Abstract
This article shows how to do business process orchestration using the Informatica product suite.

Supported Versions
- PowerCenter 8.6.1
- PowerCenter 9.0
- Data Quality 8.6.1
- Data Quality 9.0
- B2B Data Transformation 8.6.1
- B2B Data Transformation 9.0

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Orchestration

What is Orchestration?
Orchestration is the layer that creates business solutions by controlling and coordinating a vast array of services and information flow in an enterprise with a variety of heterogeneous information systems. Orchestration allows you to change
the way your business functions, as needed, to define or redefine any business process on-the-fly. This provides the business with the flexibility and agility needed to compete today.

**Why Orchestration = Why SOA**

Orchestration is the cornerstone for any Service Oriented Architecture (SOA). While SOA enables reusability, flexibility, and dynamic adaptability for the businesses in any enterprise, orchestrating these services to create business process solutions is the key to help achieve this goal. The loosely coupled nature of orchestration enables orchestrations to run even if all the services are not active at the same. This is also essential for long running transactions.

**How to Orchestrate and Get SOA-Enabled**

The basic necessity for orchestration, and in turn to get on SOA-based approach, is the ability to expose an enterprise’s existing and new systems storing the data in various forms and formats as re-usable services. This basic necessity really puts forth a major challenge on how to handle enterprise data spread across multiple regions hosting heterogeneous systems that host data in multiple formats like structured, unstructured, semi-structured, and unstructured print streams.

Informatica handles this challenge with its robust, scalable, and highly available product suite. This paper explains how the Informatica product suite helps orchestrate a business solution.

**CRM - Customer Service Business Process**

For the sake of discussion and orchestration using Informatica product stack, let us choose a common business process from Customer Relationship Management (CRM). CRM can be defined as the business strategy that influences an organization’s process, culture, and technology to optimize revenue and increase value through understanding and satisfying an individual customer needs.

As a process, CRM encompasses the following list of sub processes or activities in its life cycle:

1. Segmentation & Needs Analysis
2. Campaign Management
3. Lead Management
4. Customer Service
5. Cross and Up Sell
6. Customer Retention

Each sub process demands a high operational efficiency integrated with business intelligence to drive the business to success. For our business process orchestration, let us choose “Customer Service”. In a customer service process, customers can call a support center for registering a new case or registering themselves as customers or retrieve the status of their case filed already.
The following business process diagram shows how the register case sub process works.

The diagram shows a simple register case subprocess, where a customer calls customer service to report a problem. Customer details are requested and checked against the database to see if this is an existing customer. If the customer is a new customer, the details are validated and stored in a database. Also, the case details are received from the customer. A case ID is generated for tracking the issue and the customer ID helps uniquely identify the customer. The flow diagram is self-explanatory for other scenarios.

Before we get into orchestration using Informatica product stack, let us first analyze the building blocks of any business process orchestration implementation.

**Building Blocks for Orchestration**

**Business Process**

A business process is a series of steps required to implement a business function. A process may include system interactions and/or human interactions, within an enterprise or extending across corporate boundaries. The past several years have seen an increase in the number of organizations that use IT systems to execute and monitor their business processes in an automated fashion.
Here, we discuss a sample business process - Customer Relationship management/ Customer Service / Register case to showcase how Informatica Data Services can be used for orchestration.

**Business Process Orchestration**

The business process orchestration helps a business analyst design and assemble a process definition comprising the activities that need to be performed, the roles that participate, and the flow between the activities based on a set of business rules. This is similar to the workflow management system concept. However, Business Process Execution Language (BPEL) can be used to model business processes.

Business Process Execution Language (BPEL), also called Web Services Business Process Execution Language (WS-BPEL), is an OASIS standard executable language for specifying interactions with Web Services. Processes in BPEL export and import information by using Web Service interfaces exclusively.

**Business Process Execution Engine**

A business process execution engine is the runtime engine that manages the processes and walks each process through the set of activities specified by the process definition. The engine needs to perform the actions and evaluate the business rules to determine how the flow proceeds. The engine needs to be scalable, robust, and highly-available to support the business process execution in real-time.

**Data Services**

The most important thing is that the data and the information extracted out of this raw data should be exposed in a reusable form, which is what we refer here as data services. This reusable data services, in turn, get wired as part of the business process.

Now, let us map each of these components with the Informatica product stack and build the business process orchestration for CRM/Customer Service/ Register case subprocess.

**Orchestration with Informatica Data Services**

This section describes the Informatica products and the specific components in that product that help in orchestrating the register case business process. Please note that the scope of this discussion is specific to the customer service/register case business subprocess. As a result, we may not cover the entire suite of Informatica products that enable building the business process using the highly reusable data services.

**PowerCenter Web Services**

PowerCenter comprises the Web Services Provider, which is the provider entity of the PowerCenter web service framework. The provider makes PowerCenter workflows and data integration functionality accessible to external clients through web services.

**Web Services Hub**

Web Services Hub is the key component of the Web Services provider. The Web Services Hub is the key application service in the PowerCenter domain that uses the SOAP standard to receive requests and send responses to web service clients. The web service hub is a secure, scalable, and highly available application service that hosts the data services created by PowerCenter. This can be leveraged to register other services within the organization and act as a central gateway for accessing the services.

In our current business process orchestration scenario, PowerCenter Web Services Hub acts as the central gateway hosting the data services that are wired as part of the business process flow corresponding to the register case business process.
Orchestration Using Web Services Provider

The flowchart shows the PowerCenter Web Services Provider architecture. The Hub processes requests for real-time web services and batch web services in similar ways.

The following process describes how the Web Services Hub processes web service requests:

1. A web service client sends a SOAP message to the Web Services Hub to run a web service.
2. For batch web services or protected real-time web services, the Web Services Hub authenticates the web service client based on the user name and password.
3. The Web Services Hub generates a message ID for the request. If the request is for a real-time web service, the Web Services Hub sends the message to the Integration Service. If the request is for a batch service operation, the Web Services Hub sends the message to the PowerCenter Integration Service or the Repository Service based on the type of request.
4. The PowerCenter Integration Service or Repository Service processes the request. If the request is for a real-time web service, the PowerCenter Integration Service sends the processed data to the Web Services Hub which uses the message ID to correlate the request with the response.
5. The Web Services Hub sends a SOAP response to the web service client.

For our business process orchestration, we have used PowerCenter Web Services as the central gateway component hosting the services for orchestration.

Data Quality Services

Data Quality is a suite of applications and components that deliver enterprise-strength data quality capability in a wide range of scenarios. Use Data Quality to analyze and enhance the quality of your data, such as standardizing data to agree or formally-correct terms, cleansing your data of errors, validating your data against reference material, parsing and deriving missing data values from existing data, and identifying and removing duplicate data records.

Data Quality Workbench users can create plans that validate and enhance the accuracy and completeness of postal address records using reference data. Address validation plans compare source addresses against comprehensive address reference datasets that are approved by national postal carriers such as the USPS and the Royal Mail. You can run these plans in PowerCenter and expose them as web services for consumption by external entities.

In our business process orchestration for register case process, we utilize Data Quality to validate and cleanse customer address that we received. This functionality is available as a reusable web service via the hub.

B2B Data Transformation services

B2B Data Transformation enables you to transform data efficiently from any format to any other format, via XML-based representations. You can design and implement transformations in a visual editor environment. You do not need to do any programming to configure a transformation, and hence can configure even a complex transformation in just a few hours or
days, saving weeks or months of programming time. Data Transformation can process fully structured, semi-structured, or unstructured data. The following list is a sample set of supported data formats:

<table>
<thead>
<tr>
<th>Unstructured</th>
<th>Semi-structured</th>
<th>XML</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Word</td>
<td>EXCEL</td>
<td>POS/LOM/XML</td>
</tr>
<tr>
<td>Microsoft Excel</td>
<td>PDF</td>
<td>LEP/LLF</td>
</tr>
<tr>
<td>PDF</td>
<td>PowerPoint</td>
<td>IFX</td>
</tr>
<tr>
<td>WordPad</td>
<td>Workspaces</td>
<td>CXML</td>
</tr>
<tr>
<td>Access reports</td>
<td>FrontPage</td>
<td>dXML</td>
</tr>
<tr>
<td>HTML</td>
<td>Microsoft Access</td>
<td>XML</td>
</tr>
<tr>
<td>Text files</td>
<td>Excel files</td>
<td>REXML</td>
</tr>
<tr>
<td>Exported databases</td>
<td>SQL files</td>
<td>REV/USD</td>
</tr>
<tr>
<td>XML files</td>
<td>XML files</td>
<td>XSL</td>
</tr>
<tr>
<td>XLS</td>
<td>XLSX</td>
<td>XSD</td>
</tr>
<tr>
<td>DOC</td>
<td>DOCX</td>
<td>XSLT</td>
</tr>
<tr>
<td>XML files</td>
<td>XML files</td>
<td>XSLTX</td>
</tr>
</tbody>
</table>

You can also configure the software to work with various formats such as text, binary data, messaging formats, HTML pages, PDF documents, and word processor documents. The following diagram shows how DataTransformation processes the complex data structures at a high level:

Without getting into the details of B2B DataTransformation, it is important to highlight that the services created using B2B DT can very easily be exposed as web services.

In our business process orchestration for the register case, we use the Data Transformation service to convert a case and customer related information in text format to a PDF format and send it to the customer as correspondence.

**Informatica Orchestration Server**

The Informatica Orchestration Server is a BPEL 2.0 server that acts as the process engine in our case. The server executes BPEL code generated by the Orchestration Designer or by third-party applications. The Orchestration Server interfaces with external participants through WSDL files. It runs on a separate tomcat server from PowerCenter and has the ability to run PowerCenter batch and real-time web services.

The business process is modeled using the Orchestration Designer that comes along with Informatica Orchestration components. The Orchestration Designer is an Eclipse-based development application to design a BPMN workflow and deploy the workflow as an executable process.
The following diagram shows the business process flow for the register case process. There are three different pools: External pool, Executing process pool, and the Webservices pool.

- External pool represents the invocation from user/customer who can possibly feed the case and customer information using a web page.
- Executing process pool represents the Orchestration Server pool, where the process flow is modeled (as shown in the following diagram).
- The webservices pool represents the list of all available Informatica services that are wired in to the business process flow invoked from the Orchestration server.

The process comprises the following actions:

1. External users or customers fill a web-based form with the case and customer related details.
   
   **Note:** This could also be a non-human data entry point (for example, XML or EDI document arrives from external entity).

2. The Orchestration server receives the details and invokes PowerCenter web services to check if the customer already exists.

3. If the customer details are available, the Informatica Register case service is called. Else, the Orchestration server validates the customer provided address by invoking the Data Quality service, registers the new customer, and then registers the case details.

4. With the case and customer IDs generated, the B2B Data Transformation service is invoked to generate the PDF format of the report and sends the report to the customer.

**Informatica Product Stack for Orchestration**

The following figure shows a high-level Informatica product stacking positioned for business process orchestration. The product stacking below specifically is shown to address the register case business process example. As a result, the figure below may not showcase the entire Informatica product suite that can be extended to orchestration.
Conclusion

Enterprises today are moving toward service-oriented approach and orchestration is the key that provides a dynamic, flexible, and adaptable mechanism to meet the changing needs of businesses. Informatica data services help organizations design and implement business process orchestration.

References

- Informatica PowerCenter 8.6.1 Orchestration Guide
- Informatica PowerCenter 8.6.1 Web Services Provider Guide
- Informatica B2B Data Transformation 8.6.1 Documentation

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