S&P Capital IQ Real-Time Solutions

FeedOS™ Developer's Notice

CME – Feed Migration from MDPFF to MDP3 Protocol

Reference n°: 20141223 – 17560 – 24427 (UPDATE 01 TO 20141124 – 17560 – 23232)

Effective as of: Q1 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: CME – Feed Migration from MDPFF to MDP3 Protocol
Reference 20141223 – 17560 – 24427
December 30, 2014

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MIGRATION OF THE CME MARKET DATA STREAM FROM MDPFF TO MDP3 PROTOCOL

To reflect the changes caused by the migration of the CME market data stream from MDPFF to MDP3 protocol, 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	20141223 – 17560 – 24427[i] (UPDATE 01 TO 20141124 – 17560 – 23232)
Exchanges	CME (including MALAYSIA DERIVATIVES)
Concerned MICs	XCME, XCBT, XMGE, XCEC, XKLS, XNYM
Internal Source ID	15, 16, 17, 35*
Effective Date	**Q1 2015***
Impact	• Update of the Referential Tags • Update of the Quotation Tags • Update of the Quotation Context Tags • Removal of the Spread Trades' Legs • Addition of the Trade Aggregation • Microsecond Timestamp Precision on the Level1 Market Data • Removal of the Market News Detailing the Security Trading Status
Action required	**MANDATORY ACTION** - see sections: • 2.2.1. TradingStatus • 2.5. Addition of the Trade Aggregation.

i. The red bars in the left margin highlight content that has been added or changed since the previous release of this document.

2. FeedOS Technical Implementation

Effective **Q1 2015**[*]**,** S&P Capital IQ Real-Time Solutions enhances the referential, quotation and quotation context data, and introduces trade aggregation to accommodate the new information disseminated on the CME market data stream, as described below:

2.1. Changes to the Referential Data

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

Table 2 Referential tags added on the CME market data stream

Tag Name	Numeric ID	Type
UnitOfMeasure	996	String
MaxTradeVol	1140	Float64
OperatingMIC	9533	String

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

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

Tag Name	Numeric ID	Type
Description	107	String

2.1.1. UnitOfMeasure

The values of the referential tag **UnitOfMeasure** conveyed on the CME market data stream are disseminated via FeedOS data stream in *Referential* to specify the unit of measure of the underlying commodity upon which the contract is based.

* 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.

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

Table 4 UnitOfMeasure – technical implementation in FeedOS

Component	Value	Description
Tag Name	`UnitOfMeasure`	FeedOS tag name.
Numeric ID	`996`	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 Value	*`[Exchange Specific Value]`*	An ***exchange specific value***, specifying the unit of measure of the underlying commodity upon which the contract is based.

2.1.2. MaxTradeVol

The values of the referential tag **MaxTradeVol** conveyed on the CME market data stream are disseminated via FeedOS data stream in *Referential* to specify the maximum order quantity that can be submitted for a security.

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

Table 5 MaxTradeVol – technical implementation in FeedOS

Component	Value	Description
Tag Name	`MaxTradeVol`	FeedOS tag name.
Numeric ID	`1140`	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	`Float64`	Float64 data type.
Format / Possible Value	*`[Exchange Specific Value]`*	An ***exchange specific value***, specifying the maximum order quantity that can be submitted for a security.

2.1.3. OperatingMIC

The values of the referential tag **OperatingMIC** conveyed on the CME 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 6 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.

Table 6 OperatingMIC – technical implementation in FeedOS (Continued)

Component	Value	Description
Possible Values	XCBT	Chicago Board of Trade
	XCME	Chicago Mercantile Exchange
	XKLS	Bursa Malaysia
	XMGE	Minneapolis Grain Exchange
	XNYM	New York Mercantile Exchange

2.1.4. Description

The values of the referential tag **Description** conveyed on the CME market data stream are disseminated via FeedOS data stream in *Referential* to characterize an instrument.

FeedOS implementation of the tag `Description` is detailed in the table below:

Table 7 Description – technical implementation in FeedOS

Component	Value	Description
Tag Name	`Description`	FeedOS tag name.
Numeric ID	107	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*** characterizing the instrument. **CAUTION:** The values of this tag are retrieved from the XML files available on the CME Web site. Since these files may be inaccurate, S&P Capital IQ Real-Time Solutions cannot guarantee the accuracy of the information this tag disseminates.

Referential Data Sample

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

```
instr # 305/801332 = 640432692
    PriceCurrency               string{USD}
    Symbol                      string{ZD}
    Description                 string{$10DOW JONES FUTURES}
    SecurityType                string{FUT}
    StdMaturity                 string{201503}
    FOSMarketId                 XCBT
    Factor                      float64{10}
    CFICode                     string{FFIXSX}
    MinTradeVol                 float64{1}
    UnitOfMeasure               string{IPNT}
    MaxTradeVol                 float64{1500}
    MatchAlgorithm              string{F}
    MarketSegmentID             string{5}
    MarketSegmentDesc           string{Equity}
    InternalCreationDate        Timestamp{2014-10-24 15:22:24:940}
    InternalModificationDate    Timestamp{2015-01-13 23:13:36:350}
    InternalSourceId            uint16{16}
    InternalEntitlementId       int32{1022}
    LocalCodeStr                string{ZDH5}
    PriceIncrement_static       float64{1}
    MaturityYear                uint16{2015}
    MaturityMonth               uint8{3}
    MaturityDay                 uint8{20}
    OperatingMIC                string{XCBT}
    PriceDisplayPrecision       int16{0}
    MARKET_CME_DisplayPricePrimaryDenominator   uint16{32}
    MARKET_CME_DisplayPriceSecondaryDenominator uint16{2}
    MARKET_CME_DisplayPriceNbOfDecimal  uint16{3}
```

2.2. Changes to the Quotation Data

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

Table 8 Quotation tags disseminating updated values on the CME market data stream

Tag Name	Numeric ID	Type
TradingStatus	9100	Enum
LastAuctionPrice	9146	Float64

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

Table 9 Quotation tags no longer disseminated on the CME market data stream

Tag Name	Numeric ID	Type
SettlPriceType	731	UInt8

2.2.1. TradingStatus

Each time a modification of the trading status occurs, the values of the quotation tag **TradingStatus** conveyed on the CME 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 `TradingStatus` is described in the following table (newly added values are in `green`):

Table 10 Trading Status of the CME market data stream – technical implementation in FeedOS

Component	Value	Description
Tag Name	`TradingStatus`	FeedOS tag name.
Numeric ID	9100	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`	Enumeration data type.
Format	*`[Exchange Specific Value]`*	An ***exchange specific value***, as described below, concerning the characteristics of the trading status.
Possible Values	2	Trading Halt
	5	Price Indication
	15	New Price Indication
	17	Ready to Trade
	18	Not Available for Trading
	21	Pre-Open

2.2.2. LastAuctionPrice

The values of the quotation tag **LastAuctionPrice** conveyed on the CME market data stream are disseminated via FeedOS data stream in *Other Values* to detail the last 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 `LastAuctionPrice` is described in the following table:

Table 11 LastAuctionPrice – technical implementation in QuantFEED®

Component	Value	Description
Tag Name	`LastAuctionPrice`	FeedOS tag name.
Numeric ID	9146	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	`Float64`	Float64 data type.
Format / Possible Values	*`[Exchange Specific Value]`*	An ***exchange specific value***, detailing the last auction price. **Note:** The values of this FeedOS tag are retrieved from the exchange tag `Indicative Opening Price`. The exchange defines the Indicative Opening Price as a probable price at which the market will open or re-open, given the current book and order activity. The trading engine calculates the Indicative Opening Price during the Pre-Open and Reserve states, based on the orders in the book.

Quotation Data Sample

Below are several examples of the quotation tags implementation (updated tags are in `blue`, removed tags are in ~~`crossed out red`~~):

```
"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..."

VU   21:45:00:009.156   639632361   TradingStatus=21
SI   22:00:00:004.761   639632361   OPEN    *
TE   22:00:00:004.761   639632361   *   *   *   *   *   *   O
VU   22:00:00:004.761   639632361   CurrentBusinessDay=2015-01-22   TradingStatus=15
VU   22:00:00:005.062   639632361   TradingStatus=17
VU   20:15:00:002.046   639632361   TradingStatus=21
VU   20:30:00:001.994   639632361   TradingStatus=15
VU   20:30:00:002.424   639632361   TradingStatus=17
SI   21:15:00:026.691   639632361   CLOSE   *
TE   21:15:00:026.691   639632361   *   *   *   *   *   *   C
[...]
VU   21:42:22:264.141   639632361   SettlPriceType=100
VU   21:42:22:264.162   639632361   HighLimitPrice=17361   LowLimitPrice=15701
[...]
TE   13:56:17:476.292   639632361   *   *   -0.275 10@1  *  *
TE   13:57:40:922.101   639632361   *   *   -0.2    1@1  *  *
VU   13:57:40:922.101   639632361   LastAuctionPrice=-0.2
TE   13:57:41:645.658   639632361   *   *   -0.275 10@1  *  *
TE   13:59:22:909.821   639632361   *   *   *      *     -0.275 10@1
VU   13:59:22:909.821   639632361   LastAuctionPrice=-0.275
TE   13:59:27:752.476   639632361   *   *   *      *     -0.2 1@1
TE   13:59:36:675.633   639632361   *   *   -0.25 10@1   *  *
SI   14:00:00:018.666   639632361   OPEN *
```

2.3. Changes to the Quotation Context Data

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

Table 12 Quotation context tags no longer disseminated on the CME market data stream

Tag Name	Numeric ID	Type
TradeCondition	277	String

Quotation Context Data Sample

Below is an example showing the 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..."

VU   22:00:00:046.158   640477224   TradingStatus=17
TE   22:00:00:050.216   640477224   16923   1   *   *   *   *
~~TradeCondition=E=opening_reopening_trade_detail~~
VU   22:00:00:050.323   640477224   DailyOpeningPrice=16923
```

2.4. Removal of the Spread Trades' Legs

Effective Q1 2015, the spread legs for equity products on the CME market data stream are no longer disseminated (shown in ~~crossed out red~~ in the example below). However, the exchange will send an Electronic Volume Update (shown in green):

```
"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..."

BEFORE Q1 2015
TE  14:43:15:983   648338141  *  *   *  *    99.58   2893@9
TE  14:43:15:983   648338141  *  *   99.575  17544@32  *  *
TE  14:43:15:992   648338141  *  *   99.575  17564@32  *  *
~~TE  14:43:16:877   648338141  99.55  143      *  *  *  *~~
~~TradeCondition=1=implied_trade,AggressorSide='2'=Sell~~
~~TE  14:43:16:877   648338141  99.55  10       *  *  *  *~~
~~TradeCondition=1=implied_trade,AggressorSide='2'=Sell~~
~~TE  14:43:16:877   648338141  99.55  5        *  *  *  *~~
~~TradeCondition=1=implied_trade,AggressorSide='2'=Sell~~
TE  14:43:16:878   648338141  *  *   99.575  17515@31   *  *
~~TE  14:43:16:882   648338141  99.55  1        *  *  *  *~~
~~TradeCondition=1=implied_trade,AggressorSide='1'=Buy~~
TE  14:43:16:886   648338141  *  *   99.575  17495@31   *  *

AFTER Q1 2015
TE  14:43:15:983.397   648338141  *  *  *  *  99.58   2893@9
TE  14:43:15:983.482   648338141  *  *  99.575  17544@32  *  *
TE  14:43:15:992.485   648338141  *  *  99.575  17564@32  *  *
VU  14:43:16:877.698   648338141  DailyTotalVolumeTraded=111478
TE  14:43:16:878.292   648338141  *  *  99.575  17515@31  *  *
VU  14:43:16:882.720   648338141  DailyTotalVolumeTraded=111479
TE  14:43:16:886.882   648338141  *  *  99.575  17495@31  *  *
```

2.5. Addition of the Trade Aggregation

Effective Q1 2015, the consecutive trades of an instrument on the CME market data stream are aggregated, 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..."

BEFORE Q1 2015
TE   14:08:36:014       703098276    *      *    *      *     0.004  72@2
TE   14:08:39:193       703098276    *      *    0.002  219@5 *      *
TE   14:09:40:374       703098276    0.004  1    *      *     *      *
AggressorSide='1'=Buy
TE   14:09:40:374       703098276    0.004  11   *      *     *      *
AggressorSide='1'=Buy
TE   14:09:40:375       703098276    *      *    *      *     0.004  60@1

AFTER Q1 2015
TE   14:08:36:014.434   703098276    *      *    *      *     0.004  72@2
TE   14:08:39:193.082   703098276    *      *    0.002  219@5 *      *
TE   14:09:40:374.501   703098276    0.004  12   *      *     *      *
AggressorSide='1'=Buy
TE   14:09:40:374.516   703098276    *      *    *      *     0.004  60@1
```

2.6. Microsecond Timestamp Precision on Level1 Market Data

In the Level1 Market Data disseminated after Q1 2015, the timestamps display microsecond units, 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     2014-12-02 00:13:26:865.465    2014-12-02 00:13:26:865.360    648835815      *
*       2e-05   40@2    3e-05   40@2
TE     2014-12-02 00:31:24:812.044    2014-12-02 00:31:24:811.947    648835815      *
*       2.2e-05 30@1    *       *
TE     2014-12-02 00:32:22:446.680    2014-12-02 00:32:22:446.586    648835815      *
*       2.2e-05 35@2    *       *
```

2.7. Removal of the Market News Detailing the Security Trading Status

In the Market Data before Q1 2015, the exchange published Market News about the security trading status, 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..."
“MN : MARKE NEWS”

SI      2014-12-01 23:00:00:045.420     2014-12-01 23:00:00:044 648835815       OPEN    *
TE      2014-12-01 23:00:00:045.420     2014-12-01 23:00:00:044 648835815       *       *
*       *       *       *       O
VU      2014-12-01 23:00:00:045.420     2014-12-01 23:00:00:044 648835815
TradingStatus=17
MN      null    null    XCME    Normal  product XS = ReadyToTrade trade_date=2014-12-02
related_instruments:
MN      null    null    XCME    Normal  product XS = ReadyToTrade trade_date=2014-12-02
related_instruments:
MN      null    null    XCME    Normal  product D9 = ReadyToTrade trade_date=2014-12-02
related_instruments:
MN      null    null    XCME    Normal  product D9 = ReadyToTrade trade_date=2014-12-02
related_instruments:
MN      null    null    XCME    Normal  product YB = ReadyToTrade trade_date=2014-12-02
related_instruments:
```

In the Market Data after Q1 2015, the exchange no longer publishes Market News about the security trading status, 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      2014-12-01 23:00:00:048.010     2014-12-01 23:00:00:047.934     648835815       OPEN
*
TE      2014-12-01 23:00:00:048.010     2014-12-01 23:00:00:047.934     648835815       *
*       *       *       *       *       O
VU      2014-12-01 23:00:00:048.010     2014-12-01 23:00:00:047.934     648835815
CurrentBusinessDay=2014-12-02   TradingStatus=15
VU      2014-12-01 23:00:00:051.673     2014-12-01 23:00:00:051.546     648835815
TradingStatus=17
TE      2014-12-01 23:14:13:621.975     2014-12-01 23:14:13:621.876     648835815       *
*       2e-05   10@1    3e-05   10@1
TE      2014-12-01 23:14:20:491.657     2014-12-01 23:14:20:491.552     648835815       *
*       1.9e-05 10@1    3.1e-05 10@1
```

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.