S&P Capital IQ Real-Time Solutions

FeedOS™ Developer's Notice

DIRECT EDGE – Feed Update

Reference n°: 20141125 – 21251 – 23752

Effective as of: 12 January 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: DIRECT EDGE – Feed Update
Reference 20141125 – 21251 – 23752
December 05, 2014

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UPDATE OF THE DIRECT EDGE MARKET DATA STREAM

To reflect the changes caused by the dissemination of new values on the DIRECT EDGE 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	20141125 – 21251 – 23752
Exchanges	DIRECT EDGE
Concerned MICs	EDGA, EDGX
Internal Source ID	149, 157
Effective Date	**2015-01-12***
Impact	• Update of the Referential Tags • Update of the Quotation Tags • Update of the Level1 Market Data Kinematics – OPEN & CLOSE
Action required	**MANDATORY ACTION** - see sections: • 2.1.6. SecurityType • 2.1.7. CFICode • 2.4. Update of the Level1 Market Data Kinematics – OPEN & CLOSE.

2. FeedOS Technical Implementation

Effective Monday, **January 12**[*] **2014,** S&P Capital IQ Real-Time Solutions enhances the referential, quotation and quotation context data, and updates the Level1 Market Data Kinematics to accommodate the information disseminated on the DIRECT EDGE market data stream, as described below:

- 2.1. Changes to the Referential Data
- 2.2. Changes to the Quotation Data
- 2.3. Changes to the Quotation Context Data
- 2.4. Update of the Level1 Market Data Kinematics – OPEN & CLOSE.

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 DIRECT EDGE market data stream:

Table 2 Referential tags added on the DIRECT EDGE market data stream

Tag Name	Numeric ID	Type
`SecurityGroup`	1151	String
`PriceIncrement_dynamic_TableId`	9522	UInt32
`UMTF`	9526	String
`SegmentMIC`	9533	String
`SegmentMIC`	9534	String

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

Table 3 Referential tags disseminating updated values on the DIRECT EDGE market data stream

Tag Name	Numeric ID	Type
`SecurityType`	167	String
`CFICode`	461	String

S&P Capital IQ Real-Time Solutions also **removes** the referential tags below:

Table 4 Referential tags no longer disseminated on the DIRECT EDGE market data stream

Tag Name	Numeric ID	Type
`RoundLot`	561	Float64
`MinTradeVol`	562	Float64
`ForeignFOSMarketId`	9501	UInt16
`ForeignMarketId`	9502	UInt16

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

2.1.1. SecurityGroup

The values of the referential tag **Security Group** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Referential* to indicate an exchange specific name assigned to a group of related securities which may be concurrently affected by market events and actions.

FeedOS implementation of the tag `SecurityGroup` is described in the following table:

Table 5 SecurityGroup – technical implementation in FeedOS

Component	Value	Description
Tag Name	`SecurityGroup`	FeedOS tag name.
Numeric ID	`1151`	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 / Possible Values	*`[Exchange Specific Value]`*	An ***exchange specific percentile value***, indicating an exchange specific name assigned to a group of related securities which may be concurrently affected by market events and actions.

2.1.2. PriceIncrement_dynamic_TableId

The values of the referential tag **PriceIncrement_dynamic_TableId** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Referential* to specify the table detailing the price increments for an instrument.

FeedOS implementation of the values currently available for the tag `PriceIncrement_dynamic_TableId` is described in the table below:

Table 6 PriceIncrement_dynamic_TableId – technical implementation in FeedOS

Component	Value	Description
Tag Name	`PriceIncrement_dynamic_TableId`	FeedOS tag name.
Numeric ID	`9522`	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	`UInt32`	UInt32 data type.
Format / Possible Values	*`[Exchange Specific Value]`*	An ***exchange specific value***, specifying the table that details the price increments for an instrument.

2.1.3. UMTF

The values of the referential tag **UMTF** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Referential* to specify the Universal Symbology code of a security.

FeedOS implementation of the values currently available for the tag `UMTF` is described in the table below:

Table 7 UMTF – technical implementation in FeedOS

Component	Value	Description
Tag Name	`UMTF`	FeedOS tag name.
Numeric ID	`9526`	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 / Possible Values	*`[Exchange Specific Value]`*	An ***exchange specific value***, specifying the Universal Symbology code of a security.

2.1.4. OperatingMIC

The values of the referential tag **OperatingMIC** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Referential* to specify the parent MIC.

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

Table 8 OperatingMIC – technical implementation in FeedOS

Component	Value	Description
Tag Name	`OperatingMIC`	FeedOS tag name.
Numeric ID	`9533`	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 parent MIC.
Possible Values	`EDGE`	Direct Edge

2.1.5. SegmentMIC

The values of the referential tag **SegmentMIC** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Referential* to specify the child MIC.

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

Table 9 SegmentMIC – technical implementation in FeedOS

Component	Value	Description
Tag Name	`SegmentMIC`	FeedOS tag name.
Numeric ID	`9534`	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 child MIC.
Possible Values	`EDGA`	EDGA Exchange
	`EDGX`	EDGX Exchange

2.1.6. SecurityType

The values of the referential tag **Security Type** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Referential* to specify the type of security.

FeedOS implementation of the tag `SecurityType` is described in the table below (existing values are in `black`, newly added values are in `green`):

Table 10 SecurityType – technical implementation in FeedOS

Component	Value	Description
Tag Name	`SecurityType`	FeedOS tag name.
Numeric ID	`167`	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 type of security.
Possible Values	`CS`	Common Stock
	`NONE`	None
	`PS`	Preferred Stock
	`WAR`	Warrant

2.1.7. CFICode

The values of the referential tag **CFI Code** conveyed on the DIRECT EDGE 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 (existing values are in `black`, newly added values are in `green`):

Table 11 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.
Possible Values	`EPXXXX`	Equities - Preferred Shares
	`ESXXXX`	Equities - Shares
	`EUXXXX`	Equities - Units
	`RWXXXX`	Rights - Warrants

The list below shows the possible combinations of `FOSMarketIds`, `SecurityTypes` and `CFICodes`, before and after the migration day:

```
BEFORE 2015-01-12                    AFTER 2015-01-12
{ EDGA   CS     ESXXXX }             { EDGA   CS     EPXXXX }
{ EDGA   NONE   EUXXXX }             { EDGA   NONE   ESXXXX }
{ EDGX   CS     ESXXXX }             { EDGA   PS     EUXXXX }
{ EDGA   NONE   EUXXXX }             { EDGA   WAR    RWXXXX }
                                     { EDGX   CS     EPXXXX }
                                     { EDGX   NONE   ESXXXX }
                                     { EDGX   PS     EUXXXX }
                                     { EDGX   WAR    RWXXXX }
```

Referential Data Sample

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

```
instr # 149/757913 = 313233561
    PriceCurrency                 string{USD}
    Symbol                        string{WFC+}
    SecurityType                  string{WAR}
    FOSMarketId                   EDGA
    CFICode                       string{RWXXXX}
    SecurityGroup                 string{30}
    InternalCreationDate          Timestamp{2014-11-14 15:07:46:644}
    InternalModificationDate      Timestamp{2014-11-14 15:07:46:644}
    InternalSourceId              uint16{149}
    InternalEntitlementId         int32{1031}
    LocalCodeStr                  string{WFC+}
    PriceIncrement_dynamic_TableId     uint32{4522084}
    UMTF                          string{WFC+}
    OperatingMIC                  string{EDGE}
    SegmentMIC                    string{EDGA}
```

2.2. Changes to the Quotation Data

S&P Capital IQ Real-Time Solutions **introduces** the quotation tags below to accommodate the information disseminated on the DIRECT EDGE market data stream:

Table 12 Quotation tags added on the DIRECT EDGE market data stream

Tag Name	Numeric ID	Type
`RegSHOAction`	9113	Enum
`InternalDailyClosingPriceType`	9155	Char

2.2.1. RegSHOAction

Each time a short sale price restriction occurs, the values of the quotation tag **RegSHOAction** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Other Values*:

- in the callback carrying the Level1 event `notif_TradeEventExt()`, for C++

- in the event handler `TradeEventExtEventHandler`, for C#
- in the callback carrying the Level1 event `quotNotifTradeEventExt`, for Java.

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

Table 13 RegSHOAction – technical implementation in FeedOS

Component	Value	Description
Tag Name	`RegSHOAction`	FeedOS tag name.
Numeric ID	`9113`	FeedOS unique ID broadcast on the S&P Capital IQ Real-Time Solutions data stream. This is the numeric equivalent of the tag name.
Type	`Enum`	Enum data type.
Format	*`[Exchange Specific Value]`*	An ***exchange specific value***, detailing the short sale restriction status.
Possible Values	`1`	Short sale restriction deactivated – No Price Test.
	`2`	Short sale restriction activated – Price Test in effect.
	`3`	Short sale restriction continued – Price Test remains in effect.

2.2.2. InternalDailyClosingPriceType

The values of the quotation tag **InternalDailyClosingPriceType** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Other Values* to indicate the type of the internal daily closing price:

- in the callback carrying the Level1 event `notif_TradeEventExt()`, for C++
- in the event handler `TradeEventExtEventHandler`, for C#
- in the callback carrying the Level1 event `quotNotifTradeEventExt`, for Java.

FeedOS implementation of the tag `InternalDailyClosingPriceType` is described in the table below (the values disseminated as of 2015-01-12 are highlighted in `green`):

Table 14 InternalDailyClosingPriceType – technical implementation in QuantFEED®

Component	Value	Description
Tag Name	`InternalDailyClosingPriceType`	FeedOS tag name.
Numeric ID	`9155`	FeedOS unique ID disseminated on S&P Capital IQ Real-Time Solutions data stream. This is the numeric equivalent of the tag name.
Type	`Char`	Char data type.
Format	*`[Internal Specific Value]`*	An ***internal specific value***, detailing the type of daily closing price, as described below.
Possible Values	0	**Undefined**
	a	**Official Close** – Explicit closing price value calculated and distributed by an exchange for the main trading session of a given trading day.
	b	**Official Indicative** – Exchange has provided an indicative price and marked it as indicative, however no trading activity is observed.

Table 14 InternalDailyClosingPriceType – technical implementation in QuantFEED® (Continued)

Component	Value	Description
Possible Values	c	**Official Carry Over** – Explicit Closing price value from a previous trading day carried forward by the exchange to the given trading day.
	d	**Last Price** – Final price disseminated by the exchange for the main trading session or dissemination period of a given trading day (for indices).
	e	**Last Eligible Price** – Execution price of the final trade (subject to trade qualifiers) accepted by the exchange for the main trading session of a given trading day.
	z	**Manual** – Price disseminated manually (in case of production correction).

Quotation Data Sample

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

```
InstrumentStatusL1
-- 149/10783
        BID: 17.79      0       *NO ORDER*
        ASK: 29.78      0       *NO ORDER*
        LastPrice                       float64{23.75}
        LastTradeQty                    float64{100}
        DailyTotalVolumeTraded          float64{0}
        DailyTotalAssetTraded           float64{0}
        LastTradePrice                  float64{23.75}
        RegSHOAction                    enum{1}
        LastTradeTimestamp              Timestamp{2014-12-04 15:17:29:639}
        InternalDailyOpenTimestamp      Timestamp{2014-12-05 13:00:00:924}
        InternalDailyCloseTimestamp     Timestamp{2014-12-05 01:00:00:926}
        InternalDailyHighTimestamp      Timestamp{2014-12-04 15:17:29:639}
        InternalDailyLowTimestamp       Timestamp{2014-12-04 15:15:53:793}
        InternalPriceActivityTimestamp  Timestamp{2014-12-05 02:00:00:747}
        InternalDailyClosingPriceType   char{d}
        TradingStatus                   17=ReadyToTrade
        PreviousDailyTotalVolumeTraded  float64{200}
        PreviousDailyTotalAssetTraded   float64{4748}
        PreviousDailyClosingPrice       float64{23.75}
        PreviousBusinessDay             Timestamp{2014-12-04}
        CurrentBusinessDay              Timestamp{2014-12-05}
        PriceActivityMarketTimestamp    Timestamp{2014-12-05 01:00:00:926}
```

2.3. Changes to the Quotation Context Data

S&P Capital IQ Real-Time Solutions **introduces** the quotation tags below to accommodate the information disseminated on the DIRECT EDGE market data stream:

Table 15 Quotation tags added on the DIRECT EDGE market data stream

Tag Name	Numeric ID	Type
`TradeID`	1003	String
`AggressorSide`	9356	Char

S&P Capital IQ Real-Time Solutions also **removes** the quotation tags below:

Table 16 Quotation context tags no longer disseminated on the DIRECT EDGE market data stream

Tag Name	Numeric ID	Type
`MARKET_DIRECTEDGE_HiddenLiquidityFlag` **Note:** Before 2015-01-12, this tag indicated Hidden Quantity trades. After 2015-01-12, the hidden quantities will be highlighted by Off Book Trades.	16220	Bool

2.3.1. TradeID

Each time a trade occurs, the values of the quotation context tag **TradeID** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Context* to detail the unique ID assigned to the trade entity once it is received or matched by the exchange or central counterparty:

- in the callback carrying the Level1 event `notif_TradeEventExt()`, for C++
- in the event handler `TradeEventExtEventHandler`, for C#
- in the callback carrying the Level1 event `quotNotifTradeEventExt`, for Java.

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

Table 17 TradeID – technical implementation in FeedOS

Component	Value	Description
Tag Name	`TradeID`	FeedOS tag name.
Numeric ID	1003	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 / Possible Values	*`[Exchange Specific Value]`*	An ***exchange specific value***, detailing the unique ID assigned to the trade entity once it is received or matched by the exchange or central counterparty.

2.3.2. AggressorSide

Each time a trade occurs, the values of the quotation context tag **AggressorSide** conveyed on the DIRECT EDGE market data stream are disseminated via FeedOS data stream in *Context*, to indicate whether the aggressor is a buyer or a seller:

- in the callback carrying the Level1 event `notif_TradeEventExt()`, for C++
- in the event handler `TradeEventExtEventHandler`, for C#

- in the callback carrying the Level1 event `quotNotifTradeEventExt`, for Java.

FeedOS implementation of the tag `AggressorSide` is described in the following table:

Table 18 AggressorSide – technical implementation in QuantFEED®

Component	Value	Description
Tag Name	`AggressorSide`	FeedOS tag name.
Numeric ID	9356	FeedOS unique ID disseminated on the S&P Capital IQ Real-Time Solutions's data stream. This is the numeric equivalent of the tag name.
Type	`Char`	Char data type.
Format	*`[Exchange Specific Value]`*	An ***exchange specific value***, indicating whether the aggressor is a buyer or a seller.
Possible Values	`Space`	No aggressor
	1	Buy Side
	2	Seller Side

Quotation Context Data Sample

Below is an example showing the newly added (in `green`) and removed (in ~~`crossed out red`~~) quotation context tags:

```
"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..."

TE  14:35:59:091.647    329263255    *    *    67.34   100@1   *    *
TE  14:35:59:658.794    329263255    67.59    100    *        *    *     *    H
MARKET_DIRECTEDGE_HiddenLiquidityFlag=bool{True}
TE  14:36:00:064.959    329263255    *    *    67.3    200@1   *    *
[...]
TE   13:43:18:815.361    931885499    114.31    100    *    *    *    *    f
TradeID=76261271427087
TE   13:43:40:102.536    931885499    *    *    114.3    100@1    *    *
TE   13:43:55:571.823    931885499    114.3    100    !    0    *    *    HL
TradeID=91303925778, AggressorSide='2'=Sell
VU   13:43:55:571.823    931885499    DailyOpeningPrice=114.3
```

2.4. Update of the Level1 Market Data Kinematics – OPEN & CLOSE

In the Level1 Market Data Kinematics before 2015-01-12, the exchange sent the OPEN signal for all the instruments, including those on halt.

Moreover, the exchange sent the CLOSE signal for all instruments at 20:00 New York Time, as shown in the example below:

```
TE  2015-02-18 13:00:00:509   329263255    *    *    !    0    !    0
SI  2015-02-18 13:00:00:509   329263255    OPEN      *
TE  2015-02-18 13:00:00:509   329263255    *    *    *    *    *    *    O
VU  2015-02-18 13:00:00:509   329263255    TradingStatus=17
TE  2015-02-18 13:00:01:086   329263255    *    *    *    *    72.36    100@1
TE  2015-02-18 13:00:01:086   329263255    *    *    52.5 300@1    *    *
TE  2015-02-18 13:00:01:086   329263255    *    *    55.5 100@1    *    *
TE  2015-02-19 01:00:00:082   329263255    *    *   62   300@1     *    *
TE  2015-02-19 01:00:00:082   329263255    *    *   !    0    *    *
SI  2015-02-19 01:00:00:555   329263255    CLOSE    65.54
TE  2015-02-19 01:00:00:555   329263255    65.54    *    *    *    *    *    C
VU  2015-02-19 01:00:00:555   329263255    TradingStatus=18
```

In the Level1 Market Data Kinematics after 2015-01-12, the exchange no longer sends the OPEN signal for halted instruments, as shown below:

```
VU  2015-02-18 09:22:26:844    330010630    RegSHOAction=2    TradingStatus=2
VU  2015-02-18 09:22:31:153    330010630    RegSHOAction=1
SI  2015-02-18 09:22:32:367    330010630    OPEN    *
TE  2015-02-18 09:22:32:367    330010630    *    *    *    *    *    *    O
VU  2015-02-18 09:22:32:367    330010630    RegSHOAction=1    TradingStatus=17
VU  2015-02-18 09:22:37:821    330010630    TradingStatus=2
VU  2015-02-18 09:23:17:246    330010630    TradingStatus=17
SI  2015-02-18 10:22:03:385    330010630    CLOSE    * Pourquoi ce timestamp ?
TE  2015-02-18 10:22:03:385    330010630    *    *    *    *    *    *    C
VU  2015-02-18 10:22:03:385    330010630    TradingStatus=18
VU  2015-02-18 13:01:00:463    330010630    TradingStatus=2
TE  2015-02-19 00:30:00:729    330010630    *    *    !    0    !    0
TE  2015-02-20 00:30:00:902    330010630    *    *    !    0    !    0
TE  2015-02-20 00:30:00:890    330010630    *    *    !    0    !    0
```

Moreover, the exchange will send the CLOSE signal for all instruments at 16:01 New York Time, 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..."

TE   2015-02-18 00:30:00:184.234   330011060    *    *    !  0     !    0
VU   2015-02-18 11:00:00:008.543   330011060    RegSHOAction=1
SI   2015-02-18 13:00:00:009.544   330011060    OPEN    *
TE   2015-02-18 13:00:00:009.623   330011060    *    *    *    *    *    *    O
VU   2015-02-18 13:00:00:009.625   330011060    RegSHOAction=1    TradingStatus=17
VU   2015-02-18 15:50:27:620.657   330011060    TradingStatus=2
VU   2015-02-18 15:55:27:620.985   330011060    TradingStatus=17
TE   2015-02-18 15:58:43:709.325   330011060    *    *    10.54    500@1    *    *
TE   2015-02-18 15:59:24:323.458   330011060    *    *    !    0    *    *
SI   2015-02-18 21:01:00:663.034   330011060    CLOSE    *
TE   2015-02-18 21:01:00:663.132   330011060    *    *    *  *     *    *    C
TE   2015-02-19 00:30:00:744.125   330011060    *    *    !  0     !    0
VU   2015-02-19 01:00:00:757.584   330011060    TradingStatus=18
```

3. Finding the Latest Information

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

- E-mail: rts-support@spcapitaliq.com
- Web: http://support.quanthouse.com.