

Section A – Notes to the Application

- a. **China Connect Open Gateway (CC OG)** : CC OG is a hardware and software component operated by the Exchange Participant (EP), which provides the communications interface between the China Stock Connect System (CSC) and Broker Supplied System (BSS). CC OG installs in HKEX Hosting Data Centre, namely Hosting CC OG.
- b. **Hosting CC OG Server Hardware Configuration and Software Package** : Hosting CC OG will support both standard and high availability (cluster) configurations. HKEX will provide the minimum hardware requirement (see Section C) and third party software packages (see Section D) specification for the Hosting CC OG. EP is responsible for procurement of the hardware and software package for the Hosting CC OG, liaises with HKEX Appointed Service Vendor to install the software, and arranges with its vendor to install the Hosting CC OG at HKEX Hosting Data Centre.
- c. **CC OG Application** : CC OG application is the application software provided by HKEX for trading purpose. HKEX possesses the ownership of CC OG application and owns the administrative right of the Hosting CC OG. HKEX will provide the Windows security policy setup procedure and CC OG application installation procedure to the Appointed Service Vendors. EP is required to contact directly with one of Appointed Service Vendors to install the software. Contact information of Appointed Service Vendors are as follows :

Appointed Service Vendor	Contact Person	Contact No.	Email Address
CL Technical Services Ltd	Mr Roy Lam	22384273 / 90267415	roy.kl-lam@clts.com
	Mr Mike Ko	22384273 / 94229531	mikeko@clts.com
Microware Ltd	Mr Ricky Ma	25654653 / 97225083	rickyma@microware.com.hk
	Ms Haidy Wong	25654557 / 91636325	haidywong@microware.com.hk

When EP terminates the use of Hosting CC OG, EP is required to erase the content of CC OG application at its own cost.

- d. **Hosting CC OG Maintenance** : EP is responsible for maintenance of the Hosting CC OG, direct liaison with its vendor to provide repair service, renewal of maintenance service contract for Hosting CC OG hardware & software and various types of maintenance service activities.
- e. **Security Control for Hosting CC OG** : Hosting CC OG will be installed in HKEX Hosting Data Centre which is a purpose-built facility providing the high standard of security. Only trading system sign-on will be used for authentication for the Hosting CC OG. Nevertheless, sensitive data will still be protected by software encryption throughout the data transmission as well as message authentication will still be achieved by checksum calculation.
- f. **Existing BSS System Connected to the Applied Hosting CC OG** : Should EP connect the existing BSS system to the applied Hosting CC OG, EP is only required to conduct one rollout test to ensure the hardware stability and internal network connectivity after connecting to production CSC, HKEX Service Network and production Hosting CC OG. EP may rollout the applied Hosting CC OG in production after successful completion of the rollout test, submission of the Standard Terms and Conditions for China Connect Open Gateways Installed at the Data Centre of HKEX (if applicable), BSS Declaration and rollout notification to HKEX by giving not less than 2 weeks in advance notice.

(Updated in February 2017)

- g. New BSS System Connected to the Applied Hosting CC OG** : Should EP connect a new BSS system to the applied Hosting CC OG, EP is required to conduct simulator test, end-to-end test and rollout test. EP can download the simulator test package and end-to-end test package from Electronic Communication Platform (ECP) at <https://www.ecp.hkex.com.hk> or contact HKEX – Participant General Enquiry Hotline at 2840-3626 for assistance on collection of the BSS testing package. Subject to return a positive end-to-end test result and complete the installation of the applied Hosting CC OG, EP can apply to conduct rollout test. The rollout test is for EP to ensure the EP’s hardware stability and internal network connectivity after connecting to production CSC, HKEX Service Network and production Hosting CC OG. EP may rollout the applied Hosting CC OG in production after successful completion of the rollout test, submission of the Standard Terms and Conditions for China Connect Open Gateways Installed at the Data Centre of HKEX (if applicable), BSS Declaration and rollout notification to HKEX by giving not less than 2 weeks in advance notice.
- h. Central Trade Feed Service** : Central Trade Feed (CTF) is an optional service provided in CSC. An EP, subscribing this service, can designate one or more CC OGs as the consolidation point(s) to receive online trade notifications for trades originated from all trading devices belonging to the EP. For EP with large number of trading devices and throttle entitlement, CTF trade notification messages may introduce substantial traffic during the peak hour and hence additional processing overhead to BSS and network. It may have impact to BSS order response time. EP with multiple CC OGs should consider number of CC OGs for receiving CTF according to the business need. Besides the online trade notifications, the mid-day and day-end trade file will also be distributed to EP via Electronic Communication Platform.
- i. Market Data** : Apart from the static data, 1-price depth real-time A-share data of the eligible stocks for Shanghai market and Shenzhen market (“Stock Connect A-Share Data”) will be disseminated to EPs via their CC OG. Shanghai market data will be updated once every 5 seconds while Shenzhen market data will be updated once every 3 seconds. Stock Connect A-Share Data could only be used internally by EPs and for redistribution to their trading clients; further redistribution to third parties is not allowed. The Stock Connect A-Share Data could not be used for index compilation and for deriving any tradable products. The data content of the Stock Connect A-Share Data includes Best Bid Price/Volume, Best Offer Price/Volume, Volume Traded, Value Traded, Previous Price, Open Price, Latest Price, Highest Price, Lowest Price.
- j. Throttle Rate Assignment** : Assignment of multiple China Connect throttle rates to one Hosting CC OG is supported in CSC. Each Hosting CC OG can support up to 60 China Connect throttle rates. CC OG throttle rates are for trading via Northbound Trading Link which cannot be transferred to Orion Central Gateway session for AMS/3 trading, and vice versa.
- k. Broker Number Assignment** : For new Hosting CC OG application, one new broker number will be assigned by HKEX. EP may request for an additional new broker number for assignment to Hosting CC OG but the quantity should not be more than the standard China Connect throttle assigned. HKEX reserves the right to accept or reject the request of additional new broker number without further explanation. Maximum of 20 broker numbers can be supported by each Hosting CC OG and each EP cannot have more than 80 broker numbers in total for all trading devices connected to AMS/3 and CSC.
- l. Bandwidth Consumption for Hosting CC OG connecting to HKEX Service Network (HSN)** : Each EP must subscribe dual circuits from HSN for Hosting CC OG connections. EPs can install multiple CC OGs over a pair of HSN circuits. When one or more CC OGs receive Market Data information, 2Mbps multicast bandwidth on each HSN circuit will be consumed. If no CC OG requires Market Data information, 1 Mbps multicast bandwidth on each HSN circuit will be consumed. In addition, it will also consume additional 1Mbps bandwidth for unicast traffic per each CC OG.
- m. Monthly Fee for Hosting CC OG** : The monthly fee is calculated on a full month basis and will be based on number of rolled out Hosting CC OG as at the first trading day of each month. A new Hosting CC OG roll out on the 2nd trading day or afterwards during the month will be charged the monthly fee in the following month while there will be no refund of the monthly fee of Hosting CC OG if termination is made during the month. Please refer to Section B – “Fees and Charges” for details of charges.
- n. Monthly Fee for China Connect Throttle Rate** : The monthly fee will be charged base on the number of China Connect throttle rate assigned to Hosting CC OG as at the first trading day of each month. The fee is calculated on a full month basis. There will be no adjustment on the movement of China Connect throttle rate during the month. Please refer to Section B – “Fees and Charges” for details of charges.

- o. Backup Arrangement for Hosting CC OG :** In order to reduce the disruption to the EPs' trading operations due to the failure of their CC OG/BSS, HKEX offers the backup service (i.e. install a backup CC OG) to all EPs. EP may apply for a backup CC OG as a backup device in its office or in its business continuity centre depending on its business need. A backup CC OG shall be kept at a "non-trading" mode. In case of failure of production Hosting CC OG, EP can fax the "Request for Backup CC OG Activation Form" to HKEX – Cash Trading and follow the "Procedure for Activation of Backup CC OG" as stated in the Explanatory Note 2 of Backup Site CC OG to activate the Backup CC OG. When the Backup CC OG is activated, the connection of production CC OG to CSC will be disconnected.

- p. IP Address Scheme for CC OG/BSS :** To better manage and maintain the CSC trading facilities, a "CSC Device IP Addressing Scheme" (see Section E) has been developed to standardise the IP assignment approach across all BSS broker firms. EPs are required to follow this scheme in assigning the IP address of their CC OG/BSS local network or remote network. For EP who has site specific requirement on network environment, where BSS cannot share the same segment with CC OG and the use of Network Address Translation is not feasible, EP may request to change the Hosting CC OG downstream IP address prior to Hosting CC OG installation by completing and returning the "Hosting CC OG/BSS Downstream IP Address Change Requisition Form" (see Appendix 1 and 2) to the Appointed Service Vendor.

- q. Standard Terms and Conditions :** The Hosting CC OG is subject to the Standard Terms and Conditions for China Connect Open Gateways Installed at the Data Centre of HKEX.

Section B – Fees and Charges

Monthly User Fee

<i>Chargeable Item</i>	<i>Amount</i>
CC OG User Fee	HK\$1,250
Each standard China Connect throttle rate acquired from the Exchange and assigned to a CC OG	HK\$960

Section C – Hosting CC OG Minimum Hardware Requirement

a. Standard Hosting CC OG Configuration

The PC server must be certified for Microsoft Windows Server 2008 R2 Standard Edition with the following component requirements:-

- CPU: One Intel ® Xeon E5506 CPU or more powerful model (Quad-core CPU with at least 2.13 GHz clock speed and 4 MB cache). AMD CPUs with the same or better performance figure than the minimum CPU requirement may also be considered.
- Memory: 4 GB DDR3 RAM.
- System Storage: 2x 300GB 10K rpm hard-disk configured in RAID-1 (mirror). Hardware RAID controller is expected.
- Removable media: CD Writer or DVD Writer drive.
- Network interface: Two Gigabit Ethernet adapters.
- Power Supply: Dual power supply units.
- Monitor display: Standard PC monitor.
- Keyboard: Standard 101 keyboard.
- Mouse: Standard PC mouse.

Important Note

- It is the responsibility of EP to consult their respective hardware vendor(s) for configuration advice and seek for on-going maintenance support. Besides, EP should liaise with the appointed service vendor to check for compatibility issue with Hosting CC OG applications.

b. High Availability Hosting CC OG Configuration

Two identical PC servers and one shared disk storage are configured as 2-node cluster. The PC servers and the shared storage must be certified for Microsoft Windows Server 2008 R2 Enterprise Edition with the following component requirements:-

PC Server

- CPU: One Intel ® Xeon E5506 CPU or more powerful model (Quad-core CPU with at least 2.13 GHz clock speed and 4 MB cache). AMD CPUs with the same or better performance figure than the minimum CPU requirement may also be considered.
- Memory: 4 GB DDR3 RAM.
- System Storage: 2x 300GB 10K rpm hard-disk configured in RAID-1 (mirror). Hardware RAID controller is expected.
- Host Bus Adapters (HBA): Dual HBA (e.g. with Serial Attached SCSI (SAS) or Fibre Channel interface) to match with the shared storage.
- Removable media: CD Writer or DVD Writer drive.
- Network interface: Three Gigabit Ethernet adapters.
- Power Supply: Dual power supply units.
- Monitor display: Standard PC monitor ^(note 1).
- Keyboard: Standard 101 keyboard ^(note 1).
- Mouse: Standard PC mouse ^(note 1).

Note 1 : A single set of monitor display, keyboard and mouse can be shared by the 2 cluster nodes using KVM switch.

Shared (Cluster) Storage

- 2x 300GB 10K rpm hard disk shared storage, configured in RAID-1, with dual controllers (e.g. Serial Attached SCSI or Fibre Channel interface).
- Power Supply: Dual power supply units.

Important Notes:

- The above mentioned hardware configuration for high availability Hosting CC OG configuration assumes a dedicated shared storage device for each 2-node cluster setup. HKEX highly recommends EP to follow this basic configuration. However, if EP chooses to share a single external storage among multiple clustered Hosting CC OGs, EP is responsible to liaise with their respective hardware vendor(s) to ensure such customised cluster configuration is certified for Microsoft Windows Server 2008 R2 Enterprise Edition. Also, EP should implement appropriate redundancy measure to avoid multiple Hosting CC OGs unavailability due to a single external storage failure.
- It is the responsibility of EP to consult their respective hardware vendor(s) for configuration advice and seek for on-going maintenance support. Besides, EP should liaise with the appointed service vendor to check for compatibility issue with Hosting CC OG applications.

Section D – Third Party Software Packages for Hosting CC OG

a. Standard Hosting CC OG Configuration

- One copy of Microsoft Windows Server 2008 R2 Standard Edition.
- One copy of Microsoft Windows Server 2008 Client Access License (CAL)
- One copy of Trend Micro Office Scan V11 anti-virus client software.

b. High Availability Hosting CC OG Configuration

- Two copies of Microsoft Windows Server 2008 R2 Enterprise Edition, one for each cluster node.
- One copy of Microsoft Windows Server 2008 Client Access License (CAL)
- Two copies of Trend Micro Office Scan V11 anti-virus client software, one for each cluster node.

Section E – CSC Device IP Addressing Scheme

a. Introduction

This document intends to describe the Hosting CC OG/BSS network IP addressing scheme. EPs are required to follow this scheme in assigning the IP addresses to their Hosting CC OG/BSS local network or remote network. EPs should maintain the detail records of their current IP address assignment for support and maintenance purposes.

HKEX recommends the first three octets of the IP address to be 192.168.176 (i.e., 192.168.176.*) as these IP addresses are reserved for private use and will not be routed to the Internet even if EPs have mistakenly connected their private LAN segment to their own corporate LAN segment.

It should also be noted that the first octet of the IP address of BSS must NOT be 10 or 172 as these IP addresses are retained for trading network connection (to Host) and the HA Hosting CC OG LAN cards interconnection.

The 4th octet of the IP address classified connecting devices as follows:

- Hosting CC OG : 192.168.176.1 – 127
- BSS : 192.168.176.128 – 254

The following sections explain the IP address assignment for Hosting CC OG and BSS.

b. Hosting CC OG

Two IP addresses are allocated for each Hosting CC OG. One is used for trading network connection (to CSC) while the other is utilized for BSS LAN connection in HKEX Hosting Data Centre. The IP address for trading network connection (to CSC) is defined by HKEX and is referred to as upstream IP address.

Hosting CC OG IP address for connection to BSS is referred to as downstream IP address and its default IP address assignment is defined below:

Hosting CC OG IP address is within 192.168.176.1 – 127 (with default subnet mask equal to 255.255.255.0). This IP address range can accommodate up to 127 standard Hosting CC OGs or 36 HA Hosting CC OGs. Alternatively, EPs may request to define their own Hosting CC OG IP addresses to suit their business needs.

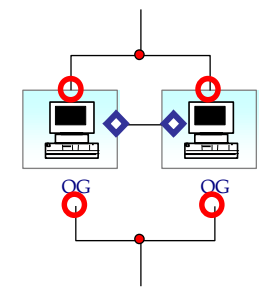
- For HA configuration, the virtual IP address and the 2 physical IP addresses for connection to BSS are assigned in a consecutive manner. IP addresses with the last octet set to multiple of tens are reserved (e.g. 192.168.176.10, 192.168.176.20, 192.168.176.30 and etc. are reserved). Interconnection (cluster heartbeat connection) between two HA server nodes are cross-cable connected.

The example below demonstrates the possible IP address assignment for HA Hosting CC OG configuration.

Example 1

- virtual IP address is defined as :
 - 192.168.176.1.
- physical IP addresses are specified to be:
 - 192.168.176.2.
 - 192.168.176.3.
- interconnection LAN card IP addresses are enumerated as:
 - 172.16.1.1.
 - 172.16.1.2.

HA Configuration



- Virtual IP Address
- Physical IP Address
- ◇ Interconnection LAN IP Address

Example 2

- virtual IP address is defined as :
 - 192.168.176.4.
- physical IP addresses are specified to be:
 - 192.168.176.5.
 - 192.168.176.6.
- interconnection LAN card IP addresses are enumerated as:
 - 172.16.1.1.
 - 172.16.1.2.

Example 3

- virtual IP address is defined as :
 - 192.168.176.7.
- physical IP addresses are specified to be:
 - 192.168.176.8.
 - 192.168.176.9.
- interconnection LAN card IP addresses are enumerated as:
 - 172.16.1.1.
 - 172.16.1.2.

Example 4

- virtual IP address is defined as :
 - 192.168.176.11.
- physical IP addresses are specified to be:
 - 192.168.176.12.
 - 192.168.176.13.
- interconnection LAN card IP addresses are enumerated as:
 - 172.16.1.1.
 - 172.16.1.2.

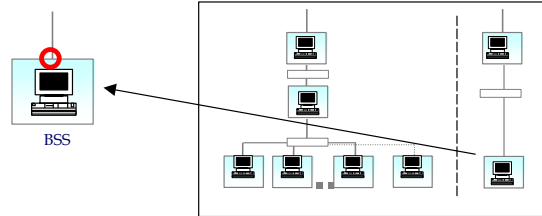
c. Network Device Configuration

EPs are required to configure Hosting CC OG directly attached network device (e.g. BSS network port, network switch, router port, firewall port, etc.) as **auto-negotiation** in speed and duplex operation. This, in turn, allows the Hosting CC OG to perform automatic configuration to achieve the best possible mode of operation over each end of the network link. The Hosting CC OG network interface supporting 10/100/1000 Mbps and half/full duplex mode coupled with auto-negotiation settings at network device would then maximize the network performance and avoid incompatible settings.

d. Broker Supplied System

BSS IP address should share the same LAN segment as Hosting CC OG do, therefore the IP address should be specified within the following range:

Network mask: 255. 255. 255. 0.
BSS IP address: 192. 168. 176. 128 – 254.



If BSS connects to multiple Hosting CC OGs, BSS can base on the IP addresses and port numbers at both ends to distinguish the origin of messages received.

It is recommended that the BSS should share the same IP subnet of the Hosting CC OG. If the BSS is located at different IP segment, Network Address Translation (NAT) should be used at the EPs' routers or firewalls so as the BSS can be reached at the same IP segment to the Hosting CC OG.

For EPs who have site specific requirement on network environment, where BSS CANNOT share the same segment with Hosting CC OG and the use of NAT is not feasible, they may request to change the Hosting CC OG downstream IP address prior to CC OG installation by completing and returning the "Hosting CC OG/BSS Downstream IP Address Change Requisition Form" (see Appendix 1 and Appendix 2) to the Appointed Service Vendors at their own cost.

Hosting CC OG/BSS Downstream IP Address Change Requisition Form

Notes:

1. EP requests to change the Hosting CC OG/BSS downstream IP address should complete and return the requisition form by email to Appointed Service Vendor one week before Hosting CC OG installation and followed by telephone call to confirm submission. EP should also need to keep a copy of the requisition form for future support and maintenance purpose.
2. EP should directly contact the Appointed Service Vendor for service date, the cost for changing downstream IP address and the billing arrangement.
3. The downstream IP address range reserved for Hosting CC OG is 192.168.176.1 – 192.168.176.127 (with default subnet mask equal to 255.255.255.0). Should EPs require changing the Hosting CC OG downstream IP address, the requested IP address must not be 10 or 172 for the 1st octet of the downstream IP address.

To : CL Technical Services Ltd

Attn : Mr Roy Lam (Email : roy.kl-lam@clts.com or Tel. 90267415) or

Mr Mike Ko (Email : mikeko@clts.com or Tel. 94229531)

Part I – Participant Information

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

Part II – Details of Hosting CC OG/BSS Downstream IP Address Setting Requested by EP

Related Hosting CC OG Device ID :	Expected Service Date :	
Related Hosting CC OG Installation Address :		
Hosting CC OG/BSS Downstream Network Configuration	IP Address Setting Requested by EP	
Cluster Downstream IP Address <i>(Note 3)</i>		
First Node Downstream IP Address <i>(Note 3)</i>		
Second Node Downstream IP Address <i>(Note 3)</i>		
Downstream Subnet Mask		
BSS Segment(s) ➤ The segment number of BSS Server belong to (destination network)		
BSS Subnet Mask(s) ➤ The subnet number of BSS Server Segment (subnet for destination network)		
BSS Gateway ➤ The IP number of Gateway where the Hosting CC OG belongs to (Gateway IP address in source network)		

Signature : _____

Date : _____

Hosting CC OG/BSS Downstream IP Address Change Requisition Form

Notes:

1. EP requests to change the Hosting CC OG/BSS downstream IP address should complete and return the requisition form by email to Appointed Service Vendor one week before Hosting CC OG installation and followed by telephone call to confirm submission. EP should also need to keep a copy of the requisition form for future support and maintenance purpose.
2. EP should directly contact the Appointed Service Vendor for service date, the cost for changing downstream IP address and the billing arrangement.
3. The downstream IP address range reserved for Hosting CC OG is 192.168.176.1 – 192.168.176.127 (with default subnet mask equal to 255.255.255.0). Should EPs require changing the Hosting CC OG downstream IP address, the requested IP address must not be 10 or 172 for the 1st octet of the downstream IP address.

To : Microware Ltd

Attn : Mr Ricky Ma (Email : ricky.ma@microware.com.hk or Tel. 97225083) or

Ms Haidy Wong (Email : haidywong@microware.com.hk or Tel. 91636325)

Part I – Participant Information

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

Part II – Details of Hosting CC OG/BSS Downstream IP Address Setting Requested by EP

Related Hosting CC OG Device ID :	Expected Service Date :	
Related Hosting CC OG Installation Address :		
Hosting CC OG/BSS Downstream Network Configuration	IP Address Setting Requested by EP	
Cluster Downstream IP Address <i>(Note 3)</i>		
First Node Downstream IP Address <i>(Note 3)</i>		
Second Node Downstream IP Address <i>(Note 3)</i>		
Downstream Subnet Mask		
BSS Segment(s) ➤ The segment number of BSS Server belong to (destination network)		
BSS Subnet Mask(s) ➤ The subnet number of BSS Server Segment (subnet for destination network)		
BSS Gateway ➤ The IP number of Gateway where the Hosting CC OG belongs to (Gateway IP address in source network)		

Signature : _____

Date : _____