Introduction to Business Process Execution Language

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About the Speaker

- Nicholas J. Donatone is Vice President of Database Services for MFG Systems Corporation.
- Nicholas is one of the founders of the New Jersey Oracle User Group and has been President/Co-President of NJOUG for over 16 years.
- Nicholas has been working with Oracle software since version 4.
- Nicholas has made presentations at NJOUG, VOUG, NYOUG, ODTUG, IOUG and at Oracle OpenWorld

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- This presentation is an excerpt from one of MFG System Workshops.
- MFG is a Certified Oracle Partner.
- The following is a sample of some of the MFG Workshops
  - SOA – Oracle Service Oriented Architecture Suite
  - BPEL – Business Process Execution Language
  - OWB – Oracle Warehouse Builder
  - RAC – Real Application Cluster
  - Oracle Business Intelligence Discoverer
  - Portal

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Business Process Management

- Before we get into BPEL let's first discuss BPM
- BPM technology is a framework of applications that effectively tracks and orchestrates business process.
- BPM solutions automatically manage processes
  - extracting customer information from a database
  - add new customer transaction information
  - generate transactions in multiple related systems
  - support straight-though processing without human intervention when needed
- It also allows for manual intervention

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Business Process Management

- BPM allows you to automate tasks involving information from multiple systems
  - with rules to define the sequence in which the tasks are performed as well as responsibilities, conditions, and other aspects of the process.
- BPM not only allows a business process to be executed more efficiently,
  - it also provides the tools to allow you to measure performance and identify opportunities for improvement
  - easily make changes in processes to act upon those opportunities.

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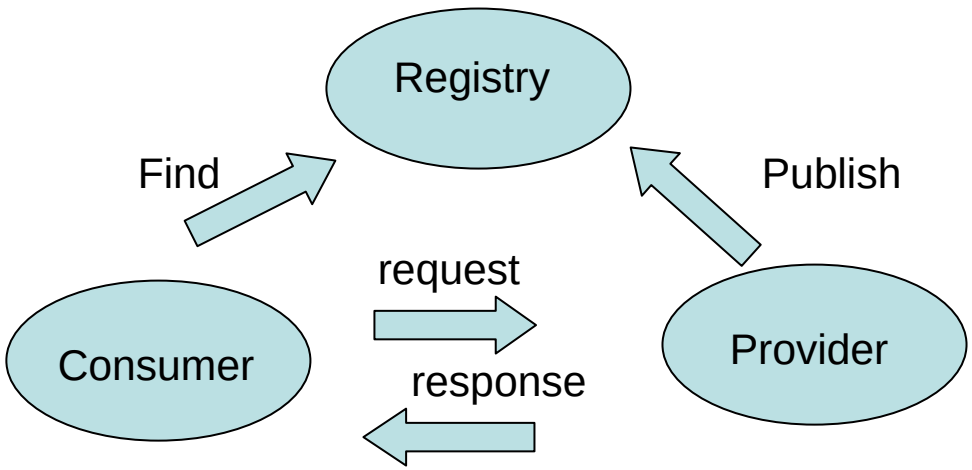
Service Oriented Architecture

- Service-Oriented Architecture (SOA) is:
  - “a standards-based implementation style whose goal is to achieve secure, reliable, and interoperable loosely coupled interacting services.”*



* Adapted from He, Hao. “What is Service-Oriented Architecture?” O’Reilly. September 30, 2003

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Web Services

- Web Services Description Language (WSDL)
  - Describes the service being provided
  - Defines what the services does
  - How to contact it
- Universal Description, Discovery, and Integration (UDDI) protocol
  - Like a Yellow book of Web Serives

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WS-* Quality of Service

- WS-Coordination (Web Services Coordination)
  - proposed IT industry standard for how individual Web services can interact in order to accomplish an application task.
  - The WS-Coordination interface defines a context within which coordination is to take place and the specific items of data that are to be exchanged in order for transactions to complete successfully as part of an overall business process defined in a Business Process Execution Language (BPEL) program.
- WS-Transaction is a companion specification for what will constitute the completion of a transaction.
- WS-Security
- WS- Reliable Messaging
- WS- Interoperability
  - Open industry organization charted to promote Web services interoperability

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Business Process Execution Language

- Business Process Execution Language (BPEL)1 defines a notation for specifying business process behavior based on Web Services.
- Business processes can be described in two ways:
  - Executable business processes
  - Business protocols

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Business Process Execution Language

- BPEL is used to model the behavior of both executable and abstract processes.
- The scope includes:
  - Sequencing of process activities, especially Web Service interactions.
  - Correlation of messages and process instances
  - Recovery behavior in case of failures and exceptional conditions
  - Bilateral Web Service based relationships between process roles

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Business Process Execution Language

- BPEL (Business Process Execution Language) for Web services is an XML-based language (BPEL4WS, usually shortened to BPEL, which rhymes with "people")
  - designed to enable task-sharing for a distributed computing or grid computing environment
  - across multiple organizations
  - using a combination of Web services.
- Written by developers from BEA Systems, IBM, and Microsoft, BPEL combines and replaces IBM's WebServices Flow Language (WSFL) and Microsoft's XLANG specification.

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XML Standards

- BPEL builds on and extends XML and Web Services specifications. BPEL is expressed entirely in XML, uses and extends WSDL, and uses WSDL and XML Schema for the data model.
  - WSDL
  - XSD
  - Namespaces

Business Process Execution Language

- Using BPEL, a programmer formally describes a business process that will take place across the Web in such a way that any cooperating entity can perform one or more steps in the process the same way.
- In a supply chain process, for example, a BPEL program might describe a business protocol that formalizes what pieces of information a product order consists of, and what exceptions may have to be handled.
- The BPEL program would not, however, specify how a given Web service should process a given order internally.

BPEL Servers

- Oracle BPEL Process Manager
- ActiveBPEL Engine (Open Source)
- IBM BPEL4WS Editor
- Microsoft BizTalk Server XLANG

- Other BPEL Servers

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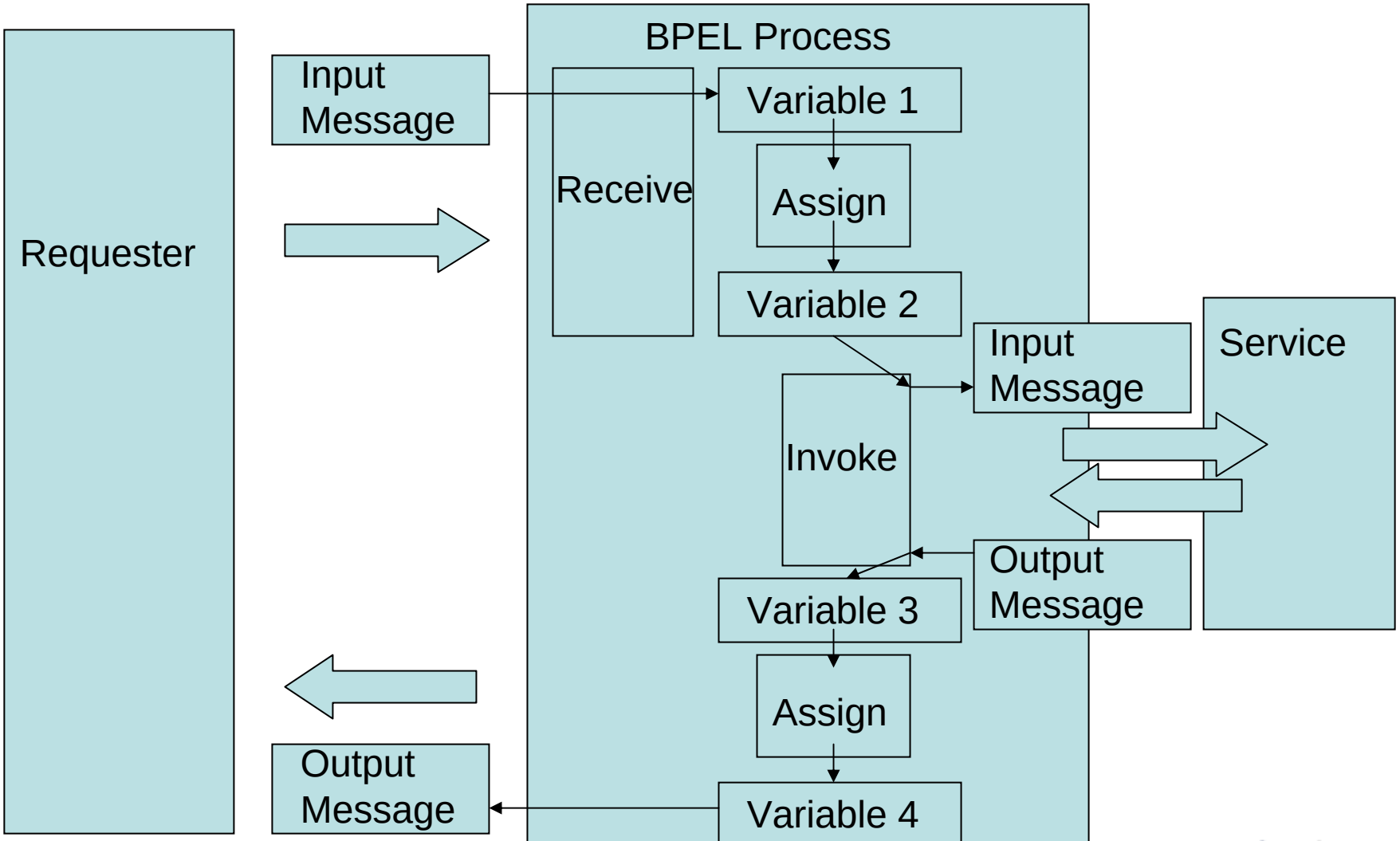
Description of Basic BPEL Process



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Description of Basic BPEL Process

- Requester invokes BPEL process by passing a message
- **Receive** operation copies received data into **Variable 1**
- **Assign** operation crates **Variable 2** with data from **Variable 1**
- **Invoke** creates a service request from **Variable 2**
- Request sent to service by **Invoke**
- Response received by the **Invoke**
- Response message copied to **Variable 3**
- Assign creates **Variable 4** from **Variable 3**
- Reply creates service reply from **Variable 4**
- Service response is sent by the **Reply**

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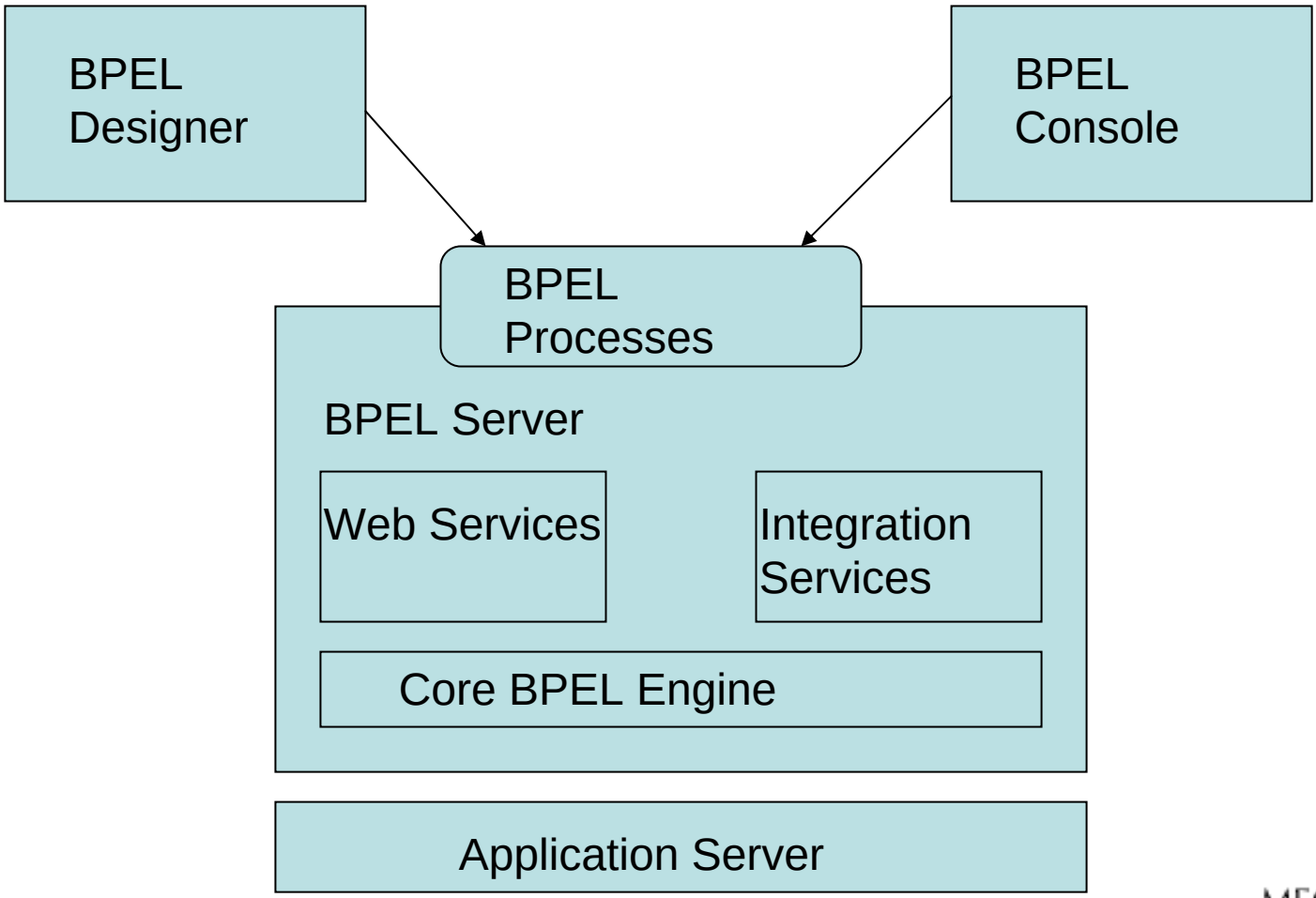
Oracle BPEL Process Manager

- BPEL is emerging as the standard for assembling a set of discrete services into an end-to-end process flow, radically reducing the cost and complexity of process integration initiatives.
- Oracle BPEL Process Manager offers a comprehensive and easy-to-use infrastructure for creating, deploying and managing BPEL business processes.
- A GUI developer tool integrated into JDeveloper

Oracle BPEL Process Manager Architecture



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Oracle BPEL Process Manager Architecture

- Oracle BPEL Process Manager
  - Manage BPEL processes
  - Is Composed of the Designer, Process Manager & Console
    - Oracle BPEL Process Designer
      - Model, edit & design processes
    - Integration Services
      - Transformation & adapters
    - Core BPEL engine
      - Supports BPEL standard, runs on various application servers

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Supported Adapters

- File Adapters
- FTP Adapters
- Oracle Advanced Queuing
- Database Adapter
- JMS Adapter
- Oracle Applications Adapter
- And more….

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Data Transformation Services

- Built in transformer component
- Uses XSLT Mapper
  - XPath
  - XSD
  - XSL
- Test tool

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BPEL/SOA Methodology

- Web Services Architecture Usage Scenarios
  - http://www.w3.org/TR/ws-arch-scenarios/
- Scenario types
  - Fire-and-Forget
  - Request/Response (Callback)
- Code-First
- WSDL-First

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BPEL Process

- Depends on exposed services
  - Register Service
- Invoke process flow
- Data Transformation
- Exception processing
- User tasks
- Sensors
- Monitor

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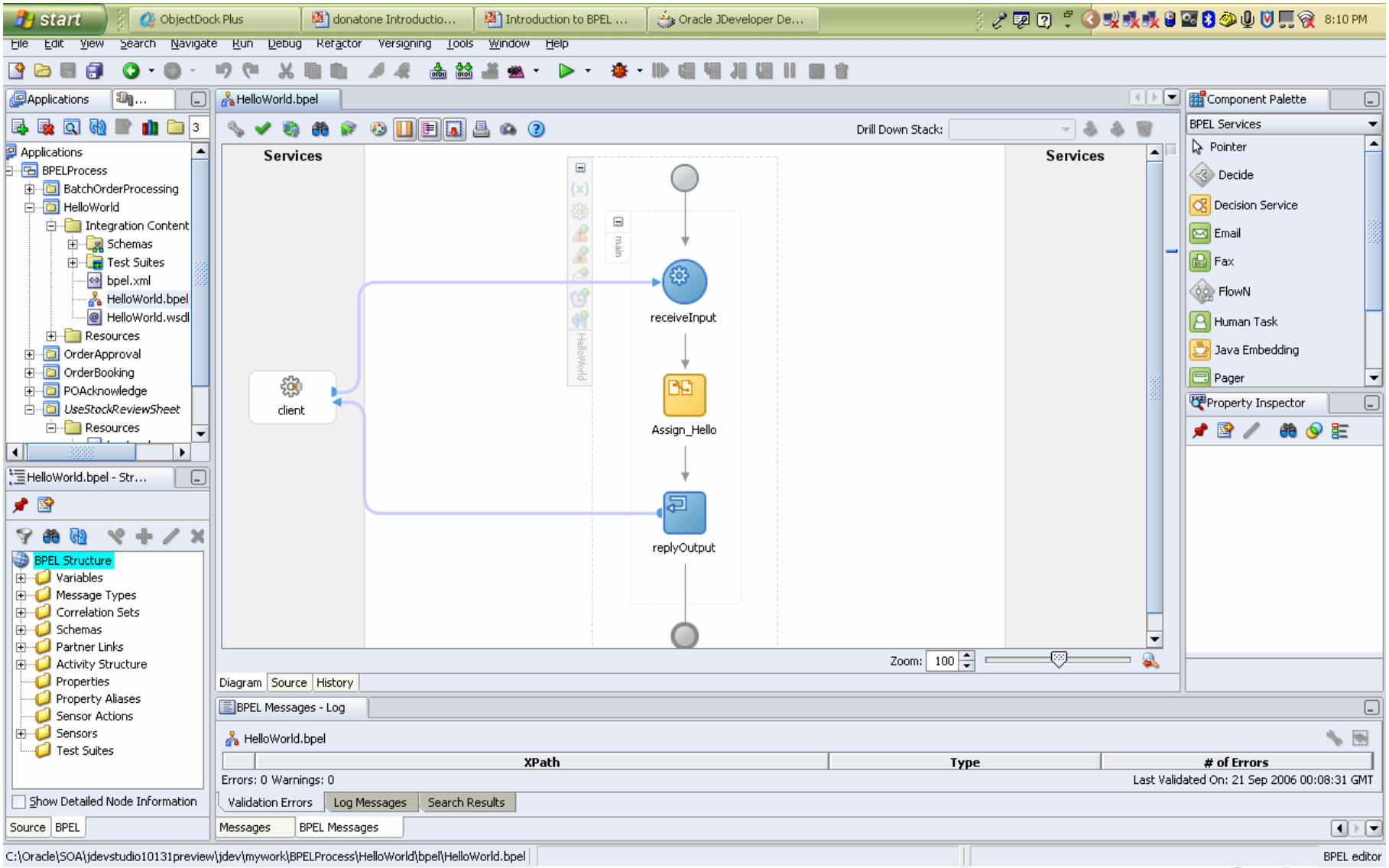
Oracle BPEL GUI



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And Now…

- A demo of jDeveloper 10.1.3 preview
- Let's create a simple BPEL process
  - "Hello World"
- Let's look at a more complex Booking Order process

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Thank You

- **Books you may want to reference…**
  - **BPEL Cookbook: Best Practices for SOA-based integration and composite applications development (Paperback)**
    by Jeremy Bolie (Author), Michael Cardella (Author), Stany Blanvalet (Author), Matjaz Juric (Author), Sean Carey (Author), Praveen Chandran (Author), Yves Coene (Author), Kevin Geminiuc (Author), Markus Zirn (Editor), Harish Gaur (Editor)
  - **Business Process Execution Language for Web Services : BPEL and BPEL4WS (Paperback- Second Addition)**
    by Matjaz B. Juric (Author), Benny Mathew (Author), Poornachandra Sarang (Author)

- Speaker: Nicholas J Donatone
- Session Name: Introduction to Business Process Execution Language
- Further questions?
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