



Cboe Foreign Exchange Connectivity Manual

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Version 2.3

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Change Log

Version	Description of change
1.3	Change Log added Definition of terms added Connectivity Order process added Updated Appendix B
1.4	List of Port's and IP's updated for London LD4 Port and IP list added for NY5 Connectivity Order process updated
1.5	More detail on internet migration options in NY5 Trans-Atlantic WAN availability Clarification of NY5 demarcation
1.6	NY5 certification requirement removed
1.7	Cboe FX Link port ranges added for NY5 and LD4 Prod and Cert
1.8	Significant post-migration updates added Trans-Atlantic WAN connectivity details added Legacy connectivity decommission timelines added
1.9	Port ranges for local MD repeaters added Test TCP Ports added 545 decommission timeline added Connectivity testing paragraph added Clarification on Tran-Atlantic WAN service availability
2.0	Change to port range and IP's for Cboe FX Link Updated description of trans-Atlantic service
2.1	Legacy connectivity table in appendix B updated
2.2	Certification Cboe FX Link port update
2.3	Added: Cboe FX NDFs and Cboe SEF information Updated: email addresses / phone numbers Removed: references to Cboe FX Link and Java FIX; Appendix B

Introduction

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

In summary:

The London matching engines are located at Equinix LD4, serving the Cboe FX spot market and the Cboe Swiss NDF market. The London matching engines do not serve the Cboe SEF market.

The New York matching engines are located at Equinix NY5, serving the Cboe FX spot market and the Cboe SEF NDF market. The New York matching engines do not serve the Cboe Swiss market.

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

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.

Contacts

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Connectivity Ordering Process

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

https://fx.cboe.com/pdfs/Hotspot_Connectivity_Order_Form.pdf

https://fx.cboe.com/pdfs/Cboe_Switzerland_GmbH_Connectivity_Order_Form.pdf

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

Connectivity Options

The following Connectivity options are supported, as detailed below:

- **Data centre cross-connect**
- **Directly connected via metro ethernet circuit**
- **Extranet**
- **Internet**
- **NY5 <--> LD4 transatlantic WAN**

Data Centre Cross-Connect

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

New York: Users may cross-connect from any of the Equinix Secaucus campus data centres 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.

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

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.

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.

Internet

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

Transatlantic Connectivity Between LD4 & 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 datacentre cross-connects and directly connected metro ethernet circuits.

The following services are available in production only:

- Cboe FX ITCH Market data
- Cboe FX FIX Market data
- Cboe FX FIX order entry (excluding market making activity)
- Cboe FX STP/DropCopy

Market data from the transatlantic market will be distributed via ITCH repeaters in the local data centre. Users don't 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

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.

Bandwidth Guidance

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

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 LD4 - UK	10G	LR (single-mode) & SR (multi-mode)
	1G	LX (single-mode), SX (multi-mode) & 1000BaseT
Equinix LD5, LD6 - UK	10G	LR (single-mode)
	1G	LX (single-mode)

IP Addressing

The details below 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.

Connectivity Testing

- Cboe runs TCP port listeners 24/7 on the highest TCP port in every TCP port range as is shown in Appendix A.1 and A2, "IP addresses & 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.

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

Cboe Foreign Exchange NY5 connectivity via cross-connects

Cboe Foreign Exchange Connectivity Manual v2.3

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	27137 - 27379	27379
Production	Java GUI	208.90.208.0/27	5121-5127	n/a
Production	FIX BookFeed	208.90.208.32/27	7040 - 7167	7167
Production	FIX BookFeed – LD4 (Transatlantic)	208.90.208.32/27	7168 - 7295	7295
Production	FIX BookFeed	208.90.208.32/27	27380 – 27623	27623
Production	Cboe FX ITCH	208.90.208.32/27	8064 - 8191	8191
Production	Cboe FX ITCH – LD4 (Transatlantic)	208.90.208.32/27	8192 - 8319	8319
Certification	Drop Copy / STP	208.90.208.240/28	19200 - 19327	19327
Certification	FIX Order Entry	208.90.208.240/28	16128 - 16255	16255
Certification	FIX Order Entry - Link	208.90.208.240/28	36224 – 36351	36351
Certification	Java GUI	208.90.208.240/28	443	n/a
Certification	FIX BookFeed	208.90.208.240/28	17152 - 17279	17279
Certification	FIX MM - Link	208.90.208.240/28	37348 - 37360	37360
Certification	FIX BookFeed	208.90.208.240/28	37361 - 37375	37375
Certification	Cboe FX ITCH	208.90.208.240/28	18176 - 18303	18303

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 & 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
Certification	Drop Copy / STP	195.3.211.0/28	19200 - 19327	19327
Certification	FIX Order Entry	195.3.211.0/28	16128 - 16255	16255
Certification	FIX Order Entry	195.3.211.0/28	36224 - 36351	36351
Certification	FIX BookFeed	195.3.211.0/28	17152 - 17279	17279
Certification	FIX Order Entry	195.3.211.0/28	37348 - 37360	37360
Certification	FIX BookFeed	195.3.211.0/28	37361 - 37375	37375
Certification	Cboe FX ITCH	195.3.211.0/28	18176 - 18303	18303

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	6017 - 6019	6019	-	Yes
Production	Java GUI	195.93.197.193	443	n/a	Yes	-
Production	FIX BookFeed	195.93.197.194	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