

Java CAPS 5.1.3 Notes

Logging

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JCD-based Programmatic Log Manipulation

Introduction

In Java CAPS 5.1 the Sun SeeBeyond Integration Server is a modified version of the Sun Application Server 8.0 Platform Edition. As such a number of things that can be done with that application server can be done with the Sun SeeBeyond Integration Server. Most notably, the Sun SeeBeyond Integration Server uses the `java.util.logging` API for logging. Integration Server logging can be manipulated from the command line, using the `isadmin` tool, from a Web-based GUI and, also, programmatically.

This note discusses how IS logging can be manipulated programmatically using Java Collaboration Definitions. This note applies to the Sun SeeBeyond Integration Server included in Java CAPS 5.1.

List Logging categories

What `log4j` calls logging categories, which I also call logging categories by habit, is called logger hierarchy in JCD 1.4 Logging API. The notion is that a series of logging hierarchies exist and logging levels can be manipulated for these hierarchies individually, by complete hierarchy name, or collectively, by a non-leaf point in a hierarchy. Let's look at an example:

```
com +- stc +- bpms +- bpelConnector +- ConnectionFactoryImpl
    |      |      |      |      |      +- ConnectionImpl
    |      |      |      |      |      +- ManagedConnectionImpl
    |      |      |      |      |      +- impl +- ExecutorImpl
    |      |      |      |      |      +- EndPointFactoryRegistryInfoImpl
    |      |      |      |      |      +- AbstractWSProvider
    |      |      |      |      |      +- BPELResourceAdapterImpl
    |      |      |      |      |      +- WorkListenerImpl
    |      |      |      +- bpelImpl ...
    |      +- codegen ...
    |      +- ...
+- stc ...
+- ...
```

To enable FINE level of logging for the entire hierarchy starting with `com.stc.bpms` one would enable FINE level logging for the non-leaf category of `com.stc.bpms`. This would enable FINE

level logging both for com.stc.bpms and for com.stc.bpms.bpelConnectore and its children as well as com.stc.bpbs.bpelImpl and its children.

To override the logging level for a logging category further down in the hierarchy one would explicitly set the logging level for that category, for example com.stc.bpms.bpelConnector.ConnectionImpl.

This topic is discussed in a number of posts and publications so it will not be discussed further.

In order to determine what can be logged one needs to know what logging categories are defined and enabled in the Integration Server domain. domain.xml of the domain defines logging categories and logging levels both at the high level, for hierarchies such as admin, classloader, saaj and others, and specific such as STC.eWay.batch and others. Not knowing what subcategories are defined under these categories makes logging a hit and miss affair or results in way too much logging if higher levels of logging are enabled at too high levels in the hierarchy.

A Java Collaboration Definition containing Java code shown below will obtain a listing of all logging categories that the Integration Server knows about and will dumped it into the server.log for inspection. To allow this collaboration to operate in a Java CAPS domain the server.policy file for the domain must be modified to grant control permission to java.util.logging.LoggingPermission.

```
java.util.Vector vctLoggers = new java.util.Vector();
java.util.logging.Logger lgr = null;
;
/*
   this requires server.policy change:
   java.util.logging.LoggingPermission control;
*/
java.util.logging.LogManager lgmgr
    = java.util.logging.LogManager.getLogManager();
lgmgr.checkAccess();
;
java.util.Enumeration lgNames = lgmgr.getLoggerNames();
while (lgNames.hasMoreElements()) {
    String sLoggerName = (String) lgNames.nextElement();
    lgr = java.util.logging.Logger.getLogger( sLoggerName );
    vctLoggers.add( sLoggerName + "=" + lgr.getLevel() );
}
;
String sLoggers = "";
java.util.Collections.sort( vctLoggers );
for (int i = 0; i < vctLoggers.size(); i++) {
    sLoggers += "\n" + vctLoggers.get( i );
}
logger.warn( "\nLoggers currently registered, "
            + "with configured logging levels:\n"
            + sLoggers + "\n" );
```

Executing a collaboration containing this code in a domain with no eInsight business processes will produce a list of logging categories similar to this:

Loggers currently registered, with configured logging levels:

=INFO

ListLogCategories.cmListLogCategories_jcdListLogCategories1.jcdListLogCategories_Runtime_H
andler=INFO
STC.JMS.com.stc.jms.client.ConnectionImpl=INFO
STC.JMS.com.stc.jms.client.ObjectFactory=INFO
STC.JMS.com.stc.jms.client.QueueObjectFactory=INFO
STC.JMS.com.stc.jms.client.STCConnection=INFO
STC.JMS.com.stc.jms.client.STCConnectionFactory=INFO
STC.JMS.com.stc.jms.client.STCDestination=INFO
STC.JMS.com.stc.jms.client.STCMessageConsumer=INFO
STC.JMS.com.stc.jms.client.STCMessageProducer=INFO
STC.JMS.com.stc.jms.client.STCQueue=INFO
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STC.JMS.com.stc.jms.client.STCQueueReceiver=INFO
STC.JMS.com.stc.jms.client.STCQueueSession=INFO
STC.JMS.com.stc.jms.client.STCSession=INFO
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STC.JMS.com.stc.jms.client.STCTopicPublisher=INFO
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STC.JMS.com.stc.jms.client.TxMgtXA=INFO
STC.JMS.com.stc.jms.client.XAQueueObjectFactory=INFO
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STC.JMS.com.stc.jms.sockets.AsyncWireDedicatedThread=INFO
STC.JMS.com.stc.jms.sockets.AsyncWireFactory=INFO
STC.JMS.com.stc.jms.sockets.CommitIMessage=INFO
STC.JMS.com.stc.jms.sockets.ProxyStcms=INFO
STC.JMS.com.stc.jms.sockets.Wire=INFO
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STC.JMS.com.stc.jms.util.XAssert=INFO
STC.JMS=INFO
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STC.Utility.logging.com.stc.connector.loggingadapter.SunLoggingResourceAdapterImpl=INFO
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ListLogCategories.jcdListLogCategories=INFO
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gingUtilsSendToqSetLogCategory.jcdFile2JMSQueue=INFO
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gCategory=INFO
STC.eGate.CMap.Collabs.WriteFromqSetLogCategoryResult.cmWriteFromqSetLogCategoryResult_jcd
JMSQu2001887966.LoggingUtilsCommon.jcdJMSQueueToFile=INFO
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com.stc.jmsmx.stcms.StcmsAdminMBean=INFO
com.sun.enterprise.admin.jmx.remote.finer.logger=INFO
com.sun.sbyn=WARNING
com.sun.xml.wss=FINE
console=INFO
edu.yale.its.tp.cas.client.filter.CASFilter=INFO
global=INFO
java.lang.Class=INFO
javax.enterprise.resource.corba.SLAS-ORB.naming.lifecycle=INFO
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javax.enterprise.resource.corba.SLAS-ORB.oa.lifecycle=INFO
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javax.enterprise.resource.corba.SLAS-ORB.orb.resolver=INFO
javax.enterprise.resource.corba.SLAS-ORB.rpc.encoding=INFO
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javax.enterprise.resource.corba.SLAS-ORB.rpc.transport=INFO
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javax.enterprise.resource.corba._DEFAULT_.orb.resolver=INFO
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javax.enterprise.resource.jdo.persistencemanager=INFO
javax.enterprise.resource.jdo.sqlstore=INFO
javax.enterprise.resource.jms=INFO
javax.enterprise.resource.jta=INFO
javax.enterprise.resource.resourceadapter=INFO
javax.enterprise.system.container.ejb.entity.internal=INFO
javax.enterprise.system.container.ejb.mdb=INFO
javax.enterprise.system.container.ejb=INFO
javax.enterprise.system.container.web=INFO
javax.enterprise.system.core.classloading=INFO
javax.enterprise.system.core.naming=INFO
javax.enterprise.system.core.security=INFO
javax.enterprise.system.core.transaction=INFO
javax.enterprise.system.core=INFO
javax.enterprise.system.stream.err=INFO
javax.enterprise.system.stream.out=INFO
javax.enterprise.system.tools.admin=INFO
javax.enterprise.system.tools.deployment.audit=INFO
javax.enterprise.system.tools.deployment=INFO
javax.enterprise.system.tools.verifier=INFO
javax.enterprise.system.util=INFO
javax.enterprise=INFO
javax.management.mbeanserver=INFO
javax.management.misc=INFO

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javax.management.remote.misc=INFO
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org.apache.commons.modeler.util.DomUtil=INFO
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org.apache.jasper.runtime.JspFactoryImpl=INFO
org.apache.jasper.security.SecurityClassLoad=INFO
org.apache.jasper.servlet.JspServlet=INFO
org.apache.struts.action.ActionServlet=INFO
org.apache.struts.action.RequestProcessor=INFO
org.apache.struts.config.ModuleConfigFactory=INFO
org.apache.struts.tiles.ComponentDefinition=INFO
org.apache.struts.tiles.DefinitionsUtil=INFO
org.apache.struts.tiles.TilesPlugin=INFO

```
org.apache.struts.tiles.TilesRequestProcessor=INFO
org.apache.struts.tiles.TilesUtil=INFO
org.apache.struts.tiles.xmlDefinition.I18nFactorySet=INFO
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org.apache.struts.util.MessageResources=INFO
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org.apache.struts.util.PropertyMessageResources=INFO
org.apache.struts.util.RequestUtils=INFO
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org.apache.tomcat.util.compat.JdkCompat=INFO
org.apache.tomcat.util.http.mapper.Mapper=INFO
org.apache.tomcat.util.net.PoolTcpEndpoint=INFO
org.apache.tomcat.util.net.SSLImplementation=INFO
org.apache.tomcat.util.net.jsse.JSSEImplementation=INFO
org.apache.tomcat.util.threads.ThreadPool=INFO
sun.rmi.client.call=INFO
sun.rmi.client.ref=INFO
sun.rmi.dgc=INFO
sun.rmi.loader=INFO
sun.rmi.server.call=INFO
sun.rmi.server.ref=INFO
sun.rmi.transport.misc=INFO
sun.rmi.transport.tcp.proxy=INFO
sun.rmi.transport.tcp=INFO
tomcat.server./SeeBeyondISDeployer.Context=INFO
tomcat.server./asadmin.Context=INFO
tomcat.server./com_sun_web_ui.Context=INFO
tomcat.server./configagent.Context=INFO
tomcat.server./diagtool.Context=INFO
tomcat.server./jmx-console.Context=INFO
tomcat.server./jndiTree.Context=INFO
tomcat.server./profiler.Context=INFO
tomcat.server./rtsutil-console.Context=INFO
tomcat.server./web1.Context=INFO
tomcat.server./webapps-simple.Context=INFO
tomcat.server.ROOT.Context=INF
```

Deploying an eInisght business process to the same domain will add the following logging categories:

```
com.stc.bpms.bpelConnector.ConnectionFactoryImpl=INFO
com.stc.bpms.bpelConnector.ConnectionImpl=INFO
com.stc.bpms.bpelConnector.ManagedConnectionImpl=INFO
com.stc.bpms.bpelConnector.impl.AbstractWSPProvider=INFO
com.stc.bpms.bpelConnector.impl.BPELResourceAdapterImpl=INFO
com.stc.bpms.bpelConnector.impl.EndPointFactoryRegistryInfoImpl=INFO
com.stc.bpms.bpelConnector.impl.ExecutorImpl=INFO
com.stc.bpms.bpelConnector.impl.WorkListenerImpl=INFO
com.stc.bpms.bpelImpl.model.BPELAlertterImpl=INFO
com.stc.bpms.bpelImpl.runtime.AbstractEventHandler=INFO
com.stc.bpms.bpelImpl.runtime.BPELInterpreter=INFO
com.stc.bpms.bpelImpl.runtime.BPWSBytesToString=INFO
com.stc.bpms.bpelImpl.runtime.BPWSConcatSequence=INFO
com.stc.bpms.bpelImpl.runtime.BPWSConverter=INFO
com.stc.bpms.bpelImpl.runtime.BPWSDateFormatOperation=INFO
com.stc.bpms.bpelImpl.runtime.BPWSDateTimeOperation=INFO
com.stc.bpms.bpelImpl.runtime.BPWSDecrementDatetime=INFO
com.stc.bpms.bpelImpl.runtime.BPWSIncrementDatetime=INFO
com.stc.bpms.bpelImpl.runtime.BPWSMarshalToBytes=INFO
com.stc.bpms.bpelImpl.runtime.BPWSNumericOperation=INFO
com.stc.bpms.bpelImpl.runtime.BPWSStringToBytes=INFO
```



```
com.stc.bpms.bpelImpl.runtime.BPWSUnMarshal=INFO
com.stc.bpms.bpelImpl.runtime.CallFrame=INFO
com.stc.bpms.bpelImpl.runtime.ExtendedAssignerImpl=INFO
com.stc.bpms.bpelImpl.runtime.Interpreter=INFO
com.stc.bpms.bpelImpl.runtime.ProcessInstance=INFO
com.stc.bpms.bpelImpl.runtime.ProcessType=INFO
com.stc.bpms.bpelImpl.util.BPELHelper=INFO
com.stc.bpms.mbean.BPEngineMBean=INFO
com.stc.codegen.eInsightImpl.mbeans.EInsightCollabMBeanConfig=INFO
com.stc.codegen.eInsightImpl.mbeans.EInsightCollabMBeanLoader=INFO
com.stc.codegen.eInsightImpl.mbeans.EInsightMonitorMBean=INFO
com.stc.codegen.eInsightImpl.runtime.ejb.BPELService=INFO
com.stc.codegen.eInsightImpl.runtime.ejb.MDBMessageFactoryMgr=INFO
com.stc.codegen.eInsightImpl.runtime.ejb.MDBWSPProvider=INFO
```

Note

Of the dozens of categories listed above most pertain to the Integration Server itself and its various subsystems. Very few are specifically identifiable as relating to the particular Java CAPS project developed by the Java CAPS developer. This is the reason why it is impossible to create a logging environment that logs just the messages pertaining to a specific project and to no other project deployed to the domain. It is also impossible to isolate non-project-specific logging messages that are logged by these components of the environment that are executed directly or indirectly when the specific project is executed. This is something that people who came from the 4.5 environment find hard to understand and accept.

To be more specific, the collaboration that gets and dumps logging categories belongs to a project ListLogCategories. One can see logging categories starting with STC.eGate.CMap.Collabs.ListLogCategories and ListLogCategories. These are the only categories that are specifically identifiable with that user-developed project. When the solution containing this collaboration is executed the JMS subsystem is executed because the collaboration is triggered by arrival of a JMS message and it writes a JMS Message to a queue. The collaboration is run inside the Integration Server and a number of its subsystems are executed before, during and after execution of the collaboration. None of the messages produced as a consequence are identifiable as relating to the collaboration execution.

Note

Deploying an elnsight business process adds generic elnsight logging categories. There are no categories that are in any way identifiable with the project containing the elnsight business process itself.

Setting Logging Categories

Java CAPS 5.1 Blog entry at http://blogs.sun.com/javacapsfieldtech/entry/java_caps_5_1_310 discusses the use of the `isadmin` command line tool to get and set log levels for logging categories. This section discusses how the same can be achieved programmatically through Java code embedded in a Java Collaboration Definitions.

Note

I have no idea why one would wish to do this using a Java Collaboration since there are easier means of setting logging categories, most notably using the `isadmin` command line tool and the Integration Server Administrator console UI, but it can be done and this code shows how it can be done.

This code expects the `input.getTextMessage()` method, which happens to be a method of a JMS OTD, to return a string of the form “`logging.category.name=LEVEL`”, for example “`STC.eWay=FINE`”. The collaboration does not need to be triggered by a JMS Message, though it is in this case, as long as the input message is of the required format or as long as different way of setting the logging category, `sNameToChange`, and the logging level, `sLevel`, is implemented.

To allow this collaboration to operate in a Java CAPS domain the `server.policy` file for the domain must be modified to grant `control` permission to `java.util.logging.LoggingPermission`.

```
String sMsg = input.getTextMessage();
String sNameToChange = sMsg.substring( 0, sMsg.indexOf( "=" ) );
String sLevel = sMsg.substring( sMsg.indexOf( "=" ) + 1 );
;
;
java.util.logging.Logger lgr = null;
java.util.logging.LogManager lgmgr =
java.util.logging.LogManager.getLogManager();
lgmgr.checkAccess();
;
java.util.logging.Level lvlToChange = null;
java.util.logging.Level lvlOriginal = null;
;
lvlToChange = java.util.logging.Level.parse( sLevel );
;
// add loger if it does not exist
lgr = java.util.logging.Logger.getLogger( sNameToChange );
lgmgr.addLogger( lgr );
;
;
// log level changes made here do not survive server restart
java.util.Enumeration lgNames = lgmgr.getLoggerNames();
while (lgNames.hasMoreElements()) {
    String sLoggerName = (String) lgNames.nextElement();
    lgr = java.util.logging.Logger.getLogger( sLoggerName );
    ;
    if (sLoggerName.equals( sNameToChange )) {
        lvlOriginal = lgr.getLevel();
        lgr.setLevel( lvlToChange );
        if (logger.isDebugEnabled()) {
            logger.debug
            ( "\n--->>> Changed log level for "
            + sLoggerName
            + " from "
            + lvlOriginal
            + " to "
            + lgr.getLevel() );
        }
    }
    } else if (sLoggerName.startsWith( sNameToChange + "." )) {
        lvlOriginal = lgr.getLevel();
        lgr.setLevel( lvlToChange );
        if (logger.isDebugEnabled()) {
```

```

        logger.debug
            ( "\n--->>> Changed sub log level for "
            + sLoggerName
            + " from "
            + lvlOriginal
            + " to "
            + lgr.getLevel() );
    }
}
;
}

```

Note

The code not merely set the logging level for the specified category but also iterates over all its children and sets the logging level accordingly.

Executing this collaboration with input of `com.stc.bpms.bpelImpl.runtime=INFO` produces log entries in `server.log` similar to these shown below but only if logging level for collaborations, `STC.eGate.CMap.Collabs`, is set to `FINE` or greater and if the original logging level was set to `FINER`.

```

[ # | 2007-12-
29T16:36:27.078+1100 | FINE | IS5.1.3 | STC.eGate.CMap.Collabs.SetLogCategory.
cmSetLogCategory_jcdSetLogCategory1.Logging.jcdSetLogCategory | _ThreadID=
23; ThreadName=JMS Async S28;
Context=dpSetLogCateLoggingSetLo240905692/qSetLogCategory_cmSetLogCatego
ry_jcdSetL_u002D_989602643_ejb; |
--->>> Changed sub log level for
com.stc.bpms.bpelImpl.runtime.ExtendedAssignerImpl from FINER to INFO | # ]

[ # | 2007-12-
29T16:36:27.078+1100 | FINE | IS5.1.3 | STC.eGate.CMap.Collabs.SetLogCategory.
cmSetLogCategory_jcdSetLogCategory1.Logging.jcdSetLogCategory | _ThreadID=
23; ThreadName=JMS Async S28;
Context=dpSetLogCateLoggingSetLo240905692/qSetLogCategory_cmSetLogCatego
ry_jcdSetL_u002D_989602643_ejb; |
--->>> Changed sub log level for
com.stc.bpms.bpelImpl.runtime.BPELInterpreter from FINER to INFO | # ]

[ # | 2007-12-
29T16:36:27.078+1100 | FINE | IS5.1.3 | STC.eGate.CMap.Collabs.SetLogCategory.
cmSetLogCategory_jcdSetLogCategory1.Logging.jcdSetLogCategory | _ThreadID=
23; ThreadName=JMS Async S28;
Context=dpSetLogCateLoggingSetLo240905692/qSetLogCategory_cmSetLogCatego
ry_jcdSetL_u002D_989602643_ejb; |
--->>> Changed sub log level for
com.stc.bpms.bpelImpl.runtime.AbstractEventHandler from FINER to INFO | # ]

[ # | 2007-12-
29T16:36:27.078+1100 | FINE | IS5.1.3 | STC.eGate.CMap.Collabs.SetLogCategory.
cmSetLogCategory_jcdSetLogCategory1.Logging.jcdSetLogCategory | _ThreadID=
23; ThreadName=JMS Async S28;
Context=dpSetLogCateLoggingSetLo240905692/qSetLogCategory_cmSetLogCatego
ry_jcdSetL_u002D_989602643_ejb; |
--->>> Changed log level for com.stc.bpms.bpelImpl.runtime from FINER to
INFO | # ]

```

```
[#|2007-12-29T16:36:27.078+1100|FINE|IS5.1.3|STC.eGate.CMap.Collabs.SetLogCategory.cmSetLogCategory_jcdSetLogCategory1.Logging.jcdSetLogCategory|_ThreadID=23; ThreadName=JMS Async S28; Context=dpSetLogCateLoggingSetLo240905692/qSetLogCategory_cmSetLogCategory_jcdSetL_u002D_989602643_ejb;|--->>> Changed sub log level for com.stc.bpms.bpelImpl.runtime.Interpreter from FINER to INFO|#]
```

```
[#|2007-12-29T16:36:27.078+1100|FINE|IS5.1.3|STC.eGate.CMap.Collabs.SetLogCategory.cmSetLogCategory_jcdSetLogCategory1.Logging.jcdSetLogCategory|_ThreadID=23; ThreadName=JMS Async S28; Context=dpSetLogCateLoggingSetLo240905692/qSetLogCategory_cmSetLogCategory_jcdSetL_u002D_989602643_ejb;|--->>> Changed sub log level for com.stc.bpms.bpelImpl.runtime.ProcessType from FINER to INFO|#]
```

Note

Unlike when set through the isadmin command line tool, once the Integration Server is restarted the logging levels changed by execution of this collaboration will revert to these in the domain.xml.

Project Exports

Java CAPS 5.1.3 project export for the projects developed in support of this note are contained in Logging_Project_Export_20071229.zip. Sample data and command files used to trigger these projects are contained in logging_data_files_20071229.zip.