

TIBCO ActiveMatrix BusinessWorks™ Plug-in for Trillium User's Guide

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TIBCO Documentation and Support Services

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Product-Specific Documentation

Documentation for TIBCO products is not bundled with the software. Instead, it is available on the TIBCO Documentation site. To directly access documentation for this product, double-click the following file:

`TIBCO_HOME/release_notes/TIB_bwplugintrillium_version_docinfo.html`

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

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

The following documents provide additional information and can be found on the TIBCO Documentation site:

- *TIBCO ActiveMatrix BusinessWorks Documentation*
- *TIBCO Enterprise Administrator User's Guide*

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- For an overview of TIBCO Support, and information about getting started with TIBCO Support, visit this site:

<http://www.tibco.com/services/support>

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Entry to this site requires a user name and password. If you do not have a user name, you can request one.

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Plug-in Overview

TIBCO ActiveMatrix BusinessWorks™ Plug-in for Trillium is used to access Matcher and Cleanser services running on Trillium Software Director.

TIBCO ActiveMatrix BusinessWorks™ is a leading integration platform to integrate a wide variety of technologies and systems within enterprise and on cloud. ActiveMatrix BusinessWorks includes an Eclipse-based graphical user interface (GUI) based on TIBCO Business Studio™ for design, testing, and deployment. Ensure that you get the basic knowledge of TIBCO ActiveMatrix BusinessWorks before using the plug-in. For more details, see the TIBCO ActiveMatrix BusinessWorks documentation.

TIBCO ActiveMatrix BusinessWorks Plug-in for Trillium plugs into TIBCO ActiveMatrix BusinessWorks and adds a [Trillium Palette](#) to TIBCO Business Studio.

The plug-in provides the following functions:

- Accessing a Cleanser service running on Trillium Software Director
Cleanse: It sends data to a Cleanser server and receives cleansed data.
- Accessing a Matcher service running on Trillium Software Director
The plug-in provides the following two ways to match data:
 - MatchWindow: It sends multiple records to a Matcher server and returns zero or more matches from a match of window records identified by the Matcher server.
 - MatchReference: It matches a record to a candidate in the match window and returns an array of keys and a corresponding array of match patterns for the matching candidate.

Getting Started

This tutorial is designed for beginners who want to use TIBCO ActiveMatrix BusinessWorks Plug-in for Trillium from the very beginning in TIBCO Business Studio.

TIBCO ActiveMatrix BusinessWorks uses the Eclipse graphical user interface (GUI) provided by TIBCO Business Studio to define business processes and generate Enterprise Archives (EAR files). At run time, you can run and deploy EAR files. Therefore, you can manage BusinessWorks applications in TIBCO® Enterprise Administrator (TEA).

A basic procedure of using TIBCO ActiveMatrix BusinessWorks Plug-in for Trillium includes:

1. [Creating a Project](#)
2. [Configuring a Process](#)
3. [Debugging and Running a Process](#)
4. [Deploying an Application](#)

Creating a Project

Projects are BusinessWorks application modules that are created in TIBCO Business Studio. A project contains various resources.

Procedure

1. Open TIBCO Business Studio 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. From the menu, click **File > New > BusinessWorks Resources**.
3. Click **BusinessWorks Application Module** in the BusinessWorks Resource dialog. Click **Next**.

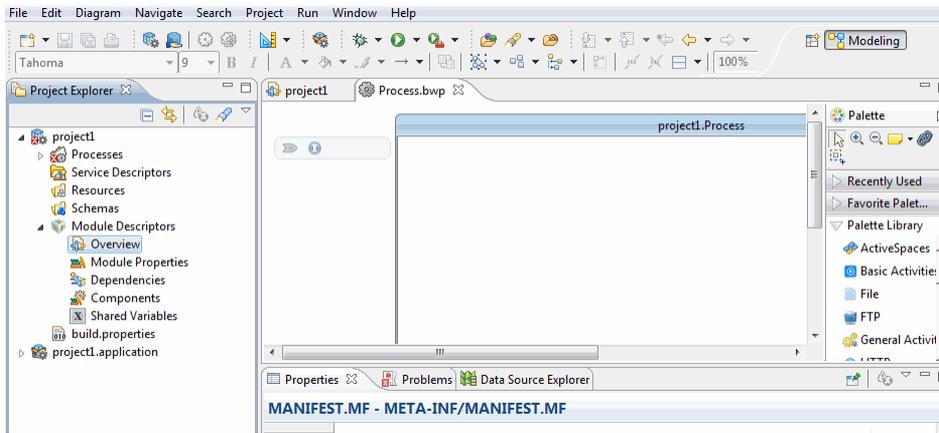


There are several ways to open the New BusinessWorks Application Module dialog and create a new project in TIBCO Business Studio. See the TIBCO ActiveMatrix BusinessWorks documentation for more information.

4. Type a name for the project that you are creating in the **Project name** field.
5. Keep the **Use default location**, **Create empty process**, and **Create Application** check boxes selected. Click **Finish**.

Result

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



Configuring a Process

Processes define the business logic. After creating a project, configure a process by adding activities, conditions, and services.

Procedure

1. Select an activity from the Palette view and drag it to the Process editor.
For example, select and drag the Timer activity from the General Activities palette, and the Cleanse activity from the Trillium palette.
2. Drag the  icon to create a transition between the Timer activity and the selected activity.
You can also click  in the Palette view to create a transition.
3. Configure the added activities, as described in [Trillium Palette](#).
4. Click **File > Save** to save the project.

Debugging and Running a Process

You can debug your BusinessWorks applications to check if the configurations are correct.

Procedure

1. Open the process you have configured in TIBCO Business Studio.
2. On the toolbar, click **Debug > Debug Configurations**.
3. In the Debug Configurations dialog, click **BusinessWorks Application > BWApplication** in the left panel.
4. In the **Applications** tab in the right panel, select the applications you want to debug.
5. Click **Debug**.
TIBCO Business Studio changes to the Debug perspective. Logs are displayed in the Console view.

Checking Output of an Activity

After debugging the application, you can check the output of activities.



You can also check the activity output in the plug-in logs. See [Managing Logs](#) for more information.

Procedure

1. In the Debug perspective, expand **BWApplication**, and click the activity in the upper-left panel.

2. In the upper-right panel, click the **Job Data** view and click **Output**.

Result

The output of the activity is displayed.

Deploying an Application

After deploying BusinessWorks applications, you can manage the applications by using TIBCO Enterprise Administrator.

Prerequisites

The following tasks are required before deploying applications:

- [Creating a Project](#)
- [Generating an EAR File](#)

A typical workflow of deployment includes:

1. Uploading an EAR file.
2. Deploying an application.
3. Starting an application.

You can deploy an application EAR file by using the command-line mode with the **bwadmin** utility. See *TIBCO ActiveMatrix BusinessWorks Administration* for more details about how to deploy an application.

Generating an EAR File

Application archives are enterprise archive (EAR) files that are created in TIBCO Business Studio. An EAR file is required when deploying an application.

Prerequisites

An application project has already been created, as described in [Creating a Project](#).



There are many ways to generate an EAR file, the following is one method. See *TIBCO ActiveMatrix BusinessWorks Administration* for more information.

Procedure

1. Go to the File Explorer view and click the **Open Directory to Browse**  icon.
2. Select the folder where you want to generate the EAR file and click **OK**.
A new folder is displayed in the File Explorer view.
3. Drag the application from the Project Explorer view to the new folder in the File Explorer view.
The EAR file is generated with the name `<name>.<application>_<version>.ear`.

Trillium Palette

Trillium Palette includes the Cleanse, Match Window and Match Reference activities.

Cleanse Activity

You can use the Cleanse activity to send data to a Cleanser service running on Trillium Software Director and receive cleansed data. Data is cleansed according to the rules set on the target Cleanser server.

General

The **General** tab contains the following fields:

Field	Module Property?	Description
Name	No	The name to be displayed as the label for the activity in the process.
System ID	Yes	A single character identifier of the Cleanser server that you want to connect to.
Server Name	Yes	The name of the Cleanser server that you want to connect to.

Description

In the **Description** tab, you can provide a short description for this activity.

Input Editor

In the **Input Editor** tab, you can create a new schema or update an existing schema by adding new elements, whose schemas have been defined by a Cleanser server. For the input elements, you have to select **String** in the data type field. For more information, see *TIBCO ActiveMatrix BusinessWorks Development*.

Output Editor

In the **Output Editor** tab, you can create a new schema or update an existing schema by adding new elements, whose schemas have been defined by a Cleanser server. For the input elements, you have to select **String** in the data type field. For more information, see *TIBCO ActiveMatrix BusinessWorks Development*.

Input

In the **Input** tab, elements will be shown as configured in **Input Editor** and you can also provide values for those elements.

Output

In the **Output** tab, elements will be shown as configured in **Output Editor**.

Fault

The **Fault** tab lists two types of errors.

Error	Description
Trillium Exception	This error is returned from Trillium Software Director. For a complete list of errors from Trillium Software Director, see <i>TS Director SDK Reference Guide Version 15</i> .
Trillium Plugin Exception	This error is returned from the plug-in.

Match Window Activity

You can use the Match Window activity to send multiple records to a Matcher service running on Trillium Software Director and return zero or more matches from a match window of records identified by the Matcher server. When it finds duplicate data during the match process, it adds the records to the match window and generates a unique key for each record.

General

The **General** tab contains the following fields:

Field	Module Property?	Description
Name	No	The name to be displayed as the label for the activity in the process.
System ID	Yes	A single character identifier of the Matcher server that you want to connect to.
Server Name	Yes	The name of the Matcher server that you want to connect to.

Description

In the **Description** tab, you can provide a short description for this activity.

Input Editor

In the **Input Editor** tab, you can create a new schema or update an existing schema by adding new elements, whose schemas have been defined by a Matcher server. For the input elements, you have to select **String** in the data type field. For more information, see *TIBCO ActiveMatrix BusinessWorks Development*.

Output Editor

In the **Output Editor** tab, you can create a new schema or update an existing schema by adding new elements, whose schemas have been defined by a Matcher server. For the input elements, you have to select **String** in the data type field. For more information, see *TIBCO ActiveMatrix BusinessWorks Development*.

Input

In the **Input** tab, elements will be shown as configured in **Input Editor** and you can also provide values for those elements. Multiple records can be sent to **Match Window**.

Output

In the **Output** tab, elements will be shown as configured in **Output Editor**.

Fault

The **Fault** tab lists two types of errors.

Error	Description
Trillium Exception	This error is returned from Trillium Software Director. For a complete list of errors from Trillium Software Director, see <i>TS Director SDK Reference Guide Version 15</i> .
Trillium Plugin Exception	This error is returned from the plug-in.

Match Reference Activity

You can use the Match Reference activity to access a Matcher server running on Trillium Software Director. It finds out many records in the match window and returns matched patterns for the matching candidate.

General

The **General** tab contains the following fields:

Field	Module Property?	Description
Name	No	The name to be displayed as the label for the activity in the process.
System ID	Yes	A single character identifier of the Matcher server that you want to connect to.
Server Name	Yes	The Matcher server name that you want to connect to.
Window Size	Yes	The number of records for the match window. The default window size is 1000 and it only supports positive integers.  If you set the window size to 0, the plug-in returns the default maximum window size on the server.
Match Level	Yes	The match level to be performed: One or Two. It defaults to Level One. <ul style="list-style-type: none"> Level One is used for the household matching. Level Two is used for the individual person matching.

Description

You can provide a short description for this activity in the **Description** tab.

Input Editor

In the **Input Editor** tab, you can create a new schema or update an existing schema by adding new elements, whose schemas have been defined by a Matcher server. For the input elements, you have to

select **String** in the data type field. For more information, see *TIBCO ActiveMatrix BusinessWorks Development*.

Input

In the **Input** tab, elements will be shown as configured in **Input Editor** and you can also provide values for those elements. Multiple records can be sent to **Match Window**.

Output

In the **Output** tab, elements will be shown as configured in **Input Editor**.

Fault

The **Fault** tab lists two types of errors.

Error	Description
Trillium Exception	This error is returned from Trillium Software Director. For a complete list of errors from Trillium Software Director, see <i>TS Director SDK Reference Guide Version 15</i> .
Trillium Plugin Exception	This error is returned from the plug-in.

Working with Sample Project

A sample project is shipped with the plug-in. Working through the sample project helps you understand how TIBCO ActiveMatrix BusinessWorks Plug-in for Trillium works.

TIBCO ActiveMatrix BusinessWorks Plug-in for Trillium packages one sample project. The sample project is located in the `TIBCO_HOME\bw\palettes\trillium\version_number\sample` directory.

The sample project includes the following two processes:

- The `Cleaserecords` process shows how to use the `Cleanse` activity to cleanse data. See [Working with CleanseRecords Process](#).
- The `Matchrecords` process shows how to use `MatchWindow` and `MatchReference` activities to match data with different methods. See [Working with MatchRecords Process](#).



Before working with the plug-in sample project, you might have to deploy a Trillium sample project to Real-time on Trillium Software Director. For more information about how to deploy a Trillium sample project on Trillium Software Director, see Trillium Software Director Documentation.

Importing Sample Projects

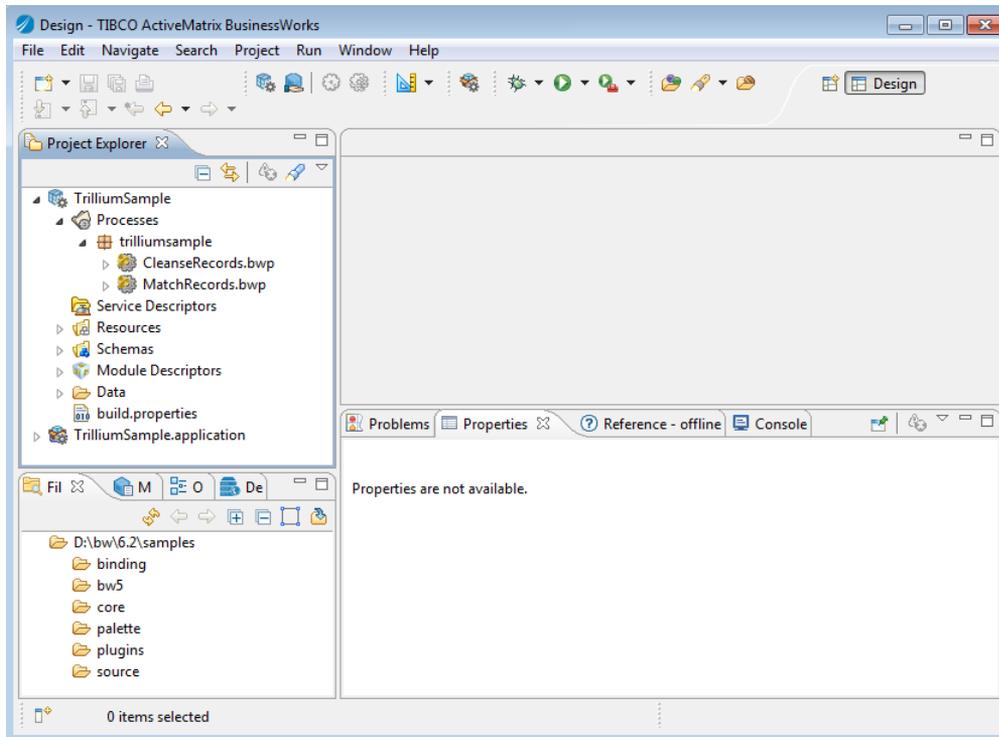
Before running the project, import the sample project to TIBCO Business Studio.

Procedure

1. Open TIBCO Business Studio 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 dialog, expand the **General** folder, and select the **Existing Studio Projects into Workspace** item. Click **Next**.
4. Click **Browse** next to the **Select archive file** field to find the sample. Click **Finish**.
The sample project is located in the `TIBCO_HOME\bw\palettes\trillium\version_number\sample` directory.

Result

The sample project is imported to TIBCO Business Studio.



Configuring Module Properties

You must configure the module properties before running the the sample project.

Prerequisites

Before configuring the module properties, you must import the sample project to TIBCO Business Studio. See [Importing the Sample Project](#).

Procedure

1. Extract the sample project files from the TrilliumSample archive file to your sample project folder. Ensure that the sample project folder contains two subfolders: `TrilliumSample` and `TrilliumSample.application`.
2. In the Project Explorer view, expand **TrilliumSample > Module Descriptors**, and then double-click **Module Properties**.
3. In the **User** tab, double-click the default value, and then change it to the full path of your sample project folder.
For example, if you extract the files from the TrilliumSample archive file to your sample project folder `D:\Temp`, you have to change your default value to `D:\Temp`.

Working with CleanseRecords Process

The sample process shows how to cleanse data.

Prerequisites

Before running the sample project, you must import the sample project and configure the module properties. See [Importing Sample Project](#) and [Configuring Module Properties](#).

Procedure

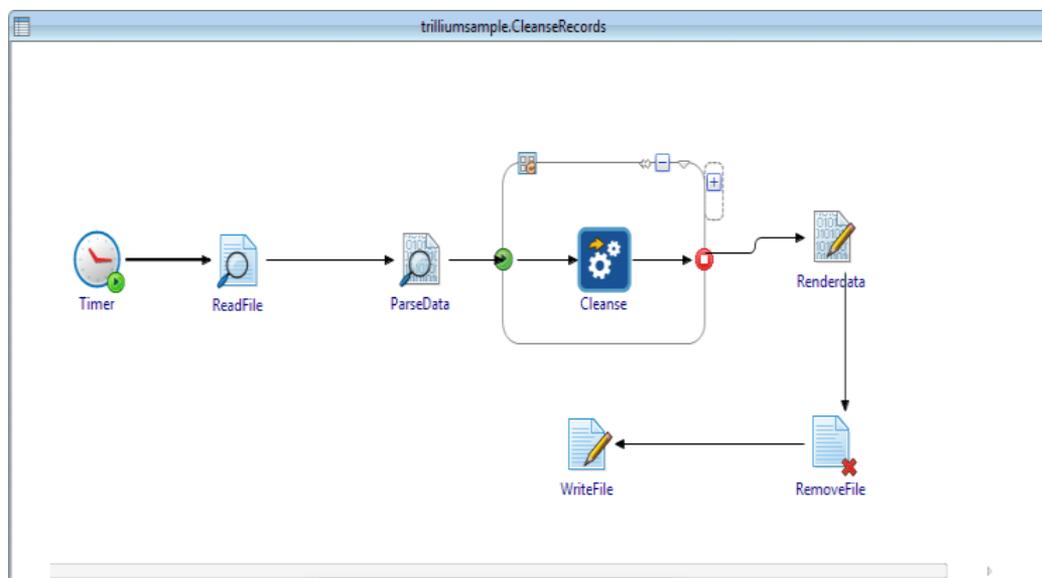
1. Expand the TrilliumSample project in Project Explorer.
2. Double-click **Processes > trilliumsample > CleanseRecords.bwp**.
3. Expand **Module Descriptors** and double-click **Components**.
4. Ensure only the CleanseRecords component is selected in the Component Configurations area.
5. Click **Run > Run Configurations**.
6. Expand **BusinessWorks Application** and click **BWApplication**.
7. Ensure only the TrilliumSamples.application is selected in the **Applications** tab.
8. Click **Run**.
9. Click **Terminate**  to stop the process.

Result

The processed file is generated into the Data folder under the TrilliumSample folder.

Configurations for CleanseRecords Process

The CleanseRecords process contains the following activities.



Activity	Description
Timer	Starts the process at a specific time.
ReadFile	Reads the RecordsToCleanse.csv file located in the TrilliumSample \Data folder.
ParseData	Takes the input from the RecordsToCleanse.csv file and processes it by converting it into a specified schema tree.
Cleanse	Sends data to a Cleanse server running on Trillium Software Director and receives cleansed data.

Activity	Description
Renderdata	Takes an input of a data schema and renders it as a text string.
RemoveFile	Deletes the cleansed file.
WriteFile	Generates the <code>CleansedRecords.csv</code> file located in the <code>TrilliumSample\Data</code> folder .

Working with MatchRecords Process

The sample project shows how to match data.

Prerequisites

Before running the sample project, you must import the sample project and configure the module properties. See [Importing Sample Project](#) and [Configuring Module Properties](#).

Procedure

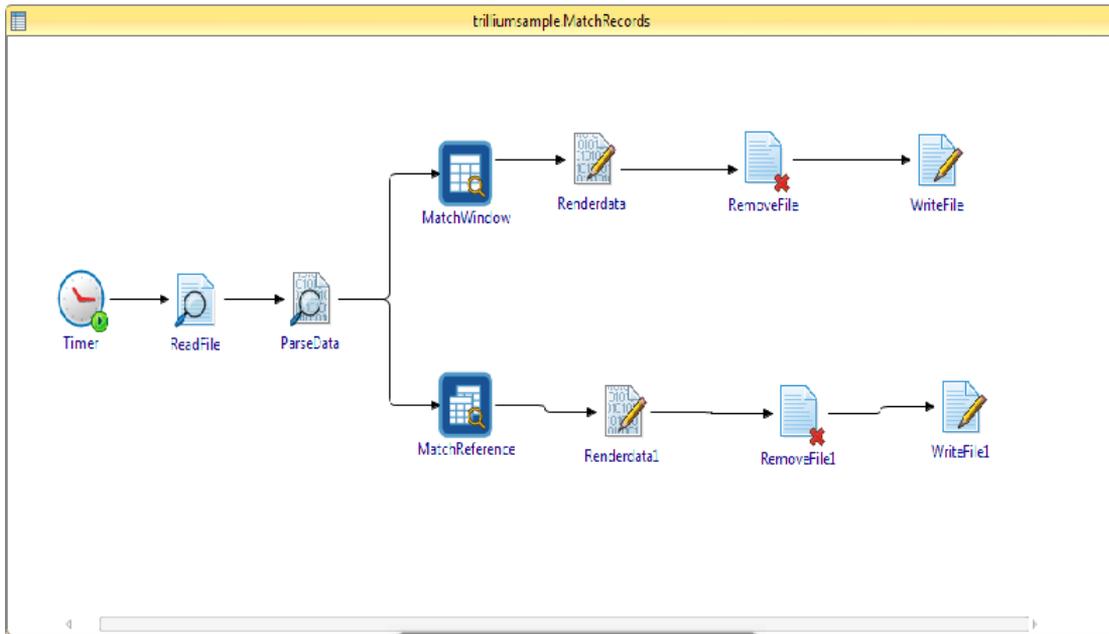
1. Expand the TrilliumSample project in Project Explorer.
2. Double-click **Processes > trilliumsample > MatchRecords.bwp**.
3. Expand **Module Descriptors** and double-click **Components**.
4. Ensure only the MatchRecords component is selected in the Component Configurations area.
5. Click **Run > Run Configurations**.
6. Expand **BusinessWorks Application** and click **BWApplication**.
7. Ensure only the TrilliumSamples.application is selected in the **Applications** tab.
8. Click **Run**.
9. Click **Terminate**  to stop the process.

Result

The processed file is generated into the `Data` folder under the `TrilliumSample` folder.

Configurations for MatchRecords Process

The MatchRecords process contains the following activities.



Activity	Description
Timer	Starts the process at a specific time.
ReadFile	Reads the MatchWindowRecords.csv file located in the TrilliumSample\Data folder.
ParseData	Takes the input from the MatchWindowRecords.csv file and processes it by converting it into a specified schema tree.
MatchWindow	Sends data to a Matcher service running on Trillium Software Director, finds out many records in the match window and returns matched patterns.
Renderdata	Takes an input of a data schema and renders it as a text string.
RemoveFile	Deletes the matched output file.
WriteFile	Generates the MatchedWindowRecords.csv file located in the TrilliumSample\Data folder.
MatchReference	Sends data to a Matcher service running on Trillium Software Director, finds out many records in the match window and returns matched patterns for the matching candidate.
Renderdata1	Takes an input of a data schema and renders it as a text string.
RemoveFile1	Deletes the matched output file.

Activity	Description
WriteFile1	Generates the MatchedReferenceRecords.csv file located in the TrilliumSample\Data folder.

Managing Logs

Logs are used to trace and troubleshoot plug-in exceptions.

A `logback.xml` file is located in the `TIBCO_HOME\bw\version_number\config\design\logback` directory. Update this file to [Setting Up Log Levels](#) and [Exporting Logs to a File](#).

Log Levels

The plug-in captures logs at different levels.

Log Level	Description
Info	Indicates normal plug-in operations. No action is required. 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 occurred. Depending on the severity of the error, the plug-in might continue with the next operation or might stop.
Debug	Indicates a developer-defined tracing message.

Setting Up Log Levels

By default, the log level is `Error`. You can change the log level to trace different messages.



If neither the plug-in log nor the BusinessWorks log is configured in the `logback.xml` file, the error logs of the plug-in are displayed in the Console view by default.

If the plug-in log is not configured but the BusinessWorks log is configured in the `logback.xml` file, the configuration for the BusinessWorks log is implemented by the plug-in.

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 User loggers area to specify the log level for the plug-in.

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

The `level` tag defines the log level and the value is `Error` or `Debug`.



When the `level` is set to `Debug`, the input and output for the plug-in activities are also displayed in the Console view. See [Log Levels](#) for more details regarding each log level.

- Optional: Add the following node in the User loggers area to specify the log level for an activity.

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

For example, if you want to set the log level of the MatchWindow activity to Debug, add the following node:

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



If you do not configure a specific log level for an activity, the activity applies the log levels that you configured for the plug-in.

- Save the file.

Exporting Logs to a File

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

Procedure

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



After deploying an application in TIBCO Enterprise Administrator, navigate to the `TIBCO_HOME\bw\version_number\domains\domain_name\appnodes\space_name\node_name` directory to find the `logback.xml` file.

- Add the following node to specify the file location.

```
<appender name="FILE" class="ch.qos.logback.core.FileAppender">
  <file>c:/bw6-trillium.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 have to add the file name in the file path.

- Add the following node to the root node at the bottom of the `logback.xml` file to export the logs to a file.

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

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

- Save the file.

Error Codes

The error codes are listed with the corresponding descriptions and resolutions.

Error Code	Error Message	Role	Category	Description	Resolution
500001	Connection Exception. Trillium Returned Message : {{0}}-{{1}}	errorRole	Trillium Exception	The error occurs when a client connects to Trillium Software Director.	For a complete list of errors from Trillium Software Director, see <i>TS Director SDK Reference Guide Version 15</i> .
500002	Trillium Exception. Trillium Returned Message : {{0}}-{{1}}	errorRole	Trillium Exception	The error returns from Trillium Software Director.	For a complete list of errors from Trillium Software Director, see <i>TS Director SDK Reference Guide Version 15</i> .
500003	Plugin Exception. The Exception Detail : {{0}}	errorRole	Plugin Exception	The error returns from the plug-in.	Check if the plug-in activity configuration is correct or not.