SOA Best Practices & Framework Services in Order to Invoice Enterprise Application Integrations

By

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Booth# 1426

Agenda Today

- Protégé Profile
- Business Scenario
- Why SOA?
- SOA Approach
- SOA Solution Overview
- Framework Services –
  - Process Flow
  - Environment
  - Exception Handing Service, AQ Service
  - Canonical Data Model.
  - Cross Reference Service.
  - Worklist Application, failure points, canonicals, adapters
- Best Practices –Framework Services using BPEL
  - Process Design
  - Process Maintenance
- Questions?

About Protégé

- Oracle Certified Partner.
- Information Technology Professional Services Firm in operation since 1993.
- Core competencies include Oracle E-Business Suite, Data warehousing/Business Intelligence, and Application Integration
- Full service offerings including Project Management, Functional, and Technical Consulting Services.
- Long term Customer Relationships.
- Ever Growing list of Referenceable Clients.

What We Do

- Our staff of seasoned professionals find solutions to business problems. We work with our clients to develop a deep understanding of the issues in order to achieve a common goal.
  - Understand your business and your process
  - Work within budgeted time and dollars
  - Stand behind and support the solutions we design.
  - Meet the goals of the project.

Skill Sets and Tools Experience

- Oracle E-Business Suite
  - Versions 10.7- 12
- Programming Languages
  - SQL, PL/SQL, Java, JSP, XML, C, C++, BPEL
- Platforms
  - Linux, Sun, Windows HP-UX
- Databases
  - Oracle Version 7 – 10, SQL Server, Informix
- Tools & Middleware
  - Oracle Forms & Reports, Oracle JDeveloper, Oracle Portal, Workflow Builder, SOA, BPEL, Discoverer, OBIEE, BI Publisher
- Industry Experience
  - Discrete Manufacturing
  - Flow Manufacturing
  - Process Manufacturing
  - Government Contractors
  - Software Companies
  - Service Providers
  - Pharmaceutical and Life Sciences
  - Medical Device
  - Semi Conductor
- Third Party Integration
  - Hyperion, Ceridian, ADP, D&B, Vertex, Optio, Evergreen, Noetix, Web Methods, Siebel, Remedy

Business Scenario

- Successful enterprise integration needs to establish communication between multiple computer systems, as well as between business units and IT departments
- Middleware is separate of the participating applications. Needs to have functionality and identity of its own, as it has limited control over participating applications.
- Middleware needs to provide its own services, that support its functionality, that are consistent and comprehensive
- Write once, run anywhere - REUSE

SOA Solution Overview

At Monster, application integrations of Oracle's Siebel, Oracle E-Business Suite, and other business applications leverage solutions built on the BPEL components of the Oracle SOA Suite. This case study shows why and how a framework of services has been developed to provide a common solution for data cross-reference and exception handling. Also we will review enterprise integration patterns including use of canonical data models to enhance your BPEL and ESB solutions.

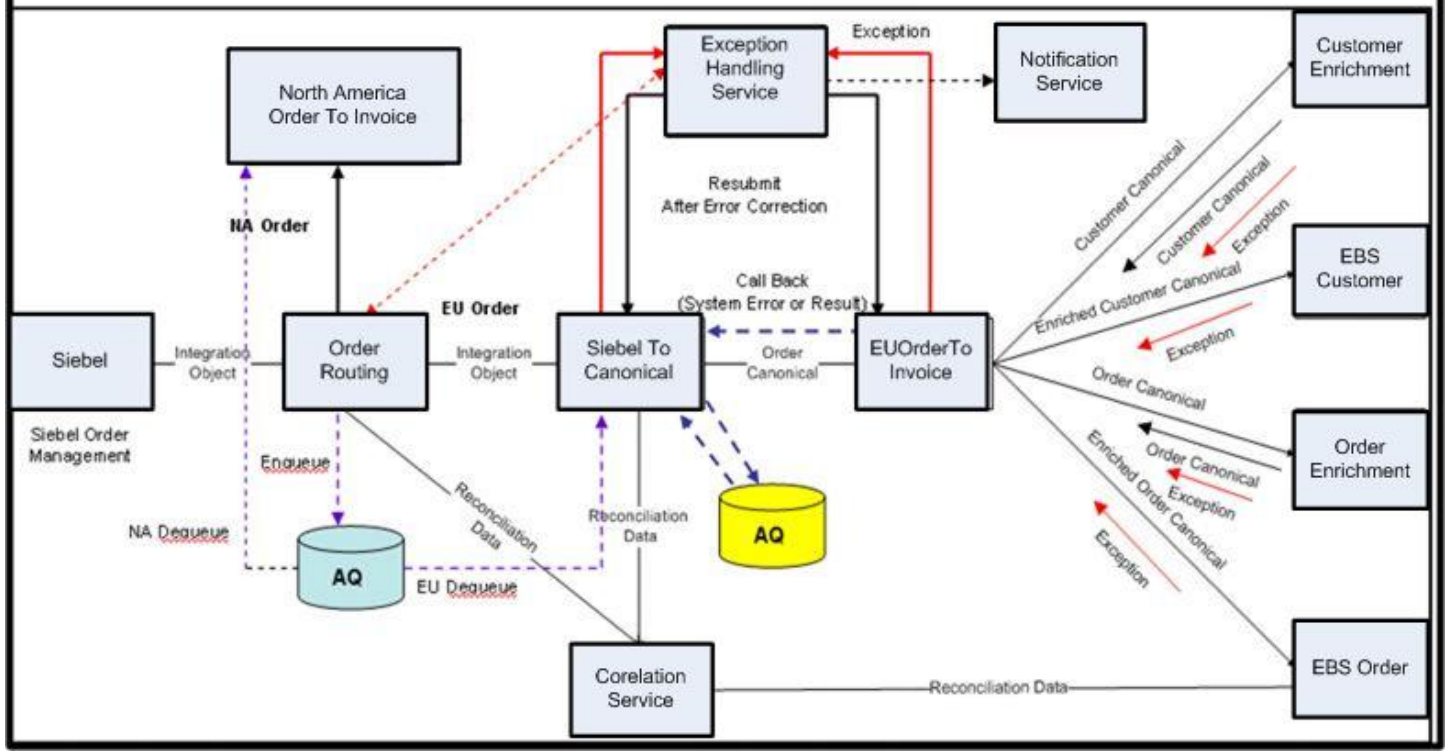
Why SOA?

- Better Return on Investment
- Code Mobility
- More System Security
- Support for multiple Client types
- Better Maintainability
- More Reuse
- Better Parallelism in development
- Better Scalability

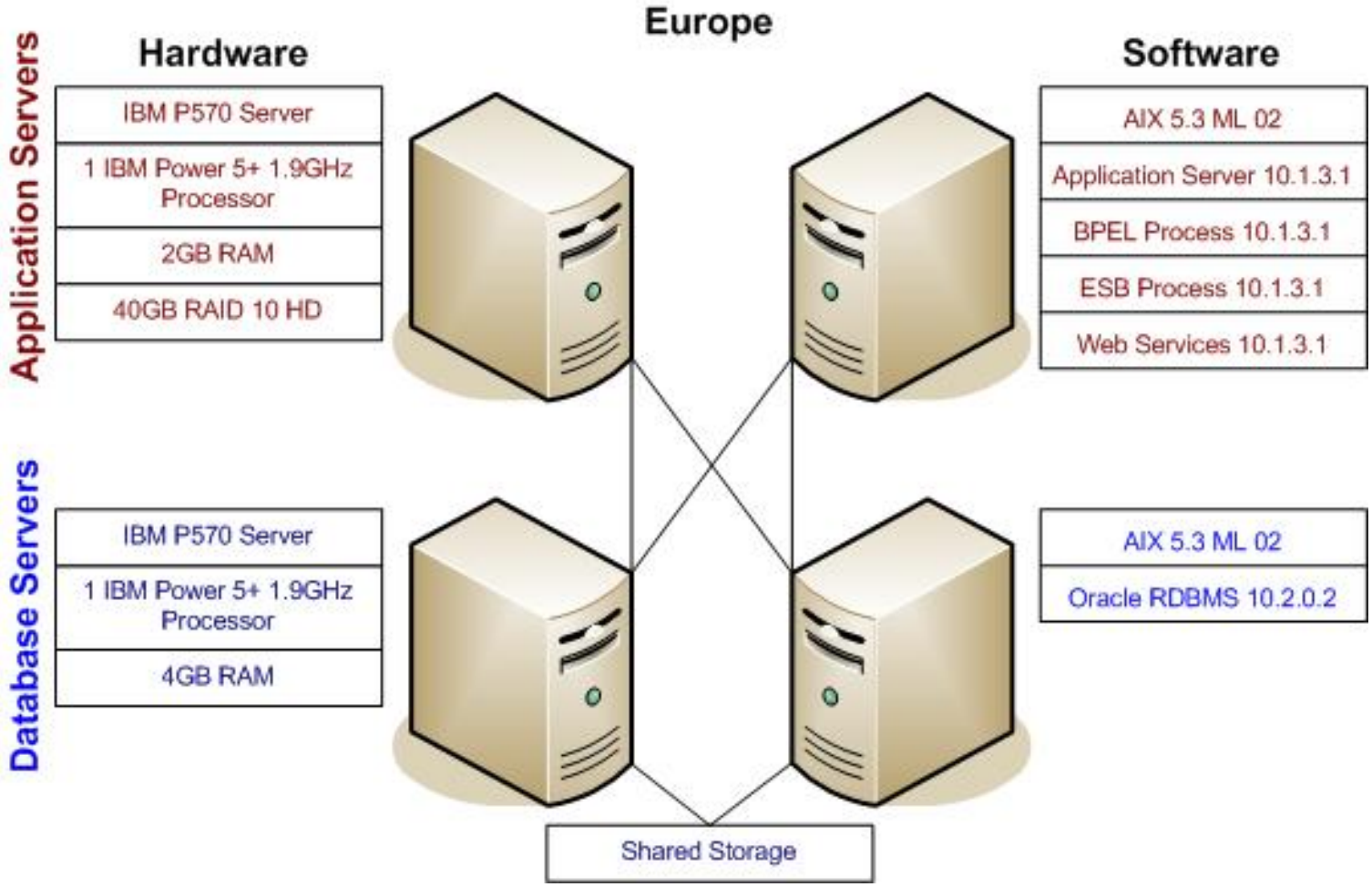
SOA Approach

- **Principles**
  - Encapsulated logic
  - Loose coupling
  - Service contract
  - Autonomy
  - Abstraction
  - Reusability
  - Composability
  - Statelessness
  - Discoverability
- **Result**
  - Promotes agility
  - Building block
  - Inherent reuse

Siebel Order To Invoice Integration - Process Flow Diagram



Environment



Framework Services

- **Services**
  - **Exception handling** – Common service that handles all exceptions generated during the execution of the BPEL and ESB processes.
  - **Cross-reference handling** – Common service that performs table-based look-ups for data transformation
- **Integration patterns**
  - **Canonical data models** – Common data model used by each participating application to produce and consume messages in a common format for the data object.

Exception Handling Services

- Exceptions are normal and can be expected throughout architecture
  - Includes logical errors such as coding errors, mapping failures, validation failures, business rule violation, stored procedure failure, or table constraint violations. In addition, technical failures can cause exceptions such as database down, memory limitations, endpoint system down, and network problems.
- Potentially significant affect
  - Exceptions are real-time events that might impact not only a single transaction, but could also disrupt a critical business process.

Exception Handling Services

- Implementation – framework architected to:
  - Allow exceptions themselves to be an actionable entity
  - Exceptions are very descriptive and contain contextual information about the data and service that failed.
  - Framework dispatches these exceptions to the appropriate process
  - Exception is propagated to the appropriate user based on context and defined business flow

Details: Exception Handling

- **Framework Service** that handles application or business faults thrown anywhere within BPEL Processes.
- **Leverages human workflow** and task services to provide exception notification and integration with Oracle Worklist application.
- **Worklist Application User Interface** to present , fix and resubmit orders that failed within middleware.
- Uses **JAZN repository** to manage user credentials.

Details: Exception Handling

- **Siebel Adapter failure** → **Orders Queued in Siebel.**
- **BPEL Order Routing failures**
  - System Faults: *Partner Services Not available*, *remote faults.* → **Orders Queued (Oracle Advance Queues)**
  - Data Exception: *Invalid XML data* → **Routed to Exception Handler, Notification**

Details: Exception Handling

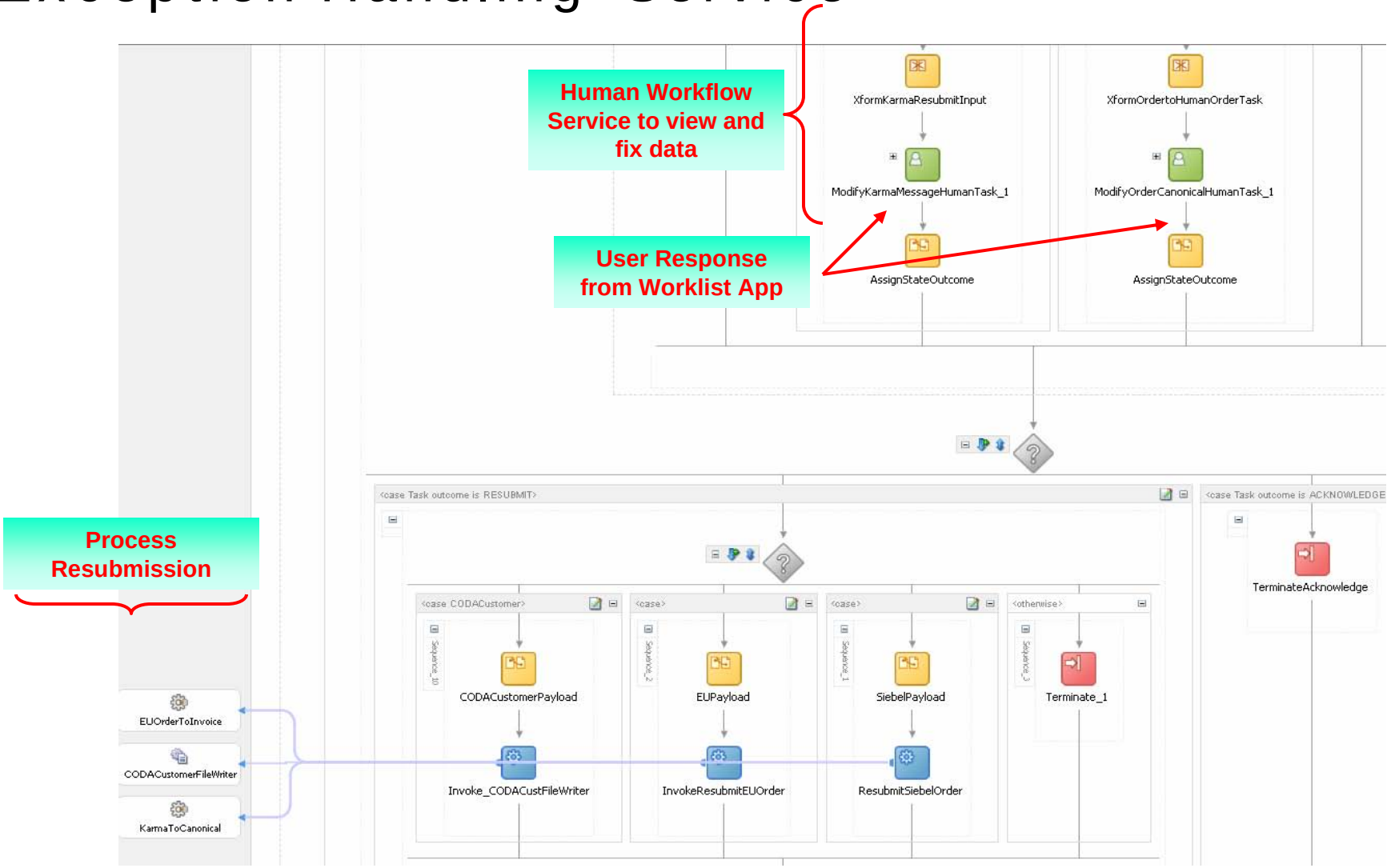
- **Order Enrichment Process failures**
  - Data Exceptions:
    Invalid data, XREF lookup failures, validation failures

Routed to Exception Handler, Fix errors via human workflow using worklist application. Resubmit within middleware.

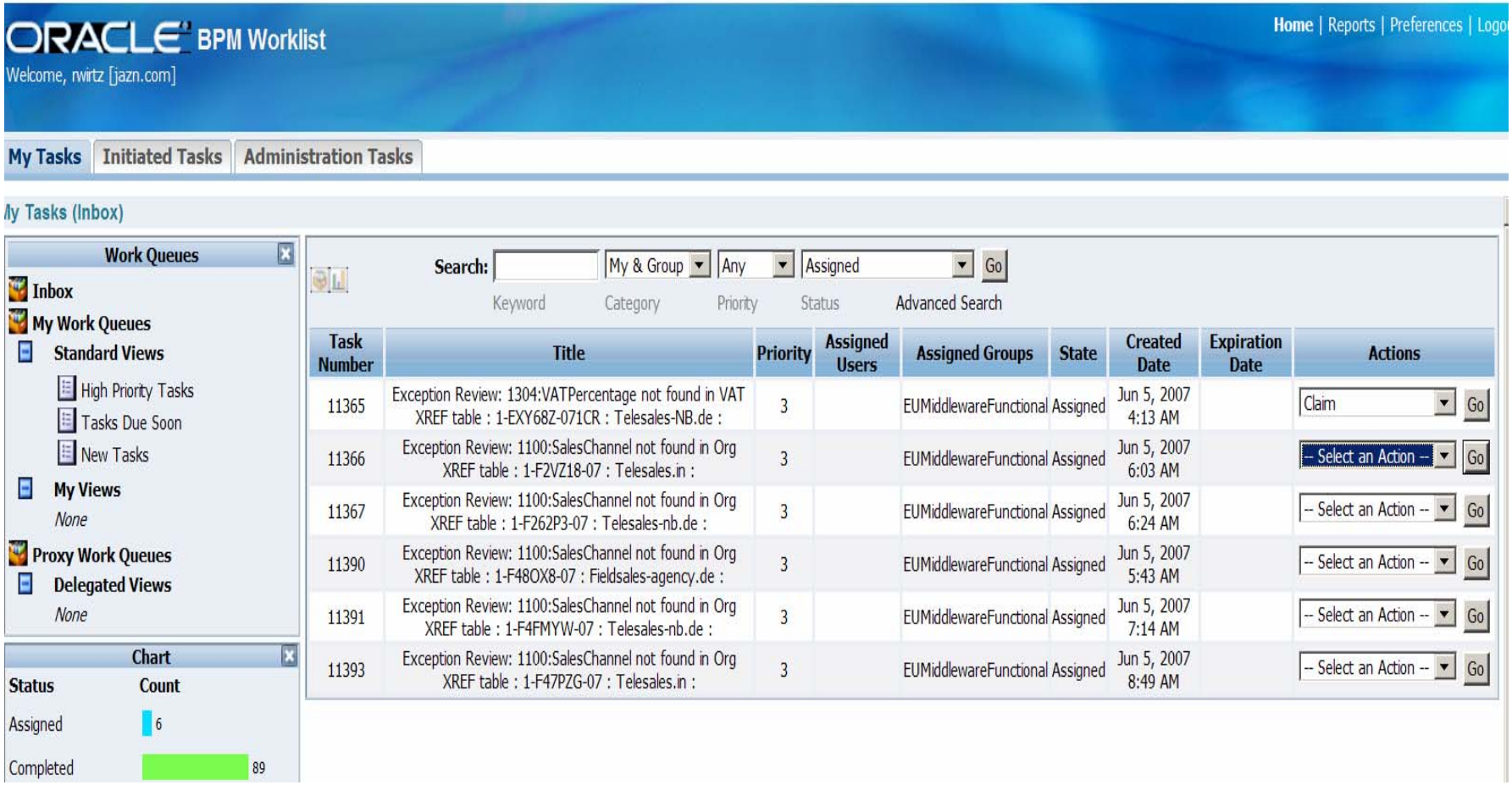
- **EBS (E-Business Suite) failures**
  - *EBS not available, process timeouts, service failures*

Routed to Oracle Advanced Queues for later processing

Exception Handling Service

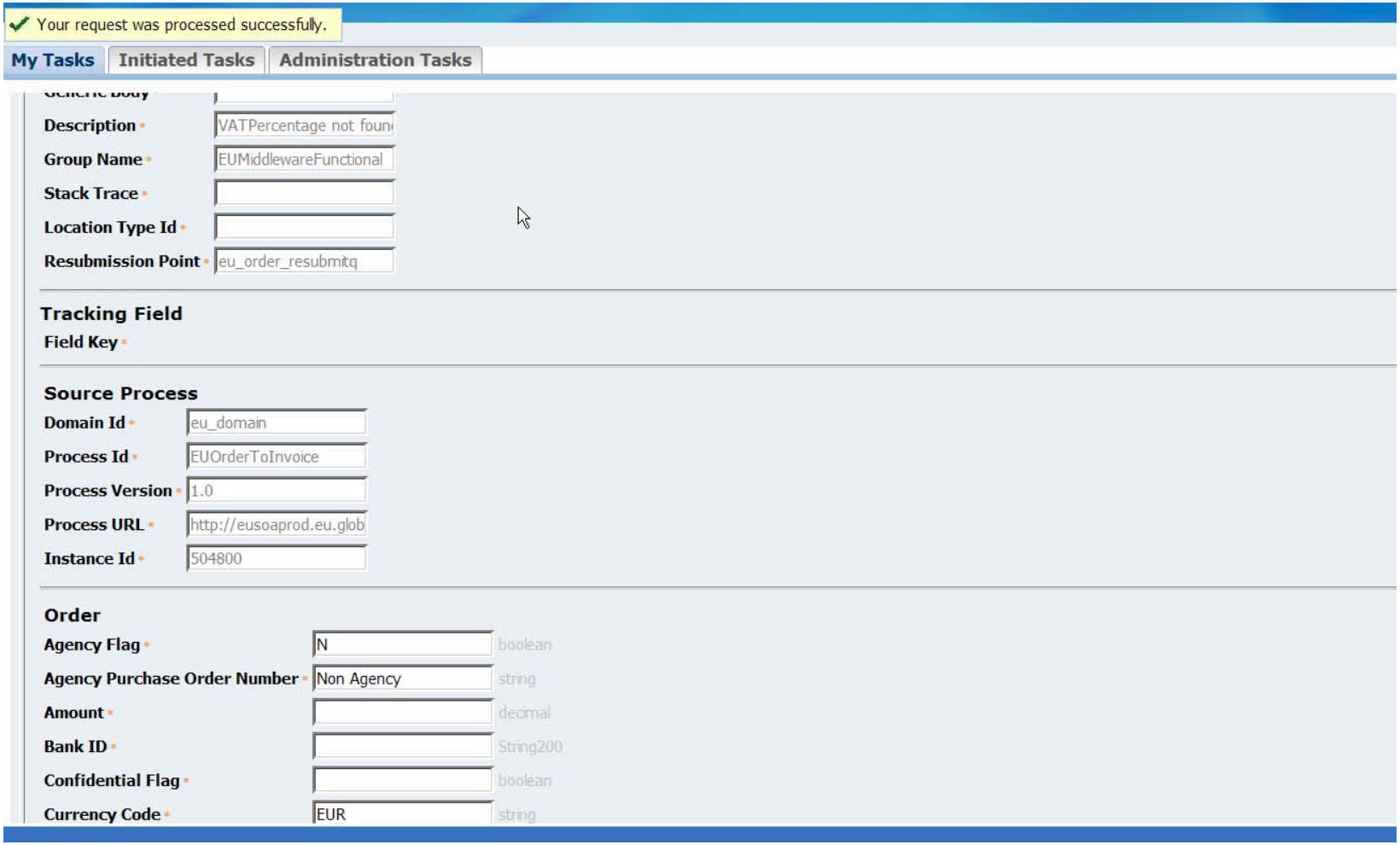


Worklist Application- Queues

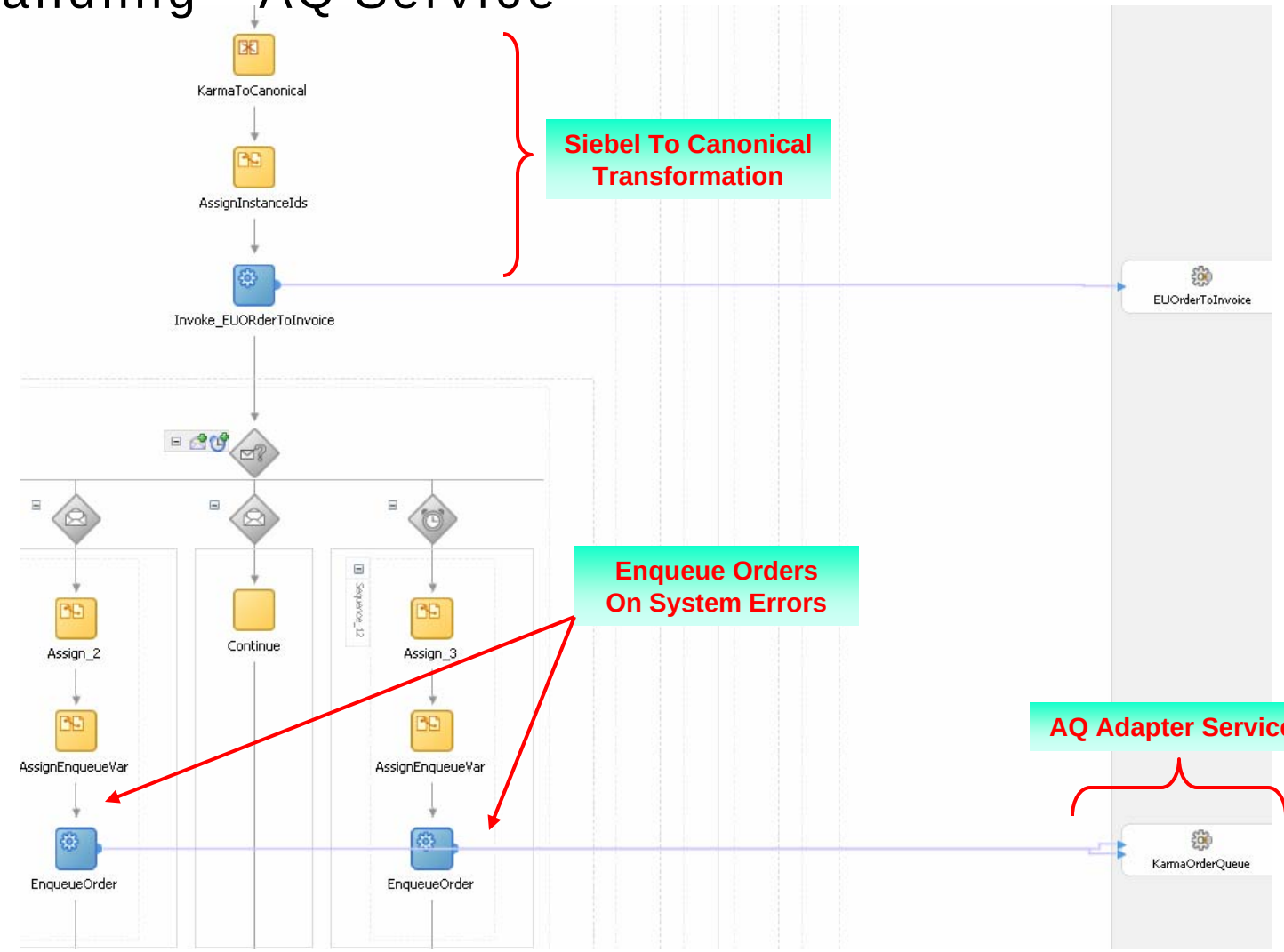


Task Number	Title	Priority	Assigned Users	Assigned Groups	State	Created Date	Expiration Date	Actions
11365	Exception Review: 1304:VATPercentage not found in VAT XREF table : 1-EXY68Z-071CR : Telesales-NB.de :	3		EUMiddlewareFunctional	Assigned	Jun 5, 2007 4:13 AM		Claim Go
11366	Exception Review: 1100:SalesChannel not found in Org XREF table : 1-F2VZ18-07 : Telesales.in :	3		EUMiddlewareFunctional	Assigned	Jun 5, 2007 6:03 AM		-- Select an Action -- Go
11367	Exception Review: 1100:SalesChannel not found in Org XREF table : 1-F262P3-07 : Telesales-nb.de :	3		EUMiddlewareFunctional	Assigned	Jun 5, 2007 6:24 AM		-- Select an Action -- Go
11390	Exception Review: 1100:SalesChannel not found in Org XREF table : 1-F48OX8-07 : Fieldsales-agency.de :	3		EUMiddlewareFunctional	Assigned	Jun 5, 2007 5:43 AM		-- Select an Action -- Go
11391	Exception Review: 1100:SalesChannel not found in Org XREF table : 1-F4FMYW-07 : Telesales-nb.de :	3		EUMiddlewareFunctional	Assigned	Jun 5, 2007 7:14 AM		-- Select an Action -- Go
11393	Exception Review: 1100:SalesChannel not found in Org XREF table : 1-F47PZG-07 : Telesales.in :	3		EUMiddlewareFunctional	Assigned	Jun 5, 2007 8:49 AM		-- Select an Action -- Go

Worklist Application- Order Resubmission form



Exception Handling – AQ Service



Cross reference Services

- Data transformation is regularly required between applications
  - Data values will need to be transformed as data moves from one application to another to accommodate the data validation requirements of the consuming applications
- Requires flexibility
  - Cross reference source/target values will be volatile over the life of the applications.
  - Data ownership will be defined for the source/target values.
  - A user-interface for data modification must be provided.

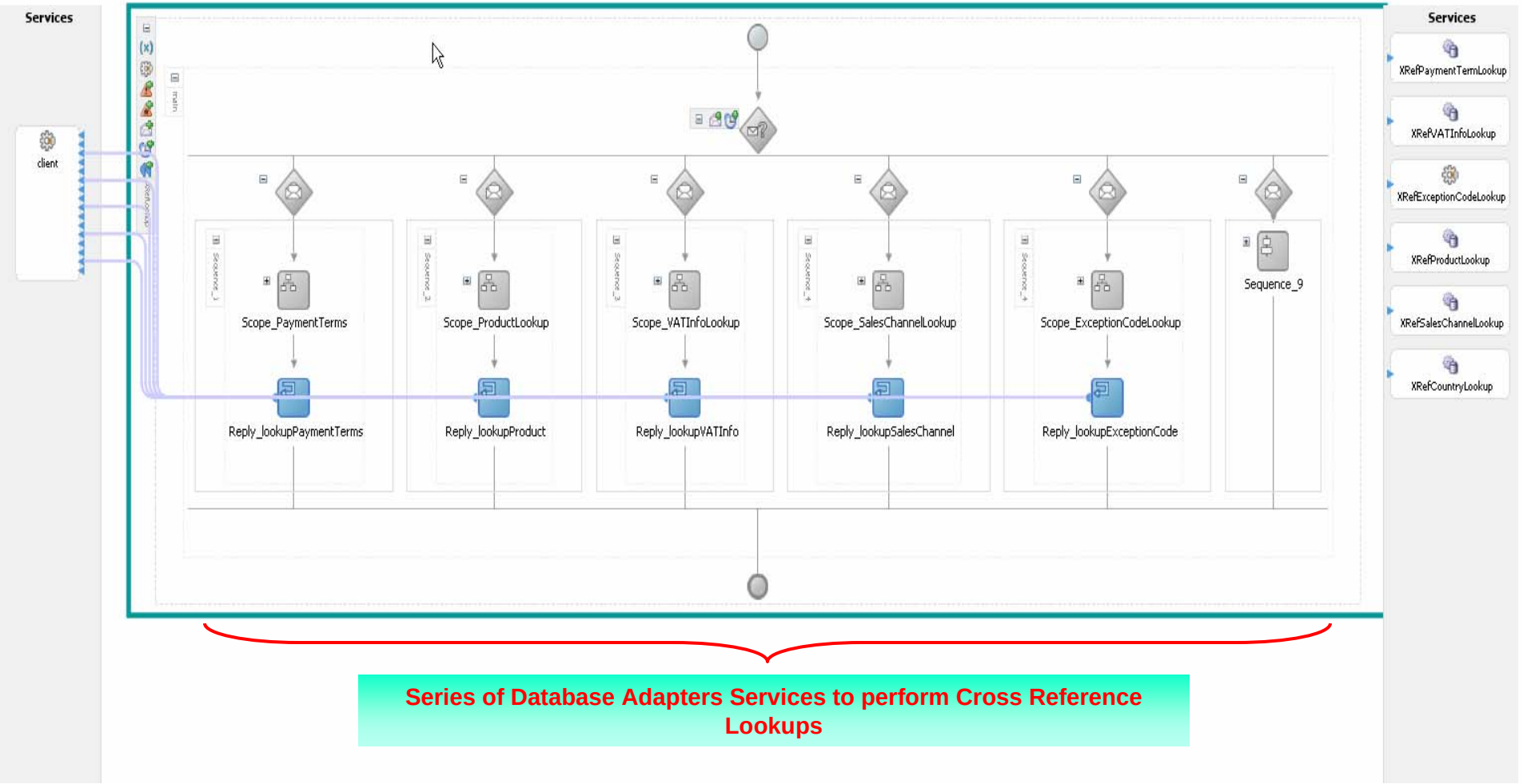
Cross Reference Services

- Implementation - framework architected to
  - Pass a cross-reference type and source value to a service
  - A target value is returned from the service.
  - If the cross-reference is not successful, an exception is returned, to be handled by the exception handling service.

Details: Cross-reference

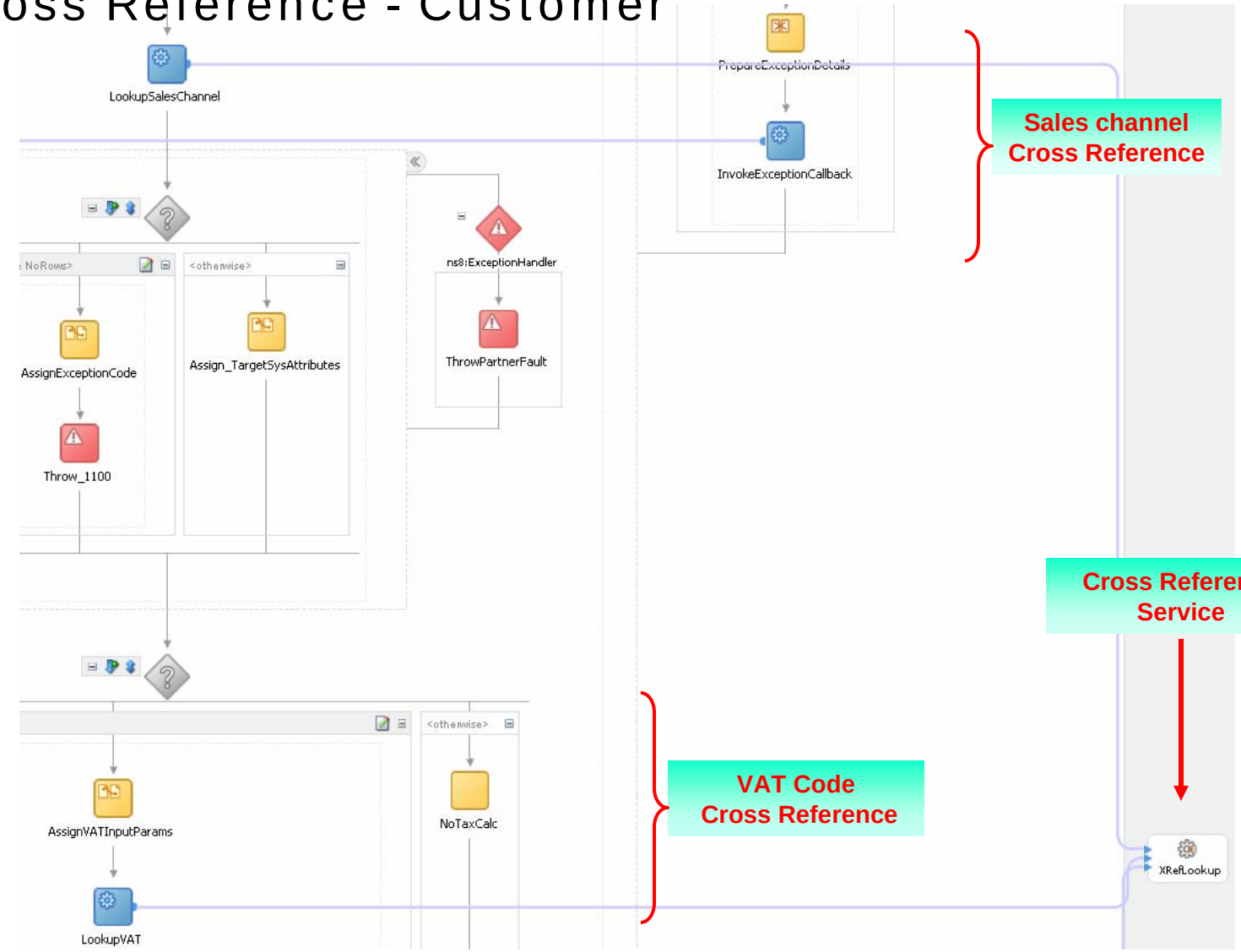
- Utility to perform data enrichment and validation on customer and order data.
- Leverages database adapter as interface for lookups.
- Cross-reference tables for product, sales-channels, payments terms, error codes, VAT codes, country, language.
- Custom JSP Web Application user interface to maintain tables.

Cross Reference Service

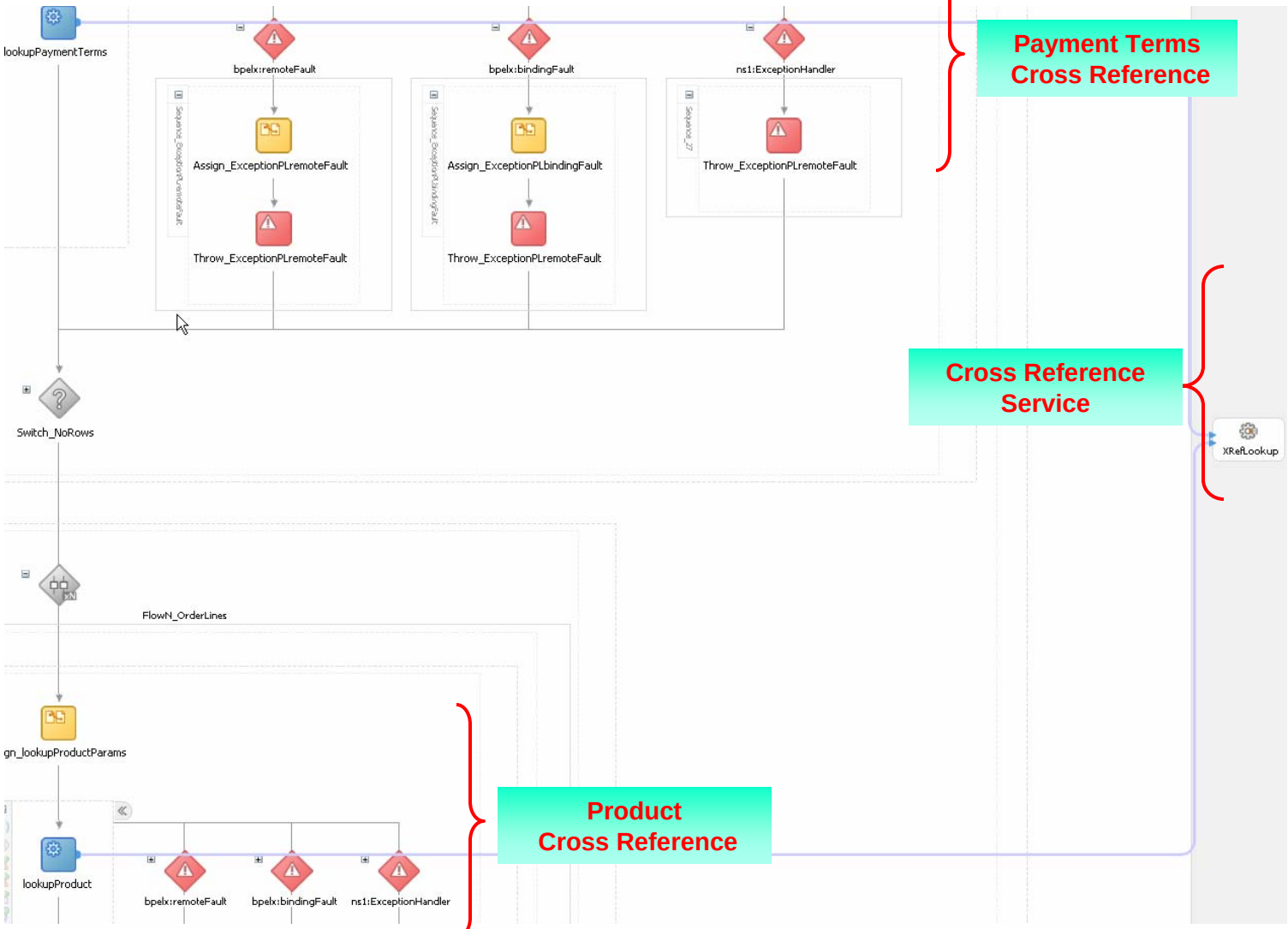


Series of Database Adapters Services to perform Cross Reference Lookups

Cross Reference - Customer



Cross Reference - Invoice



Canonical Data Model

- Enterprise level information model representing business entities that can be exchanged across systems
- Structure for any given entity remains consistent regardless of its intended use - whether it is produced by an ERP application or consumed by a CRM application.
- Benefits:
  - Endpoint solutions remain decoupled from all other applications. Minimize dependencies when integrating applications that use different data formats with a canonical data model that is independent from any specific application.
  - A high level of abstraction can be maintained. The technology solution can be aligned with the business.
  - Require each application to produce and consume messages in the common format.

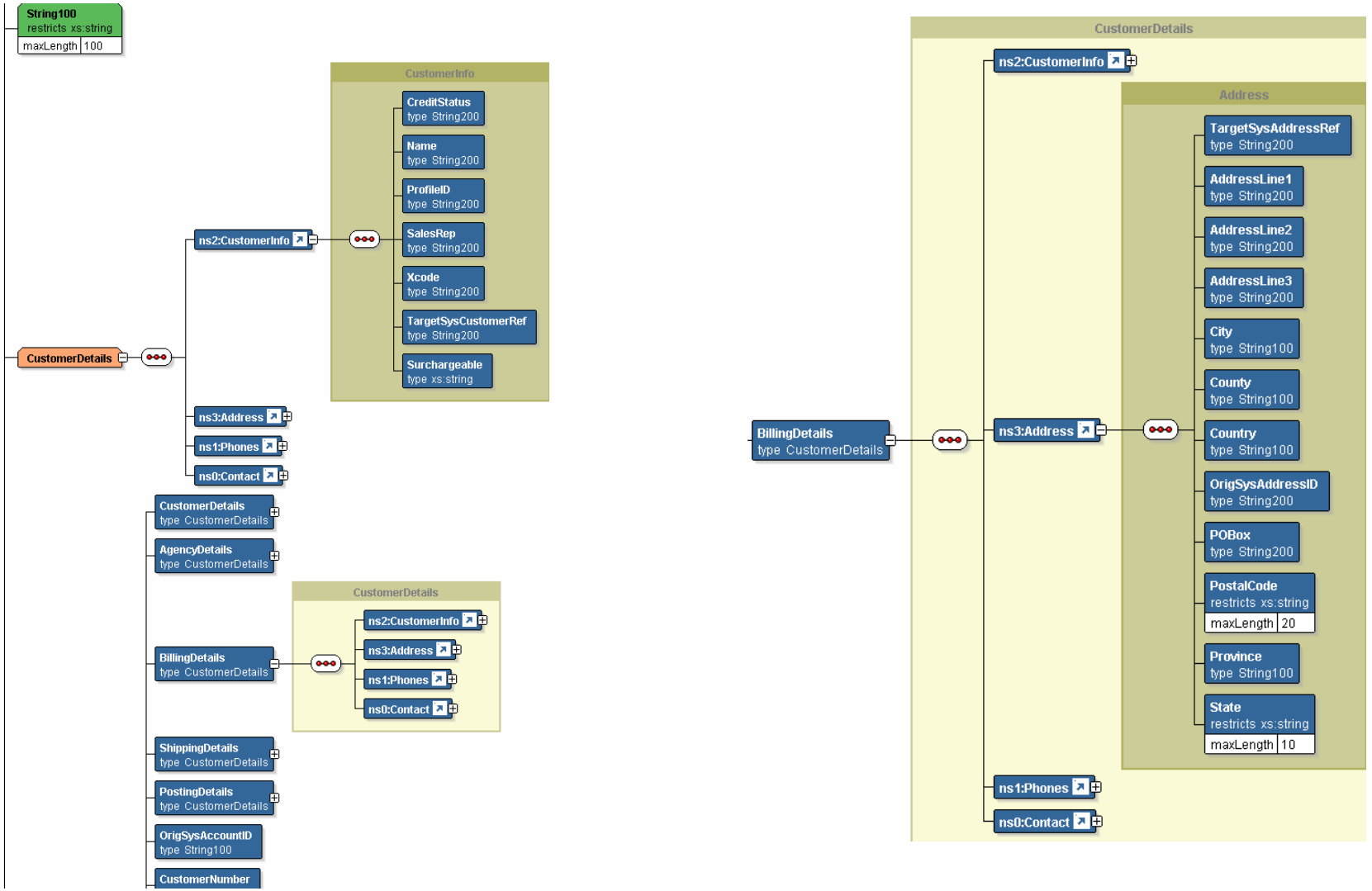
Canonical Data Model

- Implementation
  - Canonical entities are defined by schemas that define the syntax rules for the entity. The schema defines attributes, data types, and constraints.
  - When designing canonical documents in the analysis phase of a project, there are a number of approaches for deriving the enterprise information model.
    - Adopt industry standard schema
    - Adopt prominent endpoint schema
    - Model ground-up from business requirements.

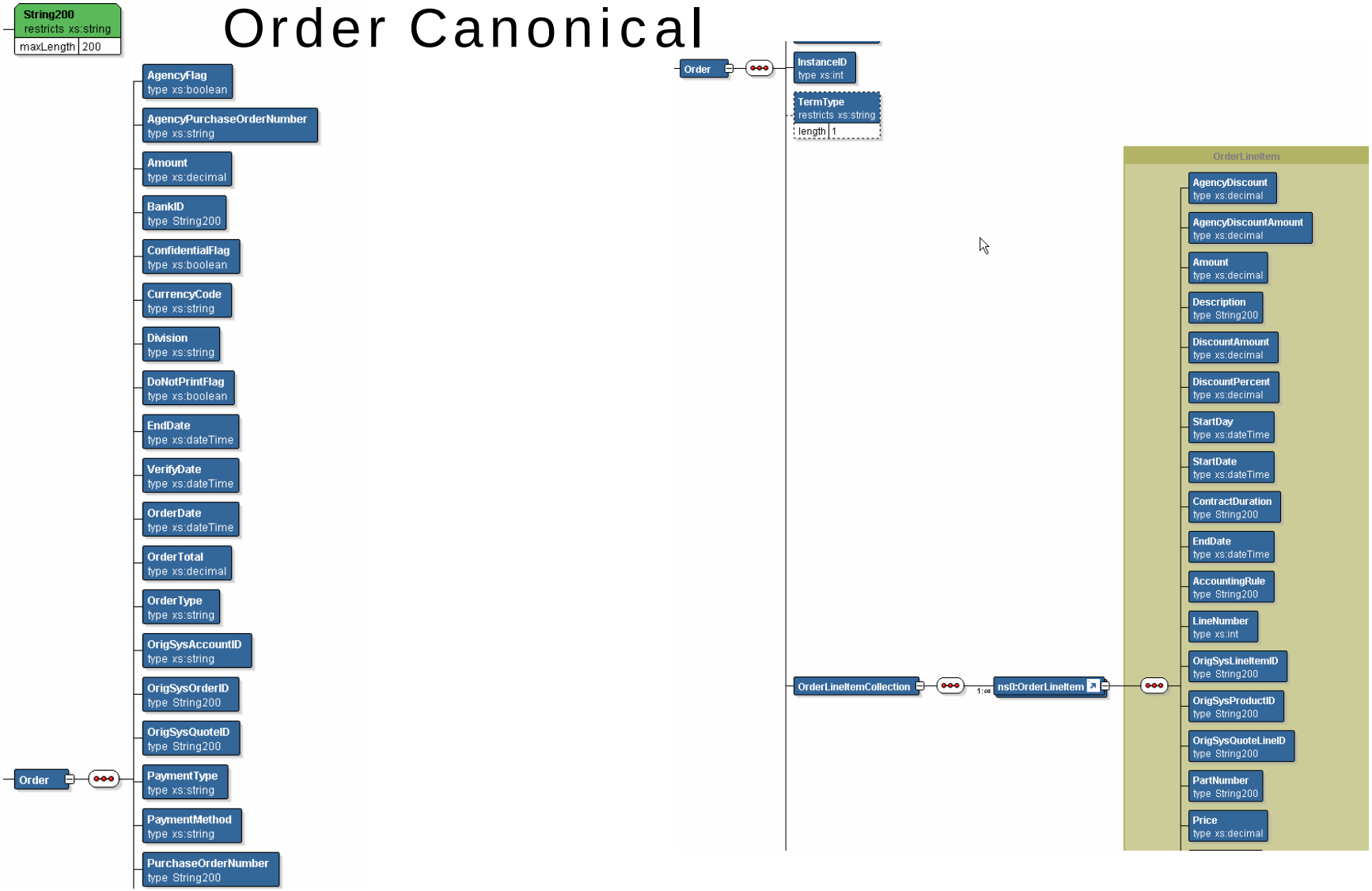
Canonical Data Model

- Designed to be independent of any specific application.
- Minimizes dependencies when integrating applications that use different data formats.
- Developed for
  - Customer
  - Order
  - Exception

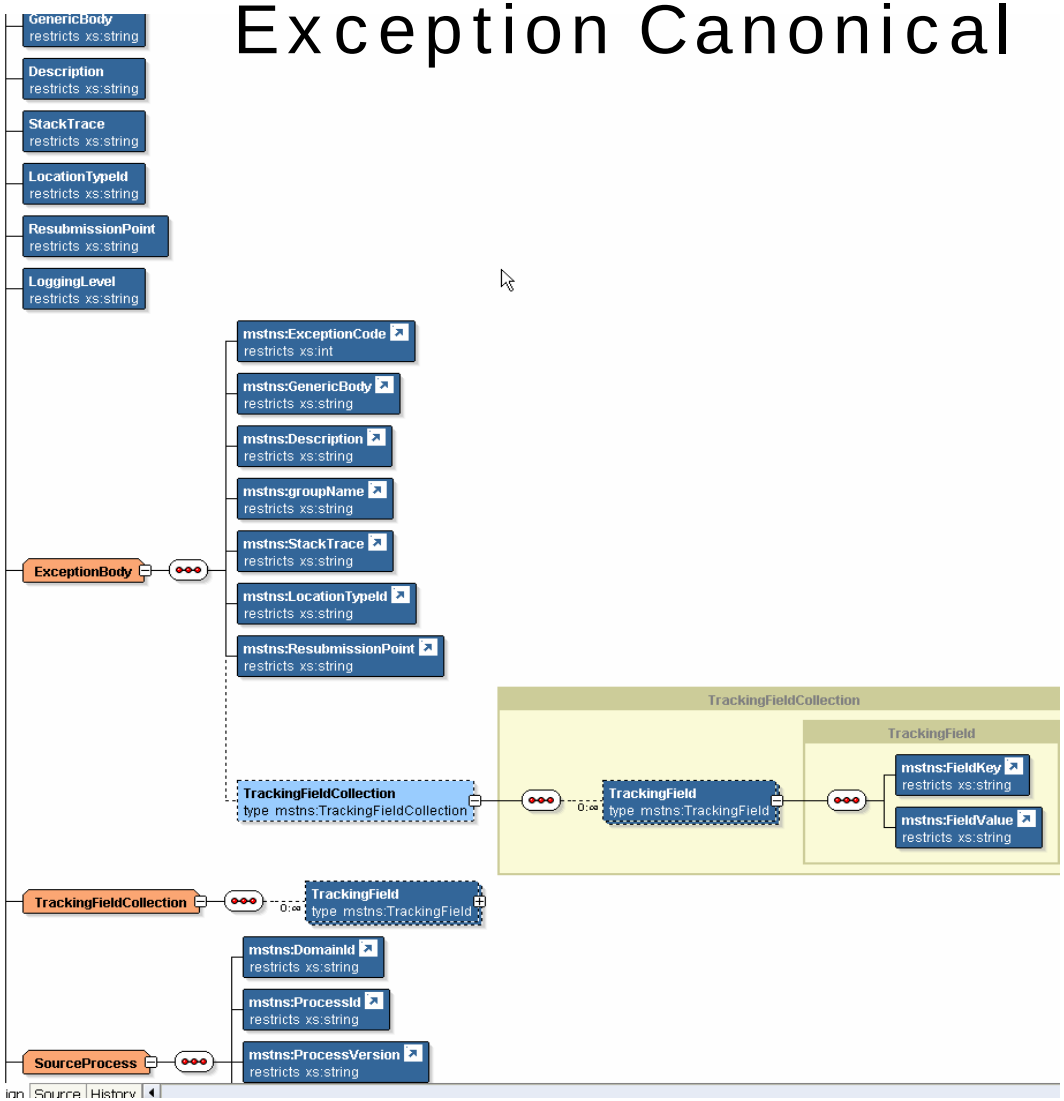
Customer Canonical



Order Canonical



Exception Canonical



BPEL Process Design-Best Practices

- **Include framework services**
  For use by the BPEL process – exception handling, cross reference, etc
- **Design decoupled BPEL processes.**
  Makes it flexible, reusable, minimizes dependencies.
- **Maintain Common Schema Repository.**
  URL based XSD references, no local copies.
- **Use Canonical Schema Models.**
  Standard based business definition, common vocabulary.
- **Oracle Advanced Queues for process resubmission, error handling.**
  Better control, DB persistence, improved performance.

BPEL Process Maintenance-Best Practices

- **Managing dehydration space is critical.**
  Space allocation, archive strategy, purge strategy.

- **Manage BPEL Domains.**
  Partitions BPEL processes as per business functionality, configurations, control.

- **BPEL Process Manager tuning to optimize performance**
  Worker bean threads, dspMaxThreads, JTA Transaction timeout, SyncMaxWaitTime, Idempotent

- **BPEL Dehydration Database performance tuning**
  Processes, sessions, SGA memory, Redo log file size, separate BPEL tablespace.

Questions?

Inspired People …
Tailored Solutions

Protégé
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Thank you!

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