Interface Specifications
HKEX Orion Central Gateway – Securities Market (OCG-C)

Binary Drop Copy Protocol

Version 3.~~1~~2
~~23 September 2021~~19 July 2023

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1.   Document Control

1.1   Change History

Version Number	Issue Date	Section Number	Status
1.0	31 October 2012	All	First Version
1.1	21 December 2012	▪ 3.7 – Password Policy ▪ 6.6 – Board-Lot Order Handling ▪ 7.1 – Message Types ▪ 7.6.1 – Lookup Request ▪ 7.6.2 – Lookup Response ▪ 7.7.1 – Logon ▪ 7.7.2 – Logout ▪ 7.8 – Execution Reports ○ bit position of Copy Message Indicator updated ▪ 7.8.3 – Execution Report – Order Cancelled (Unsolicited) ▪ 7.8.7 – Board Lot and Odd Lot Trade Cancel (Executed Trade Cancelled) ▪ 7.9.1 – Trade Accepted ▪ 7.9.2 – Trade Cancelled ▪ 8 – Data Dictionary ▪ Appendix A – Password Policy	Revised Version
1.2	25 March 2013	▪ 3.5 – Encryption ▪ 7 – Message Definitions ▪ 8 – Data Dictionary	Minor Revisions
1.3	28 June 2013	▪ 3.7 – Change Password ▪ 5.3 – Logon Message Processing – Next Expected Message Sequence ▪ 6.1 – Data Types ▪ 6.8 – Odd Lot Order Handling ▪ 7.6.2 - Lookup Response (8) ▪ 7.8.6 – Auto-matched Trade (Order Executed) ○ Inclusion of Trade Match ID ▪ 7.8.7 - Auto-matched Trade Cancel (Executed Trade Cancelled) ▪ 7.10 – Business Messages – Semi-Automatic Odd/Special Lot Trade (21) ▪ 7.11.1 – Business Message Reject (9) ▪ 8.2 – Body Fields	Revised Version
1.4	2 December 2013	Clarification of message fields and message handling: ▪ Section 3.5 – Encryption ▪ Section 6 – Service Description ▪ Section 7 – Message Definitions ▪ Section 8 – Data Dictionary	Revised Version

1.5	20 June 2014	6.8 – Odd lot/Special lot Order Handling 6.13 – Cancelled Semi-Auto Matched Trades 7.8.8 – Trade (Odd lot/Special lot Order Executed) 7.8.9 – Trade (Semi-auto-matched Trade Cancelled) 7.10 – Business Messages - Semi-Auto Matched Trade	Revised Version
1.6	23 July 2015	Update (description only) for AMS Volatility Control Mechanism (VCM): 7.8.3 – Order Cancelled – Unsolicited 8.2 – Body Fields	Revised Version
2.0	12 January 2017	Update for OTP-C	Revised Version
2.1	12 July 2017	Section 7.8.3 Order Cancelled – Unsolicited Keep same message format as for AMS (no Reason field - Bit Position 20)	Revised Version
2.2	29 June 2018	6.16 Session Contents Update for the obsolescence of terminal and OG devices.	Revised Version
3.0	28 December 2020	Update for CMG migration: - Global terminology change of OCG to CMG - Support RSA Padding scheme OAEP for password encryption in the Logon message	Revised Version
3.0	11 February 2021	Update for Section 4.6 Fault Tolerance	Revised Version
3.1	13 August 2021	- Provide Aggressive/Passive Indicator for auto-matched trades - Increase the transaction time precision to microsecond	Revised Version
3.1	23 September 2021	Change the name CMG to OCG-C	Revised Version
3.2	19 July 2023	Add Self-matching Prevention (SMP) functionality	Revised Version

2.   Introduction

This document describes the binary drop copy interface of the HKEX Orion Central Gateway - Securities Market ("OCG-C"). The OCG-C application here provides an application level interface to HKEX securities trading system ("OTP-C") for drop copy purpose.

The terminology used, message format, message flow and event model described throughout this document are similar to that of FIX 5.0 SP2 protocol specifications, where applicable, with some specific and explicit changes for performance and adaptability reasons.

3. Connectivity

3.1 Session

Exchange Participants connect their broker supplied systems ("BSS" or "Client") to the OCG-C via subscription to one or more OCG-C "Session". This connection is a standard TCP/IP point-to-point connection.

EPs are expected to pre-register at least one IP address using which a client from their end would establish a OCG-C drop copy session. For backup purposes, EPs can optionally pre-register up to 3 additional IP addresses for each Session.

A session can be established from only one of the pre-registered IP addresses for that session. EPs can pre-register any given IP address for more than one session such that the same BSS can be used to connect to OCG-C through one or more sessions.

3.2 Comp ID

The client should use the Comp ID (a unique session identifier) provided by HKEX in order to connect to the OCG-C. A single client may have multiple connections to the OCG-C (i.e. multiple Binary sessions, each with its own Comp ID).

The messages sent to the OCG-C should contain the Comp ID assigned to the client in the field Comp ID in the header section.

3.3 IP Address and Port Numbers

A client that wishes to connect to the OCG-C will first connect to the Lookup Service by using one of the four (4) Lookup Service IP-port pairs published by HKEX. Two of these connection points represent the primary site Lookup Service and the other two represent the backup site Lookup Service

HKEX will provide these four (4) IP address and Port number pairs through a separate medium.

3.4 Lookup Service

The client connecting to the OCG-C via the binary protocol must first connect to a predefined Lookup Service and request for a connection point (an IP address and port) to the binary trading gateway.

The client should attempt the lookup service connections in the following order:

- Primary site primary Lookup Service
- Primary site mirror Lookup Service
- Backup site primary Lookup Service
- Backup site mirror Lookup Service
- Cycle back to primary site primary Lookup Service

The backup site lookup services will not be open unless there is a failover.

The client can request for the lookup service via the Lookup Request message by specifying the Type of Service and the Protocol Type the client wish to connect to.

The Lookup Service will respond to a Lookup Request with a Lookup Response. If the Lookup Request accepted, the OCG-C will deliver two IP address & Port pairs (one for the primary

and one for the mirror) of OCG-C drop copy service to the client via the Lookup Response. The client is expected to always attempt the primary service first.

In the case where the Lookup Request is rejected, the OCG-C will reply with a Lookup Response with Lookup Status set to Rejected (1). The reason for rejection of the Lookup Request will be reflected in the Lookup Reject Code field.

If lookup service can't be reached for reasons or the service rejects the request, client should observe a delay of **5 seconds** before re-attempting.

3.5   Encryption

The binary protocol expects Password and New Password be encrypted when they are sent in the Logon message from the client to the OCG-C.

To encrypt the password, the client is expected to use a 2048-bit RSA (http://en.wikipedia.org/wiki/RSA_(algorithm)) public key circulated (through a different medium) by HKEX. The binary output of the RSA encryption must be represented in Big Endian (Padding scheme is PKCS #1 or OAEP) and then converted to an alphanumeric value by means of standard base-64 encoding (http://en.wikipedia.org/wiki/Base64) when communicating to the OCG-C.

HKEX may periodically renew the public key used by the client and after a public key renewal; the client may continue to use the old key for a limited grace period. Both keys may be used during this time.

3.6   Password

The client should specify a password in the password field of the Logon message. This password must be in encrypted form. For security reasons, the client is expected to prefix the login time, in UTC format (YYYYMMDDHHMMSS), to the password before encryption. The client must ensure that login time is in accurate UTC. The OCG-C will extract the login time prefix from the decrypted password string and validate that it is within the configured tolerance of the actual current time. Logon requests that's fails this validation are rejected by the OCG-C.

The status of the password (i.e. whether it is accepted or rejected) will be specified in the Session Status field of the Logon sent by the OCG-C to confirm the establishment of a binary connection.

Repeated failures in password validation may force HKEX to lock the client; the EP is expected to contact HKEX to unlock the client and reset the password.

3.7   Change Password

Each new Comp ID will be assigned a password on registration. The client is expected to change the password upon first logon whenever a password is (re)issued by HKEX.

Password change request can be made together with a Logon request. The client should specify the encrypted new password in the New Password field and the current encrypted password in the Password field.

The new password must comply with HKEX password policy (refer to **Appendix A**). The status of the new password (i.e. whether it is accepted or rejected) will be specified in the Session Status field of the Logon sent by the OCG-C to confirm the establishment of a binary connection. The new password will, if accepted, be effective for subsequent logins.

The client is required to change the password periodically. HKEX will set expiry duration for the password without exemption; a reminder will be sent indicating that the password is to about to expire, through the Text field in the Logon response. Once the password has

expired for a client, that client will not be allowed to logon, and the EP is required to contact HKEX to unlock and reset the client password.

3.8 Failure and Recovery

The system has been designed with fault tolerance and disaster recovery technology that ensures that trading should continue in the unlikely event of a process or gateway outage.

If the client is unexpectedly disconnected from the Primary OCG-C, it should attempt to re-connect to the Primary OCG-C before attempting to connect to the Secondary OCG-C. Even after these attempts if a connection can't be established, the client then should make use of Lookup Service to determine the connection points once again.

4. Binary Session

4.1 Establishing a Binary Session

Each client will use the assigned IP address and port provided via the Lookup Service to establish a TCP/IP connection with the OCG-C. The client will initiate a Binary session at the start of each trading day by sending the Logon message.

A client must identify itself using the Comp ID field. The OCG-C will validate the Comp ID, password and IP address of the client.

Once the client is authenticated, the OCG-C will respond with a Logon message with Session Status set to Session Active (0). If the client's Logon message included the field New Password and the client is authenticated, the OCG-C will respond with a Logon message with Session Status set to Session Password Changed (1).

The client must wait for the Logon from the OCG-C before sending additional messages. If additional messages are received from the client before the exchange of Logon messages, the TCP/IP connection with the client will be disconnected.

If a logon attempt fails for the following reasons, the OCG-C will send a Logout or a Reject and then terminate the session; the Session Status of the Logout message will indicate the reason for the logout:

- Password failure
- Comp ID is locked
- Logon is not permitted during this time

For all other reasons, including the following, the OCG-C will terminate the session without sending a Logout or Reject:

- Invalid Comp ID or IP address

If during a logon of a client (i.e., a Comp ID), the OCG-C receives a second connection attempt while a valid binary session is already underway for that same Comp ID, the OCG-C will terminate both connections without sending a Logout or Reject message.

Inbound message sequence number will not be incremented if the connection is abruptly terminated due to the logon failure.

If a session level failure occurs due to a message sent by the client which contains a sequence number that is less than what is expected and the PossDup is not set to 1 = Yes, then the OCG-C will send a Logout message and terminate the Binary connection. In this scenario the inbound sequence number will not be incremented but the outbound sequence number will be incremented.

If the OCG-C does not respond to the session initiation (client initiated Logon message), the client is expected to wait for a time *60 seconds* prior to terminating the connection. The client is expected to retry session initiation after a time of *60 seconds* has elapsed.

If a client is disconnected abruptly or via a Logout message from the OCG-C, the client is expected to wait for a time period of *10 seconds* prior to reconnecting to the OCG-C.

4.2 Maintaining a Binary Session

4.2.1 Message Sequence Numbers

Under the binary protocol, the client and OCG-C will each maintain a separate and independent set of incoming and outgoing message sequence numbers. Sequence numbers should be initialized[1] to 1 (one) at the start of the day and be incremented throughout the session. Either side of a binary session will track the:

- Next Expected Message Sequence number (starting at 1)
- Next To Be Sent Message Sequence number (starting at 1); with respect to the contra-party.

Monitoring sequence numbers will enable parties to identify and react to missed messages and to gracefully synchronize applications when reconnecting during a Binary session.

Any message sent by either side of a binary session will increment the sequence number unless explicitly specified for a given message type.

If any message sent by one side of a binary session contains a sequence number that is LESS than the Next Expected Message Sequence Number then the other side of this session is expected to send a Logout message and terminate the Binary connection immediately, unless the PossDup flag is set to 1 = Yes

A Binary session will not be continued to the next trading day. Both sides are expected to initialize (Reset to 0) the sequence numbers at the start of each day. At the start of each trading day if the client starts with a sequence number greater than 1 then the OCG-C will terminate the session immediately without any further exchange of messages.

4.2.2 Heart Beat and Test Request

The client and OCG-C will use the Heartbeat message to exercise the communication line during periods of inactivity and to verify that the interfaces at each end are available.

The heartbeat interval is expected to be set as *20 Seconds*.

The OCG-C will send a Heartbeat anytime it has not transmitted a message for the duration of a heartbeat interval. The client is expected to employ the same logic.

If the OCG-C detects inactivity for a period longer than *3 heartbeat intervals*, it will send a Test Request message to force a Heartbeat from the client. If a response to the Test Request is not received by a reasonable transmission time (recommended being an elapsed time equivalent to 3 heartbeat intervals), the OCG-C will send a Logout and break the TCP/IP connection with the client. The client is expected to employ similar logic if inactivity is detected on the part of the OCG-C.

4.3 Terminating a Binary Session

Session termination can be initiated by either the OCG-C or the client by sending a Logout message. Upon receiving the Logout request, the contra party will respond with a Logout message signifying a Logout reply. Upon receiving the Logout reply, the receiving party will terminate the connection.

If the contra-party does not reply with either a Resend Request or a Logout reply, the Logout initiator should wait for *60 seconds* prior to terminating the connection.

The client is expected to terminate each binary connection at the end of each trading day before the OCG-C service is shut down. However, all open connections will be terminated (a

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[1] *Lookup service related messages (i.e., Lookup Request and Lookup Response) are expected to have a sequence number of 1 always; and these sequence numbers have no relationship with the sequence numbers for the session referred to here.*

Logout message will be sent) by the OCG-C when its service is shut down. Under exceptional circumstances the OCG-C may initiate the termination of a connection during the trading day by sending the Logout message.

If, during the exchange of Logout messages, the client or the OCG-C detects a sequence gap, it should send a Resend Request.

4.4 Re-establishing a Binary Session

If a binary connection is terminated during the trading day it may be re-established via an exchange of Logon messages.

Once the Binary session is re-established, the message sequence numbers will continue from the last message successfully transmitted prior to the termination.

4.5 Sequence Reset

The sequence reset could be done in two modes;

1. Gap-fill mode:

   Gap-fill mode is expected to be used by one side when skipping session level messages which can be ignored by the other side.

2. Reset mode:

   Reset mode is used only in exceptional scenarios to indicate a reset in the session's starting sequence number. This mode can ONLY be used by the OCG-C. Client initiated resets would be rejected by the OCG-C.

Following scenarios exist:

4.5.1 During a Session

The OCG-C and the client may use the Sequence Reset message in Gap Fill mode if either side wishes to increase the expected incoming sequence number of the other party.

The OCG-C may also use the Sequence Reset message in Sequence Reset mode if it wishes to increase the expected incoming sequence number of the other party. The Sequence Reset mode should only be used to recover from an emergency situation. It should not be relied upon as a regular practice.

4.5.2 When starting a new Session

4.5.2.1 Reset Initiated by the Client

Reset sequence (reset to 1) through the Logon Message will not be facilitated by the OCG-C. In order to reset the sequence (reset to 1) the client should manually inform the HKEX Operations Desk.

4.5.2.2 Reset Initiated by the OCG-C

The system has been designed with fault tolerance and disaster recovery technology that should ensure that the OCG-C retains its incoming and outgoing message sequence numbers for each client in the unlikely event of an outage.

However, the client is required to support a manual request by HKEX to initialize sequence numbers prior to the next login attempt.

4.6 Fault Tolerance

After a failure on client side or on OCG-C side, the client is expected to be able to continue the same session.

In case of a catastrophic scenario, the binary gateway will restart from a higher sequence number considering the previous session or may start from sequence number 1.

If the sequence number is reset to 1 by the OCG-C side, any previous messages will be available for the client side.

The client and the OCG-C are expected to negotiate on the Next Expected Message Sequence number and Next To Be Received Sequence number through an alternate medium prior to initiating the new session (Manually setting the sequence number for both ends after having a direct communication with the client).

4.7   Checksum Validation

The OCG-C performs a checksum validation on all incoming messages into the input services. Incoming messages that fail the checksum validation will be rejected and the connection will be dropped by the OCG-C without sending a logout.

Conversely, the OCG-C stamps an identically calculated checksum field on all outgoing messages from the input interfaces. In case of a checksum validation failure, the client is expected to drop the connection and take any appropriate action before reconnecting. Messages that fail the checksum validation should not be processed.

This checksum is a **CRC32C** value with the polynomial **0x1EDC6F41**, presented as a 32-bit unsigned integer (http://en.wikipedia.org/wiki/Cyclic_redundancy_check#CRC-32C).

5. Recovery

5.1 General Message Recovery

- A gap is identified when an incoming message sequence number is found to be greater than Next Expected Message Sequence number.

- The Resend Request will indicate the Start Sequence and End Sequence of the message gap identified and when replying to a resend request, the messages are expected to be sent strictly honouring the sequence.

- If messages are received outside of the Start and End sequence numbers, then the recovering party is expected to queue those messages until the gap is recovered.

   During the message recovery process, the recovering party will increment the Next Expected Sequence number accordingly based on the messages received. If messages applicable to the message gap are received out of sequence then the recovering party will drop these messages.

- The party requesting the Resend Request can specify "0" in the End Sequence to indicate that they expect the sender to send ALL messages starting from the Start Sequence.

   In this scenario, if the recovering party receives messages with a sequence greater than the Start Sequence, out of sequence, the message will be ignored.

- Administrative messages such as Sequence Resets, Heartbeats and Test Requests which can be considered irrelevant for a retransmission could be skipped using the Sequence Reset message in gap-fill mode.

   Note that the OCG-C expects the client to skip Sequence Reset messages when replying to a Resend Request at all times.

- When resending messages, the OCG-C would use either PossDup or PossResend flags to indicate whether the messages were retransmitted earlier.

   If PossDup flag is set to 1 = Yes, it indicates that the same message with the given sequence number with the same business content may have been transmitted earlier.

   In the case where PossResend flag is set to 1 = Yes, it indicates that the same business content may have been transmitted previously but under the different message sequence number. In this case business contents needs to be processed to identify the resend. For example, in Execution Reports the Execution ID may be used for this purpose.

5.2 Resend Request

The client may use the Resend Request message to recover any lost messages. This message may be used in one of three modes:

(i)   To request a single message. The Start Sequence and End Sequence should be the same.

(ii)   To request a specific range of messages. The Start Sequence should be the first message of the range and the End Sequence should be the last of the range.

(iii)   To request all messages after a particular message. The Start Sequence should be the sequence number immediately after that of the last processed message and the End Sequence should be zero (0).

5.3 Logon Message Processing – Next Expected Message Sequence

Upon receipt of a Logon message from a client, the OCG-C will validate the Comp ID and the Password. If this validation results in an invalid Comp ID or invalid password the OCG-C would terminate the session with the client without any further exchange of messages.

If the Logon request is validated successfully for Comp ID and password, the OCG-C will move onto validate the Next Expected Message Sequence number of the incoming Logon message.

If the Next Expected Message Sequence number indicated is:

1. Greater than the OCG-C's Next To Be Sent Sequence number, then the session will be terminated immediately after sending the logout message (i.e., manual intervention is required in this case).

2. Equal to the OCG-C's Next To Be Sent Sequence number, then the OCG-C will start sending message starting from the indicated sequence number

3. Less than the OCG-C's Next To Be Sent Sequence number, then the OCG-C would consider this as a gap-fill (i.e., the client has not received these messages and the OCG-C has to resend them now) and send messages starting from the indicated message up to the logon message sequence and skip the logon message sequence using a gap-fill and continue sending new messages from there on

If the Next Expected Message Sequence number indicated is valid then the OCG-C will send a Logon signifying a logon reply specifying the Next Expected Message Sequence number from the client. Immediately following the logon reply, the OCG-C would start message transmission as indicated above.

The client upon receipt of the Logon message from the OCG-C is expected follow the exact steps as indicated above.

Neither side should generate a Resend Request based on the Sequence Number of the incoming Logon message but should expect any gaps to be filled automatically by following the Next Expected Sequence processing described above.

Note that indicating the Next Expected Message Sequence number in the Logon request is mandatory.

5.4 Possible Duplicates

The OCG-C handles possible duplicates according to the Financial Information Exchange – FIX protocol.

5.5 Possible Resends

5.5.1 Client Initiated Messages

The OCG-C does not handle possible resends for the client-initiated messages and the message will be processed without considering the value in the PossResend field.

5.5.2 OCG-C Initiated Messages

The OCG-C may use the PossResend field to indicate that an application message may have already been sent under a different Sequence Number. The client should validate the contents (e.g. Execution ID) of such a message against those of messages already received during the current trading day to determine whether the new message should be ignored or processed.

5.6 Gap Fills

The following messages are expected to be skipped using gap-fills when being retransmitted:

1. Logon
2. Logout
3. Heartbeat
4. Test Request
5. Resent Request
6. Sequence Reset

All other messages are expected to be replayed within a retransmission.

5.7 Transmission of Missed Messages

The Execution Reports & Trade Capture Reports generated during a period when a client is disconnected from the OCG-C will be sent to the client when it next reconnects. In the unlikely event the disconnection was due to an outage of the OCG-C, all such messages will include a PossResend set to 1 = Yes

6. Service Description

6.1 Data Types

The table below describes each data type included in all of the messages in the Binary Trading Gateway.

#	Data Type	Size in Bytes	Description
1.	Alphanumeric Fixed Length (n)	Length is n bytes (Fixed for a given field)	These fields use standard ASCII character bytes. All fields of this data type will be null terminated and the length of the field will include this null character. If the field value does not occupy the full length of the field then data after the null termination should be discarded. For messages coming into OCG-C: ▪ if the field value occupies the full length of the field including the null character, OCG-C will override the last character with null value. ▪ if the field value does not occupy the full length of the field and if there is no null termination character specified, OCG-C will consider the full length excluding the null character as the field value. ***In case the field is empty, the first byte will be null filled.*** Each Alphanumeric Fixed Length field will have its size indicated within the Data Dictionary section. Alphanumeric Fixed Length fields will support Multiple Values to be specified separated by a space. For applicable fields please refer the <u>Data Dictionary</u>.
2.	Alphanumeric Variable Length	Variable	These fields use standard ASCII character bytes. All fields of this data type will be null terminated and the length of the field will include this null character. If the field value does not occupy the full length of the field then data after the null termination should be discarded. ***In case the field is empty, the third byte will be null filled.*** The length of each Alphanumeric Variable Length field will be indicated in the first two bytes as UInt16. The length range of this field will be from 0 – 65,535. The Alphanumeric Variable Length fields will also support Multiple Values to be specified separated by a space.
3.	Byte	1	A single byte used to hold any ASCII character.
4.	Decimal	8	**Signed** Little-Endian encoded integer field with 8 implied decimal places. For example, 10000.03100012 the system will multiply this by 10^8 converting it to an integer and this integer will be bit encoded accordingly as a signed 8 byte binary number
5.	UInt8	1	**Unsigned** integer. Range: 0 - 255
6.	Int8	1	**Signed** integer. Range: -128 – 127

#	Data Type	Size in Bytes	Description
7.	UInt16	2	Little-Endian encoded **unsigned** integer. Range: 0 – 65,535
8.	Int16	2	Little-Endian encoded **signed** integer. Range: -32,768 – 32,767
9.	UInt32	4	Little-Ending encoded **unsigned** integer Range: 0 – 4,294,967,295
10.	Int32	4	Little-Endian encoded **signed** integer. Range: -2,147,483,648 – 2,147,483,647
11.	Bitmap Fixed Length	32	Bitmap Fixed Length provides up to 256 representation options. To indicate availability set 1 to the applicable bit position and 0 for unavailability. Each bit in the presence map will represent a field and the sequence in which the fields should be included into the message will be based on the bit position (starting from the most significant bit position).
12.	Bitmap Variable Length	Variable	Bitmap Variable Length is used to indicate the presence of fields and nested repeating blocks in a repeating block. To indicate availability set 1 to the applicable bit position and 0 for unavailability. The length of the bitmaps used for different repeating blocks may vary. Each Bitmap Variable Length field will have its size indicated within the Data Dictionary section.
13.	Int64	8	Little -Endian encoded 64 bits signed integer Range: -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
14.	UInt64	8	Little -Endian encoded 64 bits unsigned integer Range: 0 to 18,446,744,073,709,551,615

6.2   Message Composition

Each message comprises of the following logical components:

1. Header

2. Body

3. Trailer

Fields within a message are formed in the same order as the composition given above.

Fields present within the body of the message is defined through a field presence map where the present fields are indicated as part of the header.

Fields which are part of the header and the trailer are considered mandatory.

6.2.1 Field Presence Map

The binary protocol provides a concept of field presence maps per each message type where using these bitmap fields available within the message, senders could indicate the fields available within the message in a dynamic nature.

Each bit in the presence map will represent a field and the sequence in which the fields should be included into the message will be based on the bit position (starting from the most significant bit position). All fields applicable to a particular presence map should be included into message immediately following the applicable presence map.

For example, consider an 8 bit presence map. Positions 1, 2 and 3 indicate Instrument, Client Order ID and Order Quantity respectively where rest of the positions has not been assigned to a field.

To indicate the presence of the fields Instrument and Order Quantity the presence map will be set as shown below:

Position	0	1	2	3	4	5	6	7
Represented field	Instrument	Client Order ID	Order Qty	N/A	N/A	N/A	N/A	N/A
Bit value (presence)	1	0	1	0	0	0	0	0

Message view:

Preceding fields of the message								
Presence Map	1	0	1	0	0	0	0	0
Instrument	HKEX							
Order Quantity	1000							
Succeeding fields of the message								

The applicable data types and lengths of the body fields are provided in the data dictionary. Based on the available fields as indicated by the field presence map, the recipient of the message is expected to decode the message accordingly.

Bit position for a field that commonly appears in multiple messages may be different; each message will have its own bit position for individual fields present in that message.

6.2.2 Repeating Blocks and Nested Repeating Blocks

The binary protocol supports repeating blocks within the message body while also allowing nested repeating blocks within a repeating block.

When indicating a repeating block the field presence map will only indicate the presence of the repeating block. Based on the repeating block construct, the receiving party is expected to evaluate the field contents and the numbers of repeating blocks.

This specification describes the repeating block construct and the relevant field information such as the data types required to identify the message contents and also to calculate header and trailer information such as message length and checksums.

Each repeating block construct will have a repeating block header field which is immediately followed by a field presence map which will indicate the presence of the applicable fields in that repeating block and any nested repeating blocks included within.

For e.g. consider an 8-bit field presence map included in the message header:

Position	0	1	2	3	4	5	6	7
Represented field	Inst	Client Order ID	Order Qty	No Entitlements	N/A	N/A	N/A	N/A
Bit value (presence)	1	0	1	1	0	0	0	0

The 3rd position indicates a repeating block which indicates the number of entitlement applicable to the particular message.

A sample 'No Entitlements' repeating block construct is given below:

No Entitlements		Number of repeating blocks. Valid values are 1 or 2. *(Repeating block header field)*
No Entitlements Body Fields Presence Map		This will indicate the fields/nested repeating blocks present in this repeating block
0	Entitlement Type	Absence of this field indicates the meaning of the entitlement is implicit. Else: ▪ 0 =Trade ▪ 1 = Make Market
1	Entitlement Indicator	Determines if the party is entitled for the specified Entitlement Type ▪ 0 = No ▪ 1 = Yes
2	No Entitlement Attributes	Number of entitlement attributes for the specified Entitlement Type *(Repeating block header field)*
	No Entitlement Attributes Body Fields Presence Map	This will indicate the fields/nested repeating blocks present in this repeating block
	0 Entitlement Attribute Type	Name of the entitlement attribute ▪ 4000 = Minimum Quote Obligation ▪ 4001 = Maximum Quote Spread Obligation
	1 Entitlement Attribute Data Type	The data type applicable to the specified Entitlement Attribute Type: ▪ 7 = Decimal
	2 Entitlement Attribute Value	The value of the Entitlement Attribute.
3	Entitlement ID	Unique identifier for a specific Entitlement Group instance

In the above message construct, 'No Entitlement Attributes' is a nested repeating block within the 'No Entitlements' repeating group.

The following provides an example message view when the nested repeating block is not present in the message. This is indicated in the Body Field Presence Map of the 'No Entitlements' repeating block.

Message view:

Order	Field	Value
1	No Entitlements	1 (one repeating blocks indicated)

2	No Entitlements Body Field Presence map	Position	0	1	2	3	4	5	6	7
		Represented field	Ent Type	Ent Ind	No Ent Attribs	Ent ID	N/A	N/A	N/A	N/A
		Bit value (presence)	1	1	0	1	0	0	0	0
3	Entitlement Type	0 = Trade								
4	Entitlement Indicator	1 = Yes								
5	Entitlement ID	TEST_01								

6.3 Security Identification

Instruments will be identified using the Security ID field. It is required to specify Security ID Source as Exchange Symbol (8) and Security Exchange as XHKG (similar to FIX exchange code for HKEX).

6.4 Party Identification

Party Identification is defined as follows:

ID	Description	Relevant Binary Field
Broker ID	Identifier of the member the interest is submitted under	Owning Broker ID
Entering Broker ID	Identifier of the entering member the interest is submitted under	Submitting Broker ID
Contra Broker ID	Identifier of the Contra member the interest is submitted under	Counterparty Broker ID
BS User ID	The location ID of the member	Broker Location ID

6.5 Client Order ID

In a drop copy message Client Order ID field will be provided only if the original message submitted through the Trading interface had this field. The same rule is applicable to Original Client Order ID field.

6.6 Board Lot Order Handling

Order book updates such as new board (i.e., round) lot orders, board lot order cancels, board lot order amends, resultant trades, trade cancels etc. will be published to the drop copy clients using Execution Report message.

For Non-CG originated Order Cancel/Replace:

- Drop Copy will send two execution reports, one for the cancellation of the original order followed by the acknowledgement of the Replaced Order (if applicable).

- The Cancellation due to Cancel/Replace will be treated as an Unsolicited Cancellation (Exec Restatement Reason = 100)

- In the Execution Report sent for the acknowledgment of the Replaced order, the cumulative quantity will be specified as 0 and order quantity and leaves quantity will be equal to the open order quantity at the market due to the amend request.

- In a case where the Replaced order is rejected, only the cancellation of the original order will be reported to the drop copy client

6.7 Quote Handling

The Execution Report message is used to notify the drop copy client if a quote is accepted, or updated, cancelled or executed.

6.8 Odd Lot/Special Lot Order Handling

Order book updates such as new odd lot/special lot orders & odd lot/special lot order cancels will be published to the drop copy clients using Execution Report message.

Trades concluded through semi-automatic trading and related trade cancels will also be published to the drop copy client.

In general, the OCG-C uses the following approach for sending the odd lot/special lot trading related messages:

Business Scenario	Odd lot/Special Lot Order Submitting Broker		Trade Reporting Broker	
	is a Non-OCG-C session broker	is a OCG-C session broker	is a Non-OCG-C session broker	is a OCG-C session broker
Odd lot/Special lot New Order – Accepted	Execution Report	Execution Report	*N/A*	
Odd lot/Special lot Order – Cancelled	Execution Report	Execution Report	*N/A*	
Odd lot/Special lot Trade – Accepted	Trade Capture Report	Execution Report	Trade Capture Report	Trade Capture Report
Odd lot/Special lot Trade – Cancelled	Trade Capture Report	Execution Report	Trade Capture Report	Trade Capture Report

6.9 Trade Report Handling

Trade Capture Report message is used to notify the drop copy client when an off-exchange trade is reported or an already reported off-exchange trade is cancelled successfully.

6.10 Execution IDs

The OCG-C will use the Execution ID field to affix a unique identifier for each Execution Report. Execution ID will be unique per trading day.

6.11 Execution Reports

The Execution Report message is used to communicate many different events to the drop copy client. The events are differentiated by the value in the Exec Type field as outlined below:

Exec Type	Description	Order Status Field
0 = New	**Order Accepted** Indicates that a new order has been accepted.	▪ 0 = New
C = Expire	**Order Expired** Indicates that an order has been expired. The reason for expiry is specified in the field Reason	▪ 12 = Expired
F = Trade	**Order Executed (Trade)** Indicates that an order has been partially or fully filled. The execution details (e.g. price and quantity) are specified.	▪ 1 = Partially Filled ▪ 2 = Filled
4 = Cancel	**Order Cancelled** Indicates that an order cancel request has been accepted and successfully processed. This message can also be sent unsolicited in which case the Execution Report may include the Exec Restatement Reason Field to indicate the reason for cancellation; Original Client Order ID field will not be provided.	▪ 4 = Cancelled
5 = Amend	**Order Amended**	▪ 0 = New

Exec Type	Description	Order Status Field
	Indicates that an order cancel/replace request has been accepted and successfully processed.	▪ 1 = Partially Filled ▪ 2 = Filled
H = Trade Cancel	**Trade Cancel** Indicates that an execution has been cancelled by Market Operations. The message will include a Reference Execution ID to identify the execution being cancelled and the updated execution details (e.g. price and quantity).	▪ 0 = New ▪ 1 = Partially Filled ▪ 2 = Filled ▪ 4 = Cancelled ▪ 12 = Expired

6.12 Cancelled Auto-matched Trades

A trade already concluded for an order could be cancelled by the HKEX Market Operations. A trade cancel will be communicated to the client via an Execution Report. The Execution Report will include the Reference Execution ID in order to identify the particular trade which is being cancelled.

If a trade is cancelled in this manner, system will not reinstate the Leaves Quantity of that order by the busted (cancelled) quantity. In this specific scenario order quantity will NOT be equal to the summation of the Leaves Quantity and the Cumulative Executed Quantity.

6.13 Cancelled Semi-Auto Matched Trades

A semi-auto matched trade (i.e., odd lot/special trade) already concluded for an odd lot/special lot order could be cancelled by the HKEX Market Operations. A trade cancel will be communicated to the drop copy client by providing the Reference Execution ID in order to identify the particular trade which is being cancelled.

6.14 Message Rejection

If an incoming message violates any message level validations such as data type mismatches or message structure mismatches, the messages are expected to be rejected back to the sender using a Reject (3) message (applicable to both the client and the OCG-C).

6.15 Copy Message Indicator

Copy Message Indicator field will be set to 1 = Yes for each message sent through the Drop Copy sessions in order to indicate that the given message is a drop copy of another message.

6.16 Session Contents

The client enabled for the drop copy functionality will receive a copy of each eligible Execution Report (8) and Trade Capture Report (17).

A drop copy connection is configured to receive a copy of all the Execution Reports and Trade Capture Reports generated for the Broker ID(s) assigned to the Drop Copy session, irrespective of the OCG-C Trading Session used by the given Broker ID for trading.

The drop copy client may have the privilege to subscribe to one of the following drop copy options:

▪ Trades Only

  Under 'Trades only' option, the client will have access to Execution Reports related to auto-matched trades, Trade Capture reports and Odd-lot trades.

▪ Orders & Trades

Under 'Orders & Trades' option, the client will have access to all order (board and odd-lot), quote related Execution Reports and Trade Capture reports

A drop copy client must choose the required option when subscribing to the drop copy service with HKEX market operations. This option can't be changed intra-day.

The following table describes the contents for the two subscription options:

Business Message Type	Order and Trades Option	Trades Only Option
Execution Report		
Exec Type = New	√	X
Exec Type = Expire	√	X
Exec Type = Cancel	√	X
Exec Type = Amend	√	X
Exec Type = Trade	√	√
Exec Type = Trade Cancel	√	√
Trade Capture Report		
Trade Accepted	√	√
Trade Cancelled	√	√

7. Message Definitions

7.1 Supported Message Types

All supported message types initiated by the client or the OCG-C:

#	Message	Message Type	Usage
1.	Heartbeat	0	Allows the client and OCG-C to exercise the communication line during periods of inactivity and verify that the interfaces at each end are available.
2.	Test Request	1	Allows the client or the OCG-C to request a response from the other party if inactivity is detected.
3.	Resend Request	2	Allows for the recovery of messages lost during a malfunction of the communications layers.
4.	Reject	3	Used to reject a message that does not comply with session level validations.
5.	Sequence Reset	4	Allows the client or the OCG-C to increase the expected incoming sequence number of the other party.
6.	Logon	5	Allows the client and the OCG-C to establish a Binary session.
7.	Logout	6	Allows the client and the OCG-C to terminate a Binary session.
8.	Lookup Request	7	The Lookup Request can be used by a client to request for a connection point (IP/Port pair) to the OCG-C.
9.	Lookup Response	8	The Lookup Response message is used by the OCG-C in response to a valid Lookup Request sent by the client.
10.	Execution Report	10	Indicates one of the following: ▪ Order Accepted ▪ Order Expired ▪ Order Cancelled ▪ Order Amended ▪ Trade ▪ Trade Cancel
11.	Trade Capture Report	21	Indicates one of the following: ▪ Off-exchange Trade Accepted ▪ Off-exchange Trade Cancelled

7.2 In-bound Messages

Only Session-level messages are expected.

7.3 Out-bound Messages

In addition to the Session-level messages, the following lists the messages that are sent by the OCG-C to the client:

1. Execution Report (10)
2. Trade Capture Report (21)

7.4 Message Header

All messages exchanged between the client and the OCG-C have the following standard message header:

Order	Field Name	Required	Description
1.	Start of Message	Y	Indicates the starting point of a message. Always set to ASCII STX character
2.	Length	Y	Length of the messaging including all the fields in the message (i.e., length of all header, body and trailer fields)
3.	Message Type	Y	Message Type. Refer to **Data Dictionary**
4.	Sequence Number	Y	Message sequence number applicable to this message
5.	PossDup	Y	Message with the same sequence number may have been sent previously?
6.	PossResend	Y	Message with the same business data may have been sent previously?
7.	Comp ID	Y	Comp ID assigned to the client session.
8.	Body Fields Presence Map	Y	Indicates the list of fields that would be present immediately after this Body Fields Presence Map field.

7.5 Message Trailer

All messages exchanged between the client and the OCG-C have the following standard message trailer.

The checksum will take into consideration the full message (i.e., fields in both Header and Body).

Order	Field Name	Required	Description
1.	Checksum	Y	CRC32C based checksum.

7.6 Lookup Service

7.6.1 Lookup Request (7)

This message is initiated by the client.

Bit Position	Field Name	Required	Description
0	Type Of Service	Y	Type of service required for the client: ▪ 2 = Drop Copy
1	Protocol Type	Y	Type of message protocol required by the client in order to connect to the specified service: ▪ 1 = Binary

Note: Bit Position refers to the Bit Presence Map.

The sequence number of the Lookup Request is always expected to be set to 1 by the client.

7.6.2 Lookup Response (8)

This response message is initiated by the OCG-C.

Bit Position	Field Name	Required	Description
0.	Status	Y	Indicates whether the Lookup Request was accepted or rejected by the OCG-C: ▪ 0 = Accepted ▪ 1 = Rejected
1.	Lookup Reject Code	N	If request is rejected then a code to identify the rejection: ▪ 0 = Invalid Client ▪ 1 = Invalid service type ▪ 2 = Invalid Protocol ▪ 3 = Client is blocked ▪ 4 = Other
2.	Reason	N	Textual reason for the Lookup Request rejection
3.	Primary IP	N	IP Address of the primary service in case of a successful lookup
4.	Primary Port	N	Port number of the primary service in case of a successful lookup
5.	Secondary IP	N	IP Address of the secondary service in case of a successful lookup
6.	Secondary Port	N	Port number of the secondary service in case of a successful lookup

The sequence number of the Lookup Response will always be set to 1 by the OCG-C.

7.7   Administrative Messages

7.7.1   Logon (5)

This message is initiated by the client and the OCG-C may respond with the same message as a response.

Bit Position	Field Name	Required	Description
0	Password	N	Encrypted Password assigned to the Comp ID. Required only if the message is initiated by the client. Padding scheme supported is PKCS #1 or OAEP.
1	New Password	N	New encrypted Password for Comp ID. Padding scheme supported is PKCS #1 or OAEP.
2	Next Expected Message Sequence	Y	Indicates the next expected message sequence number by the party initiating this message
3	Session Status	N	Status of the Binary session. Required if the message is generated by the OCG-C.
4	Text	N	Text field will be used to convey the number of days to password expiry when the OCG-C replies with a Logon message upon a successful logon attempt.
5	Test Message Indicator	N	The Test Message Indicator field will be used to indicate whether the binary client is connected to the 'Test' or 'Production Mode' of the system when the OCG-C replies with a LOGON message upon a successful logon attempt. ▪ 0 = No (Production Mode) ▪ 1 = Yes (Test Mode)

Password (Bit Position 0) <u>must be present</u> in the Logon message initiated by the client.

7.7.2   Logout (6)

This message can be initiated by both client and the OCG-C.

Bit Position	Field Name	Required	Description
0	Logout Text	N	Textual reason for the Logout
1	Session Status	N	Status of the Binary session. May be present if the message is generated by the OCG-C.

7.7.3 Heartbeat (0)

This message can be initiated by both client and the OCG-C.

Bit Position	Field Name	Required	Description
0	Reference Test Request ID	N	Required if the Heartbeat is in response to a Test Request. The value in this field will echo the Test Request ID received in the test Request.

7.7.4 Test Request (1)

This message can be initiated by both client and the OCG-C.

Bit Position	Field Name	Required	Description
0	Test Request ID	Y	Identifier included in Test Request message to be returned in resulting Heartbeat.

7.7.5 Resend Request (2)

This message can be initiated by both client and the OCG-C.

Bit Position	Field Name	Required	Description
0	Start Sequence Number	Y	Sequence number of the first message expected to be resent.
1	End Sequence Number	Y	Sequence number of the last message expected to be resent. This may be set to 0 to request the sender to transmit ALL messages starting from Start Sequence Number.

7.7.6 Reject (3)

This message will be initiated by the OCG-C.

Bit Position	Field Name	Required	Description
0	Message Reject Code	Y	Code specifying the reason for the rejection of the message
1	Reason	N	Textual reason for the reject.
2	Reference Message Type	N	Type of message rejected.
3	Reference Field Name	N	Name of the field (as per the data dictionary) which caused the rejection
4	Reference Sequence Number	Y	Sequence number of the message which caused the rejection
5	Client Order ID	N	Client specified identifier of the rejected message if it is available.

7.7.7 Sequence Reset (4)

This message can be initiated by both client and OCG-C.

Bit Position	Field Name	Required	Description
0	Gap Fill	N	Indicates whether the sequence number is to be interpreted in a RESET mode or a GAP-FILL mode. The default value will be set as ('N') RESET if this field is not present.
1	New Sequence Number	Y	Indicates the sequence number of the next message to be sent by the sender

7.8 Business Messages – Execution Reports (10)

7.8.1 Order Accepted

The OCG-C will send this execution report once a new order (board lot or odd lot/special lot) or a new quote has been accepted.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order. Would be present if the order is initiated through a OCG-C session, may or may not be present if the order is initiated through other access platforms.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order ▪ 1 = Market ▪ 2 = Limit
12	Price	N	Limit price Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity
14	Time In Force (TIF)	N	Time qualifier of the order. Absence of this field is interpreted as 0 = Day: ▪ 0 = Day (Default) ▪ 3 = Immediate or Cancel = IOC ▪ 4 = Fill or Kill = FOK ▪ 9 = At Crossing. Applicable for orders in Auction session.
15	Position Effect	N	Indicates whether the resulting position after a trade should be a closing position

16	Order Restrictions	N	Restrictions associated with this order: ▪ 2 = Index Arbitrage ▪ 5 = Acting as Market Maker or Specialist in Security ▪ 6 = Acting as Market Maker or Specialist in underlying of a derivative security The above three values are applicable only if Side = 5 (Sell Short)
17	Max Price Levels	N	Maximum number of price levels to trade through. Applicable if: Order Type = 2 (Limit). If present, this should be set as 1.
18	Order Capacity	N	Designates the capacity of the firm placing the order: ▪ 1 = Agency ▪ 2 = Principal
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated: ▪ 0 = New
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report: ▪ 0 = New
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 1 = Odd Lot ▪ 2 = Round Lot Absence of this field indicates a Round (i.e., Board) Lot order.
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes
43	SMP ID	N	The identifier to prevent self-matching

7.8.2 Order Cancelled

The OCG-C sends this execution report once the request to cancel an order (board lot or odd lot/special lot) has been accepted.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order. Would be present if the order is submitted through a OCG-C session, may or may not be present if the order is submitted through other access platforms.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order
8	Original Client Order ID	N	Original Client Order ID as specified in the incoming cancel request. Would be present if the order is submitted through a OCG-C session, may or may not be present if the order is submitted through other access platforms.
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order
12	Price	N	Limit price Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity
14	Time In Force	N	Time qualifier of the order
15	Position Effect	N	Indicates whether the resulting position after a trade should be a closing position
16	Order Restrictions	N	Restrictions associated with the order
17	Max Price Levels	N	The maximum number of price levels to trade through
18	Order Capacity	N	Designates the capacity of the firm placing the order

19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated: ▪ 4 = Cancelled
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report: ▪ 4 = Cancel
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 1 = Odd Lot ▪ 2 = Round Lot Absence of this field indicates a Round Lot order.
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes

7.8.3 Order Cancelled – Unsolicited

The OCG-C will send this execution report for an unsolicited cancellation of an order (board lot or odd lot/special lot).

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order. Would be present if the order is submitted through a OCG-C session, may or may not be present if the order is submitted through other access platforms.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated

7	Side	Y	Side of the order
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order
12	Price	N	Limit price Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity
14	TIF	N	Time qualifier of the order
15	Position Effect	N	Indicates whether the resulting position after a trade should be a closing position
16	Order Restrictions	N	Restrictions associated with the order
17	Max Price Levels	N	The maximum number of price levels to trade through
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated: ▪ 4 = Cancelled
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report: ▪ 4 = Cancel
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 1 = Odd Lot ▪ 2 = Round Lot Absence of this field indicates a Round Lot order.

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Bit Position	Field Name	Required	Description
28	Exec Restatement Reason	N	Code to identify the reason for an Execution Report message with Exec Type= 4 (Cancel) ■ 6 = Cancel on Trading Halt/VCM ■ 8 = Market Operation ■ 17 = Cancel aggressive due to self-match prevention ■ 18 = Cancel passive due to self-match prevention ■ 100 = Unsolicited Cancel for original order (for cancel/replace operation which fails market validation) ■ 101 = On Behalf Of Cancel – Single ■ 102 = On Behalf Of Cancel – Mass ■ 103 = Mass cancelled by Broker ■ 104 = Cancel on disconnect ■ 105 = Cancel due to Broker suspension ■ 106 = Cancel due to Exchange Participant suspension ■ 107 = System Cancel
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ■ 0 = No ■ 1 = Yes
43	SMP ID	N	The identifier to prevent self-matching

7.8.4 Order Expired

The OCG-C will send this execution report when an order (board lot or odd lot/special lot) expires.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order Would be present if the order is submitted through a OCG-C session, may or may not be present if the order is submitted through other access platforms.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ■ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ■ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated

7	Side	Y	Side of the order
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order
12	Price	N	Limit price Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity
14	TIF	N	Time qualifier of the order
15	Position Effect	N	Indicates whether the resulting position after a trade should be a closing position
16	Order Restrictions	N	Restrictions associated with the order
17	Max Price Levels	N	The maximum number of price levels to trade through
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
20	Reason	N	Textual description for the reason for order expiry.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated: ▪ 12 = Expired
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report: ▪ C = Expire
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 1 = Odd Lot ▪ 2 = Round Lot Absence of this field indicates a Round Lot order.
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes

7.8.5 Order Amended

The OCG-C sends this execution report when ~~a Cancel/Replace~~ an Order Amend request or a Quote Modification is accepted. This message is not applicable to an odd lot/special lot order.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order
8	Original Client Order ID	N	Original Client Order ID as specified in the incoming amend request. Would be present if the order is submitted through a OCG-C session, may or may not be present if the order is submitted through other access platforms.
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order
12	Price	N	Limit price Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity
14	TIF	N	Time qualifier of the order
15	Position Effect	N	Indicates whether the resulting position after a trade should be a closing position
16	Order Restrictions	N	Restrictions associated with the order
17	Max Price Levels	N	The maximum number of price levels to trade through
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated

22	Order Status	Y	Order status after applying the transaction that is being communicated: ▪ 0 = New ▪ 1 = Partially Filled
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report: ▪ 5 = Amend
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 2 = Round Lot Absence of this field indicates a Round Lot order.
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes
43	SMP ID	N	The identifier to prevent self-matching. Present only for quote modification.

Note: For an Order Amend Request submitted through interfaces other than the OCG-C, to modify order price and/or increase order quantity, the Drop Copy interface will provide an Execution Report = Order Cancelled first (for the original order) followed by, if applicable, Execution Report = Order Accepted (for the replaced order).

7.8.6 Auto-matched Trade (Board Lot Order Executed)

The OCG-C sends this execution report for an auto-matched trade.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order.
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order.

12	Price	N	Limit price.
			Required if:
			Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity.
14	TIF	N	Time qualifier of the order.
15	Position Effect	N	Indicates whether the resulting position after a trade should be an opening position or closing position
16	Order Restrictions	N	Restrictions associated with an order
17	Max Price Levels	N	The maximum number of price levels to trade through
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated
			▪ 1 = Partially Filled
			▪ 2 = Filled
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report
			▪ F = Trade
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order:
			▪ 2 = Round Lot
			Absence of this field indicates a Round Lot order.
30	Match Type	N	The point in the matching process at which this trade was matched:
			▪ 4 = Auto Match
			▪ 5 = Cross Auction
31	Counterparty Broker ID	N	The Broker ID of the user sitting on the opposite side of the trade
32	Execution Quantity	Y	Execution Size
33	Execution Price	Y	Execution price
35	Order Category	N	Defines the type of interest behind a trade
			▪ 1 = Internal Cross Order
			Absence of this field means the trade is not concluded within the same firm

37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes
38	Trade Match ID	N	Identifier assigned to a trade by the matching system
42	Aggressor Indicator	N	Used to identify whether the order initiator is an aggressor or not in the auto-matched trade during continuous trading session: ▪ 0 = Order initiator is passive ▪ 1 = Order initiator is aggressor

7.8.7 Auto-matched Trade Cancel (Executed Trade Cancelled)

The OCG-C sends this execution report when an auto-matched trade is cancelled by the exchange.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order.
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the order.
12	Price	N	Limit price. Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity.
14	TIF	N	Time qualifier of the order.

15	Position Effect	N	Indicates whether the resulting position after a trade should be an opening position or closing position
16	Order Restrictions	N	Restrictions associated with an order
17	Max Price Levels	N	The maximum number of price levels to trade through
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated • 0 = New • 1 = Partially Filled • 2 = Filled • 4 = Cancelled • 12 = Expired
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report • H = Trade Cancel
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: • 2 = Round Lot Absence of this field indicates a Round Lot order.
28	Exec Restatement Reason	N	Code to identify the reason for an Execution Report message with Exec Type = H (Trade Cancel) • 8 = Market Operations
32	Execution Quantity	N	Execution Size Will be set to 0
33	Execution Price	N	Execution price Will be set to 0
34	Reference Execution ID	Y	Execution ID previously published for this Trade.
35	Order Category	N	Defines the type of interest behind a trade • 1 = Internal Cross Order Absence of this field means the trade is not concluded within the same firm
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: • 0 = No • 1 = Yes

7.8.8 Trade (Odd lot/Special lot Order Executed)

The OCG-C sends this execution report for an Odd lot/Special lot order when it is filled.

Note that this trade message is sent to the drop copy client only if the Side refers to an Odd lot/Special lot order submitted by a broker ID through a OCG-C session.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.
3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order.
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Order Type of the Order: ▪ 2 = Limit
12	Price	N	Limit price. Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity.
14	TIF	N	Time qualifier of the order.
15	Position Effect	N	Indicates whether the resulting position after a trade should be an opening position or closing position
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated

22	Order Status	Y	Order status after applying the transaction that is being communicated ▪ 2 = Filled
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report ▪ F = Trade
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 1 = Odd Lot
31	Counterparty Broker ID	N	The Broker ID of the user sitting on the opposite side of the trade
32	Execution Quantity	Y	Execution Size
33	Execution Price	Y	Execution price
35	Order Category	N	Defines the type of interest behind a trade ▪ 1 = Internal Cross Order Absence of this field means the trade is not concluded within the same firm
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes
38	Trade Match ID	N	Identifier assigned to a trade by the matching system
39	Exchange Trade Type	N	Exchange assigned trade type: ▪ E = Special Lot – Semi Automatic ▪ O = Odd Lot – Semi Automatic

7.8.9 Trade (Semi-auto-matched Trade Cancelled)

The OCG-C sends this execution report when a semi-auto-matched trade is cancelled by the exchange.

Note that this trade cancellation message is sent to the drop copy client only if the Side refers to an Odd lot/Special lot order submitted by a broker through a OCG-C session.

Bit Position	Field Name	Required	Description
0	Client Order ID	N	Client specified identifier of the order.
1	Submitting Broker ID	Y	The Broker ID of the user that submitted the order for which the Execution Report is generated.
2	Security ID	Y	Instrument identifier value of security ID source type.

3	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
4	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
5	Broker Location ID	N	The Location ID of the Submitting Broker
6	Transaction Time	Y	The time at which the particular message was generated
7	Side	Y	Side of the order.
9	Order ID	Y	Order ID assigned for the order
11	Order Type	N	Type of the Order
12	Price	N	Limit price. Required if: Order Type = 2 (Limit)
13	Order Quantity	N	Total order quantity.
14	TIF	N	Time qualifier of the order.
15	Position Effect	N	Indicates whether the resulting position after a trade should be an opening position or closing position
18	Order Capacity	N	Designates the capacity of the firm placing the order
19	Text	N	The most recent text sent by the client will be echoed back to the client.
21	Execution ID	Y	Unique Execution ID assigned by the system for each Execution Report generated
22	Order Status	Y	Order status after applying the transaction that is being communicated ▪ 0 = New ▪ 1 = Partially Filled ▪ 2 = Filled ▪ 4 = Cancelled ▪ 12 = Expired
23	Exec Type	Y	Execution Type that indicates the reason for the generation of the Execution Report ▪ H = Trade Cancel
24	Cumulative Quantity	Y	Cumulative execution quantity
25	Leaves Quantity	Y	Open order quantity
27	Lot Type	N	Defines the lot type assigned to the order: ▪ 1 = Odd Lot Absence of this field indicates a Round Lot order.

28	Exec Restatement Reason	N	Code to identify the reason for an Execution Report message with Exec Type = H (Trade Cancel) ▪ 8 = Market Operations
32	Execution Quantity	N	Execution Size Will be set to 0
33	Execution Price	N	Execution price Will be set to 0
34	Reference Execution ID	Y	Execution ID previously published for this Trade.
35	Order Category	N	Defines the type of interest behind a trade ▪ 1 = Internal Cross Order Absence of this field means the trade is not concluded within the same firm
37	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes

7.9 Business Messages – Trade Capture Reports (21)

7.9.1 Trade Accepted

The OCG-C sends this message to confirm an off-exchange trade reported.

Bit Position	Field Name	Required	Description
0	Trade Report ID	N	Unique Identification for the Trade Capture Report assigned by the reporting side of the Trade (to be returned to the reporting broker).
1	Trade Report Trans Type	Y	Identifies the trade report message transaction type: ▪ 0 = New (for the non-reporting side) ▪ 2 = Replace (for the reporting side)
2	Trade Report Type	Y	Type of the Trade Report: ▪ 0 = New (Submit)
3	Trade Handling Instructions	N	Indicates how the trade capture report should be handled by the receiver: ▪ 0 = Trade Confirm
4	Submitting Broker ID	Y	The Broker ID to which this Trade Capture Report is being sent.
5	Counterparty Broker ID	N	The Broker ID of this trade on the opposite side in relation to Submitting Broker ID above
6	Broker Location ID	N	The location ID of the Submitting Broker

7	Security ID	Y	Instrument identifier value of security ID source type.
8	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
9	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
10	Side	Y	The side of the trade applicable to the submitter of the trade capture report: ▪ 1 = Buy ▪ 2 = Sell ▪ 5 = Sell Short
11	Transaction Time	Y	The time at which the particular message was generated
12	Trade ID	Y	The unique ID assigned to the trade entity once it is received or matched by the exchange.
13	Trade Type	Y	Type of the trade: ▪ 4 = Late Trade ▪ 22 = Privately Negotiated Trade ▪ 102 = Odd Lot Trade ▪ 104 = Overseas Trade
14	Execution Quantity	Y	Execution Size
15	Execution Price	Y	Execution price
16	Clearing Instruction	N	Clearing Information ▪ 0 = Process normally ▪ 1 = Exclude from all netting ▪ 14 = Buy In
17	Position Effect	N	Indicates whether the resulting position after a trade should be an opening position or closing position: ▪ 1 = Close Applicable only if Side = 1 (Buy) to indicate covering a short sell.
19	Order Capacity	N	Designates the capacity of the firm placing the order ▪ 1 = Agency ▪ 2 = Principal
20	Order Category	N	Defines the type of interest behind a trade: ▪ 1 = Internal Cross Order Absence of this field means the trade is not concluded within the same firm.
21	Text	N	Free Text

23	Exec Type	N	Execution Type that indicates the reason for the generation of this confirmation: ▪ F = Trade
24	Trade Report Status	N	Trade Report Status: ▪ 0 = Accepted Absence of this field indicates 0 = Accepted.
25	Exchange Trade Type	N	Exchange assigned Trade Type: ▪ M = Manual Trade ▪ S = Manual – Non Standard Price Trade ▪ Q = Special Lot Trade ▪ P = Odd Lot Trade ▪ R = Previous Day's Trade ▪ V = Overseas Trade
26	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes

7.9.2 Trade Cancelled

The OCG-C sends this message to notify the cancellation of a reported off-exchange trade.

Bit Position	Field Name	Required	Description
0	Trade Report ID	N	Unique Identification for the Trade Capture Report assigned by the reporting side of the Trade Cancel (to be returned to the reporting broker).
1	Trade Report Trans Type	Y	Identifies the trade report message transaction type: ▪ 0 = New (for the party opposite to that requesting this cancel) ▪ 2 = Replace (for the party requesting this cancel) ▪ 5 = Cancel due to back out of trade (for both buyer and seller if Exec Type = L)
2	Trade Report Type	Y	Type of the Trade Report: ▪ 6 = Trade Report Cancel
3	Trade Handling Instructions	N	Indicates how the trade capture report should be handled by the receiver: ▪ 0 = Trade Confirm
4	Submitting Broker ID	Y	The Broker ID to which this Trade Capture Report is being sent.
6	Broker Location ID	N	The location ID of the Submitting Broker
7	Security ID	Y	Instrument identifier value of security ID source type.
8	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
9	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
10	Side	Y	The side of the trade applicable to the submitter of the trade capture report: ▪ 1 = Buy ▪ 2 = Sell ▪ 5 = Sell Short
11	Transaction Time	Y	The time at which the particular message was generated
12	Trade ID	Y	Unique ID assigned to the trade by the exchange when the trade was reported.
14	Execution Quantity	Y	Execution Size
15	Execution Price	Y	Execution price

23	Exec Type	N	Execution Type that indicates the reason for the generation of this confirmation: ▪ H = Trade Cancel (by the counter-party) ▪ L = Triggered or activated by System (cancelled by the exchange)
26	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes

7.10 Business Messages – Semi-Automatic Odd/Special Lot Trade (21)

7.10.1 Trade Accepted

The OCG-C sends this message to confirm a semi-automatic trade concluded if:

- The Side in this trade message refers to the submitter of the trade,
- The Side in this trade message refers to the resting order, but this order was submitted by a broker ID belonging to a non-OCG-C session

Bit Position	Field Name	Required	Description
0	Trade Report ID	N	Unique Identification for the Trade Capture Report assigned by the reporting side of the Trade (to be returned to the reporting broker).
1	Trade Report Trans Type	Y	Identifies the trade report message transaction type: ▪ 0 = New (for the resting order) ▪ 2 = Replace (for the reporting side)
2	Trade Report Type	Y	Type of the Trade Report: ▪ 0 = New (Submit)
4	Submitting Broker ID	Y	The Broker ID to which this Trade Capture Report is being sent.
5	Counterparty Broker ID	N	The Broker ID of this trade on the opposite side in relation to Submitting Broker ID above
6	Broker Location ID	N	The location ID of the Submitting Broker
7	Security ID	Y	Instrument identifier value of security ID source type.
8	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
9	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
10	Side	Y	The side of the trade applicable to the submitter of the trade capture report: ▪ 1 = Buy ▪ 2 = Sell ▪ 5 = Sell Short
11	Transaction Time	Y	The time at which the particular message was generated
12	Trade ID	Y	The unique ID assigned to the trade entity once it is received or matched by the exchange.
13	Trade Type	Y	Type of the trade: ▪ 102 = Odd Lot Trade

14	Execution Quantity	Y	Execution Size
15	Execution Price	Y	Execution price
17	Position Effect	N	Indicates whether the resulting position after a trade should be an opening position or closing position: ▪ 1 = Close Applicable only if Side = 1 (Buy) to indicate covering a short sell.
19	Order Capacity	N	Designates the capacity of the firm placing the order ▪ 1 = Agency ▪ 2 = Principal
20	Order Category	N	Defines the type of interest behind a trade: ▪ 1 = Internal Cross Order Absence of this field means the trade is not concluded within the same firm.
21	Text	N	Free Text
23	Exec Type	N	Execution Type that indicates the reason for the generation of this confirmation: ▪ F = Trade
24	Trade Report Status	N	Trade Report Status: ▪ 0 = Accepted Absence of this field indicates 0 = Accepted.
25	Exchange Trade Type	N	Exchange assigned Trade Type: ▪ E = Special Lot – Semi Automatic ▪ O = Odd Lot – Semi Automatic
26	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes
27	Order ID	N	Order ID assigned for the resting order. Applicable only if the Side refers to the resting order.
28	Client Order ID	N	Client specified identifier of the order. Applicable only if the Side refers to the resting order.

7.10.2 Trade Cancelled

The OCG-C sends this message to notify the cancellation of a semi-automatic trade if:

▪ The Side in this message refers to the submitter of the trade,

▪ The Side in this message refers to the resting order, but this order was submitted by a broker ID belonging to a non-OCG-C session.

Bit Position	Field Name	Required	Description
1	Trade Report Trans Type	Y	Identifies the trade report message transaction type: ▪ 5 = Cancel due to back out of trade (for both buyer and seller if Exec Type = L)
2	Trade Report Type	Y	Type of the Trade Report: ▪ 6 = Trade Report Cancel
4	Submitting Broker ID	Y	The Broker ID to which this Trade Capture Report is being sent.
6	Broker Location ID	N	The location ID of the Broker ID referred to above
7	Security ID	Y	Instrument identifier value of security ID source type.
8	Security ID Source	Y	Identifies the source of the security ID. Must be same as in the original order: ▪ 8 = Exchange Symbol
9	Security Exchange	N	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
10	Side	Y	The side of the trade applicable to the recipient of this trade capture report: ▪ 1 = Buy ▪ 2 = Sell ▪ 5 = Sell Short
11	Transaction Time	Y	The time at which the particular message was generated
12	Trade ID	Y	Unique ID assigned to the trade by the exchange when the trade was reported.
14	Execution Quantity	Y	Execution Size
15	Execution Price	Y	Execution price
23	Exec Type	N	Execution Type that indicates the reason for the generation of this confirmation: ▪ L = Triggered or activated by System (cancelled by the exchange)
26	Copy Message Indicator	Y	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes

7.11 Business Messages – Infrastructure

7.11.1 Business Message Reject (9)

This message will be initiated by OCG-C and will be used to reject an application level message which fulfills session levels rules.

Bit Position	Field Name	Required	Description
0	Business Reject Code	Y	Code specifying the reason for the rejection of the message: ▪ 0 = Other ▪ 3 = Unspecified Message Type ▪ 4 = Application not available
1	Reason	N	Textual reason for the reject. If the rejection is due to an issue with a particular field its name will be specified.
2	Reference Message Type	Y	Type of message rejected.
3	Reference Field Name	N	Name of the field (as per the data dictionary) which caused the rejection
4	Reference Sequence Number	N	Sequence number of the message which caused the rejection
5	Business Reject Reference ID	N	Client specified identifier of the rejected message if it is available.

8. Data Dictionary

8.1 Header and Trailer Fields

#	Field Name	Data Type	Description
1.	Body Fields Presence Map	Bitmap Fixed Length	Bitmap indicates the fields and repeating blocks present in the body of the message. To indicate availability, set 1 to the applicable bit position and 0 for unavailability.
2.	Checksum	UInt32	CRC32C based checksum. Polynomial used - 0x1EDC6F41
3.	Comp ID	Alphanumeric Fixed Length (12)	Comp ID assigned to the sender of the message.
4.	Length	UInt16	Length of the message including all the fields in the message (i.e. length of all header, body and trailer fields)
5.	Message Type	UInt8	Defines the message type: **Value = Meaning** ▪ 0 = Heartbeat ▪ 1 = Test Request ▪ 2 = Resend Request ▪ 3 = Reject ▪ 4 = Sequence Reset ▪ 5 = Logon ▪ 6 = Logout ▪ 7 = Lookup Request ▪ 8 = Lookup Response ▪ 9 = Business Message Reject ▪ 10 = Execution Report ▪ 21 = Trade Capture Report
6.	PossDup	UInt8	Indicates possible retransmission of message with this sequence number: ▪ 0 – No (original transmission) ▪ 1 – Yes (possible duplicate)
7.	PossResend	UInt8	Indicates that message may contain information that has been sent under another sequence number: ▪ 0 – No (original transmission) ▪ 1 – Yes (possible resend)
8.	Sequence Number	UInt32	Message sequence number applicable to the message.
9.	Start of Message	UInt8	Indicates the starting point of a message. Always set to the ASCII STX character (0x02).

8.2 Body Fields

#	Field Name	Data Type	Description
1.	Aggressor Indicator	UInt8	Used to identify whether the order initiator is an aggressor or not in the auto-matched trade during continuous trading session: ▪ 0 = Order initiator is passive ▪ 1 = Order initiator is aggressor
2.	Broker Location ID	Alphanumeric Fixed Length (11)	The location ID of the Submitting Broker
3.	Business Reject Code	UInt16	Code specifying the reason for the rejection of the business message: ▪ 0 = Other ▪ 3 = Unspecified Message Type ▪ 4 = Application not available
4.	Business Reject Reference ID	Alphanumeric Fixed Length (21)	The value of the business-level "ID" field in the message being referenced.
5.	Clearing Instruction	UInt8	Clearing Information: ▪ 0 = Process normally ▪ 1 = Exclude from all netting ▪ 14 = Buy In
6.	Client Order ID	Alphanumeric Fixed Length (21)	Client specified identifier of the order.
7.	Copy Message Indicator	UInt8	Indicates if the message is a drop copy: ▪ 0 = No ▪ 1 = Yes
8.	Counterparty Broker ID	Alphanumeric Fixed Length (12)	The Broker ID on the opposite side of the trade
9.	Cumulative Quantity	Decimal	Cumulative execution quantity
10.	End Sequence	UInt32	Sequence number of the last message expected to be resent. This may be set to 0 to request the sender to transmit ALL messages starting from the Start Sequence
11.	Exec Type	Byte	Execution Type that indicates the reason for the generation of the Execution Report ▪ '0' = New ▪ '4' = Cancel ▪ '5' = Amend ▪ 'C' = Expire ▪ 'F' = Trade ▪ 'H' = Trade Cancel ▪ 'L' = Triggered or Activated by System

12.	Execution ID	Alphanumeric Fixed Length (21)	Unique Execution ID assigned by the system for each Execution Report generated
13.	Execution Price	Decimal	Execution price
14.	Execution Quantity	Decimal	Execution Size
15.	Exec Restatement Reason	UInt16	Code to identify the reason for an Execution Report message with Exec Type= 4 (Cancel) or H (Trade Cancel): ▪ 6 = Cancel on Trading Halt/VCM ▪ 8 = Market Operation (for unsolicited admin / system cancel an order or trade) ▪ 17 = Cancel aggressive due to self-match prevention ▪ 18 = Cancel passive due to self-match prevention ▪ 100 = Unsolicited Cancel for original order (for cancel/replace operation which fails market validation when creating new order) ▪ 101 = On Behalf Of Single Cancel ▪ 102 = On Behalf Of Mass Cancel ▪ 103 = Mass cancelled by Broker ▪ 104 = Cancel on disconnect ▪ 105 = Cancel due to Broker suspension ▪ 106 = Cancel due to Exchange Participant suspension ▪ 107 = System Cancel
16.	Exchange Trade Type	Byte	Exchange assigned Trade Type. ▪ 'M' = Manual Trade ▪ 'S' = Manual Non Standard price ▪ 'Q' = Special Lot ▪ 'P' = Odd Lot ▪ 'R' = Previous Day ▪ 'V' = Overseas ▪ 'E' = Special Lot – Semi Automatic ▪ 'O' = Odd Lot – Semi Automatic
17.	Gap Fill	Byte	Indicates whether the sequence number is to be interpreted in a RESET mode or a GAP-FILL mode: ▪ 'N' = Reset ▪ 'Y' = Gap Fill
18.	Leaves Quantity	Decimal	Open order quantity
19.	Logout Text	Alphanumeric Variable Length (Max = 75)	Textual reason for the logout.

20.	Lookup Reject Code	UInt8	Code to identity the lookup request rejection: ▪ 0 = Invalid Client ▪ 1 = Invalid service type ▪ 2 = Invalid Protocol ▪ 3 = Client is Blocked ▪ 4 = Other
21.	Lot Type	UInt8	Defines the lot type assigned to the order. The absence of this field indicates a Round Lot order: ▪ 1 = Odd Lot ▪ 2 = Round Lot
22.	Match Type	UInt8	The point in the matching process at which this trade was matched: ▪ 4 = Auto Match ▪ 5 = Cross Auction
23.	Max Price Levels	UInt8	The maximum number of price levels to trade through
24.	Message Reject Code	UInt16	Code specifying the reason for the session level rejection: ▪ 1 = Required field missing ▪ 5 = Value is incorrect for this field ▪ 6 = Incorrect data format for value ▪ 11 = Invalid message type ▪ 99 = Other
25.	New Password	Alphanumeric Fixed Length (450)	New encrypted password for Comp ID. Padding scheme supported is PKCS #1 or OAEP.
26.	New Sequence Number	UInt32	Indicates the sequence number of the next message to be sent by the sender
27.	Next Expected Message Sequence	UInt32	Indicates the next expected message sequence number by the party initiating this message
28.	Order ID	Alphanumeric Fixed Length (21)	Order ID of the order
29.	Owning Broker ID	Alphanumeric Fixed Length (12)	Order owner's Broker ID as defined within the OCG-C.
30.	Order Quantity	Decimal	Total order quantity of the order
31.	Order Status	UInt8	Order status after applying the transaction that is being communicated: ▪ 0 = New ▪ 1 = Partially Filled ▪ 2 = Filled ▪ 4 = Cancelled ▪ 12 = Expired

32.	Order Type	UInt8	Order type applicable to the order. Applicable values: ▪ 1 = Market ▪ 2 = Limit
33.	Order Restrictions	Alphanumeric Fixed Length (21)	Multiple values can be sent in the Execution Instructions field separated by a space. Restrictions associated with an order ▪ 2 = Index Arbitrage ▪ 5 = Acting As Market Maker Or Specialist In Security ▪ 6 = Acting As Market Maker Or Specialist In Underlying of a derivative security The above three values are applicable only if Side = 5 (Sell Short)
34.	Order Capacity	UInt8	Designates the capacity of the firm placing the order ▪ 1 = Agency ▪ 2 = Principal
35.	Order Category	UInt8	Defines the type of interest behind a trade: ▪ 1 = Internal Cross Order
36.	Original Client Order ID	Alphanumeric Fixed Length (21)	Client Order ID of the order being amended or cancelled
37.	Password	Alphanumeric Fixed Length (450)	Encrypted password assigned to the Comp ID. Padding scheme supported is PKCS #1 or OAEP.
38.	Position Effect	UInt8	Indicates whether the resulting position after a trade should be an opening position or closing position ▪ 1 = Close Applicable only if: Side = 1 (Buy)
39.	Price	Decimal	Limit price of the order. Required if: Order Type = 2(Limit)
40.	Protocol Type	UInt8	The type of protocol required by the client in order to connect to the specified service: ▪ 1 = Binary
41.	Primary IP	Alphanumeric Fixed Length (16)	The IP of the primary service in case of successful lookup, in x.x.x.x format.
42.	Primary Port	UInt16	The port of the primary service in case of successful lookup
43.	Reference Execution ID	Alphanumeric Fixed Length (21)	Refers to an ExecID previously published in case of a trade cancel or correct

44.	Reference Field Name	Alphanumeric Fixed Length (50)	Name of the field (as per the data dictionary) which caused the rejection
45.	Reference Message Type	UInt8	Type of message rejected.
46.	Reference Sequence Number	UInt32	Sequence number of the message which caused the rejection
47.	Reference Test Request ID	UInt16	Required if the Heat Beat is in response to a Test Request. The value in this field will echo the Test Request ID received in the test Request.
48.	Reason	Alphanumeric Variable Length (Max = 75)	Textual description of the transaction that is being communicated through the Execution Report, Quote Status Report, Mass Cancel Report, Trade Capture Report, etc.
49.	Security Exchange	Alphanumeric Fixed Length (5)	The market which is used to identify the security: ▪ XHKG Required if: Security ID Source = 8 (Exchange Symbol)
50.	Security ID	Alphanumeric Fixed Length (21)	Instrument identifier value of security ID source type.
51.	Security ID Source	UInt8	Identifies the source of the security ID: ▪ 8 = Exchange Symbol
52.	Secondary IP	Alphanumeric Fixed Length (16)	The IP of the mirror service in case of successful lookup
53.	Secondary Port	UInt16	The port of the mirror service in case of successful lookup
54.	Session Status	UInt8	Status of the Binary session. Required if the message is generated by the OCG-C: ▪ 0 = Session active ▪ 1 = Session password change ▪ 2 = Session password due to expire ▪ 3 = New session password does not comply with the policy ▪ 4 = Session logout complete ▪ 5 = Invalid username or password ▪ 6 = Account locked ▪ 7 = Logons are not allowed at this time ▪ 8 = Password expired ▪ 100 = Password change is required ▪ 101 = Other
55.	Side	UInt8	Side of the order: ▪ 1 = Buy ▪ 2 = Sell ▪ 5 = Sell Short

56.	SMP ID	Alphanumeric Fixed Length (10)	The identifier to prevent self-matching.
56.57.	Start Sequence	UInt32	Sequence number of the first message expected to be resent
57.58.	Status	UInt8	Indicates whether the Lookup Request was accepted or rejected by the OCG-C. ▪ 0 = Accepted ▪ 1 = Rejected
58.59.	Submitting Broker ID	Alphanumeric Fixed Length (12)	The Broker ID of the user that is submitting the new order
59.60.	Text	Alphanumeric Variable Length (Max = 50)	Free Text
60.61.	Time In Force – TIF	UInt8	Time qualifier of the order. Absence of this field is interpreted as Day (0). Applicable values: ▪ 0 = Day (Default) ▪ 3 = IOC ▪ 4 = FOK ▪ 9 = At Crossing (for orders in Auction session)
61.62.	Test Message Indicator	UInt8	The Test Message Indicator field will be used to indicate whether the binary client is connected to the 'Test' or 'Production Mode' of the system when the OCG-C replies with a LOGON message upon a successful logon attempt: ▪ 0 = No (Production Mode) ▪ 1 = Yes (Test Mode)
62.63.	Test Request ID	UInt16	A unique ID applicable to the Test Request.
63.64.	Transaction Time	Alphanumeric Fixed Length (25)	The time at which the particular message was generated Format: YYYYMMDD-HH:MM:SS.ssssss, UTC
64.65.	Trade Type	UInt8	Type of the trade being reported: ▪ 4 = Late Trade ▪ 22 = Privately Negotiated Trade ▪ 102 = Odd Lot Trade ▪ 104 = Overseas Trade
65.66.	Trade Report ID	Alphanumeric Fixed Length (21)	Unique Identification for trade capture report as assigned by the reporting party of the specific transaction. (to be returned to the reporting broker)

~~66.~~67.	Trade Report Trans Type	UInt8	Identifies the trade report message transaction type: ▪ 0 = New ▪ 2 = Replace ▪ 5 = Cancel due to back out of the trade (for both buyer and seller if Exec Type = L)
~~67.~~68.	Trade Report Type	UInt8	Type of the Trade Report: ▪ 0 = New ▪ 6 = Trade Report Cancel
~~68.~~69.	Trade Report Status	UInt8	Trade Report Status: ▪ 0 = Accepted ▪ 1 = Rejected Absence of this field indicates 0 = Accepted
~~69.~~70.	Trade ID	Alphanumeric Fixed Length (25)	The unique ID assigned to the trade entity once it is received or matched by the exchange
~~70.~~71.	Trade Match ID	Alphanumeric Fixed Length (25)	Identifier assigned to a trade by the matching system
~~71.~~72.	Trade Handling Instructions	UInt8	Indicates how the trade capture report should be handled by the receiver: ▪ 0 = Trade Confirm
~~72.~~73.	Type of Service	UInt8	The type of service required by the client: ▪ 2 = Drop Copy

Appendices

A. Password Policy

- Length is 8 characters.

- Must comprise of a mix of alphabets (A-Z and a-z) and digits (0-9)

- Must be changed on first-time logon or first logon after reset from HKEX market operations.

- New password can't be one of the previous 5 passwords.

- Can't be changed more than once per day.

- Session will be locked after 3 consecutive invalid passwords

- Expires every 90 days.

A. Password Policy