HKEX
香港交易所

OTC Clear Message Queue (MQ) Configuration Guide

Version: 1.4

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Classification – Internal

INTRODUCTION

OTCC Clearing Members can use IBM MQ for the communication between their system and the OTCC Direct Messaging Service in SDNET. This document provides information for setting up the MQ channels for the production and development environment. The OTCC development environment is a Production-Like (PLIKE) environment.

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1. System Requirements

The OTC Clear Message Queue service is provided by OTC Clear to Clearing Members and Sponsored Settlement Members (“Members”) of OTC Clear only.

Software Requirements

To use the service, Members is required to set up an IBM WebSphere MQ 9.2 server (or later version).

Note: after the End of Support of IBM WebSphere MQ 9.2, IBM WebSphere MQ 9.3 or later would be required.

Security Requirements

OTCC requires all client systems to be compliant with Transport Layer Security (TLS) version 1.2. TLS 1.3 is currently not supported.

Mutual authentication is used for security. When a client connects to the OTCC MQ server, the server would present its TLS certificate first. The server certificate contains the server’s domain name. The client MQ server would verify the server certificate and present its TLS certificate. Afterward, the server would verify the client’s certificate and grant access. Mutual TLS ensures that the two MQ queue manager peers can authenticate each other’s identity and communicate securely.

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2. Communication Line Setup

The configuration of SDNet/2 is the same for both OASIS and the MQ server.

Step 1: Connect to SDNet/2 Routers

Step 1.1:

Before the configuration, please ensure that the Metro Ethernet communication lines and routers have been installed and configured properly by the SDNet/2 service provider already.

Step 1.2:

Connect the SDNet/2 routers to the LAN switches with LAN cables. The LAN interface of the SDNet/2 router supports network speed up to Gigabit Ethernet and it is configured as “Auto Negotiation” (i.e. both speed and duplex mode are auto). The LAN switch ports (connecting the SDNet/2 routers) should also have “auto” configuration settings and should provide a single VLAN (Layer 2) for connecting SDNet/2 router and the SFTP client.

Step 1.3:

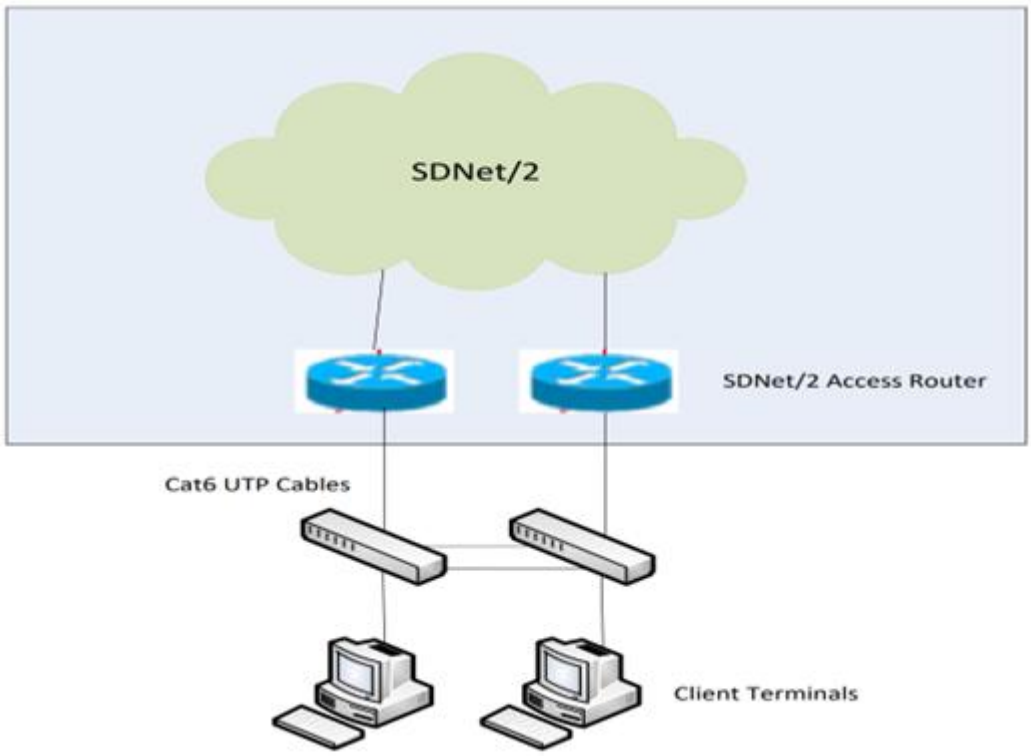
HSRP/VRRP group number on SDNet/2 router for OASIS will be assigned by the SDNet/2 service vendor. Members should avoid using the same HSRP/VRRP group number in their network for applications other than OASIS.

Step 1.4:

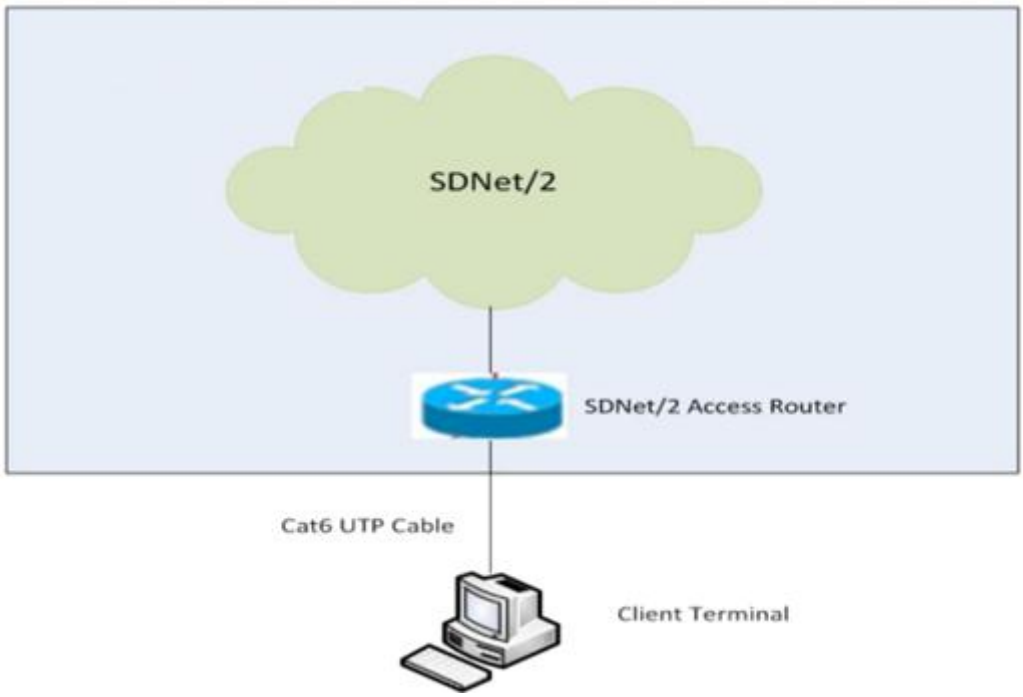
Connect the PC/Server to the routers and LAN switch with LAN cables. There are two possible options to establish the connection:

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Option 1: Dual-link connection (for production site)



Option 2: Single-link connection



Step 2: Firewall Setup

The following IP addresses and ports need to be opened on the firewall for access to the production MQ servers:

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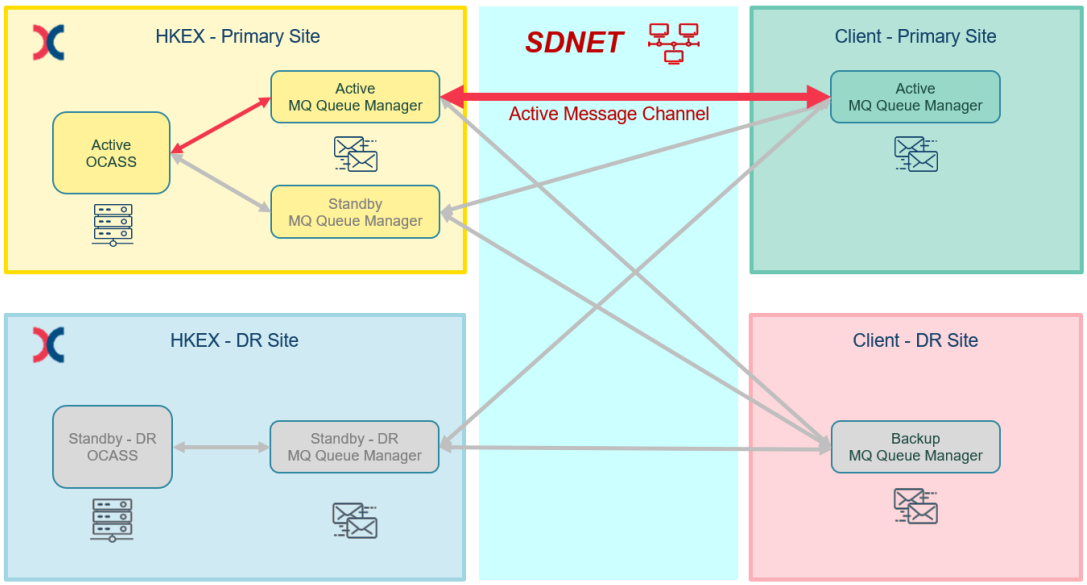
Site	Port	Production IP Address	Direction
Primary	1423 (TCP)	10.154.11.131	From CM to OTCC
	TBP by CM	10.154.11.132	From OTCC to CM
Secondary/DR	1423 (TCP)	10.153.11.131	From CM to OTCC
	TBP by CM	10.153.11.132	From OTCC to CM

Due to network design in HKEX, the source IPs and destination IPs are different. The IPs are the same between Production and PLIKE.

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3. Operational Model

The diagram below shows the production operation model of the OTCC MQ platform.



1. For resilience and disaster recovery in production, OTCC has set up IBM MQ servers on three separate nodes in two sites:
    a. The OTCC Primary Site contains two nodes, which shares the same floating IP address.
    b. The third node is in the OTCC DR Site, which has a different IP address from the above
    c. Only one of these three nodes would become active at any time.
2. The Clearing Member creates a Message Channel that connects their active IBM MQ queue manager to OTCC's active queue manager over the SDNET.
3. The Clearing Member can use an IBM MQ MQI client to connect their system to the message queues via the Message Channel, or use an API like the IBM MQ classes for JMS
4. In case of disaster recovery in OTCC, The Clearing Member should connect to the IP address provided for this purpose.

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4. MQ Configuration Information

The following information is provided for setup. Clearing Members should provide the highlighted items to OTCC for registration and configuration. Please fill in and submit "Request for the use of SFTP report download service or SFTP/ MQ direct messaging service". Please note that both sender and receiver channels are required when setting up the MQ.

Configuration Parameter	OTCC	Clearing Member
MQ	IBM WebSphere MQ 9.3	**To be provided by CM**
Hostname / IP Address (SDNET)	Due to network design in HKEX, the source IPs and destination IPs are different. The IPs are the same between Production and PLIKE. **From CM to OTCC** **Primary:** 10.154.11.131/32, gateway: 10.154.11.254 **DR:** 10.153.11.131/32, gateway: 10.153.11.254 **From OTCC to CM** **Primary:** 10.154.11.132/32, gateway: 10.154.11.254 **DR:** 10.153.11.132/32, gateway: 10.153.11.254	**(SDNET)** **To be provided by CM**
Port	1423	**To be provided by CM**
Queue manager	PLIKE: U0HKEX100.OTCPRD Alias: U0HKEX100 Production: **P**0HKEX100.OTCPRD Alias: **P**0HKEX100	**To be provided by CM**
Sender Channel	PLIKE: HKEX.<PCM>.U Production: HKEX.<PCM>.P	PLIKE: <PCM>.HKEX.U Production: <PCM>.HKEX.P
Receiver Channel	PLIKE: <PCM>.HKEX.U PLIKE: <PCM>.HKEX.P	PLIKE: HKEX.<PCM>.U Production: HKEX.<PCM>.P
Queue	Q.OTCDM.HKEX.01	**To be provided by CM**

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MQ channels are secured by SSL/TLS. The SSL Cipher used is provided below.

Please provide the distinguished name and the signing certificate information of the client certificate to OTCC for verification and registration. If Clearing Member would like to use other SSL cipher, please contact HKEX OTC IT team (OTC_IT@hkex.com.hk).

	OTCC	**Clearing Member**
SSL Cipher Specification	TLS_RSA_WITH_AES_256_CBC_SHA256	
Distinguished Name (DN) of certificate	PLIKE: CN=mq.uat.otcclearinghk.com Production: CN=*.otcclearinghk.com	**To be provided by CM**

Please find the signer certificate information for OTCC below. Clearing Member is also required to provide signer certificates for MQ setup. For testing environment setup, self-signed certification is acceptable. However, for production setup, it must be signed by an external authorized Certifying Authorities.

Certificate Name	**Type**	**Serial Number**	**Link**
Sectigo Public Server Authentication CA OV R36	Intermediate	2c1a3c76e943ddddff191b31890aed71	https://crt.sh/?id=4267304698 (Please click "Download Certificate: PEM" to download the certificate file)
Sectigo Public Server Authentication Root R46	Intermediate	00d27fbbc1de359e5216ad6149586099c4	https://crt.sh/?id=11405654893 (Please click "Download Certificate: PEM" to download the certificate file)
USERTrust RSA Certification Authority	Root	01fd6d30fca3ca51a81bbc640e35032d	https://crt.sh/?id=1199354 (Please click "Download Certificate: PEM" to download the certificate file)

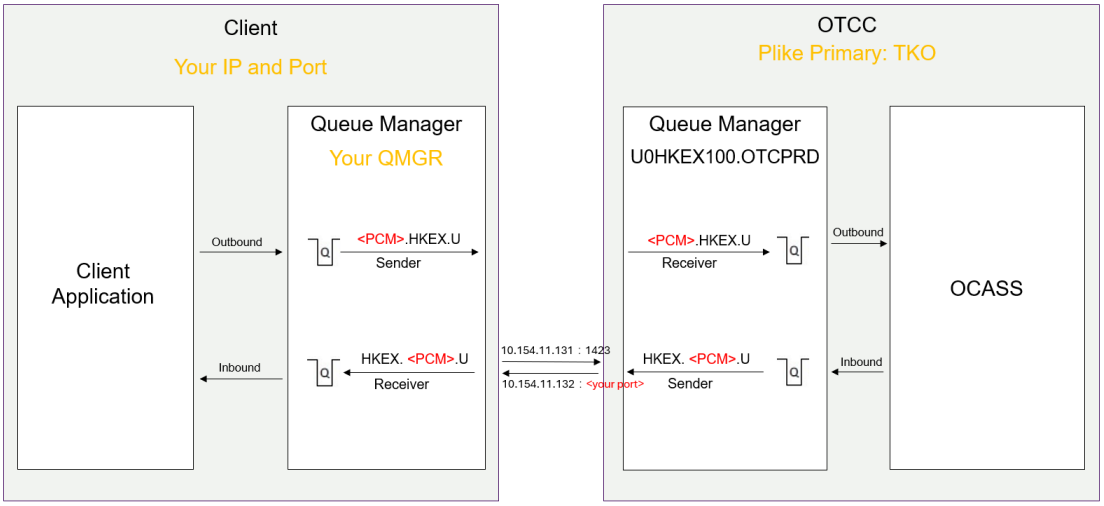
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5. Example Configurations

PLIKE (for Development)

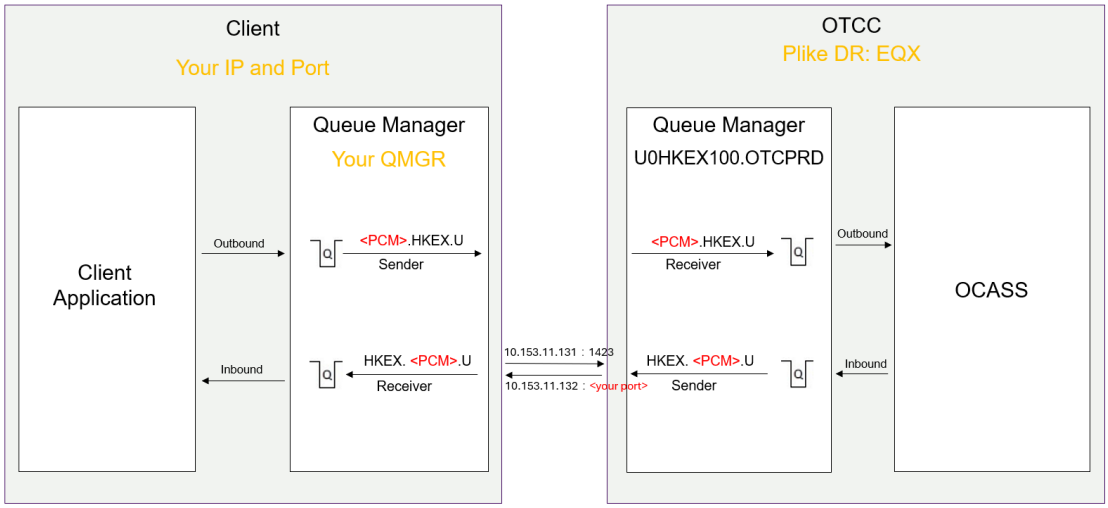
1. Primary

PLIKE Primary



2. DR

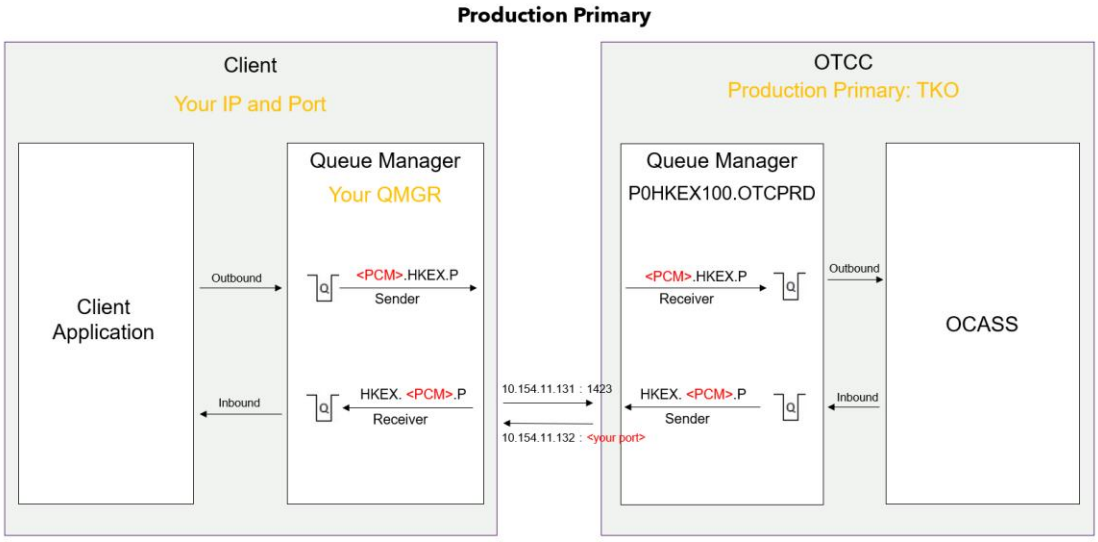
PLIKE DR



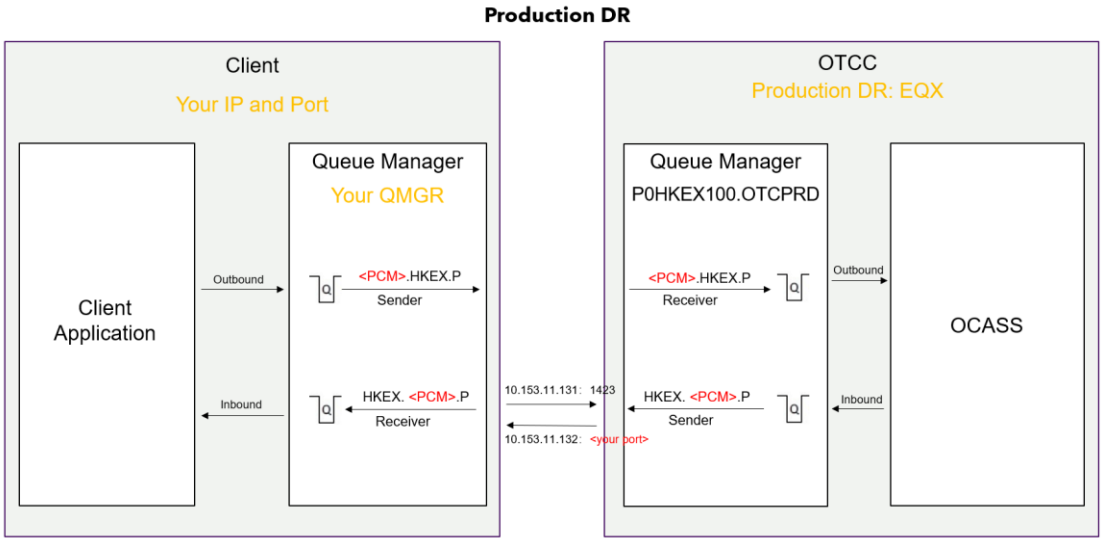
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Production

1. Primary



2. DR



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6. Service Hours

The Direct Messaging Service is available from 2:00 a.m. HKT to 8:00 p.m. HKT on every OTC Clear Clearing Day and Northbound Clearing Day (including Special working Day on weekends) for connection via Message Queue (MQ).

A connectivity test will be conducted by OTCC at around 2:15 a.m. HKT on the above service days. Clearing Member/Broker should ensure that their MQ servers and channels are up and ready at that time.

7. Contingency Handling

Network Issue

If there is a network issue, the Clearing Member/Broker should contact HKEX OTC operation team as soon as possible. The clearing take-up process supports manual operation. With the Clearing Broker's confirmation, HKEX OTC operation team can help to manually accept or reject client trades in OCASS.

For the MQ channel, messages would be sent automatically when the channels could be connected again.

System Failover - Local Fail-over within Primary Site

For the MQ channel, if the primary MQ server is out of service, the secondary server will take over. Clearing Members/Brokers will be switched over to the secondary servers automatically and no change is needed in configuration.

System Failover - Site Fail-over to DR Site

If both primary servers and secondary servers are out of service, the Disaster Recovery (DR) Servers will be brought up. Clearing Members/Brokers need to switch to the DR IP address to connect to the DR site.

In this scenario, some messages sent shortly before the data centre fail-over may be lost in the MQ channel. Resetting MQ sequence number of sender channel to 1 may be required. OTC Operations team would manually resend any missing messages for the Clearing Members and Brokers. If Clearing Brokers are unable to resend the Clearing Take-up responses, please contact HKEX OTC Operations team to manually accept or reject client trades in OCASS.

End of Document

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