IBM Opportunity Detection
Version 9 Release 1
October 25, 2013

Installation Guide

IBM

Contents

Chapter 1. Installation overview

An installation of Opportunity Detection is complete when you install, configure, and deploy Opportunity Detection. The Opportunity Detection Installation Guide provides detailed information about installing, configuring, and deploying Opportunity Detection.

Use the Installation Roadmap section to obtain a broad understanding about using the Opportunity Detection Installation Guide.

Installation roadmap

Use the installation roadmap to quickly find the information that you need for installing Opportunity Detection.

You can use Table 1 to scan the tasks that must be completed for installing Opportunity Detection. The **Information** column in the following table provides links to the topics that describe the tasks for installing Opportunity Detection:

Table 1. Opportunity Detection installation roadmap

Chapter	Information
Chapter 1, "Installation overview"	This topic provides the following information: • "How the installers work" on page 2 • "Modes of installation" on page 3 • "Opportunity Detection documentation and help" on page 3
Chapter 2, "Planning the Opportunity Detection installation," on page 5	This topic provides the following information: • "Prerequisites" on page 5 • "Opportunity Detection installation worksheet" on page 8 • "Installation order for IBM EMM products" on page 10
Chapter 3, "Preparing data sources for Opportunity Detection," on page 13	This topic provides the following information: • "Creating databases or schemas" on page 13 • "Configuring the web application server for your JDBC driver" on page 14 • "Creating data sources for Opportunity Detection" on page 16

Table 1. Opportunity Detection installation roadmap (continued)

Chapter	Information
Chapter 4, "Installing Opportunity Detection," on page 19	This topic provides the following information: • "Installing Opportunity Detection by using the GUI mode" on page 19 • "Installing Opportunity Detection by using the console mode" on page 26 • "Installing Opportunity Detection silently" on page 27 • "Opportunity Detection components" on page 28
Chapter 5, "Configuring Opportunity Detection before deployment," on page 31	This topic provides information about deploying Opportunity Detection Design Time and Run Time. This topic also provides the following information: • "Creating and populating the Opportunity Detection system tables" on page 31 • "Registering Opportunity Detection manually" on page 32
Chapter 6, "Deploying Opportunity Detection," on page 33	This topic also provides the following information: • "Deploying Opportunity Detection on WebSphere Application Server" on page 33
Chapter 6, "Deploying Opportunity Detection," on page 33	This topic provides the following information: • "Modifying log levels for Opportunity Detection" on page 40 • "Verifying the Opportunity Detection installation" on page 41 after deployment.
Chapter 8, "Uninstalling Opportunity Detection," on page 43	This topic provides information about how to uninstall Opportunity Detection.
Chapter 9, "The configTool utility," on page 45	This topic provides information about the `configTool` utility.

How the installers work

You must use the suite installer and the product installer when you install any IBM® EMM product. For example, for installing Opportunity Detection, you must use the IBM EMM suite installer and the IBM Opportunity Detection installer.

Make sure that you use the following guidelines before you use the IBM EMM suite installer and the product installer:

• The suite installer and the product installer must be in the same directory on the computer where you want to install the product. When multiple versions of a product installer are present in the directory with the master installer, the master installer always shows the latest version of the product on the IBM EMM Products screen in the installation wizard.

- If you are planning to install a patch immediately after you install an IBM EMM product, make sure that the patch installer is in the same directory as that of the suite and product installers.
- The default top-level directory for IBM EMM installations is /IBM/EMM for UNIX. However, you can change the directory during installation.

Modes of installation

The IBM EMM suite installer can run in one of the following modes: X Window System mode, console mode, or silent mode (also called the unattended mode). Select a mode that suits your requirements when you install Opportunity Detection.

X Window System mode mode

Use the X Window System mode for UNIX to install Opportunity Detection by using the graphical user interface.

Console mode

Use the console mode to install Opportunity Detection by using the command-line window.

Note: To display the Installer screens correctly in console mode, configure your terminal software to support UTF-8 character encoding. Other character encoding, such as ANSI, will not render the text correctly, and some information will not be readable.

Silent mode

Use the silent or unattended mode to install Opportunity Detection multiple times. The silent mode uses response files for installation, and does not require user input during the installation process.

Opportunity Detection documentation and help

Opportunity Detection provides documentation and help for users, administrators, and developers.

Use the following table to get information about how to get started with Opportunity Detection:

Table 2. Get up and running

Task	Documentation
View a list of new features, known issues, and workarounds	*IBM Opportunity Detection Release Notes*
Learn about the structure of the Opportunity Detection database	*IBM Opportunity Detection System Tables and Data Dictionary*
Install or upgrade Opportunity Detection and deploy the Opportunity Detection web application	One of the following guides: • *IBM Opportunity Detection Installation Guide* • *IBM Opportunity Detection Upgrade Guide*

Use the following table to get information about how to configure and use
Opportunity Detection:

Table 3. Configure and use Opportunity Detection

Task	Documentation
• Maintain users and roles • Maintain data sources • Monitor and maintain runtime environment performance	*IBM Opportunity Detection Administrator's Guide*

Use the following table to get information about how to get help if you face issues
when you use Opportunity Detection:

Table 4. Get help

Task	Instructions
Open online help	1. Choose **Help > Help for this page** to open a context-sensitive help topic. 2. Click the **Show Navigation** icon in the help window to display the full help.
Obtain PDFs	Use either of the following methods: • Choose **Help > Product Documentation** to access Opportunity Detection PDFs. • Choose **Help > All IBM EMM Suite Documentation** to access all available documentation.
Get support	Go to http://www.ibm.com/ and click **Support & downloads** to access the IBM Support Portal.

Chapter 2. Planning the Opportunity Detection installation

When you plan your Opportunity Detection installation, you must ensure that you have set up your system correctly, and that you have configured your environment to deal with any failures.

Prerequisites

Before you install or upgrade any IBM EMM product, you must ensure that your computer complies with all the prerequisite software and hardware.

System requirements

For information about system requirements, see the *Recommended Software Environments and Minimum System Requirements* guide.

Network domain requirements

The IBM EMM products that are installed as a suite must be installed on the same network domain to comply with the browser restrictions that are designed to limit the security risks that can occur with cross-site scripting.

JVM requirements

IBM EMM applications within a suite must be deployed on a dedicated Java™ virtual machine (JVM). IBM EMM products customize the JVM that is used by the web application server. If you encounter errors that are related to the JVM, you must create a WebSphere® domain that is dedicated to the IBM EMM products.

Knowledge requirements

To install IBM EMM products, you must have a thorough knowledge of the environment in which the products are installed. This knowledge includes knowledge about operating systems, databases, and web application servers.

Internet browser settings

Make sure that your internet browser complies with the following settings:
* The browser must not cache web pages.
* The browser must not block pop-up windows.

Access permissions

Verify that you have the following network permissions to complete the installation tasks:
* Administration access for all necessary databases
* Read and write access to the relevant directory and subdirectories for the operating system account that you use to run the web application server and IBM EMM components
* Write permission for all files that you must edit

- Write permission for all directories where you must save a file, such as the installation directory and backup directory if you are upgrading
- Appropriate read/write/execute permissions to run the installer
- Root access for the Linux operating system.

Verify that you have the administrative password for your web application server.

For UNIX, all installer files for IBM products must have full permissions, for example, rwxr-xr-x.

JAVA_HOME environment variable

If a **JAVA_HOME** environment variable is defined on the computer where you install an IBM EMM product, verify that the variable points to a supported version of JRE. For information about system requirements, see the *Recommended Software Environments and Minimum System Requirements* guide.

Make sure that the **JAVA_HOME** environment variable points to JRE 1.6. If the **JAVA_HOME** environment variable points to an incorrect JRE, you must clear the **JAVA_HOME** variable before you run the IBM EMM installers.

You can clear the **JAVA_HOME** environment variable by running the following command in the terminal:

export JAVA_HOME= (leave empty)

After the environment variable is cleared, the IBM EMM installers use the JRE that is bundled with the installers. You can reset the environment variable after the installation is complete.

DETECT_HOME environment variable

The **DETECT_HOME** environment variable must point to the full path to the location where Opportunity Detection Run Time is installed, for example:

DETECT_HOME=/home/streamsadmin/OpDetection/

Marketing Platform requirement

You must install Marketing Platform before you install any IBM EMM products. For each group of products that work together, you must install Marketing Platform only once. Each product installer checks whether the required products are installed. If your product or version is not registered with Marketing Platform, a message prompts you to install or upgrade Marketing Platform before you proceed with your installation. Marketing Platform must be deployed and running before you can set any properties on the **Settings > Configuration** page.

IBM InfoSphere Streams requirements

IBM InfoSphere Streams is a computing platform that you can use to convert expanding data volumes into information and business insights that you can work with. IBM InfoSphere Streams is installed automatically when you install Opportunity Detection Run Time.

Required RPMs for InfoSphere Streams

Note: IBM InfoSphere Streams is supported only on Red Hat Enterprise Linux (RHEL).

To operate correctly, IBM InfoSphere Streams requires a set of prerequisite RPMs that are provided in the following table:

Table 5. Required RPMs for RHEL 6 on x86_64 (64-bit) systems

RPM name	Minimum RPM version	Operating system release	Availability
gcc-c++	4.4.5-6.el6	6.1	Operating system package
	4.4.6-3.el6	6.2	
ibm-java-x86_64-sdk	6.0-12.0	6.1, 6.2	InfoSphere Streams package **Note:** You must install the ibm-java-x86_64-sdk package before running the installers for Opportunity Detection. To obtain the package, navigate to the `StreamsInstallFiles/rpm` directory in the IBM InfoSphere Streams installer.
libcurl-devel	7.19.7-26.el6	6.1	InfoSphere Streams package
	7.19.7-26.el6_1.2	6.2	
perl-XML-Simple	2.18-6.el6	6.1, 6.2	InfoSphere Streams package **Note:** You must install the perl-XML-Simple package before running the installers for Opportunity Detection. To obtain the package, navigate to the `StreamsInstallFiles/rpm` directory in the IBM InfoSphere Streams installer.
policycoreutils-python	2.0.83-19.8.el6_0	6.1	Operating system package
	2.0.83-19.18.el6	6.2	

Confirm that the following IBM InfoSphere Streams elements exist before installing Opportunity Detection Run Time:
* streamsadmin user
* IBM InfoSphere Streams files

Updating JAVA package

You must update the JAVA package that is required by IBM InfoSphere Streams. Complete the following steps to update all packages in the `rpm` directory:
1. Locate and unzip the IBM InfoSphere Streams package streams file.
2. Navigate to the `StreamsInstallFiles` directory.
3. Navigate to the `rpm` directory and update all packages.

Modifying the bashrc file

You must modify the `bashrc` file for the streamsadmin user for the streams command to work. Use the following example to modify the `bshrc` file"

```
# .bashrc

# Source global definitions
if [ -f /etc/bashrc ]; then
        . /etc/bashrc
fi
export JAVA_HOME=/opt/ibm/java-x86_64-60
source /home/streamsadmin/InfoSphereStreams/bin/streamsprofile.sh
. /home/db2inst1/sqllib/db2profile
export DETECT_HOME=/home/streamsadmin/OpDetection
alias st='streamtool'
alias ls='ls -lt'
```

Firewall configuration guidelines for InfoSphere Streams

If your security plan requires a firewall on the host operating system or between
hosts, the following communications must be enabled between hosts and blocked
from unauthorized external access:

- SSH communication between runtime hosts
- Communication between InfoSphere Streams management services, which is
  limited to ports in the local port range (TCP/IP port numbers that are
  automatically assigned by the host machine)
- TCP communication between processing elements (PEs), which is limited to
  ports in the local port range
- HTTPS connections between the Streams Web Service (SWS) and InfoSphere
  Streams interfaces such as the Streams Console. Each InfoSphere Streams
  runtime instance that is running SWS requires a user-assigned HTTPS port.
- All communication protocols between applications and any systems, such as
  databases or external analytics services

For more information, see the IBM InfoSphere Streams documentation that is
available in the /home/streamsadmin/InfoSphereStreams/doc/install-and-admin
directory.

Installation of Streams by root users

Opportunity Detection supports Streams integration with root users only. If you
are running the installation utility as a root user, you are the owner of the
InfoSphere Streams installation. During the installation, you can specify the
location of the installed InfoSphere Streams files. The default location is
home_directory/InfoSphereStreams.

Important: The streamsadmin user owns the IBM InfoSphere Streams installation,
and must exist before you run the InfoSphere Streams installation utility.

For more information about installing and configuring IBM InfoSphere Streams, see
IBM InfoSphere Streams: Installation and Administration Guide.

Opportunity Detection installation worksheet

Use the Opportunity Detection installation worksheet to gather information about
the database that contains your Opportunity Detection system tables and about
other IBM EMM products that are required for the installation of Opportunity
Detection.

Runtime tables

You can have multiple databases that contain runtime tables.

Enter the database information for each runtime environment in the following table:

Table 6. Information for the Opportunity Detection runtime environment

Database information	Notes
Database server	
Port	
Database name or SID	
Schema name	
Password	

IBM EMM products information worksheet

Use the IBM EMM products information checklist to gather the information that is required during the installation of an IBM EMM product.

The installation wizards for each IBM EMM product must be able to communicate with the Marketing Platform system table database to register the product. Each time that you run the installer, you must enter the following database connection information for the Marketing Platform system table database:

- Database type
- Database host name
- Database port
- Database name or schema ID
- User name and password for the database account

Obtain the following information for all IBM EMM products that have a web component, which you deploy on a web application server:

- The name of the systems on which the web application servers are installed. You can have one or several web application servers, depending on the IBM EMM environment you are setting up.
- The port on which the application server listens. If you plan to implement SSL, obtain the SSL port.
- The network domain for your deployment system. For example, mycompany.com.

If you are installing an IBM EMM product in one of the countries listed on the Country for Install screen of your product installer, you must enter your IBM Site ID in the space provided. Your IBM Site ID can be found on one of the following documents:

- IBM Welcome letter
- Tech Support Welcome letter
- Proof of Entitlement letter
- Other communications that are sent when you purchase your software

IBM might use the data that is provided by the software to better understand how customers use our products and to improve customer support. The data that is gathered does not include any information that identifies individuals. Complete the following actions if you do not want to have such information to be collected:

1. After Marketing Platform is installed, log on to the Marketing Platform as a user with administration privileges.
2. Go to **Settings > Configuration**, and set the `Disable Page Tagging` property under the **Platform** category to True.

Installation order for IBM EMM products

When you install or upgrade multiple IBM EMM products, you must install them in a specific order.

The following table provides information about the order that you must follow when you install or upgrade multiple IBM EMM products.

Table 7. Installation or upgrade order for IBM EMM products

For this product or combination:	Install or upgrade in this order:
Campaign (with or without eMessage)	1. Marketing Platform 2. Campaign **Note:** eMessage is installed automatically when you install Campaign. However, eMessage is not configured or enabled during the Campaign installation process.
Interact	1. Marketing Platform 2. Campaign 3. Interact Design Time environment 4. Interact Run Time environment 5. Interact Extreme Scale Server If you want to install or upgrade the Interact design time environment only, then install or upgrade the Interact design time environment in the following order: 1. Marketing Platform 2. Campaign 3. Interact Design Time environment If you want to install or upgrade the Interact runtime environment only, then install or upgrade the Interact runtime environment in the following order: 1. Marketing Platform 2. Interact Run Time environment If you want to install the Interact Extreme Scale Server only, then install the Interact Extreme Scale Server in the following order: 1. Marketing Platform 2. Interact Run Time environment 3. Interact Extreme Scale Server

Table 7. Installation or upgrade order for IBM EMM products (continued)

For this product or combination:	Install or upgrade in this order:
Marketing Operations	1. Marketing Platform 2. Marketing Operations **Note:** If you are integrating Marketing Operations with Campaign, you must also install Campaign. The order of installation for those two products does not matter.
Distributed Marketing	1. Marketing Platform 2. Campaign 3. Distributed Marketing
Interaction History	1. Marketing Platform 2. Interaction History
Attribution Modeler	1. Marketing Platform 2. Interaction History 3. Attribution Modeler
Contact Optimization	1. Marketing Platform 2. Campaign 3. Contact Optimization
Opportunity Detection	1. Marketing Platform 2. Opportunity Detection If Opportunity Detection is integrated with Interact, install the products in the following order: 1. Marketing Platform 2. Campaign 3. Interact 4. Opportunity Detection
IBM SPSS® Modeler Advantage Marketing Edition	1. IBM SPSS Modeler Advantage Marketing Edition

Chapter 3. Preparing data sources for Opportunity Detection

Opportunity Detection uses data sources to store user and interaction data.

Complete the following steps to prepare data sources for Opportunity Detection:
1. Create a database schema for the Opportunity Detection system tables.
2. Create a system user account. The system user account must have the following rights: CREATE, DELETE, DROP, INSERT, SELECT, and UPDATE.
3. Configure the web application server for your JDBC driver.
4. Create JDBC data sources in the web application server.

Creating databases or schemas

Set up data sources so that the Opportunity Detection system can store user and interaction data. You can use your Campaign Customer (user) tables or set up unique data sources based on the type of data that is stored.

Complete the following steps to create databases or schemas for Opportunity Detection:
1. Create a database and a database schema for the Opportunity Detection system tables. The following table provides information about vendor-specific guidelines while creating a database or a database schema for the Opportunity Detection system tables:

Table 8. Guidelines for creating databases or schemas

Database vendor	Guidelines
DB2®	Set the database page size to at least 16K, or 32K if you need to support Unicode. See the DB2 documentation for instructions.

   Note: If you plan to enable locales that use locales that use multi-byte characters, such as Chinese, Korean, and Japanese, ensure that the database is created to support them.
2. Create a system user account.

   The account that you create must have at least CREATE, SELECT, INSERT, UPDATE, DELETE, and DROP rights.
3. Obtain information about your databases or schemas and database accounts and then print and add the information to the "Opportunity Detection installation worksheet" on page 8. You can use this information later in the installation process.

Required databases or schemas for Opportunity Detection

The Opportunity Detection Design Time environment requires several databases to hold user and interaction data.

A database or a schema is required to hold the Opportunity Detection design time tables. There must be a separate database or schema for each server group.

Configuring the web application server for your JDBC driver

Opportunity Detection requires the correct JAR file to support JDBC connections. You must add the location of the JAR file to the class path of the web application server where you plan to deploy Opportunity Detection.

Complete the following steps to configure the web application server for your JDBC driver:

1. Obtain the latest vendor-provided Type 4 JDBC driver that is supported by IBM EMM, as described in the *Recommended Software Environments and Minimum System Requirements* guide.

   Use the following guidelines after you obtain the JDBC driver:

   - If the driver does not exist on the server where you plan to deploy Opportunity Detection, obtain it and unpack it on the server. Unpack the drivers in a path that does not include spaces.
   - If you obtain the driver from a server where the data source client is installed, verify that the version is the latest supported by Opportunity Detection.

   The following table lists the driver file name or names for the databases that are supported for IBM EMM system tables:

Database	Files
DB2	`db2jcc4.jar` - required for V10.1
	`db2jcc_license_cu.jar` - not required in V9.5 and higher

2. Add the full path to the driver, including the file name, to the class path of the web application server where you plan to deploy Opportunity Detection.

   According to the web application server where you plan to deploy Opportunity Detection, use the following guidelines:

   - For all supported versions of WebSphere, set the class path when you set up the JDBC providers for Opportunity Detection.

3. Make a note of the database driver class path in the Opportunity Detection installation worksheet, as you must enter the path when you run the installer.

4. Restart the web application server so that your changes take effect.

   During startup, monitor the console log to confirm that the class path contains the path to the database driver.

Information for creating JDBC connections

Use default values when you create JDBC connections if specific values are not provided. For more information, see the application server documentation.

Note: If you are not using the default port setting for your database, make sure that you change it to the correct value.

WebLogic

Use the following values if your application server is WebLogic:

SQLServer

- Database Driver: Microsoft MS SQL Server Driver (Type 4) Versions: 2008, 2008R2

- Default port: 1433
- Driver class: `com.microsoft.sqlserver.jdbc.SQLServerDriver`
- Driver URL: `jdbc:sqlserver://`
  `<your_db_host>:<your_db_port>;databaseName=<your_db_name>`
- Properties: Add `user=<your_db_user_name>`

Oracle 11 and 11 g
- Driver: Other
- Default port: 1521
- Driver class: `oracle.jdbc.OracleDriver`
- Driver URL:
  `jdbc:oracle:thin:@<your_db_host>:<your_db_port>:<your_db_service_name>`

  Enter the driver URL by using the format that is shown. IBM EMM applications do not allow the use of Oracle's RAC (Real Application Cluster) format for JDBC connections.
- Properties: Add `user=<your_db_user_name>`

DB2
- Driver: Other
- Default port: 50000
- Driver class: `com.ibm.db2.jcc.DB2Driver`
- Driver URL: `jdbc:db2://<your_db_host>:<your_db_port>/<your_db_name>`
- Properties: Add `user=<your_db_user_name>`

WebSphere

Use the following values if your application server is WebSphere:

SQLServer
- Driver: N/A
- Default port: 1433
- Driver class:
  `com.microsoft.sqlserver.jdbc.SQLServerConnectionPoolDataSource`
- Driver URL: N/A

In the **Database Type** field, select **User-defined**.

After you create the JDBC Provider and data source, go to the **Custom Properties** for the data source, and add, modify properties as follows.
- `serverName=<your_SQL_server_name>`
- `portNumber =<SQL_Server_Port_Number>`
- `databaseName=<your_database_name>`

Add the following custom property:

Name: `webSphereDefaultIsolationLevel`

Value: 1

Datatype: `Integer`

Oracle 11 and 11 g
- Driver: Oracle JDBC Driver
- Default port: 1521
- Driver class: `oracle.jdbc.OracleDriver`
- Driver URL:
  `jdbc:oracle:thin:@<your_db_host>:<your_db_port>:<your_db_service_name>`

  Enter the driver URL by using the format that is shown. IBM EMM applications do not allow the use of Oracle's RAC (Real Application Cluster) format for JDBC connections.

DB2
- Driver: DB2 Universal JDBC Driver Provider
- Default port: 50000
- Driver class: `com.ibm.db2.jcc.DB2Driver`
- Driver URL: `jdbc:db2://<your_db_host>:<your_db_port>/<your_db_name>`

Creating data sources for Opportunity Detection

You can use the WebSphere Integrated Solutions Console to create a data source for Opportunity Detection.

Before creating data sources, make sure that the JDBC provider type for Opportunity Detection is the DB2 using IBM JCC driver. Complete the following steps to specify the JDBC provider:

1. Log into the Websphere console
2. Go to **Resources > JDBC > JDBC Providers**.
3. Click **New** to open the Create new JDBC provider window.
4. In the **Database type** field, select **DB2**.
5. In the **Provider type** field, select **DB2 using IBM JCC driver**.
6. In the **Implementation type** field, select **Connection pool data source**.
7. Click **Next** and enter the required information.
8. Click **Next** to view the summary.
9. Click **Finish** to configure the JDBC provider.

Note: The data source and the JNDI name for Opportunity Detection must be OpDetectionDS.

Complete the following steps to create data sources for Opportunity Detection:

1. In WebSphere Integrated Solutions Console, go to **Resources > JDBC > Data sources** and click **New**.
2. In the Create a data source window, enter `OpDetectionDS` in the **Data source name** and the **JNDI name fields** and click **Next**.
3. Select the **Select an existing JDBC provider** check box, and select **DB2 using IBM JCC driver** in the corresponding list.
4. Click **Next** to see the Enter database specific properties for the data source window.
5. Enter the appropriate values in all the fields.
6. Clear the **Use this data source in container managed persistence (CMP)** check box and click **Next**.

7. In the **Component-managed authentication alias** field, select your global J2C authentication alias.

   If a global J2C authentication alias does not exist, complete the following steps to create a global J2C authentication alias:

   a. Click the **Global J2C alias Security domains** link.

      Important: Clicking the Global J2C alias Security domains cancels the Create a data source wizard, and all your selections are lost. You must create the data source again after you create a global J2C authentication alias.

   b. Click **New**.

   c. Enter the required information in the General Properties window.

   d. Click **OK** and then click **Save** in the Data sources window.

8. Click **Finish** to create the OpDetectionDS data source.

Chapter 4. Installing Opportunity Detection

You must run the IBM EMM installer to start the installation of Opportunity Detection. The IBM EMM installer starts the Opportunity Detection installer during the installation process. Make sure that the IBM EMM installer and the product installer are saved at the same location.

Each time that you run the IBM EMM Suite installer, you must first enter database connection information for the Marketing Platform system tables. When the Opportunity Detection installer starts, you must enter the required information for Opportunity Detection.

After installing Opportunity Detection, you can create an EAR file if necessary.

Important: Before you install Opportunity Detection, make sure that the available temporary space on the computer where you install Opportunity Detection is more than three times the size of the Opportunity Detection installer.

Installation files

The installation files are named according to the version of the product and the operating system on which they must be installed, except UNIX. For UNIX, different installation files exist for the X Window System mode and the console mode.

The following table displays examples of the installation files that are named according to the product version and the operating system:

Table 9. Installation files

Operating system	Installation file
UNIX: X Window System mode	`Product_N.N.N.N_RHEL64.bin`, where *Product* is the name of your product, and *N.N.N.N* is the version number of your product.
UNIX: Console mode	`Product_N.N.N.N.bin`, where *Product* is the name of your product, and *N.N.N.N* is the version number of your product. This file can be used for installation on all UNIX operating systems.

Installing Opportunity Detection by using the GUI mode

For UNIX, use the X Window System mode to install Opportunity Detection.

Important: Before you install Opportunity Detection, make sure that the available temporary space on the computer where you install Opportunity Detection is more than three times the size of the Opportunity Detection installer.

Make sure that the following components are located in the same directory:
- IBM EMM suite installer
- Opportunity Detection
- InfoSphere Streams file

Complete the following actions to install Opportunity Detection by using the GUI mode:

1. In a command-line prompt window, navigate to the directory where you have saved the IBM EMM and the Opportunity Detection installers.
2. Run the following:

   ./IBM_EMM_installer_full_name_linux.bin

   For example:

   ./IBM_EMM_Installer_9.1.0.0_linux.bin The IBM EMM Suite Installer opens.
3. Click **OK** on the first screen to see the Introduction window.
4. Follow the instructions on the installer, and click **Next**. Use the information in the following table to take the appropriate actions on each window in the EMM installer.

Table 10. IBM EMM installer GUI

Window	Description
Introduction	This is the first window of the IBM EMM suite installer. You can open the Opportunity Detection installation and upgrade guides from this window. Click **Next** to go to the next window.
Response Files Destination	Click the **Generate Response File** check box if you want to generate response files for your product. Response files store the information that is necessary for the installation of your product. You can use response files for an unattended installation of your product, or to get pre-filled answers if you rerun the installer in the GUI mode Click **Choose** to browse to a location where you want to store the response files. Click **Next** to go to the next window.
IBM EMM Products	In the **Install Set** list, select **Custom** to select the products that you want to install. In the **Install Set** area, you can see all the products whose installation files are in the same directory on your computer. In the **Description** field, you can view the description of the product that you select in the **Install Set** area. Click **Next** to go to the next window.
Installation Directory	Click **Choose** to browse to the directory where you want to install IBM EMM. Click **Next** to go to the next window.
Select Application Server	Select **IBM WebSphere** as the application server. Oracle Weblogic is not supported for Opportunity Detection Click **Next** to go to the next window.

Table 10. IBM EMM installer GUI (continued)

Window	Description
Platform Database Type	Select **IBM DB2** as the database. Opportunity Detection is supported only on IBM DB2. Click **Next** to go to the next window.
Platform Database Connection	Enter the following information about your database: • Database host name • Database port • Database name or System ID (SID) • Database user name • Database password Click **Next** to go to the next window. **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.
Platform Database Connection (continued)	Review and confirm the JDBC connection. Click **Next** to go to the next window.
Preinstallation Summary	Review and confirm the values that you added during the installation process. Click **Install** to start the installation process. The Marketing Platform installer opens. If a previous instance of Marketing Platform exists, the instance is upgraded to the current version. If a previous instance of Marketing Platform does not exist, Marketing Platform is installed.

5. Follow the instructions on the Marketing Platform installer to install or upgrade Marketing Platform. See *IBM EMM Marketing Platform Installation Guide* for more information.
6. In the Installation Complete window, click **Done**. The Marketing Platform installation is complete, and the Opportunity Detection installer opens.
7. Use the information in the following table to navigate the Opportunity Detection installer. In the Platform Database Connection window, enter all the required information and click **Next** to start the Opportunity Detection installer.

Table 11. Opportunity Detection installer GUI

Window	Description
Introduction	This is the first window of the Opportunity Detection installer. You can open the Opportunity Detection installation and upgrade guides from this window. Click **Next** to go to the next window.
Software Licence Agreement	Carefully read the agreement. Use **Print** to print the agreement. Click **Next** after you accept the agreement.

Table 11. Opportunity Detection installer GUI (continued)

Window	Description
Installation Directory	Click **Choose** to browse to the directory where you want to install Opportunity Detection. Click **Next** to go to the next window.
Opportunity Detection Components	Select the **Design Time** and **Run Time** check boxes. Click **Next** to go to the next window.
Opportunity Detection Web Application Connection Settings	Enter the following information about the web application connection settings: • Network domain name • Host name • Port number Select the **Use secure connection** check box if you want to create a secure connection to the web application. Click **Next** to go to the next window.
DesignTime Database Setup	Select one of the following check boxes: • **Automatic database setup** • **Manual database setup** Click **Next** to go to the next window.
DesignTime Database Type	You can see this window if you selected the **Automatic database setup** check box in the DesignTime Database Setup window. Make sure that **IBM DB2** is selected. Click **Next** to go to the next window.
DesignTime Database Connection	You can see this window if you selected the **Automatic database setup** check box in the DesignTime Database Setup window. Enter the following details for the Design Time database: • Database host name • Database port • Database system ID (SID) • Database user name • Database password **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. Click **Next** to go to the next window.
DesignTime database JDBC Connection	Review and confirm the JDBC connection. Click **Next** to go to the next window.

Table 11. Opportunity Detection installer GUI (continued)

Window	Description
Interact Service Settings	Enter the following information to configure the Interact service: • Host name or IP address • Port number Click **Next** to go to the next window.
RunTime Database Setup	Select one of the following check boxes: • **Automatic database setup** • **Manual database setup** Click **Next** to go to the next window.
Detect Database Type (Unix)	Review and confirm your IBM DB2 installation directory. Click **Next** to go to the next window.
RunTime Database Connection	Enter the following details for the Run Time database: • Database host name • Database port • Database system ID (SID) • Database user name • Database password **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. Click **Next** to go to the next window.
RunTime database JDBC Connection	Review and confirm the JDBC connection. Click **Next** to go to the next window.
Interact Connector Settings	Enter the following information to configure the Interact Connector: • Host name or IP address • Port number Click **Next** to go to the next window.
Streams Remote Control Service Settings	Enter the following information to configure the Streams Remote Control Service: • Host name or IP address • Port number Click **Next** to go to the next window.
Preinstallation Summary	Review and confirm the values that you added during the installation process. Click **Install** to start the installation process. The Opportunity Detection installer opens.

Table 11. Opportunity Detection installer GUI (continued)

Window	Description
Installation Complete	Click **Done** to close the Opportunity Detection installer and go back to the IBM EMM installer. Go back to the IBM EMM Suite Installer.

8. Follow the instructions on the IBM EMM installer to finish installing Opportunity Detection. Use the information in the following table to take the appropriate actions on each window in the EMM installer.

Table 12. EMM installer GUI

Window	Description
Deployment EAR file	Specify whether you want to create an enterprise archive (EAR) file to deploy your IBM EMM products. Click **Next** to go to the next window.
Package EAR file	You can see this window if you select **Create an EAR file for deployment** in the Deployment EAR file window. Select the applications that you want to package in the EAR file.
EAR file details	Enter the following information for your EAR file: • Enterprise application identifier • Display name • Description • EAR file path
EAR file details (continued)	Select **Yes** or **No** to create an additional EAR file. If you select **Yes**, you must enter the details for the new EAR file. Click **Next** to complete the installation of your product.
Deployment EAR file	Specify whether you want to create another EAR file to deploy your IBM EMM products. Click **Next** to go to the next window.
Installation Complete	This window provides the locations of the log files that are created during installation. Click **Previous** if you want to change any installation details. Click **Done** to close the IBM EMM installer.

Creating an EAR file after running the installer

You create EAR files after you install IBM EMM products. You might do this to have a different combination of products in EAR file.

Note: Run the installer in console mode from the command line.

Use the following procedure if you want to create an EAR file after you install IBM EMM products:

1. If this is the first time you are running the installer in console mode, make a backup copy of the installer's `.properties` file for each of your installed products.

   Each IBM product installer creates one or more response files with a `.properties` extension. These files are in the same directory where you placed the installers. Be sure to back up all files with the `.properties` extension, including the installer_*productversion*`.properties` files and the file for the IBM installer itself, which is named `installer.properties`.

   If you plan to run the installer in unattended mode, you must back up the original `.properties` files, because when the installer runs in unattended mode, it clears these files. To create an EAR file, you need the information that the installer writes in the `.properties` files during the initial installation.

2. Open a command window and change directories to the directory that contains the installer.

3. Run the installer executable with this option:

   `-DUNICA_GOTO_CREATEEARFILE=TRUE`

   On UNIX type systems, run the `.bin` file rather than the `.sh` file.

   The installer wizard runs.

4. Follow the instructions in the wizard.

5. Before you create more EAR files, overwrite the `.properties` file or files with the backups you created before you ran in console mode for the first time.

Completing manual installation of Opportunity Detection

If you select manual database set up when you install Opportunity Detection, you must you complete a few more tasks before your installation is complete.

Complete the following tasks after you run the IBM EMM and the Opportunity Detection installer:

1. Run the Design Time scripts.

2. Run the RunTime scripts.

3. In the *Detect Installation Home*`/InteractService/wlp/usr/servers/ InteractService` directory, modify the `server.xml` file to reflect the following settings:

```
<dataSource id="OpDetectionDS" jndiName="OpDetectionDS">
  <jdbcDriver libraryRef="DB2JCC4Lib"/>
  <properties.db2.jcc currentSchema="SCHEMA_NAME"
   databaseName="DB_name" password="Encrypted Password"
   portNumber="port_number" serverName="islrpbeixv358.in.ibm.com"
   user="akuser2"/>
</datasource>
```

   Important: The schema name must be capital letters.

4. In the `/home`/streamsadmin/OpDetection/toolkits/unica_db_access/db.access/ `native.function` directory, modify the `function.xml` file to reflect the following settings:

```
<library>
  <cmn:description></cmn:description>
  <cmn:managedLibrary>
    <cmn:lib>UnicaDatabaseAccessLib</cmn:lib>
    <cmn:lib>db2</cmn:lib>
    <cmn:libPath>../../impl/lib</cmn:libPath>
    <cmn:libPath>/IBM_DB2_installation_directory/lib64</cmn:libPath>
```

```
        <cmn:includePath>../../impl/include</cmn:includePath>
        <cmn:includePath>/IBM_DB2_installation_directory/include</cmn:libPath>
    </cmn:managedLibrary>
</library>
```

5. Restart the server.

Installing Opportunity Detection by using the console mode

Use the console mode to install Opportunity Detection by using the command-line window. You can select various options in the command-line window to complete tasks such as selecting the products to install, or selecting the home directory for the installation.

Before you install Opportunity Detection, make sure that you have configured the following elements:

*   An application server profile
*   A database.

To display the Installer screens correctly in console mode, configure your terminal software to support UTF-8 character encoding. Other character encoding, such as ANSI, will not render the text correctly, and some information will not be readable.

Complete the following actions to install Opportunity Detection by using the command-line window:

1. Open a command-line prompt window and navigate to the directory where you have saved the IBM EMM installer and the Opportunity Detection installer.
2. For Unix, invoke the *ibm_emm_installer_full_name*.sh file.

    For example: **IBM_EMM_Installer_9.1.0.0.sh**
3. Follow the directions that are displayed in the command-line prompt. Use the following guidelines when you have to select an option in the command-line prompt:

    *   The default options are defined by the symbol [X].
    *   To select or clear an option, type the number that is defined for the option, and then press Enter.

    For example, suppose the following list displays the components that you can install:

    1 [X] Marketing Platform

    2 [X] Campaign

    3 Contact Optimization

    4 Interaction History

    If you want to install Interaction History, and do not want to install Campaign, enter the following command: **2,4**

    The following list would then display the options that you selected:

    1 [X] Marketing Platform

    2 Campaign

    3 Contact Optimization

    4 [X] Interaction History

    Note: Do not clear the option for Marketing Platform unless you have already installed it.

4. The IBM EMM installer launches the Opportunity Detection installer during the installation process. Follow the instructions in the command-line prompt window of the Opportunity Detection installer.

5. After you enter `quit` in the Opportunity Detection installer command-line prompt window, the window shuts down. Follow the instructions in the command-line prompt window of the IBM EMM installer to complete the installation of Opportunity Detection.

   Note: If any error occurs during the installation, a log file is generated. You must exit the installer to view the log file.

Installing Opportunity Detection silently

Use the unattended or silent mode to install Opportunity Detection multiple times.

Before you install Opportunity Detection, make sure that you have configured the following elements:
- An application server profile
- A database

When you install Opportunity Detection by using the silent mode, response files are used to obtain the information that is required during installation. You must create response files for a silent installation of your product. You can create response files by using one of the following methods:
- Using the sample response files as a template for creating your response files. The sample response files are included with your product installers in the `ResponseFiles` compressed archive. For more information about sample response files, see "Sample response files" on page 28.
- Running the product installers in the X Window System (UNIX) mode or the console mode before you install the product in the silent mode. One response file is created for the IBM EMM suite installer, and one or more response files are created for your product installer. The files are created in the directory that you specify.

   Important: For security reasons, the installer does not save database passwords in the response files. When you create response files, you must edit each response file to enter database passwords. Open each response file and search for PASSWORD to find where you must edit the response file.

When the installer runs in the silent mode, it looks for the response files in the following directories sequentially:
- In the directory where the IBM EMM installer is saved.
- In the home directory of the user who installs the product

Make sure that all response files are in the same directory. You can change the path where response files are read by adding arguments to the command line. For example: `-DUNICA_REPLAY_READ_DIR="myDirPath" -f myDirPath/installer.properties`
- *IBM_EMM_installer_full_name* `-i silent`

   For example:

   `IBM_EMM_Installer_9.1.0.0_win.exe -i silent`
   Use the following command for Unix or Linux:
- *IBM_EMM_installer_full_name_opertating_system*`.bin -i silent`

For example:

```
IBM_EMM_Installer_9.1.0_unix.bin -i silent
```

Sample response files

You must create response files to set up a silent installation of Opportunity Detection. You can use sample response files to create your response files. The sample response files are included with the installers in the ResponseFiles compressed archive.

The following table provides information about sample response files:

Table 13. Description of sample response files

Sample response file	Description
`installer.properties`	The sample response file for the IBM EMM master installer.
`installer_product intials and product version number.properties`	The sample response file for the Opportunity Detection installer. For example, `installer_ucn.n.n.n.properties` is the response file of the Campaign installer, where *n.n.n.n* is the version number.
`installer_report pack initials, product initials, and version number.properties`	The sample response file for the reports pack installer. For example, `installer_urpc.properties` is the response file of the Campaign reports pack installer.

Opportunity Detection components

Opportunity Detection contains two components: Design Time and Run Time. You can use the Design Time component to define events. You must install a single instance of Design Time. You can use the Run Time component to present offers to the customers. You can install multiple instances of Run Time.

For best performance, you must install a Run Time server on a server where no other IBM EMM products are installed.

The following table describes the components that you can select when you install Opportunity Detection.

Table 14. Opportunity Detection components

Component	Description
Opportunity Detection Run Time	The Opportunity Detection runtime server. You can add multiple servers in your environment to create an IBM InfoSphere Streams instance. You can map the instance to a server group.
Opportunity Detection Design Time	The design environment for Opportunity Detection.

Installing Opportunity Detection Run Time

The Opportunity Detection installer installs Opportunity Detection Run Time.

Opportunity Detection Run Time is installed at the following location:

`/home/streamsadmin/OpDetection`

You cannot change the folder where Opportunity Detection Run time is installed. You can see the following Opportunity Detection directory structure:

```
|--OpDetection
 |--bin
  |--comm_agent
 |--deploy
 |--toolkits
  |--makefile.inc
  |--makedefs.inc
  |--app_launcher
  |--blocking_merger
  |--get_file_names
  |--json_utils
  |--MultiConnectionTCPServer
  |--password_helper
  |--rtioc_types
  |--shared_store
  |--shared_types
  |--TCPSinkPlus
  |--time_utils
  |--timeutils_types
  |--unica_db_access
  |--unica_utils
 |--database
 |--logs
 |--properties
 |---StreamsRemoteControlService
  |---wlp
   |---usr
    |---server
     |---streamsRCS
    |---dropins
     |---axis2
      |---web-inf
       |---services
        |---streamsremotecontrolservice.aar
 |---InteractConnector
  |---wlp
   |---usr
    |---server
     |---InteractConnector
    |---dropins
     |---axis2
      |---web-inf
       |---services
        |--- interactconnector.aar
```

The streamsadmin user must be the owner of all the files. Use the **chown** command to change the owner of the OpDetection directory structure to streamsadmin. The `server.xml` file in the WAS liberty profile for StreamsRemoteControlService and InteractServlet services points to the `dropin` directory, and is configured with the installers. You must start the server where Run Time is installed.

You must start the Run Time server after you have deployed and configured Opportunity Detection.

Chapter 5. Configuring Opportunity Detection before deployment

You must complete specific tasks before you deploy Opportunity Detection. There are no pre-deployment configuration tasks for Opportunity Detection Design Time and Opportunity Detection Run Time.

Creating and populating the Opportunity Detection system tables

If you have not created and populated the system tables during the installation process, use your database client to run the Opportunity Detection SQL scripts against the appropriate database, or to create and populate the Opportunity Detection runtime environment and design environment.

All SQL scripts exist in the *Installation_Home*/OpDetection/database/DB2/ DesignTime directory in your Opportunity Detection design environment.

Design environment tables

Before you can deploy the Opportunity Detection design environment, you must create tables in the Opportunity Detection system table database.

Run Time environment table

Use the following scripts to create and populate the Run Time environment tables:
* **opDetectRunTimeSchema.sql**
* **OutcomeTable.sql**
* **StateTable.sql**

The **opDetectRunTimeSchema.sql** script is run by the installer if you choose to upgrade Opportunity Detection automatically. You must run the **OutcomeTable.sql** and the **StateTable.sql** manually. However, before running the **OutcomeTable.sql** and the **StateTable.sql** scripts, you must make the changes that are described in the following table:

Note: The user table space and system temporary table space where the Opportunity Detection runtime environment tables exist must each have a page size of 32K or greater.

Table 15. Scripts for creating runtime environment tables

Data source type	Script name and location	Changes required
IBM DB2	**opDetectRunTimeSchema.sql** Location: *Opportunity_Detection_Install_Home*/ *database_name*/RunTime	None. The script is automatically run by the installer if you choose to upgrade Opportunity Detection automatically.

Table 15. Scripts for creating runtime environment tables (continued)

Data source type	Script name and location	Changes required
IBM DB2	`OutcomeTable.sql` Location: *Opportunity_Detection_Install_Home/ database_name*/RunTime	Replace `%OutcomeTable%` with the name of the outcome table that you want to create. **Note:** This script is not run automatically even if you choose to upgrade Opportunity Detection automatically.
IBM DB2	`StateTable.sql` Location: *Opportunity_Detection_Install_Home/ database_name*/RunTime	Replace `%Table%` with the name of the state table that you want to create. **Note:** This script is not run automatically even if you choose to install Opportunity Detection automatically.

Registering Opportunity Detection manually

If the Opportunity Detection installer cannot connect to the Marketing Platform database during the installation process, you must register Opportunity Detection manually.

You must import the Opportunity Detection information into the Marketing Platform system tables manually after the installer closes to register Opportunity Detection manually.

Registering Opportunity Detection Design Time manually

Run the **configTool** utility to register the Opportunity Detection design time environment manually if the environment was not automatically registered during the installation process.

The **configTool** utility imports menu items and sets configuration properties. You must run the **configTool** utility as many times as there are files.

The following command can be used as an example to register the Opportunity Detection design time environment manually:

```
configTool -v -i -o -p "Affinium|suite|uiNavigation|mainMenu" -f
"OppDetection_Installation_Dir\conf\detect_navigation.xml"
```

Chapter 6. Deploying Opportunity Detection

To deploy Opportunity Detection, you must deploy Opportunity Detection Design Time by using an EAR or WAR file.

You must know how to work with your web application server. Consult your web application server documentation for details such as navigation in the Administration console.

Deploying Opportunity Detection Design Time

When you run the IBM EMM installer, you can either include Opportunity Detection in an EAR file, or you can choose to deploy the Opportunity Detection WAR file. If you include the Marketing Platform or other products in an EAR file, you must follow all the deployment guidelines that are detailed in the individual installation guides for the products that are included in the EAR file.

After you install Opportunity Detection, Design Time is deployed automatically when you deploy the `Opportunity Detection.war` file. . The `Opportunity Detection.war` file is in the Opportunity Detection installation directory.

Deploying Opportunity Detection on WebSphere Application Server

You can deploy Opportunity Detection runtime environment on supported versions of WebSphere Application Server (WAS) from a WAR file or EAR file.

Note: Make sure that multiple language encoding is enabled in WAS.

Deploying Opportunity Detection on WAS from a WAR file

You can deploy the Opportunity Detection application from a WAR file on WAS.

Complete the following tasks before you deploy Opportunity Detection:
- Confirm that your version of WebSphere meets the requirements in the *Recommended Software Environments and Minimum System Requirements* document, including any necessary fix packs or upgrades.
- Confirm that you created the data sources and database provider in WebSphere.

To deploy the Opportunity Detection application WAR file on WAS, complete the following steps:
1. Go to the WebSphere Integrated Solutions Console.
2. If your system tables are in DB2, click the data source that you created. Go to the Custom Properties for the data source.
3. Select the Custom properties link.
4. Set the value for the **resultSetHoldability** property to 1.

   If you do not see the **resultSetHoldability** property, create the **resultSetHoldability** property and set its value to 1.
5. Go to **Applications > Application Types > WebSphere enterprise applications** and click **Install**.
6. In the Preparing for the application installation window, select the **Detailed - Show all options and parameters** check box and click **Next**.

7. Click **Continue** to see the Install New Application wizard.
8. Accept the default settings on the windows of the Install New Application wizard except the following windows:
   - In step 1 of the Install New Application wizard, select the **Precompile JavaServer Pages files** check box.
   - In step 3 of the installation wizard, set the **JDK Source Level** to 16.
9. In the left navigation panel of WebSphere Integrated Solutions Console, navigate to **Applications > Application Types > WebSphere enterprise applications**.
10. In the Enterprise Applications window, click the `unica.war` file.
11. In the **Web Module Properties** section, click **Session Management** and select the following check boxes:
    - **Override session management**
    - **Enable Cookies**
12. Click **Enable Cookies**, and in the **Cookie name** field, enter a unique cookie name.
13. In the **Applications > Enterprise Applications** section of the server, select the WAR file that you deployed.
14. In the **Detail Properties** section, select **Class loading and update detection**.
15. In the **Class loader order** section, select the **Classes loaded with local class loader first (parent last)** option.
16. In the **WAR class loader policy** section, select the **Class loader for each WAR file in application** option.
17. Go to **Application Servers > your server > Process definition > Java Virtual Machine**.
18. In the **Generic JVM arguments** section, enter the following JVM arguments:

    ```
    -Dcom.ibm.websphere.webservices.DisableIBMJAXWSEngine=true
    -Dibm.cl.verbose=PersistenceProvider
    -Dibm.cl.verbose=PersistenceProviderImpl
    -agentlib:getClasses -verbose:dynload
    -Dcom.ibm.xml.xlxp.jaxb.opti.level=3
    ```
19. Start your deployment.

Deploying Opportunity Detection on WAS from an EAR file

You can deploy the Opportunity Detection application on WAS when Opportunity Detection is a module within an EAR file.

You can deploy Opportunity Detection by using an EAR file if you included Opportunity Detection in an EAR file when you ran the IBM EMM installer.

Before you deploy Opportunity Detection:
- Confirm that your version of WebSphere meets the requirements in the *Recommended Software Environments and Minimum System Requirements* document, including any necessary fix packs or upgrades.
- Confirm that you created the data sources and database provider in WebSphere.

To deploy Opportunity Detection from an EAR file onto WebSphere Application Server, complete the following steps:
1. Go to the WebSphere Integrated Solutions Console.
2. If your system tables are in DB2, click the data source that you created. go to the Custom Properties for the data source. .

3. Select the Custom properties link.
4. Set the value for the **resultSetHoldability** property to 1.

   If you do not see the **resultSetHoldability** property, create the **resultSetHoldability** property and set its value to 1.
5. Go to **Applications > Application Types > WebSphere enterprise applications** and click **Install**.
6. In the Preparing for the application installation window, select the **Detailed - Show all options and parameters** check box and click **Next**.
7. Click **Continue** to see the Install New Application wizard.
8. Accept the default settings on the windows of the Install New Application wizard except the following windows:
   - In step 1 of the Install New Application wizard, select the **Precompile JavaServer Pages files** check box.
   - In step 3 of the installation wizard, set the **JDK Source Level** to 16.
9. In the left navigation panel of WebSphere Integrated Solutions Console, navigate to **Applications > Application Types > WebSphere enterprise applications**.
10. In the Enterprise Applications window, select the EAR file that you want to deploy.
11. In the **Web Module Properties** section, click **Session Management** and select the following check boxes:
    - **Override session management**
    - **Enable Cookies**
12. Click **Enable Cookies**, and in the **Cookie name** field, enter a unique cookie name.
13. In the **Detail Properties** section, select **Class loading and update detection**.
14. In the **Class loader order** section, select the **Classes loaded with local class loader first (parent last)** option.
15. In the **WAR class loader policy** section, select the **Class loader for each WAR file in application** option.
16. Go to **Application Servers > your server > Process definition > Java Virtual Machine**.
17. In the **Generic JVM arguments** section, enter the following JVM arguments:
    ```
    -Dcom.ibm.websphere.webservices.DisableIBMJAXWSEngine=true
    -Dibm.cl.verbose=PersistenceProvider
    -Dibm.cl.verbose=PersistenceProviderImpl
    -agentlib:getClasses -verbose:dynload
    -Dcom.ibm.xml.xlxp.jaxb.opti.level=3
    ```
18. Start your deployment.

    For more information about WebSphere Application Server version 8, see Welcome to the WebSphere Application Server information center.

Chapter 7. Configuring Opportunity Detection after deployment

After you deploy Opportunity Detection, you must configure the Opportunity Detection design and runtime environments. Configuring these environments completes a basic installation of Opportunity Detection.

Opportunity Detection also has properties on the Configuration page that complete important functions that you can optionally adjust. See the *IBM Opportunity Detection Administrator's Guide* or the context help for the properties to learn more about what they do and how to set them.

After deploying Opportunity Detection, you must configure the following elements:

- Server group. To configure a server group, go to **Settings > Opportunity Detection Settings > Server Group**. See *Opportunity Detection Administration Guide* for more information.
- Audience level. To configure an audience level, go to **Settings > Opportunity Detection Settings > Audience Level**. See *Opportunity Detection Administration Guide* for more information.
- Table and file connector. To configure a table and file connector, go to **Settings > Opportunity Detection Settings > Server Group**. See *Opportunity Detection Administration Guide* for more information.
- URLs. You must configure the URLs for the following services if you have changed the port:
  - StreamsRemoteControlWebService
  - InteractConnector
  - InteractDesignService

  To configure URLs, go to **Settings > Configuration > Opportunity Detection > System**.

Restart the Web Application Server after making all the changes.

After deploying Opportunity Detection, you must also configure data sources for Opportunity Detection. To configure the data sources, go to **Settings > Opportunity Detection Settings > Data Sources**.

Starting the Opportunity Detection Run Time server

You must start the Run Time server after you have deployed and configured Opportunity Detection. Complete the following steps to start the server where Run Time is installed:

Note: You must start all services in the following procedure by using the streamsadmin user.

1. Log into the server where Run Time is installed as streamsadmin.
2. Navigate to the StreamsRemoteControlService liberty service. The following path can be used as a guideline:

   /home/streamsadmin/OpDetection/StreamsRemoteControlService/wlp/bin

3. Use the following command to start the StreamsRemoteControlService liberty service:

   ./server start StreamsRCS

4. Navigate to the Interactconnector service. The following path can be used as a guideline:

   /home/streamsadmin/OpDetection/InteractConnector/wlp/bin

5. Use the following command to start the Interactconnector service.

   ./server start InteractConnector

Starting the InteractDesignService

You must start the InteractService after you have deployed and configured Opportunity Detection. Complete the following steps to start the InteractService:

1. Log in to the server where Run Time is installed as root.
2. Navigate to the following path:

   Opportunity_Detect_Install_Home/InteractService/wlp/bin

3. Run the following command:

   ./server start InteractService

Setting configuration properties

You must set the following configuration properties for Opportunity Detection:

* Opportunity Detection | System | Streams Remote Control Web Service | ServerURL
* Opportunity Detection | System | Interact Design Service | ServerURL
* Opportunity Detection | System | Interact Connector | ServerURL
* Opportunity Detection | logging | log4jConfig

See *Opportunity Detection 9.1.0 Administrtor's Guide* for more information about setting configuration properties for Opportunity Detection.

Configuring Opportunity Detection in a cluster

Opportunity Detection can be installed and deployed in a cluster.

Complete the following steps to install and deploy Opportunity Detection in a cluster:

1. Install IBM InfoSphere Streams on multiple servers by using a shared NFS Streams support installation. To ensure this run the Opportunity Detection RunTime installer from a server that has the following elements:
   * The streamsadmin user.
   * The home directory of the streamsadmin user is /home/streamsadmin.
   * The /home/streamsadmin directory is shared across the servers that are a part of the cluster.
   * The root user on the server where you install Opportunity Detection RunTime has read and write access to streamsadmin.

2. After installing IBM InfoSphere Streams, use the following command to create instances of Streams with multiple hosts:

   streamstool mkinstance -i *instance_name* **hosts** *FQDN/IP list*

3. Create a copy of InteractConnector for every server in the cluster.Complete the following steps to create copies of InteractConnector:

a. Create a copy of InteractConnector with a unique name suffix for each server in the cluster in the /home/streamsadmin/OpDetection/ directory.

b. Go to /home/streamsadmin/OpDetection/InteractConnector_*copytag*>/wlp/usr/servers/InteractConnector/ and change the server.xml file to reflect the following values:

```
<server description="new server">
  <!-- Enable features -->
  <featureManager>
   <feature>jsp-2.2</feature>
   <feature>localConnector-1.0</feature>
   <feature>servlet-3.0</feature>
   <feature>serverStatus-1.0</feature>
  </featureManager>
  <httpEndpoint id="defaultHttpEndpoint" host="<hostname>"
   httpPort="<portnum>" httpsPort="9443"/>
  <application context-root="servlets" id="StreamServlet"
name="StreamServlet" type="war"
location="/home/streamsadmin/OpDetection/InteractConnector/wlp/usr
/servers/InteractConnector/dropins/InteractConnector"/>
   <logging logDirectory="/home/streamsadmin/OpDetection/InteractConnector
/wlp/usr/servers/InteractConnector/logs" consoleLogLevel="ERROR"
messageFileName="messages.log"/>
   <webContainer deferServletLoad="false"/>
  </server>
```

4. Go to /home/streamsadmin/OpDetection/InteractConnector_*copytag*>/wlp/usr/servers/InteractConnector/dropins/InteractConnector/WEB-INF/ and change the web.xml file to reflect the following values:

```
<init-param>
  <param-name>ProxyOutboundHostNames</param-name>
  <param-value>localhost</param-value>
</init-param>
```

5. Start InteractConnector on each server of the cluster.

Installing IBM HTTP Server and configuring load balancer plugin

To support clustering Opportunity Detection needs IBM HTTP server and plugin. The IBM HTTP server and the plugin provides load balancing and a single point of entry for Interact RunTime. The server and the plugin are a part of the Wepshere Application Server (WAS) extensions. See IBM documentation to configure WAS, the IBM HTTP Server, and the plugin.

Complete the following steps to configure the IBM HTTP server and configuring the load balancer plugin:

1. Create a plugin_cfg.xml file by using WAS, or use the following plugin_cfg.xml as an example:

   Note: Replace host_node*n* and port_node*n* with the host and port of the InteractConnectors from the Opportunity Detection RunTime cluster.

```
<?xml version="1.0" encoding="UTF-8"?>
<Config ASDisableNagle="false" AcceptAllContent="false"
AppServerPortPreference="HostHeader" ChunkedResponse="false" FIPSEnable="false"
IISDisableNagle="false" IISPluginPriority="High" IgnoreDNSFailures="false"
RefreshInterval="60" ResponseChunkSize="64" SSLConsolidate="false"
SSLPKCSDriver="REPLACE" SSLPKCSPassword="REPLACE" TrustedProxyEnable="false"
VHostMatchingCompat="false">
  <Log LogLevel="Error" Name="./logs/defaultServer/http_plugin.log"/>
  <Property Name="ESIEnable" Value="true"/>
  <Property Name="ESIMaxCacheSize" Value="1024"/>
  <Property Name="ESIInvalidationMonitor" Value="false"/>
```

```
<Property Name="ESIEnableToPassCookies" Value="false"/>
<Property Name="PluginInstallRoot" Value="."/>
<VirtualHostGroup Name=="default_host">
  <VirtualHost Name="host:port"/>
</VirtualHostGroup>
<ServerCluster CloneSeparatorChange="false" GetDWLMTable="false"
IgnoreAffinityRequests="true" LoadBalance="Round Robin"
Name="defaultServer_default_node_Cluster" PostBufferSize="64"
PostSizeLimit="-1" RemoveSpecialHeaders="true" RetryInterval="60">
  <Server CloneID="9ec9fa61-0e3e-431f-a497-8c7b5fdd201e" ConnectTimeout="0"
ExtendedHandshake="false" MaxConnections="-1" Name="default_node_defaultServer0"
ServerIOTimeout="900" WaitForContinue="false"
  >
  <Transport Hostname="host_node1 Port=port_node1 Protocol="http"/>
  </Server>
  <Server Name="Detectdb2" ConnectTimeout="5" ExtendedHandshake="false"
ServerIOTimeout="60" LoadBalanceWeight="1" MaxConnections="-1"
WaitForContinue="false">
  <Transport Hostname="host_node2 Port=port_node2 Protocol="http"/>
  </Server>
<Server Name="Detectn1" ConnectTimeout="5" ExtendedHandshake="false"
ServerIOTimeout="60" LoadBalanceWeight="1" MaxConnections="-1"
WaitForContinue="false">
  <Transport Hostname="host_node3 Port=port_node3 Protocol="http"/>
  </Server>
  <ServerCluster>
  <UriGroup Name="default_host_defaultServer_default_node_Cluster_URIs">
    <Uri AffinityCookie="JSESSIONID" AffinityURLIdentifier="jsessionid"
Name="/servlets/*"/>
  </UriGroup>
  <Route ServerCluster="defaultServer_default_node_Cluster"
UriGroup="default_host_defaultServer_default_node_Cluster_URIs"
VirtualHostGroup="default_host"/>
</Config>
```

2. Configure the `httpd.conf` file to add the plugin module and provide the path
   of the `plugin-cfg.xml` file by adding the following ines at the end of
   `httpd.conf` file:

   ```
   LoadModule was_ap22_module
   WAS_INSTALLATION_DIR>/Plugins/bin/64bits/mod_was_ap22_http.so
   WebSpherePluginConfigIBM_HTTP_SERVER_DIR/conf/plugin-cfg.xml
   ```

3. Make sure that you add the IBM HTTP Servers URL to the InteractConnector
   URL in Opportunity Detection confguration. Complete the following steps to
   add the IBM HTTP Servers URL to InteractConnector URL:

   a. Login to Platform and navigate to **Settings > Configuration**.

   b. In the configuration tree, go to **IBM EMM > Opportunity Detection >
      System > InteractConnector**.

   c. Edit the Server URL to reflect the following value:

      http://*HTTP_SERVER_HOST*:*HTTP_SERVER_PORT*/servlets/StreamServlet

Modifying log levels for Opportunity Detection

You can modify log levels for Opportunity Detection Design Time and RunTime.

Complete the following steps to modify log levels for Opportunity Detection
Design Time and Run Time:

1. Log in to Opportunity Detection by root.

2. In the *Opportunity_Detect_installation_home*/conf directory, modify the
   `detect_log4j.properties` file to reflect the following information:

   ```
   log4j.logger.com.ibm.unica.detect=INFO, FILE
   ```

3. In the *Opportunity_Detect_installation_home*/InteractService/wlp/usr/
   servers/InteractService directory, change the console log level in the
   server.xml file For example, the server.xml file can reflect the following
   settings:

   ```
   <logging logDirectory="/opt/Detect/FakeInstall/OpDetection/
    InteractService/wlp/usr/servers/InteractService/logs"
    consoleLogLevel="ERROR" messageFileName="messages.log"/>
   ```

4. Log in to StreamsRemoteControl as the streamsamdin user.
5. In the /home/streamsadmin/OpDetection/StreamsRemoteControlService/wlp/
   usr/servers/StreamsRCS directory, change the console log level in the
   server.xml file. For example, the server.xml file can reflect the following
   setting:

   ```
   consoleLogLevel="DEBUG"
   ```

6. Log in to InteractConnector as the streamsamdin user.
7. In the /home/streamsadmin/OpDetection/InteractConnector/wlp/usr/servers/
   InteractConnector directory, change the console log level in the server.xml
   file. For example, the server.xml file can reflect the following setting:

   ```
   consoleLogLevel="DEBUG"
   ```

8. Restart the server for your changes to take effect.

Verifying the Opportunity Detection installation

You must verify whether Opportunity Detection is correctly installed by
confirming that you can access the interactive channels and the Opportunity
Detection runtime URL.

Complete the following steps to verify your installation:

1. To verify that the Opportunity Detection design time environment is installed,
   log in to the IBM EMM and confirm that you can access **Opportunity
   Detection > Workspaces**.
2. Run the following URL in a web browser:

   http://*host.domain.com*:port/axis2/services/InteractDesignService?wsdl

   Confirm that you get the WSDL for the Interact Design Service.
3. Run the following URL in a web browser:

   http://*host.domain.com*:port/axis2/services/RemoteControl?wsdl

   Confirm that you get the WSDL for the Remote Control Service.
4. Run the following URL in a web browser:

   http://*host.domain.com:port*/servlets/StreamServlet?command=ping

   Confirm that you see the following message in the browser:

   OK

Chapter 8. Uninstalling Opportunity Detection

Run the Opportunity Detection uninstaller to uninstall Opportunity Detection. When you run the Opportunity Detection uninstaller, the files that were created during the installation process are removed. For example, files such as configuration files, installer registry information, and user data are removed from the computer.

When you install IBM EMM products, an uninstaller is included in the `Uninstall_Product` directory, where *Product* is the name of your IBM product.

If you manually remove the files in your installation directory instead of running the uninstaller, the result might be an incomplete installation if you later reinstall an IBM product in the same location. After uninstalling a product, its database is not removed. The uninstaller only removes default files that are created during installation. Any file that is created or generated after installation is not removed.

Note: On UNIX, the same user account that installed Opportunity Detection must run the uninstaller.

Complete the following tasks to uninstall Opportunity Detection:

1. If you have deployed the Opportunity Detection web application, undeploy the web application from WebSphere.
2. Shut down WebSphere.
3. Stop the processes that are related to Opportunity Detection.
4. Complete one of the following steps to uninstall Opportunity Detection:
   - Double-click the Opportunity Detection uninstaller that exists in the `Uninstall_Product` directory. The uninstaller runs in the mode in which you installed Opportunity Detection.
   - In a command-line window, navigate to the directory where the uninstaller exists, and run the following command to uninstall Opportunity Detection by using the console mode:

     `Uninstall_Product -i console`
   - In a command-line window, navigate to the directory where the uninstaller exists, and run the following command to uninstall Opportunity Detection by using the silent mode:

     `Uninstall_Product -i silent`

     When you uninstall Opportunity Detection by using the silent mode, the uninstallation process does not present any dialogs for user interaction.

Note: If you do not specify an option for uninstalling Opportunity Detection, the Opportunity Detection uninstaller runs in the mode in which Opportunity Detection is installed.

Chapter 9. The configTool utility

The properties and values on the Configuration page are stored in the system tables. You can use the `configTool` utility to import and export configuration settings to and from the system tables.

When to use configTool

You might want to use `configTool` for the following reasons.

- To import partition and data source templates that are supplied with Campaign, which you can then modify and duplicate by using the Configuration page.
- To register (import configuration properties for) IBM EMM products, if the product installer is unable to add the properties to the database automatically.
- To export an XML version of configuration settings for backup or to import into a different installation of IBM EMM.
- To delete categories that do not have the **Delete Category** link. You do this by using `configTool` to export your configuration, then manually deleting the XML that creates the category, and by using `configTool` to import the edited XML.

Important: This utility modifies the `usm_configuration` and `usm_configuration_values` tables in the Marketing Platform system table database, which contains the configuration properties and their values. For best results, either create backup copies of these tables, or export your existing configurations by using `configTool` and back up the resulting file so you have a way to restore your configuration if you make an error when you use `configTool` to import.

Syntax

```
configTool -d -p "elementPath" [-o]

configTool -i -p "parent ElementPath" -f importFile [-o]

configTool -x -p "elementPath" -f exportFile

configTool -vp -p "elementPath" -f importFile [-d]

configTool -r productName -f registrationFile [-o] configTool -u
productName
```

Commands

-d -p "*elementPath*" [o]

Delete configuration properties and their settings, specifying a path in the configuration property hierarchy.

The element path must use the internal names of categories and properties. You can obtain them by going to the Configuration page, selecting the wanted category or property, and looking at the path that is displayed in parentheses in the right pane. Delimit a path in the configuration property hierarchy by using the | character, and surround the path with double quotation marks.

Note the following.

- Only categories and properties within an application can be deleted by using this command, not whole applications. Use the -u command to unregister a whole application.
- To delete categories that do not have the **Delete Category** link on the Configuration page, use the -o option.

When you use -d with the -vp command, the configTool deletes any child nodes in the path you specify if those nodes are not included in the XML file you specify.

-i -p "*parentElementPath*" -f *importFile* [o]

Import configuration properties and their settings from a specified XML file.

To import, you specify a path to the parent element under which you want to import your categories. The configTool utility imports properties under the category you specify in the path.

You can add categories at any level below the top level, but you cannot add a category at same level as the top category.

The parent element path must use the internal names of categories and properties. You can obtain them by going to the Configuration page, selecting the required category or property, and looking at the path that is displayed in parentheses in the right pane. Delimit a path in the configuration property hierarchy by using the | character, and surround the path with double quotation marks.

You can specify an import file location relative to the tools/bin directory or you can specify a full directory path. If you specify a relative path or no path, configTool first looks for the file relative to the tools/bin directory.

By default, this command does not overwrite an existing category, but you can use the -o option to force an overwrite.

-x -p "*elementPath*" -f *exportFile*

Export configuration properties and their settings to an XML file with a specified name.

You can export all configuration properties or limit the export to a specific category by specifying a path in the configuration property hierarchy.

The element path must use the internal names of categories and properties, which you can obtain by going to the Configuration page, selecting the wanted category or property, and looking at the path that is displayed in parentheses in the right pane. Delimit a path in the configuration property hierarchy by using the | character, and surround the path with double quotation marks.

You can specify an export file location relative to the current directory or you can specify a full directory path. If the file specification does not contain a separator (/ on UNIX, / or \ on Windows), configTool writes the file to the tools/bin directory under your Marketing Platform installation. If you do not provide the xml extension, configTool adds it.

-vp -p "*elementPath*" -f *importFile* [-d]

This command is used mainly in manual upgrades, to import configuration properties. If you applied a fix pack that contains a new configuration property, and you then upgrade, importing a configuration file as part of a manual upgrade process can override values that were set when the fix pack was applied. The -vp command ensures that the import does not override previously set configuration values.

Important: After you use the configTool utility with the -vp option, you must restart the web application server on which Marketing Platform is deployed so the changes are applied.

When you use -d with the -vp command, the configTool deletes any child nodes in the path you specify if those nodes are not included in the XML file you specify.

-r *productName* -f *registrationFile*

Register the application. The registration file location can be relative to the tools/bin directory or can be a full path. By default, this command does not overwrite an existing configuration, but you can use the -o option to force an overwrite. The *productName* parameter must be one of those names that are listed above.

Note the following.
* When you use the -r command, the registration file must have <application> as the first tag in the XML.

  Other files can be provided with your product that you can use to insert configuration properties into the Marketing Platform database. For these files, use the -i command. Only the file that has the <application> tag as the first tag can be used with the -r command.
* The registration file for the Marketing Platform is named Manager_config.xml, and the first tag is <Suite>. To register this file on a new installation, use the populateDb utility, or rerun the Marketing Platform installer as described in the *IBM Marketing Platform Installation Guide*.
* After the initial installation, to re-register products other than the Marketing Platform, use configTool with the -r command and -o to overwrite the existing properties.

The configTool utility uses product names as parameters with the commands that register and unregister products. With the 8.5.0 release of IBM EMM, many product names changed. However, the names that are recognized by configTool did not change. The valid product names for use with configTool are listed below, along with the current names of the products.

Table 16. Product names for configTool registration and unregistration

Product name	Name used in configTool
Marketing Platform	Manager
Campaign	Campaign
Distributed Marketing	Collaborate
eMessage	emessage
Interact	interact
Contact Optimization	Optimize
Marketing Operations	Plan

Table 16. Product names for configTool registration and unregistration (continued)

Product name	Name used in configTool
CustomerInsight	`Insight`
Digital Analytics for On Premises	`NetInsight`
Opportunity Detection	`Detect`
Leads	`Leads`
Interaction History	`InteractionHistory`
Attribution Modeler	`AttributionModeler`
IBM SPSS Modeler Advantage Enterprise Marketing Management Edition	`SPSS`
Digital Analytics	`Coremetrics`

-u *productName*

Unregister an application that is specified by *productName*. You do not have to include a path to the product category; the product name is sufficient, and it is required. The process removes all properties and configuration settings for the product.

Options

-o

When used with **-i** or **-r**, it overwrites an existing category or product registration (node).

When used with **-d**, you can delete a category (node) that does not have the **Delete Category** link on the Configuration page.

Examples

- Import configuration settings from a file named `Product_config.xml` in the `conf` directory under the Marketing Platform installation.

  `configTool -i -p "Affinium" -f Product_config.xml`

- Import one of the supplied Campaign data source templates into the default Campaign partition, partition1. The example assumes that you placed the Oracle data source template, `OracleTemplate.xml`, in the `tools/bin` directory under the Marketing Platform installation.

  `configTool -i -p "Affinium|Campaign|partitions|partition1|dataSources" -f OracleTemplate.xml`

- Export all configuration settings to a file named `myConfig.xml` in the `D:\backups` directory.

  `configTool -x -f D:\backups\myConfig.xml`

- Export an existing Campaign partition (complete with data source entries), save it to a file named `partitionTemplate.xml`, and store it in the default `tools/bin` directory under the Marketing Platform installation.

  `configTool -x -p "Affinium|Campaign|partitions|partition1" -f partitionTemplate.xml`

- Manually register an application named productName, by using a file named `app_config.xml` in the default `tools/bin` directory under the Marketing Platform installation, and force it to overwrite an existing registration of this application.

```
configTool -r product Name -f app_config.xml -o
```
* Unregister an application named productName.
```
configTool -u productName
```

Before you contact IBM technical support

If you encounter a problem that you cannot resolve by consulting the documentation, your company's designated support contact can log a call with IBM technical support. Use these guidelines to ensure that your problem is resolved efficiently and successfully.

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

Information to gather

Before you contact IBM technical support, gather the following information:
- 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

When you call IBM technical support, you might be asked to provide information about your environment.

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.

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information about the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
170 Tracer Lane
Waltham, MA 02451
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not

been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Privacy Policy and Terms of Use Considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. A cookie is a piece of data that a web site can send to your browser, which may then be stored on your computer as a tag that identifies your computer. In many cases, no personal information is collected by these cookies. If a Software Offering you are using enables you to collect personal information through cookies and similar technologies, we inform you about the specifics below.

Depending upon the configurations deployed, this Software Offering may use session and persistent cookies that collect each user's user name, and other personal information for purposes of session management, enhanced user usability, or other usage tracking or functional purposes. These cookies can be disabled, but disabling them will also eliminate the functionality they enable.

Various jurisdictions regulate the collection of personal information through cookies and similar technologies. If the configurations deployed for this Software Offering provide you as customer the ability to collect personal information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for providing notice and consent where appropriate.

IBM requires that Clients (1) provide a clear and conspicuous link to Customer's website terms of use (e.g. privacy policy) which includes a link to IBM's and Client's data collection and use practices, (2) notify that cookies and clear gifs/web beacons are being placed on the visitor's computer by IBM on the Client's behalf along with an explanation of the purpose of such technology, and (3) to the extent required by law, obtain consent from website visitors prior to the placement of cookies and clear gifs/web beacons placed by Client or IBM on Client's behalf on website visitor's devices

For more information about the use of various technologies, including cookies, for these purposes, See IBM's Online Privacy Statement at: http://www.ibm.com/privacy/details/us/en section entitled "Cookies, Web Beacons and Other Technologies."

IBM ®

Printed in USA