



# BATS Chi-X Europe

## Market Data Migration Guide

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# 1 Introduction

## 1.1 Overview

The technology which drives the Chi-X Europe trading platform will be replaced with the same world-class proven technology which drives BATS Europe MTF, BATS BZX Exchange, BATS BYX Exchange, and BATS BZX Options Exchange. This document describes the differences between the market data delivery capabilities of the two platforms and changes that Participants will be required to make.

The Chi-X Europe and BATS Europe integrated and dark pools will continue to operate as separate islands of liquidity, albeit with smart order routing (SOR) capabilities between the two. A tradable instrument on each platform is considered distinct.

The books will operate under a single MTF license, but will retain separate ISO MICs (CHIX and BATE). The market data infrastructure which drives the Chi-X Europe and BATS Europe books will continue to be distinct. The UAT environments for both will also continue to be distinct. The market data products available on Chi-X Europe and BATS Europe will be harmonised.

Figure 1 shows a logical diagram of all market data products available. Participants need not subscribe to all of them.

See the **integration materials** for a complete listing of all migration milestones and documents.

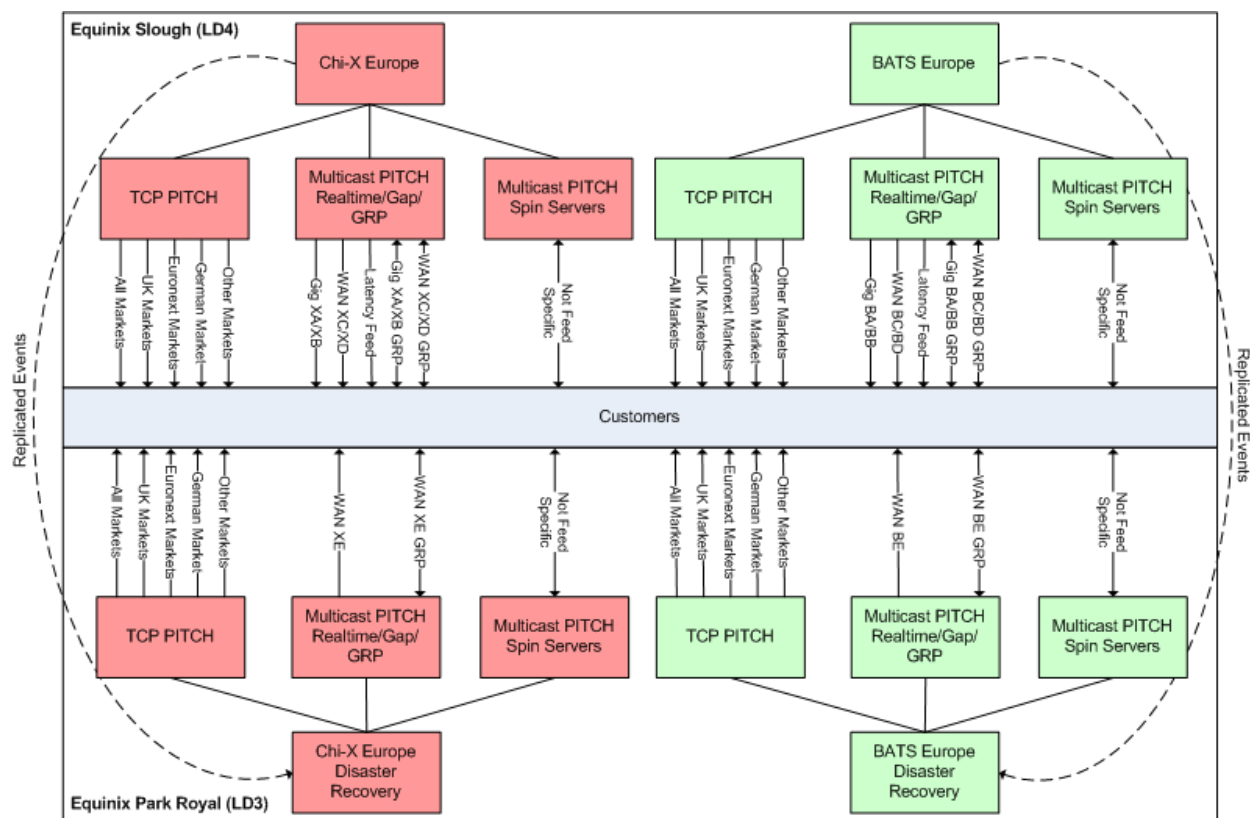


Figure 1: Logical market data diagram.

## 1.2 Testing Opportunities

The only change being made to the feed to support the migration will be in the interpretation of Execution IDs (see below). Participants which currently have facilities to handle TCP PITCH will need to make this minimal change.

Testing against the new Chi-X Europe UAT environment can be facilitated over dedicated or Internet VPN connectivity.

BATS Europe has available for download historical production data from the BATS Europe MTF platform to aid in testing. This is provided at no charge.

Two Dress Rehearsals will be provided prior to cutover.

## 2 CHIXMD Feed

The TCP CHIXMD Feed will be replaced with **BATS Europe TCP PITCH**. The two protocols are extremely similar, both being based on the de facto standard ITCH and SOUP protocols. Adapting code which takes CHIXMD to take TCP PITCH should be straightforward. The SOUP session protocol is identical.

### 2.1 Differences

- *Order References (Order IDs) will become 12 alphanumeric characters instead of 9 digits.* These are used in Add Order (A), Add Order — Long Form (a), Order Executed (E), Order Cancel (X), Order Cancel — Long Form (x), Trade (P), and Trade — Long Form (p) messages. Each of these messages will increase in overall length correspondingly.

Order IDs are day-unique and not reused across any of the four books.

Example order references:

- Pre-migration: `42971` (where  is a space)
- Post-migration: `2T1WC20007V7`

- *Trade References (Execution IDs) are now 12 alphanumeric characters instead of 9 digits.* These are used in Order Execution (E), Order Execution — Long Form (e), and Trade Break (B) messages. Each of these messages will increase in overall length correspondingly.

Examples trade references:

- Pre-migration: `2808` (where  is a space)
- Post-migration: `0000498000P`

- *Interpretation of Execution IDs.* Special meaning can be derived from Execution IDs. On the Chi-X Europe platform, executions which had a final digit of 0 indicated Chi-Delta fills. After migration, the *fourth character* of the Execution ID will indicate the nature of the execution:

- 0 - BATS Europe Integrated Book (only sent on the BATS Europe feeds)
- 1 - Chi-X Europe Integrated Book (only sent on the Chi-X Europe feeds)
- D - BATS Europe Dark Pool Execution (only sent on the BATS Europe feeds)
- E - Chi-X Europe Chi-Delta Dark Pool Execution (only sent on the Chi-X Europe feeds)
- R - Negotiated Transaction

Execution IDs are day-unique and not reused across any of the four books.

For example, an Execution ID of `000D5980004E` is a BATS Europe Dark Pool Execution.

- *Reloading of the visible part of an iceberg order uses different messaging.* To prevent information leakage, the BATS TCP PITCH feed intentionally makes it difficult to determine the reload of an iceberg order by sending a different stream of messages with new Order IDs. No new message types or field values are required. Any compliant ITCH-style protocol handler will handle the new mechanism.
- *System Event messages.* CHIXMD sends System Messages to indicate the Start of Day and End of Day. TCP PITCH does not send these.

## 2.2 Feeds Available

Recall that there will be separate feeds for the Chi-X Europe and BATS Europe books. Data is split across 12 units by market and symbol range. A number of different TCP PITCH feeds will be available which bundle a number of units comprising a market into a single feed.

See § 5.1, p. 7 for production bandwidth requirements. Chi-X Europe currently cap the sum total of all customer test traffic in UAT at 10 Mbit/s. After migration to BATS Europe technology, this limitation will not be in place for TCP ports. As a rough guideline, the volumes in UAT tend to be one-quarter of the volumes in production.

## 3 Chi-X Europe Multicast Data Feed

The Chi-X Europe Multicast Data Feed will be retired. The BATS Europe multicast PITCH feed is considerably different. See **BATS Europe Multicast PITCH Specification** for a complete description of the services offered.

Chi-X Europe real-time and gap market data will be delivered on distinct multicast groups from BATS Europe market data. Different upstream GRP and Spin servers will also be used for each feed.

The only differences made in the BATS Europe Multicast PITCH message format across the Chi-X Europe and BATS Europe markets will be around interpretation of Execution IDs (see *Differences* above for CHIXMD).

### 3.1 Symbol/Market Splits and Bandwidth

Data is split across units by instrument listing market and symbol, as is currently done for BATS Europe. There will be 12 units for Chi-X Europe and 12 units for BATS Europe. The same layout of symbol to market data unit will be preserved across the Chi-X Europe and BATS Europe books.

BATS Europe currently distributes Austrian (WBAH) data on unit 12. This will be changing shortly on the BATS Europe book (prior to the Chi-X Europe migration) to be sent on unit 8. The tables below show the new distribution. The Chi-X Europe feeds will always distribute the data on unit 8.

### 3.2 Feeds Available

In Equinix Slough, four feeds are provided per book:

- *Chi-X Europe:*
  - Gig-Shaped Primary (XA)
  - Gig-Shaped Secondary (XB)
  - WAN-Shaped Primary (XC)
  - WAN-Shaped Secondary (XD)
- *BATS Europe:*

- Gig-Shaped Primary (BA)
- Gig-Shaped Secondary (BB)
- WAN-Shaped Primary (BC)
- WAN-Shaped Secondary (BD)

In Equinix Park Royal, only a single WAN shaped feed is provided per book:

- *Chi-X Europe*: WAN-Shaped Disaster Recovery (XE)
- *BATS Europe*: WAN-Shaped Disaster Recovery (BE)

See § 5.2, p. 8 for bandwidth requirements. The UAT Multicast PITCH feed is bandwidth limited to 0.5 Mbit/s per unit, or around 6 Mbit/s for the entire feed. The same feeds by market and symbol will be available in UAT as in production. The feed will generally only be available in UAT to directly connected Participants. If necessary, VPN access may be possible; please discuss with the BATS Europe NOC.

## 4 Reference Data

Both BATS Europe and Chi-X Europe static reference data and tick table file formats will be made available for a period after migration. At some point in the future after sufficient notice, the Chi-X Europe version will be discontinued.

Post-migration, the reference data files will only be available over HTTP (not FTP). Access will be provided via internet connectivity only.

## 5 Bandwidth Requirements

### 5.1 TCP Feeds

Separate feeds are provided for each book (Chi-X Europe and BATS Europe). For example, to take all UK markets for both books would be 16 Mbit/s + 16 Mbit/s = 32 Mbit/s.

<b>Books</b>	<b>Market(s)</b>	<b>Minimum Bandwidth</b>
Chi-X Europe	All Markets (units 1-12)	40 Mbit/s
	XLON, XDUB (units 1-3)	16 Mbit/s
	XPAR, XAMS, XBRU, XLIS (units 4-6)	19 Mbit/s
	XETR/XFRA, WBAH (units 7-8)	5 Mbit/s
	MTAA/ETFP, XMCE, XVTX/XSWX, XCSE, XHEL, XSTO, XOSL (units 9-12)	10 Mbit/s
BATS Europe	All Markets (units 1-12)	40 Mbit/s
	XLON, XDUB (units 1-3)	16 Mbit/s
	XPAR, XAMS, XBRU, XLIS (units 4-6)	19 Mbit/s
	XETR/XFRA, WBAH (units 7-8)	5 Mbit/s
	MTAA/ETFP, XMCE, XVTX/XSWX, XCSE, XHEL, XSTO, XOSL (units 9-12)	15 Mbit/s

## 5.2 Multicast Feeds

The bandwidth values below are per book (Chi-X Europe and BATS Europe). For example, to take the Gig-Shaped feed for the UK markets (units 1-3), the bandwidth required would be 120 Mb/s for Chi-X Europe real-time data, 120 Mb/s for BATS Europe real-time data, 6 Mb/s for the Chi-X Europe gap responses, and 6 Mb/s for the BATS Europe gap responses, for a total of 252 Mb/s. Bandwidth shaping values given are not necessarily the same as the bandwidth peaks seen on each feed—queuing could occur even on the Gig-Shaped feeds.

The UAT multicast feeds require 0.5 Mb/s (0.4 Mb/s real-time + 0.1 Mb/s gap) per unit, per book.

Unit	Markets	Gig-Shaped (per book)		WAN-Shaped (per book)	
		Real-time	Gap Response	Real-time	Gap Response
1	XLON (0-H)	45 Mb/s	2.0 Mb/s	4.9 Mb/s	0.3 Mb/s
2	XLON (I-R)	45 Mb/s	2.0 Mb/s	4.9 Mb/s	0.3 Mb/s
3	XLON (S-Z) XDUB (all)	30 Mb/s	2.0 Mb/s	3.2 Mb/s	0.3 Mb/s
4	XPAR (0-F)	40 Mb/s	2.0 Mb/s	4.0 Mb/s	0.3 Mb/s
5	XPAR (G-Z)	40 Mb/s	2.0 Mb/s	4.0 Mb/s	0.3 Mb/s
6	XAMS (all) XBRU (all) XLIS (all)	40 Mb/s	2.0 Mb/s	4.0 Mb/s	0.3 Mb/s
7	XETR/XFRA (0-E)	40 Mb/s	2.0 Mb/s	4.2 Mb/s	0.3 Mb/s
8	XETR/XFRA (F-Z) WBAH (all)	40 Mb/s	2.0 Mb/s	4.2 Mb/s	0.3 Mb/s
9	MTAA/ETFP (0-M) XMCE (0-M)	18 Mb/s	2.0 Mb/s	2.0 Mb/s	0.3 Mb/s
10	MTAA/ETFP (N-Z) XMCE (N-Z)	18 Mb/s	2.0 Mb/s	1.5 Mb/s	0.3 Mb/s
11	XVTX (all) XSWX (all)	30 Mb/s	2.0 Mb/s	2.4 Mb/s	0.3 Mb/s
12	XSTO (all) XHEL (all) XOSL (all) XCSE (all)	40 Mb/s	2.0 Mb/s	3.1 Mb/s	0.3 Mb/s
<b>Total</b>		<b>450 Mb/s</b>		<b>46 Mb/s</b>	

## 6 Multicast Configuration

The following subsections give the multicast configuration for all available Multicast PITCH feeds. This includes the IP port, market and symbol ranges, realtime multicast groups and source IP addresses, and gap response multicast group and source IP addresses.

BATS reserves the right to add units and/or change symbol distribution within 48 hours notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to, at minimum, support mappings in these tables via software configuration. Symbol ranges are chosen to try to distribute updates evenly. The distribution is reviewed periodically and may be adjusted.

BATS reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

### 6.1 Rendezvous Points

Data Centre	Feed	Multicast RP
LD4	Chi-X Europe Gig-Shaped XA	95.130.108.248
LD4	Chi-X Europe Gig-Shaped XB	95.130.108.252
LD4	Chi-X Europe WAN-Shaped XC	95.130.108.249
LD4	Chi-X Europe WAN-Shaped XD	95.130.108.253
LD4	Chi-X Europe UAT Wan-Shaped	95.130.108.255
LD4	BATS Europe Gig-Shaped BA	95.130.109.248
LD4	BATS Europe Gig-Shaped BB	95.130.109.252
LD4	BATS Europe WAN-Shaped BC	95.130.109.249
LD4	BATS Europe WAN-Shaped BD	95.130.109.253
LD4	BATS Europe UAT Wan-Shaped	95.130.109.255
LD3	Chi-X Europe Wan-Shaped XE	95.130.106.249
LD3	BATS Europe Wan-Shaped BE	95.130.107.249

Multicast streams can be initiated by an IGMP join message for the required group, a PIM join message, or be statically configured. The statically configured option removes Participant control of market data forwarding and requires careful consideration.

## 6.2 Chi-X Europe Primary Production Multicast Configuration (LD4)

Unit	IP Port	Market (Symbol Range)	Gig-Shaped (XA)			WAN-Shaped (XC)		
			Real-time MC and (Src) IP Addr	Gap Response MC and (Src) IP Addr	IP	Real-time MC and (Src) IP Addr	Gap Response MC and (Src) IP Addr	IP
1	31101	XLON (0-H)	224.0.82.2	224.0.82.3		224.0.82.34	224.0.82.35	
2	31102	XLON (I-R)	(95.130.108.129)	(95.130.108.129)		(95.130.108.145)	(95.130.108.145)	
3	31103	XLON (S-Z)	224.0.82.2	224.0.82.3				
		XDUB (all)	(95.130.108.130)	(95.130.108.130)				
4	31104	XPAR (0-F)	224.0.82.4	224.0.82.5		224.0.82.36	224.0.82.37	
		XPAR (G-Z)	(95.130.108.130)	(95.130.108.130)		(95.130.108.145)	(95.130.108.145)	
5	31105		224.0.82.4	224.0.82.5				
		XAMS (all)	(95.130.108.131)	(95.130.108.131)				
6	31106	XBRU (all)	224.0.82.6	224.0.82.7		224.0.82.38	224.0.82.39	
		XLIS (all)	(95.130.108.131)	(95.130.108.131)		(95.130.108.145)	(95.130.108.145)	
7	31107	XETR (0-E)	224.0.82.8	224.0.82.9		224.0.82.40	224.0.82.41	
		XFRA (0-E)	(95.130.108.129)	(95.130.108.129)		(95.130.108.145)	(95.130.108.145)	
8	31108	XETR (F-Z)						
		XFRA (F-Z)						
		WBAH (all)						
9	31109	MTAA (0-M)						
		ETFP (0-M)	224.0.82.10	224.0.82.11		224.0.82.42	224.0.82.43	
		XMCE (0-M)	(95.130.108.130)	(95.130.108.130)		(95.130.108.145)	(95.130.108.145)	
10	31110	MTAA (N-Z)						
		ETFP (N-Z)						
		XMCE (N-Z)						
11	31111	XVTX (all)						
		XSWX (all)						
12	31112	XSTO (all)	224.0.82.12	224.0.82.13		224.0.82.44	224.0.82.45	
		XHEL (all)	(95.130.108.131)	(95.130.108.131)		(95.130.108.145)	(95.130.108.145)	
		XOSL (all)						
		XCSE (all)						

BATS reserves the right to add units and/or change symbol distribution within 48 hours notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to, at minimum, support mappings in these tables via software configuration. Symbol ranges are chosen to try to distribute updates evenly. The distribution is reviewed periodically and may be adjusted.

BATS reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

### 6.3 Chi-X Europe Secondary Production Multicast Configuration (LD4)

Unit	IP Port	Market (Symbol Range)	Gig-Shaped (XB)			WAN-Shaped (XD)		
			Real-time MC and (Src) IP Addr	Gap Response MC and (Src) IP Addr	IP	Real-time MC and (Src) IP Addr	Gap Response MC and (Src) IP Addr	IP
1	31101	XLON (0-H)	224.0.82.66	224.0.82.67		224.0.82.98	224.0.82.101	
2	31102	XLON (I-R)	(95.130.108.161)	(95.130.108.161)		(95.130.108.177)	(95.130.108.177)	
3	31103	XLON (S-Z)	224.0.82.66	224.0.82.67				
		XDUB (all)	(95.130.108.161)	(95.130.108.161)				
4	31104	XPAR (0-F)	224.0.82.68	224.0.82.69		224.0.82.100	224.0.82.101	
			(95.130.108.161)	(95.130.108.161)		(95.130.108.177)	(95.130.108.177)	
5	31105	XPAR (G-Z)	224.0.82.68	224.0.82.69				
			(95.130.108.161)	(95.130.108.161)				
6	31106	XAMS (all)	224.0.82.70	224.0.82.71		224.0.82.102	224.0.82.103	
		XBRU (all)	(95.130.108.161)	(95.130.108.161)		(95.130.108.177)	(95.130.108.177)	
		XLIS (all)						
7	31107	XETR (0-E)	224.0.82.72	224.0.82.73		224.0.82.104	224.0.82.105	
		XFRA (0-E)	(95.130.108.162)	(95.130.108.162)		(95.130.108.177)	(95.130.108.177)	
8	31108	XETR (F-Z)						
		XFRA (F-Z)						
		WBAH (all)						
9	31109	MTAA (0-M)						
		ETFP (0-M)	224.0.82.74	224.0.82.75		224.0.82.106	224.0.82.107	
		XMCE (0-M)	(95.130.108.162)	(95.130.108.162)		(95.130.108.177)	(95.130.108.177)	
10	31110	MTAA (N-Z)						
		ETFP (N-Z)						
		XMCE (N-Z)						
11	31111	XVTX (all)						
		XSWX (all)						
12	31112	XSTO (all)	224.0.82.76	224.0.82.77		224.0.82.108	224.0.82.109	
		XHEL (all)	(95.130.108.162)	(95.130.108.162)		(95.130.108.177)	(95.130.108.177)	
		XOSL (all)						
		XCSE (all)						

BATS reserves the right to add units and/or change symbol distribution within 48 hours notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to, at minimum, support mappings in these tables via software configuration. Symbol ranges are chosen to try to distribute updates evenly. The distribution is reviewed periodically and may be adjusted.

BATS reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

## 6.4 Chi-X Europe Disaster Recovery Multicast Configuration (LD3)

Unit	IP Port	Market (Symbol Range)	WAN-Shaped (XE)	
			Real-time MC and (Src) IP Addr	Gap Response MC and (Src) IP Addr
1	31301	XLON (0-H)		
2	31302	XLON (I-R)	224.0.84.2	224.0.84.3
3	31303	XLON (S-Z) XDUB (all)	(95.130.106.93)	(95.130.106.93)
4	31304	XPAR (0-F)	224.0.84.4	224.0.84.5
5	31305	XPAR (G-Z)	(95.130.106.93)	(95.130.106.93)
6	31306	XAMS (all) XBRU (all) XLIS (all)	224.0.84.6 (95.130.106.93)	224.0.84.7 (95.130.106.93)
7	31307	XETR (0-E) XFRA (0-E)	224.0.84.8 (95.130.106.94)	224.0.84.9 (95.130.106.94)
8	31308	XETR (F-Z) XFRA (F-Z) WBAH (all)		
9	31309	MTAA (0-M) ETFP (0-M) XMCE (0-M)	224.0.84.10 (95.130.106.94)	224.0.84.11 (95.130.106.94)
10	31310	MTAA (N-Z) ETFP (N-Z) XMCE (N-Z)		
11	31311	XVTX (all) XSWX (all)		
12	31312	XSTO (all) XHEL (all) XOSL (all) XCSE (all)	224.0.84.12 (95.130.106.94)	224.0.84.13 (95.130.106.94)

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## 6.5 Chi-X Europe UAT Multicast Configuration (LD4)

Unit	IP Port	Market (Symbol Range)	WAN-Shaped	
			Real-time MC and (Src) IP Addr	Gap Response MC and (Src) IP Addr
1	31501	XLON (0-H)		
2	31502	XLON (I-R)	224.0.85.2 (95.130.110.196)	224.0.85.3 (95.130.110.196)
3	31503	XLON (S-Z) XDUB (all)		
4	31504	XPAR (0-F)	224.0.85.4 (95.130.110.196)	224.0.85.5 (95.130.110.196)
5	31505	XPAR (G-Z)		
6	31506	XAMS (all) XBRU (all) XLIS (all)	224.0.85.6 (95.130.110.196)	224.0.85.7 (95.130.110.196)
7	31507	XETR (0-E) XFRA (0-E)	224.0.85.8 (95.130.110.196)	224.0.85.9 (95.130.110.196)
8	31508	XETR (F-Z) XFRA (F-Z) WBAH (all)		
9	31509	MTAA (0-M) ETFP (0-M) XMCE (0-M)	224.0.85.10 (95.130.110.196)	224.0.85.11 (95.130.110.196)
10	31510	MTAA (N-Z) ETFP (N-Z) XMCE (N-Z)		
11	31511	XVTX (all) XSWX (all)		
12	31512	XSTO (all) XHEL (all) XOSL (all) XCSE (all)	224.0.85.12 (95.130.110.196)	224.0.85.13 (95.130.110.196)

BATS reserves the right to add units and/or change symbol distribution within 48 hours notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to, at minimum, support mappings in these tables via software configuration. Symbol ranges are chosen to try to distribute updates evenly. The distribution is reviewed periodically and may be adjusted.

BATS reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

## 7 Spin Server and GRP Configurations

### 7.1 Chi-X Europe Production Spin Server and GRP Configuration (LD4 and LD3)

Service	Unit	TCP Port	IP Addresses (LD4)	IP Address (LD3)
Gig-Shaped (XA) GRP	(all)	19987	95.130.108.64 95.130.108.65	—
Gig-Shaped (XB) GRP	(all)	19985	95.130.108.66 95.130.108.67	—
WAN-Shaped (XC) GRP	(all)	19986	95.130.108.64 95.130.108.65	—
WAN-Shaped (XD) GRP	(all)	19984	95.130.108.66 95.130.108.67	—
WAN-Shaped (XE) GRP	(all)	19971	—	95.130.106.64 95.130.106.65 95.130.106.66 95.130.106.67
Spin Server #1	1	19999	95.130.108.64 95.130.108.65	95.130.106.64 95.130.106.65 95.130.106.66 95.130.106.67
	2	19998		
	3	19997		
	4	19996		
	5	19995		
	6	19994		
	7	19993	95.130.108.66 95.130.108.67	95.130.106.68 95.130.106.69 95.130.106.70 95.130.106.71
	8	19992		
	9	19991		
	10	19990		
	11	19989		
	12	19988		
Spin Server #2	1	19983	95.130.108.68 95.130.108.69 95.130.108.70	95.130.106.72 95.130.106.73 95.130.106.74 95.130.106.75
	2	19982		
	3	19981		
	4	19980		
	5	19979		
	6	19978		
	7	19977		
	8	19976		
	9	19975		
	10	19974		
	11	19973		
	12	19972		

## 7.2 Chi-X Europe UAT Spin Server and GRP Configuration (LD4)

Service	Unit	TCP Port	IP Address (LD4)
WAN-Shaped GRP	(all)	18986	95.130.110.194
Spin Server	1	18999	95.130.110.194
	2	18998	
	3	18997	
	4	18996	
	5	18995	
	6	18994	
	7	18993	
	8	18992	
	9	18991	
	10	18990	
	11	18989	
	12	18988	

## 8 Revision History

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20 December 2011	Initial draft version.
13 January 2012	Initial public version. Corrected various addressing information. Moved Austrian feed (WBAH) from unit 12 to units 7–8.
23 January 2012	Moved Austrian feed (WBAH) from units 7–8 to unit 8 only.
22 February 2012	Added Spin Server #2 to Park Royal (LD3) environments to match Spin Server #2 in Slough (LD4) environments.
27 February 2012	Added XFRA and ETFP MICs for completeness.

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