S&P Capital IQ Real-Time Solutions

FeedOS™ Developer's Notice

BATS US – Feed Update

Reference n°: 20150216 – 24473 – 25354

Effective as of: 04 May 2015*

Action required from users: MANDATORY ACTION

S&P CAPITAL IQ
McGRAW HILL FINANCIAL

* For the actual day when the changes to your custom feed handler take effect, please contact your QuantFEED® project manager.

S&P Capital IQ Real-Time Solutions
FeedOS™ Developer's Notice: BATS US – Feed Update
Reference 20150216 – 24473 – 25354
April 21, 2015

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UPDATE OF THE BATS US MARKET DATA STREAM

To improve the quality of the market data disseminated on the BATS US market data stream, S&P Capital IQ Real-Time Solutions has decided to enhance the content of FeedOS.

This developer's notice contains late-breaking information about the implementation of this modification in your applications, which may not be included otherwise in the published documentation. The topics this notice covers include:

- 1. Update Summary
- 2. FeedOS Technical Implementation
- 3. Finding the Latest Information.

1. Update Summary

Table 1 Current update summary

Notice Reference	20150216 – 24473 – 25354
Exchanges	BATS US
Concerned MICs	BATS
Internal Source ID	113
Effective Date	**2015-05-04***
Impact	• Update of the Referential Tags • Update of the Level1 Market Data Kinematics – Halted Instruments Behavior • Update of the Level1 Market Data Kinematics – Opening Auctions • Microsecond Timestamp Precision on the Level1 Market Data
Action required	**MANDATORY ACTION** - see sections: • 2.2. Update of the Level1 Market Data Kinematics – Halted Instruments Behavior • 2.3. Update of the Level1 Market Data Kinematics – Opening Auctions • 2.4. Microsecond Timestamp Precision on the Level1 Market Data.

2. FeedOS Technical Implementation

Effective Monday, **May 04*** **2015,** S&P Capital IQ Real-Time Solutions enhances the referential data and updates the Level1 Market Data Kinematics to accommodate the information disseminated on the BATS US market data stream, as described below:

- 2.1. Changes to the Referential Data
- 2.2. Update of the Level1 Market Data Kinematics – Halted Instruments Behavior
- 2.3. Update of the Level1 Market Data Kinematics – Opening Auctions
- 2.4. Microsecond Timestamp Precision on the Level1 Market Data.

2.1. Changes to the Referential Data

S&P Capital IQ Real-Time Solutions **introduces** the referential tags below to accommodate the information disseminated on the BATS US market data stream:

Table 2 Referential tags added on the BATS US market data stream

Tag Name	Numeric ID	Type
PriceCurrency	15	String
ForeignFOSMarketId	9501	UInt16

Moreover, S&P Capital IQ Real-Time Solutions **updates** the referential tags below:

Table 3 Referential tags disseminating updated values on the BATS US market data stream

Tag Name	Numeric ID	Type
CFICode	461	String

2.1.1. PriceCurrency

The values of the referential tag **PriceCurrency** conveyed on the BATS US market data stream are disseminated via FeedOS data stream in *Referential* to specify the currency of the price.

FeedOS implementation of the tag `PriceCurrency` is described in the table below:

Table 4 PriceCurrency – technical implementation in FeedOS

Component	Value	Description
Tag Name	PriceCurrency	FeedOS tag name.

* This is the proposed day for the update of the standard version of the feed handler. For dedicated feed handlers, the date and Source IDs may differ. For the actual day when the changes to your custom feed handler will take effect, please contact your FeedOS™ project manager.

Table 4 PriceCurrency – technical implementation in FeedOS (Continued)

Component	Value	Description
Numeric ID	15	FeedOS unique ID disseminated on the S&P Capital IQ Real-Time Solutions data stream. This is the numeric equivalent of the tag name.
Type	String	String data type.
Format	*[Exchange Specific Value]*	An ***exchange specific value***, specifying the currency of the price.
Possible Values	USD	United States Dollar

2.1.2. ForeignFOSMarketId

The values of the referential tag **ForeignFOSMarketId** conveyed on the BATS US market data stream are disseminated via FeedOS data stream in *Referential* to internally specify the foreign market of a security.

FeedOS implementation of the tag ForeignFOSMarketId is described in the table below:

Table 5 ForeignFOSMarketId – technical implementation in FeedOS

Component	Value	Description
Tag Name	ForeignFOSMarketId	FeedOS tag name.
Numeric ID	9501	FeedOS unique ID disseminated on the S&P Capital IQ Real-Time Solutions data stream. This is the numeric equivalent of the tag name.
Type	UInt16	UInt16 data type.
Format	*[Exchange Specific Value]*	An ***exchange specific value***, internally specifying the foreign market of a security.
Possible Values	ARCX	NYSE Arca
	XASE	NYSE Market LLC
	XNAS	NASDAQ - All Markets
	XNYS	New York Stock Exchange

2.1.3. CFICode

The values of the referential tag **CFI Code** conveyed on the BATS US market data stream are disseminated via FeedOS data stream in *Referential* to specify the standardized identification code of an instrument.

FeedOS implementation of the tag CFICode is described in the table below :

Table 6 CFICode – technical implementation in FeedOS

Component	Value	Description
Tag Name	CFICode	FeedOS tag name.
Numeric ID	461	FeedOS unique ID disseminated on the S&P Capital IQ Real-Time Solutions data stream. This is the numeric equivalent of the tag name.
Type	String	String data type.
Format	*[Exchange Specific Value]*	An ***exchange specific value***, detailing the standardized identification code of an instrument.

Table 6 CFICode – technical implementation in FeedOS (Continued)

Component	Value	Description
Possible Values	EPXXXX	Equities - Preferred Shares
	ESXXXX	Equities - Shares
	EUXXXX	Equities - Units
	EXXXXX	Equities
	RWXXXX	Rights - Warrants
	RXXXXX	Rights

The list below shows the possible combinations of `SecurityTypes` and `CFICodes`, before and after the migration day (please note that additional combinations may be available, as the exchange could introduce new instruments):

```
BEFORE 2015-05-04                    AFTER 2015-05-04
{ BATS CS   ESXXXX }                 { BATS CS   ESXXXX }
{ BATS NONE EUXXXX }                 { BATS NONE EUXXXX }
{ BATS PS   EPXXXX }                 { BATS NONE EXXXXX }
{ BATS WAR  RWXXXX }                 { BATS NONE RXXXXX }
                                     { BATS PS   EPXXXX }
                                     { BATS WAR  RWXXXX }
```

Referential Data Sample

Below is an example showing the current implementation of the newly added (in `green`) referential tags:

```
instr # 444/762457 = 931897945
    PriceCurrency               string{USD}
    Symbol                      string{JMG}
    SecurityType                string{CS}
    FOSMarketId                 BATS
    CFICode                     string{ESXXXX}
    SecurityGroup               string{15}
    InternalCreationDate        Timestamp{2015-04-01 11:57:34:433}
    InternalModificationDate    Timestamp{2015-04-03 08:09:42:095}
    InternalSourceId            uint16{113}
    InternalEntitlementId       int32{1009}
    LocalCodeStr                string{JMG}
    ForeignFOSMarketId          XNYS
    PriceIncrement_dynamic_TableId      uint32{2031716}
    UMTF                        string{JMG}
    OperatingMIC                string{BATS}
```

2.2. Update of the Level1 Market Data Kinematics – Halted Instruments Behavior

In the Level1 Market Data Kinematics **before 2015-05-04**, the exchange sent the OPEN signal for all instruments, including those on halt, as shown in the example below:

```
“TE (TradeEvent) : MARKET_TIME INSTRUMENT LAST_PRICE TRADE_QTY BID_PRICE BID_QTY ASK_PRICE
ASK_QTY *CONTENT_MASK* *FLAGS*"
"VU (ValuesUpdate) : SERVER_TIME INSTRUMENT VALUES..."
"SI (TradeEvent) *SIGNAL* : SERVER_TIME INSTRUMENT SIGNAL LAST_PRICE"

VU   11:20:52:052   931897945    RegSHOAction=1  TradingStatus=2
SI   12:00:00:227   931897945    OPEN    *
TE   12:00:00:227   931897945    *       *       *       *       *       *       O
VU   12:00:00:227   931897945    TradingStatus=17
VU   14:50:16:914   931897945    RegSHOAction=1  TradingStatus=5
VU   14:50:16:914   931897945    TradingStatus=17
TE   14:50:16:915   931897945    *       *       11.6    100@1   *       *
TE   14:50:16:916   931897945    *       *       *       *       21.04   100@1
```

In the Level1 Market Data Kinematics **after 2015-05-04**, the exchange sends the OPEN signal only for non-halted instruments, as shown in the example below:

```
“TE (TradeEvent) : MARKET_TIME INSTRUMENT LAST_PRICE TRADE_QTY BID_PRICE BID_QTY ASK_PRICE
ASK_QTY *CONTENT_MASK* *FLAGS*"
"VU (ValuesUpdate) : SERVER_TIME INSTRUMENT VALUES..."
"SI (TradeEvent) *SIGNAL* : SERVER_TIME INSTRUMENT SIGNAL LAST_PRICE"

VU   11:20:52:039.625   931897945    RegSHOAction=1  TradingStatus=2
VU   14:50:16:914.328   931897945    TradingStatus=5
SI   14:50:16:914.328   931897945    OPEN    *
TE   14:50:16:914.328   931897945    *       *       *       *       *       *       O
VU   14:50:16:914.328   931897945    RegSHOAction=1  TradingStatus=17
TE   14:50:16:915.451   931897945    *       *       11.6    100@1   *       *
TE   14:50:16:915.564   931897945    *       *       *       *       21.04   100@1
```

2.3. Update of the Level1 Market Data Kinematics – Opening Auctions

In the Level1 Market Data Kinematics **before 2015-05-04**, the Trading Status of all auction eligible instruments was set to `5=PriceIndication` at 08:00 New York Time (EDST):

```
“TE (TradeEvent) : MARKET_TIME INSTRUMENT LAST_PRICE TRADE_QTY BID_PRICE BID_QTY ASK_PRICE
ASK_QTY *CONTENT_MASK* *FLAGS*"
"VU (ValuesUpdate) : SERVER_TIME INSTRUMENT VALUES..."
"SI (TradeEvent) *SIGNAL* : SERVER_TIME INSTRUMENT SIGNAL LAST_PRICE"

TE   11:16:00:747   931897945    *       *       !       0       !       0
VU   11:20:52:052   931897945    RegSHOAction=1
VU   12:00:00:001   931897945    TradingStatus=17
SI   12:00:00:227   931897945    OPEN    *
TE   12:00:00:227   931897945    *       *       *       *       *       *       O
VU   12:00:00:227   931897945    TradingStatus=5
TE   12:47:45:471   931897945    *       *       20.55   100@1   *       *
TE   12:47:45:472   931897945    *       *       *       *       61.65   100@1
--
TE   13:29:56:966   931897945    *       *       *       *       41.44   300@1
TE   13:29:56:966   931897945    *       *       *       *       41.39   300@1
VU   13:30:00:018   931897945    LastAuctionPrice=41.25
VU   13:30:00:018   931897945    LastAuctionPrice=41.1   LastAuctionVolume=0
DailyOpeningPrice=41.1  TradingStatus=17
TE   13:30:00:021   931897945    *       *       41.06   200@1   *       *
TE   13:30:00:021   931897945    *       *       41.04   200@1   *       *
--
TE   19:54:58:403   931897945    *       *       *       *       41.27   1700@3
TE   19:54:59:197   931897945    *       *       41.22   1500@1  *       *
TE   19:54:59:412   931897945    *       *       *       *       41.27   700@2
VU   19:55:00:001   931897945    LastAuctionPrice=41.245 MARKET_BATS_AuctionType=C
TradingStatus=5
TE   19:55:01:018   931897945    *       *       41.22   2100@2  *       *
TE   19:55:07:162   931897945    *       *       *       *       41.27   100@1
TE   19:55:07:164   931897945    *       *       *       *       41.27   700@2
```

In the Level1 Market Data Kinematics **after 2015-05-04**, the Trading Status of all auction eligible instruments will be set to `5=PriceIndication`, two minutes before 09:30 New York Time (EDST) or upon receiving the Auction information, as shown below (the Trading Status will change back to `17=ReadyToTrade` only when a trade occurs or upon receiving the Auction summary message – reset of the auction information):

```
"TE (TradeEvent) : MARKET_TIME INSTRUMENT LAST_PRICE TRADE_QTY BID_PRICE BID_QTY ASK_PRICE
ASK_QTY *CONTENT_MASK* *FLAGS*"
"VU (ValuesUpdate) : SERVER_TIME INSTRUMENT VALUES..."
"SI (TradeEvent) *SIGNAL* : SERVER_TIME INSTRUMENT SIGNAL LAST_PRICE"

TE   11:16:00:747.828   931897945    *       *       !       0       !       0
VU   11:20:52:039.635   931897945    RegSHOAction=1
SI   12:00:00:001.123   931897945    OPEN    *
TE   12:00:00:001.123   931897945    *       *       *       *       *       *       O
VU   12:00:00:001.123   931897945    RegSHOAction=1  TradingStatus=17
TE   12:47:45:471.421   931897945    *       *       20.55   100@1   *       *
TE   12:47:45:471.421   931897945    *       *       *       *       61.65   100@1
--
TE   13:27:31:663.335   931897945    *       *       40.02   400@1   *       *
TE   13:27:45:998.721   931897945    *       *       40.01   400@1   *       *
TE   13:27:45:998.721   931897945    *       *       *       *       42.17   400@1
VU   13:28:00:007.195   931897945    LastAuctionPrice=41.09  MARKET_BATS_AuctionType=O
TradingStatus=5
TE   13:28:00:036.387   931897945    *       *       40.01   500@2   *       *
TE   13:28:00:036.387   931897945    *       *       *       *       42.17   500@2
TE   13:28:00:329.564   931897945    *       *       40.02   400@1   *       *
TE   13:28:00:332.648   931897945    *       *       40.02   500@2   *       *
VU   13:28:05:049.874   931897945    LastAuctionPrice=41.095
--
TE   13:29:56:965.329   931897945    *       *       *       *       41.44   300@1
TE   13:29:56:965.330   931897945    *       *       *       *       41.39   300@1
VU   13:30:00:365.235   931897945    LastAuctionPrice=41.25
VU   13:30:00:365.311   931897945    LastAuctionPrice=41.1   LastAuctionVolume=0
TradingStatus=17
TE   13:30:00:365.707   931897945    *       *       41.06   200@1   *       *
TE   13:30:00:365.707   931897945    *       *       41.04   200@1   *       *
TE   13:30:00:365.707   931897945    *       *       *       *       41.41   300@1
--
TE   19:54:58:436.083   931897945    *       *       *       *       41.27   1700@3
TE   19:54:59:197.085   931897945    *       *       41.22   1500@1  *       *
TE   19:54:59:412.086   931897945    *       *       *       *       41.27   700@2
VU   19:55:00:137.577   931897945    LastAuctionPrice=41.245 MARKET_BATS_AuctionType=C
TradingStatus=5
TE   19:55:01:815.128   931897945    *       *       41.22   2100@2  *       *
TE   19:55:07:508.328   931897945    *       *       *       *       41.27   100@1
TE   19:55:07:508.521   931897945    *       *       *       *       41.27   700@2
--
TE   20:00:48:238.168   931897945    *       *       *       *       47.22   100@1
TE   20:00:48:240.254   931897945    *       *       *       *       48.31   100@1
TE   20:02:02:333.687   931897945    *       *       *       *       !       0
TE   21:00:00:001.495   931897945    *       *       !       0       *       *
VU   21:00:00:565.348   931897945    TradingStatus=18
TE   23:30:00:920.684   931897945    *       *       !       0       !       0
```

2.4. Microsecond Timestamp Precision on the Level1 Market Data

Effective 2015-05-04, the server timestamps will display microsecond units on the Level1 Market Data, as shown in the example below (highlighted in green):

```
“TE (TradeEvent) : MARKET_TIME INSTRUMENT LAST_PRICE TRADE_QTY BID_PRICE BID_QTY ASK_PRICE
ASK_QTY *CONTENT_MASK* *FLAGS*"

TE   19:55:07:508.521   931897945    *       *       *       *       41.27   700@2
TE   20:00:48:238.168   931897945    *       *       *       *       47.22   100@1
TE   20:00:48:240.254   931897945    *       *       *       *       48.31   100@1
```

3. Finding the Latest Information

For the latest documentation and product updates, additional support and training, please contact our support services:

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