QuantHouse® FeedOS™

FeedOS™ Quotation Tags Guide

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Corporate Headquarters
QuantHouse®
52 Rue de la Victoire
75009 Paris
France
Tel: +33 (0) 1 73 02 32 11
Fax: +33 (0) 1 73 02 32 12

UK Office
10 Foster Lane
London EC2V 6HR
United Kingdom
Tel: +44 (0) 203 107 1676

US Offices
55 Water Street, 44th floor
New York, NY 10041
United States of America
Tel: +1-(212)-438-4346

130 East Randolph
One Prudential Plaza, Suite 2900
Chicago, IL 60601
United States of America
Tel: +1-(312)-233-7129

www.quanthouse.com

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ABOUT THIS GUIDE

As part of QuantHouse® QuantFEED® and FeedOS™ documentation set, this guide provides you with an outline of the underlying structure of FeedOS™ Quotation Tags' and Subscription Servers' processes that maintain the snapshot database. It also details the FeedOS™ Quotation Tags' role in releasing and updating the market data stream.

I. Who This Guide Is For

This document is primarily intended for the use of FeedOS™ software engineers, developers and other team members using QuantFEED®. Furthermore, this guide also addresses issues and topics concerning any person who plans to develop software that interacts with QuantFEED® suite in general and FeedOS™ middleware technology in particular.

II. What Do You Need to Use This Guide

To integrate the market data stream into your applications, general knowledge of market data acquisition and deployment is mandatory. Moreover, a good understanding of financial markets and instruments, including standards and protocols, is recommended as well.

General knowledge of **Application Programming Interface** (API) functioning and specifications for routines, data structures, object classes and variables is also required. Depending on the platform you use – C++, C# or Java –, good coding skills are necessary.

III. Conventions Used in This Guide

This guide uses several common conventions to help you locate and interpret information easily. Following is a summary of the typographical conventions:

- Concepts and new terms are in **bold**.
- Sample source code – including keywords and variables –, and text that you should type appear in `monospaced font`.
- Folder, file and field names are *italicized.*
- Placeholders are shown in ***bold-italic***.
- Menu names and commands appear in **bold**, and menu commands are separated by ">".

- In numbered steps, commands or options that you need to click or select are shown in **boldface**.

In addition to typographical conventions, the following special elements are included to set off different types of information to make them easily recognizable:

Note	Notes provide some additional details or information related to the topic that might help you expand your knowledge or understanding.

Tip	Tips offer helpful shortcuts or easier ways to do something.

Caution	Cautions provide recommended details or other important information you need to know about consequences of using a feature or executing a task.

Warning	Warnings give you essential details or data about indispensable conditions or settings of your system, third-party applications and mandatory steps you should observe and apply on your platform, procedures, practices and tasks.

IV. What's New in This Guide

The current version of FeedOS™ Quotation Tags Guide includes the following changes:

- new, easy-to-follow structure, concise explanations and new layout
- improved sections about the structure and components of subscription messages – see 1.1. The Structure of a FeedOS™ L1 Message, and tags' update mechanism – see 1.2. Tags' Update Mechanism – An Example.
- new tables about the basic and cumulative life cycles of the quotation tags – see Table 1-2 and Table 1-3, and quotation context data tags – see Table 1-7.

IV.I. Document History

The table below summarizes the changes in the previous versions of this guide:

Table 1 FeedOS™ Quotation Tags Guide – Document History

Release date	Version	Changes
2011-11-18	1.2	New section about session tags.
2010-09-15	1.1	New diagram of the trading phases.
2010-08-10	1.0	Creation of the document.

V. We Would Like to Hear from You

As the reader of this document and user of our products, you are our most important critic and commentator. We appreciate your opinion and want to know what you like about our work, what you dislike, what we could do better, what topics you would like to see us cover, but also any other comments and suggestions you wish to share with QuantHouse®.

You can e-mail or write us to let us know what you did or did not find useful about this guide, as well as other topics and details you would like us to cover in the subsequent releases. When you write, please be sure to include this document's title and version, as they appear on the copyright page. We will carefully review your comments and share them with the authors and contributors who worked on this guide.

E-mail:

support@quanthouse.com

Mail:

QuantHouse®
52 Rue de la Victoire
75009 Paris
France

CHAPTER 1

FEEDOS™ QUOTATION TAGS

FeedOS™ Market Data Stream disseminates trading-related information about instruments in **Quotation Values**. The Quotation Values – such as `DailyTotalVolumeTraded`, `DailyClosingPrice`, `TradingStatus` etc. – are maintained in the Snapshot Database, available on a Subscription Server. The **Snapshot Database** implements the rules that govern the life cycle of Quotation Values and are described by this document.

When developing applications in FeedOS™ API C++ or FeedOS™ API Java to handle the market data stream, you can employ the same class to maintain *all* the Quotation Values – `FeedOS::InstrumentQuotationData_2` or `com.feedos.api.request.InstrumentQuotationData`. However, if you need only some particular Quotation Values, you need to recompute them on the client side, based on the rules detailed in the following sections:

- 1.1. The Structure of a FeedOS™ L1 Message
- 1.2. Tags' Update Mechanism – An Example
- 1.3. Tags' Description
- 1.4. Tags' and Content Mask's Usage.

1.1. The Structure of a FeedOS™ L1 Message

When subscribing by instruments to L1 events, the Subscription Server sends an initial snapshot of the Quotation Values in the subscription response. Afterwards, the real-time events contain only delta information in the relevant fields. Because the Quotation Values are not re-sent, they have to be recomputed according to the rules described hereunder.

Moreover, the L1 messages simultaneously convey *quotation data* (such as `BestBid` and `BestAsk`), *trading data* (`Price`, `LastTradeQty`) and *quotation tags* (`Context`, `Other Values`) on a single instrument. The table below summarizes the main components of a message:

Table 1-1 Elements of an L1 subscription message

Field	Description
`FOSInstrumentCode`	Instrument internal code.
`server_timestamp`	Timestamp of the event from QuantHouse®'s perspective (in most cases, as recorded by the Feed Handler).
`market_timestamp`	Timestamp of the event from the venue perspective.
`ContentMask`	Bit field indicating signals (such as `OCHL_daily`) and the presence of other fields.
`BestBid`	Field conveying the values of Best Bid Price, Quantity and Number of Orders.
`BestAsk`	Field conveying the values of Best Ask Price, Quantity and Number of Orders.

Table 1-1 Elements of an L1 subscription message (Continued)

Field	Description
`Price`	Field carrying the value of Last Trade Price.
`LastTradeQty`	Field carrying the value of Last Trade Quantity.
`Context`	Field conveying a list of quotation context flags (mainly trade conditions).
`OtherValues`	Field conveying a list of other quotation values.

The **Quotation Tags' Life Cycle** is governed by the following rules:

- For the **Basic Life Cycle** of the Quotation Tags, the value of a tag is set from a field (*LastTradeQty*), when the corresponding bit combination occurs in the content mask, as described in the Table 1-2.
- For the **Cumulative Life Cycle** of the Quotation Tags, the value of the tag is set by adding to the latest known tag value the value of a field (*LastTradeQty*) or a combination of fields (*LastPrice*LastTradeQty*), when the corresponding bit combination occurs in the content mask, as described in the Table 1-3.

In addition, the rules below apply to both life cycles:

- Some of the tags have a "twin", "dumpster" tag, named `Previous<Name_of_the_Tag>` (or `Prior<Name_of_the_Tag>`). When the main tag is reset, the dumpster-tag receives the old value. For instance, when the tag `DailyClosingPrice` (or the tag `SessionTotalVolumeTraded`) is reset and gets a new value, the dumpster-tag `PreviousDailyClosingPrice` (or `PriorSessionsTotalVolumeTraded`) stores the old one.
- Most Quotation Tags can also be explicitly sent in the L1 message in the field *OtherValues*.
- All Quotation Tags can be explicitly reset when receiving an empty tag value in an L1 message.

The table below details the basic life cycle of the quotation tags, including the combination of flags in the content mask that signal their presence in the market data stream:

Table 1-2 Basic life cycle of the quotation tags

Tag name	Triggering condition (bit combination and/or Value)	Value set from	Reset with the content mask	Name of the tag inheriting the value before reset	May be explicitly carried in *Other Values*
`DailyOpeningPrice`	`LastPrice & OCHL Daily & Open`	set to evt.Price	N/A	N/A	Yes
`DailyClosingPrice`	`LastPrice & OCHL Daily & Close`	set to evt.Price	`OCHL Daily & Open`	`PreviousDailyClosingPrice`	Yes
`DailyHighPrice`	`LastPrice & OCHL Daily & High`	set to evt.Price	`OCHL Daily & Open`	N/A	Yes
`DailyLowPrice`	`LastPrice & OCHL Daily & Low`	set to evt.Price	`OCHL Daily & Open`	N/A	Yes
`SessionOpening Price`	`LastPrice & Open & OtherValues & (TradingSessionId != -1)`	set to evt.Price	N/A	N/A	Yes
`SessionClosing Price`	`LastPrice & Close`	set to evt.Price	`Open`	`PreviousSession ClosingPrice`	Yes

Table 1-2 Basic life cycle of the quotation tags (Continued)

Tag name	Triggering condition (bit combination and/or Value)	Value set from	Reset with the content mask	Name of the tag inheriting the value before reset	May be explicitly carried in *Other Values*
SessionHighPrice	LastPrice & High	set to evt.Price	Open	N/A	Yes
SessionLowPrice	LastPrice & Low	set to evt.Price	Open	N/A	Yes
CurrentBusinessDay	OCHL Daily & Open	day from server_ts	N/A	PreviousBusinessDay	No
CurrentBusinessDay	OCHL Daily & Open & OpeningNext CalendarDay	(day from server_ts) + 1	N/A	PreviousBusinessDay	No
DailySettlement Price	No	N/A	OCHL Daily & Open	PreviousSettlement Price	Yes – Only
LastAuctionPrice	No	N/A	N/A	N/A	Yes – Only
LastAuctionVolume	No	N/A	N/A	N/A	Yes – Only
LastTradeTimestamp	LastPrice & LastTradeQty & !OffBookTrade	set to evt.Price	N/A	N/A	Yes
LastOffBookTrade Timestamp	LastPrice & LastTradeQty & OffBookTrade	set to evt.Price	N/A	N/A	Yes
LastPrice	LastPrice	set to evt.price	N/A	N/A	Yes
LastTradeQty	LastPrice & LastTradeQty & !OffBookTrade	set to evt.LastTrade Qty	N/A	N/A	Yes
LastOffBookTrade Qty	LastPrice & LastTradeQty & OffBookTrade	set to evt.LastTrade Qty	N/A	N/A	Yes
LastTradePrice	LastPrice & LastTradeQty & !OffBookTrade	set to evt.price	N/A	N/A	Yes
LastOffBookTrade Price	LastPrice & LastTradeQty & OffBookTrade	set to evt.price	N/A	N/A	Yes

The table below details the cumulative life cycle of the quotation tags, including the combination of flags in the content mask that signal their presence in the market data stream:

Table 1-3 Cumulative life cycle of the quotation tags

Tag name	To be cumulated when the content mask has the following bits	Value cumulated with	Reset with the content mask	Name of the tag inheriting the value before reset	May be explicitly carried in *Other Values*
DailyTotalVolume Traded	LastPrice & LastTradeQty & !OffBookTrade	cumulate evt.LastTradeQty	OCHL Daily & Open	PreviousDaily TotalVolume Traded	Yes
DailyAssetVolume Traded	LastPrice & LastTradeQty & !OffBookTrade	cumulate (evt.Price * evt.LastTradeQty)	OCHL Daily & Open	PreviousDaily TotalAsset Traded	Yes
DailyTotalOffBook VolumeTraded	LastPrice & LastTradeQty & OffBookTrade	cumulate evt.LastTradeQty	OCHL Daily & Open	N/A	Yes
DailyTotalOffBook AssetTraded	LastPrice & LastTradeQty & OffBookTrade	cumulate (evt.Price * evt.LastTradeQty)	OCHL Daily & Open	N/A	Yes
SessionTotal VolumeTraded	LastPrice & LastTradeQty & !OffBookTrade	cumulate evt.LastTradeQty	Open	PriorSessions TotalVolume Traded	Yes
SessionTotalAsset Traded	LastPrice & LastTradeQty & !OffBookTrade	cumulate (evt.Price * evt.LastTradeQty)	Open	PriorSessions TotalAsset Traded	Yes
SessionTotalOff BookVolumeTraded	LastPrice & LastTradeQty & OffBookTrade	cumulate evt.LastTradeQty	Open	PriorSessions TotalOffBook VolumeTraded	Yes
SessionTotalOff BookAssetTraded	LastPrice & LastTradeQty & OffBookTrade	cumulate (evt.Price * evt.LastTradeQty)	Open	PriorSessions TotalOffBook AssetTraded	Yes

1.2. Tags' Update Mechanism – An Example

Each trading day has three major phases: pre-open (for some venues), trading session (or multiple trading sessions) and closing. During these phases, the tags are regularly updated with specific information. The Figure 1-1 describes the tags' update mechanism during each phase, by means of snapshots.

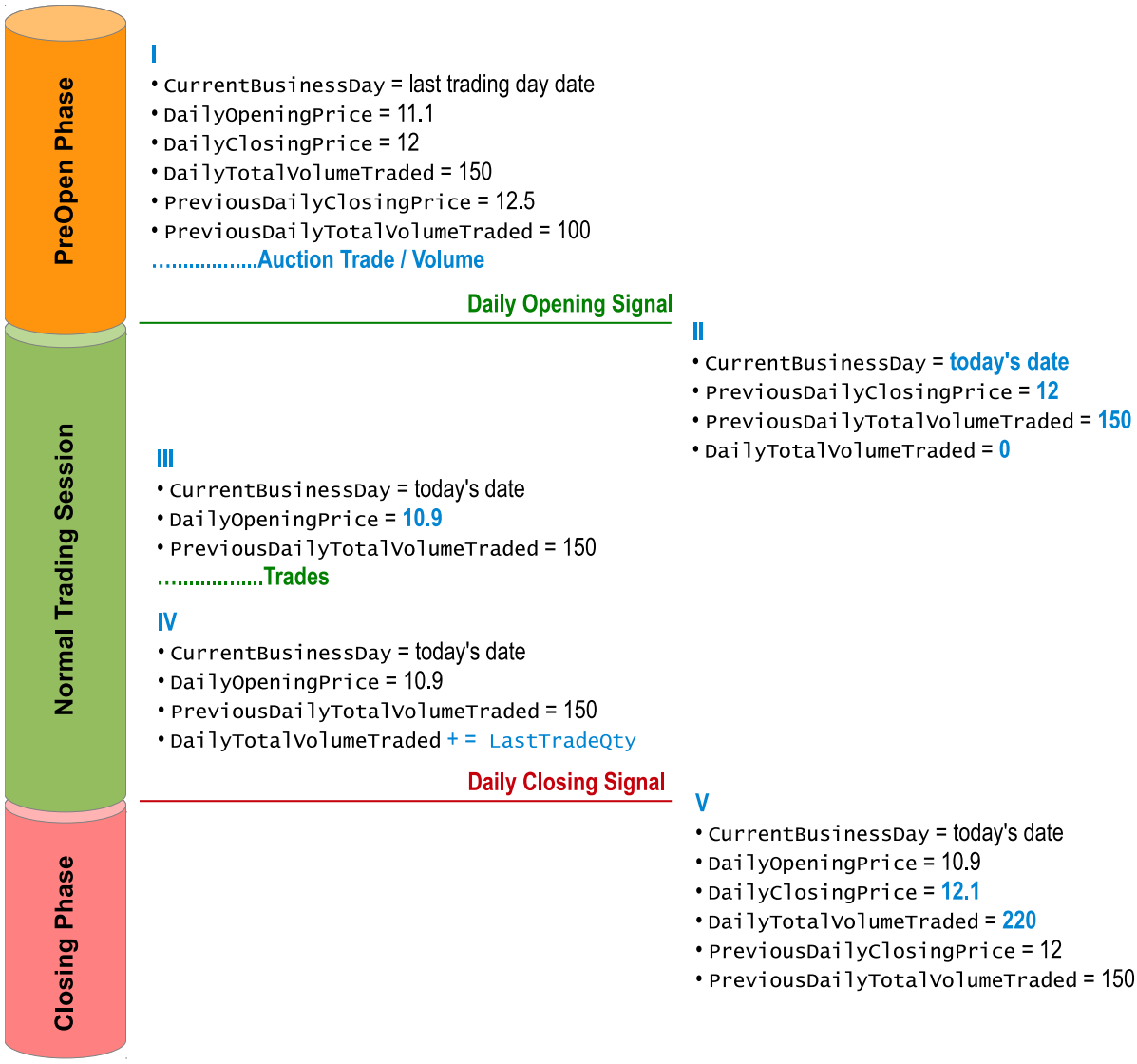
In this example, the market snapshot of the Pre-Open Phase – I shows the relevant market values set at the closing of the previous trading day, as the tag CurrentBusinessDay confirms it. Assuming the snapshot was taken on Wednesday early morning, before the market opening, the value of the tag DailyClosingPrice corresponds to the closing price on Tuesday.

However, after the Daily Open Signal – II, when the market opens, the tag CurrentBusinessDay displays the Wednesday's date, while the tags PreviousDailyClosingPrice and PreviousDailyTotalVolumeTraded convey the values for Tuesday. Moreover, as no transaction is yet concluded, the value of the tag DailyTotalVolumeTraded is reset to zero.

During the trading day, as trades occur, the tag DailyOpeningPrice is either set directly (the tag is disseminated in *OtherValues*) or set implicitly, if the Content Mask contains *Open*, *LastPrice* and *OCH_daily*. The tag DailyVolumeTraded disseminates is set (or cumulated, as illustrated in stage Trades – IV) based on the quantity of instruments being traded, as described in the stages Trades – III and IV of the diagram.

At the Closing Phase, after the `Daily Closing Signal - V`, all the tags disseminate updated data about today's transactions, such as `DailyOpeningPrice`, `DailyClosingPrice`, `DailyTotalVolumeTraded`, but also the price and volume recorded on the trading day before (`PreviousDailyClosingPrice` and `PreviousDailyTotalVolumeTraded`).

Figure 1-1 Update mechanism during a trading day



1.3. Tags' Description

This section provides you with a summarized description of the different quotation tags, their type and possible values:

- 1.3.1. Instant Values
- 1.3.2. Internal Values
- 1.3.3. Daily Values
- 1.3.4. Session Values

- 1.3.5. Additional Values.

1.3.1. Instant Values

The table below details the tags' instant values:

Table 1-4 Tags' instant values

Tag name	Encoding	Description
TradingStatus	Enum	It is set on the trading status.
TradingSessionId	Int8	It contains the trading session ID.
LastPrice	Float64	It contains the last price, it can be the Off Book or On Book Price, or other prices like closing price.
LastTradeQty	Float64	It is set on LastTradeQty.
LastTradeTimestamp	Timestamp	It is set from market official time.
LastTradePrice	Float64	It is set on the last traded price (on book).
LastOffBookTradePrice	Float64	It is set on the OffBook last traded price.
LastOffBookTradeQty	Float64	It is set on the OffBook last traded quantity.
LastOffBookTradeTimestamp	Timestamp	It is set from market oficial time.
SettlPriceType	Uint8	It specifies the type of settlement price: • 1 = final price • 2 = theoretical. On CME market data stream, there are two additional values: • 100 = Actual Preliminary settlement price OR Rounded Preliminary for instruments subject to settlement rounding • 101 = Rounded Preliminary settlement price.
LowLimitPrice	Float64	It indicates the inferior suspension threshold.
HighLimitPrice	Float64	It indicates the superior suspension threshold.
SessionVWAPPrice	Float64	It indicates the Volume-Weighted Average Price (VWAP) of the instrument.

1.3.2. Internal Values

The table below details the tags' internal values:

Table 1-5 Tags' internal values

Tag name	Encoding	Description
InternalDailyOpenTimestamp	Timestamp	It is set to server UTC time on DailyOpen.
InternalDailyCloseTimestamp	Timestamp	It is set to server UTC time on DailyClose.
InternalDailyHighTimestamp	Timestamp	It is set to server UTC time on DailyHigh.
InternalDailyLowTimestamp	Timestamp	It is set to server UTC time on DailyLow.
InternalPriceActivityTimestamp	Timestamp	It is set to server UTC time on LastPricejAskjBid.
InternalLastAuctionTimestamp	Timestamp	It is set to server UTC time on LastAuctionPrice.

Tip	While FeedOS™ provides you with this timestamp scheme, you can implement your own.

1.3.3. Daily Values

The table below details the tags' daily values:

Table 1-6 Tags' daily values

Tag name	Encoding	Descripton
DailyOpeningPrice	Float64	If the LastPrice is available, the DailyOpeningPrice will be set on DailyOpen.
DailyClosingPrice	Float64	It is set on DailyClose at the end of the trading day, and reset the next trading day at DailyOpen.
DailySettlementPrice	Float64	It is reset on DailyOpen. It contains the Settlement Price for derivative instruments.
DailyHighPrice	Float64	It is set on DailyHigh and reset the next trading day at DailyOpen.
DailyLowPrice	Float64	It is set on DailyLow and reset the next trading day at DailyOpen.
DailyTotalVolumeTraded	Float64	It is set to Zero at DailyOpen, it is extrapolated from the trades by adding the LastTrad- eQty after each trade.
DailyTotalAssetTraded	Float64	It is set to Zero at DailyOpen; it contains the cumulated Price*Quantity. **Warning:** To get the DailyTotalAssetTraded in currency, you have to also apply the Factor.
PreviousDailyTotalVolumeTraded	Float64	It is set on DailyOpen; if there is a DailyClosingPrice or a DailySettlementPrice, it contains the DailyTotalVolumeTraded value of the last business day.
PreviousDailyTotalAssetTraded	Float64	It is set on DailyOpen; if there is a DailyClosingPrice or a DailySettlementPrice, it contains the DailyTotalAssetTraded value of the last business day.
PreviousDailyClosingPrice	Float64	It is set on DailyOpen; if there is a DailyClosingPrice, it contains the value of the DailyClosingPrice from the last business day; if there is a DailySettlementPrice, it contains the value of DailySettlementPrice from the last business day.
PreviousBusinessDay	Timestamp	It is set on DailyOpen; if there is a DailyClosingPrice or a DailySettlementPrice, from either CurrentBusinessDay or InternalDailyCloseTimestamp if there is a DailyClosingPrice or a DailySettlementPrice.
CurrentBusinessDay	Timestamp	It is set on DailyOpen; it is equal to the current value of OpeningNextCalendarDay.
PreviousDailySettlementPrice	Float64	See 1.4.11.2. Daily Open: Signal and Price – Updated Tags.
DailyTotalOffBookVolumeTraded	Float64	It is set to Zero at DailyOpen; it contains the volume's sum of OffBook trades.
DailyTotalOffBookAssetTraded	Float64	It is set to Zero at DailyOpen; it contains the OffBook trade cumulated Price*Quantity.

The table below lists the values of the Quotation Context tags:

Table 1-7 Quotation Context values (non comprehensive)

Tag name	Encoding	Description
Text	String	It is a free format text string.
TradeCondition	String	It provides a space-delimited list of conditions describing a trade.
Buyer	String	It provides details about the buyer.
Seller	String	It provides details about the seller.
Scope	Char	It specifies the market scope of the market data.
TradeID	String	It details the ID of the trade.
OriginFOSMarketIdOf_LastPrice	Uint16	It conveys the origin market's ID for the Last Price.
OriginOf_LastPrice	String	It details the origin for the Last Price.
OriginFOSMarketIdOf_BestBid	Uint16	It conveys the origin market's ID for the Best Bid.
OriginOf_BestBid	String	It details the origin for the Best Bid.
OriginFOSMarketIdOf_BestAsk	Uint16	It conveys the origin market's ID for the Best Ask.
OriginOf_BestAsk	String	It details the origin for the Best Ask.
AggressorSide	Char	It indicates the party in the trade that initiates the deal.
OrderModificationReason	Enum	It enumerates the reasons for changing an order.
TradeConditionsDictionaryKey	Uint32	It conveys the Table Key of the Trade Conditions Dictionary.
NbOfBuyOrdersTraded	Int32	It details the number of Buy orders that have been traded.
NbOfSellOrdersTraded	Int32	It details the number of Sell orders that have been traded.
PegOrderLimitPrice	Float64	It details the price limit order to buy or sell a stated amount.

1.3.4. Session Values

The table below details the tags' session values:

Table 1-8 Tags' session values

Tag name	Encoding	Description
TradingSessionId	Int8	It contains the actual trading session ID.
SessionOpeningPrice	Float64	If the LastPrice is available, the SessionOpeningPrice is set on SessionOpen.
SessionClosingPrice	Float64	It is set on SessionClose at the end of a trading session and reset when the next session opens.
SessionHighPrice	Float64	It is set on SessionHigh and reset at SessionOpen.
SessionLowPrice	Float64	It is set on SessionLow and reset at SessionOpen.
SessionTotalVolumeTraded	Float64	It is set to Zero at SessionOpen. It is extrapolated from the trades, by adding the LastTradeQty after each trade.
SessionTotalAssetTraded	Float64	It is set to Zero at SessionOpen. It contains the cumulated Price*Quantity.
SessionTotalOffBookVolumeTraded	Float64	It is set to Zero at SessionOpen. It contains the volume's sum of OffBook trades.
SessionTotalOffBookAssetTraded	Float64	It is set to Zero at SessionOpen. It contains the OffBook trade cumulated Price*Quantity.

Table 1-8 Tags' session values (Continued)

Tag name	Encoding	Description
PriorSessionsTotalAssetTraded	Float64	It is set on SessionOpen. It contains the cumulated SessionTotalAssetTraded value of the closed sessions since the last DailyOpen.
PriorSessionsTotalVolumeTraded	Float64	It is set on SessionOpen. It contains the cumulated SessionTotalVolumeTraded value of the closed sessions since the last DailyOpen.
PriorSessionsTotalOffBookAsset Traded	Float64	It is set on SessionOpen. It contains the cumulated SessionTotalOffBookAssetTraded value of the closed sessions since the last DailyOpen.
PriorSessionsTotalOffBookVolume Traded	Float64	It is set on SessionOpen. It contains the cumulated SessionTotalOffBookVolumeTraded value of the closed sessions since the last DailyOpen.

1.3.5. Additional Values

The following table details additional values:

Table 1-9 Additional values

Tag name	Encoding	Description
LastAuctionPrice	Float64	It is a theoretical price, it is sent on the pre-opening and the pre-closing phases.
LastAuctionVolume	Float64	It is a theoretical volume, it is sent on the pre-opening and the pre-closing phases.
OpenInterest	Float64	It details the number of open contracts for derivative instruments (real-time value).
LastAuctionImbalanceSide	Char	It details the side of the auction imbalance: • B – Bid • A – Ask • N – Neutral • 0 – No imbalance.
LastAuctionImbalanceVolume	Float64	It details the volume of the auction imbalance.

1.4. Tags' and Content Mask's Usage

The following subsections describe the tags' update conditions, possible values and release process for each phase described in section 1.2. Tags' Update Mechanism – An Example on page 4:

- 1.4.1. Normal Trade
- 1.4.2. Off Book Trade
- 1.4.3. Index Instrument
- 1.4.4. Best Bid Update
- 1.4.5. Best Ask Update
- 1.4.6. Trading Status Modification
- 1.4.7. Daily High/Low Trade

- 1.4.8. Session High/Low Trade
- 1.4.9. Daily Open: Signal Only
- 1.4.10. Session Open: Signal Only
- 1.4.11. Daily Open: Signal and Price
- 1.4.12. Session Open: Signal and Price
- 1.4.13. Daily Close: Signal and Price
- 1.4.14. Daily Close: Signal Only
- 1.4.15. Auction Price and Volume.

The triggering mechanisms detailed below are handled by the class `InstrumentQuotationData2`, which you should also implement for any other particular cases.

1.4.1. Normal Trade

When a **Normal Trade** happens, the following changes occur in:

- 1.4.1.1. Normal Trade Triggering Mechanism
- 1.4.1.2. Normal Trade Updated Tags.

1.4.1.1. Normal Trade Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the fields *LastPrice* and *LastTradeQty* in the message body.
- Supplemental flags are raised for the tags: `Open`, `Close`, `Bid`, `Ask`, `TradingStatus`, `High`, `Low`.

1.4.1.2. Normal Trade Updated Tags

After the trade, the tags below are updated in the snapshot database within the Subscription Server:

- `LastTradePrice` and `LastPrice` are updated from the *LastPrice* field
- `LastTradeQty` updated from the *LastTradeQty* field
- `LastTradeTimestamp` is set from the market official time
- `LastTradeQty` is added to `DailyTotalVolumeTraded`
- `LastTradeQty*LastTradePrice` is added to `DailyTotalAssetTraded`
- `InternalPriceActivityTimestamp` is set to *NOW*.

1.4.2. Off Book Trade

When an **Off Book Trade** happens, the following changes occur in:

- 1.4.2.1. Off Book Trade Triggering Mechanism

- 1.4.2.2. Off Book Trade Updated Tags.

1.4.2.1. Off Book Trade Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the fields *LastPrice*, *LastTradeQty* and the tag `OffBookTrade` in the message body.
- Supplemental flags are raised for the tags: `Open`, `Close`, `Bid`, `Ask` and `TradingStatus`.

1.4.2.2. Off Book Trade Updated Tags

After the trade, the tags below are updated in the snapshot database within the Subscription Server:

- `LastOffBookTradePrice` and `LastPrice` are updated from the *LastPrice* field
- `LastOffBookTradeQty` is updated from the *LastTradeQty* field
- `LastOffBookTradeTimestamp` is set from the market official time
- `LastOffBookTradeQty` is added to `DailyTotalOffBookVolumeTraded`
- `LastOffBookTradeQty*LastOffBookTradePrice` is added to `DailyTotalOffBookAssetTraded`
- `InternalPriceActivityTimestamp` is set to *NOW*.

1.4.3. Index Instrument

When an **Index Instrument** happens, the following changes occur in:

- 1.4.3.1. Index Instrument Triggering Mechanism
- 1.4.3.2. Index Instrument Updated Tags.

1.4.3.1. Index Instrument Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the presence of the field *LastPrice* in the message body.
- Supplemental flags are raised for the tags: `Open`, `Close`, `TradingStatus`, `High` and `Low`.

1.4.3.2. Index Instrument Updated Tags

The tags below are updated in the snapshot database within the Subscription Server:

- `LastPrice` is updated from the *LastPrice* field
- `InternalPriceActivityTimestamp` is set to *NOW*.

1.4.4. Best Bid Update

When a **Best Bid** is updated, the following changes occur:

- 1.4.4.1. Best Bid Update Triggering Mechanism
- 1.4.4.2. Best Bid Updated Tags.

1.4.4.1. Best Bid Update Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the presence of the `Bid` tag in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.4.2. Best Bid Updated Tags

The `InternalPriceActivityTimestamp` is set to *NOW*.

1.4.5. Best Ask Update

When a **Best Ask** is updated, the following changes occur in:

- 1.4.5.1. Best Ask Update Triggering Mechanism
- 1.4.5.2. Best Ask Updated Tags.

1.4.5.1. Best Ask Update Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the presence of the `Ask` tag in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.5.2. Best Ask Updated Tags

The `InternalPriceActivityTimestamp` is set to *NOW*.

1.4.6. Trading Status Modification

When a **Trading Status** is modified, the following changes occur in:

- 1.4.6.1. Trading Status Modification – Triggering Mechanism
- 1.4.6.2. Trading Status Modification – Updated Tags.

1.4.6.1. Trading Status Modification – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the simultaneous presence of the tags `TradingStatus` and `OtherValues` in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.6.2. Trading Status Modification – Updated Tags

The new trading status is sent in `OtherValues`.

1.4.7. Daily High/Low Trade

When a **Daily High/Low Trade** happens, the following changes occur in:

- 1.4.7.1. Daily High/Low Trade – Triggering Mechanism
- 1.4.7.2. Daily High/Low Trade – Updated Tags.

1.4.7.1. Daily High/Low Trade – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the tags `High` and/or `Low` and the field *LastPrice* in the message body.
- Supplemental flags are raised for the tags: `Open`, `Close`, `Bid`, `Ask`, `TradingStatus`, `OffBookTrade`.

1.4.7.2. Daily High/Low Trade – Updated Tags

The tags `High` and/or `Low` are updated with the value in the filed *LastPrice*.

1.4.8. Session High/Low Trade

When a **Session High/Low Trade** happens, the following changes occur in:

- 1.4.8.1. Session High/Low Trade – Triggering Mechanism
- 1.4.8.2. Session High/Low Trade – Updated Tags.

1.4.8.1. Session High/Low Trade – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the tags `High` and/or `Low` and the field *LastPrice* in the message body. The tag `TradingSessionId` has a value different from `-1`.
- Supplemental flags are raised for the tags: `Open`, `Close`, `Bid`, `Ask`, `TradingStatus`, `OffBookTrade`.

1.4.8.2. Session High/Low Trade – Updated Tags

The tags `High` and/or `Low` are updated with the value in the filed *LastPrice*.

1.4.9. Daily Open: Signal Only

When a **Daily Open Signal without a Price** happens, the following changes occur in:

- 1.4.9.1. Daily Open: Signal Only – Triggering Mechanism
- 1.4.9.2. Daily Open: Signal Only – Updated Tags.

1.4.9.1. Daily Open: Signal Only – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the simultaneous presence of the tags `Open` and `OCHL_Daily` in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.9.2. Daily Open: Signal Only – Updated Tags

The tags below are updated in the snapshot database within the Subscription Server:

1. `DailyOpeningPrice` is reset.
2. If there is a `DailyClosingPrice` or a `DailySettlementPrice`, then:
   - `PreviousBusinessDay` is set from `CurrentBusinessDay` or `InternalDailyCloseTimestamp`
   - `PreviousDailyTotalVolumeTraded` is set from `DailyTotalVolumeTraded`
   - `PreviousDailyTotalAssetTraded` is set from `DailyTotalAssetTraded`
   - `PreviousDailyClosingPrice` is set from `DailyClosingPrice`
   - `PreviousDailySettlementPrice` is set from `DailySettlementPrice`.
3. `CurrentBusinessDay` is set to NOW.day, or NOW/day+1, if `OpeningNextCalendarDay` is present.
4. `DailyTotalVolumeTraded` and `DailyOffBookTotalVolumeTraded` are set to *Zero*.
5. `DailyTotalAssetTraded` and `DailyOffBookTotalAssetTraded` set to *Zero*.
6. `DailyClosingPrice`, `DailyHighPrice`, `DailyLowPrice` and `DailySettlementPrice` are reset.
7. `InternalDailyOpenTimestamp` is set to *NOW*.

1.4.10. Session Open: Signal Only

When a **Session Open Signal without a Price** happens, the following changes occur in:

- 1.4.10.1. Session Open: Signal Only – Triggering Mechanism
- 1.4.10.2. Session Open: Signal Only – Updated Tags.

1.4.10.1. Session Open: Signal Only – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the simultaneous presence of the tags `Open` and `OtherValues` in the message body. The tag `TradingSessionId` has a value different from `-1`.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.10.2. Session Open: Signal Only – Updated Tags

The tags below are updated in the snapshot database within the Subscription Server:

1. `SessionOpeningPrice` is reset.
2. `SessionHighPrice` and `SessionLowPrice` are reset.
3. `PreviousSessionClosingPrice` is set from `SessionClosingPrice` if available.
4. `PriorSessionTotalAssetTraded` is incremented with the value of `SessionTotalVolumeTraded`.
5. `SessionTotalAssetTraded` is set to *Zero*.
6. `PriorSessionsTotalVolumeTraded` is incremented with the value of `SessionTotalVolumeTraded`.
7. `SessionTotalVolumeTraded` is set to *Zero*.
8. `PriorSessionsTotalOffBookAssetTraded` is incremented with `SessionTotalOffBookAssetTraded`.
9. `SessionTotalOffBookAssetTraded` is set to *Zero*.
10. `PriorSessionsTotalOffBookVolumeTraded` is incremented with `SessionTotalOffBookVolumeTraded`.
11. `SessionTotalOffBookVolumeTraded` is set to *Zero*.

1.4.11. Daily Open: Signal and Price

When a **Daily Open Signal with a Price** happens, the following changes occur in:

- 1.4.11.1. Daily Open: Signal and Price – Triggering Mechanism
- 1.4.11.2. Daily Open: Signal and Price – Updated Tags.

1.4.11.1. Daily Open: Signal and Price – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the tags `Open` and `OCHL_Daily` and the field *LastPrice* in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.11.2. Daily Open: Signal and Price – Updated Tags

The tags below are updated in the snapshot database within the Subscription Server:

1. `DailyOpeningPrice` is updated from the *LastPrice* field.
2. If there is a `DailyClosingPrice` or a `DailySettlementPrice`, then:

- `PreviousBusinessDay` is set from `CurrentBusinessDay` or `InternalDailyCloseTimestamp`
- `PreviousDailyTotalVolumeTraded` is set from `DailyTotalVolumeTraded`
- `PreviousDailyTotalAssetTraded` is set from `DailyTotalAssetTraded`
- `PreviousDailyClosingPrice` is set from `DailyClosingPrice`
- `PreviousDailySettlementPrice` is set from `DailySettlementPrice`.

1.4.12. Session Open: Signal and Price

When a **Session Open Signal with a Price** happens, the following changes occur in:

- 1.4.12.1. Session Open: Signal and Price – Triggering Mechanism
- 1.4.12.2. Session Open: Signal and Price – Updated Tags.

1.4.12.1. Session Open: Signal and Price – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the tags `Open` and `OtherValues`, and the field *LastPrice* in the message body. The tag `TradingSessionId` has a value different from `-1`.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.12.2. Session Open: Signal and Price – Updated Tags

The tags below are updated in the snapshot database within the Subscription Server:

1. `SessionOpeningPrice` is updated from the *LastPrice* field.
2. `SessionHighPrice` and `SessionLowPrice` are reset.
3. `PreviousSessionClosingPrice` is set from `SessionClosingPrice` if available.
4. `PriorSessionsTotalAssetTraded` is incremented with the value of `SessionTotalAssetTraded`.
5. `SessionTotalAssetTraded` is set to *Zero*.
6. `PriorSessionsTotalVolumeTraded` is incremented with the value of `SessionTotalVolumeTraded`.
7. `SessionTotalVolumeTraded` is set to *Zero*.
8. `PriorSessionsTotalOffBookAssetTraded` is incremented with `SessionTotalOffBookAssetTraded`.
9. `SessionTotalOffBookAssetTraded` is set to *Zero*.
10. `PriorSessionsTotalOffBookVolumeTraded` is incremented with `SessionTotalOffBookVolumeTraded`.
11. `SessionTotalOffBookVolumeTraded` is set to *Zero*.

1.4.13. Daily Close: Signal and Price

When a **Daily Close Signal with a Price** happens, the following changes occur in:

- 1.4.13.1. Daily Close: Signal and Price – Triggering Mechanism

- 1.4.13.2. Daily Close: Signal and Price – Updated Tags.

1.4.13.1. Daily Close: Signal and Price – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following fields and tags:

- The *Content mask* flags the simultaneous presence of the tags `Close` and `OCHL_Daily` and the field *LastPrice* in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.13.2. Daily Close: Signal and Price – Updated Tags

The tags below are updated in the snapshot database within the Subscription Server:

- `DailyClosingPrice` is updated from the *LastPrice* field.
- `InternalDailyCloseTimestamp` is set to *NOW*.

1.4.14. Daily Close: Signal Only

When a **Daily Close Signal without a Price** happens, the following changes occur in:

- 1.4.14.1. Daily Close: Signal Only – Triggering Mechanism
- 1.4.14.2. Daily Close: Signal Only – Updated Tags.

1.4.14.1. Daily Close: Signal Only – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the simultaneous presence of the `Close` and `OCHL_Daily` tags in the message body.
- Supplemental flags are raised for any other tag that it is present in the message.

1.4.14.2. Daily Close: Signal Only – Updated Tags

The `InternalDailyCloseTimestamp` is set to *NOW*.

1.4.15. Auction Price and Volume

Depending on the type of feedhandler, the auction phase is handled with simple or normalized tags:

1.4.15.1. Handling the Auction Phase with Simple Tags

When the auction phase is handled with simple tags, the following events are being sent:

- at the beginning of the auction phase: `TradingStatus` = `PreOpen` or `PriceIndication`
- during the auction: `LastPrice` (without `LastTradeQty`) is sent as a real-time event

- during the auction: specific tags `MARKET_xxxxx_LastAuctionQty` (depending on the data received from the exchange) are being sent.

1.4.15.2. Handling the Auction Phase with Normalized Tags

When the auction phase is handled with normalized tags, the tags `LastAuctionPrice` and `LastAuctionVolume` are being sent as *Other Values*:

- `TradingStatus` value is sent with the value `PriceIndication` (Integer value 5).
- `LastAuctionPrice`
- `LastAuctionVolume`
- `LastAuctionImbalanceSide`
- `LastAuctionImbalanceVolume`
- `InternalLastAuctionTimestamp` (Internal because it is recorded at the feedhandler level and not available from the market).

When an **Auction Price and Volume** (`LastAuctionPrice` and `LastAuctionVolume`) happens, the following changes occur in:

- 1.4.15.3. Auction Price and Volume – Triggering Mechanism
- 1.4.15.4. Auction Price and Volume – Updated Tags.

1.4.15.3. Auction Price and Volume – Triggering Mechanism

The triggering mechanism consists of mandatory and supplemental (or optional) flags for the following tags:

- The *Content mask* flags the presence of the `OtherValues` tag in the message body.
- Supplemental flags are raised for the tags: `Open`, `Close`, `Bid`, `Ask`, `TradingStatus`, `High`, `Low`.

1.4.15.4. Auction Price and Volume – Updated Tags

The `LastAuctionPrice` and `LastAuctionVolume` are sent in the *OtherValues* where they can be updated.

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