



LMEprism Contributor Interface Specification 1.08

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1 Introduction

This document is the Contributor Interface Specification for the LMEprism system. It describes how contributing firms should implement software and/or technical procedures for providing data to and receiving data from the system.

The system enables individual market making contributors to provide option vols data on a daily basis for production of a calculated data set based on all contributions, i.e. the option vols report. This report is then made available to the contributors.

Contributions can be made in a specific configurable time window each trading day, the default being 15:30 to 16:45. Contributions made after the close of the official Contribution Window will only be included in calculations if the Contribution Window is extended by the LME. Note that on LME half days a different window may operate.

Contribution is only permitted on trading days. Generally non-trading days are considered as any Saturday, any Sunday or any UK bank holiday.

2 Overview of Data Contribution

This section describes the various mechanisms by which the contributors may provide their data to the LME. Contributors may choose to use a combination of one or more of the options provided.

Option	Title	Summary
Option A	Data Entry via Web GUI	An interactive, secure web based application, hosted by the LME and accessed via secure connections (https). Contributors manually enter and amend data.
Option B	File Upload via Web GUI	Uses the same Web GUI as option A. The users can upload data files which will be automatically submitted if valid.
Option C	Direct File Transfer to LME using SFTP	Secure file transfer across an IP network. The Contributor is responsible for pushing the files to the LME using SSH FTP (SFTP). Data will be automatically submitted if valid.

For FTP purposes connectivity to the LME should be via VPN or LMEnet, as appropriate for each Contributor. In both cases all data is transferred via secure, encrypted connections. Bandwidth requirements are negligible due to the amount of data being transferred.

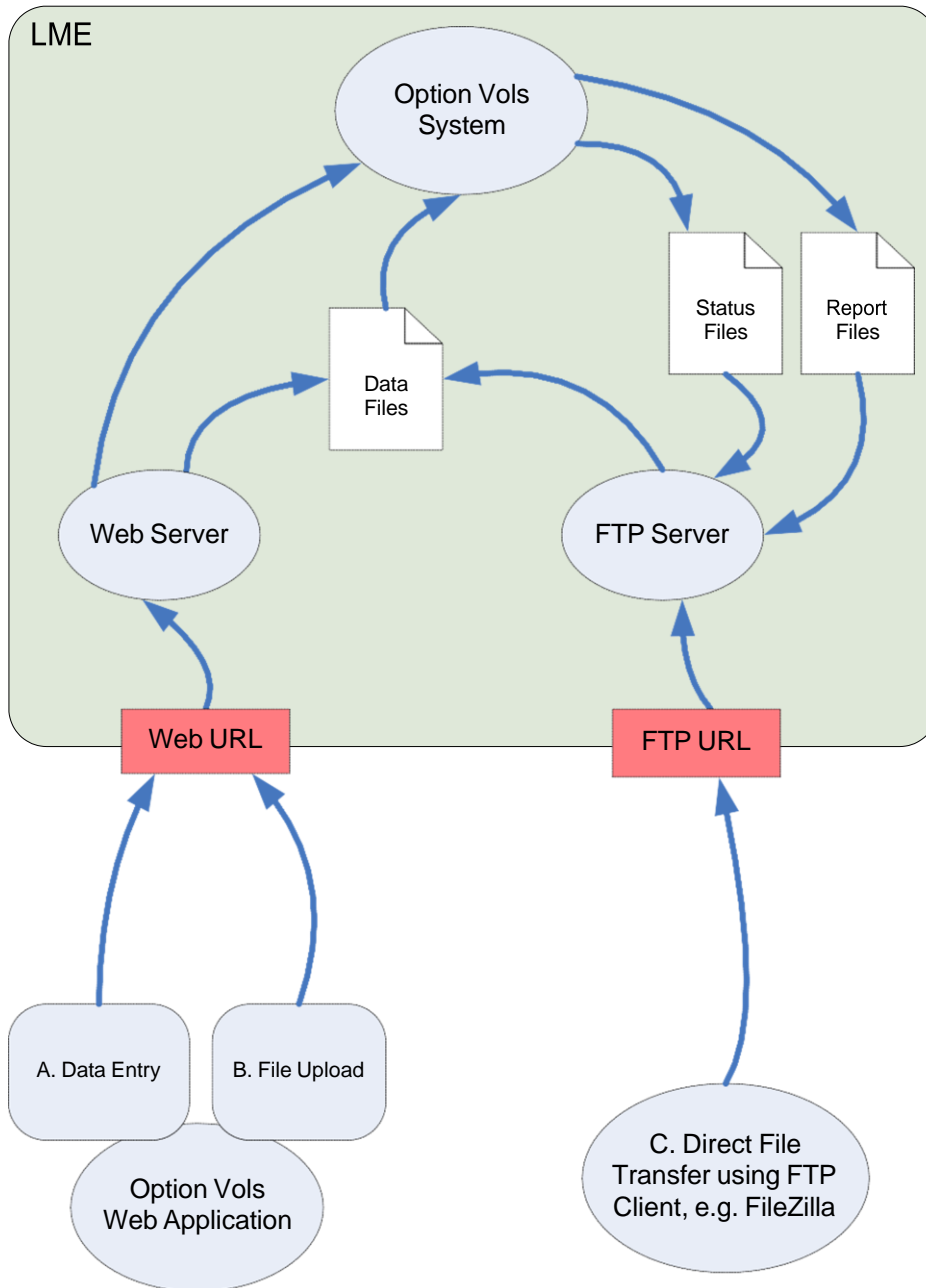
For web access purposes a Web GUI will be provided. This will be officially supported for Internet Explorer 11 and Google Chrome. The application may work in other browsers, but this is not guaranteed. The user should also run the Web GUI from a PC with the following minimum specification for optimum performance:

CPU	<i>Modern processor (less than three years old)</i>
RAM	<i>4 GB</i>
Operating System	<i>Microsoft Windows 7</i>

Full detail of the Web GUI is covered by the Web GUI User Guide [2] though some details of its use are presented in this document for explanatory purposes.

The following subsections describe each of the options in more detail.

LME Option Vols – Contribution Options



2.1 Option A - Data Entry Via Web GUI

In this option the Web GUI is used to enter the data.

In order to enter data directly into the Web GUI the user must have the “Primary User” or “Secondary User” roles.

Creation of users and assignment of roles is done using the User Admin interface of the Web GUI which is covered in section 4.

Anyone with one of the above roles will be able to access the contributions screen for entering data. On accessing this screen the user will be presented with a grid containing the valid date series for the commodity selected. The user can then enter the values required for each series. Once finished the user must explicitly submit the values for inclusion in calculations and averaging. Any errors in the data will be shown on the screen to the user.

If data for the given Data Set has already been delivered to the system for that day by the contributor by one of the other mechanisms (e.g. direct file transfer) or already submitted once using this mechanism, then the existing data will be shown on the screen when first accessed. The user will be able to edit the data. As with entering the data from scratch the new values must be explicitly submitted to be included in calculations once the contribution window is closed.

2.2 Option B - File Upload Via Web GUI

This option also utilises the Web GUI. Anyone with the “Primary User” or “Secondary User” role will be able to browse for a file on their local file system and upload it to the system.

This file must adhere to the naming and format conventions outlined in section 6.

Each file can contain one or more Data Sets of the same data type, e.g. copper option vols and nickel option vols can be provided in the same file. They could also be provided in separate files if required.

If there are any errors in the data these will be shown on the contributions screen after upload. In the event of error any data set with an error will not be automatically submitted but marked as Invalid to allow correction or re-upload. Any file upload or submission will always replace any data for the same Contributor, Commodity and Contribution Date that already exists on the server in its entirety.

The system will also produce a status report that can be configured to be emailed to one or more of the contributor’s users. Users can be emailed just status reports where there was an error or all status reports if they require (as a confirmation that upload was successful).

2.3 Option C - Direct File transfer using SFTP

The Contributor is responsible for transferring the data files to the LME using SFTP. There is no LME software installed at the Contributor site. The Contributors own systems are responsible for generating the data in the appropriate file format and transferring it to the LME. The file transfer must be performed using the SFTP protocol.

This file must adhere to the naming and format conventions outlined in section 6. As with option B each file can contain one or more data sets.

At the LME host end, the system will validate the uploaded data and if correct automatically submit it for inclusion in calculations. A status report will be created to confirm upload which will be placed in the contributors FTP area. It is the responsibility of the contributor to monitor for this file and take appropriate action (if any).

The status report can also be configured to be emailed to one or more of the contributor's users. Users can be emailed just status reports where there was an error or all status reports if they require (as a confirmation that upload was successful).

If there are any errors in the data these will be flagged in the status report. In the event of error any data set with an error will not be automatically submitted. The contributor can either correct the errors and re-send the file or use the Web GUI outlined in option A to correct the errors and submit.

Any file upload will always replace any data for the same Contributor, Commodity and Contribution Date that already exists on the server.

3 Overview of Report Collection

Once all calculations have been performed the LME will publish the daily report for option vols. This will be available soon after the close of the contribution window, at approximately 17:30 each contribution day.

Contributors will optionally be able to enable email notification for the publication of this report. This notification can be configured to be delivered to one or more users. Notifications for any re-publication will also be available and configured separately. For example a contributor may not need to know when the report is first published as they are checking themselves anyway, but may require an email notification if the report is re-published.

As with data contribution there are a number of options for viewing/collecting this report.

Option	Title	Summary
Option A	Data review via Web GUI	Using the same Web GUI used for contribution, the user can view reports and graphs.
Option B	File download via Web GUI	Using the same Web GUI as above, the users can download a copy of the report in csv file format.
Option C	Direct File download from LME via SFTP	Secure file transfer across an IP network. The Contributor is responsible for pulling the files from the LME using SFTP

3.1 Option A – Viewing on Web GUI

A contributor user with any type of role will be able to access the Web GUI and view today's report on screen.

3.2 Option B – File download using Web GUI

Also using the Web GUI, any user will be able to download the report. This will be downloaded in a csv file format as outlined in section 6.4.

3.3 Option C – File download using SFTP

Each contributor will be able to download the report from their FTP area, accessed in the same way as Option C for contribution. The format of the file will be as outlined in section 6.4. The contributor is responsible for checking for the existence of this report at the appropriate time (or when prompted by an email notification).

4 User Account Management

Contributors are responsible for managing their own user accounts using the User Admin screen on the Web GUI.

The LME will initially create a single “Primary User” account for a contributor. This account can then be used to access the User Admin screen and create other accounts for the same contributor.

Each user is assigned a role that controls the functions available to them:

- Primary User – has access to all data submission and viewing functions and also has access to create and manage user account for their own contributor (submission functions subject to further commodity permissions – see below).
- Secondary User - has access to all data submission and viewing functions (submission functions subject to further commodity permissions – see below)
- View Only User – only has access to viewing functions

Submission of data can be further restricted at a commodity level using “submission permissions”, e.g. though a user has the “Secondary User” role they are only allowed to submit data for Nickel, but not Copper. Note that users can only have submission permissions on commodities that the contributor as a whole is allowed to submit. For example if contributor ABC is not permitted to submit Copper then any user from ABC would also not be permitted to submit Copper. Contributor permissions are controlled by the LME.

The following restrictions apply to user accounts:

- Usernames must be a valid email address.
- Passwords must be a minimum of 8 characters long and contain at least one uppercase letter, lowercase letter, and number.

Usernames and passwords are shared between the Web GUI and FTP service access points, i.e. if a new user is created via the Web GUI they will have access to both the Web GUI and FTP.

Passwords must be changed every 90 days. All users will be able to change their own password using the User Admin screen on the Web GUI. If a user has forgotten their password they can request the LME IT Service Desk reset it for them.

If a user attempts to repeatedly access the system with a bad password, their account will be disabled after 5 attempts. The account can be re-enabled by an administrator (either from the LME or contributing firm) using the Web GUI.

If invalid system access is repeatedly attempted from the same IP address, this IP address will become subject to tar-pitting after 10 attempts. Tar-pitting means that the user will have to wait 30 seconds in

between attempts to login. If the user subsequently logs in with a valid username and password the tarpitting will be cleared for that IP address.

5 File Transfer - connecting and logging on

5.1 Service Access Point

The FTP URL will be confirmed by the LME.

5.2 The protocol

The FTP Server uses the “SSH File Transfer Protocol” otherwise known by the abbreviation ‘SFTP’.

Note that the system does not support traditional non-secure FTP – if connecting directly to the FTP server contributors must ensure that the tools, libraries or components that they use support SFTP.

For more details on firewall configuration see the LME System Firewall Configuration Guide [1].

5.3 Logging on

After the SFTP client has established a secure connection, it must log on using the LME provided access credentials (username and password). These are the same credentials as used to access the Web GUI and set up as described in section 4.

Users may change their password using the Web GUI.

6 File formats

All of the files described in this section are in plain ASCII text format csv files, that is to say they include the characters 0x20 to 0x7E Plus CR (0x0D), LF (0x0A), TAB (0x09) only.

Each file consists of a number of records. Each record is a single line of text, terminated by the CR and LF characters.

Each record consists of one or more data fields, which are comma separated. Any space characters between fields are ignored.

6.1 Data Upload Files

The option volatilities upload file must be named with the following convention:

XXX_Options_YYYYMMDD.csv

Where:

XXX is the three letter mnemonic for the contributor

YYYYMMDD is the current contribution date

For example the contributor ABC would upload a file named *ABC_Options_20140321.csv* on the 21st March 2014.

The data upload file consists of one header row with the field names in followed by one or more data rows, with each data row containing the option vols for a given contributor, commodity and series.

The specification for each row is as follows:

Field Name	Field Name Variants Permitted*	Comment
Firm Id	FirmId	Standard 3 character Contributor mnemonic. All letters should be capitals.
Product	Product Code ProductCode	Commodity code, all letters should be capitals. Currently supported codes are: AA, AH, CA, NA, NI, PB, SN, ZS
Series	Month Date Date Series DateSeries Prompt Prompt Date PromptDate	Date series for the given commodity in the format MMM-YY, e.g. Mar-16 Contract lengths for each commodity are (length depends on whether before or after the expiry date each month): AA – 26/27 AH – 62/63 CA – 62/63 NA – 26/27 NI – 26/27 PB – 14/15 SN – 14/15 ZS – 26/27
-10Delta	-10 Delta -10% -10%Delta -10% Delta -10 -0.1 -0.10 -.1 -.10 Amount1 Amount	Averaged -10 Delta, differential from 50 Delta
-25Delta	-25 Delta -25% -25%Delta -25% Delta -25 -0.25 -.25 Amount2 Amount	Averaged -25 Delta, differential from 50 Delta

Field Name	Field Name Variants Permitted*	Comment
50 Delta	50Delta 50% 50%Delta 50% Delta 50 0.5 0.50 .5 .50 Amount3 Amount	Averaged 50 Delta
+25Delta	+25 Delta +25% +25%Delta +25% Delta 25 0.25 .25 Amount4 Amount	Averaged +25 Delta, differential from 50 Delta
+10Delta	+10 Delta +10% +10%Delta +10% Delta 10 0.1 0.10 .1 .10 Amount5 Amount	Averaged +10 Delta, differential from 50 Delta

**Note that processing by the system is case insensitive so any of the above variants could also be capitalised, e.g. 50DELTA is valid.*

An example of the content of an option vols file is given below:

```
Firm Id,Product Code,Series,-10Delta,-25Delta,50 Delta,+25Delta,+10Delta
ABC,CA,Mar-14,0.55,0.65,31.55,0.10,0.25
ABC,CA,Apr-14,0.55,0.65,31.55,0.10,0.25
ABC,CA,May-14,0.55,0.65,31.55,0.10,0.25
ABC,CA,Jun-14,0.55,0.65,31.55,0.10,0.25
<etc out to end of contract>
```

A single option vols file can contain one or more commodities. For example CA, ZS and NI could all be included in a single file. Equally these could all be provided in separate files.

The following validation will occur:

- File name format must match format given above
- Contribution date given in file name is correct one
- File format is correct, i.e. csv with header and 8 fields
- No duplicate rows are included
- In each row:
 - Correct number of fields are provided (8)
 - Contributor code is valid and matches folder to which upload occurred
 - Commodity code is valid
 - Series is valid
 - Vols value is to not more than 2 decimal places
 - Vols value is in range 0.00 – 999.99 (minus values allowed for deltas)
 - If wing differentials are provided then the 50 delta must be provided

Any validation error will be written to the status file and result in the data for that commodity not being automatically submitted for inclusion in report calculations.

Data for a given commodity and data type is validated as a whole set, i.e. the whole data set must be valid before it can be submitted. Individual values in the set will not be submitted if other rows are invalid, e.g. if the Mar-14 series for CA is valid but the Apr-14 series for CA contains an error then the whole data set is invalid, the Mar-14 series for CA will not be submitted.

If more than one data set is provided in the file then each of these is treated independently for validation purposes, e.g. copper option vols could have no errors and be submitted whereas nickel options vols contains errors and is flagged as invalid.

If extra rows are provided that are in the correct format (i.e. have 8 fields), but are for series that are not part of the given data set then these will be automatically ignored and the data set accepted, e.g. if series for Mar-32 are provided for CA then these would be ignored.

6.2 Processed Data Input Files

After processing each data file, the system will remove the file from the upload directory and write a copy to the processed directory using the following the naming convention:

XXX_Options_processed_YYYYMMDD_hhmmss.csv

E.g.

ABC_Options_processed_20100422_164500.csv

The timestamp part of this is the time the file was processed by the system.

The data files will be retained in the 'processed' directory for 30 days for diagnostic purposes.

6.3 Status Files

After processing each data file, the system produces two copies of a status file in the 'status' directory.

The first copy of the file will have a name of the form:

XXX_Options_status.csv

The second copy of the file will have a name of the form:

XXX_Options_status_YYYYMMDDhhmmss.csv

Where:

XXX – the contributor code

hhmmss - time the file was processed

YYYYMMDD - date the file was processed (ISO format)

The first form is to provide a simple means of checking the status of the latest upload. Every time an upload is performed, the appropriate status file is overwritten. The second form provides a more comprehensive history – these files are never overwritten.

The status files will be retained in the 'status' directory for 30 days for diagnostic purposes.

The status file will consist of a single header row and then each of the rows from the original upload file. The header row gives the overall status of the upload, while the individual record rows give the status of each row, indicating any fields with errors.

The header row contains the following fields:

Field Name	Comment
Record Type	H
File Status	One of: 'OK', 'WARNING', 'ERROR'
File status code	Overall status code for the file, see section 8.1 for codes
Processing Date	The date the data file was processed. ISO format, YYYYMMDD
Processing Time	The time the file was processed. hhmmss format
Contribution Date	The contribution date from the original data file. ISO format, YYYYMMDD e.g 20100514
Contributor Mnemonic	The Contributor mnemonic from the original data file.

Each of the record rows contains the following fields:

Field Name	Comment
Record Type	R
Record status	Indicates the status of the data record. One of: 'OK' 'WARNING' 'ERROR'
Record status	The numeric status code for this row, see section 8.2 for codes.
First Error Field	The numeric offset of the first field in the data record to have failed validation. One based. Zero if there is no error.
The following valid or invalid fields will be present in the record if (and only if) the system could successfully interpret the format of the original file.	
Firm Id	Standard 3 character Contributor mnemonic
Product	Commodity code, e.g. CA
Series	In MMM-YY format, e.g. Mar-14
-10 DIFF	Averaged -10 Delta, differential from 50 Delta
-25 DIFF	Averaged -25 Delta, differential from 50 Delta
50 Delta	Averaged 50 Delta
+25 DIFF	Averaged +25 Delta, differential from 50 Delta

+10 DIFF	Averaged +10 Delta, differential from 50 Delta
----------	--

Some examples of status files are given below.

Valid File

```
H,OK,0,20100427,164530,20100427,ABC  
R,OK,0,0,ABC,CA,Mar-14,0.55,0.65,31.55,0.10,0.25  
R,OK,0,0,ABC,CA,Apr-14,0.55,0.65,31.55,0.10,0.25  
<etc>
```

Empty File

```
H,WARNING,100,20100427,164530,20100427,ABC
```

File with errors (incorrect commodity code)

```
H,ERROR,204,20100427,164530,20100427,ABC  
R,OK,0,0,ABC,CA,Mar-14,0.55,0.65,31.55,0.10,0.25  
R,ERROR,402,3,ABC,XX,Apr-14,0.55,0.65,31.55,0.10,0.25  
R,OK,0,0,ABC,CA,May-14,0.55,0.65,31.55,0.10,0.25
```

6.4 Report Files

After the contribution window has closed for option volatilities, the LME will publish the daily report. There is one report that covers all commodities. Two copies of the report will be placed in the contributor's report file area - one with just the name and one with the timestamp included. The first copy is the latest report, while the second provides a history of all published report versions for that day. There will only ever be one copy of the first.

The first copy of the file will have a name of the form:

TodaysVolatility_DDMMYY.csv

The second copy of the file will have a name of the form:

TodaysVolatility_DDMMYYhhmmss.csv

Where:

hhmmss - time the file was processed 24 hour format (e.g. 171522)

DDMMYY - date the file was processed (e.g. 24Sep15)

If the LME re-publish a report for a given day then this will over-write any existing report for that day.

As with all other files the report is in plain text csv format and contains a header row followed by the following fields in each data row:

Field Name	Comment
Date	Contribution date, format DDMMYY, e.g. 24Sep15
Product	Commodity code, e.g. CA
Series	MMYY, e.g. Mar14
-10 DIFF	Mean of the -10 Delta contributions, given as differential from 50 Delta
-25 DIFF	Mean of the -25 Delta contributions, given as differential from 50 Delta
50 Delta	Mean of the 50 Delta
+25 DIFF	Mean of the +25 Delta contributions, given as differential from 50 Delta
+10 DIFF	Mean of the +10 Delta contributions, given as differential from 50 Delta
Median	The mid-point of the contributions from all contributors for the 50 Delta. This is before any topping and tailing. Given to 2 decimal places.
Lowest	The lowest value from any contributor for this series for the 50 Delta. Given to 2 decimal places.
Highest	The highest value from any contributor for this series for the 50 Delta. Given to 2 decimal places.
S1	One standard deviation below the mean for the 50 Delta. Given to 2 decimal places.

S2	One standard deviation above the mean for the 50 Delta. Given to 2 decimal places.
----	--

For example:

Date, Product, Series, -10 DIFF, -25 DIFF, 50 Delta, +25 DIFF, +10 DIFF,
Median, Lowest, Highest, S1, S2
24Sep15, CA, Mar14, 0.65, 0.75, 27.00, 0.1, 0.2, 27.55, 24.25, 30.35, 26.25, 28.25

<etc>

7 File Transfer - server structure and usage

Once the Contributor client software has successfully logged on to the FTP server, it will have access to a fixed directory structure described here.

From the apparent root there will be a set of four subdirectories as follows:

- Upload
- Status
- Processed
- Report

7.1 The upload directory

Contributors will have read/write access to this directory.

The purpose of this directory is to allow Contributors to upload data files into the system. Once a data file has been deposited in the upload directory, within 30 seconds it will be picked up by the system software and processed. Processing of each file involves validation of the data, loading it into the database, generation of the status files and move of the file to the 'processed' directory.

Each data file will disappear from the upload directory as it is processed by the system.

If (and only if) the data passes validation 100% then it will be automatically submitted immediately.

If the data is not 100% valid then it will still be imported into the system, and may be edited and submitted using the Web GUI. Alternatively, the original data file can be corrected and re-uploaded. Each time the same data file (for the same contribution date) is uploaded, its data will overwrite any data already held for that contribution date.

7.2 The status directory

Contributors will have read only access to this directory.

For each file that is processed by the system, a status file will be written to the status directory. The status file will be written to the status directory twice, once with a constant name for the data type, and once with a name incorporating the date and time of processing (see section 6.3 for details). The status file can also be configured to be emailed to one or more of the contributor's users. Such configuration is via the Web GUI.

Each status file contains status information about the validity of the original data file content. Contributors should automatically download these files to verify that the data uploaded has been accepted.

Thirty seconds after depositing a file in the 'upload' directory, client applications should start polling the status directory for the appropriate status file. If the status file is not yet present, the client application should poll every 10 seconds.

Client applications should download the status file and check it for errors –appropriate contributor personnel should be alerted of any errors.

The system will purge out old status files after 30 days.

7.3 The processed directory

Contributors will have read/write access to this directory.

After each data file is processed, it will be deposited in the 'processed' directory. For each file processed a single file will be deposited indicating the date and time of the import.

There is no mandatory processing by Contributors required for files in the processed directory – they are there purely for Contributor convenience. Contributors may delete the files from the processed directory.

The system will purge out old processed files after 30 days.

7.4 The Report directory

Contributors will have read access to this directory.

Once a daily report has been published by the LME, it will be deposited in the 'report' directory of all contributors who have permission for at least one of the data sets contained in the report. All reports are deposited in the single Report directory.

Each instance of a report file will be written to the report directory twice, once with a constant name for the data set, and once with a name incorporating the date and time of processing. More details on the naming convention and the content of the report file can be found in section 6.4.

The system will purge out old report files after 30 days.

8 Status Codes

8.1 File Status Codes

These are the codes which are used in the header records of the status files to give the overall status of the file.

Category	Code	Description
OK	0	Success
ERROR	201	Invalid file name
ERROR	202	Invalid contribution date
ERROR	204	File contains one or more errors in transaction records
ERROR	205	Upload not permitted on non-trading day
ERROR	206	Contribution window not yet open
ERROR	207	Contribution window closed
ERROR	209	General System Error – could not process the file
ERROR	210	System disabled
ERROR	211	Empty File
ERROR	212	Data set is locked
ERROR	213	Header missing from file
ERROR	214	Only header provided in file, i.e. no records
ERROR	215	Extra data found in file
ERROR	216	Incorrect number of columns in header
ERROR	217	Invalid file format
ERROR	218	Contributor disabled

8.2 Record Status Codes

These are the codes which are used for the individual transaction records of the status files.

Category	Code	Description
OK	0	Success
ERROR	400	Could not parse record (not in correct csv format)
ERROR	401	Invalid Contributor Mnemonic
ERROR	402	Invalid Commodity Code
ERROR	403	Invalid Series Date
ERROR	404	Invalid Value
ERROR	405	Duplicate Record
ERROR	407	Contributor not permitted for data

9 Glossary

Term	Description
Commodity	A metal or other commodity, e.g. Copper, Nickel
Contribution Day	A day that contributions are permitted. Weekends and bank holidays are not valid contribution days.
Contribution Set	A grouping of data sets for controlling workflow, e.g. base metals options volatilities
Contribution Window	The time in which contributions are allowed, e.g. 15:45 to 16:30 for base metals option vols
Contributor	An organisation that provides data to the system.
Data Set	A combination of commodity and data type, e.g. nickel options volatilities
Data Type	Data types are “rates” or “options volatilities”
Date Series	Discrete date point in the future, e.g. Feb-14, Mar-15 etc
Firm	Another name for a contributor
FTP	File Transfer Protocol
HTTPs	Hypertext Transfer Protocol within a connection encrypted by TLS
LME	The London Metal Exchange
LME User	A user of the system who works for the LME.
Contributor User	A user who works for a contributor
Report	A collection of calculated data for one or more data sets.
SFTP	SSH FTP
TLS	transport layer security - provides secure communications between two computers across arbitrary intervening TCP/IP networks.
TCP/IP	Transport Control Protocol/Internet Protocol
URL	Uniform Resource Locator – a textual way of referring to network resources, for example http://www.lme.com