dxFeed Market Data: Model of Event Publishing for Different Markets

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1. Event delivery contracts

Name	Description	Example
Ticker	Delivery of latest actual value, queued older events could be conflated to conserve bandwidth and resources.	Values of the latest bid/ask and last sale prices for IBM
Stream	All events are delivered in order.	Incoming tape of all trades for IBM
History	Request data history – values for certain records (groups of elements) which have arrived into QDS and have special timestamp value fitting into period requested by consumer.	Charting: daily bars for IBM from Sep 1st till Sep 10th 2011

2. dxFeed API event classes

dxFeed API event	Corresponding QD records	Description	Fields	Delivery contracts
Quote	Quote	Bid/Ask prices for a given instrument	Symbol, Bid Time, Bid Exchange, Bid Price, Bid Size, Ask Time, Ask Exchange, Ask Price, Ask Size	Ticker Stream
Trade	Trade	Last Sale price for a given instrument + daily volume	Symbol, Exchange, Time, Price, Size, Volume	Ticker Stream
TimeAndSale	TradeHistory	Trade in a tape of trades for a given instrument	Symbol, Time, Sequence, Exchange, Price, Size, Bid Price, Ask Price, Exchange Sale Conditions, Flags (e.g. isValidTick, etc)	Ticker Stream History
Summary	Fundamental, Summary	Open-High-Low-Close values for current day and Close for previous trading day	Symbol, Day Id, Day High Price, Day Low Price, Day Open Price, Day Close Price, Prev Day Id, Prev Day Close Price, Open Interest	Ticker Stream
Order	MarketMaker	Market depth: Level 2 quote by market maker / regional exchange quote / element of order book	Order: Symbol, Index, Side, Level, Time, Exchange, Market Maker ID, Price, Size MarketMaker: Symbol, Exchange, Market Maker ID, Bid Price, Bid Size, Ask Price, Ask Size	Ticker Stream

dxFeed API event	Corresponding QD records	Description	Fields	Delivery contracts
Profile	Profile	Instrument profile	Symbol, Description, Flags (Is Trading Halted)	Ticker Stream
Candle	Candle	Charting OHLCV candle	Symbol, Open, High, Low, Close, Volume, BidVolume, AskVolume, VWAP, Count	Stream History
Greeks	Greeks	Option greeks and implied volatility	Delta, Gamma, Rho, Theta, Vega, Volatility, Price	Ticker Stream
TheoPrice	TheoPrice	Option theoretical price	Delta, Gamma, Dividend, Interest, Price, Time, UnderlyingPrice	Ticker Stream
Underlying	Underlying	Snapshot of computed values that are available for an option underlying symbol based on the option prices on the market	Symbol, Volatility, FrontVolatility, BackVolatility, PutCallRatio	Ticker Stream
Series	Series	Snapshot of computed values that are available for all option series for a given underlying symbol based on the option prices on the market	Symbol, Index, Expiration, Volatility, PutCallRatio, ForwardPrice, Dividend, Interest	Ticker Stream

3. Events to be published for different feed types

3.1. Equities

Original Feed Event	dxFeed Event
BBO Quote (bid/ask)	Quote
Regional Quote (bid/ask)	Quote, Order
Trade (last sale)	Trade, TradeETH, TimeAndSale
Trade conditions change messages	Trade, TradeETH
Volume setting events (trades, explicit volume update messages)	Trade, TradeETH
OHLC setting events: trades, explicit hi/lo update messages, explicit summary messages, etc.	Summary
Instrument definition	Profile
Trading halt/resume messages	Profile
Depth: order books, price levels, market maker quotes	Order

Original Feed Event	dxFeed Event
Charting aggregations	Candle

3.2. Indices and indicators

Original Feed Event	dxFeed Event
Index value	Trade, TimeAndSale
Bid index value, Ask index value (where available, calculated by bid/ask of index components)	Quote
Volume setting events (trades, explicit volume update messages)	Trade
OHLC setting events: trades, explicit hi/lo update messages, explicit summary messages, etc.	Summary
Instrument definition	Profile
Charting aggregations	Candle

3.3. Futures

Original Feed Event	dxFeed Event
Quote (bid/ask)	Quote
Trade (last sale)	Trade, TimeAndSale
Trade conditions change messages	Trade
Volume setting events (trades, explicit volume update messages)	Trade
OHLC setting events: trades, explicit hi/lo update messages, explicit summary messages, etc.	Summary
Instrument definition	Profile
Depth: order books, price levels	Order
Charting aggregations	Candle

3.4. Options

Original Feed Event	dxFeed Event
BBO Quote (bid/ask)	Quote
Regional Quote (bid/ask)	Quote
Trade (last sale)	Trade, TradeETH, TimeAndSale
Trade conditions change messages	Trade, TradeETH
Volume setting events (trades, explicit volume update messages)	Trade, TradeETH

Original Feed Event	dxFeed Event
OHLC setting events: trades, explicit hi/lo update messages, explicit summary messages, etc.	Summary
Instrument definition	Profile
Charting aggregations	Candle
Greeks and IV	Greeks
Theoretical prices	TheoPrice
VIX-volatilities, P/C ratios	Underlying, Series

3.5.Spreads

Original Feed Event	dxFeed Event
Quote (bid/ask)	Quote
Trade (last sale)	Trade, TimeAndSale
Volume setting events (trades, explicit volume update messages)	Trade
OHLC setting events: trades, explicit hi/lo update messages, explicit summary messages, etc.	Summary
Instrument definition	Profile
Charting aggregations	Candle
Greeks and IV	Greeks
Theoretical prices	TheoPrice

3.6.FX

Original Feed Event	dxFeed Event
Quote (bid/ask)	Quote
Trade (last sale)	Trade, TimeAndSale
Volume setting events	Trade
Market depth	Order
OHLC setting events: trades, explicit hi/lo update messages, explicit summary messages, etc.	Summary
Instrument definition	Profile
Charting aggregations	Candle

3.7.Feed types and events matrix

	Quote	Trade	TradeETH	TimeAndSale	Order	Summary	Profile	Candle	Greeks	TheoPrice	Underlying	Series
Equities	●	●	●	●	●	●	●	●			●	
Indexes		●		●		●	●	●				
Futures	●	●		●	●	●	●	●			●	
Options	●	●		●	●	●	●	●	●	●		●
Spreads	●	●		●		●	●	●	●	●		
FX	●	*		*		*		●				

*only for cryptocurrencies

4. Daily reset (rollover) procedures

Daily rollover can happen per-instrument (e.g. futures could have different rollover times depending on contract and venue) or could happen simultaneously for all instruments on the market at after-hours (e.g. NYSE equities). Time of rollover is defined by trading schedules on the given market.

Rollover affects Summary event which contains OHLC for the current day and close value for the day the instrument traded previously.
Also, rollover (reset) zeroes Volume field in Trade record and Bid.Size/Ask.Size fields in Quote record.
For futures Settlement date replaces last trade in Close when it arrives.

Summary consists of “current” and “historical” parts:

“Current”

The fields DayId, OpenInterest, DayOpen.Price, DayHigh.Price, DayLow.Price and DayClose.Price are linked to either current trading day or previous trading day – when new day has not begun yet. The day is given by DayId field.

1) These fields form a logical group linked to one trading day.

2) These fields are linked to trading day, not trading session.

3) These fields are linked to trading days only, non-trading days are omitted (fields keep their current values during non-trading days).

4) These fields are linked to trading day regardless of whether the instrument was actually traded this day or not.

5) Transition to the next trading day is done during trading pause (rollover).

Schedule is the following:

1) before the start for the next trading day (before the first trading session of the new trading day) these fields are prepared for new day. DayId is set to new day, OpenInterest retains current value (special field), all the OHLC-fields are reset to NaN.

Ideally this happens at the given time before trading start, e.g. 1 hour. In reality it depends on the type of instrument, exchange and protocol specialties. E.g. stocks are reset at midnight, options – at 6am, futures – in 5-10 mins before open on individual schedules.

2) DayOpen, DayHigh and DayLow are updated as soon as trading starts – either with official exchange values (if available) or calculated values. DayClose remains NaN.

3.a) After trading close DayClose is filled – with official close price is available or last trade price otherwise.

3.b) If the given instrument did not trade this day, all fields contain NaN.

In the case when exchange sends ClosePrice, but we had no sign of trade in this instrument this day, we update the close price with official value nevertheless.

Field keep these values until new trading day start, where the whole procedure starts from the step 1.

OpenInterest is a special field used for options and futures, it's never reset. Formally it's in the "current" group of fields and should be read as "open interest on the start of the current day".

"Historical" part

PrevDayId and PrevDayClose.Price are linked to the last trading day before DayId when this instrument was traded. That day is identified by PrevDayId field.

Algorithm for filling these fields is simple - DayId and DayClose.Price are copied into them when preparing for the new trading day (see p.1 above) when DayClose.Price is not NaN.