

How to take HRMS process management to the next level with Workflow Business Event System.

Sarala Rajeshuni
Aram Yagubian
Krishna Kunamaneni

Jet Propulsion Laboratory/California Institute of Technology, Pasadena, CA

Abstract:

Oracle Workflow with the Business Event System offers a complete process management solution for enterprises to manage business processes cost-effectively. Using Workflow event messaging, event subscriptions, AQ Servlet and advanced queuing technologies, this presentation will demonstrate the step-by-step design and implementation of system solutions in order to integrate two dissimilar systems and establish communication remotely. As a case study, the presentation walks you through the process of propagating organization name changes in other applications that originated from the HRMS module without changing applications code. The solution can be applied to your particular business cases for streamlining or modifying business processes across Oracle and non-Oracle applications.

Target Audience:

This document is targeted to technical and functional users, with knowledge of Oracle applications

Introduction:

Jet Propulsion Laboratory (JPL) is a federally funded research and development facility (FFRDC) located in Pasadena, California. JPL is operated by CALTECH (California Institute of Technology), Pasadena, California. JPL is specialized in robotic exploration of our solar system. Our recent missions include Cassini-Huygens (Mission to Saturn and Titan), Stardust (sampling planetary material), Mars Odyssey (Orbiting Spacecraft) and Mars Exploration Rovers (twin rovers Spirit and Opportunity). These rovers offered unique contributions in pursuit of the overall Mars science strategy

JPL originally implemented Oracle Applications HRMS, Financials, Manufacturing along with 25 custom applications and 10 third party software products in 1998, later in December 2001, we upgraded to Oracle 11i (release 115.3) from 10.7SC. Currently, we are in Release 11.5.9 and are in the process of upgrading to Release 11.5.10. Our fully installed Oracle products include General Ledger, Projects, Receivables, Payables, Cash Management, Order Management, Inventory, Assets, Workflow and its Business Event System, Purchasing, Human Resources, Payroll, Advanced Benefits and Manufacturing. IBS, our Institutional Business System is responsible for developing, maintaining and supporting business applications hosted by these Oracle Products. ICIS, our Institutional Information Services provides all IT services required by JPL Lab wide. With these two Organizations sharing Institutional business, personal, organizational and other related information exchange is required between the two systems on daily business basis. To facilitate information transfer dynamically, a messaging interface was designed between these two Systems. Implementation of this event messaging interface reduces overheads involved with file transfers and other sources of data transfer. Message transformations are completely automated and occur on fly without any human interaction. This automated business processing can be used for streamlining or modifying daily business processes and for providing real time and cost effective data solutions to business systems. This white paper discusses the prototyping effort of this implementation using Oracle Workflow Business Event System and Advanced Queuing Technologies.

Event Messaging Interface

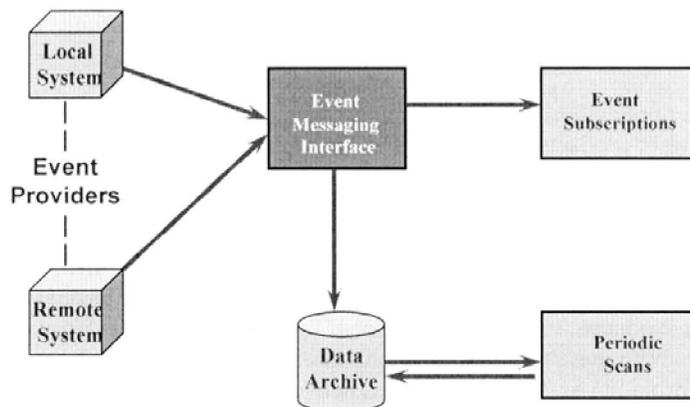
Oracle Workflow Business Event System is an application service used to communicate business events between business systems. It extends Oracle Workflow and leverages Oracle Advanced Queuing technologies to transfer event messages seamlessly over the internet and intranet. This provides a complete cost effective solution to enterprise systems and automates their daily business needs. Workflow and its business event system can be used to setup business activities as workflow business events. Capturing these events and executing their subscriptions can automate the entire business process, providing real time data solutions.

Oracle Advanced Queuing includes internet features supporting e-business integration by performing Advanced Queuing operations over internet and intranet. Oracle Advanced Queue Servlet (AQ Servlet) is a Java servlet running on the remote web server. Internet users can communicate with this servlet and transfer messages securely over internet. This AQ servlet in turn communicates with database and performs all the required AQ operations. Using AQ servlet, business systems can receive messages from remote servers, enqueue/dequeue the received messages to/from local queues and automate all the business processing locally. Using AQ servlet, queuing operations can be performed in workflow and non workflow environments.

Workflow Business Event System can be used to communicate messages between similar systems. With integration of Workflow Business Event System and AQ servlet, it is possible to establish communication between dissimilar systems and enable message transfers remotely. Workflow Business Event System captures daily business events and communicates with AQ servlet and messages are propagated to Oracle queues of remote system over the internet. Workflow business event system captures business events locally and AQ servlet receives messages remotely and performs all the enqueue and dequeue operations remotely. These two systems integrate seamlessly providing a data transfer between workflow and non workflow systems.

Fig 1 describes our Event Messaging Interface designed for event communication between our two organizations. Using Workflow Business Event System, AQ and AQ Servlet, event messages are transferred from local AQ to remote AQ.

Fig1. ICIS/NBS Event Messaging Interface Architecture

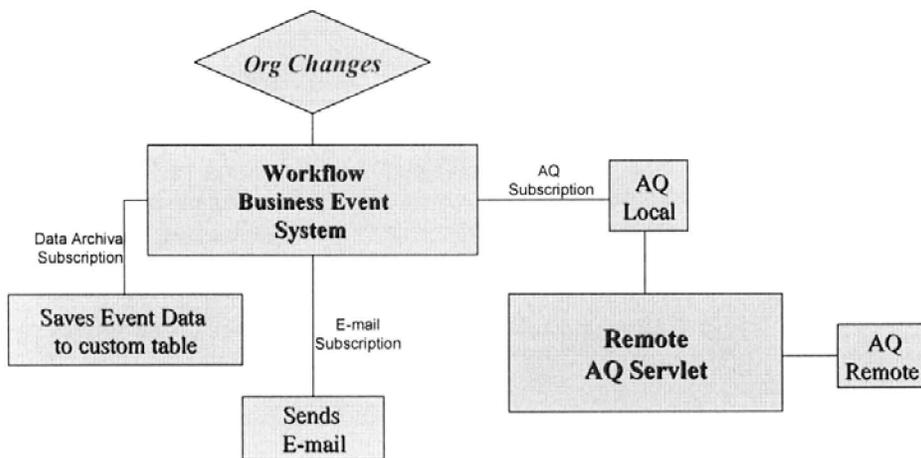


Event messaging interface is a pool of events with our two organizations being the event providers. Events and subscriptions to events were defined by event providers. Other functional requirements were e-mail messages to registered users and data archival of events and messages generated by this system. Since the message transfer is real time, periodic data scans can be used to retrieve the archived information on demand.

Propagation of Org Change Event – A Case Study

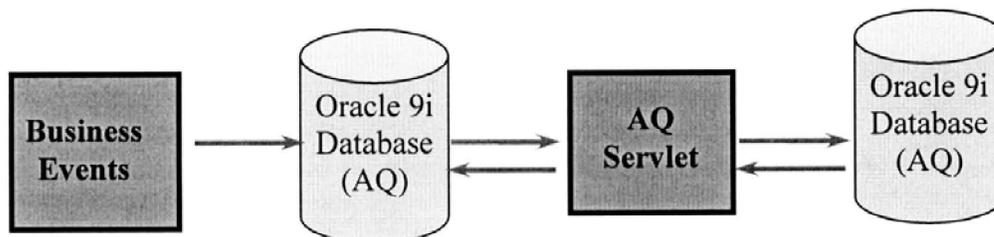
As a part of Event messaging interface implementation, a prototype was developed to capture organizational changes through Business Event System locally and propagate them to remote system using the internet features of Oracle’s Advanced Queuing (AQ). Fig2 illustrates the subscriptions defined for the event and Fig3 illustrates the propagation of event messages using Advanced Queue Servlet.

Fig2. Propagation of Org change Event



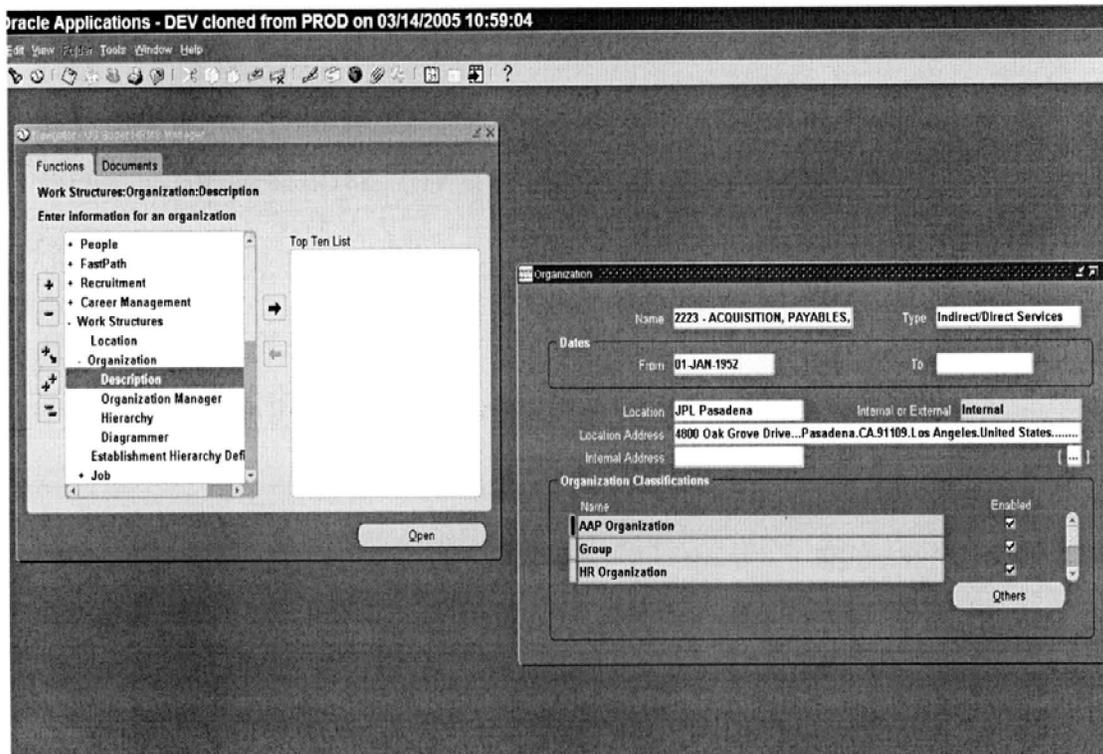
Data Archival subscription stores the event data generated locally in Oracle database. E-mail subscription emails the event message to registered users using SMTP protocol. AQ subscription enqueues the event message to local AQ and propagates the message across internet to the AQ Servlet running on remote server. AQ Servlet authenticates the message delivery and in return enqueues the message to remote queue. Fig 3 illustrates this message propagation.

Fig3. Message propagation with AQ Servlet through HTTP(s)



To initiate this message propagation, Org Change event was captured from the organizational changes made in the HRMS module of Oracle Applications (Fig 4).

Fig4. Organization changes in HRMS module



A database trigger was created to capture this event and initiate the subscription process.

Event Propagation: A three step process

Using a three step process, business events from our local system were propagated to the remote System.

Create Event: Events were created using the Workflow Business Event System (Fig 5).

Create Subscription: Subscriptions to the event were defined using the Workflow Business Event System (Fig 6).

Raise Event: Applications generating the event can call the event API to start the subscription process. In our prototype, our database trigger capturing the event initiates this subscription process.

```

wf_event.RAISE (p_event_name => event_name,
                p_event_key   => event_key,
                p_parameters  => param_list,
                p_event_data  => NULL,
                p_send_date   => NULL
                );

```

Fig5. Setting up of an Event

plorer

Home Search Favorites History Mail Print Edit Discuss Messen...

000/pls/DEV/Wf_Event_Html.EditEvent?h_guid=F25EE53533540EF4E0340000BEA658C9

Name oracle apps per.org.orgchange.event

Display Name JPL Org Change Event

Description JPL Org Change Event

Status Enabled

Generate Function

Owner Name HR

Owner Tag HR

Customization Level User-Defined

Submit Cancel

Fig 6. Setting up of a Subscription

Edit Subscription - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit Discu

Address https://nbs-dev11b.jpl.nasa.gov/8000/pls/DEV/Wf_Event_Html.EditSubscription?h_guid=F4F58283FB8808F6E0340000BE

Edit Subscription ?

Subscriber

System DEV

Triggering Condition

Source Type Local

Event Filter oracle apps per.org.orgchange.event

Source Agent

Execution Control

Phase 10

Status Enabled

Rule Data Key

Action

Rule Function pipa_org_wf.org_change_load

Workflow Item Type

Workflow Process Name

Out Agent

To Agent

Priority Normal

Parameters

Documentation

Owner Name HR

Owner Tag HR

Customization Level User-Defined

Description

Submit Cancel

Event Propagation with Oracle's Advanced Queuing (AQ)

Remote System:

AQ Propagation Servlet is a Java Servlet packaged with Oracle database. It is configured to work with Oracle database where AQ messages are propagated to. Web configuration files of AQ Servlet should be configured to establish the list of authenticated users connecting to the Servlet through HTTP(s) propagation. Finally, AQ Servlet should be compiled and deployed on the remote web server at a predefined path (aqserv/AQPropServlet). Name and path of the AQ Servlet are fixed in Oracle 9i.

Local System:

Using Business Event System, subscriptions were created to enqueue the event messages to AQ. HTTP propagation link is created from the local database to the remote AQ Servlet. This link connects to the remote AQ Servlet with an authenticated user name and password.

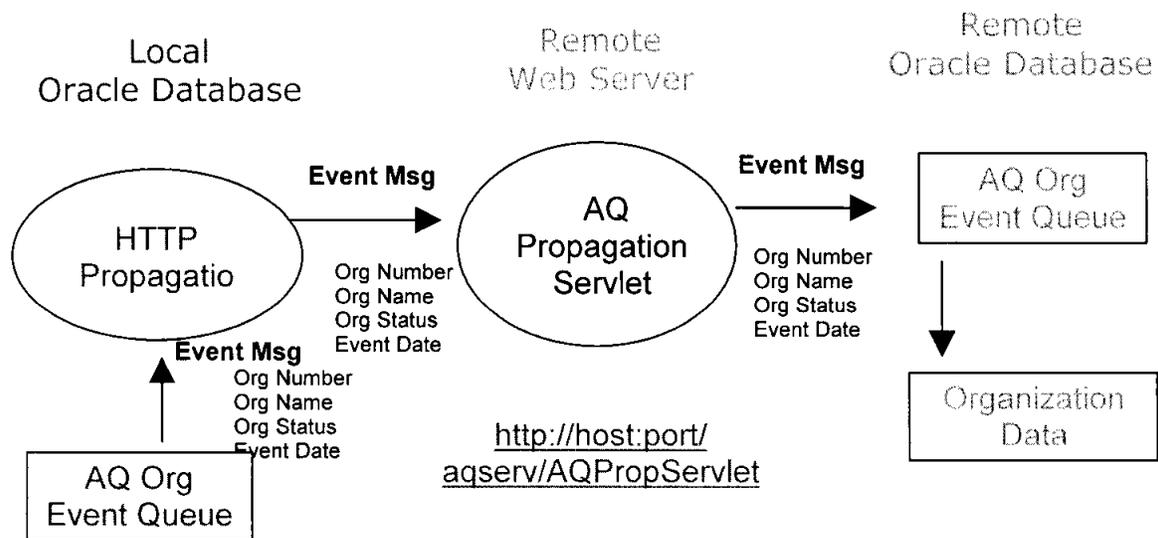
Local and Remote Systems:

Using dbms_aqadm API, messages, Queue, and queue tables were created on both local and remote systems to hold messages. Queue propagations setup to send and receive messages.

Local and Remote System: Subscriptions can also be predefined to the queue receiving the messages

When an event is raised by Oracle Applications, Business Event System executes all the predefined subscriptions and the local AQ communicates with the remote AQ Servlet through HTTP(s) propagation. AQ Servlet authenticates the user connecting through the internet and after establishing the authentication, sends message to the associated remote queue. Remote queue dequeues the message and executes all prescribed subscriptions. Flow of events is illustrated in Fig 7 below.

Fig7. Organization Propagation of Org Change Event



Flow of Event propagation:

Business Event is raised by the Workflow Business Event System

Event subscriptions are executed

Local AQ sends event messages to remote AQ Servlet through HTTP(s) propagation

AQ Servlet authenticates the user connecting and enqueues the message to remote queue

Remote subscriptions are executed

Conclusions:

Business process can be enhanced by using Workflow Business Event System and Advanced Queuing
No major software installation is required at the remote server
Communication can be established between dissimilar Systems using workflow BES and AQ
Messages are delivered once and only once
Message delivery, delays and errors are handled by AQ
AQ Servlet receives messages through HTTP(s) propagation

Acknowledgement:

Thuy Tran, JPL Information Services Engineering Office – ICIS
IBS and ICIS management