

Version 9 Release 1.2
February, 2016

*IBM Opportunity Detect Administrator's
Guide*

IBM

Note

Before using this information and the product it supports, read the information in "Notices" on page 91.

This edition applies to version 9, release 1, modification 2 of IBM Opportunity Detect (product number 5725-D16) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Chapter 1. About IBM Opportunity Detect

IBM® Opportunity Detect enables you to look for specified customer behaviors and patterns in your customer data. You define the transactions and patterns that Opportunity Detect looks for, and you specify the data that is written to the database or web servlet when those criteria are met.

You use Opportunity Detect components to build trigger systems in workspaces. When you run a workspace, its trigger systems apply your business logic to streams of data from your transaction and profile data feeds.

Opportunity Detect uses IBM InfoSphere® Streams technology for enhanced performance.

Streams is an advanced analytic platform that allows Opportunity Detect to quickly ingest, analyze and correlate information as it arrives from batch and real time sources. The solution can handle very high data throughput rates.

Integration with IBM Campaign

You can integrate Opportunity Detect with IBM Campaign.

You can use the Expanded Outcome data source connector to store the Outcome data in database tables that Campaign can use. See the section on Expanded Outcome tables in the *IBM Opportunity Detect User's Guide* for details about this integration.

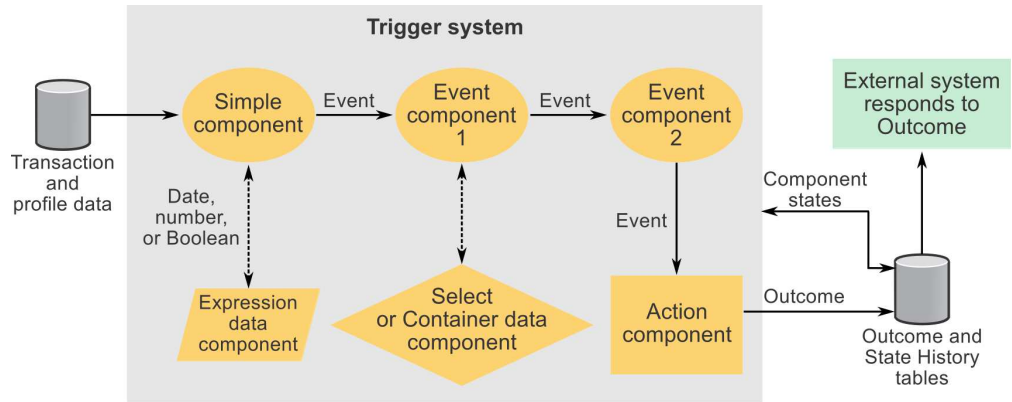
Note: Another product, IBM Interact Advanced Patterns, provides integration with IBM Interact. With this integration, you can apply Pattern component logic to data sent from Interact in real time. See the *IBM Interact and IBM Interact Advanced Patterns Integration Guide* for details.

Trigger system basics

A trigger system is comprised of configurable components. When a trigger system runs, it produces State History and Outcome data.

State History data is the saved results of processing some components; the system uses this information in subsequent runs. Outcome data can be used by external systems to respond to customer activity.

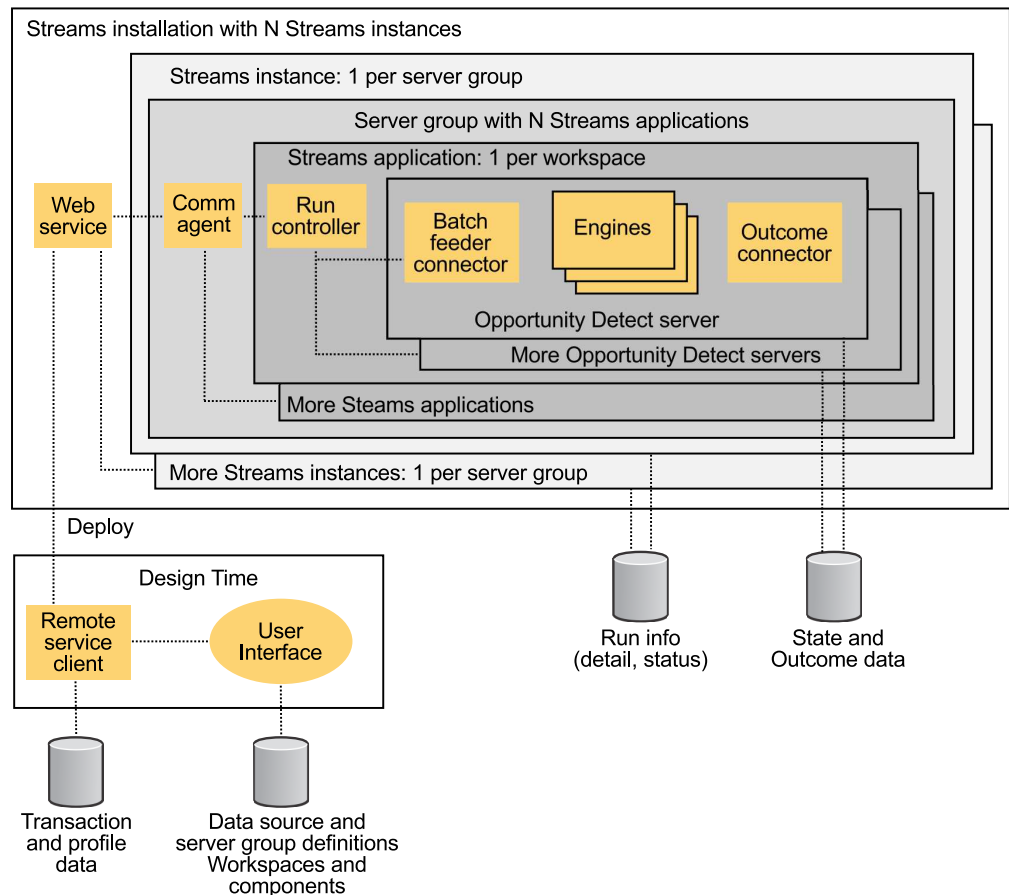
The following diagram illustrates a basic trigger system.



IBM Opportunity Detect architecture

IBM Opportunity Detect uses IBM InfoSphere Streams, a high-performance computing platform. Multiple instances of the Opportunity Detect engine can run in servers in a Streams instance. You can define multiple server groups and specify the data they can access. You can also specify which server group processes your Opportunity Detect workspace.

The following diagram provides a high-level overview of Opportunity Detect architecture for batch mode.



Locale in Opportunity Detect

Opportunity Detect supports several locales for transaction and profile data.

When you create a File type of data source connector, you can select a locale for the data in these files.

Note that full support for any character set in Opportunity Detect also depends on the configuration of the following.

- The Opportunity Detect system table database.
- The client machines and browsers used to access Opportunity Detect.

Enable cookies

Enable cookies in your browser to take advantage of all of the features provided in the Opportunity Detect user interface.

Chapter 2. Opportunity Detect roles and permissions

The permissions assigned to users in Opportunity Detect determine what areas of the application they can access and the actions they can perform.

You manage user application access by assigning the desired roles and permissions to individual users, or by assigning users to groups that have the desired roles and permissions. You can use the default roles, or create custom roles with the permissions that you specify. You can not create custom permissions, only custom roles.

You manage roles and permissions from the Users, User Groups, and User Roles & Permissions pages. All of these pages are available under the **Settings** menu.

Tip: For help when you work on these pages, click **Help > Help for this page**, or see the *IBM Marketing Platform Administrator's Guide*.

Permissions for Opportunity Detect

The following table describes permissions that you can assign to roles in Opportunity Detect.

All permissions that have the **Not Granted** status are treated as **Denied**.

Table 1. Permissions in Opportunity Detect

Permission	Description
View only	Can access all of the user interface, in view-only mode.
Design triggers	<ul style="list-style-type: none">• Can create workspaces and design trigger systems.• Can create, modify, and delete all trigger related resources.• Can access Workspace, Component, Audience Level, Data Source, and Named Value List pages.• Can not access the Server Groups page or the Deployment tab of a workspace.• Can not set off a batch run.• Can not administer objects that the web service creates when Opportunity Detect is integrated with Interact.
Run for testing	<ul style="list-style-type: none">• Deploy deployment configurations and run batch deployment configurations on server groups not designated for production.• Can access Server Group page and the Deployment tab of a workspace, but can not designate a server group for production.• Can not deploy deployment configurations or run deployment configurations that use a production server group.
Run for production	<ul style="list-style-type: none">• Deploy deployment configurations and run batch deployment configurations on any server group.• Perform all actions on the Server Group page and the Deployment and Batch Run tabs of a workspace, including designating a server group for production.

Table 1. Permissions in Opportunity Detect (continued)

Permission	Description
Administer real time	<p>Manage objects that the web service creates when Opportunity Detect is integrated with Interact to enable real time mode.</p> <p>Allows the following.</p> <ul style="list-style-type: none"> • Delete workspaces and components created by the web service. • Start and stop real time deployment configurations and update their log level. <p>The user with this permission alone can not start runs for real time deployment configurations.</p> <p>No one, even with this permission, can do any of the following.</p> <ul style="list-style-type: none"> • Delete and update audience levels, data sources, named value lists, server groups, or deployment configurations created by the web service. • Create and deploy deployment configurations created by the web service.

Related concepts:

“Built-in roles in Opportunity Detect”

Built-in roles in Opportunity Detect

Four built-in roles are included with Opportunity Detect.

In addition, you can create roles with permissions that you specify. See the *IBM Marketing Platform Administrator’s Guide* for details on creating custom roles.

The following table shows the permissions assigned to each built-in role.

Table 2. Built-in roles in Opportunity Detect

Role	Permissions
OpDetectViewer	<ul style="list-style-type: none"> • View only
OpDetectTestDesigner	<ul style="list-style-type: none"> • View only • Design triggers • Run for testing
OpDetectProductionDesigner	<ul style="list-style-type: none"> • View only • Design triggers • Run for production
OpDetectAdmin	<ul style="list-style-type: none"> • View only • Design triggers • Run for testing • Run for production • Administer real time

Related reference:

“Permissions for Opportunity Detect” on page 5

Chapter 3. Data source setup in Opportunity Detect

To set up data sources for IBM Opportunity Detect, you configure them in the user interface, including setting up connections to the databases that hold run detail, State History, and Outcome data.

To develop data feeds, you must identify the operational systems, databases, and tables that hold the feed data you want to use. If you plan to use flat files, you must extract this data into flat files in the required format, with the required file names.

The following table describes the input and output data you set up in Opportunity Detect.

Note: All of your database tables must be of the same type. If you use DB2 for your system tables, Oracle is not supported for profile or lookup tables. If you use Oracle for your system tables, DB2 is not supported for profile or lookup tables.

Table 3. Types and formats of data used in Opportunity Detect

Type	Description	Allowed formats
Input data		
Your profile and transaction files must be accessible from the machine on which the Opportunity Detect run time component is installed.		
Transaction data	Customer activities, obtained from your organization's operational system. At least one transaction data source is required to run a workspace.	<ul style="list-style-type: none"> • Flat file • A message from a queue server • A message from the IBM Opportunity Detect web service
Profile data	Customer attributes. Examples of profile data are age, home address, and telephone number. Optional.	<ul style="list-style-type: none"> • Flat file • Database tables <p>If a queue or the Web Service data source connector is used for transaction data, the associated profile data must be in a database table.</p>
Lookup data	An auxiliary table that holds static data, and is used to look up values.	<ul style="list-style-type: none"> • Database tables
Output data (system tables)		
State History	Data needed for component processing. You can share State History tables with multiple workspaces for development and test purposes, and set up one or more State History tables for exclusive use by the production environment.	<ul style="list-style-type: none"> • Database tables
Outcomes	Data produced by trigger systems, for use by external systems. You can share Outcome tables with multiple workspaces for development and test purposes, and set up one or more State History tables for exclusive use by the production environment.	<ul style="list-style-type: none"> • Database tables • A message from a queue server • A message from the IBM Opportunity Detect web service

Table 3. Types and formats of data used in Opportunity Detect (continued)

Type	Description	Allowed formats
Run detail	Data produced by the engine, containing information about workspace runs. The table is created in the run time database automatically during installation. When you set up data sources, you define a database connection for the run time database and associate it with the server group.	<ul style="list-style-type: none"> Database tables

Data source configuration roadmap

You configure data sources in Opportunity Detect as described in this roadmap. When you have finished this process, you can build, deploy, and run trigger systems, as described in the *IBM Opportunity Detect User's Guide*.

You can access all of the configuration tools mentioned here by navigating to the **Settings > Detect Settings** page.

You must have appropriate permissions to access the configuration tools. The following built in roles allow the user to access these tools.

- **OpDetectAdmin**
- **OpDetectTestDesigner**
- **OpDetectProductionDesigner**

If you use a custom role, it must have either of the following permissions.

- **Run for testing**
- **Run for production**

Table 4. Data source configuration roadmap

Step	Where to find details
Set up your State History and Outcome database tables. Required.	"Setting up State History and Outcome tables" on page 11
On the Audience Levels page, configure audience codes. Required.	"Configuring audience level codes" on page 12
On the Named Value Lists page, create display names for pre-defined values in your transaction and profile data sources. Optional.	"Configuring named value lists" on page 14
On the Data Sources page, identify the fields in your transaction and profile data sources and specify display names. Required.	"Defining data sources" on page 15
On the Server Groups page, define database connections, data source connectors, and server groups, and map connectors to data sources. Required.	"Configuring server groups and data source connections" on page 17

Table 4. Data source configuration roadmap (continued)

Step	Where to find details
Set up your transaction and profile data feeds. Required.	<ul style="list-style-type: none"> • If you use the flat file format, ensure that the files meet the requirements for data used in Opportunity Detect. <ul style="list-style-type: none"> – “Naming requirements for profile and transaction files” on page 24 – “Data requirements for profile and transaction files” on page 25 – “Profile data” on page 26 • If you use the web service connector for transactions, see the <i>IBM Opportunity Detect Administrator’s Guide</i> for details about the Java classes that must be developed to use the Web Service data source connector.

Setting up State History and Outcome tables

Use this procedure to edit the SQL scripts provided for creating your State History and Outcome tables and to run the scripts against your database.

Before you begin

You must set up a data source connection on the Server Groups page for each database where you create these tables.

About this task

You do not need to use this procedure to set up Outcome tables if you use the Opportunity Detect Web Service data source connector for your Outcome data, because the data is sent to the Java class you develop.

Procedure

1. Open the SQL scripts in a text editor and edit them as described in the comments in the files.

The scripts are located in the `database/database type/RunTime` directory under your Opportunity Detect run time installation. Edit the following scripts.

- `OutcomeTable.sql`-Use this script to create the Outcome table when you use the Outcome type of data source connector.
- `ExpandedOutcome.sql`-Use this script to create the two Outcome tables when you use the Expanded Outcome type of data source connector.
- `StateTable.sql`-Use this script to create the State History table or tables.

You replace variables with the names you want to give to the tables in the database. Comments in the scripts provide instructions.

2. Run the scripts against the database you have configured to hold your State History and Outcome data.

Audience level codes

Audience codes represent the various audience levels defined in your data. Opportunity Detect groups data sources based on the audience code associated with them.

About audience levels

An audience level is composed of a key or database table field that uniquely identifies a member of that audience level. For example, your organization could use the audience levels Household, Customer, and Account. Each of these levels represents a different view of your marketing data.

Audience levels are typically organized hierarchically. Using the examples above, you might have the following hierarchy.

- Household is at the top of the hierarchy, and each household can contain multiple customers.
- Customer is next in the hierarchy, and each customer can have multiple accounts.
- Account is at the bottom of the hierarchy.

Other, more complex examples of audience hierarchies exist in business-to-business environments, where audience levels may need to exist for businesses, companies, divisions, groups, individuals, accounts, and so on.

These audience levels may have different relationships with each other, for example one-to-one, many-to-one, or many-to-many. By defining audience levels, you allow these concepts to be represented within Opportunity Detect, so users can manage the relationships among these different audiences for targeting purposes. For example, although there might be multiple customers per household, you might want to limit contact to one customer per household.

Note: IBM Services can advise you on the audiences you need to define for your system.

How audiences are associated with data sources

When you define your data sources on the Data Sources page, you specify the fields you want to use in Opportunity Detect. When you specify an audience ID field, you associate that field with an audience level defined in Opportunity Detect.

Audience codes for internal use

Opportunity Detect includes a pre-defined audience code: n. The n code is used internally by the system and is read-only. You must create additional audience codes to represent the audience levels in your data.

Also, the letter i is reserved for real time mode, and signifies the audience used for the audience level used by Interact when integration is enabled. You should not use i when configuring your audience levels for batch mode.

Configuring audience level codes

Use this procedure to specify audience level codes in Opportunity Detect.

Procedure

1. Log in to Opportunity Detect and go to the **Settings > Detect Settings > Audience Levels** page.
2. Click **Add Audience Level**.
3. Give the audience level a name and a code.

The audience code must be a single alphanumeric ASCII character, lower case (0-9, a-z except i).

4. Click **Save and Close**.

Named value lists enable display names for predefined field values

When users of Opportunity Detect work with components to build trigger systems, they can select data fields from drop-down lists in the component editors. If a data source includes a field with predefined values, you can create a named value list to assign display names to these values.

The display names are what the user sees when working with component editors. Display names make the component-building process more intuitive.

Named value lists are reusable. For example, you might have several transaction data sources that have a Boolean field where the predefined values are 0 and 1, where 1=true and 0=false. In this case, you can create a named value list that you associate with these fields in several transaction data sources.

Named value list example

For example, you might have a field in a data source that is named FREQUENCY. This field contains three predefined values, which have the following significance.

- F for customers who interact with your company frequently
- A for customers whose interaction frequency is average
- I for customers who interact with your company rarely

To help users understand what these values mean, you can map each value to a display name. You might create a named value list called Frequency and map the values as follows.

Table 5. Mapping data to display names

Value	Display name
F	Frequent customer
A	Average customer
I	Infrequent customer

After you map the values, you can associate the list with the field when you define the data source. Then, when a user selects this field in a component editor, the drop-down list that contains the predefined values shows the display names, which are more meaningful to the user than the actual values in the data source.

Predefined lists

Three lists are present when Opportunity Detect is installed, for use in the component editors. The values are mapped to display names as follows, but you can modify the values as needed to reflect your data.

Table 6. Display name mapping in predefined lists

List name	Display name mapping
NUMERIC_YES_NO	<ul style="list-style-type: none">• Yes = 1• No = 0

Table 6. Display name mapping in predefined lists (continued)

List name	Display name mapping
DAY_WEEK_MONTH	<ul style="list-style-type: none"> • Day = day • Week = week • Month - month
HIGH_MED_LOW	<ul style="list-style-type: none"> • High = H • Medium = M • Low = L

Configuring named value lists

Use this procedure to create named value lists in Opportunity Detect.

Before you begin

Obtain the following information about your data.

- Pre-defined values - You need these when you create the named value list items in this procedure.
- Name of the field in your data source that contains predefined values - You need this when you associate the named value list to the appropriate field in your data source.

Procedure

1. Log in to Opportunity Detect and go to the **Settings > Detect Settings > Named Value Lists** page.
2. Click **Add List**.
3. In the Properties panel, give the list a name and description, and specify the data type.
The data type must match the data type of the field in your data source.
4. In the List Items panel, enter a display name and the predefined value that exists in your data source, and click **Add List Item**.
Repeat this step for each predefined value for which you want to create a display name.
5. Click **Save and Close**.

What to do next

When you specify transaction and profile fields on the Data Sources page, associate the named value list with the appropriate field.

Deleting and modifying named value lists

Use this procedure to delete or modify named value lists in Opportunity Detect.

Before you begin

Before you can delete a list or a list item, you must either delete all of the components that use any of the list items, or edit those components to remove the reference to the list item.

The components that use items in a list are shown in the List Item and Component Association panel.

About this task

The predefined lists can be modified, but they not be deleted.

Procedure

1. Log in to Opportunity Detect and go to the **Settings > Detect Settings > Named Value Lists** page.
2. To delete a list, select the list you want to delete, click **Delete List**, and click **OK**.
3. To delete a list item, select the list to which the item belongs, select the item you want to delete, click **Delete List Item**, and click **OK**.

Defining data sources

Use the **Data Sources** page to a define each transaction and profile data source that you want to use in Opportunity Detect.

About this task

When you define the transaction and profile data sources that you want to make available in workspaces, you do the following.

- Specify the type of data source and a display name for the data source.
- Specify every field that you want to make available for use in building trigger systems.
- Optionally, associate named value lists with fields that have predefined values.

Procedure

1. Log in to Opportunity Detect and go to the **Settings > Detect Settings > Data Sources** page.
2. Click **Add Source**.
3. In the Properties panel, give the data source a name and description and specify the content type.

The content type describes how the data is used in Opportunity Detect.

4. In the Fields panel, click **Add Fields**, complete the fields in the Add a Data Source Field window and click **OK**.

Repeat this step for each field that you want to use as a data source.

For every transaction data source, you must define an audience field and a date field.

Profile data sources require only an audience field. Only one profile data source per audience level is supported.

For profile data sources in database tables, the value you enter in the **Name** field must be the same as the corresponding column name in the database.

Optionally, select a named value list to associate with the field, if the field contains predefined values.

5. Click **Save and Close**.

Fields on the Data Sources page

You define data sources on the Data Sources page. If you are unsure of how to complete the fields, use the information provided here.

Table 7. Fields on the Data Sources page

Field	Description
Properties	
Content Type	Select one of the following options. <ul style="list-style-type: none"> • Transaction - Customer transactions. At least one Transaction data source is required to run a workspace. • Profile - Data such as address, age, and gender in an external database table.
Name	Enter a descriptive name for the data source. <ul style="list-style-type: none"> • For profile data sources in database tables, the name must be the same as the corresponding column name in the database. • For transaction data sources, the name does not have to match the field name in the actual flat file or web service message.
Description	Provide a description of the data source.
Add Field	
Name	Provide the physical name of the field in the source database table or flat file. Data source field names should not be assigned so that one name can be found within another. For example, the name date can be found within the name firstdate.
Display Name	Provide a descriptive name. This appears in component editors.
Description	Provide a description of the data source field.
App Type	Select the attribute type from the following options. The options available depend on the Content Type selected for the data source. <ul style="list-style-type: none"> • Audience Id-Select this for audience level fields. • Audience Level-If you select Audience Id as the App Type, select the audience level you want to associate with this field. • Profile Attribute-Choose this type for profile fields that are not audience or date fields. • Transaction Attribute-Choose this type for transaction fields that are not audience or date fields. • Transaction Date-Choose this type for date fields. One date field is required for each transaction data source.
Audience Level	If you selected Audience Id as the App Type, enter the audience level code that applies for the field.

Table 7. Fields on the Data Sources page (continued)

Field	Description
Data Type	<p>Select the type of the data in the field. The options available depend on the App Type selected for the field, and also on the custom data types defined on the Custom Data Types page, if any.</p> <p>The following are the default options.</p> <ul style="list-style-type: none"> • Boolean • Currency • Date • Double • Integer • String <p>The application supports profile data sources in database tables in a variety of database types. The data types shown in this field are generic types that may be different in your database. The system converts the type you select into the correct data type for your database.</p>
Name Value List	<p>Named value lists with a data type that matches the field you are working with are displayed here. If the field contains predefined values, you can associate it with a named value list.</p>

Deleting and modifying data sources

Use this procedure to delete or modify data sources in Opportunity Detect.

Before you begin

If you want to edit a data source that is being used by a component, you must either delete the components that use the data source, or edit those components to remove the reference to the data source.

The components that use the data source are shown in the Source Field and Component Association panel.

Procedure

1. Log in to Opportunity Detect and go to the **Settings > Detect Settings > Data Sources** page and select the data source you want to work with.
2. To delete the whole data source, click **Delete Source** and click **OK**.
3. To add a field, click **Add Field** and click **OK**.
4. To delete a field, select the field, click **Delete Field** and click **OK**.

Configuring server groups and data source connections

Use this procedure to define server groups and connect them to data sources you have configured.

About this task

Server groups are comprised of the following.

- Streams servers that are set up during installation
- Database connections that you create

- Data source connectors that you create and map to data sources

Typically, organizations use different server groups for their development, test, and production environments. Development and test server groups often share Outcome and State History tables, while the production server group normally has its own, exclusive Outcome and State History tables.

Procedure

1. Log in to Opportunity Detect and go to the **Settings > Detect Settings > Server Groups** page.
2. The first time you use the Server Groups page, and whenever you add a new server, click **Synchronize with changed streams configuration** on the Servers tab to refresh the list of servers.
3. On the Database Connections tab, configure a connection for every database containing the following tables that you plan to use with Opportunity Detect.
 - Run time tables
 - Outcome tables
 - State History
 - Profile

You need the database name.

4. On the Data Source Connectors tab, configure connectors for your transaction, profile, Outcome, and State History data.

You do not have to set up a connector for your run time tables.

For transaction and profile data in file format, you specify the encoding, locale, and currency format used in the file. Opportunity Detect constructs the required file name, and you must ensure that your data files use this name.

5. On the Server Groups tab, select a server group to open a panel with four tabs. Configure server groups as follows.
 - a. On the Properties tab, select an available Streams server and instance, and specify whether the server group is used for production.

You can also view a list of workspaces that have deployment configurations associated with the server group.
 - b. On the Servers tab, double-click in the **# of Engines** column to set the number of Opportunity Detect engines to run on this machine.
 - c. On the Database tab, select a run time database and select the database connections you want to make available for table connector mapping.
 - d. On the Data Source Mapping tab, map transaction and profile data sources and your Outcome and State History tables to data source connectors.

Table connectors and flat file connectors enable the system to connect to your Outcome and State History database tables and your transaction and profile files.

Related concepts:

“About data source connectors” on page 22

Related reference:

“Fields on the Server Groups page” on page 19

Fields on the Server Groups page

If you are unsure of how to complete the fields on the Server Groups page, use the information provided here.

Table 8. Server Groups page: Servers tab

Field	Description
Synchronize with changed streams configuration	Click to refresh the list of servers and stream instances.

Table 9. Server Groups page: Database Connections tab.

Tip: If a database connection error occurs, verify that the information entered in these fields is correct.

Field	Description
Add	Click to open a panel where you can add a database connection.
Name	Enter a descriptive name for this database.
Database Type	Select a database type from the drop-down list of supported databases.
Database Name	Enter the name of the database as shown in your database management client. This must exactly match the name as shown in the client. Case-sensitive.
Server Name	Enter the fully qualified name or IP address of the machine that hosts the database server. For example, machine.mycompany.com.
Port	Enter the port on which the database listens. The default port for DB2 is 50000.
User Id	Enter the user name of the database account you want Opportunity Detect to use to access to this database.
Password, Confirm Password	Enter the password for the account you entered in the User ID field.

Table 10. Server Groups page: Data Source Connectors tab

Field	Description
Add	Click to select the type of connector to add. The options are: <ul style="list-style-type: none"> • File • Queue • Table <p>Note: For additional information on setting up queue data source connectors, see Chapter 6, “Real time processing in Opportunity Detect,” on page 51.</p>
Table Connector	
Name	Enter a descriptive name for this table connector. It is a good practice to align this name with the name of the database you plan to associate with the connector.
Type	Select a type from the drop-down list. The options are: <ul style="list-style-type: none"> • State • Profile • Outcome • Expanded Outcome

Table 10. Server Groups page: Data Source Connectors tab (continued)

Field	Description
Table Name	Enter the name of the table as shown in your database management client. This must exactly match the name as shown in the client. Case-sensitive.
Description	Enter a description of the table.
Sharable	Select this checkbox if you want to be able to use this table connector on different server groups.
File Connector	
Name	Enter a descriptive name for the file connector.
File Name	<p>Click the link in this field to open a pop-up window, and complete the following fields.</p> <ul style="list-style-type: none"> • Name - Enter the base file name for this flat file. Permitted characters are ASCII letters, numbers, and underscore. Do not use spaces or any other special characters. • Audience Level - Select from a drop-down list of available audience levels. <p>Opportunity Detect constructs a complete file name from the base name you provide. The name of your file must match the name that Opportunity Detect constructs.</p>
Description	Enter a description of this file.
File Encoding	<p>Select the encoding used in the file from the drop-down list. Options are:</p> <ul style="list-style-type: none"> • Chinese Traditional (Big 5) • Unicode (Little endian) • Unicode (Big endian) • Western European (ISO) • Central European (ISO) • Latin 3 (ISO) • Latin 9 (ISO) • Korean (EUC) • Chinese (GB 18030) • Unicode (UTF-7) • Unicode (UTF-8)
Date Locale	<p>Select from a drop-down list of supported locales. Options are:</p> <ul style="list-style-type: none"> • English (United States) • Chinese (China) • English (United Kingdom) • French • German • Italian • Japanese (Japan) • Korean • Portuguese (Brazil) • Russian • Spanish • Thai

Table 10. Server Groups page: Data Source Connectors tab (continued)

Field	Description
Currency	Select from a drop-down list of supported locales. Options are the same as for Date Locale .

Table 11. Server Groups page: Server Groups tab

Field	Description
Add	Click to open a panel where you can define a server group.
Properties tab	
Name	Enter a descriptive name for the server group.
Stream Instance	Select a stream instance ID. See your administrator if you are not sure which one to select.
Usage	Enter a brief description of how this server group is used. For example, Production or Development.
For Production	Select this checkbox if you want to restrict user's ability to run workspaces on this server, based on their permissions.
Servers tab	
Fully Qualified Name	Double-click in the # of Engines column to set the number of Opportunity Detect engines to run on this machine.
Database tab	
Select Runtime database connection	The run time database holds the tables where your run, run details, and run status data is stored. Select the run time database that you want this server group to be able to access.
Select database connections for table connector mapping	The database connections you check here are the ones that are available when you map a table data source to a connector in the Table Data Source Connector Mapping window.
Data Source Mapping tab	
List of datasources	Click the name of a data source to open a pop-up window where you can map the data source to a connector. Only sharable table connectors are available for mapping in the server group page. A connector can be mapped to only one data source.
Data Source Mapping tab: Table data source connector mapping	
Data Source name	This is a read-only field that contains the name of the data source you clicked to open this window.
Connector	Select from a list of previously configured connectors.
Database connection	Select from a list of previously configured database connections.
Data Source Mapping tab: File data source connector mapping	
Data Source name	This is a read-only field that contains the name of the data source you clicked to open this window.
Connector	Select from a list of previously configured file data source connectors.

Related concepts:

“About data source connectors” on page 22

“About deployment configurations” on page 29

“Audience level codes” on page 11

Related tasks:

“Configuring server groups and data source connections” on page 17

“Configuring audience level codes” on page 12

About data source connectors

Data source connectors enable the system to connect to the transaction, profile, State History, and Outcome data sources that you have defined. The types of data source connectors are described in this section.

Note: For Outcomes, the data source connector you use determines the format of the Outcome data.

File Connectors

Use flat file data source connectors to connect to transaction and profile data that is in file format.

Table Connectors

Use table data source connectors to connect to the following data sources.

- Profile data that is in database table format
- All State History tables
- Outcome data that you want to be written to database tables

You have the option to make table connectors sharable. The sharable feature works as follows.

- A sharable connector can be used in more than one server group.
- Sharable connectors can be mapped on the Data Source Mapping tab of the Server Groups page and on the Deployment tab of a workspace. Table connectors that are not sharable can be mapped only on the Deployment tab of a workspace.

For example, you might want to have connectors for Outcome and State History tables that are not shared and can be used only by the deployment configuration used for production. You might also want sharable table connectors so you can map them to the same Outcome and State History tables for all test workspaces.

Regardless of whether a connector is sharable, a table connector can be mapped to only one data source.

There are four types of table data source connectors.

State

Used to connect to your State History tables.

Profile

Used to connect to your profile data that is in database table format.

Outcome

Used when you want Outcome data to be stored in database tables in the XML format used by previous versions of Opportunity Detect.

Expanded Outcome

Used when you want Outcome data to be stored in database tables in a form that external systems or IBM Campaign can use more easily than the format provided by the Outcome connector.

Web Service

You can use the Web Service connector to connect to transaction and Outcome data coming from or being sent to the Opportunity Detect web service.

If you use the web service for transaction data and you also use profile data, the profile data must be in database table format.

You do not have to create this type of connector. It exists in the system by default.

For details about the Java classes that must be developed to use the Web Service data source connector, see "Web Service data source connector for input and output in Opportunity Detect" in the *IBM Opportunity Detect Administrator's Guide*.

Queue

You can use this connector for real time operation.

For additional information on setting up Queue data source connectors, see "Real time processing in Opportunity Detect" in the *IBM Opportunity Detect Administrator's Guide*.

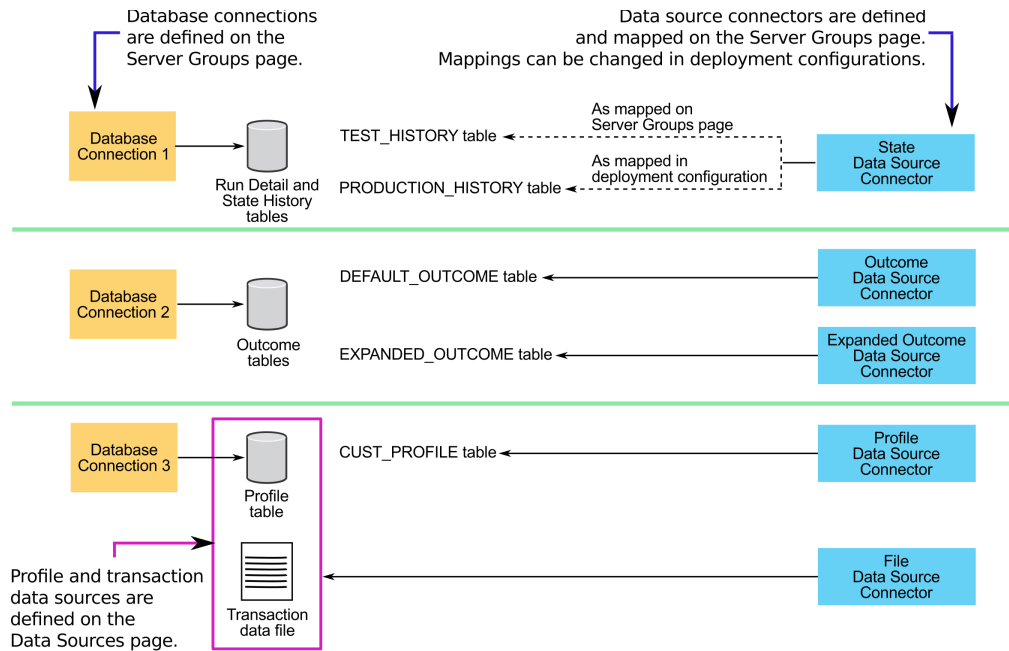
Default TCP Connector

Used by the system with IBM Interact Advanced Patterns when integration with IBM Interact is implemented.

You do not have to create this type of connector. It exists in the system by default.

Example of data source connector configuration

The following diagram illustrates a possible data source configuration, showing the relationship between database connections, data source connectors, and the data sources used in Opportunity Detect.



Related concepts:

Chapter 7, “Web Service connectors for input and output in Opportunity Detect,” on page 61

“About deployment configurations” on page 29

Chapter 5, “Outcome data in Opportunity Detect,” on page 41

Chapter 6, “Real time processing in Opportunity Detect,” on page 51

Related tasks:

“Configuring server groups and data source connections” on page 17

Related reference:

“Fields on the Server Groups page” on page 19

“Fields and buttons on the Deployment tab” on page 35

Naming requirements for profile and transaction files

As part of the process for setting up server groups, you configure a file connector on the Data Source Connectors tab on the Server Groups page. The system uses the name you specify to generate a file name. Ensure that the names of your transaction and profile feed files exactly match the name shown on the Data Source Connectors tab on the Server Groups page.

When you define file data source connectors for server groups, you supply a name. The system expects the names of transaction and profile feed files to contain this name plus additional information, as follows. In this example, *data_source_name* is the name you enter when you define the data source connector.

Detect.audience_code.data_source_name.date

You must use this name format for the transaction and profile feed files that correspond to the data sources that you configure in Opportunity Detect.

Permitted characters for the name you enter are ASCII letters, numbers, and underscore. Do not use spaces or any other special characters

Date portion of the name

The *date* portion of the file name must have this format: YYYYMMDDhhmmss

Names of flat files must contain a date.

The date determines the order in which the files are processed. Files with the same timestamp are processed simultaneously. If you use a profile, you must create one for each set of files with a different timestamp.

During ramp-up, you might process multiple transaction files with different dates in a single run. If you are using profile files, you must include different profile files named with dates that match the date in the names of each of the transaction files.

How flat files are processed

Opportunity Detect uses the *data_source_name* portion of the file name to identify multiple instances of a transaction data source.

You might have a series transaction files, all with exactly the same fields, containing batches of transactions created at different times and using different timestamps in their names. Every time you run a trigger system that uses this data, a file with a different date stamp and/or timestamp would be used.

Data requirements for profile and transaction files

Profile and transaction files have a specified format.

Format requirements

Flat files must have the following format.

- One header that contains the names of the fields in the file. The names must exactly match the names defined in the data source to which the connector is mapped..
- The first field must be the audience ID.
- All record lines must use a delimiter between fields, but not before the first field in the line or after the last field in the line.

The following delimiters are allowed.

- pipe (vertical line: |)
 - comma
 - semi-colon
 - tab
 - space
- A pair of delimiters next to one another indicates the absence of data for the field positioned between those two delimiters. If the first field of the record contains no data, then the line begins with the first delimiter, and if the last field contains no data, then the line ends with the last delimiter.
 - The delimiter must not be used within data fields.

Date field requirement

For transaction files only, one field must be a timestamp field, expressed in milliseconds.

Audience ID field requirement

One field in all data sources must be an ID field used for an audience level, and this must be the first field in each record in the file.

Sort order requirement

The records in a flat file must be sorted by audience ID first, then by transaction timestamp.

Additional considerations

Note the following considerations.

- Opportunity Detect cannot match fields with NULL values when performing comparisons. You must substitute either a single printable character or a character string for the NULL values if you want to use NULL as a condition in comparisons.
- Date fields must be in system-readable date format even if you want those dates to be empty (NULL). You can represent NULL dates as either very old dates or very future dates .
- The date format in date fields must match the date format that is associated with the date locale used in the file connector.
- In distributed environment, all runtime servers must be able to access the profile and transaction files.

Transaction and profile file examples

Note: The following examples are formatted with constant widths for readability. Actual transaction and profile files must not use constant widths.

Here is an example of a simple transaction file.

ID	NAME	CALLED_NUMBER	CALL_LENGTH	TRAN_DATE_TIME
001234	David	732-123-4567	15	2012-02-10 09:12:33
001234	David	732-111-5555	48	2012-02-10 10:11:50
002941	Jeremiah	732-777-8888	40	2012-02-10 11:22:44
005555	Anthony	732-333-4444	27	2012-02-10 03:01:02
005555	Anthony	732-32-8945	121	2012-02-10 10:12:30
005555	Anthony	973-597-0022	2	2012-02-10 19:00:21
006789	Tom	732-111-2222	4	2012-02-10 06:54:01

Here is an example of a simple profile file.

ID	AGE	ZIP
001234	25	11111
002941	55	22222
005555	31	33333
006789	60	44444
100382	18	55555

Profile data

The following requirements apply to all profile data sources used in trigger systems.

- Profile data is not required. However, if profile data is not defined, all the data used in a trigger system (including any required profile data) must be included in the transaction data.
- When profile data is defined, for every customer represented in your transaction file, there must be a single record for that customer in your associated profile. When a transaction file is associated with a profile flat file, the system ignores transaction records without an associated profile record, and ignores profile records without an associated transaction record. In both cases, these orphan records affect processing efficiency.
- When profile data files are used, a profile file must exist for every transaction file. The time portion of the name must match the time in the name of the transaction file. You cannot use the same profile file for different transaction files.

Chapter 4. Deploying and running workspaces

You can create and run deployment configurations and view deployment and batch run history on the Workspaces page.

- On the Deployment tab, you can create deployment configurations for workspaces, deploy the configurations, stop and restart deployments, and view deployment history.
- On the Batch Run tab, you can manage run parameters, run deployed workspaces, see the status of the most recent batch runs, and stop and start ongoing runs.
- On the Batch History tab, you can see details about past runs, filtered by deployment and a date range.

About deployment configurations

Before you can run a workspace to process data, you create a deployment configuration for it and then deploy it.

When you deploy a configuration, the workspace is compiled into a Streams application and sent with all of its component logic to the Streams server.

When a workspace is successfully deployed on the Streams server, you can select and run a saved deployment configuration to run the workspace.

Each workspace has its own configuration deployment, and multiple configuration deployments can be running simultaneously.

Server group availability in deployment configurations

Opportunity Detect environments typically include at least one test server group and one production server group. For any workspace, you can create a deployment configuration for each server group configured in your system.

The server groups available for selection in a deployment configuration are those that are not yet mapped in any deployment configuration for the workspace you are working with. You can use a server group only once for each workspace, but you can use the same server group in deployment configurations for different workspaces.

For best performance, you would normally run only a single workspace on a production server group.

Option to use different configurations for test and production

Using different deployment configurations, you can test components against new data sources, test new components, and test edits to existing components without affecting the production environment.

For example, you can create a deployment configuration that allows you to deploy a workspace to the test server group to test it, and you can create another configuration that allows you to deploy the workspace to the production server group for production runs. By changing data source mappings, you can separate

the test data from the production data in your State History and Outcome tables.

Required permissions

The permissions assigned to a user determine which server groups they can access when creating a deployment configuration, as follows.

- A user with the **Run for testing** permission sees only server groups designated for test usage. The built-in **OpDetectTestDesigner** role has this permission.
- A user with the **Run for production** permission sees only server groups designated for production usage. The built-in **OpDetectProductionDesigner** role has this permission.
- To have access to both test and production server groups, a user must have both of the permissions listed above. The built-in **OpDetectAdmin** role has both of these permissions.

In addition, your system administrator may also create custom roles that include the required permissions.

Related concepts:

Chapter 7, “Web Service connectors for input and output in Opportunity Detect,” on page 61

“About data source connectors” on page 22

Related reference:

“Fields on the Server Groups page” on page 19

Data source connector mapping

Data source connectors can be mapped to different data sources in each deployment configuration, which provides flexibility for testing and ramp-up operations.

Default mappings between data source connections and database tables are set when server groups are configured. However, in deployment configurations, you can change the default mappings for a selected server group. Your changed mappings apply only within the deployment configuration and do not affect the global, default mappings for the server group.

Mapping for testing

Suppose you have a server group named Test. You might want to use one set of State History and Outcome tables with the Test server group in one workspace, and another set of State History and Outcome tables with the Test server group in another workspace.

You can do this by changing the mapping of the data source connector on the Data Source Mapping tab for the deployment configuration.

On the other hand, you might want to use the same State History table for several different test workspaces, to reduce the number of State History tables and data source connectors that you need to create.

Mapping for ramp-up

In Opportunity Detect, ramp-up is the process of accumulating State History data for Container and Pattern components. This enables the system to produce meaningful outcomes quickly, rather than waiting for the history to accumulate over time.

For example, trigger system designers often need to introduce a new trigger system into a production workspace that already includes multiple trigger systems. Suppose that the production workspace consists of 10 trigger systems that have been in production for several months. When a new trigger system is introduced, its history can be ramped up by running it in its own workspace against historical transactions, using the same State History table used for the production workspace.

Because the new trigger system is run in isolation, running it against historical transactions does not affect any of the history of the 10 triggers already in production. After ramp-up, the new trigger can then be copied to the production workspace.

To use this technique, you must mark the State History table **Sharable** in the server group.

Having multiple workspaces run against the same State History table has this limitation: the application does nothing to guard against simultaneous access of the same history record. This means that if two workspaces use the same State History table and process the same set of customer IDs, it is possible for each workspace to access the same history record simultaneously. If two workspaces access the same State History record at the same time, the application does not fail, but some data may not be saved.

If the risk of losing data is small, then you could run two sets of triggers simultaneously for the same set of IDs, one with real time feeds and the other with batch feeds.

The application provides a way to guard against inadvertent access of two workspaces against the same State History table. If a table is not marked **Sharable** in the server group, it can be mapped only on the Deployment tab of a workspace, and it can be used by only one deployment configuration at a time.

Related reference:


“Fields and buttons on the Deployment tab” on page 35

Running workspaces

Use this procedure to run a workspace for test or production purposes.

Before you begin

Only valid workspaces can be run. To be valid, a workspace must contain at least one Simple component and one Action component.

If the workspace was modified after it was deployed, indicated by  next to its name, you must deploy it again for the changes to go into effect when processing transactions.

Procedure

1. Select the workspace you want to run.
The Workspace Manager page opens.
2. On the Batch Run panel, select the deployment configuration you want to run.
Only configurations that have been deployed are available for selection.
3. Complete run parameters as desired.
4. Click **Start**.

Related concepts:

Chapter 5, "Outcome data in Opportunity Detect," on page 41

Related tasks:

"Creating and deploying a deployment configuration" on page 34

Fields and buttons on the Batch Run tab

On the Batch Run tab, you can manage run parameters, run deployed workspaces, see the status of the most recent batch runs, and stop and start ongoing runs.

Table 12. Fields and buttons on the Batch Run tab

Field or button	Description
Deployment Configuration	Select a deployment configuration to run and click Start . Only deployment configurations that are successfully deployed and ready to run are listed. If you expect a deployment configuration to be available and it is not listed, check the Streams server logs and correct any problems. Then, start the deployment configuration and try to perform the run again. If any transaction data source in the deployment configuration has been mapped to the Web Service connector, the deployment configuration is not available for batch runs.
Run Parameters	
Feed Path	Location of the feed files.
Inactivity Mode	If your workspace includes any Forward Inactivity components or Pattern components configured with the negative event mode, to enable the component to process data as expected you must select On in this field and also set the date in the Inactivity Date field.
Inactivity Date	Specifies the date the system uses to check for inactivity. Applies only to workspaces that contain Forward Inactivity components or Pattern components configured with the negative event mode, when the Inactivity Mode field is set to On . It is possible that no transactions for a customer whose transaction has activated the component will be processed when the component is due to fire. In those cases, the system uses the date set in the Inactivity Date field to determine whether the component should fire. Typically, you should set this field to the latest transaction timestamp in the batch file being processed.

Table 12. Fields and buttons on the Batch Run tab (continued)




Field or button	Description
Artificial Transaction	<p>Check this box if your workspace includes any components that use an artificial transaction.</p> <p>You can select the following options.</p> <ul style="list-style-type: none"> • Off - No artificial transaction is set. • End of Day - Sends an artificial transaction to indicate the end of day at the end of each unique transaction date in the feed files. • End of Run - Sends an artificial transaction after all transactions are sent for a user, regardless of how many transaction dates are in the feed files.
System Log Level	<p>Set the logging level for a batch run. Optionally, select a system log level for real time runs. Options are as follows, listed in ascending order of detail.</p> <ul style="list-style-type: none"> • Fatal • Error • Warning • Information • Trace • Debug <p>Raising the log level can affect performance.</p> <p>You can also update the logging level during runs by selecting a deployment and clicking  Update Logging level on the Deployment tab.</p>
Run in Recovery	<p>When this box is selected, if a run fails, and you re-start the run after fixing any problems, the system attempts to resume the run where it left off. You must wait three minutes for the automatic save to complete before attempting to re-start the run.</p>
Batch Notification	<p>Select this box if you have a batch notification file and you want to receive notifications.</p>
Most Recent	
 Stop button	<p>Click to stop a batch run.</p>
 Start button	<p>Click to re-start a batch run that has been stopped.</p>
Run id	<p>Unique identifier for the most recent run.</p>
Detail id	<p>A counter that increments each time a recovery run occurs.</p>
Deployment Configuration	<p>The name of the deployment configuration used for the run.</p>
Start Time	<p>Date and time of the beginning of the run.</p>
End Time	<p>Date and time of the end of the run.</p>
Run Time	<p>Duration of the run.</p>

Table 12. Fields and buttons on the Batch Run tab (continued)

Field or button	Description
State	<p>During the run, this column may display a variety of interim states. When a run ends, the state is one of the following.</p> <ul style="list-style-type: none"> • Run Success • Run Failed

Related reference:

“Fields and buttons on the Deployment tab” on page 35

“Fields on the Batch History tab” on page 38

The profile data refresh mechanism


Opportunity Detect automatically refreshes profile data every six hours. If you require an immediate refresh of profile data, you can stop and restart your deployment.

Creating and deploying a deployment configuration

Use this procedure to create and deploy a deployment configuration.

Procedure



1. Select the valid workspace for which you want to create a deployment

configuration and click  **Add a Deployment Configuration** on the Deployment tab.

A panel opens with three tabs: Properties, Data Source Mapping, and History.

2. Complete the fields on the Properties tab and select a server group.
The type of data source connector that you choose for the **Input mode** field determines what connector types are valid for the data sources in your workspace.
3. If you want to override the default data source mapping for the server group, do the following.
 - a. On the Data Source Mapping tab, select the data source you want to change.
 - b. Clear the Server Group Default checkbox.
 - c. Select an alternate mapping for the data source and click **OK**.
Note the following restrictions.
All transaction (input) data sources must be mapped to same connector type.
The system enforces restrictions on what combinations of data source connectors you can use for transaction, profile, Outcome, and State History data sources.

These changes apply only within the deployment configuration; they do not affect the default mappings for the server group.

4. Click  **Save** and then click  **Deploy**.

What to do next

When the deployment configuration is successfully deployed, you can use it to run your workspace.

Related tasks:

“Running workspaces” on page 31

Fields and buttons on the Deployment tab

On the Deployment tab of a workspace, you can create deployment configurations for workspaces, map data source connectors within the deployment configuration, deploy the configurations, stop and restart deployments, and view deployment history.

Table 13. Fields and buttons on the Deployment tab








Field or button	Description
 Add button	Click to open a panel where you can create a deployment configuration.
 Save button	Click to save a deployment configuration.
 Delete button	Click to delete the selected deployment configuration.
 Deploy button	Click to deploy the selected deployment configuration.
 Start button	Click to re-start a deployment that has been stopped.
 Stop button	Click to stop a running deployment.
 Update logging level	Click to update the logging level during a run. Raising the log level can affect performance.
Status	Indicates whether all data sources are mapped for the deployment configuration. You can not deploy an incomplete deployment configuration.
Deployment Configuration	Names of the available deployment configurations. Select the radio button next to a name to select the deployment configuration, after which you can deploy it, run it, or modify its properties in the panel that opens.
Server Group	Name of the server group the selected deployment uses.
Deployed	Indicates whether the selected configuration has been deployed.

Table 13. Fields and buttons on the Deployment tab (continued)

Field or button	Description
Version	For batch runs, this number shows the version number of the most recent successful deployment. When Opportunity Detect is integrated with Interact, the number shows the version most recently deployed, re-deployed, or undeployed from IBM Interact.
Input mode	The input mode selected on the Properties tab of the deployment configuration.
Input version	The input version entered on the Properties tab of the deployment configuration.
Output version	The output version entered on the Properties tab of the deployment configuration.
Workspace modified on	Timestamp of the most recent workspace modification. By comparing this timestamp to the timestamp in the Deployed On column, you can determine whether the latest version of the workspace is deployed.
Deployed On	Timestamp of the most recent successful deployment of the selected deployment configuration.
Properties tab	
Name	Enter a name for the deployment configuration.
Server Group	Select from a list of available server groups.
Usage	The usage entered in the definition of the selected server group.
Input mode	Select the mode that matches the type of data source connector you are using for transaction data sources in the deployment. The option selected in this field governs the validation rules applied on Deployment tab.
Input version	If this is the first time you are deploying, enter 1. Increment this number each time you make any changes in the structure of your transaction data and redeploy. If you are using queue connectors, this number must also be updated in the sending program for transaction data.
Output version	If this is the first time you are deploying, enter 1. Increment this number each time you make any changes in the structure of your Outcome data and redeploy.
Script file name (Optional)	If you use a notification batch file, enter the file name here.
Data Source Mapping tab	
Status	Indicates whether a data source is mapped to a connector.
Data Source	Data sources used in the workspace are listed here. Click a link to view the Data Source Connector Mapping dialog box. You can retain the default mapping used in the server group selected on the Properties tab, or you can deselect the Server Group Default check box to change the mapping.
Type	Lists the configured data source type: Transaction, State, or Outcome.
Connector	Lists the connector used with the data source for this deployment configuration.

Table 13. Fields and buttons on the Deployment tab (continued)

Field or button	Description
Connector Type	<p>Lists the connector type of the data source: Table, File, TCP, Web Service Connector, Queue, or Expanded Outcome.</p> <ul style="list-style-type: none"> • The Table connector is used for State History tables, for profile data stored in database tables, and for Outcome data where the XML format used by earlier versions of Opportunity Detect is desired. • The File connector is used for profile and transaction data in flat file format. • The TCP connector is used only for Interact Advanced Patterns, which is integrated with Interact. • The Web Service connector can be used for transaction data and Outcomes. Special configuration is needed to use the Web Service connector. For more information, see the <i>IBM Opportunity Detect Administrator's Guide</i>. • The Queue connector can be used for transaction data and Outcomes. Special configuration is needed to use the Queue connector. For more information, see the <i>IBM Opportunity Detect Administrator's Guide</i>. • The Expanded Outcome connector is used for Outcome data sources when the output needs to be stored in database tables structured differently from the format used in the Table connector. Use this connector for integration with IBM Campaign.
Database	Lists the database configured for the data sources that use a Table connector.
Default	Indicates whether the data source uses the default mappings for the server group selected on the Properties tab.
Data Source Connector Mapping window	
Data Source Name	Name of the selected data source.
Connector Type	<p>Available connector types. The connector types that are available are determined by the type of the data source, as follows.</p> <ul style="list-style-type: none"> • Profile data source: File, Table • Transaction data source: File, Web Service • State data source: Table • Outcome data source: Table, Web Service
Table Type	For Outcome data sources, when the connector type is Table , you can select either Outcome or Expanded Outcome for the table type.
Connector	Data source connectors available for mapping.
Database Connection	For Table type connectors, the database connections available for mapping.
Server Group Default	Indicates whether the mapping is the one defined in the server group. Deselect this box if you want to change the data source connector mapping.
History tab	
From Date, To Date, Get History button	Select a date range and click Get History to see details for the successful deployments of the selected deployment configuration.

Table 13. Fields and buttons on the Deployment tab (continued)

Field or button	Description
Status	For batch mode, indicates whether the version of the selected deployment configuration was successfully deployed. When Opportunity Detect is integrated with Interact, Undeploy and Redeploy are additional actions for which success or failure can be indicated.
Version	The number of the deployment for which the row provides details. Includes successful and failed deployments.
Action	For stand-alone Opportunity Detect, the only action is Deploy. When Opportunity Detect is integrated with Interact, Undeploy and Redeploy are additional actions.
Date	Timestamp of completion of the listed action.
Input mode	The input mode selected on the Properties tab of the deployment configuration.
Input version	The input version entered on the Properties tab of the deployment configuration.
Output version	The output version entered on the Properties tab of the deployment configuration.
Message	Additional details for the listed action, including the deployment configuration ID, which is automatically generated when deployment takes place.

Related concepts:

“About data source connectors” on page 22

“Data source connector mapping” on page 30

Related reference:

“Fields and buttons on the Batch Run tab” on page 32

“Fields on the Batch History tab”

Fields on the Batch History tab

On the Batch History tab, you can see details about past runs, filtered by deployment and a date range.

Table 14. Fields on the Batch History tab

Field	Description
Deployment Configuration	Select a deployment configuration for which you want to retrieve run history.
From Date, To Date, Get Run History button	Enter or select a date range and then click Get Run History to retrieve information about past runs.
Result	The final status of the run. <ul style="list-style-type: none"> • Run Success • Run Success with Errors • Run Failed
Run Id	Unique identifier for the run.

Table 14. Fields on the Batch History tab (continued)

Field	Description
Detail Id	A counter that increments each time a recovery run occurs.
Run Type	Indicates whether the run is a normal or recovery run.
Start Time	Date and time of the beginning of the run.
End Time	Date and time of the end of the run.
Run Time	The duration of the run.

Related reference:

“Fields and buttons on the Deployment tab” on page 35

“Fields and buttons on the Batch Run tab” on page 32

About batch notifications

The Opportunity Detect engine can run batch files when it completes a run. You can use these files to issue different notifications for each successful and failed engine run.

An example batch file is shipped with the product; you must edit this file as needed to perform the appropriate actions for your system when the Opportunity Detect engine completes a run. If the batch file is empty, no further processing takes place.

The batch file must be a shell script with the `.sh` extension. It must have executable permission (755).

When you run the Opportunity Detect engine from the Batch Run tab in a workspace, check the **Batch Notification** check box and specify the file name to run a batch file when the process completes.

Batch file usage examples

- After an engine process runs successfully, the notification file can call an external process to act on the reported outcome data.
- After an engine process fails to complete, the notification file can send a notification of the failure to the appropriate people.

Batch file required location

You must create a `scripts` directory on the machine where Streams is installed, under the `/home/streamsadmin/OpDetection` directory, if it has not been created previously. Place your batch file in this directory.

Related concepts:

“Outcome format with the Expanded Outcome data source connector” on page 43

Chapter 5. Outcome data in Opportunity Detect

Opportunity Detect generates one outcome record for every set of transactions that meets the criteria specified in the trigger system.

Outcome data can have different formats, depending on the data source connector that you use for your Outcomes when you run your trigger systems.

You assign data source connectors to tables, queues, or a web service when you create server groups. When you deploy a trigger system, you can change this default mapping in the deployment configuration.

How Outcome data is specified in trigger systems

Outcome data is specified in the Action component, in the Outcome panel. This panel has two fields:

- **Message**, which holds a text string that you specify.
- **Additional information**, which holds data captured using an inline expression. The inline expression can choose data from any data source or component that is available to the Action component.

This data can be a single value (scalar), or a row in a data record stored in a Container or Select component (tabular).

Types of data source connectors for Outcomes

For Outcome data, Opportunity Detect provides four types of data source connectors.

Outcome table

Used when you want Outcome data to be stored in database tables in the XML format used by previous versions of Opportunity Detect.

Expanded Outcome tables

Used when you want Outcome data to be stored in database tables in a form that external systems or IBM Campaign can use more easily than the format provided by the Outcome connector.

Web Service

Used when your system is configured to use the Opportunity Detect web servlet for Outcome data, for real time operation. See the *IBM Opportunity Detect Administrator's Guide* for details about the Java classes that must be developed to use the Web Service data source connector.

Queue

Used when your system is configured to use a Queue connector for Outcome data, for real time operation. See the *IBM Opportunity Detect Administrator's Guide* for information on setting up a Queue data source connector.

Related concepts:

“About data source connectors” on page 22

Related tasks:

“Running workspaces” on page 31

Outcome format with the Outcome data source connector

When the Outcome data source connector is used for Outcome data, the system writes the data in the XML format used by previous versions of Opportunity Detect.

Fields in the Outcome table

The following table describes the fields in the Outcome table when you use the Outcome data source connector.

Table 15. Fields in the Outcome table

Field	Description
AUDIENCEID	ID of the audience for which the trigger system fired. Examples of an audience are account, customer, or household.
RUNID	ID of the run. The Run ID helps distinguish between the Outcomes of one run versus the Outcomes of runs before or after it. Because of the Run ID, you do not need to truncate the Outcome table after every run because you can query the table for all of the Outcomes in a specific run.
COMPONENTID	Unique ID of the Action component that fired to generate the Outcome.
AUDIENCETYPE	The single character audience code assigned on the Opportunity Detect Audience Levels page.
OUTCOMEDATE	The timestamp of the final event that caused the Action to fire.
MESSAGE	The data that was specified in the Message and Additional Information fields of the Action component. The data is written in XML format.
ROW_NUMBER	A unique sequence field, generated automatically.

XML format of the message field of the Outcome table

The XML in the message field of the Outcome table contains the data specified in the **Message** and **Additional Information** fields of the Action component.

Here is an example of the XML for a simple Outcome. The Action component in the example includes the following information in the Outcome.

- **Message** field: Send printer paper offer.
- **Additional Information** field:
 - The sum of all values in the field named Amount in a Container component named All Transactions.
 - The field named zipcode in the data source named Customer Profile.

```
<OUTPUT>
<TEXT>
  Send printer paper offer.
</TEXT>
<CONTAINER name="All Transactions" field="Amount" function="SUM">
  123.45
</CONTAINER>
```

```
<DATASOURCE name="Customer Profile" field="zipcode">
  11746
</DATASOURCE>
</OUTPUT>
```

XML format of Outcome values from Container and Select components

Select and Container components can hold values that consist of a single value or a set of fields.

If the value has been aggregated into a single number using a function, it is called a scalar value. Here is an example of the XML for a scalar value where the Outcome includes a field named Amount from a Container component named C1. The Amount field is aggregated using the average function.

```
<CONTAINER name="C1" field="Amount" function="average">
  123.45
</CONTAINER>
```

If the value is a set of fields, it is called a tabular value. Here is an example of the XML for a tabular value where the Outcome includes fields named Field_1, Field_2, and Field_3 from a Select component named S1.

```
<SELECT name="S1">
  <ROW>
    <FIELD name="Field_1">abc</FIELD >
    <FIELD name="Field_2">123.45</FIELD >
    <FIELD name="Field_3">xyz</FIELD >
  </ROW >
</SELECT >
```

Outcome format with the Expanded Outcome data source connector

When the Expanded Outcome data source connector is used for Outcome data, the system writes the data in a form that can be used by IBM Campaign or an external system.

The data produced by Opportunity Detect is called Outcome data.

About the Expanded Outcome tables

The Expanded Outcome connector writes the Outcome data to two database tables, which you must create using scripts provided with Opportunity Detect.

DB2 is the only supported database type for the Expanded Outcome tables.

The tables are:

- A **primary** table that contains the text string specified in the **Message** field in the Action component.
- A **secondary** table that contains the data specified in the **Additional information** field in the Action component.

You provide a base name for the Expanded Outcome tables when you run the ExpandedTable.sql script to create the tables. The script appends the number 1 to the name of the primary table, and appends the number 2 to the name of the secondary table.

For example, if you specify the base name ExpandedOutcome, the script creates two tables: ExpandedOutcome1 and ExpandedOutcome2.

Fields in the Expanded Outcome tables

These descriptions of the fields in the Expanded Outcome tables refer to scalar and tabular values, which are defined as follows:

Scalar

A single unit of data.

Tabular

A data set, as in a database row. In Opportunity Detect Outcomes, tabular data is saved in XML format.

Depending on how you specify the Outcome data, the Outcome can contain either type of value, or both types. If you include tabular data in a Campaign integration, additional processing is required before Campaign can consume it.

Table 16. Fields in the Expanded Outcome primary table

Field	Description	Data type
OUTCOMEID	Unique sequence ID. Used as the primary key to link to the secondary Expanded Outcome table.	Integer
AUDIENCEID	ID of the audience member for which the trigger system fired. Examples of an audience are account, customer, or household. The audience ID is stored as a string. Multi-column audience IDs are not supported.	NVARCHAR(60) If you use Oracle system tables and plan to integrate with Campaign, you must change the data type of this field from NVARCHAR(60) to Varchar2(60) because Campaign does not support the NVARCHAR(60) data type.
AUDIENCELEVEL	The single character audience code assigned on the Opportunity Detect Audience Levels page.	NVARCHAR(60) If you use Oracle system tables and plan to integrate with Campaign, you must change the data type of this field from NVARCHAR(60) to Varchar2(60) because Campaign does not support the NVARCHAR(60) data type.
COMPONENTID	Unique ID of the Action component that fired to generate the Outcome.	Varchar
OUTCOMEDATE	The timestamp of the final event that caused the Action component to fire.	Timestamp
RUNID	ID of the run, for batch mode only. The Run ID helps distinguish between the Outcomes of one run versus the Outcomes of runs before or after it. Because of the Run ID, you do not need to truncate the Outcome table after every run because you can query the table for all of the Outcomes in a specific run.	Integer

Table 16. Fields in the Expanded Outcome primary table (continued)

Field	Description	Data type
MESSAGE	The text string that was specified in the Message field of the Action component.	NVARCHAR(60) If you use Oracle system tables and plan to integrate with Campaign, you must change the data type of this field from NVARCHAR(60) to Varchar2(60) because Campaign does not support the NVARCHAR(60) data type.
PROCESSED	A flag that indicates whether the data has been consumed by Campaign.	Integer

Table 17. Fields in the Expanded Outcome secondary table

Field	Description	Data type
OUTCOMEID	Unique sequence ID. Used as a foreign key to link the record to the primary Expanded Outcome table.	Integer
NAME	The name assigned in the Additional Information field of the Action component.	NVARCHAR(60) If you use Oracle system tables and plan to integrate with Campaign, you must change the data type of this field from NVARCHAR(60) to Varchar2(60) because Campaign does not support the NVARCHAR(60) data type.
VALUE	The scalar and tabular data that was specified in the Additional Information field of the Action component. Tabular values are saved in XML format.	Clob
DATATYPE	For scalar values, the data type can be one of the following. <ul style="list-style-type: none"> • boolean • currency • date • double • integer • string For tabular values, the data type is set to string, because tabular values are stored in XML, and the data type for XML is string.	NVARCHAR(60) If you use Oracle system tables and plan to integrate with Campaign, you must change the data type of this field from NVARCHAR(60) to Varchar2(60) because Campaign does not support the NVARCHAR(60) data type.

XML format of tabular values

Here is an example of the XML for a tabular value, where the record includes these fields:

- Field_1
- Field_2
- Field_3

Example

```

<SELECT name="S1">
  <ROW>
    <FIELD name="Field_1">abc</FIELD >
    <FIELD name="Field_2">123.45</FIELD >
    <FIELD name="Field_3">xyz</FIELD >
  </ROW >
</SELECT >

```

Integrating Opportunity Detect with Campaign in batch mode

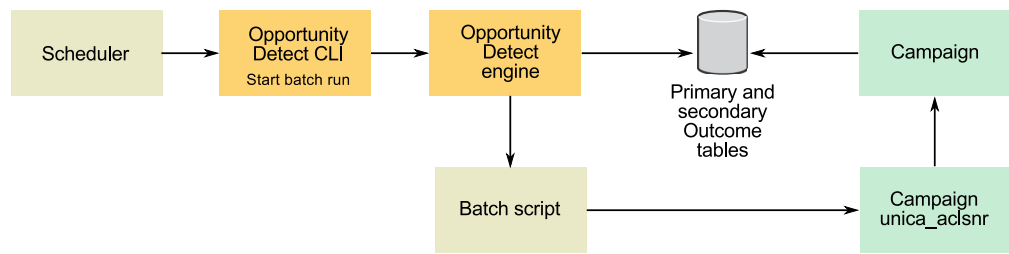
The following example illustrates how you might use the Expanded Outcome data in Campaign, in batch mode.

Before you begin

You must have Campaign and Opportunity Detect installed and running.

About this task

The following diagram illustrates the example described in this procedure.



Procedure

1. Create the Expanded Outcome tables in your database using the script provided with Opportunity Detect.
2. On the Server Groups page in Opportunity Detect, do the following.
 - If a database connection for the database where you created your Expanded Outcome tables does not exist, create one.
 - If an Expanded Outcome data source connector does not exist, create one. If you make the connector sharable, you can map the connector to your primary Expanded Outcome table on the Server Groups page or on the Deployment tab of the workspace. If you do not make the connector sharable, you can map it only on the Deployment tab.
3. Create the Opportunity Detect workspace and configure it to use the Expanded Outcome data source connector for Outcome data, either on the Server Groups page or on the Deployment tab of the workspace.
4. On the Deployment tab of the Opportunity Detect workspace, configure the deployment to call a batch file at the end of a successful run. Create the batch script to call the Campaign listener service, `unica_aclsnr`, to run a Campaign flowchart that you design.
5. Use the Opportunity Detect command line utility, `RemoteControlCLI (CLI)`, to run the workspace. Use your own scheduling utility to run the CLI batch script at the desired interval; for example, daily. When the workspace runs, Opportunity Detect inserts Outcome data into the Expanded Outcome tables.

6. Configure your Campaign flowchart as follows.
 - a. In a Select process, create a new table mapping as follows.
 - Map your main audience in Campaign to the OUTCOMEID field in the primary Expanded Outcome table. This is required so that you can select Outcome records for use in the flowchart. Selection must use the OUTCOMEID field, as the same AUDIENCEID field can be repeated in multiple Outcome records.
 - Map your alternate audience in Campaign to the AUDIENCEID field in the primary Expanded Outcome table. This mapping defines the audience on which rest of the flowchart logic should be performed.

Note: If you plan to use Opportunity Detect Outcome data in multiple flowcharts, save the mapped table information into a table catalog and load this catalog in other flowcharts.
 - b. Select records where the value in the PROCESSED field in the primary Expanded Outcome table is 0.
This value indicates that the record has not been processed yet.
 - c. Set the value in the PROCESSED field in the primary Expanded Outcome table to 1, to indicate that the record has been processed.
You can write SQL in a Select process to set this value.
 - d. In an Audience process, switch the audience from OUTCOMEID to AUDIENCEID.
 - e. Use the Opportunity Detect data as desired in your flowchart.
 - f. Use a MailList process to assign an offer and update contact history.

Integrating Opportunity Detect with Campaign in interactive mode

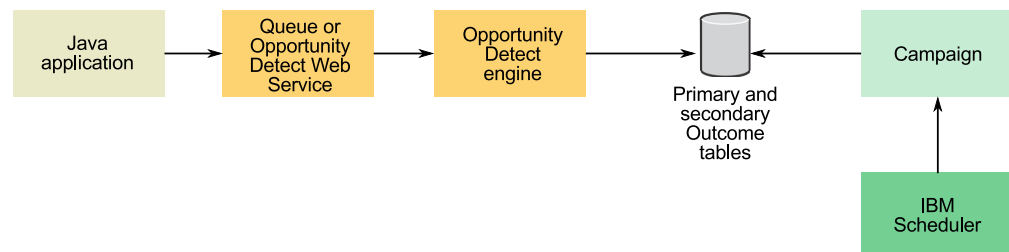
The following example illustrates how you might use the Expanded Outcome data in Campaign, in interactive mode.

Before you begin

You must have Campaign and Opportunity Detect installed and running.

About this task

The following diagram illustrates the example described in this procedure.



Procedure

1. Create the Expanded Outcome tables in your database using the script provided with Opportunity Detect.
2. Do one of the following.

- If you plan to use a queue connector, configure a queue for your transaction data in your queue server.
 - If you plan to use the Web Service, develop the required Java classes.
3. On the Server Groups page in Opportunity Detect, do the following.
 - If a database connection for the database where you created your Expanded Outcome tables does not exist, create one.
 - If an Expanded Outcome data source connector does not exist, create one.
If you make the connector sharable, you can map the connector to your primary Expanded Outcome table on the Server Groups page or on the Deployment tab of the workspace. If you do not make the connector sharable, you can map it only on the Deployment tab.
 4. Configure the Opportunity Detect workspace to use the Web Service or a queue data source connector for transaction data, and the Expanded Outcome data source connector for Outcome data.
 5. Configure your Campaign flowchart as follows.
 - a. In a Select process, create a new table mapping as follows.
 - Map your main audience in Campaign to the OUTCOMEID field in the primary Expanded Outcome table. This is required so that you can select Outcome records for use in the flowchart. Selection must use the OUTCOMEID field, as the same AUDIENCEID field can be repeated in multiple Outcome records.
 - Map your alternate audience in Campaign to the AUDIENCEID field in the primary Expanded Outcome table. This mapping defines the audience on which rest of the flowchart logic should be performed.

Note: If you plan to use Opportunity Detect Outcome data in multiple flowcharts, save the mapped table information into a table catalog and load this catalog in other flowcharts.

- b. Select records where the value in the PROCESSED field in the primary Expanded Outcome table is 0.
This value indicates that the record has not been processed yet.
 - c. Set the value in the PROCESSED field in the primary Expanded Outcome table to 1, to indicate that the record has been processed.
You could write SQL in a Select process to set this value.
 - d. In an Audience process, switch the audience from OUTCOMEID to AUDIENCEID.
 - e. Use the Opportunity Detect data as desired in your flowchart.
 - f. Use a MailList process to assign an offer and update contact history.
6. Use your own scheduling utility or the IBM EMM Scheduler to schedule flowchart runs at the desired interval; for example, every minute.

Outcome format with the Web Service data source connector

You can use a Web Service Connector for incoming transaction data and for outcome data.

When you use the Web Service connector for outcomes, the data is sent to a web servlet. This servlet executes a plugin that can write to a file. You can also do additional programming to enable the plugin to write to a queue or act like a web service.

See the *IBM Opportunity Detect Administrator's Guide* for details about the Web Service connector.

Chapter 6. Real time processing in Opportunity Detect

The type of data source connectors that you use for your workspace determines whether it is processed in batch or real time mode. For real time mode, use a Queue or Web Service type of data source connector for transaction and Outcome data.

Data source connectors are mapped to data sources in two places. The default mappings are set when a server group is configured. However, these mappings are commonly changed when a deployment is configured.

Queue connectors allow Opportunity Detect to operate with either the IBM WebSphere or Active MQ queue server.

Consider the following points when you are deciding whether to use queue connectors or the Web Service connector.

- The Queue type of connector retains messages in the event of a network or machine failure, or if you deploy a new version of a configuration deployment. In contrast, the Web Service drops messages in those cases.
- Queues handle spikes in demand more efficiently than the Web Service does.
- Both choices require some development and IT effort on the part of your organization.
 - To use the Web Service data source connector, your organization must develop code to receive and send the transaction and Outcome data. This is described in Chapter 7, “Web Service connectors for input and output in Opportunity Detect,” on page 61.
 - To use the queue data source connector, your organization must develop code to send the transaction data, and you must install and maintain a queue server.

Related concepts:

“About data source connectors” on page 22

Transaction message example for the sending program

This section describes the data in the message that your sending program must produce when you use a queue data source connector for transaction data. It also provides a code sample for creating a transaction message in the required format.

Information required for the transaction message

When you use a queue connector for transaction data, the sending program must provide the following information in the data sent to the queue server.

Table 18. Required information for transaction data

Name	Value
AUDHASH	Hash for the audienceId generated using a standard hash function. The function must generate a positive value. Used in the header of a JMS message.

Table 18. Required information for transaction data (continued)

Name	Value
deploymentConfigurationId	You can obtain the ID of the deployment configuration on the Deployment tab of the workspace. Select the deployment configuration and select the History tab in the panel that opens. Look under the Message column for the configuration ID. Used in the header and the body of a JMS message.
inputVersion	The input version number entered on the Properties tab of the deployment configuration. Used in the header and the body of a JMS message.
AudienceLevel	The code assigned to the audience level on the Settings > Detect Settings > Audience Levels page. Used in the body of a JMS message.
audienceId	The customer ID associated with this transaction. Used in the body of a JMS message.
inputDataSourceName	The name of the data source to which the queue connector is mapped. Data sources are defined on the Settings > Detect Settings > Data Sources page. Used in the body of a JMS message.
transaction	Fields from your Transaction data source, as defined on the Settings > Detect Settings > Data Sources page. Used in the body of a JMS message. Note: The date must be expressed in milliseconds. Example: <pre>{ "FLAG": true, "DATE": 1408077610000, "AMT": 1000.00, "NUMBER": 10, "TRANCODE": "ATMD", "CURRENCY": 1009.1, "ID": "cm00411" }</pre>

Sample code for creating a transaction message using the JMS API

Here is a sample code snippet for creating a JMS message for transaction data using the JMS API. Line breaks have been added for readability.

```
//JMS Header Fields
MapMessage message = session.createMapMessage();
message.setLongProperty("AUDHASH", hashCode);
message.setStringProperty("deploymentConfigurationId",
    "eecd1b4-5333-4076-9af6-dc6c2f932c0e");
message.setLongProperty("inputVersion", 5);

//JMS Body Fields
message.setString("deploymentConfigurationId",
    "eecd1b4-5333-4076-9af6-dc6c2f932c0e");
message.setInt("inputVersion", 5);
message.setString("audienceLevel", "audienceLevel");
message.setString("audienceId", "cm00409");
```



```

message.setString("inputDataSourceName", "DataSourceNam");
message.setString("transaction", "{\"Date\":1408077610000,\"Amount2\":1000.00,\"
Type\": \"E1a\", \"Amount1\":1009.1, \"ID\": \"cm00409\"}");

```

Example of a transaction message

This is sample input message that was sent to an Active MQ queue server. Line breaks have been added for readability.

```

ActiveMQMapMessage {commandId = 0, responseRequired = false,
messageId = ID:ADMINIB-3C6H892-58046-1428399823708-0:0:1:1:1,
originalDestination = null,
originalTransactionId = null,
producerId = null,
destination = queue://amqinput,
transactionId = null,
expiration = 0,
timestamp = 1428399824137,
arrival = 0,
brokerInTime = 0,
brokerOutTime = 0,
correlationId = null,
replyTo = null,
persistent = false,
type = null,
priority = 4,
groupID = null,
groupSequence = 0,
targetConsumerId = null,
compressed = false,
userID = null,
content = org.apache.activemq.util.ByteSequence@60945fea,
marshalledProperties = null,
dataStructure = null,
redeliveryCounter = 0,
size = 0,
properties = {inputVersion=5,
deploymentConfigurationId=eecdc1b4-5333-4076-9af6-dc6c2f932c0e,
AUDHASH=13670},
readOnlyProperties = false,
readOnlyBody = false, droppable = false}
ActiveMQMapMessage
{ theTable =
{audienceLevel=audienceLevel,
audienceId=cm00409,
inputVersion=5,
transaction={"FLAG":true,
"DATE":1408077610000,
"AMT":1000.00,
"NUMBER":10,
"TRANCODE":"ATMD",
"CURRENCY":1009.1,
"ID":"cm00411"}
}
}

```

Outcome message example

This section describes the data in the message that the system produces when you use a queue data source connector for Outcomes.

Outcome message format using the queue connector

When you use a queue connector for the Outcome data source, the message has the format shown in the following table.

In addition, the following rules apply.

- System-defined field names are camel case.
- Data types start with a capital letter.
- Valid data types are String, Integer, Double, Currency, Boolean, Date, and Tabular.
- Values for Date and String data types are surrounded with double quotes.
- Values for Integer, Double, Currency, Boolean, and Tabular data types are **not** surrounded with double quotes.

Table 19. JMS message format for Outcome data

Name	Value
producerName	OpportunityDetect
clientID	If you have multiple Opportunity Detect installations, enter the ID of the installation where this queue connector is used, as defined in the clientId property under the IBM Opportunity Detect And Interact Adv Patterns System category on the Settings > Configuration page. If you have a single Opportunity Detect installation, this value should be default.
actionName	The name of the Action component that produced the Outcome.
workspaceName	The name of the workspace.
deploymentName	The name of the deployment that is running the workspace.
outputVersion	The output version number entered on the Properties tab of the deployment configuration.
data	<p>The data you have specified in the Action component for your Outcome, plus the data that is included in every Outcome.</p> <p>Outcome data always includes the audience ID, audience level, the ID of the Action component, and a time-stamp.</p> <p>Time-stamps have this format:</p> <p>yyyy-MM-dd HH:mm:ss</p> <p>Additional fields that you specify in the Action component are output with the label you give the field in the Action component, the value, and the data type. This data can be a single value (scalar), or a row in a data record stored in a Container or Select component (tabular).</p>

Example of the Outcome message using the queue connector

Here is an example of a message produced by the system when you use a Queue data source connector for an Outcome. Line breaks have been added for readability.

```
producerName: OpportunityDetect,
clientID :default,
actionName: "Name of Action component"
workspaceName : "Name of workspace"
deploymentName : "Name of deployment"
outputVersion: "Version",
```

```

data = [
  {
    "message": {
      "value": "Pass",
      "dataType": "String"
    }
  },
  {
    "audienceId": {
      "value": "acc333",
      "dataType": "String"
    }
  },
  {
    "audienceLevel": {
      "value": "audienceLevelvalue",
      "dataType": "String"
    }
  },
  {
    "componentId": {
      "value": "AA1233445556666",
      "dataType": "String"
    }
  },
  {
    "firingtime": {
      "value": "2014-04-01 05:40:01",
      "dataType": "Date"
    }
  },
  {
    "fieldName1": {
      "value": 333,
      "dataType": "Integer"
    }
  },
  {
    "fieldName2": {
      "value": "2014-04-01 05:40:01",
      "dataType": "Date"
    }
  },
  {
    "fieldName3": {
      "value": {
        "header" : [
          {
            "tablefield1": {
              "dataType": "String"
            },
          },
          {
            "tablefield2": {
              "dataType": "Date"
            }
          }
        ],
      },
    ]
  },
  rows : [
    {
      "values" : ["value1","value2"]
    },
    {
      "values" : ["value1","value2"]
    },
    {
      "values" : ["value1","value2"]
    }
  ]
}

```

```

    },
  ],
},
"dataType": "Tabular"
}
]

```

Queue processing setup roadmap

This roadmap describes how to set up real time processing using queue data source connectors in Opportunity Detect.

Table 20. Real time processing setup roadmap

Step	Where to find details
Ensure that you have met the prerequisites.	"Prerequisites for using queue connectors"
Decide how many queue data source connectors to create and how you want to map them.	"Planning your queue connectors"
Copy client libraries from your queue server to your IBM InfoSphere Streams machine and set environment variables.	"Installing MQ client libraries" on page 57
Set up data sources in Opportunity Detect for the transaction data that you want to process in real time mode.	Chapter 3, "Data source setup in Opportunity Detect," on page 9
Create queue data source connectors for the transaction and Outcome data sources that you want to process in real time mode.	"Creating queue connectors" on page 58
Map your queue data source connectors to your transaction and Outcome data sources.	"Mapping queue connectors to data sources" on page 59

Prerequisites for using queue connectors

Ensure that the following prerequisites are met when you use queue connectors.

1. You must have a functioning IBM WebSphere or Active MQ queue server with queues configured as required for your deployment configuration.
2. You must set up one queue for each queue data source connector you plan to use.
3. The queue server must be accessible from the Opportunity Detect run-time server (the Streams server).
4. The Streams system user, typically the streamsadmin user, must have read and write permissions on the queue server.
5. Your organization must develop the necessary sending program to push transaction data into the queue.
6. If you have multiple Opportunity Detect installations, set an ID for each one in the `clientId` property under the **IBM Opportunity Detect And Interact Advanced Patterns | System** category on the **Settings > Configuration** page. If you have a single Opportunity Detect installation, you do not have to set any values for this property.

Planning your queue connectors

Consider the following points when you create and map queue data source connectors.

- Your queue server must not be configured to use SSL, because Opportunity Detect does not support SSL communication with the queue server.
- Ensure that at least one queue is created on your queue server for each queue connector that you plan to use.
- A workspace has only one Outcome data source, regardless of how many Action components it contains.
- You must map one queue connector to each transaction and Outcome data source. Optionally, you can map more than one queue connector to the transaction and Outcome data sources.
- A non-shared queue connector can be used by only one deployment. The system enforces this constraint.
- A non-shared connector cannot be mapped to a data source when you configure a server group. It can be mapped in a deployment configuration only.
- A shared queue connector can be used across multiple deployment configurations.
- Shared connectors are mapped when you configure a server group. You can change this mapping in a deployment configuration.
- For Outcomes, you would typically use multiple non-shared queues if you have multiple consumers of the Outcomes, and use a shared queue if you have only a single consumer of the Outcomes.
- For testing, it is typical to use shared data source connectors for your transaction data, to reduce the time required to set up separate queues. Because the message includes the configuration ID, the transaction data is sent to the appropriate queue. For production, you should generally use non-shared connectors for your transaction data.

Installing MQ client libraries

To use the queue data source connector, you must install the message queue client and set the library path in an environment variable on your Streams server.

Procedure

1. Obtain the client for your message queue server.
 - For WebSphere, download the client here:
<http://www-01.ibm.com/software/integration/wmq/clients/>
 - For Active MQ, download the client here:
<http://activemq.apache.org/download.html>
2. Install the message queue client on every machine where IBM InfoSphere Streams is installed.
See the documentation for your queue server for full instructions on installing the client.
3. On all machines where Streams is running, edit the Streams `.bashrc` file for the `streamsadmin` user as follows.
The `.bashrc` file is typically located in home directory for `streamsadmin` user.
 - a. Set the `JAVA_HOME` environment variable to use Streams Packaged Java. For example:

```
export JAVA_HOME=/home/streamsadmin/InfoSphereStreams/java
```
 - b. Set additional environment variables, as follows.
 - Websphere MQ

Set the STREAMS_MESSAGING_WMQ_HOME environment variable to the path where you installed the client library. For example:

```
export STREAMS_MESSAGING_WMQ_HOME="/opt/mqm"
```

- ActiveMQ

Set the STREAMS_MESSAGING_AMQ_HOME environment variable to the location where Apache ActiveMQ is installed. For example:

```
export STREAMS_MESSAGING_AMQ_HOME="/home/streamsuser/  
ApacheActiveMQ"
```

4. Restart the Streams instance.

Creating queue connectors

Follow this procedure to create a queue connector.

Before you begin

You must have transaction data sources defined on the **Settings > Detect Settings > Data Sources** page.

Procedure

1. Navigate to the **Settings > Detect Settings > Server Groups** page.
2. On the Data Source Connectors tab, click **Add a new Data Source Connector** and select **Queue**.
3. Complete the fields in the panel that opens.

Fields on the queue connector panel

If you are unsure of how to complete the fields on the queue connector panel, use the information provided here.

Table 21. Fields on the queue connector panel

Field	Description
Name	A descriptive name for the queue connector.
Queue type	Select the type of queue server you are using: Active MQ or Websphere MQ .
Queue Name	Name of the queue as configured on the queue server.
Connection URL	An example value appropriate for the queue type you selected is provided.
Connection Factory	An example value appropriate for the queue type you selected is provided.
Connection Factory Identifier	An example value appropriate for the queue type you selected is provided.
User Id	The user name for the account that the system uses to access the queue server.
Password	The password for the account that the system uses to access the queue server.
Confirm Password	The password for the account that the system uses to access the queue server. Active MQ only.
Description	A description for this queue connector.

Table 21. Fields on the queue connector panel (continued)

Field	Description
Sharable	Select this checkbox if you want to be able to use this queue connector on more than one server group.

Mapping queue connectors to data sources

Follow this procedure to map a queue connector to a data source in a deployment configuration.

Before you begin

- You must have transaction data sources defined on the **Settings > Detect Settings > Data Sources** page.
- You must have queue connectors defined on the Data Source Connectors tab on the **Settings > Detect Settings > Server Groups** page.

About this task

This procedure assumes that you are mapping the transaction and Outcome data sources to queue connectors in a deployment configuration, overriding the default server group settings.

Procedure

1. Create a deployment configuration as described elsewhere in this guide.
2. On the Data Source Mapping tab, select the transaction data source you want to change.
3. Clear the **Server Group Default** checkbox.
4. In the Data Source Connector Mapping window, do the following.
 - a. Select **Queue** as the **Connector Type**
 - b. Select a queue connector.
5. Repeat steps 2-4, selecting any additional transaction and Outcome data sources you want to map.

Chapter 7. Web Service connectors for input and output in Opportunity Detect

You can use a Web Service Connector for incoming transaction data, for Outcome data, or for both.

To use the Web Service Connector for either input or Outcome data, your organization must develop Java classes.

- When you specify the Web Service Connector for incoming transaction data, you develop a Java class that sends the data to an API over HTTP.
- When you specify the Web Service Connector for Outcome data, you develop a Java class that implements an interface provided by a servlet. You can write the Outcome data to a file, to a database, or you can develop your plugin to act like a web service.

This section provides the details required for this development effort.

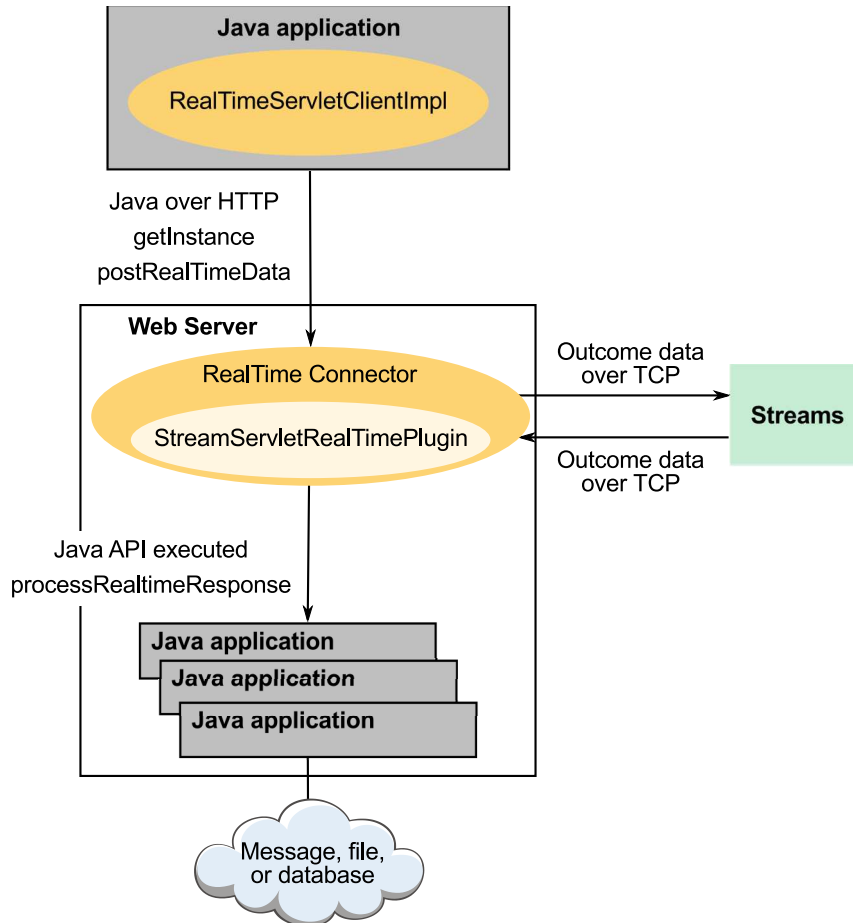
Example use case

Here is an example of how a telephone company might use the Web Service connector for both input and Outcome data.

- A customer makes a call on her cell phone while on vacation.
- A call data record is sent to the Web Service connector.
- Opportunity Detect processes the transaction and detects an unusual event, in this case a call from outside the customer's data plan area.
- Opportunity Detect sends the Outcome data to two Web Service plugins.
 - One plugin updates profile variables used by Interact.
This data improves the customer profile that Interact uses to evaluate effective offers when the customer visits the company's web site or calls customer service.
 - Another plugin alerts a company system, which sends an SMS offer to the customer's phone.
For example, the message might offer to upgrade her data plan.

Block diagram

The following diagram illustrates the Web Service connector.



Location of the input jar files and the output class and plugin

All of the locations described in this section are under the run time installation of Opportunity Detect.

- For input, your Java application must use the `RealTimeClient.jar` file, located here:

```
RealTimeConnector/wlp/usr/servers/RealTimeConnector/dropins/  
RealTimeConnector/WEB-INF/client
```

The following dependent .jar files must be included in the Java class path of your application. They are in the same location as the `RealTimeClient.jar` file.

- `JSON4J.jar`
- `log4j.jar`

- For Outcomes, your Java application must use the `StreamServletRealTimePlugin` class, located here:

```
RealTimeConnector/wlp/usr/servers/RealTimeConnector/dropins/  
RealTimeConnector/WEB-INF/classes/com/ibm/unica/detect/interact/servlet
```

Place the plugin you develop here:

```
RealTimeConnector/wlp/usr/servers/RealTimeConnector/dropins/  
RealTimeConnector/WEB-INF/lib
```

Timestamp format

Timestamps in input data must be expressed in milliseconds.

Data types

No objects are used for either input or Outcomes using the Web Service connector. Only primitive data types are used.

Locale

Locale is handled by the Opportunity Detect engine.

Monitoring

Because Opportunity Detect is built on Streams, you can use the built-in monitoring capabilities of the Streams server to monitor processing. See the Streams documentation for details.

Related concepts:

“About data source connectors” on page 22

“About deployment configurations” on page 29

Class for input: RealTimeClient

Reference for the RealTimeClient class, used for sending input data to the Web Service connector.

You must compile your implementation against RealTimeClient.jar.

The RealTimeClient class has two methods:

- getInstance
- postRealTimeData

Code example

Here is a code example. The code opens an HTTP connection to the Interact Connector servlet and sends transaction data.

```
private static
String
urlString = "http://detectvm2.emmlabs.ibm.com:8282/servlets/StreamServlet";
RealTimeServletClient
streamServletRealTimeClient = RealTimeServletClientImpl.getInstance(urlString);
String
deploymentConfigurationId = "e0692797-70fc-4a34-9232-9f7df3e9bb68";
int version = 5;
String audienceId = "Acc09";
String inputDataSourceName = "RealTimeDataSource";
Map inputDataSourceFields = new Hashtable();
// The names of the keys below are the names of datasource fields.
// Start of transaction
inputDataSourceFields.put("Boolean", true);
inputDataSourceFields.put("Timestamp", new Date().getTime());
inputDataSourceFields.put("Double", 99.9);
inputDataSourceFields.put("Integer", 56);
inputDataSourceFields.put("String", "Hello");
```

```

inputDataSourceFields.put("AudienceId", audienceId);
// End of transaction
streamServletRealTimeClient.postRealTimeData
(deploymentConfigurationId, version, audienceId,
inputDataSourceName, inputDataSourceFields);

```

In the example, the fields in the transaction hash table are defined on the **Detect Settings > Data Sources** page as shown below.

Fields

Name	Display Name	Description	App Type	Data Type	Name Value List
AudienceId	AudienceId		Audience Id : Cust	String	
Timestamp	Timestamp		Transaction Date	Date	
Integer	Integer		Transaction Attrib	Integer	
Double	Double		Transaction Attrib	Double	
String	String		Transaction Attrib	String	
Boolean	Boolean		Transaction Attrib	Boolean	

Additional details are provided in the remainder of this section.

getInstance

```
getInstance (urlString, connectTimeout, readTimeout)
```

urlString

URL of the Interact connector. The value is the same as used for the **Opportunity Detection | System | Real Time Connector | ServerURL** configuration property, shown on the **Settings > Configuration** page.

postRealTimeData

```
postRealTimeData (deploymentConfigurationId, version, audienceId,
inputDataSourceName, inputDataSourceFields)
```

deploymentConfigurationId

The deployment configuration ID. For example e0692797-70fc-4a34-9232-9f7df3e9bb68.

To obtain the version number of a deployment configuration, select the Deployment tab of a workspace, select the relevant deployment configuration, and select the History tab in the panel that opens. Use the configuration ID listed in the **Message** column.

audienceId

The value in the audience ID field in your customer data source.

This field must be defined as an audience field on the Data Sources page in Opportunity Detect.

version

The version of the deployment.

To obtain the version number of the deployment, select the Deployment tab of the workspace, select the relevant deployment configuration, and select the History tab in the panel that opens. Use the most recent version listed in the Version column.

If you re-deploy the deployment configuration that you are using, you must update this version parameter in your Java program.

inputDataSourceName

The name of the data source that has been created on the Data Sources page in Opportunity Detect for real time transactions.

inputDataSourceFields

A map of fields in the data source as defined on the Data Sources page in Opportunity Detect.

Class for Outcomes: StreamServletRealTimePlugin

Reference for the StreamServletRealTimePlugin class, used for sending Outcome data to the Web Service connector.

Editing the Streams servlet web.xml

To make a plugin executable, you must edit the Streams servlet web.xml file.

The Streams servlet web.xml file is located under your Opportunity Detect run time installation in the following path:

```
RealTimeConnector/wlp/usr/servers/RealTimeConnector/dropins/  
RealTimeConnector/WEB-INF.
```

Add the StreamServletRealTimePlugin class name to the following section of the Streams servlet web.xml file, as follows. Note that line breaks have been added to fit the example on the page.

```
<init-param>  
  <param-name>PluginClassNames</param-name>  
  <param-value>com.ibm.unica.detect.interact.servlet.  
    StreamServletRealTimePluginImpl.com.company.ClassName</param-value>  
</init-param>
```

Code examples

Your plugin must implement the StreamServletRealTimePlugin interface, which has only one function: processRealtimeResponse.

Note: In the following examples, line breaks have been added to fit the examples on the page.

Here is an example of code that implements the interface.

```
package com.ibm.unica.detect.interact.servlet;  
import java.util.Map;  
@SuppressWarnings("rawtypes")
```

```

public interface StreamServletRealTimePlugin {
public void processRealTimeResponse(
    final String audienceId,
    final String audienceLevel,
    final String componentId,
    final long timestamp,
    final Map response);
}

```

Here is an example of a plugin implementation that prints all output parameters into the servlet log file.

```

package com.ibm.unica.detect.interact.servlet;
import java.util.Map;
import org.apache.log4j.Logger;
@SuppressWarnings("rawtypes")
public class StreamServletRealTimePluginImpl
implements StreamServletRealTimePlugin {
private static Logger logger =
    Logger.getLogger(StreamServletRealTimePluginImpl.class);
public void processRealTimeResponse(
    final String audienceId,
    final String audienceLevel,
    final String componentId,
    final long timestamp,
    final Map response)
{
    logger.info("audienceLevel: " + audienceLevel + ";
audienceId: " + audienceId + ";
componentId: " + componentId + ";
timestamp: " + timestamp + ";
processRealTimeResponse: " + response);
}
}

```

processRealtimeResponse

processRealtimeResponse (audienceId, audienceLevel, componentId, timestamp, response)

audienceId

The value in the audience ID field in your customer data source.

This field must be defined as an audience field in Opportunity Detect.

audienceLevel

The audience level code assigned in Opportunity Detect to the audience level used in the transaction that produced the Outcome.

componentId

The ID of the Action component that produced the Outcome.

timestamp

The timestamp when the Action component fired its Outcome.

response

A map of the Outcome data that was specified in the **Message** and **Additional Information** fields of the Action component.

Chapter 8. Automating tasks using the RemoteControlCLI utility

The Opportunity Detect command line utility, RemoteControlCLI (CLI), allows you to automate the management of deployment configurations and batch runs. You can use the CLI to perform the same actions you can perform on the Deployment & Batch Run tab of a workspace.

The RemoteControlCLI utility and sample batch or shell scripts are all located in the cli directory under your Opportunity Detect design time installation.

The following sample scripts are provided with your installation.

Table 22. Command line scripts

Script	Usage
encode	Encrypt the password that the CLI uses to connect to the design time database.
deploy	Deploy a deployment configuration.
stop	Stop the deployment of a deployment configuration.
start	Re-start the deployment of a deployment configuration.
startBatch	Start a batch run by starting a deployed deployment configuration.
stopBatch	Stop a batch run by stopping a deployed deployment configuration.

Prerequisites

The following are prerequisites for using the Opportunity Detect command line scripts.

- The computer where you run the scripts must have network access to machines where the Opportunity Detect design time and run time components are installed.
- Java version 6 must be installed on the machine where you run the scripts.
- You must set the JAVA_HOME system environment variable. You can do this either on the machine where you run the scripts, or by editing the scripts to set it temporarily when the scripts run.

Password security

The information the CLI uses to connect with the design time database is saved in the RemoteControlCLI.xml file, located in the cli directory. This information includes the user name and password for an account in the database.

You can encrypt the password that is stored in this file, to avoid storing the password in clear text.

Setting up the database connection for the Opportunity Detect CLI

You edit the RemoteControlCLI.xml file to enable the CLI to connect with the Opportunity Detect design time database.

Before you begin

Obtain the following information about your design time database.

- The name and URL of the database used with your design time installation.
- The user name and password for an account with Administrator privileges in the design time database.
- The URL of your design time installation
- The URL and class name for the database driver used with your design time database.

Procedure

1. Open the RemoteControlCLI.xml file, located in the cli directory under your Opportunity Detect design time installation.
2. Run the encode script to encrypt the password for the database account. Copy the resulting string and use it as the value for the ConnectionPassword key in the RemoteControlCLI.xml file.

This step is optional, but provides the best security. If you do not encrypt the password, it is stored in clear text in the RemoteControlCLI.xml file.

If you use an encrypted password, set the value of the ConnectionPasswordEncrypted key to True.

3. Use the database information you obtained to complete the values in the rest of the keys in the RemoteControlCLI.xml file.
4. Save and close the RemoteControlCLI.xml file.

Results

You can now run the CLI commands.

Related reference:

“RemoteControlCLI XML reference”

RemoteControlCLI XML reference

The values you enter in the RemoteControlCLI.xml file enable the CLI to connect with your Opportunity Detect design time database.

Table 23. Reference for CLI XML keys

XML key	Value
RemoteControlURL	The URL for your Opportunity Detect design time installation. Example: http://example.com:8080/axis2/services/RemoteControl
ConnectionDriverName	The class name of the database driver used with your Opportunity Detect design time installation. Example: com.ibm.db2.jcc.DB2Driver
ConnectionURL	The URL of the driver used with your Opportunity Detect design time installation. Example: jdbc:db2://example.com:50000/ Detect91:retrieveMessagesFromServerOnGetMessage=true;

Table 23. Reference for CLI XML keys (continued)

XML key	Value
ConnectionUserName	The user name of an account in the Opportunity Detect design time database. Example: example_user_name
ConnectionPassword	The password of the same account used for the ConnectionUserName. Example: example_password
ConnectionPasswordEncrypted	A flag that indicates whether the password value used for ConnectionPassword has been encrypted using the encode script. If you use an encoded password, set this value to True.
Schema	The URL of the Opportunity Detect design time database. Example: http://example.com:8080/axis2/services/RemoteControl

Related tasks:

“Setting up the database connection for the Opportunity Detect CLI” on page 69

RemoteControlCLI command reference

The RemoteControlCLI utility supports the following commands and options.

Syntax

`RemoteControlCLI deploy -d deployment configuration ID -v version number`

`RemoteControlCLI start -d deployment configuration ID -v version number`

`RemoteControlCLI stop -d deployment configuration ID -v version number`

`RemoteControlCLI startBatch -d deployment configuration ID -v deployment configuration version number -w workspace ID -fp path to feed files`

`[-am Off|EndOfDay|EndOfRun]`
`[-ll Off|Fatal|Error|Warn|Info|Debug|Trace]`
`[-n notification file name]`
`[-r] [-ri] ID of the batch run to recover`

In addition, if you have applied Opportunity Detect FixPack 9.1.1.2, the following options are available with the startBatch command.

`[-im Off|On]`
`[-id inactivity date in YYYY-MM-DD HH:MM:SS format]`

`RemoteControlCLI stopBatch -d deployment configuration ID -v version number`

You can obtain the help for this utility by entering `-h` by itself or with any of the above commands.

Where to find the deployment configuration ID and version number

You can obtain the version number and ID of the deployment configuration on the Deployment tab of the workspace. Select the deployment configuration and select

the History tab in the panel that opens. Look under the Version and Message columns for the version and configuration ID. When you run the command, increment the deployment configuration version by 1.

For example, if the deployment version is currently *n*, you would specify a deployment configuration version number of *n+1*.

Command and option details

RemoteControlCLI deploy -d *deployment configuration ID* -v *deployment configuration version number*

Deploy a deployment configuration to the Streams server. For a first time deployment, you must use the Deployment & Batch Run tab of the workspace. You can perform subsequent deployments using the CLI.

RemoteControlCLI start -d *deployment configuration ID* -v *deployment configuration version number*

Start a deployment configuration.

RemoteControlCLI stop -d *deployment configuration ID* -v *version number*

Stop a deployment configuration.

RemoteControlCLI startBatch -d *deployment configuration ID* -v *deployment configuration version number* -w *workspace ID* -fp *path to feed files*

Start a batch run.

The non-required options for this command allow you to set the same parameters that are available on the Deployment & Batch Run tab, as follows.

- **-am** *Off|EndOfDay|EndOfRun*
Set the artificial transaction mode
- **-ll** *Off|Fatal|Error|Warn|Info|Debug|Trace*
Set the logging level for all Streams components
- **-n** *notification file name*
Set the file used to send notifications about run success or failure
- **-r**
Run in recovery mode (requires **-ri**)
- **-ri** *ID of batch run*
Set the ID of the batch run to recover (used with **-r**)

In addition, if you have applied Opportunity Detect FixPack 9.1.1.2, the following options are available.

- **-im** *Off|On*
Turn inactivity mode on or off. If you do not set this mode, the default is off.
- **-id** *inactivity date in YYYY-MM-DD HH:MM:SS format*
Set the date for the inactivity mode (used with **-im**). The date that you specify is the date that the system uses to look for any Forward Looking Inactivity events that need to be triggered.

```
RemoteControlCLI stopBatch -d deployment configuration ID -v version number
```

Stop a batch run.

Chapter 9. Troubleshooting Opportunity Detect

Some suggestions for resolving issues with Opportunity Detect are listed in this section, along with workarounds or solutions.

Obtaining Streams logs

When a problem occurs with a Opportunity Detect deployment, you should examine the Streams log to help diagnose the problem.

About this task

Note: To include more detail in the Streams log, set the system log level to Debug on the Batch Run tab of a workspace deployment.

Procedure

1. In Opportunity Detect, go to **Detect > Workspace Manager** and select the workspace that is having the problem.
2. Obtain the ID of the deployment configuration. On the Deployment tab of the workspace, select the deployment configuration and select the History tab in the panel that opens. The configuration ID is listed in the Message column.
3. On the Streams sever, navigate to the following directory.
`/home/streamsadmin/OpDetection/deploy/Deployment_Configuration_ID/
current`
4. Open the Streams `job_ids.list` file and note the Streams job IDs.
5. Log in to Streams as the streamsadmin user and select the Streams job IDs you noted in the previous step. Click the **Download Trace File** icon.
All the relevant logs are downloaded in compressed format.

Failed to get most recent runs for the workspace

Symptoms

After logging in to in to Opportunity Detect, when you select a workspace you see a popup window stating "Failed to get most recent runs for the workspace".

Causes

The following issues are the most common causes of this issue.

- Opportunity Detect design time could not connect to Opportunity Detect runtime (the Streams server). This is the most common cause of the problem.
- The database server is down.
- A network problem is affecting connections.

Resolving the problem

If the Streams server is down, start its services using the procedure in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide* titled "Starting the Opportunity Detect Run Time server and Interact service."

If the database server is down, restart it.

For network problems, contact your system administrator.

Apache HttpClient error during Streams synchronization

Symptoms

When you synchronize Streams by clicking **Synchronize with changed Streams configuration** on the **Settings & Detect Settings > Server Group** page, you see a popup that states "org.apache.commons.httpclient.HttpClient incompatible with org.apache.commons.httpclient.HttpClient"

Causes

One or both of the Marketing Platform and Opportunity Detect deployments are not configured properly in the web application server.

Resolving the problem

1. Stop the following services:
 - StreamsRCS
 - RealTimeConnector
 - InteractService
2. In WebSphere, stop your Marketing Platform and Opportunity Detect deployments.
3. Follow the instructions in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide* to set **Class loading and update detection** and **Manage Modules** properties for both Marketing Platform and Opportunity Detect.
See Chapter 6: Deploying Opportunity Detect.
4. In WebSphere, restart your Marketing Platform and Opportunity Detect deployments.
5. Restart the StreamsRCS, RealTimeConnector, and InteractService.

Connection refused during Streams synchronization

Symptoms

When you synchronize Streams by clicking **Synchronize with changed Streams configuration** on the **Settings & Detect Settings > Server Group** page, you see this warning: "Connection refused."

Causes

The most likely cause is that the Streams RCS service is down.

Resolving the problem

Use the following command to start the StreamsRCS.

1. Log in to the Streams runtime server as the streamsadmin user.
2. Go to /home/streamsadmin/OpDetection/StreamsRemoteControlService/wlp/bin.
3. Execute the following command.

```
./server start StreamsRCS --clean
```

404 transport error during Streams synchronization

Symptoms

Problem: When you synchronize Streams by clicking **Synchronize with changed Streams configuration** on the **Settings & Detect Settings > Server Group** page, you see a popup with the error: "Transport error: 404 Error: Not Found."

Resolving the problem

In WebSphere, enable **Override class reloading settings** and set the **Polling interval for updated files** to 4 seconds. Then restart the WebSphere profile.

Database access error in Streams log

Symptoms

In an installation that uses DB2 for system tables, after a workspace is deployed, you cannot start the deployment configuration. Some Streams jobs are unhealthy.

An error such as the following appears in the Streams log:

```
/home/streamsadmin/OpDetection/toolkits/unica_db_access/impl/include/
UnicaDatabaseAccess.h: At global scope:
/home/streamsadmin/OpDetection/toolkits/unica_db_access/impl/include/
UnicaDatabaseAccess.
/home/streamsadmin/OpDetection/toolkits/unica_db_access/impl/include/
UnicaDatabaseAccess.h:44: error: 'SQLHENV' does not name a type
/home/streamsadmin/OpDetection/toolkits/unica_db_access/impl/include/
UnicaDatabaseAccess.h:45: error: 'SQLHDBC' does not name a type
/home/streamsadmin/OpDetection/toolkits/unica_db_access/impl/include/
UnicaDatabaseAccess.h:53: error: 'SQLHSTMT' does not name a type
/home/streamsadmin/OpDetection/toolkits/unica_db_access/impl/include/
UnicaDatabaseAccess.h:69: error: 'SQLINTEGER' does not name a type
make: *** [build/function/com/ibm/unica/engine/LoadState.o] Error 1
```

Resolving the problem

1. If you are using DB2 for your system table database, ensure that the include directory is present under the DB2 client installation directory on the Streams server.

If the include directory is not present, contact your database administrator.

2. Ensure that all .h (header) files are present in the include directory under the DB2 client installation directory on the Streams server.
3. Ensure that an accurate path is specified in the Streams function.xml file for the include and lib64 directories.

The function.xml file is located in the /home/streamsadmin/OpDetection/toolkits/unica_db_access/db.access/native.function directory.

The path should reflect the location of your DB2 database client. This is described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Editing Streams and Opportunity Detect XML files."

Streams dependency checker fails with ulimit warning

Symptoms

The Streams 3.2.1 dependency checker fails with a ulimit warning.

Resolving the problem

Increase the ulimit property as follows.

1. Log in as root to the Linux server on which you are trying to install Streams and edit the 90-nproc.conf file located in the /etc/security/limits.d folder. Edit the file to have following entries

```
# Default limit for number of user's processes to prevent
# accidental fork bombs.
# See rhbz #432903 for reasoning.
```

```
*          soft  nproc  4096
root       soft  nproc  unlimited
```

2. Restart the Linux server on which you are trying to install Streams.
3. Log in to Streams as the streamsadmin user.
4. Execute the following command.

```
ulimit -a
```

The outcome should include a line like this. max user processes (-u) 4096

After applying a Fix Pack, new features are not present

Symptoms

After you upgrade by applying a Fix Pack, you do not have the expected new features or functionality.

Resolving the problem

Clear the application server cache as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Clearing the application server cache."

MIN_TIMESTAMP feeder error in Streams log

Symptoms

After a workspace is deployed, the deployment configuration is down and some of streams jobs are unhealthy.

The following error appears in the Streams log: "com.ibm.unica.feeder/UnicaFeeder.spl:613:73: CDISP0053E ER-ROR: An unknown identifier was referenced in the SPL program: MIN_TIMESTAMP."

Causes

A date is present in profile data.

Resolving the problem

Dates in Profile data are not supported. Remove dates from your profile data.

Invalid XML error or CDISC5101E error in Streams log

Symptoms

One of the following errors appears in the Streams log.

- An invalid XML (Unicode : 0x45) was found in the prolog of the document
- The system cannot connect to the AAS service. See the previous error messages.

Resolving the problem

If you have version 9.1.1.2 or higher, set the JAVA_HOME environment variable as follows.

- Set the Streams instance and the StreamRCS service to use the Infosphere jre 1.7 on startup.
- Set the Realtime connector service to use the Infosphere jre 1.6 on startup.

The StreamsRCS and Realtime Connector services are deployed on WebSphere Liberty profile application server. Typically the jre is set using JAVA_HOME or

JRE_HOME environment variables in the server.env file in the liberty profile configuration directory. These environment variables are overridden if already set for the liberty profile instance.

See the WebSphere documentation for more information on how to change the jre that the service uses: <http://www-01.ibm.com/support/docview.wss?uid=swg21596484> for more information.

Deployment fails with STREAMS_ADAPTERS_ODBC environment variable error

Symptoms

Deployment fails with the following error in the trace log: "No STREAMS_ADAPTERS_ODBC environment variable set." This issue can occur when you use Oracle or DB2 for Profile tables, or Oracle for system tables.

Resolving the problem

Set the environment variables as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Configuring the Streams database adapter for Oracle"

Attempt to save a workspace or database connection fails

Symptoms

When you try to save a workspace or database connection, a popup warns that the process failed.

Resolving the problem

In WebSphere, under Security Settings for each node in your environment, set the **Component-managed authentication alias** and **Mapping-configuration alias** fields as described in the *IBM Opportunity Detect Installation Guide*, in the topic titled "Creating data sources in the web application server for Opportunity Detect."

Workspace fails to deploy with boost library errors

Symptoms

The workspace fails to deploy. The trace log contains the following errors.

The trace log is located under your Streams installation in the /OpDetection/logs directory.

```
/home/streamsadmin/OpDetection/toolkits/unica_utils/impl/include/UnicaUtils.h:
 39:36: error: boost/iostreams/copy.hpp: No such file or directory
/home/streamsadmin/OpDetection/toolkits/unica_utils/impl/include/UnicaUtils.h:
 40:43: error: boost/iostreams/filter/zlib.hpp: No such file or directory
/home/streamsadmin/OpDetection/toolkits/unica_utils/impl/include/UnicaUtils.h:
 41:48: error: boost/iostreams/filtering_stream.hpp:
No such file or directory
/home/streamsadmin/OpDetection/toolkits/unica_utils/impl/include/UnicaUtils.h:
 42:51: error: boost/iostreams/filtering_streambuf.hpp:
No such file or directory
/home/streamsadmin/OpDetection/toolkits/unica_utils/impl/include/UnicaUtils.h:
 43:38: error: boost/iostreams/stream.hpp: No such file or directory
make: *** [build/function/com/ibm/unica/engine/GetFiringTime.o] Error 1
make: *** Waiting for unfinished jobs....
```

Resolving the problem

Install Boost libraries as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Installing Boost libraries."

After installation, verify that the libraries are present under the /usr/include/boost directory.

JMS authentication fails

Symptoms

Runs of a workspace using a Queue connector fail with this error in the Streams log: "JMS Authentication Failed..."

Deployment of workspace using a Queue connector is successful, but the deployment configuration is down and some of Streams jobs are unhealthy.

Resolving the problem

Set variables in the streamsadmin .bashrc file, as described in the *IBM Opportunity Detect Administrator's Guide*, in the topic titled "Installing MQ client libraries."

Workspace using queues fail to deploy with CDISP0467W error

Symptoms

A workspace containing a Queue connector fails to deploy. The trace log contains the following error.

```
com.ibm.unica.engine/UnicaEngine.spl:1938:1: CDISP0467W WARNING:
    The SaveStateForAllContainers function does not need to be declared stateful
    because it does not call any stateful functions.
Exception in thread "main" java.lang.UnsupportedClassVersionError:
    JVMCFRE003 bad major ver-sion; class=com/ibm/streamsx/messaging/jms/
    JMSSource, offset=6
at java.lang.ClassLoader.defineClass(ClassLoader.java:275)
at java.security.SecureClassLoader.defineClass(SecureClassLoader.java:74)
at java.net.URLClassLoader.defineClass(URLClassLoader.java:540)
at java.net.URLClassLoader.defineClass(URLClassLoader.java:451)
at java.net.URLClassLoader.access$300(URLClassLoader.java:79)
at java.net.URLClassLoader$ClassFinder.run(URLClassLoader.java:1038)
at java.security.AccessController.doPrivileged(AccessController.java:310)
at java.net.URLClassLoader.findClass(URLClassLoader.java:429)
at java.lang.ClassLoader.loadClass(ClassLoader.java:660)
at java.lang.ClassLoader.loadClass(ClassLoader.java:626)
at com.ibm.streams.operator.internal.runtime.api.OperatorAdapter.loadOperatorClass
    (OperatorAdapter.java:386)
at com.ibm.streams.operator.internal.compile.OperatorCompileTime.
    verifyClassNameAndLibraries (OperatorCompileTime.java:175)
at com.ibm.streams.operator.internal.compile.OperatorCompileTime.
    executeCompileTimeChecks (OperatorCompileTime.java:137)
at com.ibm.streams.operator.internal.compile.
    OperatorCompileTime.main (OperatorCompileTime.java:108)
com.ibm.unica.qcio/QueueInputOutput.spl:150:3: CDISP9164E ERROR:
```

Resolving the problem

Set the JAVA_HOME variable as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Configuring IBM InfoSphere Streams for use with Opportunity Detect."

Workspaces using a Web Service or Queue connector has unhealthy run

Symptoms

Workspaces using a Web Service or Queue connector deploy successfully but jobs (runs) are unhealthy. The following error is in the Streams log.

```
ERROR :::PEC.StartPE M[PECServer.cpp:runPE:207] P[5] - Could not load dll for
PE 5 from /home/streamsadmin/OpDetection/deploy/ 2218dfd2-5a59-417b-bd5c-
a17e07f6fd78/6/output/ com.ibm.unica.engine.UnicaEngine/Distributed/bin/
com.ibm.unica.engine.UnicaEngine-a.dpe because of /data/databaseserver/
DB210.1/lib64/libdb2.so.1: undefined symbol: sqlnlsFreeCpCvResources
```

Resolving the problem

1. Execute `printenv LD_LIBRARY_PATH` command as root and verify that the correct `LD_LIBRARY_PATH` value is set.

If necessary, correct the value as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Configuring the Streams database adapter for DB2" or "Configuring the Streams database adapter for Oracle."

2. Check the `.bashrc` file for both root and the Streamsadmin user to verify that the `Db2Instance` variable points to your database.
3. Restart the Streams instance and the Streams RCS Service.

Issues configuring ODBC.ini and executing ISQL on the Streams server

Symptoms

When you use Oracle for your system tables or profile data, iSQL fails to run.

Resolving the problem

Use a fully qualified name for the database server in the `ODBC.ini` file.

Workspace fails to update

Symptoms

During workspace creation, you see the following error message: "Failed to update workspace." The `trace.log` has the following entry:

```
[WebContainer : 8] ERROR com.ibm.unica.detect.ui.service.WorkspaceService -
createOrUpdateWorkspace() caught exception for workspaceId = 'null'
and workspaceName = 'GS'
```

Resolving the problem

1. Clear the application server cache as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the topic titled "Clearing the application server cache."
2. Check **Class loading and update detection** and **Manage modules** settings as described in the *IBM Opportunity Detect and Interact Advanced Patterns Installation Guide*, in the chapter titled "Deploying Opportunity Detect."

Login fails in a distributed environment

Symptoms

When a user logs in to Opportunity Detect, the user is redirected to the login screen again.

Resolving the problem

Ensure that the system time on all machines used in the distributed environment is the same.

With Oracle system tables, StreamsRCS fails to start

Symptoms

When you use Oracle for your system tables, the StreamsRCS service fails to start. In the StreamsRCS log the following error occurs.

```
Error: Caused by: java.lang.RuntimeException: There were errors
initializing your configuration: <openjpa-2.2.1.1-SNAPSHOT-r422266:1431746
fatal user error> org.apache.openjpa.util.UserException: A connection could
not be obtained for driver class "oracle.jdbc.OracleDriver" and URL
"jdbc:oracle:thin:@//Machine-Name:Port/DB-Name". You may have specified an
invalid URL.
```

Resolving the problem

1. Copy the ojdbc6.jar file from your from Oracle installation to
/home/streamsadmin/OpDetection/StreamsRemoteControlService/
wlp/usr/servers/StreamsRCS/dropins/StreamsRCS/WEB-INF/lib
2. Restart the StreamsRCS and StreamsInstance services.

StreamsRCS service fails to start

Symptoms

The StreamsRCS service fails to start. The logs show the following details.

```
Launching StreamsRCS (wlp-1.0.2.c10220130316-0213/websphere-kernel_1.0.2)
on IBM J9 VM, version pxa6470_27sr1fp1-20140708_01 (SR1 FP1) (en_US)
[AUDIT ] CWWKE0001I: The server StreamsRCS has been launched.
[err] Could not find matching export for Import-Package:
com.ibm.wsspi.logging; version="[1.0.0,1.1.0]"
[ERROR ] CWWKZ0005E: The application WEB-INF cannot start because
the server is not configured to handle applications of type StreamsRCS.
2015-11-24 00:56:07,645 [Default Executor-thread-2] INFO WarBasedAxisConfigurator
- Could not find axis2.xml,
loading default org/apache/axis2/deployment/axis2_default.xml from classpath
2015-11-24 00:56:07,697 [Default Executor-thread-2] INFO AxisServlet
- java.lang.IllegalArgumentException: The XMLInputFactory does not recognize
the property "reuse-instance".
[ERROR ] Uncaught.init.exception.thrown.by.servlet
```

Resolving the problem

Ensure that Java 6 is in your PATH environment variable.

Workspaces using a queue connector fail to deploy

Symptoms

A workspace that uses a Queue connector fails to deploy. The trace log contains an error such as the following.

```
Instantiate class: org.apache.activemq.jndi.ActiveMQInitialContextFactory
19 Nov 2015 18:16:39.758 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- javax.naming.NoInitialContextException: Cannot instantiate class:
org.apache.activemq.jndi.ActiveMQInitialContextFactory
[Root exception is java.lang.ClassNotFoundException:
org.apache.activemq.jndi.ActiveMQInitialContextFactory]
19 Nov 2015 18:16:39.759 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- javax.naming.spi.NamingManager.getInitialContext(NamingManager.java:685)
19 Nov 2015 18:16:39.759 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- javax.naming.InitialContext.getDefaultInitCtx(InitialContext.java:318)
```

```

19 Nov 2015 18:16:39.759 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- javax.naming.InitialContext.init(InitialContext.java:253)
19 Nov 2015 18:16:39.760 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- javax.naming.InitialContext.<init>(InitialContext.java:227)
19 Nov 2015 18:16:39.760 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- com.ibm.streamsx.messaging.jms.JMSConnectionHelper.createAdministeredObjects
(JMSConnectionHelper.java:192)
19 Nov 2015 18:16:39.760 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- com.ibm.streamsx.messaging.jms.JMSSource.initialize(JMSSource.java:340)
19 Nov 2015 18:16:39.761 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82]
- com.ibm.streams.operator.internal.runtime.api.OpAdapter.operatorInitialize
(OpAdapter.java:92)
19 Nov 2015 18:16:39.761 [22294] ERROR #splapptrc,J[108],P[118],
ImportedTransactionSet_AKRT.TransactionSet_JMS_AKRT,spl_javaop M[JavaOp.cpp:trace:82] -

```

Resolving the problem

Edit the Streams `.bashrc` file to reference the queue server client library, as described in the *IBM Opportunity Detect Administrator's Guide* in the topic titled "Installing MQ client libraries."

Deployment process failure

Symptoms

A deployment process fails to complete successfully.

The following error messages appear in the Streams log.

```

CDISR2517E The stdin mode is not the standard input for prompting for a
password. The tty mode is the standard input. The password prompt was
disabled.

```

```

CDISC5102E An error occurred while the system logged in to the instance.
See the previous error messages.

```

When you synchronize Streams by clicking **Synchronize with changed Streams configuration** on the **Settings & Detect Settings > Server Group** page, you see this warning: "Connection refused."

Causes

The most likely cause is incorrect or missed execution of the Streams First Steps application.

Resolving the problem

1. Log in to the Streams runtime server as the `streamsadmin` user.
2. Execute the following command:

```
streamstool genkey
```
3. Restart the Streams instance and redeploy the workspace.

Appendix. Opportunity Detect and Interact Advanced Patterns configuration properties

This section describes the Opportunity Detect and Interact Advanced Patterns configuration properties on the Configuration page.

IBM Opportunity Detect and Interact Advanced Patterns | Navigation

Properties in this category specify values that are used internally to navigate among IBM EMM products.

welcomePageURI

Description

The Uniform Resource Identifier of the IBM Opportunity Detect index page. This value is used internally by IBM EMM applications. Changes to this value are not recommended.

Default value

/index.jsp

seedName

Description

Used internally by IBM EMM applications. Changes to this value are not recommended.

Default value

Detect

type

Description

Used internally by IBM EMM applications. Changes to this value are not recommended.

Default value

Detect

httpPort

Description

The port number that is used by the application server for connections to the Opportunity Detect application.

Default value

7001

httpsPort

Description

The port number that is used by the application server for secure connections to the Opportunity Detect application.

Default value

7001

serverURL

Description

The URL of the Opportunity Detect installation. Accepts either the HTTP or HTTPS protocol. You must use the domain and the machine name (rather than the IP address) when IBM EMM products are installed on more than one machine. Also, if you are on a clustered environment and choose to use ports that are different from the default ports 80 or 443 for your deployment, do not use a port number in the value of this property.

Important: If IBM EMM products are installed in a distributed environment, you must use the machine name rather than an IP address in the navigation URL for all of the applications in the suite.

Default value

[server-url]

logoutURL

Description

Used internally. Changes to this value are not recommended.

IBM Marketing Platform uses this value to call the logout handler of each registered application if the user clicks the logout link in IBM EMM.

serverURLInternal

Description

Used internally. Changes to this value are not recommended.

displayName

Description

Used internally. Changes to this value are not recommended.

Default value

Opportunity Detect

IBM Opportunity Detect and Interact Advanced Patterns | System | Streams Remote Control Web Service

The property in this category specifies the URL for the IBM InfoSphere Streams remote control web service.

ServerURL

Description

The person who installs the product sets this property value during installation. The default port number is 8080.

Default value

`http://[SRCSTHost]:[SRCSPort]/axis2/services/RemoteControl`

IBM Opportunity Detect and Interact Advanced Patterns | System | Real Time Connector

The property in this category specifies the URL for the web service used when Interact is integrated with Interact Advanced Patterns or when the Web Service connector is used for input data.

ServerURL

Description

The person who installs the product sets this property value during installation. The default port number is 8282.

Default value

`http://[RealTimeConnectorHost]:[RealTimeConnectorPort]/servlets/StreamServlet`

IBM Interact Advanced Patterns | System | Interact Design Service

The property in this category specifies the URL for the web service that allows Interact to automatically create and deploy advanced patterns when Interact is integrated with Interact Advanced Patterns.

ServerURL

Description

This web service is the integration point between Interact and Interact Advanced Patterns design time. The person who installs the product sets this property value during installation. The default port number is 8181.

Default value

`http://[InteractServiceHost]:[InteractServicePort]/axis2/services/InteractDesignService`

IBM Opportunity Detect and Interact Advanced Patterns | logging

The property in this category specifies the location of the Opportunity Detect log file.

log4jConfig

Description

The location of the configuration file that Opportunity Detect uses for logging. This value is set automatically during installation, but if you change this path, you must restart the web application server to apply the change.

Default value

`[absolute-path]/conf/detect_log4j.properties`

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If you are not a designated support contact at your company, contact your IBM administrator for information.

Note: Technical Support does not write or create API scripts. For assistance in implementing our API offerings, contact IBM Professional Services.

Information to gather

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- A brief description of the nature of your issue.
- Detailed error messages that you see when the issue occurs.
- Detailed steps to reproduce the issue.
- Related log files, session files, configuration files, and data files.
- Information about your product and system environment, which you can obtain as described in "System information."

System information

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If your problem does not prevent you from logging in, much of this information is available on the About page, which provides information about your installed IBM applications.

You can access the About page by selecting **Help > About**. If the About page is not accessible, check for a `version.txt` file that is located under the installation directory for your application.

Contact information for IBM technical support

For ways to contact IBM technical support, see the IBM Product Technical Support website: (http://www.ibm.com/support/entry/portal/open_service_request).

Note: To enter a support request, you must log in with an IBM account. This account must be linked to your IBM customer number. To learn more about associating your account with your IBM customer number, see **Support Resources > Entitled Software Support** on the Support Portal.

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