Integrating RTI Data Distribution Service Applications with Oracle CEP

This document describes how users can enable RTI Data Distribution Service applications to interoperate with Oracle Complex Event Processing (CEP)

The basis of the document is a sample integration using the interactive RTI **SHAPES** demo program downloadable from the RTI website at http://www.rti.com/downloads . This sample integration shows Oracle CEP consuming data from RTI's DDS-compliant integration platform, detecting events, and as a result, injecting new data into DDS.

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1.1 Summary of Integration Demo

This document describes how to configure Oracle CEP and RTI Data Distribution Service to work together, using the RTI Shapes Demo as a case study. The goal is to show how to leverage both Oracle CEP and RTI middleware in distributed applications, showing how these products can exchange information with very little effort on the part of the application developer.

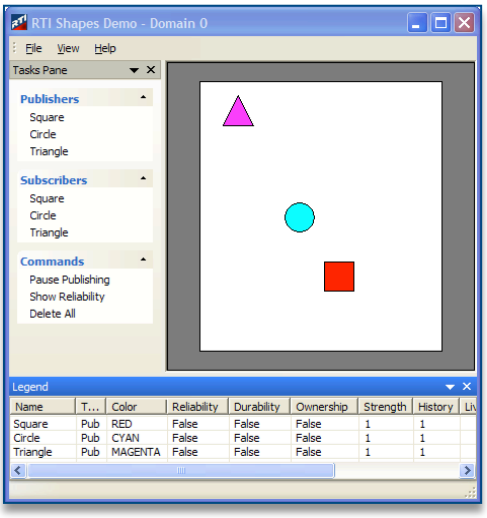
The demonstration also shows how each product offers powerful capabilities individually, and how they are made more robust through their integration:

- Oracle CEP makes it easy to detect and process streaming real-time events.
- RTI Data Distribution Service provides powerful data communication and transformation capabilities.

1.2 Integration Demo Scenario

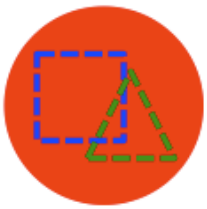
The demo will consist of a simple collision-detection system.

1. The RTI Shapes Demo will provide the data source and sink. This demo application displays bouncing shapes of different colors on a canvas. In this case, it will publish triangles and squares.



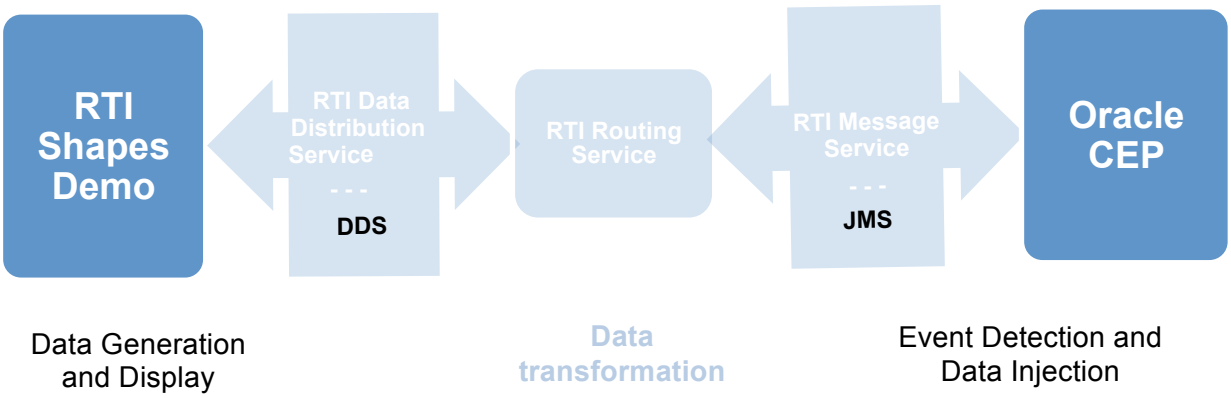
2. The RTI Routing Service will subscribe to the shapes published by the RTI Shapes Demo and will publish corresponding JMS MapMessages over RTI Message Service, RTI's JMS implementation.
3. Oracle CEP will subscribe to these JMS messages, also using RTI Message Service. It will detect whenever triangles and squares (*1*) fall within a certain distance of each other or (*2*) overlap.
    a. In the first situation, it will publish a yellow circle positioned and sized such that it touches each of the two nearby shapes.

    b. In the second situation, it will publish a red circle sized and positioned such that it covers each of the two shapes.



4. RTI Shapes Demo will subscribe to the resulting circles and display them alongside the original triangles and squares.

The whole flow looks like this:



2 Integration Demo Procedure

The following instructions describe how to configure RTI Data Distribution Service for implementing and testing the event detection and injection logic in Oracle CEP. The sample codes and scripts used in this demo are provided at http://www.rti.com/docs/Oracle_CEP_Integration.tar.gz. Download this file before continuing with the next steps.

There are two RTI components to configure: RTI Shapes Demo (or your own application if you are using these instructions as a guide for your own custom integration) and RTI Routing Service. Both can be configured by means of XML configuration files.

2.1 Step 1: Download and Install the RTI Software

There are two software packages from RTI to be downloaded and installed:

- **RTI Data Distribution Service, Professional Edition**

  RTI Data Distribution Service, Professional Edition: RTI Shapes Demo, RTI Message Service and RTI Routing Service are all included in the RTI Data Distribution Service, Professional Edition product distribution. You can download a fully-functional 30-day trial at http://www.rti.com/downloads/dds.html. The downloadable evaluation is available for Windows or Linux and is provided in the form of a self-

extracting installer. Please contact license@rti.com with requests for longer evaluation periods.

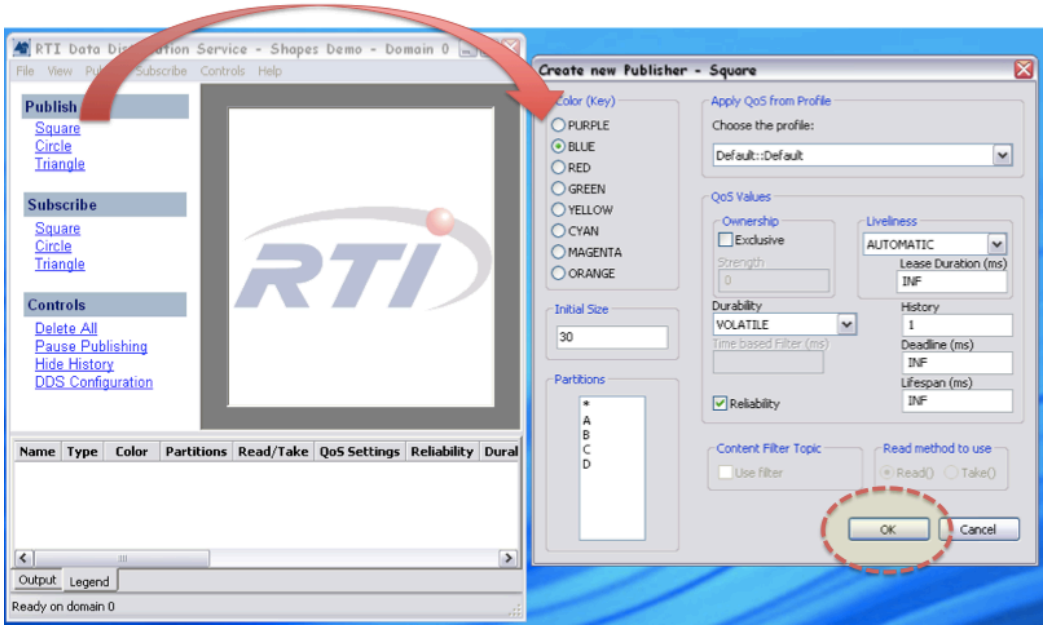
- **RTI Routing Service Adapter SDK**

  RTI Routing Service Adapter SDK is not available through RTI's website download page. Please contact sales@rti.com to request a trial license of RTI Routing Service Adapter SDK.

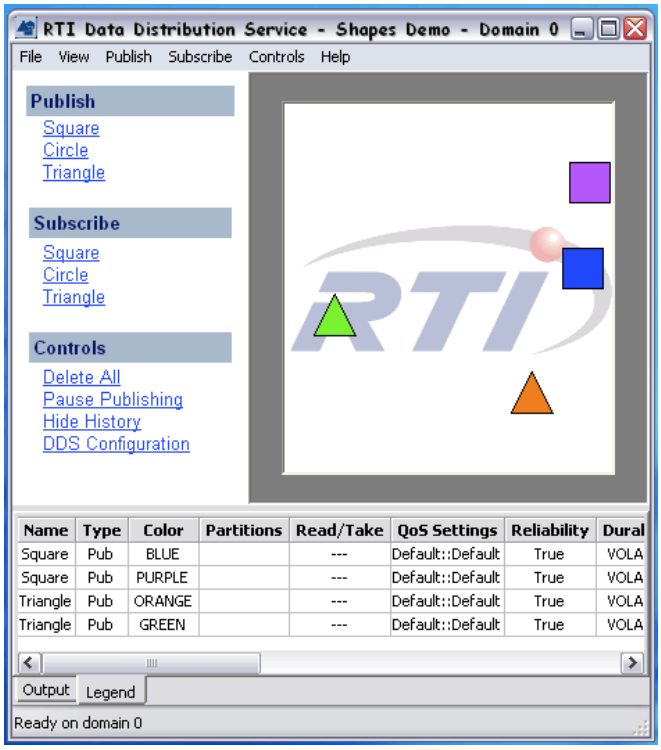
2.2 Step 2: Configure RTI Shapes Demo

Open up the RTI Shapes Demo program (included in your download of RTI Data Distribution Service, Professional Edition or downloadable separately at http://www.rti.com/downloads.) It is not necessary for you to pre-configure this tool. Simply publish and subscribe the shapes you want when you launch the tool for the demo.

1. **Publish some number of squares.** Open RTI Shapes Demo and click *Square* under the *Publish* heading in the application window. Select a color other than red or yellow in the radio buttons at left (since we will use those as indicator colors in the circles published by Oracle CEP) and then click OK. The remaining settings in the dialog box can be left at their default values.



2. **Publish some number of triangles.** Repeat the same procedure, this time with triangles. They may be of the same colors as the squares or of different colors. You should end up with something like is shown below:



3. **Subscribe to circles.** Click *Circle* under the *Subscribe* heading in the RTI Shapes Demo window. Then click OK in the resulting dialog box, leaving all settings with their default values. You will not see any change to the canvas, because no one is yet publishing circles. But you should see a new "Circle" line appear in the *Legend* view at the bottom of the window.

2.3 Step 3: Configure RTI Routing Service

The RTI Routing Service will be configured to subscribe to the shape topics published out of RTI Shapes Demo and to republish them to Oracle CEP using RTI Message Service (included in your RTI Data Distribution Service download.) It will also be configured to do the reverse operation: to subscribe to shape messages from Oracle CEP and publish them back to RTI Shapes Demo.

This configuration is based on Example 10 in the *Getting Started Guide* for RTI Routing Service.

- **On a Windows system**, you can access this document from your Start Menu: *Programs → RTI → RTI Routing Service 2.0.1 → Getting Started Guide*.
- **On a Linux or Windows system**, you can find the file in the directory *RTI_Routing_Service_2.0.1/doc/pdf* within your installation directory.

Read and execute this example before continuing to make sure RTI Routing Service and its JMS adapter are working in your environment.

- It includes an **XML configuration file for RTI Routing Service**: *RTI_Routing_Service_2.0.1/example/shapes/jms_rti.xml* in your RTI Data Distribution Service, Professional Edition installation.
- It includes **example JMS application code** to help you understand the structure of the MapMessages produced by RTI Routing Service and how to use them: *RTI_Routing_Service_2.0.1/example/shapes/jmsPubSub/src* in your RTI Data Distribution Service, Professional Edition installation.

2.4 Step 4: Configure Oracle CEP

Once Oracle CEP is installed, you need to first create an Oracle CEP domain. This can be created using the Configuration Wizard provided by Oracle. (On a Windows System, you can access it from Start Menu -> Oracle Complex Event Processing -> Tools -> Configuration Wizard).

Instructions for configuring Oracle CEP to work with RTI Message Service are provided in the *Interoperability Guide* included in RTI Data Distribution Service, Professional Edition.

- **On a Windows system**, you can access this document from your Start Menu: *Programs → RTI → RTI Message Service 4.5c → Interoperability Guide*.
- **On a Linux or Windows system**, you can find the file in the directory *ndds.4.5c/doc/pdf* within your installation directory.

Follow Section 3.2 Oracle Complex Event Processing to setup your Eclipse environment. This section of the interoperability guide describes the general process to setup a Oracle Project. The following notes describes the differences that apply to this specific demo. (If you haven't already, download the provided sample codes and scripts at: http://www.rti.com/docs/Oracle_CEP_Integration.tar.gz)

a. When you create an Oracle Project, you need to create a Target runtime environment also if one has not been previously created. The default location is C:\Oracle\Middleware, instead of C:\BEA as described in the document.

b. After you finished step 3.2.1, SKIP step "3.2.2 Configure the JMS Adapters", and follow the instructions below instead to setup the appropriate JMS adapters for this demo:

   i. In the project folder, open file META-INF\spring\[projectName].content.xml. Replace this file's contents with the content of provided file RTI_Oracle_Demo\META-INF\spring\OracleProject.content.xml

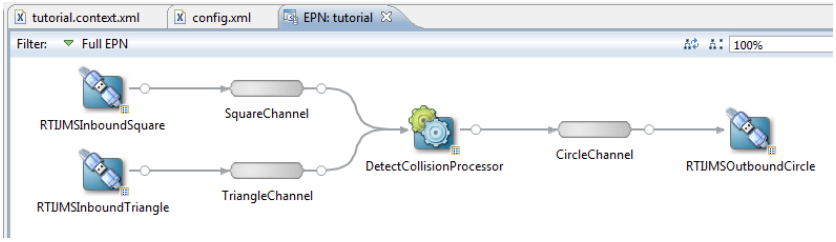
   ii. In your project folder, open file META-INF\wlevs\config.xml. Replace this file's contents with the content of provided file RTI_Oracle_Demo\META-INF\wlevs\config.xml

iii. Modify the content of ALL <jndi-provider-url> tags. The content of this tag should contain the appropriate file path to the file ShapesQosConfig.xml. This file is provided by the Router Adpater SDK, under folder RTI_Routing_Service_2.0.1/example/shapes/jmsPubSub/ShapesQosConfig.xml.

iv. Copy the provide file RTI_Oracle_Demo\META-INF\wlevs\processor.xml to your project's folder META-INF\wlevs.

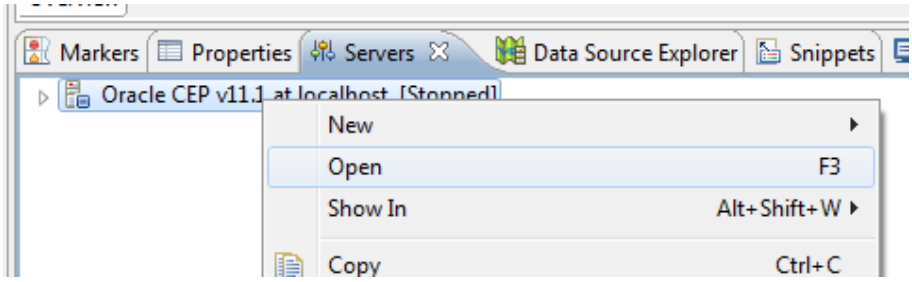
v. Right click on your project's main folder, and select Refresh to make sure the added file is recognized by the project.

vi. Right click on your project's main folder again, and select "Open EPN Editor". You should see a diagram like the following:

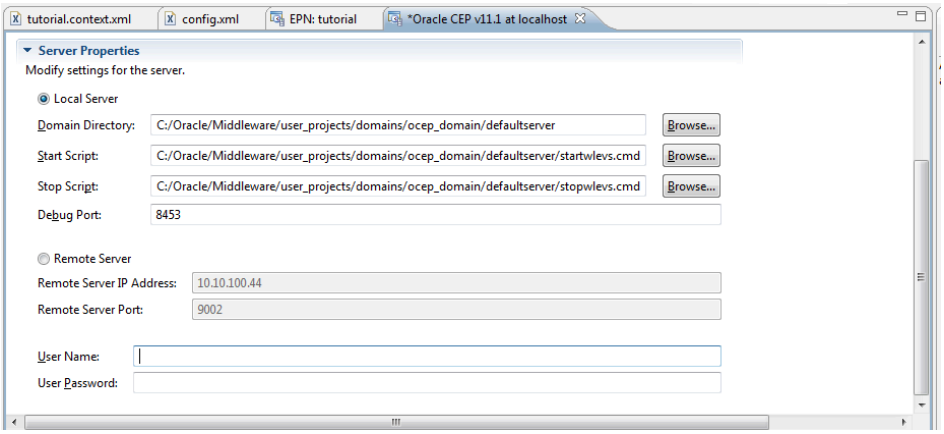


c. Go back to the Interoperability guide document, and continue with step 3.2.3, Run your project. (NOTE: A common error here is that the server's target runtime username and password does not match the ones specified in your Oracle domain. Verify the proper login is used by performing the following steps.

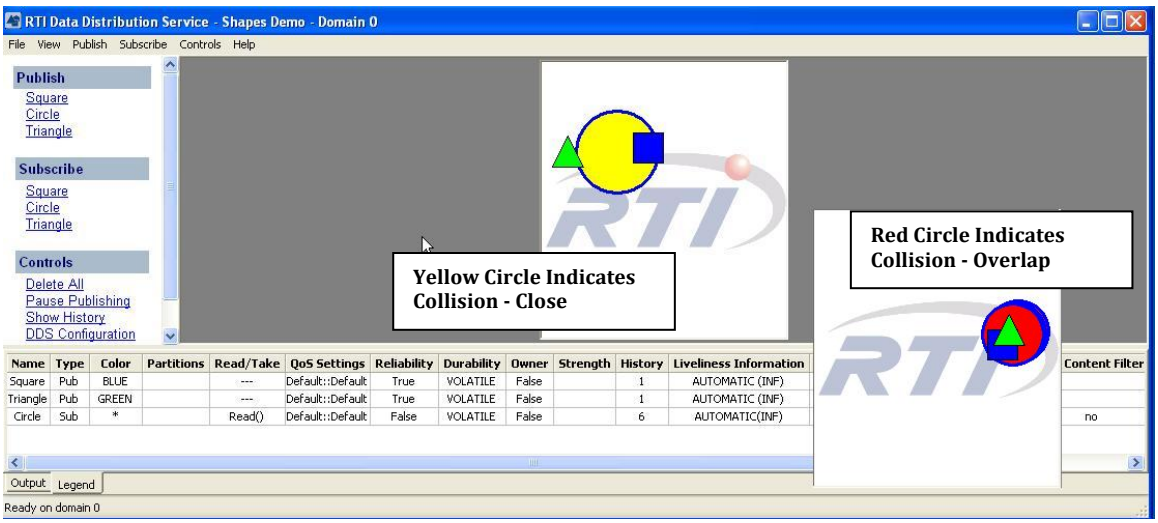
i. Under the server tab, right click on your target run time and select "Open".



ii. Once you open the server properties page, scroll all the way down, and make sure the username and password is filled in correctly.



2.5 Step 5: Putting the Pieces Together



The components of this demo can be started in any order. They will discover one another on the network automatically and begin communicating once all three have been started.

1. As described in section 2.2 above, start RTI Shapes Demo to publish the input shapes and to display the collision detection results.
2. As described in section 2.3 above, start RTI Routing Service following the instructions in Example 10 of its Getting Started Guide.
3. As described in section 2.4 above, start Oracle CEP with the JMS adapter configured to use RTI Message Service as the JMS provider.

Note: Use the “Hide the History” option should any residue collision analysis be shown initially.

3 Contact Us

For help configuring Oracle CEP with RTI Data Distribution Service, please contact your RTI account manager or field application engineer. Regional contact names can be found at http://www.rti.com/company/contact/ or email us at sales@rti.com.