Connectivity Guide

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

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1. Document Control

1.1 Change History

Version Number	Issue Date	Section Number	Status
1.0	28 May 2013	All	First Version
1.1	20 January 2014	Appendix D – Worksheet for Application of Production Circuit for HKEx Orion Central Gateway (OCG) Session and HKEx Orion Market Data Platform – Securities Market (OMD-C)	Revised Version
1.2	15 December 2015	Appendix A – SDNet/2 Accredited Vendors Information	Revised Version
1.3	27 July 2017	Various sections – update HKEX name & logo, update PCCW to HKT, update Wharf T&T to WTT, remove OG & MDF Appendix D – Private Policy Statement	Revised Version
2.0	14 March 2018	Section 3.4, 4.2, Appendix A & D – Update URLs for OMD connectivity guide Update URLs for SDNet/2 Section 4.1 – Update the name of accredited vendors and figure 5. Appendix B – IP address of OCG End-to-End Test Site	Revised Version
2.1	8 November 2018	Various sections – update OMD-C bandwidth requirement Appendix D – Private Policy Statement	Revised Version
2.2	10 May 2019	Appendix D – update OMD-C bandwidth requirement	Revised Version
2.3	17 March 2020	Appendix B – IP address of OCG End-to-End & Prod-Lite Test Site	Revised Version
2.4	14 April 2020	Various sections – Update accredited vendors to change company name from WTT to HKBNES and to remove HGC from the accredited vendor list	Revised Version
3.0	19 March 2021	CMG Migration - Global substitution of Orion Central Gateway & OCG by Cash Market Gateway & CMG respectively.	Revised Version

Version Number	Issue Date	Section Number	Status
3.0	17 September 2021	Change the name CMG to OCG-C	Revised Version

2. Overview

This document aims to provide network configuration information and guidance to assist end-users ("EPs") in setting up their networks for making connection to HKEX Orion Central Gateway - Securities Market ("OCG-C") production and testing environments.

This document contains:

- Configuration information, i.e. IP addresses of the OCG-C system in OCG-C Production environment and End-to-End Test environment
- Guidelines / policies for SDNet/2 and HKEX Service Network ("HSN") connection

3. OCG-C Production Network Configuration Information

This section mainly provides information for the connectivity of the Broker Supplied System (BSS) from the Exchange Participant ("EP")'s end to HKEX's OCG-C production environment. It covers the following topics:

- Network configuration at EP's end
- Bandwidth of SDNet/2 Circuits for OCG-C
- Routing Setup on BSS (including configuration notes for BSS with firewall/NAT requirement)
- Sharing SDNet/2 Circuit between OCG-C and HKEX Orion Market Data Platform – Securities Market ("OMD-C")
- OCG-C Access for HSN users

3.1 Network Configuration at EP's End in SDNet/2
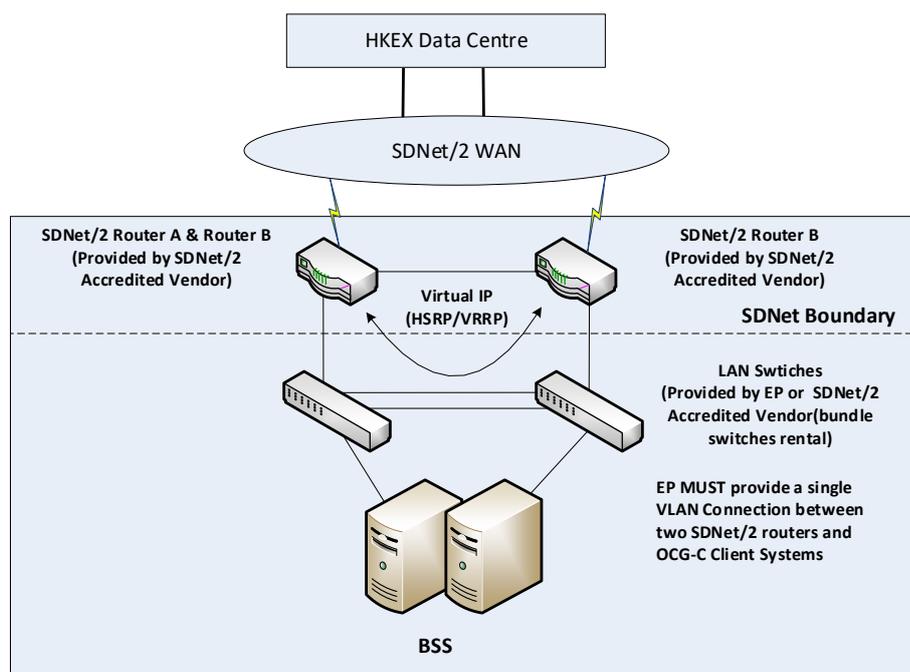
Figure-1 EP Network for OCG-C

Dual-circuits connection is required for connecting to OCG-C services. EP may connect to OCG-C Services via SDNet/2 circuit. Currently, EPs can choose one or more of the following SDNet/2 Accredited Vendors for connecting to SDNet/2:

- Hong Kong Telecommunications (HKT) Limited (HKT)
- HKBN Enterprise Solutions HK Limited (HKBNES)

After submission of production circuit installation form to SDNet/2 Accredited Vendors, they will install a pair of SDNet/2 routers and provide EPs with the following information for their switch (provided by EPps or Accredited Vendors bundle switch rental) configuration:

Router Interface	Gigabit Ethernet Interface (Physical port is assigned by SDNet/2 Accredited Vendor)
Port Speed	Auto Sense up to 1Gbps
Duplex Mode	Auto Negotiation
HSRP/VRRP Group	61
IP Subnet	An IPv4 subnet (A.B.C.0) will be provided by SDNet/2 Accredited Vendor and the subnet mask is 255.255.255.0
Gateway IP	Virtual IP (Virt-IP) is A.B.C.254
EP's usable IP address range	EP may use **A.B.C.1 to A.B.C.223** to assign IP address for their BSS servers and network devices, The range from A.B.C.224 to A.B.C.254 are reserved by HKEX.

Note:

- EP's network switches MUST provide a single VLAN (Layer 2) connection for the two SDNet/2 routers for HSRP/VRRP communication between themselves
- HSRP/VRRP group 61 is used for OCG-C. EPs should avoid using this group number in the SDNet/2 EP subnet
- BSS must be configured with the recommended IP address range within the allocated subnet
- All EPs have to submit their BSS IP addresses to HKEX for registration
- No routing protocol will be exchanged between SDNet/2 routers and EP's network
- Both lines of each pair of SDNet/2 dual-circuits must be installed by the same Accredited Vendor

3.2 Bandwidth of SDNet/2 Circuits for OCG-C

Based on the needs of EPs, EPs should subscribe to bandwidth equal to or greater than the minimum requirement from the SDNet/2 Accredited Vendors.

The minimum SDNet/2 circuit bandwidth for OCG-C depends on the total number of throttles of all OCG-C sessions assigned in EP's BSSs connecting to the same pair of SDNet/2 circuits. The bandwidth per throttle for different messages is shown in the following table.

OCG-C Sessions	Minimum Bandwidth Requirement ([1]) (FIX & Binary)
Trading	40 Kbps / Throttle
Drop Copy (Orders and Trades Option)	40 Kbps / Throttle ([2])
Drop Copy (Trades Only Option)	20 Kbps / Throttle ([2])

Table-1 Bandwidth Estimation for OCG-C

Note:
1. Minimum bandwidth requirement is also applicable to HSN.
2. Throttle calculation for Drop Copy session:
   - Drop Copy session includes orders and trades from the OCG-C sessions.

3.3 Routing Setup on BSS in SDNet/2

HKEX Primary Site

OCG-C Server Farm
10.1.93.0/24

HKEX Backup Site

OCG-C Server Farm
10.2.93.0/24

SDNet/2 WAN

SDNet/2
Router A

SDNet/2
Router B

Virt-IP = Virtual Gateway IP at Client Subnet

Routing Setup on BSS:
Route 10.1.93.0 mask 255.255.255.0 next-hop Virt-IP
Route 10.2.93.0 mask 255.255.255.0 next-hop Virt-IP

BSS
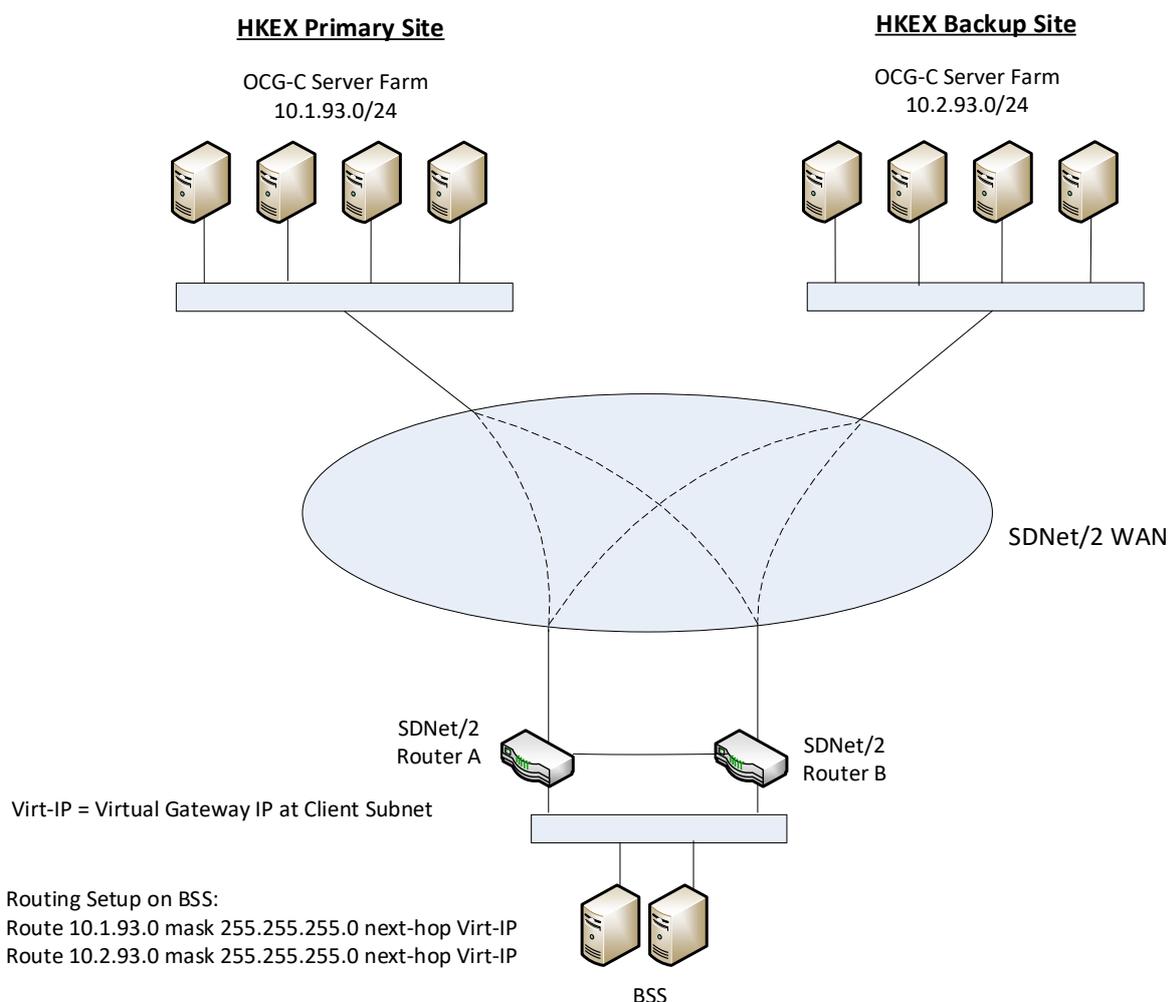
Figure-2 BSS Network Setup for OCG-C

Figure-2 provides an overview of the BSS setup for OCG-C. At the physical layer, the infrastructure is made of two routers which provide network redundancy and isolation to failure. HKEX recommends that EPs utilize a fully redundant SDNet/2 connection from both routers and EPs are recommended to direct their BSS traffic to the virtual gateway IP at the SDNet/2 EP's subnet provided by the SDNet/2 Accredited Vendor.

If the BSS is not directly connected to the SDNet/2 EP's subnet, Network Address Translation (NAT) should be employed at the EP's network so that the OCG-C servers at HKEX are still connecting to the BSS with IP addresses at SDNet/2 EP's subnet (i.e. A.B.C.1 to A.B.C.223). In addition, the EP's network devices should be configured with the routing to the HKEX OCG-C servers via the "Virt-IP" provided by the SDNet/2 Accredited Vendors.

3.4 Sharing SDNet/2 Circuit between OCG-C & OMD-C
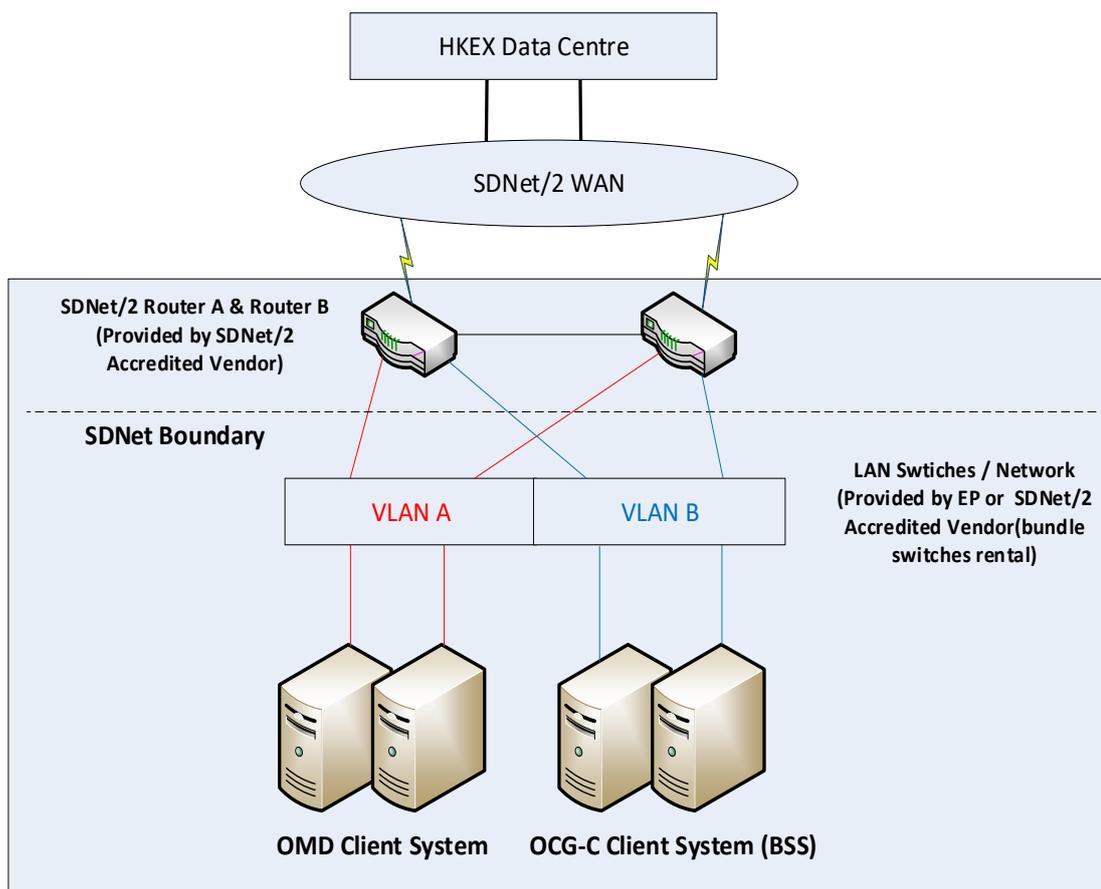
Figure-3 Sharing SDNet/2 Circuit between OCG-C and OMD-C

In the production environment, SDNet/2 has been designed to allow OMD-C and OCG-C applications to share the same physical connection. Provided there is enough bandwidth available and the business requirements warrant it, EPs can run these two applications over a single set of physical circuits. The minimum bandwidth of SDNet/2 circuits should be equal to or greater than the sum of minimum bandwidth of OCG-C and OMD-C. The minimum bandwidth for OCG-C is described in section 3.2 while the OMD-C is described in the OMD Connectivity Guide for Securities Market & Index Datafeed Products.

An example of sharing OMD-C Standard Security Package with OCG-C, the minimum bandwidth subscribed from SDNet/2 Accredited Vendor is 16Mbps with following allocation.

Typical Bandwidth Allocation for Sharing a 16M bps SDNet/2 Circuit		
OCG-C Session	OMD-C (SS) – Unicast	OMD-C (SS) – Multicast
800Kbps*	200Kbps	15Mbps

*800Kbps bandwidth is available for OCG-C trading and drop copy sessions (refer section 3.2 for OCG-C bandwidth requirement)

Table-2 Bandwidth allocation for Multiple Services on SDNet/2 Circuits

As a normal installation for SDNet/2 service, SDNet/2 Accredited Vendors will install a pair of routers for sharing OMD-C and OCG-C applications. Please note that:

- Separated Gigabit Ethernet interfaces on SDNet/2 routers for different applications
- If EPs share the same switches for OMD-C and OCG-C applications, two separated VLANs (e.g. VLAN A and VLAN B) must be configured as shown in the diagram above.
- SDNet/2 Accredited Vendor will provide different client Subnets and Gateway IP addresses for OCG-C and OMD-C respectively
- Bandwidth is separated between OMD-C and OCG-C.
- EP must subscribe sufficient bandwidth based on actual requirements (i.e. equal to or greater than the sum of OCG-C and OMD-C)

If the subscribed bandwidth is greater than the sum of minimum bandwidth of OCG-C and minimum bandwidth OMD-C, the excess bandwidth will be allocated to OCG-C.

In considering sharing the circuit between OCG-C and OMD-C, EPs should also note the followings:

i) In case of failure/interruption of the shared circuits, trading activities and datafeed products using this set of circuits will be affected; and

ii) Troubleshooting for network related issues (e.g. performance, latency or packet loss etc.) may be more complicated and time consuming. EPs need to assess impact of this risk in making the circuit sharing decision.

3.5 OCG-C Access for HSN Users
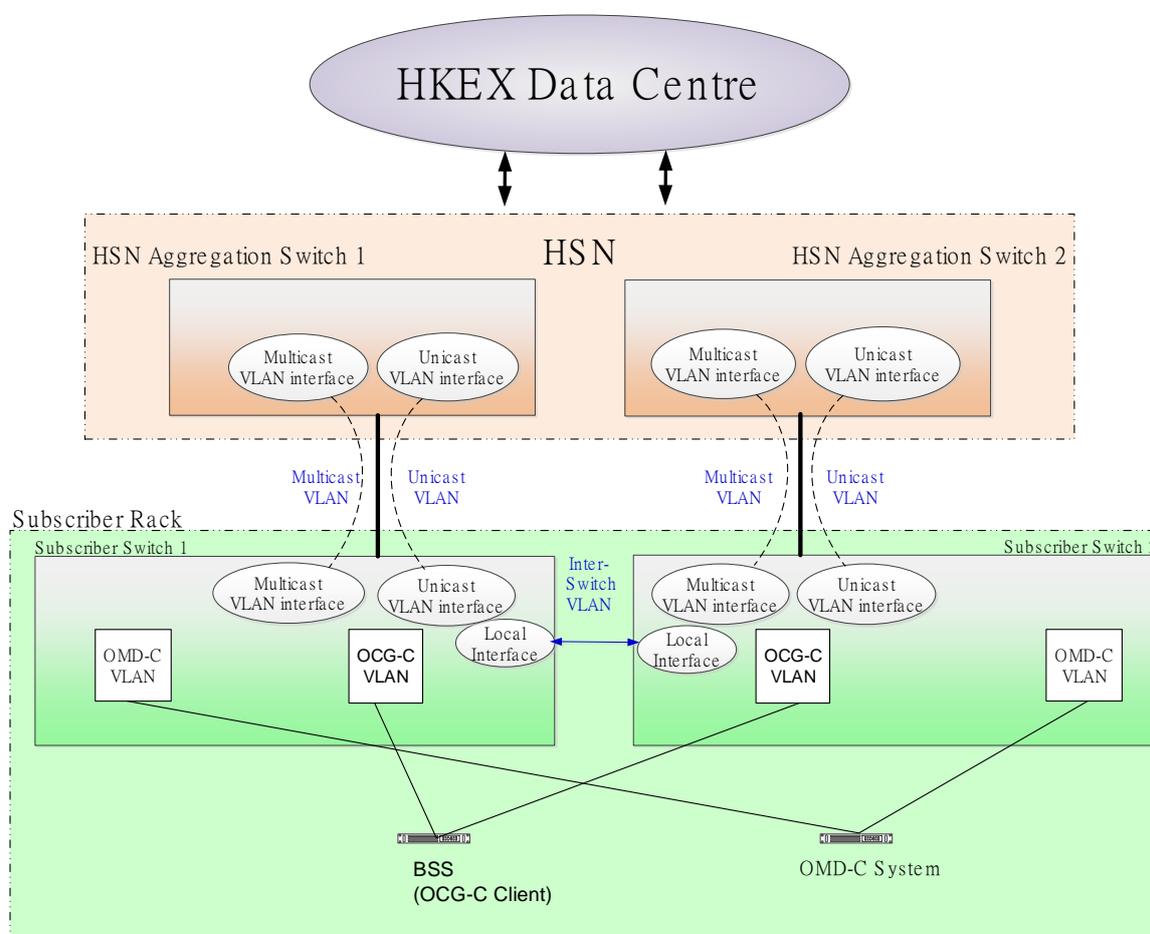
Figure-4 HSN for OCG-C and OMD-C

EP may choose to connect their equipment directly at HKEX Hosting Data Centre via HSN connections. In such a case, the EP will be responsible for providing their own layer 3 switch or router to HSN. Each pair of subscriber switches can support multiple applications, including OMD-C and OCG-C client with individual VLAN. Multicast and Unicast will be separated in the HSN ports. Since BSS (OCG-C client) has Unicast traffic only, it will only run in the Unicast VLAN between HSN and subscriber switch. For details, EP may refer to the Interface Specification on Connectivity Services and Timing Service from Hosting Services or contact HKEX Hosting Services team via email hssales@hkex.com.hk.

Note:

After OCG-C service was subscribed in HSN, a detail Interface Specification and IP address information will be provided to the EPs including the following:

- IP subnet address for BSS
- Layer 3 switch IP and VLAN information

- BGP peering connectivity detail for new HSN port

Before connecting BSS to the HSN production network, subscriber is required to conduct a Network Commissioning Test to verify the network setup in the subscriber layer 3 switches.

Besides, subscriber is required to conform the HSN Connectivity Extension Restriction which is set out in the paragraph headed "B. Connectivity Services – (i) HKEX Service Network (HSN) Connectivity Service" in Schedule 2 to the Hosting Agreement, which reads as follow:

"Connection provided under the HSN Connectivity Service shall not be extended outside the Site by the Subscriber by any means."

For the sake of assisting your company in ensuring compliance with the HSN Connectivity Extension Restriction, please note that equipment that is used for connection to the various trading systems through the HSN Connectivity should be installed inside the HKEX Data Center. Such equipment shall include computer servers, network equipment, equipment running the Broker Supplied System or the OMnet Application Programming Interface for automatic generation of orders including algorithmic trading orders and market making quotes and equipment running the Open Gateway or Network Gateway applications. A connection through the HSN Connectivity via any of the abovementioned equipment installed outside the Data Center would be regarded as an extension of the HSN Connectivity outside the Data Center and thus a breach of the HSN Connectivity Extension Restriction.

For more details, subscriber should refer to the "Guidance Note on HKEX Service Network Connectivity Extension Restriction" (HDS/16/0206) in HKEX Website and signed Hosting Services Subscription Agreement.

4. OCG-C End-to-End Test Network Configuration Information

This section mainly provides information for the connectivity of the Broker Supplied System (BSS) from the EP's end to HKEX's OCG-C End-to-End (E2E) test environment. It covers the following topics:

- Network configuration at EP's end (Single circuit)
- Sharing Testing SDNet/2 Circuit among OCG-C and OMD-C
- OCG-C End-to-End test environment access for HSN users

4.1 Network Configuration at EP's End (Single Circuit)

HKEX Development Site

OCG-C Server Farm
10.1.93.0/24

SDNet/2 WAN

SDNet/2
Router A

Virt-IP = Virtual Gateway IP at Client Subnet

Routing Setup on Client Servers:
Route 10.1.93.0 mask 255.255.255.0 next-hop Virt-IP

Servers of Client System
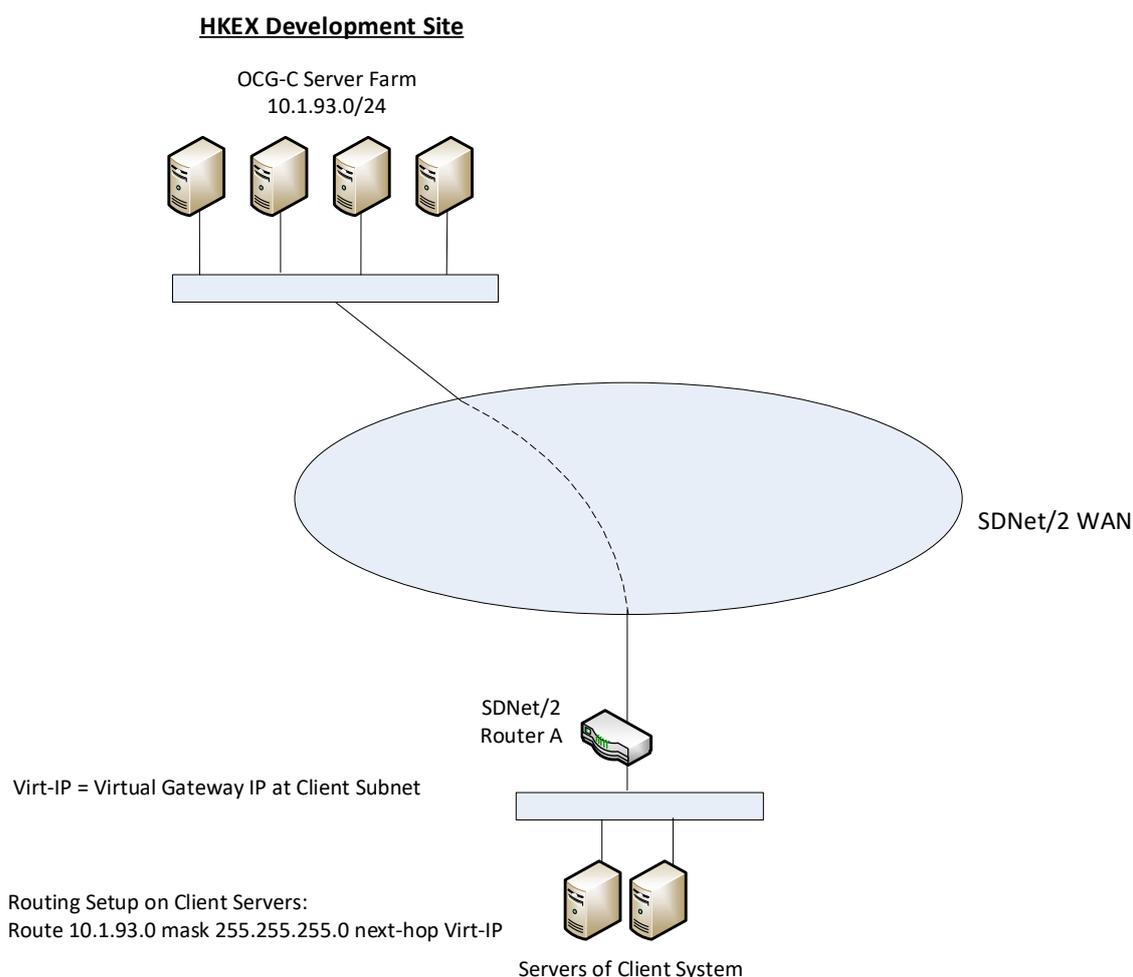
Figure-5 End-to-End Testing Network for OCG-C (Single SDNet/2 Circuit)

Figure-5 provides an overview of the End-to-End OCG-C testing network setup for single SDNet/2 circuit.

Similar to Production environment, the E2E test environment is carrier neutral. EPs can choose one or more of the following SDNet/2 Accredited Vendors for connecting to SDNet/2:

- Hong Kong Telecommunications (HKT) Limited (HKT)
- HKBN Enterprise Solutions HK Limited (HKBNES)

For conducting OCG-C E2E test, a single SDNet/2 testing circuit is required. EPs can apply for a new testing circuit from SDNet/2 Accredited Vendors. After submission of testing circuit application form to SDNet/2 Accredited Vendors, they will install SDNet/2 router (for new application) for EPs and provide EPs with the following information for their switch (provided by EpPs or Accredited Vendors bundle switch rental) configuration:

Router Interface	Gigabit Ethernet Interface (Physical port is assigned by SDNet/2 Accredited Vendor)
Port Speed	Auto Sense up to 1Gbps
Duplex Mode	Auto Negotiation
HSRP/VRRP Group	61
IP Subnet	An IPv4 subnet (A.B.C.0) will be provided by SDNet/2 Accredited Vendor and the subnet mask is 255.255.255.0
Gateway IP	Virtual IP (Virt-IP) is A.B.C.254
EP's usable IP address range	EP may use **A.B.C.1 to A.B.C.223** to assign IP address for their BSS servers and network devices, The range from A.B.C.224 to A.B.C.254 are reserved by HKEX.

Note:

- EP's network switches MUST provide a single VLAN (Layer 2) connection for the single SDNet/2 router for HSRP/VRRP communication between themselves
- HSRP/VRRP group 61 is used for OCG-C. EPs should avoid using this group number in the SDNet/2 EP subnet
- BSS must be configured with the recommended IP address range within the allocated subnet
- All EPs have to submit their BSS IP addresses to HKEX for setting up E2E sessions with OCG-C E2E Test Server
- No routing protocol will be exchanged between SDNet/2 router and EP's network

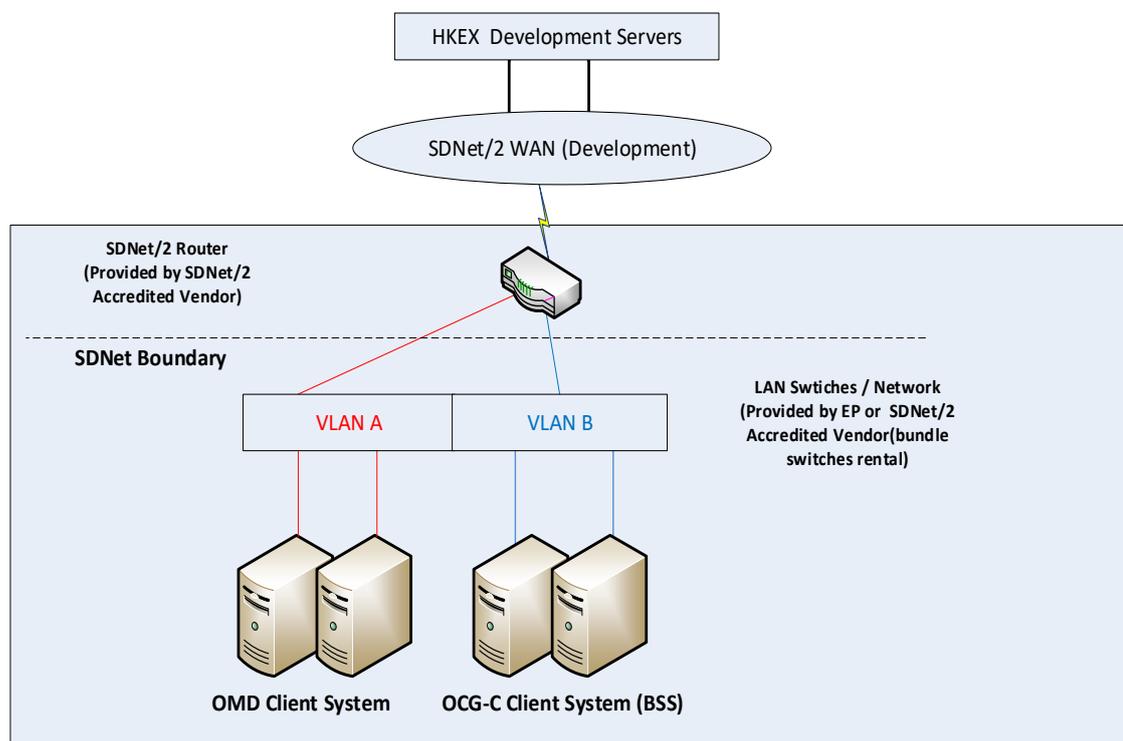## 4.2 Sharing Testing SDNet/2 Circuit among OCG-C and OMD-C

Figure-6 Sharing SDNet/2 Testing Circuit among OCG-C and OMD-C

For EPs who plan to receive market data via direct connection to OMD-C upon OCG-C rollout and want to get real time market data during OCG-C E2E test, OMD-C feed [i.e. either OMD-C(SS), OMD-C(SP) or OMD-C(SF)] is provided. If EPs wish to have OMD-C feed (for OCG-C E2E test) and OCG-C application running on the same testing circuit, please take note of the below minimum bandwidth requirement :

Applications	Minimum Bandwidth
OCG-C	1Mbps
OCG-C + OMD-C Feed {For OCG-C End-to-End test only}	3Mbps

Table-3 Bandwidth and Circuit Requirements for OCG-C and OMD-C on SDNet/2 Circuit

EPs who plan to receive market data directly from OMD-C in production environment should note that they are also required to separately conduct Readiness Test on OMD-C which needs dual-circuits with at least 16 Mbps bandwidth. Should EPs wish to use the same set dual-circuits to connect to OCG-C application, OMD-C feed in OCG-C E2E test environment and OMD-C feed in OMD-C Readiness test environment for testing purpose, EPs need to contact their SDNet/2 Accredited Vendor regarding the feasibility, logistic arrangement, additional bandwidth requirement and the associated configuration fee. Completion of OCG-C E2E test using the

OMD-C Feed should not be regarded as having completed the Readiness Test of receiving market datafeed. For more details regarding OMD-C Readiness Test, EPs should refer to "OMD Connectivity Guide for Securities Market and Index Datafeed Products" for the bandwidth and connection requirement to connect to OMD-C Readiness Test Environment and OMD-C Production System.

4.3   OCG-C End-to-End Test Environment Access for HSN Users

To facilitate EP application of testing to simulate HSN network in HKEX Data Center, subscriber can subscribe Hosting Services Testing Network (HSTN). A pair of 1G/100Mbps UTP ports is provided to each subscriber rack.

For details of HSTN network setup, EP may refer to the Interface Specification on Connectivity Services and Timing Service from Hosting Services, or contact HKEX Hosting Services team via email hssales@hkex.com.hk .

5. Other Guidelines on OCG-C Connections

5.1 Installation of SDNet/2 Circuits and HSN

5.1.1 SDNet/2 circuits

EPs are required to contact the SDNet/2 Accredited Vendors for installation of SDNet/2 circuits for OCG-C connection. Details of the SDNet/2 Accredited Vendors and reference costs charged by different SDNet/2 Accredited Vendors can be found in Appendix A.

5.1.2 HSN

EPs who will use HKEX's Hosting Service for OCG-C connection should contact our Hosting Service team directly for details on the HSN.

5.2 Bandwidth Requirements

To facilitate EPs in assessing the bandwidth requirement and communication with SDNet/2 Accredited Vendors and HKEX Hosting Services on the SDNet/2 production circuit and HSN respectively, "Worksheet for Application of Circuit for HKEX Orion Central Gateway - Securities Market (OCG-C) Session and HKEX Orion Market Data Platform – Securities Market (OMD-C)" is attached in Appendix D for easy reference.

6. Enquiry Hotline

	Contact No.	Email Address
For HSN service	2211-6447	hssales@hkex.com.hk
For SDNet/2 service		
Hong Kong Telecommunications (HKT) Limited	2888-2929 or dedicated Account Manager	sdnet@pccw.com or email to dedicated Account Manager
HKBN Enterprise Solutions HK Limited	2112-9000(Ordering) 121-388 (Billing & General Enquiry)	sdnet@hkbn.com.hk
For enquiry on Connectivity Guide	2840-3351	bsssupport@hkex.com.hk

Appendices

Appendix A – SDNet/2 Accredited Vendors Information

Three Accredited Vendors have been selected and accredited to provide SDNet/2 network services. These vendors are (in alphabetical order):

- HKBN Enterprise Solutions HK Limited (HKBNES)

- Hong Kong Telecommunications (HKT) Limited (HKT)

For details of SDNet/2 circuit price information/ technical specification/ service level, please refer to https://www.hkex.com.hk/services/connectivity/sdnet-2/securities-trading-(otpc-shanghai-and-shenzhen-connect)?sc_lang=en~~http://www.hkex.com.hk/services/connectivity/sdnet-2/securities-trading-(ams3-shanghai-and-shenzhen-connect)?sc_lang=en~~.

For the diagram of SDNet/2 network equipments, space requirements and power supplies, please refer to "SDNet/2 Installation Guidelines" https://www.hkex.com.hk/services/connectivity/sdnet-2/securities-trading-(otpc-shanghai-and-shenzhen-connect)?sc_lang=en~~http://www.hkex.com.hk/services/connectivity/sdnet-2/securities-trading-(ams3-shanghai-and-shenzhen-connect)?sc_lang=en~~.

Appendix B – OCG-C Server Connectivity Information

OCG-C Primary Site:

OCG-C Binary Order Flow Service Lookup Server IP Range	10.1.93.11 – 10.1.93.51
OCG-C Binary Order Flow Service Lookup Server Port Range	50001 - 50100
OCG-C Binary & FIX Order Flow Server IP Range	10.1.93.11 – 10.1.93.51
OCG-C Binary & FIX Order Flow Server Port Range	50001 - 50100
OCG-C Binary Drop Copy Service Lookup Server IP Range	10.1.93.11 – 10.1.93.51
OCG-C Binary Drop Copy Service Lookup Server Port Range	50001 - 50100
OCG-C Binary & FIX Drop Copy Gateway Server IP Range	10.1.93.11 – 10.1.93.51
OCG-C Binary & FIX Drop Copy Gateway Server Port Range	50001 - 50100

OCG-C Backup Site:

OCG-C Binary Order Flow Service Lookup Server IP Range	10.2.93.11 – 10.2.93.51
OCG-C Binary Order Flow Service Lookup Server Port Range	50001 - 50100
OCG-C Binary & FIX Order Flow Server IP Range	10.2.93.11 – 10.2.93.51
OCG-C Binary & FIX Order Flow Server Port Range	50001 - 50100
OCG-C Binary Drop Copy Service Lookup Server IP Range	10.2.93.11 – 10.2.93.51
OCG-C Binary Drop Copy Service Lookup Server Port Range	50001 - 50100
OCG-C Binary & FIX Drop Copy Gateway Server IP Range	10.2.93.11 – 10.2.93.51
OCG-C Binary & FIX Drop Copy Gateway Server Port Range	50001 - 50100

OCG-C End-to-End Test & Prod-Lite Test Site:

OCG-C Binary Order Flow Service Lookup Server IP Range	10.1.93.101 – 10.1.93.220
OCG-C Binary Order Flow Service Lookup Server Port Range	50001 – 50100
OCG-C Binary & FIX Order Flow Server IP Range	10.1.93.101 – 10.1.93.220
OCG-C Binary & FIX Order Flow Server Port Range	50001 – 50100
OCG-C Binary Drop Copy Service Lookup Server IP Range	10.1.93.101 – 10.1.93.220
OCG-C Binary Drop Copy Service Lookup Server Port Range	50001 – 50100
OCG-C Binary & FIX Drop Copy Gateway Server IP Range	10.1.93.101 – 10.1.93.220
OCG-C Binary & FIX Drop Copy Gateway Server Port Range	50001 - 50100

Note:

The OCG-C IP address and port ranges provided in the table above are reserved for the client connection of the OCG-C servers. Actual OCG-C IP address and port number will be provided to the EPs upon enrolment of the OCG-C service in the production environment or the end-to-end test environment.

Appendix C – OMD Connectivity Information for OCG-C End-to-End Test

Please refer the "OMD Connectivity Guide for Securities Market and Index Datafeed Products" in OMD-C web Corner for the OMD connectivity information for OCG-C End-to-End test in the end-to-end test environment.

Appendix D – Worksheet for Application of Production Circuit for HKEX Orion Central Gateway - Securities Market (OCG-C) Session and HKEX Orion Market Data Platform – Securities Market (OMD-C)

Notes :
1. This worksheet aims at assisting Exchange Participant (EP) in making arrangement with SDNet/2 Accredited Vendors for SDNet/2 production circuit or HKEX Hosting Services for production HKEX Service Network installation. SDNet/2 Accredited Vendors and HKEX Hosting Services are collectively referred to as "network providers" in this worksheet.
2. EP should provide the completed worksheet to the network provider when placing order for the production lines. It is not required to return the completed worksheet to HKEX **except when the production lines will be used for receiving data from OMD-C channels (i.e. Section D is filled in). Worksheets with Section D filled in should be returned to HKEX – Market Data by email to IVsupport@hkex.com.hk**.
3. Separate dual circuits may be required for each installation address. **Please use one worksheet for each set of dual circuits required.**
4. Please refer to the "Guides" for how to complete the worksheet(s) for your OCG-C and OMD-C connections.
5. EP is responsible for arranging with network providers directly for circuits and network switch(es) installation, quotation and billing arrangement.
6. EP needs to ensure sufficient bandwidth to meet its business requirement and the connection.

Part I - Participant Information

Name of Exchange Participant		Participant ID	
Contact Person Name		Email Address	
Office Phone No.	Mobile Phone No.	Fax No.	

Part II – Type of Connection to Circuit

Section A OCG-C Session					
OCG-C Session			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CO	☐	☐		40 Kbps/throttle	
CO	☐	☐		40 Kbps/throttle	
CO	☐	☐		40 Kbps/throttle	
CO	☐	☐		40 Kbps/throttle	
				[A] *Sub-total :*	

Section B	Drop-Copy Session for Orders & Trades				
Drop-Copy Session			No. of Throttle	Minimum bandwidth	Bandwidth Required(per line)
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CC	☐	☐		40 Kbps/throttle	
CC	☐	☐		40 Kbps/throttle	
				[B] *Sub-total :*	

Section C	Drop-Copy Session for Trades Only				
Drop-Copy Session			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CC	☐	☐		20 Kbps/throttle	
CC	☐	☐		20 Kbps/throttle	
				[C] *Sub-total :*	

Section D	OMD-C Subscription			
Datafeed Product	Product Selected	With Any Combination[1] of the Following Complimentary Datafeed(s)	Allocation of Bandwidth	
			OMD-C Multicast	OMD-C Unicast
Securities Standard (SS) *[included Conflated Broker Queue]*	☐	a) Odd Lot Order (OLO) ☐	15 Mbps	200 Kbps
Securities Premium (SP) - **without** Conflated Broker Queue (CBQ) [2]	☐		28 Mbps	200 Kbps
Securities Premium (SP) + Conflated Broker Queue (CBQ) [2]	☐	b) Index Feed (INDEX) ☐	35 Mbps	200 Kbps
Securities FullTick (SF) - **without** Conflated Broker Queue (CBQ) [2]	☐		51 Mbps	200 Kbps
Securities Fulltick (SF) + Conflated Broker Queue (CBQ) [2]	☐	c) Stock Connect Market Feed (SCM) ☐	58 Mbps	200 Kbps
		[D] *Sub-total :*		

[1] *EP could subscribe any combination (i.e. a + c) / all of Complimentary Datafeed(s)*
[2] *Must be High Performance Option*

Part III – Bandwidth Information

Minimum Bandwidth Required **[A]+ [B]+ [C]+ [D]**	:	

Part IV – Production Line Information (Dual Circuits)

Production Line Configuration :		
1	❑	New Application
2	❑	Switch from existing single SDNet/2 BSS testing line and install one new backup SDNet/2 line
3	❑	Switch from existing dual SDNet/2 lines for OMD-C Readiness Test to OCG-C production lines
4	❑	Re-deploy not in use SDNet/2 dual lines to OCG-C production lines
5	❑	Share with the existing OMD-C production lines

Primary Circuit No.:		Secondary Circuit No.:		
Bandwidth Subscribed :		High Performance Option :	❑ Yes ❑ No	
Installation Address :				
Accredited Vendor :	❑ HKT ❑ HKBNES ❑ HKEX Service Network			
Installation Date :				

By signing below, we consent to the processing of personal data in accordance with the Privacy Policy Statement included in this form.

Signature of Person In Charge
with Company Chop   : _____   Date : _____

Name of Person In Charge   : _____

Privacy Policy Statement

Hong Kong Exchanges and Clearing Limited, and from time to time, its subsidiaries (together the "**Group**") (and each being "**HKEX**", "**we**", "**us**" or "**member of the Group**" for the purposes of this Privacy Policy Statement as appropriate) recognise their responsibilities in relation to the collection, holding, processing, use and/or transfer of personal data under the Personal Data (Privacy) Ordinance (Cap. 486) ("**PDPO**"). Personal data will be collected only for lawful and relevant purposes and all practicable steps will be taken to ensure that personal data held by us is accurate. We will use your personal data which we may from time to time collect in accordance with this Privacy Policy Statement.

We regularly review this Privacy Policy Statement and may from time to time revise it or add specific instructions, policies and terms. Where any changes to this Privacy Policy Statement are material, we will notify you using the contact details you have provided us with and, where required by the PDPO, give you the opportunity to opt out of these changes by means notified to you at that time. Otherwise, in relation to personal data supplied to us through the HKEX website or otherwise, continued use by you of the HKEX website or your continued relationship with us shall be deemed to be your acceptance of and consent to this Privacy Policy Statement, as amended from time to time.

If you have any questions about this Privacy Policy Statement or how we use your personal data, please contact us through one of the communication channels set out in the "Contact Us" section below.

We will take all practicable steps to ensure the security of the personal data and to avoid unauthorised or accidental access, erasure or other use. This includes physical, technical and procedural security methods, where appropriate, to ensure that the personal data may only be accessed by authorised personnel.

Please note that if you do not provide us with your personal data (or relevant personal data relating to persons appointed by you to act on your behalf) we may not be able to provide the information, products or services you have asked for or process your requests, applications, subscriptions or registrations, and may not be able to perform or discharge the Regulatory Functions (defined below).

Purpose

From time to time we may collect your personal data including but not limited to your name, mailing address, telephone number, email address, date of birth and login name for the following purposes:

1. to process your applications, subscriptions and registration for our products and services;
2. to perform or discharge the functions of HKEX and any company of which HKEX is the recognised exchange controller (as defined in the Securities and Futures Ordinance (Cap. 571)) ("Regulatory Functions");
3. to provide you with our products and services and administer your account in relation to such products and services;
4. to conduct research and statistical analysis;
5. to process your application for employment or engagement within HKEX to assess your suitability as a candidate for such position and to conduct reference checks with your previous employers; and
6. other purposes directly relating to any of the above.

Direct marketing

Where you have given your consent and have not subsequently opted out, we may also use your name, mailing address, telephone number and email address to send promotional materials to you and conduct direct marketing activities in relation to HKEX financial services and information services, and financial services and information services offered by other members of the Group.

If you do not wish to receive any promotional and direct marketing materials from us or do not wish to receive particular types of promotional and direct marketing materials or do not wish to receive such materials through any particular means of communication, please contact us through one of the communication channels set out in the "Contact Us" section below. To ensure that your request can be processed quickly please provide your full name, email address, log in name and details of the product and/or service you have subscribed.

Identity Card Number

We may also collect your identity card number and process this as required under applicable law or regulation, as required by any regulator having authority over us and, subject to the PDPO, for the purpose of identifying you where it is reasonable for your identity card number to be used for this purpose.

Transfers of personal data for direct marketing purposes

Except to the extent you have already opted out we may transfer your name, mailing address, telephone number and email address to other members of the Group for the purpose of enabling those members of the Group to send promotional materials to you and conduct direct marketing activities in relation to their financial services and information services.

Other transfers of your personal data

For one or more of the purposes specified above, your personal data may be:

1. transferred to other members of the Group and made available to appropriate persons in the Group, in Hong Kong or elsewhere and in this regard you consent to the transfer of your data outside of Hong Kong;
2. supplied to any agent, contractor or third party who provides administrative, telecommunications, computer, payment, debt collection, data processing or other services to HKEX and/or any of other member of the Group in Hong Kong or elsewhere; and
3. other parties as notified to you at the time of collection.

How we use cookies

If you access our information or services through the HKEX website, you should be aware that cookies are used. Cookies are data files stored on your browser. The HKEX website automatically installs and uses cookies on your browser when you access it. Two kinds of cookies are used on the HKEX website:

Session Cookies: temporary cookies that only remain in your browser until the time you leave the HKEX website, which are used to obtain and store configuration information and administer the HKEX website, including carrying information from one page to another as you browse the site so as to, for example, avoid you having to re-enter information on each page that you visit. Session cookies are also used to compile anonymous statistics about the use of the HKEX website.

Persistent Cookies: cookies that remain in your browser for a longer period of time for the purpose of compiling anonymous statistics about the use of the HKEX website or to track and record user preferences.

The cookies used in connection with the HKEX website do not contain personal data. You may refuse to accept cookies on your browser by modifying the settings in your browser or internet security software. However, if you do so you may not be able to utilise or activate certain functions available on the HKEX website.

Compliance with laws and regulations

HKEX and other members of the Group may be required to retain, process and/or disclose your personal data in order to comply with applicable laws and regulations or in order to comply with a court order, subpoena or other legal process (whether in Hong Kong or elsewhere), or to comply with a request by a government authority, law enforcement agency or similar body (whether situated in Hong Kong or elsewhere) or to perform or discharge the Regulatory Functions. HKEX and other members of the Group may need to disclose your personal data in order to enforce any agreement with you, protect our rights, property or safety, or the rights, property or safety of our employees, or to perform or discharge the Regulatory Functions.

Corporate reorganisation

As we continue to develop our business, we may reorganise our group structure, undergo a change of control or business combination. In these circumstances it may be the case that your personal data is transferred to a third party who will continue to operate our business or a similar service under either this Privacy Policy Statement or a different privacy policy statement which will be notified to you. Such a third party may be located, and use of your personal data may be made, outside of Hong Kong in connection with such acquisition or reorganisation.

Access and correction of personal data

Under the PDPO, you have the right to ascertain whether we hold your personal data, to obtain a copy of the data, and to correct any data that is inaccurate. You may also request us to inform you of the type of personal data held by us. All data access requests shall be made using the form prescribed by the Privacy Commissioner for Personal Data ("**Privacy Commissioner**") which may be found on the official website of the Office of the Privacy Commissioner or via this link

https://www.pcpd.org.hk/english/publications/files/Dforme.pdf

Requests for access and correction of personal data or for information regarding policies and practices and kinds of data held by us should be addressed in writing and sent by post to us (see the "Contact Us" section below).

A reasonable fee may be charged to offset our administrative and actual costs incurred in complying with your data access requests.

Termination or cancellation

Should your account or relationship with us be cancelled or terminated at any time, we shall cease processing your personal data as soon as reasonably practicable following such cancellation or termination, provided that we may keep copies of your data as is reasonably required for archival purposes, for use in relation to any actual or potential dispute, for the purpose of compliance with applicable laws and regulations and for the purpose of enforcing any agreement we have with you, for protecting our rights, property or safety, or the rights, property or safety of our employees, and for performing or discharging our functions, obligations and responsibilities.

General

If there is any inconsistency or conflict between the English and Chinese versions of this Privacy Policy Statement, the English version shall prevail.

Contact us

By Post:
Personal Data Privacy Officer
Hong Kong Exchanges and Clearing Limited
8/F., Two Exchange Square

8 Connaught Place
Central
Hong Kong

By Email:
DataPrivacy@HKEX.COM.HK

Completion Guides for OCG-C Circuit Application Worksheet

1. This worksheet is designed to assist EPs in making arrangement for circuit installation only. EPs should fill in this worksheet according to their enrolments for the OCG-C sessions and OMD datafeed products.

2. EPs decide how many sets of dual circuits for their enrolled connection. One set of dual circuits can be shared among OCG-C session, Drop-Copy session and various type of OMD-C Subscription. EPs may also install separate set of dual circuits for each connection.

3. EPs with more than one set of dual circuits can choose different network providers for different sets of circuits.

4. EPs need to calculate the minimum bandwidth required for each set of dual circuits based on number of throttles on OCG-C session & Drop-Copy session and the connection to OMD:
    (a) Without OMD-C connection
         - Fill in Sections A, B and C in the worksheet and work out their respective Sub-totals of Bandwidth Required.
    (b) With OMD-C connection
         - Fill in Sections A, B, C and D in the worksheet and work out their respective Sub-totals of Bandwidth required.
         - Pay attention to the number of throttles can be included in the minimum bandwidth of the selected datafeed product. For example, the 16Mbps minimum bandwidth of SS can accommodate 20 throttles of 40Kbps on top of Index Feed and the Odd Lot Order Feed. If the EP needs only one OCG-C Trading session with no more than 20 throttles for a set of dual circuits plus one direct connection to OMD-SS for market data, then the minimum Bandwidth Requirement for this set of dual circuits is 16 Mbps. (See Example 1 in Illustration)

5. The actual minimum Bandwidth required also depends on the bandwidths available for SDNet/2 or HSN circuits. Please refer to the below table for the available bandwidths.

Bandwidth/ network provider	Bandwidth Available for SDNet/2		Bandwidth Available for HSN Circuits
	HKT	HKBNES	HKEX Hosting Services
1 Mbps	√	√	
2 Mbps	√	√	
3 Mbps	√	√	
4 Mbps	√	√	
5 Mbps	√	√	
6 Mbps	√	√	
7 Mbps	√	√	
8 Mbps	√	√	
9 Mbps	√	√	
10 Mbps	√	√	
20 Mbps	√	√	
30 Mbps	√	√	
40 Mbps	√	√	N/A
50 Mbps	√	√	
60 Mbps	√	√	
70 Mbps	√	√	
80 Mbps	√	√	
90 Mbps	√	√	
100 Mbps	√	√	√
1 Gbps	√	√	√

10 Gbps	N/A	√

	Bandwidth Available for High Performance Option under SDNet/2	
Bandwidth/ network provider	HKT	HKBNES
30 Mbps	√	√
40 Mbps	√	√
50 Mbps	√	√
60 Mbps	√	√
70 Mbps	√	√
80 Mbps	√	√
90 Mbps	√	√
100 Mbps	√	√
1 Gbps	√	√

6. EPs can acquire more bandwidth than the minimum required.

7. EPs should note that if EPs choose to (i) switch from existing single SDNet/2 BSS testing line and install one new backup line, (ii) switch from existing dual SDNet/2 lines for OMD-C Readiness to OCG-C production lines, (iii) re-deploy not in use SDNet/2 dual lines to OCG-C production lines, (iv) share with the existing OMD-C production lines, it may involve re-configuration charge and bandwidth upgrade charge from network provider. The line cannot be used for both production and testing purpose. There is lead time involved if EPs request to switch back the production line to testing line purpose.

8. EP should provide the completed worksheet to the network provider when placing order for the production lines. It is not required to return the completed worksheet to HKEX except when the production lines will be used for receiving data from OMD-C channels (i.e. Section D is filled in). Worksheets with Section D filled in should be returned to HKEX – Market Data by email to IVsupport@hkex.com.hk.

9. Late installation of production line may affect EPs' availability to join the OCG-C rollout test.

Illustration for how to use the OCG-C Circuit Application Worksheet to calculate the minimum bandwidth

Example 1:

An EP (Participant ID 7777) needs one OCG-C Trading session of 20 throttles as well as one direct connection to OMD-SS for market data with Index and Odd Lot Order information. Parts II and III should be filled in as below:

Part II – Type of Connection to Circuit

Section A OCG-C Session			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
OCG-C Session			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CO07777001	☑	☐	20	40 Kbps/throttle	800 Kbps
				[A] *Sub-total :*	800 Kbps

Section B Drop-Copy Session for Orders & Trades			No. of Throttle	Minimum bandwidth	Bandwidth Required(per line)
Drop-Copy Session			No. of Throttle	Minimum bandwidth	Bandwidth Required(per line)
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CC	☐	☐		40 Kbps/throttle	
				[B] *Sub-total :*	

Section C Drop-Copy Session for Trades Only			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
Drop-Copy Session			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CC	☐	☐		20 Kbps/throttle	
				[C] *Sub-total :*	

Section D OMD-C Subscription				
Datafeed Product	Product Selected	With [Any / All][1] of the Following Complimentary Datafeed(s)	Allocation of Bandwidth	
			OMD-C Multicast	OMD-C Unicast
Securities Standard (SS) *[included Conflated Broker Queue]*	☑	a) Odd Lot Order (OLO) ☑	15 Mbps	200 Kbps
Securities Premium (SP) - **without** Conflated Broker Queue (CBQ) [2]	☐		28 Mbps	200 Kbps
Securities Premium (SP) + Conflated Broker Queue (CBQ) [2]	☐	b) Index Feed (INDEX) ☑	35 Mbps	200 Kbps
Securities FullTick (SF) -**without** Conflated Broker Queue (CBQ) [2]	☐		51 Mbps	200 Kbps
Securities Fulltick (SF) + Conflated Broker Queue (CBQ) [2]	☐	c) Stock Connect Market Feed (SCM) ☑	58 Mbps	200 Kbps
		[D] *Sub-total :*	15.2Mbps	

[1] *EP could subscribe any one / combination (i.e. a + c) / all of Complimentary Datafeed(s)*
[2] *Must be High Performance Option*

Part III– Bandwidth Information

Minimum Bandwidth Required [A]+ [B]+ [C]+ [D]	:	16 Mbps

Example 2:

An EP (Participant ID 7778) needs one OCG-C Trading session of 20 throttles, one OCG-C Market Making session of 40 throttles, one OCG-C Drop Copy (for Orders and Trades) session of 60 throttles as well as one direct connection to OMD-SF + Conflated Broker Queue (CBQ) for market data with Index and Odd Lot Order information. Parts II and III should be filled in as below:

Part II – Type of Connection to Circuit

Section A OCG-C Session			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
OCG-C Session			A	B	A x B
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CO07778001	☑	☐	20	40 Kbps/throttle	800 Kbps
CO07778401	☑	☐	40	40 Kbps/throttle	1,600 Kbps
				[A] *Sub-total :*	2,400 Kbps

Section B Drop-Copy Session for Orders & Trades			No. of Throttle	Minimum bandwidth	Bandwidth Required(per line)
Drop-Copy Session			A	B	A x B
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CC07778001	☑	☐	60	40 Kbps/throttle	2,400 Kbps
				[B] *Sub-total :*	2,400 Kbps

Section C Drop-Copy Session for Trades Only			No. of Throttle	Minimum bandwidth	Bandwidth Required (per line)
Drop-Copy Session			A	B	A x B
Comp ID *(assigned by HKEX to EP)*	Production	Backup	A	B	A x B
CC	☐	☐		20 Kbps/throttle	
				[C] *Sub-total :*	

Section D	OMD-C Subscription				
Datafeed Product	Product Selected	With [Any / All][1] of the Following Complimentary Datafeed(s)		Allocation of Bandwidth	
				OMD-C Multicast	OMD-C Unicast
Securities Standard (SS) *[included Conflated Broker Queue]*	☐	a) Odd Lot Order (OLO)	☑	15 Mbps	200 Kbps
Securities Premium (SP) -**without** Conflated Broker Queue (CBQ) [2]	☐			28 Mbps	200 Kbps
Securities Premium (SP) + Conflated Broker Queue (CBQ) [2]	☐	b) Index Feed (INDEX)	☑	35 Mbps	200 Kbps
Securities FullTick (SF) -**without** Conflated Broker Queue (CBQ) [2]	☐			51 Mbps	200 Kbps
Securities Fulltick (SF) + Conflated Broker Queue (CBQ) [2]	☑	c) Stock Connect Market Feed (SCM)	☑	58 Mbps	200 Kbps
		[D] *Sub-total :*		58.2Mbps	

[1] EP could subscribe any one / combination (i.e. a + c) / all of Complimentary Datafeed(s)
[2] Must be High Performance Option

Part III – Bandwidth Information

Minimum Bandwidth Required [A]+ [B]+ [C]+ [D]	:	63 Mbps

Checklist

The checklist below help EPs ensure that they have planned the OCG-C connections sufficiently to match their enrolments for OCG-C sessions and OMD datafeed products if needed.

☐ Number of worksheets = Number of sets of dual circuits to be subscribed for the enrolled OCG-C sessions

☐ The total number of OCG-C sessions over all worksheets = Number of OCG-C session enrolled

☐ The total number of Drop Copy sessions for Orders and Trades over all worksheets = Number of Drop Copy sessions for Orders and Trades enrolled

☐ The total number of Drop Copy sessions for Trades only over all worksheets = Number of Drop Copy sessions for Trades only enrolled

☐ The total number of direct connections to OMD Securities Standard (SS) = Number of connections to SS enrolled

☐ The total number of direct connections to OMD Securities Premium (SP) = Number of connections to SP enrolled

☐ The total number of direct connections to OMD Securities FullTick (SF) = Number of connections to SF enrolled

☐ The worksheets have covered connection information for all complimentary OMD data feeds such as Index Feed, Odd Lot Order Feed and Stock Connect Market Feed for SS, SP and SF; and Conflated Broker Queue for SP and SF for which we have enrolled