S&P Capital IQ Real-Time Solutions

FeedOS™ Developer's Notice

OSLO MIT – Feed Update

Reference n°: 20150324 – 23726 – 21127

Effective as of: 20 April 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: OSLO MIT – Feed Update
Reference 20150324 – 23726 – 21127
April 01, 2015

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UPDATE OF THE OSLO MIT MARKET DATA STREAM

To reflect the changes caused by the Millennium Exchange Release 8.6 North Sea on the Oslo Børs, 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

Table 1 Current update summary

Notice Reference	20150324 – 23726 – 21127
Exchanges	OSLO MIT
Concerned MICs	BURG, XOAM, XOAS, XOSL
Internal Source ID	65, 92
Effective Date	**2015-04-20***
Impact	• Update of the Referential Tags • Update of the Quotation Tags • Update of the Quotation Context Tags • Changes to the Level 1 Market Data Kinematics
Action required	**MANDATORY ACTION** - see sections: • 2.4. Update of the Level1 Market Data Kinematics – CLOSE • 2.5. Update of the Level1 Market Data Kinematics – Halted Instruments Behavior.

2. FeedOS Technical Implementation

Effective Monday, **April 20*** **2015,** S&P Capital IQ Real-Time Solutions enhances the referential, quotation and quotation context data, and updates the Level1Market Data Kinematics to accommodate the information disseminated on the OSLO MIT market data stream, as described below:

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 OSLO MIT market data stream:

Table 2 Referential tags added on the OSLO MIT market data stream

Tag Name	Numeric ID	Type
SecurityStatus	965	UInt8

2.1.1. SecurityStatus

The values of the referential tag **SecurityStatus** conveyed on the OSLO MIT market data stream are disseminated via FeedOS data stream in *Referential* to indicate the status of an instrument.

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

Table 3 SecurityStatus – technical implementation in FeedOS

Component	Value	Description
Tag Name	SecurityStatus	FeedOS tag name.
Numeric ID	965	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	UInt8	UInt8 data type.
Format	*[Exchange Specific Value]*	An ***exchange specific value***, indicating the status of an instrument.
Possible Values	1	Active (Default value)
	2	Inactive
	3	Suspended

* 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.

Referential Data Sample

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

```
instr # 187/756990 = 392924414
    PriceCurrency               string{NOK}
    Symbol                      string{NANO}
    Issuer                      string{Nordic Nanovector ASA}
    Description                 string{Nordic Nanovector}
    SecurityType                string{CS}
    FOSMarketId                 XOSL
    CFICode                     string{ESXXXX}
    CountryOfIssue              string{NO}
    RoundLot                    float64{1}
    SecurityStatus              uint8{2}
    SecuritySubType             string{SH}
    SecurityGroup               string{OBNW}
    InternalCreationDate        Timestamp{2015-03-23 02:01:02:231}
    InternalModificationDate    Timestamp{2015-03-27 02:01:01:822}
    InternalSourceId            uint16{65}
    LocalCodeStr                string{1301592}
    ISIN                        string{NO0010597883}
    PriceIncrement_dynamic_TableId      uint32{4259941}
    OperatingMIC                string{XOSL}
    DynamicVariationRange       float64{0}
    StaticVariationRange        float64{0}
    MARKET_LSE_NormalMarketSize float64{300}
    MARKET_LSE_SegmentCode      string{OBNW}
```

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 OSLO MIT market data stream:

Table 4 Quotation tags added on the OSLO MIT market data stream

Tag Name	Numeric ID	Type
MARKET_TURQUOISE_DarkBookTradingStatus	14721	Enum
MARKET_TURQUOISE_OffBookReportingTradingStatus	14722	Enum

2.2.1. MARKET_TURQUOISE_DarkBookTradingStatus

The values of the quotation tag **MARKET_TURQUOISE_DarkBookTradingStatus** conveyed on the OSLO MIT market data stream are disseminated via FeedOS data stream in *Other Values* to indicate the trading status:

- 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 `MARKET_TURQUOISE_DarkBookTradingStatus` is described in the table below:

Table 5 MARKET_TURQUOISE_DarkBookTradingStatus – technical implementation in FeedOS

Component	Value	Description
Tag Name	`MARKET_TURQUOISE_DarkBookTradingStatus`	FeedOS tag name.
Numeric ID	`14721`	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***, indicating the trading status of the Dark Book.
Possible Values	`2`	Trading Halt
	`5`	Price Indication
	`17`	Ready to Trade
	`18`	Not Available for Trading

2.2.2. MARKET_TURQUOISE_OffBookReportingTradingStatus

Each time a trade occurs, the values of the quotation tag **MARKET_TURQUOISE_OffBookReportingTradingStatus** conveyed on the OSLO MIT market data stream are disseminated via FeedOS data stream in *Other Values* to indicate the off book trading status:

- 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 `MARKET_TURQUOISE_OffBookReportingTradingStatus` is described in the table below:

Table 6 MARKET_TURQUOISE_OffBookReportingTradingStatus – technical implementation in FeedOS

Component	Value	Description
Tag Name	`MARKET_TURQUOISE_OffBookReporting TradingStatus`	FeedOS tag name.
Numeric ID	`14722`	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***, indicating the off book trading status.
Possible Values	`2`	Trading Halt
	`17`	Ready to Trade
	`18`	Not Available for Trading

Quotation Data Sample

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

```
InstrumentStatusL1
-- 187/756990
        BID: 34.7       6016    @1
        ASK: 34.8       2862    @2
        LastPrice                       float64{34.7}
        LastTradeQty                    float64{100}
        DailyHighPrice                  float64{35.5}
        DailyLowPrice                   float64{34}
        DailyTotalVolumeTraded          float64{276752}
        DailyTotalAssetTraded           float64{9571516.7}
        LastTradePrice                  float64{34.7}
        LastTradeTimestamp              Timestamp{2015-03-24 10:32:13:409}
        InternalDailyOpenTimestamp      Timestamp{2015-03-24 08:00:29:015}
        InternalDailyCloseTimestamp     Timestamp{2015-03-23 16:37:00:084}
        InternalDailyHighTimestamp      Timestamp{2015-03-24 09:13:46:004}
        InternalDailyLowTimestamp       Timestamp{2015-03-24 09:01:48:613}
        InternalPriceActivityTimestamp  Timestamp{2015-03-24 10:32:13:409}
        TradingStatus                   17=ReadyToTrade
        LastOffBookTradePrice           float64{34.6}
        LastOffBookTradeQty             float64{7835}
        LastOffBookTradeTimestamp       Timestamp{2015-03-24 09:30:54:747}
        DailyOpeningPrice               float64{34.7}
        PreviousDailyTotalVolumeTraded  float64{2173729}
        PreviousDailyTotalAssetTraded   float64{75511846.2}
        PreviousDailyClosingPrice       float64{34.5}
        PreviousBusinessDay             Timestamp{2015-03-23}
        CurrentBusinessDay              Timestamp{2015-03-24}
        LastAuctionPrice                float64{34.7}
        LastAuctionVolume               float64{8150}
        DailyTotalOffBookVolumeTraded   float64{23505}
        DailyTotalOffBookAssetTraded    float64{813273}
        PreviousInternalDailyClosingPriceType   char{a}
        InternalLastAuctionTimestamp    Timestamp{2015-03-24 08:00:26:797}
        PriceActivityMarketTimestamp    Timestamp{2015-03-24 10:32:13:409}
        MARKET_TURQUOISE_DarkBookTradingStatus  Enum{17}
        MARKET_TURQUOISE_OffBookReportingTradingStatus  Enum{17}
        MARKET_LSE_MIT_TradingStatusDetails     char{T}
        MARKET_LSE_MIT_TotalAuctionVolume       float64{8150}
```

2.3. Changes to the Quotation Context Data

S&P Capital IQ Real-Time Solutions **introduces** the quotation context tags below:

Table 7 Quotation context tags added on the OSLO MIT market data stream

Tag Name	Numeric ID	Type
MMTFlagsV2	9901	String

2.3.1. MMTFlagsV2

The values of the quotation tag **MMTFlagsV2** conveyed on the OSLO MIT market data stream are disseminated via FeedOS data stream in *Context* to detail the Market Model Typology (version 2) applicable to the trade:

- 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.

QuantFEED® implementation of the tag `MMTFlagsV2` is described in the table below (newly available values are in `green`):

Table 8 MMTFlagsV2 – technical implementation in QuantFEED®

Component	Value	Description
Tag Name	`MMTFlagsV2`	FeedOS tag name.
Numeric ID	`9901`	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] 10-character long`***	An ***exchange specific value***, detailing the Market Model Typology (version 2) applicable to the trade.
Possible Values	**MMT Level 1 - MARKET MECHANISM – OFFSET 1**	
	`1`	Central Limit Order Book
	`2`	Quote Driven Market
	`3`	Dark Order Book
	`4`	Off Book
	MMT Level 2 - TRADING MODE – OFFSET 2	
	`1`	Undefined Auction
	`2`	Continuous Trading
	`3`	At Market Close Trading
	`4`	Out of Main Session Trading
	`5`	Trade Reporting (On Exchange)
	`6`	Trade Reporting (Off Exchange)
	`7`	Trade Reporting (Systematic Internaliser)
	`O`	Scheduled Opening Auction
	`K`	Scheduled Closing Auction
	`I`	Scheduled Intraday Auction
	`U`	Unscheduled Auction
	MMT Level 3 - TRANSACTION TYPE	
	3.1. TRANSACTION CATEGORY – OFFSET 3	
	`B`	Benchmark Trade
	`P`	Plain-Vanilla Trade
	`D`	Dark Trade
	`T`	Technical Trade
	`G`	Give-up/Give-In Trade
	`F`	Trade with Conditions

Table 8 MMTFlagsV2 – technical implementation in QuantFEED® (Continued)

Component	Value	Description
Possible Values	***3.2. NEGOTIATED TRANSACTION INDICATOR – OFFSET 4***	
	N	Negotiated Trade
	-	No Negotiated Trade
	3.3. CROSSING TRADE INDICATOR – OFFSET 5	
	X	Crossing Trade
	-	No Crossing Trade
	3.4. MODIFICATION INDICATOR – OFFSET 6	
	C	Trade Cancellation
	A	Trade Amendment
	-	New Trade
	3.5. BENCHMARK INDICATOR – OFFSET 7	
	B	Benchmark Trade
	-	No Benchmark Trade
	3.6. EX/CUM DIVIDEND INDICATOR – OFFSET 8	
	E	Ex/cum dividend Trade
	-	No Ex/Cum Dividend Trade
	MMT Level 4 - PUBLICATION MODE – OFFSET 9	
	-	Immediate Publication
	1	Non Immediate Publication

Quotation Context Data Sample

Below is an example showing the newly added (in green) quotation context tags:

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

TE   09:56:51:297.554    392918866    44.9   13    *     *     45    6070@4
TradeID=1181374316812924, AggressorSide='1'=Buy,
TradeConditionsDictionaryKey=uint32{266338406}, MMTFlagsV2=12P------
```

2.4. Update of the Level1 Market Data Kinematics – CLOSE

In the Level1 Market Data Kinematics **before 2015-04-20**, the CLOSE signal was sent when the `MARKET_LSE_MIT_TradingStatusDetails` received the value `c=MarketClose`, 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   07:10:00:058.199   392918865   MARKET_LSE_MIT_TradingStatusDetails=y
TE   07:10:00:058.215   392918865   *       *       0.2     1000@1  *       *
VU   07:15:00:108.872   392918865   MARKET_LSE_MIT_TradingStatusDetails=a   TradingStatus=21
SI   07:15:00:132.984   392918865   OPEN    *
TE   07:15:00:132.984   392918865   *       *       *       *       *       *       O
VU   07:15:00:132.984   392918865   MARKET_LSE_MIT_TradingStatusDetails=T
InternalDailyClosingPriceType=?
VU   07:45:01:012.758   392918865   MARKET_LSE_MIT_TradingStatusDetails=T
MARKET_LSE_MIT_HaltReason=?
VU   07:45:25:030.183   392918865   TradingStatus=17
TE   09:03:45:533.090   392918865   0.2     1       0.2     999@1   *       *       HL
TradeID=1181374308417942,AggressorSide='2'=Sell,TradeConditionsDictionaryKey=uint32{2663384
05},MMTFlagsV2=12P------
VU   09:03:45:533.090   392918865   DailyOpeningPrice=0.2
TE   09:03:50:573.225   392918865   0.2     1       0.2     998@1   *       *
TradeID=1181374308417944, AggressorSide='2'=Sell,
TradeConditionsDictionaryKey=uint32{266338405}, MMTFlagsV2=12P------
VU   17:20:00:014.078   392918865   MARKET_LSE_MIT_TradingStatusDetails=d
LastAuctionPrice=?      LastAuctionVolume=?     TradingStatus=5
VU   17:25:29:129.044   392918865   MARKET_LSE_MIT_TradingStatusDetails=z   TradingStatus=18
VU   17:25:30:004.886   392918865   MARKET_LSE_MIT_TradingStatusDetails=b   TradingStatus=15
VU   17:58:00:129.422   392918865   MARKET_LSE_MIT_TradingStatusDetails=x   TradingStatus=18
SI   17:59:00:203.602   392918865   CLOSE   0.2
TE   17:59:00:203.602   392918865   0.2     *       *       *       *       *       C
VU   17:59:00:203.602   392918865   MARKET_LSE_MIT_TradingStatusDetails=c
InternalDailyClosingPriceType=d
VU   17:59:00:203.602   392918865   DailyClosingPrice=0.2
```

In the Level1 Market Data Kinematics **after 2015-04-20**, the CLOSE signal will be sent earlier, when the `MARKET_LSE_MIT_TradingStatusDetails` receives the value `z=ClosingPricePublication`, as shown 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   07:10:00:058.199   392918865   MARKET_LSE_MIT_TradingStatusDetails=y
TE   07:10:00:058.215   392918865   *       *       0.2     1000@1  *       *
VU   07:15:00:108.872   392918865   MARKET_LSE_MIT_TradingStatusDetails=a   TradingStatus=21
SI   07:15:00:132.984   392918865   OPEN    *
TE   07:15:00:132.984   392918865   *       *       *       *       *       *       O
VU   07:15:00:132.984   392918865   MARKET_LSE_MIT_TradingStatusDetails=T
MARKET_TURQUOISE_OffBookReportingTradingStatus=17       InternalDailyClosingPriceType=?
VU   07:45:01:012.758   392918865   MARKET_LSE_MIT_TradingStatusDetails=T
MARKET_TURQUOISE_DarkBookTradingStatus=17       MARKET_LSE_MIT_HaltReason=?
VU   07:45:25:030.183   392918865   TradingStatus=17
TE   09:03:45:533.090   392918865   0.2     1       0.2     999@1   *       *       HL
TradeID=1181374308417942, AggressorSide='2'=Sell,
TradeConditionsDictionaryKey=uint32{266338405}, MMTFlagsV2=12P------
VU   09:03:45:533.090   392918865   DailyOpeningPrice=0.2
TE   09:03:50:573.225   392918865   0.2     1       0.2     998@1   *       *
TradeID=1181374308417944,AggressorSide='2'=Sell,TradeConditionsDictionaryKey=uint32{2663384
05},MMTFlagsV2=12P------
VU   17:20:00:014.078   392918865   MARKET_LSE_MIT_TradingStatusDetails=d
LastAuctionPrice=?      LastAuctionVolume=?     TradingStatus=5
SI   17:25:29:129.044   392918865   CLOSE   0.2
TE   17:25:29:129.044   392918865   0.2     *       *       *       *       *       C
VU   17:25:29:129.044   392918865   MARKET_LSE_MIT_TradingStatusDetails=z
InternalDailyClosingPriceType=d TradingStatus=18
VU   17:25:29:131.648   392918865   DailyClosingPrice=0.2   InternalDailyClosingPriceType=a
VU   17:25:30:004.886   392918865   MARKET_LSE_MIT_TradingStatusDetails=b   TradingStatus=15
VU   17:57:00:046.501   392918865   MARKET_TURQUOISE_OffBookReportingTradingStatus=15
VU   17:58:00:129.422   392918865   MARKET_LSE_MIT_TradingStatusDetails=x   TradingStatus=18
VU   17:59:00:203.602   392918865   MARKET_LSE_MIT_TradingStatusDetails=c
MARKET_TURQUOISE_DarkBookTradingStatus=18
VU   17:59:00:329.970   392918865   MARKET_TURQUOISE_OffBookReportingTradingStatus=18
```

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

In the Level1 Market Data Kinematics **before 2015-04-20**, halted instruments closed (Trading Status `18=Not Available for Trading`) at the end of the trading day, and then reopened (Trading Status `17=Ready to Trade`) at the beginning of a new trading day, like regularly traded instruments, as shown in the example below:

```
VU    07:22:35:400    392921684    LastAuctionPrice=1.28
TE    07:44:21:122    392921684    *       *       !       0       !       0
VU    07:44:21:122    392921684    TradingStatus=18
TE    07:44:21:122    392921684    *       *       !       0       !       0
VU    07:44:21:125    392921684    LastAuctionPrice=?      LastAuctionVolume=?
```

In the Level1 Market Data Kinematics **after 2015-04-20**, halted instruments will remain halted (Trading Status `2=Trading Halt`) during market closing and opening, until they will be traded again, as shown in the example below:

```
VU    07:22:35:400    392921684    LastAuctionPrice=1.28
TE    07:44:21:122    392921684    *       *       !       0       !       0
VU    07:44:21:122    392921684    TradingStatus=2
TE    07:44:21:122    392921684    *       *       !       0       !       0
VU    07:44:21:125    392921684    LastAuctionPrice=?     LastAuctionVolume=?
```

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: https://support.quanthouse.com.