



TECHNICAL &
SYSTEM ADMIN

SAND2017-3788C

The PeopleSoft IB and the SOA Suite

A Story of Corporate Integration and Beyond

2017
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Introductions

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Outline

- » Project Overview
- » PeopleSoft Objects
- » Software Architecture
- » Integration Broker Configuration - Demo
- » SOA Suite
- » Security
- » Testing
- » Failover and Recovery
- » Lessons Learned
- » Conclusion
- » References



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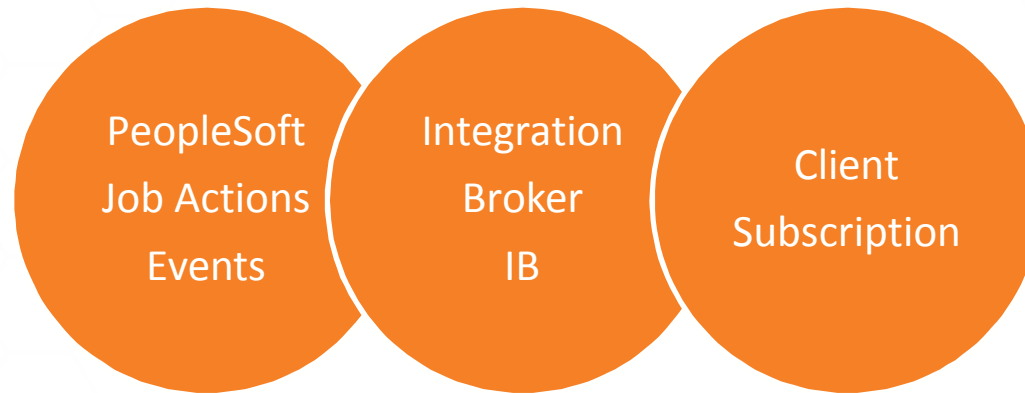
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Project Overview

» Started August 2014

- Initial Goal
 - Let a secondary system know when someone leaves a department.



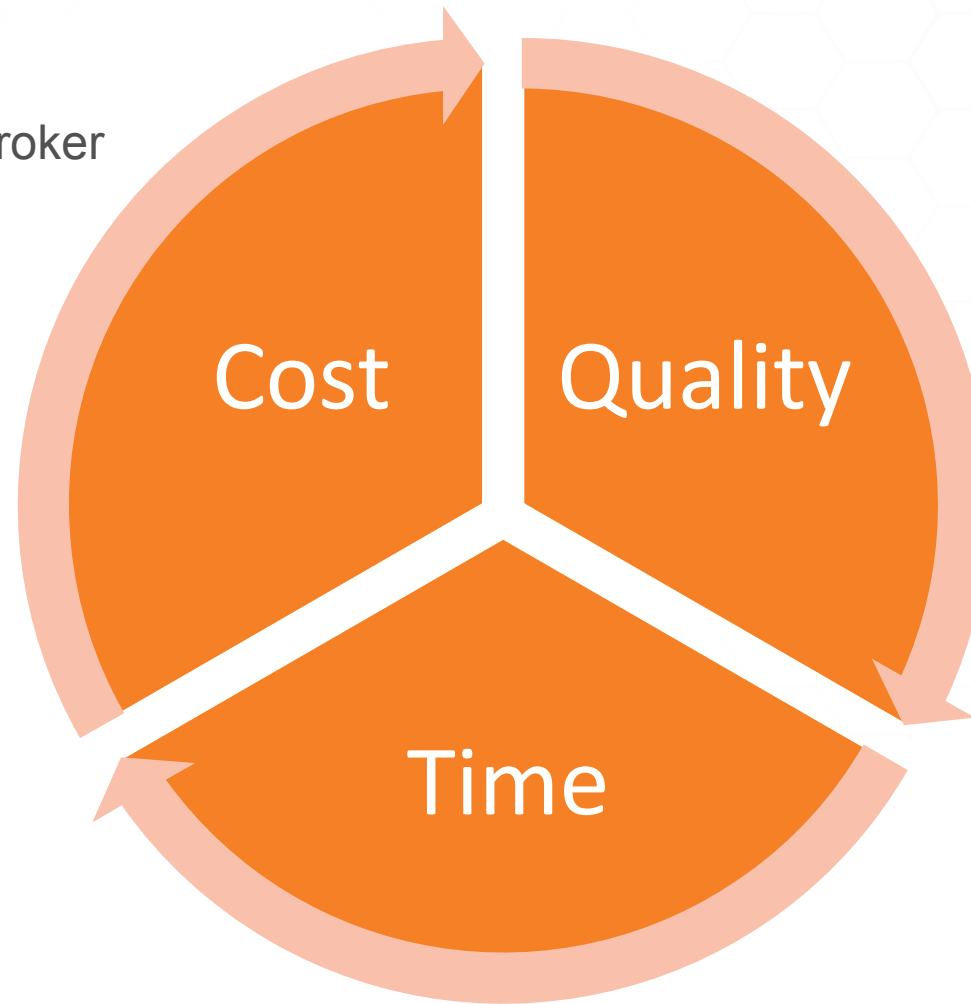
Project Overview

» Current Availability

- PeopleSoft HRMS and the Integration Broker
- SOA Suite, alternatives, point to point
- Client Subscription Applications

» Negotiate across Teams

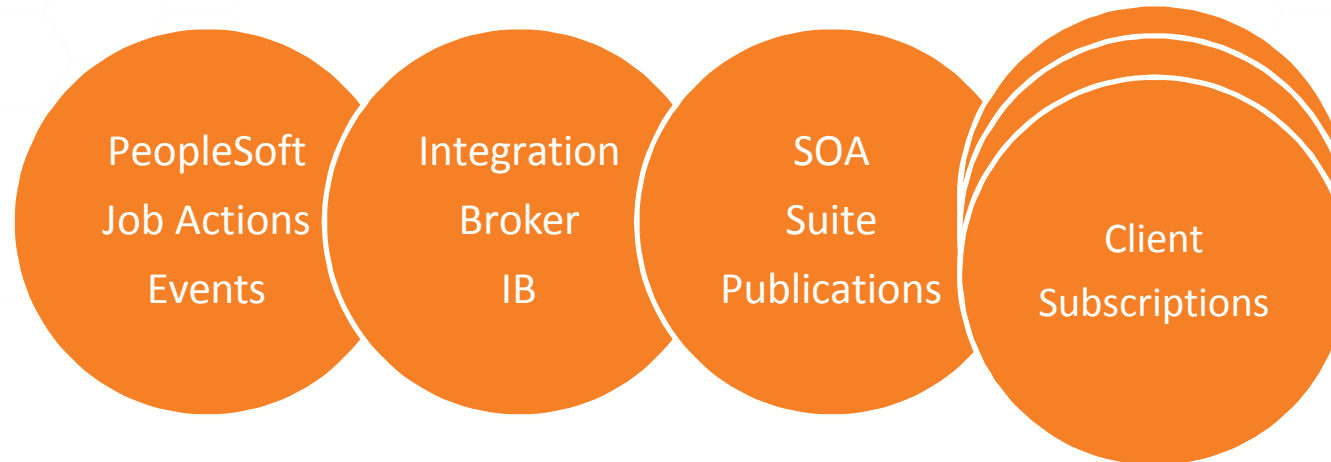
- Responsibilities
- Information Model
- Company standards
- Identifying and Minimizing Risks



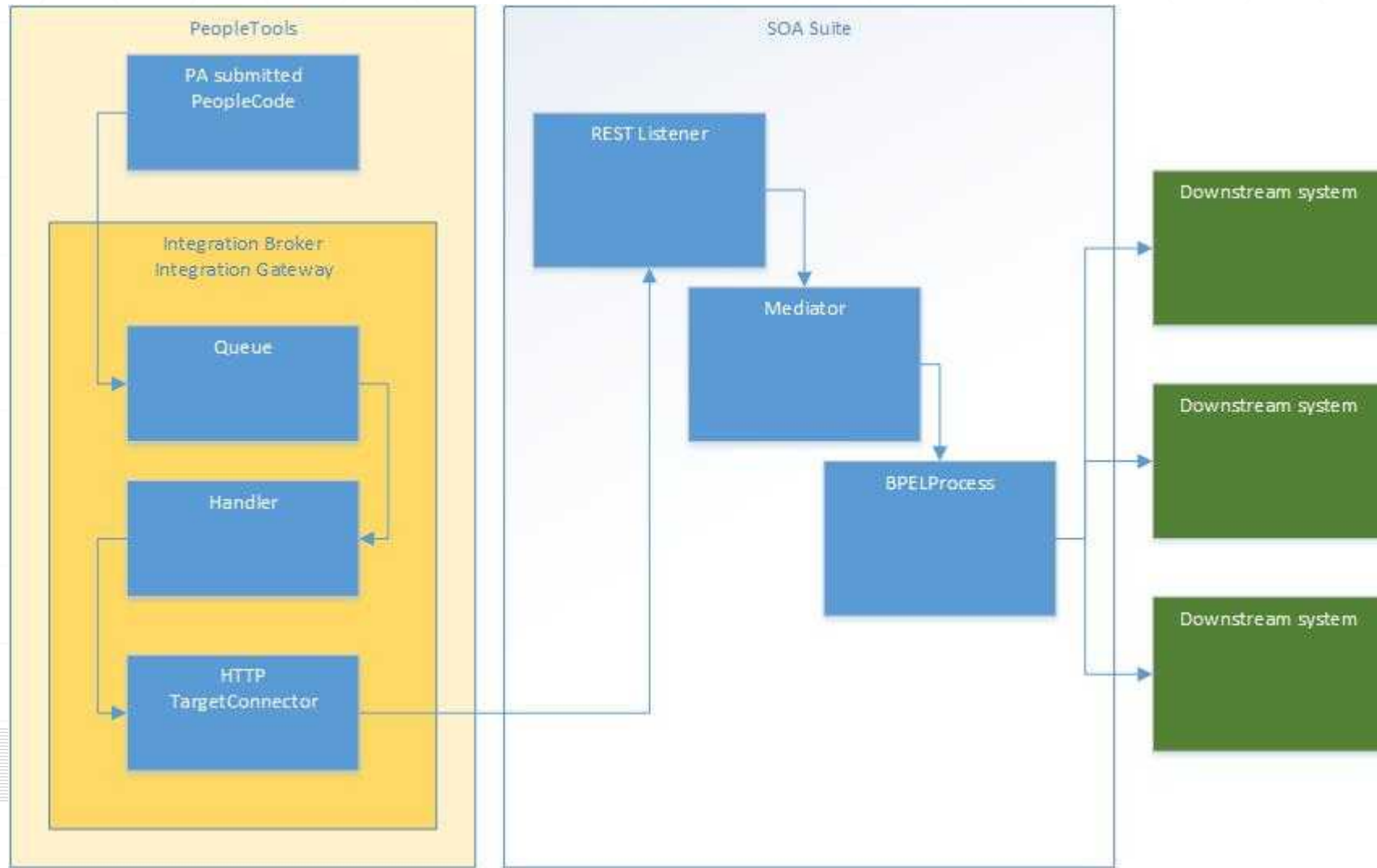
Project Overview

» Implemented August 2015

- Semi-Final Goal
 - Implement a publish and subscribe method to notify any subscriber when someone leaves a department.



Software Architecture



Queue Message PeopleCode Example

```
Function MY_ACTIONS_TO_BE_QUEUED(&MY_JOB_RCD As Row);  
    Local Message &Msg;  
    Local IntBroker &Ib;  
    Local Rowset &MsgRowset;  
    Local IBInfo &IBInfo;  
  
    IF The Action should be sent THEN  
  
        &Msg = CreateMessage(Operation.MY_ACTION_REQUEST, %IntBroker_Request);  
        &MsgRowset = &Msg.GetRowset();  
  
        &MsgRowset.GetRow(1).MY_ACTION_REQUEST_RS.EMPLID.Value = &MY_JOB_RCD.JOB.EMPLID.Value;  
  
        &String = DateTimeToLocalizedString(&MY_JOB_RCD.JOB.EFFDT.Value, "M/d/y");  
        &String = &String | " 00:00:00.000000";  
  
        &IBInfo = &Msg.IBInfo;  
  
        If &MY_JOB_RCD.JOB.EFFDT.Value > %Datetime Then  
            &IBInfo.FuturePublicationDateTime = DateTimeValue(&String);  
        Else  
            &IBInfo.FuturePublicationDateTime = %Datetime;  
        End-If;  
  
        &Ib = %IntBroker;  
  
        &Ib.Publish(&Msg, True);  
  
        &IBInfo = Null;  
        &Msg = Null;  
  
    End-If;  
End-Function;
```

QUEUE Handler - 1

```
import PS_PT:Integration:INotificationHandler;

class MY_ACTION_SUBSCRIPTION implements PS_PT:Integration:INotificationHandler
  method MY_ACTION_SUBSCRIPTION();
  method OnNotify(&_MSG As Message);
end-class;

/* constructor */
method MY_ACTION_SUBSCRIPTION
end-method;

method OnNotify
  /* &_MSG as Message */
  /* Extends/implements PS_PT:Integration:INotificationHandler.OnNotify */
  /* Variable Declaration */
  Local Message &message = &_MSG;
  Local Rowset &ActionRowset = &message.GetRowset();
  Local integer &i = 0;
  Local Document &DOC, &DOC_Tmpl;
  Local Compound &COM, &COM_Tmpl;
  Local XmlDoc &XmlDoc, &xmldocReturn;
  Local string &String;
  Local boolean &bRet;
  Local Message &MSG, &RESP;
```



QUEUE Handler -2

```
rem For &i = 1 To &ActionRowset.ActiveRowCount;
    &MSG = CreateMessage(Operation.HRACTIONRESTSERVICE_POST);
    &DOC_Tmpl = &MSG.GetURIDocument();
    &COM_Tmpl = &DOC_Tmpl.DocumentElement;
    &COM_Tmpl.GetPropertyByName("EMPLID").Value = &ActionRowset.GetRow(1).MY_DRVD_ACTIONS.EMPLID.Value;

    &MSG.URIResourceIndex = 1;

    /* Get and populate the request message */
    &DOC = &MSG.GetDocument();
    &COM = &DOC.DocumentElement;
    &COM_Tmpl.GetPropertyByName("Type").Value = &ActionRowset.GetRow(1).MY_DRVD_ACTIONS.ACTION_DESCRSHORT.Value;
    &String = DateTimeToLocalizedString(&ActionRowset.GetRow(1).MY_DRVD_ACTIONS.EFFDT.Value, "M/d/y");
    &String = &String | " 00:00:00.000000";
    &COM_Tmpl.GetPropertyByName("EffectiveDate").Value = DateTimeValue(&String);
    REM &COM_Tmpl.GetPropertyByName("EffectiveDate").Value = &ActionRowset.GetRow(1).MY_DRVD_ACTIONS.EFFDT.Value;
    &COM_Tmpl.GetPropertyByName("DeptID").Value = &ActionRowset.GetRow(1).MY_DRVD_ACTIONS.DEPTID.Value;
    &COM_Tmpl.GetPropertyByName("MgrDeptID").Value = &ActionRowset.GetRow(1).MY_DRVD_ACTIONS.DEPTID2.Value;

    &RESP = %IntBroker.SyncRequest(&MSG);

rem *** show result;
rem WriteToLog(%ApplicationLogFence_Error, "SOA Suite PA HTTPResponseCode:" | &RESP.HTTPResponseCode);

If &RESP.HTTPResponseCode <> 200 Then
    Error " MY_PA_SOASUITE_REQUEST Response Code = " | &RESP.HTTPResponseCode;
End-If;

end-method;
```

IB to SOA Suite Integration

» We assume the integration broker has already been configured in your environment. If not, see **E-IB: How to Setup Integration Broker in PeopleTools 8.40-8.47 and 8.48+ (Doc ID 623676.1)** on MOS.

» Steps

1. SOA Suite team will provide the WADL and XSD.
2. Create Document in PIA.
3. Create Message Definition.
4. Create REST Service Definition.



Demo



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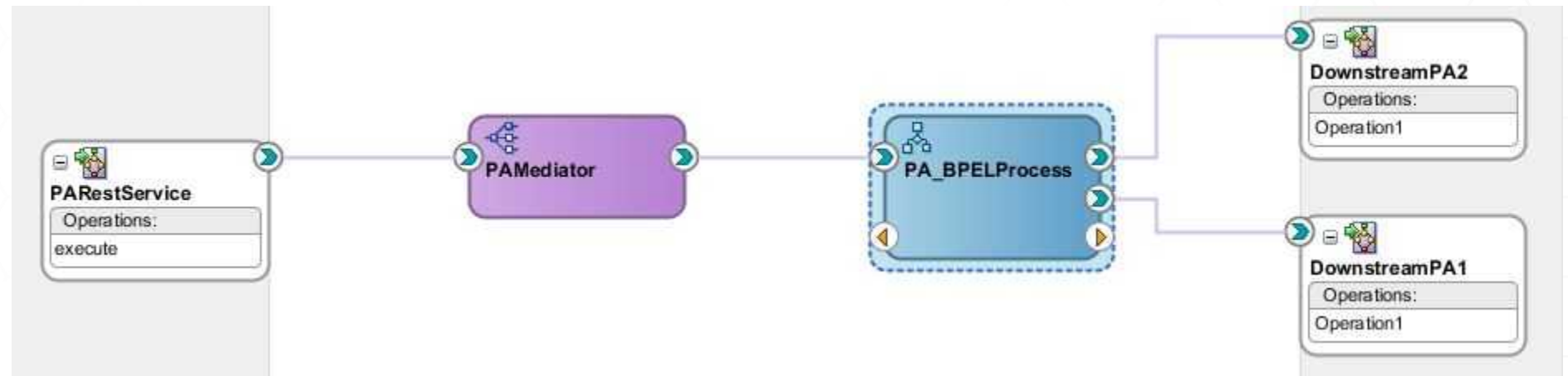
Versioning and Aliases

- » Service Operations and Messages can be versioned
- » Most recent version is the default
 - Non-default versions can be used but handler must transform message
- » Aliasing
 - Watch out for collision with delivered message and routing names
 - Give messages and routings aliases to prevent issues with delivered updates



SOA Suite – Composite Application

- » Developed in JDeveloper
- » PA Composite consists of:
 - Rest Service
 - Mediator
 - BPEL Process
 - Rest Binding



SOA Suite – Rest Service

- » Provides the external RESTful interface for PeopleSoft

REST Binding 

Update a REST binding

Name:

Description:

☐ Enforce XMLSchema Ordering

Resources:   

Resource Path
/

Operation Bindings:   

Operation	Resource Path	HTTP Verb	Complete
execute	/	POST	yes

SOA Suite - Mediator

» Mediator – mediates message flow

- Allows
 - Message Routing
 - Message Validation
 - Message Filtering
 - Message Transformation

The screenshot displays the configuration window for a Mediator in SOA Suite. The window is divided into several sections:

- Mediator**: Contains fields for Name (PAMediator), WSDL URL (WSDLs/PAMediator1.wsdl), Port Type (execute_ptt), and Resequence Level (operations).
- Routing Rules**: A section for defining routing rules.
- Operations**: A section for defining operations. It includes a list of operations with columns for Name, Priority, and Validate Syntax (XSD). The 'execute' operation is selected.
- Configuration**: A section for configuring the selected operation. It includes fields for Translate From Native (<<No Translation Needed>>), Callout To (<<Java Callout Class>>), and a Filter Expression (<<Filter Expression>>). Below these are fields for Validate Semantic, Translate To Native (<<No Translation Needed>>), Transform Using (<<Transformation Map>> --> payload), Assign Values (\$out.payload/client:process/client:input := \$in.request/inp1:singleString), and Override Using.

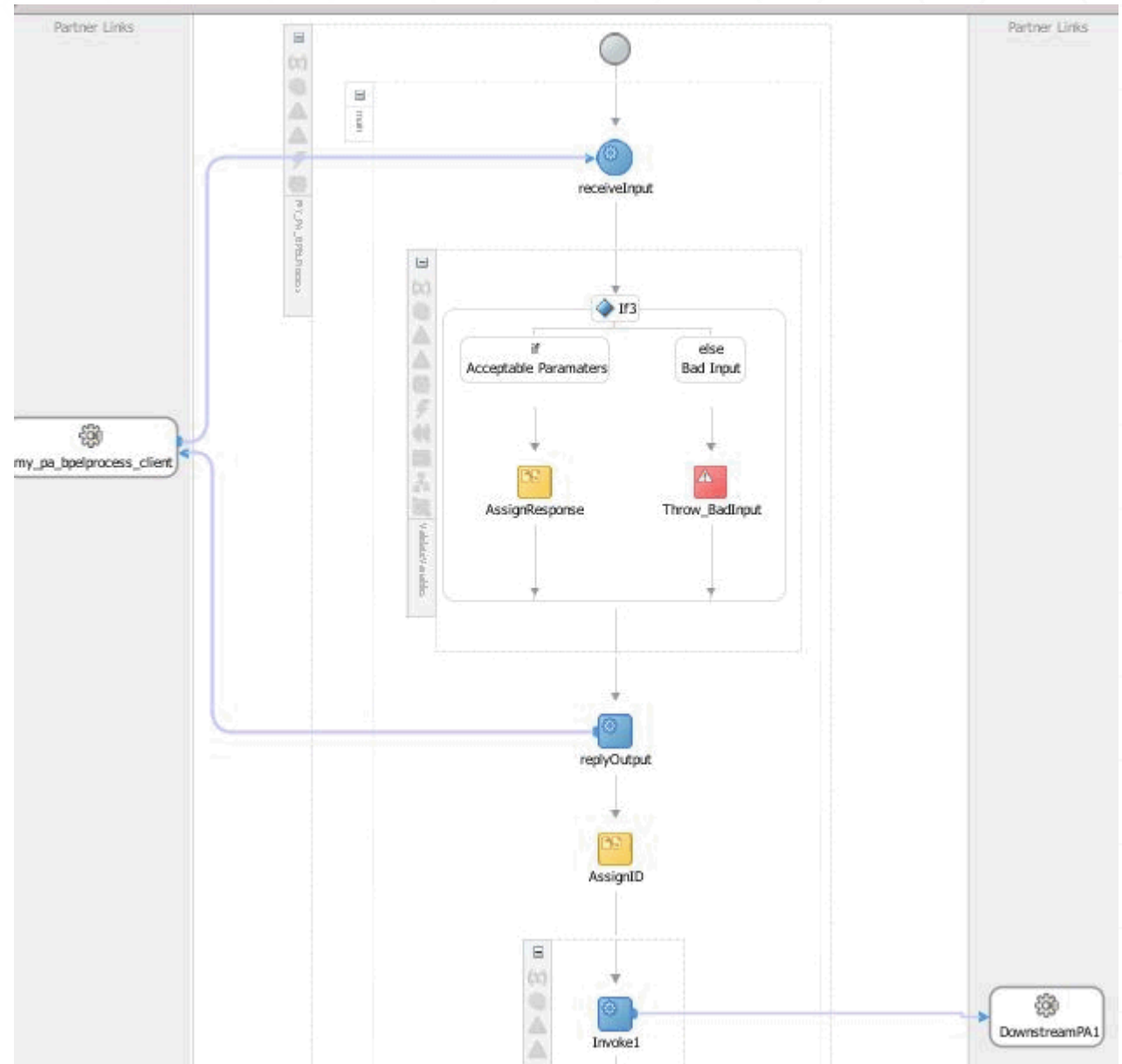
SOA Suite - BPEL Process

» BPEL – Business Orchestration

- Design a business process that integrates a series of activities into an end-to-end flow

» PA Process

- Verifies input
- Sends response to client
- Continues applying business rules and notifies other systems



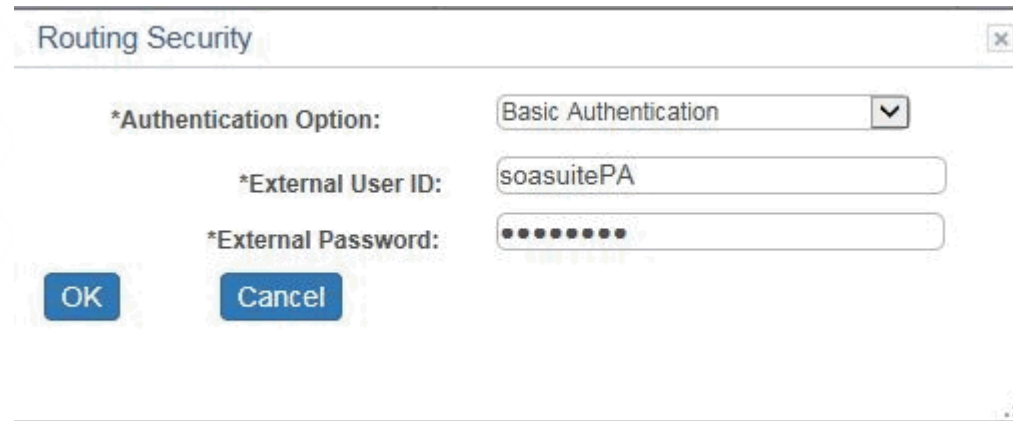
Security - HTTPS

- » Assume secure communication is required between PeopleSoft and SOA Suite
- » PeopleSoft needs to be able to verify that the connection is valid
- » Root and/or intermediate certificates imported into PeopleSoft
 - PIA (PeopleTools - Security - Security Objects - Digital Certificates)
- » Gateway web server keystores – integrationgateway.properties
 - Private key
 - Public key signed by trusted CA
 - Root and/or intermediate certificate from Certificate Authority (CA)



Security – Outbound Authentication

- » SOA Suite enabled basic authentication on REST service
 - Request needs to include a username and password to allow access
- » HTTP Basic Authentication (external user name and external password) is set on the Parameters tab of the Routing definition.



The screenshot shows a dialog box titled "Routing Security". It contains three fields: "*Authentication Option:" with a dropdown menu set to "Basic Authentication", "*External User ID:" with a text box containing "soasuitePA", and "*External Password:" with a masked password field (represented by dots). At the bottom left are "OK" and "Cancel" buttons.

Testing

» Test the REST service in SOA Suite

- SOAPUI
- Browser client
- Browser plugins

» Test PeopleSoft as the client

- We created a page in PIA to generate fake PAs in D/Q
- Gave access to SOA Suite team so they could easily generate test messages
- Initially sent messages directly to SOA Suite
- Added option to queue to Integration Broker
- Allowed easy way to test future dated transaction by bypassing the PA system in PeopleSoft

SOA Suite PA Tester

User ID soasuitePA

Description soasuitePA (entity account)

ID

Supervisor ID

*Type

Effective Date 

Department ID

Supervisor Department

Failover and Recovery

- » Redundant networking and server architecture
- » Integration broker will queue messages
 - If SOA suite unavailable for any reason, Integration Broker will set the message to error and hold all subsequent messages until the error is resolved.
 - Setup PT_AMM_WF to recurrence to notify admins of messages in error state
 - Can also be used to input future dated actions that are processed on a certain date – implemented in handler PeopleCode and queue configuration (archived and not unordered)



Lessons Learned

- » Code migration techniques/requirements
- » Version of services
- » Other systems subscription to be notified – current system requires adding another part and redeploying composite
- » Limited subset of customized Actions sent – specific to project requirements instead of generic for future use
 - Different system events require different Actions
 - Best to send all generic Actions to the SOA Suite
 - Build the specific subscription as a composite in the SOA Suite
 - Microservices could simplify data sent, more flexibility



Conclusion

» Questions?



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References

- » E-IB: Example for Consuming a Third-Party RESTful Web Service(Doc ID 1592925.1)
- » E-IB: How to Set Up HTTP Basic Authentication for an Outbound HTTP POST REST Web Service (Doc ID 1637951.1)
- » E-IB: How to create and access a simple REST based Web Services? (Doc ID 1454887.1)
- » PeopleSoft Integration Broker: Setting Up SSL Encryption (Doc ID 704499.1)
- » SOA Suite developer guide: <http://docs.oracle.com/middleware/12212/soasuite/soasuite-develop.htm>
- » E-WF/IB/AE: How to Enable Email Notification on Monitoring Message Queues? (Doc ID 637351.1)



Demo Backup slides



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Create Document in PIA

» Navigation:

PeopleTools – Documents – Document Utilities – Create Document from Schema

» Select a package to create the document in

» Provide a URL for XSD or upload a schema file. Click Read XSD.

» Select Build and click Build.

Create Document from Schema

Package:

XSD Sources

☐ XSD Url

☒ File

[Load from File](#)

[Read XSD](#)

Elements

[Personalize](#) | [Find](#) | [Find](#) | [Find](#) | [First](#) << 1 of 1 >> [Last](#)

[Build](#)

Elements

Build Results

1



MyPaAction

[Build](#)



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Create Message Definition

» Navigation:

PeopleTools – Integration Broker – Integration Setup – Messages

Add New Message

Type ▼

Message Name

Message Version

Alias

Note Select an existing document object to link to the new message at save time.

Package 🔍

Document 🔍

Version x 🔍

Add

[Return to Search](#)



Message Definition

» Verify Message Definition – Check element types and other options (ex. required).

» Element Types:

- Binary
- Boolean
- Character
- Date
- Datetime
- Decimal
- Integer
- String
- Text
- Time

The screenshot shows the Oracle Data Modeler Message Definition window. At the top, there are tabs for Document, XML, Relational, JSON, and HTML. Below these, the Package is PT_Lookup, Document Name is MyPaAction, and Version Name is V1. There are sections for Metadata References and Document Details. The main area shows a tree view of the message definition with the following elements: MyPaAction (expanded), emplid1, emplid2, ACTION_DESCSHORT, EffectiveDate, DeptID, and MgrDeptID. At the bottom, there are buttons for Validate, Copy, Rename, Export, and Save. A 'Return to Search' link is also present. The bottom status bar shows the current view as Document | XML | Relational | JSON | HTML.

Create Rest Service Definition

» Navigation:

PeopleTools – Integration Broker – Integration Setup – Services

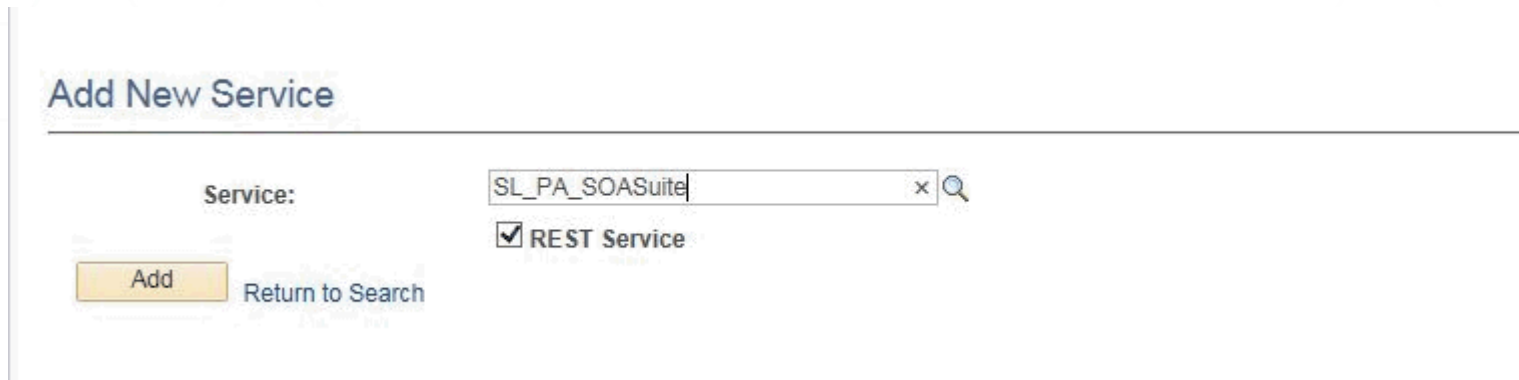
» Be sure to check the REST Service checkbox!

» Add a new service

» [[provide details on what is happening]]

- Services logically group a set of service operations

(http://docs.oracle.com/cd/E66686_01/pt855pbr1/eng/pt/tibr/concept_UnderstandingManagingRESTServices-f77faf.html?pli=ul_d129e147_tibr)



Add New Service

Service: SL_PA_SOASuite x 🔍

☒ REST Service

Add Return to Search

Add Service Operation

- » Save Service
- » Provide a name for the Service Operation and select a REST method.
- » Click add to Create and Configure the Service Operation
- » [[more context]]
 - General information (name, desc, etc).
 - Specifies service operation type – determines if synchronous or asynchronous
 - Contains routings (outbound or inbound messages)
 - Handlers (one or more)

http://docs.oracle.com/cd/E66686_01/pt855pbr1/eng/pt/tibr/concept_UnderstandingManagingServiceOperations-076395.html?pli=ul_d129e132_tibr

Services

Service MYPA_RESTORESERVICE ☒ REST Service Type

*Description PA Notification ☒ Is Provider

Comments

Service Alias

Owner ID

*Namespace http://hris.sandia.gov/Enterprise/Tools/schemas

Link Existing Operations View WADL

Service Operations

Service Operation MYPA_RESTORESERVICE ?

REST Method: Post Add

Save Return to Search Add

Service Operation Configuration - 1

- » Enter a description and comment
- » Change alias if desired

General

Handlers

Routings

Service Operation

MYPA_RESTSERVICE_POST

REST Method

POST

*Operation Description

PA Notification

Operation Comments

PA notification sent to SOA Suite

Owner ID

Operation Alias

MYPA_RESTSERVICE

☐ User/Password Required

*Req Verification

None

☐ Used with Think Time Methods

Service Operation Configuration - 2

- » Enter the REST Base URL from the SOA suite
- » Add the document template created previously
- » add slide/step reference
- » Build the URI
 - » All defined arguments and the paramters used to fill them at runtime
- » Click Build
 - » Modal window opens
 - » We used Simple String Expression Type
 - » 5 of 6 primitives were text, EffectiveDate was a DateTime
 - » We found it easier to build URL from testing tool/browser
- » Sample URI
 - » ?DeptID={DeptID}&SNLID={SNLID}&Type={Type}&EffectiveDate={EffectiveDate}&MgrSNLID={MgrSNLID}&MgrDeptID={MgrDeptID}

REST Resource Definition

REST Base URL

URI Template Format Example: weather/{state}/{city}?forecast={day}

URI	Personalize	Find	First	<<	1 of 1	>>	Last
Index	Template	Validate	Build				
	?DeptID={DeptID}&EMPLID1={EMPLID1}&ACTION_DESCSHORT=	Validate	Build	+	-		

Document Template [View Message](#)

Service Operation Configuration - 3

- » Enter message name.
- » Configure expected status code
 - 200 – OK
 - 404 – Not found
 - 500 – Internal service error
- » Click Save

Default Service Operation Version

*Version

v1

Version Description

Version Comments

Default

Active

Routing Status

Any-to-Local

Does not exist

Local-to-Local

Does not exist

Runtime Schema Validation

Request Message

Response Message

Add Fault Type

Routing Actions Upon Save

Generate Any-to-Local

Generate Local-to-Local

Message Instance

Type

Request

Message.Version

MY_ACTION_REQUEST.V1

View Message

Content-Type

text/xml

Optional Content-Types

Type

Response

Message.Version

View Message

Content-Type

text/xml

Optional Content-Types

Status Code

200

Optional Status Codes

Testing URL

- » How do you get here??
 - » Click Validate
 - » Enter values for each parameter
 - » Click Generate URL
-
- » You can use that URL to send a test message to the SOA Suite
 - » Verify that will work

Validate URI

PackagePT_Lookup

DocumentMyPaAction

VersionV1

Left | Right

MyPaAction

✱ emplid1 - 12345

✱ emplid2 - 23456

✱ ACTION_DESCSHORT - TRANSFER

✱ EFFDT - 2017-06-11-12.00.00.000

✱ DeptID - 56789

✱ DEPTID2 - 67890

URI ?DeptID={DeptID}&EMPLID1={EMPLID1}&ACTION_DESCSHORT={ACTION_DESCSHORT}&EFFDT={EFFDT}&EMPLID2={EMPLID2}&DEPTID2={DEPTID2}

Template

Generate URL

☐ SSL

URL https://ibgateway.com/PSIGW/RESTListeningConnector/NODENAME/?DeptID=56789&EMPLID1=&ACTION_DESCSHORT=TRANSFER&EFFDT=&EMPLID2=&DEPTID2=67890

Return

Server Architecture

