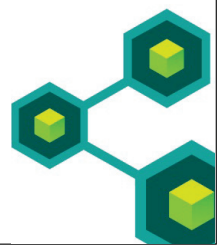
Perform Dye Tracing

IBM Cognos BI 10.2.2



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Objectives

- At the end of this module, you should be able to:
  - identify dye tracing requirements
  - perform dye tracing

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What is Dye Tracing?

- allows tracing of actions by a single user or a set of users
- implements special filter to be leveraged in IPF appenders
- enabled through JMX and IPF configuration
- enabled/disabled at run-time only

By dye tracing the actions of defined users, the actions of other users will be filtered out in the trace. This is useful to focus on specific users, as previously all actions of all users would be trapped in a dye trace, producing large quantities of data to review. Dye tracing is available to all IPF (Indication Processing Facility) based logging, and can filter all categories, and any type of indication. You could use this method, for example, if someone is having a login problem, as this could trace their efforts, and by defining the user, you can focus on the user(s) being traced.

Dye tracing is to be enabled or disabled at run-time only. JMX parts reset if IBM Cognos 10 is shut down or restarted, as there is no persistence in the JMX. The CAMIDs to dye trace will need to be re-entered, but the IPF files will have maintained their information and require no further modification.

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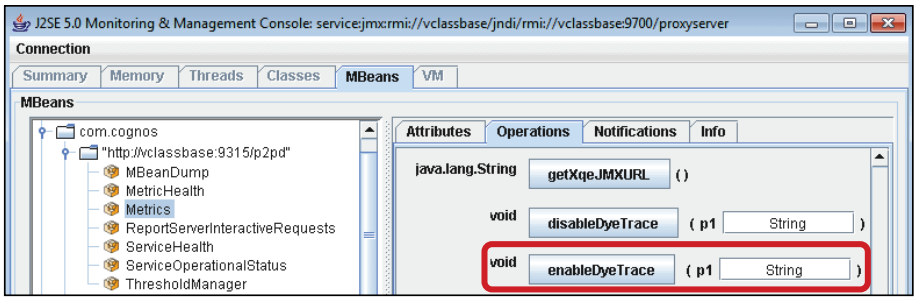
What are the Requirements of JMX Connectivity?

- dye tracing requires JMX port and credentials
- CAMID of a user must be added to a JMX dialog
- can use JConsole as tool to work with JMX properties



Dye tracing is enabled via Java Management Extensions (JMX). This requires the JMX connectivity to be enabled in IBM Cognos 10 and to have access to a JMX console to actually work with the JMX properties. To enable JMX connectivity for dye tracing, modify the external JMX port and JMX credential properties in IBM Cognos Configuration.

You can get the CAMID from a user's Properties page in IBM Cognos Connection, using the Search path property, to add to the JMX dialog box. You can add more than one CAMID; the CAMID(s) act as parameters to the IPF filter. CAMIDs are entered into the JMX property enableDyeTrace.

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Add an IPF Filter

- a filter can be added to any appender in IPF file

```
<appender name="ipfLocalFile" class="org.apache.log4j.RollingFileAppender">
  <param name="File" value="../logs/AAAclient.log"/>
  <param name="MaxBackupIndex" value="10"/>
  <param name="MaximumFileSize" value="10485760"/>
  <layout class="org.apache.log4j.PatternLayout">
    <param name="ConversionPattern" value="%m%n"/>
  </layout>
  <filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>
</appender>
```


Dye tracing is implemented such that a <filter> is available for reference in IPF based logging. This <filter> will exclude any IPF indication which does not originate from a dyed user so that the remaining output contains dyed indications only.

By adding a new filter to any appender in an IPF file, it will filter indications from user sessions that were not specified in the JMX dialog box. A <filter> element which is referenced within an <appender> is used to define where to write the indication stream. Any category making reference to that <appender> element will consequently provide a superset of indications which the <appender> element might or might not dump to the specified target, depending on the filter.

The filter in the slide example adds a dye tracing filter to the AAA trace (ipfaaaclientconfig.xml).

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Summary

- At the end of this module, you should be able to:
  - identify dye tracing requirements
  - perform dye tracing

Workshop 1: Perform Dye Tracing

Dye tracing allows for the filtering of any IPF based logging to a defined set of users. To achieve this, dye tracing leverages fields in the CAM cookie in IBM Cognos 10. Once dye tracing is enabled, a special log4j <filter> can be added to any given IPF <appender> to filter on only the dyed user's actions from the log stream. Any IPF based logging in IBM Cognos 10 can leverage the dye tracing functionality. log4j is a Java-based logging utility.

You will enable user specific logging for IPF (dye tracing). To do this you will:

- enable JMX connectivity:
  - IBM Cognos Configuration: External JMX port **9700**, and External JMX credentials admin/Education1
- use IBM Cognos Administration to find the CAMIDs for users to dye trace: Frank Bretton and Donald Chow
- activate dye tracing using JConsole (C:\Program Files (x86)\Java\jdk1.5.0_04\bin\jconsole.exe)
  - add the CAMIDs using the enableDyeTrace option
- gather the dyed log stream and write it to a log file:
  - change AAAclient.log to dyetrace_output.log
  - preceding the </appender> tag, add a filter:
    ```
    <filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>
    ```
  - change the <appender-ref> property as follows:
    ```
    <appender-ref ref="DyeTraceOutput"/>
    ```
- log on to IBM Cognos 10 as a dyed user, and then as a non-dyed user (Branka Hirsch, hirschb), repeating the same navigation tasks each time
- optionally, log on as another dyed user, chowd, repeating the same navigation tasks as the other users
- stop the IBM Cognos 10 Full: 9315 service, and investigate the results of the trace by reviewing the log output file
- start the IBM Cognos 10 Full: 9315 service, for the next module workshop

For more information about where to work and the workshop results, refer to the Tasks and Results section that follows.

Notes:

Dye tracing is enabled via Java Management Extensions (JMX). This requires the JMX connectivity to be enabled in IBM Cognos 10 and to have access to a JMX console to actually work with the JMXproperties. The Java Developer's Kit (JDK) contains a JMX console called JConsole. As IBM Cognos 10 comes bundled with a JRE only, to get JConsole a JDK has to be installed. This is only for the JConsole tool. If you have other JMX tools you may use those, however this workshop will use JConsole. JConsole can run on any computer and is not dependent on any IBM Cognos 10 components. In the classroom environment for this course, a JDK installed with Apache was used, jdk1.5.0_04.

Workshop 1: Tasks and Results

At the beginning of this workshop, all dispatchers are stopped.

Task 1. Enable JMX connectivity for IBM Cognos 10.

- Launch the **IBM Cognos 10 - 64 Full** instance of **IBM Cognos Configuration**, and ensure that the IBM Cognos Full service is stopped.
- In the **Explorer** pane, click **Environment**.

  You will configure the JMX properties for External JMX port and External JMX credential.

  If your environment is a distributed install, you will have to enable JMX connectivity on each instance of the application tier. This environment is a distributed install, however you will use only one instance in this workshop, so you only have to enable JMX connectivity on this active instance.
- In the **External JMX port** property, type the available port number **9700**, and then press **Enter**.
- In the **External JMX credential** property, click **Edit**, type the **admin**/**Education1** credentials, and then click **OK**.

- In **IBM Cognos Configuration**, on the toolbar click **Save configuration**, close the message box when the process has finished, and then on the toolbar, click **Start**.
- When all services have started, close the message, and then close **IBM Cognos Configuration**.

Task 2. Find the CAMIDs for the users that you want to dye trace.

Dye tracing can be enabled for a defined set of users. This set is defined by the search path for a user object in the Content Store in the form of a CAMID. As administrator, you will use IBM Cognos Administration to obtain the CAMID for the users that you want to trace.

- Launch **Internet Explorer**, go to **http://vclassbase:88/C10Full**, and then log on to the **LDAP_Dev** namespace with **admin**/**Education1** credentials.
- Launch **IBM Cognos Administration**, and then click the **Security** tab.

  The users you want to trace are in the LDAP namespace.
- Click **LDAP_Dev**, and then click **People**.
- Navigate through the list to find **Frank Bretton**.
- In the **Actions** column for the **Frank Bretton (brettonf)** entry, click **Set properties**, and then on the **General** tab, click **View the search path, ID and URL**.

  The CAMID information is displayed in the Search path box. The results appear similar to the following:

- Copy the **Search path** contents, launch **Notepad**, and then paste the contents into a text document.
- In **IBM Cognos Administration**, close the **View the search path, ID and URL** dialog box, close the **Set properties** page, and then repeat the steps for **Donald Chow**, to include him in your set of users to trace.
- In **IBM Cognos Administration**, close the **View the search path, ID and URL** dialog box, close the **Set properties** page, and then click **Log Off**.

  Leave the browser window and Notepad open.

Task 3. Activate dye tracing using JConsole.

- In **Windows Explorer**, navigate to **C:\Program Files (x86)\Java\jdk1.5.0_04\bin**, and then double-click **jconsole.exe** to launch **JConsole**.

  Close any messages that appears regarding the color scheme being changed to Windows 7 basic.

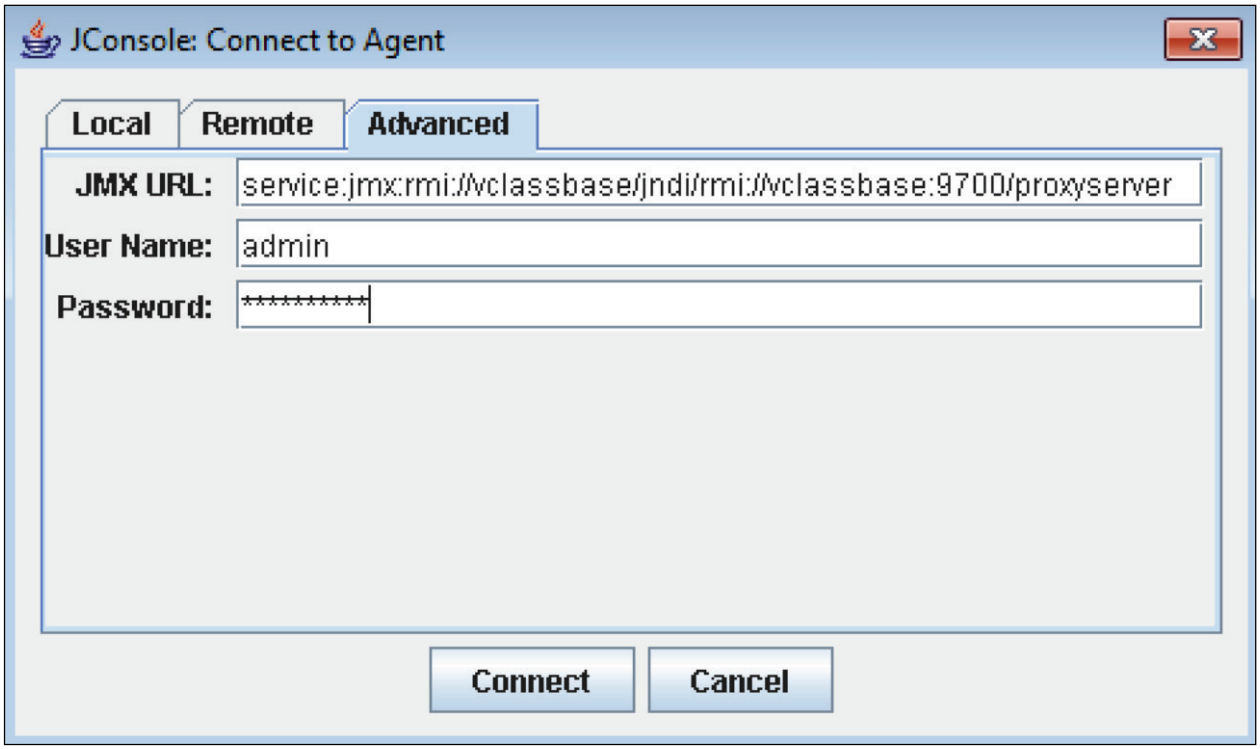
  If you stop the IBM Cognos 10 service, remember that JConsole is not persistent, and to activate the dye tracing again, you will have to invoke another JConsole session and re-enter the user(s) CAMID information for tracing.

- Click the **Advanced** tab.

  You will use a connection string in the JMX URL field in the following format: service:jmx:rmi://CM_Server/jndi/rmi://Monitoring_Server:<JMXport>/proxyserver

  CM_Server is the server name running Content Manager (vclassbase) and Monitoring_Server is the server name running a JMX-enabled Dispatcher, which in this environment is vclassbase.

- Populate the fields as follows:
  - JMX URL: **service:jmx:rmi://vclassbase/jndi/rmi://vclassbase:9700/proxyserver**
  - User Name: **admin**
  - Password: **Education1**



- Click **Connect**.

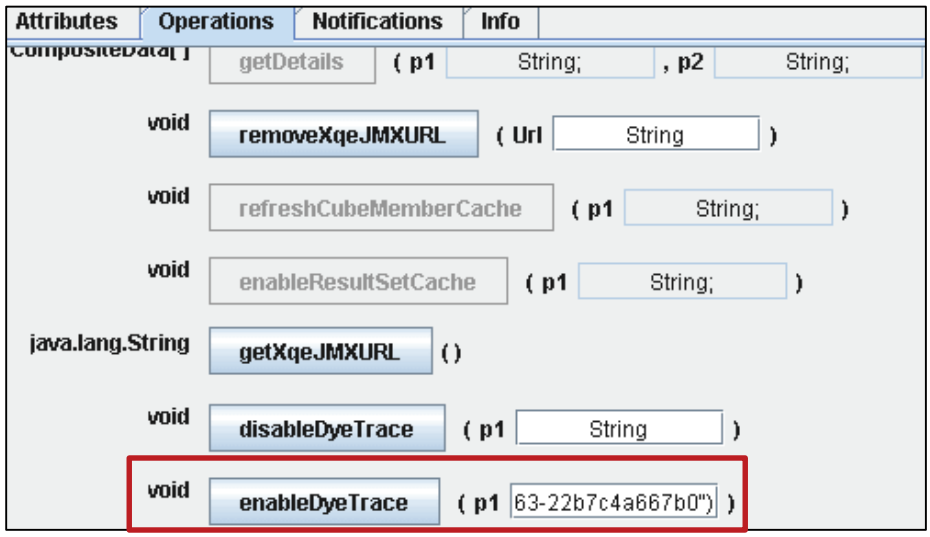
  It may take a few moments for the contents in the Tree pane to appear.

- In the **Tree** pane, navigate to **com.cognos\"http://vclassbase:9315/p2pd"\Metrics**, and then in the pane on the right, click the **Operations** tab.

  Several operations are displayed. You can add a single user to the set of dye traced users, remove a single user from this set, or reset the whole set which will disable dye tracing for all users.

- Copy the search path (CAMID) line for Frank Bretton that you pasted in **Notepad**, paste it into the **p1** text box for **enableDyeTrace**, replacing the current contents.

  Ensure that you remove all text from the p1 text box and replace it with the CAMID. The results appear similar to the following:



- Click **enableDyeTrace**.
- In the **Info** dialog box, click **OK** to close the message that the method was successfully invoked.
- Click the **Attributes** tab, click **Refresh**, and then review the **DyeTracedUsers** property to ensure that the CAMID information has been added.

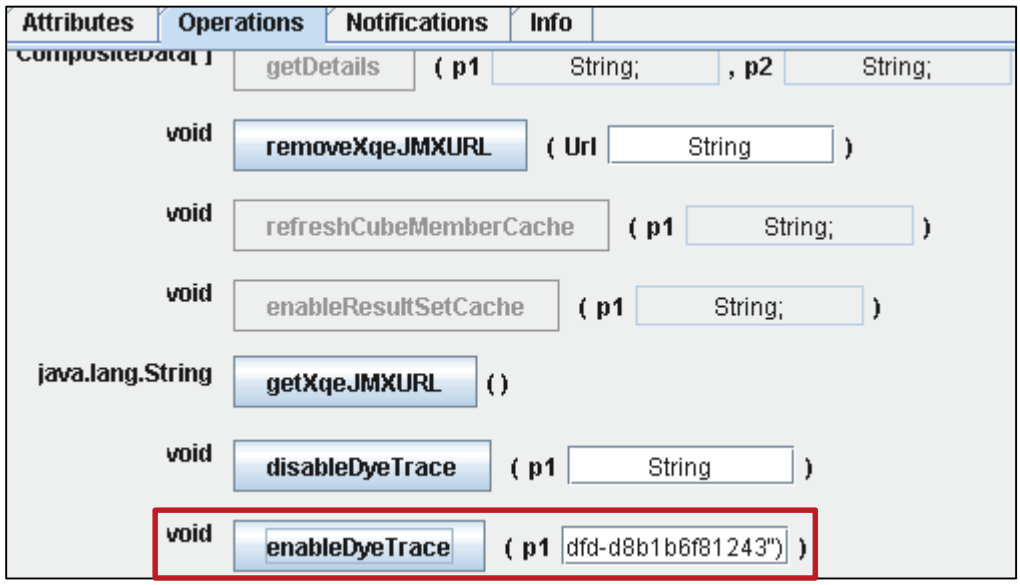
  The results appear similar to the following:

Attributes | Operations | Notifications | Info

Name	Value
AllRequestsLastUpdateTime	Wed Apr 08 00:36:18 GMT 2015
AnnotationServiceRequestCount	**0**
AverageTimeInQueue	**0**
AverageTimeInThreadQueue	**0**
CMRequestCount	**0**
CommittedHeapSize	**1073741824**
CommittedHeapSizeHighWatermark	**1073741824**
ConsolidatedLastResponseTime	**javax.management.openmbean.CompositeDataSupport**
Credentials	AAAAAAAAAAEEAAAAFAAAAKfzpCTVqbW6kG2aNwxD+U6X6H2Q
CubeState	**javax.management.openmbean.CompositeDataSupport**
CurrentHeapSize	**754085928**
CurrentHeapSizeHighWatermark	**754085928**
CurrentTime	Wed Apr 08 00:36:19 GMT 2015
DispatcherSearchPath	/configuration/dispatcher[@name='http://vclassbase:9315/p2pd']
DispatcherStatus	true
DispatcherURL	http://vclassbase:9315/p2pd/servlet/dispatch
DyeTracedUsers	**[CAMID("LDAP_Dev_ID:u:cdd5001a-1c66-4966-8263-22b7c4a667b0")]**
FailedExternalizedDocumentsPercent	**0.0**

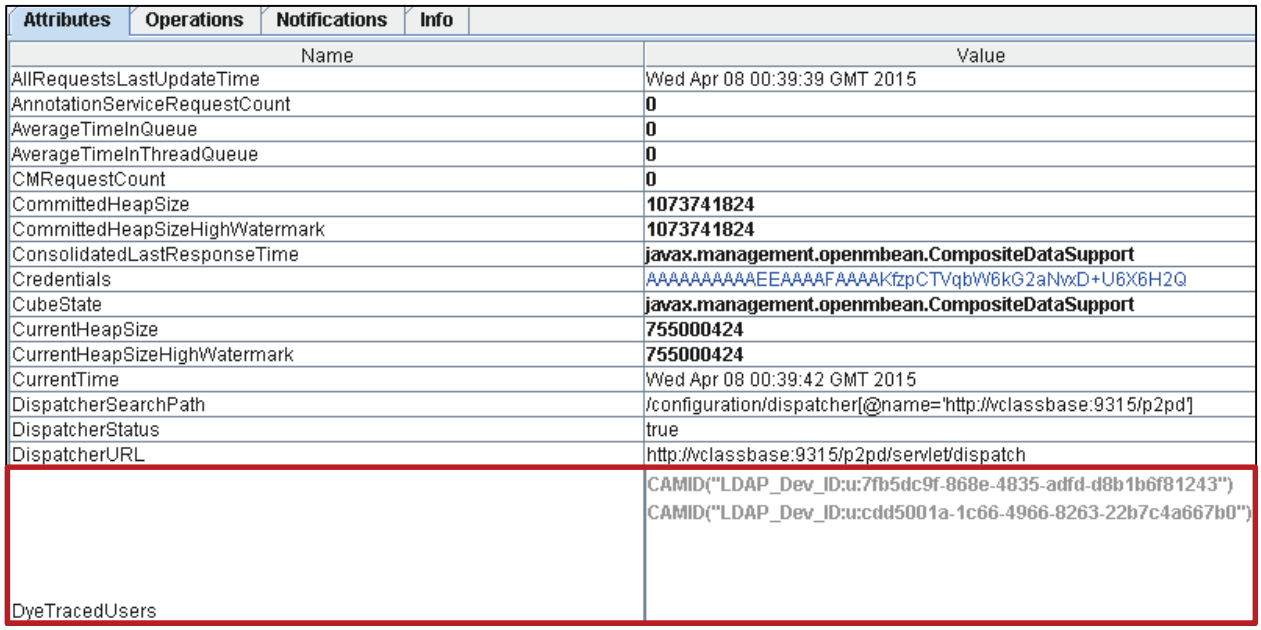
- Click the **Operations** tab, and then repeat the steps for the CAMID information for Donald Chow.

  The results appear similar to the following:



- On the **Attributes** tab, click **Refresh**, and then double-click the **DyeTracedUsers** property value to review the set of users to trace.

  The results appear similar to the following:



  You have defined the users that will be dye traced.

  Leave JConsole open.

Task 4. Gather the dyed log stream and write it to a log file.

An easy method of getting a dyed IPF based log file is to add the new <filter> to the<appender> used in the pre-created IPF configurations. For example, consider the ipfAAAclientconfig.xml.sample file which would be used to create an AAA trace to troubleshoot authentication and security issues. It contains an <appender> which is referenced by all the defined categories called "ipfLocalFile". This <appender> will write to a file named AAAclient.log.

To add dye tracing to that file, simply add the <filter> to that <appender> and save the file. This will create a dye tracing version of the AAA trace. The method you will use here is to activate your IPF based logging by renaming the component specific IPF trace, adding the <category> element, and adding dye tracing support by editing the ipfclientconfig.xml file to add a new appender.

- In **Windows Explorer**, navigate to **C:\Program Files\IBM\cognos\c10_64full\configuration**, make a copy of **ipfaaaclientconfig.xml.sample**, paste it in the same location, and then rename this new file as **ipfclientconfig.xml**.
- From the **Taskbar**, launch **Eclipse**. If the Workspace Launcher dialog box appears, select the **Use this as the default and do not ask again** check box and then click **OK**. If the Usage Data Upload dialog box appears, select the **Turn UDC feature off** button and then click **Finish**. When Eclipse opens, close the **Welcome** tab (if it is open).
- From the **File** menu, click **Open File**, navigate to **C:\Program Files\IBM\cognos\c10_64full\configuration**, and then open **ipfclientconfig.xml**.
- Maximize the **Eclipse** window, and then maximize the **ipfclientconfig.xml** tab.

- At the bottom of the pane click the **Source** tab, and then from the **Edit** menu, do a **Find/Replace** for **<appender name="ipfLocalFile"**.

  The section appears similar to the following:

```
<appender name="ipfLocalFile"
class="org.apache.log4j.RollingFileAppender">
    <param name="File" value="../logs/AAAclient.log"/>
    <param name="MaxBackupIndex" value="10"/>
    <param name="MaximumFileSize" value="10485760"/>
    <layout class="org.apache.log4j.PatternLayout">
         <param name="ConversionPattern" value="%m%n"/>
    </layout>
</appender>
```

- Change **AAAclient.log** to **dyetrace_output.log**.
- Preceding the </appender> tag, add the following code:
  <filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>

  A section of the result appears as follows:

```
    </layout>
<filter class="com.cognos.indications.LogIPFDyeTraceFilter"/>
</appender>
```

- Do a **Find** for **Audit.RTUsage.CAM.AAA** and locate the following section:

```
<category name="Audit.RTUsage.CAM.AAA"
class="com.cognos.indications.LogTypedLogger" additivity="true">
    <!-- Configurable levels: debug, error, off -->
    <level value="debug"/>
    <appender-ref ref="ipfLocalFile"/>
</category>
```

- Change the <appender-ref> property as follows:

  <appender-ref ref="DyeTraceOutput"/>

  Using this method allows you to specifically enable dye tracing for selected categories only, and distribute the output to one or more appenders.

  The results appear as follows:

```
<category name="Audit.RTUsage.CAM.AAA" class="com.cognos.indications.LogTypedLogger" additivity="true">
    <!-- Configurable levels: debug, error, off -->
    <level value="debug"/>
    <appender-ref ref="DyeTraceOutput"/>
</category>
```

- Save the file, and then close **Eclipse**. If necessary, select the **Always exit without prompt** check box and then click **OK**.

  Dyed output will go to the file specified for the new DyeTraceOutput <appender>.

Task 5. Log on as a non-dyed user, and then as a dyed user.

- From the **Taskbar**, launch **Services**, and stop the **IBM Cognos 10 Full:9315** service, when the service has fully stopped, in **Windows Explorer**, delete the files from the root of the **C:\Program Files\IBM\cognos\c10_64full\logs** directory, and then take note of the time.

  Do not delete the XQE directory or its contents.

- Start the **IBM Cognos 10 Full:9315** service.

  If using the Services dialog to start IBM Cognos Full:9315 service, and a message appears stating that it could not be started in a timely fashion, click OK, and then click the Refresh button in 2 minute intervals until you can see that the service has started successfully.

- When the service has fully started, in **Internet Explorer**, go to **http://vclassbase:88/C10Full**, and then log on to the **LDAP_Dev** namespace with **brettonf\Education1** credentials.

  Frank Bretton is a dyed user.

- Launch **IBM Cognos Connection**, and then navigate to **Public Folders\Samples_DQ\Models\GO Sales (query)**.

- On the toolbar, click **My Area Options**, click **My Preferences**  , click **OK**, and then log off **Frank Bretton**.

- Make note the time, and wait for 2 minutes to pass.

- Repeat the steps, logging on as a non-dyed user (**hirschb/Education1**).

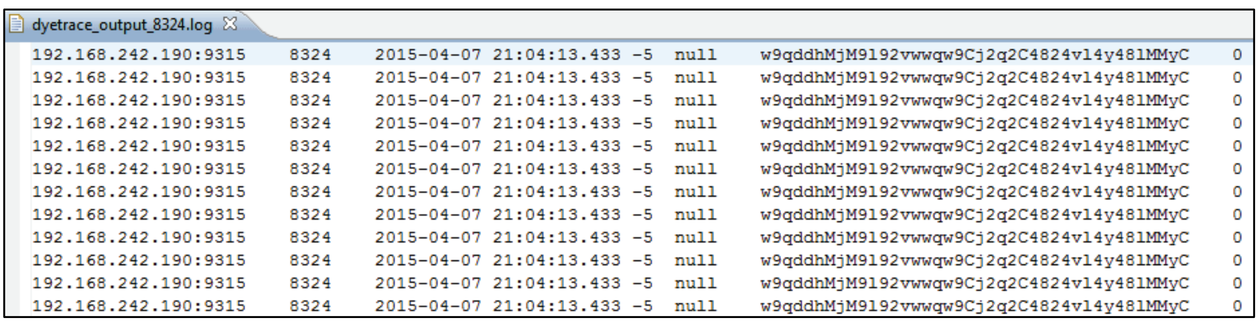
  Optionally, you can repeat the steps by logging on as another dyed user: **chowd/Education1**.

Task 6. Investigate the results of the trace.

- In **Windows Explorer**, disable the dye tracing by deleting the **C:\Program Files\IBM\cognos\c10_64full\configuration\ipfclientconfig.xml** file.
- In the **Services** window, stop the **IBM Cognos 10 Full:9315** service.

  Wait for the service to stop, before proceeding to the next step.
- Open **Eclipse** and close the **ipfclientconfig.xml** tab (if necessary).
- In **Eclipse**, open the most recent **C:\Program Files\IBM\cognos\c10_64full\logs\dyetrace_output_xxxx.log** file that was created during the trace (the other dyetrace_output_xxxx.log files will be empty).

  The results appear similar to the following:



```
dyetrace_output_8324.log
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
192.168.242.190:9315    8324    2015-04-07 21:04:13.433 -5  null    w9qddhMjM9192vwwqw9Cj2q2C4824vl4y48lMMyC    0
```

  You could also open this file in another tool, such as Microsoft Excel.

  Question: What entries do you see for each user? What entries are missing for the non-dyed user? (Hint: Use the times you recorded to look in the log files.)

  Answer: Only dye traced users are getting filtered.

  Consider a large company with users logging in or out at all times; this could generate large log files to review. Dye tracing is a great way to filter the results. What you trace depends on the problem(s) they are having.
- Close the **dyetrace_output_xxxx.log** tab, and then close **Eclipse**.
- Close the **Jconsole: Connect to Agent** dialog box, and then close the **J2SE 5.0 Monitoring & Management Console** window.
- In the **Services** window, start the **IBM Cognos 10 Full:9315** service for the next module, and then close all open windows without saving.