TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™

User's Guide

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Product-Specific Documentation

Documentation for TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ is available on the TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ Product Documentation page.

The following documents for this product can be found on the TIBCO Documentation site:

- *TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ Release Notes*
- *TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ Installation Guide*
- *TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ User's Guide*

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- For creating a Support case, you must have a valid maintenance or support contract with TIBCO. You also need a user name and password to log in to https://support.tibco.com. If you do not have a user name, you can request one by clicking Register on the website.

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Overview

TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ provides a way for external applications to connect to the TIBCO Cloud Messaging service. ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ uses a publish and subscribe model for real-time messaging between applications. Your clients can publish messages with any content, and the subscribing clients receive only those messages whose content matches with the subscribing client's interests.

ActiveMatrix BusinessWorks Plug-in for TIBCO eFTL™ contains the **eFTL Publisher** activity, **eFTL Subscriber** activity, and the **eFTL Connector** shared resource for publishing and subscribing to messages.

Getting Started

This tutorial is designed to get users started with TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ in TIBCO Business Studio™ for BusinessWorks.

All the operations are performed in TIBCO Business Studio for BusinessWorks. To get familiar with TIBCO Business Studio for BusinessWorks, see *Tibco ActiveMatrix BusinessWorks™ Concepts*.

The basic steps to create and deploy an application using ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ include:

1. Creating a Project
2. Creating an eFTL Connection
3. Configuring a Process
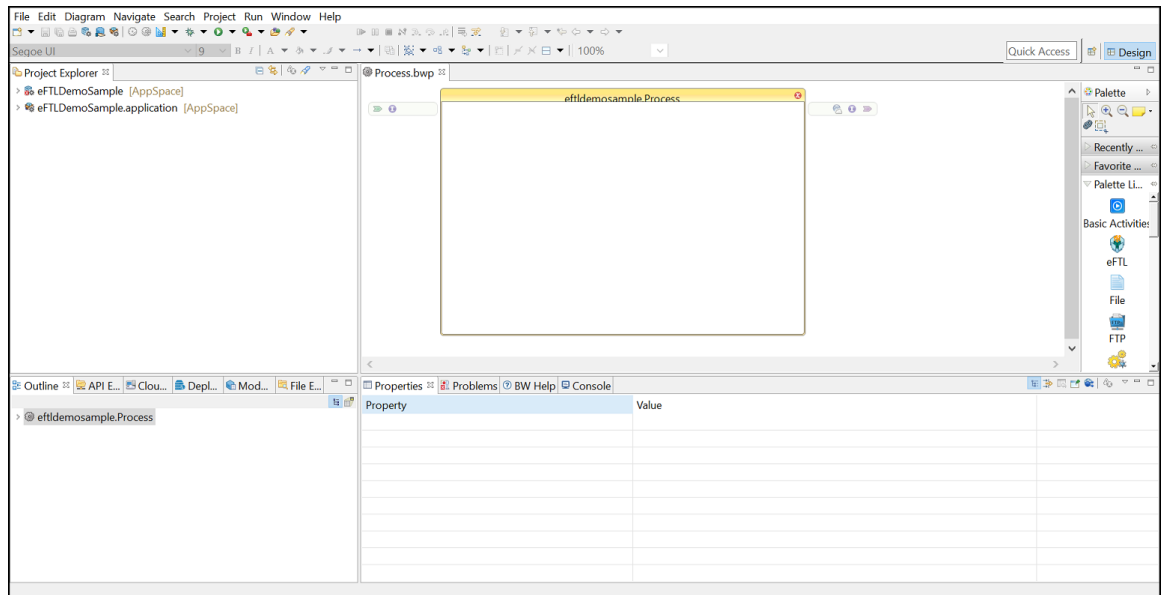4. Testing a Process
5. Deploying an Application

Creating a Project

The first task to use a plugin is creating a project. You can add resources and processes after creating a project.
An Eclipse project is an application module configured for TIBCO ActiveMatrix BusinessWorks™. An application module is a resource unit that is named, versioned, and packaged as part of an application.

Procedure

1. Start TIBCO Business Studio™ for BusinessWorks:

   - Windows: Select **Start** > **All Programs** > **TIBCO** > *TIBCO_HOME* > **TIBCO Business Studio** *version_number* > **Studio for Designers**.
   - Linux: Run the TIBCO Business Studio executable file located in the *TIBCO_HOME*/studio/ *version_number*/eclipse directory.
   - Mac OS: Run the TIBCO Business Studio executable file located in the *TIBCO_HOME*/studio/ *version_number*/eclipse directory.

2. Select **File** > **New** > **BusinessWorks Resources** to open the BusinessWorks Resource wizard.

3. In the Select a wizard dialog box, click **BusinessWorks Application Module** and click **Next** to open the New BusinessWorks Application Module wizard.

4. In the Project dialog, configure the project to create:
   a) Enter a project name.
   b) By default, the created project is located in the workspace currently in use. If you do not want to use the default location for the project, clear the **Use default location** check box and click **Browse** to select a new location.
   c) Use the default version of the application module, or enter a new version in the **Version** field.
   d) Keep the **Create empty process** and **Create Application** check boxes selected to automatically create an empty process and an application when creating the project.
   e) To create a Java module select the **Use Java configuration** check box.

      A Java module provides the Java tooling capabilities.
   f) Click **Finish** to create the project.

Result

A project and an application are created and displayed in the Project Explorer view. The Process editor opens automatically.

Creating an eFTL Connection

After creating a project, you have to create an eFTL Connection shared resource to establish TIBCO Cloud Messaging connection.

Prerequisites

eFTL Connection shared resource is available at the **Resources** level. Create the project as described in Creating a Project.

Procedure

1. Expand the created project in the Project Explorer view.

2. Right-click the **Resources** folder and click **New** > **eFTL Connection** to open the eFTL Connection wizard. The resource folder, package name, and resource name of the eFTL connection are provided by default, and can be customized.

3. Click **Finish** to open the eFTL Connection editor.

4. Configure the eFTL Connection shared resource in the eFTL Connection editor.

5. Click **Test Connection** to validate the connection.
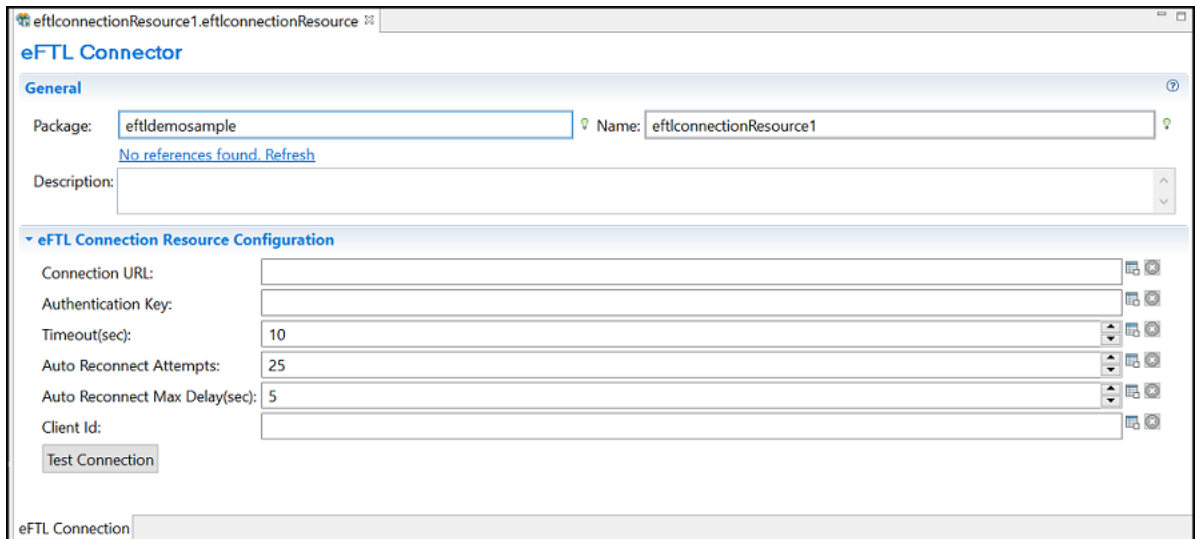
Configuring a Process

An empty process is created by default when creating a project. You can add activities to the empty process.

Prerequisites

Ensure that you have created an empty process when creating a project. For more information, see Creating a Project .

Procedure

1. In the Project Explorer view, click the created project and open the empty process from the **Processes** folder.

2. Select activities from the Palette view and drop them in the Process editor.

   For example, select and drop the **Timer** activity from the General Activities palette, and the **eFTL Publisher** activity from the eFTL palette library.
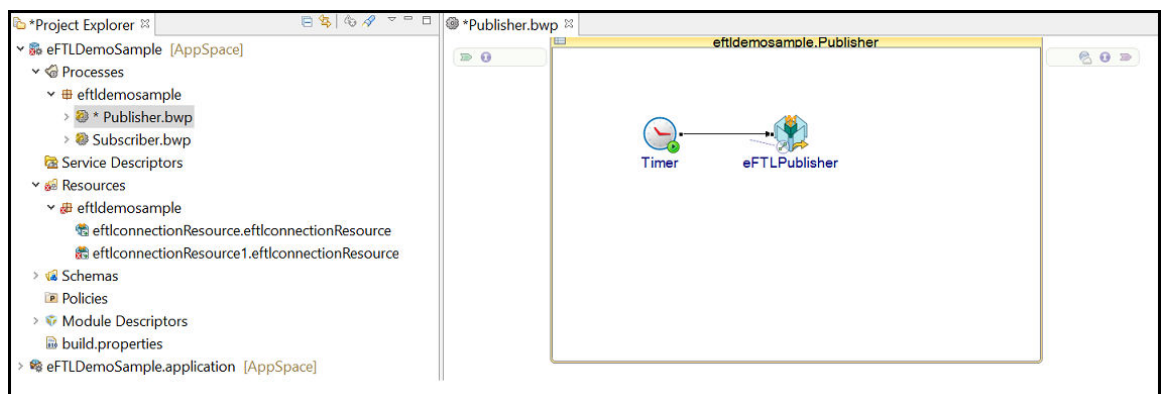
3. Click an activity in the Process editor and drag the 🖉 icon to create a transition between the added activities.

4. Configure the added eFTL activities, as described in eFTL Palette.

5. Click **File** > **Save** to save the process.

Testing a Process

After configuring, you might debug or test a process.

Prerequisites

Ensure that you have configured a process, as described in Configuring a Process.

Procedure

1. Open the process you have configured in the TIBCO Business Studio.

2. On the toolbar, click ⚙️ ▼ **Debug** > **Debug Configurations**.

3. Click **BusinessWorks Application** > **BWApplication** in the left panel.
   By default, all the applications in the current workspace are selected in the **Applications** tab. Ensure that only the application you want to debug is selected in the **Applications** tab in the right panel.

4. Click **Debug** to test the process in the selected application.
   TIBCO Business Studio changes to the Debug perspective. The debug information is displayed in the Console view.

5. In the **Debug** tab, expand the debugged process and click an activity.

6. In the upper-right panel, click the **Job Data** view, and then click the **Output** tab to check the activity output.

Deploying an Application

After testing, you can deploy the application that contains the configured process into a runtime environment, and then use the **bwadmin** utility to manage the deployed application.

Prerequisites

Before deploying an application, generate an application archive, which is an enterprise archive (EAR) file created in TIBCO Business Studio™ for BusinessWorks.

Deploying an application involves:

Procedure

1. Uploading an application archive.

2. Deploying an application archive.

3. Starting an application.

For more details on how to deploy an application, see *TIBCO ActiveMatrix BusinessWorks™ Administration*.

eFTL Palette

TIBCO ActiveMatrix BusinessWorks™ uses the eFTL palette to send and receive messages to and from the TIBCO Cloud Messaging service.

eFTL Publisher

The **eFTL Publisher** is an asynchronous activity that takes input from the shared resource and publishes or sends messages to the TIBCO Cloud Messaging service.

General

The **General** tab has the following fields.

Field	Literal Value/Process Property/Module Property	Description
Name	No	Name to be displayed as the label for the activity in the process.
eFTL Connection	Yes	eFTL connection resource for communicating with a TIBCO Cloud Messaging service.

Description

The **Description** tab has the following fields.

Field	Description
Description	Publisher description

Advanced

The **Advanced** tab has the following fields:

Field	Literal Value/Process Property/Module Property	Description
ThreadPool Shared Resource	Yes	Specifies a queue of threads available to run a queue of tasks. Thread pools are used to improve performance when executing large numbers of asynchronous tasks by reducing per task invocation overhead, provide a means of bounding, and managing the resources consumed when executing a collection of tasks.

Tags

You can add custom tags.

Field	Description
Tag	Name of the tag.
Expression	You can add the XPath expression from the XPath Builder dialog box.

Input Editor

The **Input Editor** tab has the following fields.

Input Item	Datatype	Description
Message type	complex	The message type used in the application. From the Schemas folder, drag the `Message :` `MessageType` element on to the process editor.

Input

The **Input** tab has the following fields.

Field	Description
Destination	The destination for a message.
Message	This is the data element defined in the Input Editor tab.

Fault

The **Fault** tab has the following fields.

Fault	Description
EFTLPublisherActivityFault	Thrown when an error occurred while publishing message
EFTLCreateMessageFault	Thrown when publisher fails to build the message to be published
EFTLConnectionFault	Thrown when the activity does not find the eFTL connection

Design

This figure describes the design process for eFTL Publisher.

```
┌─────────────────────────────────────┐
│ Establish connections to TIBCO eFTL  │
│   Plugin using TIBCO eFTL client     │
│             library                  │
└─────────────────────────────────────┘
                  │
                  ▼
┌─────────────────────────────────────┐
│         Publish messages over        │
│         TIBCO eFTL Plugin            │
└─────────────────────────────────────┘
```
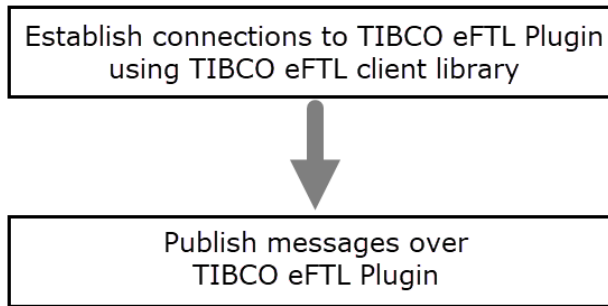
eFTL Subscriber

The eFTL Subscriber is a process starter activity that listens for a published message from the TIBCO Cloud Messaging service.

General

The **General** tab has the following fields.

Field	Literal Value/Process Property/Module Property	Description
Name	No	The name to be displayed as the label for the activity in the process.
eFTL Connection	Yes	The eFTL connection resource for communicating with a TIBCO Cloud Messaging service.
Durable Subscriber	No	Changes the subscriber into durable subscriber. (default False) • Incoming messages are preserved if the subscriber application fails, and delivered after the subscriber is back online. • `Durable Name` and `Durable Type` fields are displayed. A trigger marked as a durable subscriber should have run at least once in order for it to receive pending messages that are sent during application failure.
Durable Name	Yes	Name of the durable subscriber that stores messages. Required when Durable Subscriber is set to `True`.

Field	Literal Value/Process Property/Module Property	Description
Durable Type	No	Required when Durable Subscriber is set to `True` (enabled). Currently, only Shared durable subscriber type is supported. As a Shared Durable Subscriber, if you have multiple instances of an app, the messages received are distributed among the app instances in a round-robin manner.
Destination	Yes	If left blank, the subscriber receives all messages. If not blank, it receives only messages with the specific destination set.
Content Matcher	Yes	Specify the **eFTL Subscriber** activity's interest in a message, based on its content. Example syntax: `String` format: `{"MyLong":123}`. A content matcher selects a subset of messages from a message stream according to the fields and values in those messages. The data types supported as part of content matcher are string, long, or boolean.
Acknowledgment Mode	No	Acknowledge subscriber messages mode. **Modes** • **Auto**: eFTL library automatically acknowledges the message when the application callback returns. • **Explicit**: Must be used with a Confirm activity in the ActiveMatrix BusinessWorks™ process to explicitly acknowledge the message.

Description

On the **Description** tab, you can enter a short description for the activity.

Advanced

The Advanced tab has the following fields:

Field	Literal Value/Process Property/Module Property	Description
Sequence Key	No	XPath expression that specifies which processes must run in sequence. Process instances with sequencing keys that evaluate to the same value are executed sequentially in the sequence the process instance was created.
Custom Job Id	No	This field can contain an XPath expression that specifies a custom ID for the process instance.

Tags

You can add custom tags.

Field	Description
Tag	Name of the tag.
Expression	You can add the XPath expression from the XPath Builder dialog box.

Output Editor

The **Output Editor** tab defines the schema to use for incoming messages.
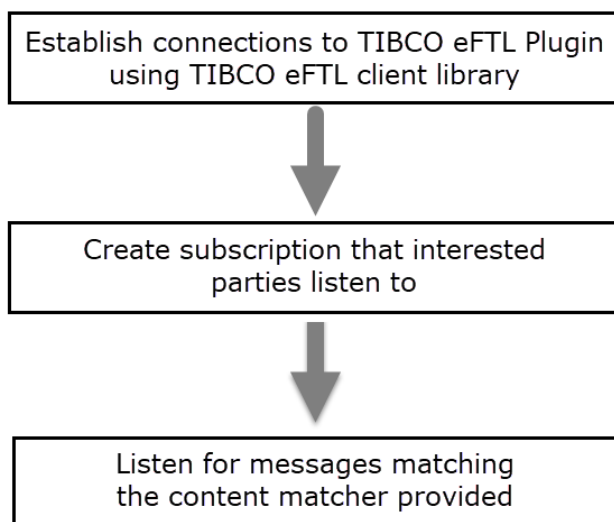
Conversations

You can initiate the conversation here. Click the **Add New Conversation** button to initiate multiple conversations.

Output

The **Output** is a data element defined according to the XML schema defined in the **Output Editor tab**.

Design

This diagram describes the design process for eFTL Subscriber.

```
┌─────────────────────────────────────────┐
│  Establish connections to TIBCO eFTL Plugin  │
│     using TIBCO eFTL client library        │
└─────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────┐
│    Create subscription that interested     │
│            parties listen to               │
└─────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────┐
│     Listen for messages matching           │
│     the content matcher provided           │
└─────────────────────────────────────────┘
```

Shared Resources

Shared resources are used to define a resource that contains configuration data that can be referenced from multiple processes.

eFTL Connector Shared Resource

The **eFTL Connector** shared resource describes the connection parameters for establishing TIBCO Cloud Messaging connection.

You must have an active TCM subscription before you create a connection.

General

The **General** section has the following fields.

Field	Module Property?	Description
Package	No	The name of the package in which you want to create a shared resource.
Name	No	The name to be displayed as a label for the shared resource.
Description	No	A short description of the shared resource.

eFTL Connection Resource Configuration

The eFTL Connection Resource Configuration section has the following fields

Field	Module Property?	Description
Connection URL	Yes	URL to the TIBCO Cloud Messaging service. You can obtain the URL from the TIBCO Cloud Messaging domain in the cloud.
Authentication Key	Yes	Authentication key required to log in to your TIBCO Cloud Messaging service. You can obtain the authentication key from the TIBCO Cloud Messaging domain in the cloud.
Timeout(sec)	Yes	Connection timeout value. The default value is 10.
Auto Reconnect Attempts	Yes	Specifies the number of times the client attempts to reconnect automatically. The default value is 25.
Auto Reconnect Max Delays(sec)	Yes	Determines the maximum delay between auto reconnect attempts. The default value is 5.

Field	Module Property?	Description
Client ID	Yes	Unique client identifier.

Test Connection

When you click the **Test Connection** button, the activity connects to the TIBCO Cloud Messaging service. You can use this button to determine whether the specified connection configuration is correct.

Sample Project Overview

The sample project helps to understand how TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ operates.

ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™ is packaged with a sample project. After installing the plug-in, the following projects can be found in the `TIBCO_HOME`\bw\palettes\eFTL\`version_number`\samples directory.
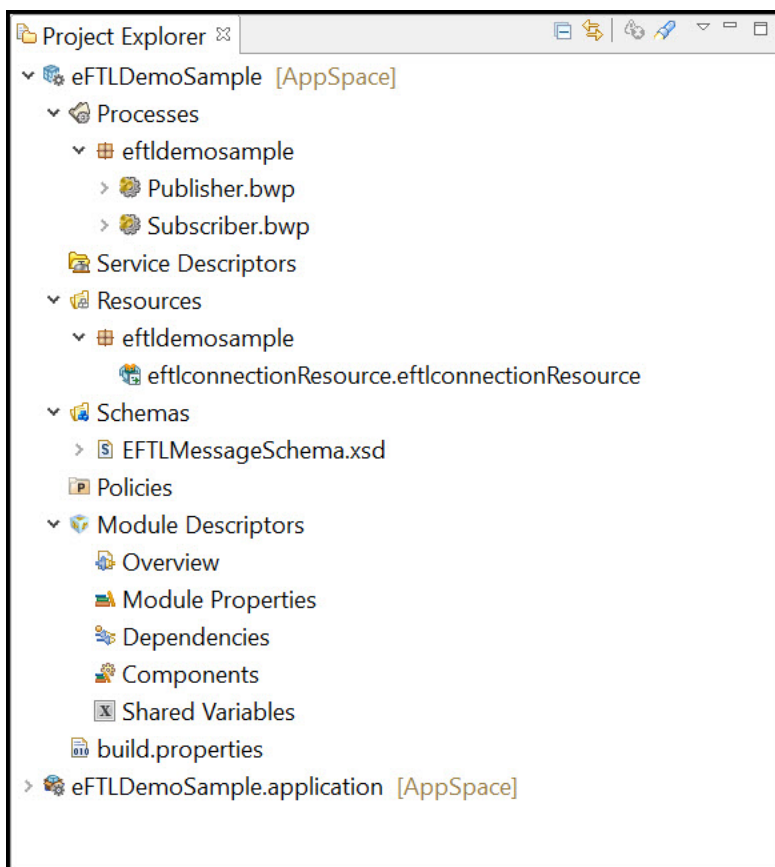
Importing Sample Project

Before running the project, you must import the sample project to TIBCO Business Studio™ for BusinessWorks.

Procedure

1. Start TIBCO Business Studio for BusinessWorks by using one of the following ways:

   - **Microsoft Windows**: Click **Start** > **All Programs** > **TIBCO** > **TIBCO_HOME** > **TIBCO Business Studio** *version_number* > **Studio for Designers**.

   - **Linux**: Run the TIBCO Business Studio executable file located in the `TIBCO_HOME/studio/version_number/eclipse` directory.

2. Click **File** > **Import**.

3. In the Import window, expand the **General** folder and select the **Existing Studio Projects into Workspace** item. Click **Next.**

4. To locate the samples, select the **Select archive file** field and click **Browse**. Click **Finish.**

   The `eFTLDemoSample.zip` file is located in the `TIBCO_HOME`/bw/palettes/eftl/version/samples directory.

Result

The sample project is imported to TIBCO Business Studio for BusinessWorks.
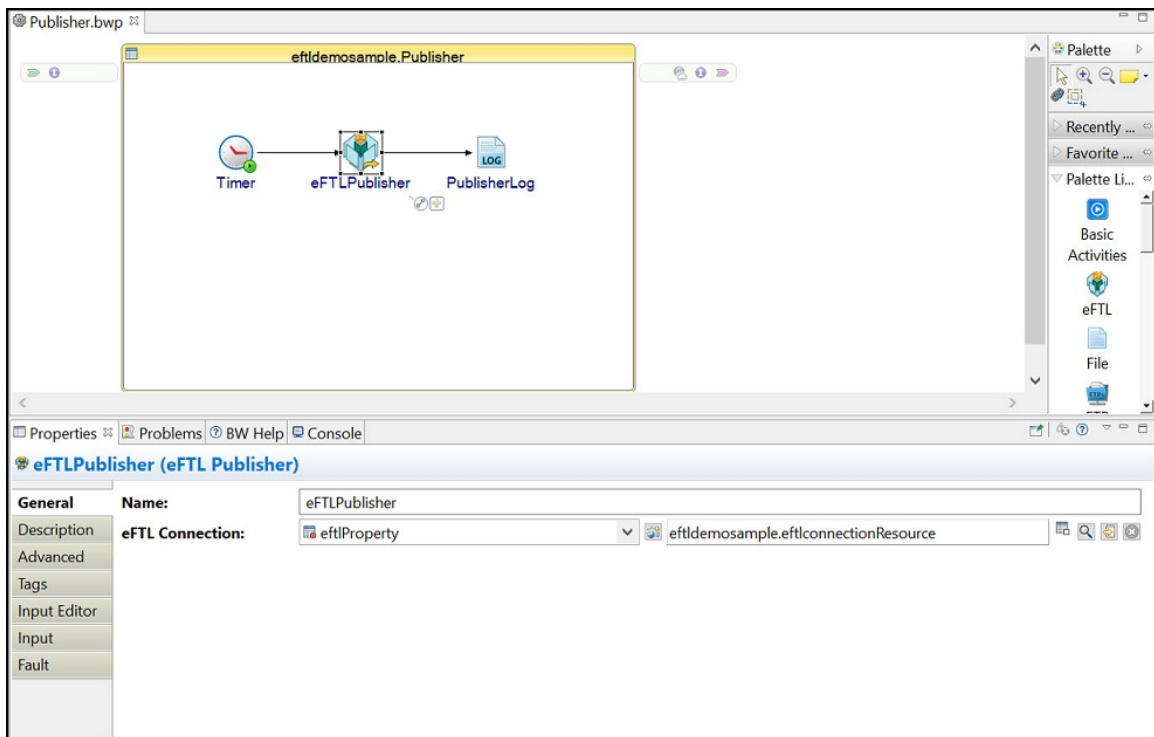
Configuration of Processes

The sample project contains two processes. After Importing the sample project, expand the Processes resource to display the processes.

This sample project contains the following two processes:

Publisher.bwp

This process demonstrates how to use the eFTL plug-in to publish messages over the Tibco Cloud Messaging service.

Subscriber.bwp

This process contains the **eFTL Subscriber** process starter activity. The **eFTL Subscriber** activity listens for an incoming message event and starts the job execution on receiving incoming records and writes them to a log.
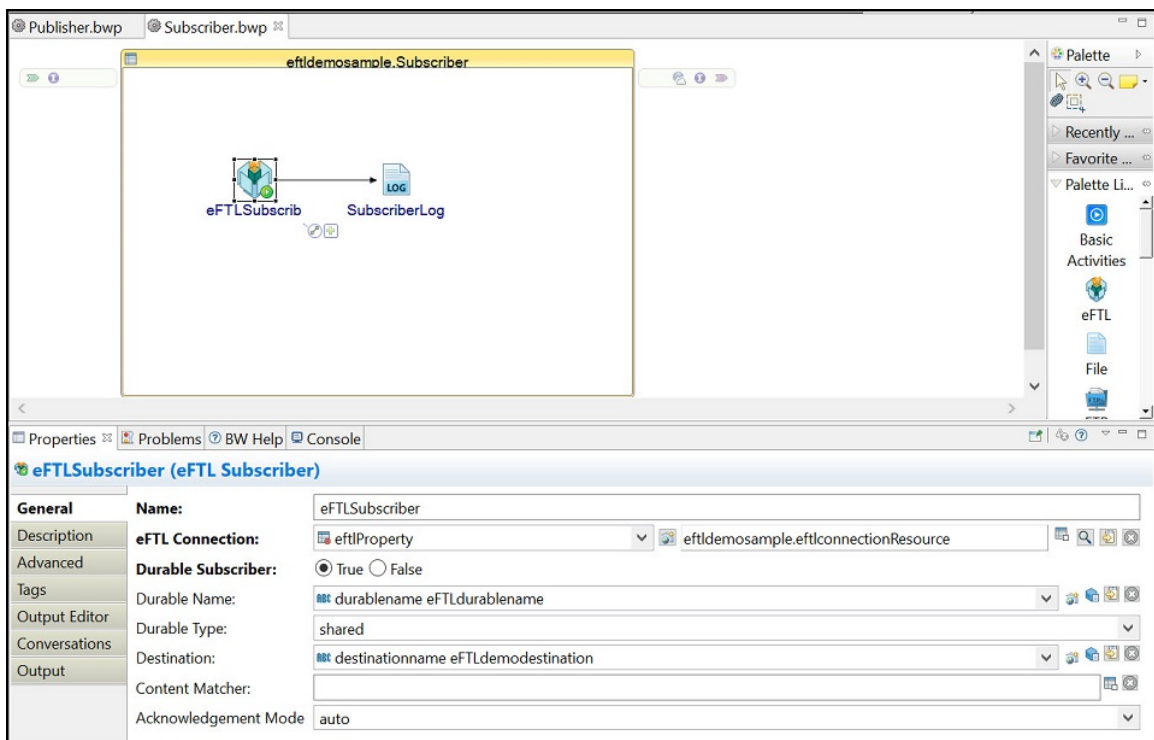
Running the Sample Project

The sample project shows how to use the plug-in to send and receive messages using TIBCO ActiveMatrix BusinessWorks™ Plug-in for TIBCO eFTL™.

Prerequisites

Import the sample project to TIBCO Business Studio™ for BusinessWorks, as described in Importing the Sample Project.

Procedure

1. In the Project Explorer view, expand the **Module Descriptors** resource and double-click **Components**.

2. By default, all the processes are listed in the Components editor.

3. On the toolbar, click the **Save** 💾 icon to save your changes.

4. From the menu, click **Run** > **Run Configurations** to run the selected process.

5. In the Run Configuration dialog box, expand **BusinessWorks Application**, and then click **BWApplication.**

6. In the right panel, click the **Applications** tab, and select the check box next to **eFTLDemoSample.application**.

7. Click **Run** to run the selected process.

8. Click the **Terminate** 🔳 icon to stop the process.

Managing Logs

When an error occurs, you can check logs to trace and troubleshoot the plug-in exception.

By default, error logs are displayed in the Console view when you run a process in the Debug mode. You can change the log level of the plug-in to trace different messages and export logs to a file. Different log levels correspond to different messages as described in Log Levels.

Log Levels

Different log levels include different information. The plug-in supports the following log levels.

Log Level	Description
Info	Indicates normal plug-in operations. No action is needed. A tracing message tagged with Info indicates that a significant processing step is reached and logged for tracking or auditing purposes. Only info messages preceding a tracking identifier are considered as significant steps.
Error	Indicates that an unrecoverable error has occurred. Depending on the error severity, the plug-in may continue with the next operation or may stop altogether.
Debug	Indicates a developer-defined tracing message.

Setting up Log Levels

You can configure different log levels for the plug-in and plug-in activities to trace different messages. By default, the plug-in uses the log level configured for TIBCO ActiveMatrix BusinessWorks™. The default log level of ActiveMatrix BusinessWorks™ is Error.

Procedure

1. Navigate to the `TIBCO_HOME\bw\`*version_number*`\config\design\logback` directory and open the `logback.xml` file.

2. Add the following node in the BusinessWorks Palette and Activity logger area to specify a log level for the plug-in:
   ```
   <logger name="com.tibco.bw.palette.eftl.runtime">
   <level value="DEBUG"/>
   </logger>
   ```
   The value of the level element can be Debug, Info, or Error.

   > If you set the log level to Debug, the input and output for the plug-in activities are also displayed in the Console view. For more details regarding each log level, see Log Levels.

3. Optional. Add one of the following nodes in the BusinessWorks Palette and Activity loggers' area to control a log level for the activity.

   - For example, to control the debug log level for the **eFTL Publisher** activity, set the following parameters:
     ```
     <logger name="com.tibco.bw.palette.eftl.runtime.MessagePublisherActivity">
     <level value="DEBUG"/>
     </logger>
     ```

- For example, to control the debug log level for the **eFTL Subscriber** activity, set the following parameters:

```
<logger
name="com.tibco.bw.palette.eftl.runtime.SubscriberEventSourceEventSource">
<level value="DEBUG"/>
</logger>
```

- For example, to control the debug log level for the **eFTL Connector** shared resource, set the following parameters:

```
<logger name="com.tibco.bw.sharedresource.eftl.runtime">
<level value="DEBUG"/>
</logger>
```

> The activities that are not configured with specific log levels use the log level configured for the plug-in.

4. Save the file.

Exporting Logs to a File

Modify the logback.xml file to export plug-in logs to a file.

Procedure

1. Navigate to the *TIBCO_HOME*\bw\version_number\config\design\logback directory and open the logback.xml file.

> When deploying an application in TIBCO Enterprise Administrator, you need to navigated to the *TIBCO_HOME*\bw\version_number\domains\domain_name\appnodes \space_name\node_name directory to find the logback.xml file.

2. Add the following node to specify the file location.

```
<appender name="FILE" class="ch.qos.logback.core.FileAppender">
    <file>c:/bw6-bweftl.log</file>
        <encoder>
          <pattern>%d{HH:mm:ss.SSS} [%thread] %-5level %logger{36}-%msg%n</pattern>
        </encoder>
</appender>
```

The file tag defines the location to which the log is exported and the value is the absolute path of the file.

> You also need to add the file name in the file path.

3. Add the following node to the root node at the bottom of the logback.xml file to enable exporting the logs to a file.

```
    <appender-ref ref="FILE" />
```

```
<root level="DEBUG">
    <appender-ref ref="STDOUT" />
    <appender-ref ref="FILE" />
</root>
```

4. Save the file.

Error Codes

The following table lists error codes, detailed explanation of each error, where applicable, and ways to solve different errors.

Error Codes	Error Message	Error Resolution
TIBCO-BW-PALETTE-EFTL-500002	IOException occurred while retrieving XML Output for activity [{0}].	None.
TIBCO-BW-PALETTE-EFTL-500004	Failed to connect: [{0}]	Examine the failure and correct accordingly.
TIBCO-BW-PALETTE-EFTL-500005	Failed to build message due to the exception [{0}].	Verify the Message xml schema and message provided.
TIBCO-BW-PALETTE-EFTL-500006	Error occurred while publishing: [{0}].	Examine the failure and correct accordingly.
TIBCO-BW-PALETTE-EFTL-500007	Unable to create the subscription. Error details [{0}].	Examine the failure and correct accordingly.
TIBCO-BW-PALETTE-EFTL-500008	Failed to process EFTL message: [{0}]. Subscriber Id=[{1}].	Examine the failure and correct accordingly.
TIBCO-BW-PALETTE-EFTL-500009	Error acknowledging EFTL message due to exception [{0}].	Examine the failure and correct accordingly.