

CHI-X EUROPE

Chi-X Europe Multicast Data Feed Specification

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Version: 1.6

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System response times may vary for a number of reasons including market conditions, trading volumes and system performance.

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1 INTRODUCTION

Chi-X Europe is changing its real time market data interface from a TCP/IP based feed to a multicast solution. This solution comprises of several feeds, which will be gradually introduced.

1.1 Document scope

This document is intended to capture the broad structure and definitions of Chi-X Europe's multicast market data interface.

1.2 Version History

Date	Version	Changes
27/07/2010	1.0	Initial version.
12/08/2010	1.1	Duplicate fields removed from Snapshot message.
07/10/2010	1.2	Various typographical corrections and clarifications. No change to message structures.
13/10/2010	1.3	Section 3.2.5: Amended size of "Condition Code" field in Snapshot header from 4 bytes to 2 bytes. Clarification of wording in Section 3.2.1.
21/10/2010	1.4	Section 3.2.2.4. Extension of description of trade message and also clarification to description of "Order Reference" field. Section 3.3.3. Corrected decimal value of the message type in the Replay Request Message from 81 to 82. No change to message structures.
15/12/2010	1.5	Added feed ID mappings to Section 3.2.2. Amended description of "Close" field in Section 3.2.5. No change to message structures.
29/06/2011	1.6	Corrected ASCII value for Trade Identifier "P" in Section 3.2.4.4 No change to message structures.

1.3 Enquiries

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2 FUNCTIONAL OVERVIEW OF CHI-X EUROPE'S MULTICAST MARKET DATA INTERFACE

2.1 Introduction

Chi-X Europe will provide its market data to market participants via a new set of services, distributed via IP multicast feeds.

Throughout this document, the order-by-order data feeds will be referred to as MCDF (MultiCast Data Feeds).

Chi-X Europe market data distribution consists of several services and feeds:

Services:

- Real time market data via multicast
- Replay of a portion of the market data, intra-day
- Sampled market data, at 15 second intervals
- EOD market data. This will be a service which will provide a complete order-by-order file, for each of the MCDF constituents. This file will be in a comma delimited format, with one line per record. Chi-X Europe's trading participants will be able to download this file from an ftp server.
- Historical market data. This feature is provided as a distinct service (on a per request basis) to our trading participants

Feeds:

- Order-by-order data feed, which can be used to determine the state of Chi-X Europe's order book. This feed is available in 2 forms (each feed will have identical format):
 - o combined feed: all countries traded on Chi-X Europe are included in the feed
 - o split feeds:
 - UK market
 - German market
 - Euronext markets: France, Netherlands, Belgium, Portugal
 - All other European markets
- Snapshot feed, which can be used either as a mechanism to recover from an intra-day outage or as an additional mechanism to verify the current state of the order book. For each of the order-by-order feeds there will be a snapshot feed.
- Aggregated feeds (quantity by price) for the combined feed
 - o Top of the book (touch levels)
 - o Market depth by price, for the top 5 levels

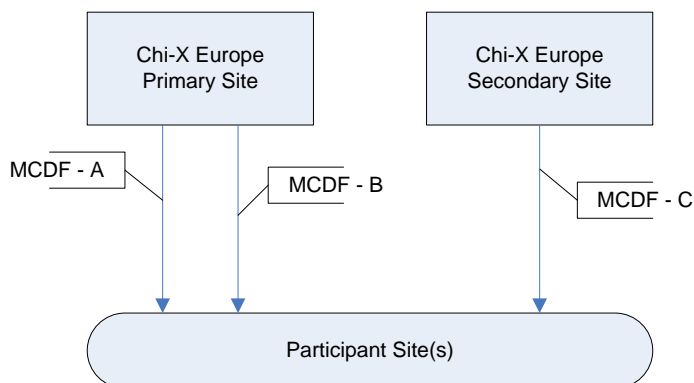
Data in MCDF will be represented in a binary format (except for the login messages used for the Replay Server). Codes for the stocks traded on Chi-X Europe will be included in a static mapping file. This file will be available for download from one of Chi-X Europe's servers.

Each MCDF message will be identified by a sequence number which will be unique per feed, e.g. the sequence scheme for the UK market feed will be different from the sequence scheme for the Euronext markets feed. The sequence number will reset daily.

MCDF messages will be sent with a sequenced packet header, permitting the consumer to accurately monitor the stream for missing messages.

There may be more than one market data message per packet. Messages for stock status updates and heartbeats will not be combined with messages which reflect order book updates. Several stock status update messages can be grouped in the same packet.

MCDF will be provided via 3 independent channels. Channels “A” and “B” will be located in our primary matching venue (Equinix data centre in Slough – LD4) for intra-site redundancy purposes and an additional channel “C” in our backup location (Equinix data centre in Park Royal – LD3), as per the diagram below



The “A” and “B” channels will be provided via parallel routes.

2.2 Definitions

MCDF server (MS): a server that publishes Chi-X Europe’s market data over IP multicast. Clients can join *Multicast Groups* and subscribe to a variety of feeds, provided by MCDF servers: order-by-order or aggregated quantity-by-price; combined market data or split feeds

Replay Server (RS): A server farm which replays a certain range of market data messages, which have been missed by participants.

This service is available over TCP/IP, and clients need to request a replay from the *Replay Server (RS)*. RS answers the client’s request either with an acceptance (i.e. sending the missed sequence) or with a rejection (in case the client has exceeded the maximum numbers of replays per day or the requested sequence number is too old).

Per client, the number of messages available for replay is 1,000,000 for each trading day, per feed.

Further replay requests may be available against an administration fee up to a maximum number of messages per day.

RS will only replay data for the last 5,000,000 messages contained in cache.

Snapshot Feed (SF): A feed which is published at intervals of 15 seconds and carries the current state of the order book. Each order-by-order feed has its own snapshot feed, and each snapshot feed has its own pre-determined cycle sequence. Each snapshot message carries the last sequence number used.

The snapshot will not be replayed. In case of missed messages clients should simply wait for the next multicast cycle.

Multicast Group: A multicast IP address on which market data is published. There will be a dedicated multicast group for each of the following feeds, on each of the “A”, “B” and “C” channels:

- combined order-by-order feed
- each of the order-by-order split feeds
- each of the snapshot feeds (one snapshot feed for each of the order-by-order) feeds
- aggregated feeds: top of the book and market depth

2.3 Description of service

2.3.1 Overview

The MCDF Server (MS) captures the individual trading events and converts them to market data messages.

All information identifying the participant is removed from the message.

MS may package more than one message per multicast packet, in case the data is already available, but will not wait for additional data.

MS publishes a continuous stream of market data.

2.3.2 Functional description of the multicast real-time market data

Clients connect to MS pre-open, and start receiving market data once trading starts on the Chi-X Europe platform.

The first market data message of the day is sequence number 1, and the sequence is incremented with each message, per feed.

Clients subscribing to the order-by-order feed can re-construct the order book and use the snapshot feed to verify.

IP multicast not being a guaranteed delivery mechanism, it is possible that during normal operation messages are missed.

2.3.2.1 Recovery of missed messages

There are 3 ways of recovering from such a situation:

- (a) Leverage usage of the primary “A” / “B” channels

Subscribing to both the “A” and “B” channels from the primary location, allows clients to constantly compare the messages received on each of the feed, as there is a lower probability that both feeds miss exactly the same messages.

- (b) Use Replay Server (RS)

When identifying that a message has been missed, the client should request from RS the replay of the missed messages.

A connection to RS can either be maintained permanently during the day, or can be opened as needed

Upon receiving a replay request, RS will first determine if the request can be serviced. In such a case, RS will reply to the client with the missing sequence.

In case the client exceeds the maximum number of replay messages allowed per day, the replay request may be denied, or a service fee may be charged.

(c) Use Snapshot Feed (SF)

In case messages have been missed, the client may subscribe to the SF and wait for the next iteration of the order book, and then proceed with rebuilding the order book.

Clients who connect intra-day should use option (c) above.

At the end of each day a file based version of the complete market data feed will be prepared and made available on an ftp server, accessible to clients.

2.3.3 Functional description of the snapshot feed

At intervals of 15 seconds a snapshot representing the current state of the order book will be published. This feed will be published throughout the day, and can be used in a variety of ways:

- verification that trading participants properly process the order-by-order data feed
- recovery in case messages on the order-by-order feed have been missed, and the trading strategy does not depend on processing every modification to the order book
- starting point for participants who have missed the start of day and first connect to Chi-X Europe during trading hours

Each order-by-order feed has a dedicated snapshot server, and each snapshot server has its own pre-determined cycle sequence.

Each snapshot message carries the last sequence number used by the order-by-order feed it is associated with, as well as its own sequence number. The own sequence number of the snapshot feed should be used to identify if a snapshot message has been missed or not. This sequence number will be reset upon each cycle. Cycles will be identified by a unique number throughout the day.

The snapshot will not be replayed. In case of missed messages clients should simply wait for the next broadcast cycle.

2.3.4 Aggregated feeds

Two distinct aggregated feeds will be provided, each for the combined markets:

- Top of the book: this feed will provide touch level aggregated data, carrying the following information: stock identifier, last price, total quantity ask (touch), number orders ask (touch), touch price ask, total quantity bid (touch), number orders bid (touch), touch price bid
- Market depth by price level: same information pertaining to the top of the book feed, but available for the first 5 levels of the market depth. In addition, the feed will carry 2 fields, indicating the total quantity available for each bid and ask, on levels deeper than 5.

2.3.5 EOD market data files

At the end of every day, a file based version of the complete market data will be created for each feed, and made available for download from an ftp server.

2.3.6 Type of messages

MCDF will carry the following type of messages:

- Add Order: whenever a visible order has been inserted in the order book.
- Modify Order: whenever an existing order has been amended by the client (price or quantity).
- Remove Order: whenever an existing order has been removed from the order book.
- Trade: whenever a match has occurred. A specific flag will indicate the trade attributes (e.g. Vision or Delta trade).
- Trade Invalidation.
- Stock Status Updates: whenever a stock changes its status in the Chi-X Europe trading platform, a message will be sent to the client.
- Heartbeats: whenever there is no activity, heartbeats will be published at 10 second intervals. The heartbeats will carry the sequence value of the next message to be sent. They will consist of a multicast header with no message data.

2.3.7 Stock Status Codes

The following stock status conditions are considered by Chi-X Europe:

- o Accepted / not accepted (halt or suspension) for continuous trading
- o Accepted / not accepted for pegging
- o Accepted / not accepted for Chi-Delta
- o Accepted / not accepted for Chi-Vision

Below is a table with example status codes.

Code	Bit offset. Meaning: 0 = condition not set / orders accepted, 1 = condition set / orders not accepted				Comments
	0	1	2	3	
	Integrated Book	Pegged Orders	Chi-Delta	Chi-Vision	Bits 4 – 15 are for future use (to be ignored now)
0	0	0	0	0	If no access is given to the integrated book for a given stock, everything else is also unavailable. All other services are independent from one another.
2	0	1	0	0	
4	0	0	1	0	
6	0	1	1	0	
8	0	0	0	1	
10	0	1	0	1	
12	0	0	1	1	
14	0	1	1	1	
15	1	1	1	1	

Table 1: Status codes

3 MESSAGE FORMATS

3.1 Overview

This section provides the details of the message formats used within Chi-X Europe's multicast market data interface (data types, headers, messages, and descriptions) for MCDF, SF and RS

Field width is given in bytes. Message fields should be interpreted as unsigned numbers in Little Endian order, unless it is stated otherwise.

Timestamp is given in microseconds and represents the time the event occurred within the matching engine and is based on UNIX time, the time elapsed since midnight Jan 1st 1970.

Price is represented as a fixed-point value with a scaling factor of 10^{-7} (e.g. 1 is represented as 10000000).

Order and Trade reference numbers are day-unique identifiers assigned by Chi-X during the trading session. (Please note that a given Order reference can appear multiple times on the data stream but will always uniquely represent one underlying order).

3.2 Multicast messages: MCDF, SF, Aggregated Feeds

3.2.1 MCDF Packet Structure

The MCDF packet will be structured into a header (for control purposes) and message body (carrying the information).

Consumers should note that any given packet will contain either: order and trade related messages (A,M,X,T,C types) or will contain stock status messages (U type). The two will not be mixed. All order and trade related messages are the same size, however it should be noted stock status messages are a different fixed length.

Heartbeats will be sent in the absence of market data and also sent pre-open in order for the feed to be established at the network level.

3.2.2 MCDF Packet Header

The packet header will contain a sequence number for the first data message as well as a count of the number of order book update messages contained therein. Additionally the header will identify the logical grouping of market segment.

The structure of the Header is as follows:

Field name	Width	Value
Feed identifier	2	Identifies the feed listened to, as well as the type of message carried. If MSB = 1 (most significant bit is set to 1), the packet carries stock update messages If MSB = 0 the packet carries market data messages. Current identifiers are as follows: 0 – composite 1 – London stocks 2 – Euronext stocks 3 – Xetra stocks 4 – All others markets

Sequence number	8	Sequence number unique per feed, representing the first message in the packet. To identify that no message has been lost, this number must be equal to the sum of the previous sequence number and previous message count.
Message count	2	Number of messages included in the multicast packet.
Reserved	8	To be ignored.

3.2.3 MCDF Heartbeat

This message will be published on the order-by-order feeds when there is no activity in market data for a period of 10 seconds.

Before market open, only heartbeats will be published.

The heartbeat message consists of an “empty packet”, i.e. a header with no message body. Message count is 0, and the sequence number indicates the next data message to be received.

The structure of the Heartbeat is as follows:

Field name	Width	Value
Feed identifier	2	Identifies the feed listened to. MSB = 0.
Sequence number	8	For a heartbeat, this number indicates the sequence number of the next data message that will be sent.
Message count	2	0
Reserved	8	To be ignored.

3.2.4 MCDF Message Body

3.2.4.1 Add Order Message

This message is published whenever an order with visible quantity is inserted into the order book.

Add Order Message		
Field name	Width	Value
Message Type	1	65 ("A")
Time Stamp	8	Timestamp.
Order Reference	8	Day unique order reference number.
Side	1	66 ("B") - Buy Order 83 ("S") - Sell Order
Shares	4	Total number of shares being added to the book (may be less than the number of shares entered because part of the order may trade before being posted to the book).
Stock	4	Static numeric identifier of the stock symbol. For information on Chi-X Europe reference data please see the following link: http://www.chi-xeurope.com/stocks-and-symbols/entire-chi-x-stock-list.asp
Price	8	The display price of the order.

Reserved	4	To be ignored.
Reserved	2	To be ignored.

3.2.4.2 Modify Order Message

This message is published whenever a visible order is modified by the client (revision of price or quantity). The unique order reference number is preserved on the order revisions.

Modification of a quantity down is a native order amend (the order retains time priority) and a modification of a price is a re-ordering of the book.

Modify Order Message		
Field name	Width	Value
Message Type	1	77 ("M")
Time Stamp	8	Timestamp.
Order Reference	8	Day unique order reference number.
Side	1	66 ("B") - Buy Order 83 ("S") - Sell Order
Shares	4	Revised number of shares.
Stock	4	Static numeric identifier of the stock symbol.
Price	8	Revised price.
Reserved	4	To be ignored.
Reserved	2	To be ignored.

3.2.4.3 Remove Order Message

This message is published whenever a visible order is removed from the book.

Remove Order Message		
Field name	Width	Value
Message Type	1	88 ("X")
Time Stamp	8	Timestamp
Order Reference	8	Day unique order reference number.
Side	1	66 ("B") - Buy Order 83 ("S") - Sell Order
Shares	4	0
Stock	4	Static numeric identifier of the stock symbol.
Price	8	0
Reserved	4	To be ignored.

Reserved	2	To be ignored.
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3.2.4.4 Trade Message

This message is published whenever an order has been executed, in whole or in part.

The message is sent when previously published visible orders are executed and when executions occur against hidden order quantity in the integrated book or on Chi-Delta. The message also reports executions brought on-exchange such as a Chi-Vision ELP trade. The trade identifier can be used to distinguish the type of execution.

For integrated book trades the traded quantity should be removed from the associated order on the order book. If the order fully trades then the order should be removed totally as there will be no separately issued Remove Order Message.

Trade Message		
Field name	Width	Value
Message Type	1	84 ("T")
Time Stamp	8	Timestamp.
Order Reference	8	Day unique order reference number for Trade Identifier "I". For all other Trade identifiers this field will be set to 0.
Trade identifier	1	73 ("I") - Integrated book (visible order trade) 72 ("P") - Protected from display 68 ("D") - Chi-Delta trade 86 ("V") - Negotiated Chi-Vision trade 67 ("C") - Negotiated CFD equity trade at Current price 83 ("S") - Negotiated CFD equity trade at Special price Above are sample codes which can be expected. Chi-X Europe reserves the right to introduce new codes.
Shares	4	Number of shares executed.
Stock	4	Static numeric identifier of the stock symbol.
Price	8	Execution price.
Trade Reference	4	Day unique trade reference number.
Reserved	2	To be ignored.

3.2.4.5 Trade Invalidation Message

This message is published whenever a trade has been invalidated by Chi-X Europe.

Trade Invalidation Message

Field name	Width	Value
Message Type	1	67 ("C")
Time Stamp	8	Timestamp
Order Reference	8	Set to zero "0" in this message type.
Reserved	1	
Shares	4	Number of shares of the original trade.
Stock	4	Static numeric identifier of the stock symbol.
Price	8	Execution price of the original trade.
Trade Reference	4	Day unique trade reference number.
Reserved	2	To be ignored.

3.2.4.6 Stock Status Update Message

This message is published whenever the status of a stock changes, indicating the new status.

Status Update Message		
Field name	Width	Value
Message Type	1	85 ("U")
Time Stamp	8	Timestamp
Condition code	2	All orders will be accepted in a given stock if this field is set to zero (no condition codes set). For all other conditions, please refer to Table 1
Stock	4	Static numeric identifier of the stock symbol.

3.2.5 Snapshot Feed

A snapshot of the Chi-X Europe order-book will be published every 15 seconds, for each of the order-by-order feeds. Each snapshot cycle will consist of a series of snapshot messages for stocks relevant to the feed in question.

Consumers should note that if an order book for a particular stock is empty a snapshot message will still be sent but with no order element data present. Conversely if the order-book is very liquid then multiple snapshot messages will be sent with the final message containing the stock trailer.

The final message in a snapshot cycle will carry a Stock identifier of zero (0) and an Element count of zero (0).

Snapshot Message		
Field name	Width	Value
Message Type	1	78 ("N")
Time Stamp	8	Timestamp
Feed identifier	2	Identifies the feed listened to
Stock	4	Numeric identifier of the stock
Condition code	2	Current state of the stock
Snapshot cycle	2	Identifier of the cycle, unique per day, incremented
Sequence number	4	Unique sequence number, reset to 1 at the start of each cycle.
Feed Sequence	8	Last sequence number (of the associated order-by-order feed) used to create the snapshot
Element count	2	Identifies the number of order elements and whether the packet carries the stock level trailer records. If MSB = 1 (most significant bit is set to 1), the packet carries trailer records and may also carry order element records If MSB = 0 the packet only carries order element records The remaining bits (MSB masked out) identify the number of order elements within the message. One element is composed of Side, Order Reference, Quantity, Price and Rank (per level)
Records below will be repeated, in line with Element Count		
Buy / Sell Indicator	1	66 ("B") - Buy Order 83 ("S") - Sell Order
Order reference	8	Day unique order reference number
Quantity	4	Number of shares included in the order
Price	8	Display price of the order
Rank	2	Priority of the order (place in queue)
.....		
When the stock level trailer below has been received, it means there are no more orders for this stock		
Close	8	Last price traded on the previous trading day within CXE.
Open	8	First price traded that day within CXE.
High	8	Highest price traded intra-day within CXE.
Low	8	Lowest price traded intra-day within CXE.
Volume	8	Number of shares traded.
Consideration	8	Value of shares traded (in stock trading currency).
Trades	4	Number of trades.

3.2.6 Aggregated Feeds

3.2.6.1 Aggregated Top of the Book Message

This message will be published whenever the touch levels have been modified (either as result of a quote or as a result of a trade).

Aggregated Top of the Book Message		
Field name	Width	Value
Message Type	1	71 ("G")
Time Stamp	8	Timestamp
Stock	4	Static numeric identifier of the stock symbol.
Order count (Bid)	2	Number of orders on the bid at the touch
Quantity (Bid)	4	Total quantity on the bid at the touch
Price (Bid)	8	Best bid price
Order count (Ask)	2	Number of orders on the ask at the touch
Quantity (Ask)	4	Total quantity on the ask at the touch
Price (Ask)	8	Best ask price
Last Trade Price	8	Value of last trade
Last Trade Qty	4	Quantity of last trade
Trade Status	1	Trading status of the stock

3.2.6.2 Aggregated Market Depth by Price Message

This message will be published whenever the top 5 levels have been modified (either as result of a quote or as a result of a trade).

Aggregated Market Depth by Price Message		
Field name	Width	Value
Message Type	1	80 ("P")
Time Stamp	8	Timestamp
Stock	4	Static numeric identifier of the stock symbol.
Order count (Bid-1)	2	Number of orders on the bid at Level 1
Quantity (Bid-1)	4	Total quantity on the bid at Level 1
Price (Bid-1)	8	Bid price at Level 1
Order count (Ask-1)	2	Number of orders on the ask at Level 1
Quantity (Ask-1)	4	Total quantity on the ask at Level 1
Price (Ask-1)	8	Ask price at Level 1
Order count (Bid-2)	2	Number of orders on the bid at Level 2
Quantity (Bid-2)	4	Total quantity on the bid at Level 2
Price (Bid-2)	8	Bid price at Level 2
Order count (Ask-2)	2	Number of orders on the ask at Level 2
Quantity (Ask-2)	4	Total quantity on the ask at Level 2
Price (Ask-2)	8	Ask price at Level 2

Order count (Bid-3)	2	Number of orders on the bid at Level 3
Quantity (Bid-3)	4	Total quantity on the bid at Level 3
Price (Bid-3)	8	Bid price at Level 3
Order count (Ask-3)	2	Number of orders on the ask at Level 3
Quantity (Ask-3)	4	Total quantity on the ask at Level 3
Price (Ask-3)	8	Ask price at Level 3
Order count (Bid-4)	2	Number of orders on the bid at Level 4
Quantity (Bid-4)	4	Total quantity on the bid at Level 4
Price (Bid-4)	8	Bid price at Level 4
Order count (Ask-4)	2	Number of orders on the ask at Level 4
Quantity (Ask-4)	4	Total quantity on the ask at Level 4
Price (Ask-4)	8	Ask price at Level 4
Order count (Bid-5)	2	Number of orders on the bid at Level 5
Quantity (Bid-5)	4	Total quantity on the bid at Level 5
Price (Bid-5)	8	Bid price at Level 5
Order count (Ask-5)	2	Number of orders on the ask at Level 5
Quantity (Ask-5)	4	Total quantity on the ask at Level 5
Price (Ask-5)	8	Ask price at Level 5
Remaining Bid quantity	8	Total bid quantity at levels deeper than 5
Remaining Ask quantity	8	Total ask quantity at levels deeper than 5
Last Trade	8	Value of last trade
Last Trade Qty	4	Quantity of last trade
Trade Status	1	Trading status of the stock

3.3 Replay Messages

3.3.1 Login Request Message

Upon connecting to the RS, the user needs to send a login message to be authenticated.

Login Request Message		
Field name	Width	Value
Message Type	1	76 ("L")
Username	6	Username (left justified text padded with spaces on the right)
Password	10	Password (left justified text padded with spaces on the right)

3.3.2 Login Reply Message

The login accepted packet is sent by the server immediately after, and in response to, a login request packet indicating the result of the login request.

In case of a login rejection, the RS will drop the connection.

Login Reply Message		
Field name	Width	Value
Message Type	1	75 ("K") – Login Accepted 74 ("J") – Login Rejected

3.3.3 Replay Request Message

This message will be sent by the trading participant, after a successful login, indicating the sequence of messages to be replayed.

Replay Request Message		
Field name	Width	Value
Message Type	1	82 ("R")
Feed identifier	2	Identifies the feed which needs to be replayed
Start sequence	8	Sequence number of the first message which needs to be replayed
Stop sequence	8	Sequence number of the last message which needs to be replayed

In the case that more messages have been requested than the remaining quota, then upon fulfilling the quota a “Replay Completed” message will be sent.

3.3.4 Replay messages

The messages replayed by RS are the same structure and format as the message data published by MCDF.

3.3.5 Replay Completed Message

Every replay is terminated with Replay Completed message. If replay server is not able to serve requested data, it will also send this message in response, so it could be used as an indication that the server is ready to process another replay request.

Replay Completed Message		
Field name	Width	Value
Message Type	1	89 ("Y") – another replay possible 90 ("Z") – message quota exceeded, replay forbidden

4 NETWORK

4.1.1 General Considerations

Chi-X Europe will offer three iterations of the multicast data feeds. The primary data centre will host channels “A” and “B” while the secondary data centre will host channel “C”. MCDF channels will only be available to participants from the data centre to which they connect to. I.e. participants connect to Slough, can only receive channels “A” and “B”, participants connecting to Park Royal can only receive channel “C”.

In the primary data centre, “A” and “B” channels will be available via separate, parallel paths. Participants connecting with only a single connection (circuit or cross connect) will have connectivity to only one feed group, which will be determined by where their connection is terminated. As the channels in the primary data centre are provided via parallel paths and there should be no discernable latency difference between the “A” and “B” channels and no disadvantage should be created by taking the “B” feed over the “A” channel.

“A”, “B” and “C” channels will be provided via completely diverse paths and will be provided from separate sources. Multicast signalling will be performed via dynamic join protocols (PIMv2 and IGMPv2). Separate rendezvous points and sources will be provided for each channel (“A”, “B”, “C”).

Initially, multicast data feeds will be available only to directly connected (circuit or collocated) participants. Access to multicast data for vendors and extranet connected participants will be available at a later date.

For more comprehensive details on the network configuration and address schema please see the “Chi-X Multicast Network Parameters” document at the following link:

<http://www.chi-xeurope.com/document-library-sub-sections/technical-specifications-and-agreements.asp>