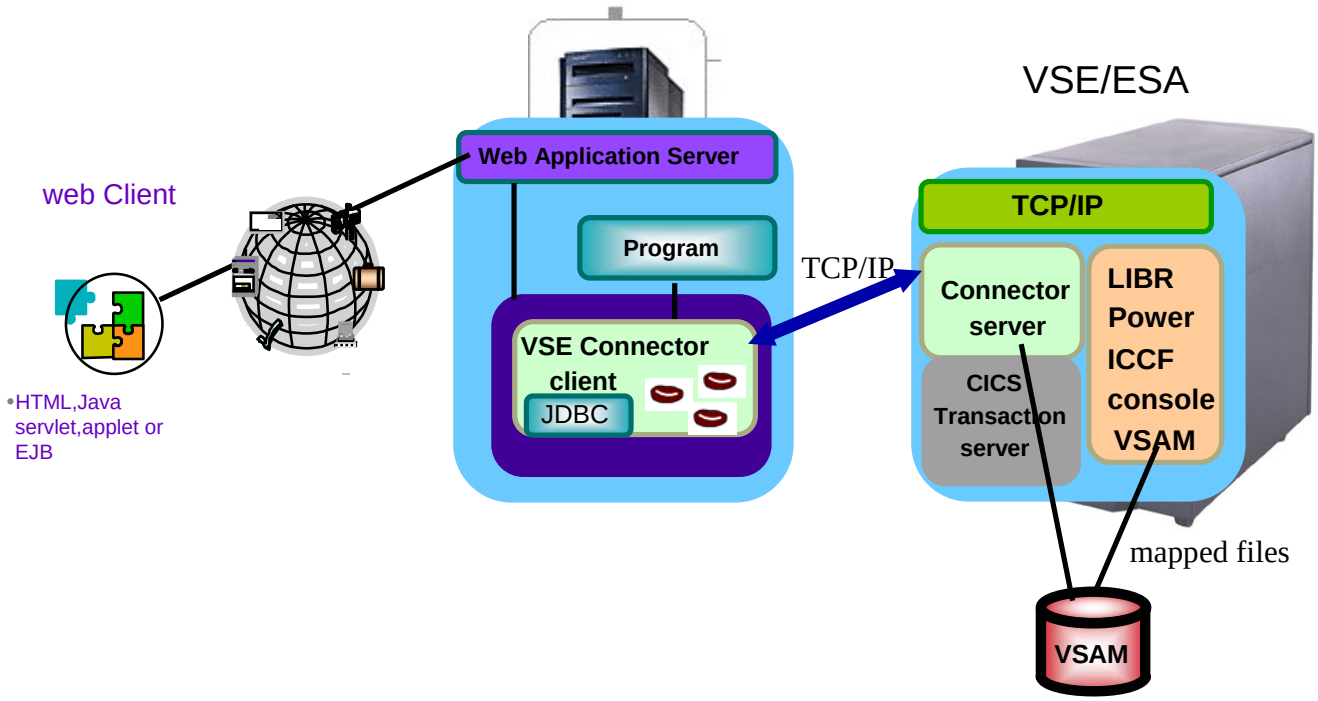
❖**Java platform (i.e. Windows, Linux)**

2. VSE Connector Client

The VSE Connector Client contains a Java class library with java beans which contain functions for the connection and session management and data access functions for the various resources on VSE/ESA.

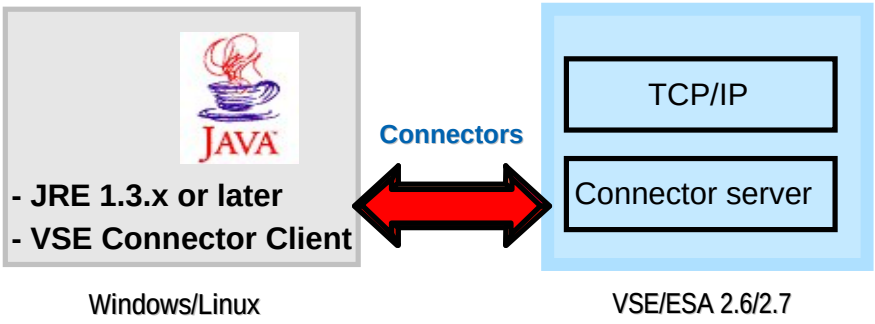
This setup is the objective of this workshop.

Overview possibilities
Java-Based Connector



- Java access to VSE/ESA Resources.
- VSE Connector client is part of VSE/ESA 2.5 and newer
- VSAM file access for mapped files
- better integration with Web Application Server using VSAM JDBC driver

Chapter1:Setup Connector Server on VSE



STEP1.1: Setup correct TCP/IP system ID for VSE Connector server

✓ TCP/IP for VSE/ESA has a **system ID** (default is **00**), specified in TCP/IP startup Job (the default name is TCPIP00):

```
// EXEC IPNET,SIZE=IPNET,PARM='ID=00',INIT=.....
```

✓ To use the TCP/IP services from another partition (i.e. VSE Connector Server) this partition has to 'know' the system ID. This is specified in the VSE Connector server startup job as follows:

```
// OPTION SYSPARM='nn'      -  where nn is the system ID.
```

★ **Recommendation**: Copy the skeleton SKVCSSTJ from ICCF lib 59 in your primary library, adjust and submit it.

★ It's the startup job of VSE Connector server.

STEP1.2: Start VSE Connector server

At the VSE console enter:

```
r rdr,STARTVCS
```

several messages will appear on the console. The server is ready for e-business when the following messages are shown:

```
IESC1002I FINISHED STARTUP OF VSE CONNECTOR SERVER
IESC1003I WAITING FOR CONNECTIONS OF CLIENTS...
```

With this STEP, VSE is ready for incoming requests from VSE Connector Client .

Chapter2:Setup VSE Connector Client

STEP2.1: Navigate to VSE Connector Client

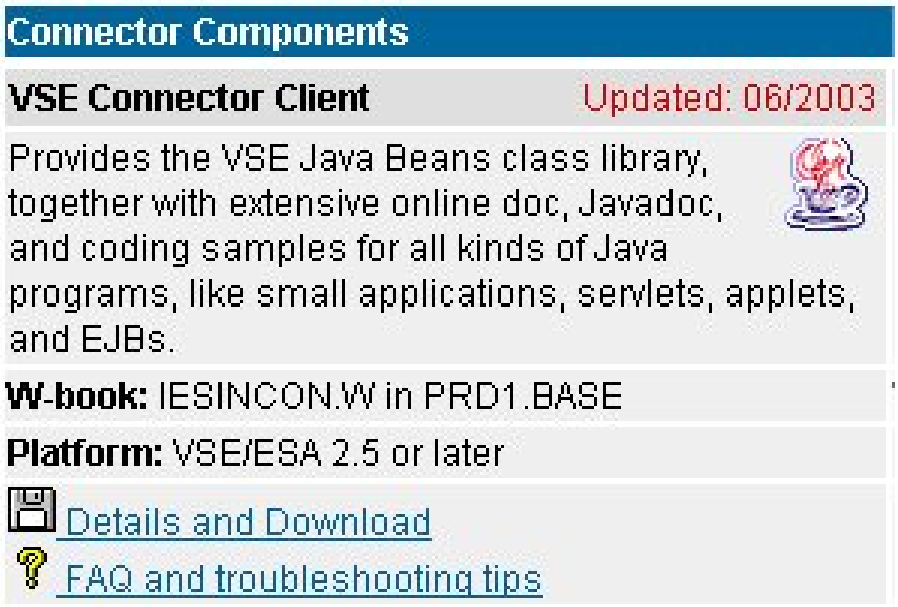
Open the VSE Homepage with a web browser:

http://www-1.ibm.com/servers/eserver/zseries/os/vse/

Click on "Service and Support" on the left side
and then on "e-business connectors and utilities".

The page opened contains the VSE Connector Client and the tools that can be downloaded for free.

In the upper left corner you see **VSE Connector Client** which represents the remote component of the e-business Connectors.



Click on:
Details and Download

The page explains the most important functions of the VSE Connector Client, the counterpart on Windows of VSE Connector Server on VSE/ESA.
It also mentions that a **Java** environment is needed.

Setup VSE Connector Client

STEP2.2: Verification if Java environment installed

To install the VSE Connector Client, a Java Virtual Machine must be installed on your PC.

- To just run Java programs, the JRE 1.3.x or later is needed (Java Runtime Environment),
- to develop/compile Java programs, JDK 1.3.x or higher is needed (Java Developer Kit, which includes the JRE).

To verify if a Java Virtual Machine is installed,
open a command promptl and enter command:

```
java -version
```

You should see something like:

```
Java version "1.3.1"
Java(TM) 2 Runtime Environment, Standard Edition
```

If the messages above are shown go to *STEP2.4*.

STEP2.3 Install Java Environment

If following message (or similar) is shown:

```
'java' is not recognized as an internal or external command,
operable program or batch file.
```

then your system has no Java virtual machine (Runtime Environment) installed or it can not be found in the path (check profile.local)

To install a Java Virtual machine do:

On the same HTML page (VSE home page ->*Service and Support -> VSE e-business Connectors*):

VSE Connector Client -> Details and Download

in section: **Installation** you will find a link were you can download the Java Developer Kit from IBM.

http://www.ibm.com/developerworks/java/

or you can download a SUN Version from http://www.sun.com

Install the downloaded JDK 1.3.x. or later.

Setup VSE Connector Client

STEP2.4: Download VSE Connector Client code

(A) Download from the Internet:

With Java installed, navigate on **VSE Connector Client -> Details and Download** to:

Download latest Code

and click on: **vsecon270-pq74694.zip** (VSE 2.6/2.7) The file name may vary since it contains a APAR number, which must have been applied on VSE.

The download process will be started. You will be prompted to specify where to save the code. The file downloaded is a zipped file.

(B) Download via FTP:

An alternative to the HTML download can be an FTP download if the code is on a FTP server.

Change to a temporary directory

Issue commands:

ftp <ppp.xxx.yyy.zzz>

cd </pub/directory>

bin

mget *.zip

- answer with a **yes** for the components:

vseconnector.zip

vsenavigator.zip

maptool.zip

Note: The VSE Connector client is also shipped and installed with the VSE base product in Library PRD1.BASE as member *iesincon.w*

You can download it from there in binary format and rename it to *install.class (VSE 2.5) or vsecon27.zip (VSE 2.6/2.7).* The newest level will always be on the Internet.

Setup VSE Connector Client

STEP2.4:

After the code is *downloaded it must be unzipped.*
It is recommended to build separate directories to unzip the files.
In a Command prompt type:
mkdir C:\ivsecon
mkdir C:\inavigator

The ZIP files contain files that will be needed for installation, like:
install.class, install.bat, install.cmd, install.sh
The **maptool** does not use an installer, therefore it can be simply unzipped to the final destination directory.

STEP2.5 unzip the VSE Connector file

Now you can unzip the downloaded .zip files like:
pkunzip vseconnector.zip

STEP2.6: Install VSE Connector Client

Open a command prompt.
Change current directory to the one where you unzippped vseconnector.zip to (i.e. C:\ivsecon).
Type **install.bat** or **java install**

This will guide you trough the installation process of the VSE Connector client.
The default directory where the VSE Connector Client will be installed is
C:\vsecon

The VSE connector client consists of:
- a Java class library (Java Beans) - Connector functions
- a detailed HTML documentation about the functions and possibilities
- concepts for development, deployment and implementation
- a lot of commented and ready to run samples

Reboot your system after installing (Windows only).

Setup VSE Connector Client

STEP2.10 Verify settings of CLASSPATH and VSECON

Verify that the CLASSPATH contains VSE Connector Client java archives files with the ending .jar

- in Windows:

  `set CLASSPATH` `(Linux: echo $CLASSPATH)`

  It must include something like:

  `.;%VSECON%\VSEConnector.jar;%$VSECON%\ibmjsse.jar;`
  `%VSECON%\cci.jar`

To update the Classpath for the whole Windows system, update it in
START – Settings - **Control panel – System**
- Andvanced Tab - Environment Variables

Verify the VSECON variable :

- in Windows:

  `set VSECON` `(Linux: echo $VSECON )`

  It must show the installation path of VSE Connector Client
  i.e. **`C:\vsecon`**

To update the VSECON variable in Windows , update it in **Control panel - System - Andvanced Tab - Environment Variables**

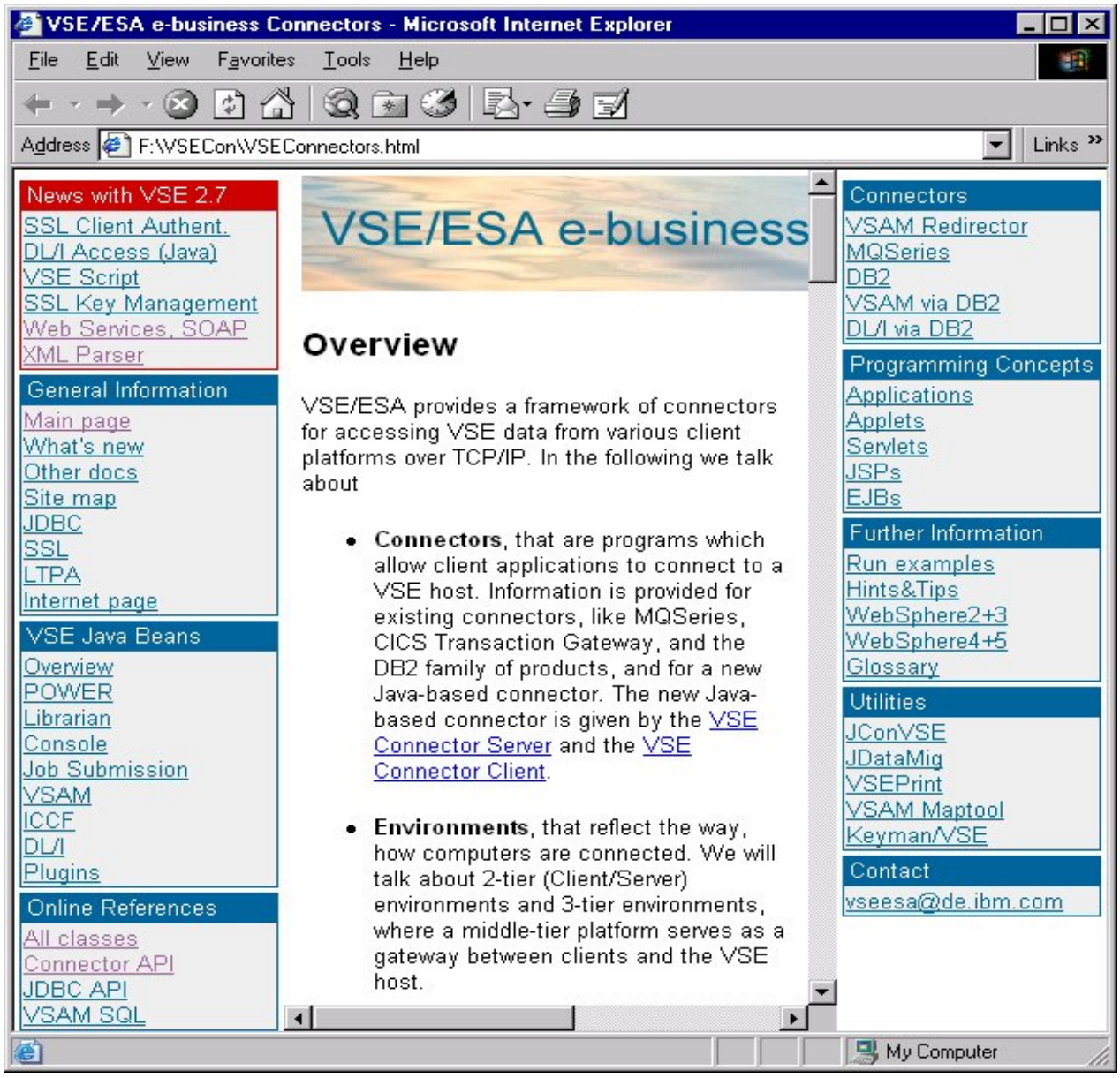
NOTE: You may have to open a new command prompt to take the changes in effect.

Chapter3:Verify installation of Connector Client

STEP3.1: Verify VSE Connector Client documentation

To verify that the VSE Connector Client is installed properly,
open the VSE Connector Client HTML Documentation.

START -> Programs -> VSE Connectors -> VSEConnectors.html
The Main HTML page will be opened.



Verify installation of Connector Client

STEP3.2: Verify that VSE Connector Client can work with VSE/ESA resources

Make sure the VSE Connector server is started on VSE. To see how to start VSE Connector server see *Setup Connector Server on VSE* at the beginning of this presentation.

From the main local HTML page of VSE Connectors, (see STEP3.1)

Click:

Applications in section **Programming Concepts** in right frame.

Click on **Examples -> How to work with Librarian Objects**

The commented source code explains the steps of this program.

The link **LibrApiExample.java** shows the entire source code of the program. The program accesses VSE Libraries via the VSE Java-Based Connector and retrieves all the Library names from VSE, the sub libraries for PRD2 and the members for Library PRD2.CONFIG.

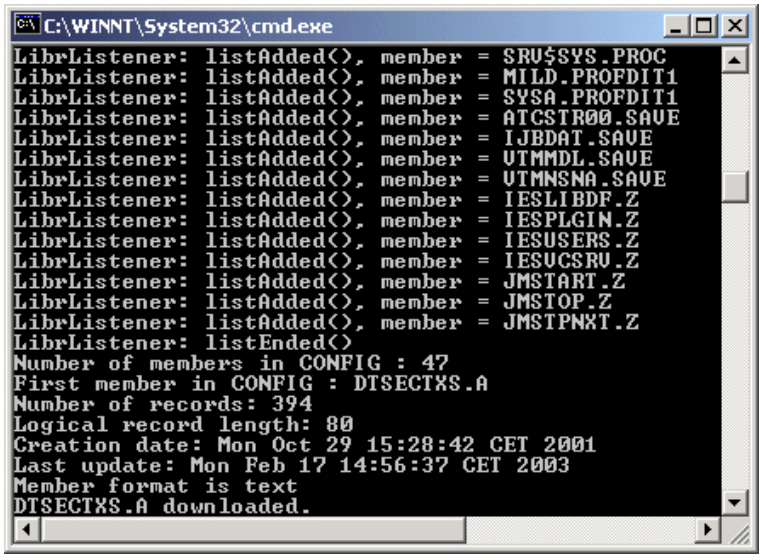
All samples are stored on your PC in the VSE Connector Client folder:
<vsecon>\samples

Make sure you know the IP address of the VSE system, the userid and password to use.

On a command prompt navigate to the ***<vsecon>\samples*** directory

Start the program:

`LibrApiExample.bat`



Chapter4: Connector Sample to access VSAM data in batch

Access VSAM data via Java-Based Connector
using the Java sample program VsamDisplayExample

All samples are stored in the VSE Connector Client folder:
<vsecon>\samples
The Java source code is in: *<vsecon>\samples\com\ibm\vse\samples*

We will work with VsamDisplayExample.java
The program displays the content of a VSAM file using a MAP.

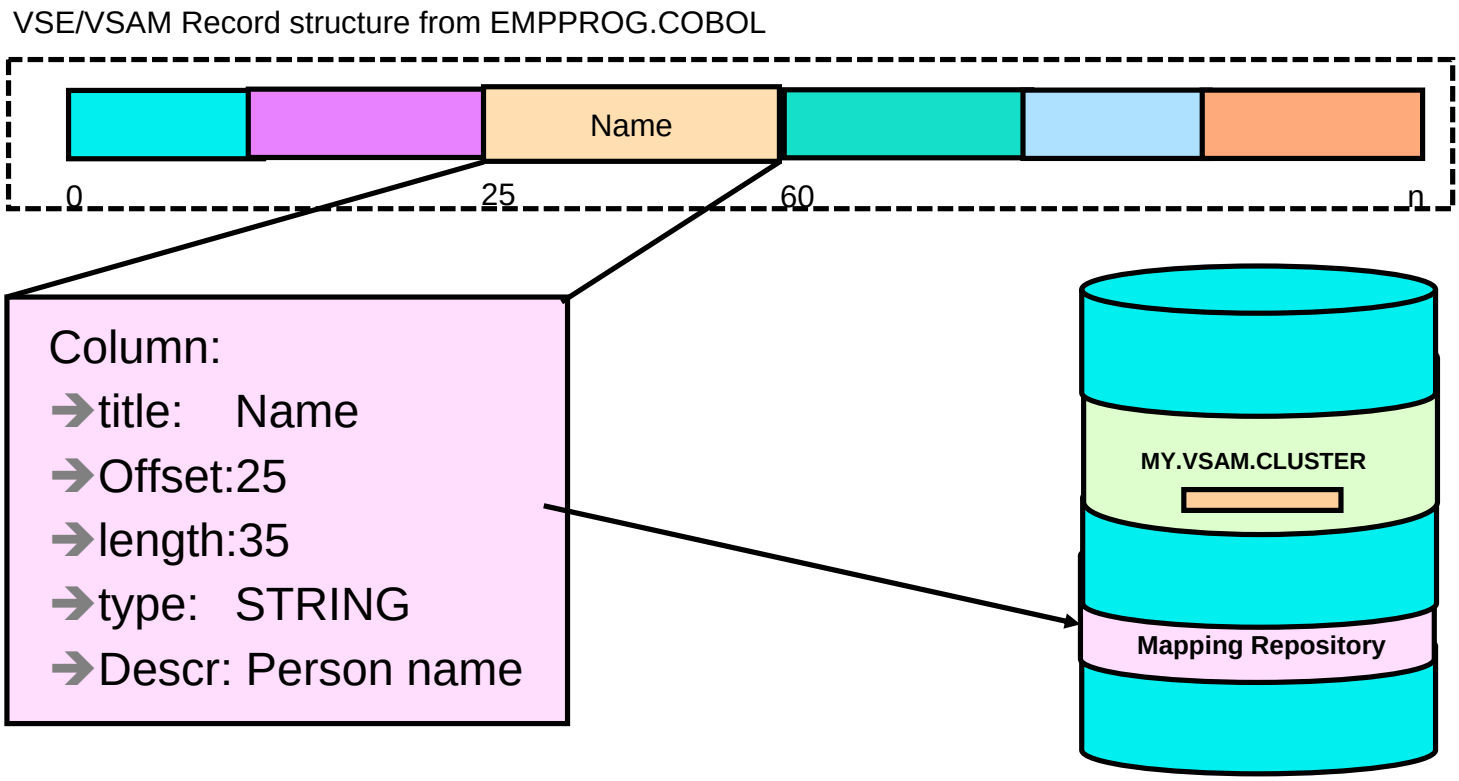
STEP4.1 Mapping specification for a VSAM cluster

To have access via Connectors to a VSAM file, the structure of the record must be defined. This definition is called the **map**. The elements of a map are **columns**. A subset of the columns can be grouped in a **view**, were a view refers to columns of a map rather then having definitions of the columns. Multiple maps and views can be defined for a VSAM cluster..

Make sure you know the IP address of the VSE system, userid and password.
The Map (i.e. **FLIGHTS_MAP**) we have to define contains the following fields:

```
Offset Length Type      Key    Field Name     Description
-----------------------------------------------------------------
0      4      UNSIGNED  yes    FLIGHT_NUMBER  Flight Number
4      20     STRING    no     START          Start
24     20     STRING    no     DESTINATION    Destination
44     5      STRING    no     DEPARTURE      Departure (hh:mm)
49     5      STRING    no     ARRIVAL        Arrival    (hh:mm)
54     4      UNSIGNED  no     SEATS          Seats
58     4      UNSIGNED  no     RESERVED       Seats reserved
62     4      PACKED    no     PRICE          Price
66     20     STRING    no     AIRLINE        Airline
```

Mapping of VSAM cluster



Mapping characteristics:

- **No changes to VSAM data**
- **Mapping information stored in a repository in VSAM (VSE.VSAM.MAPPING.DEFS)**
- **Possible data types: STRING, binary, signed number, unsigned number, packed data**
- **Multiple maps and views (subset of map fields) supported**
- Mapping of VSAM cluster can be done using:
  - Maptool - standalone program,
  - IDCAMS RECMAP on VSE/ESA,
  - a Java program, or VSE Navigator

Install Maptool

STEP4.2 Navigate to Maptool from VSE home page

Open the VSE Homepage with a web browser:

http://www-1.ibm.com/servers/eserver/zseries/os/vse/

Click on "**Service and Support**" on the left side

and then on "**e-business connectors and utilities**".

Navigate to **Maptool -> Details and Download**

STEP4.3 Download Maptool Code

HTML download:

Click on: **maptool.zip** (VSE 2.7). The file name may vary.

The download process will be started. You will be prompted to specify where to save the code. *Save it in a place you remember later on*.

FTP download:

For FTP download, have a look at *STEP2.4*

After the code is *downloaded,* unzip it to the directory you'd run it from. No further installation actions are required to run it.

pkunzip maptool.zip

The ZIP file contains the startup files of Maptool:

run.bat run.sh

Note: - The VSE Connector client must be installed.

- Verify that the CLASSPATH and variable VSECON is set (set VSECON and set CLASSPATH) or adjust the CLASSPATH in run.bat

Start the Maptool, using command (in <maptool> root directory):

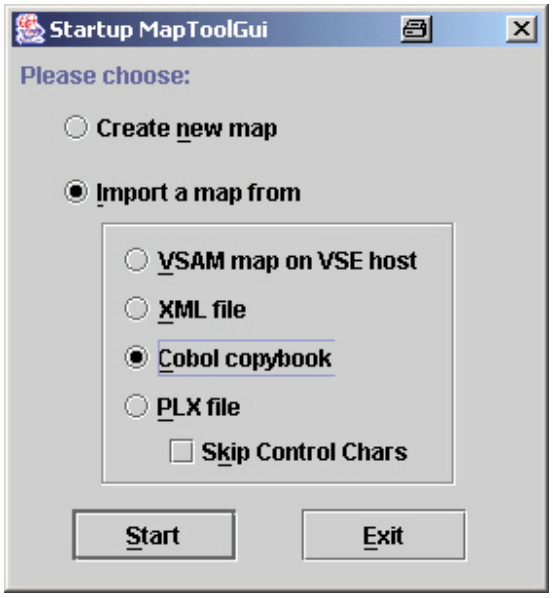
run.bat

Create a Map using Maptool and a COBOL Copybook

STEP4.4 Mapping of FLIGHT.ORDERING.FLIGHTS using Maptool

Import the existing Cobol Copy Book *Flights.cb* from **<maptool>\doc** directory, with the definitions of the VSAM record.

Click: **Import a map from -> COBOL Copybook**



Click on **Start.** Specify the Cobol copybook file. **Open**
Verify that there are no conflicts.
Click on **Import**.
The map will be shown. Verify and compare the definitions of the fields with the definitions in Step 4.1.
Click on **Export - > VSE VSAM Map**
Specify required parameter,
VSE IP: xxx.xxx.xxx.xxx Port: **2893**
Catalog : **VSESP.USER.CATALOG**
Cluster: **FLIGHT.ORDERING.FLIGHTS.TEAMxx**
xx is your team number
Map: **FLIGHTS_MAP**
Click: **OK**
At this time the map is defined in the specified VSE system.

Access VSAM using VsamDisplayExample

STEP4.5: Modify Java program VsamDisplayExample

Start the program in **<vsecon>\samples** with **VsamDisplayExample.bat**
You get an error, then go to next step ?

Exercise: The name of the VSAM file must be modified.

The source program is in <vsecon>\samples\com\ibm\vse\samples

- Edit program VsamDisplayExample.java (i.e. notepad) and change
  - the cluster name: **FLIGHT.ORDERING.FLIGHTS**
    to **FLIGHT.ORDERING.FLIGHTS.TEAMxx**
  - the map name: **FLIGHTS_MAP**
    where xx is your team number
- Save the modified source.
- Compile the changed program

To compile the source open a command prompt
and change directory to **<vsecon>\samples**
Enter: **javac com\ibm\vse\samples\VsamDisplayExample.java**

Note: the compile must be done from the <vsecon>\samples directory because all samples belong to the Java package com.ibm.vse.samples

If the compile returns no errors, execute the program
<vsecon>\samples\VsamDisplayExample.bat

Chapter5: Connector Sample to access VSAM data via CICS

STEP5.1: Access FLIGHTS.ORDERING.FLIGHTS via CICS

Since most of VSAM files are active in a CICS environment, to update them via Connectors, the VSAM cluster must be defined with Share Option 4 or the access with the Connectors must be done via CICS.
We'll use the same sample **VsamDisplayExample.java**
from <*vsecon*>*samples**com**ibm**vse**samples*

To can have access via CICS the file must be defined in CICS (verify it).
This can be done via: Interactive Interface -> PF6 -> CEDA DEF file(**FLIGHxx**) were xx – is the team number.

The map must be defined for this access – specific here is the catalog name for Connector access which has a name of:
#VSAM.#CICS.<CICSAPPLID>

In our case the CICS used is the one having APPLID DBDCCICS.

All samples are stored on your system in the directory: <*vsecon*>*samples*
The Java source code is in: <*vsecon*>*samples**com**ibm**vse**samples*

The Map **FLIGHTS** should contain the following field definitions:

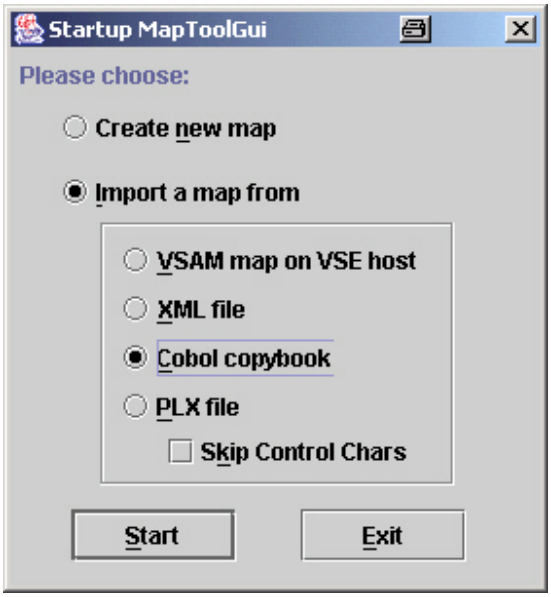
```
Offset Length Type      Key    Field Name     Description
-----------------------------------------------------------------
0      4      UNSIGNED  yes    FLIGHT_NUMBER  Flight Number
66     20     STRING    no     AIRLINE        Airline
4      20     STRING    no     START-AIRPORT  Start
24     20     STRING    no     DESTINATION    Destination
62     4      PACKED    no     PRICE          Price
```

Use the Maptool to define this map for access trough CICS.

Connector Sample to access VSAM data via CICS

STEP5.2: Use of Maptool to define a map for a VSAM cluster

Install maptool as decribed in STEP4.2 if not already done.
Import the existing Cobol Copy Book *Flights.cb* from <maptool>\doc directory, with the definitions of the VSAM record.
Import a map from -> COBOL Copybook



Click on **Start.** Specify the cobol copybook file. **Open**
Verify that there are no conflicts.
Click on **Import**.
The map will be shown. Verify and adjust the definitions of the fields with the definitions described in *Step5.1*.
Click on **Export - > VSE VSAM Map**
Specify required parameter,
VSE IP: xxx.xxx.xxx.xxx Port: **2893**

Catalog : **#VSAM.#CICS.DBDCCICS**
Cluster: **FLIGHxx - where xx is your team number**
Map: **FLIGHTS**
Click: **OK**
At this time the map is defined in the specified VSE system.

Connector Sample to access VSAM data via CICS

STEP5.3: Modify Java program VsamDisplayExample

Exercise: The name of the VSAM file and map must be modified.

The source program is in <vsecon>\samples\com\ibm\vse\samples

- Edit Java program VsamDisplayExample.java (with notepad) and change
  - The Catalog name: **#VSAM.#CICS.DBDCCICS**
  - the cluster name: **FLIGHxx**
  - the map name: **FLIGHTS**

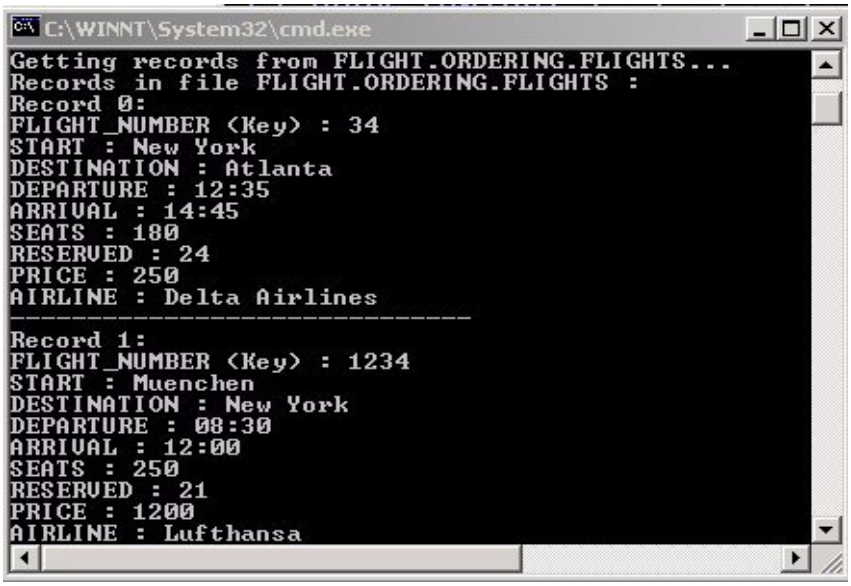
    where xx is your team number
- Save the modified source.
- Compile the changed program

To compile the source open a command prompt
and change directory to **<vsecon>\samples**
Enter: **javac com\ibm\vse\samples\VsamDisplayExample.java**

Note: the compile must be done from the <vsecon>\samples directory because all samples belong to the Java package com.ibm.vse.samples

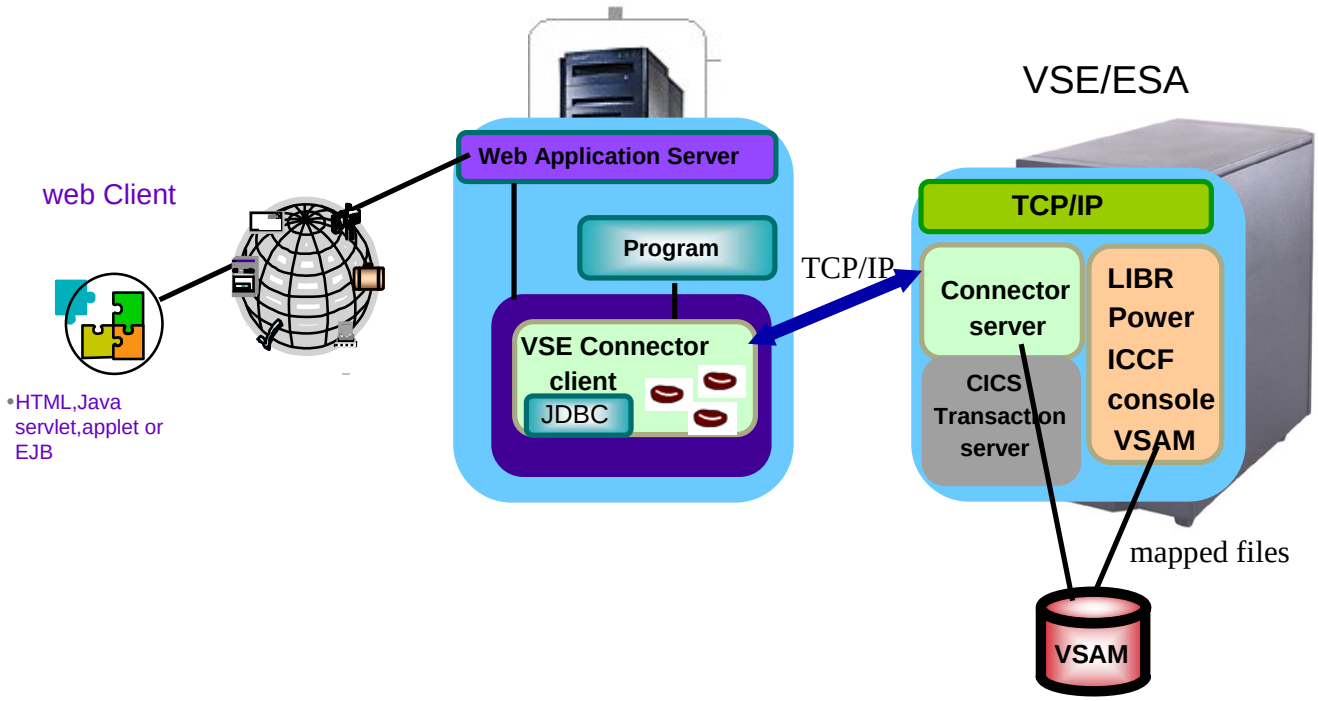
If the compile returns no errors, execute the program again

<vsecon>\samples\VsamDisplayExample.bat



Try to modify the program to retrieve a specific record only.

Overview possibilities
Java-Based Connector



- Java access to VSE/ESA Resources.
- VSE Connector client is part of VSE/ESA 2.5 and newer
- VSAM file access for mapped files
- better integration with Web Application Server using VSAM JDBC driver

Chapter6: Graphical interface to VSE/ESA, VSE Navigator

VSE Navigator is an application based on the VSE Connector Client.

A wide range of functions of the VSE e-business Connectors, are incorporated in the VSE Navigator.

With this graphical interface, VSE resources can be displayed and changed.

There are also other tools free downloadable from the VSE Home page.
(**Service and Support -> VSE Connectors**)

You can download the VSE Navigator in similar way from the homepage.

Save the downloaded file in its own directory and unzip it. The ZIP file contains the following files: **install.class, install.bat, install.cmd, install.sh**

To run the Navigator, the Connector client must be installed on your workstation.

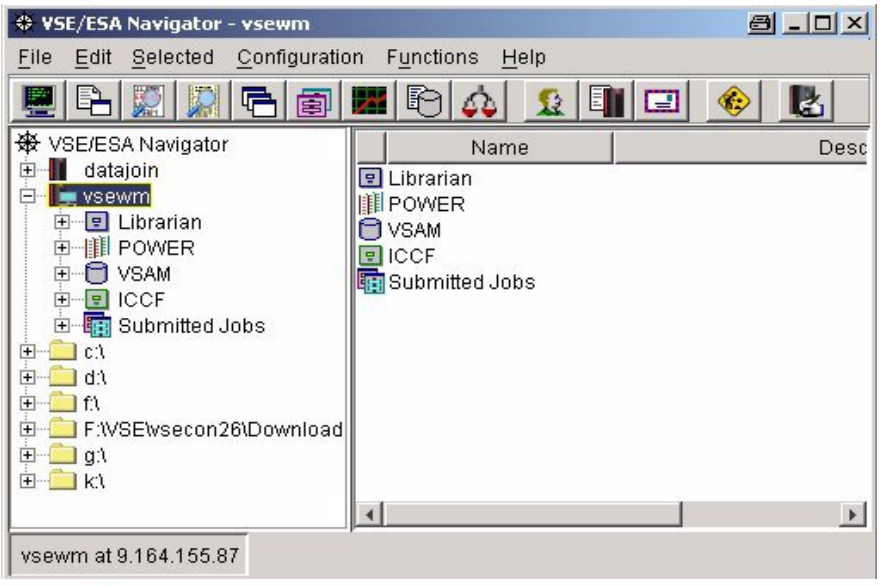
NOTE: Install Navigator in the same directory with VSE Connector client.

Open a Command prompt (Linux shell or DOS window) and change directory to the **install.class** file.

Enter: **java install** or run one of the install batch files.

The installation process will guide you.

Navigator can be used to work with multiple VSE systems at the same time from a graphical interface.



Graphical interface to VSE/ESA, VSE Navigator

✓Start Navigator (run.sh)

✓In Windows (**START-Programs- VSE Navigator**)

First start will guide you trough the settings:

✓Look and feel

✓Local directories

✓Local applications (i.e. Browser, file compare tool)

✓setup a host system

Configuration -> Hosts

enter Name you'd like to give this VSE in **Description**

enter the IP address,

and userid

and click **SAVE** and then **CLOSE**

Right click on the Host Icon and then **Connect**

Enter the *password* and then **OK**.

- To look at the same VSAM file you worked with the Java Program, after connecting to the VSE system:
- expand VSAM Folder
- expand **VSESP.USER.CATALOG** folder
- expand the cluster
  (i.e. **FLIGHT.ORDERING.FLIGHTS.TEAMxx**)
- right click on the MAP **FLIGHTS_MAP**
- click: **Display VSAM data**

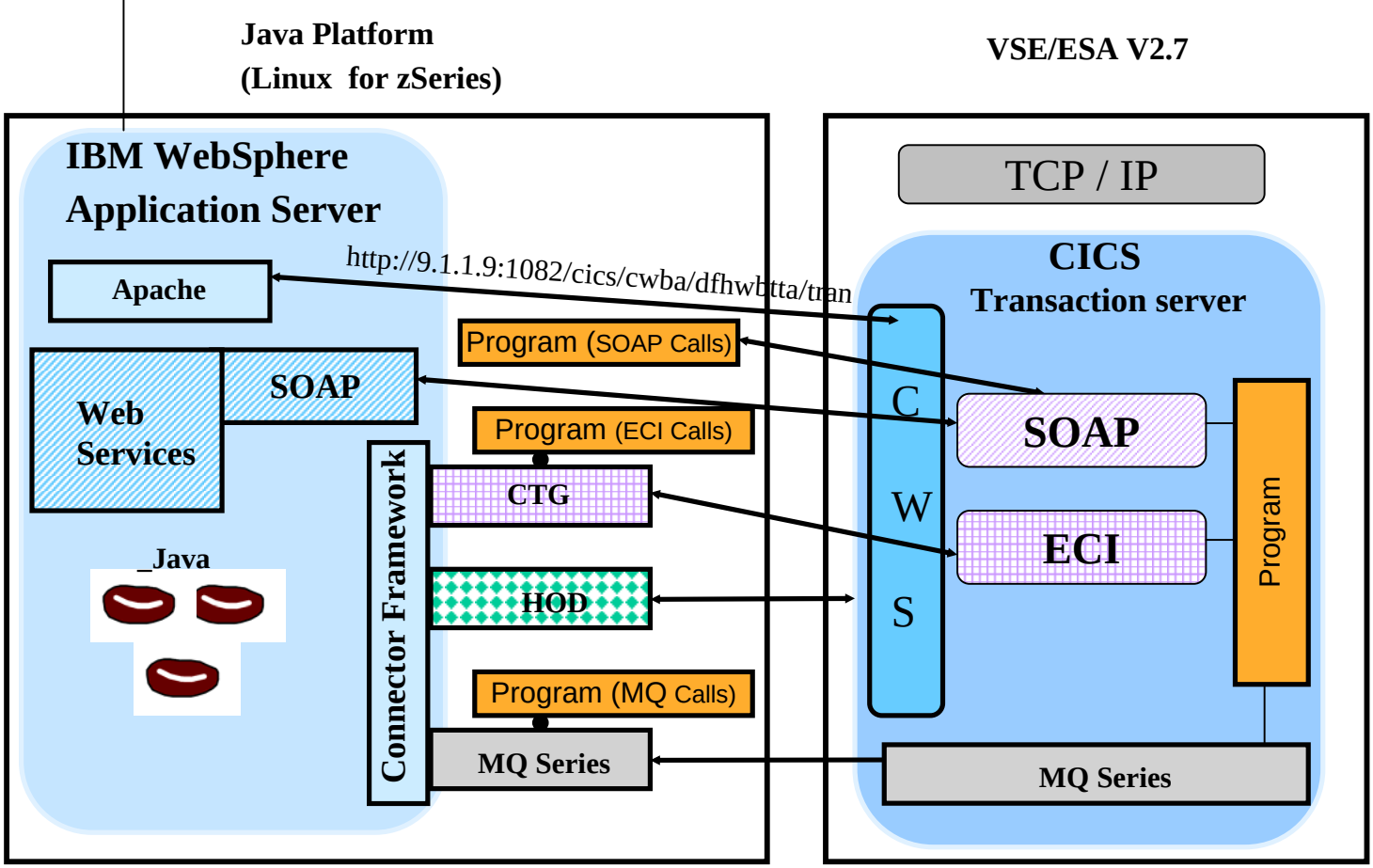
At this time, you used the same function as with the Java program, with the advantage of the graphical possibilities of VSE Navigator.

Access to CICS TS in VSE/ESA V2.7

Direct CICS app.. calls from Browser:

• Call via CWS (CICS Web support)
http://9.1.1.9:1082/cics/cwba/dfhwbtta/tran

•Call a CICS transaction as Web service
http://9.1.1.9:2006/cics/cwba/IESSOAPS



• CWS - CICS Web support (within CICS Transaction server 1.1 for VSE)
• CTG - CICS Transaction Gateway (Websphere CICS Connector)
• HOD - Host OnDemand (Websphere Host Integrator)
• SOAP - Simple Object Access Protocol

Setup for CICS Web support

- Change DFHSITxx for the CICS TS you'd like to enable CWS:
  - Enable Intersystem communication
    ISC=YES
  - Enable TCP/IP protocol
    TCPIP=YES
- Build the Conversion table
  - run skeleton **DFHCNV** from ICCF library 59
- Define TCP/IP service in CICS (no naming restriction):

```
CEDA  DEFine TCpipservice( CWS      )
  TCpipservice    : CWS
  Group           : VSESPG
  Description  ==> SERVICE FOR CWS
  Urm          ==> DFHWBADX
  Portnumber   ==> 08082              1-65535
  Certificate  ==>
  STatus       ==> Open               Open |
Closed
  SSl          ==> YES                 Yes |
No | Clientauth
  Attachsec    ==> Local              Local |
Verify
  TRansaction  ==> CWXN
  Backlog      ==> 00009              0-32767
  TSqprefix    ==>
  Ipaddress    ==>
  SOcketclose  ==> No                 No | 0-
240000
```

CWS additional setup for CTG

To allow incoming CICS requests from remote sites using CICS Transaction Gateway through External Call Interface (ECI), the CWS interface must be setup and an additional TPC/IP service must be defined with the Port for ECI requests and the associated initial transaction to be invoked.

- Define TCP/IP service in CICS (no naming restriction):

```
CEDA  DEFine TCpipservice( ECI      )
  TCpipservice   : ECI
  Group          : VSESPG
  Description  ==> SERVICE FOR ECI
  Urm          ==>
  Portnumber   ==> 01435              1-65535
  Certificate  ==>
  STatus       ==> Open               Open | Closed
  SSl          ==> No                 Yes | No | Clientauth
  Attachsec    ==> Verify             Local | Verify
  TRansaction  ==> CIEP
  Backlog      ==> 00001              0-32767
  TSqprefix    ==>
  Ipaddress    ==>
  SOcketclose  ==> No                 No | 0-240000
```

CWS additional setup for SOAP

To allow incoming SOAP requests from remote sites using the Web Services Architecture, to have platform independent data interchange using XML, the CWS interface must be setup and an additional TPC/IP service must be defined with the Port for SOAP requests and the associated initial transaction to be invoked.

- Define TCP/IP service in CICS (no naming restriction):

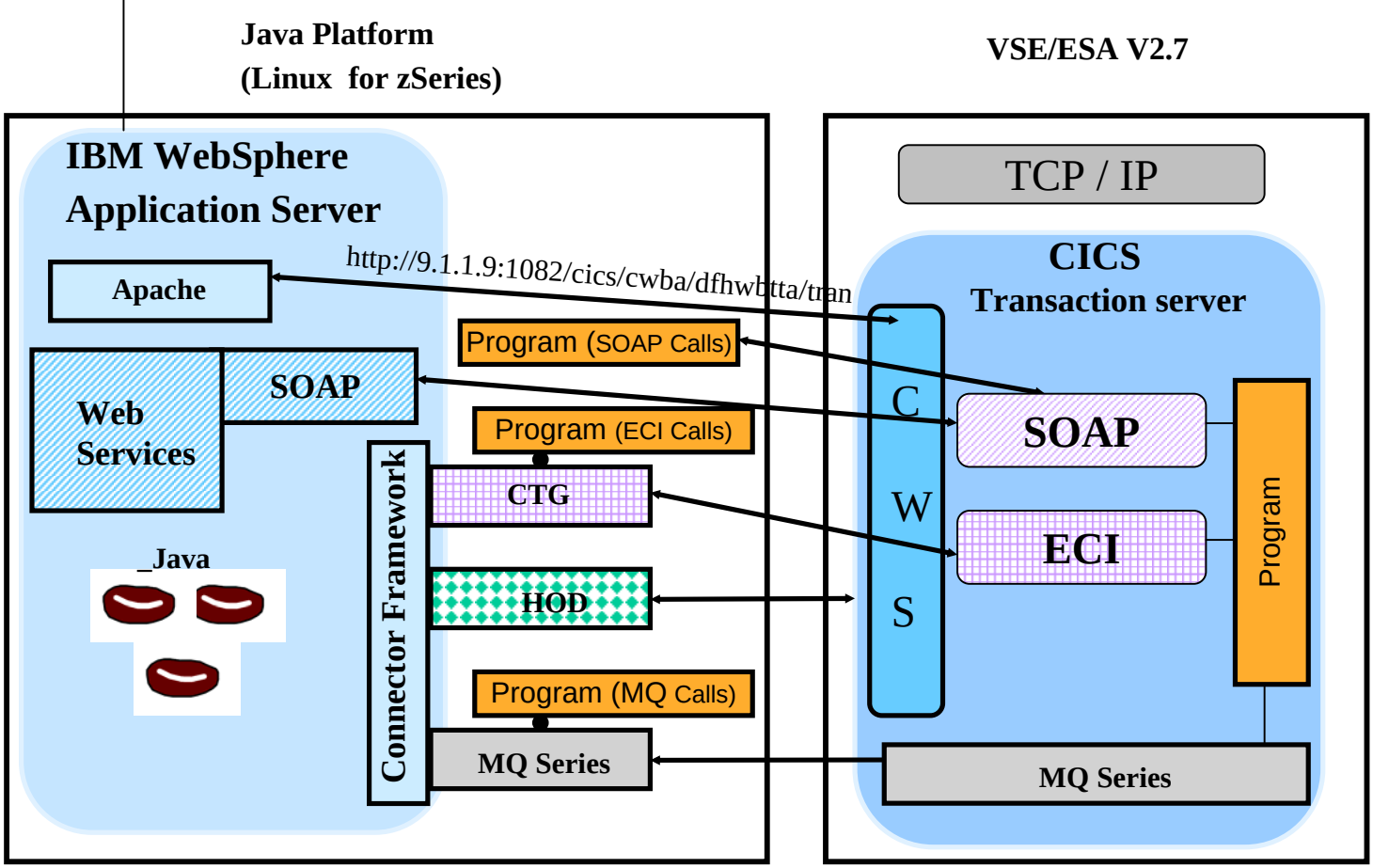
```
CEDA  DEFine TCpipservice( SOAP     )
  TCpipservice    : SOAP
  Group           : VSESPG
  Description  ==> SERVICE FOR SOAP
  Urm          ==> DFHWBADX
  Portnumber   ==> 08081              1-65535
  Certificate  ==>
  STatus       ==> Open               Open | Closed
  SSl          ==> YES                Yes | No | Clientauth
  Attachsec    ==> Verify             Local | Verify
  TRansaction  ==> CWXN
  Backlog      ==> 00001              0-32767
  TSqprefix    ==>
  Ipaddress    ==>
  SOcketclose  ==> No                 No | 0-240000
```

Access to CICS TS in VSE/ESA V2.7

Direct CICS app.. calls from Browser:

• Call via CWS (CICS Web support)
http://9.1.1.9:1082/cics/cwba/dfhwbtta/tran

•Call a CICS transaction as Web service
http://9.1.1.9:2006/cics/cwba/IESSOAPS



• CWS - CICS Web support (within CICS Transaction server 1.1 for VSE)
• CTG - CICS Transaction Gateway (Websphere CICS Connector)
• HOD - Host OnDemand (Websphere Host Integrator)
• SOAP - Simple Object Access Protocol

Summary

Major Steps to install VSE Connector Client on a workstation

- ✓install Java Runtime Environment (JRE) or
- ✓Java Developer Kit (JDK)
  - ✓free download from SUN or IBM
    - ✓version 1.3.x or later

    http://www.ibm.com/developerworks/java/

- ✓download VSE Connector client

http://www-1.ibm.com/servers/eserver/zseries/os/vse/support/vseconn/vsecon.html

- ✓install VSE Connector client
  - ✓at a command prompt enter: java install

- ✓download VSE Navigator

http://www-1.ibm.com/servers/eserver/zseries/os/vse/support/vseconn/vsenavi.html

- ✓install VSE Navigator
  - ✓at a command prompt enter: java install

Additional Information

- **VSE/ESA Home Page**
  http://www.ibm.com/servers/eserver/zseries/os/vse/

- **e-business Connectors User's Guide**
  SC33-6719
  http://www-1.ibm.com/servers/eserver/zseries/os/vse/pdf/ieswue21.pdf

- **e-business connectors tools**
  http://www.ibm.com/servers/eserver/zseries/os/vse/ebus/home.html

e-business Connectivity for VSE/ESA	**SG24-5950**
e-business Solutions for VSE/ESA	**SG24-5662**
Servlet and JSP Programming	**SG24-5755**
Linux Web Hosting with WebSphere, DB2, and Domino	**SG24-6007**

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