070

Gateway Development Kit (Native)

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GDK-Native Getting Started Guide

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Intro

This Getting Started Guide is intended as a brief guide to get you up and running, informing you of some basic features available like subscribing for TopOfBook and entering an order to get you familiar with Gateway Development Kit (GDK) Native.

Note that full implementation details of all the services are not covered here. For more detailed information, refer to <u>Gateway Development Kit (Native)</u>.

GDK-Native Getting Started Guide

Using the Development Tools

First you should become familiar with using the development tools provided for debugging and comparison with your custom gateway or client. In this tutorial we're going to do the following: 1) Start up the mgftest example gateway. 2) Start the sd gateway client and connect to the instrument, marketdata, and order services provided by the gateway. 3) Grab a snippet of hex output from the mgftest debug log and run it through the BufferDumper to see nicely formatted decoding of the hex.

- 1) Startup the mgftest gateway
- 2) Start the sd client and connect to the services
- 3) Run hex output from mgftest.debug through BufferDumper

1) Startup the mgftest gateway

- As a prerequisite you should already have the ORC environment installed on your system. Contact support if you do not and need help.
- At this point to simplify things we're going to the ignore the environment manager (for Trade Access the environment manager will never be used). We're going to statically set the port (here we are using 10000 but it can be whatever you like) to use when we start the process and the sd client will connect directly to the service as opposed to querying the environment manager for the service. Also we will enable full debug logging so that the sd hex dumps are printed.
- To do this open /etc/orc/orc.conf for editing. Your mgftest process should be defined like the following: PROC:mgftest:::;jserv:MGFTEST:mgftestmgfd::MGF Test:: -dmax -p 10000 ::
- start the process: /etc/orc/start_process mgftest
- Open up the mgftest.debug. Typically found in /orcreleases/mgftest-<version>/log/mgftest.debug. Look for the following log lines to verify the services are provided and the gateway has started correctly:

```
2012-03-08 17:51:00,782000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[impl.ServiceSocketServer] - Creating Socket Server
on URL: sdoff://<dynamic>:10000
2012-03-08 17:51:00,785000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[cl] - Starting Socket at: 0.0.0.0/0.0.0:10000
2012-03-08 17:51:00,785000 -0600 flashtaco mgftest
[26970:main]/INFO:[impl.ServiceSocketServer] - Created Socket Server
on URL: sdoff://<dynamic>:10000, port=10000
2012-03-08 17:51:00,789000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.InstrumentServiceAcceptor] - onOpened:
InstrumentService (5001) service version 1.9
2012-03-08 17:51:00,789000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.manager] - Instrument Service: available
2012-03-08 17:51:00,789000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.MarketDataServiceAcceptor] - onOpened:
MarketDataService (5002) service version 1.6
2012-03-08 17:51:00,790000 -0600 flashtaco mqftest
[26970:main]/INFO:[messaging.manager] - MarketData Service: available
2012-03-08 17:51:00,791000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.OrderServiceAcceptor] - onOpened:
OrderService (5003) service version 1.17
2012-03-08 17:51:00,791000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.manager] - Order Service available for
sessionName: MGF_DEFAULT_SESSION id: 1
```

```
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.QuoteServiceAcceptor] - onOpened:
QuoteService (5004) service version 2.10
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.manager] - Quote Service available for
sessionName: MGF_DEFAULT_SESSION id: 1
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.TradeReportServiceAcceptor] - onOpened:
TradeReportService (5006) service version 2.4
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/INFO:[messaging.manager] - TradeReport Service available
for sessionName: MGF_DEFAULT_SESSION id: 1
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[mgf.defaultengine] - MGF starting:
ServerSideLimitsManager
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[mgf.defaultengine] - MGF starting:
StatisticsManager
2012-03-08 17:51:00,792000 -0600 flashtaco mgftest
[26970:main]/INFO:[mgf.statistics] - Not logging MGF Statistics.
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[mgf.defaultengine] - MGF starting:
DefaultRemoteOrderServiceManager
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[mgf.defaultengine] - MGF starting:
mgf.messaging.manager
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[messaging.manager] - Messaging Manager starting...
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[messaging.manager] - Messaging Manager started.
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[mgf.defaultengine] - MGF Engine: started
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/DEBUG:[mgf.gateway] - MGF Gateway Service: started.
```

```
2012-03-08 17:51:00,793000 -0600 flashtaco mgftest
[26970:main]/INFO:[mgf.main] - Gateway started
```

 More info on configuring the mgftest gateway can be found in the Development Tools section of the general GDK-Native documentation.

2) Start the sd client and connect to the services

- cd orcreleases and create a directory called gateway_cli_client. This will be your working directory where you
 place the gateway_cli_client-<version>-run.jar which should have been provided. Contact support if you do
 not have this jar.
- The sd client is a simple tool and not good at multi-tasking so we are going to start two clients; one for connecting to the instrument and marketdata service and one for connecting to the orderservice.
- Create a start script for the marketdata service client startMDClient.sh:

```
HOST=localhost
PORT=10000

JAVA_OPTS="-Xms200m -Xmx400m -XX:+UseConcMarkSweepGC"

#JAVA_OPTS="$JAVA_OPTS -Dlog4j.configuration=file:./log4j.xml"

JAVA_OPTS="$JAVA_OPTS -Dmarketdataservice.url=sdoff://$HOST:$PORT

-Dinstrumentservice.url=sdoff://$HOST:$PORT"

JAVA_OPTS="$JAVA_OPTS -Denable.quotes=false

-Denable.tradereports=false -Denable.orders=false"

#Make sure this is the correct version of your jar

java ${JAVA_OPTS} -jar gateway_cli_client-latest-SNAPSHOT-run.jar
```

Create a second start script for the order service client startOrderClient.sh:

```
HOST=localhost
PORT=10000

JAVA_OPTS="-Xms200m -Xmx400m -XX:+UseConcMarkSweepGC"

#JAVA_OPTS="$JAVA_OPTS -Dlog4j.configuration=file:./log4j.xml"

JAVA_OPTS="$JAVA_OPTS -Dorderservice.url=sdoff://$HOST:$PORT"

JAVA_OPTS="$JAVA_OPTS -Denable.quotes=false
-Denable.tradereports=false -Denable.marketdata=false
-Denable.instruments=false"

#Make sure this is the correct version of your jar

java ${JAVA_OPTS} -jar gateway_cli_client-latest-SNAPSHOT-run.jar
```

Run startMDClient.sh and follow the prompts on the screen to connect to the instrument and market
data service. As you do this monitor the mgftest.debug in a separate terminal window so you can see
what happens as you connect to a service.

```
/orcreleases/gateway_cli_client] ./startMDClient.sh
OrderService disabled!
OrderService disabled!
TradeReportService disabled!
InstrumentService configuration parameters:
Provider name: null
Provider id : 0
Market id : 0
MarketDataService configuration parameters:
Provider name: null
Provider id : 0
Market id : 0
********
*** Service API Client ***
*********
*** c - Connect
*** h - Print Help
                      * * *
*** q - Quit
********
InstrumentService:onOpened, provider: ServiceVersion=1.9,
ServiceImplVersion=1.0, ApplicationVersion=1.64-SNAPSHOT /
1329280017712 / 23313, MessageEncoding=ISO-8859-1
MarketDataService:onOpened, provider: ServiceVersion=1.6,
ServiceImplVersion=1.0, ApplicationVersion=1.64-SNAPSHOT /
1329280017712 / 23313, MessageEncoding=ISO-8859-1
*********
    Service API Client
********
*** Available services:
* * *
                      * * *
*** i - InstrumentService ***
*** m - MarketDataService ***
********
*** d - Disconnect
********
*** h - Print Help
*** q - Quit
Press Enter for: c
>>
```

request a snapshot of all the instruments.

```
********
   Service API Client ***
*********
*** Available services:
*** i - InstrumentService ***
*** m - MarketDataService ***
*******
*** d - Disconnect
*** h - Print Help
*** q - Quit
********
Press Enter for: c
>> i
*********
     InstrumentService
********
*** Available commands:
                       * * *
*** Transactions:
                       * * *
*** f - Find Instruments ***
*** t - Find TickTable
                       * * *
                       * * *
*** Subscriptions:
                       * * *
*** i - Instrument Subscr. ***
*** s - TickTable Subscr. ***
*** b - Back to Main menu ***
*** h - Print Help
                       * * *
                       * * *
*** q - Quit
*******
>> i
Valid input:
Snapshot[0], Subscribe[1], Unsubscribe[2], SubscribeWithoutSnapshot[3]
     , Unknown[i¿¿]
Action >> 0
Received InstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument:OrderBookID="20082",
TickRulesTableID="T2", Currency="SEK", RoundLot=100.0, Factor=1.0,
MassQuoteID="UL_BIG", Symbol="SYMB20082", CFICode="ESVUOB",
SecurityType=CS,
SecurityDesc="SYMBOL20082", ContractMultiplier=1.0,
UnderlyingSymbol="UL_BIG"}}
Received InstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument:OrderBookID="20080",
TickRulesTableID="T2", Currency="SEK", RoundLot=100.0, Factor=1.0,
MassQuoteID="UL_BIG", Symbol="SYMB20080", CFICode="ESVUOB",
SecurityType=CS,
SecurityDesc="SYMBOL20080", ContractMultiplier=1.0,
UnderlyingSymbol="UL_BIG" } }
```

(many instruments)

Received InstrumentsSubscriptionSnapshotEndRsp:
{SnapshotEndRsp:RequestID=0, RejReason=Success, MessageTypeID=49}

① Useful Information

After the instrument download finishes printing to the screen type 'b' and hit <enter> to navigate back to the main menu.

• Now we will navigate back to the main menu and use the marketdata service to subscribe for TopOfBook for one instrument:

```
Received InstrumentsSubscriptionSnapshotEndRsp:
{SnapshotEndRsp:RequestID=0, RejReason=Success, MessageTypeID=49}
Returning to Main menu...
********
    Service API Client
********
*** Available services:
* * *
                      * * *
*** i - InstrumentService ***
*** m - MarketDataService ***
*********
*** d - Disconnect
*******
*** h - Print Help
*** q - Quit
Press Enter for: i
>> m
********
     MarketDataService
*******
*** Available commands:
                     * * *
* * *
                      * * *
*** Subscriptions:
*** t - Top of Book Sub.***
*** d - Depth Subscription ***
*** p - Public Trades Sub. ***
*** n - News Subscription ***
*********
*** b - Back to Main menu ***
*** h - Print Help
                      * * *
*** q - Quit
                      * * *
********
>> t
OrderBookId 20080
Valid input:
Snapshot[0], Subscribe[1], Unsubscribe[2], SubscribeWithoutSnapshot[3]
     , Unknown[i¿;]
Action >> 1
Press Enter for: t
>> Received TopOfBookSubscriptionTopOfBookFeed:
{TopOfBookFeed:OrderBook={OrderBook:OrderBookID="20080",
SecurityTradingStatus=ReadyToTrade, FeedStatus=Down}}
```

• Now open up a second terminal and run startOrderClient.sh. Follow the prompts on the screen to

connect to the order service and enter a new order for the same OrderBookID for which you subscribed for TopOfBook. Be sure to make it a limit order because mgftest will not send a TopOfBook update for a market order.

```
/orcreleases/gateway_cli_client] ./startOrderClient.sh
OrderService configuration parameters:
Provider name: null
Provider id : 0
Market id : 0
OrderService disabled!
TradeReportService disabled!
InstrumentService disabled!
MarketDataService disabled!
*******
    Service API Client
*** c - Connect
*** h - Print Help
*** q - Quit
                     * * *
********
OrderService:onOpened, provider: ServiceVersion=1.17,
ServiceImplVersion=1.0, ApplicationVersion=1.64-SNAPSHOT /
1329280017712 / 23313, MessageEncoding=ISO-8859-1,
ExtenstionValues={134217973=(String) "FiCustOrderCapacity"}
*******
   Service API Client
********
*** Available services:
                     * * *
*** o - OrderService
********
*** d - Disconnect
********
*** h - Print Help
                    * * *
*** q - Quit
*******
Press Enter for: c
>> 0
********
       OrderService
********
*** Available commands:
                     * * *
*** Transactions:
                    * * *
                    * * *
*** n - New Order
                    * * *
*** m - Modify Order
```

```
*** c - Cancel Order
*** e - Execute File
*** Subscriptions:
*** o - Order Subscription ***
*** t - Trade Subscription ***
*******
*** b - Back to Main menu ***
                          * * *
*** h - Print Help
                          * * *
*** q - Quit
*******
>> n
OrderBookID >> 20080
Valid input:
Buy[1], Sell[2], Unknown[i¿;]
Side >> 1
Qty >> 10
Price >> 50
Valid input:
Market[1], Limit[2], StopOrStopLoss[3], StopLimit[4], WithOrWithout[6]
    , LimitOrBetter[7], LimitWithOrWithout[8], OnBasis[9],
PreviouslyOuoted[D]
    , PreviouslyIndicated[E], ForexSwap[G], Funari[I],
MarketIfTouched[J]
    , MarketWithLeftOverAsLimit[K], PreviousFundValuationPoint[L],
NextFundValuationPoint[M]
    , Pegged[P], CounterOrderSelection[Q], Unknown[i¿;]
Type >>
Valid input:
Day[0], GoodTillCancel[1], AtOpening[2], ImmediateOrCancel[3],
FillOrKill[4]
   , GoodTillCrossing[5], GoodTillDate[6], AtClose[7],
GoodThroughCrossing[8]
   , AtCrossing[9], Unknown[ï¿¿]
TiF >>
Sending create order: {Order:OrderBookID="20080",
OrderID=1351631033080, Side=Buy, OrderQty=10.0, OrdType=Limit,
Price=50.0, Originator="testUser", TimeInForce=Day}
Press Enter for: n
>> Received CreateOrderOperationResponse:
{CreateOrderRsp:RequestID=1331253081469, TransactionID=0,
InTimestamp=0, OutTimestamp=0, Order={Order:OrderID=1351631033080,
Price=50.0, CumQty=0.0, OrdStatus=New,
```

```
SecondaryOrderID="Mkt1331250658617",
ExchCreationTime=1331253110630000}}
```

 Notice you should have received a CreateOrderOperationResponse and the MarketData Service client should have received a TopOfBookFeed:

```
Received TopOfBookSubscriptionTopOfBookFeed:
{TopOfBookFeed:TransactionID=0,
OrderBook={OrderBook:OrderBookID="20080", BidPx=50.0, BidSize=10.0,
ImpliedBidSize=0.0, OfferPx=0.0, OfferSize=0.0, ImpliedOfferSize=0.0,
BidAtMarket=false, OfferAtMarket=false}}
```

3) Run hex output from mgftest.debug through BufferDumper

Now you are going to run BufferDumper against a hex dump of the TopOfBookFeed that mgftest sent to the client. In the future you can do this for any inbound/outbound message from mgftest.

• Find the hex dump of the TopOfBookFeed corresponding to the order you sent earlier in mgftest.debug.

```
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest [26970:Depth
Sender]/DEBUG:[MarketDataService.out] - Sent
sendTopOfBookSubscriptionTopOfBookFeed:
{TopOfBookFeed:TransactionID=0,
OrderBook={OrderBook:OrderBookID="20080", BidPx=50.0, BidSize=10.0,
ImpliedBidSize=0.0, OfferPx=0.0, OfferSize=0.0, ImpliedOfferSize=0.0,
BidAtMarket=false, OfferAtMarket=false}}
2012-03-08 18:31:50,640000 -0600 flashtaco mqftest [26970:Depth
Sender]/INFO:[mgf.marketdatamanager] - BBO: null(20080):
{OrderBook:OrderBookID="20080", BidPx=50.0, BidSize=10.0,
ImpliedBidSize=0.0, OfferPx=0.0, OfferSize=0.0, ImpliedOfferSize=0.0,
BidAtMarket=false, OfferAtMarket=false}
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest [26970:Order
Sender]/DEBUG:[session.order] - New OrderServiceProviderSender created
for thread id 33
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1
sent message of length 105 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:48979":
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] -
0000: 44 00 00 00 64 60 00 00
                               00 66 02 03 A1 27 4C 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] -
                                 27 73 06 32 30 30 38 30
0010: 8A 27 53 52 00 00 00 B2
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] -
0020: 00 84 01 52 00 00 00 00
                                00 00 49 40 86 01 52 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] -
0030: 00 00 00 00 00 24 40 D2
                                 27 52 00 00 00 00 00 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0005] -
0040: 00 00 85 01 52 00 00 00 00 00 00 00 87 01 52
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0006] -
0050: 00 00 00 00 00 00 00 00
                                D3 27 52 00 00 00 00 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] -
0060: 00 00 00 D4 27 66 D5 27
                                 66
```

Create a file called topofbookfeed_dump.txt and copy and paste just the hex dump into it.

```
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] -
0000: 44 00 00 00 64 60 00 00
                                00 66 02 03 A1 27 4C 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] -
0010: 8A 27 53 52 00 00 00 B2
                                27 73 06 32 30 30 38 30
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0003] -
0020: 00 84 01 52 00 00 00 00
                               00 00 49 40 86 01 52 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0004] -
                                27 52 00 00 00 00 00 00
0030: 00 00 00 00 00 24 40 D2
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0005] -
0040: 00 00 85 01 52 00 00 00
                                00 00 00 00 00 87 01 52
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0006] -
0050: 00 00 00 00 00 00 00 00
                               D3 27 52 00 00 00 00 00
2012-03-08 18:31:50,640000 -0600 flashtaco mgftest
[26970:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0007] -
0060: 00 00 00 D4 27 66 D5 27
                                66
```

Run bufferDumper.sh passing in topofbookfeed_dump.txt as an argument.

```
/orcreleases/mgftest/bin] ./bufferDumber.sh topofbookfeed_dump.txt
Original hex dump
_____
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] -
0000: 44 00 00 00 64 60 00 00
                                00 66 02 03 A1 27 4C 00
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] -
0010: 8A 27 53 52 00 00 00 B2
                               27 73 06 32 30 30 36 30
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0003] -
0020: 00 84 01 52 00 00 00 00
                                00 40 59 40 86 01 52 00
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0004] -
0030: 00 00 00 00 00 24 40 D2
                                27 52 00 00 00 00 00 00
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0005] -
0040: 00 00 85 01 52 00 00 00
                                00 00 00 00 00 87 01 52
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] -
0050: 00 00 00 00 00 00 00 00
                               D3 27 52 00 00 00 00 00
2012-03-08 12:26:23,626000 -0600 flashtaco mgftest
[23556:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] -
0060: 00 00 00 D4 27 66 D5 27
                                66
```

Cleaned up hex dump

Decoded message

00000: 44 : DOFF Message Type: 44 'D'

(char)

00001: 00 00 00 64 : DOFF message length: 100 bytes

(int32)

00005: 60 00 00 00 : SDOFF message length: 96 bytes

(nbo-uint32)

00009: 66 02 03 : SDOFF MessageTag/Service

Tag/Operation Id: [1.102]/[1.2]/3

00012: a1 27 4c 00 : [0.5025]=0 (uint64)

00016: 8a 27 53 52 00 00 00 : [0.5002]=Struct. Length: 82

bytes

00023: b2 27 73 06 32 30 30 36 30 00 : [0.5042]="20060" (string) 00033: 84 01 52 00 00 00 00 40 59 : [0.132]=101.0 (real64)

40

00044: 86 01 52 00 00 00 00 00 24 : [0.134]=10.0 (real64)

40

00055: d2 27 52 00 00 00 00 00 00 : [0.5074]=0.0 (real64)

00

00066: 85 01 52 00 00 00 00 00 00 : [0.133]=0.0 (real64)

00

00077: 87 01 52 00 00 00 00 00 00 : [0.135]=0.0 (real64)

00

00088: d3 27 52 00 00 00 00 00 00 00 : [0.5075]=0.0 (real64)

00

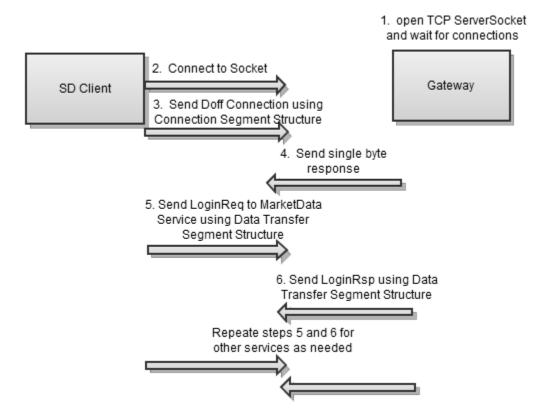
```
00099: d4 27 66 : [0.5076]=F (boolean)
00102: d5 27 66 : [0.5077]=F (boolean)
```

More info on running BufferDumper can be found in the Development Tools section of the general GDK-Native documentation.

GDK-Native Getting Started Guide

Initial Handshake and Login Tutorial

In this section you will learn how to provide a service and accept a login from a client. To simplify things we are not registering with the environment manager for service discovery at this point. Instead we will start the gateway on a static port and configure the Gateway CLI Client to connect directly to that port. While this is possible with the CLI client, if you are attempting to use Orc Trader or Liquidator you must register with the environment manager.



Handshake

Steps 1-4 in the diagram above constitute the handshake. Establishing the TCP connection should be straightforward. Below is an example of the handshake using the SD Command Line client. There are some differences in the connection message if you are using Orc Trader or Liquidator and I will point these out.

SD Command Line Client (CLI Client)

 In the previous tutorial on using the gateway development tools we have already used the CLI client to connect the mgftest gateway. From mgftest.debug we can see what the doff connection message from the CLI client looks like and also the 1 byte response the gateway replies with:

```
2012-03-08 18:02:04,816000 -0600 flashtaco mgftest
[26970:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceSocketServer]
- Accepted Socket Connection
2012-03-08 18:02:04,818000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl] - Channel 1 received message of
length 6 to "sdoff://127.0.0.1:10000" from "sdoff://127.0.0.1:48979":
2012-03-08 18:02:04,818000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 05 06 00 00
00 00
2012-03-08 18:02:04,818000 -0600 flashtaco mgftest
[26970:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n] - Received Connect message (pos=0, limit=6):
2012-03-08 18:02:04,818000 -0600 flashtaco mgftest
[26970:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n/Cont'd_0001] - 05 06 00 00 00 00
2012-03-08 18:02:04,818000 -0600 flashtaco mgftest
[26970:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n] - Received connect message with type 5, protocol=6, compression=0,
encryption=0
2012-03-08 18:02:04,819000 -0600 flashtaco mgftest
[26970:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n] - Sending Connect Reply message (pos=0, limit=1):
2012-03-08 18:02:04,819000 -0600 flashtaco mgftest
[26970:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n/Cont'd 0001] - 42
```

- The first byte "message type" should always be 0x05. This holds for the other clients as well.
- The second byte "protocol" is 0x06 indicating the CLI client will use Zlib binary protocol. The other clients may send a value 0x05 indicating Binary DOFF protocol. There is no behavior difference in your gateway between Zlib binary and Binary DOFF protocol. The other possible protocol types are legacy and need not be supported. So you may want to sanity check that this byte is equal to 5 or 6 but otherwise it can be ignored.
- The third byte indicates whether compression is enabled and the type if it is. Since it is 0x00 the CLI client uses does not use compression. Liquidator also does not use compression. Orc Trader may use ZLib compression if it is enabled to do so. If using compression the every byte in the Data Transfer Segment is compressed besides the Message Type and the DOFF Message Length. Java provides standard Zlib compression libraries java.util.zip.Inflater and java.util.zip.Deflater. Huffman compression is not supported by any of our clients.
- The remaining bytes indicate the Len and Payload and can be ignored.
- If there were no issues with the connection message then you should always reply with "B" or 0x42 in hex. If there was some problem with the connection you may reply with "F" to close it.
- At this point you should be able to create a simple program to establish the TCP connection with the CLI client and perform the DOFF handshake.

Login Request

Now we will look at the Login Request and Response for the CLI client. Again we will look to the mgftest.debug log for an example of the messages.

• Hex dump of LoginReq to MarketDataService from CLI client run through BufferDumper.

```
Original hex dump
2012-03-08 18:02:04,880000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 44 00 00 00
4D 49 00 00
            00 41 02 01 CC 27 6C 02
2012-03-08 18:02:04,880000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0002] - 0010: 9D 27 73 04
31 2E 36 00
             99 27 73 04 31 2E 30 00
2012-03-08 18:02:04,880000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0003] - 0020: 9A 27 73 13
             77 61 79 20 43 4C 49 20
2012-03-08 18:02:04,880000 -0600 flashtaco mqftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0004] - 0030: 43 6C 69 65
             04 73 09 74 65 73 74 55
6E 74 00 A9
2012-03-08 18:02:04,880000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0005] - 0040: 73 65 72 00
B7 27 73 0A
             74 65 73 74 47 72 6F 75
2012-03-08 18:02:04,880000 -0600 flashtaco mgftest
[26970:Channel_1_reader]/DEBUG:[cl/Cont'd_0006] - 0050: 70 00
Cleaned up hex dump
0000: 44 00 00 00 4D 49 00 00 00 41 02 01 CC 27 6C 02
0010: 9D 27 73 04 31 2E 36 00 99 27 73 04 31 2E 30 00
0020: 9A 27 73 13 47 61 74 65 77 61 79 20 43 4C 49 20
0030: 43 6C 69 65 6E 74 00 A9 04 73 09 74 65 73 74 55
0040: 73 65 72 00 B7 27 73 0A 74 65 73 74 47 72 6F 75
0050: 70 00
Decoded message
______
00000: 44
                                    : DOFF Message Type: 44 'D'
(char)
00001: 00 00 00 4d
                                    : DOFF message length: 77 bytes
(int32)
00005: 49 00 00 00
                                    : SDOFF message length: 73 bytes
(nbo-uint32)
00009: 41 02 01
                                     : SDOFF Message Tag/Service
Tag/Operation Id: [1.65]/[1.2]/1
00012: cc 27 6c 02
                                     : [0.5068] = 2 (int64)
00016: 9d 27 73 04 31 2e 36 00
                                   : [0.5021]="1.6" (string)
                               : [0.5017]="1.0" (string)
00024: 99 27 73 04 31 2e 30 00
00032: 9a 27 73 13 47 61 74 65 77 61 : [0.5018]="Gateway CLI Client"
(string)
      79 20 43 4c 49 20 43 6c 69 65
      6e 74 00
00055: a9 04 73 09 74 65 73 74 55 73 : [0.553]="testUser" (string);
      65 72 00
00068: b7 27 73 0a 74 65 73 74 47 72 : [0.5047]="testGroup" (string)
      6f 75 70 00
```

- The first byte (Byte 0 == 44) is the Message type. In most cases it will be 0x44 or 'D' for Plain Data but can also be 'C' Compressed if Compression is enabled. Messages with other types can be ignored.
- Bytes 1-4 = 00 00 00 4d = DOFF Message Length. Big Endian encoded. This is the only field that is Big Endian encoded. Does not include own length. A DOFF message may be composed of multiple SD messages in which case the DOFF message length would equal the total length of all the SD messages. If compression was enabled we would decompress the rest of the message up to Doff Length bytes.
- All of the remaining SD fields are Little Endian encoded
- Bytes 5-8 = 49 00 00 00 = SD Message Length. Does not include own length
- Bytes 9-11 = SD-Header: MessageTag, ServiceTag, and OperationID. While in this case MessageTag and ServiceTag are only one byte a piece they are defined as uint32 which means they are stop bit encoded entities of up to 4 bytes. At the bottom of this section is an example method in Java of how to decode these fields. OperationID is simply a single byte.
 - Decoding these three header fields gives us MessageTag=65, ServiceTag=2, OperationID=1. Note that this client did not add the orc namespace 5000 to the MessageTag of 65 or ServiceTag of 2. While all clients will do this for field tags, they will not always do it for Message or Service tags. When this happens we just add 5000 to the tag internally to get the adjusted tags of 5065 and 5002.
 - From the insfrastructure-message-definitions.xml MessageTag 65 in orc namespace = LoginReq:

```
<request name="LoginReq" extends="orc.BaseReq"
tag="orc.messages.65"><!-- 'A' -->
```

From service-definitions.xml Service 2 = MarketDataService

```
<service name="MarketDataService" tag="orc.services.2"
version="1.7">
```

- nothing needs to be done with the OperationID
- To decode a uint32 stop bit encoded entity: Read the bytes from left to right until you encounter a byte where the left most bit is 0. At this point you have all the bytes in the entity. Strip off the most significant bit of each byte in the entity, arrange the bytes in LittleEndian, and convert to decimal.
- stop bit decoding example for unsigned field type (uint16, uint32, or uint64):

```
private int fastDecodeInt(ByteBuffer buffer) {
   int result = 0;
   byte shift = 0;
   byte b = -1;
   while (b < 0) {
      b = buffer.get();
      result += ((b & 0x7F)) << shift;
      shift += 7;
   }

   //Sometimes only the tag value and not the orc namespace
value are used for services and messages
   //so we add 5000 for the orc namespace if it was not used.
   if(result < 5000){
      result += 5000;
   }

   return result;
}</pre>
```

• Now we decode the SD Body which consists of tag value pairs. Tags are of type uint32 which are stop bit encoded. The first tag is 5068. From insfrastructure-message-definitions.xml this is RequestID. (Add the Orc namespace value to the RequestID field value):

- The first byte of the value will always be a char indicating a message type. In this case reading in the ISO-8859-1 encoded byte 0x6c = 'I'. This indicates int64 although we already know this from the service-definition so this can pretty much be ignored.
- Next we read in the int64 value which is signed stop-bit encoded. Decoding signed stop-bit encoded values is a little different since the most significant (left-most) bit is the sign bit. Example code is below. Decoding the value we get 2 for the RequestID.
- Example Java method of how to do stop bit decoding for a signed or unsigned field type. If the field type is signed (int16, int32, or int64) then boolean the parameter signed should be true. Otherwise for type uint16, uint32, or uint64 signed should be false.

```
private long fastDecodeLong(ByteBuffer buffer, boolean signed) {
    long result = 0;
    byte shift = 0;
    byte b = -1;
    boolean neg = false;
    while (b < 0) {
      b = buffer.get();
      if (signed && shift == 0) {
        neg = ((b \& 0x40) == 0x40);
        result += (b & 0x3F);
        shift = 6;
      else {
        if (signed && shift == 62) {
          long lastPart = (b \& 0x7F);
          if (lastPart == 0L | lastPart == 1L) {
            result += lastPart << shift;
          else if (neg && lastPart == 2L && result == 0L) {
            return Long.MIN VALUE;
          else {
            throw new RuntimeException("Value overflow, value
outside range of long");
        }
        else {
          result += ((long) (b \& 0x7F)) << shift;
          shift += 7;
      }
    if (neg && result < 0) {
      throw new RuntimeException("Value overflow, value > " +
Long.MAX_VALUE);
    return neg ? -result : result;
}
```

- The next tag decodes to 5021 = ServiceVersion which is a String. The charset received from the client is ISO-8859-1.
 - The first byte of the value is 0x73 which equals 's' indicating String. This will be the first byte of all Strings.
 - Next we need to decode to stop bit decode the string length 0x04 = 4.
 - The next 4 bytes make up the String: 31 2e 36 00 = "1.6". The last byte will always be 0x00 to indicate "\0".
- The remaining 4 tag value pairs of the message are Strings so decode the same as above.
- To sum up after this message is decoded it represents a LoginReq to the MarketDataService for testUser:testGroup. Assuming the ServiceVersion and ServiceImplVersion are valid and there is no existing

login for user:group active your GDK application should now create a MarketDateService session for this user:group and send a successful LoginRsp to the client.

Login Response

	ferDumper output of the hexdump of MarketDataService LoginResponse taken from mgftest.debu						
1							

```
Original hex dump
______
2012-03-12 10:25:49,261000 -0500 flashtaco mqftest
[27929:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] -
0000: 44 00 00 00 58 54 00 00 00 61 02 01 CC 27 6C 02
2012-03-12 10:25:49,261000 -0500 flashtaco mgftest
[27929:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] -
0010: AD 27 69 00 9D 27 73 04 31 2E 36 00 99 27 73 04
2012-03-12 10:25:49,261000 -0500 flashtaco mgftest
[27929:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] -
0020: 31 2E 30 00 9A 27 73 26
                               31 2E 36 34 2D 53 4E 41
2012-03-12 10:25:49,261000 -0500 flashtaco mgftest
[27929:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] -
0030: 50 53 48 4F 54 20 2F 20
                                31 33 32 39 32 38 30 30
2012-03-12 10:25:49,261000 -0500 flashtaco mqftest
[27929:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] -
0040: 31 37 37 31 32 20 2F 20
                                32 33 33 31 33 00 DB 02
2012-03-12 10:25:49,261000 -0500 flashtaco mgftest
[27929:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] -
0050: 73 0B 49 53 4F 2D 38 38 35 39 2D 31 00
Cleaned up hex dump
0000: 44 00 00 00 58 54 00 00 00 61 02 01 CC 27 6C 02
0010: AD 27 69 00 9D 27 73 04 31 2E 36 00 99 27 73 04
0020: 31 2E 30 00 9A 27 73 26 31 2E 36 34 2D 53 4E 41
0030: 50 53 48 4F 54 20 2F 20 31 33 32 39 32 38 30 30
0040: 31 37 37 31 32 20 2F 20 32 33 33 31 33 00 DB 02
0050: 73 0B 49 53 4F 2D 38 38 35 39 2D 31 00
Decoded message
_____
00000: 44
                                     : DOFF Message Type: 44 'D'
(char)
00001: 00 00 00 58
                                     : DOFF message length: 88 bytes
(int32)
00005: 54 00 00 00
                                    : SDOFF message length: 84 bytes
(nbo-uint32)
00009: 61 02 01
                                     : SDOFF Message Tag/Service
Tag/Operation Id: [1.97]/[1.2]/1
00012: cc 27 6c 02
                                    : [0.5068] = 2 (int64)
00016: ad 27 69 00
                                     : [0.5037] = 0 (int32)
                                   : [0.5021]="1.6" (string)
00020: 9d 27 73 04 31 2e 36 00
00028: 99 27 73 04 31 2e 30 00
                                    : [0.5017]="1.0" (string)
00036: 9a 27 73 26 31 2e 36 34 2d 53 : [0.5018]="1.64-SNAPSHOT /
1329280017712 / 23313" (string)
       4e 41 50 53 48 4f 54 20 2f 20
       31 33 32 39 32 38 30 30 31 37
      37 31 32 20 2f 20 32 33 33 31
       33 00
00078: db 02 73 0b 49 53 4f 2d 38 38 : [0.347]="ISO-8859-1" (string)
       35 39 2d 31 00
```

- Encoding the response should be straightforward once you're able to decode the request. The Doff message
 constant should always be 'D' = 0x44 unless the login failed and you are closing the connection in which case
 you send 'F'.
- Example java code for stop-bit encoding:

```
protected final long mask8 = 0x00000000000000ffL;
 protected final long mask16 = 0x000000000000ffffL;
 protected final long mask32 = 0x0000000fffffffffL;
 protected final long mask64 = -1L;
/**
* copy the value into the buffer at it's current position.
signed indicates whether the type is signed or unsigned.
* Param mask is one of the masks above corresponding to the data type
you are encoding. So for int8 or uint8 pass in mask8, int16 ->
mask16, etc...
* /
protected void fastEncodeLong(ByteBuffer buffer, long value, boolean
signed, final long mask) {
    rangeCheck(value, mask);
    long tmp = value;
    if (tmp < 0 && !signed) {
      if ((tmp & ~mask) != ~mask) {
        throw new RuntimeException("Value is negative but written as
unsigned.");
      }
      else {
        tmp = value & mask;
    if (signed) {
      byte sign = 0x00;
      if (signed && tmp < 0) {
        sign = (byte) 0x40;
        tmp = -tmp;
      if (tmp > 0x3F) {
        buffer.put((byte) (0x80 | sign | (tmp & 0x3F)));
        tmp = tmp >> 6;
        while (tmp > 0x7F) {
          buffer.put((byte) (0x80 | (tmp & 0x7F)));
          tmp = tmp >> 7;
        buffer.put((byte) tmp);
      }
      else {
        buffer.put((byte) (sign | tmp));
      }
```

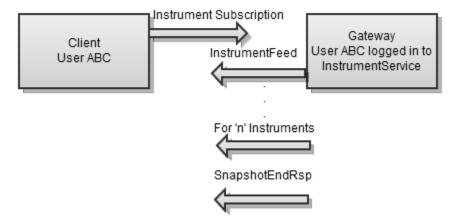
```
else {
      while ((tmp & 0xffffffffffffff80L) != 0) {
        // while (tmp > 0x7F) {
        buffer.put((byte) (0x80 | (tmp & 0x7F)));
        tmp = tmp >> 7;
        tmp &= 0x01fffffffffffff;
     buffer.put((byte) (tmp & 0x7F));
   * Checks that the long value is in the range implied by the
provided mask. The method is agnostic with respect to
   * signed/unsigned. For instance, to check that a long value is a
valid uint8, set mask to 0xff. Any bit pattern in
   * the ranges 0xfffffff00-0xfffffffff and 0x00000000-0x0000000ff will
be accepted. Note that this implies that there are
   * two alternative representations of any uint8 value. In other
words, 0xffffff00 == 0x00000000 when seen as a uint8.
   * @param value
              The value to be checked
   * @param mask
              Bit mask (2**N)-1 (N=8,16,32 or 64)
   * @param contextDescription
              Used for error reporting
   * /
  protected void rangeCheck(final long value, final long mask) {
    long extraBits = (value & ~mask);
    if (extraBits == OL || extraBits == ~mask) {
      return;
```

```
throw new IllegalArgumentException("Value out of range");
}
```

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Instrument Subscription

At this point you should be able to use the Gateway CLI Client to log into a service provided by your GDK gateway. The next step is to have the client send an instrument subscription and the gateway publish a snapshot of all it's instruments.



Instrument Subscription Request

BufferDumper output of instrument subscription request sent from CLI client. Hex dump taken mgftest.debug:

```
Original hex dump
_____
2012-03-12 14:17:05,864000 -0500 flashtaco mgftest
[27929:Channel_2_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 44 00 00 00
OF OB 00 00 00 31 01 04 CC 27 6C 00
2012-03-12 14:17:05,864000 -0500 flashtaco mgftest
[27929:Channel_2_reader]/DEBUG:[cl/Cont'd_0002] - 0010: 87 02 62 30
Cleaned up hex dump
0000: 44 00 00 00 0F 0B 00 00 00 31 01 04 CC 27 6C 00
0010: 87 02 62 30
Decoded message
______
00000: 44
                                    : DOFF Message Type: 44 'D'
(char)
00001: 00 00 00 0f
                                    : DOFF message length: 15 bytes
(int32)
00005: 0b 00 00 00
                                    : SDOFF message length: 11 bytes
(nbo-uint32)
00009: 31 01 04
                                    : SDOFF Message Tag/Service
Tag/Operation Id: [1.49]/[1.1]/4
00012: cc 27 6c 00
                                    : [0.5068] = 0 (int64)
00016: 87 02 62 30
                                    : [0.263]='0' (octet)
```

- The SD header decodes to Message Tag = 49, Service Tag = 1, OperationId = 4. From service-definitions.xml this maps to InstrumentSubscriptionControl, InstrumentService, InstrumentSubscription.
- The first tag-value = RequestID=0.
- The second tag = 263 and is defined in fix-fields-definitions.xml as SubscriptionRequestType. The type of SubscriptionRequestType is SubscriptionRequestTypeEnum. SubscriptionRequestTypeEnum is also defined in fix-fields-definitions.xml however it is over-ridden in service-definitions.xml and restriced to just the values defined there.
 - from fix-fields-definitions.xml:

• from service-definitions.xml:

• The Subscription request type = 0 = Snapshot so this means to just publish a snapshot of all the instruments and then close the subscription. If it were SnapshotUpdates you would keep the subscription open after the snapshot and publish any updates as they come in.

InstrumentFeed

In response to an InstrumentSubscription the gateway publishes and InstrumentFeed for each of it's instruments and a SnapshotEndRsp to indicate all the feeds have been published. By default the mgftest gateway load 115

instruments on startup. If you look at the hex dump after an instrument subscription it is quite large. This is because we pack multiple InstrumentSubscriptionFeed messages into a single message on the wire. We will encode and send each message individually but if the sending thread is not available we pack the encoded message into a buffer of messages waiting to be sent. Once the sending thread becomes available it will flush the whole buffer. For our purposes I have configured mgftest to have just a few instruments.

mgftest.debug for publishing InstrumentFeed for 6 instruments (one of which is multi-leg) and 1 InstrumentLegFeed

```
2012-03-12 15:29:23,276000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[cl] - Channel 1 received message of length
20 to "sdoff://127.0.0.1:10000" from "sdoff://127.0.0.1:34779":
2012-03-12 15:29:23,276000 -0500 flashtaco mgftest
[30114:Channel 1 reader]/DEBUG:[cl/Cont'd 0001] - 0000: 44 00 00 0F 0B
        00 31 01 04 CC 27 6C 00
2012-03-12 15:29:23,276000 -0500 flashtaco mgftest
[30114:Channel 1 reader]/DEBUG:[cl/Cont'd 0002] - 0010: 87 02 62 30
2012-03-12 15:29:23,278000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.in] - Received
InstrumentsSubscription: {InstrumentsSubscriptionControlReq:RequestID=0,
SubscriptionRequestType=Snapshot}
2012-03-12 15:29:23,278000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[session.instrument] -
onInstrumentsSubscriptionControl: Session: instrument:testUser:testGroup:1
Request:
{InstrumentsSubscriptionControlReq:RequestID=0,SubscriptionRequestType=Snap
shot } receivedNanoTime: 10643784023883921
2012-03-12 15:29:23,279000 -0500 flashtaco mgftest
[30114:Channel 1 reader]/DEBUG:[session.instrument] - New
IInstrumentServiceProviderSender created for thread id 37
2012-03-12 15:29:23,280000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument={Instrument:OrderBookID="4711",
TickRulesTableID="T2", Currency="USD", RoundLot=500.0, Factor=1.0,
MassQuoteID="UL2", Symbol="ABB", CFICode="ESVUOB",
SecurityType=CS, SecurityDesc="ABB B", ContractMultiplier=1.0,
UnderlyingSymbol="UL2"}, ChannelID=null, ExchangeSecurityId=null,
MinPriceIncrementAmount=1.0, BookDepth=1, ImpliedBookDepth=0}}
2012-03-12 15:29:23,280000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument={Instrument:OrderBookID="10000",
TickRulesTableID="T2", Currency="SEK", RoundLot=100.0, Factor=1.0,
MassQuoteID="UL1", Symbol="SYMB10000", CFICode="ESVUOB",
SecurityType=CS, SecurityDesc="SYMBOL10000", ContractMultiplier=1.0,
UnderlyingSymbol="UL1" }, ChannelID=null, ExchangeSecurityId=null,
MinPriceIncrementAmount=1.0, BookDepth=1, ImpliedBookDepth=0}}
2012-03-12 15:29:23,280000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument={Instrument:OrderBookID="Combo1",
TickRulesTableID="T2", Currency="NOK", RoundLot=1000.0, Factor=1.0,
```

```
MassQuoteID="UL2", Symbol="XYZ", CFICode="MMMM",
SecurityType=MultiLeg, SecurityDesc="XYZ Desc", ContractMultiplier=1.0,
UnderlyingSymbol="UL2"}, ChannelID=null, ExchangeSecurityId=null,
MinPriceIncrementAmount=1.0, BookDepth=1, ImpliedBookDepth=0}}
2012-03-12 15:29:23,281000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentLegFeed:
{InstrumentLegFeed:OrderBookID="Combo1", InstrumentLegs=[parentOrderbookid:
null exchangeSecurityId: null{InstrumentLeg:OrderBookID="101", Side=Buy,
LegRatioQty=1.0}, parentOrderbookid: null
exchangeSecurityId: null{InstrumentLeg:OrderBookID="4711", Side=Sell,
LegRatioQty=2.0}]}
2012-03-12 15:29:23,281000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument:OrderBookID="1312",
TickRulesTableID="T1", Currency="EUR", RoundLot=500.0, Factor=1.0,
MassQuoteID="UL1", Symbol="FUT1", CFICode="FFSPSX",
SecurityType=Future, SecurityDesc="FUT1 Desc", ContractMultiplier=1.0,
UnderlyingSymbol="UL1"}, ChannelID=null, ExchangeSecurity
Id=null, MinPriceIncrementAmount=1.0, BookDepth=1, ImpliedBookDepth=0}}
2012-03-12 15:29:23,281000 -0500 flashtaco mgftest
[30114:Channel 1 reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument={Instrument:OrderBookID="101",
TickRulesTableID="T1", Currency="SEK", RoundLot=100.0, Factor=1.0,
MassQuoteID="UL1", Symbol="ERICB", CFICode="ESVUOB", SecurityType=CS,
SecurityDesc="Ericsson B", ContractMultiplier=1.0, UnderlyingSymbol="UL1"},
ChannelID=null, ExchangeSecurityId=null, MinPriceIncrementAmount=1.0,
BookDepth=1, ImpliedBookDepth=0}}
2012-03-12 15:29:23,281000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionInstrumentFeed:
{InstrumentFeed:Instrument={Instrument={Instrument:OrderBookID="1311",
TickRulesTableID="T2", Currency="GBP", RoundLot=500.0, Factor=1.0,
MassQuoteID="UL2", Symbol="WAR1", CFICode="RWSTCB", SecurityType=Warrant,
SecurityDesc="WAR1 Desc", ContractMultiplier=1.0, UnderlyingSymbol="UL2"},
ChannelID=null, ExchangeSecurityId=null, MinPriceIncrementAmount=1.0,
BookDepth=1, ImpliedBookDepth=0}}
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1 sent
message of length 114 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:34779":
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] - 0000:
44 00 00 00 6D 69 00 00
                         00 32 01 04 89 27 53 5F
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
00 00 00 B2 27 73 05 34 37 31 31 00 BD 27 73 03
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
54 32 00 OF 73 04 55 53 44 00 B1 04 52 00 00 00
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
```

```
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
00 00 40 7F 40 E4 01 72 00 00 80 3F C5 27 73 04
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
55 4C 32 00 37 73 04 41
                         42 42 00 CD 03 73 07 45
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] - 0050:
53 56 55 4F 42 00 A7 01
                         69 13 6B 73 06 41 42 42
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] - 0060:
20 42 00 E7 01 72 00 00
                        80 3F B7 02 73 04 55 4C
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0008] - 0070:
32 00
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:Channel_1_reader]/DEBUG:[InstrumentService.out] - Sent
sendInstrumentsSubscriptionSnapshotEndRsp: {SnapshotEndRsp:RequestID=0,
RejReason=Success, MessageTypeID=49}
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1 sent
message of length 656 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:34779":
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0001] - 0000:
44 00 00 02 8B 76 00 00
                        00 32 01 04 89 27 53 6C
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0002] - 0010:
00 00 00 B2 27 73 06 31
                         30 30 30 30 00 BD 27 73
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
03 54 32 00 OF 73 04 53
                         45 4B 00 B1 04 52 00 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
00 00 00 00 59 40 E4 01
                         72 00 00 80 3F C5 27 73
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0005] - 0040:
04 55 4C 31 00 37 73 0A
                         53 59 4D 42 31 30 30 30
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] - 0050:
30 00 CD 03 73 07 45 53
                         56 55 4F 42 00 A7 01 69
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] - 0060:
13 6B 73 0C 53 59 4D 42
                         4F 4C 31 30 30 30 30 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0008] - 0070:
E7 01 72 00 00 80 3F B7
                         02 73 04 55 4C 31 00 6C
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0009] - 0080:
00 00 00 32 01 04 89 27 53 62 00 00 00 B2 27 73
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0010] - 0090:
07 43 6F 6D 62 6F 31 00 BD 27 73 03 54 32 00 0F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
```

```
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0011] - 00A0:
73 04 4E 4F 4B 00 B1 04 52 00 00 00 00 00 40 8F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0012] - 00B0:
40 E4 01 72 00 00 80 3F
                         C5 27 73 04 55 4C 32 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0013] - 00C0:
37 73 04 58 59 5A 00 CD
                         03 73 05 4D 4D 4D 4D 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0014] - 00D0:
A7 01 69 2A 6B 73 09 58
                        59 5A 20 44 65 73 63 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0015] - 00E0:
E7 01 72 00 00 80 3F B7
                         02 73 04 55 4C 32 00 45
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0016] - 00F0:
00 00 00 36 01 04 B2 27
                        73 07 43 6F 6D 62 6F 31
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0017] - 0100:
00 9F 27 41 30 00 00 00
                         02 53 12 00 00 00 B2 27
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0018] - 0110:
73 04 31 30 31 00 36 62
                         31 EF 04 72 00 00 80 3F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0019] - 0120:
53 13 00 00 00 B2 27 73
                         05 34 37 31 31 00 36 62
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0020] - 0130:
32 EF 04 72 00 00 00 40
                         6E 00 00 00 32 01 04 89
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0021] - 0140:
27 53 64 00 00 00 B2 27
                        73 05 31 33 31 32 00 BD
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0022] - 0150:
27 73 03 54 31 00 0F 73
                         04 45 55 52 00 B1 04 52
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0023] - 0160:
00 00 00 00 00 40 7F 40
                        E4 01 72 00 00 80 3F C5
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0024] - 0170:
27 73 04 55 4C 31 00 37 73 05 46 55 54 31 00 CD
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0025] - 0180:
03 73 07 46 46 53 50 53
                         58 00 A7 01 69 21 6B 73
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0026] - 0190:
OA 46 55 54 31 20 44 65
                         73 63 00 E7 01 72 00 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0027] - 01A0:
80 3F B7 02 73 04 55 4C
                          31 00 6F 00 00 00 32 01
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0028] - 01B0:
04 89 27 53 65 00 00 00 B2 27 73 04 31 30 31 00
```

```
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0029] - 01C0:
BD 27 73 03 54 31 00 0F
                        73 04 53 45 4B 00 B1 04
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0030] - 01D0:
52 00 00 00 00 00 00 59
                        40 E4 01 72 00 00 80 3F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0031] - 01E0:
C5 27 73 04 55 4C 31 00
                         37 73 06 45 52 49 43 42
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0032] - 01F0:
00 CD 03 73 07 45 53 56 55 4F 42 00 A7 01 69 13
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0033] - 0200:
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0034] - 0210:
72 00 00 80 3F B7 02 73
                         04 55 4C 31 00 6F 00 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0035] - 0220:
00 32 01 04 89 27 53 65
                         00 00 00 B2 27 73 05 31
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0036] - 0230:
33 31 31 00 BD 27 73 03
                        54 32 00 OF 73 04 47 42
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0037] - 0240:
50 00 B1 04 52 00 00 00
                         00 00 40 7F 40 E4 01 72
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0038] - 0250:
                         55 4C 32 00 37 73 05 57
00 00 80 3F C5 27 73 04
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0039] - 0260:
41 52 31 00 CD 03 73 07 52 57 53 54 43 42 00 A7
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0040] - 0270:
01 69 97 01 6B 73 0A 57 41 52 31 20 44 65 73 63
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0041] - 0280:
00 E7 01 72 00 00 80 3F
                         B7 02 73 04 55 4C 32 00
2012-03-12 15:29:23,291000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1 sent
message of length 24 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:34779":
2012-03-12 15:29:23,291000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] - 0000:
44 00 00 00 13 0F 00 00 00 2E 01 04 CC 27 6C 00
2012-03-12 15:29:23,291000 -0500 flashtaco mgftest
```

[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010: AD 27 69 00 AA 27 49 31

- You see that in response to the InstrumentSubscription we iterated through all our instruments and for each published an InstrumentFeed. We also sent an InstrumentLegFeed containing all the legs of the multileg instrument. This resulted in 2 messages being sent on the wire. The first InstrumentFeed was sent individually over the wire. The remaining InstrumentFeeds and InstrumentLegFeed were SDOFF encoded but then placed in a buffer because the sending thread was busy and they were all sent together as one DOFF message once the sending thread finished with the first message.
- The third message sent on the wire was the SnapshotEndRsp indicating all the instruments have been sent and the subscription is now closed.

Single InstrumentFeed BufferDumper

```
Original hex dump
______
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0001] - 0000:
44 00 00 00 6D 69 00 00
                         00 32 01 04 89 27 53 5F
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
00 00 00 B2 27 73 05 34
                        37 31 31 00 BD 27 73 03
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
54 32 00 OF 73 04 55 53
                         44 00 B1 04 52 00 00 00
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
00 00 40 7F 40 E4 01 72 00 00 80 3F C5 27 73 04
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
55 4C 32 00 37 73 04 41 42 42 00 CD 03 73 07 45
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] - 0050:
53 56 55 4F 42 00 A7 01
                         69 13 6B 73 06 41 42 42
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] - 0060:
20 42 00 E7 01 72 00 00
                         80 3F B7 02 73 04 55 4C
2012-03-12 15:29:23,282000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0008] - 0070:
32 00
Cleaned up hex dump
0000: 44 00 00 00 6D 69 00 00 00 32 01 04 89 27 53 5F
0010: 00 00 00 B2 27 73 05 34 37 31 31 00 BD 27 73 03
0020: 54 32 00 OF 73 04 55 53 44 00 B1 04 52 00 00 00
0030: 00 00 40 7F 40 E4 01 72 00 00 80 3F C5 27 73 04
0040: 55 4C 32 00 37 73 04 41 42 42 00 CD 03 73 07 45
0050: 53 56 55 4F 42 00 A7 01 69 13 6B 73 06 41 42 42
0060: 20 42 00 E7 01 72 00 00 80 3F B7 02 73 04 55 4C
0070: 32 00
```

Decoded message

```
-----
```

00000: 44 : DOFF Message Type: 44 'D' (char) 00001: 00 00 00 6d : DOFF message length: 109 bytes (int32) 00005: 69 00 00 00 : SDOFF message length: 105 bytes (nbo-uint32) 00009: 32 01 04 : SDOFF Message Tag/Service Tag/Operation Id: [1.50]/[1.1]/4 00012: 89 27 53 5f 00 00 00 : [0.5001]=Struct. Length: 95 bytes 00019: b2 27 73 05 34 37 31 31 00 : [0.5042]="4711" (string) 00028: bd 27 73 03 54 32 00 [0.5053]="T2" (string) 00035: 0f 73 04 55 53 44 00 : [0.15]="USD" (string) 00042: b1 04 52 00 00 00 00 40 7f : [0.561]=500.0 (real64) 00053: e4 01 72 00 00 80 3f [0.228]=1.0 (real32) : 00060: c5 27 73 04 55 4c 32 00 [0.5061]="UL2" (string) : 00068: 37 73 04 41 42 42 00 [0.55]="ABB" (string) 00075: cd 03 73 07 45 53 56 55 4f 42: [0.461]="ESVUOB" (string) 00

00086: a7 01 69 13

[0.167]=19 (int32) :

00090: 6b 73 06 41 42 42 20 42 00 : [0.107]="ABB B" (string)

```
00099: e7 01 72 00 00 80 3f : [0.231]=1.0 (real32)
00106: b7 02 73 04 55 4c 32 00 : [0.311]="UL2" (string)
```

- SD Header = 32 01 04 = InstrumentFeed/InstrumentService/InstrumentSubscription
- On the next line of 89 27 53 5f 00 00 00: First encode the tag = 5001 indicating the Instrument struct. Next encode the char value of 'S' for struct (We already know it's the Instrument struct but this is to support some legacy clients). Struct length is the next value to encode which is defined as le-uint32 (not stop bit just 4 bytes LittleEndian). At this point you would not yet know how many bytes are in the struct so can just mark the location where you write it and add it after you encode the rest of the struct.
- Encode all the fields of the struct. Most of these fields you should know how to do from previous example.
 Compute the struct length and add it.
- I will give some example java code for encoding of a real32/real64 since we haven't hit this before:

```
//encode real64
protected void fastEncodeDouble(ByteBuffer buffer, double value) {
    long representation = Double.doubleToLongBits(value);
    ByteOrder savedOrder = buffer.order();
    buffer.order(ByteOrder.LITTLE_ENDIAN);
    buffer.putLong(representation);
    buffer.order(savedOrder);
}

//encode real32
protected void fastEncodeFloat(ByteBuffer buffer, float value) {
    int representation = Float.floatToIntBits(value);
    ByteOrder savedOrder = buffer.order();
    buffer.order(ByteOrder.LITTLE_ENDIAN);
    buffer.putInt(representation);
    buffer.order(savedOrder);
}
```

Multiple InstrumentFeeds/InstrumentLegFeed in one DOFF message on wire

For simplicity you don't have to pack multiple InstrumentFeeds into the same DOFF message, you can send each one individually. Here is an example if you choose to:

```
00 00 00 00 59 40 E4 01 72 00 00 80 3F C5 27 73
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
04 55 4C 31 00 37 73 0A
                        53 59 4D 42 31 30 30 30
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0006] - 0050:
30 00 CD 03 73 07 45 53 56 55 4F 42 00 A7 01 69
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0007] - 0060:
13 6B 73 0C 53 59 4D 42
                         4F 4C 31 30 30 30 30 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0008] - 0070:
E7 01 72 00 00 80 3F B7
                         02 73 04 55 4C 31 00 6C
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0009] - 0080:
                         53 62 00 00 00 B2 27 73
00 00 00 32 01 04 89 27
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0010] - 0090:
07 43 6F 6D 62 6F 31 00
                        BD 27 73 03 54 32 00 0F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0011] - 00A0:
73 04 4E 4F 4B 00 B1 04
                         52 00 00 00 00 00 40 8F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0012] - 00B0:
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0013] - 00C0:
37 73 04 58 59 5A 00 CD 03 73 05 4D 4D 4D 4D 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0014] - 00D0:
                         59 5A 20 44 65 73 63 00
A7 01 69 2A 6B 73 09 58
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0015] - 00E0:
E7 01 72 00 00 80 3F B7
                         02 73 04 55 4C 32 00 45
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0016] - 00F0:
00 00 00 36 01 04 B2 27
                         73 07 43 6F 6D 62 6F 31
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0017] - 0100:
00 9F 27 41 30 00 00 00
                         02 53 12 00 00 00 B2 27
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0018] - 0110:
73 04 31 30 31 00 36 62
                         31 EF 04 72 00 00 80 3F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0019] - 0120:
53 13 00 00 00 B2 27 73
                         05 34 37 31 31 00 36 62
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0020] - 0130:
32 EF 04 72 00 00 00 40
                         6E 00 00 00 32 01 04 89
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0021] - 0140:
27 53 64 00 00 00 B2 27 73 05 31 33 31 32 00 BD
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
```

```
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0022] - 0150:
27 73 03 54 31 00 0F 73 04 45 55 52 00 B1 04 52
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0023] - 0160:
00 00 00 00 00 40 7F 40
                         E4 01 72 00 00 80 3F C5
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0024] - 0170:
27 73 04 55 4C 31 00 37
                         73 05 46 55 54 31 00 CD
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0025] - 0180:
03 73 07 46 46 53 50 53
                        58 00 A7 01 69 21 6B 73
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0026] - 0190:
OA 46 55 54 31 20 44 65
                         73 63 00 E7 01 72 00 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0027] - 01A0:
80 3F B7 02 73 04 55 4C
                         31 00 6F 00 00 00 32 01
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0028] - 01B0:
04 89 27 53 65 00 00 00
                         B2 27 73 04 31 30 31 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0029] - 01C0:
BD 27 73 03 54 31 00 0F 73 04 53 45 4B 00 B1 04
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0030] - 01D0:
52 00 00 00 00 00 00 59
                          40 E4 01 72 00 00 80 3F
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0031] - 01E0:
C5 27 73 04 55 4C 31 00
                         37 73 06 45 52 49 43 42
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0032] - 01F0:
00 CD 03 73 07 45 53 56
                        55 4F 42 00 A7 01 69 13
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0033] - 0200:
6B 73 0B 45 72 69 63 73
                         73 6F 6E 20 42 00 E7 01
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0034] - 0210:
72 00 00 80 3F B7 02 73 04 55 4C 31 00 6F 00 00
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0035] - 0220:
00 32 01 04 89 27 53 65 00 00 00 B2 27 73 05 31
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0036] - 0230:
33 31 31 00 BD 27 73 03
                         54 32 00 OF 73 04 47 42
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0037] - 0240:
50 00 B1 04 52 00 00 00
                         00 00 40 7F 40 E4 01 72
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0038] - 0250:
                          55 4C 32 00 37 73 05 57
00 00 80 3F C5 27 73 04
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0039] - 0260:
41 52 31 00 CD 03 73 07 52 57 53 54 43 42 00 A7
```

2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0040] - 0270:
01 69 97 01 6B 73 0A 57 41 52 31 20 44 65 73 63
2012-03-12 15:29:23,290000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0041] - 0280:
00 E7 01 72 00 00 80 3F B7 02 73 04 55 4C 32 00

Cleaned up hex dump

```
Decoded message
_____
00000: 44
                                 : DOFF Message Type: 44 'D' (char)
00001: 00 00 02 8b
                                 : DOFF message length: 651 bytes
(int32)
00005: 76 00 00 00
                                 : SDOFF message length: 118 bytes
(nbo-uint32)
00009: 32 01 04
                                 : SDOFF Message Tag/Service
Tag/Operation Id: [1.50]/[1.1]/4
00012: 89 27 53 6c 00 00 00 : [0.5001]=Struct. Length: 108 bytes
00019: b2 27 73 06 31 30 30 30 30 00 : [0.5042]="10000" (string)
                            : [0.5053]="T2" (string)
00029: bd 27 73 03 54 32 00
00036: 0f 73 04 53 45 4b 00
                               : [0.15]="SEK" (string)
00043: b1 04 52 00 00 00 00 00 59: [0.561]=100.0 (real64)
      40
00054: e4 01 72 00 00 80 3f
                                 : [0.228]=1.0 (real32)
00061: c5 27 73 04 55 4c 31 00 : [0.5061]="UL1" (string)
00069: 37 73 0a 53 59 4d 42 31 30 30 : [0.55]="SYMB10000" (string)
      30 30 00
00082: cd 03 73 07 45 53 56 55 4f 42: [0.461]="ESVUOB" (string)
      0.0
00093: a7 01 69 13
                                     [0.167]=19 (int32)
00097: 6b 73 0c 53 59 4d 42 4f 4c 31: [0.107]="SYMBOL10000" (string)
      30 30 30 30 00
00112: e7 01 72 00 00 80 3f : [0.231]=1.0 (real32)
00119: b7 02 73 04 55 4c 31 00
                                 : [0.311]="UL1" (string)
00127: 6c 00 00 00
                                 : SDOFF message length: 108 bytes
(nbo-uint32)
00131: 32 01 04
                                 : SDOFF Message Tag/Service
Tag/Operation Id: [1.50]/[1.1]/4
00134: 89 27 53 62 00 00 00 : [0.5001]=Struct. Length: 98 bytes
00141: b2 27 73 07 43 6f 6d 62 6f 31 : [0.5042]="Combo1" (string)
00152: bd 27 73 03 54 32 00
                             : [0.5053]="T2" (string)
00159: 0f 73 04 4e 4f 4b 00
                                 : [0.15]="NOK" (string)
00166: b1 04 52 00 00 00 00 40 8f : [0.561]=1000.0 (real64)
00177: e4 01 72 00 00 80 3f : [0.228]=1.0 (real32)
00184: c5 27 73 04 55 4c 32 00
                                      [0.5061]="UL2" (string)
                                 :
00192: 37 73 04 58 59 5a 00
                                 : [0.55]="XYZ" (string)
00199: cd 03 73 05 4d 4d 4d 4d 00 : [0.461]="MMMM" (string)
00208: a7 01 69 2a
                                      [0.167]=42 (int32)
00212: 6b 73 09 58 59 5a 20 44 65 73: [0.107]="XYZ Desc" (string)
      63 00
00224: e7 01 72 00 00 80 3f
                                 : [0.231]=1.0 (real32)
00231: b7 02 73 04 55 4c 32 00
                                 : [0.311]="UL2" (string)
00239: 45 00 00 00
                                 : SDOFF message length: 69 bytes
(nbo-uint32)
00243: 36 01 04
                                 : SDOFF Message Tag/Service
Tag/Operation Id: [1.54]/[1.1]/4
00246: b2 27 73 07 43 6f 6d 62 6f 31 : [0.5042]="Combo1" (string)
      00
00257: 9f 27 41 30 00 00 00 02 : [0.5023]=Array. Length: 48 bytes / 2
```

```
items.
00265: 53 12 00 00 00 : [0.5023]=Struct. Length: 18 bytes 00270: b2 27 73 04 31 30 31 00 : [0.5042]="101" (string)
00278: 36 62 31
                                        [0.54]='1' (octet)
                                  :
00281: ef 04 72 00 00 80 3f
                                        [0.623]=1.0 (real32)
                                  :
00288: 53 13 00 00 00
                                  : [0.5023]=Struct. Length: 19 bytes
00293: b2 27 73 05 34 37 31 31 00 :
                                       [0.5042]="4711" (string)
00302: 36 62 32
                                        [0.54]='2' (octet)
                                   :
00305: ef 04 72 00 00 00 40
                                         [0.623]=2.0 (real32)
                                   :
00312: 6e 00 00 00
                                  : SDOFF message length: 110 bytes
(nbo-uint32)
00316: 32 01 04
                                  : SDOFF Message Tag/Service
Tag/Operation Id: [1.50]/[1.1]/4
00319: 89 27 53 64 00 00 00
                                  : [0.5001]=Struct. Length: 100 bytes
00326: b2 27 73 05 31 33 31 32 00 : [0.5042]="1312" (string)
00335: bd 27 73 03 54 31 00
                                  :
                                       [0.5053]="T1" (string)
00342: 0f 73 04 45 55 52 00
                                  : [0.15]="EUR" (string)
00349: b1 04 52 00 00 00 00 40 7f : [0.561]=500.0 (real64)
      40
00360: e4 01 72 00 00 80 3f
                                  : [0.228]=1.0 (real32)
00367: c5 27 73 04 55 4c 31 00
                                  : [0.5061]="UL1" (string)
00375: 37 73 05 46 55 54 31 00
                                       [0.55]="FUT1" (string)
                                   :
00383: cd 03 73 07 46 46 53 50 53 58 : [0.461]="FFSPSX" (string)
00394: a7 01 69 21
                                   : [0.167]=33 (int32)
00398: 6b 73 0a 46 55 54 31 20 44 65 : [0.107]="FUT1 Desc" (string)
      73 63 00
00411: e7 01 72 00 00 80 3f : [0.231]=1.0 (real32)
00418: b7 02 73 04 55 4c 31 00
                                  : [0.311]="UL1" (string)
00426: 6f 00 00 00
                                   : SDOFF message length: 111 bytes
(nbo-uint32)
00430: 32 01 04
                                  : SDOFF Message Tag/Service
Tag/Operation Id: [1.50]/[1.1]/4
00433: 89 27 53 65 00 00 00
                                  : [0.5001]=Struct. Length: 101 bytes
00440: b2 27 73 04 31 30 31 00
                                  : [0.5042]="101" (string)
00448: bd 27 73 03 54 31 00
                                  : [0.5053]="T1" (string)
00455: 0f 73 04 53 45 4b 00
                                       [0.15]="SEK" (string)
                                  :
00462: b1 04 52 00 00 00 00 00 59: [0.561]=100.0 (real64)
      40
00473: e4 01 72 00 00 80 3f
                                       [0.228]=1.0 (real32)
00480: c5 27 73 04 55 4c 31 00
                                       [0.5061]="UL1" (string)
00488: 37 73 06 45 52 49 43 42 00 : [0.55]="ERICB" (string)
00497: cd 03 73 07 45 53 56 55 4f 42:
                                       [0.461]="ESVUOB" (string)
      0.0
00508: a7 01 69 13
                                       [0.167]=19 (int32)
00512: 6b 73 0b 45 72 69 63 73 73 6f :
                                       [0.107]="Ericsson B" (string)
      6e 20 42 00
00526: e7 01 72 00 00 80 3f
                                 : [0.231]=1.0 (real32)
00533: b7 02 73 04 55 4c 31 00
                                  :
                                       [0.311]="UL1" (string)
00541: 6f 00 00 00
                                   : SDOFF message length: 111 bytes
(nbo-uint32)
00545: 32 01 04
                                  : SDOFF Message Tag/Service
Tag/Operation Id: [1.50]/[1.1]/4
```

```
00548: 89 27 53 65 00 00 00 : [0.5001]=Struct. Length: 101 bytes 00555: b2 27 73 05 31 33 31 00 : [0.5042]="1311" (string)
00564: bd 27 73 03 54 32 00
                                    : [0.5053]="T2" (string)
00571: 0f 73 04 47 42 50 00
                                    : [0.15]="GBP" (string)
00578: b1 04 52 00 00 00 00 40 7f: [0.561]=500.0 (real64)
                                : [0.228]=1.0 (real32)
00589: e4 01 72 00 00 80 3f
00596: c5 27 73 04 55 4c 32 00
                                    : [0.5061]="UL2" (string)
00604: 37 73 05 57 41 52 31 00 :
                                         [0.55]="WAR1" (string)
00612: cd 03 73 07 52 57 53 54 43 42: [0.461]="RWSTCB" (string)
00623: a7 01 69 97 01
                                    : [0.167]=87 (int32)
00628: 6b 73 0a 57 41 52 31 20 44 65: [0.107]="WAR1 Desc" (string)
       73 63 00
```

```
00641: e7 01 72 00 00 80 3f : [0.231]=1.0 (real32)
00648: b7 02 73 04 55 4c 32 00 : [0.311]="UL2" (string)
```

- You see here multiple SDOFF messages sent as part of one DOFF message. DOFF Message Length needs to be the length of all the combined SDOFF messages.
- The InstrumentLegFeed (00243: 36 01 04: SDOFF Message Tag/Service Tag/Operation Id: 1.54/1.1/4) contains an example of encoding an array for future reference.

SnapshotEndRsp

SnapshotEndRsp notifies the clients that all the Instruments have been published.

```
Original hex dump
2012-03-12 15:29:23,291000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0001] - 0000:
44 00 00 00 13 0F 00 00 00 2E 01 04 CC 27 6C 00
2012-03-12 15:29:23,291000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
AD 27 69 00 AA 27 49 31
Cleaned up hex dump
______
0000: 44 00 00 00 13 0F 00 00 00 2E 01 04 CC 27 6C 00
0010: AD 27 69 00 AA 27 49 31
Decoded message
-----
00000: 44
                                   : DOFF Message Type: 44 'D' (char)
00001: 00 00 00 13
                                   : DOFF message length: 19 bytes
(int32)
00005: 0f 00 00 00
                                   : SDOFF message length: 15 bytes
(nbo-uint32)
00009: 2e 01 04
                                    : SDOFF Message Tag/Service
Tag/Operation Id: [1.46]/[1.1]/4
00012: cc 27 6c 00
                                   : [0.5068]=0 (int64)
00016: ad 27 69 00
                                   : [0.5037]=0 (int32)
00020: aa 27 49 31
                                    : [0.5034]=49 (uint32)
```

GDK-Native Getting Started Guide

TopOfBook Subscription

To get TopOfBook a client sends a TopOfBookSubscription similar to the InstrumentSubscription which was covered in more detail previously. The client specifies an OrderBookId as part of the TopOfBookSubscription to tell the gateway which instrument it would like to the TopOfBookFeed for. A separate subscription request is needed for each instrument. The gateway's behavior on receipt of the subscription request varies depending on the SubscriptionRequestType (same as for InstrumentSubscription) but for TopOfBook it is typically SnapshotUpdates indicating the client wants the snapshot of the current book and then stay subscribed for any future updates. It is not necessary to send the SnapshotEndRsp for TopOfBookFeed. When an update comes in you need only send those fields which have changed over the wire. For example if the current book is: Bid=10@50 Offer=10@51 and the exchange sends an update for just the offer you only need to send the OfferPx and OfferSize in the TopOfBookFeed.

I'm just going to show some log and hex dump from mgftest.debug of the TopOfBookSubscription and TopOfBookFeed here. See earlier examples for more detailed encoding/decoding help.

TopOfBookSubscription from client

```
2012-03-12 18:21:06,179000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[cl] - Channel 2 received message of length
28 to "sdoff://127.0.0.1:10000" from "sdoff://127.0.0.1:51407":
2012-03-12 18:21:06,179000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 44 00 00 00 17 13
        00 46 02 03 CC 27 6C 00
2012-03-12 18:21:06,179000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[cl/Cont'd_0002] - 0010: 87 02 62 31 B2 27
73 04
        31 30 31 00
BufferDumper:
Cleaned up hex dump
0000: 44 00 00 00 17 13 00 00 00 46 02 03 CC 27 6C 00
0010: 87 02 62 31 B2 27 73 04 31 30 31 00
Decoded message
_____
00000: 44
                                    : DOFF Message Type: 44 'D' (char)
00001: 00 00 00 17
                                    : DOFF message length: 23 bytes
(int32)
00005: 13 00 00 00
                                     : SDOFF message length: 19 bytes
(nbo-uint32)
00009: 46 02 03
                                     : SDOFF Message Tag/Service
Tag/Operation Id: [1.70]/[1.2]/3
00012: cc 27 6c 00
                                     : [0.5068]=0 (int64)
00016: 87 02 62 31
                                    : [0.263]='1' (octet)
00020: b2 27 73 04 31 30 31 00
                                    : [0.5042]="101" (string)
```

Publish TopOfBookFeed Snapshot to client

```
2012-03-12 18:21:06,180000 -0500 flashtaco mgftest
```

```
[30114:Channel_2_reader]/DEBUG:[MarketDataService.in] - Received
TopOfBookSubscription:
{TopOfBookSubscriptionControlReq:RequestID=0,
SubscriptionRequestType=Subscribe, OrderBookID="101"}
2012-03-12 18:21:06,180000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[session.marketdata] -
onTopOfBookSubscriptionControl: Session: marketdata:testUser:testGroup:2
Request:
{TopOfBookSubscriptionControlReq:RequestID=0,
SubscriptionRequestType=Subscribe, OrderBookID="101" } receivedNanoTime:
10654086927078921
2012-03-12 18:21:06,180000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/INFO:[session.marketdata] -
onTopOfBookSubscriptionControl: Session: marketdata:testUser:testGroup:2
Request:
{TopOfBookSubscriptionControlReq:RequestID=0,
SubscriptionRequestType=Subscribe, OrderBookID="101"} receivedNanoTime:
10654086927078921
2012-03-12 18:21:06,181000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[session.marketdata] - Sending BBO snapshot
for: 101
2012-03-12 18:21:06,181000 -0500 flashtaco mgftest
[30114:Channel 2 reader]/DEBUG:[session.marketdata] - New
IMarketDataServiceProviderSender created for thread id 39
2012-03-12 18:21:06,182000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[MarketDataService.out] - Sent
sendTopOfBookSubscriptionTopOfBookFeed:
{TopOfBookFeed:OrderBook={OrderBook:OrderBookID="101",
SecurityTradingStatus=ReadyToTrade, FeedStatus=Down}}
2012-03-12 18:21:06,182000 -0500 flashtaco mgftest
[30114:Channel_2_reader]/DEBUG:[mgf.marketdatasubscriptionhandler] -
TopOfBook: adding subscriptions for: 101 user: testUser
2012-03-12 18:21:06,182000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 2 sent
message of length 35 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:51407":
2012-03-12 18:21:06,182000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0001] - 0000:
44 00 00 00 1E 1A 00 00 00 66 02 03 8A 27 53 10
2012-03-12 18:21:06,182000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
00 00 00 B2 27 73 04 31
                         30 31 00 C6 02 69 11 D7
2012-03-12 18:21:06,182000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
27 69 00
BufferDumper:
Cleaned up hex dump
0000: 44 00 00 00 1E 1A 00 00 00 66 02 03 8A 27 53 10
0010: 00 00 00 B2 27 73 04 31 30 31 00 C6 02 69 11 D7
0020: 27 69 00
```

```
Decoded message
_____
00000: 44
                                   : DOFF Message Type: 44 'D' (char)
00001: 00 00 00 1e
                                   : DOFF message length: 30 bytes
(int32)
00005: 1a 00 00 00
                                   : SDOFF message length: 26 bytes
(nbo-uint32)
00009: 66 02 03
                                   : SDOFF Message Tag/Service
Tag/Operation Id: [1.102]/[1.2]/3
00012: 8a 27 53 10 00 00 00
                                  : [0.5002]=Struct. Length: 16 bytes
00019: b2 27 73 04 31 30 31 00
                                  : [0.5042]="101" (string)
00027: c6 02 69 11
                                  : [0.326]=17 (int32)
00031: d7 27 69 00
                                      [0.5079]=0 (int32)
```

and then later an update to TopOfBook is published to the subscription

```
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest [30114:Depth
Sender]/INFO:[mgf.marketdatamanager] - BBO: null(101):
{OrderBook:OrderBookID="101", BidPx=0.0, BidSize=0.0, ImpliedBidSize=0.0,
OfferPx=51.0, OfferSize=10.0, ImpliedOfferSize=0.0, BidAtMarket=false,
OfferAtMarket=false}
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 2 sent
message of length 103 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:51407":
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] - 0000:
44 00 00 00 62 5E 00 00 00 66 02 03 A1 27 4C 00
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
8A 27 53 50 00 00 00 B2 27 73 04 31 30 31 00 84
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
01 52 00 00 00 00 00 00 00 86 01 52 00 00 00
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
00 00 00 00 00 D2 27 52 00 00 00 00 00 00 00
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
85 01 52 00 00 00 00 00
                         80 49 40 87 01 52 00 00
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0006] - 0050:
00 00 00 00 24 40 D3 27
                         52 00 00 00 00 00 00 00
2012-03-12 18:24:12,876000 -0500 flashtaco mgftest
[30114:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0007] - 0060:
00 D4 27 66 D5 27 66
BufferDumper:
Cleaned up hex dump
0000: 44 00 00 00 62 5E 00 00 00 66 02 03 A1 27 4C 00
```

Decoded message

00

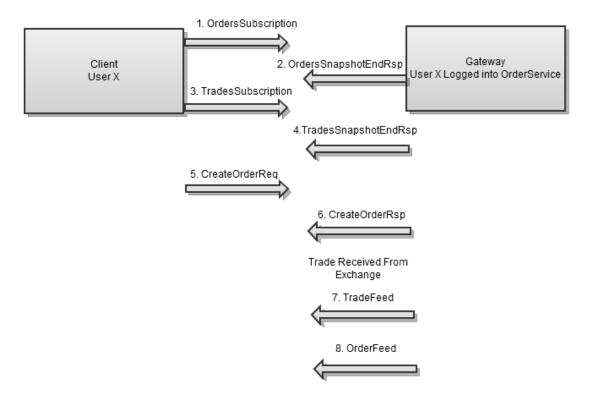
00000: 44 : DOFF Message Type: 44 'D' (char) 00001: 00 00 00 62 : DOFF message length: 98 bytes (int32) 00005: 5e 00 00 00 : SDOFF message length: 94 bytes (nbo-uint32) 00009: 66 02 03 : SDOFF Message Tag/Service Tag/Operation Id: [1.102]/[1.2]/3 00012: a1 27 4c 00 : [0.5025]=0 (uint64) 00016: 8a 27 53 50 00 00 00 : [0.5002]=Struct. Length: 80 bytes 00023: b2 27 73 04 31 30 31 00 : [0.5042]="101" (string) 00031: 84 01 52 00 00 00 00 00 00 : [0.132]=0.0 (real64) 00042: 86 01 52 00 00 00 00 00 00 00 : [0.134]=0.0 (real64) 00 00053: d2 27 52 00 00 00 00 00 00 00 : [0.5074]=0.0 (real64) 0.0 00064: 85 01 52 00 00 00 00 00 80 49 : [0.133]=51.0 (real64) 40 00075: 87 01 52 00 00 00 00 00 00 24 : [0.135]=10.0 (real64)

00086: d3 27 52 00 00 00 00 00 00 00 : [0.5075]=0.0 (real64)

00097: d4 27 66 : [0.5076]=F (boolean) 00100: d5 27 66 : [0.5077]=F (boolean)

GDK-Native Getting Started Guide

Entering an Order and Receiving Trade



Orders and Trades Subscriptions

OrderSubscriptionReq

```
2012-03-13 12:03:56,664000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 44 00 00 00 20 1C
        00 4F 03 08 CC 27 6C 00
2012-03-13 12:03:56,664000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0002] - 0010: 87 02 62 31 B6 27
       74 65 73 74 55 73 65 72
2012-03-13 12:03:56,664000 -0500 flashtaco mgftest
[1555:Channel 1 reader]/DEBUG:[cl/Cont'd 0003] - 0020: 00 AE 27 69 01
2012-03-13 12:03:56,666000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[OrderService.in] - Received
OrdersSubscription:
{OrdersSubscriptionControlReq:RequestID=0,
SubscriptionRequestType=Subscribe, Owner="testUser", NumberOfDays=1}
BufferDumper:
Cleaned up hex dump
0000: 44 00 00 00 20 1C 00 00 00 4F 03 08 CC 27 6C 00
0010: 87 02 62 31 B6 27 73 09 74 65 73 74 55 73 65 72
0020: 00 AE 27 69 01
Decoded message
_____
00000: 44
                                   : DOFF Message Type: 44 'D' (char)
00001: 00 00 00 20
                                    : DOFF message length: 32 bytes
(int32)
00005: 1c 00 00 00
                                    : SDOFF message length: 28 bytes
(nbo-uint32)
00009: 4f 03 08
                                     : SDOFF Message Tag/Service
Tag/Operation Id: [1.79]/[1.3]/8
00012: cc 27 6c 00
                                    : [0.5068]=0 (int64)
00016: 87 02 62 31
                                     : [0.263]='1' (octet)
00020: b6 27 73 09 74 65 73 74 55 73 : [0.5046]="testUser" (string)
       65 72 00
00033: ae 27 69 01
                                     : [0.5038]=1 (int32)
```

- The owner field sent by gateway cli client was "testUser" while the fullname for this session is "testUser:testGroup". It may be necessary append the group name to the owner inside your gateway so that it does not conflict with a user from another group with the same username.
- You'll notice there is a field NumberOfDays. This indicates the number of days back for which to send cached
 orders. Typically this field is ignored and we send all the active orders in our cache to the client as we would
 not want to have active orders on the market that the client was not aware of.
 - Periodically you can clean inactive orders from your cache. Inactive orders that have never been filled
 and have no chance of being re-activated can be removed immediately. Inactive orders that have been
 filled (partially or fully) we typically keep in the cache for 3 days in case a trade bust is received.
- After OrderFeed messages have been sent for each active order in your cache send the OrdersSnapshotEndRsp

Useful Information

The OrdersSnapshotEndRsp is different for the generic SnapshotEndRsp for most other subscriptions. It contains a field OrderID which will be the maximum OrderID for an order in your gateway's cache. This will keep Orc Trader from using a previously used OrderID.

TradesSubscription

- The TradesSubscription should be very similar to the OrdersSubscription. There is also a NumberOfDays
 field indicating the number of days back for which you are to send cached trades. We typically keep trades in
 our cache for 7 days
- After sending a TradeFeed for the cached trades for each day up to NumberOfDays send the SnapshotEndRsp

Order Request and Response

CreateOrderReq

```
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl] - Channel 1 received message of length
89 to "sdoff://127.0.0.1:10000"
from "sdoff://127.0.0.1:42322":
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 44 00 00 00 54 50
        00 4C 03 03 CC 27 6C BA
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0002] - 0010: 8D B3 D0 C1 4D 90
        39 00 00 00 B2 27 73 04
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0003] - 0020: 31 30 31 00 CA 27
       F0 99 68 36 62 31 26 52
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0004] - 0030: 00 00 00 00 00 00
        28 62 32 3B 62 30 2C 52
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0005] - 0040: 00 00 00 00 00 00
34 40
       B8 27 73 09 74 65 73 74
2012-03-13 12:06:53,031000 -0500 flashtaco mgftest
[1555:Channel_1_reader]/DEBUG:[cl/Cont'd_0006] - 0050: 55 73 65 72 00 D0
27 62
        30
2012-03-13 12:06:53,033000 -0500 flashtaco mqftest
[1555:Channel_1_reader]/DEBUG:[OrderService.in] - Received
CreateOrderOperation:
{CreateOrderReq:RequestID=1331658384250, Order={MgfOrderID=null,
Order={Order:OrderBookID="101", OrderID=218527847, Side=Buy, OrderQty=5.0,
OrdType=Limit,
Price=20.0, Originator="testUser", TimeInForce=Day}, State=null,
ExchangeOrder=null, LatestReqType=null, MgfExchangeSession=null,
CumQtyClient=0.0, ClOrdID=-1,
OrigClOrdID=-1}, TargetOrdStatus=New}
```

BufferDumper:

Cleaned up hex dump

- -

0000: 44 00 00 00 54 50 00 00 00 4C 03 03 CC 27 6C A5 0010: EB AC D5 C1 4D 90 27 53 39 00 00 00 B2 27 73 04 0020: 31 30 31 00 CA 27 4C C6 E5 D6 6A 36 62 31 26 52 0030: 00 00 00 00 00 00 14 40 28 62 32 3B 62 30 2C 52 0040: 00 00 00 00 00 34 40 B8 27 73 09 74 65 73 74 0050: 55 73 65 72 00 D0 27 62 30

Decoded message

00000: 44 : DOFF Message Type: 44 'D' (char) 00001: 00 00 00 54 : DOFF message length: 84 bytes (int32) 00005: 50 00 00 00 : SDOFF message length: 80 bytes (nbo-uint32) 00009: 4c 03 03 : SDOFF Message Tag/Service Tag/Operation Id: [1.76]/[1.3]/3 00012: cc 27 6c a5 eb ac d5 c1 4d : [0.5068]=1331663575781 (int64) 00021: 90 27 53 39 00 00 00 : [0.5008]=Struct. Length: 57 bytes 00028: b2 27 73 04 31 30 31 00 [0.5042]="101" (string) : 00036: ca 27 4c c6 e5 d6 6a : [0.5066]=223720134 (uint64) 00043: 36 62 31 [0.54]='1' (octet) : 00046: 26 52 00 00 00 00 00 00 14 40 : [0.38]=5.0 (real64) 00056: 28 62 32 [0.40]='2' (octet) 00059: 3b 62 30 [0.59]='0' (octet) 00062: 2c 52 00 00 00 00 00 00 34 40 : [0.44]=20.0 (real64)

00072: b8 27 73 09 74 65 73 74 55 73 : [0.5048]="testUser" (string)

```
65 72 00
00085: d0 27 62 30 : [0.5072]='0' (octet)
```

Similar to the OrderSubscription the Owner field was specified just as "testUser". It may be necessary for your
gateway to convert this to the proper fullname of testUser:testGroup if you plan to allow multiple users from
different groups connect to the gateway.

CreateOrderRsp

- We always send CreateOrderRsp in response to a CreateOrderReq. Typically it is sent after you get some
 response from the exchange telling you the order has been entered successfully of if it was rejected.
 Alternatively the order might fail some internal validation of your gateway and you can reject it immediately.
- Typically when you receive confirmation that an order has been entered from the exchange you also publish
 an OrderFeed message to all subscribers. It is not necessary to send to the user who entered the order
 though since this would be redundant to the CreateOrderRsp.

```
2012-03-13 12:06:53,042000 -0500 flashtaco mgftest [1555:Order
Sender]/DEBUG:[OrderService.out] - Sent sendCreateOrderOperationResponse:
{CreateOrderRsp:Requ
estID=1331658384250, TransactionID=0, InTimestamp=0, OutTimestamp=0,
Order={MgfOrderID=218527847:testGroup, Order={Order:OrderBookID="101",
OrderID=218527847
, Side=Buy, OrderQty=5.0, OrdType=Limit, Price=20.0,
Originator="testUser:testGroup", Owner="testUser:testGroup",
TimeInForce=Day, CumQty=0.0, OrdStatus=New,
 SecondaryOrderID="Mkt1331658142873", ExchCreationTime=1331658413034000},
State=Active, ExchangeOrder={ExchangeOrderKey=Mkt1331658142873,
ExchangeSpecificFie
lds={}}, LatestReqType=null, MgfExchangeSession=sessionName:
MGF_DEFAULT_SESSION id: 1, CumQtyClient=0.0, ClOrdID=-1, OrigClOrdID=-1}}
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1 sent
message of length 102 from "sdoff:/
/127.0.0.1:10000" to "sdoff://127.0.0.1:42322":
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] - 0000:
44 00 00 00 61 5D 00 00
                          00 6C
 03 03 CC 27 6C BA
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
8D B3 D0 C1 4D A1 27 4C
                         00 8D
 27 4C 00 92 27 4C
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0003] - 0020:
00 90 27 53 3E 00 00 00
                         CA 27
 4C E7 F0 99 68 27
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
62 30 2C 52 00 00 00 00 00 00
 34 40 OE 52 00 00
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
```

```
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
00 00 00 00 00 00 C6 01 73 11
4D 6B 74 31 33 33
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] - 0050:
31 36 35 38 31 34 32 38
                         37 33
00 C0 27 4C 90 94
2012-03-13 12:06:53,043000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] - 0060:
AF 95 AE E4 AE 02
BufferDumper:
Cleaned up hex dump
______
0000: 44 00 00 00 61 5D 00 00 00 6C 03 03 CC 27 6C A5
0010: EB AC D5 C1 4D A1 27 4C 00 8D 27 4C 00 92 27 4C
0020: 00 90 27 53 3E 00 00 00 CA 27 4C C6 E5 D6 6A 27
0030: 62 30 2C 52 00 00 00 00 00 34 40 0E 52 00 00
0040: 00 00 00 00 00 00 C6 01 73 11 4D 6B 74 31 33 33
0050: 31 36 35 38 31 34 32 38 37 34 00 C0 27 4C B8 92
0060: A4 BB C1 E4 AE 02
Decoded message
-----
00000: 44
                                   : DOFF Message Type: 44 'D' (char)
00001: 00 00 00 61
                                   : DOFF message length: 97 bytes
(int32)
00005: 5d 00 00 00
                                   : SDOFF message length: 93 bytes
(nbo-uint32)
00009: 6c 03 03
                                    : SDOFF Message Tag/Service
```

Tag/Operation Id: [1.108]/[1.3]/3 00012: cc 27 6c a5 eb ac d5 c1 4d : [0.5068]=1331663575781 (int64) 00021: a1 27 4c 00 : [0.5025]=0 (uint64) 00025: 8d 27 4c 00 : [0.5005]=0 (uint64) 00029: 92 27 4c 00 : [0.5010]=0 (uint64) 00033: 90 27 53 3e 00 00 00 : [0.5008]=Struct. Length: 62 bytes 00040: ca 27 4c c6 e5 d6 6a [0.5066]=223720134 (uint64) : 00047: 27 62 30 [0.39]='0' (octet) 00050: 2c 52 00 00 00 00 00 34 40 : [0.44]=20.0 (real64) 00060: 0e 52 00 00 00 00 00 00 00 : [0.14]=0.0 (real64) 00070: c6 01 73 11 4d 6b 74 31 33 33 : [0.198]="Mkt1331658142874" (string) 31 36 35 38 31 34 32 38 37 34

59

00

```
00091: c0 27 4c b8 92 a4 bb c1 e4 ae : [0.5056]=1331663592819000 (uint64) 02
```

Trade

Whenever a trade occurs a TradeFeed is published to all subscribers and an OrderFeed for the order the trade updated is sent to all subscribers. Typically the TradeFeed is published first because Liquidator strategies are more likely to trigger off of it.

 Note: The mgftest gateway has a built in matching engine so if you enter a Buy and Sell order at the same price a trade will be generated for each order.

TradeFeed

Below is actually two trades being sent over the wire since the CLI client I was using entered both a Buy and Sell order at the same price to instigate the trade.

```
2012-03-13 13:33:46,420000 -0500 flashtaco mgftest [1555:Order
Sender]/DEBUG:[OrderService.out] - Sent sendTradesSubscriptionTradeFeed:
{TradeFeed:Trade={Trade:OrderBookID="101", ExecID="1360d5660b0:1",
OrderID=218527847, LastPx=20.0, LastQty=5.0, Side=Buy,
SecondaryOrderID="Mkt1331658142873",
 ExchCreationTime=1331663626415000, Owner="testUser:testGroup",
ExecType=Trade } }
2012-03-13 13:33:46,420000 -0500 flashtaco mgftest [1555:Order
Sender]/DEBUG:[OrderService.out] - Sent sendTradesSubscriptionTradeFeed:
{TradeFeed:Trade={Trade:OrderBookID="101", ExecID="1360d5660b0:2",
OrderID=223750116, LastPx=20.0, LastQty=5.0, Side=Sell,
SecondaryOrderID="Mkt1331658142875",
 ExchCreationTime=1331663626415000, Owner="testUser:testGroup",
ExecType=Trade}}
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1 sent
message of length 261 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:42322":
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0001] - 0000:
44 00 00 01 00 7C 00 00
                          00 78 03 09 91 27 53 72
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0002] - 0010:
00 00 00 B2 27 73 04 31
                          30 31 00 11 73 0E 31 33
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
36 30 64 35 36 36 30 62
                          30 3A 31 00 CA 27 4C E7
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
F0 99 68 1F 52 00 00 00
                          00 00 00 34 40 20 52 00
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
00 00 00 00 00 14 40 36 62 31 C6 01 73 11 4D 6B
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
```

```
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] - 0050:
74 31 33 33 31 36 35 38 31 34 32 38 37 33 00 C0
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0007] - 0060:
27 4C 98 D7 A6 CB C1 E4
                         AE 02 B6 27 73 13 74 65
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0008] - 0070:
73 74 55 73 65 72 3A 74
                         65 73 74 47 72 6F 75 70
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0009] - 0080:
00 96 01 62 46 7C 00 00
                        00 78 03 09 91 27 53 72
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0010] - 0090:
00 00 00 B2 27 73 04 31
                         30 31 00 11 73 0E 31 33
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0011] - 00A0:
36 30 64 35 36 36 30 62
                        30 3A 32 00 CA 27 4C E4
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0012] - 00B0:
CF D8 6A 1F 52 00 00 00
                         00 00 00 34 40 20 52 00
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0013] - 00C0:
00 00 00 00 00 14 40 36
                         62 32 C6 01 73 11 4D 6B
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0014] - 00D0:
                          31 34 32 38 37 35 00 C0
74 31 33 33 31 36 35 38
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0015] - 00E0:
                         AE 02 B6 27 73 13 74 65
27 4C 98 D7 A6 CB C1 E4
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0016] - 00F0:
73 74 55 73 65 72 3A 74
                        65 73 74 47 72 6F 75 70
2012-03-13 13:33:46,424000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0017] - 0100:
00 96 01 62 46
```

BufferDumper:

Cleaned up hex dump

0000: 44 00 00 01 00 7C 00 00 00 78

000a: 03 09 91 27 53 72

0010: 00 00 00 B2 27 73 04 31 30 31 00 11 73 0E 31 33

0020: 36 30 64 35 36 36 30 62 30 3A 31 00 CA 27 4C E7

0030: F0 99 68 1F 52 00 00 00 00 00 34 40 20 52 00

0040: 00 00 00 00 01 4 40 36 62 31 C6 01 73 11 4D 6B

0050: 74 31 33 33 31 36 35 38 31 34 32 38 37 33 00 C0

0060: 27 4C 98 D7 A6 CB C1 E4 AE 02 B6 27 73 13 74 65

0070: 73 74 55 73 65 72 3A 74 65 73 74 47 72 6F 75 70

0080: 00 96 01 62 46 7C 00 00 00 78 03 09 91 27 53 72

0090: 00 00 00 B2 27 73 04 31 30 31 00 11 73 0E 31 33

00a0: 36 30 64 35 36 36 30 62 30 3A 32 00 CA 27 4C E4

00b0: CF D8 6A 1F 52 00 00 00 00 00 34 40 20 52 00

```
00c0: 00 00 00 00 00 14 40 36 62 32 C6 01 73 11 4D 6B
00d0: 74 31 33 33 31 36 35 38 31 34 32 38 37 35 00 C0
00e0: 27 4C 98 D7 A6 CB C1 E4 AE 02 B6 27 73 13 74 65
00f0: 73 74 55 73 65 72 3A 74 65 73 74 47 72 6F 75 70
0100: 00 96 01 62 46
Decoded message
-----
00000: 44
                                  : DOFF Message Type: 44 'D' (char)
00001: 00 00 01 00
                                  : DOFF message length: 256 bytes
(int32)
00005: 7c 00 00 00
                                  : SDOFF message length: 124 bytes
(nbo-uint32)
00009: 78 03 09
                                  : SDOFF Message Tag/Service
Tag/Operation Id: [1.120]/[1.3]/9
00012: 91 27 53 72 00 00 00
                                  : [0.5009]=Struct. Length: 114 bytes
00019: b2 27 73 04 31 30 31 00
                                 : [0.5042]="101" (string)
00027: 11 73 0e 31 33 36 30 64 35 36 : [0.17]="1360d5660b0:1" (string)
      36 30 62 30 3a 31 00
                           : [0.5066]=218527847 (uint64)
00044: ca 27 4c e7 f0 99 68
00051: 1f 52 00 00 00 00 00 34 40 : [0.31]=20.0 (real64)
00061: 20 52 00 00 00 00 00 00 14 40 :
                                       [0.32]=5.0 (real64)
00071: 36 62 31
                                  : [0.54]='1' (octet)
00074: c6 01 73 11 4d 6b 74 31 33 33 : [0.198]="Mkt1331658142873"
      31 36 35 38 31 34 32 38 37 33
      00
00095: c0 27 4c 98 d7 a6 cb c1 e4 ae : [0.5056]=1331663626415000 (uint64)
00106: b6 27 73 13 74 65 73 74 55 73 : [0.5046]="testUser:testGroup"
(string)
      65 72 3a 74 65 73 74 47 72 6f
      75 70 00
00129: 96 01 62 46
                                  : [0.150]='F' (octet)
                                   : SDOFF message length: 124 bytes
00133: 7c 00 00 00
(nbo-uint32)
00137: 78 03 09
                                  : SDOFF Message Tag/Service
Tag/Operation Id: [1.120]/[1.3]/9
00140: 91 27 53 72 00 00 00
                                  : [0.5009]=Struct. Length: 114 bytes
00147: b2 27 73 04 31 30 31 00 : [0.5042]="101" (string)
00155: 11 73 0e 31 33 36 30 64 35 36 : [0.17]="1360d5660b0:2" (string)
      36 30 62 30 3a 32 00
00172: ca 27 4c e4 cf d8 6a
                                 : [0.5066]=223750116 (uint64)
00179: 1f 52 00 00 00 00 00 34 40 :
                                       [0.31]=20.0 (real64)
00189: 20 52 00 00 00 00 00 14 40 : [0.32]=5.0 (real64)
00199: 36 62 32
                                       [0.54]='2' (octet)
                                   :
00202: c6 01 73 11 4d 6b 74 31 33 33 : [0.198]="Mkt1331658142875"
(string)
      31 36 35 38 31 34 32 38 37 35
00223: c0 27 4c 98 d7 a6 cb c1 e4 ae : [0.5056]=1331663626415000 (uint64)
      02
00234: b6 27 73 13 74 65 73 74 55 73 : [0.5046]="testUser:testGroup"
```

(string)

65 72 3a 74 65 73 74 47 72 6f

```
75 70 00
00257: 96 01 62 46 : [0.150]='F' (octet)
```

• This TradeFeed should be published to "testUser:testGroup", any users subscribed for group "testGroup", or any users subscribed for all trades (wildcard subscription "*").

OrderFeed

Again this example is actually two OrderFeeds for two separate orders being sent in the same doff message

```
2012-03-13 13:33:46,419000 -0500 flashtaco mgftest [1555:Order
Sender]/DEBUG:[OrderService.out] - Sent sendOrdersSubscriptionOrderFeed:
{OrderFeed:Order={MgfOrderID=223750116:testGroup,
Order={Order:OrderBookID="101", OrderID=223750116, Side=Sell, OrderQty=5.0,
OrdType=Limit, Price=20.0, Originator="testUser:testGroup",
Owner="testUser:testGroup", TimeInForce=Day, CumOty=0.0, OrdStatus=New,
SecondaryOrderID="Mkt1331658142875", ExchCreationTime=1331663626414000},
State=Active,
ExchangeOrder={ExchangeOrderKey=Mkt1331658142875,
ExchangeSpecificFields={}}, LatestReqType=null,
MgfExchangeSession=sessionName: MGF_DEFAULT_SESSION id: 1,
CumQtyClient=0.0, ClOrdID=-1, OrigClOrdID=-1}}
2012-03-13 13:33:46,419000 -0500 flashtaco mgftest [1555:Order
Sender]/DEBUG:[OrderService.out] - Sent sendOrdersSubscriptionOrderFeed:
{OrderFeed:Order={MgfOrderID=223750116:testGroup,
Order={Order:OrderBookID="101", OrderID=223750116, Side=Sell, OrderQty=5.0,
OrdType=Limit, Price=20.0, Originator="testUser:testGroup",
 Owner="testUser:testGroup", TimeInForce=Day, CumQty=5.0, OrdStatus=Filled,
SecondaryOrderID="Mkt1331658142875", ExchCreationTime=1331663626414000},
State=Terminated,
 ExchangeOrder={ExchangeOrderKey=Mkt1331658142875,
ExchangeSpecificFields={}}, LatestReqType=null,
MgfExchangeSession=sessionName: MGF_DEFAULT_SESSION id: 1,
CumQtyClient=0.0, ClOrdID=-1, OrigClOrdID=-1}}
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl] - Channel 1 sent
message of length 303 from "sdoff://127.0.0.1:10000" to
"sdoff://127.0.0.1:42322":
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0001] - 0000:
44 00 00 01 2A 91 00 00 00 6F 03 08 90 27 53 87
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0002] - 0010:
00 00 00 B2 27 73 04 31 30 31 00 CA 27 4C E4 CF
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0003] - 0020:
D8 6A 36 62 32 26 52 00 00 00 00 00 14 40 28
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0004] - 0030:
62 32 2C 52 00 00 00 00 00 00 34 40 B8 27 73 13
```

```
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0005] - 0040:
74 65 73 74 55 73 65 72
                        3A 74 65 73 74 47 72 6F
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0006] - 0050:
75 70 00 B6 27 73 13 74 65 73 74 55 73 65 72 3A
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0007] - 0060:
74 65 73 74 47 72 6F 75 70 00 3B 62 30 0E 52 00
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0008] - 0070:
00 00 00 00 00 00 00 27 62 30 C6 01 73 11 4D 6B
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0009] - 0080:
74 31 33 33 31 36 35 38 31 34 32 38 37 35 00 C0
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0010] - 0090:
                        AE 02 91 00 00 00 6F 03
27 4C B0 CF A6 CB C1 E4
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0011] - 00A0:
08 90 27 53 87 00 00 00
                        B2 27 73 04 31 30 31 00
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0012] - 00B0:
CA 27 4C E4 CF D8 6A 36
                       62 32 26 52 00 00 00 00
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0013] - 00C0:
00 00 14 40 28 62 32 2C
                        52 00 00 00 00 00 00 34
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0014] - 00D0:
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0015] - 00E0:
73 74 47 72 6F 75 70 00 B6 27 73 13 74 65 73 74
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0016] - 00F0:
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd 0017] - 0100:
62 30 0E 52 00 00 00 00
                        00 00 14 40 27 62 32 C6
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0018] - 0110:
01 73 11 4D 6B 74 31 33
                        33 31 36 35 38 31 34 32
2012-03-13 13:33:46,422000 -0500 flashtaco mgftest
[1555:SdoffChannelDecorator sender thread]/DEBUG:[cl/Cont'd_0019] - 0120:
38 37 35 00 C0 27 4C B0 CF A6 CB C1 E4 AE 02
BufferDumper:
Cleaned up hex dump
0000:
0000: 44 00 00 01 2A 91 00 00 06F 03 08 90 27 53 87
0010: 00 00 00 B2 27 73 04 31 30 31 00 CA 27 4C E4 CF
0020: D8 6A 36 62 32 26 52 00 00 00 00 00 14 40 28
```

```
0030: 62 32 2C 52 00 00 00 00 00 34 40 B8 27 73 13
0040: 74 65 73 74 55 73 65 72 3A 74 65 73 74 47 72 6F
0050: 75 70 00 B6 27 73 13 74 65 73 74 55 73 65 72 3A
0060: 74 65 73 74 47 72 6F 75 70 00 3B 62 30 0E 52 00
0070: 00 00 00 00 00 00 27 62 30 C6 01 73 11 4D 6B
0080: 74 31 33 33 31 36 35 38 31 34 32 38 37 35 00 C0
0090: 27 4C B0 CF A6 CB C1 E4 AE 02 91 00 00 00 6F 03
00a0: 08 90 27 53 87 00 00 00 B2 27 73 04 31 30 31 00
00b0: CA 27 4C E4 CF D8 6A 36 62 32 26 52 00 00 00 00
00c0: 00 00 14 40 28 62 32 2C 52 00 00 00 00 00 00 34
00d0: 40 B8 27 73 13 74 65 73 74 55 73 65 72 3A 74 65
00e0: 73 74 47 72 6F 75 70 00 B6 27 73 13 74 65 73 74
00f0: 55 73 65 72 3A 74 65 73 74 47 72 6F 75 70 00 3B
0100: 62 30 0E 52 00 00 00 00 00 14 40 27 62 32 C6
0110: 01 73 11 4D 6B 74 31 33 33 31 36 35 38 31 34 32
0120: 38 37 35 00 C0 27 4C B0 CF A6 CB C1 E4 AE 02
012f:
Decoded message
-----
00000: 44
                                    : DOFF Message Type: 44 'D' (char)
00001: 00 00 01 2a
                                    : DOFF message length: 298 bytes
(int32)
00005: 91 00 00 00
                                    : SDOFF message length: 145 bytes
(nbo-uint32)
00009: 6f 03 08
                                    : SDOFF Message Tag/Service
Tag/Operation Id: [1.111]/[1.3]/8
00012: 90 27 53 87 00 00 00
                                    : [0.5008]=Struct. Length: 135 bytes
00019: b2 27 73 04 31 30 31 00
                                   : [0.5042]="101" (string)
00027: ca 27 4c e4 cf d8 6a
                                        [0.5066]=223750116 (uint64)
                                    :
00034: 36 62 32
                                        [0.54]='2' (octet)
00037: 26 52 00 00 00 00 00 00 14 40 :
                                        [0.38]=5.0 (real64)
00047: 28 62 32
                                        [0.40]='2' (octet)
                                    :
00050: 2c 52 00 00 00 00 00 00 34 40 :
                                        [0.44]=20.0 (real64)
00060: b8 27 73 13 74 65 73 74 55 73 :
                                        [0.5048]="testUser:testGroup"
(string)
       65 72 3a 74 65 73 74 47 72 6f
       75 70 00
00083: b6 27 73 13 74 65 73 74 55 73: [0.5046]="testUser:testGroup"
       65 72 3a 74 65 73 74 47 72 6f
       75 70 00
00106: 3b 62 30
                                        [0.59]='0' (octet)
00109: 0e 52 00 00 00 00 00 00 00 00 :
                                        [0.14]=0.0 (real64)
00119: 27 62 30
                                        [0.39]='0' (octet)
00122: c6 01 73 11 4d 6b 74 31 33 33 :
                                        [0.198]="Mkt1331658142875"
(string)
       31 36 35 38 31 34 32 38 37 35
00143: c0 27 4c b0 cf a6 cb c1 e4 ae : [0.5056]=1331663626414000 (uint64)
       02
00154: 91 00 00 00
                                   : SDOFF message length: 145 bytes
(nbo-uint32)
```

```
00158: 6f 03 08
                                   : SDOFF Message Tag/Service
Tag/Operation Id: [1.111]/[1.3]/8
00161: 90 27 53 87 00 00 00
                                   : [0.5008]=Struct. Length: 135 bytes
00168: b2 27 73 04 31 30 31 00
                                   :
                                        [0.5042]="101" (string)
00176: ca 27 4c e4 cf d8 6a
                                        [0.5066]=223750116 (uint64)
00183: 36 62 32
                                        [0.54]='2' (octet)
00186: 26 52 00 00 00 00 00 00 14 40 :
                                        [0.38]=5.0 (real64)
00196: 28 62 32
                                    :
                                        [0.40]='2' (octet)
00199: 2c 52 00 00 00 00 00 00 34 40 :
                                        [0.44]=20.0 (real64)
00209: b8 27 73 13 74 65 73 74 55 73 : [0.5048]="testUser:testGroup"
(string)
       65 72 3a 74 65 73 74 47 72 6f
       75 70 00
00232: b6 27 73 13 74 65 73 74 55 73: [0.5046]="testUser:testGroup"
(string)
       65 72 3a 74 65 73 74 47 72 6f
       75 70 00
00255: 3b 62 30
                                        [0.59]='0' (octet)
00258: 0e 52 00 00 00 00 00 14 40 :
                                        [0.14]=5.0 (real64)
00268: 27 62 32
                                        [0.39]='2' (octet)
00271: c6 01 73 11 4d 6b 74 31 33 33 : [0.198]="Mkt1331658142875"
(string)
       31 36 35 38 31 34 32 38 37 35
       00
```

00292: c0 27 4c b0 cf a6 cb c1 e4 ae : [0.5056]=1331663626414000 (uint64) 02

• Just like TradeFeed this OrderFeed should be published to "testUser:testGroup", any users subscribed for group "testGroup", or any users subscribed for all trades (wildcard subscription "*").

GDK-Native Getting Started Guide

Connecting With Orc Trader and Liquidator

Previous examples were done using the Gateway CLI Client. Here we will go over some of the subtleties of connecting to your GDK gateway with Orc Trader and Liquidator. Before using Orc Trader or Liquidator you will first need to make sure you have done the following steps:

- Installed Trading Service (TS) package which includes an environment, cds and storage
- Register your services with environment manager. (More information can be found in the 'Initial Handshakes and Login' section of the general GDK-Native documentation.
- Obtain a keycode for front-end user that contains access to "MGF Test SD", which is market constant 471.
 This is a market constant that you can use during your development period. When development is close to completion you will obtain a keycode for your custom GDK-Native gateway.

Orc Trader

Handshake

By default Orc Trader has compression enabled so the connection message will look slightly different:

```
2012-03-14 10:36:57,374000 -0500 flashtaco mgftest
[10053:Channel_1_reader]/DEBUG:[cl] - Channel 1 received message of
length 6 to "sdoff://192.168.153.14:42277" from
"sdoff://192.168.153.199:1449":
2012-03-14 10:36:57,374000 -0500 flashtaco mgftest
[10053:Channel_1_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 05 06 02 00
00 00
2012-03-14 10:36:57,375000 -0500 flashtaco mgftest
[10053:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n] - Sending Connect Reply message (pos=0, limit=1):
2012-03-14 10:36:57,375000 -0500 flashtaco mgftest
[10053:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n/Cont'd_0001] - 42
```

After the handshake all SD messages to/from the client need to be zlib compressed. A Java library you can
use to do this is java.util.zip.Inflater and java.util.zip.Deflater

Loading the serverlink

When you connect to a service from Orc Trader it will automatically attempt to make several subscriptions (depending on the service you are connecting to). Here are the subscriptions you need to implement in order for Orc Trader to load the link for your GDK gateway:

- MarketDataService: NewsSubscription
- InstrumentService: TickRuleTablesSubscription (If you manually download instruments you will need to implement the InstrumentsSubscription)
- OrderService: OrdersSubscription and TradesSubscription

Liquidator

Handshake

- Liquidator does not use compression
- It does have a different protocol byte than the CLI client (Binary DOFF vs. Zlib Binary) but the behavior is the same.

```
22012-03-14 10:52:05,047000 -0500 flashtaco mgftest
[16899:Channel_1_reader]/DEBUG:[cl] - Channel 1 received message of
length 6 to "sdoff://127.0.0.1:36023" from "sdoff://127.0.0.1:56707":
2012-03-14 10:52:05,047000 -0500 flashtaco mgftest
[16899:Channel_1_reader]/DEBUG:[cl/Cont'd_0001] - 0000: 05 05 00 00
00 00
2012-03-14 10:52:05,048000 -0500 flashtaco mgftest
[16899:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n] - Sending Connect Reply message (pos=0, limit=1):
2012-03-14 10:52:05,048000 -0500 flashtaco mgftest
[16899:ServiceSocketServer_acceptor]/DEBUG:[impl.ServiceProviderSessio
n/Cont'd_0001] - 42
```

Loading the serverlink

Similar to Orc Trader, Liquidator will automatically make several subscriptions upon logging into a service that need to be implemented in the gateway for the link to load successfully.

- InstrumentService: InstrumentsSubscription, TickRuleTablesSubscription
- OrderService: OrdersSubscription, TradesSubscription

When the link has successfully loaded a service you should see this line in Liquidator's log file:

```
Mar 14 10:52:05.148305 flashtaco liquidator[23928:1@24064]/info: [liquidator] - [MGF Test SD:InstrumentService] synced
```

Activating the SD Message Logging

Run Liquidator with the -dd flag and the SD messages will be logged to the "*.debug" log.

Login Message Sequence

A SD gateway needs to respond to all subscription requests with a Snapshot End Response, even if there is no data to be sent.

Here are the default messages that Liquidator will send for a normal connection.

```
Mar 15 11:16:30.882858 arriba liquidatorDL[5305:1@5305 ]/debug: [MGF Test
SD] - [TradeReportService] status is None now.
Mar 15 11:16:30.882919 arriba liquidatorDL[5305:1@5305 ]/debug: [MGF Test
SD] - [MassQuoteService] status is None now.
Mar 15 11:16:30.882965 arriba liquidatorDL[5305:1@5305 ]/debug: [MGF Test
SD] - [ContributionService] status is None now.
Mar 15 11:16:31.933719 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
```

```
SD] - [InstrumentService] status is Connected now.
Mar 15 11:16:31.933793 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Write message
q[0][SD]-[58]-LoginReq=[ServiceVersion=1.9|Group=liquidator1|Username=liqui
dator1
ApplicationVersion=liquidator ].
Mar 15 11:16:31.939141 arriba liquidatorDL[5305:1@5398 ]/debug: [MGF Test
SD] - [MarketDataService] status is Connected now.
Mar 15 11:16:31.939279 arriba liquidatorDL[5305:1@5398 ]/debug: [MGF Test
SD] - MarketDataService: Write message
q[0][SD]-[58]-LoginReq=[ServiceVersion=1.7|Group=liquidator1|Username=liqui
dator1
ApplicationVersion=liquidator | ].
Mar 15 11:16:31.940159 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - [QuoteService] status is Connected now.
Mar 15 11:16:31.940208 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - QuoteService: Write message
q[0][SD]-[59]-LoginReq=[ServiceVersion=2.10|Group=liquidator1|Username=liqu
idator1|
ApplicationVersion=liquidator | ].
Mar 15 11:16:31.941443 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - [OrderService] status is Connected now.
Mar 15 11:16:31.941470 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - OrderService: Write message
q[0][SD]-[59]-LoginReq=[ServiceVersion=1.10|Group=liquidator1|Username=liqu
idator1
ApplicationVersion=liquidator | ].
Mar 15 11:16:32.055339 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - OrderService: Read message
q[0][SD]-[81]-LoginRsp=[RejReason=0|ServiceVersion=1.17|ServiceImplVersion=
1.0
ApplicationVersion=Unknown
MessageEncoding=ISO-8859-1|FieldsMetadata=F\x02\x00\x00iCustOrderCapacity\x
00|].
Mar 15 11:16:32.055386 arriba liquidatorDL[5305:1@5399 ]/info:
[liquidator] - [MGF Test SD:OrderService] Logon ok. daemon version [1.17]
Mar 15 11:16:32.055596 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - QuoteService: Read message
q[0][SD]-[81]-LoginRsp=[RejReason=0|ServiceVersion=2.10|ServiceImplVersion=
ApplicationVersion=Unknown
MessageEncoding=ISO-8859-1 | FieldsMetadata=F\x02\x00\x00iCustOrderCapacity\x
00|].
Mar 15 11:16:32.055719 arriba liquidatorDL[5305:1@5400 ]/info:
[liquidator] - [MGF Test SD:QuoteService] Logon ok. daemon version [2.10]
Mar 15 11:16:32.055850 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - QuoteService: Write message
q[1][SD]-[27]-TradesSubscriptionControlReq=[SubscriptionRequestType=1|
NumberOfDays=1 | Owner=liquidator1 | ].
Mar 15 11:16:32.055893 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - QuoteService: Write message
q[2][SD]-[23]-QuotesSubscriptionControlReq=[SubscriptionRequestType=1|Owner
=liquidator1|].
```

```
Mar 15 11:16:32.055930 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - OrderService: Write message
q[1][SD]-[27]-TradesSubscriptionControlReq=[SubscriptionRequestType=1|
NumberOfDays=1 | Owner=liquidator1 | ].
Mar 15 11:16:32.055942 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - OrderService: Write message
q[2][SD]-[23]-OrdersSubscriptionControlReq=[SubscriptionRequestType=1|Owner
=liquidator1|].
Mar 15 11:16:32.055967 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Read message
q[0][SD]-[50]-LoginRsp=[RejReason=0|ServiceVersion=1.9|ServiceImplVersion=1
.0
ApplicationVersion=Unknown
MessageEncoding=ISO-8859-1|].
Mar 15 11:16:32.055984 arriba liquidatorDL[5305:1@5397 ]/info:
[liquidator] - [MGF Test SD:InstrumentService] Logon ok. daemon version
[1.9]
Mar 15 11:16:32.056067 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Write message
q[1][SD]-[7]-InstrumentsSubscriptionControlReq=[SubscriptionRequestType=1|]
Mar 15 11:16:32.056150 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Write message
q[2][SD]-[7]-TickRuleTablesSubscriptionControlReq=[SubscriptionRequestType=
1|].
Mar 15 11:16:32.056242 arriba liquidatorDL[5305:1@5398 ]/debug: [MGF Test
SD] - MarketDataService: Read message
q[0][SD]-[50]-LoginRsp=[RejReason=0|ServiceVersion=1.7|ServiceImplVersion=1
.0
ApplicationVersion=Unknown
MessageEncoding=ISO-8859-1|].
Mar 15 11:16:32.056284 arriba liquidatorDL[5305:1@5398 ]/info:
[liquidator] - [MGF Test SD:MarketDataService] Logon ok. daemon version
[1.7]
Mar 15 11:16:32.056296 arriba liquidatorDL[5305:1@5398 ]/debug:
[liquidator] - Resubscribe on [MGF Test SD]
Mar 15 11:16:32.056320 arriba liquidatorDL[5305:1@5398 ]/debug:
[liquidator] - Resubscribe for depth on [MGF Test SD]
Mar 15 11:16:32.056327 arriba liquidatorDL[5305:1@5398 ]/info:
[liquidator] - [MGF Test SD:MarketDataService] synced
Mar 15 11:16:32.056373 arriba liquidatorDL[5305:1@5398 ]/debug: [MGF Test
SD] - [MarketDataService] status is Synchronized now.
Mar 15 11:16:32.069981 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Read message q[0][SD]-[124]-
InstrumentFeed=[Instrument={OrderBookID=20091|TickRulesTableID=T2|Currency=
SEK | RoundLot=100 | Factor=1 |
MassQuoteID=UL_BIG | Symbol=SYMB20091 | CFICode=ESVUOB | SecurityType=19 | Security
Desc=SYMBOL20091
ContractMultiplier=1 | UnderlyingSymbol=UL_BIG \ ].
Mar 15 11:16:32.070086 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - ticks_add_tick_mapping: [20091]: assigned [T2]
Mar 15 11:16:32.070598 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - QuoteService: Read message
```

```
q[0][SD]-[11]-SnapshotEndRsp=[RejReason=0|MessageTypeID=88|].
Mar 15 11:16:32.070655 arriba liquidatorDL[5305:1@5400 ]/info:
[liquidator] - [MGF Test SD:QuoteService] download of trades completed.
Mar 15 11:16:32.070648 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - OrderService: Read message
q[0][SD]-[11]-SnapshotEndRsp=[RejReason=0|MessageTypeID=88|].
Mar 15 11:16:32.070730 arriba liquidatorDL[5305:1@5399 ]/info:
[liquidator] - [MGF Test SD:OrderService] download of trades completed.
Mar 15 11:16:32.072784 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - QuoteService: Read message
q[0][SD]-[11]-QuotesSnapshotEndRsp=[RejReason=0|MessageTypeID=74|].
Mar 15 11:16:32.072856 arriba liquidatorDL[5305:1@5400 ]/info:
[liquidator] - [MGF Test SD:QuoteService] download of quotes completed.
Mar 15 11:16:32.072876 arriba liquidatorDL[5305:1@5400 ]/info:
[liquidator] - [MGF Test SD:QuoteService] synced
Mar 15 11:16:32.073006 arriba liquidatorDL[5305:1@5400 ]/debug: [MGF Test
SD] - [QuoteService] status is Synchronized now.
Mar 15 11:16:32.073354 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - OrderService: Read message
q[0][SD]-[15]-OrdersSnapshotEndRsp=[RejReason=0|MessageTypeID=79|OrderID=0|
Mar 15 11:16:32.073365 arriba liquidatorDL[5305:1@5399 ]/info:
[liquidator] - [MGF Test SD:OrderService] download of orders completed.
MaxOrderID [0]
Mar 15 11:16:32.073369 arriba liquidatorDL[5305:1@5399 ]/info:
[liquidator] - [MGF Test SD:OrderService] synced
Mar 15 11:16:32.073442 arriba liquidatorDL[5305:1@5399 ]/debug: [MGF Test
SD] - [OrderService] status is Synchronized now.
Mar 15 11:16:32.648225 arriba liquidatorDL[5305:1@5353 ]/debug: [new_combo]
- tag 258997 [MGF Test SD:Combo1] legs_cnt 2 cds_c 0 expirydate 0
Mar 15 11:16:32.653901 arriba liquidatorDL[5305:1@5353 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [Y] rule [T1] lower
[0] step [0.1]
Mar 15 11:16:32.653923 arriba liquidatorDL[5305:1@5353 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [Y] rule [T1] lower
[5] step [0.5]
Mar 15 11:16:32.653933 arriba liquidatorDL[5305:1@5353 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [Y] rule [T2] lower
[0] step [0.25]
Mar 15 11:16:32.653953 arriba liquidatorDL[5305:1@5353 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [Y] rule [T2] lower
Mar 15 11:16:33.071810 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Read message
... Instruments and Tick Rules being sent.
Mar 15 11:16:33.076445 arriba liquidatorDL[5305:1@5397 ]/info:
[liquidator] - [MGF Test SD:InstrumentService] download of instruments
completed.
Mar 15 11:16:33.076469 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Read message q[2][SD]-[72]-TickRulesTableFeed=
[TickRulesTableID=T1|TickRules=[2{StartTickPriceRange=0|TickIncrement=0.1}{
```

```
StartTickPriceRange=5
TickIncrement=0.5}]].
Mar 15 11:16:33.076484 arriba liquidatorDL[5305:1@5397 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [N] rule [T1] lower
[0] step [0.1]
Mar 15 11:16:33.076503 arriba liquidatorDL[5305:1@5397 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [N] rule [T1] lower
[5] step [0.5]
Mar 15 11:16:33.076520 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Read message q[1][SD]-[72]-TickRulesTableFeed=
[TickRulesTableID=T2|TickRules=[2{StartTickPriceRange=0|TickIncrement=0.25}
{StartTickPriceRange=10|
TickIncrement=1}]].
Mar 15 11:16:33.076533 arriba liquidatorDL[5305:1@5397 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [N] rule [T2] lower
[0] step [0.25]
Mar 15 11:16:33.076541 arriba liquidatorDL[5305:1@5397 ]/debug:
[liquidator] - [MGF Test SD] ticks_add_tick_rule: cds [N] rule [T2] lower
[10] step [1]
Mar 15 11:16:33.076554 arriba liquidatorDL[5305:1@5397 ]/debug: [MGF Test
SD] - InstrumentService: Read message
q[0][SD]-[11]-SnapshotEndRsp=[RejReason=0|MessageTypeID=55|].
Mar 15 11:16:33.076560 arriba liquidatorDL[5305:1@5397 ]/info:
[liquidator] - [MGF Test SD:InstrumentService] download of tick table
completed.
Mar 15 11:16:33.076564 arriba liquidatorDL[5305:1@5397 ]/info:
[liquidator] - [MGF Test SD:InstrumentService] synced
```

Mar 15 11:16:33.076673 arriba liquidatorDL[5305:1@5397]/debug: [MGF Test
SD] - [InstrumentService] status is Synchronized now.

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