Analysis Tool for WebSphere Business Events Applications

User Guide

IBM Research - Haifa

First Edition: December 2009
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Table of Contents

Chapter 1 – Introduction

This document describes the functionality and capabilities of the Analysis Tool for WebSphere Business Events (WBE) Applications SupportPac.

Overview

The support pack is useful for Business Event Processing (BEP) application development with WebSphere Business Events, providing an insight into a set of definitions by application visualization and verifying the logical integrity of an application using static and dynamic analysis techniques.

Similar to other software applications, event processing application development is an evolutional process. Modifications and extensions to existing definitions are very common, requiring continuous validation and verification against project specifications. While small applications are relatively easy to maintain, modifying and extending medium or big applications with tens or hundreds of assets can be labor-intensive and error-prone. Developers need to assess how a proposed change affects other application artifacts and whether the application logic is preserved.

The static analysis module is designed for the application build-time phase and offers a set of observations on top of the event processing application graph, including dead end detection, cycle detection, asset consequences, and provenance. These provide users with a better understanding of the entire application logic, enabling them to change interactions with confidence.

The dynamic analysis module is designed for application validation and debug during run-time. It offers two observations based on a given scenario execution: interaction in context and rules coverage. Interaction in context details all given interaction evaluations in a certain context, while rules coverage highlights all the application artifacts (events, actions, and interaction blocks) covered by a specific scenario.

Getting Started

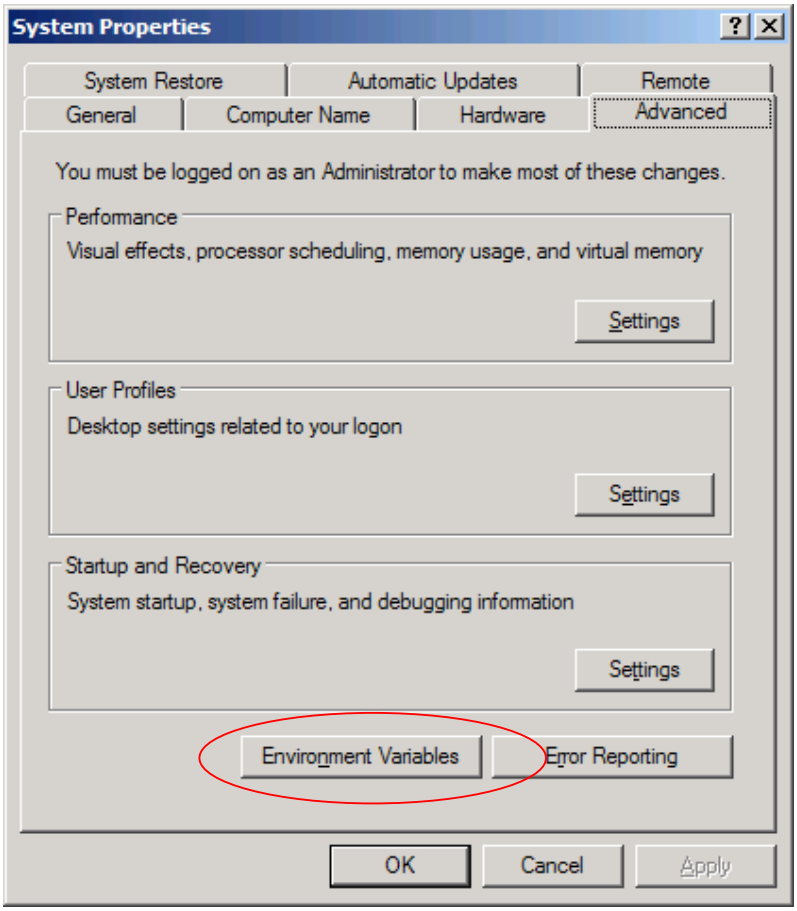
The Analysis Tool for WebSphere Business Events Applications makes use of resources installed by a typical product installation, thus WebSphere Business Events should be installed prior to running the support pack.

The support pack is distributed as a zip archive file. To invoke the application, unzip the file and open the created folder and follow the instructions below:

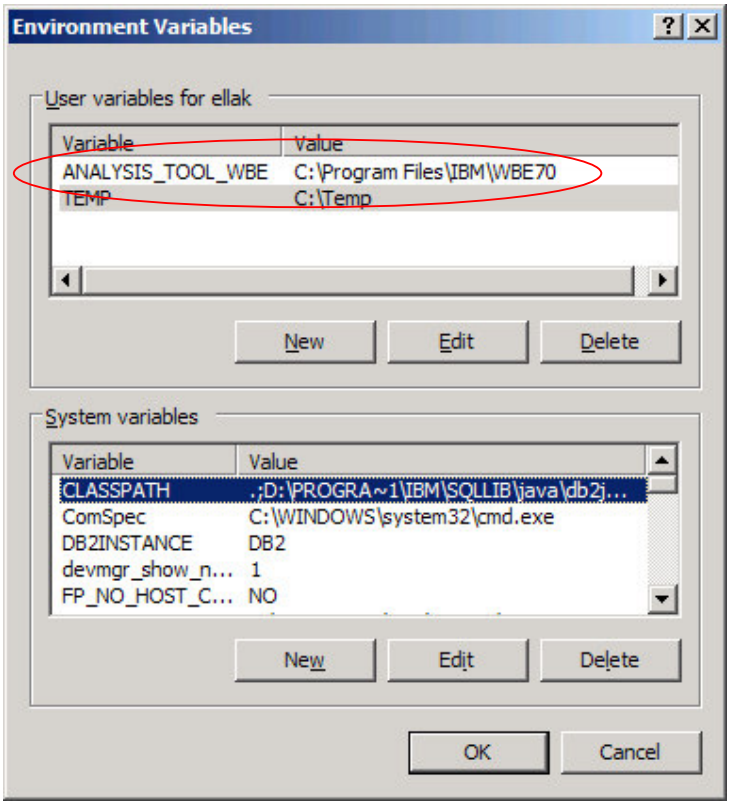
Setting the ANALYSIS_TOOL_WBE environment variable

Do the following to set the ANALYSIS_TOOL_WBE environment variable to your WebSphere Business Events installation directory (e.g., C:\Program Files\IBM\WBE70):

On your desktop, right-click the **My Computer** icon and select **Properties**. On the Advanced tab of the System Properties window, select **Environment Variables**:

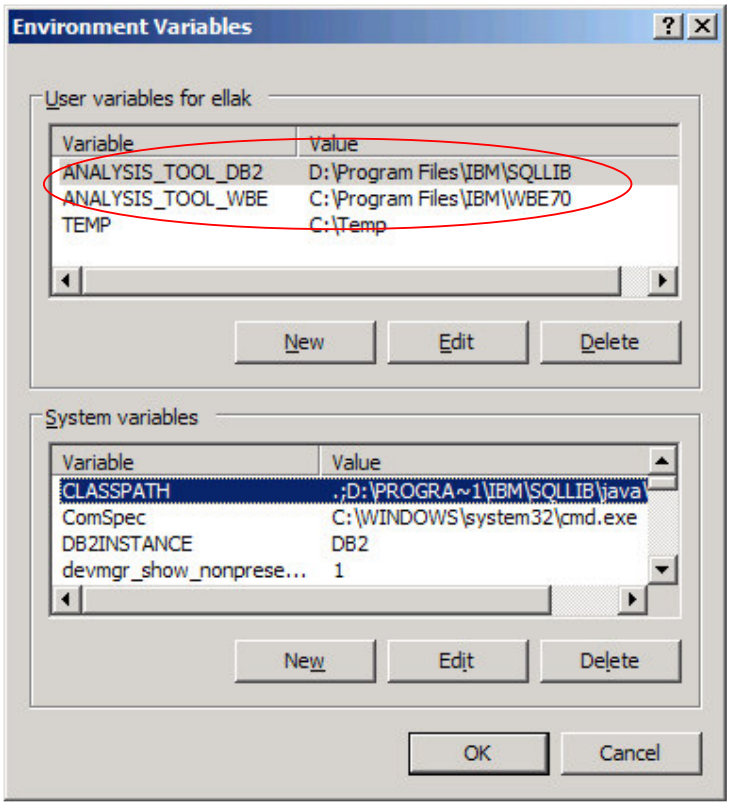


In the Environment variables window, set the variable ANALYSIS_TOOL_WBE to your WebSphere Business Events installation directory:



Setting the ANALYSIS_TOOL_DB2 environment variable

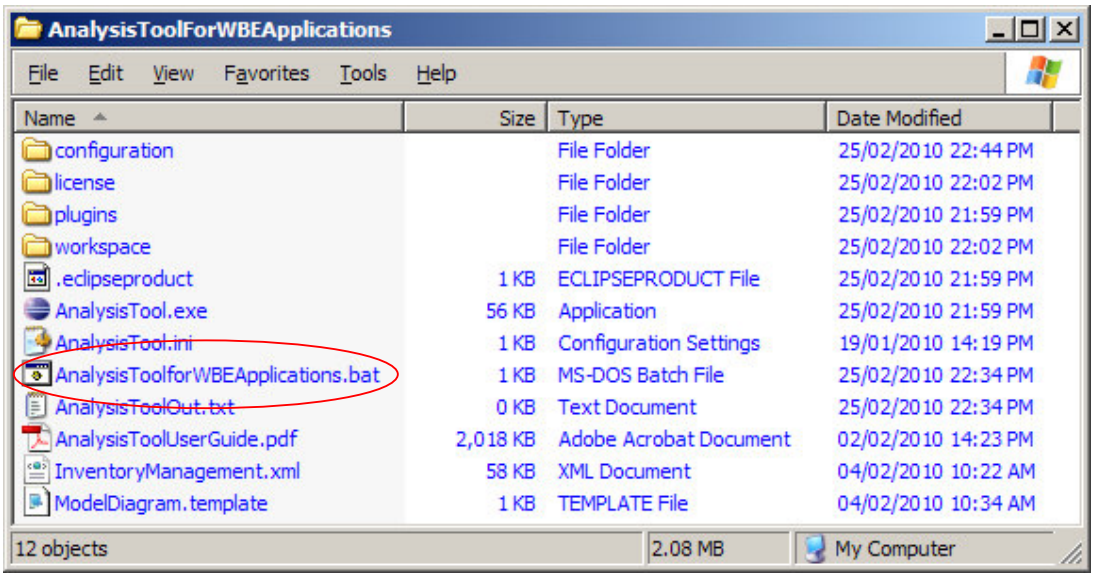
In similar to ANALYSIS_TOOL_WBE, set **ANALYSIS_TOOL_DB2** environment variable your DB2 installation dir (e.g. D:\Program Files\IBM\SQLLIB). Please note, that the current Analysis Tool version supports only DB2.



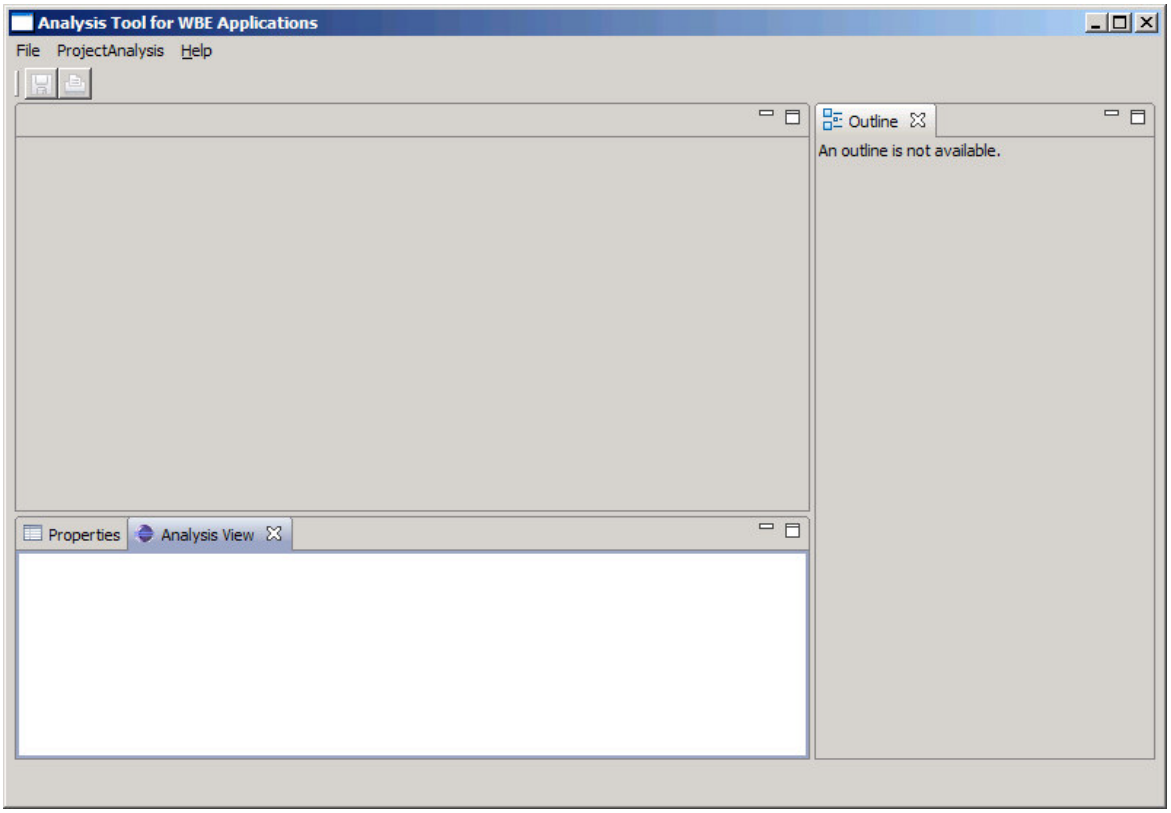
Chapter 2 – Application Visualization

Starting the Application

To start the Analysis Tool application, double-click the **batch** file **AnalysisToolforWBEApplications.bat"** in the newly created (unzipped) folder.



The Analysis Tool application will open:

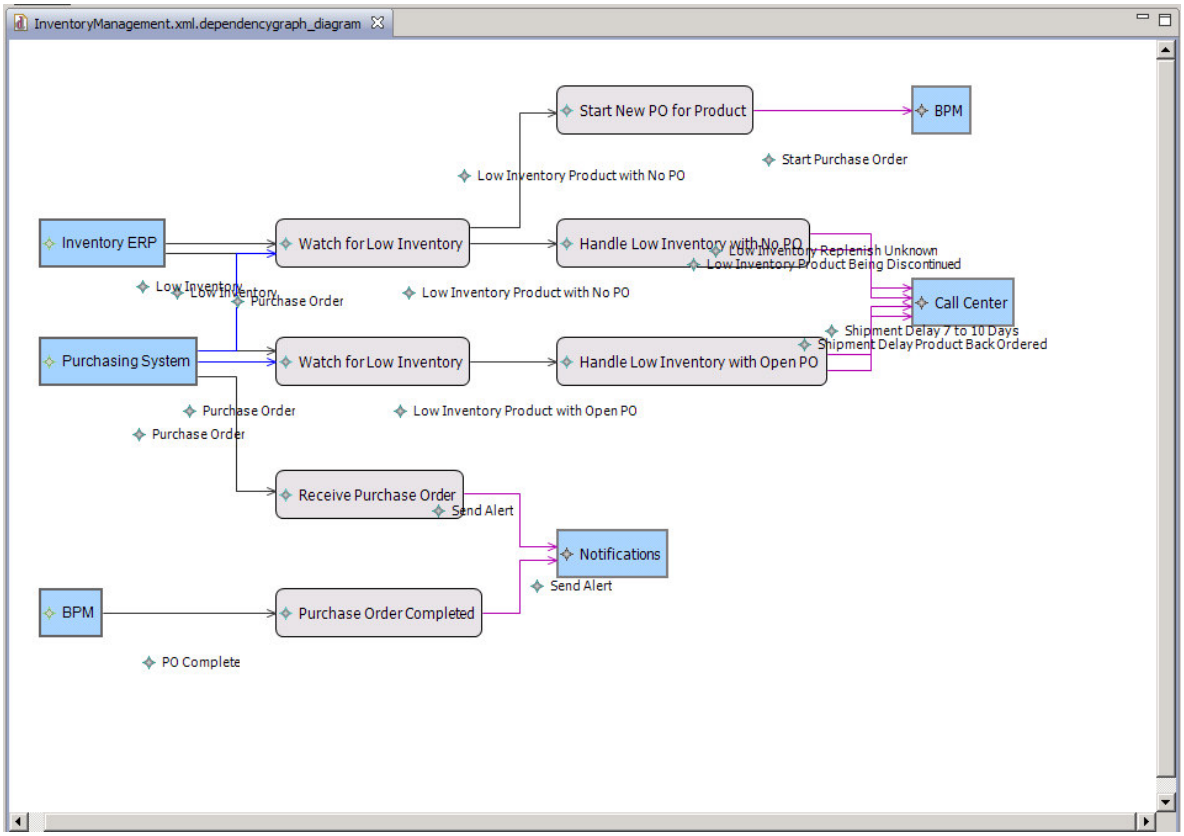


Opening a WebSphere Business Events Project

To import a project, select **File → Open WBE Definition**.

The support pack uses a project xml file, which can be exported by selecting **Save as local xml...** from the WebSphere Business Events business space (starting in version 7.0).

Once the project is loaded, its visual representation (the dependency graph) appears in the application's main window:



Touchpoints are represented by **blue** rectangles. Touchpoints producing events are on the left (producers), while touchpoints consuming actions are on the right (consumers).

Interaction blocks are represented by **gray** rectangles.

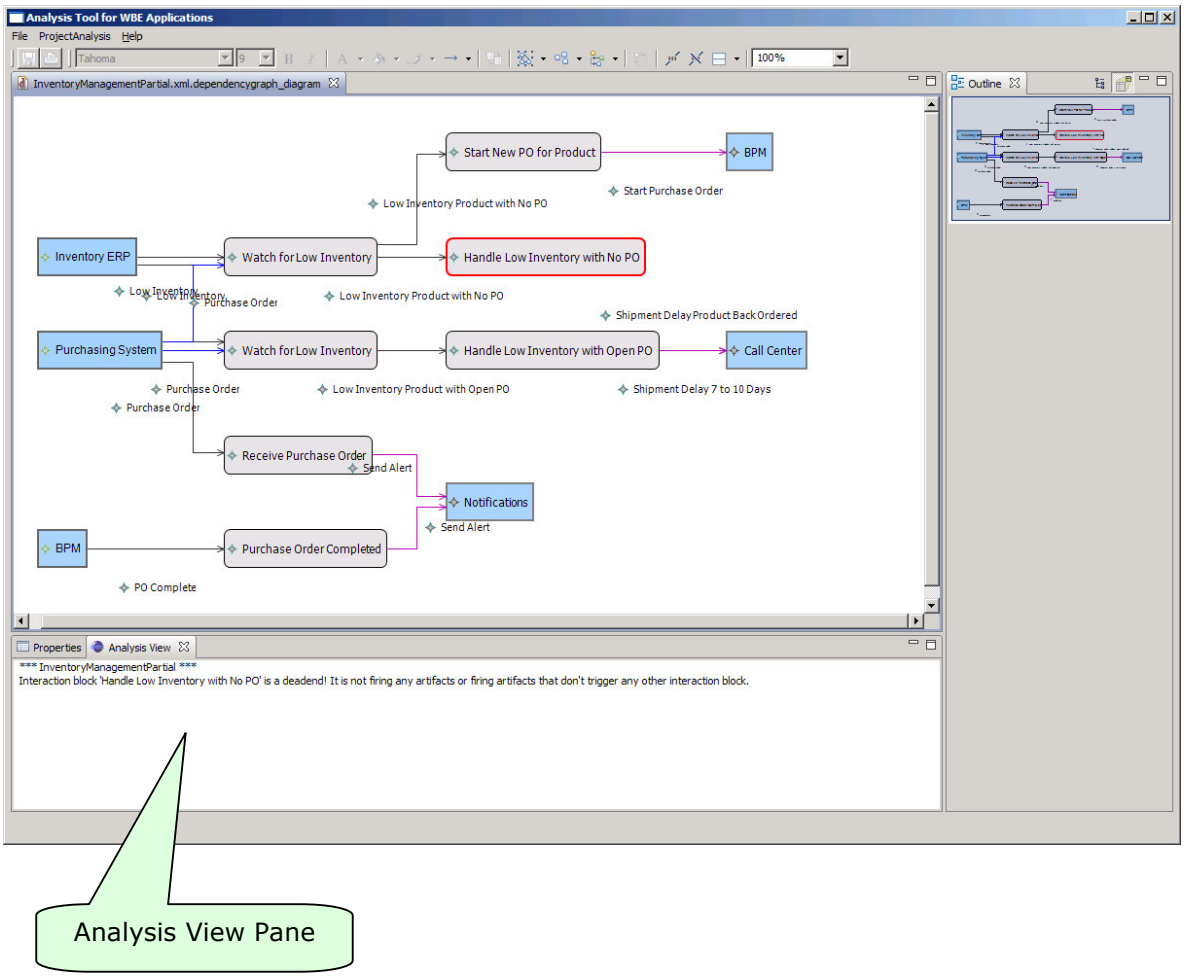
Events are represented by **black** or **blue** arrows with the event name near the arrow. Black arrows indicate triggering events (those that are used as "in response to" in interaction block definition), and blue arrows indicate dependency events and actions. These dependency events and actions are used for filter evaluations, but they do not trigger the interaction blocks.

Actions are represented by **purple** arrows with the action name near the arrow.

Comment: The support pack allows a "read-only" view of the application. Although the application artifacts can be relocated (layout change) on the screen, and even modified and deleted – your action will only apply to the current application view and will not be saved.

Dead End Detection

Once a WebSphere Business Events project is loaded, the tool tests the project for possible dead ends. A dead end is an interaction block that does not fire any event or action, or fires a synthetic event that in turn does not trigger any other interaction block.
This is usually an undesired situation, and as such is highlighted in the application graph with a red border around the dead end block. In addition to this visual effect, all static and dynamic observations are presented in the Analysis View pane at the bottom of the screen.



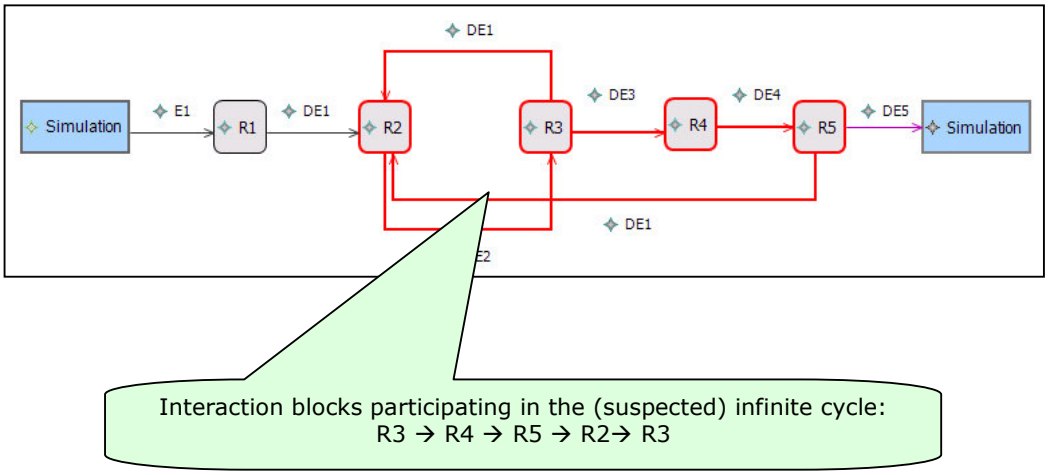
Chapter 3 – Performing Static Analysis

Detecting Potential Cycles

This observation addresses the problem of infinite loops during the application run. Although creating a cycle during the build time will not necessarily result in a termination problem during runtime, users should be aware of that possibility.

The "detect cycles" option highlights all the potential cycles in your application (if they exist), and displays a textual description of this observation in the Analysis View pane.

To perform cycle detection, select **Project Analysis → Detect Cycles**.



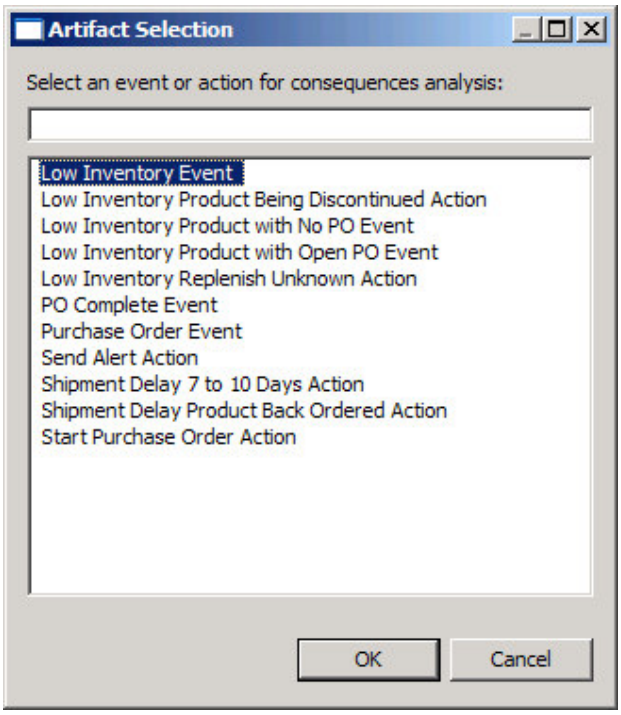
Asset Consequences Analysis

Asset (event or action) consequences are the application artifacts directly or indirectly affected by an asset. For a given event, all the interaction blocks it feeds directly are its direct consequences; each one of these interaction blocks triggers in turn its own outcomes, which are the given event's indirect consequences, etc.

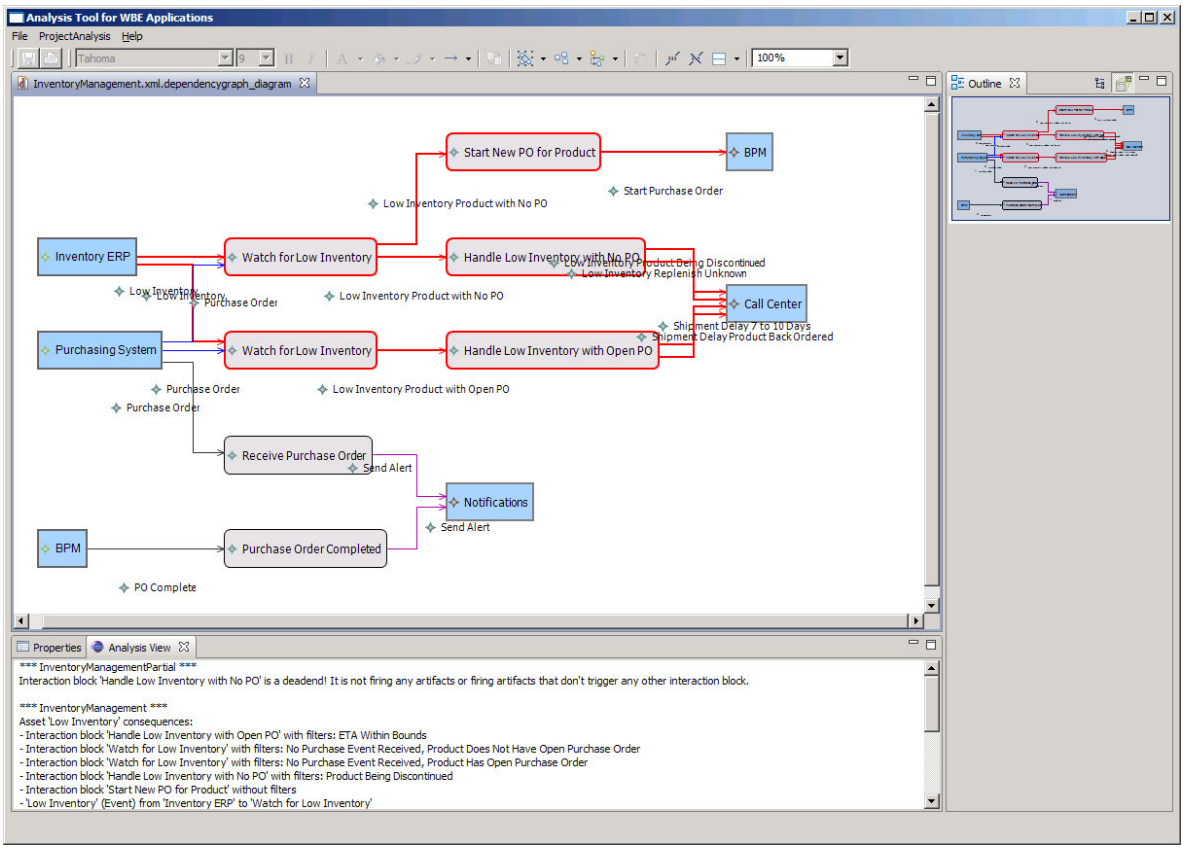
All the consequences of a selected asset are highlighted on the dependency graph, and a detailed explanation (consequences list) is displayed in the Analysis View pane.

To view asset consequences select **Project Analysis → Asset Consequences**. The Artifact Selection window is displayed.

Select an asset (event or action) for consequences analysis and click **OK**.



In this example, we selected the "Low Inventory" event as a target artifact.

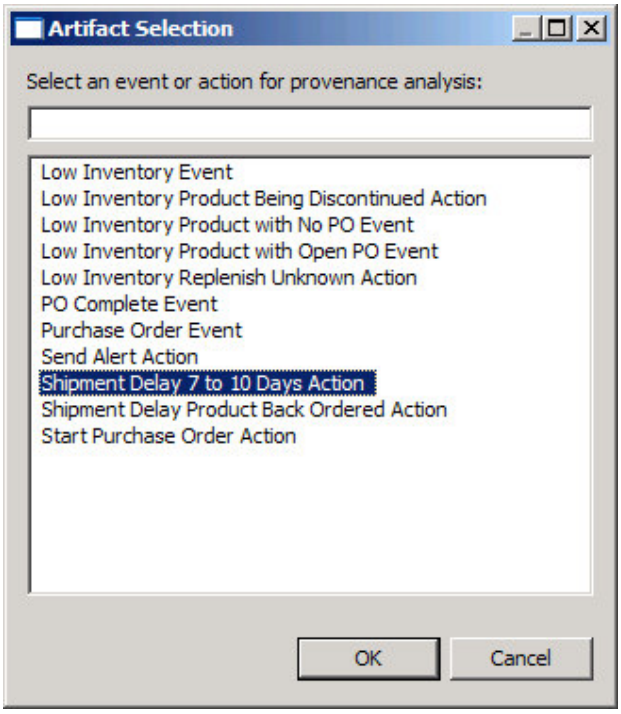


Asset Provenance Analysis

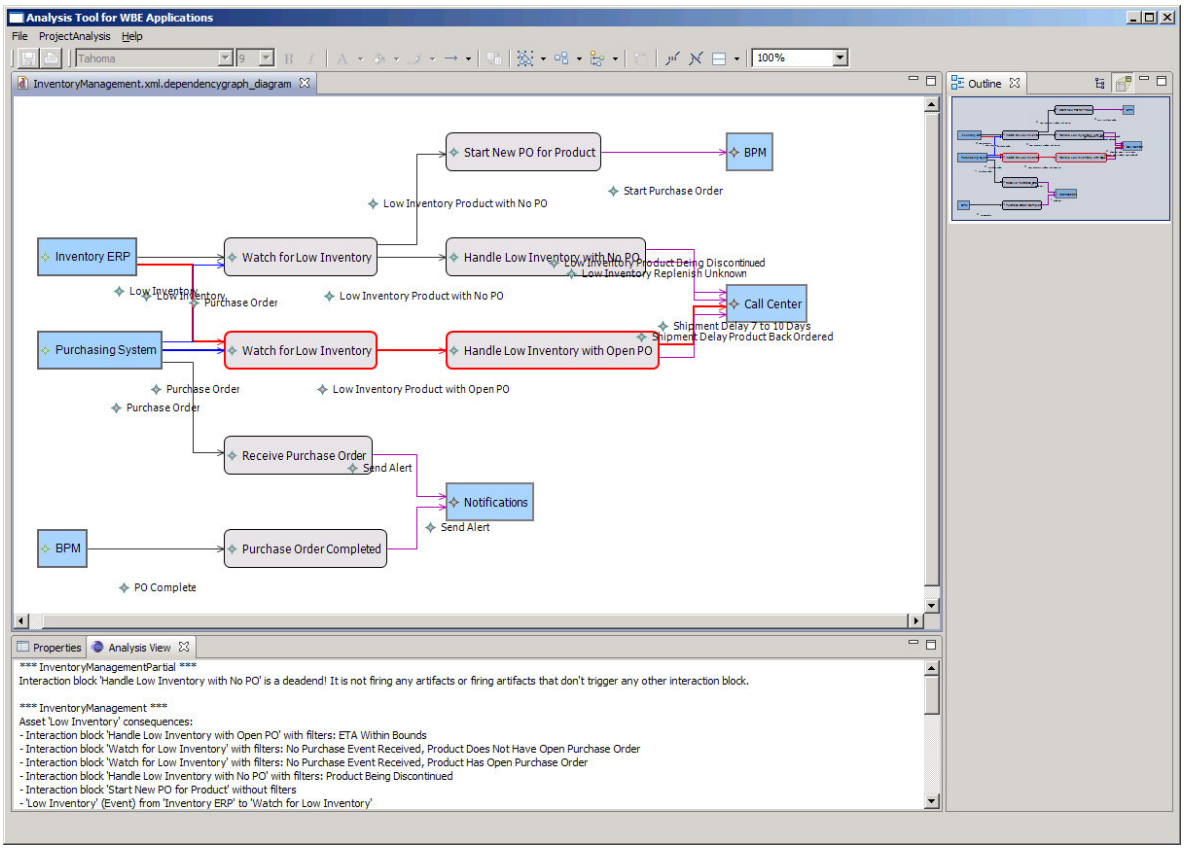
Asset (event or action) provenance is a complementary observation to asset consequences. For a given asset, asset provenance highlights all possible ways to fire it.

To view asset provenance select **Project Analysis → Asset Provenance**. The Artifact Selection window is displayed.

Select an asset (event or action) for provenance analysis and click **OK**.



In this example, we selected "Low Inventory Product with No PO" Event as a target artifact.

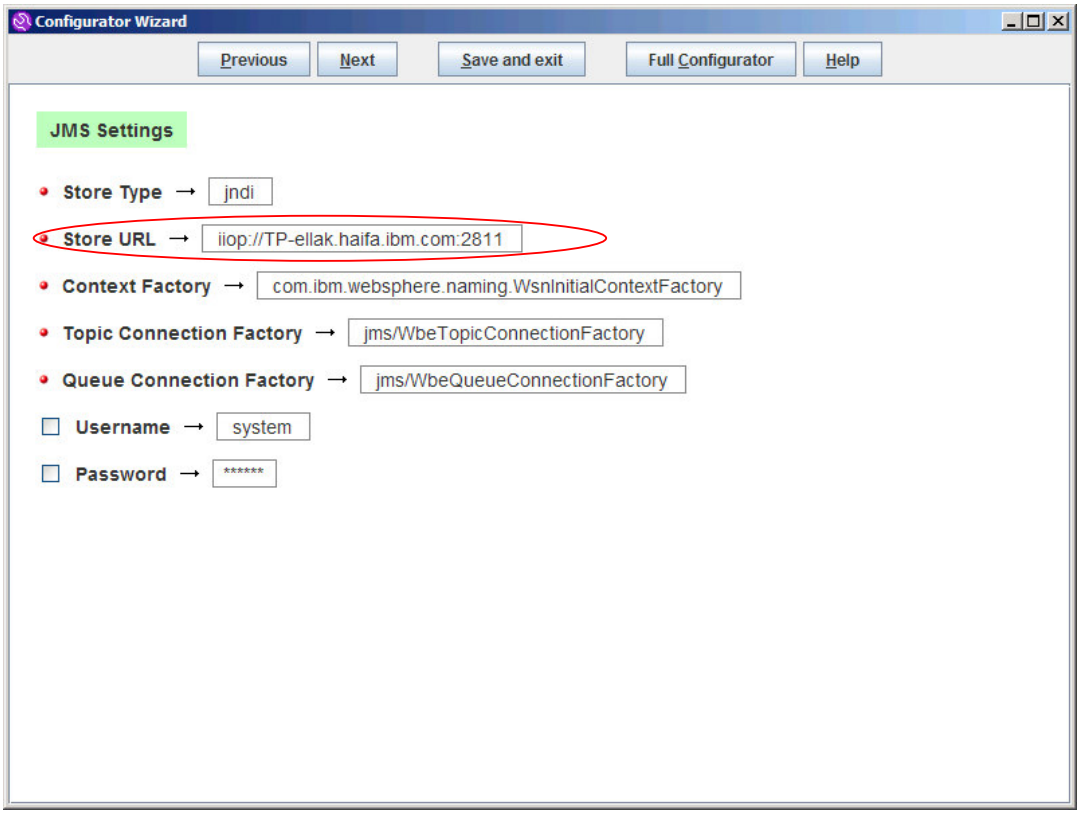


Chapter 4 – Performing Dynamic Analysis

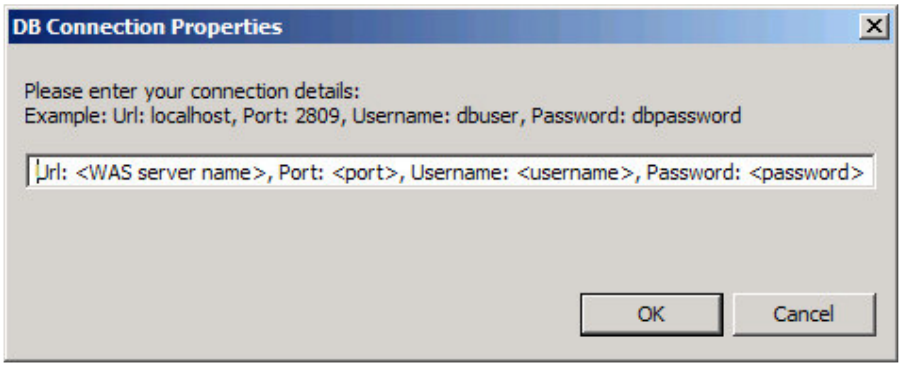
Defining DB connection

The dynamic analysis module requires WebSphere Business Events DB access, so the connection to the server database must also be configured. At the first time you will perform dynamic analysis of your application (Interaction in Context or Artifacts Coverage), you will be required to insert your connection details:URL of the machine running WebSphere Business Events and PORT number, your DB USERNAME and PASSWORD.

Both the URL and PORT details from the WebSphere Business Events "Store URL" field:



Fill in your connection details in the following dialog. Your connection details will be encrypted and saved in DBProperties.txt file in your support pack folder. Do not delete this file, unless your connection details are changed.



Interaction Block in Context

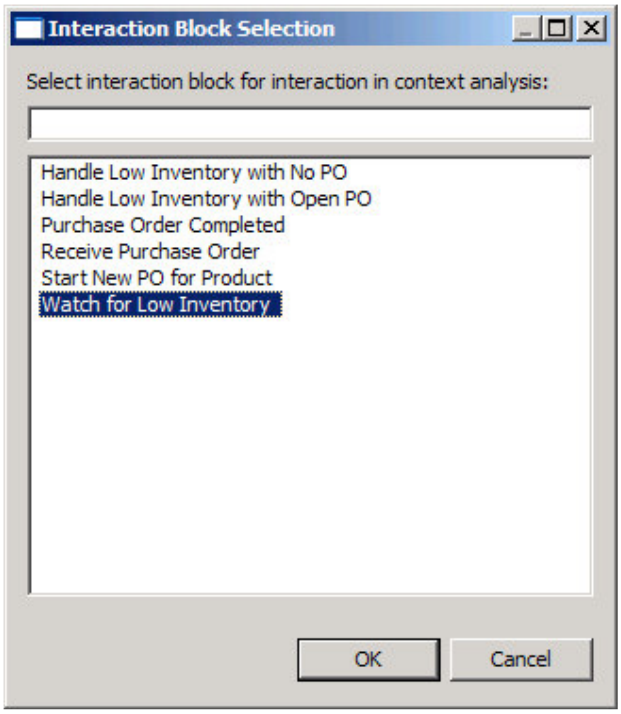
This observation tracks a single interaction evaluation based on specific scenario execution. All interaction block evaluations are listed with the associated info: triggering event with its fields, filter evaluation, block evaluation result (true/false), and actions fired, if relevant.

This analysis is based on data in the WebSphere Business Events DB history tables, so the DB history mode must be turned on, and the relevant scenario must be executed prior to this observation run.

Comment: Note that an **associated action** is printed for a fired **synthetic event** (and not the synthetic event itself), due to WebSphere Business Events' implementation restriction.

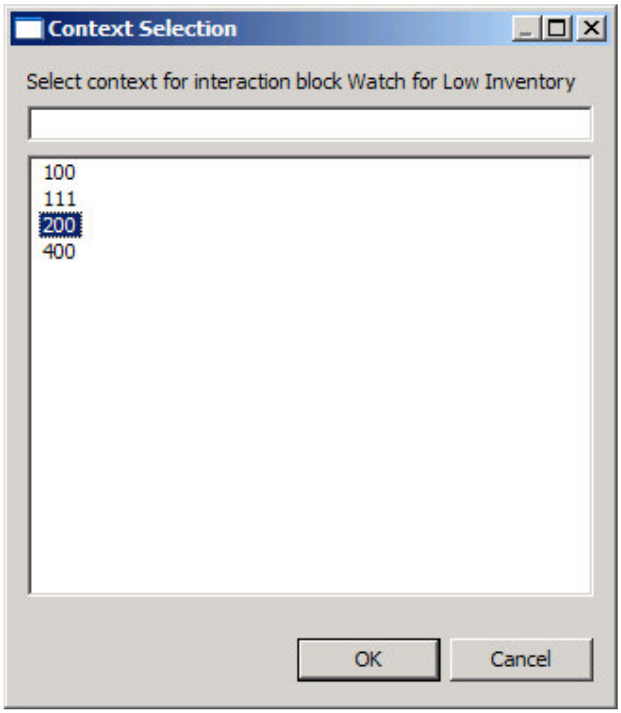
To perform this analysis, select **Project Analysis → Interaction in Context**. The Interaction Block Selection window is displayed.

Select an interaction block for interaction in-context analysis:

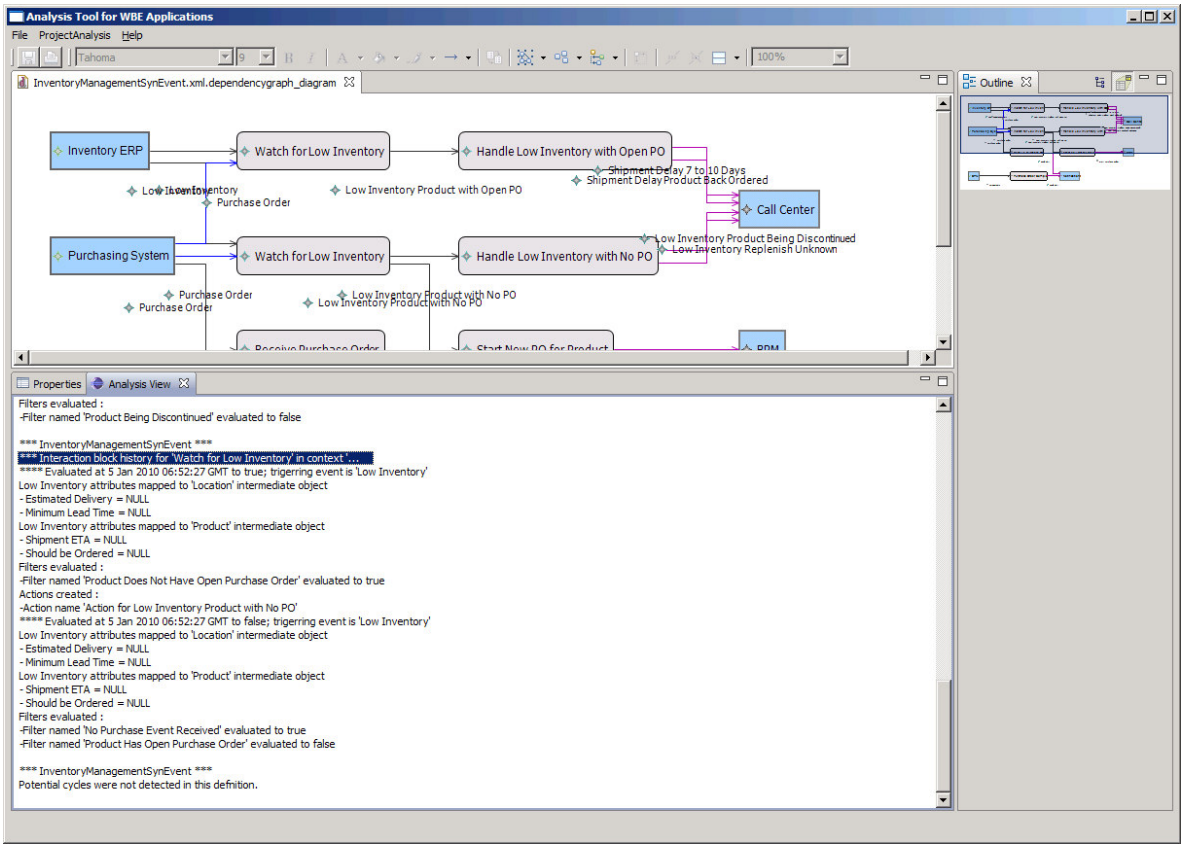


In this example, we selected "Watch for Low Inventory" as the interaction block for analysis.

After selecting the interaction block, select the context for that interaction block.



In this example, "product code" is used as the context and 200 as the selected context. The result of the analysis is shown in the Analysis View pane:



Artifacts Coverage

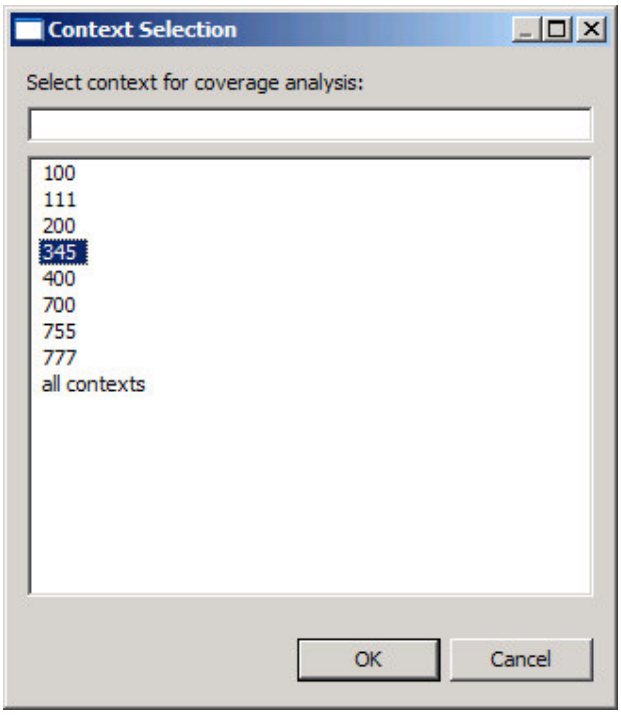
This observation provides a view of application artifacts covered by specific scenario executions. Interaction blocks evaluated to true, events arrived or fired, and actions fired are highlighted in the dependency graph.

This analysis is based on data in the WebSphere Business Events DB history tables, so the DB history mode must be turned on, and the relevant scenario must be executed prior to this observation run.

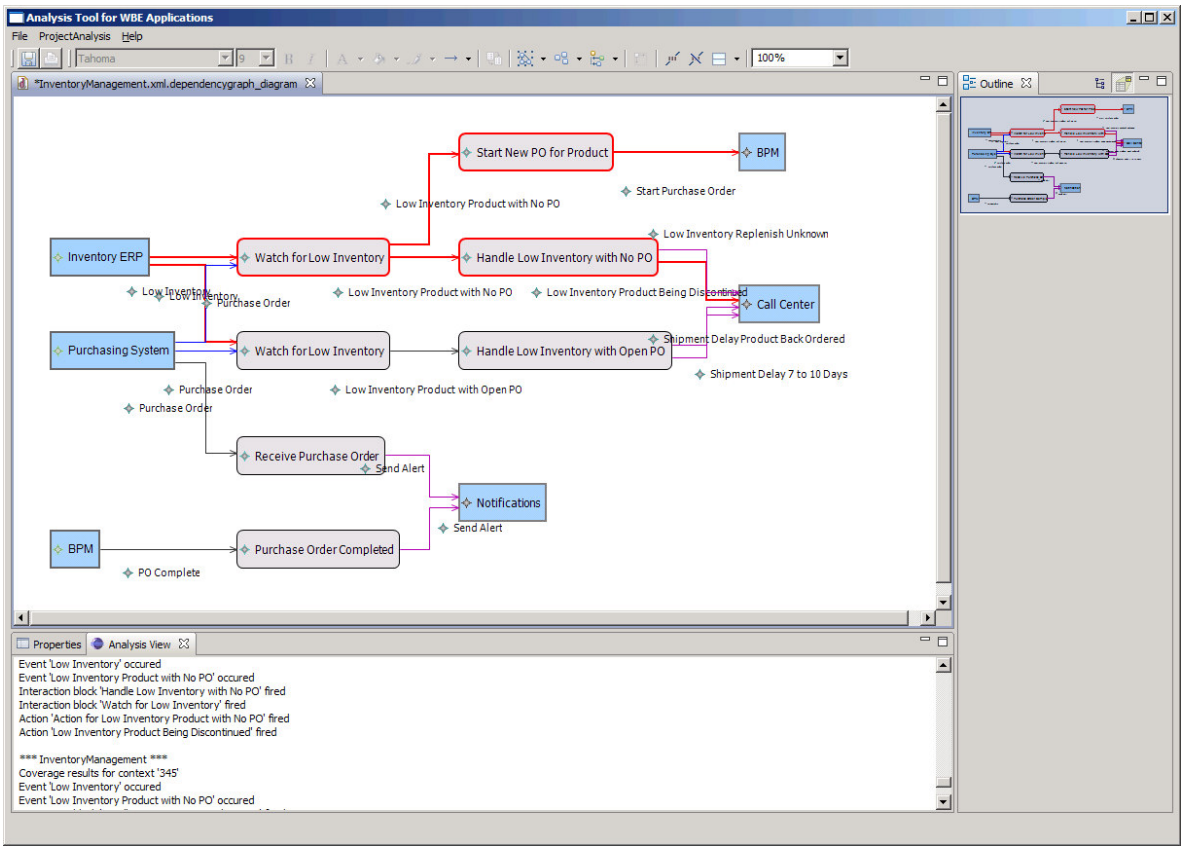
To perform Rule Coverage Analysis, select **Project Analysis → Artifacts Coverage**.

Artifacts Coverage Analysis can be done for a specific context or for all existing contexts together. The former highlights all the application artifacts fired in a given scenario execution in a specific context, while the latter highlights all the artifacts fired in all contexts.

In this example, "product code" is used as the context and 345 as the selected context.



The result of the analysis is highlighted in the application graph.



Known issue: in case a synthetic event was fired as a result of a certain interaction block evaluation, all relations carrying this event type will be highlighted on the graph, even though some of them refer to event instance fired by interaction block that was not evaluated or evaluated to false.

Chapter 5 – Additional Functions

Additional Functions

Several useful functions are available from the right-click popup menu in the dependency graph. Two examples of useful options include **Zoom in and out,** that allows you to take a closer or a more high-level look at your application; and **File → Save as Image File**, that allows you to save your diagram as an image.