



# RiftSaw

# JBoss BPEL Server

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# Agenda

- Motivation
- WS-BPEL 2.0
- RiftSaw

# Motivation

- Enterprise applications & Information Systems
  - Help to perform business operations
  - Improve businesses through business process automation (BPA)
  - Are required to support the **whole** (if possible) business processes
- Business process
  - Dynamic in nature
  - Requires multiple application functionality
- Problem
  - Process change requires application change
  - Information system gap time

# Business Process Automation

- 1) Provide a standard way to expose and access functionality of applications as services
- 2) Provide an enterprise bus infrastructure for communication and management of services
- 3) Provide integration architecture between the various services and newly developed applications used in processes
- 4) Provide a specialized language for composition of exposed functionalities of applications into business processes

# Why specialized language?

- WSDL based web-services
  - Simple interactions
  - May be stateless
  - Inadequate to express model, describe complex compositions
- Standard programming languages issues
  - Not portable enough (B2B – Java vs. C++)
  - Programming in Large vs. programming in small
    - High level state transition logic
    - Inflexible solutions for traditional languages because of unclear separation between process flow and business logic
  - Very hard to analyze and improve

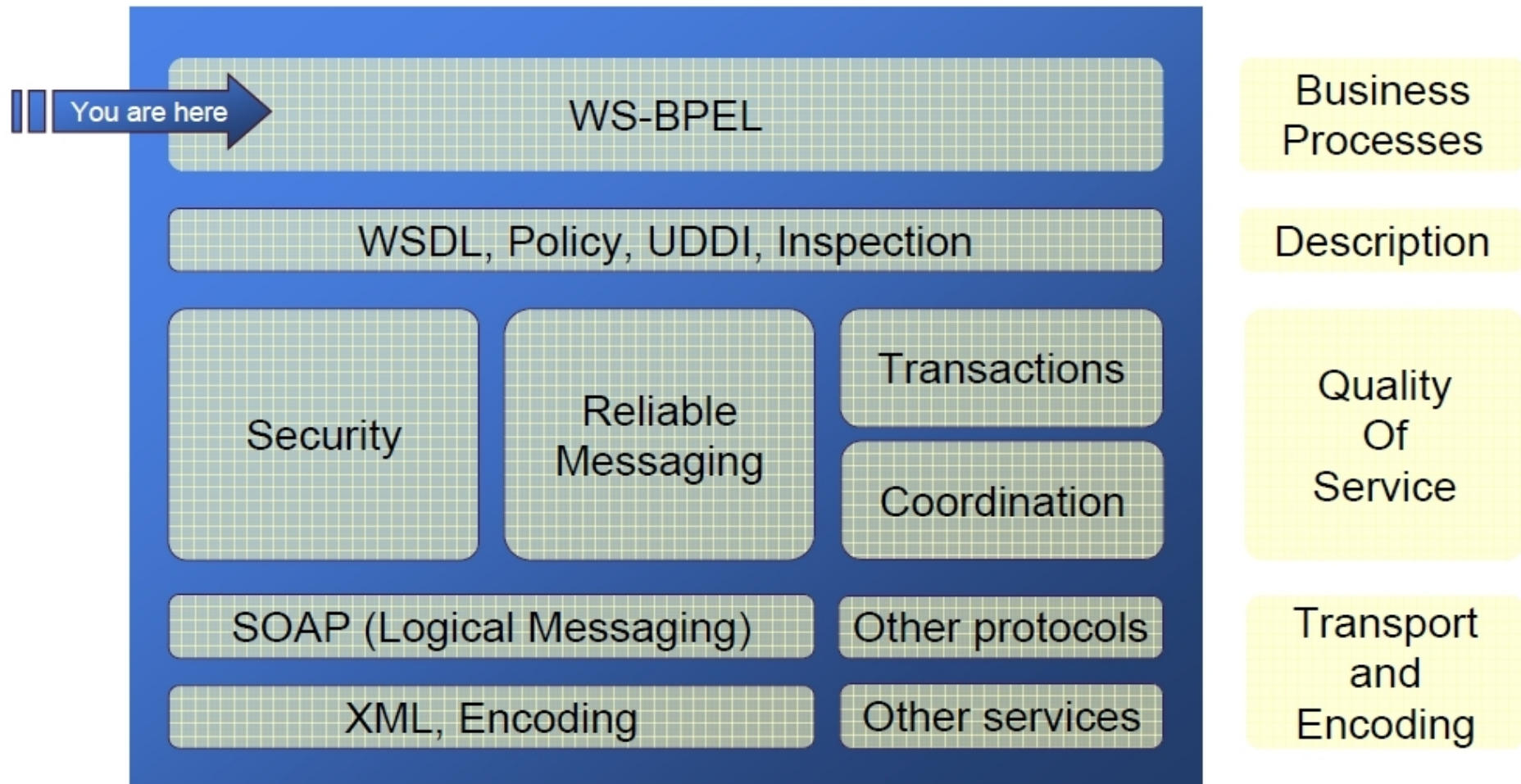
# WS-BPEL (1)

- Industry standard
- Business process orchestration
- Designed to fit naturally into Web service stack
  - Expressed entirely in XML
  - Uses and extends WSDL 1.1
  - Uses XML Schema 1.0 for data model
- Portable across platform and vendor
  - Will run on any BPEL-compliant engine
- Comparable to general purpose programming language

# WS-BPEL (2)

- Appetizer
  - Describe the logic of business processes through composition of Web services
  - Compose larger business processes out of smaller processes and services
  - Handle synchronous and asynchronous invocations, callbacks
  - Invoke service operations in sequence or parallel
  - Route incoming messages to the appropriate processes
  - Selectively compensate completed activities in case of failures
  - ...

# WS-BPEL (3)

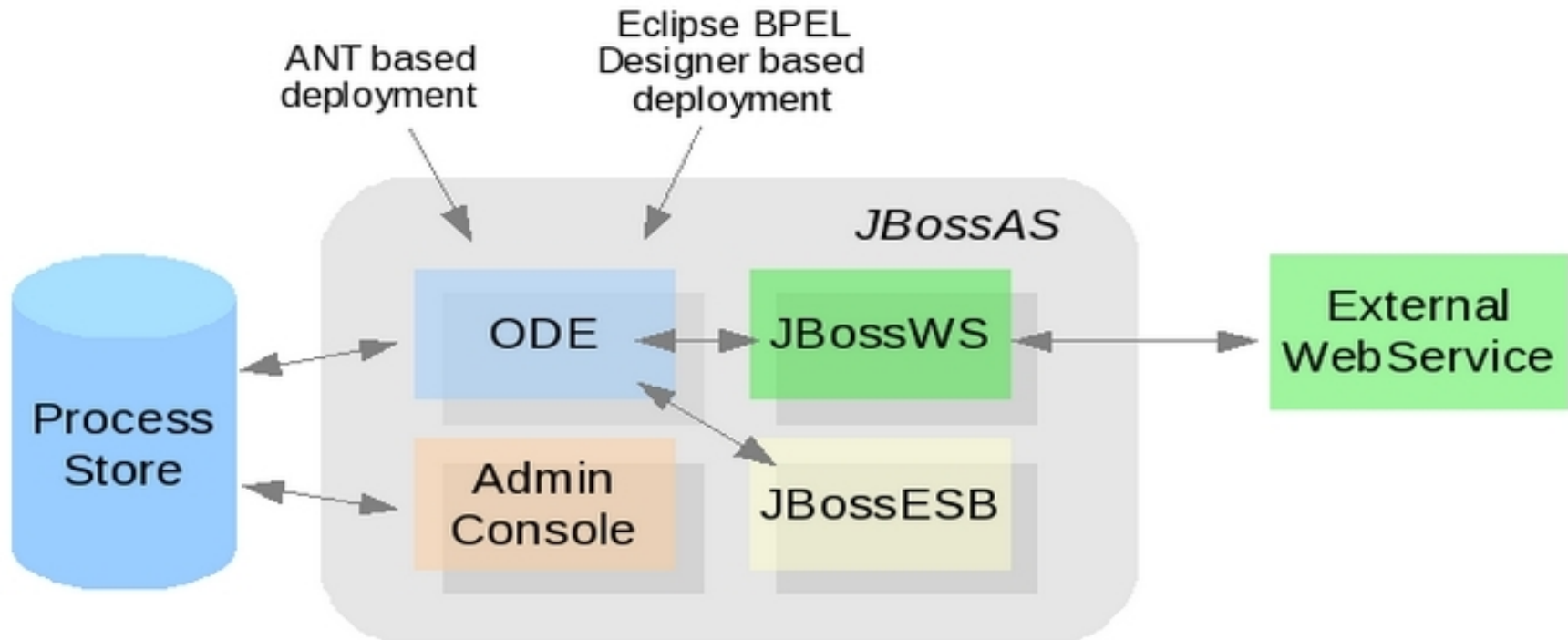




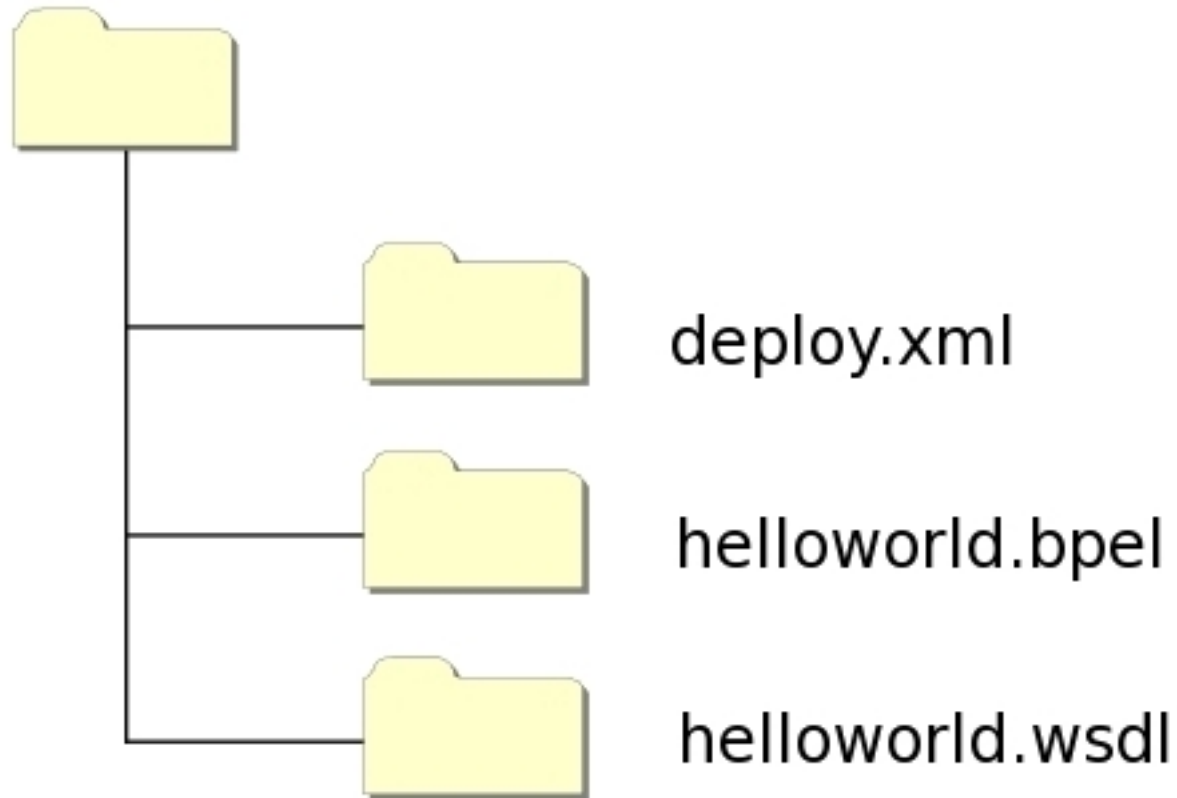
# Project RiftSaw

- Open-source
- WS-BPEL 2.0 compliant engine
- Based on Apache ODE
  - ✓ JBoss Hot Deployment
  - ✓ Admin Console
  - ✓ JBoss WS support (both native and CXF)
  - ✓ UDDI
  - ✓ Clustering
- Eclipse-based tooling via JBoss Tools

# RiftSaw Components



# RiftSaw Deployment



# WS-BPEL Process Definition

**<process>**

**(<import />)+** <!-- WSDL definitions, XML schemas -->

**<extensions>** ... **</extensions/>** <!-- language extensions -->

**<partnerLinks>** ... **</partnerLinks/>** <!-- Definition and roles of process participants -->

**<variables>** ... **</variables>** <!-- Data/state used within the process -->

**<correlationSets>** ... **</correlationSets>** <!-- Properties that enable conversations -->

**<faultHandlers>** ... **</faultHandlers>** <!-- Exception handling -->

**<compensationHandlers>** ... **</compensationHandlers>** <!-- Error recovery – undo -->

**<eventHandlers>** ... **</eventHandlers>** <!-- Concurrent events with process itself -->

**<!-- Business process flow -->**

**(activities)\***

**</process>**

# Partner Links

- BPEL process
  - Invokes partners
  - Receives client invocations and client callbacks
- Types
  - Invoked partner link
  - Client partner link
- Purpose
  - Asynchronous invocation support
  - Client filtering

# PartnerLinks - Sample

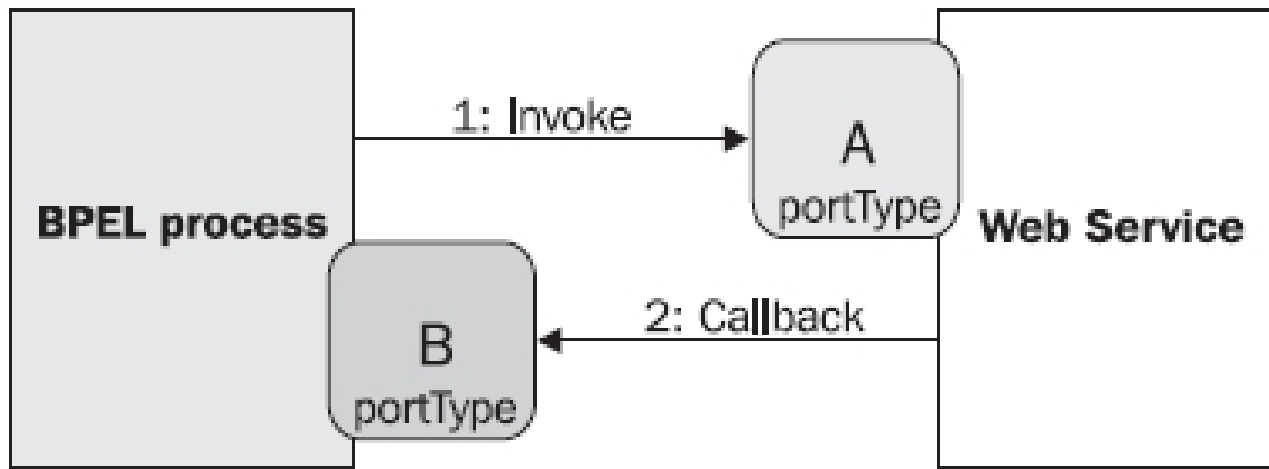
## WebService PartnerLinkType in WSDL:

```
<plnk:partnerLinkType name="WebService">  
    <plnk:role name="WebServiceProvider" portType="tns:WebServicePort"/>  
</plnk:partnerLinkType>
```

## BPEL process:

```
<bpel:partnerLink name="asyncService"  
    partnerLinkType="tns:WebService"  
    partnerRole="WebServiceProvider"/>
```

# Partner Links – Where do we stand?



# Partner Links - PartnerLinkTypes

## WebService PartnerLinkType in WSDL:

```
<plnk:partnerLinkType name="WebService">  
    <plnk:role name="WebServiceProvider" portType="tns:WebServicePort"/>  
    <plnk:role name="WebServiceRequester" portType="tns:WebServiceCallbackPort"/>  
</plnk:partnerLinkType>
```

## BPEL process:

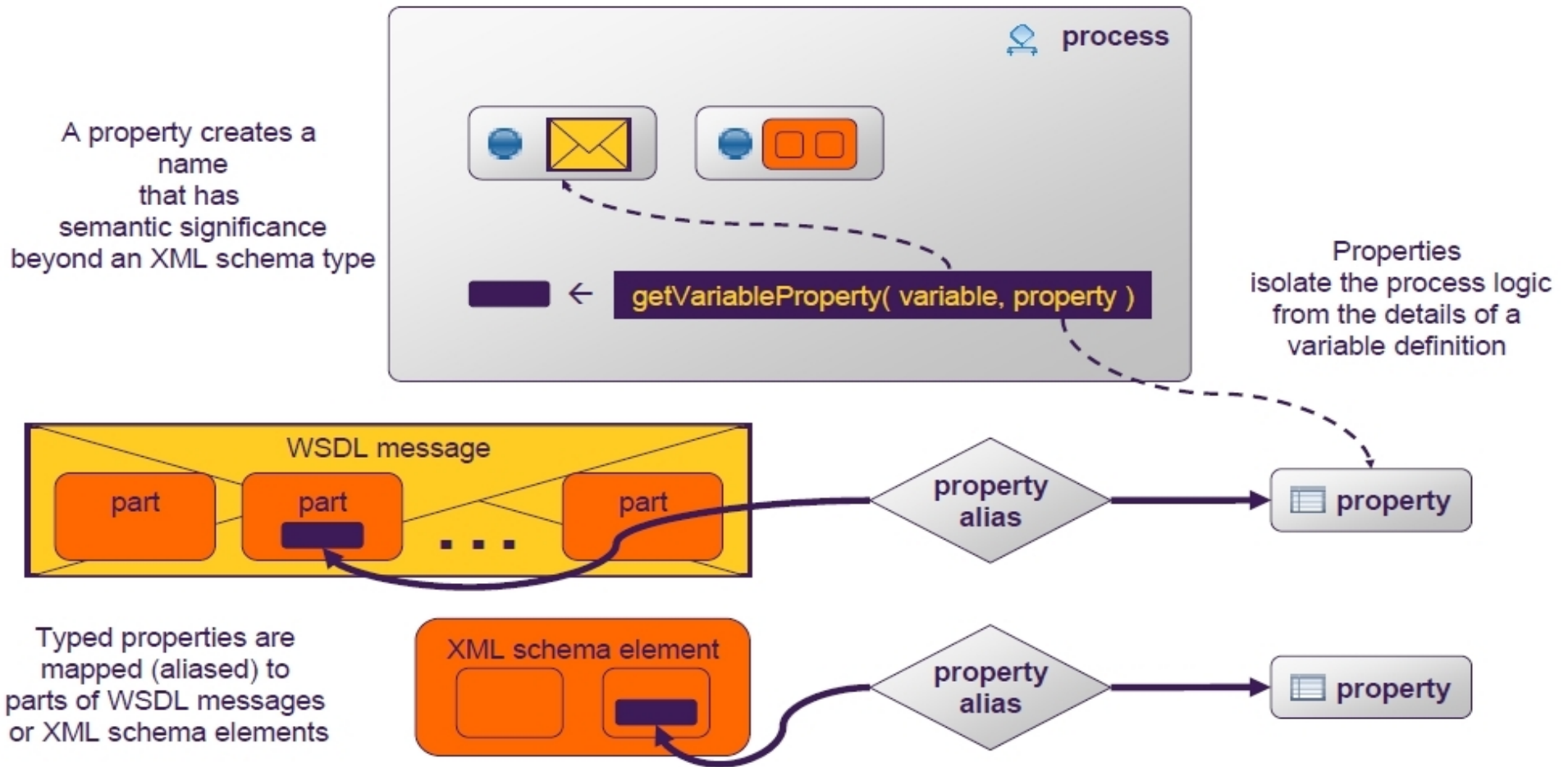
```
<bpel:partnerLink name="asyncService"  
    partnerLinkType="tns:WebService"  
    myRole="WebServiceRequester"  
    partnerRole="WebServiceProvider"/>
```



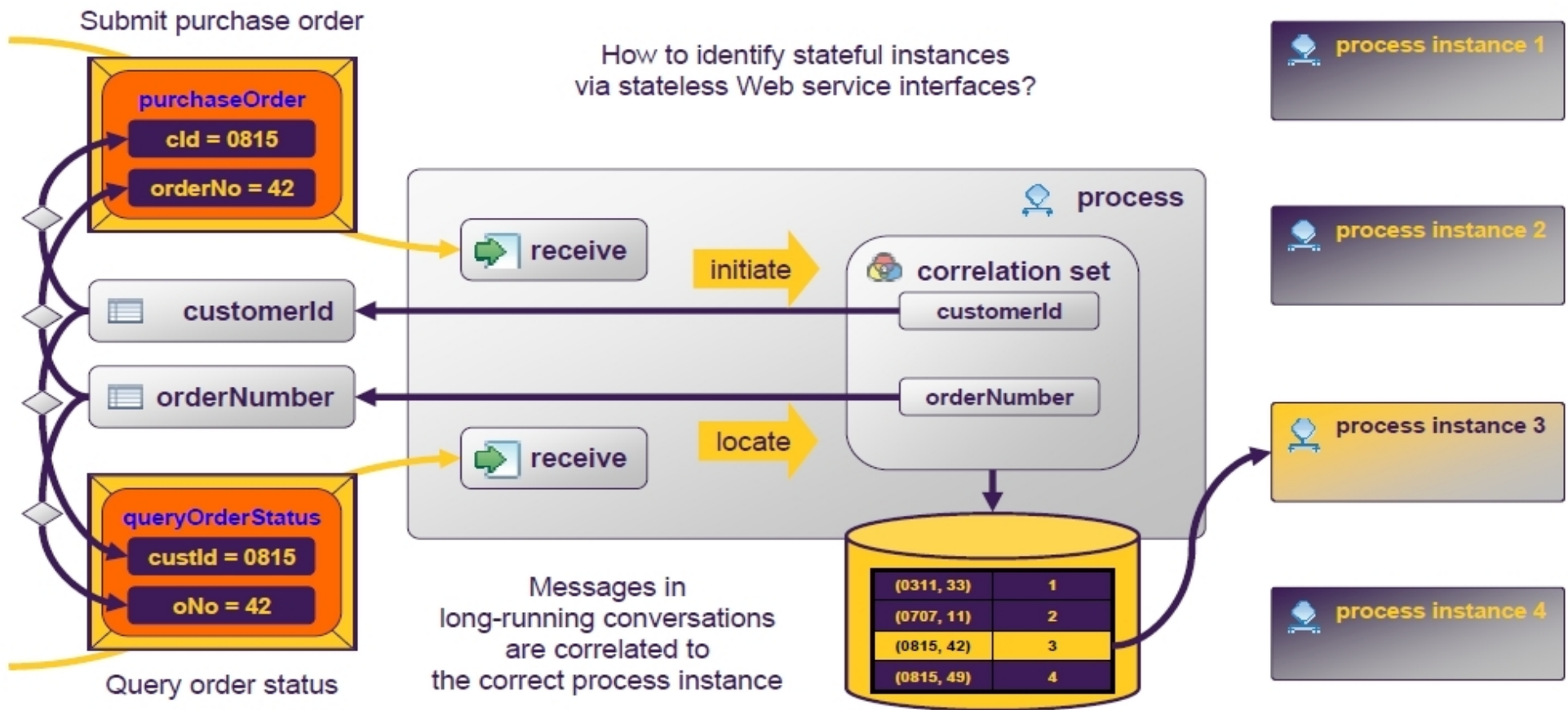
# Variables

- Hold the state of the process
- Defined as
  - WSDL Message
  - XML Schema elements/types
- Used in receive/reply/assign
- XSL transformation in assign

# Variable Properties



# Correlation Sets



# Basic Activities

- receive
- reply
- assign
- Invoke
- validate
- wait
- empty
- extensionActivity
- throw
- rethrow
- exit
- compensate
- compensateScope

# Basic Activities Demo

- Basic assign
- Synchronous web service invocation
- Asynchronous BPEL process invocation

# Structured Activities

- flow
  - links
- sequence
- while
- repeatUntil
- forEach
- pick
- If-then-else
- scope

# Scopes

- Local declarations
- Local handler
  - Fault handler
  - Termination handler
  - Compensation handler
- Isolation
  - Global variable access

# Structured Activities Demo

- Fault & compensation handler
- Event handler



# Deployment Descriptor

- Configures process to use specific services
- Supplies bindings for partner links to WSDL's
- Sample:

```
<deploy xmlns="http://www.apache.org/ode/schemas/dd/2007/03" xmlns:bpl="..." ...>  
  <process name="bpl:SimpleInvoke">  
    <active>true</active>  
    <provide partnerLink="theClientPartnerLink">  
      <service name="intf:SimpleInvokeService" port="SimpleInvokePort" />  
    </provide>  
    <invoke partnerLink="theExternalServicePartnerLink">  
      <service name="intf2:HelloWorldService" port="HelloWorldPort"/>  
    </invoke>  
  </process>  
</deploy>
```

# RiftSaw Adds

- Via ODE
  - Implicit correlations
  - Activity failure/recovery
  - XPath extensions
  - External variables
  - Headers handling
  - Flexible assigns
  - Process context

# RiftSaw Lacks

- Future
  - BPEL4People – based in WS-HT

# Q & A

