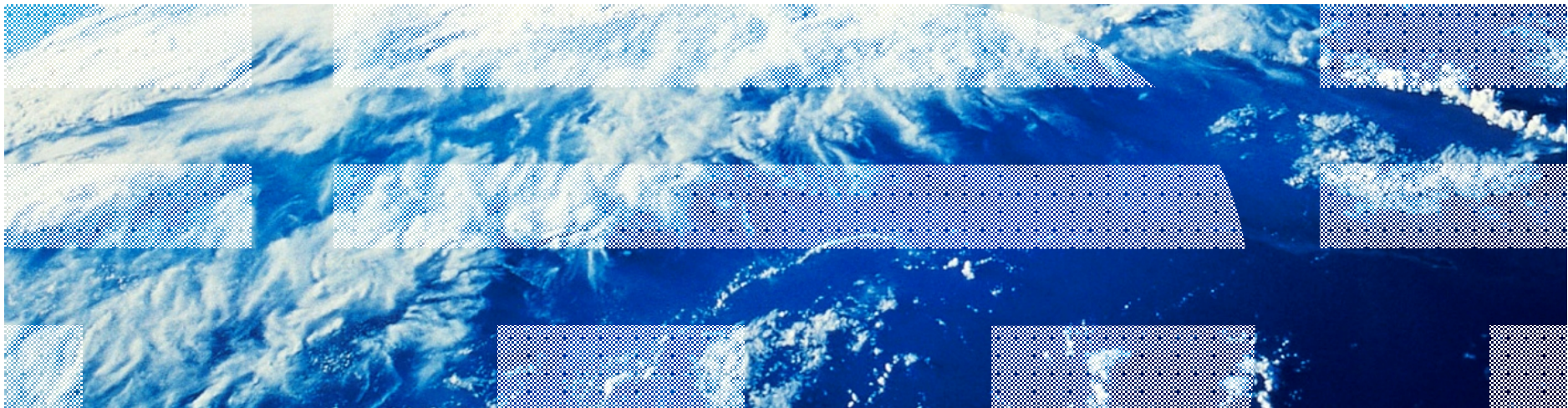# z/VSE Connectors Update

Ingo Franzki, IBM

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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.
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Agenda

§ **z/VSE V4.3 Connector Enhancements**

– POWER Output Generation Messages and exploitation in Java-based Connector

– Decimal Position support for Java-based Connector

– EXCPAD for VSAM Redirector

– Redirector Trace activation via VSAM SNAP

– New Tool: Virtual z/VSE FTP Daemon

§ **z/VSE V4.2 Connector Enhancements**

– Web Service (SOAP) Security

– Web Service support for long parameter names

§ **z/VSE V4.1 Connector Enhancements**

– VSAM Redirector – new DBHandler for data normalization

– VSAM Redirector – Loaders

– VSAM Redirector – Converters

– VSAM Redirector – Capture Exit

z/VSE V4.3: OGM Support - Overview

§ **As of z/VSE 4.2, VSE/POWER can generate the following notification messages for a SAS (Spool Access Support) application**

- **Job Generation message 1Q5HI (JGM):**
  Informs that the job, submitted via SAS interface, has generated another job as punch output with DISP=I

- **Job Completion message 1Q5DI (JCM):**
  Informs that the job, submitted via SAS interface, has completed

§ **With z/VSE 4.3, a new notification message has been added:**

- **Output Generation message 1Q5RI (OGM):**
  Is generated each time when the job, submitted via SAS interface, has created LST or PUN entry, and this entry became ready for processing

§ **For details about how to use the VSE/POWER Spool Access Support programming interface, please see Manual "VSE/POWER Application Programming"**

z/VSE V4.3: OGM Support - Benefits

§ **With the new OGM support, a Job Scheduler application can now control the whole lifetime of a job:**

- Job Submission
- Job Generation (DISP=I)
- Job Completion
- Output Generation

§ **Without OGMs, its hard to find all outputs generated by a job**

- A job may produce various outputs
  - Multiple LST/PUN cards in the job
  - Output segmentation
- Outputs may have different names than the generating job (JNM=nnn in LST/PUN card)
- Outputs may have different numbers than the generating job
  - Segmentation overflow (more than 127 segments)
  - Multiple LST/PUN cards in the job

§ **OGMs now provide a save way to retrieve all outputs generated by a Job**

z/VSE V4.3: OGM Support - VSE Connector Exploitation

§ The VSE Connector Client & Server now support OGMs

- When submitting a Job via VSE Connector Client, an application can request to queue OGMs for the job:

```
VSEPowerEntry entry = new VSEPowerEntry(system,QUEUE_RDR,"MYJOB");
entry.setQueueComplMsgs(true);   // request job completion messages
entry.setQueueOutputMsgs(true);  // request output generation messages
entry.put(jobfile);             // submit the job
```

- The application can check if a job has completed:

```
if(entry.isCompleted())          // check if the job execution is complete
```

- When the job has completed, the application can retrieve a list of outputs generated by the job:

```
entry.addVSEResourceListener(this);   // register as resource listener
entry.getOutputList();                // retieve the list of output entries
entry.removeVSEResourceListener(this); // de-register resource listener
```

- The application can then process the list of received VSEPowerEntry objects
- Example: com/ibm/vse/samples/SubmitJob.java in the samples directory

z/VSE V4.3: Decimal Positions - Overview

§ **The VSE Connector supports decimal data types like PACKED or ZONED**

  – **in both signed and unsigned variants**

§ **Those data types are often used by customer applications to store monetary type of information**

  – Monetary information usually has at least 2 decimal places, e.g. $123.45

  – COBOL or PL/1 applications usually store such decimal numbers as packed decimal (COMP-3) or zoned decimal data types, with implied decimal position

  – The implied decimal position (as the name implies) is not really stored as part of the decimal number, but it is implied when reading or updating the number

§ **Example:**

  – The decimal value of 123.45 is stored as packed decimal: `X'12345C'`

  – The implied decimal position is 2 in this case (2 digits from the right).

§ **Since the decimal position is not stored as part of the numerical data, that information needs to be stored as part of the mapping information together with the field name, offset, length and type**

§ **With z/VSE 4.3, the VSE Connectors has been enhanced to support (implied) decimal positions**

z/VSE V4.3: Decimal Positions - Details

§ **Decimal positions apply to the following data types:**

- PACKED   Packed Decimal (COBOL COMP-3)
- UPACKED   Unsigned Packed Decimal
- ZONED   Zoned Decimal (COBOL PIC 9(n))
- UZONED   Unsigned Zoned Decimal

§ **The decimal position can be:**

- Zero   No decimal position (e.g. 12345)
- Positive   Specifies the number of decimal digits from the right
  (e.g. 123.45 has a decimal position of 2)
- Negative   Specifies the number of implied zero digits right to the number
  (e.g. 1234500 has decimal position of -2 if stored as 12345
  as un-scaled value)

§ **The decimal position is interpreted by the VSE Connector Client when passing such numerical data to the calling application**

- The implied decimal position as stored in the mapping is applied to the (un-scaled) number, before passing it to the user application
- Any number passed from user application to the VSE Connector Client is converted to its un-scaled value based on the implied decimal position

§ **Decimal numbers with a non-zero decimal position are represented as Java java.math.BigDecimal object by the VSE Connector Client**

z/VSE V4.3: Decimal Positions - Details

§ **The following components have been updated to support decimal positions**

 – The mapping file (IESMAPD) to store the decimal position
 – VSE Connector Client to handle decimal positions and java.math.BigDecimals
 – VSAM JDBC Driver to support Decimal Positions
 – VSE Script Server to support Decimal Positions
 – IDCAMS RECMAP command to support Decimal Positions
 – VSAM Maptool to support Decimal Positions
 – VSE Navigator to support Decimal Positions

§ **Any existing mapping stored in the mapping file IESMAPD can be used unchanged with z/VSE 4.3 or later**

 – Any migrated decimal field will have a zero decimal position, which is what they implicitly had when no decimal position support was existing.

§ **Any existing application that did work with an older version of the VSE Connector Client will work unchanged with the z/VSE 4.3 version of VSE Connector Client**

 – As long as the mapping is not changed to use decimal positions other than zero
 – Mappings migrated or copied over from previous versions will automatically have a zero decimal position, as stated above
 – User applications may have to be adapted if non-zero decimal positions are used
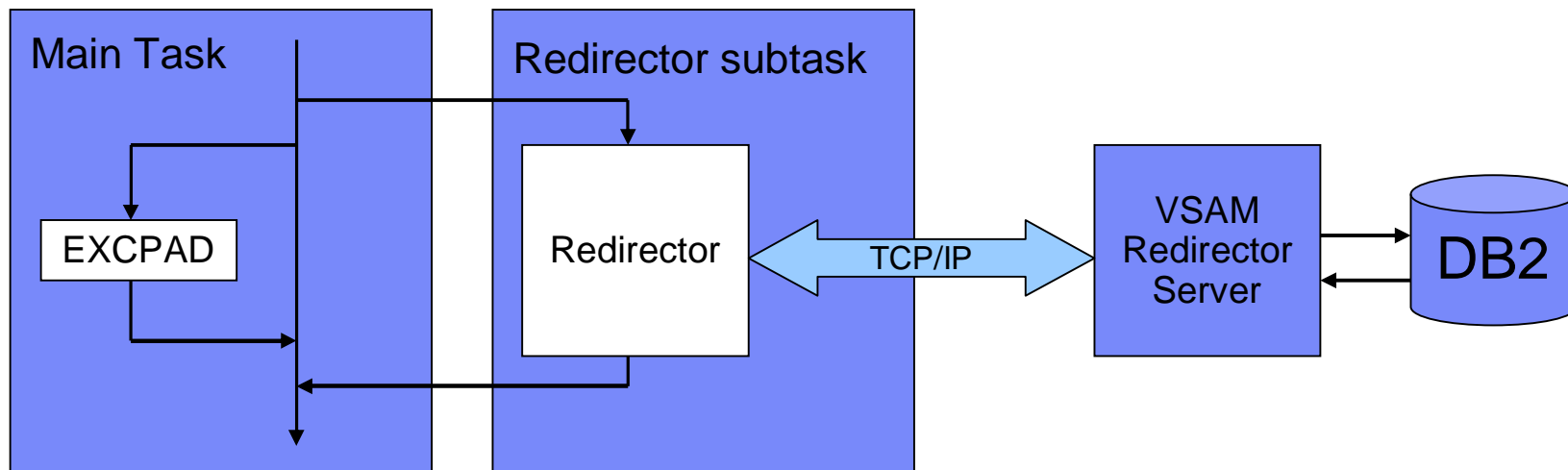
z/VSE V4.3: Redirector EXCPAD - Overview

§ **Prior to z/VSE 4.3** **the VSAM Redirector was executed** **in the same subtask** **as VSAM and the application (caller)**

– Redirector activities may be time consuming (network transfers, database operations, ...)

• During this time, no other activities are possible for this subtask

– Under CICS, VSAM normally returns back via EXCPAD exit when waiting for an I/O

• Allows CICS to perform other activities concurrently

§ **Since z/VSE 4.3** **VSAM executes the Redirector under a** **separate subtask**

– VSAM now also returns back to CICS via EXCPAD when waiting for Redirector

• Allows CICS to perform other activities concurrently

– This capability is primarily implemented for CICS TS transactions.

• The Redirector EXCPAD is not used for VSAM files opened by CICS/VSE.

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z/VSE V4.3: Redirector EXCPAD - Benefits

§ **Prior to z/VSE 4.3 heavy use of VSAM Redirector could slow down transaction processing in CICS**

– Due to VSAM requests block the CICS I/O task when Redirector is active

§ **With the new subtask the VSAM Redirector handling no longer blocks the CICS I/O task**

– Allowing other transactions to do its work

– Multiple redirected requests will be queued up for processing in the new subtask

§ **The EXCPAD user exit is enabled automatically under the following conditions:**

– a VSE/VSAM cluster is enabled for the Redirector

– the EXCPAD exit is defined during the OPEN request

§ **VSAM will attach only one Redirector subtask per partition even if multiple redirected files are opened in the partition with an active EXCPAD**

§ **Support is transparent**

– No need to configure or setup anything

– All types of Redirector activities are processed in subtask (except OPEN/CLOSE)

  • VSAM Redirector OWNER=VSAM or REDIRECTOR

  • VSAM Capture Exit

  • Customer/Vendor implemented Redirector Exit

z/VSE V4.3: Redirector Trace activation via SNAP

§ The VSAM Redirector host parts consist of
– IESVEX01 (will be renamed to IKQVEX01 when activating redirection)
– IESREDIR – VSAM Redirector Client
– IESVSCAP – VSAM Capture Exit

§ All 3 parts have an internal trace facility
– Prior to z/VSE 4.3, the trace could only be activated through a MSHP PATCH
  • Trace was written to SYSLOG (console) only
– Since z/VSE 4.3, the trace can now be dynamically enabled (and disabled) via the VSAM SNAP trace
  • Trace is now written to SYSLST (listing) of job

§ Trace activation is done via IKQVEDA:

```
// EXEC IKQVEDA,PARM='SYSIPT'
ENABLE SNAP=0010,PART=F2
END
/*
```

z/VSE V4.3: VSAM SNAP Trace assignments

Type:	Enables:
0001	Catalog management error code trace
0002	Buffer manager trace
0003	OPEN control block dump (when OPEN processing is complete) OPEN error trace (prints control blocks if an error occurs during OPEN processing) CLOSE control block dump (at the beginning of CLOSE processing)
0004	VSE/VSAM I/O trace
0005	I/O error trace
0008	Catalog management I/O trace (prints all I/O operations done by VSE/VSAM catalog management)
0009	Record management error trace (prints control blocks for any error detected by VSE/VSAM record management)
0010	**Redirector Trace**
0013	In-core wrap trace for trace points within VSE/VSAM Record Management
0014	Level2 SNAP013 Trace (I/O, EXCPAD and z/VSE Lock Activity)
0015	Level3 SNAP013 Trace (Buffer Management)
0016	Produce a printout (PDUMP) each time the SNAP013 Trace Table wraps.

New Tool: Virtual z/VSE FTP Daemon

§ **The Virtual z/VSE FTP Daemon can be installed on any Java-enabled platform and emulates an FTP server**

– The actual access to z/VSE resources is done using the VSE Connector Server.

§ **Download:** http://ibm.com/zvse/download

à **Fits perfectly to Linux Fast Path**

§ **The Virtual z/VSE FTP Daemon:**

– Handles all incoming FTP clients.

– Connects to one or multiple VSE Connector Servers.

– Is responsible for connection-handling.

– Is responsible for data translation (ASCII-EBCDIC).

– Is IPv6 ready

• You can connect FTP clients using IPv6, the Virtual z/VSE FTP Daemon connects to the VSE Connector Server using IPv4.

– Supports SSL

• both for the FTP connection (between FTP client and Virtual z/VSE FTP Daemon, using implicit SSL (FTPS)),

• and for the connection to the VSE Connector Server (between Virtual z/VSE FTP Daemon and z/VSE host).
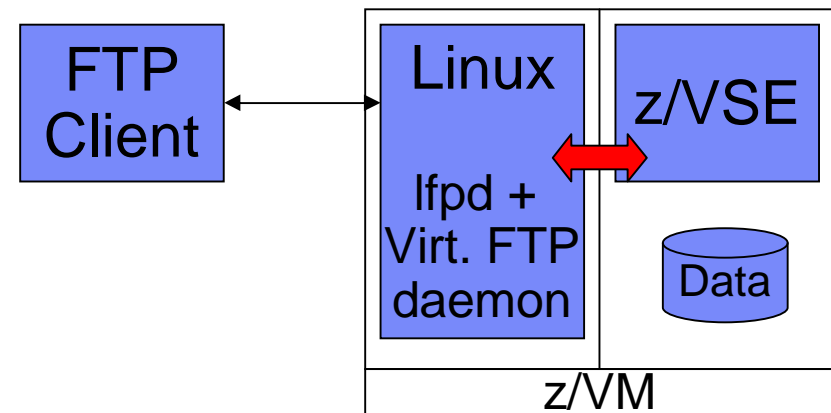
FTP Client

Linux
lfpd +
Virt. FTP
daemon

z/VSE

Data

z/VM

Agenda

§ z/VSE V4.3 Connector Enhancements

– POWER Output Generation Messages and exploitation in Java-based Connector
– Decimal Position support for Java-based Connector
– EXCPAD for VSAM Redirector
– Redirector Trace activation via VSAM SNAP
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§ z/VSE V4.2 Connector Enhancements

– Web Service (SOAP) Security
– Web Service support for long parameter names

§ z/VSE V4.1 Connector Enhancements

– VSAM Redirector – new DBHandler for data normalization
– VSAM Redirector – Loaders
– VSAM Redirector – Converters
– VSAM Redirector – Capture Exit

z/VSE V4.2: Web Service Security - What is SOAP

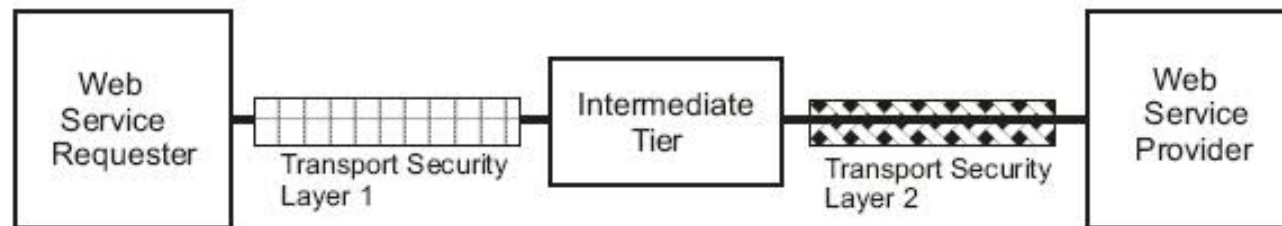Web Servcies uses the Simple Object Access Protocol (SOAP) to transport requests and responses

```
<soap:Envelope>
  <soap:Header>
    ...
  </soap:Header>
  <soap:Body>
    <GetStock>
      <Company>IBM</Company>
    </GetStock>
  </soap:Body>
</soap:Envelope>
```

z/VSE V4.2: Web Service Security - Overview

§ **Web Service security can be divided into:**

– Transport-layer security

• E.g. Secure Socket Layer, HTTPS, IPSec, VPN

– Message-layer security

• Security related elements within the SOAP message

§ **Both transport-layer and message-layer security provide security features for:**

– Authentication/authorization

– Data encryption and signatures

z/VSE V4.2: Web Service Security - Authentication

§ **Using authentication allows a service provider to check who is using the requested service**

– The service provider may use this information to execute the service under a specific user-ID, with its associated access rights (authorization)

§ **Terms:**

– **Authentication:**

• The process of identifying an individual using the credentials of that individual.

– **Authorization:**

• The process of determining whether an authenticated client is allowed to access a resource or perform a task within a security domain. Authorization uses information about a client's identity and/or roles to determine the resources or tasks that a client can perform.

– **Credentials:**

• A set of claims used to prove the identity of a client. They contain an identifier for the client and a proof of the client's identity such as a password. They may also include information, such as a signature, to indicate that the issuer certifies the claims in the credential.

– **Identification:**

• The use of an identifier that allows a system to recognize a particular subject and distinguish it from other users of the system

z/VSE V4.2: Web Service Security - Authentication

§ Transport Layer Authentication

- The transport layer carries information about who is requesting the service
  - HTTP Authentication (Basic and Digest Access Authorization, see RFC 2617)
  - SSL Client Authentication with SSL/HTTPS

§ Message Layer Authentication

- The SOAP message itself carries information about who is requesting the service
  - Direct authentication, using plain text passwords or a password digest
  - Brokered Authentication, using a X.509 Certificate
    Carries the X.509 Certificate as part of the SOAP header

z/VSE V4.2: Web Service Security – Direct Authentication

§ **Direct authentication** defines two ways of transporting the password:

- **Plain text password**
  - UsernameToken is used to transport the actual password.
  - If you use plain-text password configuration, you must use a secure transport method (such as HTTPS)

```
<soap:Header>
  <Security xmlns="...secext-1.0.xsd>
    <UsernameToken>
      <Username>John Smith</Username>
      <Password>Pass12wd</Password>
    </UsernameToken>
  </Security>
  ...
```

- **Password digest**
  - See next foil

z/VSE V4.2: Web Service Security – Direct Authentication

§ **Direct authentication with Password digest**

- **The communicating parties (the requester and the service) use an insecure transport channel**
  - Steps must be taken to protect the passwords from being exposed to others
  - The requester creates a digest of the actual password that is concatenated with a set of random bytes (field nonce) and another value that is dependent on the creation-time (field created).

  ```
  digest = Base64_encode(SHA-1(nonce+created+password))
  ```

- **To authenticate the request, the service provider computes the digest value using the password bound to the received username.**
  - It compares the received digest value with the computed digest value.
    ```
    <soap:Header>
      <Security xmlns="...secext-1.0.xsd>
        <UsernameToken>
          <Username>John Smith</Username>
          <Password Type="...#PasswordDigest">AFHHF23wger=</Password>
          <Nonce>ksSDGFljdfD=</Nonce>
          <Created>2010-07-15T07:12:19.573Z>/Created>
        </UsernameToken>
      </Security>
    ...
    ```

z/VSE V4.2: Web Service Security – Brokered Authentication

§ **Brokered authentication using a X.509 Certificate**

– Carries the X.509 Certificate as part of the SOAP header

```
<soap:Header>
  <Security xmlns="...secext-1.0.xsd>
    <BinarySecurityToken EncodigType= "wsse:Base64Binary"
                         ValueType= "wsse:X509v3">
      MIICuzCCAiQCBF...
      ...
    </BinarySecurityToken>
  </Security>
...
```

– The certificate is base64 encoded

– The receiver can use the certificate to authenticate the requestor

– The use of a secure transport channel is recommended

  • Secure Socket Layer, HTTPS

z/VSE V4.2: Web Service Security – VSE as Service Provider

§ **Transport Layer Security**

– **Encryption**

- CICS Web Support already provides SSL support (HTTPS)

  - Configure TCPIPSERVICE in CICS for use with SSL

  - Create the required keys and certificates.

– **Authentication**

- CICS Web Support supports SSL client authentication (HTTPS), as well as HTTP Basic Authentication

  - To force a client to use HTTP basic authentication, you need to configure the TCPIPSERVICE to use the CICS provided converter program DFH$WBSB (specify URM=DFH$WBSB)

- VSE SOAP Engine also passes userid and password to the service provider program

§ **Message Layer Security**

– **Authentication**

- Support for extracting the authentication token from the SOAP header has been added

- The VSE SOAP Engine passes the authentication information to the service provider program

- The VSE SOAP Engine does not itself perform the authentication

z/VSE V4.2: Web Service Security – VSE as Service Requestor

§ **Transport Layer Security**

– **Encryption**

- The z/VSE HTTP Client has been enhanced to support HTTP over SSL (HTTPS)
  - The URL must start with https:// …
  - You must provide a public/private key pair, together with certificates.
  - For details of how to specify the keys, refer to the skeleton SKSOAPOP in VSE/ICCF Library 59.

– **Authentication**

- SSL Client Authentication can be used
  - If requested, the SSL protocol can send the client's certificate to the server
- The z/VSE HTTP client has been enhanced to support HTTP basic authentication
  - The Service requestor needs to tell the VSE SOAP Engine to use HTTP Authentication

§ **Message Layer Security**

– **Authentication**

- The VSE SOAP Engine has been enhanced to support
  - UsernameToken with plain text password or password digest
  - BinarySecurityToken using X.509 Certificate
- The Service requestor needs to tell the VSE SOAP Engine which kind of token to use (including the userid & password or certificate name)

z/VSE V4.2: Web Services – Further enhancements

§ Mapping Long-Names to Short-Names

– Due to the size restriction for TS Queue entries, SOAP parameters can only have names up to 16 characters (as shown in the SOAP_PROG_PARAM control block)

  • If you wish to use SOAP parameters that are greater than 16 characters, you can supply your own mapping to map long names (greater than 16 chars) to short names (less than or equal to 16 characters)

– **The z/VSE SOAP Engine will translate:**

  • Long names to their corresponding short names when it receives SOAP messages that contain parameters with long names
  • Short names to their corresponding long names when sending out SOAP messages containing parameters with long names

– **Short names that belong to a long name must start with a "#" character**

  • so that the z/VSE SOAP Engine can recognize this as a name that needs to be translated.

– **The mapping is specified in the SOAP option phase IESSOAPO.**

  • Use Skeleton SKSOAPO in ICCF library 59 to supply the mapping

Agenda

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– Web Service (SOAP) Security
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§ z/VSE V4.1 Connector Enhancements

– VSAM Redirector – new DBHandler for data normalization
– VSAM Redirector – Loaders
– VSAM Redirector – Converters
– VSAM Redirector – Capture Exit

z/VSE V4.1: VSAM Redirector Enhancements

§ New DBHandler (old handler is DB2Handler):

- VSAM keyfield can be mapped to multiple fields
- Lists of data can be normalized in the database
- Variable length lists are supported
- Record types are supported
- OWNER=REDIRECTOR only
- A graphical user interface can be used to create the configuration for the DBHandler (imports COBOL copybooks)

§ Loaders:

- Provides a fast copy of VSAM records into a database
- DeltaLoader & MQLoader: For use with VSAM Capture Exit

§ Converters:

- a new concept to convert host-datatypes (EBCDIC, packed decimal, ...) into open systems datatypes
- Additional special converters can be implemented by customers or vendors
- The converters allow great flexibility in datatype conversion by providing alot of options for the conversion (documented in the HTML documentation

z/VSE V4.1: VSAM Redirector Enhancements

Mapping of fixed-length lists with (old) DB2Handler

§ With DB2Handler: possible, but suboptimal

§ All fields are in the same database table

COBOL copybook

01 RECORD-1.

    03 KEYFIELD PIC X(8).

    03 DATAFIELD PIC X(10).

    03 FIXED-LIST OCCURS 3.

      05 LISTFIELD-A PIC 9(9).

      05 LISTFIELD-B PIC X(5).

Database table RECORD_1

§KEYFIELD

§DATAFIELD

§LISTFIELD_A_1

§LISTFIELD_B_1

§LISTFIELD_A_2

§LISTFIELD_B_2

§LISTFIELD_A_3

§LISTFIELD_B_3

Field	KEYFIELD	DATAFIELD	LISTFIELD_A_1	LISTFIELD_B_1	LISTFIELD_A_2	LISTFIELD_B_2	LISTFIELD_A_3	LISTFIELD_B_3
Data	KEY12345	DataValue	1	Val1	2	Val2	3	Val3

z/VSE V4.1: VSAM Redirector Enhancements

Mapping of fixed-length lists with (new) DBHandler

Automatic normalization:

COBOL copybook

01 RECORD-1.

    03 KEYFIELD PIC X(8).

    03 DATAFIELD PIC X(10).

    03 FIXED-LIST OCCURS 3.

        05 LISTFIELD-A PIC 9(9).

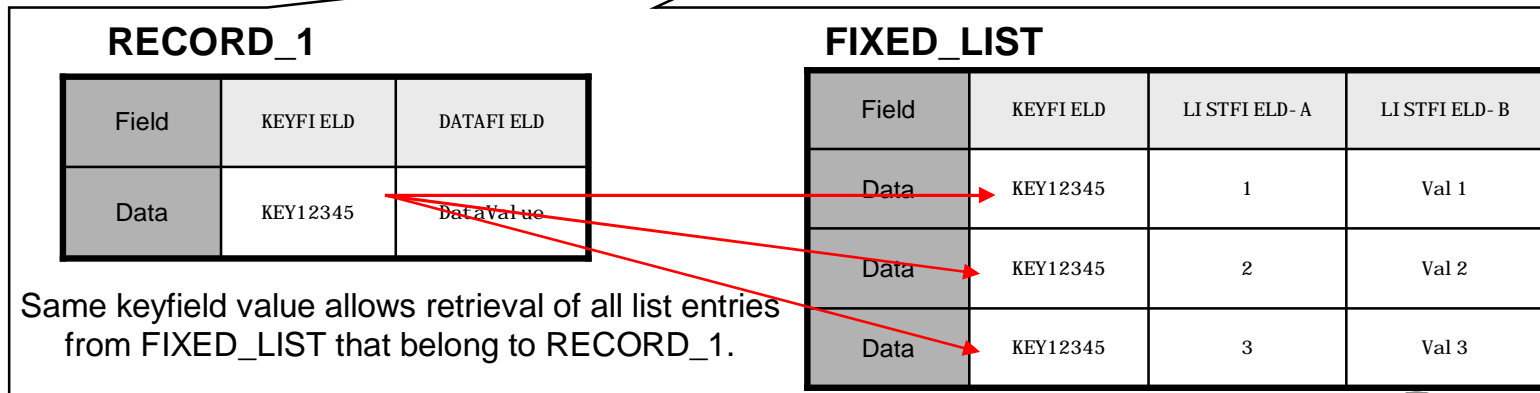   05 LISTFIELD-B PIC X(5).

Database table RECORD_1

§KEYFIELD

§DATAFIELD

Database table FIXED_LIST

§KEYFIELD (foreign key relation)

§LISTFIELD-A

§LISTFIELD-B

RECORD_1

Field	KEYFIELD	DATAFIELD
Data	KEY12345	DataValue

Same keyfield value allows retrieval of all list entries from FIXED_LIST that belong to RECORD_1.

FIXED_LIST

Field	KEYFIELD	LISTFIELD-A	LISTFIELD-B
Data	KEY12345	1	Val1
Data	KEY12345	2	Val2
Data	KEY12345	3	Val3

z/VSE V4.1: VSAM Redirector Enhancements

Mapping of variable-length lists

§ Not possible with DB2Handler

§ Automatic normalization with DBHandler

COBOL copybook

01 RECORD-2.

    03 KEYFIELD PIC X(8).

    03 COUNTER PIC 9(5) COMP-3.

    03 VARIABLE-LIST OCCURS 1 TO 5

        DEPENDING ON COUNTER.

      05 LISTFIELD-A PIC 9(9).

      05 LISTFIELD-B PIC X(5).

    03 DATAVALUE PIC X(10).

Database table RECORD_2

§KEYFIELD

§COUNTER

§DATAVALUE

Database table VARIABLE_LIST

§KEYFIELD (foreign key relation)

§LISTFIELD-A

§LISTFIELD-B

z/VSE V4.1: VSAM Redirector Enhancements

Mapping of variable-length lists (sample cont.)

Database table RECORD_2

§KEYFIELD

§COUNTER

§DATAVALUE

Database table VARIABLE_LIST

§KEYFIELD (foreign key relation)

§LISTFIELD-A

§LISTFIELD-B

Field	KEYFIELD	COUNTER	DATAVALUE
Data	KEY12345	2	DataValue
Data	KEY98765	4	DataValue

Field	KEYFIELD	LISTFIELD-A	LISTFIELD-B
Data	KEY12345	1	Val1
Data	KEY12345	2	Val2
Data	KEY98765	9	Val9
Data	KEY98765	8	Val8
Data	KEY98765	7	Val7
Data	KEY98765	6	Val6
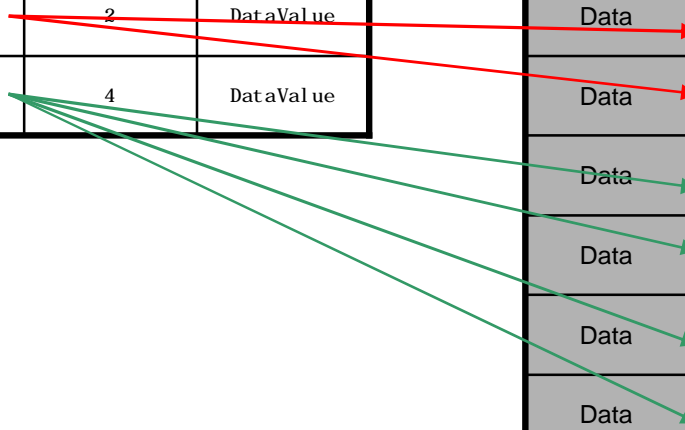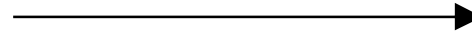
z/VSE V4.1: VSAM Redirector Enhancements

Mapping of record-types

§ Not possible with DB2Handler

§ Automatic normalization with DBHandler

COBOL copybook

01 RECORD-3.

   03 RECORD-TYPE PIC X(1).

   03 RECORD-FORMAT-C.

     05 CUSTOMER-NO   PIC X(7).

     05 CUSTOMER-NAME   PIC X(25).

     05 CUSTOMER-ADDRESS PIC X(45).

   03 RECORD-FORMAT-P REDEFINES

       RECORD-FORMAT-C.

     05 PRODUCT-NO   PIC X(7).

     05 PRODUCT-CATEGORY PIC X(15).

     05 PRODUCT-NAME   PIC X(15).

No RECORD_3 table, relation of record type value to target table is stored in the configuration:

Type ‚C' -> Target table RECORD_FORMAT_C
Type ‚P' -> Target table RECORD_FORMAT_P

Database table RECORD_FORMAT_C

§CUSTOMER_NO

§CUSTOMER_NAME

§CUSTOMER_ADDRESS
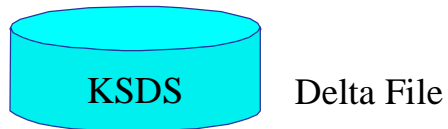
Database table RECORD_FORMAT_P

§PRODUCT_NO

§PRODUCT_CATEGORY

§PRODUCT_NAME

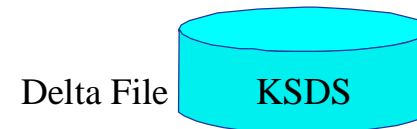# z/VSE V4.1: VSAM Redirector Enhancements

VSAM Capture Exit

Journaling   vs.   Cumulative

KSDS   Delta File   Delta File   KSDS

Key

|	
Record 1	inserted
Record 2	inserted
Record 3	inserted
Record 2	updated
Record 1	deleted
Record 3	updated
Record 4	inserted
Record 1	inserted
Record 2	updated
Record 4	updated
Record 4	deleted

Record 1	inserted
Record 2	updated
Record 3	updated
Record 4	deleted

➤ Only last version of the record is stored

z/VSE V4.1: VSAM Redirector Enhancements

VSAM Capture Exit – Delta Record
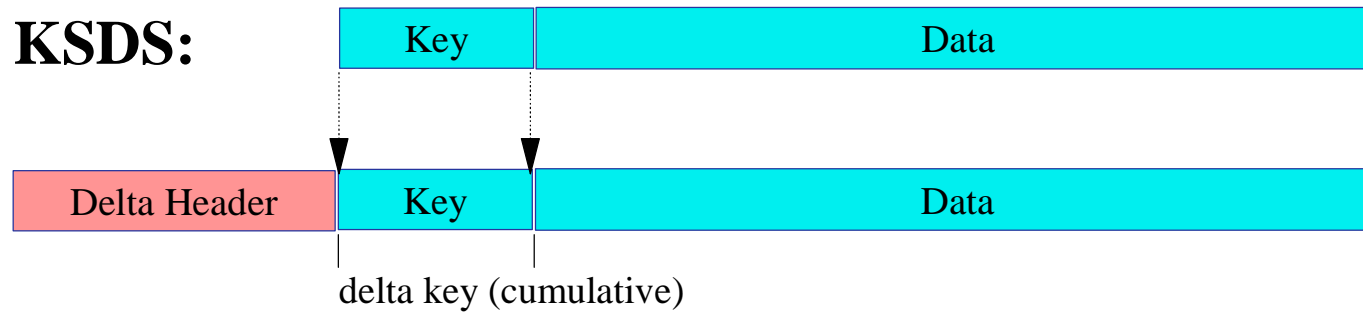
z/VSE V4.1: VSAM Redirector Enhancements

VSAM Capture Exit – Delta Header

Name	Length	Description
TODClock	8	TOD Clock value of update
JobName	8	Job name of program
PhaseName	8	Phase name of program
Origin	8	Origin value, e.g. Label name
PartID	2	Partition ID, e.g. F2
OpCode	1	'I'=insert,'U'=update,'D'=delete
Flags	1	'01'X= RRD/RBA follows
RecordLen	2	Length of Record (exl. Header and RBA/RRN)

In case of a ESDS/RRDS/VRDS a 4 byte RRN/RBA follows

The delta header contains information about
- **when** was the update done (TOD)
- **who** did the update (job and phase name)
- **what** was changed (operation and record data)

z/VSE V4.1: VSAM Redirector Enhancements

VSAM Capture Exit – Decision Exit

§ An optional decision exit can be specified

§ The exit gets control before a delta record or message is being written

   – Gets record data of before and after

   – Can decide if the change is of interest

   – Based on return code passed back from decision exit, delta record or message is being processor or skipped

§ For MODE=LOCAL the decision exit is also responsible for processing the delta record

§ See SKDECEXT in ICCF Lib 59 for a programming example

Questions ?