Cboe FX Foreign Exchange Connectivity Manual

Version 2.5.1

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1 Introduction

1.1 Overview

This document explains the connectivity options available to the Cboe Foreign Exchange matching engines located in London and New York. This document will be updated regularly as further information becomes available; users should ensure they are reading the latest version published at: https://fx.cboe.com/pdfs/Cboe_FX_Connectivity_Manual.pdf

The London matching engines are located at Equinix LD4, serving the Cboe FX spot market and the Cboe SEF NDF market.

The New York matching engines are located at Equinix NY5, serving the Cboe FX spot market and the Cboe SEF NDF market.

Users are responsible for choosing their connectivity provider, arranging for connectivity to the data center, and paying all associated communications charges which includes cross-connects within the data center.

It is not possible to access any Cboe Foreign Exchange market using Cboe Equities market connectivity; similarly Cboe Equities markets are not accessible from Cboe Foreign Exchange connectivity.

Effective January 2023 users in Tokyo may leverage a Point of Presence (PoP) located in the Equinix TY3 data center to reach New York NY5 matching engines.

Contacts

For connectivity and sale inquiries, please contact the Cboe FX Trade desk at fxtradedesk@cboe.com. For Cboe SEF connectivity and sales inquiries, please contact cboefxndfs@cboe.com.

London	+44 20 7131 3450
New York	+1 212 378 8558
Singapore	+65 6911 6688
Zurich	+41 43 210 3700

1.2 Physical Interfaces

Only the following physical interface specifications are supported.

Location	Speed	Media
Equinix NY5/NY4 - US	**10G**	LR (single-mode)
	1G	LX (single-mode)
Equinix NY2, NY6 – US	**10G**	LR (single-mode)
	1G	LX (single-mode)
Equinix TY3 – US PoP	**10G**	LR (single-mode)
	1G	LX (single-mode)
Equinix LD4 – UK	**10G**	LR (single-mode) and SR (multi-mode)
	1G	LX (single-mode), SX (multi-mode), and 1000BaseT
Equinix LD5, LD6 – UK	**10G**	LR (single-mode)
	1G	LX (single-mode)

2 Connectivity Options

The following Connectivity options are supported:

- Data center cross-connect
- Directly connected via metro ethernet circuit
- Extranet
- Internet
- NY5 <--> LD4 transatlantic WAN
- TY3 <--> NY5 transpacific WAN

2.1 Data Centre Cross-Connect

London: Users may cross-connect from any of the Equinix Slough campus data centers, i.e., LD4, LD5, and LD6.

New York: Users may cross-connect from any of the Equinix Secaucus campus data centers i.e., NY2, NY4, NY5, and NY6. Cross-connects between user and Cboe in both NY4 and NY5 are the shortest path and of equal length. Further details can be provided on request.

Connectivity to NY5 is also available via a Point of Presence (PoP) located in Tokyo TY3. Cross connects to customers in TY3 are not latency equalized with Secaucus NY5 connections.

- The technical and commercial relationship is between Equinix and the user, Cboe is not involved.
- The user orders and pays for the cross-connect.

2.2 Directly Connected via Metro Ethernet

Users may connect via a metro ethernet circuit.

- No co-location space is required.
- Cboe does not host telco equipment.
- The cross-connect from telco demarcation point can be ordered by Cboe and re-charged to the user.

2.3 Extranet

Users may connect using an extranet.

- Extranet supplier provisions high-speed up links for multiple users.
- The technical and commercial relationship is between the extranet provider and the user.
- Extranets must be approved by Cboe.

2.4 Internet

- Both certification and production services are available.
- Full details are provided in Appendix A.1 (NY5) and Appendix A.2 (LD4).

2.5 Transatlantic Connectivity Between LD4 and NY5

Cboe offers access to the NY5 matching engine from LD4 and vice-versa via a Cboe-provided transatlantic wide area network. This service allows access to all Cboe foreign exchange markets via a single connection in either NY5 or LD4.

The expected latency will be 67ms except under failure conditions.

Transatlantic access is only available via datacenter cross-connects and when directly connected metro ethernet circuits.

The following services are available in production only:

- ITCH Market data
- FIX Market data
- FIX Order Entry (excluding market making activity)
- STP/DropCopy

Market data from the transatlantic market will be distributed via ITCH repeaters in the local data center.

Users do not connect over the transatlantic circuit for this, but rather to a local ITCH repeater.

Transatlantic connectivity is a chargeable service, see the Connectivity Price List for details.

https://fx.cboe.com/pdfs/press/Hotspot_ConnectivityPricing.pdf

2.6 Transpacific Connectivity Between TY3 and NY5

Cboe offers access to the NY5 matching engine from the Tokyo TY3 PoP. Access from Tokyo to London is not supported at this time.

The expected latency will be 139ms except under primary WAN failure conditions. Expected latency for the secondary WAN connection will be 145ms.

Transpacific access is only available via datacenter cross-connects and when directly connected metro ethernet circuits.

The following services are available in production only:

- ITCH Market data
- FIX Market data
- FIX Order Entry (excluding market making activity)

- STP/DropCopy

Transpacific connectivity is a chargeable service, see the Connectivity Price List for details.

https://fx.cboe.com/pdfs/press/Hotspot_ConnectivityPricing.pdf

3 Connectivity Ordering Process

User requesting new cross-connects are required to sign the applicable Connectivity Order Form below.

- Cboe FX and Cboe SEF Connectivity Order Form

The signed document should be returned to fxtradedesk@cboe.com (for Cboe FX or Cboe SEF) or cboefxndfs@cboe.com (for Cboe SEF by itself).

3.1 Demarcation

London

The demarcation between Cboe and users at Equinix LD4 is the patch frame within the Cboe foreign exchange suite.

New York

The demarcation between Cboe and users at Equinix NY4 and NY5 are the satellite patching cabinets in NY4 and NY5.

Tokyo

The demarcation between Cboe and PoP users at Equinix TY3 are the Cboe demarcation cabinets located in TY3.

3.2 Connectivity Testing

- Cboe runs TCP port listeners 24/7 on the highest TCP port in every TCP port rage as is shown in Appendix A.1 and A2, “IP addresses and TCP Ports for Cboe Foreign Exchange” tables.
- Users can use this feature to ensure their connectivity to Cboe is working; for example, following a new circuit install or a change.

4 Bandwidth Guidance

- Cboe suggests a minimum of 1G.
- Insufficient bandwidth will cause dropped packets and TCP retransmissions which may lead to data being delayed.

5 IP Addressing

The following details apply to all Connectivity methods:

- Cboe hosts use registered addresses for all data flows.
- Cboe supports publicly registered user addresses.
- If required, Cboe can allocate a 10.x.y.z address block. This subnet can be split to provide transit P2P and host/NAT subnets, if needed.
- Cboe supports static routing and dynamic routing via BGP.

6 Support

Please e-mail questions or comments regarding this specification to fxtradedesk@cboe.com (for Cboe FX or Cboe SEF) or cboefxndfs@cboe.com (for Cboe SEF by itself).

Appendix A.1 – IP Addresses and TCP Ports for Cboe Foreign Exchange NY5

Cboe Foreign Exchange NY5 Connectivity via Cross-Connects				
Environment	**Service**	**IP Prefix**	**TCP Port Range**	**Test TCP Port**
Production	Drop Copy/STP	208.90.208.0/27	9088 - 9215	9215
Production	FIX Order Entry	208.90.208.0/27	6016 - 6143	6143
Production	FIX MM - Link	208.90.208.32/27 208.90.208.64/27	27137 - 27379	27379
Production	Java GUI	208.90.208.0/27	5121-5127	n/a
Production	FIX BookFeed	208.90.208.32/27 208.90.208.64/27	7040 - 7167	7167
Production	FIX BookFeed – LD4 (Transatlantic)	208.90.208.32/27 208.90.208.64/27	7168 - 7295	7295
Production	FIX BookFeed	208.90.208.32/27 208.90.208.64/27	27380 – 27623	27623
Production	Cboe FX ITCH	208.90.208.32/27 208.90.208.64/27	8064 - 8191	8191
Production	Cboe FX ITCH – LD4 (Transatlantic)	208.90.208.32/27 208.90.208.64/27	8192 - 8319	8319

Cboe Foreign Exchange NY5 Connectivity via Internet (Unencrypted order entry via the internet is not supported)						
Environment	**Service**	**Internet IP Address**	**TCP Port Range**	**Test TCP Port**	**Open Internet**	**Restricted Internet**
Production	Drop Copy/STP	74.115.129.5	9088 - 9215	9215	-	Yes
Production	FIX Order Entry (SSL)	74.115.129.3	6017- 6019	6019	-	Yes
Production	Java GUI	74.115.129.3	443	n/a	Yes	-
Production	FIX BookFeed	74.115.129.4	7040 - 7167	7167	-	Yes
Certification	Drop Copy/STP	74.115.129.6	19200 - 19327	19327	-	Yes
Certification	FIX Order Entry	74.115.129.6	16128 - 16255	16255	-	Yes
Certification	Java GUI	74.115.129.6	443	n/a	Yes	-
Certification	FIX BookFeed	74.115.129.6	17152 - 17279	17279	-	Yes

Certification	Cboe FX ITCH	74.115.129.6	18176 - 18303	18303	-	Yes

Appendix A.2 – IP Addresses and TCP Ports for London LD4

Cboe Foreign Exchange London LD4 Connectivity via Cross-Connects				
Environment	**Service**	**IP Prefix**	**TCP Port Range**	**Test TCP Port**
Production	Drop Copy/STP	195.3.208.0/27	9088 - 9215	9215
Production	FIX Order Entry	195.3.208.0/27	6016 - 6143	6143
Production	FIX Order Entry	195.3.208.32/27	27137 – 27379	27379
Production	FIX BookFeed	195.3.208.32/27	7040 - 7167	7167
Production	FIX BookFeed – NY5 (Transatlantic)	195.3.208.32/27	7168 - 7295	7295
Production	FIX BookFeed	195.3.208.32/27	27380 – 27623	27623
Production	Cboe FX ITCH	195.3.208.32/27	8064 - 8191	8191
Production	Cboe FX ITCH – NY5 (Transatlantic)	195.3.208.32/27	8192 - 8319	8319

Cboe Foreign Exchange LD4 Connectivity via Internet (Unencrypted order entry via the internet is not supported)						
Environment	**Service**	**Internet IP Address**	**TCP Port Range**	**Test TCP Port**	**Open Internet**	**Restricted Internet**
Production	Drop Copy / STP	195.93.197.195	9088 - 9215	9215	-	Yes
Production	FIX Order Entry (SSL)	195.93.197.193	5182, 6017 - 60**20**	6019	-	Yes
Production	Java GUI	195.93.197.193	443	n/a	Yes	-
Production	FIX BookFeed	195.93.197.194	5240, 7040 - 7167	7167	-	Yes
Certification	Drop Copy / STP	195.93.197.225	19200 - 19327	19327	-	Yes
Certification	FIX Order Entry	195.93.197.225	16128 - 16255	16255	-	Yes
Certification	FIX BookFeed	195.93.197.225	17152 - 17279	17279	-	Yes
Certification	Cboe FX ITCH	195.93.197.225	18176 - 18303	18303	-	Yes

Revision History

Version	Description
1.0	Initial version.
1.3	Added Change Log (Revision History). Added definition of terms. Added Connectivity Order process. Updated Appendix B.
1.4	Updated list of Port's and IP's for London LD4. Added port and IP list for NY5. Updated Connectivity Order process.
1.5	Added additional details on internet migration options in NY5. Added transatlantic WAN availability. Clarified NY5 demarcation.
1.6	Removed NY5 certification requirement.
1.7	Added Cboe FX link port ranges for NY5 and LD4 production and certification.
1.8	Added significant post-migration updates. Added transatlantic WAN connectivity details. Added legacy connectivity decommission timelines.
1.9	Added port ranges for local MD repeaters. Added test TCP Ports and 545 decommission timeline. Added connectivity testing paragraph. Clarified transatlantic WAN service availability.
2.0	Changed port range and IP's for Cboe FX Link. Updated description of transatlantic service.
2.1	Updated legacy connectivity table in Appendix B.
2.2	Updated certification Cboe FX link port.
2.3	Added Cboe FX NDFs and Cboe SEF information. Updated email addresses and phone numbers. Removed references to Cboe FX link and Java FIX; Appendix B.
2.4	Added additional IP Ranges for cross-connect connectivity in NY5 to FIX MM - link, FIX BookFeed, FIX BookFeed - LD4 (transatlantic), ITCH, and ITCH - LD4.

2.5.0	Added TY3 PoP and Transpacific link.
2.5.1	Added 2 new FIX proxy ports in LD4; adjusted for LD4 on-SEF clarity.