Engineering Standard

Interface Specification of BINARY Market Data Feed of Shenzhen Stock Exchange 5th Trading System

(Ver 1.08)

Shenzhen Stock Exchange

Issue time of Chinese Original: Dec, 2020

Issue time of English Translation: Jan, 2021

REVISION LIST

Date of Issue	Version	Communication version	Comments
Oct 2013	0.10	1.00	Establishment
Jan 2014	0.90	1.00	Amendment based on feedback from the main market participants
Apr 2014	1.00α	1.00	Amendment based on feedback on Ver0.90
June 2014	1.00β	1.00	The same channel code is used in Level 1 snapshot data & Level 2 snapshot data during the auction period Add the statistic message of snapshot data channel Add a new switch type in Security Real-time Status Message Add a new field “Contactor” in Order Tick Message of Negotiable Trade Move the field “MDStreamID” behind the field “AppleSeqNum” in Transaction Tick Data Add a note to message verification and calculation range Revise some literal error
Sep 2014	1.00γ	1.00	Add Business Rejection Message Add a “ChannelNo” field & “RawDataFormat” of Binary data field in the Announcements Message Add the missing field of Market Data Type “MDStreamID” in the Statistics of Snapshot Data Channel “0 st digit” in the field of Trading Phase Code of the Product “TradingPhaseCode” adds a value of “A= After-hour-trading” Add “Cancellation of conversion”, “Cancellation of resale”, “Pledge”, “Release of pledge” in the Type of Switch “After-hour-trading Block Trade” renamed to “After-hour-trading” Revise some literal error

Jan 2015	1.00δ		“SecurityPreName” in “Real time status of security” is changed into “FinancialStatus”; “Settlement Price” is deleted in the “MDEntryType” of Snapshot Data; “TimeInForce”, “MaxPriceLevels” & “MinQty” are deleted in Order Tick Data
Aug 2015	1.00	1.00	Extension description of message body is added. Description of Cx character string is added. "Voting rights", "Equity pledge-style Repo", "Split in real time", "Combined in real time", "Covered openning", "market-maker quotation" added in section “Real time status of security” In “Market Data Types”, “Pledge-style Repo” is added the description of channel code. “V: break for volatility” is added in the Trading Phase Code of section “Snapshot Data”. “SecurityPreName” is deleted in the “Definition of Business Layer”
Jun 2016	1.01	1.01	"round lot buy of eligible HK stocks", "round lot sell of eligible HK stocks", "Odd lot buy of eligible HK stocks", "Odd lot sell of eligible HK stocks" are added in the Security Switch Type of the Real time Status of Security. Market Real time Status Info is added. Real time market data of eligible HK stocks (630) is added in the Snapshot Data Category. Eligible HK Stocks Real time Snapshot message is added.
Apr 2017	1.02	1.02	More types are added to “Type of Market Data Entry” in "Snapshot Data of Cash Auction", e.g. “weighted average price (9)”, “the rise/fall BP of the weighted average price (xj)”, “previous weighted average close price” (xk). Notes for Type of Market Data Entry are revised. Adding “Vendor Supplied System (VSS) should be able to support for adding a new Type of Market Data Entry, and may also ignore without any actions if VSS doesn’t care about the new Type of Market Data Entry.” Adding “Vendor Supplied System (VSS) should be able to support for adding a new

			switch type, and may also ignore without any actions if VSS doesn't care about the new switch type".
Jan 2019	1.03	1.02	Add two more switches in Table 4-10 （List of Security Switch Type), Options from ordinary to covered, & options from covered to ordinary.
Sep 2019	1.04	1.02	Add CNI Indices in Snapshot category.
Jan 2020	1.05	1.02	Add one more switch in Table 4-10: 34-Resale cancellation; Delete four switches: 18-Cancellation of conversion, 19-Cancellation of resale , 24-Split in real time, 25-Combined in real time.
April 2020	1.06	1.02	"After-hour-trading" renamed to "After-hour-trading Block Trade" ; Add "after-hour-trading" market data type; Add "after-hour-trading" snapshot message Add new value of switch type in real time security status : 35- Security lending; Add interface compatibility requirement.
Aug 2020	1.07	1.02	Add following MDEntryType during the opening stage of HK stocks: xr= price cap of buy order xs= price floor of buy order xt= price cap of sell order xu= price floor of sell order Real time data session supports both TCP and Multicast protocol.
Dec 2020	1.08	1.02	**(Revisions are all in red.)** Add new value "xi -- reference price" to Market Data Entry in Snapshot Data.

Note：

Please note that this English translation is for reference only and is not the official version issued by SZSE. In the event of any inconsistency or conflict between Chinese original version and English translation version, the terms and conditions contained in the official Chinese version shall prevail.

GLOSSARY

Abbreviation of Terms	Meanings
Market Data GateWay	Access point for vendors or brokers to connect to Shenzhen Stock Exchange market data system. Market Data GateWay(MDGW) has two types: ➢ On-the –spot Version, transferred by satellite, has no data re-transmission functions, ➢ Internet Version, transferred by leased line, has data re-transmission functions.
Vendor Supplied System	“VSS”, the server or system of Vendors/brokers allowed to access to Shenzhen Stock Exchange market data system.

CONTENTS

Interface Specification of BINARY Market Data Feed of Shenzhen Stock Exchange

1. INTRODUCTION

This document is provided to market participants like brokers, and information vendors to act as guidance for their development with BINARY protocol accessing to Shenzhen Stock Exchange (SZSE) 5th trading system for real-time market data. This specification document specifies contents of market data, necessary operation guidance, as well as data exchange format in details.

All the terms, message format and message streaming description in this document are consistent with the Interface Specification of STEP Market Data Feed, which could be mutual reference.

2. SESSION MANAGEMENT

SZSE Binary market data interface supports both TCP and Multicast session mechanism. TCP protocol can be used to the transmission of both real-time data and re-transmitting data. Multicast protocol is used only to the real-time data transmission. This specification document describes the session mechanism under TCP protocol. The session mechanism under multicast protocol is described in “Market Data Distribution Protocol of Shenzhen stock exchange”.

2.1. Connection

2.1.1. Communication version

This interface specification's Communication version is 1.02, this value should be filled into the DefaultApplVerID field of the Logon message. See "Fields definition of Session Layer" for detail.

2.1.2. Session

The accessing clients shall connect their system to Market Data GateWay (MDGW) via a session. This connection is a standard TCP/IP point-to-point connection.

2.1.3. IP address and Port

Market Data Gateway provides two service ports for Vendor Supplied System, one is real-time data port (9129 as default) the other is re-transmission port (9130 as default). Each port can only establish one TCP/IP connection. Only Internet Version Market Data GateWay provides re-transmission port.

2.1.4. Security

Market Data GateWay and Vendor Supplied System shall be in the same security network. The data transmitted between them is unencrypted, and the security of data transmission shall be ensured by the accessing clients.

2.1.5. Flow Control

There is a flow control mechanism between Market Data GateWay and Vendor Supplied System. If the Vendor Supplied System cannot process the data transmitted from the Market Data GateWay in time, which results that the to-be-sent messages accumulated at the Market Data GateWay exceed the setting threshold, the Market Data Gateway shall disconnect with the Vendor Supplied System immediately. After the disconnection, Vendor Supplied System shall attempt to re-connect to the Market Data GateWay again.

2.2. Session Management

2.2.1. Establishing a session

Vendor Supplied System can establish at most two sessions with the Market Data GateWay.

- Real-time market data session, to transmit real-time data
- Re-transmission session (provided by Internet Version Market Data GateWay), to re-transmit the missing data

Establishment Process of a Session:

1. Vendor Supplied System first establishes a TCP/IP connection to Market Data GateWay(MDGW), and then send out a Logon message to Market Data GateWay.

2 .If the Market Data GateWay verifies that the Vendor Supplied System is authorized to logon, the Market Data GateWay shall return a Logon message to Vendor Supplied System as a confirmation for logon message, indicating success of this session logon.

3. If the Vendor Supplied System’s logon verification fails, the Market Data GateWay shall return a Logout message to Vendor Supplied System, which indicates this session logon fails.

4. After the Vendor Supplied System sends out a Logon message, if the Market Data GateWay doesn’t reply in a reasonable time period, Vendor Supplied System may disconnect, and attempt for the next connection after a while.
5. If the Vendor Supplied System disconnects or receives the logout message from Market Data GateWay, it shall all attempt for the next connection after a while.

Real-time market data session and re-transmission session have the same session establishment process, but use different port.

2.2.2. Heartbeat Package and Testing Request

In order for Vendor Supplied System and Market Data GateWay are able to monitor the connection status at any time, they are required to send heartbeat package to each other at idle period. When one party hasn’t received the data package for a period longer than two times of the heartbeat interval , it is regarded that there is a breakdown in the data connection, the receiving party may disconnect.

When the Vendor Supplied System logs on to the Market Data GateWay, it shall appoint a heartbeat interval parameter (in seconds) in the logon message.

If the Market Data GateWay has no data to send to the Vendor Supplied System in one heartbeat interval, the Market Data GateWay shall send out one heartbeat message to the Vendor Supplied System, in order to ensure the time interval between two messages won’t exceed the designated heartbeat interval. Likewise, the Vendor Supplied System shall also send out a heartbeat message when necessary, in order to ensure time interval of the two successive messages received by the Market Data GateWay won’t exceed the heartbeat interval.

Vendor Supplied System can check the connection with Market Data GateWay using the similar checking mechanism.

2.2.3. Termination of a Session

Both the Vendor Supplied System and Market Data GateWay can send out Logout message to request a termination of session. The party who receives Logout message request will send out one Logout message to reply. The sending party shall terminate the connection after receiving logout message reply.

If the connection party doesn't reply in a reasonable time interval, it can terminate the connection.

2.2.4. Re-establishing a Session

If a session is terminated during a trading day, the Vendor Supplied System can re-establish a session through a logon message.

After the re-establishment, Vendor Supplied System shall obtain the missing data by the message restore mechanism of the applied layer. The message restore mechanism of the applied layer please refer to Section "**Re-transmitting Message**"

3. SERVICE DESCRIPTION

3.1. Market Data Types

The Market Data can be classified into several types in business contents. Each type is probably sent via one or multiple channels according to the data volume. Each Market Data GateWay can be configured to only accept market data from specific channels.

The channel code in each type shall be issued in the individual specification guidance.

Table 3-1 List of Market Data Issuance Channel

Type		Area of Channel Code	Content of Channels
Real time Market status		0001	Real time status message of a security (390013) Real time status message of the market (390019)
Announcement		0002	Announcement messages (390012)
SZSE Indices / statistics		0010	Snapshot message (309011, 309111)
CNI Indices		0011	Snapshot message (309011)
snapshot data in the Auction	Equities	101x	Snapshot message (300111)
	Funds	102x	
	Bonds	103x	
	Warrants	104x	
	Options	105x	
	Pledge-style Repo	106x	
Tick data in the Auction	Equities	201x	order tick message (300192) transaction tick message (300191)
	Funds	202x	
	Bonds	203x	
	Warrants	204x	
	Options	205x	
	Pledge-style Repo	206x	

Snapshot of After-hour-trading Block Trade	300x	Snapshot message (300611)
Snapshot of After-hour-trading	301x	Snapshot message (303711)
Tick data of comprehensive financial services	400x	order tick message (300592, 300792) transaction tick message (300591, 300791)
Real time data of eligible HK stocks	5001	Snapshot message (306311)

Note: 'x' in the table represents number from 0 to 9;

3.2. Reception of Snapshot Data

The snapshot data including Real-time Status of Security is issued at regular time, and cannot be re-transmitted.
Each snapshot channel may have multiple types of market data, each type has its own issuance frequency.

3.3. Reception of Tick Data

Tick data supports re-transmission. Each tick data message delivered by the Market Data GateWay contains the channel code and sequence number of this message. The message sequence number starts from 1 and increases by 1 in each channel. If the sequence number jumps more than 1, it means some tick data is missing, and the Vendor Supplied System can request for the missing data by sending a re-transmission message.

After sending out the tick data in each channel, Market Data GateWay shall send out a channel ending message.

There is an independent heartbeat message with no sequence number at each channel's idle period. If the Vendor Supplied System has not received any heartbeat message more than 2 heartbeat intervals, which probably indicates a breakdown with Market Data GateWay, Vendor Supplied System shall disconnect with the Market Data GateWay and attempt to re-connect.

3.4. Reception of Announcement Messages

The Market Data GateWay sends out announcement files via announcement messages. Each announcement file has a unique ID number.

For each new announcement file transmitted to the Market Data GateWay, it will be sent to the Vendor Supplied System via announcement messages by Market Data GateWay. For the possible missing announcement files before connecting with Market Data GateWay, Vendor Supplied System can request to re-transmit announcement summary first via re-transmission message. As the announcement summary contains ID numbers of all the issued announcements, Vendor Supplied System can request to re-transmit the missing announcement files one by one.

It is suggested that Vendor Supplied System request immediately to re-transmit announcement files after log on to the Market Data GateWay.

4. MESSAGE DEFINITION

4.1. Compatibility requirements

If VSS doesn’t care about the following new data, it shall be able to neglect them automatically without any upgrade.

1. Messages from new market data channels.
2. New application layer messages from MDGW.
3. New category of market data in snapshot data message or tick data message (MDStreamID, tag1500).

4. New fields added to the tail of the message from MDGW to VSS.
5. New type of market data entry in snapshot data message (MDEntryType, tag269).
6. New type of switch in real time status of security message (SecuritySwitchType, tag10203).

4.2. Message Structure

Each message is consist of message header, message body and message tail.

4.2.1. Message Header

A message header defines the type and body length of a message, transmitted unencryptedly.

Field Name	Description
MsgType	Type of a message
BodyLength	The length of a message body

4.2.2. Message Tail

A message tail defines the checksum of a message, transmitted unencryptedly. The calculation range of checksum starts from the message header (including the message header) to the message body.

Field Name	Description
Checksum	The checksum of a message

Below is the coding paragraph to compute a checksum.

```
uint32 GenerateCheckSum( char *buf, uint32 bufLen)
{
long idx;
uint 32 cks;
for( idx = 0L, cks=0; idx < bufLen; cks += (uint 32 )buf[ idx++ ] );
return （cks % 256 );
}
```

4.3. Message Management

4.3.1. Logon

Logon message is the first message sent out to Market Data GateWay by Vendor Supplied System. Vendor Supplied System sets up a connection with Market Data GateWay through a logon message, and Market Data GateWay confirms the Vendor Supplied System's logon success through a logon message.

Table 4-1 Definition of Logon

Field Name	Description
Standard Header	MsgType=1

SenderCompID	ID number of the sender
TargetCompID	ID number of the receiver
HeartBtInt	Interval of heartbeats, in seconds, provided to Market Data GateWay by Vendor Supplied System upon a logon.
Password	Pass word
DefaultApplVerID	Binary protocol version

4.3.2. Logout

When the connection request from Vendor Supplied System is not accepted by Market Data GateWay, the latter shall send the former a logout message to refuse the logon request. When necessary, Vendor Supplied System shall send out a logout message voluntarily to disconnect with Market Data GateWay.

Table 4-2 Definition of Logout

Field Name	Description
Standard Header	MsgType=2
SessionStatus	Session status at a logout. 0: active in session 1: session password has been changed. 2: session password shall be overdue. 3: the new session password is not consistent with the instructions. 4: session logout is complete. 5: illegal user name or password 6: user name is locked 7: logon is prohibited at the current time

	8: password is overdue 9: MsgSeqNum(34) received is too small. 10: NextExpectedMsgSeqNum(789) received is too large. 101: others 102: invalid message
Text	Text Further explanations of logout reasons.

4.3.3. Heartbeat

Heartbeat message can be used to check the TCP connection status between Market Data GateWay and Vendor Supplied System. Hence, when one party is at idle period of data sending, a Heartbeat message shall be sent regularly to check the healthiness of a connection.

Table 4-3 Definition of Heartbeat

Field Name	Description
Standard Header	MsgType=3; BodyLength=0

4.4. Common Message

4.4.1. Channel Heartbeat

Table 4-4　Definition of Channel Heartbeat of Market Data

Field Name	Description
Standard Header	Message Header MsgType=390095
ChannelNo	Channel code
AppLastSeqNum	Sequence number of the last market data message
EndOfChannel	Ending remark of channel

Note: The interval of channel heartbeat is 3 seconds.

4.4.2. Re-transmitting Message

Vendor Supplied System sends out re-transmission messages to Market Data GateWay, who returns the re-transmission data needed, as well as a re-transmission message to indicate completion after re-transmission or the failure reason if the re-transmission fails. Market Data GateWay realizes a data re-transmission by “request-answer”, so when receiving multiple re-transmission requests, Market Data GateWay shall handle the requests in the order in which they arrive.

For tick data, whether a message is lost is judged by the channel code and message sequence No. When the message sequence No. received <= the biggest message sequence No. received, it means that this message has been received and should be neglected. When the message sequence No. received ＞ the biggest message sequence No. received ＋ 1 (For example, if the biggest message sequence No. received = 10, the new message sequence No. = 12), it means that there is a message lost, and it should request the missing data through re-transmission.

For announcement files, whether it has any missing or change can be judged by checking announcement summary. If any data missed or changed, it should request the missing or changed announcement files through re-transmission.

Table 4-5　Definition of Re-transmitting Message

Field Name	Description
Standard Header	Message header MsgType=390094
ResendType	Category of Re-transmission 1=tick data 2=announcement message
ChannelNo	Channel code
AppleBegSeqNum	The starting sequence number Effective When ResendType=1, indicating the area of record number
ApplEndSeqNum	The ending sequence number When ResendType=1, indicating the area of record number When ApplEndSeqNum=0, Market Data GateWay will set ApplEndSeqNum value as the max value of this channel data record in the memory when receiving re-transmission request.
NewsID	unique mark of the announcement Effective when ResendType=2. Means requesting announcement summary when it is null.
ResendStatus	Re-transmitting status Only effective when the Market Data GateWay front-end processor returns to the Supplied Vendor System server. 1= finished 2=partly finished (part of requested data hasn't been returned yet) 3=no authority rights 4=data is not applicable
RejectText	Text

	Only effective when the Market Data GateWay front-end processor returns to the Supplied Vendor System server. If the request is rejected by Market Data GateWay front-end processor, the failure code shall be returned in this field.

4.4.3. Client User Information Reporting Message

Vendor Supplied System is liable to send the client user reporting message to Market Data GateWay front-end processor at regular time, reporting the user number connected to Vendor Supplied System at the current time. Only Vendor Supplied System of a vendor shall send this message.

Table 4-6 Definition of Client User Information Reporting Message

Field Name	Description
Standard Header	Message header MsgType=390093
OrigTime	Originated time of data
VersionCode	Code of version 01=on-the-spot version 02=internet version
UserNum	Number of users The number of client users connected to this Vendor Supplied System at the current time

4.4.4. Statistics of Snapshot Data Channel

Each snapshot channel shall send the statistic message of the snapshot channel.

Table 4-7 Definition of Statistics of Snapshot Data Channel

Field Name		Description
Standard Header		Message header MsgType=390090
OrigTime		Originated time of data
ChannelNo		Channel code
NoMDStreamID		Number of market data types
→	MDStreamID	Market Data Type
→	StockNum	Number of stocks
→	TradingPhaseCode	Closing status 0 digit: “T” means in the continuous auction (all securities haven’t closed) “E” means closed (all securities have been closed)

Note: The interval of Snapshot Data Channel Statistics is 15 seconds.

4.4.5. Business Reject Message (Business Reject)

A Business Reject Message is used to reject when an application layer message satisfies the session layer rules, but doesn’t satisfy the rules of business layer. This message is used to report on the wrong retransmitted message and client user information report message declared by the user.

Table 4-8 Definition of Business Reject Message

Field Name	Description
Standard Header	Message header MsgType=8
RefSeqNum	Sequence number of the rejected message
RefMsgType	Message type of the rejected message
BusinessRejectRefID	Business Layer ID of the rejected message
BusinessRejectReason	Reasons of rejection
BusinessRejectText	Explanation of rejection reasons

4.5. Real time Market Data

4.5.1. Real time Market Status

Field Name	Description
Standard Header	Message header MsgType=390019
OrigTime	Originated time of data
ChannelNo	Channel code
MarketID	Market code
MarketSegmentID	Market segment ID, reserved

TradingSessionID	Trading session ID
TradingSessionSubID	Trading session sub-ID
TradSesStatus	Trading session status, reserved
TradSesStartTime	Starting time of a trading session, reserved
TradSesEndTime	Ending time of a trading session, reserved
ThresholdAmount	Daily initial amount
PosAmt	Intraday remaining amount Fixed at 0.0000 when the amount is not available
AmountStatus	Status of the amount

Note:

1) The relationship among Market ID, Trading Session ID & Trading Session Sub-ID is as follow.

MarketID	TradingSessionID	TradingSessionSubID
XHKG=HK Connect	1=Day,	0=market close for the whole day 1=enter bid/offer price (opening call auctions period) 2=order matching (opening call auctions period) 3=continuous trading 4=order matching (closing call auctions period) 5=enter bid/offer price (closing call auctions period) 7=suspension 100=market not open 101=before order matching (opening call auctions period) 102=Exchange Intervention 103=market close 104=bid/offer cancelled 105=fixed at a reference price (closing call auctions

		period) 106=irrevocable(closing call auctions period) 107=random closing(closing call auctions period)

2) Market Real time Status Message is released every 3 seconds.

4.5.2. Real time status of security

Table 4-9 Definition of Real time Status of Security Message

Field Name		Description
Standard Header		Message header MsgType=390013
OrigTime		Originated time of data
ChannelNo		Channel code
SecurityID		Security code
SecurityIDSource		Source of a security code
FinancialStatus		security status
NoSwitch		Number of switch
→	SecuritySwitchType	Type of switch
→	SecuritySwitchStatus	Status of security switch

Notes:

1) notes of Security Switch Type

Table 4-10 List of Security Switch Type

Type of Switch	Type Code	Remarks
Margin buy	1	Applicable to the underlying security of margin buy
Short sell	2	Applicable to the underlying security of short selling
Fund Subscription	3	Applicable to ETF, LOF and other open-ended funds Cash subscription for gold ETFs
Fund Redemption	4	Applicable to ETF, LOF and other open-ended funds Cash redemption for gold ETFs
Issue Subscription	5	Applicable to subscription code for online issuance
Conversion	6	Applicable to convertible bonds, preferred stocks in conversion resale; and exchangeable private bonds, exchangeable corporate bonds in exchange period
Resale	7	Applicable to enterprise bonds, corporate bonds, convertible bonds, private bonds, exchangeable private bonds, subordinated debts, ABS, preferred stocks, security firm short-term bonds, and exchangeable corporate bonds in conversion resale
Warrant exercise	8	Applicable to warrant or options in exercise period
Buy open	10	Applicable to derivatives like options
Sell open	11	Applicable to derivatives like options
Subscription of gold ETF in physical	12	Applicable to gold ETF
Redemption of gold ETF in physical	13	Applicable to gold ETF
Pre-accepted tender offer	14	Applicable to equities in tender offer
Cancellation of tender offer	15	Applicable to equities in tender offer
Pledge	20	Applicable to Pledge-style Repo securities
Release of pledge	21	Applicable to Pledge-style Repo securities
Voting rights	22	Applicable to preferred stocks
Equity pledge-style Repo	23	Applicable to securities allowed for equity pledge-style repo business

Covered openning	26	Applicable to derivatives like options
market-maker quotation	27	Applicable to securities supported for market-maker quotation, like options
round lot buy of eligible HK stocks	28	Applicable to southbound eligible stocks under HK Stock Connect
round lot sell of eligible HK stocks	29	Applicable to southbound eligible stocks under HK Stock Connect
Odd lot buy of eligible HK stocks	30	Applicable to southbound eligible stocks under HK Stock Connect
Odd lot sell of eligible HK stocks	31	Applicable to southbound eligible stocks under HK Stock Connect
Options from ordinary to covered	32	Applicable to options transferring from ordinary to covered.
Options from covered to ordinary	33	Applicable to options transferring from covered to ordinary.
Resale cancellation	34	Applicable to enterprise bonds, corporate bonds, private bonds, exchangeable private bonds, subordinated debts, ABS, security firm short-term bonds, and exchangeable corporate bonds in resale cancellation period.
Securities lending	35	Applicable to contractual order or non-contractual order of securities lending or borrowing.

2) The internal of Real-time Status of Security is 15 seconds.

4.5.3. Announcements

Table 4-11 Definition of Announcements

Field Name	Description
Standard Header	Message header MsgType=390012
OrigTime	Issuance time of announcements

ChannelNo	Channel code
NewsID	Unique mark; Empty strings indicate announcement summary, which will be sent repeatedly. Whether an announcement has any missing or revision can also be told by an announcement summary.
Headline	Announcement title
RawDataFormat	format of binary data
RawDataLength	Length of binary data
RawData	Binary data

Announcement Summaries

Announcement summary is an aggregate list of the current announcement files in text format.

Table 4-12 Definition of Announcement Summaries

Number of Announcement	BulletNum	Data type: Integer
Identity of Announcement	ID1	Data type: refer to NewsID
Name of Announcement	NAME1	Data type: refer to Headline
Size of Announcement	SIZE1	Data type: refer to RawDataLength
Time of Announcement	TIME1	Data type: refer to OrigTime
…	…	…

Below is a simple sample of the content in RawData:

BulletNum=2

ID1=SZGG0001

NAME1=中小企业板交易公开信息

SIZE1=100245
TIME1=20071022-09:15:01
ID2=SZGG0002
NAME2=深圳证券市场权证交易公开信息
SIZE2=25076

4.5.4. Snapshot Data

Table 4-13 Definition of Snapshot Data

Field Name	Description
Standard Header	Message header MsgType=3xxx11
OrigTime	Originated time of data
ChannelNo	Channel Code
MDStreamID	Category of market data
SecurityID	Security code
SecurityIDSource	Source of security code
TradingPhaseCode	Trading phase code of the product: 0 st digit: S=starting (before market open) O=open call auction T=continuous auction B=trading break

	C=close call auction E=market closed H=Temporary Suspension A= After-hour-trading V=break for volatility 1st digit: 0=normal status 1=suspended for a whole day
PrevClosePx	Previous close price
NumTrades	Number of trades
TotalVolumeTrade	Total volume of trades
TotalValueTrade	Total value of trades
Extend Fields	Extended fields for various business

Notes:

1) This message is applicable to the below market data category.

Table 4-13-0 List of Snapshot Data Category

Category of Market Data MDStreamID	Description	Type of Message	Extended Fields (Yes or No)
010	(equities, funds, bonds) snapshot data of cash auction	300111	Y
020	snapshot data of pledge		
030	snapshot data of bond distribution		
040	snapshot data of option auction		
060	After-hour-trading block trade snapshot data with close price	300611	Y

061	After-hour-trading block trade snapshot data with VWAP (Volume Weighted Average Price)		
370	Snapshot of after-hour-trading	303711	Y
630	Real time market data of eligible HK stocks	306311	Y
900	index	309011	Y
910	statistic indicators	309111	Y
920	CNI Indices Snapshot data	309011	Y

4.5.4.1. Extended Fields of Snapshot Data of Cash Auction (300111)

Table 4-13-1 Definition of Extended Fields of Snapshot Data of Cash Auction

Field Name		Description
NoMDEntries		Number of market data entries
→	MDEntryType	Type of Market Data Entries: 0=buy 1=sell 2=latest price 4=open price 7=highest price 8=lowest price 9=weighted average price X1=fluctuation 1 X2=fluctuation 2 X3= buy statistics(Volume and Weighted Average Price)

		X4= sell statistics (Volume and Weighted Average Price) X5= PE ratio 1 X6=PE ratio 2 X7=fund NAV at T-1 X8=real-time NAV of funds（including 10PV of ETF） X9=warrants premium rate Xe=up price limit, Xf=down price limit, Xg= position quantity xi = reference price Xj=the rise/fall BP of the weighted average price Xk= previous weighted average close price
→	MDEntryPx	price
→	MDEntrySize	quantity
→	MDPriceLevel	level of a bid/offer in order book
→	NumberOfOrders	Number of total orders on this price level “0” indicates doesn’t show
→	NoOrders	Number of orders disclosed at this price level “0” indicates doesn’t show
→	→ OrderQty	Quantity of orders

Notes:

1) Market Data Entry for various businesses is listed as below.

Type of Market Data	Cash market call	Pledged repurchase	Bond Distribution	Options call auctions

Entry	auctions(010)	(020)	(030)	(040)
0	●	●	●	●
1	●	●	●	●
2	●	●	●	●
4	●	●	●	●
7	●	●	●	●
8	●	●	●	●
9		●		
X1	●	●	●	●
X2	●	●	●	●
X3	●	●	●	●
X4	●	●	●	●
X5	●			
X6				
X7	●			
X8	●			
X9	●			
Xe	●	●	●	●
Xf	●	●	●	●
Xg				●
xi				●
Xj		●		
xk		●		

2) notes for Type of Market Data Entry

Type of Market Data Entry	Notes
0, 1	Market Data Entry is buy (0), sell (1), where MDEntryPx shows the price, MDEntrySize shows the quantity of orders, MDPriceLevel shows the priority of level, numbered in sequence from 1. A smaller number shows a higher priority (Level 1 data discloses 5 levels at most, and Level 2 data discloses 10 levels at most). NumberOfOrders shows number of total orders on this level. Repeated pairs of NoOrders, OrderQty show the order details at this level (For Level 1 data, not available. For Level 2 data, the first 50 orders at most are disclosed.)
2	MDEntryPx shows the latest execution price, no meaning for other fields. If a security doesn’t have an execution, this entry will not be released.
4	MDEntryPx shows the opening execution price, no meaning for other fields. If a security doesn’t have an execution, this entry will not be released.
7	MDEntryPx shows the highest price, no meaning for other fields. If a security doesn’t have an execution, this entry will not be released.
8	MDEntryPx shows the lowest price, no meaning for other fields. If a security doesn’t have an execution, this entry will not be released.
9	MDEntryPx shows the weighted average interest rate on the real-time quantity of pledged repurchase, accurate to 5 decimal places. If a security doesn’t have an execution, this entry will not be released. This entry is only for the pledged repurchase business.
X1	MDEntryPx shows fluctuation 1, no meaning for other fields. Fluctuation 1 equals the latest price minus the previous close price. If a security doesn’t have an execution, this entry will not be released.
X2	MDEntryPx shows fluctuation 2, no meaning for other fields. Fluctuation 2 equals the latest price minus the last latest price. If an open price is available, Fluctuation 2 equals the latest price minus the previous close price. If a security doesn’t have an execution, this entry will not be released.

X3, x4	This entry is the aggregate total order of buy (x3), sell (x4) within the effective auctions range in the order book, where MDEntryPx shows the weighted average price of order quantity, MDEntrySize shows the total quantity of orders, no meaning for other fields.
X5	MDEntryPx shows PE ratio 1, no meaning for other fields. This entry is only released for equities.
X6	MDEntryPx shows PE ratio 2, no meaning for other fields. This entry is for reservation and not released currently.
X7	MDEntryPx shows NAV of funds, no meaning for other fields. NAV is generally at T-1. For some funds (overseas market invested funds), it may show NAV at T-x (x > =1, e.g. funds invested in the US market, x=2). This entry is only released for funds.
X8	MDEntryPx shows the real-time NAV of funds (including 10PV of ETF), no meaning for other fields. This entry is only released for funds.
X9	MDEntryPx shows the warrants premium rate, no meaning for other fields. This entry is only released for warrants.
Xe	MDEntryPx shows the up price limit, no meaning for other fields. 999999999.9999 indicates no limit for rise-limit price.
Xf	MDEntryPx shows the down price limit, no meaning for other fields. For securities whose prices could be negative, -999999999.9999 indicates no limit for fall-limit price; while for securities whose prices could not be negative, this field represents price tick which indicates no limit for fall-limit price. For instance, here stays 0.01 for stock cash auctions.
Xg	MDEntrySize shows the position quantity of an option contract, no meaning for other fields.
xi	MDEntrySize shows the circuit breaker reference price of option aution, no meaning for other fields.
Xj	MDEntryPx shows the rise/fall BP of the weighted average price, no meaning for other fields. The rise/fall BP of the weighted average price equals to the difference of the weighted average interest rate on the real-time quantity minus previous closing weighted average interest rate times 100, rounding to digits.

	This entry is only released for pledged repurchase. If a security doesn’t have an execution, this entry will not be released.
Xk	MDEntryPx shows the previous closing weighted average interest rate of a pledged repurchase, no meaning for other fields. This entry is only released for pledged repurchase.

3) Virtual matched price in the call auction are showed in bid/offer price level, where buy 1 and sell 1 show virtual matched price and quantity, buy 2/sell 2 shows the bid left quantity /offer left quantity at this virtual matched price. Suppose the virtual matched price is 15.4000, matched quantity is 3200, bid left quantity is 1200, then the following Market Data Entry shall show in the snapshot.

MDEntryType	MDEntryPx	MDEntrySize	MDPriceLevel
0	15.4000	3200.00	1
1	15.4000	3200.00	1
0	0.0000	1200.00	2

4.5.4.2. Extended Fields of Snapshot Data of After-hour-trading block trade (300611)

Table 4-13-2 Definition of Extended Fields of Snapshot Data of After-hour-trading block trade

Field Name		Description
NoMDEntries		Number of market data entries
→	MDEntryType	Type of Market Data Entries: 0=buy 1=sell

→	MDEntryPx	price
→	MDEntrySize	quantity

4.5.4.3. Index Snapshot Extended Fields (309011)

Table 4-13-3 Definition of Index Snapshot Extended Fields

Field Name		Description
NoMDEntries		Number of market data entries
→	MDEntryType	Type of Market Data Entries: 3=current index Xa=previous close index Xb=open index Xc=max index Xd=min index xl = close index xm = close index 2 (reserved) xn = close index 3 (reserved)
→	MDEntryPx	Index price

4.5.4.4. Statistic Indicator Snapshot Extended Fields (309111)

Table 4-13-3 Definition of Statistic Indicator Snapshot Extended Fields

Field Name	Description
StockNum	Number of stock samples

4.5.4.5. Eligible HK Stocks Real time Snapshot Extended Fields (306311)

Field Name		Description
NoMDEntries		Number of market data entries
→	MDEntryType	Type of Market Data Entries: 0=buy 1=sell 2=latest price 7=highest price 8=lowest price xe=up limit price xf=down limit price xh=nominal price (should be closing price after market close) xi=reference price xr = price cap of buy order xs= price floor of buy order xt= price cap of sell order xu= price floor of sell order
→	MDEntryPx	price
→	MDEntrySize	Quantity

→	MDPriceLevel	Buy or sell level
NoComplexEventTimes		Number of cooling-off periods of VCM 0 or 1 1 means it's in the cooling-off period of VCM, next is the starting and ending time of the cooling-off period.
→	ComplexEventStartTime	Starting time of the cooling-off period
→	ComplexEventEndTime	Ending time of the cooling-off period

1) notes for Type of Market Data Entry

Type of Market Data Entry	**Notes**
0, 1, 2, 7, 8	The same with the notes for type of market data entry of 300111.
xe	MDEntryPx shows the up price limit, no meaning for other fields. 999999999.9999 indicates no limit for rise-limit price. It represents the up price limit of cooling-off period when in a cooling-off period. It represents the up price limit of closing auction when in a closing auction period.
xf	MDEntryPx shows the down price limit, no meaning for other fields. For securities whose prices could be negative, -999999999.9999 indicates no limit for fall-limit price; while for securities whose prices could not be negative, this field represents price tick which indicates no limit for fall-limit price. For instance, here stays 0.01 for stock cash auctions. It represents the down price limit of cooling-off period when in a cooling-off period, represents the down price limit of closing auction when in a closing auction period
xh	MDEntryPx shows the nominal price, no meaning for other fields.
xi	MDEntryPx shows the reference price, no meaning for other fields. It represents the reference price when in a cooling-off period. It represents the reference price of closing auction when in a closing auction period, it represents the reference price of opening auction when in opening auction period.
xr	MDEntryPx shows the price cap of buy order, no meaning for other fields.

	For HK eligible stocks, it represents the price cap of buy order of opening auction when in opening auction period.
xs	MDEntryPx shows the price floor of buy order, no meaning for other fields. For HK eligible stocks, it represents the price floor of buy order of opening auction when in opening auction period.
xt	MDEntryPx shows the price cap of sell order, no meaning for other fields. For HK eligible stocks, it represents the price cap of sell order of opening auction when in opening auction period.
xu	MDEntryPx shows the price floor of sell order, no meaning for other fields. For HK eligible stocks, it represents the price floor of sell order of opening auction when in opening auction period.

2) Virtual matched price in the call auction are showed in bid/offer price level, same with the way of 300111.

4.5.4.6. After-hour-trading snapshot Extended Fields (303711)

Table 4-13-2 Definition of After-hour-trading snapshot Extended Fields

Field Name		Description
NoMDEntries		Number of market data entries
→	MDEntryType	Type of Market Data Entries: 0=buy 1=sell
→	MDEntryPx	price
→	MDEntrySize	Quantity

4.5.5. Order Tick Data

Table 4-14 Definition of Order Tick Data

Field Name	Description
Standard Header	Message header MsgType=30xx92
ChannelNo	Channel Code
ApplSeqNum	Message sequence number Starting from 1
MDStreamID	Category of market data
SecurityID	Security code
SecurityIDSource	Source of security code
Price	Order price
OrderQty	Order quantity
Side	Side of buy or sell 1: buy 2: sell G: borrow F: lend
TransacTime	Time of order
Extend Fields	Extended fields for various business

Notes: This message is applicable to the below market data category.

Table 4-14-0 List of Order Tick Data Category

Category of Market Data MDStreamID	Description	Type of Message	Extended Fields (Yes or No)
011	(equities, funds, bonds) tick data in call auction of spot market	300192	Y
021	tick data of pledge-style repo		
041	tick data of call auction in options		
051	tick data of indication of interest of negotiable trade	300592	Y
052	tick data of quote of negotiable trade		
071	tick data of security lending	300792	Y

4.5.5.1. Order Tick Data Extended Fields in Call Auction (300192)

Table 4-14-1 Definition of Order Tick Data Extended Fields in Call Auction

Field Name	Description
OrdType	Type of order 1: market price 2: limit price U: Same-side Best Price

4.5.5.2. Extended Fields for Order Tick of Negotiable Trade (300592)

Table 4-14-2 Definition of Extended Fields for Order Tick of Negotiable Trade

Field Name	Description
ConfirmID	Confirmed ID of a quote When ConfirmID is null, here means an indication of interest Otherwise it means a quote.
Contactor	Contact person
ContactInfo	Contact information

4.5.5.3. Extended Fields for Order Tick of Security Lending (300792)

Table 4-14-3 Definition of Extended Fields for Order Tick of Security Lending

Field Name	Description
ExpirationDays	term, in days
ExpirationType	Type of term 1=fixed term

4.5.6. Transaction Tick Data

Table 4-15 Defintiion of Transaction Tick Data

Field Name	Description

Standard Header	Message header MsgType=30xx91
ChannelNo	Channel Code
ApplSeqNum	Message sequence number Starting from 1
MDStreamID	Category of market data
BidApplSeqNum	Index of buy order Starting from 1, o stands for no related orders
OfferApplSeqNum	Index of sell order Starting from 1, 0 stands for no related orders
SecurityID	Security code
SecurityIDSource	Source of security code
LastPx	Order price
LastQty	Order volume
ExecTrype	Type of Execution 4=Cancelled F=Trade
TransacTime	Time of order
Extend Fields	Extended fields for various business

Notes: This message is applicable to the below market data category.

Table 4-16 List of Transaction Tick Data Category

Category of Market Data MDStreamID	Description	Type of Message	Extended Fields (Yes or

			No)
011	(equities, funds, bonds) tick data in call auction of spot market	300191	N
021	tick data of pledge-style repo		
041	tick data of call auction in options		
051	tick data of indication of interest of negotiable trade	300591	N
052	tick data of quote of negotiable trade		
071	tick data of security lending	300791	N

The sequence number of tick order and tick transaction data in the same channel is consecutive.

5. DATA DICTIONARY

All the fields of integer type in this Interface Specification use BIG-ENDIAN encoding.

5.1. Type of Data

Table 5-1 Definition of Data Type

Type of Data	Type of Binary	Notes
CompID	Char[20]	ID number of the sender or receiver
Price	Int64	Price, N13(4)
Qty	Int64	Quantity, N15(2)

Amt	Int64	Amount, N18(4)
SeqNum	Int64	Sequence number
Boolean	uInt16	1=True / Yes, 0=False / No
Length	uInt32	Length Means the length of data in byte, positive number
LocalTimeStamp	Int64	Stamp of local time YYYYMMDD-HH:MM:SS.sss YYYY=0000-9999, MM=01-12, DD=01-31, HH=00-23, MM=00-59, SS=00-60 (seconds), sss=000-999 (milliseconds)
NumLnGroup	uInt32	Repeated number Means the number of repeated group, positive number
LocalMktDate	uInt32	Date of local market Format: YYYYMMDD, YYYY=0000-9999, MM=01-12, DD=01-31
SecurityID	Char[8]	Security code

Notes:

1) Nx(y) stands for floating numbers, ‘x’ stands for the total digit number of integer and decimal, not including the decimal point. ‘y’ stands for the digit number of decimal. For instance, for ‘Price’ type data, the value of Int64 “186400” means the price is 18.6400.

2) Char[x] stands for character string where x represents the max number of bytes. Unless especial statement, all character string can include numbers, capital letters, lower case letters and spaces. Spaces should be added when the actual length of character string is shorter than the max length. Character strings all uses UTF-8 encoding.

5.2. Fields Definition of Session Layer

Table 5-2　Definition of Session Layer

Field Name	Type	Notes
BodyLength	uInt32	Length of body
MsgType	uInt32	Type of message
Checksum	uInt32	Check sum
SenderCompID	CompID	ID number of sender
TargetCompID	CompID	ID number of targeter
Password	Char[16]	Password
Text	Char[200]	Text message Could include Chinese characters, means 200 bytes at maximum
HeartBtInt	Int32	Time interval of heartbeats Default value, in seconds
DefaultApplVerID	Char[32]	Communication protocol version, Should be “n.xy”. For instance, when the communication version is 1.01, this field value should be 1.01.
SessionStatus	Int32	Session status

5.3. Fields Definition of Business Layer

Table 5-3 Definition of Business Layer

Field Name	FAST Type	Notes
AmountsStatus	char	Status of amounts 1=amounts cannot be used 2=amounts can be used
ApplBegSeqNum	SeqNum	Starting sequence number
ApplEndSeqNum	SeqNum	Ending sequence number
ApplLastSeqNum	SeqNum	Record number of the last market data message
ApplSeqNum	SeqNum	Sequence number
BidApplSeqNum	SeqNum	Index of buy order
BusinessRejectReason	uInt16	Reasons of rejection
BusinessRejectRefID	Char[10]	Business Layer ID of the rejected message
BusinessRejectText	Char[50]	Explanation of rejection reasons Could include Chinese characters, means 50 bytes at maximum
ChannelNo	uInt16	Channel code
ComplexEventStartTim e	LocalTimestamp	Starting time of the cooling-off period
ComplexEventEndTime	LocalTimestamp	Ending time of the cooling-off period
ConfirmID	Char[8]	confirmed ID of a quote
ContactInfo	Char[30]	Contact information Could include Chinese characters, means 30

		bytes at maximum
Contactor	Char[12]	Contact person Could include Chinese characters, means 12 bytes at maximum
EndOfChannel	Boolean	Ending mark of channel
ExecType	Char	Type of execution 4=cancelled F=traded
ExpirationDays	uInt16	Expiration, day in unit
Expiration Type	uInt8	Type of expiration
FinancialStatus	C8	Security status A=listed companies morning disclosure B= listed companies afternoon disclosure Each byte displays one status, can display 8 status concurrently at most
FixedPriceType	uInt8	Type of fixed price, for after-hour-trading
Headline	char[128]	Headline of announcement Could include Chinese characters, means 128 bytes at maximum
LastPx	Price	Transaction price
LastQty	Qty	Transaction volume
MarketID	Char[8]	Market code XHKG=HK connect
MarketSegmentID	Char[8]	Code of market segment
MDEntryPx	Int64	Price, N18(6)
MDEntrySize	Qty	Quantity

MDEntryType	Char[2]	Type of market data entries
MDPriceLevel	uInt16	level of a bid/offer in order book
MDStreamID	Char[3]	Market data type
NewsID	Char[8]	Index of announcements / value-added information
NoComplexEventTimes	NumInGroup	Number of cooling-off periods of VCM
NoMDEntries	NumInGroup	Number of market data entries
NoMDStreamID	NumInGroup	Number of market data types
NoOrders	NumInGroup	Number of orders disclosed at this price level
NoSwitch	NumInGroup	Number of switches
NumberOfOrders	Int64	Number of total orders at this price level
NumTrades	Int64	Number of trades
OfferApplSeqNum	SeqNum	Index of sell order
OrderQty	Qty	Number of orders
OrdType	char	Type of orders 1: market price 2: limit price U: best price of this party
OrigTime	LocalTimestamp	Time of origination
PosAmt	Amt	Remaining amount of intraday
PrevClosePx	Price	Previous closing price
Price	Price	Price of orders
RawData	Char[n]	Lengthened Binary data
RawDataFormat	Char[8]	Format of Binary data, such as TXT, PDF, DOC etc.
RawDataLength	Length	Length of binary data

RefMsgType	uInt32	type of rejected message
RefSeqNum	SeqNum	Sequence number of reference
Reject Text	Char[16]	Explanation for reject reasons Could include Chinese characters, means 16 bytes at maximum
ResendStatus	uInt8	Status of re-transmitting
ResendType	uInt8	Type of re- transmitting
SecurityID	SecurityID	Security code
SecurityIDSource	Char[4]	Source of security code 102=Shenzhen Stock Exchange 103=Hong Kong Exchange
SecurityPreName	Char[4]	Prename of security
SecuritySwitchStatus	Boolean	Status of switch
SecuritySwitchType	uInt16	Type of switches
Side	char	Side of buy or sell 1: buy 2: sell G: borrow F: lend
StockNum	uInt32	Number of stocks
TemplateID	uInt16	Template ID
ThredholdAmount	Amt	Initial amount of each day
TotalValueTrade	Amt	Total value of trades
TotalVolumeTrade	Qty	Total volume of trades
TradingPhaseCode	Char[8]	Trading phase code of this product
TradingSessionID	Char[4]	ID of trading session

		1=intra-day
TradingSessionSubID	Char[4]	Sub-ID of trading session
TradSesEndTime	LocalTimeStamp	Ending time of trading session
TradSesStartTime	LocalTimeStamp	Starting time of trading session
TradSesStatus	uInt16	Status of trading session
TransacTime	LocalTimestamp	Time of orders
UserNum	uInt16	Number of users
VersionCode	Char[16]	Version code

THE END