

Client FIX Specification Modifications for MiFID II/R Equity/Equity-Like & FFO Instruments

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Introduction

This document outlines thechanges for BofA Securities, BofA Europe DAC, BofA Securities Europe Société Anonyme(seethe 44TUBofA Securities Entities ListU) 44T and otheraffiliates of BofASecurities related to FIX messaging specifications being implemented to support MiFID II/R forequity (and equity-like) and FFOinstruments. Muchof the material here is based on work performed by the FIX Trading Community's MiFID working groups (notablythe Transparency, Transaction Reporting and Order Record Keeping working groups).

New Order and Replace Request Messages

Summary of Changes Identified by FIX Trading Community MiFID Working Groups

In this table, fields that will not be supported by BofA Securities for equity/equity-likeor FFO instruments are highlighted in grey. This tablealso identifies which fields are applicable only for equities (including equity-like) or FFO.

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Data Element	FIX Standard Details	FIX User Defined Details	Applies to
Short Sell Indicator	Side(54) - existing field from 2.7 New value H -> Sell undisclosed	n/a (as FIX Standard details)	Equities only
Order Originating From an SI	New OrderAttributeGrp component containing three fields, NoOrderAttributes(2593), OrderAttributeType(2594) and OrderAttributeValue(2595) with values: OrderAttributeType(2594)=5 (Systematic internaliser order) OrderAttributeValue(2595)="Y"	8015 OrderAttributeTypes - flattened version of OrderAttribute component	Equities only
Client Identifier	Where using an explicit client identifier, use Parties component - existing from 4.3 with fields as follows: Where the order is for a single client who is a legal entity: PartyRole(452) = 13 (Order Origination Firm) PartyIDSource(447) = N (LEI) or P (Short code identifier)	20013 PartyIDOrderOriginationFirm with reserved values for PartyID as follows: 0 = NONE (No client for this order) 1 = AGGR (An aggregation of multiple client orders) 2 = PNAL (Clients are pending allocation)	Equities & FFO

	Where the order is for a single client who is not a legal entity: PartyRole(452) = 13 (Order Origination Firm) PartyIDSource(447) = O (National ID) or P (Short code identifier) Where using the AGGR or PNAL codes (i.e. where the order has been or will be allocated to multiple clients), instead of the above, use New OrderAttributeGrp component containing three fields: NoOrderAttributeS(2593) OrderAttributeType(2594)=0 (Aggregated order) or 1 (Pending allocations) OrderAttributeValue(2595)="Y"	The AGGR/PNAL codes may alternatively be represented using 8015 OrderAttributeTypes - flattened version of OrderAttribute component.	
Commodity deriv risk reduction flag	New OrderAttributeGrp component containing three fields, NoOrderAttributes(2593), OrderAttributeType(2594)=3 (Risk reduction order) OrderAttributeValue(2595)="Y"	8015 OrderAttributeTypes - flattened version of OrderAttribute component	FFO only
Order destination instruction (i.e. to trade only on a TV, SI etc.)	ExDestinationType(2704) 0 = No trading venue restriction 1 = Can be traded only on a trading venue 2 = Can be traded only on a Systematic Internaliser (SI) 3 = Can be traded on a trading venue or Systematic Internaliser (SI)	As FIX Standard details	Equities only
RFMD vs. order indicator	BookingType(775) - existing field from 4.4 0 (regular booking) -> order 1 (CFD) or 2 (total return swap) -> RFMD	As FIX Standard details	Equities only
DEA client sub- delegated client id	Parties component - existing from 4.3 with PartyRole(452) = 3 (Client ID)	20003 PartyIDClientID	Both
DEA client trader id	Parties component - existing from 4.3 with PartyRole(452) = 11 (Order origination trader)	20011 PartyIDOrderOriginationTrader	Both
APA to be used for trade reporting	Parties component - existing from 4.3 with fields as follows: PartyRole(452) = 123 (Publishing intermediary) PartyIDSource(447) = G (MIC) PartyID(448) = the APA's MIC	20123 PartyIDPublishingIntermediary	n/a

New Order and Replace Request Messages – BofA Securities Implementation Short sell handling (equities only)

The FIX Protocol Implementation of the Side Field (tag 54) Maps to the MiFID Long/Short Sell Values as follows:

MiFID Value	Description	FIX Value (Side 54)
SELL	No short sell	2 Sell
SESH	Short sale with no exemption	5 Sell short
SSEX	Short sale with exemption	6 Sell short exempt
UNDI	Information not available	H Undisclosed sell

We will support thenew value 54=H for 'undisclosedsell' but recognisethat:

- Not all clients havea regulatory obligation to provide this (e.g. non-MiFID investment firms), and
- Not all clients may beableto modify their systems to support thenew value.

We will therefore implement logic to handlethefollowing models and require that clients inform us which model they will be using so we can configure our FIX infrastructure accordingly:

Model	Client Implementation	BofA Securities Implementation
1 – Full Support	Client implements short sell marking logic (or simply doesn't sell	SELL
	short at all) and will	SESH
	send 59=2 for long sells, 59=5 for short sells and 59=6 for exempt short sells.	SSEX
		54=H 2 UNDI
2 – No Short Sell		54=2 🛭 UNDI
Marking		54=5 🛭 UNDI
		54=6 🛭 UNDI
		54=H 2 UNDI

Identification of SI Orders (Equities Only)

To ensure correct tradereporting of off-venuetrades, werequire knowledgeof whetheran orderhas been received from a systematic internaliser. Wehave the ability to storethis information at a per client level wherethe client is:

- An SI in all equity/equity-like MiFIDinstruments,
- An SI in no equity/equity-likeMiFID instruments
- An SI in some equity/equity-like MiFID instruments (and will flag as such on inbound orders)

We will require:

- All clients to inform us as to which of the above they fall into, and
- If they fall into the last category, then they are to inform us on each inbound new order/replacerequest messagewhether they are an SI in the instrument concernedusing either:

- 2593=1; 2594=5; 2595=Y, or
- 8015=5

These are equivalent from a FIX perspective (the former being the 'standard' implementation and the latter being a simplification forclients not willing / able to implement repeating groups).

Assisted Trade Reporting

BofASecurities is not planning to support assisted tradereporting for equities/equity-like MiFIDinstruments (on the grounds that it will bean SI in all such instruments). As such, the following fields as listed in the above table will not be supported by BofA Securities (they will be simply ignored if they are provided):

- Orderinstruction to report to an APA (underassisted reporting arrangement)
- APA to beused fortrade reporting

Identification of Client and Pre-Aggregated Orders

In this section, theterm 'LEI' refers to the legal entity identifier forthe entity facing BofA Securities, i.e. an investment manager (not the funds managed by the investment manager). To meet both transaction reporting requirements and therecord keeping requirements of trading venues, BofA Securities must know, forevery inbound order:

- Whether theorder is received from a single LEI and, if so, what that LEI is.
 - This can be pre-configured into the BofAS ecurities trading infrastructure if there is a one to one mapping between FIX session and client LEI or by pre-agreed mapping from a FIX field.
 - We will also support explicit identification of the LEI using the full FIX structure 453=1;452=13 (Order Origination Firm); 447=N (LEI);448 = the LEI value (or user defined equivalent 20013 PartyID (Order origination Firm).
 - For FFO, we will continue to support the GMI account specified in tag 1 and, by default, will use that to map to the appropriate LEI.
- Whether theorder is received as an aggregation across multiple LEIs. This must beflagged to us by setting either:
 - 2954=0; 2594=1; 2595=Y, or
 - 8015=0

These are equivalent from a FIX perspective (the former being the 'standard' implementation and the latter being a simplification for clients not willing / able to implement repeating groups).

If wereceive both and aggregated orderindicator AND an LEI identifier, we will consider the aggregation flag to override the LEI.

Risk Reduction Flag (FFO Only)

Foran orderon a Commodity Derivative product, this flag indicates whether the transaction reduces risk in an objectively measurable way in accordance with Article 57 of Directive 2014/65/EU.

To indicatean orderthat reduces risk:

- OrderAttributeType(2594) = 3 (risk reduction order)
- OrderAttributeValue(2595) ="Y"

If not specified, BofA Securities willconsiderthat theorderis not risk reducing.

Order Destination Instruction (Equities Only)

This indicates whether theorderis to be traded only on a trading venue, on a trading venue or SI, or has no restriction:

- ExDestinationType(2704)=0 –no restriction on wheretheorderis traded
- ExDestinationType(2704)=1 ordercan only betraded on a trading venue
- ExDestinationType(2704)=3 –ordercan only betraded on a trading venueor SIExDestination has an additional value 2 (SIonly) which we are not planning to support.

Note this field will apply in addition to any other order routing constraints (e.g. specific venuetargeting or exclusion tags). Note also that we can support this as a standing instruction where clients require.

RFMD vs. Order Indicator (Equities Only)

This indicates whether the "new order single" FIX message represents an actual order in the specified instrument, or a request for market data (RFMD) used to obtain a price for a derivative. This distinction needs to be known at the point of message capture as it affects the trading process and associated regulatory reporting.

- BookingType(775)=0 (regularbooking) messageis to betreated as an order in the specified instrument
- BookingType(775)=1 (CFD) messageis to be treated as an RFMD
- BookingType(775)=2 (total return swap) messageis to betreated as an RFMD

Note also that we can support this as a standing instruction where clients require, and also that clients using different fields (e.g. tag 1) for this purpose will continue to be able to do so. Where clients do use 775, we will treat values 1 and 2 the same way.

DEA Identifiers

There are two requirements specifically for DEA activityas per RTS 6 article 21:

- Paragraph 3 requires that we beable to identify traders of DEA clients. We will support this using the full FIX structure 453=1;
 452=11 (Orderorigination trader); 447=D (Proprietary / Custom code);448 = the trader id value (or user defined equivalent 20011 Partyl DOrder Origination Trader).
- Paragraph 4 requires that we beable to differentiate clients of DEAclients in thecase of sub-delegation. We will support this using the full FIX structure -453=1;452=3 (Client ID);447=D (Proprietary / Custom code);448=the underlying client id (or user defined equivalent 20003 PartyIDClientID). Noteweare not required to know the actual identity of the underlying clients.

Execution Report Messages

Summary of Changes Identified by FIX Trading Community MiFID Working Groups

In this table, fields that will not besupported by BofA Securities forequity/equity-like instruments are highlighted in grey. This tablealso identifies which fields are applicable only for equities (including equity-like) or FFO. Those that are not provided by default but can be supplied on request are highlighted in blue.

Data Element	FIX Standard Details	FIX User Defined Details	Applies to
Execution Capacity	LastCapacity(29) - existing field from 2.71 (agent) -> AOTC (cross as agent) -> AOTC (cross as principal) -> MTCH 4 (principal) -> DEAL New value 5 (riskless principal) -> DEAL	n/a (as FIX Standard details)	Both
Execution Venue Identifier	30 Last Market	As FIX Standard details	Both

Transaction Reporting Venue Identifier (I.E.	Parties component - existing from 4.3 with fields as follows:	20073 PartyIDExecutionVenue	Equities only
XOFF Or SI MIC)	PartyRole(452) = 73 (Execution venue) PartyIDSource(447) = G (MIC) PartyID(448) = the SI MIC		
Trade Report Indicator	New TradeReportingIndicator field (2524) with values:	n/a (as FIX Standard details)	Equities only
	0 = Trade has not (yet) been reported		
	1 = Trade has been reported by a trading venue as an "onbook" trade		
	2 = Trade has been reported as a "systematic internalizer" seller trade		
	3 = Trade has been reported as a "systematic internalizer" buyer trade		
	4 = Trade has been reported as a "non- systematic internalizer" seller trader		
	5 = Trade has been reported under a sub- delegation arrangement by an investment firm to a reporting facility (e.g. APA) on behalf of another investment firm		
	6 = Trade has been or will be reported		
	7 = Trade has been or will be reported as a "non- Systematic Internaliser" buyer trade		
	8 = Trade has been or will be reported by a trading venue as an "off-book" trade		
	9 = Trade is not reportable		
Venue Transaction Identifier	RegulatoryTradeIDGrp component with RegulatoryTradeIDType(1906) = 5 (Trading venue transaction identifier) and the value itself in RegulatoryTradeID(1903)	8016 TradingVenueRegulatoryTradeID	Equities only
Transaction Time	TransactTime (60)	n/a (as FIX Standard details)	Equities only
"I Am An SI" (Order Recipient)	Parties component - existing from 4.3 (PartyRoleQualifier from 5.0) with fields as follows: PartyRole(452) = 63 (Systematic internaliser) PartyIDSource(447) = G (MIC) PartyID(448) = the SI MIC	20063 Party ID Systematic Internaliser	Equities only
	raityiD(446) – tile 3i MiC		
SI Execution Indicator	MatchType(574)=9 - existing from 4.3	As FIX Standard details	Equities only
Broker's LEI	Parties component - existing from 4.3 with fields as follows: PartyRole(452) = 1 (Executing firm) PartyIDSource(447) = N (LEI) PartyID(448) = the LEI	20001 PartyIDExecutingFirm	Both
APA used for trade	Parties component - existing from 4.3 with fields as	20123	n/a
reporting	follows: PartyRole(452) = 123 (Publishing intermediary) PartyIDSource(447) = G (MIC) PartyID(448) = the APA's MIC	PartyIDPublishingIntermediary	
Venue Flags			

RFPT Ref Price Waiver	Now TrdPagBublication Cro component with fields	2012 TrdDogDublication Decease	Fauities only
Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre- trade transparency waiver) TrdRegPublicationReason(2670) = 3 (No public price preceding order as public reference price was used for matching orders)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Equities only
NLIQ NT Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre-trade transparency waiver) TrdRegPublicationReason(2670) = 0 (No preceding order in book as transaction price set within average spread of a liquid instrument)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Equities only
OILQ NT Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre-trade transparency waiver) TrdRegPublicationReason(2670) = 1 (No preceding order in book as transaction price depends on system-set reference price for an illiquid Instrument)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Equities only
PRIC NT Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre-trade transparency waiver) TrdRegPublicationReason(2670) = 2 (No preceding order in book as transaction price is subject to conditions other than current market price)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Equities only
LRGS Large In Scale Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre- trade transparency waiver) TrdRegPublicationReason(2670) = 9 (No public price and/or size quoted as transaction size is large in scale)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Both
OM Waiver Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre- trade transparency waiver) TrdRegPublicationReason(2670) = 10 (No public price and/or size quoted due to order being held in a trading venue's order management facility)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication G rp component	Equities only
OTC Trade Flags			
BENC Flag	SecondaryTrdType(855) - existing field from 4.4, being added to execution reports 64 -> Benchmark	n/a (as FIX Standard details)	Equities only
SDIV flag	TradePriceConditionGrp component - existing from 4.4, being added to execution reports TradePriceCondition(1839) = 13 (Special dividend)	8014 TradePriceConditions - flattened version of TradePriceConditions component	Equities only
TNCP Flag	TradePriceConditionGrp component - existing from 4.4, being added to execution reports TradePriceCondition(1839) = 16 (Trade exempted from trading obligation)	8014 TradePriceConditions - flattened version of TradePriceConditions component	Equities only
ACTX Flag	TrdSubType(829) - existing field from 4.4, being added to execution reports 37 -> Crossed trade	n/a (as FIX Standard details)	Equities only
RPRI SI Flag	TradePriceConditionGrp component - existing from 4.4, being added to execution reports TradePriceCondition(1839) = 14 (Price improvement)	8014 TradePriceConditions - flattened version of TradePriceConditions component	Equities only

ILQD SI Flag (As Per RTS 1)	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre-trade transparency TrdRegPublicationReason(2670) = 4 (No public price quoted as order size is above standard market size")	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Equities only
SIZE SI Flag (As Per RTS 1)	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 0 (Pre-trade transparency TrdRegPublicationReason(2670) = 5 (No public price quoted as order is above standard market size)	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	Equities only
LRGS Deferral Flag	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 1 (Post-trade deferral) TrdRegPublicationReason(2670) = 6 (Deferral due to "Large in scale")	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication G rp component	Equities only
SIZE Deferral Flag (As Per RTS 2)	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 1 (Post-trade deferral) TrdRegPublicationReason(2670) = 8 (Deferral due to "Size specific")	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	FFO only
ILQD Deferral Flag (As Per RTS 2)	New TrdRegPublicationGrp component with fields TrdRegPublicationType(2669) = 1 (Post-trade deferral) TrdRegPublicationReason(2670) = 7 (Deferral due to "Illiquid instrument")	8013 TrdRegPublicationReasons - flattened version of TradeRegPublication Grp component	FFO only

Note this table (specifically the list of tradeflags) has been filtered forrelevance to equity/equity-like MiFID instruments. Further flags are available for non-equity instruments.

Execution Report Messages - BofA Securities Implementation

Venue Identifiers

FIX tag 30 will beused forthevenue of execution and will be populated on all execution report messages representing actual executions (as opposed to orderstate changes). We will provide a segment level MIC where available (i.e. as provided to us by the execution venue), or operator MIC otherwise. Where we use a broker to access an execution venue, tag 30 will contain the identifier from the execution venue, not the intermediary broker.

Where trading in 'DEAL' capacity wearerequired to notify ourclients of the 'transaction reporting venue' which is used in field 36 of clients' market-side transaction reports. This will be represented, by default, using the FIX user defined field 20073 PartylDExecution Venue (though we will be able to use the full Party component structure on request):

- NoPartylds 453=1
- PartyID 448=XOFF oran SI MIC
- PartyIDSource 447=G (MIC)
- PartyIDRole 452=73 (executionvenue)

In linewith FIX guidelines, this field (orcomponent) will only be supplied on execution report messages denoting a 'client execution' fortransaction reporting purposes.

Execution Capacity

We will usetag 29 (LastCapacity) to communicate the capacity in which we are working an order. This will be provided on all execution report messages and will not change during the life of an order. Our usage of this field is in linewith FIX Protocol guidelines as follows:

Value & Description	Explanatory Guidance
1 (Agent)	An execution on a public market or from an external party (e.g. broker) conducted on an agency basis.
	For MiFID II, this will be used to represent 'AOTC' capacity.
2 (Cross As Agent)	An execution between two clients of the executing firm, taking place within the firm, and conducted on an agency basis.
	For MiFID II, this will be used to represent 'AOTC' capacity.
3 (Cross As Principal)	An execution on a public market or from an external party (e.g. broker) conducted on a matched principal basis in line with the
	MiFID definition of 'MTCH' capacity.
4 (Principal)	An execution where the executing firm is committing capital (e.g. a risk fill or change in price on fills obtained from markets or external parties).
	Where the FIX execution message is being used to communicate an indicative price and quantity (for example when being used by the executing firm to write a swap), regardless of the source of liquidity.
	For MiFID II, this will be used to represent 'DEAL' capacity.
5 (Riskless Principal)	An execution on a public market or from an external party (e.g. broker) conducted on a riskless principal basis.
	For MiFID II, this will be used to represent 'DEAL' capacity.

Waiver and OTC Flags

We will support a number of the MiFID OTC tradeflags and venuewaiverflags (wheremadeavailableto us by trading venues), using the 'FIX User Defined' fields 8013 and 8014 where relevant. It should be noted that an execution may carry multiple flags, in which case 8013 and/or 8014 will contain multiple values, delimited by spaces:

Flag	BofA Securities Implementation
Equity/equity-like-Specific OTC Flags	
Trade reported on a deferred basis (LRGS)	8013 contains 6
SI trade in illiquid instrument (ILQD)	8013 contains 4
SI trade above standard market size (SIZE)	8013 contains 5
Non price forming trade (TNCP)	8014 contains 16
Special dividend trade (SDIV)	8014 contains 13
Benchmark price trade (BENC)	855 = 64
Agency cross trade (ACTX)	Not supported by BofA Securities

SI trade with price improvement (RPRI)	Not supported by BofA Securities
Equity/equity-like-Specific Venue Waiver Flags	
Reference price waiver (RFPT)	8013 contains 3
Execution arising from order using a large in scale waiver	8013 contains 9
Execution arising from order using an order mgt system waiver	8013 contains 10
FFO-Specific Flags	
Above specific size (SIZE)	8013 contains 8
Illiquid instrument (ILQD)	8013 contains 7

It should benoted that thevenuewaiverflags are provided for informational purposes only (i.e. are not required fields for MiFID II compliance) except for DEA clients, where these are required for record keeping purposes. These flags will only be provided on execution report messages representing actual executions from trading venues (as opposed to order state changes).

Trade Reporting Fields (Equities Only)

We will provide an indicator (field 2524) on execution reports to indicate whether the tradehas been reported and, if so, why:

Value	Description
0	Trade has not (yet) been reported
1	Trade has or will be reported by a trading venue as an "on-book" trade
2	Trade has or will be reported as a "systematic internalizer" seller trade
3	Trade has or will be reported as a "systematic internalizer" buyer trade
8	Trade has or will be reported by a trading venue as an off-book trade

Values not listed will not be provided by BofA Securities for equity/equity-like MiFIDinstruments as:

- We are not planning to support assisted tradereporting in theseproducts (which rules out value 5), and
- We will bean Slin all these products (which rules out values 4 and 7).

Value 6 can be provided on request, being a simplemapping of values 1, 2, 3 and 8.

This flag will only be provided on execution report messages representing actual executions (as opposed to orderstate changes).

SI Indicators (Equities Only)

Given BofASecurities will bean SI in all equity/equity-like MiFIDinstruments, the "I am an SI" indicatoris somewhat unnecessary. Hence BofASecurities will not be providing this by default, though should clients require this, we can add this as a customisation to a FIX connection.

BofA Securities will also not be providing the "SI execution indicator" by default (given it can be inferred directly from tag 30) but, as above, can be added as a customisation on request.

Broker LEI

BofA Securities will not be providing the "Broker LEI" by default but it can be added as a customisation on request in either 'standard' or 'user defined' form.

Transaction Time

BofA Securities will provide Transaction Time(tag 60) as standard. For DEA activity, we will provide this from the trading venue directly to the level of granularity as specified by the venue. This may be up to microsecond granularity.

Trading Venue Transaction Identifier

This will be provided for DEA activity only (in addition to the existing tag 17 execution id, which is generated internally) and is a pass-through of the transaction id supplied by the trading venue. This will be represented, by default, using the FIX user defined field 8016 Trading Venue Regulatory TradelD (though we will be able to use the full Regulatory TradelD Grp component structure on request):

- NoRegulatoryTradeIDs (1907)=1
- RegulatoryTradeIDType(1905) = 5 (Trading venuetransaction identifier)
- RegulatoryTradeID(1903) = theactual value

Questions?

If you have questions, please contact your Market Manager.

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