

Support Technical Exchange:

Integration Framework

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AGENDA

- 6.x to 7.x - Terminology/GOTO Menu
- 6.x to 7.x - Upgrade Items
- 7.x - Functionality

Maximo Enterprise Adapter / Integration Framework

MEA=MIF=Integration Framework

6.x

7.x

Integration Objects = Object Structures

Outbound Interface = Publish Channels

Inbound Interface = Enterprise Services

Integration GO TO Menu

Release 6

Integration

Integration Objects

Integration Interfaces

External Systems

Release 7.5.0.2

Integration

▶ Object Structures

▶ Publish Channels

▶ Enterprise Services

▶ External Systems

Invocation Channels

Web Services Library

End Points

Logical Management Operations

Integration Modules

Launch in Context

Message Reprocessing

Message Tracking

Interactions

Maximo Enterprise Adapter - 6 to 7 Upgrade

- Most Integration content is upgraded (including customer-created) – some exceptions
- **Upgrade Guide**
 - Preparing to upgrade Maximo Enterprise Adapter
 - Completing the Maximo Enterprise Adapter upgrade process
 - Maximo Enterprise Adapter updates

http://www-304.ibm.com/support/docview.wss?uid=swg21266217&aid=11 - Windows Internet Explorer provided by IBM

http://www-304.ibm.com/support/docview.wss?uid=swg21266217&aid=11

File Edit Go To Favorites Help

http://www-304.ibm.com/support/docview.wss?uid=s...

Tools Sign Comment

Preparing to upgrade Maximo Enterprise Adapter

The following list provides an overview of the pre-upgrade tasks for Maximo Enterprise Adapter.

- ▼ Identifying the alternate keys in the integration objects
- ▼ Registering the Maximo business object attribute setting restrictions
- ▼ Reconfiguring multiple integration points in the integration objects
- ▼ Reconfiguring multiple outbound integration points in the interfaces
- ▼ Processing integration transactions
- ▼ Reconfiguring integration controls and interfaces
- ▼ Reconfiguring interface processing rules in inbound integration points
- ▼ Reconfiguring version 6 XML schemas

If you are upgrading the Maximo Enterprise SAP ERP adapter or the Maximo Oracle ERP adapter (sections that follow), you must still complete the Preparing to upgrade Maximo Enterprise Adapter section. Ensure that the configurations you specify in each section are compatible.

Done

start Info... Sma... Max... Design Ass... Micr... IBM... I... Micr... (2:25) 2:38 PM

Maximo Enterprise Adapter - 6 to 7 Upgrade

XML Format Change

6.x XML

```
<MXASSETInterface >
  <Header>
    <SenderID>
  </Header>
  <Content>
    <MXASSET>
      <ASSET>
        <ASSETNUM>1001</ASSETNUM>
      </ASSET>
    </MXASSET>
  </Content>
</MXASSETInterface>
```

7.x XML

```
<SyncMXASSET>
  <MXASSETSync>
    <ASSET>
      <ASSETNUM>1001</ASSETNUM>
    </ASSET>
  </MXASSETSync>
</SyncMXASSET>
```

System Property – mxe.int.<Adapter Name>.convert6to7xml

Maximo Enterprise Adapter - 6 to 7 Upgrade

URLs

- 6.x - <http://hostname:port/meaweb/measervlet/adapter>
External System and Interface in the XML message
- 7.x - <http://hostname:port/meaweb/esqueue/extsysname/entservname>
External System and Service (interface) in the URL

You can continue to use a global URL

<http://hostname:port/meaweb/measervlet>

Two options to identify SENDER and INTERFACE

1. *Pass those values using the SENDER and INTERFACE properties in the HTTP header.*

Maximo Enterprise Adapter - 6 to 7 Upgrade

2. Provide a class file to assign values to SENDER and INTERFACE

- Define Class file in web.xml of MEAWEB
(maximo install folder\applications\maximo\meaweb\webmodule\WEB-INF)

```
<env-entry>  
<description>Custom Class for SENDER/INTERFACE</description>  
<env-entry-name>SRVICEIDENTIFIERCLASS</env-entry-name>  
<env-entry-type>java.lang.String</env-entry-type>  
<env-entry-value>class name</env-entry-value>  
</env-entry>
```

- Class implements interface

```
public interface ServiceIdentifier  
{  
    /**  
     * @return the name of the enterprise service  
     */  
    public String getServiceName();  
    /**  
     * @return the name of sender  
     */  
    public String getSenderName();  
}
```


Maximo Enterprise Adapter - 6 to 7 Upgrade

- Alternate Keys

The screenshot shows the 'Object Structures' configuration page in a web browser. The browser address bar shows the URL: `http://qarhvm02.swg.usma.ibm.com:7001/maximo/ui/?event=loadapp&value=intobject&uisessionid=141&csrfToken=ok6dpdh4torpt8it40rpt5v3t`. The page title is 'Object Structures'. The main content area shows configuration for the 'MXASSET' object structure. The 'Consumed By' field is set to 'INTEGRATION'. Below this, there are fields for 'Authorized Application', 'Outbound Definition Class' (psdi.iface.app.asset.MoutAssetProcess), and 'Inbound Processing Class' (psdi.iface.app.asset.MaxAssetProcess). A table titled 'Source Objects for MXASSET' displays a list of objects and their relationships. A yellow callout box points to the 'Alternate Key' field in the details section, containing the text: 'Object Structure - Define alternate key for integration - applies only to selected Object Structure'. The details section shows 'Object: ASSET', 'Parent Object', 'Object Location Path: ASSET', 'Relationship', 'Object Order: 1', and 'Alternate Key'.

Object	Parent Object	Object Location Path	Relationship	Object Order	User Defined?
ASSET		ASSET		1	<input type="checkbox"/>
ASSETMETER	ASSET	ASSET/ASSETMETER	INT_ASSETMETER	1	<input type="checkbox"/>
ASSETUSERCUST	ASSET	ASSET/ASSETUSERCUST	ASSETUSERCUST	2	<input type="checkbox"/>
ASSETSPECLASS	ASSET	ASSET/ASSETSPECLASS	ASSETSPECLASS	3	<input type="checkbox"/>
ASSETOPSKD	ASSET	ASSET/ASSETOPSKD	ASSETOPSKD	4	<input type="checkbox"/>

Maximo Enterprise Adapter - 6 to 7 Upgrade

- Setting Restrictions

The screenshot shows the 'Inbound Setting Restrictions' dialog box in the Maximo web interface. The dialog is titled 'Inbound Setting Restrictions' and is open for the object structure 'MXASSET'. It displays a list of object attributes and their restriction status.

Object	Field	Restricted?	Override?
ASSET	PARENT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ASSET	LOCATION	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ASSET	STATUS	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASSET	STATUSDATE	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ASSET	YTDCOST	<input type="checkbox"/>	<input type="checkbox"/>
ASSET	WARRANTYEXPDATE	<input type="checkbox"/>	<input type="checkbox"/>
ASSET	VENDOR	<input type="checkbox"/>	<input type="checkbox"/>
ASSET	USAGE	<input type="checkbox"/>	<input type="checkbox"/>
ASSET	UNCHARGEDCOST	<input type="checkbox"/>	<input type="checkbox"/>
ASSET	TOTUNCHARGEDCOST	<input type="checkbox"/>	<input type="checkbox"/>

The dialog also includes a 'Details' section on the left with the following information:

- Object Structure: MXASSET
- * Consumed By: INTEGRATION
- Authorized Application: [Empty]
- Outbound Definition Class: psdi.iface.app.asset.Mout
- Inbound Processing Class: psdi.iface.app.asset.Max
- Source Objects for MXASSET: [List of objects and parent objects]
- Object: ASSET
- Parent Object: [Empty]
- Object Location Path: ASSET

A yellow callout bubble points to the dialog with the text: "Object Structure - Define Setting Restriction for object attributes - applies only to selected Object Structure".

Maximo Enterprise Adapter - 6 to 7 Upgrade

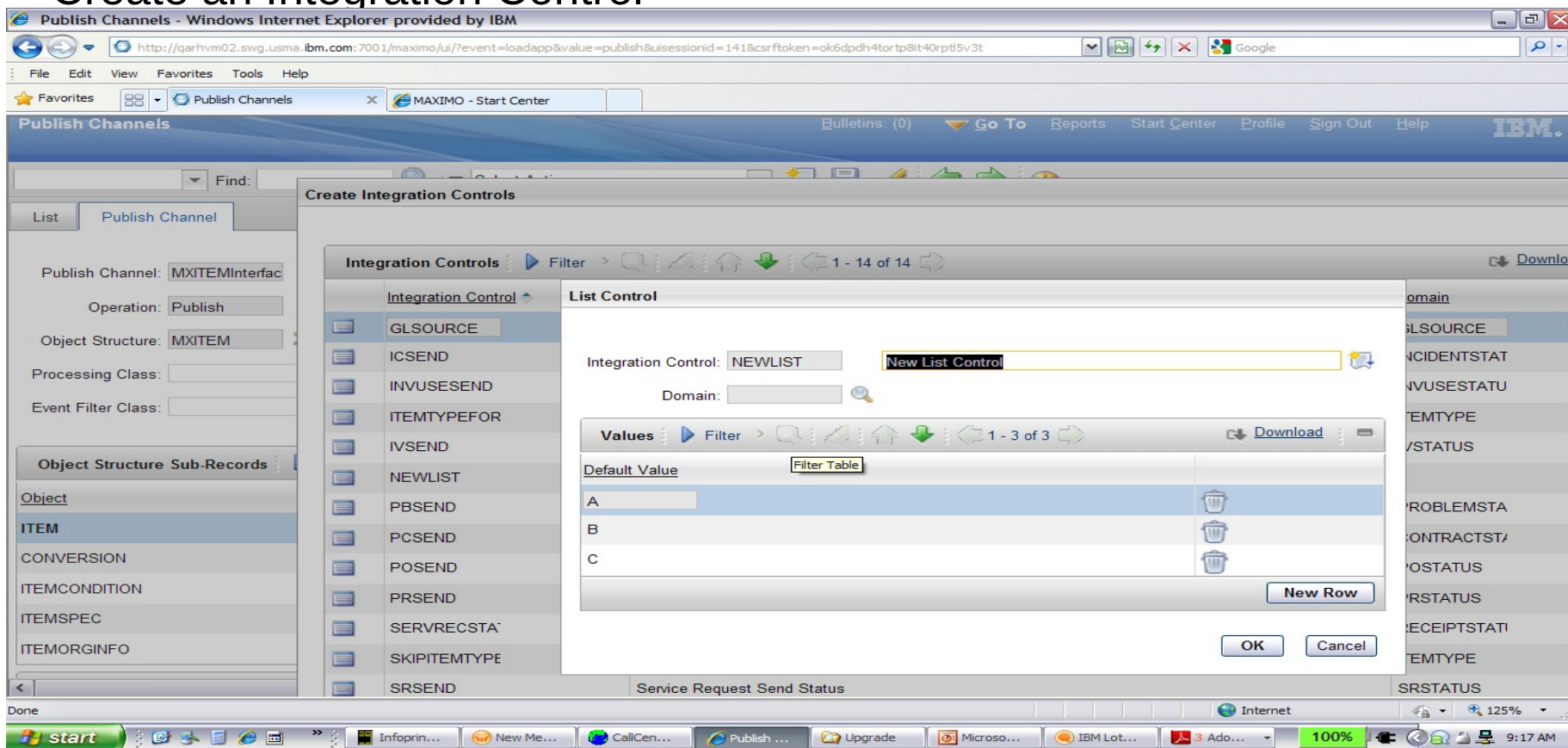
- Interface Tables - not created on 7.x
 - Configure Object Structures as Flat Supported
 - Resolve any duplicate names (Alias Conflicts)
 - Assign Interface Table End Point to External System
 - Create Interface tables
- System Properties (application)
 - mxe.int.....
 - mxe.rest...
- Merged Integration Objects
 - Replaced by object structure using non-persistent objects
 - See upgrade guide

Maximo Enterprise Adapter - 6 to 7 Upgrade

Interface Controls now called Integration Controls

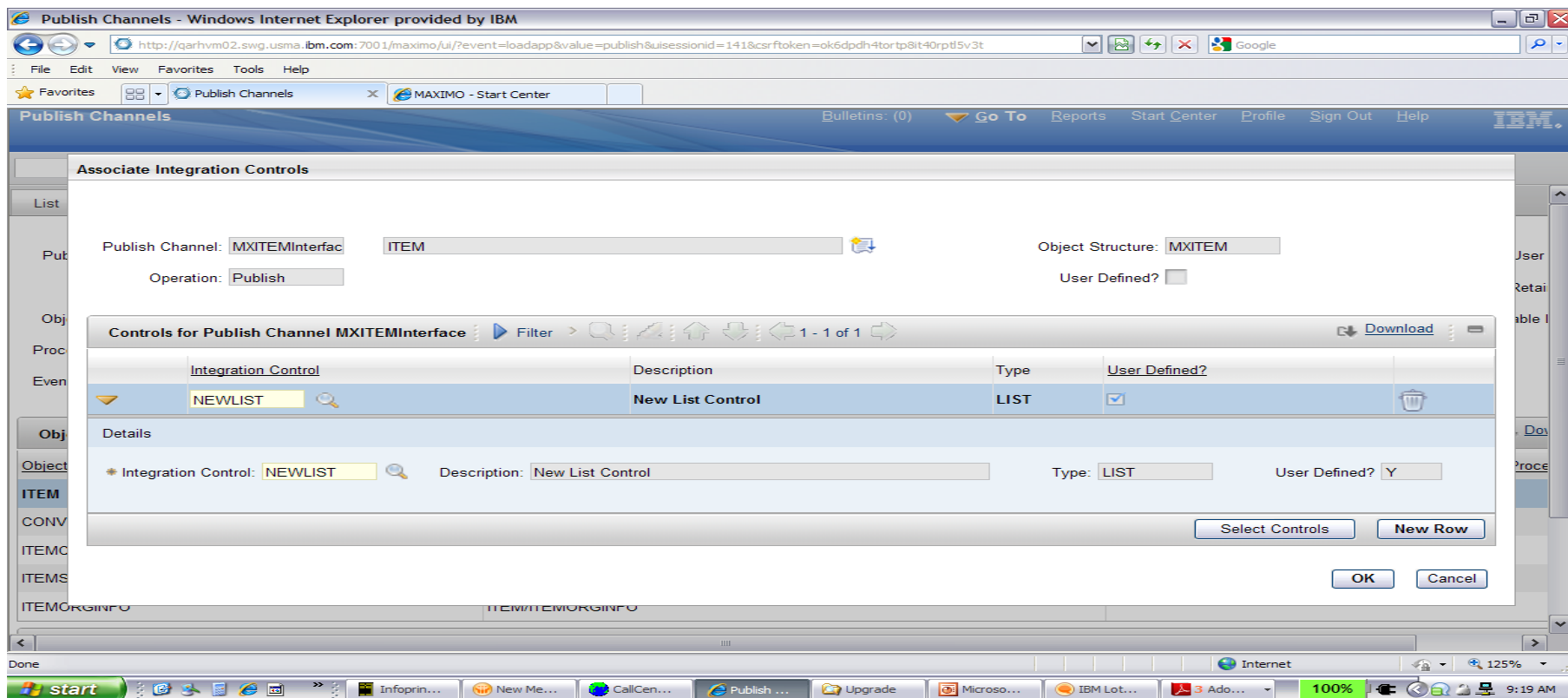
- No longer tied to an Adapter – system wide

- Create an Integration Control



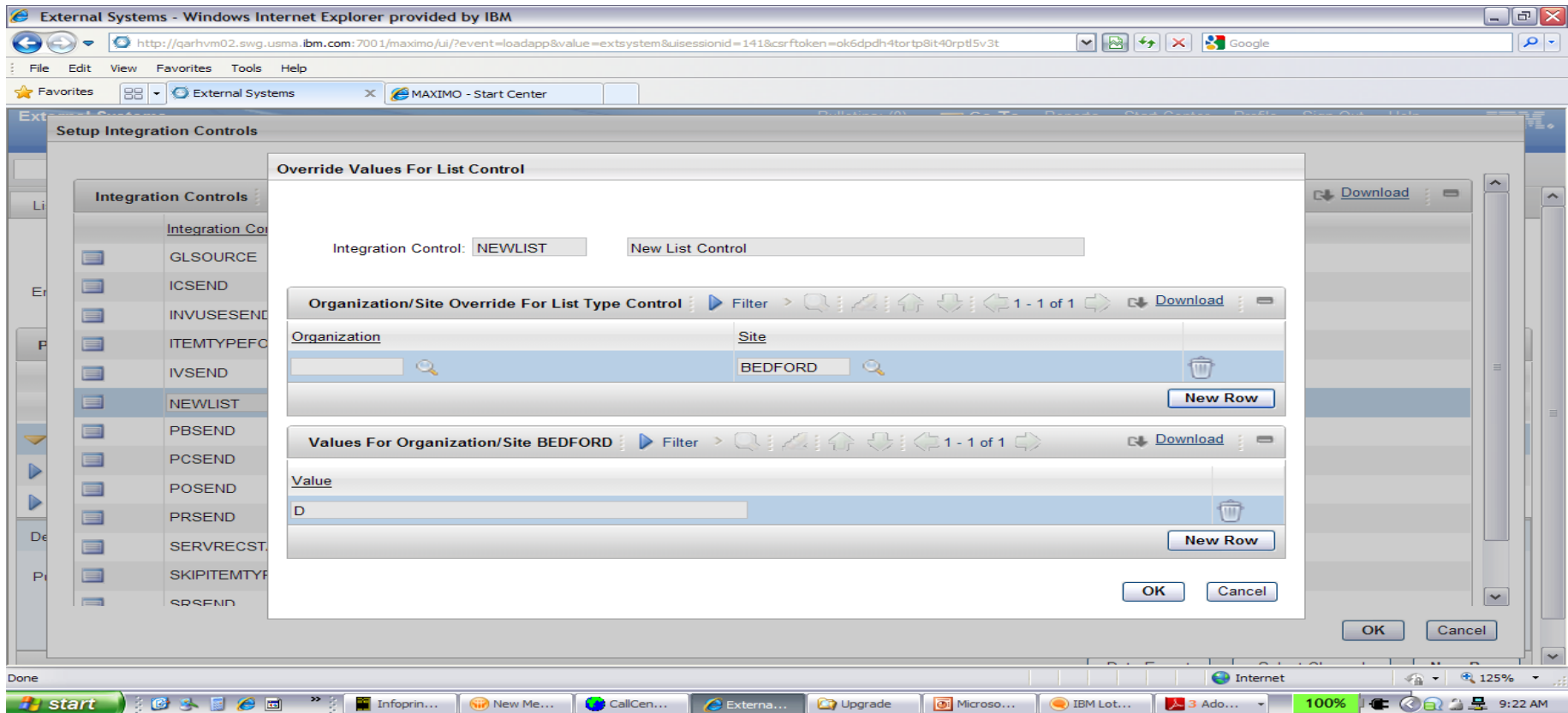
Maximo Enterprise Adapter - 6 to 7 Upgrade

- Create an Integration Control
- Associate the Control to a Channel/Service



Maximo Enterprise Adapter - 6 to 7 Upgrade

- Create an Integration Control
- Associate the Control to a Channel/Service
- Set External System-specific value & override



Maximo Enterprise Adapter - 6 to 7 Upgrade

■ Upgrade Guide

- Preparing to upgrade Maximo Enterprise Adapter
- Completing the Maximo Enterprise Adapter upgrade process
- Maximo Enterprise Adapter updates

The screenshot shows a Windows Internet Explorer browser window. The address bar displays the URL: <http://www-304.ibm.com/support/docview.wss?uid=swg21266217&aid=11>. The page title is "Preparing to upgrade Maximo Enterprise Adapter". The main content area contains the following text:

The following list provides an overview of the pre-upgrade tasks for Maximo Enterprise Adapter.

- ▼ Identifying the alternate keys in the integration objects
- ▼ Registering the Maximo business object attribute setting restrictions
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- ▼ Processing integration transactions
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- ▼ Reconfiguring interface processing rules in inbound integration points
- ▼ Reconfiguring version 6 XML schemas

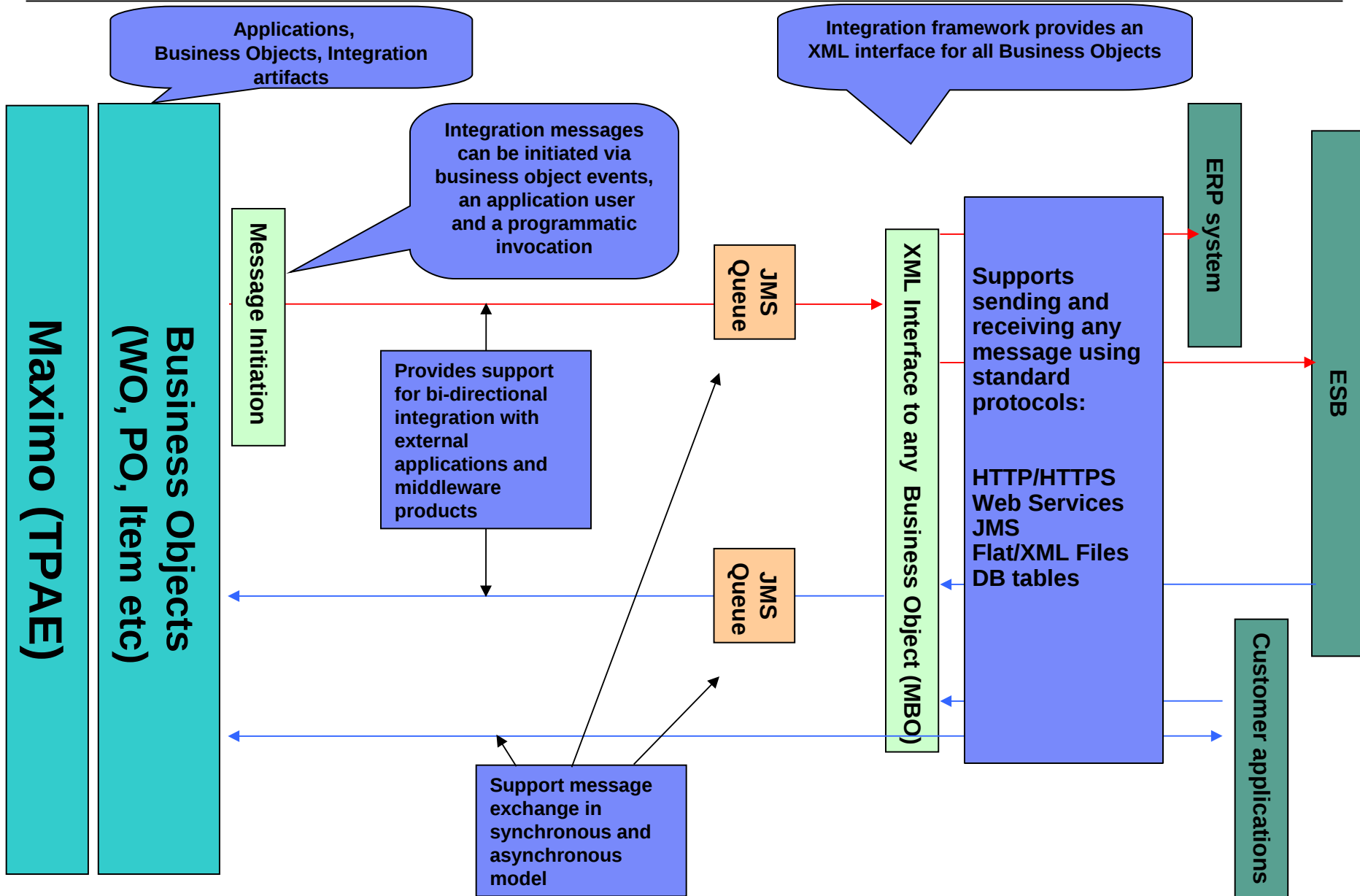
If you are upgrading the Maximo Enterprise SAP ERP adapter or the Maximo Oracle ERP adapter (sections that follow), you must still complete the Preparing to upgrade Maximo Enterprise Adapter section. Ensure that the configurations you specify in each section are compatible.

The browser window also shows a bookmarks sidebar on the left with a tree view containing the following items:

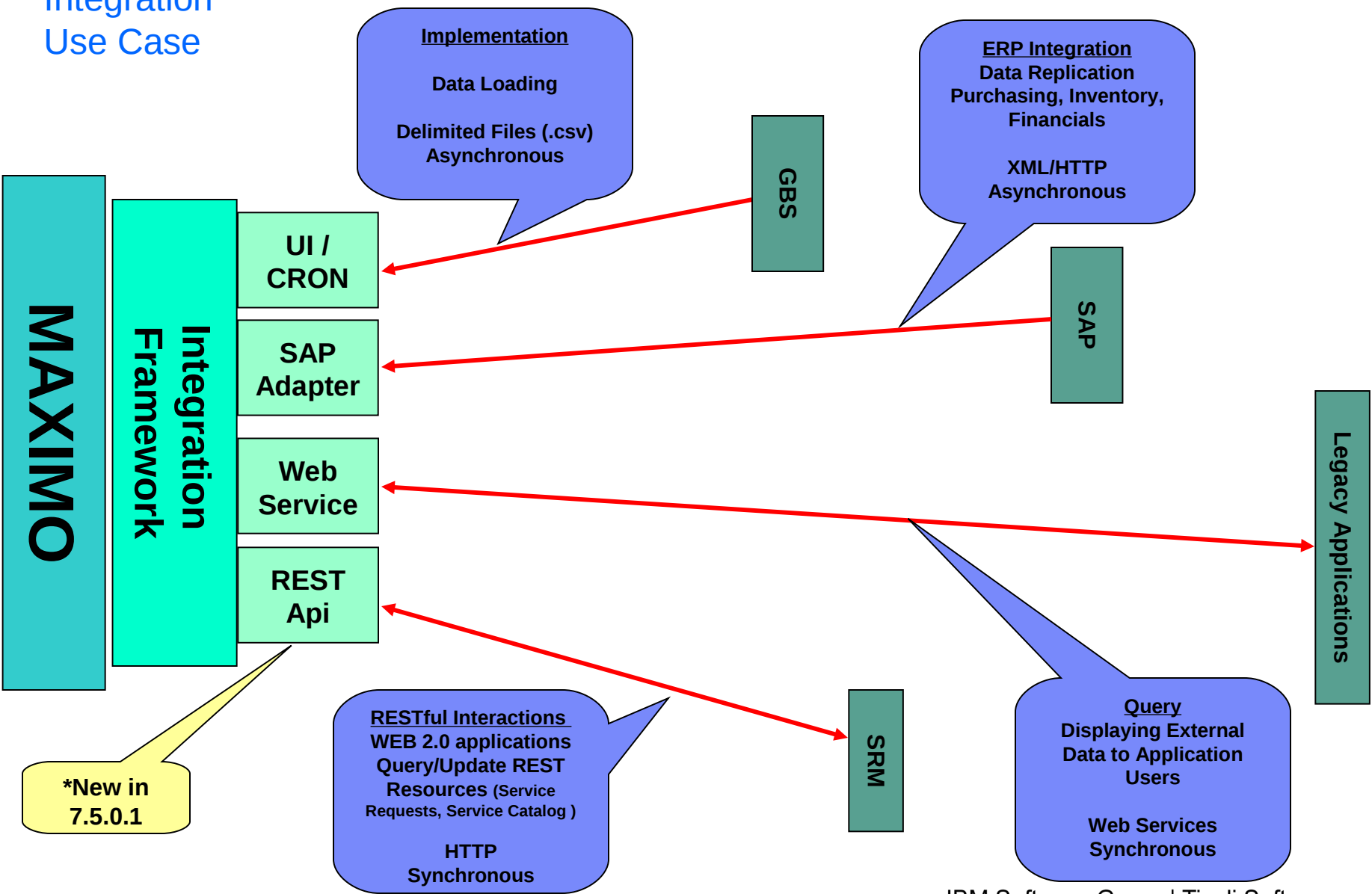
- Maximo 6
 - Completing the Maximo 6 database information worksheet
 - Preparing properties files for the upgrade process
 - Editing the maximo.properties file
 - Modifying the upgpoints.xml file
 - Evaluating version 7 reporting options
 - Disabling custom triggers
 - Preparing for new field control functionality

TPAE Products

Product-specific applications/extensions (Nuclear, Oil & Gas etc)
Consuming Products Maximo, SCCD, TSAM
Common Applications Security Reporting UI FW Integration FW (MIF)
Database Business object (MBOs) framework
TPAE (Base Services)



Integration Use Case

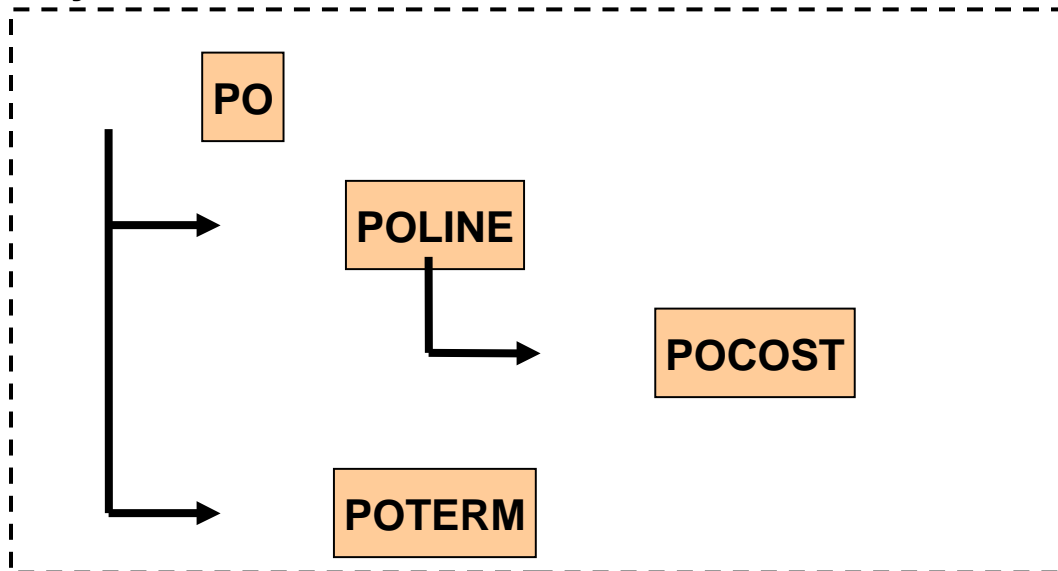


Message (schema) Definition

Object Structure: MXITEM



Object Structure: MXPO



- Graph of related Business Objects (mbo) that define the content of integration messages for channels and services

- Columns of each business object are configurable to be included/excluded

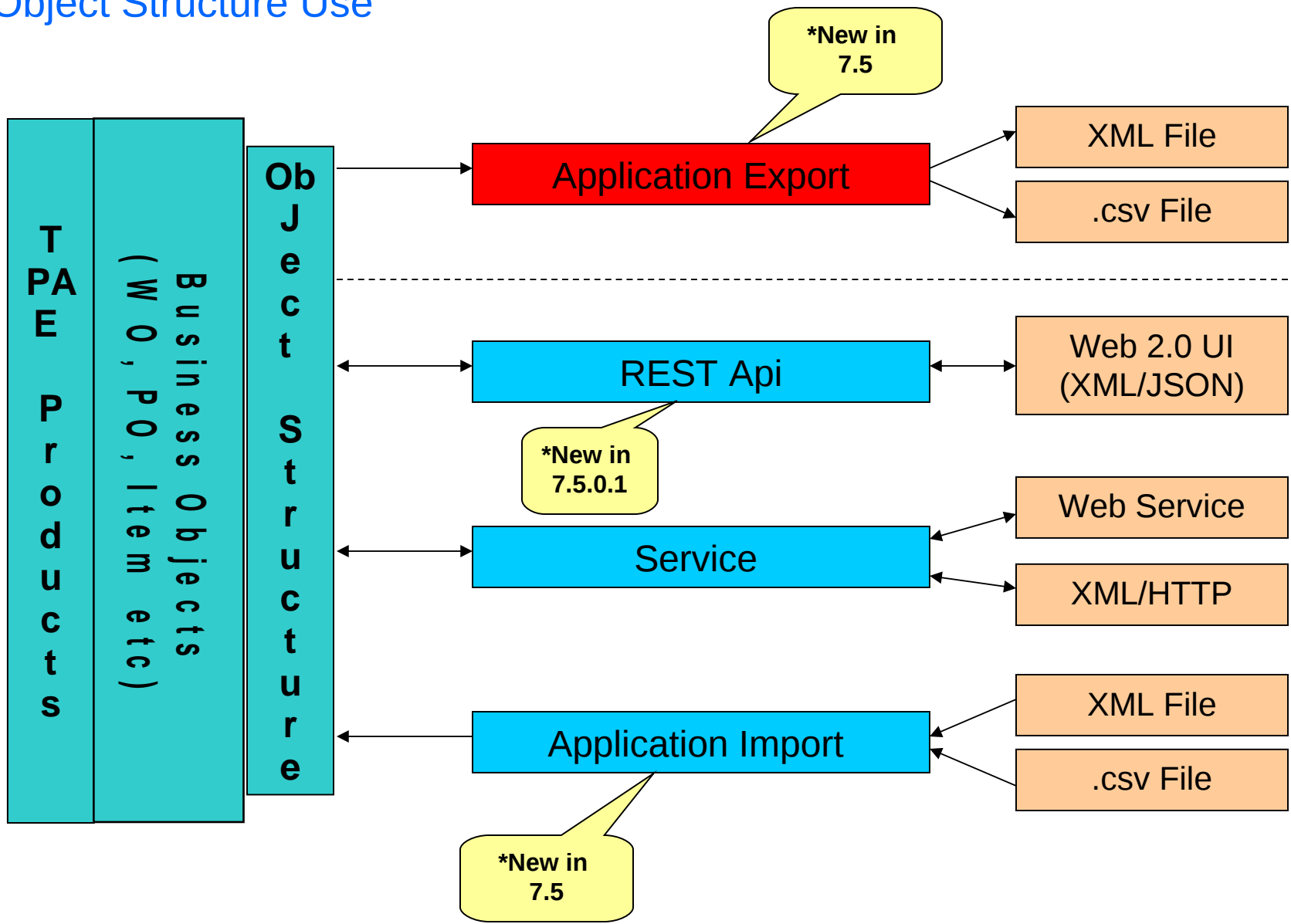
- **Over 70 provided out of box (TPAE/Consuming Products)**

- Support for creation of custom object structures

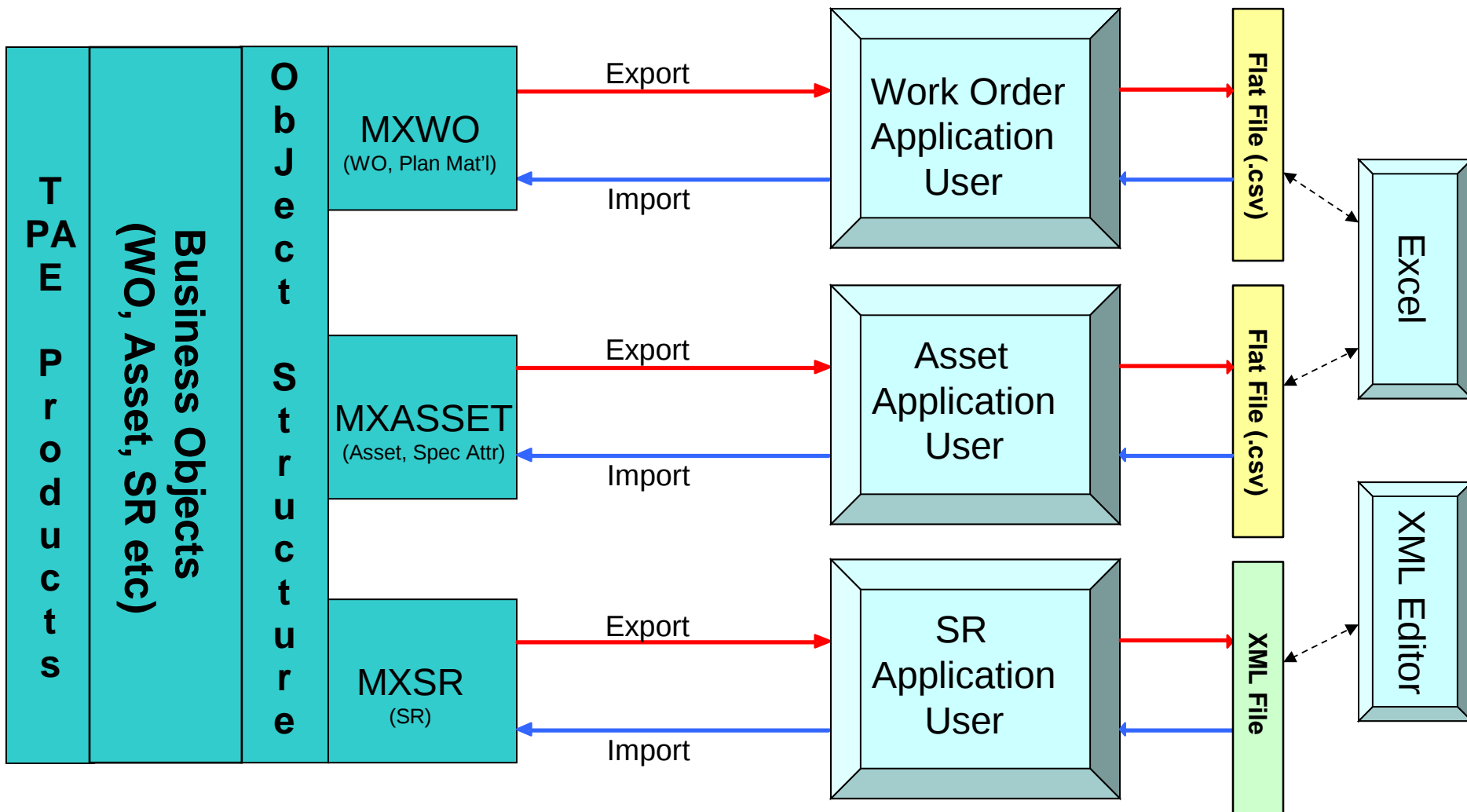
- **User Defined fields replaced by non-persistent MBO field**

Object Structures are also used for Query based Reporting and by Migration Manager

Object Structure Use



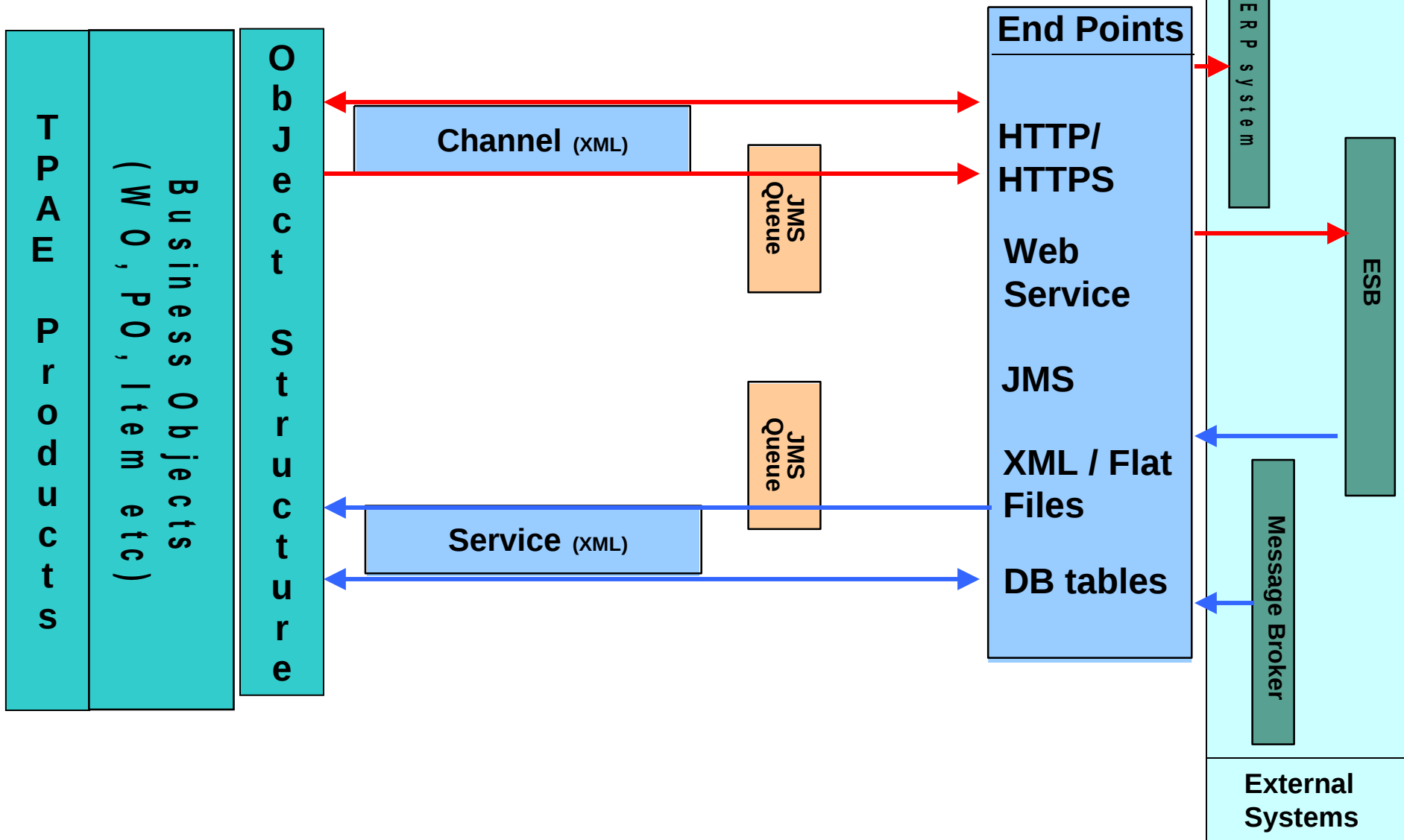
Application-based Export/Import (7.5)



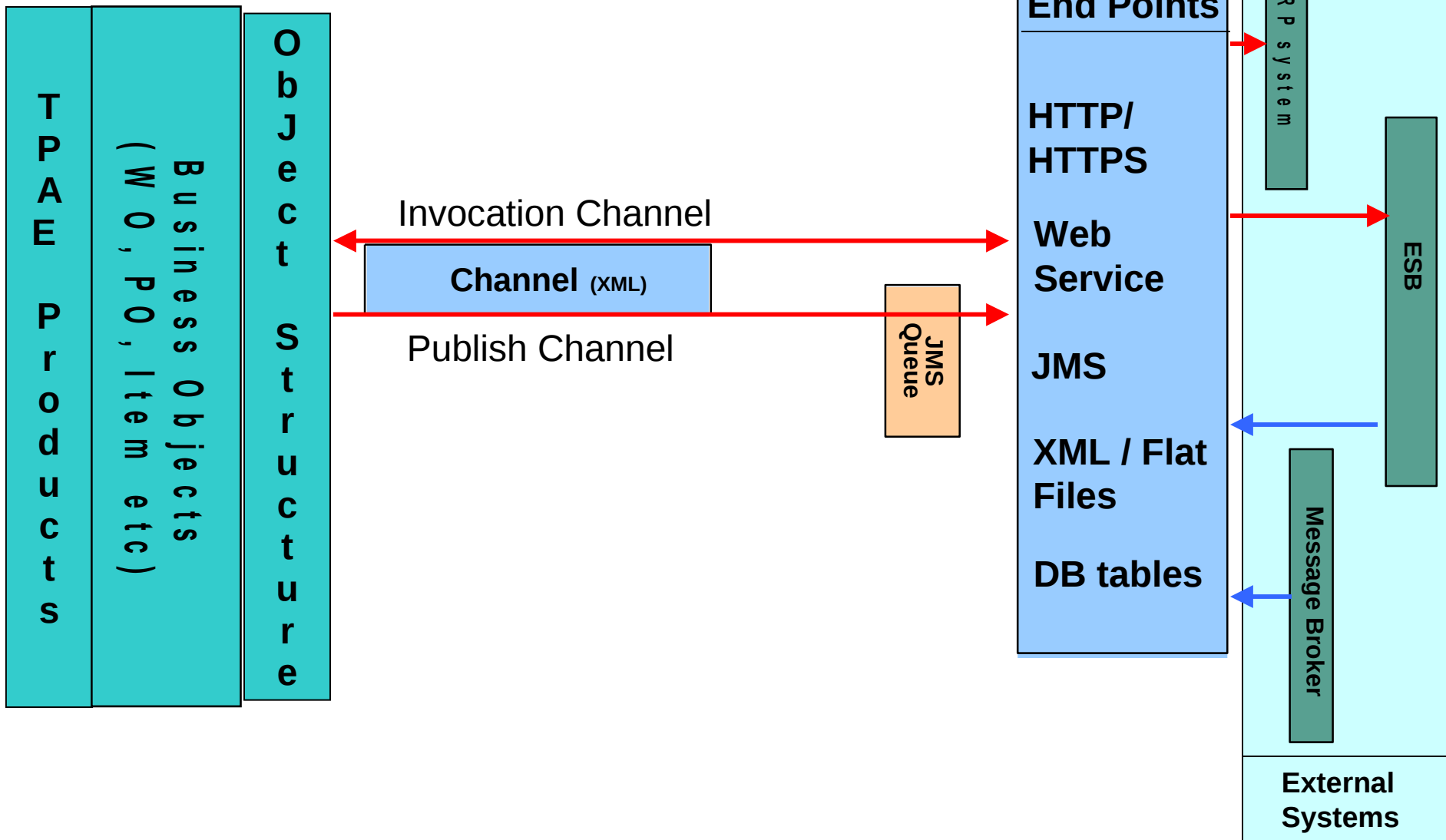
Object Structure Processing/Configuration

- Minimum Configuration
 - No Channel/Service/External System/End Point
- Synchronous Processing (no use of JMS queues)
- Outbound processing only supports export to a file
- Message format according to schema
- No Customization

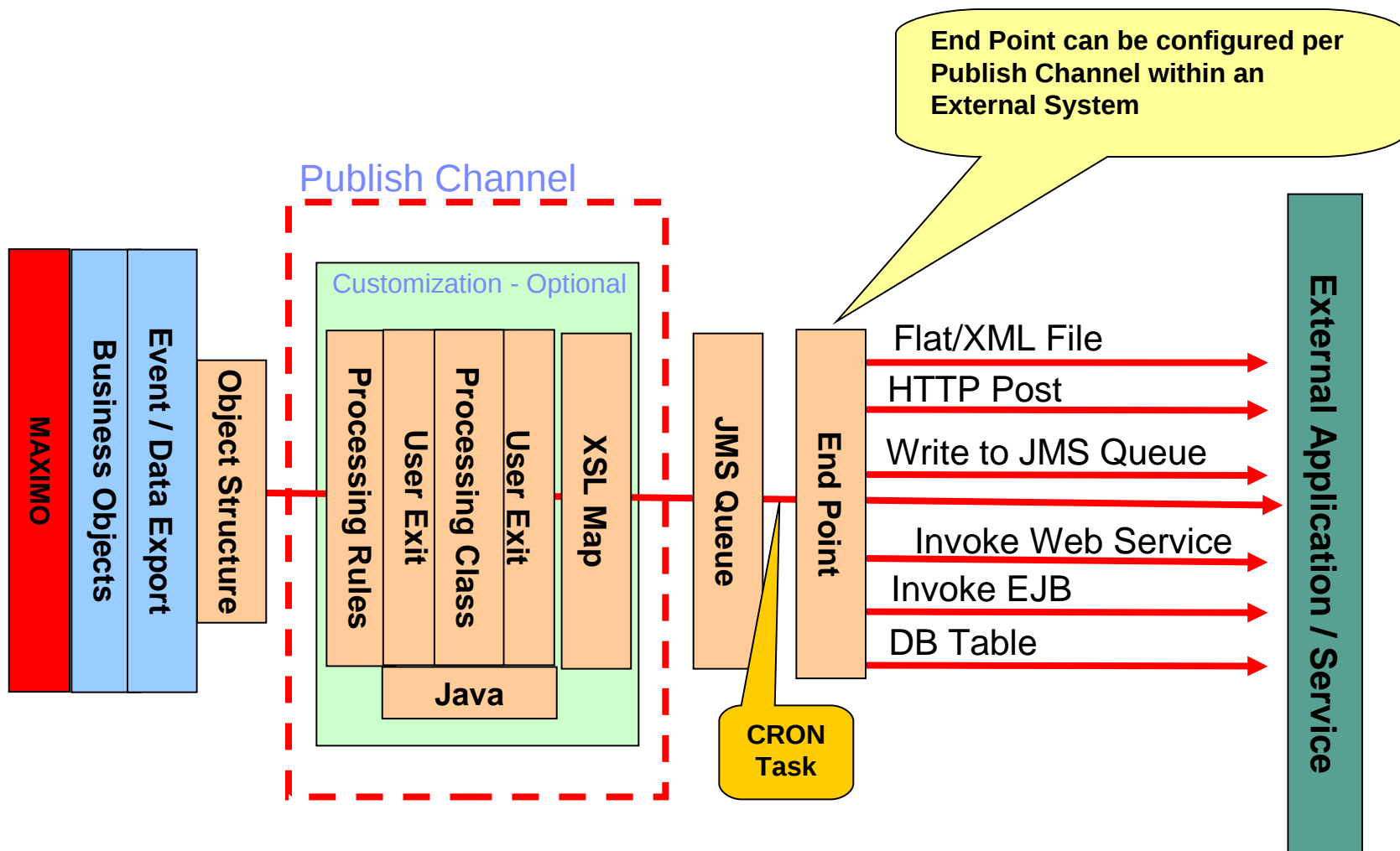
Processing Layers on top of an Object Structure



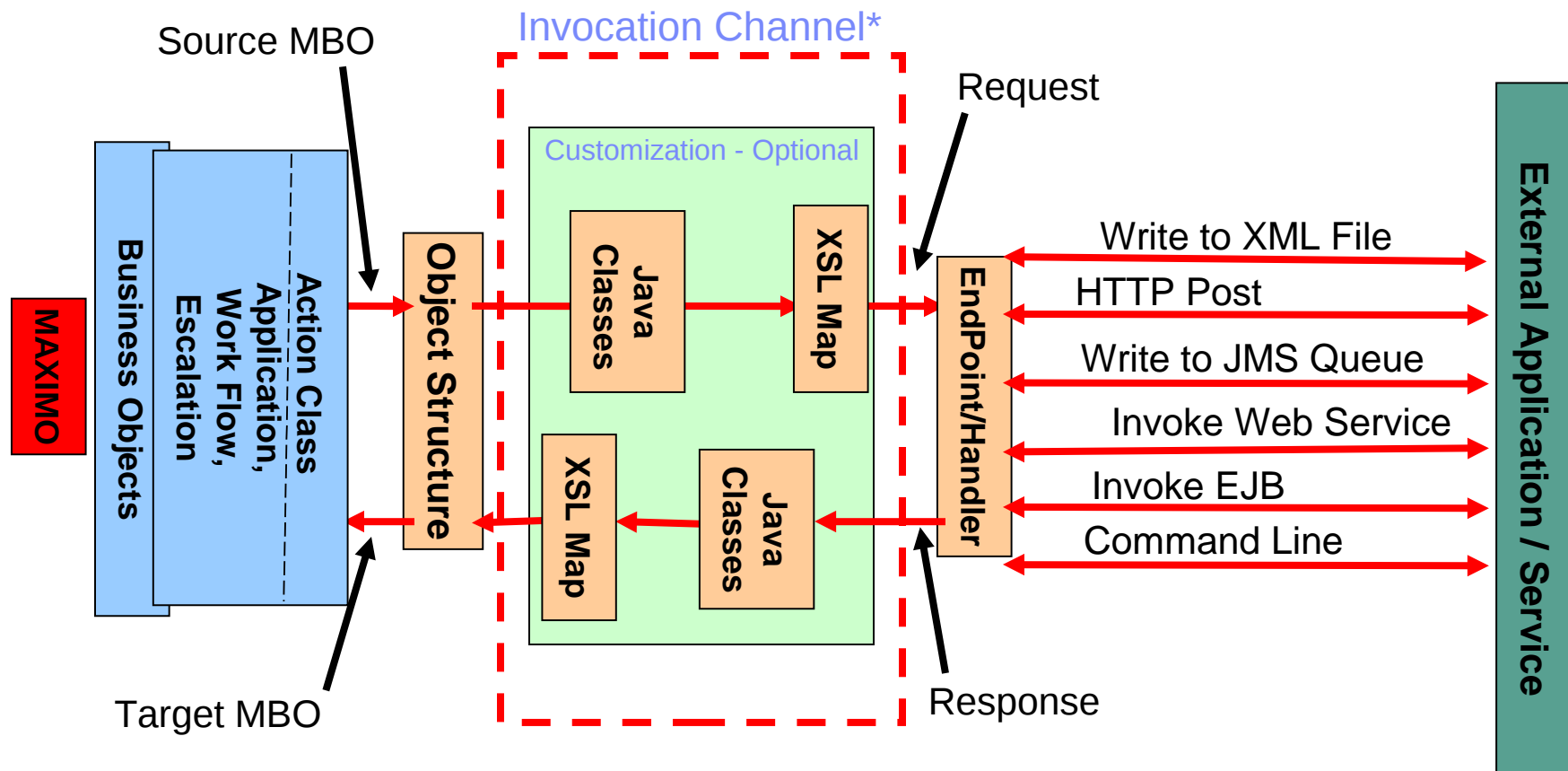
Channel Processing (OUTBOUND)



Publish Channel (Asynchronous)



Invocation Channel (Synchronous)

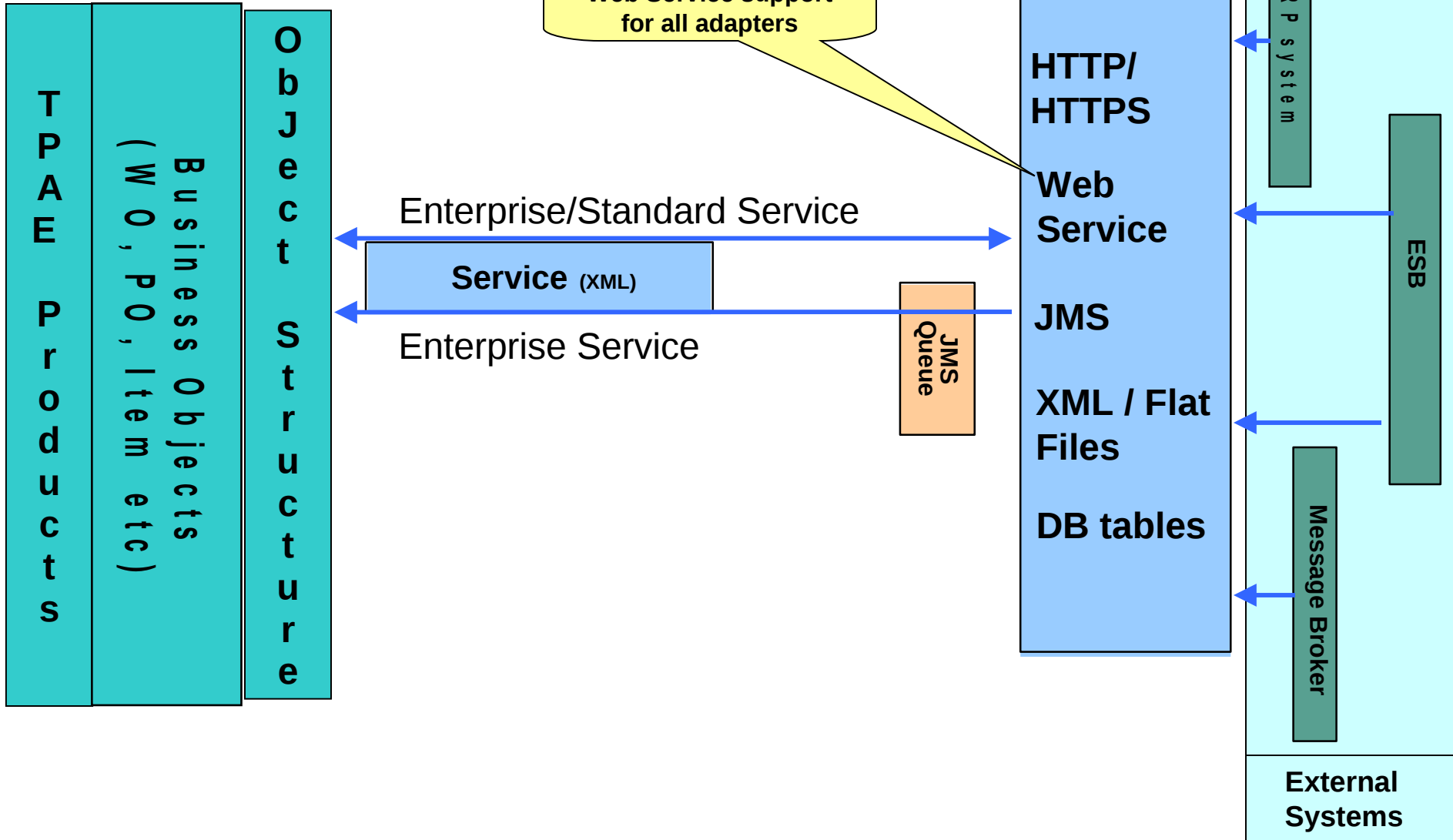


* Interactions – UI Wizard to auto-create a Web Service-based interaction – added in 7.1.1.6

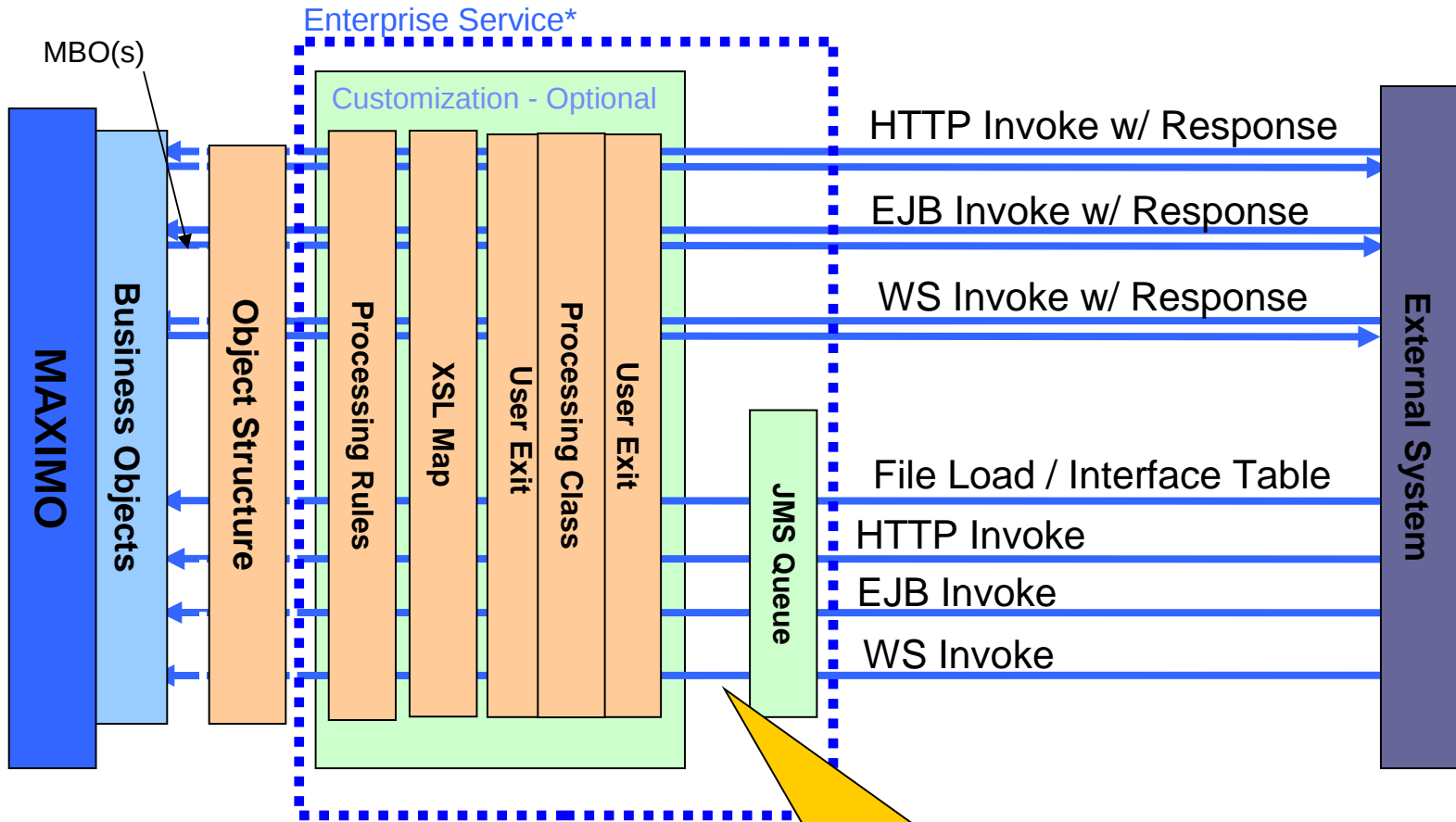
Channel Processing Capabilities

	Publish Channel	Invocation Channel
Processing	Async (Queue-ing)	Sync (no Queue-ing, response processing)
End Points	Required	Required
External System	Required	N/A
Customization	Yes	Yes (No Processing Rules)
Message Initiation	Event-based, Data Export	Action class (Java)

Service Processing (INBOUND)



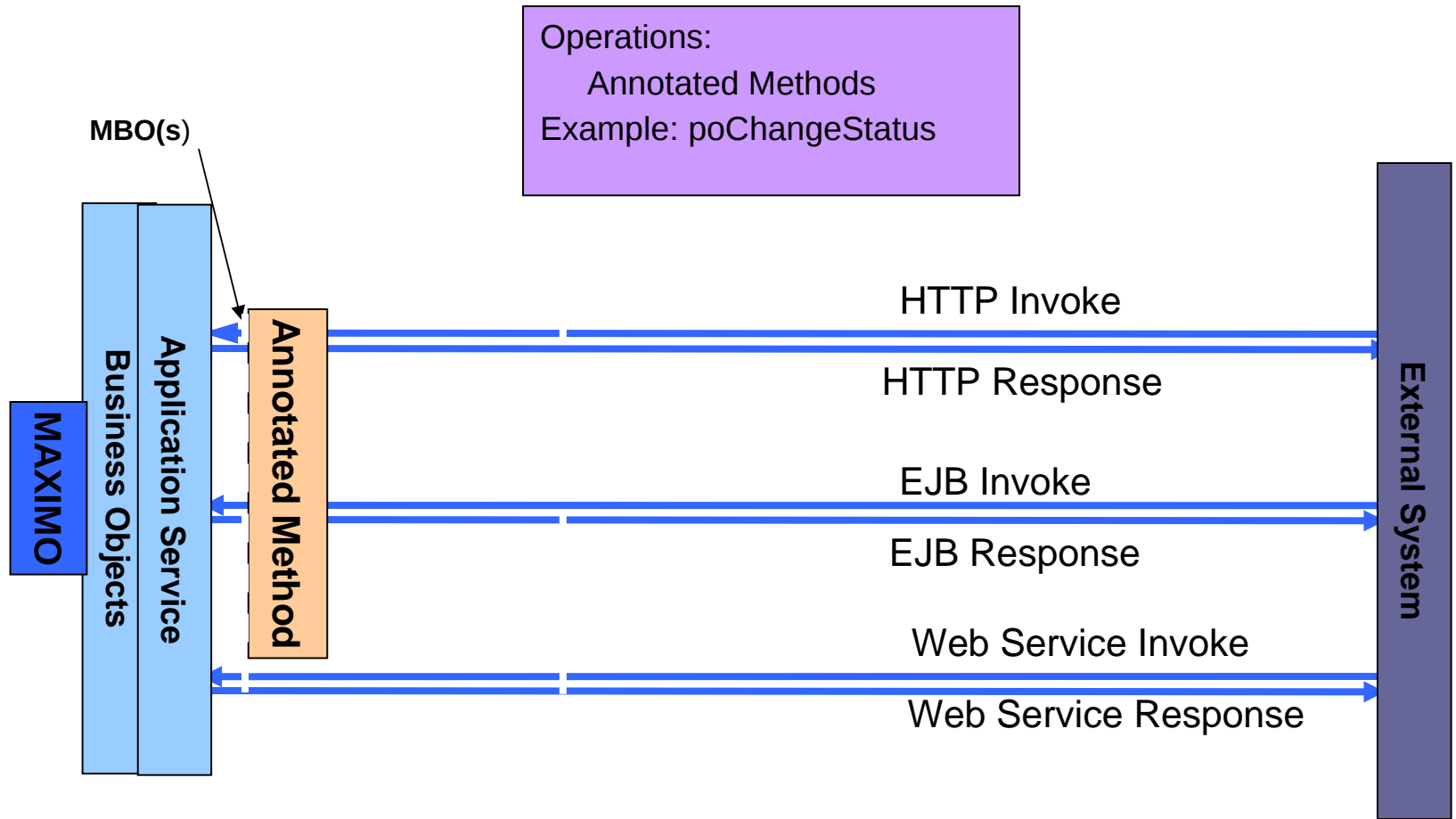
Enterprise Service



CRON Task or Message Driven Beans (MDBs)

* Enterprise Service Operations: Create, Update, Delete, Sync, Query

Standard Service



Data Import (UI File Loading) Enhancements (7.1.1.4)

Enterprise Service using JMS

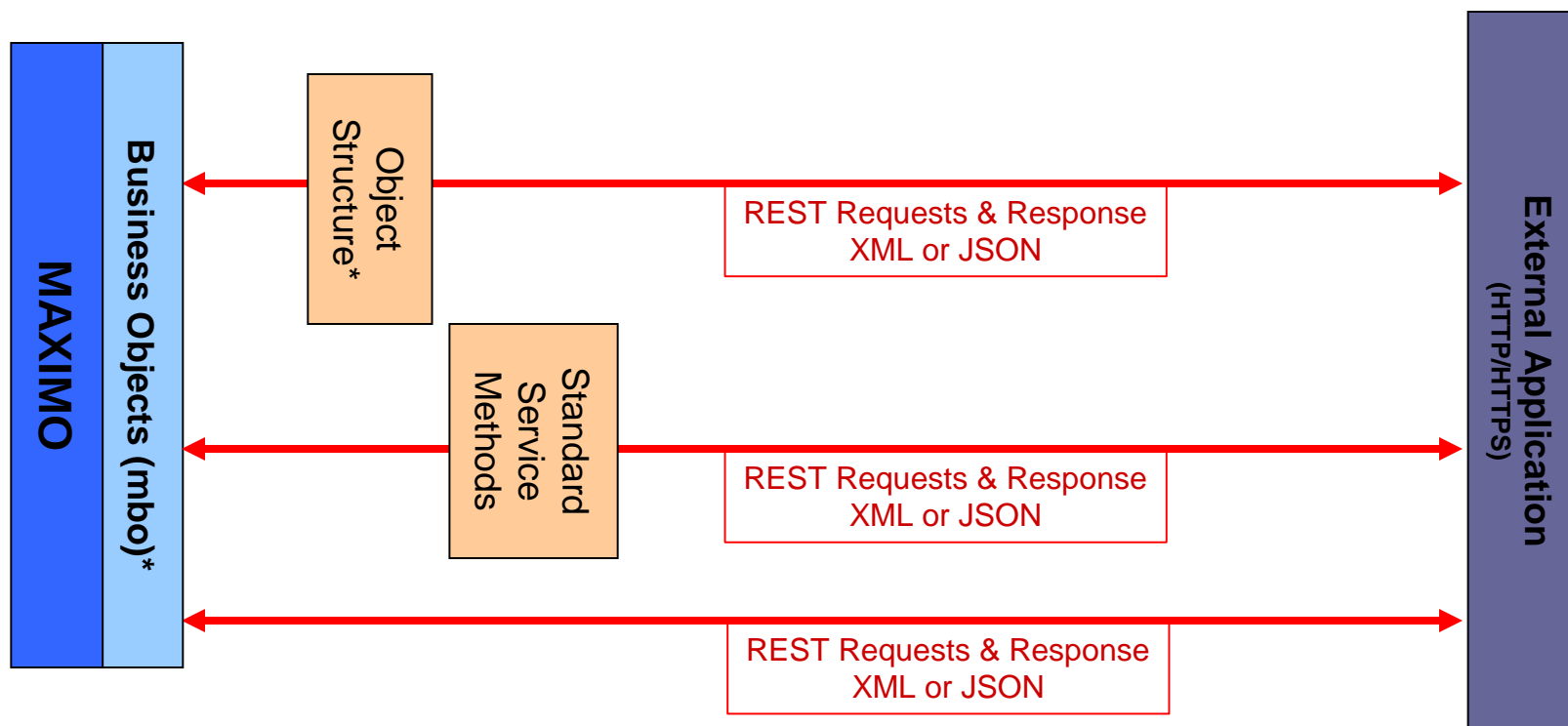
- Preview Mode
- File-based Error Management

Service Processing Capabilities

	Object Structure Service	Enterprise Service	Standard Service
Processing	Sync	Async and Sync	Sync
Access	EJB/HTTP/Web Service	EJB/HTTP/Web Service	EJB/HTTP/Web Service
External System	N/A	Required	N/A
Customization	No	Yes	No

Workflow Servlet – added in 7.1.1.6 – supports the initiation/wake-up of a Workflow. Available only via XML/HTTP

REST API



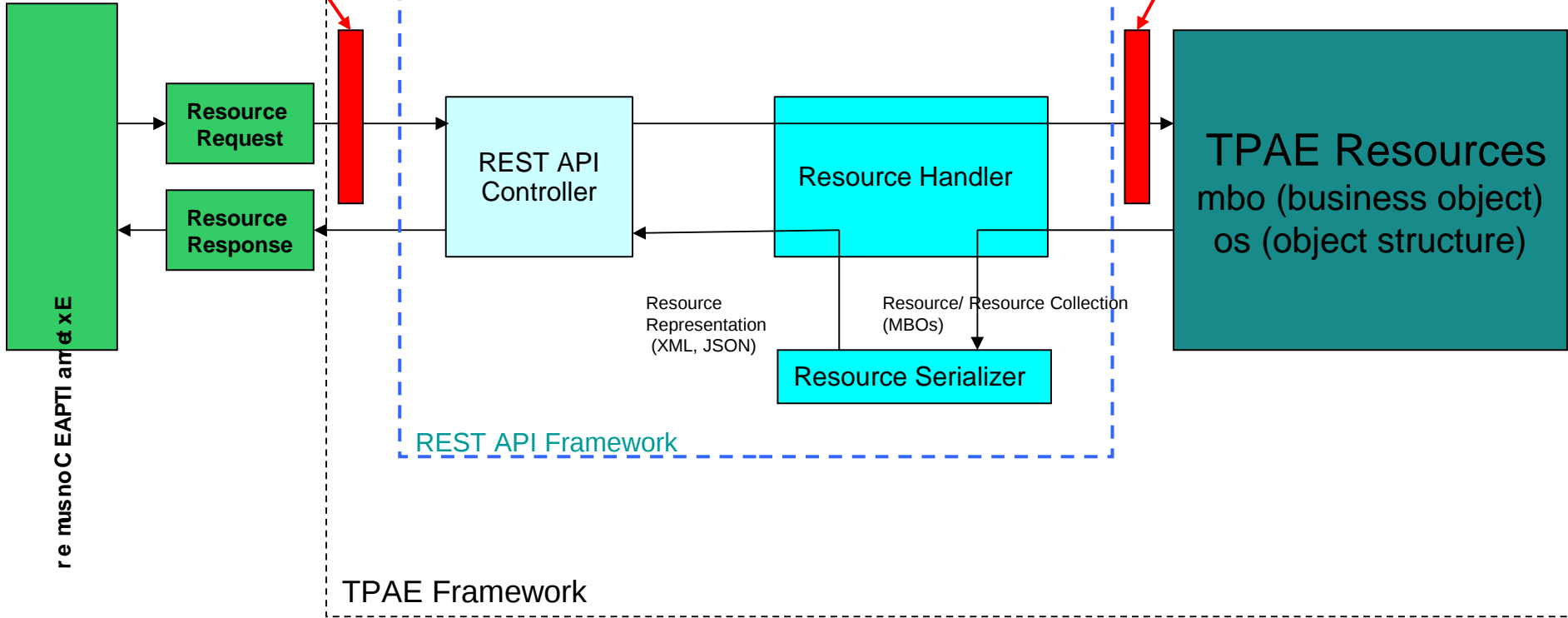
* Rest Resources: mbo** & object structure

**mbo resources requires NO Integration-related CONFIGURATION

REST API

TPAE Authentication Layer

TPAE Authorization Layer



REST API

Object Structure Query

- MIF (HTTP POST)

URL: <http://.../meaweb/os/mxasset>

HTTP Message Body:

```
<QueryMXASSET xmlns="http://www.ibm.com/maximo">  
  <MXASSETQuery>  
    <ASSET>  
      <ASSETUID operator="=">4562</ASSETUID>  
    </ASSET>  
  </MXASSETQuery>  
</QueryMXASSET>
```

- REST (HTTP GET)

URL: <http://.../maxrest/rest/os/mxasset/4562>

Message Reprocessing (Error Management)

The screenshot displays the Tivoli Message Reprocessing console within a Microsoft Internet Explorer browser window. The browser address bar shows the URL: `http://localhost:9095/intrasec/txEvent=loadpp4xrole=instnor`. The console interface includes a menu bar (File, Edit, View, Favorites, Tools, Help), a search bar, and a toolbar with navigation icons. A dropdown menu is open, showing options: Change Status, Delete Transaction, and Add to bookmarks.

The main area contains a table of messages with the following columns: Queue JNDI name, System, Message ID, Status, and Error Message. The table lists four messages, with the last one selected and highlighted in blue.

Queue JNDI name	System	Message ID	Status	Error Message
java:comp/env/jms/queue/queue	EXTSYS1	1179857730789761	RETRY	iface@invalidroot
java:comp/env/jms/queue/queue	EXTSYS1	1179857529499357	RETRY	iface@invalidroot
java:comp/env/jms/queue/queue	EXTSYS1	11798576668906610	RETRY	iface@invalidroot
java:comp/env/jms/queue/queue	EXTSYS1	11798573069846872	HOLD	[iface:could_not_send] Could not send: protocol = http host = null

Below the table, a 'Details' section provides information for the selected message:

- Queue JNDI name: java:comp/env/jms/queue/queue
- System: EXTSYS1
- Message ID: 11798573069846872
- Error Date: 22/05/07 2:09 PM
- Try Count: 0
- Error Message: [iface:could_not_send] Could not send: protocol = http host = null
- Service/Channel: JMSPO interface
- Status: HOLD
- Status Date: 22/05/07 2:09 PM
- User ID: MANADMIN
- Menu: (empty)

The Windows taskbar at the bottom shows the system tray with the date and time: 5:12 PM.

Message Tracking (Queue-based messages)

intmsgtrk - Microsoft Internet Explorer

Address: http://localhost:7001/maximo/ui/?event=loadapp&value=intmsgtrk

intmsgtrk

Go To List Reports Start Center Profile Sign Out Help

Find: Select Action

Next

Internal Message ID	11792530990312660	Ext Sys Name	EXTSYS1
Integration Mode	MXJMS	Integration Component	MXPERSONInter
Operation Name	Sync	Adapter	MAXIMO
Initial Datetime	5/15/07 2:18 PM	Queue Name	jms/maximo/int/queues/sqin
ExtMsgID Field Data	NISHA13	Search Field Data	

Transaction Details Filter 1 - 3 of 3 Download

Status	Status Date	Error
▶ 'RECEIVED'	5/15/07 2:18 PM	
▶ 'ERROR'	5/15/07 2:18 PM	[system:sqlWithIdentifier] Database erro
▶ 'PROCESSED'	5/15/07 2:28 PM	

Done Local intranet

start

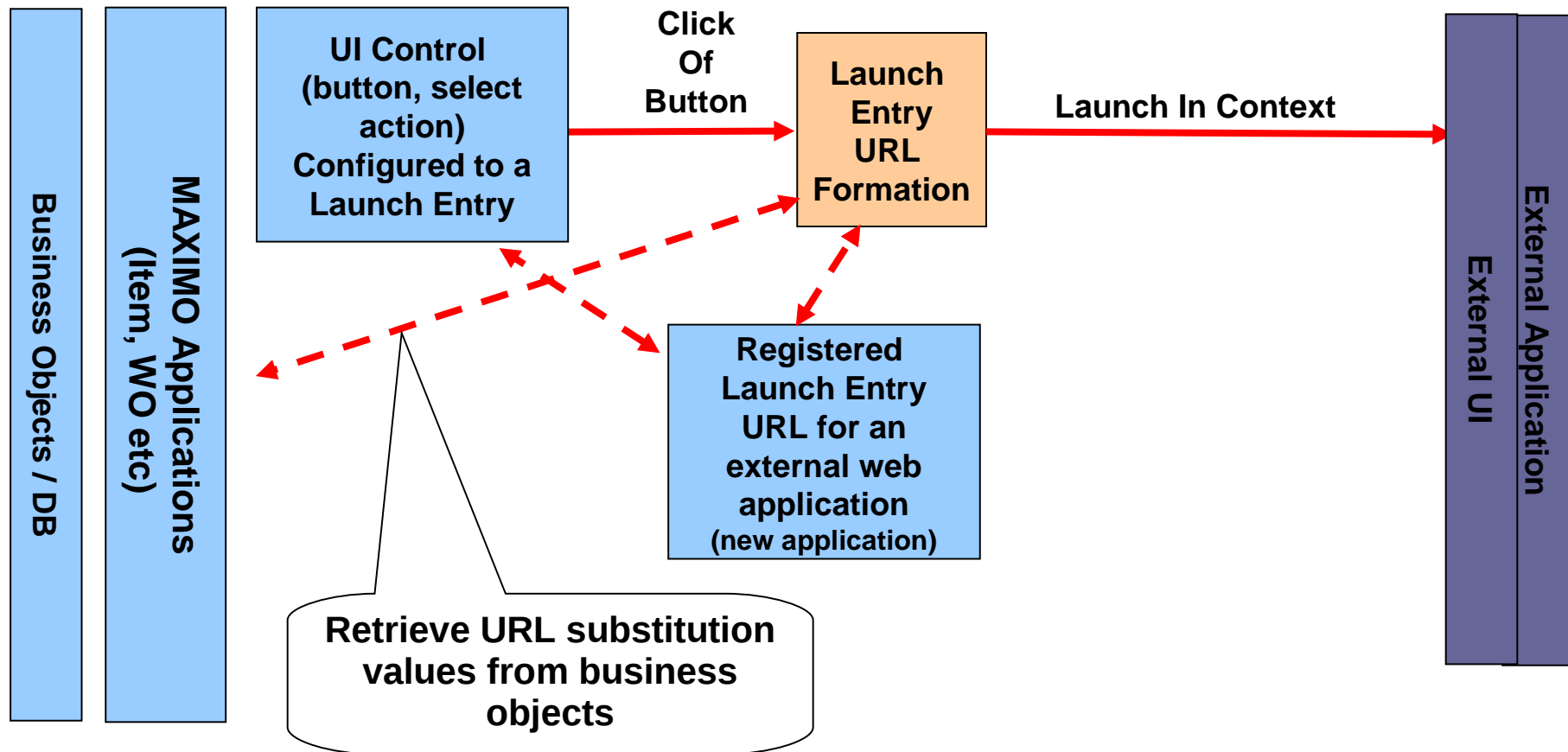
Address

98%

11:38 AM Wednesday 5/16/2007

New ... 4 Wi... PVCs ... Aqua ... BEA92... TextP... Java ... intmsg...

Launch in Context



<http://www.grainger.com/Grainger/items/{ASSETNUM}>

Release 7.5.0.0 thru 7.5.01 - New Features

- 7.5.0.0 - Publish Channel Eventing
 - Improved support for capturing events from a child object within an object structure.
- 7.5.0.0 - Application-based Importing and Exporting
 - Provide importing and exporting capabilities directly from an application such as WO, PO, Asset etc.
- 7.5.0.0 - Support for Application Authorization
 - Inbound message processing using authorization from an application
- 7.5.0.0 - Web Services via the Application Server
 - Support for JAX-WS leveraging the application server's container. Allows for support of WS policies such as WS-SECURITY, WS-ADDRESSING etc.
- 7.5.0.0 - BIDI Support
 - Support for Bi-Directional content within integration messages.
- 7.5.0.1 – REST API
 - Support for Object Structures and MBOs as REST Resources
- 7.5.0.1 - JMS messages in a TEXT format
 - Support for messages in a TEXT format

Fix Packs 7.1.1.2 - 7.1.1.8 - New Features

- 7.1.1.6 - Attachments
 - Support for including attachments on integration messages.
- 7.1.1.6 - WorkFlow
 - Support for initiating/waking up a work flow process via integration
- 7.1.1.6 - Nulling Fields
 - Support for nulling out fields from files and/or interface tables
- 7.1.1.6 - View/Delete Queue
 - UI dialog to view/delete queue messages.
- 7.1.1.6 - Web Service Interactions
 - Provide wizard-based UI to build interaction from Maximo to external web service

Fix Packs 7.1.1.2 - 7.1.1.8 - New Features (cont)

- 7.1.1.4 - Message Reprocessing
 - Data Import of large files offers ability to manage messages in error via a file.
- 7.1.1.4 - Data Import
 - Enhanced features for Preview Mode functionality
- 7.1.1.4 - Action Class to support initiating an invocation channel
 - Pre-built Action class provided to support invocation channel execution
- 7.1.1.4 - Integration Query
 - Support of a SQL WHERE clause
 - Support of 2nd level query attributes

Reference

- 7.5 Info Center – Integration Framework
 - http://pic.dhe.ibm.com/infocenter/tivihelp/v49r1/topic/com.ibm.mbs.doc/gp_

- Maximo Integration wiki
 - <https://www.ibm.com/developerworks/wikis/display/maximo/Integration>

- Training Courses
 - Integration Framework Configuration
http://www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course_description&courseCode=TR281
 - Integration Framework Customization
https://www-304.ibm.com/services/learning/content/ites.wss/us/en?pageType=course_description&courseCode=TR640
 - Customizing Business Objects
https://www-304.ibm.com/services/learning/content/ites.wss/us/en?pageType=course_description&courseCode=TR271

BACK-UP

