



Fiorano
Enabling change at the speed of thought

www.fiorano.com

Message Driven SOA --- Enterprise Service Oriented Architecture

Integration Server Comparison

How Fiorano outperforms Oracle by over 350% for the most common integration patterns

AMERICA'S

Fiorano Software, Inc.
718 University Avenue Suite
212, Los Gatos,
CA 95032 USA
Tel: +1 408 354 3210
Fax: +1 408 354 0846
Toll-Free: +1 800 663 3621
Email: info@fiorano.com

EMEA

Fiorano Software Ltd.
3000 Hillswood Drive Hillswood
Business Park Chertsey Surrey
KT16 0RS UK
Tel: +44 (0) 1932 895005
Fax: +44 (0) 1932 325413
Email: info_uk@fiorano.com

APAC

Fiorano Software Pte. Ltd.
Level 42, Suntec Tower Three 8
Temasek Boulevard 038988
Singapore
Tel: +65 68292234
Fax: +65 68292235
Email: info_asiapac@fiorano.com

Copyright © 2009, Fiorano Software and Affiliates. All rights reserved. Reproduction of this document in any form without prior written permission is forbidden. The information contained herein has been obtained from sources believed to be reliable. Fiorano disclaims all warranties as to the accuracy, completeness or adequacy of such information. Fiorano shall have no liability for errors, omissions or inadequacies in the information contained herein or for interpretations thereof. The opinions expressed herein are subject to change without notice.

EXECUTIVE SUMMARY

This document compares the performance and ease-of-use of the Fiorano and Oracle SOA platforms in the deployment of one of the most popular patterns in integration: the database consistency integration pattern. In this pattern, an update to a table in a source database (DB1) results in an update to another table in a target database running on a different machine. Information flow is one-way, from source to target, and asynchronous.

To ensure that both platforms process the precise same number of messages, each data-element in a source table in the first database is copied sequentially to a target table in the second database. The test compares both performance (that is, overall throughput) and ease-of-use (that is, development and deployment time; ease of modifying the flow).

The test serves as an accurate gauge of how the two platforms perform in real-world applications which often involve data transfers different instances of databases on different machines across a computer network.

ORACLE TEST ENVIRONMENT

Oracle's core integration architecture is based on the Oracle BPEL server. Accordingly, we used the Oracle BPEL for the tests. Figure 1 illustrates a block diagram of the steps in this BPEL flow.

As can be seen from the figure, each iteration selects data from DB1 and inserts it to DB2 via a synchronous operation. If the DB2 insert is relatively slow, overall flow will be slow and there is no way to increase throughput for DB2 operation as part of the flow logic. Moreover, the extraction of the next data element from the DB1 database cannot proceed unless DB2 has been updated with the previous data element. The update operation is essentially synchronous for each data element and pipelining is not possible, in sharp contrast to asynchronous message-driven systems.

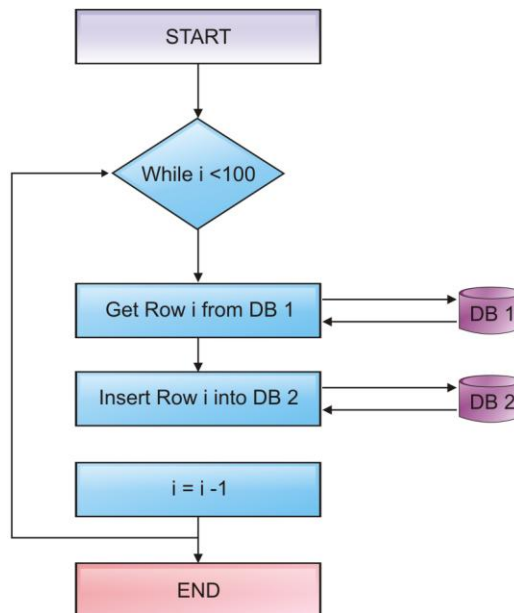


Figure 1: Oracle BPEL database consistency integration - logical flow steps.

The actual Oracle flow that implements the database synchronization operation of this test is illustrated in Appendix 1.

Creating the BPEL flow for even this simple operation is a non-trivial operation. As can be seen from figure 1, BPEL requires the definition of a “looping structure” to perform the operations, since it does not natively support the notion of picking up data from the source database based on an input trigger. There are no ‘queues’ onto which messages can be easily channeled. The user has to program a looping structure that executes until the data is exhausted.

A later section of this paper discusses the ease-of-use of the Oracle and Fiorano platforms.

FIORANO TEST ENVIRONMENT

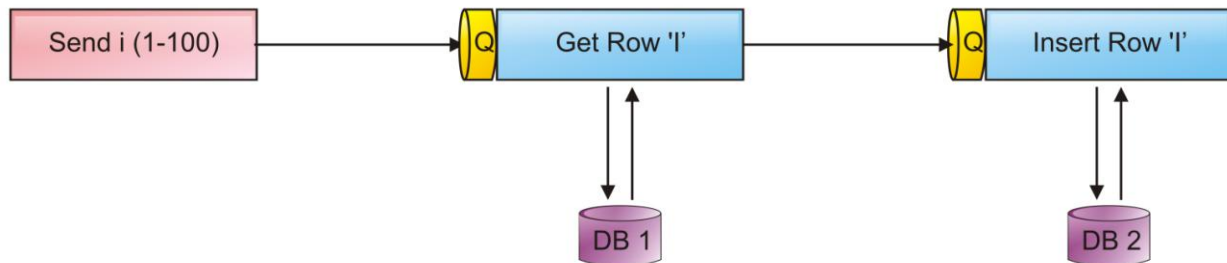


Figure 2: Fiorano database consistency integration logical flow steps

The Fiorano implementation of the database consistency integration pattern is based purely on asynchronous dataflow. Unlike BPEL, where the selection of each successive row of the DB1 database has to wait for the insertion of the previous row into the DB2 database, the Fiorano flow allows both operations (extraction of data from DB1 and insertion into DB2) to proceed in parallel. The operations happen asynchronously, with message ordering being guaranteed by the in-built JMS semantics.

The actual flow that implements the operation is illustrated in Appendix 2.

As you can see both in figure 2 and Appendix 2, Fiorano does not require any form or “looping structure” defined to perform the operation. Data is automatically picked up from DB1 when it is ready and published into a message-queue that is created dynamically by the system with no user intervention. Data from DB1 can be pumped to the output queue of DB1 regardless of whether the previous data element pumped out to the queue has been inserted into DB2. As such, the operations are not synchronous and each database can operate at its own speed. The overall throughput of the system is therefore maximized due to the “pipelining” affect. In addition, if for some reason DB2 is slower than DB1, it is possible to create multiple insertion threads in DB2 to increase the throughput further.

PERFORMANCE TEST RESULTS

The test was programmed to perform an update on 100 rows. The two databases in the test were run on different machines. Each machine ran the Redhat Linux 5.2 operating system, had 4 GB of RAM and 2 CPU Intel processors.

The test data consisted of 100 rows, each of which was moved from DB1 to DB2. The final timing comparison is presented below.

Oracle BPEL: 12.36 seconds

Please refer to [Appendix 1](#)

Fiorano SOA: 3.5 seconds

Please refer to [Appendix 2](#)

The test illustrates that Fiorano is over 350% faster than Oracle BPEL for Database consistency integration operations.

EASE OF USE AND DEVELOPMENT EFFICIENCY

Fiorano SOA Development

The entire flow for database consistency integration takes less than 10 minutes to develop on Fiorano. As can be seen from Appendix 2, the flow consists of two database components connected via 'routes', with a simple transformation component in the middle to ensure that the data formats are consistent. Further, the Fiorano environment allows the flow to be modified dynamically, even while running; changes to the flow do not require the flow to be stopped and 'redeployed'. Each individual component can also be independently reconfigured on-the-fly.

Oracle BPEL Development

In the Oracle BPEL flow, the DB component maps to top link artifacts to be deployed on the oracle application server. There are significant issues in synchronizing the BPEL flow with the backend (application server). For example, if the database schema changes, it is not particularly easy to change the DB services of the flow to use the new DB Schema.

Steps to Create Oracle BPEL Flow include:

1. Create BPEL Process Project in JDeveloper.
2. The default project contains 1 receive activity and 1 reply activity (for synchronous projects, which are the default in Oracle BPEL and in most other BPEL servers as well).
3. The next step involves creating the partner link for the Database operation for DB1. In the partner link creation wizard, an Adapter service for 'database' needs to be defined. The adapter-service wizard for database configuration involves choosing the right table, fields and database query. This step creates necessary WSDL, XSD and Top Link-Mapping files.
4. The Invoke activity is configured to use the database operation created in step 3. We now define both input and output variables for the invoke activity.
5. Step 3 and Step 4 are repeated for DB2 activity.
6. As part of the Database configuration, Database connector configuration is added to the application server resource adapter.
7. Count Variable is defined and a while loop activity with termination condition is added to the BPEL flow.
8. Assign activity is added between DB1 and DB2 invoke, which sets the input variable of DB2 invoke with the output variable of DB1 which maps to XPATH expressions.
9. Before deploying the BPEL Project for the first time to the BPEL Process manager server, an Integration server connection needs to be created using the Integration server connection creation wizard.
10. The BPEL Project is deployed to the BPEL Process manager using the integration server connection created in step 9.
11. The Oracle BPEL Console is now used to start the BPEL Process flow with appropriate input message.

In comparison with Fiorano, steps 3, 4, 5 and 6 take longer in Oracle. Fiorano does not require any concept of a while loop since the event-based push is implicit with Fiorano. As such, steps 6, 7, and 8 in the Oracle flow are replaced by a single 'connector' in the Fiorano diagram. This connector creates the event-driven message-queue connecting DB1 to DB2.

BPEL has a significant learning curve in comparison with the Fiorano approach since one has to learn BPEL concepts. A BPEL 'expert' can compose the current database consistency flow application in question in about 30 minutes; Non-experts may take a lot longer.

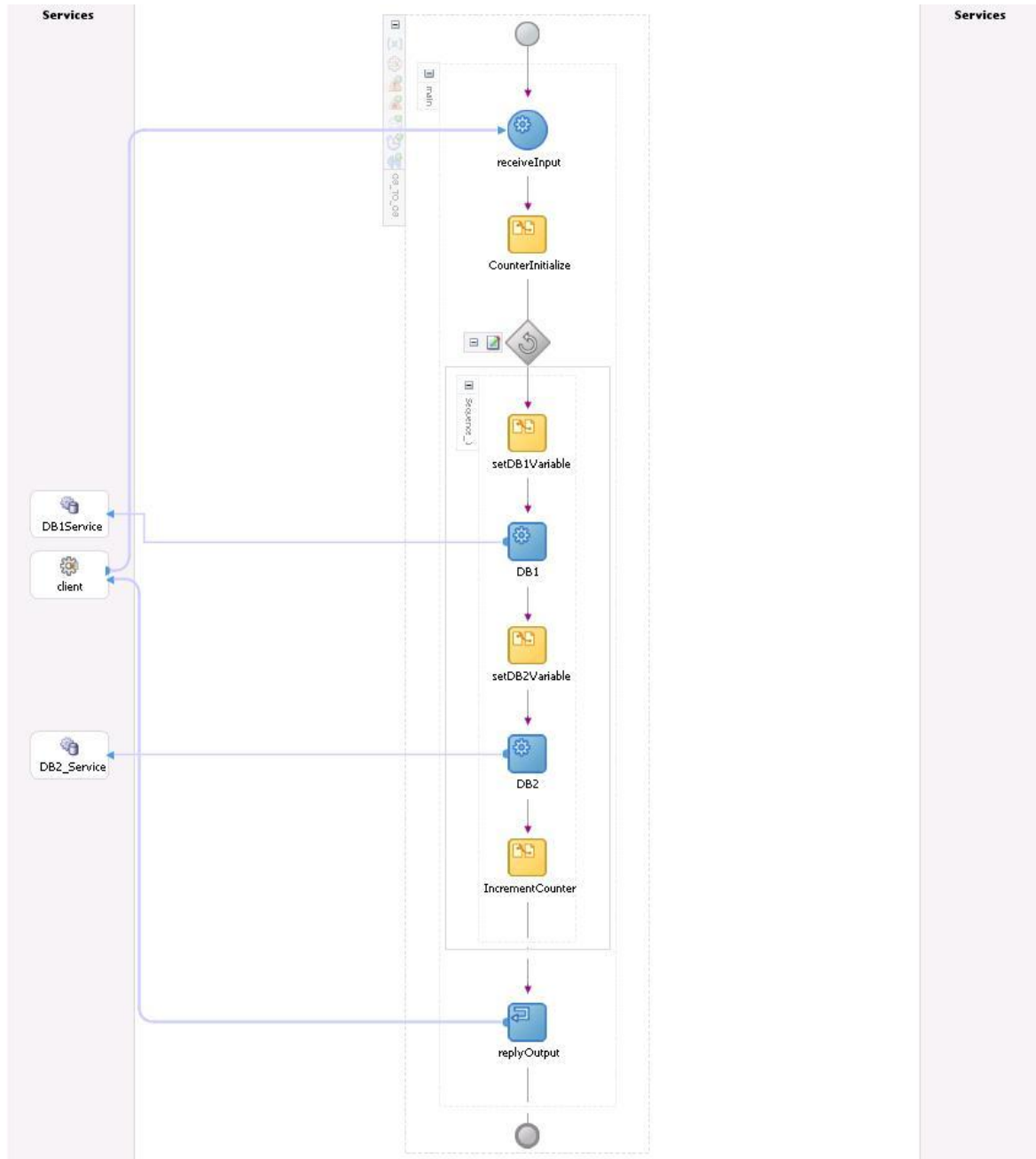
ORACLE DEVELOPMENT PAIN POINTS:

- Every change to the process flow requires a redeployment of the complete process flow (Incremental deployment is not possible).
- Reconfiguring the DB Service (for instance, configuring the database to use a different table) in Oracle BPEL flows is not possible. A new service needs to be created for this purpose.
- Exporting a BPEL project to different instances of the application server needs configuration changes in the application server (Resource connector's settings).

ABOUT FIORANO SOFTWARE

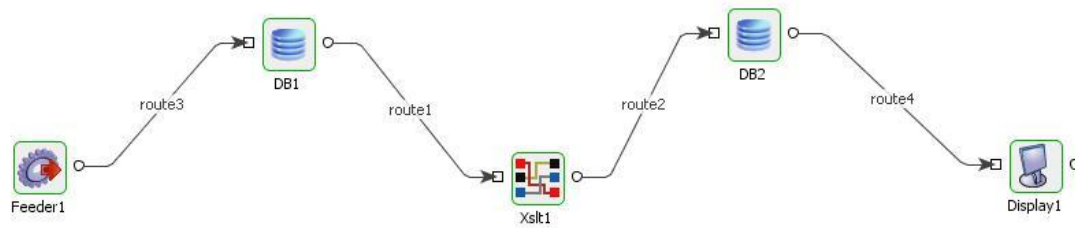
Fiorano Software (www.fiorano.com) is a leading provider of enterprise class business process integration and messaging infrastructure technology. Fiorano's network-centric solutions set a new paradigm in ROI, performance, interoperability and scalability. Global leaders including Fortune 500 companies such as Boeing, British Telecom, Credit Agricole Titres, Lockheed Martin, NASA, POSCO, Qwest Communications, Schlumberger and Vodafone among others have used Fiorano technology to deploy their enterprise nervous systems.

Appendix 1: Oracle Flow for Database Consistency Integration



To download the flows shown in the above figure, please refer to the link
ftp://ftpb1r.fiorano.com/fiorano_flows/OracleFlow.zip

Appendix 2: Fiorano Flow for Database Consistency Integration



To download the flow shown in the above figure, please refer to the link
ftp://ftpbldr.fiorano.com/fiorano_flows/FioranoFlow.zip