Surveillance Insight for Financial Services
Version 1.0.0

Surveillance Insight for Financial Services

IBM

Product Information

This document applies to Version 1.0.0 and may also apply to subsequent releases.

Contents

Introduction

The IBM® Surveillance Insight for Financial Services solution uses cognitive and advanced analytic capabilities for real-time supervision and surveillance, enforcement of regulatory rules, and proactive monitoring of fraudulent activities.

IBM Surveillance Insight for Financial Services uses IBM advanced analytics, including graph computing, big data analytics and reasoning, natural language processing, sentiment analysis, stream analysis, and semantic event analysis. It includes a large-scale real-time graphing tool that can handle and analyze trillions of linked pieces of data. A novel reasoning engine and analytics pipeline to enable it to handle various cognitive tasks. Natural language processing capability enables it to understand text information and to distinguish ambiguous terms based on context and knowledge graphs. It includes sentiment analysis capabilities to understand emotions. Stream analysis provides filters to handle very large amounts of streaming data such as trades. Semantic event analysis applies machine learning to map anomaly signals to human events.

You use this solution to
- Identify new trading and behavioral patterns
- Combine information from multiple data sources, such as trades and electronic communications
- Apply learning models, which are continuously updated
- Provide effective and easy to use visualization tools

The solution provides the following outcomes:
- Identification of new predictive patterns by linking various information with Trader profiles, such as "know your trader"
- Improving the accuracy of alerts by using risk profiling, such as reducing false positives and false negatives
- Improving the efficiency of investigations

Audience

This guide is intended for administrators and users of the IBM Surveillance Insight for Financial Services solution. It provides information on installation and configuration of the solution, and information about using the solution.

Finding information and getting help

To find product documentation on the web, access IBM Knowledge Center (www.ibm.com/support/knowledgecenter).

For product support questions, send an email to surveillance_insight_support@wwpdl.vnet.ibm.com.

Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products. Some of the

components included in the IBM Surveillance Insight for Financial Services have accessibility features. For more information, see "Accessibility features," on page 37.

The HTML documentation has accessibility features. PDF documents are supplemental and, as such, include no added accessibility features.

Forward-looking statements

This documentation describes the current functionality of the product. References to items that are not currently available may be included. No implication of any future availability should be inferred. Any such references are not a commitment, promise, or legal obligation to deliver any material, code, or functionality. The development, release, and timing of features or functionality remain at the sole discretion of IBM.

Samples disclaimer

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Chapter 1. IBM Surveillance Insight for Financial Services

IBM Surveillance Insight for Financial Services provides you with the capabilities to meet regulatory obligations by proactively monitoring vast volumes of data for incriminating evidence of rogue trading or other wrong-doing through a cognitive and holistic solution for monitoring all trading-related activities. The solution improves current surveillance process results and delivers greater efficiency and accuracy to bring the power of cognitive analysis to the financial services industry.

IBM Surveillance Insight for Financial Services provides trade and electronic communications (eComms) surveillance components. On the trade side, the solution generates alerts from structured trade data (such as order data, trade data, and executions data) by detecting patterns through a high-speed and scalable transaction analysis system that can process large volumes of trade data. Factors that contribute to anomalous behavior can include trading behavior anomalies as compared to peers and an individual's past trading history, communication anomalies such as discussing something suspicious before or after trades, and outside public events from news and social media. However, looking at the trade side alone is not enough to conclude that there is evidence of wrong-doing.

By including eComms surveillance the solution can detect the anomalies and correlate them with the trading activity. Combining trade and eComms surveillance presents a holistic picture. Additionally, the solution provides reason based on data observations that are made over a long time period. As well, the solution learns anomalies from data, by comparing traders' behavior with self, population, and affinity groups. This cognitive reasoning engine also hierarchically correlates the causality of semantic events to predict potential risks.

For the eComms surveillance, the solution can understand natural language and detect various signals from it. For instance, the solution can determine the sentiment and the semantics of eComms communication.

A key piece of the solution is to make it intuitive for compliance teams to easily view the scores of evidence data that is gathered and allow them to explore the data to ensure that there is evidence to pursue next steps. IBM Surveillance Insight for Financial Services provides different visualization techniques that can handle large, multivariate, and heterogeneous graphs and transition network graphs to provide the most easily understandable representation of the underlying evidence data.

With the trade and eComms surveillance components and the cognitive capabilities, IBM Surveillance Insight for Financial Services can meet the supervision and surveillance needs of the financial services industry across front, mid, and back-office functions.

Solution capabilities and features

Taking the surveillance to the next level, IBM Surveillance Insight for Financial Services offers the first of a kind—a cognitive reasoning engine which goes beyond a rule-based alert system and leverages real-time trader trading behaviors along with their communications and social network through email, social media, blogs,

and tweets to provide more accurate and actionable insights and alerts. The solution offers real-time surveillance capability through its reasoning engine with unique visualization experience.

The IBM Surveillance Insight for Financial Services solution provides online, real-time business activity monitoring, with powerful capabilities for helping financial market firms use advanced data mining, statistical models, and sophisticated pattern mining to identify and act on potentially fraudulent activity. In addition, these patterns can be used to generate alerts. The solution takes advantage of IBM's substantial research and development investments to support a real-time surveillance infrastructure that enables firms to:

- Use advanced pattern mining capabilities and statistical models to review market information and identify exceptions within large volumes of data. Leverage cognitive networks that are fundamental form of brains—large-scale Markovian and Bayesian network tools and deep learning tools—to identify surveillance insights.
- Use industry's first ever reasoning engine to combine traditional structured data analysis with unstructured data analysis (such as semantic analysis, behavioral analysis, and emotional analysis) to provide evidence of suspicious transactions.
- Use advanced graph visualization and reasoning that is combined with traditional drill-down and drill-across techniques to help with investigation.

Features such as unstructured data analysis, identity resolution, event correlation, cognitive reasoning, and knowledge management help firms identify scenarios and exceptions for immediate qualification, investigation, and correction. Advanced data mining capabilities help identify suspicious trading behaviors.

The solution interface
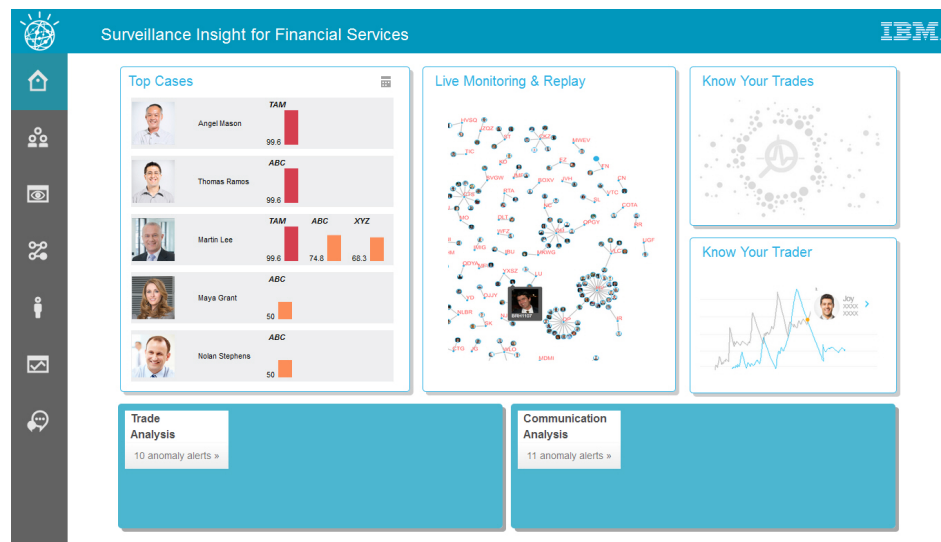
The solution uses integrated analytics to combine trade data with electronic communications to help improve efficiency and accuracy of surveillance results. It applies a reasoning engine to understand traders' long-term behavior, detect anomalies from various 'weak signals' and provide risk estimation to compliance officers.
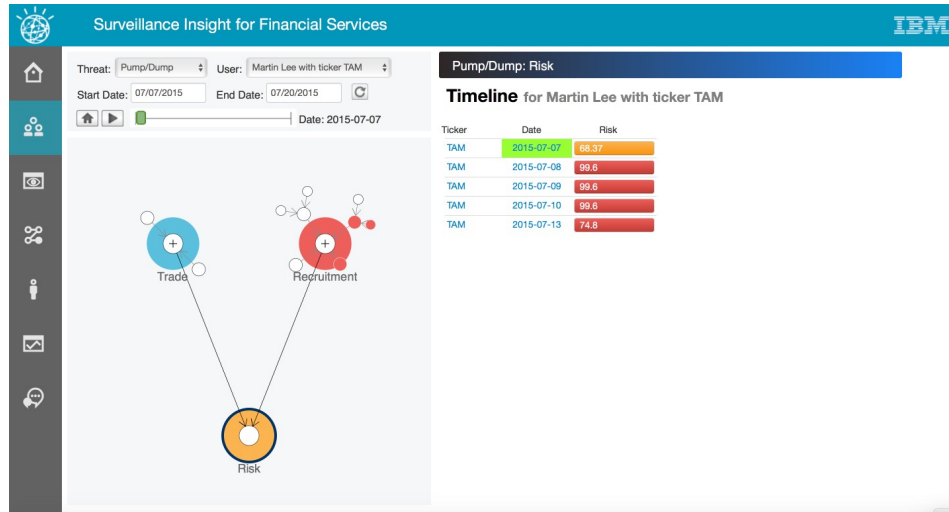
IBM Surveillance Insight for Financial Services learns anomalies from data, by comparing traders' behavior with self, population, and affinity groups. This cognitive reasoning engine also hierarchically correlates the causality of semantic events to predict the potential upcoming risk. Information and alerts are delivered through effective and easy-to-use visualization tools.
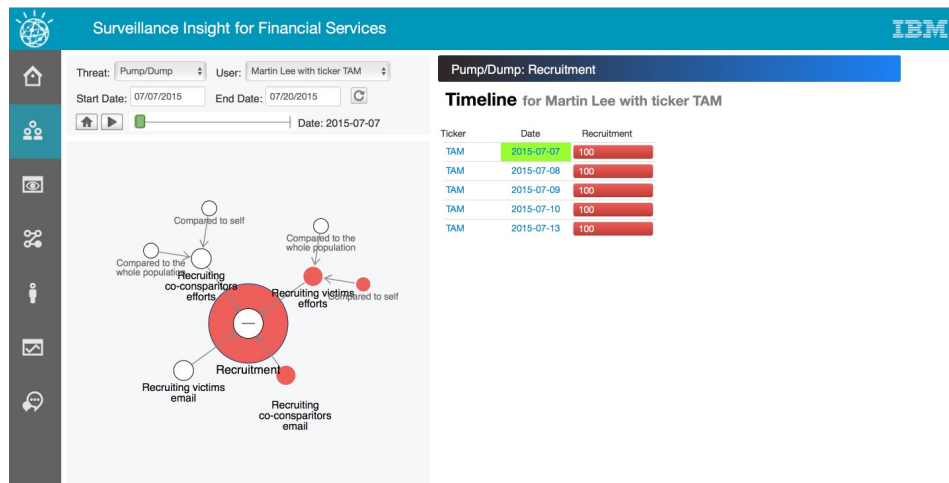
The solution uses large-scale graph computing technology to handle and analyze large and linked data sets to gain insights into trading behavior.
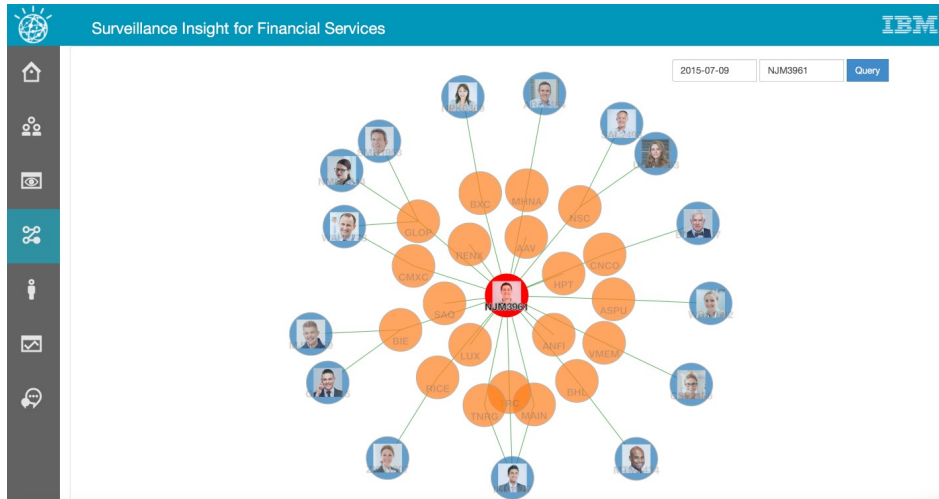
Analysis is provided in real time and can scale to handle large volumes of transactions.

Example: Use IBM Surveillance Insight for Financial Services to determine evidence of a Pump and Dump scheme

In this example, we use IBM Surveillance Insight for Financial Services to demonstrate how the need for a holistic approach—that is, looking at both trade and eComms evidence data in an integrated manner to corroborate one another rather than viewing them isolation.

Pump and dump is a form of rogue trading behavior that involves artificially inflating the price of an owned stock through false and misleading positive statements to sell the cheaply purchased stock at a higher price. After the operators of the scheme sell their overvalued shares (or dump them), the price falls and the investors lose their money. This type of activity is typically undertaken with micro-cap and mid-cap stocks that are more vulnerable to these schemes.

But, just looking at the trading activity is not enough to determine whether a pump and dump fraud has occurred. It might, in fact, be a genuine trading pattern from normal behavior. Looking only at the eComm side is also not conclusive as it

might be traders talking about various things without any follow-up action. However, when you correlate the data and identify the event sequences in an integrated view then the evidence of a pump and dump fraud becomes clear.

Pump and dump can also involve a certain level of planning, conspiracy, or collusion across a group of traders. The pumping activity might even take place as a scheme within a group.

In this example, we show how IBM Surveillance Insight for Financial Services can detect these nuances.

Background

Fred is a compliance officer at ABC Broker-Dealer Inc. The company was recently fined by regulators for failing to detect rogue trading behavior among some of the company's traders. The rogue behavior was concentrated among, but not limited to, traders that are dealing with small cap equities. The traders were using pump and dump techniques to significantly improve their profit margins.

Solution workflow

To help prevent this kind of situation in the future, ABC Broker-Dealer Inc. installs IBM Surveillance Insight for Financial Services to reduce the number of fraudulent activities perpetrated by their traders.

Fred logs in to his compliance workbench and is shown a prioritized list of top cases. The list clearly shows the employees and the scenarios. Also shown are several alerts that need to be investigated.
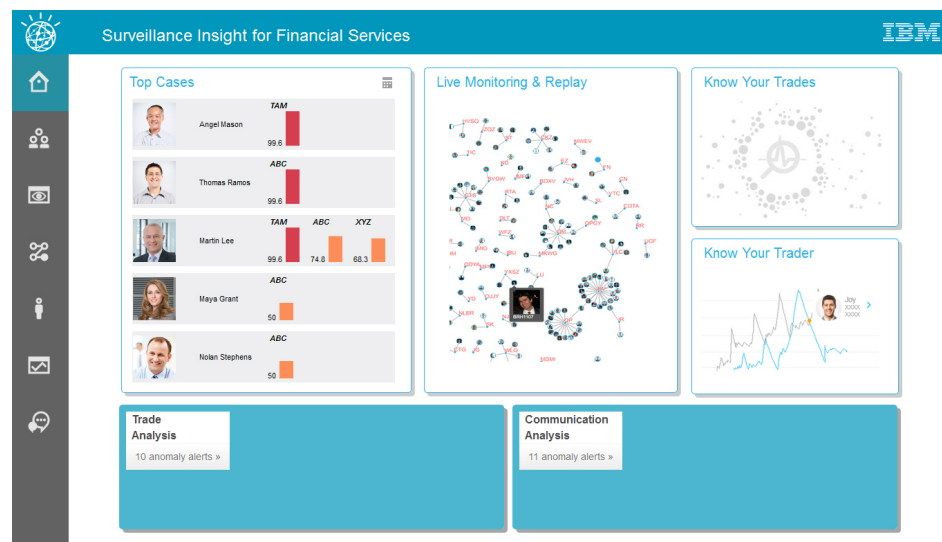
One of the alerts indicates evidence of pump and dump with a high confidence score. The solution has detected strong signals of a pump and dump event having occurred.

Indication of a pump and dump event
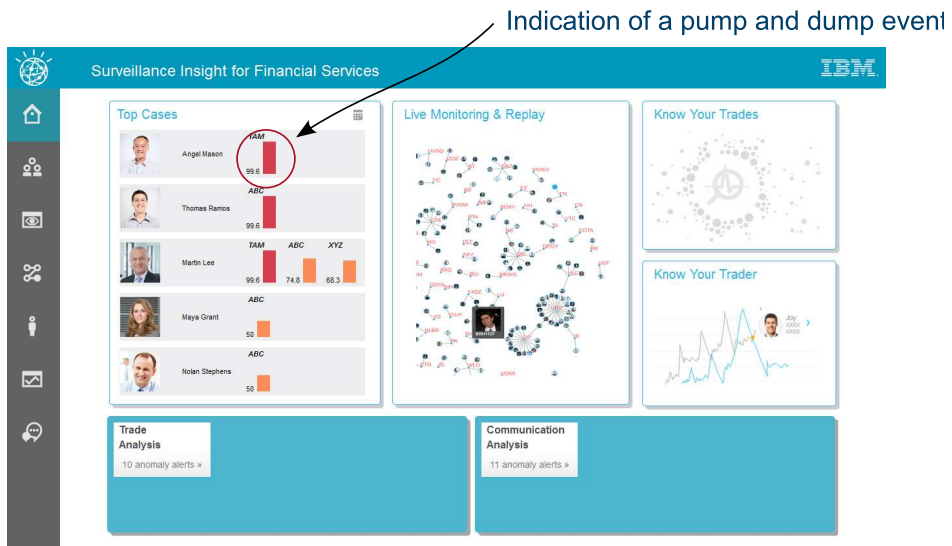
From the dashboard, Fred clicks the alert and is taken to the reasoning and evidence page to begin the investigation.
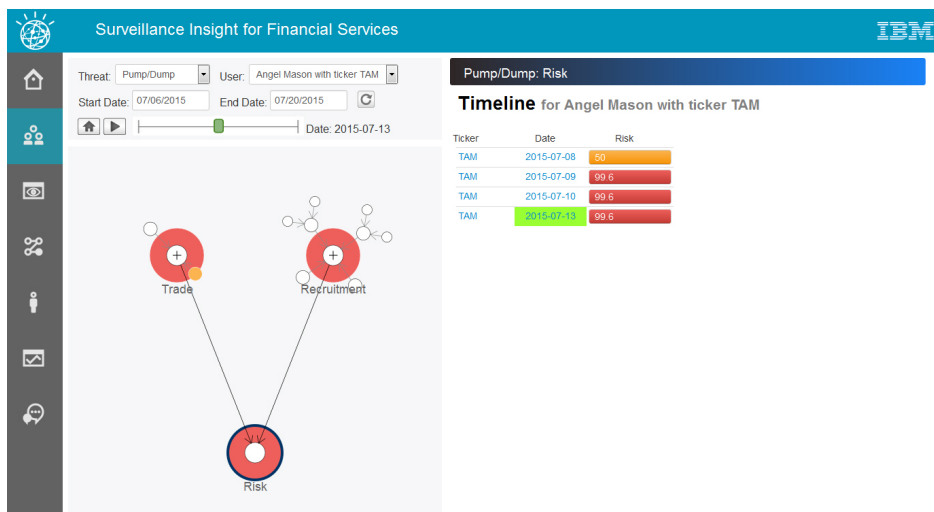
The evidence that suggests the pump and dump is shown on the right.

The reasoning graph on the left represents the underlying Bayesian network that is built to detect the pump and dump activity. Using the reasoning graph, Fred can view the input nodes and detectors that identified the pump and dump.

Colors are used to indicate the significance of each factor in determining the event: blue to show low significance, yellow to show moderate, and red to show high.

Fred can see the various precursor events that contributed to the pump and dump alert. He can see the trading and eComms anomalies together to see both the trading patterns and evidence from email conversations that can confirm the infraction.

From the **E-Comm Analysis** page, the specific email evidence of the activity is documented.

And the details in the email conversations are shown.

Chapter 2. Prerequisites and installation preparation

Before you install IBM Surveillance Insight for Financial Services, ensure that the computers that you use meet the minimum requirements for operating systems, prerequisite software, processing, and disk space.

Supported operating systems and hardware requirements

Review the minimum hardware and operating system requirements before you install IBM Surveillance Insight for Financial Services.

For an up-to-date list of environments that are supported by IBM Surveillance Insight for Financial Services, see the IBM Software Product Compatibility Reports (www.ibm.com/support/docview.wss?uid=swg27047153).

The computer on which you run the solution installer and the computer on which you install IBM Surveillance Insight for Financial Services must be running a 64-bit Red Hat Enterprise Linux Server Edition 6.5 operating system.

Hardware requirements

The computer on which you install IBM Surveillance Insight for Financial Services must have the following hardware requirements:

Processors
2 sockets with 6 cores per socket

RAM 32 GB

Disk space
500 GB

User requirements

You must have **root** or **sudo** access to install IBM Surveillance Insight for Financial Services.

Setting ulimit values

Before you install IBM Surveillance Insight for Financial Services, ensure that you have appropriate ulimit values. You set the ulimit values in two files: `90-nproc.conf` and `91-nproc.conf`.

Procedure

Log in to the computer as the **root** user or as a user with **sudo** permissions.

1. Go to the `/etc/security/limits.d` directory.
2. Open the `90-nproc.conf` file for editing. If the file does not exist, you must create it.
3. Add the following lines to the file:
   ```
   *     soft  nproc  100000
   root  soft  nproc  unlimited
   ```
4. Save and close the file.
5. Open the `91-nproc.conf` file for editing. If the file does not exist, you must create it.

6. Add the following lines to the file:

```
* - nofile 100000
```

7. Save and close the file.
8. Restart the computer for the changes to take effect.

Prerequisite software

Some prerequisite software is required before you can install IBM Surveillance Insight for Financial Services.

You must install the following software before you can use IBM Surveillance Insight for Financial Services:

IBM InfoSphere® Streams

> IBM InfoSphere Streams is a software platform that enables the development and execution of applications that process information in data streams. Incoming data is processed through IBM InfoSphere Streams and then output to the IBM Surveillance Insight for Financial Services data stores.
>
> For more information about IBM InfoSphere Streams, see the product documentation (www.ibm.com/support/knowledgecenter/SSCRJU_4.1.0).

IBM DB2®

> The IBM Surveillance Insight for Financial Services data stores are in 2 IBM DB2 database.
>
> For more information about IBM DB2, see the product documentation (www.ibm.com/support/knowledgecenter/SSEPGG_10.5.0).

IBM WebSphere® Application Server

> IBM Surveillance Insight for Financial Services services are deployed to a WebSphere Application Server instance.
>
> For more information about WebSphere Application Server, see the product documentation (www.ibm.com/support/knowledgecenter/SSEQTP_8.5.5).

Install IBM DB2 software

You must install IBM DB2 before you can install IBM Surveillance Insight for Financial Services.

After you install the database software, you must create two databases that will be used during the IBM Surveillance Insight for Financial Services installation.

Installing IBM DB2 Workgroup Server

You must install IBM DB2 Workgroup Server Edition version 10.5.

Note: On Linux operating systems, the setup wizard is a graphical installer that requires an X Windows System (X11) to display the graphical user interface.

Procedure

1. Go to the directory where you decompressed the installation files.
2. Decompress the IBM DB2 installation file (`DB2_10.5.0.3_limited_Lnx_x86-64.tar.gz`), and go to the `server_r` directory.
3. Start the installer by using the following command: `./db2setup`.
4. In the **DB2 Setup Launchpad**, click **Install a Product**.

5. Under **DB2 Version 10.5 Fix Pack 3 Workgroup, Enterprise and Advanced Editions**, click **Install New**.

6. Select **Typical** for the installation type.

7. On the **Select the installation, response file creation, or both** page, accept the default or select **Install DB2 Server Edition on this computer**.

8. Follow the steps in the wizard to install and configure your database server. For more information about any of the settings, see the IBM DB2 documentation on IBM Knowledge Center (www.ibm.com/support/knowledgecenter/SSEPGG_10.5.0/com.ibm.swg.im.dbclient.install.doc/doc/c0023452.html).

Adding the IBM DB2 license

You must add the DB2 license after you install IBM DB2 server for IBM Surveillance Insight for Financial Services.

Procedure

1. Go to the folder where you decompressed the installation files.

2. Decompress the file that is named DB2_ESE_AUSI_QS_Activ_10.5.0.3.zip.

3. Change to the database administrator user. For example, su db2inst1.

4. Type the following command and press Enter:

   db2licm -a ese_u/db2/license/db2ese_u.lic

5. Type the following command to validate that the license was added:

   db2licm -l

Creating the databases

After you install the IBM DB2 database server for IBM Surveillance Insight for Financial Services, you must create two databases.

Procedure

1. Change to the database instance owner. For example, su db2inst1.

2. Enter the following command to configure IBM DB2 for IBM Surveillance Insight for Financial Services and press Enter.

   db2set db2_compatibility_vector=

3. Restart IBM DB2:

   a. Enter the following command to stop the database instance and press Enter.

      db2stop

   b. Enter the following command to start the database instance and press Enter.

      db2start

4. Enter the following command to create the DATAMGT database:

   db2 create database datamgt automatic storage yes pagesize 32 k

5. Enter the following command to create the RESULTS database:

   db2 create database results automatic storage yes pagesize 32 k

Installing IBM Installation Manager

You must install IBM Installation Manager so that you can install WebSphere Application Server and IBM HTTP Server.

Procedure

1. Go to the InstallationMgr directory where you decompressed the installation files.

2. Decompress the Installation Manager installation file.
3. Enter the following command to start the installer:

   `./install`
4. Follow the steps to install IBM Installation Manager.

Installing WebSphere Application Server

You install WebSphere Application Server by using IBM Installation Manager.

Procedure

1. Go to the directory where you downloaded the installation files.
2. Decompress the WebSphere Application Server installation files.

   You must decompress all of the compressed files: `WASND_v8.5.5_1of3.zip`, `WASND_v8.5.5_2of3.zip`, and `WASND_v8.5.5_3of3.zip`.
3. Start IBM Installation Manager from the **Application Browser** or go to the `/opt/IBM/InstallationManager/eclipse` directory, and run `./IBMIM`.
4. Click **File** > **Preferences**.
5. Click **Add Repository**.
6. Browse to the location where you decompressed the WebSphere Application Server installation files.
7. In the directory where you decompressed the installation files, select `repository.config`, click **OK** to close the dialog.
8. In IBM Installation Manager, click **Install**.
9. Under **IBM WebSphere Application Server Network Deployment**, select **Version 8.5.5.0**.
10. Click **Next**, and follow the steps in IBM Installation Manager to install the product.
11. When prompted for **Which program do you want to start?**, select **Profile Management Tool to create a profile**, and click **Finish**.
12. In the **WebSphere Customization Toolbox 8.5** window, click **Create**.
13. Select **Application Server**, and click **Next**.
14. Select **Typical profile creation**, and click **Next**.
15. Follow the steps in the wizard to configure your application server. For more information about any of the settings, see the WebSphere Application Server documentation.

Applying fix pack 8 to WebSphere Application Server version 8.5.5

You must apply fix pack 8 to your installation of WebSphere Application Server version 8.5.5. You can apply the Fix Pack by using IBM Installation Manager.

For more information about fix pack 8, see the 8.5.5.8: WebSphere Application Server V8.5.5 Fix Pack 8 page (www.ibm.com/support/docview.wss?uid=swg24041178).

Procedure

1. Stop WebSphere Application Server.
   a. Go to the `/opt/IBM/WebSphere/AppServer/profiles/AppSrv01/bin` directory.
   b. Enter the following command: `./stopServer server1`
2. Start IBM Installation Manager from the **Application Browser** or go to the `/opt/IBM/InstallationManager/eclipse` directory, and run `./IBMIM`.

3. Click **Update**.

4. On the **Update Packages** page, select **IBM WebSphere Application Server V8.5**, and click **Next**.

5. Enter your IBM ID and password, and click **OK**.

6. In the list of updates, select **Version 8.5.5.8**, and click **Next**.

7. Select the 8.5.5.8 fixes from the list of fixes, and click **Next**.

8. Follow the remaining steps to apply the fix pack, click **Update**, and click **Finish**.

Installing WebSphere Software Development Kit Java Technology Edition

You install IBM WebSphere SDK Java™ Technology Edition by using IBM Installation Manager. Install WebSphere SDK Java Technology Edition to the same computer where you installed WebSphere Application Server.

After you install the SDK, you must change your WebSphere Application Server configuration to use this version rather than the default.

Procedure

1. Go to the directory where you downloaded the installation files.

2. Decompress the WebSphere SDK installation files.

   You must decompress all of the compressed files:
   `WS_SDK_JAVA_TEV7.0_1OF3_WAS_8.5.5.zip`,
   `WS_SDK_JAVA_TEV7.0_2OF3_WAS_8.5.5.zip`, and
   `WS_SDK_JAVA_TEV7.0_OF3_WAS_8.5.5.zip`.

3. Start IBM Installation Manager from the **Application Browser** or go to the `/opt/IBM/InstallationManager/eclipse` directory, and run `./IBMIM`.

4. Click **File** > **Preferences**.

5. Click **Add Repository**.

6. Browse to the location where you decompressed the WebSphere SDK installation files.

7. In the directory where you decompressed the installation files, select `repository.config`, click **OK** to close the dialog.

8. In IBM Installation Manager, click **Install**.

9. Under **IBM WebSphere SDK Java Technology Edition (Optional)**, select **Version 7.0.4.1**.

10. Click **Next**.

11. On the **Install Packages** page, select **Use the existing package group**, select **IBM WebSphere Application Server V8.5**, and click **Next**.

12. Follow the steps in IBM Installation Manager to install the product.

Configuring WebSphere Application Server

You must change the Java version that is used by WebSphere Application Server and set memory settings for IBM Surveillance Insight for Financial Services.

You must use Java version 1.7 for IBM Surveillance Insight for Financial Services. The default for WebSphere Application Server is version 1.6.

Procedure

1. Open a web browser.

2. In the address bar, type the address for the WebSphere Admin Console.

The Admin console address is `http://servername:9060/ibm/console` where *servername* is the name or IP address for the computer where you installed WebSphere Application Server and WebSphere Software Development Kit Java Technology Edition.

3. If security is enabled, enter the **User ID** and **Password**, and click **Log in**. Otherwise, click **Log in**.

4. Change the transport protocol:

   a. Expand **Security**, and click **Global security**.

   b. Under **Authentication**, expand **RMI/IIOP security**, and click **CSIv2 inbound communications**.

   c. Under **CSIv2 Transport Layer**, select **SSL-supported** for the **Transport** value.

   d. Click **OK**, and then click **Save**.

5. Change the Java version:

   a. Expand **Servers** > **Server Types** > **WebSphere application servers**, and click **server1**.

   b. Under **Server Infrastructure**, click **Java SDKs**.

   c. Select the check box for **1.7_64**, and click **Make Default**.

   d. Click **Save**.

6. Set the Java memory settings:

   a. Expand **Servers** > **Server Types** > **WebSphere application servers**, and click **server1**.

   b. Under **Server Infrastructure**, expand **Java and Process Management**, and click **Process Definition**.

   c. Under **Additional Properties**, click **Java Virtual Machine**.

   d. Enter 50 in **Initial Heap Size**.

   e. Enter 8196 in **Maximum Heap Size**.

   If you have enough RAM, you can enter 16384 in the **Maximum Heap Size**.

   f. Click **Apply**, and then click **Save**.

7. Restart the WebSphere Application Server instance. For example, in a terminal window, go to the `/opt/IBM/WebSphere/AppServer/profiles/AppSrv01/bin` directory, and enter the following commands:

   a. `./stopServer.sh server1`

   b. `./startServer.sh server1`

Configuring data source connections in WebSphere Application Server

You must create data source connections to the DATAMGT and RESULTS databases in your WebSphere Application Server profile. You create the data source connections in the WebSphere administration console.

Procedure

1. Open a web browser.

2. In the address bar, type the address for the WebSphere Admin Console.

   The Admin console address is `http://servername:9060/ibm/console` where *servername* is the name or IP address for the computer where you installed WebSphere Application Server and WebSphere Software Development Kit Java Technology Edition.

3. If security is enabled, enter the **User ID** and **Password**, and click **Log in**. Otherwise, click **Log in**.

4. Add the database instance owner credentials to a user alias for WebSphere Application Server.

   a. Expand **Servers** > **Server Types** > **WebSphere application servers**, and click **server1**.

   b. Under **Security**, click **Security domain**.

   c. Under **Authentication**, expand **Java Authentication and Authorization Service**, and click **J2C authentication data**.

   d. Click **New**.

   e. Enter a name for the user credentials in **Alias**.

   f. Enter the database instance owner in **User ID**. For example, enter db2inst1.

   g. Enter the database instance owner's password in **Password**.

   h. Click **Apply**, and then click **Save**.

5. In the left pane, expand **Resources** > **JDBC**, and click **Data sources**.

6. Create a data source connection to the DATAMGT database.

   a. On the **Data source** page, click **New**.

   b. Enter DATAMGT in **Data source name** and **JNDI name**, and click **Next**.

   c. Select **Create new JDBC provider**, and click **Next**.

   d. Select **DB2** in **Database type** .

   e. Select **DB2 Using IBM JCC Driver** in **Provider type**.

   f. Select **Connection pool data source** in **Implementation type**.

   g. If it was not automatically entered, enter DB2 Using IBM JCC Driver in **Name**, and click **Next**.

   h. On the Enter database class path information, leave the default values, and click **Next**.

      The **Class path** box should contain the following paths:

      ```
      ${DB2_JCC_DRIVER_PATH}/db2jcc4.jar
      ${UNIVERSAL_JDBC_DRIVER_PATH}/db2jcc_license_cu.jar
      ${DB2_JCC_DRIVER_PATH}/db2jcc_license_cisuz.jar
      ${PUREQUERY_PATH}/pdq.jar
      ${PUREQUERY_PATH}/pdqmgmt.jar
      ```

      Leave the remaining boxes blank.

   i. Select 4 for the **Driver type**.

   j. Enter DATAMGT in **Database name**.

   k. Enter the name of the server where IBM DB2 is running in **Server name**.

   l. Enter the DB2 server port number in **Port number**. The default is 50000.

   m. Click **Next**.

   n. Select the alias that you created for the database instance owner in both **Component-managed authentication alias** and **Container-managed authentication alias**, and click **Next**.

   o. Click **Finish**, and then click **Save**.

   p. Select the data source connection that you created in the table, and click **Test connection**.

      Note: Ensure that the test is successful.

7. Create a data source connection to the RESULTS database.

   a. On the **Data source** page, click **New**.

   b. Enter RESULTS in **Data source name** and **JNDI name**, and click **Next**.

c. Select **Select an existing JDBC provider**, choose **DB2 Using IBM JCC Driver**, and click **Next**.

d. Select 4 for the **Driver type**.

e. Enter RESULTS in **Database name**.

f. Enter the name of the server where IBM DB2 is running in **Server name**.

g. Enter the DB2 server port number in **Port number**. The default is 50000.

h. Click **Next**.

i. Select the alias that you created for the database instance owner in both **Component-managed authentication alias** and **Container-managed authentication alias**, and click **Next**.

j. Click **Finish**, and then click **Save**.

k. Select the data source connection that you created in the table, and click **Test connection**.

   Note: Ensure that the test is successful.

8. Configure the data source connection for the DATAMGT database.

a. On the **Data source** page, click the data source connection for the DATAMGT database.

b. Click **Custom properties**.

c. In the properties table, click `resultSetHoldability`.

d. Enter 1 in **Value**.

e. Click **Apply**, and then click **Save**.

Installing IBM InfoSphere Streams

You must install IBM InfoSphere Streams.

For more information, see the IBM InfoSphere Streams documentation on IBM Knowledge Center (www.ibm.com/support/knowledgecenter/SSCRJU_4.1.0/com.ibm.streams.install.doc/doc/installstreams-container.html).

Before you begin

You must create a user for InfoSphere Streams. For example, create a `streamsadmin` user that belongs to the `streamsadmin` group. The user must exist before you can install the product.

Log in as the root user and use the following commands to add the `streamsadmin` user:

- Use the `groupadd` command to create the `streamsadmin` group. For example, in a terminal window, enter `groupadd streamsadmin`. The group must exist before you can add the user to the group.

- Use the `useradd` command to create the `streamsadmin` user and include the `-g` option to add the user to the group. For example, in a terminal window, enter `useradd streamsadmin -g streamsadim`.

- Use the `passwd` command to set the `streamsadmin` user's password. For example, enter `passwd streamsadmin`, and follow the prompts to set the password.

Procedure

1. Go to the directory where you decompressed the installation files.

2. Decompress the `IS_STRM_4.1_RHEL6_EN.tar.gz` by using the following command: `tar xvf IS_STRM_4.1_RHEL6_EN.tar.gz`.

3. Go to the `StreamsInstallFiles` directory.
4. Start the installer by using the following command:
   `./InfoSphereStreamsSetup.bin`.
5. In the installer, on the **Select the edition to install** page, select **IBM InfoSphere Streams**, and click **Next**.
6. Ensure that you install all of the missing software packages that are identified on the **Software Dependencies** page.

   For more information about installing the software pages for InfoSphere Streams, see the IBM InfoSphere Streams documentation on IBM Knowledge Center (http://www.ibm.com/support/knowledgecenter/SSCRJU_4.1.0/com.ibm.streams.install.doc/doc/ibminfospherestreams-install-rpms-streams-package.html).
7. Enter an InfoSphere Streams user and group. This user runs the InfoSphere Streams services. If the user does not exist, it is created by the installer. For example, enter `streamsadmin` as the **User** and `streamsadmin` as the **Group**.
8. Click **Next**, and follow the steps in the wizard to install the product.

Installing Apache web server and PHP

You must install Apache web server and PHP. The IBM Surveillance Insight for Financial Services Workbench Content component is installed to the web server.

Procedure

1. Log on to the computer as the **root** user or as a user with **sudo** permissions.
2. Install Apache web server. For example, in a terminal window, enter `yum install httpd`
3. Install PHP. For example, in a terminal window, enter `yum install php`
4. Start the httpd service. For example, in a terminal window, enter `service httpd start`.

Installing perl-JSON and PERL modules

You must install perl-JSON and PERL modules on the computer where you deploy the IBM Surveillance Insight for Financial Services Graph Content.

Procedure

1. Log on to the computer as the **root** user or as a user with **sudo** permissions.
2. Install perl-JSON. For example, in a terminal window, enter `yum install perl-JSON`.
3. Enter the following commands to install the PERL modules:

```
cpan YAML
cpan strict
cpan warnings
cpan File::Basename
cpan LWP::Simple
cpan CGI CGI::Carp
cpan JSON
cpan LWP::UserAgent
cpan URI::Escape
cpan LWP::Protocol::https
```

   If you are prompted for values, you can select the defaults or choose an appropriate option.

Installing Boost C++ libraries

You must install Boost C++ libraries on the computer where you deploy the IBM Surveillance Insight for Financial Services Streams Content component.

Procedure

1. Log on to the computer as the **root** user or as a user with **sudo** permissions.
2. Download the Boost C++ libraries. For example, go to https://sourceforge.net/projects/boost/files/boost/1.57.0/, and download `boost_1_57_0.zip`.
3. Decompress `boost_1_57_0.zip`. For example, go to the directory where you downloaded `boost_1_57_0.zip`, and enter the following command: `unzip boost_1_57_0.zip`.
4. Go to the `boost_1_57_0` directory.
5. Enter the following command to build the installer: `./bootstrap.sh`.
6. Enter the following command to run the installer: `./b2 install`.

Creating directories for the solution installer

You must create a directory on each computer on which you deploy an IBM Surveillance Insight for Financial Services component.

The solution installer uses the `/opt/IBM` directory to copy license files and other files. This directory must exist on each node computer and on the computer on which you run the solution installer before you run the installation.

Procedure

1. Create an `/opt/IBM` directory on each computer on which you are going to deploy an IBM Surveillance Insight for Financial Services component.
2. Create an `/opt/IBM` directory on the computer on which you are going to run the solution installer.

Adding each node computer to the hosts file on all computers

You must add all computers on which you deploy an IBM Surveillance Insight for Financial Services component to the `hosts` file on each other computer.

Procedure

1. On each computer, open the `/etc/hosts` file.
2. Ensure that each node computer is listed in the file. For example, ensure that your `hosts` files contain entries in the following pattern:

   ```
   127.0.0.1 localhost.localdomain localhost
   IP_Address computer1.domain.com computer1
   IP_Address computer2.domain.com computer2
   ```
3. Save and close the file.

Modifying the sudoers file for the user who runs the installation

To deploy IBM Surveillance Insight for Financial Services components as a non-root user, you must add that user to the `sudoers` file on each computer.

Procedure

1. Log in as **root** user.
2. Go to the `etc` directory, and open the `sudoers` file in a text editor.

3. Add the following line for your user:

   username `ALL=(ALL) ALL`

4. Save and close the file.

5. Repeat these steps on each computer on which you deploy an IBM Surveillance Insight for Financial Services component.

Chapter 3. Install IBM Surveillance Insight for Financial Services

Use the solution installer to deploy the IBM Surveillance Insight for Financial Services component programs on computers or virtual machines that are running a Red Hat Enterprise Linux operating systems.

The solution installer provides a web interface that you use to define to target location to deploy the IBM Surveillance Insight for Financial Services installation files.

After you deploy the installation files, you run a script to install and configure the solution components.

IBM Surveillance Insight for Financial Services is composed of three parts:

- A trade stream analysis component that is provided in the Streams Content component.
- The surveillance workbench, which includes user interface components, is provided in the Workbench Content component.
- A trade surveillance module, which provides unstructured data analysis, is provided in the Analytics Content component.

After you install IBM Surveillance Insight for Financial Services, you must install each part individually.

Downloading and decompressing the installation files

You download the IBM Surveillance Insight for Financial Services solution from IBM Passport Advantage, and then decompress the files to run the solution installer.

For more information about the files that you must download, see Downloading IBM Surveillance Insights for Financial Services 1.0 (www.ibm.com/support/docview.wss?uid=swg24041078).

Procedure

1. Access the IBM Passport Advantage® web site.

   Tip: If you receive an error, try using a different web browser to access Passport Advantage.
2. Sign in and navigate to the software downloads page.
3. Find the eImages for IBM Surveillance Insight for Financial Services.
4. Download an eImage by selecting the check box beside the name. When the download is complete, a **Download Complete** message is displayed. The location of the downloaded files are displayed in the message window.
5. Decompress the IBM Surveillance Insight for Financial Services file.

Opening firewall ports for the solution installer

You can run the `firewall.sh` script to open the ports that are required on the computer on which you are running the IBM Surveillance Insight for Financial Services solution installer.

You must also open ports on the target, or client, computer on which you are installing the IBM Surveillance Insight for Financial Services components. You can use the `client_firewall.sh` script to open the required ports.

The `firewall.sh` script opens the following ports on the solution installer computer:
- 8080 incoming
- 443 incoming
- 9683 incoming
- 22 outgoing

On the target, or client computers, the `client_firewall.sh` script opens the following ports:
- 8080 outgoing
- 443 incoming
- 9683 outgoing
- 22 incoming

Procedure

1. Log on to the computer that contains the solution installer node as the root user or as a user with sudo permissions.
2. Back up your existing firewall settings by typing the following command: `/etc/init.d/iptables save`.
3. Go to the `SolutionInstaller` directory where you decompressed the solution installer files, and run the firewall script by typing the following command: `sh firewall.sh`.
4. Copy the `client_firewall.sh` file onto the computer on which you are going to install IBM Surveillance Insight for Financial Services.
5. On the client computer, back up your existing firewall settings by typing the following command: `/etc/init.d/iptables save`.
6. Go to the directory where you copied the `client_firewall.sh` file, and run the script by typing the following command: `sh client_firewall.sh`.

Starting the solution installer

You run the IBM Surveillance Insight for Financial Services solution installer on a Red Hat Enterprise Linux operating system. You use the solution installer to define the environment you want to install. After the solution installer is running, you can access the installer interface from another computer by using a web browser.

Note: Ensure that you copy the solution installer files to a directory in which you have permissions to execute files.

Procedure

1. Log on to the computer where you decompressed the installation files as the root user or as a user with sudo permissions.

2. Go to the `SolutionInstaller` directory where you decompressed the solution installer files.
3. Enter the following command: `./setup.sh username first_name last_name email password`.

   You must enter each of the values after `setup.sh`. If you do not enter a password, you will be prompted to enter one. The password must have at least 6 characters.

   After the solution installer starts, open a web browser, and go to the solution installer URL: `https://servername:8080/UI/index.html`.

   The computer on which you are using the browser to access the solution installer must have a screen resolution that is greater than 1024 by 760.

   The solution installer interface can be accessed from a Google Chrome 44, or later, or Mozilla Firefox 38 or later, web browser. It does not run in an Internet Explorer web browser.

Using the solution installer to deploy the product files

Use the solution installer to copy the IBM Surveillance Insight for Financial Services components to the computer on which you want to install the solution.

Procedure

1. Open the solution installer in a web browser.

   After the solution installer is running, you can access the URL from any computer from a Firefox or Chrome web browser.

   The URL is `https://servername:8080/UI/index.html`, where *servername* is the name of the computer where you ran the solution installer.

2. Click **New Configuration**

   If you have a configuration that was previously saved, you can start from that saved configuration.

3. From the **Mandatory Content List** pane, select **Node** and drag it to the **Configuration Editor** pane.

   The **Node** represents the computer where the IBM Surveillance Insight for Financial Services files are to be placed.

   You can deploy the content on the same computer or on different computers.

   Note: You must define a node for the computer where IBM InfoSphere Streams is installed. The **Streams Content** component must be deployed to that computer.

4. Select a node object, and enter the following information in the **Property Editor** pane:

   a. Enter a name for the node in **Name**, and press the Enter key.

   b. Enter the server name in **Host Name**, and press the Enter key.

   c. Enter the user who has access to install the components in **User Name**, and press the Enter key. For example, enter `root` or a user with sudo permissions.

   d. Enter the user's password in **User Password**, and press the Enter key.

5. From the **Mandatory Content List** pane, drag the components to the appropriate node that you have defined.

   Workbench Content
   > Contains the deployment files for the Surveillance workbench component.

> > You must deploy this component to a computer where you have
> > installed a web server.

> **Database Content**
> > Contains the sample data content.
> >
> > You must deploy this content to the same computers where you deploy
> > the Analytics Content and the Streams Content components. If the
> > Analytics Content and Streams Content components are deployed on
> > different computers, you must deploy the Database Content component
> > to both computers.

> **Analytics Content**
> > Contains the deployment files for the Trader Surveillance component.

> **Graph** Contains the deployment files for generating the graphs.
> >
> > Deploy the Graph, Streams Content, and Database Content components
> > together.

> **Streams Content**
> > Contains the deployment files for the Trade Stream Analytics
> > component.
> >
> > Deploy the Streams Content, Graph, and Database Content components
> > together.

> The files content files are copied to the `/opt/IBM/`
> `IS_FinancialMkts_SurveillanceInsight_1.0.1` directory. You can change that
> value in the **Property Editor**.

> **Tip:** If you do not want the components to be decompressed automatically,
> select each of the content components, and in the **Property Editor**, clear
> **Uncompress File**.

6. Click **Validate** to ensure that the configuration is complete.

   Any errors or missing information is displayed. You must correct the error or
   provide the information before you can run the deployment.

7. Click **Run** to start the deployment.

8. When the deployment is complete, click **Close**, and then exit the solution
   installer.

Task 1: Configuring IBM InfoSphere Streams

You must create and start a domain for IBM InfoSphere Streams.

For more information about configuring InfoSphere Streams, see IBM Knowledge
Center (https://www.ibm.com/support/knowledgecenter/SSCRJU_4.1.0/
com.ibm.streams.cfg.doc/doc/creating-basic-domain-and-instance.html).

Procedure

1. Change to the InfoSphere Streams user. For example, change to the
   streamsadmin user.

2. Go to the `/home/streamsadmin` directory.

3. Create a `.bashrc`, and add the following lines:

   ```
   source /opt/ibm/InfoSphere_Streams/4.1.0.0/bin/streamsprofile.sh
   export STREAMS_ADAPTOR=/opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/
   FinancialMkts_SurveillanceInsight_StreamsContent/graphdb_adaptor
   ```

4. Save and close the file.

5. Exit the streamsadmin user, and log in again as streamsadmin to apply the `.bashrc` settings

6. Enter the following command to start the administration tool: `streamtool`

7. In the streamtool, enter the following commands, and press Enter after each line:

```
mkdomain -d StreamsDomain
setdomainproperty sws.port=9443
genkey
startdomain -d StreamsDomain
mkinstance -i SIInstance
startinstance -i SIInstance
```

8. Enter the following command and press Enter to access the InfoSphere Streams administration console:

```
geturl
```

9. Enter the URL in your web browser, and enter the InfoSphere Streams user credentials to log in.

   Logging in to the administration console verifies that IBM InfoSphere Streams is installed and running.

Task 2: Setting up and initializing the Graph Content

Use the Graph Content to create the graph stores and run the analytics for structured data.

Before you begin

Ensure that you have installed the Boost C++ libraries on the computer where you deployed the Graph Content. For more information, see "Installing Boost C++ libraries" on page 18.

Procedure

1. Log on to the computer where you deployed the Graph, Streams Content, and the Data Content components.

2. Go to the `IS_FinancialMkts_SurveillanceInsight_1.0.1/Graph/ FinancialMkts_SurveillanceInsight_GraphContent` directory. By default, `IS_FinancialMkts_SurveillanceInsight_1.0.1` is in `/opt/IBM`.

   If you did not automatically decompress the content files, decompress `FinancialMkts_SurveillanceInsight_GraphContent.zip` in the `IS_FinancialMkts_SurveillanceInsight_1.0.1/Graph` directory.

3. Copy the `restapi` directory to the `/var/www/cgi-bin/surveillance` directory.

   You must create the `surveillance` directory in `/var/www/cgi-bin`.

4. Set the LD_LIBRARY_PATH environment variable so that it points to the `/var/www/cgi-bin/surveillance/restapi/lib` directory and the `/usr/local/lib` directory (where the Boost C++ libraries are located). For example, enter the following command `export LD_LIBRARY_PATH=/var/www/cgi-bin/surveillance/ restapi/lib/:/usr/local/lib/:$LD_LIBRARY_PATH`

5. Verify that the libraries are available. For example, enter the following command: `ldd ./gShell`.

   If any libraries are not found, you can try copying the library to the `/usr/local/lib64` directory from the `/usr/local/lib` directory.

6. Start the graph services.

a. Make a directory in which to store the graph data, and enter that directory path in the `start_restapi.sh` file. Change the `<graphstore_dir>` value to the directory that you created.

The directory must exist in the same directory as the `start_restapi.sh` file. For example, change `./gShell http localhost 8002 gshell <graphstore_dir>/database/ &` to something like `./gShell http localhost 8002 gshell ./database &`

b. Start the graph services by entering the following command: `./start_restapi.sh`.

c. Press Enter to return to the command line.

7. Enter the following commands to initialize the graphs:

a. Enter `./create_graphs.sh <path_to_data_content>`

`<path_to_data_content>` is the path to the `IS_FinancialMkts_SurveillanceInsight_1.0.1/Data/ FinancialMkts_SurveillanceInsight_DataContent` directory. For example, run the command as `./create_graphs.sh /opt/IBM/ IS_FinancialMkts_SurveillanceInsight_1.0.1/Data/ FinancialMkts_SurveillanceInsight_DataContent`

b. Enter `./create_pd_graphs.sh`

c. Enter `./update_graphs.sh`

Task 3: Configuring the Streams Content

To configure the Streams Content, you must create some directories, run some InfoSphere Streams jobs, and then install a graph adapter.

Procedure

1. Change to the InfoSphere Streams user. For example, change to the streamsadmin user.

2. Go to the `/home/streamsadmin` directory.

3. Create the following directories:

   - `EOD`
   - `trade`
   - `execution`

4. From the `/opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/ FinancialMkts_SurveillanceInsight_StreamsContent/PDZDataSet` directory, copy `initPositions.csv` to the `/home/streamsadmin` directory.

5. Go to the `/opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/ FinancialMkts_SurveillanceInsight_StreamsContent/PumpDumpSolution` directory, and run the following commands in the indicated directories:

a. In `MarketStreamSimulator`, run

   `sc -M com.ibm.sifs.utils.simulator::SimulatorMain`

b. In `TradeSummary`, run

   `sc -M com.ibm.sifs.pnd.sa.tradesummary::TradeSummaryMain`

c. In `PositionSummary`, run

   `sc -M com.ibm.sifs.pnd.sa.positionsummary::PositionSummaryMain`

d. In `com.ibm.sifs.pnd.sa.pndrules`, run

   `sc -M com.ibm.sifs.pnd.sa.pndrules::PnDRulesMain`

6. Go to the /opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/ FinancialMkts_SurveillanceInsight_StreamsContent/PumpDumpSolution directory, and run the following commands in the indicated directories to start the Pump and Dump analysis:

   a. In MarketStreamSimulator, run streamtool submitjob -C data-directory=/home/streamsadmin/ output/ com.ibm.sifs.utils.simulator.SimulatorMain.sab --embeddedzk -d StreamsDomain -i SIInstance

   b. In TradeSummary, run

      streamtool submitjob -C data-directory=/home/streamsadmin/ output/com.ibm.sifs.pnd.sa.tradesummary.TradeSummaryMain.sab --embeddedzk -d StreamsDomain -i SIInstance

   c. In PositionSummary, run

      streamtool submitjob -C data-directory=/home/streamsadmin/ output/com.ibm.sifs.pnd.sa.positionsummary.PositionSummaryMain.sab --embeddedzk -d StreamsDomain -i SIInstance

   d. In com.ibm.sifs.pnd.sa.pndrules, run

      streamtool submitjob —C data-directory=/home/streamsadmin/ output/com.ibm.sifs.pnd.sa.pndrules.PnDRulesMain.sab --embeddedzk -d StreamsDomain -i SIInstance

7. Run the graph adapter stream jobs:

   a. Go to the /opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/ FinancialMkts_SurveillanceInsight_StreamsContent/graphdb_adaptor/lib directory.

   b. Copy libgShell_LMDB.so to the /usr/lib64 directory.

   c. Go to the /opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/ FinancialMkts_SurveillanceInsight_StreamsContent/graphdb_adaptor directory.

   d. Create a soft link to the database directory that you used when you edited the start_restapi.sh file. (For more information, see "Task 2: Setting up and initializing the Graph Content" on page 25.) For example, enter the following command in a terminal window:

      ln -s /opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Graph/ FinancialMkts_SurveillanceInsight_GraphContent/database database

   e. Open run-graphstream.sh in a text editor.

   f. Change the **STINSTANCE** value to the name of the IBM InfoSphere Streams instance that you created. For more information, see "Task 1: Configuring IBM InfoSphere Streams" on page 24. For example, change the **STINSTANCE** value to SIInstance.

   g. Change the **STDOMAIN** value to the name of the IBM InfoSphere Streams domain that you created. For example, change the **STDOMAIN** value to StreamsDomain.

   h. Save and close the file.

   i. Go to the graphdb_adaptor/impl/java/lib directory.

   j. Open graph.properties in a text editor.

   k. Change the **graphurl** value to the match your web server configuration. For example, if you used the default web server port, 80, change the URL to http://localhost:80/cgi-bin/surveillance/restapi/rest/graphs/.

   l. Save and close the file.

   m. Go to the graphdb_adaptor directory.

n. Enter the following command: `./build.sh`

8. Verify that the IBM InfoSphere Streams and graph integration is correct:

   a. Go to the `/opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/FinancialMkts_SurveillanceInsight_StreamsContent/graphdb_adaptor` directory.

   b. Enter the following command:

   ```
   ./run-graphstream.sh verifygraph /opt/IBM/
   IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/
   FinancialMkts_SurveillanceInsight_StreamsContent/PDZDataSet/
   testgraph.csv
   ```

   c. Enter the following command to verify that the content was loaded:

   ```
   curl -X GET -H "X-SystemG-User: sguser_data" http://localhost:8002/
   gshell/graphs/testgraph/vertices?_cmd=count
   ```

   Ensure that you use the correct port number from when you configured in the `start_restapi.sh` file. For more information, see "Task 2: Setting up and initializing the Graph Content" on page 25.

   The command should return a result that includes `{"number of vertices":28}`.

9. Submit the composites:

   a. Go to the `/opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/FinancialMkts_SurveillanceInsight_StreamsContent/graphdb_adaptor` directory.

   b. Enter the following commands:

      1) `./run-graphstream.sh EODProcess`
      2) `./run-graphstream.sh PumpDumpScore`
      3) `./run-graphstream.sh Trader_Positions`
      4) `./run-graphstream.sh TradeSummaryAndMA`
      5) `./run-graphstream.sh Ticker_Detail`
      6) `./run-graphstream.sh OrderVertex`

   c. Go to the `/opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Streams/FinancialMkts_SurveillanceInsight_StreamsContent/PDZDataSet` directory.

   d. Copy `pnd_pdz_trades.csv` to the `/home/streamsadmin/trade` directory.

   e. Copy `pnd_pdz_execs.csv` to the `/home/streamsadmin/execution` directory.

   f. Required: Enter the following command to verify that the content was loaded:

   ```
   curl -X GET -H "X-SystemG-User: sguser_analytics" http://
   localhost:8002/gshell/graphs/pumpdump/vertices?_cmd=count
   ```

   The command should return a result that includes `{"number of vertices":2265}`. Then you can continue with the remaining steps.

   g. Copy `pnd_pdz_eod.csv` to the `/home/streamsadmin/EOD` directory.

   h. Copy `pnd_pdz_ticker_price.csv` to the `$STREAMS_ADAPTOR/data/price` directory.

   STREAMS_ADAPTOR is the variable that you created in the streamsadmin user's `.bashrc` file. For more information, see "Task 3: Configuring the Streams Content" on page 26.

   i. Copy `pnd_pdz_execs.csv` to the `$STREAMS_ADAPTOR/data/order` directory.

   These processes should take about 20 minutes to complete. You can run `curl -X GET -H "X-SystemG-User: sguser_data" http://localhost:8002/gshell/`

graphs/order_vertex/vertices?_cmd=count to monitor the progress. The jobs
are complete when you see {"number of vertices":657121}.

Task 4: Updating the Graph Content

After you run the sample data, you must update the graph content.

Procedure

1. Go to the IS_FinancialMkts_SurveillanceInsight_1.0.1/Graph/
   FinancialMkts_SurveillanceInsight_GraphContent directory. By default,
   IS_FinancialMkts_SurveillanceInsight_1.0.1 is in /opt/IBM.

   If you did not automatically decompress the content files, decompress
   FinancialMkts_SurveillanceInsight_GraphContent.zip in the
   IS_FinancialMkts_SurveillanceInsight_1.0.1/Graph directory.

2. Enter the following command:

   ./gShell singlecmd database sguser_data "indexer_clucene --graph
   order_vertex --mode build --type vertex"

3. Enter the following command:

   ./update_pd_graphs.sh

Task 5: Setting up the Analytics Content

The IBM Surveillance Insight for Financial Services Analytics Content installation
downloads and installs additional software components, including Apache Maven.

When you set up the IBM Surveillance Insight for Financial Services Analytics
Content, WAR files are generated that you must deploy to WebSphere Application
Server.

Before you begin

Ensure that you installed IBM DB2, IBM WebSphere Application Server, and IBM
WebSphere SDK Java Technology Edition on the computer where you deployed the
Analytics Content. For more information, see "Install IBM DB2 software" on page
10 and "Installing WebSphere Application Server" on page 12.

Procedure

1. Log on to the computer where you deployed the IBM Surveillance Insight for
   Financial Services Analytics Content as the root user or as a user with sudo
   permissions.

2. Update your Java environment.

   Important: You must set the **JAVA_HOME** value to the Java that is provided with
   WebSphere Application Server.

   a. Update your **JAVA_HOME** variable to use the Java that you installed for
      WebSphere Application Server. For example, enter the following command:
      export JAVA_HOME=/opt/IBM/WebSphere/AppServer/java_1.7_64

   b. Add the Java bin directory to your **PATH** environment variable. For example,
      enter the following command: export PATH=/opt/IBM/WebSphere/AppServer/
      java_1.7_64/bin:$PATH

3. Go to the IS_FinancialMkts_SurveillanceInsight_1.0.1/Analytics/
   FinancialMkts_SurveillanceInsight_AnalyticsContent directory. By default,
   IS_FinancialMkts_SurveillanceInsight_1.0.1 is in /opt/IBM.

If you did not automatically decompress the content files, decompress `FinancialMkts_SurveillanceInsight_AnalyticsContent.zip` in the `IS_FinancialMkts_SurveillanceInsight_1.0/Analytics` directory.

4. Decompress `eaves-ship-pom-1.2-SNAPSHOT-source.zip` if it is not already decompressed.

5. From the `/opt/ibm/db2/V10.5/java` directory, copy the `db2jcc4.jar` file to this directory. `db2jcc4.jar` must exist in the same location as `install.py`.

6. In the `FinancialMkts_SurveillanceInsight_AnalyticsContent` directory, enter the following command in a terminal window:

   `./install.py <target_directory> <download_directory>`

   The `<target_directory>` is where the trade surveillance components and software such as Apache Maven is installed. If you do not provide a path, `/root/IBM_ADAMS` is used.

   The `<download_directory>` is where the downloaded software, such as the Apache Maven installer, is saved. If you do not provide a path, `/root/Downloads` is used.

   Tip: If you encounter any issues during the installation, you can correct the issue and then rerun the `install.py` command. Any tasks that are complete are skipped.

7. When prompted, enter the appropriate values for your environment or accept the defaults.

   • For the `JDBC URL of the database to be used` value, the connection information for the IBM DB2 database server and the DATAMGT database that you created. Enter the URL in the following format: `jdbc:db2://localhost:50000/DATAMGT`.

   Important: The database name is case-sensitive.

   • For the `User ID to be used to access the above database` value, enter the database user name. The default is `test`. Ensure that you enter the user name that has privileges for the database.

   • For the `Password for the above database user ID` value, enter a password for the database user. The default is `testpw`.

   • For the `Enter Y to use the same DB server and access credentials for the RESULTS database` value, you can choose to create a RESULTS database in the same database server as the DATAMGT database, or you can choose another database server.

   Important: If you enter the database name, ensure that you enter the correct case for the database name.

   • For the `URL of the email text server` value, enter the URL for the email text server. The default is `http://localhost/emailtext/`. The `localhost` value should point to the server and port number where Apache web server is running.

   For the sample data, you must enter the trailing slash as shown. The `emailtext` directory is included in the Data Content. For more information, see steps 18 - 19 in "Task 8: Setting up the sample data" on page 32.

   • For the the `PATH of the WebSphere Install Folder` value, enter a path to where the WAR files that you must deploy to WebSphere Application Server are created. The default is `/opt/IBM/WebSphere/AppServer/runtimes/`.

   • For the `server on which the graph store resides` value, enter the URL for the computer where you install the Streams Content component. The default

is `localhost`. This value is the server where you install and run the IBM System G component as part of the Streams Content.

Task 6: Creating a shared library in WebSphere Application Server

You must create a shared library in WebSphere Application Server for files that are provided with the IBM Surveillance Insight for Financial Services content.

Procedure

1. Open a web browser.
2. In the address bar, type the address for the WebSphere Admin Console.

   The Admin console address is `http://servername:9060/ibm/console` where *servername* is the name or IP address for the computer where you installed WebSphere Application Server and WebSphere Software Development Kit Java Technology Edition.
3. If security is enabled, enter the **User ID** and **Password**, and click **Log in**. Otherwise, click **Log in**.
4. Expand **Environment**, and click **Shared libraries**.
5. Click **New**.
6. Enter a **Name** for the library. The name can be anything you want.
7. In **Classpath**, enter the paths to the `httpclient-4.3.6.jar` and `httpcore-4.3.3.jar` files in the *<target_directory>* directory that you used when you ran `install.py`.

   For example, if you used the default paths during installation, enter:

   `/root/IBM_ADAMS/eaves-pipeline-pom-1.1-SNAPSHOT-binary/lib/httpclient-4.3.6.jar;/root/IBM_ADAMS/eaves-pipeline-pom-1.1-SNAPSHOT-binary/lib/httpcore-4.3.3.jar`
8. Click **Apply**, and then click **Save**.
9. Restart the WebSphere Application Server instance. For example, in a terminal window, go to the `/opt/IBM/WebSphere/AppServer/profiles/AppSrv01/bin` directory, and enter the following commands:

   a. `./stopServer.sh server1`

   b. `./startServer.sh server1`

Task 7: Deploying the Analytics Content application to WebSphere Application Server

After you run the `install.py` script for the Analytics Content, you must deploy the applications to WebSphere Application Server. The applications are generated by the `install.py` script.

Procedure

1. Go to the *<target_directory>*/webapps directory, where *<target_directory>* is the directory that you used when you ran `install.py`.

   Ensure that the directory contains several `war` files that were generated by the `install.py` script. If no `war` files are in the directory, you must run the `install.py` script again.
2. Open a web browser.
3. In the address bar, type the address for the WebSphere Admin Console.

The Admin console address is `http://servername:9060/ibm/console` where *servername* is the name or IP address for the computer where you installed WebSphere Application Server and WebSphere Software Development Kit Java Technology Edition.

4. If security is enabled, enter the **User ID** and **Password**, and click **Log in**. Otherwise, click **Log in**.

5. Expand **Applications** > **Application Types** > **WebSphere enterprise applications**.

6. Install the application war files from the `<target_directory>`/webapps directory.

   a. Click **Install**.

   b. Select **Local file system**, click **Browse**, locate and select `admin-webapp.war`, and click **Open**.

   c. Click **Next**.

   d. Select **Fast Path**, and click **Next**.

   e. Leave the default settings and click **Next** for steps 1 - 3.

   f. On Step 4, enter `/admin-webapp` as the **Context Root** value, and click **Next**.

   g. Click **Finish**, and then click **Save**.

   h. Click **Install**, and repeat the steps for each of the applications.

      As you install the applications, ensure that you use the following **Context Root** values for each application:

Application	Context Root
personemo.war	/personemo
shared-web-deps.war	/shared-web-deps
ui-datamgt-birt.war	/ui-datamgt-birt
ui-v3.war	/ui-v3

7. Add the shared library to the `ui-datamgt-birt` application.

   a. In the **Enterprise Applications** list, click `ui-datamgt-birt_war`.

   b. Under **Detail Properties**, click **Class loading and update detection**.

   c. Under **Class loader order**, select **Classes loaded with local class loader first (parent last)**.

   d. Click **Apply**, and then click **Save**.

   e. In the **Enterprise Applications** list, click `ui-datamgt-birt_war` again.

   f. Under **Modules**, click **Manage Modules**.

   g. Click **Eclipse BIRT Report Viewer**.

   h. In **Class loader order**, select **Classes loaded with local class loader first (parent last)**.

   i. Click **Apply**, and then click **Save**.

8. Restart the WebSphere Application Server instance. For example, in a terminal window, go to the `/opt/IBM/WebSphere/AppServer/profiles/AppSrv01/bin` directory, and enter the following commands:

   a. `./stopServer.sh server1`

   b. `./startServer.sh server1`

Task 8: Setting up the sample data

Use the following steps to load the sample data that is provided with IBM Surveillance Insight for Financial Services.

Procedure

1. Go to the *<target_directory>* directory, where *<target_directory>* is the directory you entered when you ran `install.py`.

2. Enter the following command to set your environment variables:

   `./setenv.sh`

3. Go to the *<target_directory>*`/eaves-pipeline-pom-1.1-SNAPSHOT-binary` directory.

4. Enter the following command to create an **EAVES** environment variable:

   `export EAVES=$(pwd)`

5. Go to the *<target_directory>*`/eaves-pipeline-pom-1.1-SNAPSHOT-binary/resources/config/jar` directory.

6. Open `run-finance-sample-email-etl.props` in a text editor.

7. Edit the following values to match your environment:

   a. Change **FILESTORE_dir** to the `IS_FinancialMkts_SurveillanceInsight_1.0.1/Data/FinancialMkts_SurveillanceInsight_DataContent/EmailData` directory. For example, change the value to `opt/IBM/IS_FinancialMkts_SurveillanceInsight_1.0.1/Data/FinancialMkts_SurveillanceInsight_DataContent/EmailData`.

   b. Change **EMAIL_STORENAME** value to `emailtable150.csv`. This is the name of the file in the **FILESTORE_dir** directory.

8. Save and close the file.

9. Go to the *<target_directory>*`/eaves-pipeline-pom-1.1-SNAPSHOT-binary/scripts` directory.

10. Ensure that your Java variables are set.

    a. Update your **JAVA_HOME** variable to use the Java that you installed for WebSphere Application Server. For example, enter the following command:
    `export JAVA_HOME=/opt/IBM/WebSphere/AppServer/java_1.7_64`

    b. Add the Java bin directory to your **PATH** environment variable. For example, enter the following command: `export PATH=/opt/IBM/WebSphere/AppServer/java_1.7_64/bin:$PATH`

11. Set the **UIMA_HOME** environment variable to point to the *<target_directory>*`/opt/apache-uima/bin` directory.

    For example, `export UIMA_HOME=/root/IBM_ADAMS/opt/apache-uima/bin`.

12. Enter the following command to load the data:

    `./run-finance-sample-email-etl.sh`

13. After the script has completed, you can verify that the data was loaded by using the IBM Surveillance Insight for Financial Services Application Management console.

    a. In a web browser, enter the following URL:

       `http://`*servername*`:`*port*`/ui-datamgt-birt`

       Where *servername* is that name of the server where you installed the Trade Surveillance component, and *port* is the port number that you are using for the WebSphere Application Server profile. The default port number is 9080.

    b. Click **All Batch Runs**.

    c. Click the batch name for the job that you ran. Each time that you run `./run-finance-sample-email-etl.sh`, a batch name is created based on the time stamp of when you ran the script.

> **Note:** The **Batch Name** value is used in the following step.

   d. Under **Actions**, click **details**.

   e. Click **View Data** to see what data was loaded.

14. Go to the *<target_directory>*/eaves-pipeline-pom-1.1-SNAPSHOT-binary/ resources/config/jar directory.

15. Open baseline_trade.properties in a text editor.

16. Change the ETL_SAMPLE_BATCHNAME_EMAIL value to be the same as the **Batch Name** value.

17. Save and close the file.

18. Go to the FinancialMkts_SurveillanceInsight_DataContent/EmailData directory, and decompress the emailtext-sample.tar.gz file. For example, in a terminal window, enter tar xvf emailtext-sample.tar.gz

    The file is decompressed to a directory that is named emaildata in the current location.

19. From the EmailData directory, copy the emailtext directory to the document root directory for your web server. For example, copy the emailtext directory to the /var/www/html directory.

20. Go to the *<target_directory>*/eaves-pipeline-pom-1.1-SNAPSHOT-binary/ scripts directory.

21. Enter the following command to combine the analysis of the structured data with the unstructured (email) data:

    This step can take some time to run. For example, on a computer with 32 GB of RAM, this step can take 30 - 60 minutes.

    ./run-finance-pipeline.sh

Task 9: Setting up the Workbench Content

The Workbench Content component provides the interface for IBM Surveillance Insight for Financial Services.

Procedure

1. Log onto the computer where you deployed the Workbench Content.

   This computer must have Apache web server installed. For more information, see "Installing Apache web server and PHP" on page 17.

2. Go to the IS_FinancialMkts_SurveillanceInsight_1.0.1/Workbench/ FinancialMkts_SurveillanceInsight_WorkbenchContent directory. By default, IS_FinancialMkts_SurveillanceInsight_1.0.1 is in /opt/IBM.

   If you did not automatically decompress the content files, decompress FinancialMkts_SurveillanceInsight_WorkbenchContent.zip in the IS_FinancialMkts_SurveillanceInsight_1.0/Workbench directory.

3. From the FinancialMkts_SurveillanceInsight_WorkbenchContent directory, copy the surveillance directory to the DocumentRoot directory for your web server. For example, copy the surveillance directory to the /var/www/html directory.

4. From the FinancialMkts_SurveillanceInsight_WorkbenchContent directory, copy the surveillance.conf file to the conf.d directory for your web server. For example, copy surveillance.conf to the /etc/httpd/conf.d directory.

5. Open the surveillance.conf file in a text editor.

6. Change the file paths and URL values so that they match your environment.

Note: If you are running the Surveillance workbench on a different computer from where you installed the Trade Surveillance component, you must change the URL in the following lines to point to the correct server and port:

```
ProxyPass /surveillance/reasoning/ http://localhost:9080/ui-v3/
ProxyPass /person/ ajp://localhost:9080/personemo/
```

7. Ensure that the port numbers that are used in the file match your environment.
8. Save and close the file.
9. Restart the web server. For example, in a terminal window, enter `apachectl restart`.

Accessing the IBM Surveillance Insight for Financial Services portal

After you install the Analytics Content, Workbench Content, and Steams Content, you can access the IBM Surveillance Insight for Financial Services portal.

Procedure

1. Open a web browser.
2. In the address bar, enter the following URL: `http://servername/surveillance`

Appendix. Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products.

For information about the commitment that IBM has to accessibility, see the IBM Accessibility Center (www.ibm.com/able).

HTML documentation has accessibility features. PDF documents are supplemental and, as such, include no added accessibility features.

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