

Enduro/X - Feature #76

Feature # 357 (Closed): Enduro/X 7.0 master task

Java bindings using JNI

11/04/2016 02:02 PM - Madars

Status: Closed	Start date: 04/23/2018
Priority: Normal (Code 4)	Due date:
Assignee:	% Done: 100%
Category:	Estimated time: 0.00 hour
Target version:	
Description	
Subtasks:	
Feature # 307: error codes in string format - needed for JAVA exception building	Closed
Feature # 409: tmsrv optimizations	Closed

History

#1 - 11/04/2016 02:02 PM - Madars

- Subject changed from Java bindings to Java bindings using JNI

#2 - 11/04/2016 02:09 PM - Madars

Some infos: <https://www3.ntu.edu.sg/home/ehchua/programming/java/JavaNativeInterface.html>

#3 - 11/07/2016 09:58 AM - Madars

<http://stackoverflow.com/questions/6152747/jni-not-support-types-as-void-unsigned-int-what-to-do>

#4 - 11/07/2016 01:59 PM - Madars

<http://stackoverflow.com/questions/11803927/accessing-a-java-object-in-a-java-object-in-c-using-jni>

#5 - 11/07/2016 02:31 PM - Madars

Cmake samples for JNI: <https://github.com/bureau14/qdb-api-jni/blob/master/CMakeLists.txt>

#6 - 01/22/2017 07:14 PM - Madars

JATMI:

- <http://sqltech.cl/doc/oas11qR1/apirefs.1111/e13941/weblogic/wtc/jatmi/package-summary.html>

- http://docs.oracle.com/cd/E79994_01/tuxedo/docs1222/javadoc/javasev/com/oracle/tuxedo/tjatmi/TuxAppContext.html

#7 - 02/07/2017 12:39 PM - Madars

XA java transactions: https://docs.oracle.com/cd/B10501_01/java.920/a96654/xadistra.htm

#8 - 02/08/2017 01:21 PM - Madars

<http://www.tricoder.net/blog/?p=197>

#9 - 03/15/2017 02:36 PM - Madars

Technology sample: <http://java-gnome.sourceforge.net/HACKING.html>

```
$ git clone git://github.com/afcowie/java-gnome.git java-gnome
```

#10 - 05/26/2017 09:36 AM - Madars

<https://github.com/remram44/java-cpp-example>

#11 - 07/04/2017 09:12 PM - Madars

About views: https://docs.oracle.com/cd/E13203_01/tuxedo/tux71/html/dvlibra5.htm

#12 - 11/12/2017 01:39 PM - Madars

<https://john.nachtimwald.com/2017/06/17/calling-java-from-c/>

#13 - 11/13/2017 02:29 PM - Madars

<https://www.nag.co.uk/IndustryArticles/CallingCLibraryRoutinesfromJava.pdf>

#14 - 11/13/2017 02:35 PM - Madars

- File *CallingCLibraryRoutinesfromJava.pdf* added

#15 - 11/13/2017 05:05 PM - Madars

<https://github.com/mkowsiak/jnicookbook/tree/master/recipeNo035>

#16 - 11/29/2017 12:42 PM - Madars

<https://cmake.org/cmake/help/v3.7/module/UseJava.html>

#17 - 01/03/2018 08:57 AM - Madars

<https://stackoverflow.com/questions/819536/how-to-call-java-functions-from-c>

#18 - 01/03/2018 01:24 PM - Madars

<https://www.javatpoint.com/java-naming-conventions>

#19 - 02/16/2018 02:56 PM - Madars

<https://stackoverflow.com/questions/36849642/cmake-generate-a-jar-file-using-multiple-jar-dependencies-out-of-source-build>

#20 - 04/06/2018 10:35 PM - Madars

- Tracker changed from *Bug* to *Feature*

#21 - 04/06/2018 10:57 PM - Madars

<http://hildstrom.com/projects/jni/index.html>

#22 - 04/06/2018 11:14 PM - Madars

<https://www.cl.cam.ac.uk/teaching/0910/CandC++/lecture8-6up.pdf>

#23 - 04/18/2018 05:03 PM - Madars

error handling: <https://www.developer.com/java/data/exception-handling-in-jni.html>

#24 - 04/19/2018 05:51 AM - Madars

- Inside JNI functions, firstly we shall set the context manually, and then use standard tp commands (not O).

- When JNI error occurs, throw runtime exception. For ATMI errors, instantiate ATMI exception. For example if context is NULL.

#25 - 04/19/2018 09:26 AM - Madars

ndrxconfig.xml could look like:

```
<servers>
  <server name="someprocess">
    <srvid>1</srvid>
    <min>1</min>
    <max>1</max>
    <interpret>java -jar someprocess_package.jar</interpret>
    <sysopt>-e /tmp/RECOVER -r</sysopt>
    <appopt>-c10</appopt>
  </server>
```

So "someprocess" becomes logical name of the given server. But shall give options for formatting the command. There could be option for logical name in format string and the sysopt and appopt too:

```
<servers>
  <server name="someprocess">
    <srvid>1</srvid>
    <min>1</min>
    <max>1</max>
    <sysopt>-e /tmp/RECOVER -r</sysopt>
    <appopt>-c10</appopt>
    <interpret>java -jar ${NDRX_PROCESS}_package.jar -- ${NDRX_SYSOPT} ${NDRX_APPOPT}</interpret>
  </server>
```

Which would in the final make following runnable:

```
java -jar someprocess_package.jar -e /tmp/RECOVER -r -c10
```

#26 - 04/19/2018 09:28 AM - Madars

This will require some changes in housekeep processes, as real executable will be java.

#27 - 04/19/2018 12:13 PM - Madars

jni java instance in c: <https://www.codeproject.com/Articles/993067/Calling-Java-from-Cplusplus-with-JNI>

#28 - 04/19/2018 01:27 PM - Madars

<https://www.math.uni-hamburg.de/doc/java/tutorial/native1.1/implementing/method.html>

<https://docs.oracle.com/javase/7/docs/technotes/guides/jni/spec/functions.html>

<https://stackoverflow.com/questions/44276882/jni-what-type-of-callstaticmethod-to-use>

#29 - 04/20/2018 12:00 PM - Madars

<https://stackoverflow.com/questions/10408972/how-to-obtain-a-description-of-a-java-exception-in-c-when-using-jni>

Throw pending: <https://stackoverflow.com/questions/230689/best-way-to-throw-exceptions-in-jni-code/9812796>

#30 - 05/01/2018 06:56 PM - Madars

<http://ant.apache.org/manual/tutorial-HelloWorldWithAnt.html>

#31 - 05/01/2018 07:01 PM - Madars

We need following interface for service advertise:

```
interface Server {
    public void tpSvrInit(string [] argv);
    public void tpSvrDone();
}

interface Service {
    public void tpService(TpSvcInfo svcinfo);
}
```

#32 - 05/02/2018 08:01 AM - Madars

<https://stackoverflow.com/questions/8051863/how-can-i-close-the-socket-in-a-proper-way>

#33 - 05/16/2018 09:42 AM - Madars

xa api: https://docs.oracle.com/cd/A97630_01/java.920/a96654/xadistra.htm

#34 - 05/23/2018 08:11 AM - Madars

Seems for server's we need something like

```
<defaults>
  <envs group="ENV1">
    <env>SOME_OTHER_ENV=HELLO WORLD</env>
  </envs>
  <envs group="ENV2">
    <env>SOME_OTHER_ENV2=HELLO WORLD</env>
  </envs>
</defaults>
<server name="cconfsrv">
  <srvid>1700</srvid>
  <min>1</min>
  <max>1</max>
```

```

<sysopt>-e /tmp/CCONF</sysopt>
<envs>
  <usegroup>ENV1</usegroup>
  <usegroup>ENV2</usegroup>
  <env>JAVA_OPTS=-some -flags ${SOME_OTHER_ENV}</env>
  <env>JAVA_CLASSPATH=-some2 -flags2</env>
  ...
</envs>
</server>
..
<clients>
<envs group="ENV1">
  <env>SOME_OTHER_ENV=HELLO WORLD</env>
</envs>
  <client cmdline="/opt/bin/my_binary -t ${NDRX_CLTTAG} -s ${NDRX_CLTSUBSECT}">
  <env>
    <usegroup>ENV1</usegroup>
    <usegroup>ENV2</usegroup>
    <env>JAVA_OPTS=-some -flags ${SOME_OTHER_ENV}</env>
    <env>JAVA_CLASSPATH=-some2 -flags2</env>
  <env/>
    <exec tag="BINARY1" subsect="1" autostart="Y" />
    <exec tag="BINARY2" subsect="2" autostart="Y" />
  </client>
  <client cmdline="firefox"> <exec tag="FF"/> </client>
  <client cmdline="/tmp/test.bin" env="/tmp/yopt.env"> <exec tag="TT" log="/tmp/test.out"/> </client>
  <client cmdline="mongod -dbpath /home/mvitolin/tmp/data/db" >
    <exec tag="mongo" autostart="Y"/>
  </client>
</clients>

```

1. So we need to keep in defaults hash list of envs by set id.
2. The server keeps the linked list of envs
3. Server keeps linked list of pointer to linked resolved sets.

The same approach goes with client admin.

#35 - 05/23/2018 09:34 AM - Madars

we shall provide `exjc` (Enduro/X Java Compiler) so that we could embed the JVM and compile in the jar files, which at the process boot we could extract to disk (`/dev/shm` preferred) load the jars, and start the binary.

This way we can get the normal executable, and customer have zero config requirements for the binary configuration.

#36 - 05/26/2018 10:00 AM - Madars

Alos we might want to export server id too to env variables. So that any startup scripts might want to adjust their tcp port numbers or any other resources according to the server id

#37 - 05/30/2018 09:52 AM - Madars

Also needs to consider what happens in cases when atmi server runs in background and the atmi server parent went off.

#38 - 06/18/2018 09:26 AM - Madars

Dynamic class loader: <https://github.com/poidasmith/winrun4/blob/master/WinRun4J/src/java/JNI.cpp>

#39 - 07/03/2018 09:03 AM - Madars

Load jar from ZIP stream:

<https://stackoverflow.com/questions/16602668/creating-a-classloader-to-load-a-jar-file-from-a-byte-array>

+

<https://stackoverflow.com/questions/8367126/how-can-i-convert-byte-array-to-zip-file>

For the compiler, probably we need to join all jar files into single one and use it for the custom class loader.

Using custom class loader:

<https://dzone.com/articles/java-classloader-handling>

<https://www.concretepage.com/java/custom-classloader-java-example>

#40 - 07/05/2018 07:59 AM - Madars

seems `exembedfile` adds some un needed zero at end of the array...

#41 - 07/16/2018 11:15 AM - Madars

Seems like "`setContextClassLoader`" is needed for `exjld` for runner context to set the class loader.

#42 - 07/16/2018 12:52 PM - Madars

We should have new package for `enduroxjava` <https://github.com/Kitware/CMake/blob/master/Modules/UseJava.cmake>

#43 - 07/19/2018 08:07 AM - Madars

- Parent task set to #328

#44 - 08/12/2018 08:04 PM - Madars

- Status changed from New to In Progress

#45 - 09/17/2018 11:26 AM - Madars

<https://www.mkyong.com/java/java-custom-annotations-example/>

#46 - 09/17/2018 12:02 PM - Madars

<https://keyholesoftware.com/2014/09/15/java-annotations-using-reflection/>

#47 - 09/19/2018 08:27 AM - Madars

<https://stackoverflow.com/questions/32289952/how-can-i-switch-on-the-data-type-of-an-object-field>

#48 - 09/19/2018 10:44 AM - Madars

<https://www.mkyong.com/java/java-find-class-fields-with-specified-data-type/>

#49 - 09/19/2018 01:32 PM - Madars

<https://www.javatips.net/api/javax.transaction.xa.xaresource>

#50 - 11/21/2018 03:49 AM - Madars

1) For java application XA driver we need a driver to which from java side we can assign database handler for given XATMI context. I.e. for example `AtmiCtx.set(db XAResource)`,

The C side should have common driver like `libexrmjdrv.so` (java resource manager) for which there should be a thread local storage assigned `AtmiContext` with `XAResource` inside, and callbacks from call must be redirected back this context. `EXRMJDRV` shall be provided with some global reference to java env.

2) For `tmsrv` we need shared library which would start the java inside similarly like `exjld` does. Then it should create a `XAResource` and assign with `ATMI Context` and should work like library in step 1. For example loaders: `libndrxxajd.so`, `libndrxxajs.so` (these should load and create JVM too), and backs: `libexrmjdrv.so` (java resource manager).

Needs to think how multi-threading will be done here. Each thread should have its own `AtmiContext`. in case of 1) context can be set by java `tpbegin` from java caller...

for `tmsrv` which is multi-threaded, for each thread at init we need to create new `AtmiContext` and set the `XAResource` accordingly. There for `EXRMJDRV` there could be a thread local storage which if found to be `NULL`, will create new `AtmiCtx`. and then further will operate with it.

3) For normal apps which will use `tpcall` interface, we will need some kind of dummy xa driver (e.g. `libndrxxadumd.so`, `libndrxxadums.so`) and also dummy backend `libexrmdumdrv.so` which will hold just dummy xa functions.

#51 - 12/05/2018 07:28 AM - Madars

- Parent task changed from #328 to #357

#52 - 12/20/2018 03:38 PM - Madars

<https://stackoverflow.com/questions/8095016/unpacking-an-array-using-reflection>

#53 - 01/28/2019 06:51 AM - Madars

To track finalizer issues: <https://heaphero.io> <https://dzone.com/articles/what-happens-behind-the-scene-finalize-method>

#54 - 01/30/2019 11:17 AM - Madars

Java finalizers and try-with-resources Statement <https://docs.oracle.com/javase/tutorial/essential/exceptions/tryResourceClose.html>

might be used to deallocate C resources.

#55 - 03/12/2019 12:28 PM - Madars

We could simulate JOLT api too:

<http://documentation.microfocus.com/help/index.jsp?topic=%2Fcom.microfocus.silkperformer.doc%2FSILKPERF-11C1E1E0-JOLTGETSHORTFUNCTION-REF.html>

https://docs.oracle.com/cd/E13203_01/tuxedo/tux80/atmi/dvintro4.htm#6397

#56 - 03/12/2019 02:01 PM - Madars

```
#  
# Service type maps for jolt  
#  
[@joltmap]  
service DEBIT = {"req":"UBF", "rsp":"VIEW:JVVIEW2"}  
service LASTAUTH = {"req":"UBF", "rsp":"VIEW:JVVIEW2"}
```

#57 - 03/13/2019 12:09 PM - Madars

Probably JOLT we shall build on rest-in api.

There shall be separate link URL transaction management, i.e. begin, commit.
The transaction ID shall be transferred in HTTP/S header with the original request buffer.
Currently no AUTH will be supported.
The service repo shall be some ini file accessible from java.

This way we could keep the max compatibility with Tuxedo JOLT...

<https://www.mkyong.com/java/how-to-send-http-request-getpost-in-java/>

#58 - 03/18/2019 11:35 AM - Madars

Call Enduro/X services from java: <https://dzone.com/articles/how-to-parse-json-data-from-a-rest-api-using-simpl>
https://www.tutorialspoint.com/json/json_java_example.htm

#59 - 03/25/2019 02:38 PM - Madars

java bin [have xa_switch] ---> load the driver which would use per thread global variable has Java XA Switch.
- load the dll which would ndrxj_javabin_get_switch(), from the libexjava.so
-

if we want tmsrv to work with java code, we need to create a shared library which would:

- start VM
- load the "libexjava.so", call ndrxj_tmsrv_get_switch(), tlopen shall load the jars accordingly, set the Java Env variable (global) and check the AtmiCtx is there one for thread or not saved within libexjava.so. This would also load NDRX_XA_RMLIB jar jdbc library.

here question is about visibility, are the symbols global when loaded by jni.

#60 - 03/25/2019 02:54 PM - Madars

<https://www.postgresql.org/message-id/4674E56C.8060802@enterprisedb.com>

Re: a simple example of XA (not working)
From: Heikki Linnakangas <heikki(at)enterprisedb(dot)com>
To: Luca Ferrari <luca1978(at)infinito(dot)it>
Cc: pgsqj-jdbc(at)postgresql(dot)org
Subject: Re: a simple example of XA (not working)
Date: 2007-06-17 07:40:28
Message-ID: 4674E56C.8060802@enterprisedb.com
Views: Raw Message | Whole Thread | Download mbox

Thread:

Lists: pgsqj-jdbc

Luca Ferrari wrote:

```
> Hi all,  
> I'm trying to build a simple "manual" example of the use of the XA extension,  
> the following is the code:  
>  
> PGXADDataSource dataSource = new PGXADDataSource();  
> dataSource.setDatabaseName("hrpm");  
> dataSource.setUser("luca");  
> dataSource.setServerName("localhost");  
>  
> XAConnection connection = dataSource.getXAConnection();  
> System.out.println("Connesso!");  
> XAResource resource = connection.getXAResource();  
> MyXid identifier = new MyXid();  
> identifier.setBranchQualifier(new byte[] {0x01, 0x02, 0x03, 0x04, 0x05});  
> identifier.setGlobalTransactionId(new byte[] {0x05, 0x04, 0x03, 0x02, 0x01});  
> identifier.setFormatId(100);  
>  
> try{  
>     resource.start(identifier, XAResource.TMNOFLAGS);  
>  
>  
>     Connection jdbcConnection = connection.getConnection();  
>     Statement statement = jdbcConnection.createStatement();  
>     String sql = "INSERT INTO ...";  
>     int inserted = statement.executeUpdate(sql);  
>  
>     resource.end(identifier, XAResource.TMSUCCESS);  
>  
>     int commit = resource.prepare(identifier);  
>     if( commit == XAResource.XA_OK )  
>         resource.commit(identifier, false);  
>     else  
>         resource.rollback(identifier);  
>  
>  
> now the exception that is raised when the program commits the transaction is
```

> the following:
>
> javax.transaction.xa.XAException: org.postgresql.util.PSQLException: ERROR:
> prepared transaction with identifier "100_BQQDAgE=_AQIDBAU=" does not exist
> at org.postgresql.xa.PGXACConnection.commitPrepared(PGXACConnection.java:412)
> at org.postgresql.xa.PGXACConnection.commit(PGXACConnection.java:339)
>
> and the log of the database says:
>
> 2007-06-16 16:05:48 CEST LOG: execute <unnamed>: INSERT INTO
> 2007-06-16 16:05:48 CEST LOG: execute <unnamed>: PREPARE
> TRANSACTION '100_BQQDAgE=_AQIDBAU='
> 2007-06-16 16:05:48 CEST WARNING: non c'è nessuna transazione in corso
> 2007-06-16 16:05:48 CEST LOG: execute <unnamed>: COMMIT
> PREPARED '100_BQQDAgE=_AQIDBAU='
> 2007-06-16 16:05:48 CEST ERROR: prepared transaction with
> identifier "100_BQQDAgE=_AQIDBAU=" does not exist
> 2007-06-16 16:05:48 CEST STATEMENT: COMMIT PREPARED '100_BQQDAgE=_AQIDBAU='
> 2007-06-16 16:05:49 CEST LOG: unexpected EOF on client connection
>
> that is an error since it seems no one transaction has been started. However,
> debugging the application, I've seen that the driver disables the autocommit
> mode, thus where is the problem here?
> I'm sorry, I'm not a XA expert, just learning.

This seems to be an undesired side-effect of this patch that was committed in December:

> date: 2006/12/01 10:13:46; author: jurka; state: Exp; lines: +19 -22
> A XAConnections default autocommit state should be true. The
> driver was previously setting autocommit to false and assuming it
> would stay that way. This caused two problems. First, some
> applications expected to be able to issue local autocommit
> transactions prior to begin(). Second, some TMs (Geronimo) set the
> autocommit state to true themselves, which causes problems as the
> driver did not expect it to be changed. This patch correctly disables
> and enables autocommit around begin, prepare, commit, and rollback
> methods.

getConnection sets autocommit to false, so even though start set it to true, it's reset to false in the call to getConnection. Attached patch fixes that by explicitly setting autocommit to the right mode in PGXACConnection.getConnection.

As a work-around, just call jdbcConnection.setAutoCommit(false) in your program before executing any queries.

--
Heikki Linnakangas
EnterpriseDB <http://www.enterprisedb.com>

Attachment	Content-Type	Size
xa-autocommit-fix.patch		

#61 - 03/25/2019 03:02 PM - Madars

https://access.redhat.com/documentation/en-US/JBoss_Enterprise_Web_Platform/5/html-single/Transactions_JTA_Development_Guide/index.html#sect-Transactions_JTA_Programmers_Guide-Test-Externally_controlled_connections

#66 - 05/14/2019 10:08 AM - Madars

https://docs.oracle.com/cd/E11882_01/java.112/e16548/xadistra.htm#JJDBC28878

#67 - 05/14/2019 10:24 AM - Madars

probably we need to close the connection before commit, otherwise hold seem to hold on.

<https://stackoverflow.com/questions/32664186/closing-jdbc-connections-in-jta>

After commit call, we shall re-establish connection.

Needs to test with suspend.

#68 - 05/14/2019 12:01 PM - Madars

<http://amplifino.com/html/chapter6.html>

we need to close connection when we are about to commit.

#69 - 09/09/2019 03:31 PM - Madars

- Status changed from *In Progress* to *Resolved*

#70 - 09/09/2019 03:31 PM - Madars

- Status changed from *Resolved* to *Closed*

Files

CallingCLibraryRoutinesfromJava.pdf	523 KB	11/13/2017	Madars
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