

# Setting up the Tick42 BLP Bridge development environment

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# 1 Overview

After you have downloaded a copy of the Tick42 blp bridge source code, following the instructions on this page should lead you to being able to build and run the blp bridge

The development of this bridge was done on 64bit Windows 7 but the output is either 32 bit or 64 bit binaries. The OS platform is not expected to make any difference.

The goal of the build process outlined below is to produces a set of binaries that will run the mamaliscenc example "out of the box" so only builds enough of the open mama source to do this

## 2 Prerequisites

### 2.1 Development tools

- Visual Studio 2010 or Visual Studio 2012. There are no problems expected with later versions of the Microsoft tools but this version of the bridge has been built with VS 2010 and 2012
- Git for windows (this is optional, see note below about patching the Open Mama source), but can be obtained from <http://git-scm.com/download/win>

### 2.2 Libraries

#### 2.2.1 Boost

The Tick42 Bloomberg bridge depends on Boost version 1.54 and has only been tested against that library, although it is expected to work with higher versions. Download and documentation of Boost 1.54 can be found [here](#)

After installing and building Boost libraries, set the environment variable `TICK42_BOOST` to the place where Boost is installed.

#### 2.2.2 OpenMAMA

The OpenMAMA project should be installed and built prior any use of the Tick42 Bloomberg Bridge. The OpenMAMA documentation can be found in the [Documentation section on the OpenMAMA site](#).

Set the variable `TICK42_OPENMAMA` to OpenMAMA sources distribution.

Set the variable `API_HOME` to the OpenMAMA binaries target. It is possible to install OpenMAMA binaries distribution there as well in order to have pre-built binaries ready.

### 2.2.3 Open Bloomberg - Blp API

Download and install the APIs for C/C++ from the [Open Bloomberg site](#). Follow the instruction there and set `TICK42_BLPAPI_CPP` to the place where the BlpAPI distribution is installed.

## 2.3 Environment Variables

Building and running the OpenMAMA bridge requires a number of environment variables to be set up.

In addition to the variables in the table below `TICK42_PROJECT` is used to refer to the root directory for the Tick42 Bloomberg Bridge project. It is only used for documentation. It is not required for any builds.

For Windows and Linux

Name	Meaning
<code>API_HOME</code>	Root directory of the OpenMAMA binaries
<code>TICK42_BLPAPI_CPP</code>	Root directory for Blp API libraries
<code>CLASSPATH</code>	Java Class Path, should contain needed paths to .jar/.class files
<code>JAVA_HOME</code>	Root directory for Java Run-time Environment
<code>TICK42_BOOST</code>	Root directory to Boost libraries
<code>TICK42_OPENMAMA</code>	Root directory to OpenMAMA sources.
<code>WOMBAT_PATH</code>	Root directory to the configuration file <code>mama.properties</code>

For Linux only

Name	Meaning
<code>ANT_HOME</code>	Root directory of ANT tool-set.

AVIS_HOME	Root directory of Avis client
JDK_HOME	Root directory for Java Development Environment
TICK42_UUID	Linux/Unix only: Root directory for the include files of uuid library
LD_LIBRARY_PATH	Linux/Unix only: Shared Libraries paths. The output lib directory from the project \$LD_LIBRARY_PATH/lib and \$API_HOME/lib should be there.
C_INCLUDE_PATH	Should contain all header files needed for Java JNI support.

## 2.4 Cross Platform Build

### 2.4.1

For windows we recommend using visual studio. For Linux we provide a CMake script

### 2.4.2 Visual Studio

For Windows a VS2010 sln file is provided

Although it is possible to use CMake to generate an sln file it is recommended that the file provided is used as it include post build actions to copy OpenMAMA and BLP dlls and symbol files to the output directory.

### 2.4.3 Cmake

- Download and install CMake. There are versions for Windows and Linux. Minimum version supported is 2.6. CMake download and documentation can be found in [CMake.org site](http://CMake.org).
- CMake supports the generation GNU make.
- CMake comes in many configurations, it is possible to run CMake GUI for your platform if the platform supports GUI environment. For Linux users it is possible to use `ccmake` as console UI instead of the `cmake` command line.

## 3 Setup OpenMAMA

### 3.1 Obtain source code

The current version is 2.3.1 and was used for this release

Download from <http://www.openmama.org/downloads/releases>

### 3.2 Build the relevent mama source

#### 3.2.1 Windows

Build the project **mamalistenc**; This will also build **commonc** and **mamac**

If you want to run the java mama samples the also build the **mamajni** project

#### 3.2.2 Linux

Building for Linux is straightforward. Follow the OpenMAMA instructions to build with scons

## 4 Install Bloomberg Open API

Download from <http://www.openbloomberg.com/open-api/>

You will need to select the C/C++ version and extract from the zip file. It doesnt matter where you put it as there is an environment variable for it (you really only need the include and lib folders)

## 5 Build the tick42blp bridge

### 5.1 Windows

Set the TICK42\_OPENMAMA, TICK42\_BOOST, TICK42\_BLPAPI\_CPP environment variables to the appropriate paths.

Open the tick42blp.sln in Visual Studio 2010 and rebuild all.

There is a post build step that copies the OpenMAMA and bloomberg dlls into the \$(outdir) for the build.

The debug setting for the tick42 blp project will run mamalistenc

Alternatively, this can be run from a command prompt in \$(outdir) and contains a simple command script is provided (mamalistenc.cmd)

### 5.2 Linux

First, before building the bridge a Makefile for the GNU Make tool chain should be created, that is done easily by running:

```
cd $TICK42_PROJECT/src
cmake .
```

The result of the above commands is a Makefile, ready to be used for building the project.

It is possible to run "ccmake ." instead of "cmake ." and work with the a console UI provided the curses libraries are installed.

After a successful CMake pre-build process, a Makefile file should be produced. Run the following command where the file resides:

```
make help
```

This should produce the following output:

```
The following are some of the valid targets for this
Makefile:
... all (the default if no target is provided)
```

```
... clean
... depend
... edit_cache
... rebuild_cache
... mamatick42blpmsgimpl
... mamatick42blpimpl
```

It is possible to change some properties of the project, like directories or what libraries to link with by running the 'make edit\_cache' otherwise just running 'make' should build the whole project. 'make clean' should clean the project. 'make rebuild\_cache' along with 'make clean' will reset projects properties to their default and clean all object files.

## 6 Building and Running the Examples

In order to validate and test the built bridge a number of mama examples can be run. These are the various Mama Listener examples:

- For C/C++ code: `mamalistenc.c` On Windows the project should be compiled within the OpenMAMA solution, whilst under Linux the executable should be built with a special `Makefile.sample`.
- For .Net code: `OpenMamaListenCS` project should produce `MamaListener.exe`. Make sure configuration manager (in the solution) is set to the target architecture where the code is to be run.
- For the Java code: There is an OpenMAMA listener class that is able to run out of the box, both on Windows and Linux. During Linux `make process` of `mamajni` those classes should be built. However, for Windows the `mamajni` needs to be built from the Visual Studio Solution. See the OpenMAMA documentation for details.

## 6.1 Configuration

In order to run any of the examples, the configuration should be set up in the `mama.properties` file. The file delivered with this release contains default values

Prefix: <code>mama.tick42blp.transport.blp_tport.</code>		
Property	Meaning	Example
<code>url</code>	The URL of the feed server	<code>localhost:8194</code>
<code>fieldmap</code>	The path to the fields dictionary (relative path defaults to <code>\$WOMBAT_PATH</code> )	<code>fieldmap.csv</code>
<code>unmappedflds</code>	Should pass unmapped fields (true/false)	<code>true</code>
<code>newfidsoffset</code>	What is the FID offset for unmapped fields – always prefer high numbers like 5000.	<code>6000</code>

## 6.2 Examples under Windows

### 6.2.1 Native Code Application

#### 6.2.1.1 Run the Application

```
mamalistenc -B -S "BlpMktData" -s "VOD LN Equity" -s "EUR Curncy" -s "GBP Curncy" -s "CAD Curncy" -s "JPY Curncy" -tport blp_tport -m tick42blp -shutdown 1
```

#### 6.2.1.2 Results

See typical output in Appendix 7.3

### 6.2.2 C# Application

#### 6.2.2.1 Prerequisites

The `OpenMamaListenCS` project in the `OpenMAMA` sln will produce `MamaListener.exe`. You should be able to run it either from the IDE, with arguments only, or from the command line as shown below. It is worth emphasizing, that the C# project should be built for the same target architecture as the bridge and openmama libraries

#### 6.2.2.2 Run the Application

```
MamaListener -B -S "BlpMktData" -s "VOD LN Equity" -s "EUR Curncy" -s "GBP Curncy" -s "CAD Curncy" -s "JPY Curncy" -tport blp_tport -m tick42blp -shutdown 1
```



### 6.2.2.3 Results

See typical output in Appendix 7.3

## 6.2.3 Java – JNI Application

### 6.2.3.1 Prerequisites

Some assumptions are taken in order to run the following example:

- The example below should be run from  
`%TICK42_OPENMAMA%\mama\jni\classes`
- The example below it is assumed that the bridge is 32bit in a 64bit machine,  
 Therefore running the 32bit version of Java that resides in  
`C:\Program Files (x86)\Java\jre7\bin\java`  
 Change the above directories and the java command line in accordance to your  
 machine architecture

From Visual Studio, build the following projects in order:

1. commonc
2. mamac
3. mamajni

### 6.2.3.2 Run the Application

```
"C:\Program Files (x86)\Java\jre7\bin\java" -
cp %TICK42_OPENMAMA%\mama\jni\classes;%TICK42_OPENMAMA%\mama\jni\mamajni\li
b\* -Djava.library.path=%TICK42_OPENMAMA%\Debug
com.wombat.mama.examples.MamaListen -B -S "BlpMktData" -s "VOD LN Equity"
-s "EUR Curncy" -s "GBP Curncy" -s "CAD Curncy" -s "JPY Curncy" -tport
blp_tport -m tick42blp
```

### 6.2.3.3 The Command Line explained

- java 32bit command (in case of running 32bit native code bridge)  
`"C:\Program Files (x86)\Java\jre7\bin\java"`
- Class path for generated jni libraries (you may add those to %CLASSPATH%)  
`-`  
`cp %TICK42_OPENMAMA%\mama\jni\classes;%TICK42_OPENMAMA%\ma`  
`ma\jni\mamajni\lib\*`
- Path to the native libraries (.dlls)  
`-Djava.library.path=%TICK42_OPENMAMA%\Debug`
- The class mamalisten to run  
`com.wombat.mama.examples.MamaListen`
- The command line arguments  
`-B -S "BlpMktData" -s "VOD LN Equity" -s "EUR Curncy" -s`  
`"GBP Curncy" -s "CAD Curncy" -s "JPY Curncy" -tport`  
`blp_tport -m tick42blp`

#### 6.2.3.4 Results

See typical output in Appendix 7.3

## 6.3 Examples under Linux

### 6.3.1 Native Code Application

#### 6.3.1.1 Run the Application

```
./mamalistenc -B -S "BlpMktData" -s "VOD LN Equity" -s "EUR Curncy" -s "GBP Curncy" -s "CAD Curncy" -s "JPY Curncy" -tport blp_tport -m tick42blp -shutdown 1
```

#### 6.3.1.2 Results

See typical output in Appendix 7.3 and Appendix 7.2 for the stderr output for Linux implementation specifically.

### 6.3.2 Java – JNI Application

#### 6.3.2.1 Prerequisites

- For the Java and JNI versions of MAMA, set the `$CLASSPATH` variable to include the .jar files in the lib directory. For example:

```
export CLASSPATH=$API_HOME/lib/mamajni.jar:$CLASSPATH
```

- export the following for jni support:

```
export
C_INCLUDE_PATH=$JDK_HOME/include/:$JDK_HOME/include/linux:$C_INCLUDE_PATH
```

Make sure that all the classes in the following directories are compiled (having the .class). follow instructions in OpenMAMA Developer's Guide JNI to make the .jar and .classes:

```
$TICK42_OPENMAMA/mama/jni/classes/com/wombat/mama
$TICK42_OPENMAMA/mama/jni/classes/com/wombat/mama/examples
$TICK42_OPENMAMA/common/jni/src/com/wombat/common
```

#### 6.3.2.2 Run the Application

```
cd $TICK42_OPENMAMA/mama/jni/src/com/wombat/mama/examples
java -cp
$API_HOME/lib/mamajni_2.2.1.1.jar:$API_HOME/mama/jni/jni/classes:$API_HOME/
mama/jni/mamajni/lib/* com.wombat.mama.examples.MamaListen -B -S
"BlpMktData" -s "VOD LN Equity" -s "EUR Curncy" -s "GBP Curncy" -s
"CAD Curncy" -s "JPY Curncy" -tport blp_tport -m tick42blp -shutdown 1
```

#### 6.3.2.3 Results

See typical output in Appendix 7.3 and Appendix 7.2 for the stderr output for Linux implementation specifically.

## 7 Appendix

### 7.1 Example bash .profile

With some adaptation, Windows users can use the following excerpt as a reference for environment variable which are used across this document.

```
# OpenMAMA settings
export AVIS_HOME=$HOME/avis-client-1.2.4/src
export AVIS_SOURCE=$HOME/avis-client-1.2.4
export API_HOME=$HOME/openmama-2.2.2.1.x86_64
export PATH=$API_HOME/bin:$PATH
export LD_LIBRARY_PATH=$API_HOME/lib:$LD_LIBRARY_PATH
export WOMBAT_PATH=$API_HOME/config
export TICK42_OPENMAMA=$HOME/openmama-src-2.2.2.1
export TICK42_PROJECT=$HOME/work/open-mama-bridge-dev

# Boost libraries
export TICK42_BOOST=$HOME/boost_1_46_1

# blp_api
export TICK42_BLPAPI_CPP=$HOME/blpapi_cpp_3.6.3.1
export
LD_LIBRARY_PATH=$TICK42_BLPAPI_CPP/Linux:/usr/local/lib:↵
→$TICK42_BOOST/stage/lib:$LD_LIBRARY_PATH

# uuid include dir
export TICK42_UUID=/usr/include

# Tick42 Bloomberg Bridge shared libraries
export
LD_LIBRARY_PATH=$TICK42_PROJECT/src/lib:$LD_LIBRARY_PATH
```

```
# Java related
export JAVA_HOME=/opt/java/jdk
export JDK_HOME=/opt/java/jdk
export
C_INCLUDE_PATH=$JDK_HOME/include/:$JDK_HOME/include/linux:~
→$C_INCLUDE_PATH
export CLASSPATH=$API_HOME/lib/mamajni.jar:$CLASSPATH

export
CLASSPATH=$TICK42_OPENMAMA/mama/jni/classes/com/wombat/mama:~
→$TICK42_OPENMAMA/mama/jni/classes/com/wombat/mama/examples/:~
→$TICK42_OPENMAMA/common/jni/src/com/wombat/common:$CLASSPATH
```

### 7.1.1

## 7.2 Output to stderr for linux examples

### 7.2.1

```
2013-06-03 14:01:07:
*****

2013-06-03 14:01:07: WARNING!!! - Built for unittesting. Do not release!!!

2013-06-03 14:01:07:
*****

2013-06-03 14:01:07:
*****
*****

Warning: This is a developer release and has only undergone basic sanity
checks.

It is for testing only and should not be used in a production environment
*****
*****

mamashutdown: free-ing symbol and field lists
mamashutdown: destroying subscriptions
mamashutdown: destroying transport
```

## 7.3 Typical stdout from any of the examples

### 7.3.1

```
Session Status Event 2013/06/03 14:01:08: SessionConnectionUp
Session Status Event 2013/06/03 14:01:08: SessionStarted
2013/06/03 14:01:09: ServiceOpened
Session Status Event 2013/06/03 14:01:09: SessionConnectionUp
Session Status Event 2013/06/03 14:01:10: SessionStarted
```

```

2013/06/03 14:01:11: ServiceOpened
2013/06/03 14:01:11: SessionConnectionUp
2013/06/03 14:01:12: SessionStarted
Type CTRL-C to exit.
2013/06/03 14:01:12: ServiceOpened
Created subscription: source=[BlpMktData], symbol=[VOD LN Equity]
Created subscription: source=[BlpMktData], symbol=[EUR Curncy]
Created subscription: source=[BlpMktData], symbol=[GBP Curncy]
Created subscription: source=[BlpMktData], symbol=[CAD Curncy]
Created subscription: source=[BlpMktData], symbol=[JPY Curncy]
Processing SUBSCRIPTION_STATUS
2013/06/03 14:01:12: VOD LN Equity - SubscriptionStarted
Processing SUBSCRIPTION_STATUS
2013/06/03 14:01:13: GBP Curncy - SubscriptionStarted
Processing SUBSCRIPTION_STATUS
2013/06/03 14:01:13: EUR Curncy - SubscriptionStarted

```

```

Processing SUBSCRIPTION_DATA
2013/06/03 14:01:13: MarketDataEvents

```

message type 1

number of fields: 139

```

    EXCH_AUCTION_MKT_STATUS_RT is NULL
    EXCH_OFF_HOUR_MKT_STATUS_RT is NULL
    LAST_YLD_TDY is NULL
    OPEN_CC_BLOOMBERG_RT is NULL

```

Number of processed fields: 135

.BlpMktData.Update Type: INITIAL Status OK

MdMsgType	1	I32   1
MdMsgStatus	2	I32   0
MdMsgNum	7	I32   0
MdMsgTotal	8	I32   0
MdSeqNum	10	I64   0
wAskPrice	109	F64   189.650000
wAskSize	110	I64   7364
wBidPrice	237	F64   189.600000
wBidSize	238	I64   16222
wClosePrice	242	F64   191.950000
wHighPrice	278	F64   191.150000
wIssueSymbol	305	STRING   VOD LN Equity
wLowPrice	327	F64   188.050000

wOpenPrice	407	F64	190.250000
wVwap	494	F64	189.712300
wMidPrice	537	F64	189.625000
wPrevTradingDate	1812	TIME	2013-05-31 00:00:00
wBestBid	2293	F64	189.600000
wBestAsk	2295	F64	189.650000
wLastPrice	2663	F64	189.650000
wVolume	2664	I64	31044305
wTheoreticalPrice	3593	F64	190.250000
MKTDATA_EVENT_TYPE	6000	STRING	SUMMARY
MKTDATA_EVENT_SUBTYPE	6001	STRING	INITPAINT
PRICING_METHOD_REALTIME	6002	STRING	PRC
BID_ALL_SESSION	6003	F64	189.600000
ASK_ALL_SESSION	6004	F64	189.650000
BID_SIZE_ALL_SESSIONS_RT	6005	I32	16222
ASK_SIZE_ALL_SESSIONS_RT	6006	I32	7364
IND_BID_FLAG	6007	I8	0
IND_ASK_FLAG	6008	I8	0
ASK_SIZE_TDY	6009	I32	7364
BID_SIZE_TDY	6010	I32	16222
BID_TDY	6011	F64	189.600000
PRICE_LAST_BID_RT	6012	F64	189.600000
ASK_TDY	6013	F64	189.650000
PRICE_LAST_ASK_RT	6014	F64	189.650000
EXCH_CODE_BID	6015	STRING	L
BID_PX_LOCAL_EXCH_SOURCE_RT	6016	STRING	LN
EXCH_CODE_ASK	6017	STRING	L
ASK_PX_LOCAL_EXCH_SOURCE_RT	6018	STRING	LN
BID_ALL_SESSION_TDY_RT	6019	F64	189.600006
ASK_ALL_SESSION_TDY_RT	6020	F64	189.649994
PRICE_PREVIOUS_CLOSE_RT	6021	F64	191.950000
ID_BB_SEC_NUM_SRC	6022	I64	678605358297
LAST_TRADE	6023	F64	189.650000
LAST_AT_TRADE	6024	F64	189.649994
SIZE_LAST_AT_TRADE	6025	I32	2070
LAST_AT_TRADE_TDY	6026	F64	189.650000
SIZE_LAST_AT_TRADE_TDY	6027	I32	2070
OPEN_TDY	6028	F64	190.250000
PRICE_OPEN_RT	6029	F64	190.250000
VOLUME_TDY	6030	I64	31044305

LAST_TRADE_TDY	6031	F64	189.650000
PRICE_LAST_RT	6032	F64	189.650000
PRICE_LAST_TRADE_RT	6033	F64	189.650000
HIGH_TDY	6034	F64	191.150000
PRICE_HIGH_RT	6035	F64	191.150000
LOW_TDY	6036	F64	188.050000
PRICE_LOW_RT	6037	F64	188.050000
EXCH_CODE_LAST	6038	STRING	L
LAST_PX_LOCAL_EXCH_SOURCE_RT	6039	STRING	LN
MID_TDY	6040	F64	189.625000
RT_EXCH_MARKET_STATUS	6041	STRING	ACTV
EXCH_VWAP	6042	F64	189.713000
RT_TRADING_PERIOD	6043	STRING	TRAD
LAST_ALL_SESSIONS	6044	F64	189.650000
TRADING_DT_REALTIME	6045	TIME	2013-06-03 00:00:00
EQY_TURNOVER_REALTIME	6046	F64	5889539794.359268
RT_VWAP_VOLUME	6047	F64	30589483.000000
NEWS_HEAT_STORY_FLOW_RT	6048	I32	2
NEWS_HEAT_USER_ACTIVITY_RT	6049	I32	0
OPEN_TRADE_PRICE_REALTIME	6050	F64	190.250000
PX_OFFICIAL_CLOSE_RT	6051	F64	191.949997
PX_OFFICIAL_AUCTION_RT	6052	F64	190.250000
VWAP_TURNOVER_RT	6053	F64	5803199703.812027
VWAP_NUM_TRADES_RT	6054	I32	6674
VWAP_STANDARD_DEV_RT	6055	F64	0.682162
OFFICIAL_AUCTION_VOLUME_RT	6056	I32	1163319
IN_AUCTION_RT	6057	I8	0
RT_API_MACHINE	6058	STRING	apipubx1@y731
TURNOVER_TODAY_REALTIME	6059	F64	5889539794.359268
NEWS_SENTIMENT_RT	6060	F64	0.329546
OFFICIAL_OPEN_AUCTION_PRICE_RT	6061	F64	190.250000
OFFICIAL_OPEN_AUCTION_VOLUME_RT	6062	I32	1163319
AUCTION_EXTENSION_RT	6063	I8	0
RT_EXCH_TRADE_STATUS	6064	I8	1
RT_QUOTE_STATUS	6065	I8	1
RT_SIMP_SEC_STATUS	6066	STRING	TRAD
VOLUME_THEO	6067	I32	1163319
RT_PRICING_SOURCE	6068	STRING	LN
LONDON_MANUAL_VOLUME	6069	I32	5350847
AUCTION_TYPE_REALTIME	6070	STRING	OPEN

TRADING_CONDITIONS_1_REALTIME	6071	STRING	
TRADING_CONDITIONS_2_REALTIME	6072	STRING	
TRADING_CONDITIONS_3_REALTIME	6073	STRING	
TRADING_CONDITIONS_4_REALTIME	6074	STRING	
SOURCE_TRADING_PERIOD_REALTIME	6075	STRING	T
TICK_SIZE_TABLE_IDENTIFIER_RT	6076	I32	5959
PRICE_DISPLAY_FORMAT_TYPE_RT	6077	STRING	DECIMAL
PX_DISPLAY_FMT_MIN_#_DECIMALS_RT	6078	I32	2
PX_DISPLAY_FMT_MAX_#_DECIMALS_RT	6079	I32	3
TRADE_LOT_SIZE_REALTIME	6080	I32	1
QUOTE_LOT_SIZE_REALTIME	6081	F32	1.000000
QUOTED_CURRENCY_REALTIME	6082	STRING	GBp
SCALING_FACTOR_REALTIME	6083	F32	1.000000
NO_SHORT_SELL_REALTIME	6084	I8	0
HIGH_LOCAL_SOURCE_RT	6085	STRING	LN
LOW_LOCAL_SOURCE_RT	6086	STRING	LN
OPEN_LOCAL_SOURCE_RT	6087	STRING	LN
PRICE_52_WEEK_HIGH_RT	6088	F64	200.650000
PRICE_52_WEEK_HIGH_DATE_RT	6089	TIME	2013-05-22 00:00:00
PRICE_52_WEEK_LOW_RT	6090	F64	154.200000
PRICE_52_WEEK_LOW_DATE_RT	6091	TIME	2012-12-31 00:00:00
AT_TRADE_VOLUME	6092	I32	25693458
NUM_TRADES_RT	6093	I32	6759
PER_TRADE_VWAP_TURNOVER_RT	6094	F64	5803199698.736878
PER_TRADE_VWAP_VOLUME_RT	6095	F64	30589483.000000
TRADE_HIGH_LOW_VALIDATION_TOL_RT	6096	F64	0.500000
PER_TRADE_VWAP_REALTIME	6097	F64	189.712000
IS_DELAYED_STREAM	6098	I8	1
PREV_SES_LAST_PRICE	6099	F64	191.950000
RT_PX_CHG_NET_1D	6100	F64	-2.300000
RT_PX_CHG_PCT_1D	6101	F32	-1.198230
PRICE_CHANGE_ON_DAY_RT	6102	F64	-2.300000
TRADE_UPDATE_STAMP_RT	6103	TIME	2013-06-03 14:36:29
LAST_UPDATE_BID_RT	6104	TIME	2013-06-03 14:36:30
LAST_UPDATE_ASK_RT	6105	TIME	2013-06-03 14:36:37
RT_TIME_OF_TRADE	6106	TIME	2013-06-03 14:20:52
TIME	6107	TIME	2013-06-03 14:36:29
BID_ASK_TIME	6108	TIME	2013-06-03 14:36:37
SES_START	6109	TIME	2013-06-03 08:00:00
SES_END	6110	TIME	2013-06-03 17:00:00



```

LAST_TRADE_RECEIVED_TIME_RT | 6111 |          TIME | 2013-06-03 14:36:29
LAST_MID_TIME_RT           | 6112 |          TIME | 2013-06-03 14:36:29
TIME_AUCTION_CALL_CONCLUSION_RT | 6113 |          TIME | 2013-06-03
08:00:09
LAST_BID_TIME_TODAY_REALTIME | 6114 |          TIME | 2013-06-03
14:36:30.682000
LAST_ASK_TIME_TODAY_REALTIME | 6115 |          TIME | 2013-06-03
14:36:37.453000
LAST_MID_TIME_TODAY_REALTIME | 6116 |          TIME | 2013-06-03
14:36:29.160000
LAST_PRICE_TIME_TODAY_REALTIME | 6117 |          TIME | 2013-06-03
14:36:29.432000
LAST_TRADE_PRICE_TIME_TODAY_RT | 6118 |          TIME | 2013-06-03
14:36:29.432000
Processing SUBSCRIPTION_STATUS
2013/06/03 14:01:13: CAD Curncy - SubscriptionStarted
Processing SUBSCRIPTION_STATUS
2013/06/03 14:01:13: JPY Curncy - SubscriptionStarted
.
.
.
2013/06/03 14:01:17: MarketDataEvents
message type 14
number of fields: 30
    VOLUME is NULL
    VOLUME_TDY is NULL
Number of processed fields: 28
.BlpMktData.Update Type: TRADE Status OK
MdMsgType           | 1 |          I32 | 14
MdMsgStatus         | 2 |          I32 | 0
MdMsgNum            | 7 |          I32 | 278
MdMsgTotal          | 8 |          I32 | 278
MdSeqNum            | 10 |         I64 | 278
wIssueSymbol        | 305 |        STRING | JPY Curncy
wEventTime          | 1696 |        TIME | 2013-06-03 14:51:47
wLastPrice          | 2663 |         F64 | 100.130000
MKTDATA_EVENT_TYPE  | 6000 |        STRING | TRADE
MKTDATA_EVENT_SUBTYPE | 6001 |        STRING | NEW
LAST_TRADE          | 6023 |         F64 | 100.130000
LAST_TRADE_TDY      | 6031 |         F64 | 100.130000
PRICE_LAST_RT       | 6032 |         F64 | 100.130000
PRICE_LAST_TRADE_RT | 6033 |         F64 | 100.130000

```

LAST_ALL_SESSIONS	6044	F64	100.130000
IS_DELAYED_STREAM	6098	I8	0
RT_PX_CHG_NET_1D	6100	F64	-0.320000
RT_PX_CHG_PCT_1D	6101	F32	-0.318566
PRICE_CHANGE_ON_DAY_RT	6102	F64	-0.320000
TRADE_UPDATE_STAMP_RT	6103	TIME	2013-06-03 14:51:47
TIME	6107	TIME	2013-06-03 14:51:47
LAST_TRADE_RECEIVED_TIME_RT	6111	TIME	2013-06-03 14:51:47
LAST_PRICE_TIME_TODAY_REALTIME	6117	TIME	2013-06-03 14:51:47
LAST_TRADE_PRICE_TIME_TODAY_RT	6118	TIME	2013-06-03 14:51:47
LAST_UPDATE_CHG_1D_RT	6128	F32	-0.320000
UPDATE_ACTIONS_RT	6131	I32	6143
LAST2_TRADE	6132	F64	100.130000
LAST2_DIR	6133	I32	0
ALL_PRICE	6134	F64	100.130000
EVT_TRADE_PRICE_RT	6135	F64	100.130000
EVT_TRADE_SIZE_RT	6136	I32	0
EVT_TRADE_DATE_RT	6137	TIME	2013-06-03 00:00:00
PRICE_LAST_TIME_RT	6138	TIME	2013-06-03 14:51:47
EVT_TRADE_TIME_RT	6139	TIME	2013-06-03 14:51:47

2013/06/03 14:01:17: MarketDataEvents

message type 13

number of fields: 21

Number of processed fields: 21

.BlpMktData.Update Type: QUOTE Status OK

MdMsgType	1	I32	13
MdMsgStatus	2	I32	0
MdMsgNum	7	I32	279
MdMsgTotal	8	I32	279
MdSeqNum	10	I64	279
wAskPrice	109	F64	100.130000
wIssueSymbol	305	STRING	JPY Curncy
wEventTime	1696	TIME	2013-06-03 14:51:47
wBestAsk	2295	F64	100.130000
MKTDATA_EVENT_TYPE	6000	STRING	QUOTE
MKTDATA_EVENT_SUBTYPE	6001	STRING	ASK
ASK_ALL_SESSION	6004	F64	100.130000
IND_ASK_FLAG	6008	I8	0
ASK_TDY	6013	F64	100.130000

```

PRICE_LAST_ASK_RT      | 6014 |          F64 | 100.130000
ASK_ALL_SESSION_TDY_RT | 6020 |          F64 | 100.130000
IS_DELAYED_STREAM      | 6098 |          I8  | 0
LAST_UPDATE_ASK_RT     | 6105 |          TIME | 2013-06-03 14:51:47
BID_ASK_TIME           | 6108 |          TIME | 2013-06-03 14:51:47
LAST_ASK_TIME_TODAY_REALTIME | 6115 |          TIME | 2013-06-03 14:51:47
SHORTENED_BID_ASK_RT  | 6124 |          STRING | 100.12/13
LAST_UPDATE_CHG_1D_RT  | 6128 |          F32 | -0.320000
EVT_QUOTE_ASK_PRICE_RT | 6140 |          F64 | 100.130000
EVT_QUOTE_ASK_SIZE_RT  | 6141 |          I32 | 0
ASK2                   | 6142 |          F64 | 100.130000
ASK_UPDATE_STAMP_RT    | 6143 |          TIME | 2013-06-03 14:51:47
EVT_QUOTE_ASK_TIME_RT  | 6144 |          TIME | 2013-06-03 14:51:47

```

2013/06/03 14:01:17: MarketDataEvents

message type 14

number of fields: 30

VOLUME is NULL

VOLUME\_TDY is NULL

Number of processed fields: 28

.BlpMktData.Update Type: TRADE Status OK

```

MdMsgType              | 1 |          I32 | 14
MdMsgStatus            | 2 |          I32 | 0
MdMsgNum               | 7 |          I32 | 280
MdMsgTotal             | 8 |          I32 | 280
MdSeqNum               | 10 |         I64 | 280
wIssueSymbol           | 305 |         STRING | JPY Curncy
wEventTime             | 1696 |         TIME | 2013-06-03 14:51:47
wLastPrice             | 2663 |          F64 | 100.130000
MKTDATA_EVENT_TYPE     | 6000 |         STRING | TRADE
MKTDATA_EVENT_SUBTYPE  | 6001 |         STRING | NEW
LAST_TRADE             | 6023 |          F64 | 100.130000
LAST_TRADE_TDY         | 6031 |          F64 | 100.130000
PRICE_LAST_RT          | 6032 |          F64 | 100.130000
PRICE_LAST_TRADE_RT    | 6033 |          F64 | 100.130000
LAST_ALL_SESSIONS      | 6044 |          F64 | 100.130000
IS_DELAYED_STREAM      | 6098 |          I8  | 0
RT_PX_CHG_NET_1D       | 6100 |          F64 | -0.320000
RT_PX_CHG_PCT_1D       | 6101 |          F32 | -0.318566
PRICE_CHANGE_ON_DAY_RT | 6102 |          F64 | -0.320000
TRADE_UPDATE_STAMP_RT  | 6103 |          TIME | 2013-06-03 14:51:47

```

TIME	6107	TIME	2013-06-03 14:51:47
LAST_TRADE_RECEIVED_TIME_RT	6111	TIME	2013-06-03 14:51:47
LAST_PRICE_TIME_TODAY_REALTIME	6117	TIME	2013-06-03
14:51:47			
LAST_TRADE_PRICE_TIME_TODAY_RT	6118	TIME	2013-06-03
14:51:47			
LAST_UPDATE_CHG_1D_RT	6128	F32	-0.320000
UPDATE_ACTIONS_RT	6131	I32	6143
LAST2_TRADE	6132	F64	100.130000
LAST2_DIR	6133	I32	0
ALL_PRICE	6134	F64	100.130000
EVT_TRADE_PRICE_RT	6135	F64	100.130000
EVT_TRADE_SIZE_RT	6136	I32	0
EVT_TRADE_DATE_RT	6137	TIME	2013-06-03 00:00:00
PRICE_LAST_TIME_RT	6138	TIME	2013-06-03 14:51:47
EVT_TRADE_TIME_RT	6139	TIME	2013-06-03 14:51:47

Processing SUBSCRIPTION\_STATUS

Processing SUBSCRIPTION\_STATUS

Processing SUBSCRIPTION\_STATUS

Processing SUBSCRIPTION\_STATUS

Session Status Event 2013/06/03 14:01:17: SessionConnectionDown

Processing SUBSCRIPTION\_STATUS

Session Status Event 2013/06/03 14:01:17: SessionTerminated

Session Status Event 2013/06/03 14:01:17: SessionConnectionDown

Session Status Event 2013/06/03 14:01:17: SessionTerminated

2013/06/03 14:01:17: SessionConnectionDown

2013/06/03 14:01:17: SessionTerminated