IMS ES 2.2 SOAP Gateway

#12557 - Golden Gate 8
February 8, 2013

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Topics

• Advanced installation and maintenance
• WS-Security
• Transaction tracking
• Java Management Extensions (JMX) Monitoring
Scenario – .NET Client Invokes IMS COBOL Application as a Web Service

XML HTTP/SOAP

XML COBOL Converters

XML COBOL Adapter

XML Web Service

IMS SOAP Gateway

.NET Client

HTTP/SOAP

IMS Connect

Adapter Task Manager

IMS App

IMS

Scenario – .NET Client Invokes IMS COBOL Application as a Web Service

<?xml version="1.0"?>
<soap:Envelope>
  <soap:Body>
    <INPUTMSG>
      <in_ll>32</in_ll><in_zz>0</in_zz><in_trcd>IVTNO</in_trcd><in_cmd>DISPLAY</in_cmd><in_name1>LAST1</in_name1>
    </INPUTMSG>
  </soap:Body>
</soap:Envelope>

<?xml version="1.0"?>
<soap:Envelope>
  <soap:Body>
    <cbl:OUTPUTMSG>
      <out_ll>93</out_ll><out_zz>0</out_zz>
      <out_msg>ENTRY WAS DISPLAYED</out_msg><out_cmd>DISPLAY</out_cmd><out_name1>LAST1</out_name1> <out_name2>FIRST1</out_name2> <out_extn>8-111-1111</out_extn><out_zip>D01/R01</out_zip><out_segno>0001</out_segno>
    </cbl:OUTPUTMSG>
  </soap:Body>
</soap:Envelope>

<?xml version="1.0"?>
<soap:Envelope>
  <soap:Body>
    <INPUTMSG>
      <in_ll>32</in_ll><in_zz>0</in_zz><in_trcd>IVTNO</in_trcd><in_cmd>DISPLAY</in_cmd><in_name1>LAST1</in_name1>
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<soap:Envelope>
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    </cbl:OUTPUTMSG>
  </soap:Body>
</soap:Envelope>
The new installation architecture

In Version 2.2, the SOAP Gateway installation is divided into three components:
Advanced installation and maintenance

- Server is divided into three components
  - Imsserver – can be mounted as READ only
    - Contains the servers executable code
  - Imsbase – can be mounted as READ and WRITE
    - Contains the servers configurations and log
  - Imssoap - can be mounted as READ and WRITE
    - Contains the user-deployed web service-related files
      - WSDL's, correlators, connection bundles

- Benefits
  - easier to apply maintenance
  - allocate additional disk space when more web services are added
- IBM® Installation Manager for z/OS® V1.5.3
  - Supports centralized repository delivered through the SMP/E process

- Benefits
  - simplifies maintenance process
- Multiple SOAP Gateway server instances
  - share a single instance of the Java™ Virtual Machine (JVM).

- Benefits
  - reduces the amount of storage required for each additional server instance
What is IBM Installation Manager for z/OS?

- IBM Installation Manager has been used on distributed platforms for many years for installing IBM products and applying updates.
- It installs from a repository.
  - A repository contains a repository.config file that stores the metadata on how to install and lay out the selected packages on the system.
- More and more IBM z/OS products are using IBM Installation Manager for...
Installing multiple copies of SOAP Gateway

- The SOAP Gateway repository is a compressed file (.zip file) that you obtain after you go through the standard SMP/E process.
  - Accessible through FTP, HTTP or shared disk
- The Installation Manager for z/OS will connect to the repository and install SOAP Gateway
- You then use the Installation Manager for z/OS to install from this repository file.
The new installation process

Tape or CBPDO

IMS Enterprise Suite V2.2:
- Base Services (HAHF220)
- SOAP Gateway (JAHF221)

IBM Installation Manager
(HGIN140)
(MCSs, refiles)

LPAR1

- Sample jobs and IBM Java SDK V7
- SOAP Gateway repository
- Installation Manager installation kit

SMP/E installation process
Base Services
SOAP Gateway
Installation Manager
The new installation process

Tape or CBPDO

IMS Enterprise Suite V2.2:
- Base Services
- SOAP Gateway

IBM Installation Manager
(MCSs, refiles)

1. SMP/E installation process

Base Services

SOAP Gateway

2. Installation Manager installation kit

Sample jobs and
IBM Java SDK V7

Installation Manager
repository

3. Installation Manager

Installation Manager
('usr/lpp/installationManager/V1R4/IBM')

Sample jobs and
IBM Java SDK V7

Installation Manager
installation kit

Installation Manager
('usr/lpp/installationManager/V1R4/IBM')

SOAP Gateway

('usr/lpp/ims/enterprise/V2R2/...')

Use the Installation Manager to install SOAP Gateway by specifying the SOAP Gateway repository location.

Install the Installation Manager from the installation kit.
Advanced installation and maintenance

• Enhanced migration support of server properties
  • the -migrate command is enhanced to support the migration of server properties
    • support the migration of existing server properties
    • propagate the server configuration to multiple server instances

  iogmgmt -migrate /absolute path to IMS_Enterprise_Suite_SOAP_Gateway/

• Benefits
  • eliminates the need to reconfigure the server
Advanced installation and maintenance

• Enhanced Server shutdown
  • Graceful shutdown process all in-flight messages before the shutdown
    • Inbound web service requests
    • Outbound callout requests
    • After 5 minutes, the server forces a shutdown
  • Immediate shutdown
    • discards any in-flight messages and immediately stops the server

• Benefits
  • Graceful shutdown ensures all web service requests or callout requests are processed before the server goes down
Advanced installation and maintenance

- Multiple connection bundles for synchronous callout applications
  - allows synchronous callout response messages to be returned to the correct originating IMS Connect
- Management Utility command to specify multiple connection bundles
  
  \`
iogmgmt -corr ... -d
callout_connection_bundle_name1,
callout_connection_bundle_name2, ...
  `'

- Benefit
  - Enables use of multiple IMS Connects for outbound processing
WS-Security

• WS-Security SAML unsigned tokens for synchronous callout applications
  • Originating Userid (PSTUSID) for the IMS synchronous callout application is passed to the external web service for further authentication and authorization

• Benefit
  • Provides message-level security for synchronous callout
  • WS-Security enhancement for provider web services
    • support for Security Assertion Markup Language (SAML) 2.0 sender-vouches signed tokens

• Benefit
  • Provides additional message integrity for service provider processing
  • Extends SOAP Gateway support of WS-Security standards
Transaction tracking

- SOAP Gateway transaction tracking IDs and logging
  - SOAP Gateway can attach 40 byte horizontal tracking ID to inbound web service request
    - ID is sent with the inbound request through IMS Connect to the target IMS application and returned with the response message to SOAP Gateway
  - IMS Connect tracking ID captured by the IMS Connect Event Recorder exit routine (HWSTECL0).
    - This information can be consumed by the IBM IMS Connect Extensions for z/OS and equivalent tools.
    - For IMS 12 requires APAR PM69983 applied to IMS Connect
  - IMS log records for transactions include the tracking ID
    - IBM IMS Performance Analyzer for z/OS and IBM IMS Problem Investigator for z/OS, or equivalent tools, to inspect IMS log records.
- Benefits
  - Correlates transactions between SOAP Gateway, IMS Connect, and IMS
  - Provides information for diagnostic purposes
Transaction tracking

- SOAP Gateway transaction tracking IDs and logging
  - SOAP Gateway can generate a unique *vertical* correlation ID for every incoming request
    - used to correlate all of the SOAP Gateway message processing events associated with a service provider request using a single unique ID
- Benefits
  - Provides information for diagnostic purposes
**Transaction tracking**
- SOAP Gateway transaction tracking IDs and logging
  - Activate and configure tracking IDs
    `iogmgmt -tracking -on` command
  - View SOAP Gateway tracking and monitoring functions
    `iogmgmt -view -soapgatewayproperties`
- SOAP Gateway server transaction log file
  - provides a complete record of every request made to a SOAP Gateway
    - includes both horizontal and vertical IDs
    `iogmgmt -tranLog -on -fileMaxAge 1`
Transaction tracking
• SOAP Gateway transaction tracking IDs and logging
  • Remote IBM Tivoli Composite Application Manager for Transactions (ITCAM) data collector
    • provides for remote monitoring
  1. Start the remote transaction collector.
    • Note host name (or IP address) and port number of the transaction collector.
  2. Start the IMS SOAP Gateway ITCAM TTAPI function

  iogmgmt -tranAgent -on -address server_address -port server_port

  • remote transaction collector server host address and port number

  • Note: Before you can use this command, you must activate SOAP Gateway-to-IMS tracking IDs for the server with the iogmgtm -tracking -on command.
End-to-end Transaction Tracking – Provider Scenario (correlation based on Tracking ID)

Soap Client

IMS ES 2.2 SOAP Gateway

Route / generate Tracking ID

Request with optional tracking ID

Horizontal Tracking ID (XML) request data

Tracking ID

Horizontal Tracking ID (XML) response data + CSM

Messaging exits

Horizontal and Vertical Tracking IDs

ITCAM

Transaction Tracking API

Horizontal and Vertical Tracking IDs

Tracking ID

Vertical Tracking ID

Transaction log

IMS Connect

 IMS Connect Extensions

Horizontal Tracking ID + message data

records events with Tracking ID

IMS Performance Analyzer

IMS Problem Investigator

IMS Connect Extensions journal

Performance Analyzer

Problem Investigator

IMS 13

OTMA

IMS App

Tracking ID

Soap Client

Response

Tracking ID
**IMS Log Record**

<table>
<thead>
<tr>
<th>IMS Log Record</th>
<th>IMS Log Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>04D70000 01D18194 08000014 08000014 048C0000 C3D4E2F1 40404040 CA995369</td>
<td>P...JAM............IMS1  R.*</td>
</tr>
<tr>
<td>68C79C92 9D4E2F1 40404040 CA995369 68C79C92 00000000 00000000 00000000 <em>G.KMS1  R..G.K.</em></td>
<td>A.H.  R.*</td>
</tr>
<tr>
<td>006E1000 C8000000 00000000 00000000</td>
<td>A.H.  R.*</td>
</tr>
<tr>
<td>FDFFFFFF 0C3E3E0 0C3E3E0 0D404040</td>
<td>A.H.  R.*</td>
</tr>
<tr>
<td>006E1000 C8000000 00000000 00000000</td>
<td>A.H.  R.*</td>
</tr>
<tr>
<td>006E1000 C8000000 00000000 00000000</td>
<td>A.H.  R.*</td>
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<td>006E1000 C8000000 00000000 00000000</td>
<td>A.H.  R.*</td>
</tr>
</tbody>
</table>

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Complete your sessions evaluation online at SHARE.org/SanFranciscoEval
SOAP Log – Output Message

```
DEBUG: IMSSOAPInteraction::Output message:
000000: 000001BA 00340000 5CE3D9C3 D2C9C45C |...[....[*TRCKID*]
000010: 75726E3A 75756964 3A464133 35443231 |..>.----------
000020: 45423432 32423432 33373031 32373336 |________________
000030: 303333336 35303388 3C584D4C 416E4670 |..........<XMLAdap|
000040: 74657274F 75747075 743E3C63 626C3A4F |terOutput><cbl:O|
000050: 55545055 544D5347 20786D6C 6E733A63 |UTPUTMSG xmlns:s|
000060: 626C3D22 68747470 3A2F2F77 77772E49 |bl=http://www.I|
000070: 4D535048 42444F2E 636F6D62 73636865 |MSPHBKO.com/sche|
000080: 6D61732F 49445350 48424B4F 496E7465 |msg/IMSPHBKOInte|
000090: 72666163 65223E3C 6F75744F 6C6C3E39 |rface"<out_11><9|
0000A0: 333C2F6F 75745F66 5C3E3C6F 75745F7A |3</out_11><out_z|
0000B0: 7A3E3736 383C2F6F 75745F7A 7A3E3C6F |z>768</out_zz><o|
0000C0: 75745F6D 73673E45 4E545259 20574153 |ut_msg>ENTRY WAS|
0000D0: 20444953 50444519 45443C2F 6F75745F |DISPLAYED</out_
0000E0: 6D73673E 3C6F7574 5F636D64 3E444953 |msg><out_cmd>DIS|
0000F0: 50444519 3C2F6F75 745F636D 643E3C6F |PLAY</out_cmd><o|
000100: 75745F6E 616D6531 3E4C4153 54313C2F |ut_name1-LAST1</|
000110: 6F75745F 6E616D65 313E3C6F 75745F6E |out_name1><out_n|
000120: 616D6532 3E464952 5354313C 2F6F7574 |ame2>FIRST1</out|
000130: 5F6E616D 65323E3C 6F75745F 6578746E |_name2><out_extn|
000140: 3E382D31 31312D31 3131313C 2F6F7574 |>8-111-1111</out|
000150: 5F657874 6E3E3C6F 75745F7A 69703E44 |_extern><out_zip>D|
000160: 30312F52 30313C2F 6F75745F 7A69703E |01/R01</out_zip|
000170: 3C6F7574 5F736567 6E6F3E3D 3030313C |<out_segno>0001<|
000180: 2F6F7574 5F736567 6E6F3E3C 2F63626C |</out_segno><cbl|
000190: 3A4F5554 5055544D 53473E3C 2F584D4C |:UTPUTMSG /></XML|
0001A0: 41646170 74657274 75747075 743E000C |.AdapterOutput>
0001B0: 10025CC3 E2D4D6D2 E85C |..*CSMORY*|
```
## Transaction Events Information

### Transaction Events Table

<table>
<thead>
<tr>
<th>ID</th>
<th>Type</th>
<th>Timestamp (UTC)</th>
<th>Horizontal...</th>
<th>Vertical...</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STARTED</td>
<td>06/12/12 01:51:21 PM</td>
<td>ANY</td>
<td></td>
<td>C54ff9aeb69da65e2834cd865f14797e9a46da8700c3aaa</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>06/12/12 01:51:30 PM</td>
<td>ANY</td>
<td></td>
<td>C54ff9aeb69da65e2834cd865f14797e9a46da8700c3aaa</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>06/12/12 01:51:30 PM</td>
<td>IMSCONN...</td>
<td></td>
<td>C54ff9aeb69da65e2834cd865f14797e9a46da8700c3aaa</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>06/12/12 01:51:32 PM</td>
<td>IMSCONN...</td>
<td></td>
<td>C54ff9aeb69da65e2834cd865f14797e9a46da8700c3aaa</td>
</tr>
<tr>
<td>5</td>
<td>17</td>
<td>06/12/12 01:51:32 PM</td>
<td>ANY</td>
<td></td>
<td>C54ff9aeb69da65e2834cd865f14797e9a46da8700c3aaa</td>
</tr>
</tbody>
</table>

### Event Properties

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Attributes</td>
<td>Property Count: 5</td>
</tr>
<tr>
<td>Transaction Data</td>
<td>Property Count: 3</td>
</tr>
<tr>
<td>Horizontal Stitches</td>
<td>No Property Found</td>
</tr>
<tr>
<td>Vertical Stitches</td>
<td>No Property Found</td>
</tr>
<tr>
<td>Horizontal Context</td>
<td>No Property Found</td>
</tr>
</tbody>
</table>

---

Complete your session evaluation online at SHARE.org/SanFranciscoEval.
JMX Monitoring

• JMX instrumentation for SOAP Gateway
  • Standard JMX instrumentation for the SOAP Gateway JVM health-check information
    • includes heap memory and CPU utilization
  • SOAPGatewayProviderMonitorMBean
    • provides an interface to get statistics SOAP Gateway web service workload
      • Does not include callout or WebSphere Business Events statistics
  • enable monitoring functions with the SOAP Gateway management utility
    • iogmgt – mbeans – port xxx
      • The xxxx value is the JMX listening port for MBean requests
• Remote monitoring application
  • JConsole provides generic remote monitoring application
  • user-supplied JMX-compatible monitoring application
• Benefit
  • Provides JMX monitoring functions
JMX MBean interface for web service provider monitoring

- C:\\IMS Enterprise Suite V2.2\\SOAP Gateway\\java\\bin
  JConsole.exe
JConsole sample output
IMS ES 2.2 SOAP Gateway New Samples

- IMS Exchange web site updated
- Link on IMS Enterprise Suite SOAP Gateway web page
IMS SOAP Gateway WS-Security SAML
unsigned tokens for synchronous callout applications

Web Service

IMS SOAP Gateway
Resume
TPipe
TPS

IMS Connect
HWS1
HWSXMLA0
XML Converter
XMLCNV1D

Initiating Client
USERA

z/OS

TM/CTL Services

DEST1
TPS
HWS1
HWSXMLA0
XMLCNV1D

Application Program
ICAL
DEST1

Request data
Response data

Connection Bundle
TPS

Java Custom Authentication

Send_ONLY

XML USERA

XML USERA

XML USERA

XML USERA

XML USERA
Multiple callout connection bundles

iogmgmt -corr -u -r correlator2 -d CBA,CBB
High Level Diagnostics

- Documentation to collect to diagnose a problem
  - Job Logs
  - Installation Manager logs
    - Ex. /<InstallationManager>/appdata/logs
Cobol Top Down

- **Target Market**
  - IMS Customers who want to quickly get synchronous callout running with SOAP Gateway.
  - SOAP customers who want to have multi-operation support for synchronous callout.

- **Challenge Addressed**
  - Remove the need of COBOL copybook to generate artifacts for synchronous callout.
  - Remove requirement to manual map between XSD data types and COBOL data types.

- **Solution**
  - Parts needed for synchronous callout can be generated from a single WSDL.
  - Multiple operations defined in WSDL are now supported within the callout correlators.

- **Business Value**
  - Ease setup of synchronous callout for SOAP Gateway.
  - Reduce errors that may occur when manually creating COBOL copy book needed for callout.
  - Support multiple operations for callout.
Design

1. Locate WSDL File
2. Choose WSDL Service and Port
3. Create or edit Batch Processor Container.xml, PlatformProperties.xml, and ServiceSpecification.xml files
   - Run the Batch Processor to generate input and output data structures, mapping session files, and Compiled XML Conversion artifacts for all or a subset of the binding operations
4. Modify existing IMS application to include generated data structures and one or more synchronous callouts (ICAL)
5. Deploy Compiled XML Conversion artifacts to SOAP Gateway and IMS Connect
Prerequisites

- **Software requirements**
  - Enterprise Suite V2.2 SOAP Gateway
  - IMS V11 or IMS V12 with integrated IMS Connect SPE (PM69983, PM76333)

- **Tooling**
  - IBM Rational® Developer for System z™ Version 8.5.1 or later
  - Installation Manager V1.5.3 or later