London Stock Exchange

MIT401 - Guide to Reference Data Services

Issue 16.2

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Contents

Disclaimer

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1.0 Introduction

1.1 Purpose

The purpose of this document is to provide an overview of the reference data services available on the Millennium Exchange platform.

1.2 Readership

This document outlines the reference data services available on Millennium Exchange.

When read in conjunction with the message specifications it is intended that the document provide all of the details for London Stock Exchange customers to develop to the reference data services.

This document is particularly relevant to trading and technical staff within the Exchange's member firms, information vendors and other market participants interested in receiving London Stock Exchange reference data.

1.3 Document Series

This document is part of series of documents providing a holistic view of full trading and information services available from London Stock Exchange post the migration to Millennium Exchange.

The current series of documents are set out below:

- MIT201 – Guide to New Trading System
- MIT202 – Trading Gateway (FIX 5.0) Specification
- MIT203 – Native Interface Message Specification
- MIT204 – Post Trade Gateway (FIX 5.0) Specification
- MIT205 – Drop Copy Gateway (FIX 5.0) Specification
- MIT304 – Regulatory News Service Specification
- **MIT401 – Reference Data Service Specification (this document)**
- MIT501 – Guide to the Customer Testing Services
- MIT502 – Guide to Application Certification
- MIT503 – Certification Report

- MIT304 – Regulatory News Service Specification
- MIT701 – Guide to Sponsored Access
- MIT801 – Reject Codes

This series principally covers non-regulatory information. It does not override or supersede the Rules of the London Stock Exchange, the AIM Rules or Admission and Disclosure Standards and is intended to be read in conjunction with these Rules documents and the Millennium Exchange Parameters document.

1.4 Document History

This document has been through the following iterations:

Issue	Date	Description
1.0	1 February 2010	First issue of this document published via the Exchange's website and distributed to customers.
2.0	29 February 2010	Updated to reflect some content and format changes
3.0	5 May 2010	Updated to further reflect content and delivery mechanism changes
4.0	11 June 2010	Updated with information on intra-day reference data changes and enhancements to some file content.
5.0	19 July 2010	Updated with further information on field content. The following field has been removed from the Instrument File: ▪ Expiry Source
6.0	15 September 2010	Updated to include guidance on accessing Secure File Transfer Protocol (SFTP) services, and define in more detail delivery and format of files. Delete Orders at EOD field removed.
6.1	11 October 2010	Updated to include the SFTP and FTP IP and port details.

7.0	3 December 2010	Seventh issue of this document published via the Exchange's website and distributed to customers.
7.1	19 January 2011	Updated to rectify error in a field length in the Instrument reference data file.
8.0	23 May 2011	Updated to reflect minor changes highlighted.
9.0	15 December 2011	Updated to support product enhancements being delivered as part of Functional Release Q1 2012
10.0	26 February 2013	Updated to clarify content of field in the Ex-Marker file.
10.1	22 March 2013	Amended to reflect the latest Millennium enhancements.
10.1	5 April 2013	Update to Section 2.10 – Allow Named Orders – ENUM 1 changed to 2.
11.0	5 July 2013	Amended to reflect the latest Millennium enhancements in section 2.16
11.1	26 July 2013	Further amendments to reflect the latest Millennium enhancements.
11.2	14 August 2013	Amended contact details to sections 2.4 and 4.4. Change references for issue 11.1 also included
11.4	22 October 2013	Added clarity around Quote Type description in section 2.10 and Duration to Auction in section 2.12
11.5	12 June 2014	Amended section 2.16 to include index codes for SETSQX-RT Market Structure Changes
11.6	31 October 2014	Amended to reflect rebranding of ITCH to MITCH
11.7	21 January 2015	Section 2.6 "Instrument file record layout" has been amended to support Cross order functionality, to remove references to FIX-FAST and to rename the ITCH Market Data Group to MITCH . • 1 field renamed to ○ MITCH Market Data Group/AppID

		• 3 fields removed
		  ○ FIX-FAST Level 1 AppID
		  ○ FIX-FAST Level 2 MBP AppID
		  ○ FIX-FAST Level 2 MBO AppID
		• 4 fields added
		  ○ Cross Ord Bid Ask Spread %
		  ○ Minimum BTF Quantity
		  ○ Floor Price
		  ○ Ceiling Price

11.8	16 June 2015	The following changes have been made to aid clarity and to support the changes in Release 8.7: 2.6 – Added new field Minimum Quantity at Touch. Improved description for EMS. 2.16 – Improved/corrected trading cycle definition description for MSETS-OFIN OFLV, SETS-IOB, Standard Off Book and Stand Off Book MFD; Added 2 new trading cycles for SETSqx with No Market Maker; Added Session Index for Regular Trading 3 and Periodic Auction 3 in SETS-IDA Cycle Definition.
11.9	21 October 2015	The following changes have been made to aid clarity and to support the changes in Release 8.7: 2.10 – Amended the Quote Type field description to clarify that the Business Parameters document will determine whether an instrument supports quotes 2.16 – Updated description for SETS-IDA cycle definition to include the new SETS L1 Only Intraday Auctions.

11.10	10 May 2016	The following changes have been made to aid clarity and to support the changes for the reference data server migration: 2.2 – Updated the IP addresses and login credentials for the new reference data service 2.3 – Added Availability Model 2.19 – Added MD5 checksum files 2.20 – Added a note about the parallel reference data service 3.4, 3.5 – Clarified Enablement and Connectivity behaviour for the new reference data service
11.11	16 August 2016	The following changes have been made to aid clarity and to support the changes in Release 9.1: 2.7 – Multicast Channel ID and Load ID fields will no longer be populated. Added Mifir Identifier, Mifir Subclass, Ref Price Allowance (%), RFQ Price Deviation % and Min RFQ Quantity fields. Renamed field Minimum BTF Quantity to Minimum BTF Quantity (*EMS). Renamed column 'MITCH Market Data Group/AppID' to 'Market Data Group' 2.11 – Added RFQ Type field 2.16 – Added 'RFQ Enabled' field
	09 November 2016	The following changes have been made to aid clarity and to support the changes in Release 9.1: 2.4, 2.6 – Added new entries for new 'RFQ Enabled' file 2.7 – Clarified Minimum BTF Quantity description. The field will now have been already multiplied by EMS. Renamed 'Min RFQ Quantity (*EMS)' to 'Min RFQ Quantity' since the value will have already been multiplied by EMS. 2.16 – Removed 'RFQ Enabled' field 2.17 – Added layout for the new 'RFQ Enabled' file

11.12	26 April 2017	The following changes have been added to aid clarity, and also to clarify that off-book trade reporting will be moved to TRADEcho in June 2017: 2.7 – Blanks will now be populated in the following columns for instruments which will only be available in TRADEcho: ‘Min Reserve Order Value’, ‘Max Spread Percentage’, ‘Max Spread Floor’, ‘Market Data Group’, ‘Post Trade Parameter ID’, ‘Trading Parameter ID’. Note that the information in the following columns is redundant for instruments which will only be available in TRADEcho, and will be blanked in a future release: ‘Clearing Type’, ‘Exchange Market Size’, ’Minimum Order Size’, ‘Lot Size’. 2.9 – Blanks will now be populated in the ‘Price Validation Ratio’ and ‘Late trade Time limit’ columns. Renamed columns ‘Post Trade Parameter ID’ to ‘MIT Post Trade Parameter ID’, and ‘Trade Reporting Model’ to ‘MIT Trade Reporting Model’. Rows for Post Trade Parameters PT_S and PT_Z will be removed. 2.10 – All rows which don’t have Short Code ‘AI’, ‘AC’ or ‘PC’ will be removed. 2.20 – Removed section 3.4, 3.5 – Clarified behaviour

11.13	23 June 2017	The following changes have been made to aid clarity and to support the changes in the Release 9.2 (MiFID II compliant) upgrade: 2.7 – Replaced 'Min Reserve Order Value' with 'Pre-Trade LIS Value (Currency) '. Renamed 'ADT' to 'ADT (Currency)'. Replaced 'Min RFQ Quantity' with 'Minimum RFQ Value (Currency)'. The existing field 'Minimum BTF Quantity' will now be populated blank. Added the following new fields to the end of the file: 'MIC', 'Liquid', 'ADT (EUR)', 'ADNT', 'NTW Allowed', 'Price Tick Table ID', 'FISN', 'Max Order Value (Currency)', 'Max BTF Value (Currency)', 'Max Cross Value (Currency)', 'Max RFQ Value (Currency)', 'Notional Currency', 'Price Notation', 'Denominated Par Value'. 2.10 – Clarified that 'Execution Venue' will now be populated blank. 2.11 – Added the following new fields to the end of the file: 'Price Collar Percentage', 'Auction Price Collar Percentage', 'Sponsored User Price Collar Percentage', 'Sponsored User Auction Price Collar Percentage'.
11.14	28 July 2017	The following changes have been made to aid clarity and to support the changes in the Release 9.2 (MiFID II compliant) upgrade: 2.7 – Clarified 'Liquid' and 'FISN' field descriptions. Clarified 'Pre-Trade LIS Value (Currency)' and 'Denominated Par Value' data types. 2.11 – Clarified 'Price Tick Table ID' field description.
11.15	01 August 2017	The following changes have been made to aid clarity and to support the changes in the Release 9.2 (MiFID II compliant) upgrade: 2.7 – Added a new value 'N/A' and changed the length of the 'NTW Allowed' field.
11.16	7 November 2017	2.7 – Possible values of 'Mifir identifier' and 'Mifir Subclass' fields have been added 2.7 – Clarified the data format of 'Warrant Expiry' field
11.16.1	24 August 2018	2.18 – Section is updated to reflect the market structure changes for IOB trading service with effect from Monday 3 September 2018 in Production:

		New 'IOB-L1' and 'IOB-L1-EARLYCLOSE ' trading cycles are added to 'SETS-IDA' section 2.18 – New 'IOB-SC-L1' and 'IOB-SC-L1- Early Close' trading cycles are added for future use. 2.18 – The following updates have been done for cleanup purposes (no functional change): • The table format is changed; the new column 'Trading cycle' is added. • 'SETS-IOB' section- 'SETS-IOB', 'SETS-IOB-Early close' are removed, missing 'IOB' and 'IOB Early Close' are added (however, they will be decommissioned on 3, Sep) • 'SETS-EDSP' section – 'NE OB NO-CAC' , 'NE OB CAC' are added; the following are removed: SETS; SETS Early close; MSETS SETS; MSETS SETS – Early close; MSETS SETS NO CAC; MSETS SETS NO CAC Early close • 'SETS-IDA' section – 'SETS L1 EDSP' is removed • "Old Session Index" column is removed • "New Session Index" column is renamed to "Session Index" column 2.4.1 – Clarification added regarding End of Line (EOL) and Character encoding Standard format
11.17	28 August 2018	2.11 – Added New Parameter – Auto RFQ Min No of Quotes 2.18 – 'IOB' and 'IOB Early Close' are removed from SETS-IOB' section
12.0	5 June 2019	2.7 – Update existing "RFQ Price Deviation %" to "RFQ Quote and Execution Price Deviation Threshold %" 2.7- Include new Instrument Parameter "RFQ Tick Structure ID" 2.7 – Include new Instrument Parameter "Min Auction RFQ Quote Value"
13	25 March 2020	2.7 – Exchange Market Size – data type was corrected 2.7 – RFQ Tick Structure ID- description was amended for more clarity 2.4.2 – 'Number' data format was added 2.7 – Data format for 'Exchange market Size' was corrected (no change to the file)

14	July 2020	2.15 The possible values for the Ex-Marker code have been included
15	9 July 2020	1.3 – Removed reference to MIT601 2.1.2, 2.2.2, 2.3.2, 3.2.2, 3.4, 3.5 – Added details on new MFT (Managed File Transfer) Connectivity access
15.1	20 August 2020	1.3, 2.2.1, 2.2.2, 3.5 – Removed Connectivity references, please reference to MIT1001 – Connectivity guide 2.3.2 – Updated to reflect PDC, SDC file access Removed Unix and Windows commands
15.2	12 February 2021	Removed changes in relation to MFT migration 2.1, 3.2 Updated to reflect file availability time 2.5 Intra-day changes no longer notified via email
16	14 April 2021	2.13 – The following updates have been done: • The reference is corrected in Trading Session field description. • Four new fields have been added in the end of the file: 2nd, 3rd, 4th and 5th Price Monitoring Extension fields.
16.1	30 November 2021	2.7 - Removed 'ZY' as a valid value for Country of Register
16.2	31 January 2022	2.7 – One new field 'Professional Investor Only' has been added at the end of the Instrument file

Within this document, where amendments have been made to the previous issue, these changes will be identified by highlighting the changes in Red.

1.5 Enquiries

Please contact either the Technical Account Management Team or your Technical Account Manager if you have any questions about the Millennium Exchange services outlined in this document. Client Technology Services (UK) can be contacted at:

Telephone: +44 (0)20 7797 3939

Email: londontam@lseg.com

2.0 Reference Data Service

2.1 Calendar and Service hours

Market Reference Data files will be made available Monday-Friday from 21:30 local market time, on the weekday prior to published trading days.

2.2 Access to the service

The Market Reference Data files can be downloaded via both File Transfer Protocol (FTP) and Secure File Transfer Protocol (SFTP) service. Customers can access the FTP and SFTP server via existing Extranex, CMC and Hosting connections. It will not be possible to access the service via Internet connection.

Clients are expected to provide the source IP addresses of the FTP or SFTP request, along with the login credentials detailed below.

In addition to files that include the full reference data content, deltas from the previous day (adds, modifications and deletes) will be featured, and this will include an additional column to indicate the nature of the change - please refer to section 2.5 of this document. Intra-day changes files will be published as required – please refer to section 2.4 of this document. Customers are recommended to regularly refresh their reference data set through regular downloads of the full reference files.

The **Production Primary** service can be accessed at the following location:

	IP ADDRESS	PORT
SFTP	194.169.8.42	58101
FTP	194.169.8.42	21

The **Production Secondary** service can be accessed at the following location:

	IP ADDRESS	PORT
SFTP	194.169.8.43	58101
FTP	194.169.8.43	21

The **CDS** service can be accessed at the following location:

	IP ADDRESS	PORT
SFTP	194.169.8.157	51101
FTP	194.169.8.157	21

The following credentials should be used to access all the services:

USERNAME	PASSWORD
LSE_FTP_refdata	lsepublic82

2.3 Availability Model

The reference data servers will operate on a hot-hot configuration at our Primary Data Centre (PDC) and Secondary Data Centre (SDC). As reference data is readily available at both sites, clients can choose whether they wish to retrieve the reference data from PDC and/or SDC. Clients can be simultaneously connected to both PDC and SDC.

2.4 Service features

The service provides a number of separate full market reference data files needed to provide all the necessary data for the London market on Millennium Exchange.

TYPE	FILE NAME
Instrument	YYYYMMDD_XLON_Instrument
Calendar	YYYYMMDD_XLON_Calendar
Post Trade Parameter	YYYYMMDD_XLON_PostTrade
Trade Type	YYYYMMDD_XLON_TradeType
Trading Parameter	YYYYMMDD_XLON_Trading
Price Tick	YYYYMMDD_XLON_PriceTick
Session Parameter	YYYYMMDD_XLON_Session
Participant	YYYYMMDD_XLON_Participant
Ex-Marker	YYYYMMDD_XLON_ExMarker
Market Maker Registrations	YYYYMMDD_XLON_MMRegistrations
RFQ Enabled	YYYYMMDD_XLON_RFQenabled

In addition to the daily full market reference data files, a daily delta file and intra-day changes files will be published.

2.4.1. Data layout

The files are created in accordance with the following specifications:

File format	Csv
Fields delimiter	; (semicolon)
Decimal symbol	. (point)
Digit grouping symbol (thousands separator)	none
Date Fields format	yyyymmdd
End of line (EOL)	\r\n
Character encoding Standard	ISO-8859

The field lengths identified in the record layout below are maximum lengths. As the data is delimited, fields can be shorter than the maximum length defined.

All files will contain a header for each field.

Note: The Exchange may amend these values at any time following one week's prior written notice. Any changes will be communicated via Service Announcement.

2.4.2. Key to Field Type

STRING	An alphanumeric field
ENUM	A look-up value against a table of options
F64	Floating point 64-bit number encoded as ASCII
I32	32-bit Integer number encoded as ASCII
Number (X, Y)	A numeric field X – total number of digits Y – number of digits to the right of the decimal point

2.5 Intra-day changes

An intra-day change will be published via the production of a Changes file for each of the impacted data sets outlined in Section 2.3. Each file will be identical in format to the original daily file with the exception of an additional field indicating if the change is an add (A), update (U) or delete (D). A Changes file can be identified by the addition of '_Changes_Timestamp' to the original filename. The timestamp will be in format: HHMMSS.

The following items are anticipated to require republication on a frequent basis and result in the production of a changes file intra-day:

- Market Maker Registrations, Withdrawals and Re-instatements - YYYYMMDD_XLON_MMRegistrations_Changes

- Bid Status - YYYYMMDD_XLON_Instrument_Changes

- Ex-Marker Status - YYYYMMDD_XLON_ExMarker_Changes

In certain circumstances it may be necessary for the Exchange to publish other intra-day changes to reference data, beyond the scope of the three areas outlined above. In these situations the same process will be followed with notification issued to the market confirming the change and the republished files.

2.6 Daily Delta Files

On a daily basis, a delta file will be published in parallel with the full daily reference file. Deltas from the previous day (adds, modifications and deletes) will be featured, and this will include an additional column to indicate the nature of the change

The daily delta files will be published for each reference data file with the following naming format:

- Instrument – YYYYMMDD_XLON_Instrument_delta
- Calendar – YYYYMMDD_XLON_Calendar_delta
- Post Trade Parameter – YYYYMMDD_XLON_PostTrade_delta
- Trade Type – YYYYMMDD_XLON_TradeType_delta
- Trading Parameter – YYYYMMDD_XLON_Trading_delta
- Price Tick – YYYYMMDD_XLON_PriceTick_delta
- Session Parameter – YYYYMMDD_XLON_Session_delta
- Participant – YYYYMMDD_XLON_Participant_delta
- Ex Marker – YYYYMMDD_XLON_ExMarker_delta
- Market Maker Registrations – YYYYMMDD_XLON_MMRegistrations_delta
- RFQ Enabled - YYYYMMDD_XLON_RFQenabled_delta

Delta files will be published as blank if there are no changes from the previous day's complete reference data file.

2.7 Instrument File Record Layout

The following sections provide details on instrument data available within the service.

Field	Type (Length)	Description
Instrument ID	STRING (20)	Instrument ID, unique identifier across the system.
Calendar ID	STRING (30)	Unique key used to link the instrument to the market calendar to be used. The details of the calendar are maintained in the Calendar file.
Segment Code	STRING *(4)*	The code identifying the segment.
Post Trade Parameter ID	STRING *(30)*	Unique key used to link the instrument to the Post Trade Parameters to be used. These details are contained in the Post Trade Parameters table. This field will be blank for instruments which will only be available in TRADEcho.
Trading Parameter ID	STRING (30)	Unique key used to link the instrument to the Trading Parameters to be used. These details are contained in the Trading Parameters table. This field will be blank for instruments which will only be available in TRADEcho.
ISIN Code	STRING (12)	The International Security Identification Number (ISIN). This will be in line with ISO 6166.
Deletion Date	STRING (8)	Date on which the instrument will be deleted. Format yyyymmdd. This field may be blank.
First Trading Date	STRING (8)	Instrument's First Trading Date. Format yyyymmdd.
Instrument Status	ENUM	Whether the instrument is active for trading, suspended from trading, halted for trading or not available for trading (inactive). Possible values:

Field	Type (Length)	Description
		Value / *Meaning* 0 Active 1 Suspended 2 Inactive 3 Halt
Clearing Type	ENUM	Indicates whether the instrument is cleared or not. Possible values: *Value* / *Meaning* *0* *Not Cleared* *1* *Cleared* For instruments that will only be available in TRADEcho, the value should be ignored.
Exchange Market Size	Number (12,0)	The Exchange Market Size (EMS) is set to show the minimum size a market maker must quote in an individual security for all executable and firm quotes. This value may also be used in conjunction with a multiplier to determine other parameters. For instruments that will only be available in TRADEcho, the value should be ignored.
Pre-Trade LIS Value (Currency)	I32	The minimum consideration value for hidden and BTF Orders. The pre-trade LIS threshold of the instrument will be applicable in the instrument's trading currency.
Minimum Order Size	F64	Minimum order size allowed for that instrument. For instruments that will only be available in TRADEcho, the value should be ignored.
Last Trading Day	STRING (8)	Last Trading Day of the instrument. Format yyyymmdd. This can also be blank.
Lot Size	F64	This field defines the size increment of an order entered by a participant. Orders may be entered only in multiples of the Order Lot Size for a particular instrument ID. For instruments that will only be available in TRADEcho, the value should be ignored.

Field	Type (Length)	Description
Security Type	STRING (2)	Provides more granular groupings of instruments

		AI — AUTOMATED INPUT FACILITY NOTIFICN AL — ALLOTMENT LETTERS BD — BONDS BG — BULLDOGS BO — BOND CF — CLOSED FUNDS CN — CONVERTIBLE CP — COMMERCIAL PAPER CW — COVERED WARRANTS DB — Debenture DE — UK Equity DR — DEPOSITORY RECEIPTS EW — EQUITY WARRANTS FB — FOREIGN GOVERNMENT BONDS FC — FINANCIAL CERTIFICATES FL — FULLY PAID LETTER FR — FLOATING RATE FS — FOREIGN SHARES FT — FOREIGN UNIT TRUSTS FU — FUND UNITS FX — FIX RATE GT — GILTS GW — GILT WARRANTS IE — International Equity IP — INVESTMENT PRODUCTS IT — ITALIAN EQUITY KR — KRUGER RAND GROUP LC — LEVERAGE PRODUCTS BULL LE — LEVERAGE PRODUCTS EXOTIC LP — LEVERAGE PRODUCTS BEAR LS — LOAN STOCK MC — MULTI COUPON

Field	Type (Length)	Description	
		ML	MEDIUM TERM LOANS
		NA	NEWS ANNOUNCEMENT
		NL	NIL PAID LETTER
		OC	ONE COUPON
		OS	Provisional JSE Ordinary Share
		PC	PRIMARY CAPITAL CERTIFICATES
		PL	PARTLY PAID LETTER
		PN	PORTFOLIO NOTIFICATION
		PR	PREFERENCE SHARES
		PS	PREFERENCES SHARE
		PU	PACKAGE UNITS
		RG	RIGHTS
		RT	RIGHTS
		RV	REVERSE
		SC	STEP COUPON
		SH	SHARE
		SP	STRUCTURED PRODUCTS
		SU	STAPLED UNIT
		TA	TRADABLE DURING AUCTION
		TC	TRADABLE COMMODITIES
		TF	TRADABLE FUND
		TR	TRADABLE IN REGULATED SEGMENT
		UT	UNIT TRUST
		WA	WARRANTS
		WC	LEVERAGE PRODUCTS COVERED WARRANT CALL
		WP	LEVERAGE PRODUCTS COVERED WARRANT PUT
		WR	WARRANTS
		ZC	ZERO COUPON BONDS
		ZP	ZERO COUPON COMMERCIAL PAPER

Field	Type (Length)	Description
TIDM	STRING (4)	The mnemonic code is allocated by the Exchange and used to identify a tradable instrument.
Description	STRING (30)	Populated with the short name of the instrument
SEDOL	STRING (7)	This field is assigned by the Exchange to uniquely identify a tradable instrument or fund.
ADT (Currency)	F64	Defines the average daily turnover of the instrument specified in the instruments trading currency.
Currency	STRING (4)	This field contains the currency in which prices for a tradable instrument must be expressed. A list of all codes is contained in ISO 4217 - Codes for the representation of currencies and funds, except that, for SEAQ compatibility, GBX has been retained.
Bid Status	ENUM	The field is used to indicate whether a tradable instrument is currently in a take-over situation. Possible values: *Value* — *Meaning* 0 — Take-over situation 1 — No take-over situation
DOL Indicator	ENUM	Indicates whether a tradable instrument is included in the Daily Official List. This field can have the following values: *Value* — *Meaning* Y — Included in DOL N — Not included in DOL
DOL Section Number	STRING (4)	This field indicates the section of the DOL to which a tradable instrument belongs.
Issuer Code	STRING (6)	A code used to identify the issuer of a tradable instrument.
Issuer Name	STRING (255)	The full name of the issuer of a tradable instrument.
Normal Market Size	I10	Normal Market Size will now become the MiFID defined threshold that is used on an EU wide basis. NMS will not be controlled by the Exchange and will be set at an EU level.

Field	Type (Length)	Description
Ratio	STRING (8)	This is a free format field used to provide the ratio of Warrants to the underlying.
Settlement Type	STRING (8)	This is a free format field which holds an indicator showing what the Warrant is settled for on expiry.
Standard Market Size	I10	Standard Market Size is the MiFID average order size threshold for firms conducting in-house business (internalisation). Order sizes above the SMS do not need the offer prices to be published. SMS will not be controlled by the Exchange but will be set at an EU level.
Instrument Name	STRING (40)	The description of a tradable instrument. This is commonly known as the 'Long Name'.
DOL Symbol	STRING (36)	This field contains 12, 3-byte codes, each identifying a specific symbol used in the formatting of the DOL. These codes are not in any specific order. Embedded blank codes may exist within a list of genuine codes
Unit of Quotation	I10	The unit of quotation for an asset.
Max Spread Floor	F64	This field defines the maximum spread allowed based on a monetary value. This field will be blank for instruments which will only be available in TRADEcho.
Max Spread Percentage	F64	This field defines the maximum spread allowed based on a percentage value. The max spread floor value is used when a greater spread can be achieved by using the spread floor. This field will be blank for instruments which will only be available in TRADEcho.
Country of Register	STRING (2)	This specifies the country of Register for a specific tradable instrument. This will be in line with ISO 3166 and can also feature the following values: 'ZZ' - Multi Currency, Bearer Instruments, and unknown Country of Register Instruments 'DI' - Depository Interest Instruments
Warrant Strike Price	STRING (8)	This field will provide the price at which the Warrant can be exercised.
Warrant Expiry	STRING (8)	This is the date (YYYYMMDD) at which a Warrant expires.
Sector	STRING (4)	The Sector identifies a division of the market within a Segment.

Field	Type (Length)	Description
Multicast Channel ID	I32	Will be null.
Warrant Strike Currency	STRING (3)	This field contains the currency in which the Warrant Strike Price is expressed.
Warrant Type	STRING (30)	This field will provide the type of Warrant
Warrant Style	STRING (30)	This field will provide the exercise style of Warrant
Load ID	I32	Will be null.
Market Data Group	STRING (1)	Level 2-MITCH Market Data Channel to which this instrument is assigned. This field will be blank for instruments which will only be available in TRADEcho.
Cross Ord Bid Ask Spread %	STRING (13)	For a BTF Order, the price must be within: visible best bid - a configurable percentage AND visible best offer + a configurable percentage.
Minimum BTF Quantity	STRING (0)	Will be null.
Floor Price	STRING (30)	The floor price is the lowest price an instrument can reach before an expiry is triggered.
Ceiling Price	STRING (30)	The ceiling price is the highest price an instrument can reach before an expiry is triggered.
Minimum Quantity At Touch	F64	Minimum order size on entry allowed for that instrument to set a revised Best Bid/offer (BBO).
Mifir Identifier	STRING (4)	Mifir Identifier for the type of instrument SHRS - Shares ETFS – ETFs DPRS – Depositary receipts OTHR – Other equity-like financial instruments CRFT – Certificates ETCS - Exchange-traded-commodities ETNS - Exchange-traded notes SDRV – Securitised derivatives

Field	Type (Length)	Description
		BOND - Bonds SFPS – Structured Finance Products (SFPs)
Mifir Subclass	STRING (4)	Mifir Subclass of instrument COMM – Commodity CRDT - Credit CRPB – Corporate bond CURR - Currency CVDB – Covered Bond CVTB – Convertible Bond EQUT -Equity EUSB – Sovereign Bond INTR –Interest Rate OEPB – Other Public Bond OTHR –Other
Ref Price Allowance (%)	F64	Defines the allowance to be applied to the reference price, which is LTP/Previous Close, to validate cross orders
RFQ Quote and Execution Price Deviation Threshold (%)	F64	Defines the percentage deviation allowed from bid/ask prices, LTP or previous close price of the normal book when accepting quotes and quote responses for RFQs. The bid ask prices of the quotes submitted should be validated against the (bid/ask prices of the normal book) ± (bid/ask prices of the normal book× RFQ price deviation %).
Minimum RFQ Value (Currency)	F64	Defines the minimum value allowed for a RFQ, or a quote as a response to a RFQ.
MIC	STRING (4)	Execution Venue MIC Code. Will be populated N/A for ODTT and TEST segments. For other segments, the following values will be populated. *Value* — *Meaning* XLON — LONDON STOCK EXCHANGE AIMX — AIM MTF

Field	Type (Length)	Description
		XLOM LONDON STOCK EXCHANGE - MTF
Liquid	STRING (1)	Indicates whether the instrument is liquid or illiquid. Possible values are: *Value* *Meaning* Y Liquid N Illiquid
ADT (EUR)	F64	Defines the average daily turnover of the instrument specified in Euros.
ADNT	F64	Defines the average daily number of transactions for the instrument.
NTW Allowed	STRING (3)	Defines if Cross Orders and Negotiated off-book trades are enabled or disabled for the instrument. *Value* *Meaning* Y Enabled N Disabled N/A Not applicable
Price Tick Table ID	STRING (30)	Price tick table identifier for the instrument.
FISN	STRING (35)	Financial Instrument Short Name for the instrument. Will be blank in the R9.2 test environment.
Max Order Value (Currency)	F64	Defines the maximum order value allowed for the instrument.
Max BTF Value (Currency)	F64	Defines the maximum value allowed for BTF orders.
Max Cross Value (Currency)	F64	Defines the maximum value allowed for Cross orders.
Max RFQ Value (Currency)	F64	Defines the maximum value allowed for RFQs and quotes which are sent in response to the RFQ.
Notional Currency	STRING (3)	Defines the currency of the Notional Amount. Only populated for non-equity instruments.
Price Notation	STRING (4)	Indicates whether the price is expressed in monetary value, a percentage or yield. MONE will be populated for equity like

Field	Type (Length)	Description
		instruments and PERC will be populated for bond instruments.
Denominated Par Value	F64	Used to specify Minimum Denomination of a bond.
RFQ Tick Structure ID	STRING (30)	Defines the tick size for RFQ. If it is empty, order book's Price Tick Table ID is applied.
Min Auction RFQ Quote Value (Currency)	F64	Defines the minimum value allowed for quotes in response to an auction RFQ. If the RFQ's value is less than the value set in this parameter, then the quote value is not validated against the parameter. The value will be in the trading currency of the instrument
Professional Investor Only	STRING (3)	Defines if the instrument belongs to a sector which is to be used by professional investors only. *Value* — *Meaning* Y — Yes N — No

2.8 Calendar File Record Layout

The following sections provide details on calendar reference data available within the reference data service.

Field	Type (Length)	Description
Calendar ID	STRING *(30)*	Unique code used to identify the calendar. This code is used to link the calendar to the instrument.
Calendar Date	STRING (8)	Calendar Date, format yyyymmdd.
Description	STRING (30)	Name used to identify the calendar
Early Closing	ENUM	Whether the calendar allows early closing or not. Possible values: *Value* — *Meaning* *0* — *No* *1* — *Yes*
Trading Allowed	ENUM	Whether Trading is allowed on this day. Possible values: *Value* — *Meaning* *0* — *No* *1* — *Yes*

2.9 Post Trade Parameter File Record layout

The following sections provide details on post trade parameter available within the reference data service.

Field	Type (Length)	Description
MIT Post Trade Parameter ID	STRING *(30)*	Unique key used to link the Post Trade Parameters to files
Trade Type Table ID	STRING (30)	Unique key used to link the Post Trade Parameters file to the Trade Type file.

Field	Type (Length)	Description
Settlement Cycle	I32	The number of business days for standard settlement
CCP Internaliser	ENUM	Indicates whether instrument is available for SETS Internalisation or not. Possible values: *Value* — *Meaning* 0 — Disabled 1 — Enabled (but not for LSE) 2 — SETS Internalisation Please note this service is optional. Customers wishing to use SETS internalisation need to opt into to the service. Please see MIT 201 for more details.
MIT Trade Reporting Model	ENUM	Trade reporting model enabled for the instrument. Possible values: *Value* — *Meaning* 1 — All 2 — Single sided 3 — Dual sided - Alleged 4 — Dual sided – Independent 5 — None
Price Validation Ratio	F64	Will be populated blank.
Late trade Time limit	I32	Will be populated blank..

2.10Trade Type File Record Layout

The following sections provide details on trade type data available within the reference data service.

Field	Type (Length)	Description
Trade Type Table ID	STRING (30)	Unique key used to link the Trade Type to files
Short Code	STRING (4)	Short code of the trade type
Fix Value	I32	Corresponding Fix value of the short code
Publication Type	ENUM	Type of the trade publication applied to the instrument Possible values: Value – Meaning 0 – Do not publish 1 – Immediate publication 2 – Delay Requested
Execution Venue	STRING	Will be blank.

2.11 Trading Parameters File Record Layout

The following sections provide details on trading parameters available within the reference data service.

Field	Type (Length)	Description
Trading Parameters ID	STRING (30)	Unique identifier for the Trading Parameter that links the data in the file to other reference data files
Price Tick Table ID	STRING (30)	Will be blank.
Session Parameter Table ID	STRING (30)	Unique identifier that links this data to the Session Parameter file.
Allow Named Orders	ENUM	Indicates whether named orders are enabled Value — Meaning 0 — Disabled 2 — Enabled
Maximum Random Duration	I32	Maximum random time in seconds.
Maximum Order Duration	I32	Maximum time an order can stay on the Orderbook for GTC orders. When the maximum order duration is set to any value other than 0, GTC orders are rejected and GFD is allowed.
Min Quote Size EMS	I32	This will always be 100% of Exchange Market Size.
Minimum Auction Volume EMS	F64	This determines the minimum volume allowed before an uncrossing takes place where the proposed uncrossing price is outside of price monitoring values after all possible extensions. The percentage is based on the instruments Exchange Market Size
Quote Type	ENUM	Type of quote available in the market. Firm quotes do not interact with orders on the Order book. Possible values:

Field	Type (Length)	Description
		Value — *Meaning* *0* — *No Quotes* *1* — *Firm Quote* *2* — *Executable Quote* Note: Please refer to the Market Maker Quote Type in the sector tab of the Business Parameters document to determine whether an instrument supports quotes. This field should be ignored for instruments that do not support quotes.
Allow Stop Orders	ENUM	Indicates whether Stop Orders are enabled. Possible values: *Value* — *Meaning* *0* — *Disabled* *1* — *Enabled*
Minimum Disclosed Size EMS	F64	This relates to the iceberg peak refresh percentage
AESP Auction Duration	I32	AESP auction duration in minutes.
RFQ Type	ENUM	*Value* — *Meaning* *0* — *None* *2* — *Private*
Price Collar Percentage	F64	Defines the spread between the dynamic reference price and the price collar in terms of the percentage of the dynamic reference price.
Auction Price Collar Percentage	F64	Defines the spread between the dynamic reference price and the price collar in terms of the percentage of the dynamic reference price; applicable during auction sessions.

Field	Type (Length)	Description
Sponsored User Price Collar Percentage	F64	Defines the spread between the dynamic reference price and the price collar in terms of the percentage of the dynamic reference price; applicable for Sponsored users.
Sponsored User Auction Price Collar Percentage	F64	Defines the spread between the dynamic reference price and the price collar in terms of the percentage of the dynamic reference price; applicable in auctions for Sponsored users.
Auto RFQ Min No of Quotes	F64	Defines the minimum number of quotes that needs to be live for an Auto RFQ in order for execution to take place

2.12 Price Tick File Record Layout

The following sections provide details on price tick data available within the reference data service.

Field	Type (Length)	Description
Price Tick Table ID	STRING (30)	Unique identifier for the Price Tick that links the data in the file to other reference data files
Decimals	I32	Number of decimals supported by the Tick Structure.
Description	STRING (100)	Name used to identify the Price Tick
Max Value	F64	Upper price band value for that tick size.
Min Value	F64	Lower price band value for that tick size.
Tick Value	F64	The code to identify the valid format in which prices can be entered/displayed. The price must be a multiple of this Tick Size.

2.13 Session Parameters File Record Layout

The following sections provide details on session parameters available within the reference data service. Only session parameters where one or more field is populated will be referenced in the Session Parameter file.

Field	Type (Length)	Description
Session Parameter Table ID	STRING (30)	Unique identifier for the Session Parameter that links the data in the file to other reference data files
Trading Session	ENUM	Indicates as to which session the parameters are applicable. Please see section 2.18 for full list of values.
Duration to Auction	I32	Duration to Auction in seconds
Dynamic Circuit Breaker	F64	Percentage value for the Dynamic Circuit Breaker.
Market Order Extension	I32	Number of Market Order Extensions
Market Order Extension Duration	I32	Market order extension duration in seconds.
Minimum Volume Check	ENUM	Whether the minimum order volume check is applied during an auction Possible values: *Value* — *Meaning* *0* — *No* *1* — *Yes*
Price Monitoring Extension	I32	Number of Price Monitoring Extensions
Price Monitoring Extension Duration	I32	Duration of Price monitoring extension in seconds.
Static Circuit Breaker	F64	Percentage value for the Static Circuit Breaker.
2nd Price Monitoring Extension	F64	Percentage value for 2nd PME. If null, then the *Dynamic Circuit Breaker* is applied where applicable.

Field	Type (Length)	Description
3rd Price Monitoring Extension	F64	Percentage value for 3rd PME. If null, then the *Dynamic Circuit Breaker* is applied where applicable.
4th Price Monitoring Extension	F64	Percentage value for 4th PME. If null, then the *Dynamic Circuit Breaker* is applied where applicable.
5th Price Monitoring Extension	F64	Percentage value for 5th PME. If null, then the *Dynamic Circuit Breaker* is applied where applicable.

2.14 Participant File Record Layout

The following sections provide details on participants available within the reference data service.

Field	Type (Length)	Description
Member ID	STRING (11)	Unique code identifying the Member Firm.
Member Mnemonic	STRING (4)	A code that identifies the Member Firm.
Member Name	STRING (100)	This field holds the full name of the Member Firm.

2.15 Ex-Marker Status Record Layout

The following sections provide details on ex-marker status information for an instrument.

Field	Type (Length)	Description
Instrument ID	STRING (20)	Instrument ID, identifies the instrument
Ex-Marker Code	STRING (2)	The value of an Ex-Marker pertaining to a tradable instrument. It Indicates whether the instrument is trade cum or ex (dividend, coupon etc.) Possible values: **Value** / **Meaning**

<table>
<tr><th>Field</th><th>Type
(Length)</th><th>Description</th></tr>
<tr><td></td><td></td><td><table>
<tr><td>XA</td><td>EX Corporate Action</td></tr>
<tr><td>XC</td><td>EX Capitalisation</td></tr>
<tr><td>XD</td><td>EX Dividend</td></tr>
<tr><td>XL</td><td>Liquidation Distribution</td></tr>
<tr><td>XO</td><td>EX Other</td></tr>
<tr><td>XP</td><td>EX Repayment of Capital</td></tr>
<tr><td>XR</td><td>EX Rights</td></tr>
<tr><td>XS</td><td>EX Stock Distribution</td></tr>
<tr><td>XV</td><td>EX Reverse Stock Split</td></tr>
<tr><td>XW</td><td>EX Stock Split</td></tr>
<tr><td>S</td><td>Stabilisation Marker</td></tr>
</table></td></tr>
<tr><td>Ex-Marker End Date</td><td>STRING (8)</td><td>This is the last day a particular Ex-Marker set on a tradable instrument is valid for. Format yyyymmdd</td></tr>
<tr><td>Ex-Marker Start Date</td><td>STRING (8)</td><td>This is the date from which a particular Ex-Marker set on a tradable instrument is valid. Format yyyymmdd</td></tr>
</table>

2.16 Market Maker Registration Record Layout

The following sections provide details on market makers registered in instrument.

Field	Type (Length)	Description
Member ID	STRING (11)	Unique code identifying the Member Firm.
Instrument ID	STRING (20)	Instrument ID, identifies the instrument

2.17 RFQ Enabled Record Layout

Field	Type (Length)	Description
Instrument ID	STRING (20)	Instrument ID of an instrument for which a Market Maker is eligible to receive private RFQs for.
Firm ID	STRING (11)	Unique code of a Member Firm who is eligible to receive named private RFQs.

2.18 Values For Trading Session

Cycle Definition	Trading Cycle	Session	Session Index
SETS-EDSP	NE OB NO-CAC NE OB NO-CAC - Early close NE OB CAC NE OB CAC- Early close	Pre-Trading	217
		Opening Auction Call	218
		Regular Trading 1	219
		EDSP Auction Call	220
		Regular Trading 2	221
		Closing Auction Call	222
		Post Close	224
		Re-Opening Auction Call	225
		Resume Auction Call	226
		Closing Price Cross	227
		Halt	228
		Halt and Close	229
		Pause	230
MSETS-OFIN OFLV	NE OB EOD ONLY NE OB EOD ONLY Early close	Pre-Trading	184
		Regular Trading	185
		Post Close	187
		Halt	188
		Pause	189
ETS-IOB	ODTT ODTT Early close	Pre-Trading	191
		Opening Auction Call	192
		Regular Trading	193
		Closing Auction Call	194
		Post Close	196
		Re-Opening Auction Call	197
		Resume Auction Call	198
		Closing Price Cross	199
		Halt	200
		Halt and Close	201
		Pause	202
SETS-IDA	SETSQX-RT SETSQX-RT Early close SETSQX-NOMM	Pre-Trading	287
		Opening Auction Call	288
		Regular Trading	289

	SETSQX-NOMM Early close SETS-L1 SETS-L1- Early close IOB-L1 IOB-L1- Early close IOB-SC-L1 IOB-SC-L1- Early Close Note: IOB-SC-L1 will be introduced in due course	EDSP Auction Call	290
		Periodic Auction Call 1	291
		Regular Trading 1	292
		Periodic Auction Call 2	293
		Regular Trading 2	294
		Periodic Auction Call 3	315
		Regular Trading 3	316
		Closing Auction Call	295
		Post Close	297
		Re-Opening Auction Call	298
		Resume Auction call	299
		Halt	300
		Halt and Close	301
		Pause	302
		Closing Price Cross	303
Standard Off Book	Standard Off Book Standard Off Book Early Close	Pre-Trade Reporting	178
		Trade Reporting	15
		Post Close	22
		Halt	16
Standard Off Book MFD	Standard Off Book EQS ITR MFD Standard Off Book EQS ITR MFD Early Close Standard Off Book MFD Standard Off Book MFD Early Close	Grace Period	177
		Trade Reporting 1	17
		Trade Reporting 2	18
		Trade Reporting 3	19
		Halt	20
		Post Close	21
Quote Book	QB1 – QB26 QB1 – QB26 Early close	Pre-Trading	232
		Pre Mandatory	233
		Mandatory	234
		Post Mandatory	235
		Halt	236

2.19 MD5 Checksum files

Each reference data file will have a corresponding MD5 checksum file for clients to use for their information systems to ensure data integrity. This is an optional feature for clients to use.

3.0 Guide to Secure File Transfer Protocol (SFTP)

3.1 Introduction

The introduction of Millennium Exchange has created a new model for downloading reference data.

The service model will allow for customers to PULL the relevant reference data files in real time.

3.2 Service Overview

The service is designed to allow customers to download the reference data files in a secure and flexible manner.

Market Reference Data files will be made available Monday-Friday from 21:30 local market time on the weekday prior to published trading days.

In addition to files that include the full reference data content, deltas from the previous day (adds, modifications and deletes) will be featured. Deltas will include an additional column to indicate the nature of the change please refer to section 2.5 of MIT 401 – Guide to Reference Data Services. Intra-day changes files will be published as required – please refer to section 2.4 of MIT 401 – Guide to Reference Data Services. Customers are recommended to regularly refresh their reference data set through regular downloads of the full reference files.

Previous days' files will be moved into individual date stamped folders to keep the current day clear of older files.

3.3 Mandatory Testing

There are no testing requirements for customers to certify against the new reference data service.

3.4 Enablement

Access to the reference data service can be requested via the contact details provided in section 1.5 above.

At the time of the request, users will have their SAP given permission for access. Note: Any IP address from the SAP Subnet will be allowed access to the service.

A single username and password, detailed in section 2.2, can be used to login. The Username and Password will be valid for both test and production in order to limit administration

3.5 Connectivity

Connectivity to reference data services is provided via the Exchange's network – Extranex, CMC, hosting. Customers should target the addresses detailed in section 2.2 to enable file transmission.

Below is a series of screen shots to guide customers in the process of SFTP for file download from Windows and UNIX.

3.5.1 UNIX Commands

>sftp -oPort=51101 username@IP

Connecting to xxx.xxx.xxx.xxx...

The authenticity of host '[xxx.xxx.xxx.xxx]:51101 ([xxx.xxx.xxx.xxx]:51101)' can't be established.

RSA key fingerprint is 4b:6d:c4:0f:16:54:8d:94:d8:a4:0d:d0:bf:da:ce:a1.

Are you sure you want to continue connecting (yes/no)? Yes

Warning: Permanently added '[xxx.xxx.xxx.xxx]:51101' (RSA) to the list of known hosts.

username@IP's password: (Enter Password)

sftp> dir

20100727_XLON_Calendar 20100727_XLON_ExMarker 20100727_XLON_MMRegistration

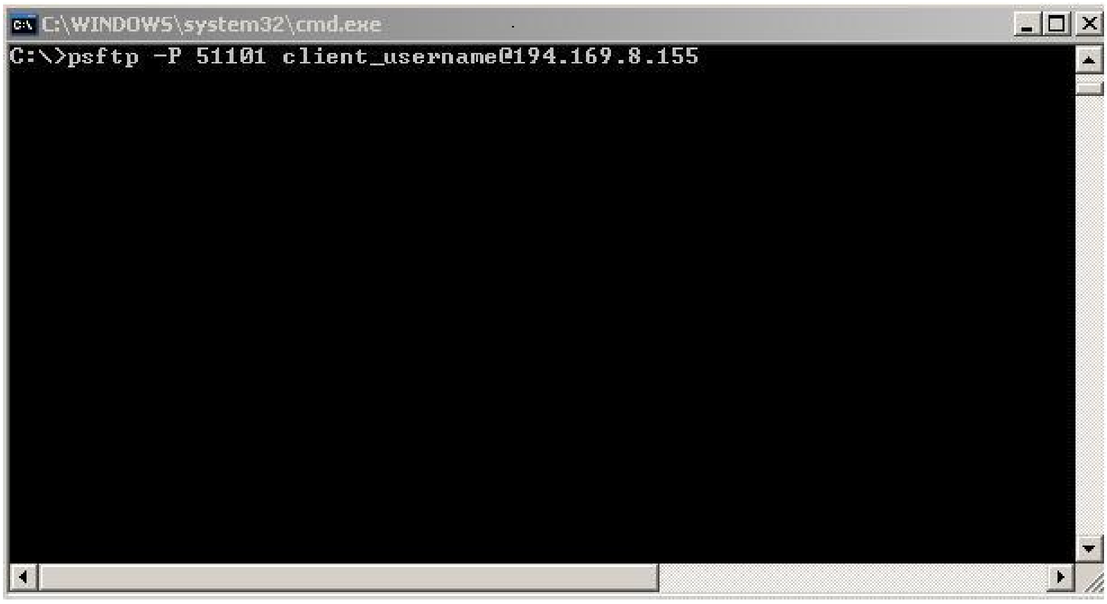
20100727_XLON_Participant 20100727_XLON_PostTrade 20100727_XLON_PriceTick

sftp> quit

3.5.2 Windows Commands:

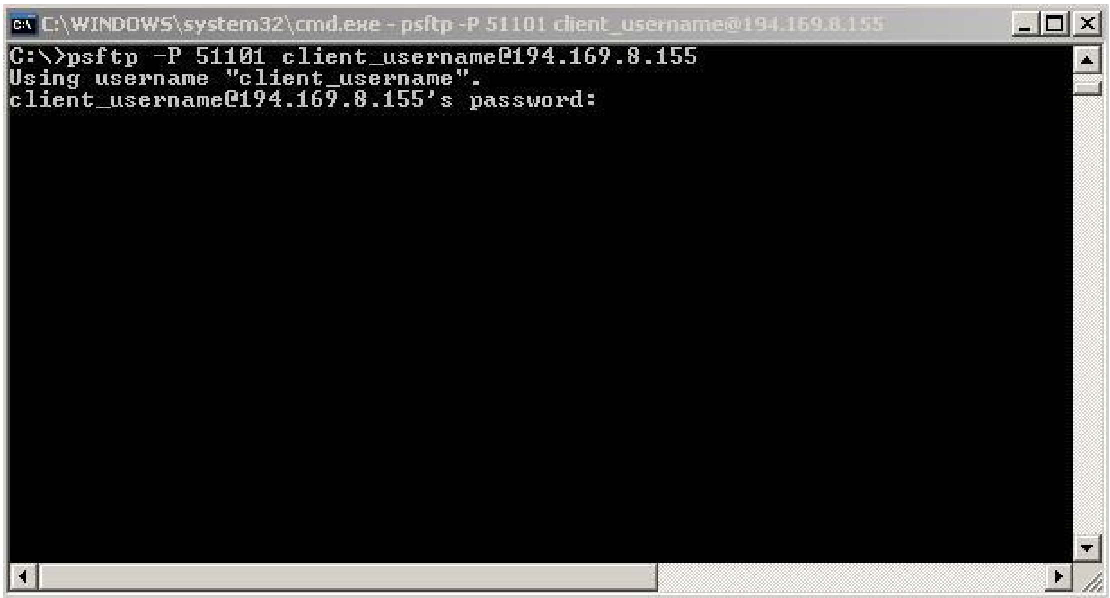
Step1.

SFTP to the address provided above with provided username



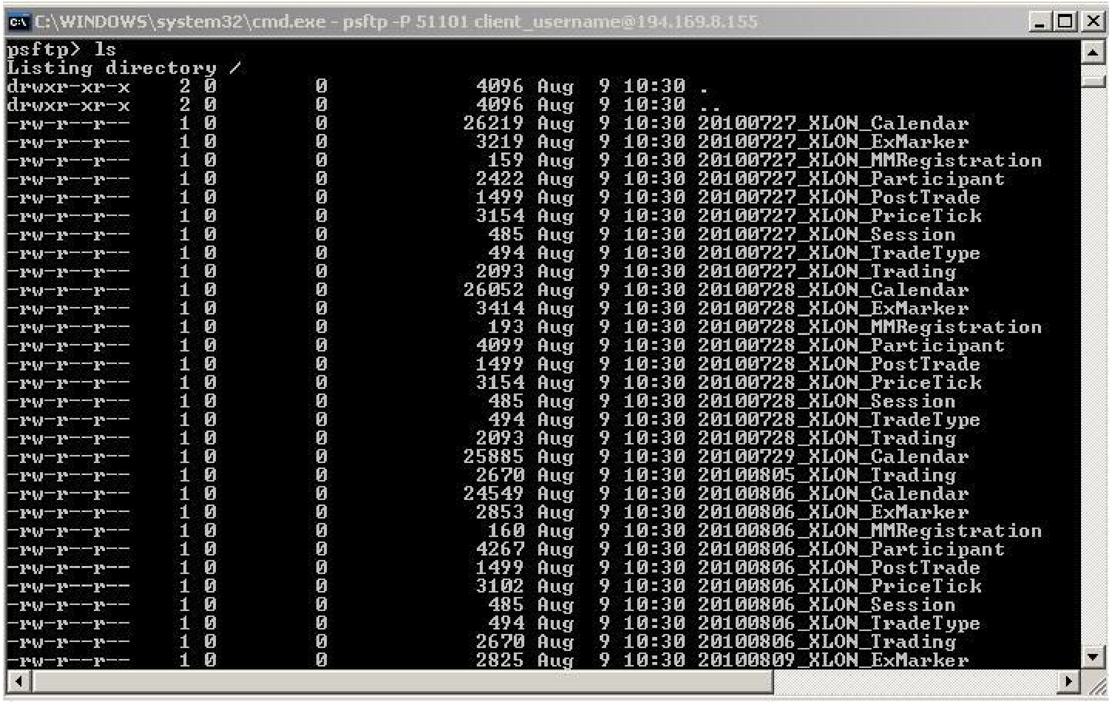
Step2.

Insert Password as required



Step 3.

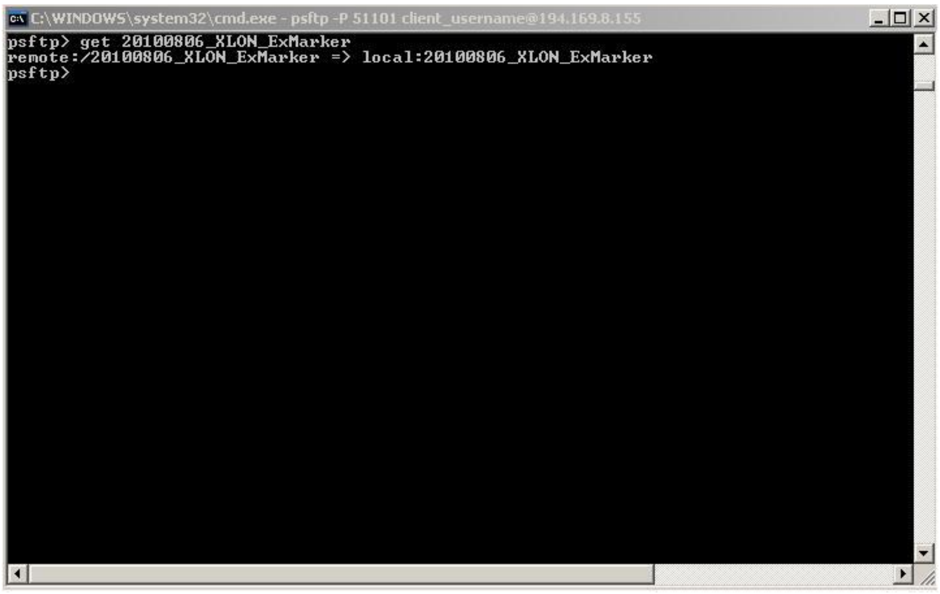
Once logged in you can perform a Directory list



```
C:\WINDOWS\system32\cmd.exe - psftp -P 51101 client_username@194.169.8.155
psftp> ls
Listing directory /
drwxr-xr-x    2 0        0            4096 Aug  9 10:30 .
drwxr-xr-x    2 0        0            4096 Aug  9 10:30 ..
-rw-r--r--    1 0        0           26219 Aug  9 10:30 20100727_XLON_Calendar
-rw-r--r--    1 0        0            3219 Aug  9 10:30 20100727_XLON_ExMarker
-rw-r--r--    1 0        0             159 Aug  9 10:30 20100727_XLON_MMRegistration
-rw-r--r--    1 0        0            2422 Aug  9 10:30 20100727_XLON_Participant
-rw-r--r--    1 0        0            1499 Aug  9 10:30 20100727_XLON_PostTrade
-rw-r--r--    1 0        0            3154 Aug  9 10:30 20100727_XLON_PriceTick
-rw-r--r--    1 0        0             485 Aug  9 10:30 20100727_XLON_Session
-rw-r--r--    1 0        0             494 Aug  9 10:30 20100727_XLON_TradeType
-rw-r--r--    1 0        0            2093 Aug  9 10:30 20100727_XLON_Trading
-rw-r--r--    1 0        0           26052 Aug  9 10:30 20100728_XLON_Calendar
-rw-r--r--    1 0        0            3414 Aug  9 10:30 20100728_XLON_ExMarker
-rw-r--r--    1 0        0             193 Aug  9 10:30 20100728_XLON_MMRegistration
-rw-r--r--    1 0        0            4099 Aug  9 10:30 20100728_XLON_Participant
-rw-r--r--    1 0        0            1499 Aug  9 10:30 20100728_XLON_PostTrade
-rw-r--r--    1 0        0            3154 Aug  9 10:30 20100728_XLON_PriceTick
-rw-r--r--    1 0        0             485 Aug  9 10:30 20100728_XLON_Session
-rw-r--r--    1 0        0             494 Aug  9 10:30 20100728_XLON_TradeType
-rw-r--r--    1 0        0            2093 Aug  9 10:30 20100728_XLON_Trading
-rw-r--r--    1 0        0           25885 Aug  9 10:30 20100729_XLON_Calendar
-rw-r--r--    1 0        0            2670 Aug  9 10:30 20100805_XLON_Trading
-rw-r--r--    1 0        0           24549 Aug  9 10:30 20100806_XLON_Calendar
-rw-r--r--    1 0        0            2853 Aug  9 10:30 20100806_XLON_ExMarker
-rw-r--r--    1 0        0             160 Aug  9 10:30 20100806_XLON_MMRegistration
-rw-r--r--    1 0        0            4267 Aug  9 10:30 20100806_XLON_Participant
-rw-r--r--    1 0        0            1499 Aug  9 10:30 20100806_XLON_PostTrade
-rw-r--r--    1 0        0            3102 Aug  9 10:30 20100806_XLON_PriceTick
-rw-r--r--    1 0        0             485 Aug  9 10:30 20100806_XLON_Session
-rw-r--r--    1 0        0             494 Aug  9 10:30 20100806_XLON_TradeType
-rw-r--r--    1 0        0            2670 Aug  9 10:30 20100806_XLON_Trading
-rw-r--r--    1 0        0            2825 Aug  9 10:30 20100809_XLON_ExMarker
```

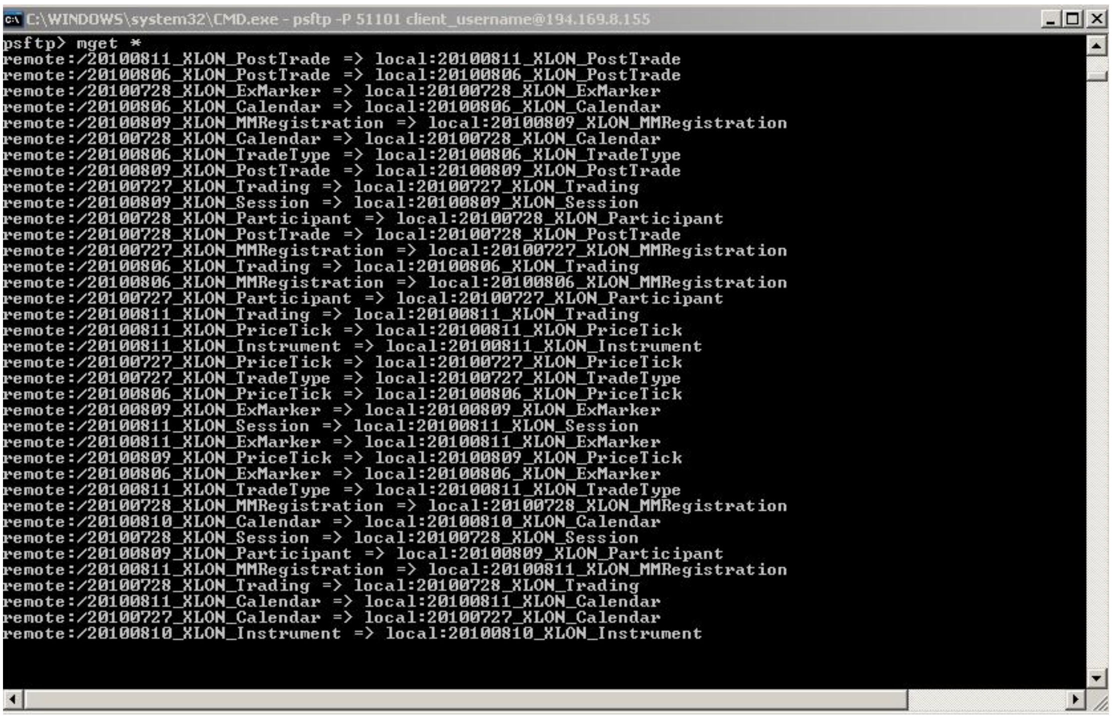
Step 4.

Get the required files individually



Step 5

Get * for all files for the current day



3.6 Automation

For automating authentication and reference data download from the CDS sFTP solution, the following can be used as an example for both UNIX and Windows.

Unix/Linux

Customers can use an 'expect' command within BASH – this can be found at the following link http://www.manpagez.com/man/1/expect/

Example script:

Example script:

```
#!/usr/bin/expect -f

spawn sftp client_username@sFTP_server
match_max 100000
expect "*?assword:*"
send -- "client_password\r"
expect "*sftp*"
send -- "get *XLON_Instrument.csv\r"
expect eof
```

Expect can also be used directly in C or C++

Windows

Customers can use an sFTP client like Winscp.

Example command line:

```
winscp.com /script=C:\connection_script.txt /log=C:\log.xml
```

Connection_script.txt example:

```
# Automatically answer all prompts negatively not to stall the script on errors
option batch on
# Disable overwrite confirmations that conflict with the previous
option confirm off

# Connect using client_username@sFTP_server
open client_username:client_password@sFTP_server
# Force binary mode transfer
option transfer binary
```

```
# Download file to the local directory D:\
get *XLON_Instrument.csv D:\somefolder

# Disconnect
close
# Exit WinSCP
exit
```

London Stock Exchange

10 Paternoster Square
London EC4M 7LS
T: +44 (0)20 7797 1000
www.londonstockexchange.com

London
Stock Exchange