

LONDON STOCK EXCHANGE

SERVICE DELIVERY

Historic OrderBook Rebuild Data Description and Guidance notes

Version 7.0

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1 Introduction

Currently on MIDAS Orderbook rebuild files are produced each day for that day's transaction history. Files are written to the staging server, for selected segments, containing details of Orders and automatic trades for each instrument in time order.

Exchange Customers have expressed an interest in obtaining these files historically, however this would require a long time to complete using the existing processing.

To accelerate this process and provide the Exchange with an efficient way of providing this data to customers a process has been developed to extract the necessary information from the warehouse as a set of three separated text files containing all the information required to rebuild the Orderbook for a period of days.

2 Assumptions

This document assumes a familiarity with:

- LSE Order mechanism types (including Iceberg Orders) and Orderbook execution processing.
- LMIL broadcast messages and data formats.
- Segment structure and rules and period rules and timings

3 Overview of the data files

Three files will be produced to cover each historic one month date range. The three files relate to the database tables on MIDAS that contain the warehouse data.

The files are :

T_OrderDetail.CSV
T_OrderHistory.CSV
T_TradeReport.CSV

3.1 File Format

Each file is produced in a comma separated format. The number of fields and the format of each field is given in the tables below.

3.2 Order Details

ColumnName	FORMAT	Nullable	Description
OrderCode	CHAR(10)	N	This code is a unique reference number allocated to each order
MarketSegmentCode	CHAR(4)	N	A code which uniquely identifies a specific trading area
MarketSectorCode	CHAR(4)	N	This code identifies a division of the market within a Market Segment.
TICode	CHAR(12)	N	Together with the Country of Register, the code used to uniquely identify a tradable instrument
CountryOfRegister	CHAR(2)	N	This specifies the Country of Register for a specific tradable instrument.
CurrencyCode	CHAR(3)	N	This field contains the currency in which prices for a tradable instrument must be expressed.
ParticipantCode	CHAR(11)	Y	A code that uniquely identifies an investor, an intermediary or a subscriber. For investors and intermediaries, this will be the Bank Identifier Code (BIC).

BuySellInd	CHAR(1)	N	Identifies whether the participant wishes to buy or sell a quantity of a tradable instrument/currency.
MarketMechanismGroup	CHAR(1)	N	This classifies the market mechanism types as quotes or orders. (O Orders, Q Quotes)
MarketMechanismType	CHAR(2)	N	A trading mechanism supported by the London Stock Exchange. (see list below)
Price	DECIMAL(18,8)	N	The price at which a participant entering an order wishes to buy/sell a tradable instrument/currency.
AggregateSize	DECIMAL(12)	N	The quantity of a tradable instrument still sought or on offer at a particular time. Since an order may be partially matched against, this need not equal the amount of stock originally entered.
SingleFillInd	CHAR(1)	N	This field indicates that order execution against an entered order will only take place if the trade is executed to the full size of the order. The single fill indicator applies to all order types except hit orders.
BroadcastUpdateAction	CHAR(1)	N	Identifies the action to be taken by customers on receipt of a message.
Date	DATE(YYYY-MM-DD)	N	The Date that the Order was first added
Time	TIME(HH:MI:SS)	N	The Time that the Order was first added
MessageSequenceNumber	INTEGER(10)	N	A sequence number used to assist in sorting orders received in the same second

This file contains details of new orders entering the trading system. It only contains details of orders that enter the Orderbook. This file does not contain details of any orders that fail validation on entry to Trading or non-persistent order mechanism types - Aggressive type A (AA), Aggressive type B (AB), Hit Orders (HO), and orders or parts of orders that execute aggressively, and for some Iceberg Order execution scenarios (see section 7 below).

Order modifications are disseminated as a delete followed by an add, the add is shown as a new order in the Order details file with a new order code and there is no way of distinguishing this from an ordinary order addition.

3.3 Order History

ColumnName	FORMAT	Nullable	Description
OrderCode	CHAR(10)	N	This code is a unique reference number allocated to each order
OrderActionType	CHAR(1)	N	The Type of Order removal taking place (See list below)
MatchingOrderCode	CHAR(10)	Y	The OrderCode of the other order involved in a trade.
TradeSize	DECIMAL(8)	Y	The quantity of tradable instrument which was bought or sold.
TradeCode	CHAR(10)	Y	A code which is assigned by the Exchange to uniquely identify executed trades.
TICode	CHAR(12)	N	Together with the Country of Register, the code used to uniquely identify a tradable instrument
CurrencyCode	CHAR(3)	N	This field contains the currency in which prices for a tradable instrument must be expressed.
CountryOfRegister	CHAR(2)	N	This specifies the Country of Register for a specific tradable instrument.
MarketSegmentCode	CHAR(4)	N	A code which uniquely identifies a specific trading area
AggregateSize	DECIMAL(12)	N	The quantity of a tradable instrument still sought or on offer at a particular time. Since an order may be partially matched against, this need not equal the amount of stock originally entered.
BuySellInd	CHAR(1)	N	Identifies whether the participant wishes to buy or sell a quantity of a tradable instrument/currency
MarketMechanismType	CHAR(2)	N	A trading mechanism supported by the London Stock Exchange. (see list below)
MessageSequenceNumber	INTEGER(10)	N	A sequence number used to assist in sorting orders received in the same second
Date	DATE(YYYY-MM-DD)	N	The Date the Order Event occurred
Time	TIME(HH:MI:SS)	N	The Time the Order Event occurred

This file contains a history of changes to each order and the method by which it is removed. For each order there are one or more rows shown with an order action type for each record. The order action type indicates if the order was partially or fully executed against, deleted, expired etc. A full list of the order action types is given below.

Order Action Type	Description
D	Deletion
E	Expiry
P	Partial Match
M	Full Match
T	Transaction Limit (150 trades)

Together with the order details file, the Order history file allows the complete life cycle of every order to be reconstructed. In the cases where there has been an execution, the resulting trade code and the matching order code are included in each appropriate Order History record.

A full list of Market Mechanism Types is given below:

AA	Aggressive Type A (None in these files)
AB	Aggressive Type B (None in these files)
CP	Committed Principal Order
FE	Firm Exposure Order
FQ	Firm Quote (None in these files)
IE	Indicative Exposure Order
HO	Hit Order (None in these files)
IQ	Indicative Quote (None in these files)
LO	Limit Order
MO	Market Order
PI	Priced Interaction Order (None in these files)

3.4 Trade Reports

ColumnName	FORMAT	Nullable	Description
MessageSequenceNumber	INTEGER(10)	N	A sequence number used to assist in sorting Trades received in the same second
TICode	CHAR(12)	N	Together with the Country of Register, the code used to uniquely identify a tradable instrument
MarketSegmentCode	CHAR(4)	N	A code which uniquely identifies a specific trading area
CountryOfRegister	CHAR(2)	N	This specifies the Country of Register for a specific tradable instrument.
CurrencyCode	CHAR(3)	N	This field contains the currency in which prices for a tradable instrument must be expressed.
TradeCode	CHAR(10)	N	A code which is assigned by the Exchange to uniquely identify executed trades.
TradePrice	DECIMAL(18,8)	N	The price at which a trade was executed.
TradeSize	DECIMAL(12)	N	The quantity of tradable instrument which was bought or sold.
TradeDate	DATE(YYYY-MM-DD)	N	The Date when the Trade took place
TradeTime	TIME(HH:MI:SS)	N	The Time when the Trade took place
BroadcastUpdateAction	CHAR(1)	N	Identifies the action to be taken by customers on receipt of a message.
TradeTypeInd	CHAR(2)	N	This indicates the type of trade which has occurred.
TradeTimeInd	CHAR(1)	N	This field indicates whether a reported trade was made outside a normal trade reporting period, whether it was reported 'late' or whether it was reported on time. (N-Normal, L-Late, O-Overnight)
BargainConditions	CHAR(1)	N	Indicates whether any bargain conditions apply to a trade report.
ConvertedPriceInd	CHAR(1)	N	Indicates whether the price and currency entered on a trade report is the price and currency in which the transaction was dealt (N), or whether conversion into the valid currency for the tradable instrument has occurred. (Y)
PublicationDate	DATE(YYYY-MM-DD)	N	The Date the trade was published
PublicationTime	TIME(HH:MI:SS)	N	The Time the trade was published

The trade report file contains details of every automatic and manual trade that has taken place, except for trades that have not been published. Automatic trades only are included in the current orderbook

rebuild daily files. This historic file has been enhanced to include manual trade types also. Note however manual trades cannot be linked to the order files, but can be placed in publication time order

Two timestamps are given for each trade. The Trade Date/Trade Time give the date and time that the trade took place, the Publication Date/Publication Time give the date and time that the trade was published on LMIL. These timestamps will be the same for automatic trades and non-delayed manual trades.

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Trade cancellations are shown as a separate record with the same tradecode but with a Broadcast Update Action of "D", and the Publication Date/Time gives the cancellation date/Time. Contra trades are shown as a separate record with a new tradecode but with a tradetype of CT, and Post Contra trades with a trade type of PC. There is no definitive method for linking the original automatic trade, with a contra or post contra trade, since linking by trade price and trade size may give more than one match.

On LMIL all uncrossing trades from an auction are aggregated and disseminated to the market as a single Trade report (different uncrossing trades in an instrument will have the same price and time). This Trade report has a dummy trade code that is unknown to MIDAS. MIDAS receives details of each individual uncrossing trade, each with the same trade time and price but a unique trade code. These individual trades will be detailed on the Historic Orderbook details files.

4 Start and End positions and overlapping data.

Since each set of files will cover a one month period in time, there are some special circumstances for orders that span more than a one month period.

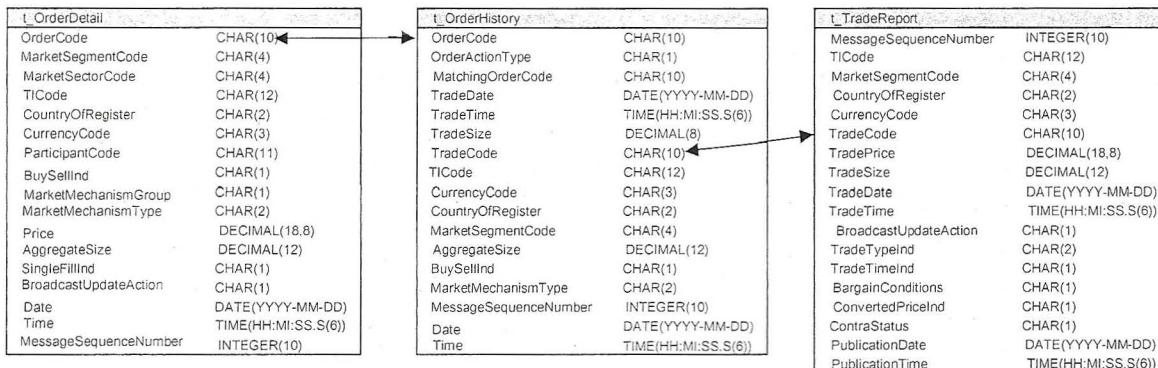
For the first day of the period being covered all orders not Deleted/Expired/Fully executed from the previous day will be included. This means that although full details are given for one month, the data in the Order Details file will contain details of orders added earlier than the period covered – i.e. orders that were placed on the orderbook prior to this period but which have not been deleted expired or fully matched. These orders are the same as those that would appear in the orderbook download LMIL service on the first day of the period. These records can be identified from the BroadcastUpdateAction that will be set to "F". For these orders the Size will be the remaining order size and not the size of the original order.

Since orders can have a life span of up to 90 days (depends on the segment), Order detail information for some orders can be repeated in several files.

To obtain Start of Day position for other days within the period spanned by the files, customers must derive the state of the orderbook from the additions and removals that take place. For example if there are 20 days covered in a set of files, to find the start of day position for day 8, select all add records from the Order Details file where there is no corresponding removal record on the Order History file with an Order Action Type of D, E, M or T with a date less than day 8.

Orders which are left on the Orderbook at the end of the final day covered will have no order history records detailing their removal, to complete the history for these orders, files covering subsequent periods will be required. These orders can be identified from the Order History file where there is no record with an Order Action Type of D, E, M or T.

5 Linking the data files



The Order detail file is linked to the Order history file by order code. This is a one-to-one or one-to-many or one-to-none relationship depending on the particular order.

The Order History file is linked to the Trade Report file by the Trade Code for Automatic Trades only. The Order History file also contains the Matching Order Code for automatic trades, allowing both the buy and sell orders to be identified. However it is not always possible to obtain details of both orders for every trade, since some non-persistent order types, or aggressive Order Details and executions against the hidden volume of an Iceberg Order are not shown.

5.1 Message Sequencing

Each record has a timestamp that can be used to determine the sequence of events to the orderbook. Times are given to the nearest second, so to reproduce events in the correct sequence where more than one record occurs in one second, The data should be sorted in the following order

Time
 Instrument
 Message Sequence Number
 OrderCode
 Order Detail records before Order History records
 OrderHistory records by Aggregate Size in descending order

Normally for an Instrument for any day, expect to see the following message types

- A group of orders that were left on the Order book from the previous day
- A group of Expire Order history records for Orders that were left on the Orderbook but expired overnight.
- A mix of all message types as continuous trading takes place.
- Manual Trade reports only following Orderbook close

8 Appendix A Broadcast Update Actions

Order Details	A	Add
	F	Start of Day Order
Trade Report	E	Automatic Execution
	A	Manual Trade Addition
	D	Manual Trade Cancellation

6 Worked Example

The following gives a small example of data for a single instrument, the Start date is 10 November 2003

T_OrderDetails

	OrderCode	MarketSegmentCode	MarketSectorCode	TICode	CountryOfRegister	CurrencyCode	ParticipantCode	BuySellInd	out	MarketMechanismType	Price	AggregateSize	SingleFillInd	on	Date	Time	MessageSequenceNumber
A032ESDB03	SET1	FT10	GB0030559776	GB	GBX		B	O	LO	138.5	6401	N	F	07/11/2003	16:29:33	191763	
C040KL5M03	SET1	FT10	GB0030559776	GB	GBX		B	O	LO	135.25	143639	N	F	07/11/2003	16:31:13	193036	
F0310XKT03	SET1	FT10	GB0030559776	GB	GBX		B	O	LO	136.5	44700	N	F	07/11/2003	16:24:15	188690	
90358DBW03	SET1	FT10	GB0030559776	GB	GBX		B	O	LO	137.75	161224	N	F	07/11/2003	16:31:13	193024	
F0310Z7A03	SET1	FT10	GB0030559776	GB	GBX		S	O	LO	141	44700	N	F	07/11/2003	16:24:15	188694	
F03I45QQ03	SET1	FT10	GB0030559776	GB	GBX		S	O	LO	138	54300	N	A	10/11/2003	10:21:23	40446	
70340YOM03	SET1	FT10	GB0030559776	GB	GBX		B	O	MO	0	3148	N	A	10/11/2003	16:31:36	150374	
60380MWD03	SET1	FT10	GB0030559776	GB	GBX		B	O	LO	138	32	N	A	10/11/2003	15:08:03	111664	

T_OrderHistory

	OrderCode	OrderActionType	MatchingOrderCode	TradeSize	TICode	CountryOfRegister	CurrencyCode	MarketSegmentCode	AggregateSize	SingleFillInd	Date	Time
A032ESDB03		M		0	GB0030559776	GB	GBX	SET1	6401	B	LO	462
C040KL5M03		M		0	GB0030559776	GB	GBX	SET1	143639	B	LO	635
F0310XKT03		M		0	GB0030559776	GB	GBX	SET1	44700	B	LO	947
90358DBW03		M		0	GB0030559776	GB	GBX	SET1	161224	B	LO	395
F0310Z7A03		M		0	GB0030559776	GB	GBX	SET1	44700	S	LO	952
F03I45QQ03		D		0	GB0030559776	GB	GBX	SET1	54300	S	LO	40746
70340YOM03	M	D0433B0A03	3148	5037GJ0703	GB0030559776	GB	GBX	SET1	0	B	MO	151591
D0433B0A03	P	70340YOM03	3148	5037GJ0703	GB0030559776	GB	GBX	SET1	2902	S	MO	151562
60380MWD03	M	E03JFP9V03	32	60380MWE03	GB0030559776	GB	GBX	SET1	0	B	LO	111666

T_TradeReport

MessageSequenceNumber	TICode	MarketSegmentCode	CountryOfRegister	CurrencyCode	TradeCode	TradePrice	TradeSize	TradeDate	TradeTime	BroadcastUpdateAction	TradeTypeInd	TradeTimeInd	BargainConditions	ConvertedPriceInd	PublicationDate	PublicationTime
151595	GB0030559776	SET1	GB	GBX	5037GJ0703	138	3148	10/11/03	16:35:09	M	UT	Z	Y	Z	10/11/03	16:35:09
111670	GB0030559776	SET1	GB	GBX	60380MWE03	138	32	10/11/03	15:08:03	M	AT	N	Y	N	10/11/03	15:08:03
120438	GB0030559776	SET1	GB	GBX	102BG18M03	137.3	200	10/11/03	15:19:00	D	O	L	Y	N	10/11/03	15:29:08
120384	GB0030559776	SET1	GB	GBX	102BG18M03	137.3	200	10/11/03	15:19:00	A	O	L	Y	N	10/11/03	15:28:58

The first 5 Orders on t_OrderDetails are records left on the book from the previous day. These have all passed their expiry time and Order Removal records are shown on the Order History table with an OrderAction Type "E"

Limit Order F03I45QQ03

Added at 10:21:23

Deleted at 10:23:08

Market Order 70340YOM03

Added at 16:31:36

Fully Executes at 16:35:09 against Order D0433B0A03

This Produces Trade 5037GJ0703 (Note this has Trade Type UT and so is produced from Uncrossing)

Limit Order 60380MWD03

Added at 15:08:03

It executes immediately and completely against order E03JFP9V03.

This produces Trade code 60380MWE03

7 Special Considerations for Iceberg Orders

Iceberg Order entry was enabled on 22 September 2003 for selected segments, so history files before this date do not contain any iceberg orders. Upon entry to the Trading system an Ordercode is generated for the entire Iceberg order but this is only returned to the customer who entered the iceberg and is not disseminated to the market. This order code is never shown on these historical files.

Each iceberg peak that enters the orderbook has a unique order code that is disseminated as a separate Limit order, these order codes are referred to as Public Order Codes. Each peak of an iceberg order is shown as a separate limit order on these order history files and the public order code is given in the order code field on Order detail and Order History.

If an Iceberg order is on the book and is hit by an order whose size is greater than the current peak size, then any executions against the hidden volume are given in the Trade details, but the partial or full matches on the hidden volume are not given in Order History. Similarly if an incoming Iceberg Order executes immediately then no order details are given for the executed part, these are treated like non-persistent orders, any remaining volume will be treated as a new limit order with the full peak size if possible.

For Iceberg Orders (IB) each time a new peak is produced from the hidden order volume, a new order entry record is shown with the public order code. The true order code for an Iceberg order that is only known the owner of the order is never shown. The mechanism type for Iceberg order peaks is always shown as a limit order (LO)