Doing more with IMS Enterprise Suite SOAP Gateway than ever before!

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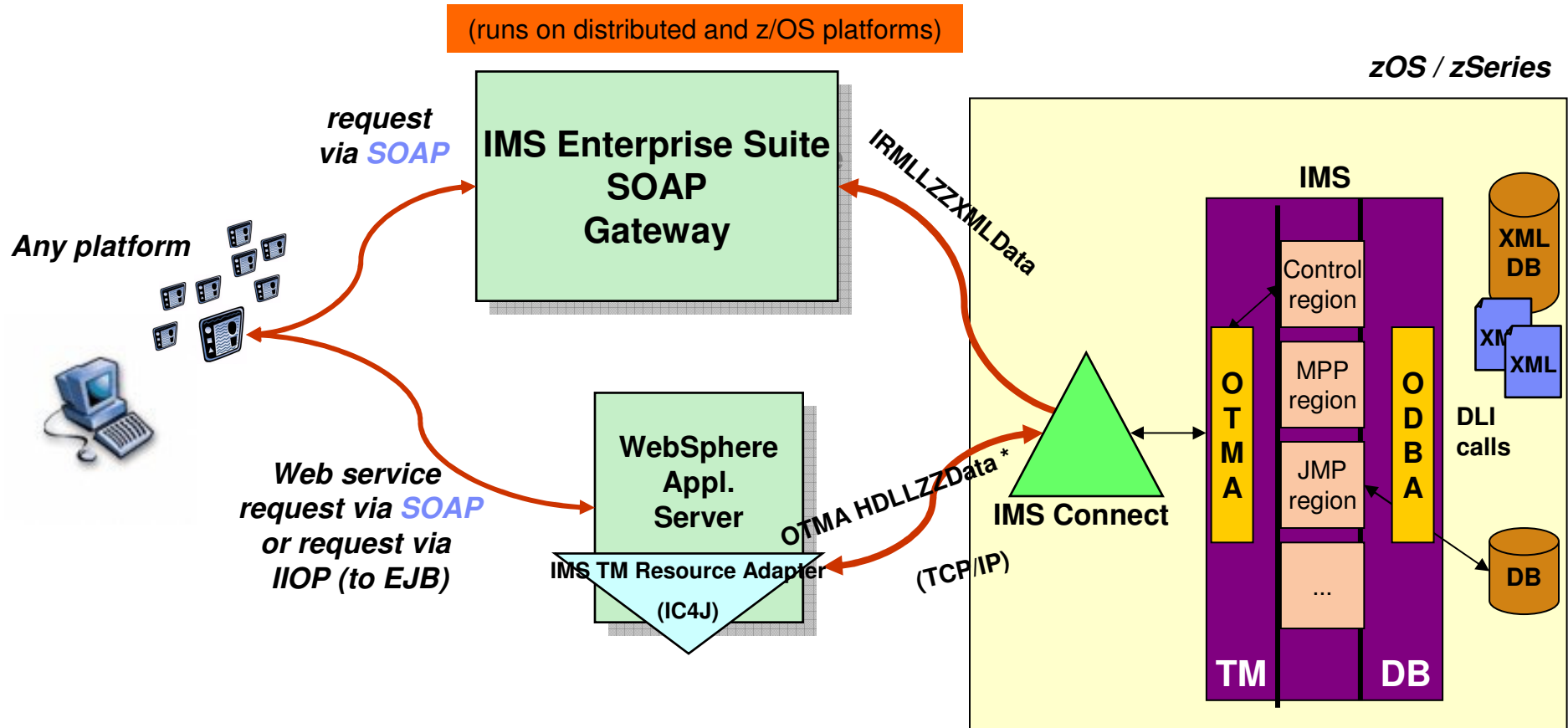IBM IMS Lab

re-THINK IMS

Agenda

- **IMS Enterprise Suite SOAP Gateway Overview**

- **IMS SOAP Gateway Updates**

- **IMS Enterprise Suite SOAP Gateway 1.1**

- **How do I get IMS Enterprise Suite SOAP Gateway?**

- **Customer Value**

IMS Enterprise Suite SOAP Gateway Overview

IMS and Web Services

(runs on distributed and z/OS platforms)

zOS / zSeries

Any platform

request via SOAP

IMS Enterprise Suite SOAP Gateway

IRMLLZZXMLData

IMS

XML DB

XML
XML

Web service request via SOAP or request via IIOP (to EJB)

WebSphere Appl. Server

IMS TM Resource Adapter
(IC4J)

OTMA HDLLZZData *

IMS Connect

(TCP/IP)

Control region

MPP region

JMP region

...

O T M A

O D B A

DLI calls

DB

TM   **DB**

*COBOL/MFS/C/Java apps.

Integrates IMS assets into SOA by providing a standard Web Services interface to your IMS TM applications

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IMS Enterprise Suite SOAP Gateway Overview

- **A Light-weight Web Service solution for IMS without the need of a Java EE server**

- **Integrates IMS assets into the Service-Oriented Architecture (SOA)**

- **Provides end-to-end interactions between IMS transactions and web services clients in an On Demand environment**

- **Enables IMS as Provider and Consumer of Web Services**

- **Secure**

- **Excellent tooling support**

  ➢ Utilizes Rational Developer for System z tooling to create converters for transforming XML messages to IMS messages and vice versa

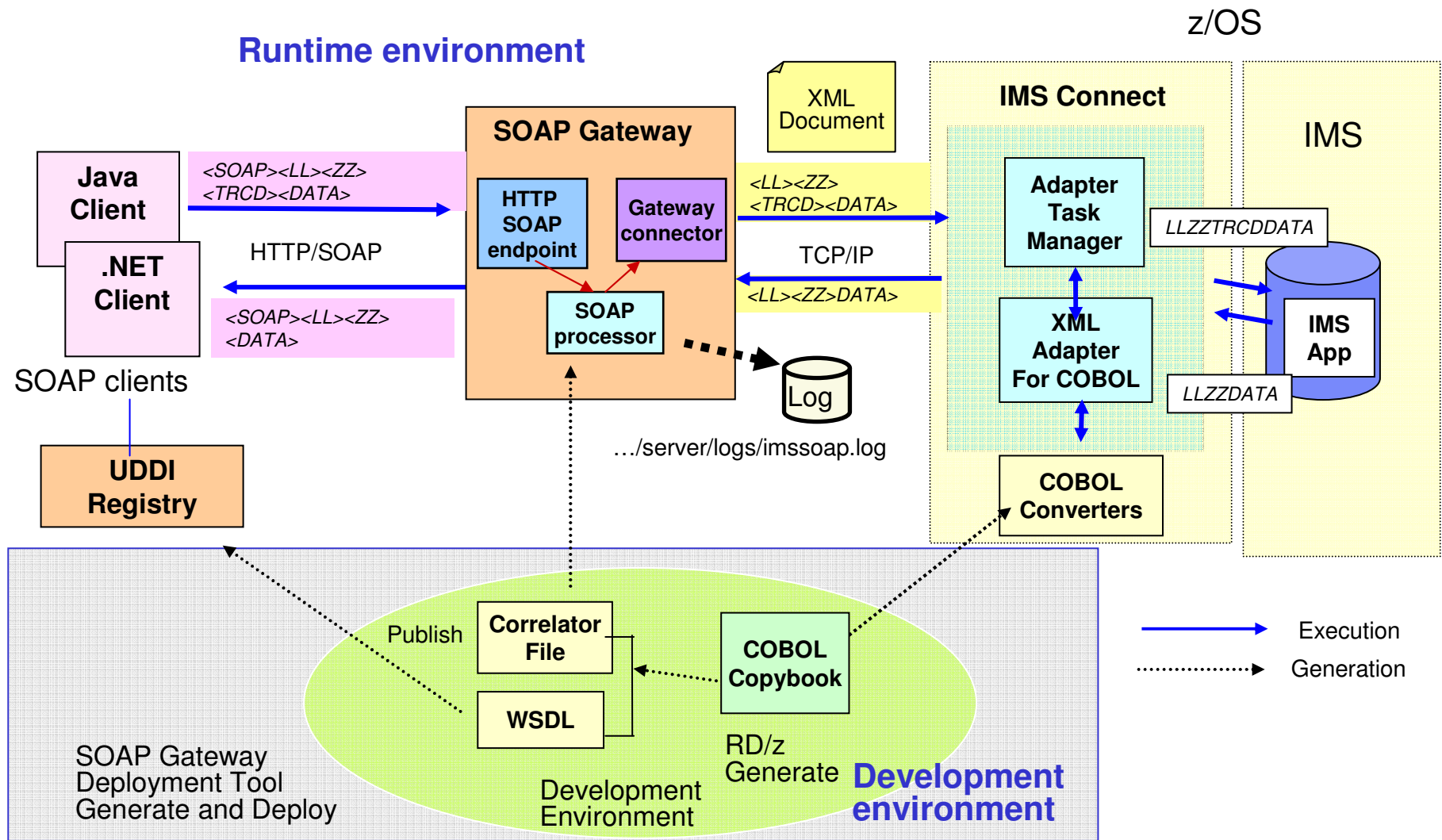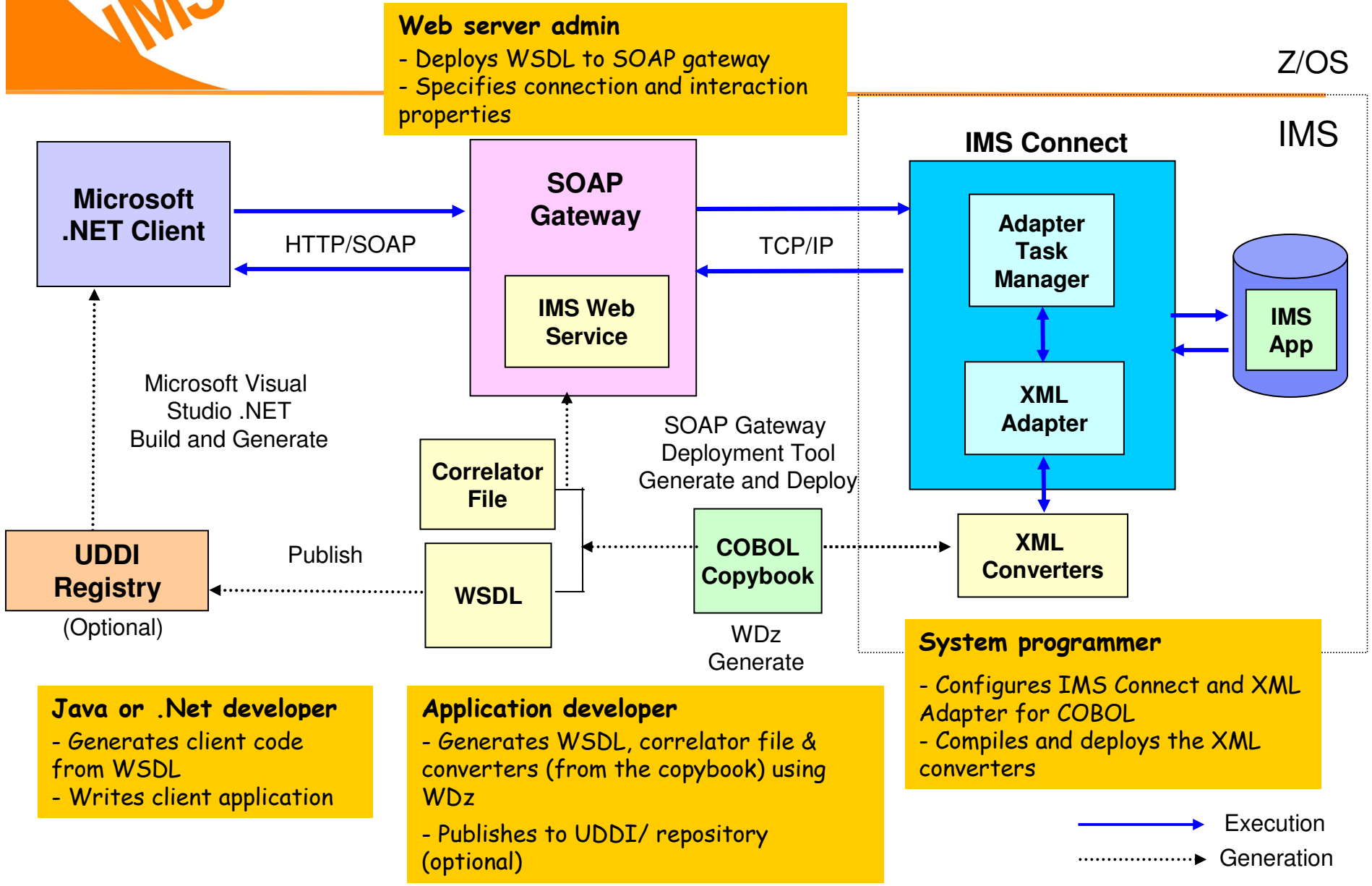 ➢ No need to change existing IMS application code

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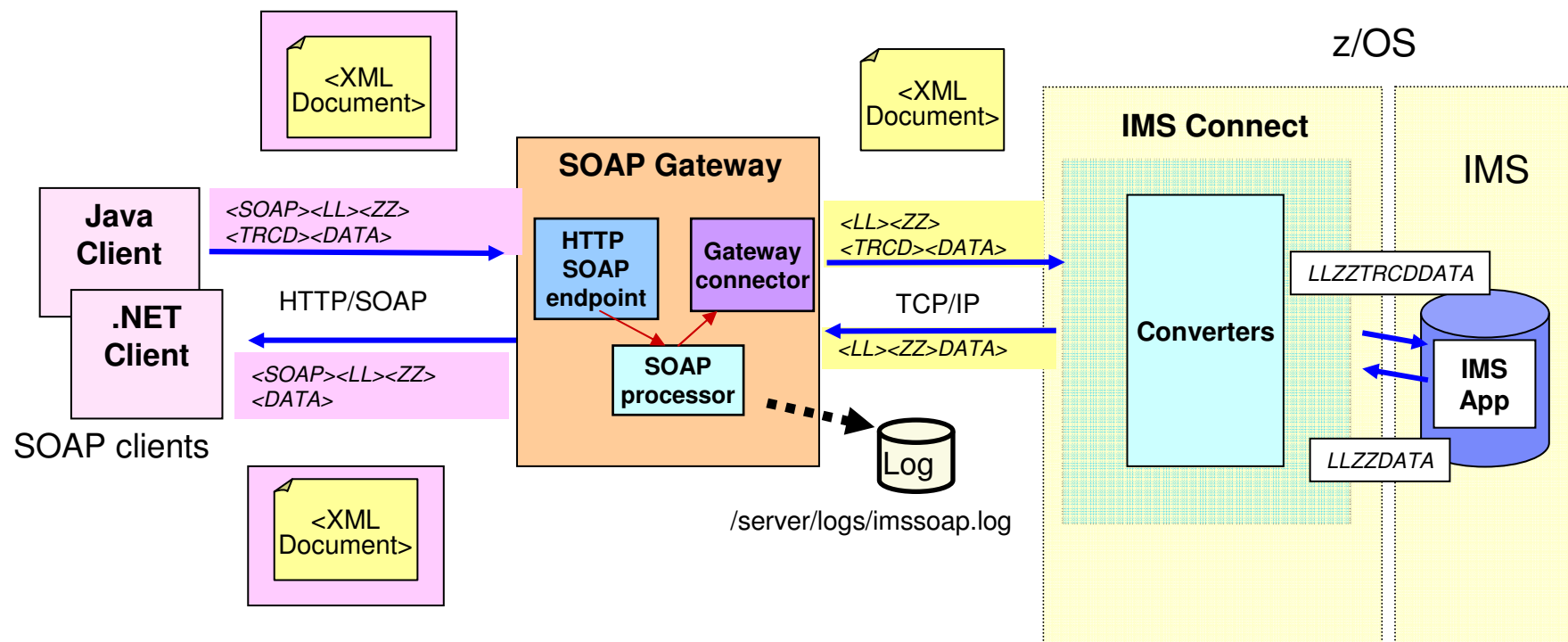
Inbound support

A direct web service solution for IMS

> Runs on Windows, AIX, zLinux and z/OS

> Three main components: The Server, the Deployment Utility, the Admin Console

> Lightweight

Does not need a J2EE server

Inbound support ...

Runtime environment

z/OS

SOAP Gateway

XML Document

IMS Connect

IMS

Java Client

<SOAP><LL><ZZ> <TRCD><DATA>

HTTP SOAP endpoint

Gateway connector

<LL><ZZ> <TRCD><DATA>

Adapter Task Manager

LLZZTRCDDATA

HTTP/SOAP

.NET Client

TCP/IP

<SOAP><LL><ZZ> <DATA>

SOAP processor

<LL><ZZ>DATA

XML Adapter For COBOL

IMS App

LLZZDATA

SOAP clients

Log

…/server/logs/imssoap.log

COBOL Converters

UDDI Registry

Publish

Correlator File

COBOL Copybook

WSDL

RD/z Generate

Development environment

SOAP Gateway Deployment Tool Generate and Deploy

Development Environment

Execution

Generation

7

Web server admin
- Deploys WSDL to SOAP gateway
- Specifies connection and interaction properties

Z/OS

IMS

IMS Connect

Microsoft .NET Client

HTTP/SOAP

SOAP Gateway

IMS Web Service

TCP/IP

Adapter Task Manager

XML Adapter

IMS App

Microsoft Visual Studio .NET Build and Generate

SOAP Gateway Deployment Tool Generate and Deploy

Correlator File

WSDL

Publish

COBOL Copybook

XML Converters

UDDI Registry

(Optional)

WDz Generate

System programmer

- Configures IMS Connect and XML Adapter for COBOL
- Compiles and deploys the XML converters

Java or .Net developer
- Generates client code from WSDL
- Writes client application

Application developer
- Generates WSDL, correlator file & converters (from the copybook) using WDz
- Publishes to UDDI/ repository (optional)

Execution

Generation

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Features at a glance

Platform

- z/OS (1.6 or higher), zLinux, Windows, AIX 5.3

Web Services standards

- HTTP 1.1, SOAP 1.1, WSDL 1.1, UTF-8 encoding, WS-I BP 1.0, WS-Security 1.1
- Web Service Provider and Consumer

IMS app interaction modes

- Web Service Provider

  Non-Conversational COBOL applications

  Commit mode 1 with Synclevel none

  Multi-segment messages

  Execution timeouts

- Web Service Consumer

  Process async and sync callout request from IMS COBOL applications

Connection management

- Connection pooling with persistent sockets

Security

- RACF userid/pwd authentication and authorization via IMS Connect and OTMA
- SSL, HTTPS

XML transformation and Tooling

- Rational Developer for System z

  RDz 7.0 for IMS SOAP Gateway v9

  RDz 7.1.1/7.5 for IMS SOAP Gateway v10

  RDz 7.6* for IMS Enterprise Suite 1.1 SOAP Gateway

- Creates WSDL for IMS transactions as providers
- Generates converters to handle XML transformation in IMS Connect

Rational Developer for System z (RDz)

- **Application development tool for modernizing and developing System z application**

- **Support for IMS application development**
  - Code Snippet for IMS DLI calls

- **Support for SOAP Gateway**
  - Web Service Provider

    Generate WSDL, XML converters and correlator files from COBOL/PLI source files

  - Web Service Consumer

   *Generate XML converters, correlator files from COBOL source and Web Service WSDL files*

Enterprise Service Tools Wizard Launchpad

Specify options to start a web service wizard

Runtime: IMS SOAP Gateway

Scenario: Create New Service Interface (bottom-up)

Conversion type: Compiled XML Conversion

Scenario description:

Generate a Web service description and runtime specific XML message processing from a high level language data structure. You can use this option when you expose an application program as a service provider.

☐ Save generation properties

Start   Cancel

** Unwarranted two complimentary copies of RDz 7.1.x for IMS 10 users

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Security Support

- **Supports RACF Security features in IMS Connect**
  - ➤ Passes *User ID*, *Password*, and *Group Name* from the Connection Bundle File
  - ➤ Supports HTTPS from the Web Service
  - ➤ Supports SSL to IMS Connect

    Client/Server Authentication (handshake)
    Data Encryption

HTTPS		**TCP/IP**	
Web Service (e.g. .NET, Java, SAP…)	🔓	**IMS SOAP Gateway**	🔓 → **IMS Connect** **IMS**

SSL
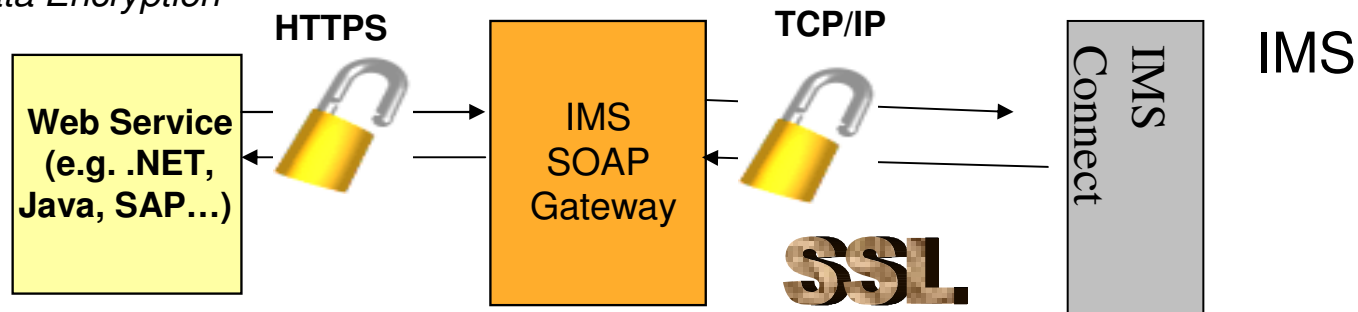
- **Supports Callout Security**
  - ➤ Detailed scenarios and documentation available as part of v10.1 iFix3
- **Setting up HTTPS is broken down into the following use cases**
  - ➤ 1. Mutual SSL Authentication and Basic Authentication
  - ➤ 2. Mutual SSL Authentication
  - ➤ 3. SSL and Basic Authentication
  - ➤ 4. SSL
  - ➤ 5. Basic Authentication

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IMS SOAP Gateway V10.1 Features

- **Support for z/OS**

- **Asynchronous Callout**
  - Requires IMS V10

- **Synchronous Callout**
  - Requires IMS V10 SPE
  - Requires IMS SOAP Gateway v10.1 and iFix2 (since iFix3 is out that can be used as well)

- **Other**
  - Correlator format supports callout

Support for z/OS

■ **Pax file containing the IMS SOAP Gateway installation**

■ **Five template files**

➤ DFSMKDR: Creates the directories inside the HFS

➤ DFSHFSAL: Allocates the HFS

➤ DFSHFSMT: Mounts the HFS

➤ IMSSOAP: Creates the PROC to start IMS SOAP Gateway

➤ IMSSOAPZ: The configuration member for the IMSSOAP PROC

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IMS 10 Callout support with SOAP Gateway

- **Enable IMS as a Web Services consumer**

- **Supports two types of IMS callout**
  - Asynchronous callout (IMS SOAP 10.1+ IMS 10)

    IMS application invokes external applications without waiting for response. Response can be received by another IMS application.
  - Synchronous callout (IMS SOAP 10.2 iFix2/iFix3 + IMS 10 Sync Callout SPE)

    IMS application invokes external application and synchronously wait for the response.

    A new DL/I call, ICAL, is added for synchronous callout with timeout capability and support large messages

- **Invokes external Web Service using SOAP**
  - Request-Response or One-way SOAP invocation
  - Correlates responses back to IMS for Synchronous callout
  - Provides Thread pool to concurrently retrieve and process IMS callout request to provide maximize performance
  - Auto reconnect to IMS Connect
  - Transform SOAP and XML messages

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IMS SOAP Gateway – Outbound support Asynchronous Callout

- **Enables IMS application to act as a client to asynchronously invoke J2EE applications and Web Services**

  - Callout to J2EE apps (e.g. EJB) and Web Services using WebSphere Application Server and IMS TM resource adapter

  - Callout to Web services using IMS SOAP Gateway

  - Callout to other apps

A sample on how to enable an IMS applications as a Web service consumer can be downloaded from the IMS SOAP Gateway Web site.
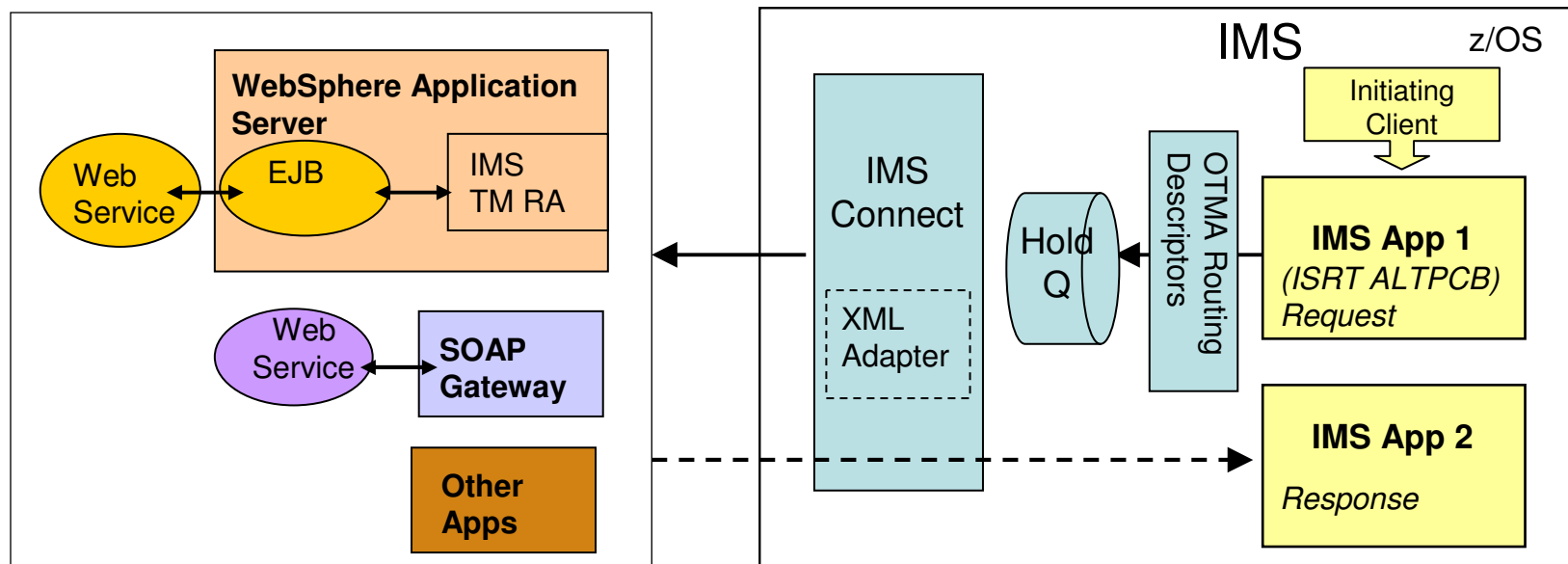
IMS SOAP Gateway – Outbound support Synchronous Callout

- **Enables IMS application to act as a client to invoke Web Services provider, J2EE and RYO applications**

  - Callout to J2EE apps (e.g. MDB) and Web Services using WebSphere Application Server and IMS TM resource adapter

  - Callout to Web services provider (e.g. .NET, SAP XI) via IMS SOAP Gateway

  - Callout to other applications (e.g. RYO, SAP)

- **Synchronously receive output back in the same IMS transaction instance**
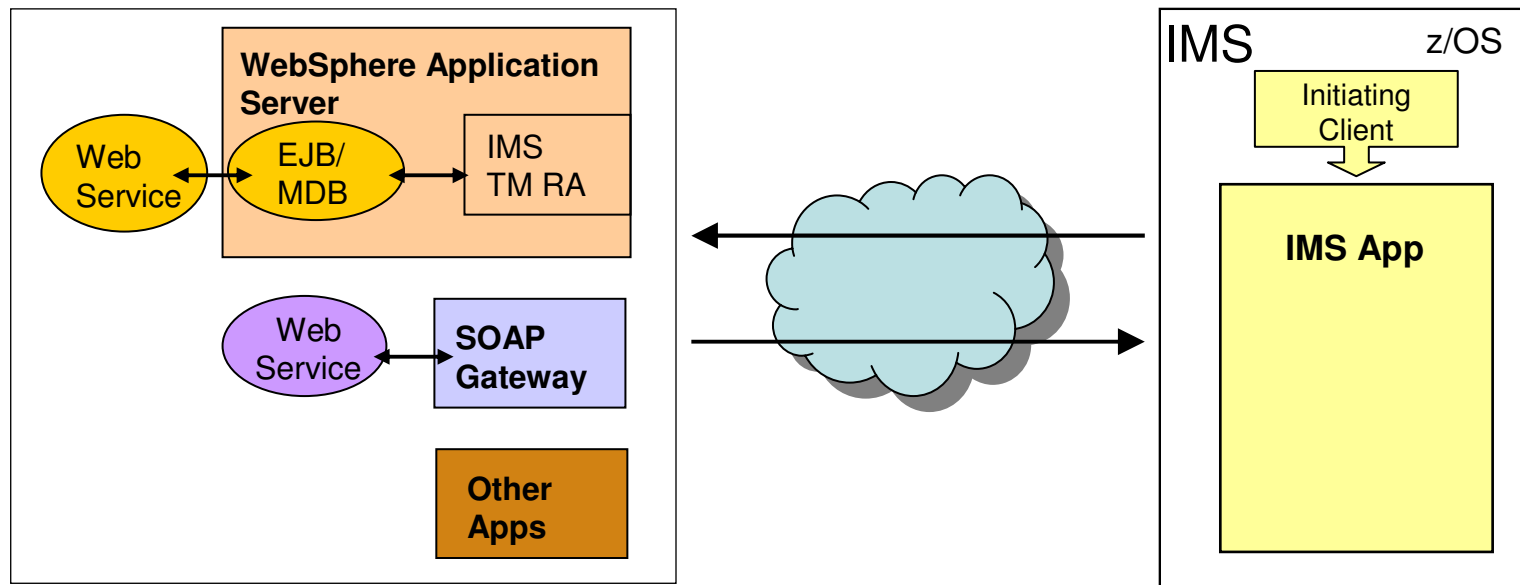
Synchronous Callout Request Response Flow

z/OS

IMS

IMS SOAP Gateway

IMS Connect

OTMA

IMS Application (BMP)

Resume TPIPE TP1 | 0

HWS1

TPIPE TP1

Descriptor

DEST1 TP1 HWS1

| 1 | DL/I ICAL
Descriptor name
Timeout

token

| 2 | Send Request Msg with a correlation token and starts timer

External

Web Service

XML Adapter

ACK | 3

| 4

| 5

token | 6

Send Only Response Msg with token

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Thread Pool for Callout

Multi-segment support for Web Service Provider
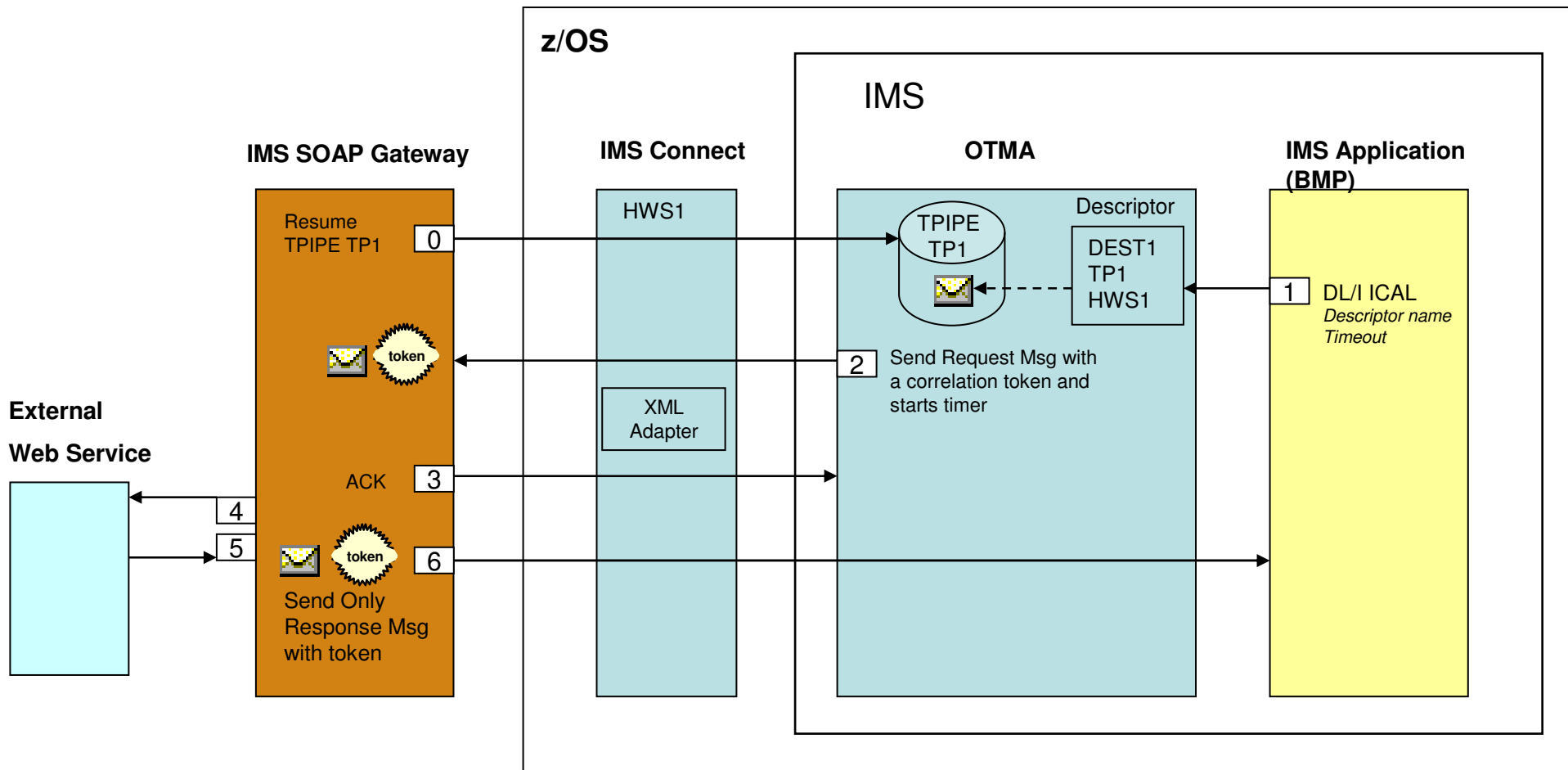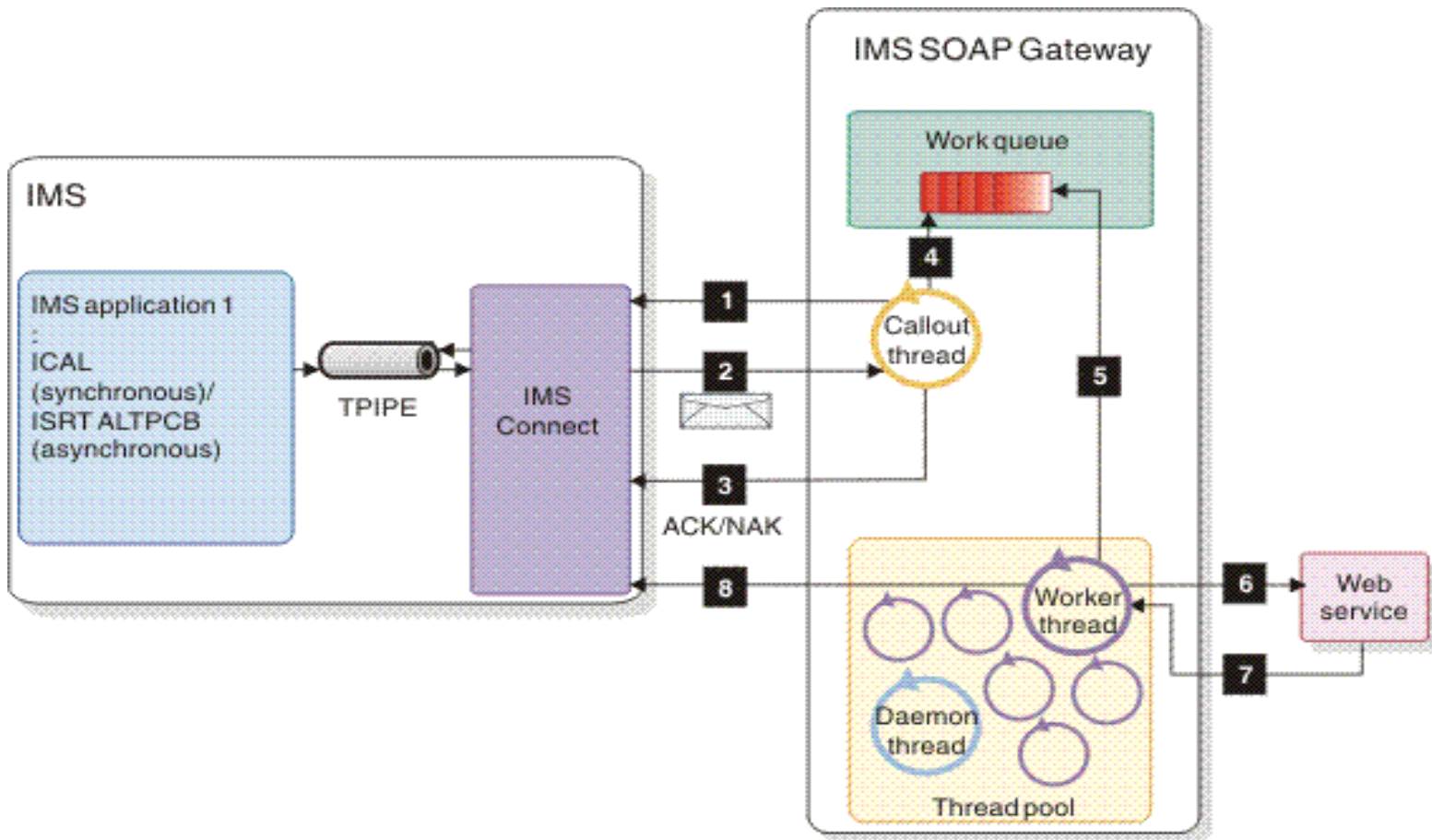
■ **Solution Highlights**

➢ Expose multi-segment COBOL IMS transaction as Web Service Providers

➢ Supports both multi-segment input and output messages

➢ No change to existing IMS applications

➢ Artifacts generated by RDz v7.5.1 or later

➢ Available with IMS SOAP v10.1 (iFix3), IMS Connect SPE and RDz v7.5.1 or later

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Examples of Multi-Segment support

- **<u>Layout 1</u>: Fixed count, order-important language structure instances.**
  - ➢ {A1, A2, B1, B2, C1, C2}
  - ➢ {A1, B1, B2, C1}
  - ➢ {A1, B1, C1}

- **<u>Layout 2</u>: Optional, fixed count, order-important language structure instances, followed by one variable count language structure, and ending with one optional language structure instance.**
  - ➢ {A1, [B1, B2,...,Bn], C1}
  - ➢ {A1, B1, [C1, C2,...,Cn]}
  - ➢ {A1, A2, B1, B2, [C1, C2,...,Cn]}
  - ➢ {A1, A2, B1, [C1, C2,...,Cn], D1}
  - ➢ {[B1, B2,...,Bn]}
  - ➢ {[B1, B2,...,Bn], C1}

A, B, and C are language structures, each less than 32 KB in size.

Multi-segment Support

Select language structures

☑ **01 REQ-HEADER.**
05 *LL* PIC S9(4) COMP-5.
05 *ZZ* PIC S9(4) COMP-5.
05 *TRANCODE* PIC X(8).
05 DAT-1 PIC X(32).
05 DAT-2 PIC 9(9) COMP.

☑ **01 REQ-BODY.**
05 *LL* PIC S9(4) COMP-5.
05 *ZZ* PIC S9(4) COMP-5.
05 DAT-3 PIC 9(4) COMP.
05 DAT-4 PIC X(4096).

☑ **01 REQ-HEADER.**
05 *LL* PIC S9(4) COMP-5.
05 *ZZ* PIC S9(4) COMP-5.
05 DAT-5 PIC 9(9) COMP.
05 DAT-6 PIC X(32).

Specify IMS message layout

#	Structure	Min	Max
1	REQ-HEADER	1	1
2	REQ-BODY	1	64
3	REQ-SUMMARY	1	1

Each entry in the table represents one or more segments in the IMS runtime message having a binary format of the corresponding language structure. The Min and Max columns specify the minimum and maximum consecutive instances (segments) of the language structure.

Generate Web service artifacts

Web Service Description (WSDL)

Request Composite XML Schema

```
<RequestMessage>
    <req_header.../>
    <req_body.../>
    <req_body.../>
    <req_body.../>
    <req_summary.../>
</RequestMessage>
```

XML to Language Structure Converter

```
<RequestMessage>
    <.../>
</RequestMessage>
```

IMS runtime message

LLLL	LL	ZZ	TRANCODE	DAT-1, DAT-2	LL	ZZ	DAT-3, DAT-4	LL	ZZ	DAT-3, DAT-4	LL	ZZ	DAT-5, DAT-6

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IMS Enterprise Suite SOAP Gateway Features

Installation

- **SMP/E install for z/OS environment**

  ➢ No longer need to download and install from the website

- **Installation Manager for distributed platforms**

  ➢ Easy-to-use installation client for managing your install and updates
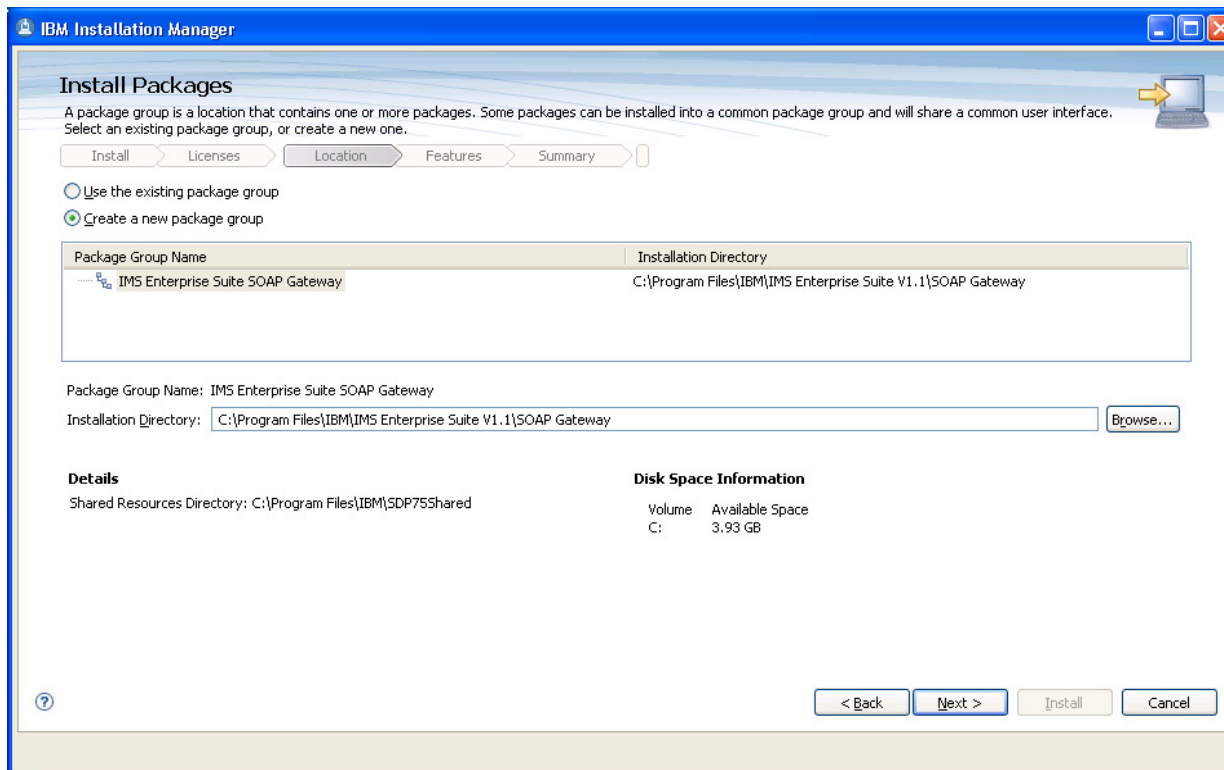
WS-Security

- **WS-Security (Web Services Security) is a communications protocol providing a means for applying security to Web services.**

- **WS-Security incorporates security features in the header of a SOAP message, working in the application layer. Thus it ensures end-to-end security.**

Without WS-Security

Soap Envelope

Soap Header

Soap Body

With WS-Security

Soap Envelope

Soap Header

WSS Header

Security Token 1

Security Token 2

Soap Body

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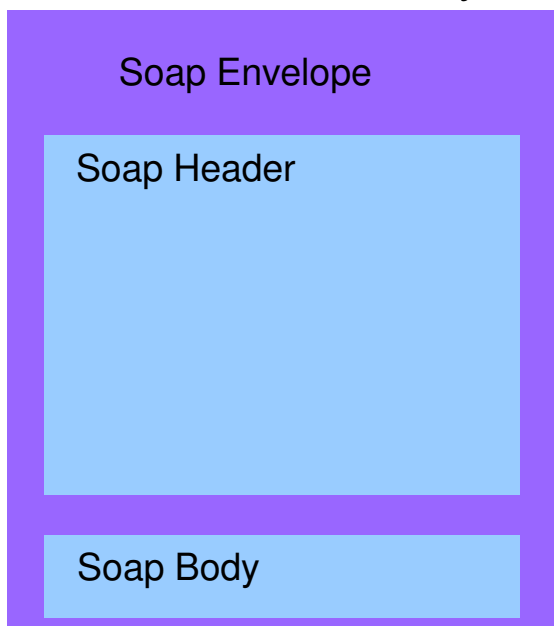
WS-Security support for Web Service Provider

- **Solution Highlights**

  ➢ Allows dynamic security information (userid and password) to be provided on a per message basis as a UserNameToken

  ➢ Security information would be used by IMS Connect and OTMA for authentication and authorization when invoking the IMS transactions

  ➢ Need to combine with SSL to protect the user id and password in the SOAP Header

- **Business Value**

  ➢ Enhanced security with each request (and response)

Current Implementation (without WS-Security)

Message

USERID PASSWORD + Message

Message

z/OS

Client A

Client B

Client C

Client D

SOAP

SOAP

SOAP

SOAP

IMS SOAP Gateway

Connection Bundle (connBundle.xml)
<connBundleA>
<connUserID>
userA
</connUserID>
<connPassword>
passwordA
</connPassword>
....
<connBundleA>
....
<connBundleD>...
<connBundleD>

SSL

IMS Connect

XML Adapter

O T M A

IMS App

Authorization

USERID PASSWORD

DB

RACF

Web Service

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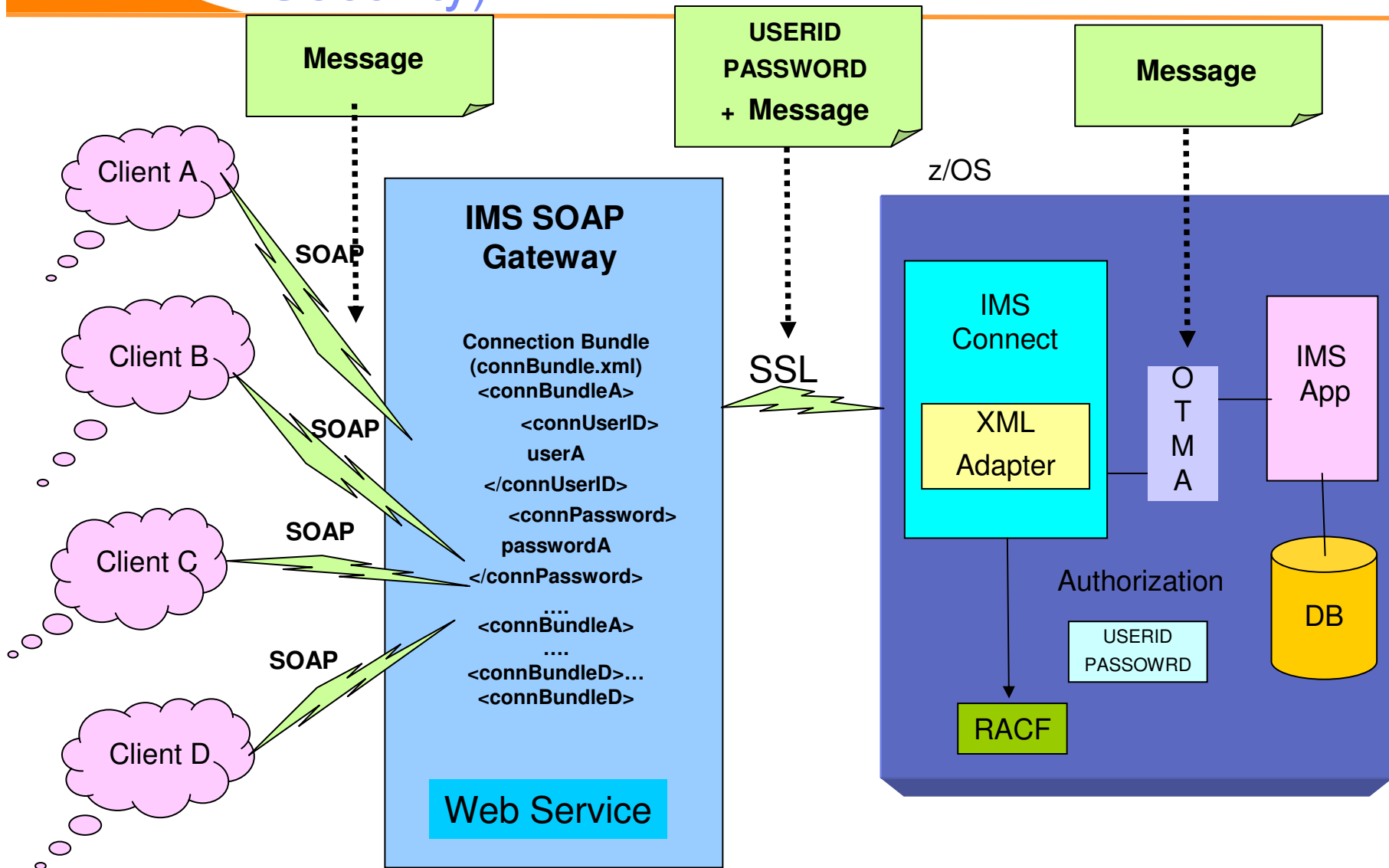
WS-Security enhancement

UserName Token

USERID

PASSWORD

+ Message

USERID

PASSWORD

+ Message

Message

z/OS

IMS Enterprise Suite SOAP Gateway

Client

SOAP

SSL

Web Service

SSL

IMS Connect

XML Adapter

O T M A

IMS App

Authorization

USERID
PASSOWRD

DB

RACF

```
<soapenv:Header soapenv:encodingStyle="...">
    <wsse:Security xmlns:wsse="...">
        <wsse:UsernameToken>
<wsse:Username>user</wsse:Username>
    <wsse:Password Type="...#PasswordText" >
    password</wsse:Password>
        </wsse:UsernameToken>
        </wsse:Security>
    </soapenv:Header>
```

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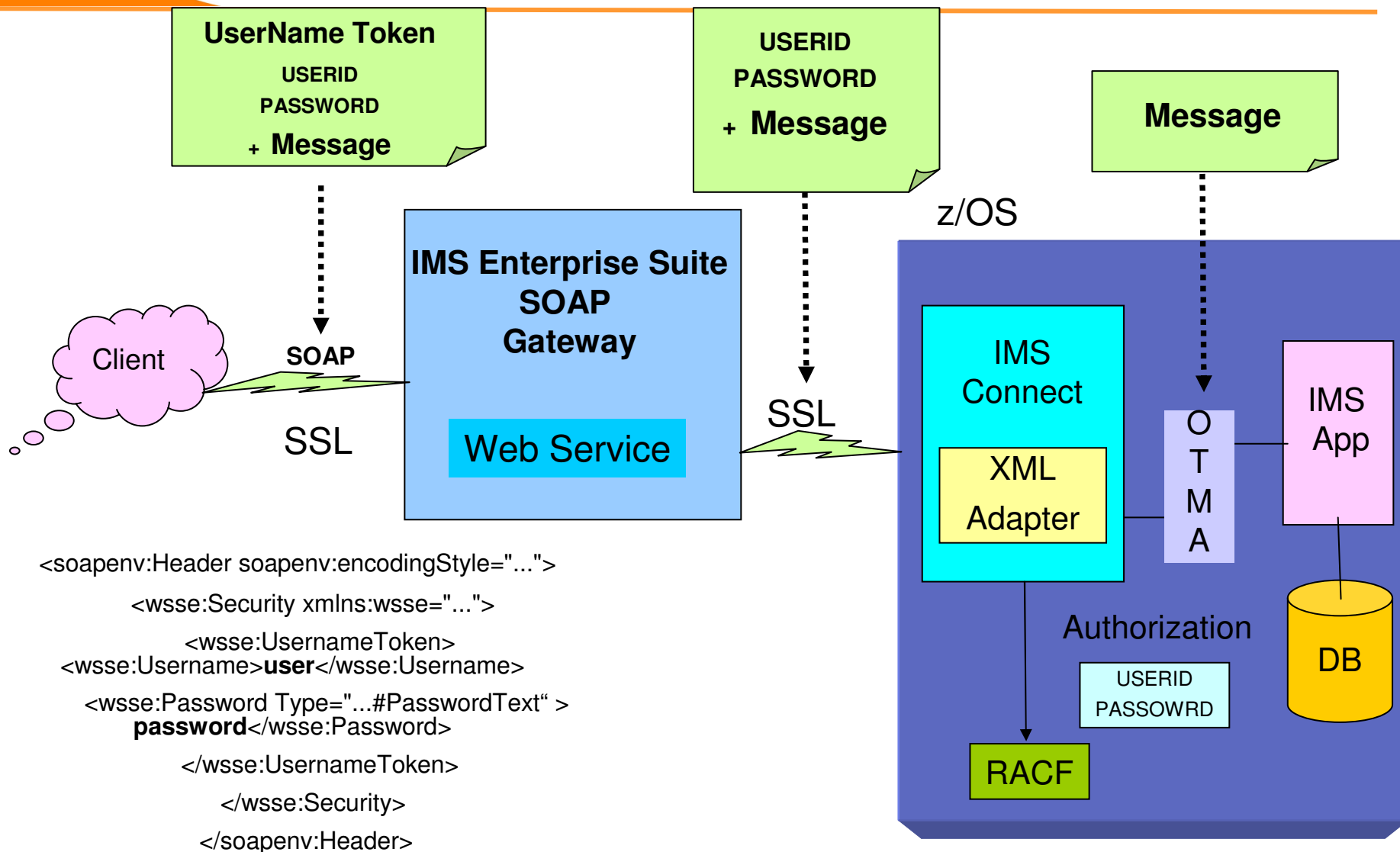
IMS and Business Events

- **Business Event**
  - ➤ A notable thing happens inside or outside your business. It may signify a problem, an opportunity, a threshold, or a deviation.

- **Business Event Monitoring and Processing**
  - ➤ Monitoring: Provides near real-time view of business performance through business metrics and key performance indicators
  - ➤ Event Processing: Provides the ability to sense when an event or event pattern to allow information to be quickly disseminated to others for both awareness and to take appropriate action

- **Values**
  - ➤ Leverage existing IMS assets to explore Business Event processing capability
  - ➤ Empower business users to define and proactively manage business events with easy-to-use graphical tools
  - ➤ Accelerate application development and growth, as well as ease the maintenance and change of business rules

WebSphere Business Monitor (WBM)

- **Enable WebSphere Business Monitor (WBM) to receive business event data from IMS applications to provide business users visibility into business activities**

- **WebSphere Business Monitor**
  - Calculates business metrics and presents key performance indicators through very visual business dashboards to provides a near real-time view of business performance
  - Deliver alerts to make an organization or administrators aware of potential problems and proactively take directed action.
  - Identify business problems, and predict future trends for improved decision making and faster reaction

Scorecards
Key Performance Indicators
for business units

KPI History and Prediction
Predict future trends for improved
decision making and faster reaction

WebSphere Business Monitor

IMS on z

IMS

IMS

IMS

Application

Common Base
Events to WBM

Reports & Analyses
Understanding trends by combining real-time performance and historical information

Mobile Dashboards
Access from smart phone, Lous
and MS Excel

Modeled Alerts
Notification of situations
that require response

Visual Dashboards
Web based easy to configure
and customize dashboards

Dynamic Alerts
Notifications defined by business
user for agile decision making

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WebSphere Business Events

- **Enable WebSphere Business Events (WBE) to receive business event data from IMS applications for business events processing and execution**

- **WebSphere Business Events**
  - Empower business users to define and proactively manage business events with easy-to-use graphical tools
  - Provide the ability to detect, decide and dynamically react to both simple and complex relationships among people, events and information

WebSphere Business Events

Systems

IMS Applications Other Apps

Sensors

BAM   Other

Business

Generate and publish events

Events

Event Processing

Events

Watch for Large Withdrawal	Related by	Customer.Account ID
In response to Withdrawal from ATM System		When
Where Large Withdrawal		
and Changed PIN in Last 24 Hours		
Then Level 1 Suspicious on Fraud		

Business Users

Perform operations on events

Actions

Event Consumer

Consume, react to events
- *Alerts*
- *Trigger Workflow*
- *Automated actions*

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Business Events
Fraud Scenario

- **Business leader: "There is still too much fraud"**

- **Business Professional: "We need to add extra fraud detection capability to our systems"**

- **Process Analyst determines …**

  - "Level 1 suspicious" when a customer:

    - ➢ Has 3 or more failed login attempts at the online banking site

    - ➢ Large withdrawal from an ATM within 24 hours of a PIN change

  - Three "Level 1 Suspicious" events trigger a "Level 2 Suspicious" event (no matter what original pattern caused it)

  - Three "Level 2 suspicious" events means there is a good chance that a fraud has occurred

  - Action: Initiate Fraud Investigation through alert to Business Professional

Business Leader

Business Professional

Process Analyst

Business Event support with SOAP Gateway

- **Small change to IMS application to send out business event data using ISRT ALTPCB call**

- **RDz generates artifacts to convert IMS business events data to WBE/WBM formats**

- **SOAP Gateway emits business events data asynchronously to WBM and WBE**

SOAP Gateway stack upgrade
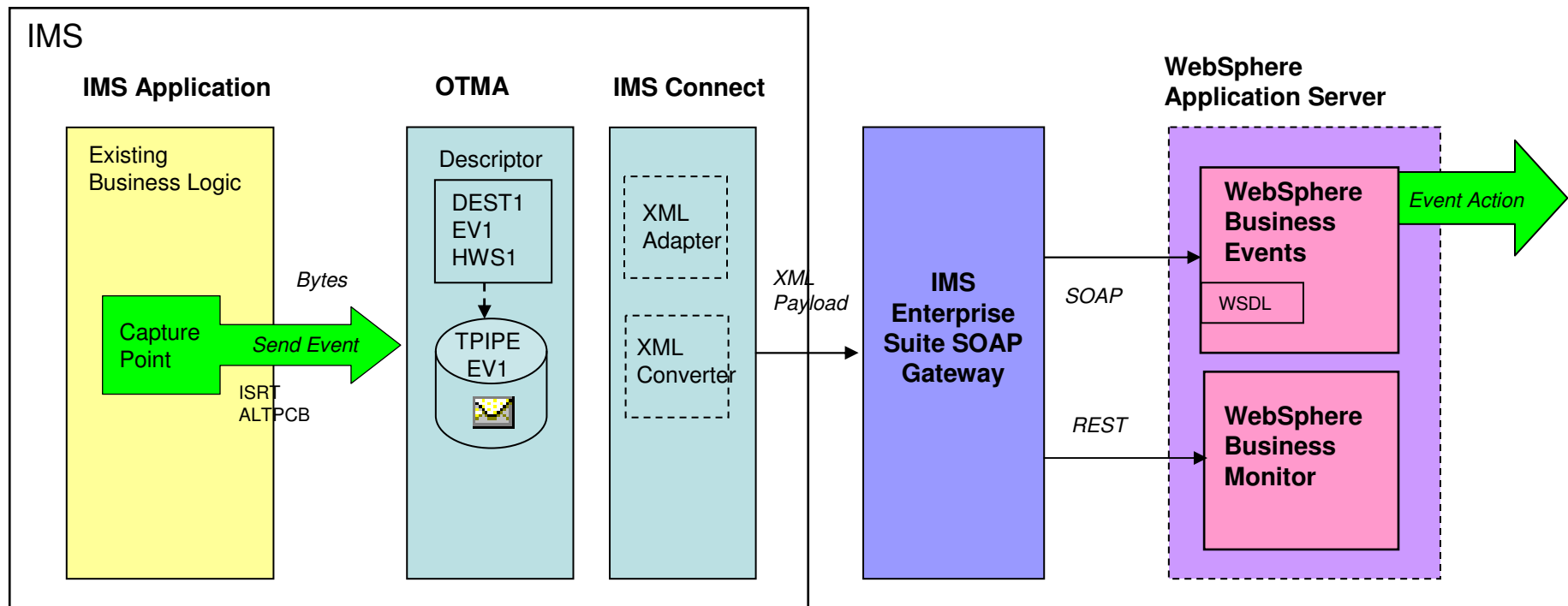
- **New Tomcat**

- **New JDK**

- **New SOAP Engine**

- **SMPe installation for z/OS**

- **Integration with IBM Installation Manager for Distributed platforms**

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How do I get IMS Enterprise Suite SOAP Gateway?

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More about IMS Enterprise Suite SOAP Gateway
http://www.ibm.com/ims

References

- **The latest *IMS™ Enterprise Suite SOAP Gateway information* is available in the IBM® Information Management Software for z/OS® Solutions Information Center at:**

  http://publib.boulder.ibm.com/infocenter/imzic/topic/com.ibm.ims.soap.doc/soapoverview.htm

Customer Value

Customer Value

- **Enable IMS applications to communicate with Web Services and clients anywhere in the network using SOAP**

- **Maximize re-use of customer enterprise assets via standard interfaces**

- **Support heterogeneous distributed computing environment**

- **Support industry standards**

- **Interoperability with partners using other software**

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Disclaimer

Thank You!

Questions?