IMS Version 10 / 11 – SOA Integration Suite Enhancements

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Topics

Integration Suite and Enterprise Suite

- IMS Web 2.0 Solution for InfoSphere MashupHub
  - Transaction and Database Support
- IMS TM Resource Adapter Enhancements
- IMS Enterprise Suite
- Integration support for
  - Synchronous Callout
  - IMS Open Database with ODBM
IMS Web 2.0 Solution for InfoSphere MashupHub
Web 2.0 --- > Mashups

- A **mashup** is a lightweight Web application
  - created by combining information or capabilities from several potentially disparate sources to deliver new functions and insights
- **Widgets** and **feeds** that are mashed together often come from independent sources that do not change when mashed up
  - New applications deliver new insights and capabilities
- Built on a Web-oriented architecture (REST, HTTP) leveraging lightweight, simple integration techniques (AJAX, RSS, JSON)
  - The result is fast creation of rich, desktop-like Web applications
- What’s new about mashups?
  - Using the application includes creating and configuring the application
Web Mashups - Architecture

Discover & Share
Find, rate, tag, comment, share widgets, mashups, and feeds

Assemble Mashups
- Discover
- Wire & mash
- Utilize recommendations & filtering
- Transform

Create Widgets
- Mash visualizations w/ feeds
- Import HTML
- Use IDE of choice

Generate Feeds
- Connect
- Transform and filter on server (Info 2.0.)

Vast Array of Information Sources

IT professionals
Information / Business Analyst
Business Users

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How do you do it with IMS?

- IMS Web 2.0 is a plugin to the InfoSphere MashupHub V1.0
  - Includes the ability to:
    - Transform IMS assets into RESTful services (XML, ATOM, or RSS feeds) that can consume or be consumed by other Web 2.0 services
    - Compose “widgets” / HTML segments into a composite User Interface (UI) or an application template
    - Bind services (data or function) to the composite UI

- IBM Mashup Center includes two components:
  - InfoSphere MashupHub for creating, storing, transforming and remixing feeds, and for sharing with the Web 2.0 community.
  - Lotus® Mashups for rapidly assembling a variety of personal, enterprise, and Web content onto a Web page or into an application.
IBM Mashup Center - Features

A visual tool for creating, storing, transforming, and remixing feeds to be utilized in mashups, and a central catalog for users to tag, rate, and share mashable assets

Transform and Mix
- Import feeds
- Merge feeds
- Filter feeds
- Publish feeds
- Annotate feeds
- Transform feeds
- Group / Sort / Union feeds

Create feeds
- Domino
- LDAP
- pureXML
- SAP
- TDI
- Web Service
- IBM Information Server
- IMS Transaction
- Excel or CSV
- MS-Access
- XML Document

Catalog
Share and discover mashable assets

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**WebSphere sMash and IMS Web 2.0**

- **WebSphere sMash** is a development and execution platform for quickly building agile, web-based applications
  - Supports some of today's hottest dynamic scripting languages – PHP (PHP: Hypertext Preprocessor) and Groovy—and provides an agile web application development environment
  - JVM-based runtime (Not JEE)
  - Allows you to unleash and reuse enterprise content, including SOA services, as RESTful services
  - Is based on the highly-acclaimed public incubator and developer community, Project Zero
  - WebSphere sMash Developers Edition v1.1 is available for free download and limited deployment. It contains browser-based tooling and an Eclipse plug-in.
  - WebSphere sMash licenses are purchased when deploying it into production.

Developing a RESTful service/feed for IMS Transactions

- Add the IMS Connect API for Java (a Jar file) to the sMash Application classpath
- Code connection and interaction information or load from a properties file.
Prerequisites

• For IMS Transaction support
  • IBM Mashup Center V1+
    • Software Requirements:
      - IMS V10+
      - IMS Connect V10+
    • Tooling Details: Rational Developer for System z (RD/z) V7.5+
  • WebSphere sMash V1.1
    • Software Requirements:
      - IMS V11
      - IMS Connect V11
      - IMS Enterprise Suite V1.1 Connect API for Java
    • Tooling Details: Rational Developer for System z (RD/z) V7.5+
How do you do it with IMS databases?

• IBM Mashup Center V2.0
  • Provides the ability to:
    • Aggregate, manipulate, and restructure data or content feeds
  • Includes:
    • The SQL Query Builder for creating feeds
  • Requires IMS Enterprise Suite DLIModel Utility
    • Supplies IMS Database Metadata

• Software requirements
  • IMS 11
    IMS Connect, ODBM, Universal Drivers
  • Tooling Details: IMS Enterprise Suite DLIModel Utility V1.1
Developing an IMS 11 database Feed

- Develop an IMS DB feed using:
  - IMS Enterprise Suite DLIModel utility
  - IBM Mashup Center V2.0

  **SETUP steps:**
  - DLIModel Utility
    - Import IMS PSB and DBD source
    - Generate
      - IMS metadata .class file
  
  - IBM Mashup Center
    - Install metadata .class file
    - Create IMS DB feed via JDBC
    - Add feed to MashupHub Catalog
Support for IMS data (Mashup Center)

• Enterprise Database Plugin
  • Allows users to create feeds from any Database that supports a JDBC driver
• Supports the following databases:
  • DB2, Derby, IDS, IMS

![Select the feed data source.](image)

![Please specify the database connection to use.](image)
Support for IMS data (Mashup Center) …

- Supports creating SQL queries via GUI interface

```
SELECT "PCB01"."HOSPITAL"."HOSPCODE", "PCB01"."HOSPITAL"."HOSPNAME" FROM "PCB01"."HOSPITAL" WHERE "PCB01"."HOSPITAL"."HOSPNAME" = 'ALEXANDRIA'
```
IMS TM Resource Adapter Enhancements

• 10.2
  • WebSphere Transformation Extender (WTX)
  • Socket Reconnect
  • Send Only Reroute

• 10.3
  • Support for Synchronous Callout

• 11
  • Generated Client ID support
WebSphere Transformation Extender (WTX) support

- Runs on
  - Microsoft™ Windows™, AIX®, z/OS Batch, z/OS IMS™, z/OS UNIX® System Services, Red Hat and SUSE Linux™, Solaris, and HP-UX.
WTX Support - Benefits

- Benefits

- Provides standards compliance access to IMS transactions
  - SEPA (XML format requirement for European banks)
  - X-12
  - EDIFACT (cross industry)
  - HIPAA (health care)
  - HL7
  - SWIFT (financial services)
  - NCPDP

- Leverages the WTX support of complex data formats on distributed platforms
Socket Reconnect support

• Ability to re-establish a broken connection with IMS Connect
  • Without user intervention
  • invoked when IMS TM RA detects:
    • IOException or EOFException from TCP/IP
    • Problem: If IMS Connect is recycled or experiences an error
      • All connections in pool become unusable (stale)
      • All connections in pool are tried before new connections are created

• Solution: Stale connections are automatically reconnected
Socket Reconnect Support …

• Implementation
  • IMS TM RA keep tracks of time in which the connections in a pool
    • Have been last successfully used
    • Have last experienced an error
  • When a TCP/IP error is detected (IOException or EOFException)
    • The connection becomes unusable and stale
      • IMS TM Resource Adapter returns an error to the application
    • Other connections in the same pool are not checked for staleness until the next attempt to use them
  • When a new request to interact with IMS Connect is received, IMS TM RA
    • Detects a stale connection and checks to see if IMS Connect is available
      • if so, re-establishes the connection and proceeds with the interaction execution
      • Otherwise, sends an error exception to the client application
Socket Reconnect Considerations

- Setup Considerations
  - To take advantage of the new functionality, the existing resource adapter in WebSphere Application Server must be replaced with the new adapter.
  - Neither the IMS application nor IMS TM RA application require modification to make use of this functionality.

- Benefits
  - Reduces communication exceptions after IMS Connect is restarted.
  - Enhances socket connection availability and fault tolerance.
    - Allows applications seamless recovery from connection errors.
Send Only Reroute support

• Enhances the existing Commit Mode 0 (CM0) send-only support to define a reroute destination
  • Supports shareable persistent sockets
    • Providing a way to retrieve the IOPCB reply
• J2EE application developer
  • sets the interactionVerb to SYNC_SEND
  • sets reroute property in the IMSInteractionSpec to TRUE
  • sets 1-8 character reroute name in the IMSInteractionSpec
    • default value HWS$DEF
• Benefit
  • Simplifies Client Application programming
    • I/O PCB output created by Send-Only request is rerouted to specified name
Generated Client ID

- Mechanism to request that IMS Connect generate a Client ID
  - Impacts ITMRA (IMS TM Resource Adapter) environments
    - For shareable persistent sockets
      - Where the client ID representing a unique socket/TPIPE must be generated rather than end-user specified
  - Addresses duplicate client ID error
    - When multiple WAS instances are configured
      - Each ITMRA generates a unique client ID which may or may not be unique across multiple WAS instances
- Benefit
  - Eliminates the requirement for different IMS Connect PORTs for instances of distributed WAS using ITMRA Shareable Persistent sockets
  - Simplifies WAS configuration and operations management
IMS Enterprise Suite
Enterprise Suite

• Part of the IMS SOA Integration Suite
  • A no-cost product (5655-T60, S&S 5655-T61)
    • Supports SMP/E for z/OS components (z/OS 1.9 and later)
    • Supports IBM Installation Manager for distributed components
  • Available for download from IMS Enterprise Suite webpage
    • www.ibm.com/software/data/ims/soa-integration-suite/enterprise-suite/

• New packaging method for the most current versions of selected IMS SOA Integration Suite components
  • IMS Enterprise Suite SOAP Gateway
  • IMS Enterprise Suite DLIModel Utility plug-in
  • IMS Enterprise Suite Connect APIs for Java and C
  • IMS Enterprise Suite Java Message Service (JMS) API

• Supports IMS 11 and IMS 10
IMS ES Soap Gateway

• Multi-Segment Message support
  • Capabilities
    • Support IMS application program multi-segment messages
      • Messages only formatted by the IMS Connect XML adapter
      • The IMS Application program cannot build XML messages
      • Asynchronous callout is not supported
      • Tooling only available for COBOL applications

• Minimum Environment and prerequisites
  • Software requirements
    • IMS Connect 10 SPE APAR PK69366/UK52038
    • Also provided with IMS SOAP Gateway 10.1
  • Tooling
    • Rational Developer for System z 7.5.1
**IMS ES Soap Gateway** …

- New features require IMS Version 11 (with Rational Developer for System z, V 7.6)
  - Support of Web Services Security (WS-Security) protocol
    - Dynamic authentication on a per-message basis for accessing IMS applications as Web services based on the IMS Connect security setup
    - Previously authentication was static on a per-Web service basis

- Support for Business Events
  - Enable IMS applications to send business event data to business event processing and monitoring engines such as IBM WebSphere Business Events V6.2 and IBM WebSphere Business Monitor V6.2 for business activities monitoring
**IMS ES DLIModel Utility**

- An Eclipse plug-in that can be installed with IBM Eclipse SDK or shell-shared with existing Rational Application Developer Software or Rational Developer for System z
  - Transforms your IMS DB information (PSBs, DBDs, COBOL copybooks, PL/I includes)
    - Into application-independent metadata that can be used for IMS XML or Java application development in an Eclipse-based environment
- Other versions
  - IMS DLIModel utility plug-in
    - Web downloadable version that runs as a plug-in to Eclipse, Rational Application Developer (RAD), and Rational Developer for System z (RDz)
  - DLIModel utility
    - IMS-shipped version that runs from Unix System Services or from the z/OS BPXBATCH utility
      - IMS 10 is the last level of IMS to include this IMS-shipped version
  - IMS 11 does not include the DLIModel Utility
**IMS ES DLIModel Utility …**

- Enhancements include:
  - Support for the import of PL/I includes
  - Addition of PROCOPT to the DLIDatabaseView metadata class
    - Enhances the JDBC driver performance
  - Support for a graphical view of Virtual Foreign Key fields
    - Allows JDBC programmers to understand the relational view of the data
      - Used with Universal JDBC driver and Universal DB resource adapter
  - Enhanced wizard to automatically selects DBDs referred to by PSBs
  - Addition of search, save and print functions to the graphical editor for PSBs and DBDs
  - Seamless shell-sharing with other Eclipse-based IBM products
JMS API for Synchronous Callout

- Java Message Service (JMS) API support for synchronous callout
  - May be used with IMS 10 or IMS 11
  - Used with Java Dependent Regions (JMPs and JBP\(s\))
  - Uses ICAL for synchronous callout
- JMS API is a JAR file in the classpath
**IMS ES Connect API**

- A simplified callable interface for interaction with IMS Connect
  - Architected on top of the sockets layer
    - Through a set of extensible profiles that define the connections and types of interactions to be performed
    - Supports conversational, non-conversational interactions as well as single and multi-segment input/output messages

- Addresses the complexities of writing RYO applications
  - Experience in TCP/IP socket programming
  - Understanding the IRM header and the possible flags as well as settings
  - Familiarity with the IMS Connect application protocols and their impact on all the possible types of interactions

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**IMS ES Connect API** ...

- Application developer
  - Configure files read in by API during execution
    - connection and interaction configuration specifications
  - Prepare input data for IMS application and interprets output data returned
    - Single-segment and multi-segment messages
    - Conversational and non-conversational support
  - Manage memory for required data structures used in C implementation

- IMS Connect API
  - Generates the IMS Connect input message header
  - Manages interaction according to the IMS Connect message protocols
  - Deals with socket connections made on behalf of the client applications
  - Supports IMS Connect user message exits HWSSMPL0/HWSSMPL1
IMS ES Connect API …

• Java implementation is available in the initial release
  • C support is being provided through the IMS Enterprise Suite V1.1 service process

• Benefits
  • Allows client applications to interact with IMS Connect without having to understand the details of the IMS Connect protocol
    • Simplifies design, development and test of the client applications
      • IMS Connect client applications have simple calls (APIs) for quickly and easily interacting with IMS through IMS Connect
        • Allows for easier development of IMS Connect client applications
    • The API manages
      • The TCP/IP communications with IMS
      • The IMS Connect message protocol by sending and receiving the appropriate messages for interactions with IMS Connect
  • Runs with IMS 10 or IMS 11
Support for Synchronous Callout
Synchronous Callout

- IMS 10 SPE (APAR/PTF information at the end of this section)
  - Allows IMS transactions to access a service outside IMS and wait for a reply within the same unit of work
    - Position IMS as both a client and a server
    - Integrates IMS with other servers and applications
    - Removes application managed message correlation

- Benefits
  - Position IMS as both a client and a server
  - Integrate IMS with other server and applications
  - Remove application managed message correlation
  - Removes 32K message segment restriction
Synchronous Callout…

IMS TM RA and IMS Soap Gateway support discussed in Share Session 6345)

IMS
- Connect
- OTMA
- TM/CTL Services
- Application Program
- ICAL
- OTMA Descriptor
- OTMA Descriptor
- ISRT, ALTPCB

z/OS
- Database
- DB Services
- MPP/JMP/IFP/BMP/JBP

WebSphere
- IMS TM resource adapter

IMS SOAP Gateway

TCP/IP
- user-written Client

IMS Connect

ICAL -> Synchronous
ISRT ALTPCB -> Asynchronous

SHARE in Seattle
Support for Open Database
The Open Database support allows access to IMS DB from programs running not only locally to IMS (same LPAR) now also from programs in a different LPAR or even from remote TCP/IP environments.

- Open Database Capabilities
  - Supports open-standards for connectivity to online IMS databases
  - Provides an environment that manages access to online IMS databases
  - Provides Open Database APIs
    - Ease application development access to IMS databases

IMS Connect and ODBM support are discussed in Share Session 6342
Open Database Overview

CICS
- Java Appl.
- TCP/IP
- LPAR

JEE
- Application Server
  - z/OS or distributed
  - Java Appl.
  - TCP/IP

Non-JEE
- Java Appl.
  - TCP/IP
  - ODBA

IMS Connect
- TCP/IP
- ODBA
- SCI

CCTL
- Java Appl.
- TCP/IP

ODBA
- Traditional ODBA

ODBM
- Traditional ODBA
- SCI
- ODBA or DRA

JEE
- TCP/IP
- ODBA
- SCI
- ODBA or DRA

Non-JEE
- TCP/IP
- ODBA
- SCI
- ODBA or DRA

CICS
- Java Appl.
- TCP/IP

WAS for z/OS
- TCP/IP
- ODBA
- SCI
- ODBA or DRA

Traditional DRA

DRA

DB

Assembler Macro Appl.

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**Integration Summary**

- Once again, the message:

- IMS continues to be a premier server
  - Architected interfaces support standard access from the web

- New interfaces, products and tools from a variety of vendors provide access to IMS transactions and data