

CURVEGLOBAL
MARKETS



Connectivity Guide



By the market. For the market.

1. DISCLAIMER

The materials presented by Curve Global Limited to illustrate its products or its services, as well as the product and services of London Stock Exchange plc and LCH.Clearnet Limited (the Publication) are for information purposes only and do not constitute, nor purport to effect, an offering of, or solicitation of offers to purchase or subscribe for, any securities, the provision of investment or trading advice or an intermediation in activities pertaining to the marketing of securities, futures contracts, options on futures, swaps or other commodities. No person should act on the basis of the Publication.

The Publication is being provided on the basis that each person in the United Kingdom to whom it is issued is reasonably believed to be such a person as is described in Article 19 (“Investment professionals”) or Article 49 (“High net worth companies, unincorporated associations etc”) of The Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 or is a person to whom this Memorandum may otherwise lawfully be distributed.

Any prospective offering, sale and use of products and services by Curve Global Limited, including the use of the Publication or any offer materials made available by CurveGlobal Limited in connection with the offering and sale of products and services to or their use by audiences in the US, is subject to all applicable US Federal securities and commodities laws and regulations.

The information in the Publication, which does not purport to be comprehensive, has been provided by Curve Global Limited and has not been independently verified. While this information has been prepared in good faith, no representation or warranty, express or implied, is or will be made and no responsibility or liability is or will be accepted by Curve Global Limited, London Stock Exchange plc or LCH.Clearnet Limited or by any of their respective affiliates, officers, employees or agents as to or in relation to the accuracy or completeness of the information in the Publication or any other written or oral information made available to any interested party or its advisers and any such liability is expressly disclaimed.

The Publication and other written or oral information supplied from time to time by or on behalf of Curve Global Limited may include statements that may constitute “forward-looking statements” within the meaning of the safe harbour provisions of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements are not historical facts, but instead represent only our beliefs regarding future events, many of which, by their nature, are inherently uncertain and outside our control. These statements include statements other than historical information or statements of current condition and may relate to our future plans and objectives and results. By identifying these statements in this manner, you are alerted to the possibility that our actual results and condition may differ, possibly materially, from the anticipated results and condition indicated in these forward-looking statements.

© April 2020 London Stock Exchange Group plc.

2. CONTENTS

1.	Disclaimer.....	2
2.	Contents.....	3
3.	Introduction	4
3.1	Purpose	4
3.2	Readership	4
3.3	Document History	4
3.4	Enquires	5
4.	Connectivity Overview	6
4.1	Connectivity Protocol.....	6
4.2	Services	6
4.2.1	SAIL Trading Gateway	6
4.2.2	FIX Trading Gateway	6
4.2.3	Market Data Gateway.....	6
4.2.4	BTS® Application	7
4.3	Connection options.....	7
4.4	Architecture	7
4.5	Disaster Recovery.....	8
5.	Connectivity	8
5.1	Customer Development Service (CDS) Test Platform	8
5.1.1	CDS Trading Services.....	8
5.1.2	CDS Information Services.....	8
5.2	Legacy Customer Development Service Test Platform.....	10
5.2.1	Legacy CDS Trading.....	10
5.3	Legacy CDS Information Services.....	10
5.4	Production Platform.....	11
5.2.1	Production Trading Services	11
5.2.2	Production Information services.....	12
5.5	Enablement Process.....	12
5.6.1	CDS (Customer Development Service) Test Platform	12
5.6.2	Production Platform.....	12
6.	Contacts	13
6.1	CurveGlobal.....	13
6.2	LCH	13



3. INTRODUCTION

The purpose of this publication is to provide participants with the knowledge and technical details necessary for accessing the CurveGlobal Markets derivatives trading system.

The CurveGlobal Markets derivatives platform utilises a standard FIX 4.2 (Financial Information eXchange) interface for order entry & execution.

Participants can also use the native SOLA Access Information Language (SAIL) protocol for order entry & execution. Market data is disseminated via HSVF (High-Speed Vendor Feed) protocol using TCP (Unicast) and UDP (Multicast).

3.1 PURPOSE

The purpose of this document is to provide participants with information on how to connect to the CurveGlobal Markets derivatives platform for both the test Customer Development Service and the production service.

3.2 READERSHIP

This document is a supporting document to the interface technical specifications. When read in conjunction with the other technical specifications, these documents provide all the details CurveGlobal Markets participants require to obtain access to the derivatives trading system.

This document is particularly relevant to project and technical staff within member firms and companies that provide CurveGlobal Markets related services to member and non-member firms.

3.3 DOCUMENT HISTORY

Issue	Date	Description
1.0	30 September 2013	First issue of this document published.
2.0	14 December 2015	Updated with SOLA 8 Production SDC IP addresses for LSEDM and OB.
3.0	16 December 2015	3.1.1 Added CDS Trading IP addresses for LSEDM Interest Rate Derivative products 3.1.2 – Added CDS HSVF IP addresses for LSEDM Interest Rate Derivative products 3.2.1 – Added production trading IP addresses for LSEDM Interest Rate Derivatives products 3.2.2 – Added production HSVF IP addresses for LSEDM Interest Rate Derivatives products
4.0	08 June 2016	3.1.1.1 – Changed port number for CDS BCS Clearing from 34900 to 35900

4.1	06 September 2016	3.2.1 – Changed port number and IP address for Production BCS Clearing for both CurveGlobal Markets and Oslo
4.2	31 August 2017	New BTS® platform – updated IPs and TCP ports
4.3	15 January 2018	3.2.1 - Added new SAIL Trading 03 and 04 gateways
4.4	03 April 2018	3.2 Added new Legacy CDS details
4.5	06 December 2018	3.1.1 – Updated the BTS® IP addresses 3.2.1 – Updated the BTS® IP addresses
5.0	17 September 2019	Updated the document for the decommissioning of LSEDM. Added the HSVF Multicast IP addresses.
5.1	5 December 2019	Connectivity template updated, including table of contents. 5.1.2, 5.2.2 – HSVF Multicast IP Addresses updated 5.6.1, 5.6.2 – Source IP required for HSVF Enablement requests
5.2	21 January 2020	4.5 – Added Disaster Recovery details for HSVF Multicast 5.1.2, 5.2.2 – HSVF Multicast IP Addresses updated
5.3	22 April 2020	3, 4.1, 4.2.3 – Added reference to UDP Multicast 4.2.4 – Updated BTS section 4.5 – Corrected DR behavior for long orders 5.6.2 – Production enablement requests to be made via Member Portal

3.4 ENQUIRES

Contact Technical Account Management at CurveGlobal Markets for any functional queries regarding the services outlined in this document. Technical Account Management can be contacted Monday to Friday between 07:30 UK and 18:00 UK:

Telephone: +44 (0)20 7797 3939

Email: londontam@lseg.com

4. CONNECTIVITY OVERVIEW

4.1 CONNECTIVITY PROTOCOL

CurveGlobal Markets uses TCP/IP (Transmission Control Protocol/Internet Protocol) for network connectivity. All FIX and native SAIL interface messages are transported using TCP. All data sent by the HSVF interface is broadcast via TCP unicast and UDP multicast. CurveGlobal Markets only supports IPv4.

4.2 SERVICES

CurveGlobal Markets provides a gateway to enter orders and receive market data.

4.2.1 SAIL Trading Gateway

The SAIL trading gateways provide a native low-latency trading interface which allows participants to send and manage orders on the trading system. The SAIL protocol in addition provides market-marking functionality via quoting messaging. The interface enables clients to perform the following activities:

- Submit an order
- Cancel an order
- Mass Cancel orders
- Cancel/Replace an order
- Market-Making

The SAIL trading gateway uses a proprietary interface referred to as the native interface.

4.2.2 FIX Trading Gateway

The FIX 4.2 trading gateway allows participants to send and manage orders on the trading system. The interface enables clients to perform the activities outlined below.

- Submit an order
- Cancel an order
- Mass Cancel orders
- Cancel/Replace an order

The entry of quotes for market-making is not supported by the FIX trading gateway. The FIX trading gateway uses the FIX 4.2 protocol.

4.2.3 Market Data Gateway

The HSVF market data feed is comprised of trades, quotes, market depth, strategies, bulletins, summaries and statistics.

The HSVF market data feed uses a TCP and UDP broadcast interface. Each message type is fixed in format and messages are non-blocked (i.e. CurveGlobal Markets does not wait for an acknowledgement before sending the following message) re-transmission of any data is available via TCP only.

HSVF messages consist of a standard message header followed by the message body which varies in format according to the message type.

- Trades

- Request for Quotes
- Quotes
- Market Depth
- Trade Cancellation
- Instrument Keys
- Instrument Summaries
- Administration messages including connection and “heartbeat” etc

4.2.4 BTS® Application

The Borsa Italiana Systems (BITS) Trading Station (BTS®) Service allows access to CurveGlobal Markets derivatives trading services.

The applications enable access through a client-server trading software application and through the **SAIL and FIX Drop Copy** gateways. The server layer is located at the CurveGlobal Markets derivatives data centre that is connected directly to the markets. The client application runs on the member’s own computers. The client application is an advanced multi-market trading application, compatible with a majority of Windows and Linux based operating systems.

4.3 CONNECTION OPTIONS

Participants are able to connect to the CurveGlobal Markets derivatives platform via Extranex, CMC, co-location hosting or VPN connectivity.

4.4 ARCHITECTURE

The CurveGlobal Markets derivatives platform consists of the following gateways:

- A single endpoint (IP address and port) interface for FIX trading.
- A single endpoint interface for SAIL trading & market-making.
- A single endpoint interface for HSVF TCP market data services.
- HSVF UDP Multicast market data services, with two different UDP feeds (A and B feed) **both delivered from** the Primary Data Centre (PDC) instance, for resiliency purposes. The “replay and recovery” services (implemented using the existing HSVF TCP feed) will give customers the possibility to retrieve missed messages.
- Two endpoint interfaces each are provided for BTS® trading.
- Each FIX, SAIL, HSVF and BTS® endpoint is supplemented with a secondary standby which is invoked during a failover in the event of an issue occurring with the primary.

4.5 DISASTER RECOVERY

CurveGlobal Markets operates in cold standby mode. In the event of total loss of the primary site datacentre, CurveGlobal Markets activates the disaster recovery site. This procedure is expected to elapse in the order of 2 hours.

Once the disaster recovery site is active, all intraday orders are cleared and the trading system re-started. Prior Good Till Date orders submitted from previous days are **not** re-instated.

HSVF Multicast delivers market data via two different multicast channels, Feed A & Feed B. As both channels are provided from the primary data centre, in the event of a loss of the primary site no HSVF Multicast service will be available from the secondary data centre. Clients should therefore connect to the HSVF TCP Market Data service available from the secondary site datacenter.

5. CONNECTIVITY

5.1 CUSTOMER DEVELOPMENT SERVICE (CDS) TEST PLATFORM

5.1.1 CDS Trading Services

CURVEGLOBAL MARKETS Interest Rate Derivatives		
Service	IP Address	TCP Port
FIX Trading 01	194.169.14.163	51460
FIX Trading 02	194.169.14.163	51470
FIX Drop Copy 01	194.169.14.163	51480
FIX Drop Copy 02	194.169.14.163	51490
SAIL Trading 01	194.169.14.161	51401
SAIL Trading 02	194.169.14.161	51402
SAIL Trading 03	194.169.14.161	51403
SAIL Trading 04	194.169.14.161	51404
SAIL Drop Copy 01	194.169.14.161	51415
SAIL Drop Copy 02	194.169.14.161	51425
BTS [®] Trading	194.169.14.172	34900; 34910; 34921; 34924

5.1.2 CDS Information Services

CURVEGLOBAL MARKETS Interest Rate Derivatives

Service	IP Address	TCP Port
HSVF TCP Market Data	194.169.14.165	52410

CURVEGLOBAL MARKETS Interest Rate Derivatives

Service	Multicast Source IP Address	Multicast Address	UDP Port
HSVF Multicast Market Data (Feed A)	194.169.15.194/32	224.4.16.226	11316
HSVF Multicast Market Data (Feed B)	194.169.15.202/32	224.4.17.226	11316



5.2 LEGACY CUSTOMER DEVELOPMENT SERVICE TEST PLATFORM

5.2.1 Legacy CDS Trading

CURVEGLOBAL MARKETS Interest Rate Derivatives		
Service	IP Address	TCP Port
FIX Trading 01	94.46.104.134	51460
FIX Trading 02	94.46.104.134	51470
FIX Drop Copy 01	94.46.104.134	51480
FIX Drop Copy 02	94.46.104.134	51490
SAIL Trading 01	94.46.104.133	51401
SAIL Trading 02	94.46.104.133	51402
SAIL Trading 03	94.46.104.133	51403
SAIL Trading 04	94.46.104.133	51404
SAIL Drop Copy 01	94.46.104.133	51415
SAIL Drop Copy 02	94.46.104.133	51425

5.3 LEGACY CDS INFORMATION SERVICES

CURVEGLOBAL MARKETS Interest Rate Derivatives		
Service	IP Address	TCP Port
HSVF Market Data	94.46.104.143	52410

5.4 PRODUCTION PLATFORM

5.2.1 Production Trading Services

CURVEGLOBAL MARKETS Interest Rate Derivatives			
Service	Channel	IP Address	TCP Port
FIX Trading 01	Primary	194.169.14.133	61460
FIX Trading 02	Primary	194.169.14.133	61470
FIX Drop Copy 01	Primary	194.169.14.133	61480
FIX Drop Copy 02	Primary	194.169.14.133	61490
SAIL Trading 01	Primary	194.169.14.131	61401
SAIL Trading 02	Primary	194.169.14.131	61402
SAIL Trading 03	Primary	194.169.14.131	61403
SAIL Trading 04	Primary	194.169.14.131	61404
SAIL Drop Copy 01	Primary	194.169.14.131	61415
SAIL Drop Copy 02	Primary	194.169.14.131	61425
FIX Trading 01	Secondary	194.169.14.151	61460
FIX Trading 02	Secondary	194.169.14.151	61470
FIX Drop Copy 01	Secondary	194.169.14.151	61480
FIX Drop Copy 02	Secondary	194.169.14.151	61490
SAIL Trading 01	Secondary	194.169.14.149	61401
SAIL Trading 02	Secondary	194.169.14.149	61402
SAIL Trading 03	Secondary	194.169.14.149	61403
SAIL Trading 04	Secondary	194.169.14.149	61404
SAIL Drop Copy 01	Secondary	194.169.14.149	61415
SAIL Drop Copy 02	Secondary	194.169.14.149	61425
° BTS Trading 01	Primary	194.169.14.138	44900;44910;44921;44924
° BTS Trading 02	Primary	194.169.14.139	44900;44910;44921;44924
° BTS Trading 01	Secondary	194.169.15.138	44900;44910;44921;44924
° BTS Trading 02	Secondary	194.169.15.139	44900;44910;44921;44924

5.2.2 Production Information services

CURVEGLOBAL MARKETS Interest Rate Derivatives			
Service	Channel	IP Address	TCP Port
HSVF TCP Market Data	Primary	194.169.14.145	62410
HSVF TCP Market Data	Secondary	194.169.14.153	62410

CURVEGLOBAL MARKETS Interest Rate Derivatives			
Service	Multicast Source IP Address	Multicast Address	UDP Port
HSVF Multicast Market Data (Feed A)	194.169.15.241/32	224.4.16.193	11316
HSVF Multicast Market Data (Feed B)	194.169.15.249/32	224.4.17.193	11316

5.5 ENABLEMENT PROCESS

Requests to be connected to the CurveGlobal Markets derivatives platform are required to be directed to your Technical Account Manager on + 44 (0) 20 7797 3939 or londontam@lseg.com

Participants are required to specify the following information:

5.6.1 CDS (Customer Development Service) Test Platform

- Company
- SAP ID
- Primary and secondary contact (name, email, telephone)
- Services required (FIX, SAIL, SAIL DROP COPY, HSVF, BTS[®])
- Source IP (for HSVF)

5.6.2 Production Platform

Member firms will be required to request Production enablement's for their Membership via the Member Portal. The login page can be found at:

<https://memberportal.lseg.com>

6. CONTACTS

6.1 CURVEGLOBAL

For **CurveGlobal** support please contact:

Product Development	+44 (0) 7797 1478	curveteam@curveglobalmarkets.com
Business Development	+44 (0) 7797 3976	businessdev@curveglobalmarkets.com
Corporate Actions team	+44 (0) 20 7797 3660	etd.corporateactions@lseg.com
Technical Account Management		
	+44 (0) 20 7797 3939	londontam@lseg.com
Functional Queries, Client On-Boarding, Technical Advice		
Client Support Team		
Incident Management (Live Service and CDS)	00800 2677 2000 / +39 02 4541 1399 (Option 3)	service-desk@borsaitaliana.it

6.2 LCH

For **LCH** enquiries please contact:

General Enquiries	+44 (0) 20 7426 7000
--------------------------	----------------------

CurveGlobal Markets

10 Paternoster Square

London

EC4M 7LS