



# BATS Europe Connectivity Manual

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## Introduction

This document explains the options available to connect to BATS Europe.

### Contacts

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## Connectivity Options

BATS Europe supports the following network connectivity choices:

- **IPSec VPN** via the Internet for certification and test access only
- **Co-location Cross-Connect at LD4**
- **Directly Connected via Metro Ethernet at LD4**
- **Extranet**
- **Interxion PoP**

Participants are responsible for choosing their telecommunications provider, arranging for connections to the BATS Europe datacentre and paying all associated communications charges including cross-connects within the data centre.

There is a per physical port charge, published at [http://www.batstrading.co.uk/resources/participant\\_resources/BTL\\_Data\\_Centre\\_Services\\_Order\\_Form-Switch-Port.pdf](http://www.batstrading.co.uk/resources/participant_resources/BTL_Data_Centre_Services_Order_Form-Switch-Port.pdf).

### IPSec VPN

Participants may connect to BATS Europe using IPSec over the Internet.

- Access to all TCP-based feeds for certification and test only
- LAN-to-LAN IPSec VPNs only
- IP address of the host presented to BATS Europe must be registered
- Certification multicast PITCH available via VPN

### Co-location Cross-Connect at Equinix LD4

Participants may co-locate and cross connect to BATS Europe at Equinix LD4 to achieve the lowest-latency connectivity. Participants interested in taking co-location space should contact Equinix sales [batsconnect@eu.equinix.com](mailto:batsconnect@eu.equinix.com).

- The technical and commercial relationship is between Equinix and the Participant, BATS Europe are not involved.
- Participant orders and pays for the cross connect to BATS Europe.

### Directly Connected via Metro Ethernet at LD4

Participants may connect to BATS Europe via Metro Ethernet.

- No co-location space is required.
- The cross-connect from telco demarcation point to BATS Europe is ordered by BATS Europe and re-charged to the Participant.

## Extranet

Participants may connect to BATS Europe via an extranet.

- Extranet supplier provisions high-speed up links to BATS Europe for multiple Participants.
- The technical and commercial relationship is between the Extranet provider and the Participant.
- Not all extranets carry multicast PITCH.

## Interxion PoP

BATS Europe offers access to all feeds at Interxion (Hanbury Street) via the BATS One Network.

- Participants may connect from either co-lo or via metro ethernet circuits
- Interxion to LD4 RTT latency = 490uS
- 1G SX fibre interface-only supported

## Physical Interfaces

The following physical interface specifications are supported as standard, for other interface specifications contact [noceurope@batstrading.com](mailto:noceurope@batstrading.com).

Location	Speed	Media
Equinix Slough (LD4)	<b>10G</b>	SR (multi-mode) & LR (single-mode)
	<b>1G</b>	SX (multi-mode), LX (single mode), 1000BaseT
	<b>&lt;1G</b>	100BaseT, 10BaseT
Interxion(Hanbury Street)	<b>1G</b>	SX (multi-mode)

The lowest latency configuration is 10G, with the Gig A multicast PITCH market data feed.

## NTP

BATS Europe offers multicast NTP synchronised to a stratum 1 GPS receiver.

## Bandwidth

### Market Data Feeds

BATS Europe offers market data in two different formats: multicast PITCH and TCP PITCH.

### Multicast PITCH

Multicast PITCH has the following key features:

- Low-latency, up to 400us faster than TCP PITCH .
- Two bandwidth versions:
  - Gig-shaped, requires gigabit cross connects.
  - WAN-shaped, requires minimum of 50M.
- Gap Response Proxy to recover small data gaps.
- Spin Server to efficiently recover from intra-day disconnects.
- Efficient binary messaging and new modify order message.
- Market selectivity: LSE, Paris, Xetra, Amsterdam, Milan & Madrid and Nordics each have their own multicast streams and hence could be subscribed to individually.
- Gig A (primary) and Gig B (secondary) feeds and WAN C (primary) and WAN D (secondary) are all available from Equinix LD4.

The Multicast PITCH specification is published at:

[http://www.batstrading.co.uk/resources/participant\\_resources/BATS\\_Europe\\_MC\\_PITCH\\_Specification.pdf](http://www.batstrading.co.uk/resources/participant_resources/BATS_Europe_MC_PITCH_Specification.pdf)

The peak 1mS, 10mS and 1 second bandwidths across all markets seen to date are:

Interval	Intra-day peaks (Mbps)	Including end of day peak (Mbps)
1mS	105	289
10mS	75	171
1 second	24	24

The lowest-latency option of BATS Europe market data is the Gig A Multicast PITCH feed.

## TCP PITCH

TCP PITCH has the following features:

- Full TCP PITCH includes all symbols in all markets.
- Unitised PITCH offers basic market selectivity and is best suited for Participants who only require a limited sub-set of market data to reduce the cost of wide area connectivity.
- BATS Europe's preference is that Participants take market data via Multicast PITCH as the infrastructure load is constant irrespective of the number of data consumers.

The peak 1, 5 and 10 second bandwidth peaks of the Full TCP PITCH feed to date are:

Interval Seconds	Intra-day peak (Mbps)	Including end of day peak (Mbps)
1	47	47
5	31	31
10	24	24

There will be sub-second microbursts that will exceed the one second peak rate. The extent to which the network connection to the Participant will cope with the microbursts exceeding the available bandwidth without packet loss will depend heavily on the buffers in the end to end path.

The relevant specifications are:

[http://www.batstrading.co.uk/resources/participant\\_resources/BATS\\_Europe\\_PITCH\\_Specification.pdf](http://www.batstrading.co.uk/resources/participant_resources/BATS_Europe_PITCH_Specification.pdf)

## FIX Order Entry

The bandwidth for order entry via the FIX interface depends on the rate of message input, which will vary according to each Participants needs, details below:

### FIX order entry bandwidth requirements

Bandwidth	256kbps	512kbps	1.5Mbps
FIX message rate	75/sec	150/sec	450/sec

## Bandwidth Guidance

- Participants are strongly advised to provision enough spare bandwidth to cope with growth and exceptional market conditions.
- The current highest traffic peaks are detailed above, this will rise as the market develops. Sub-second microbursts will significantly exceed the one second peaks.
- BATS Europe recommends that Participants should order minimum 100M circuits. Participants are encouraged to take Multicast PITCH rather than multiple TCP PITCH feeds.
  - Gig-shaped Multicast PITCH requires a 1G or 10G cross-connect.
  - WAN-shaped Multicast PITCH currently requires 50M, though 100M is recommended.
- The bandwidth a Participant chooses will be influenced by the trade off between cost of the bandwidth against the acceptability of delays caused by queuing during peaks.

## IP Addressing

The details below apply to all connectivity methods other than VPN:

- BATS Europe hosts use registered addresses for both unicast and multicast data flows.
- BATS Europe supports publicly registered Participant addresses.
- If required, BATS Europe can allocate a 10.x.y.z address block. Each Participant is allocated a /24 subnet by default. This subnet can be split to provide transit P2P and host/NAT subnets.
- BATS Europe supports static routing and dynamic routing via BGP, for multicast, BATS Europe supports static and dynamic IGMP and PIM Sparse.
- Each separate BATS Europe feed is allocated a unique TCP port. The port is determined by the BATS Europe Trade Desk during the provisioning process.

## Multicast PITCH resources

The following resources are available specifically targeted at easing the process of developing for BATS Europe Multicast PITCH.

- BATS Europe offers UAT/certification Multicast PITCH via an internet VPN.
- A BATS Europe provided test program to assist in debugging multicast infrastructure is available: [http://www.batstrading.com/resources/membership/mcast\\_pitch.zip](http://www.batstrading.com/resources/membership/mcast_pitch.zip).
- Multicast PITCH historic data files are available via the participant portal.