

MMTP[®] protocol overview and Business Application Messages

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Table of Contents

Abbreviations	3
1 MMTP® Protocol introduction.....	4
1.1 MMTP Main Characteristics	4
1.2 MMTP Session and Sequence Control Principles	4
1.3 MMTP List of Primitives	5
1.4 MMTP: Typical Exchange Session Using the Base-level Protocol.....	6
2 Business Application Messages	8

Abbreviations

ISV	Independent Software Vendor
FTP	File Transfer Protocol
SFTP	Secure File Transfer Protocol
LCAP	Logical Certified Access Point
MMTP®	Euronext's proprietary Market Message Transfer Protocol
SLE	Serveur Local d'Emission (in French) means local transmission server

1 MMTP[®] Protocol introduction

LCH SA is providing a Euronext's proprietary protocol called **MMTP[®]** (Market Message Transfer Protocol) allowing its customers to access and communicate to the central Clearing Services via a system-to- system message API. The client application located at the customer's site communicates with its private LCAP (The Logical Certified Access Point) gateway located at LCH SA's premises by managing the MMTP[®] protocol to transfer all real-time clearing messages between the two entities.

LCAP Solution Overview

The LCAP provides Members or ISVs (independent software vendor) message flows, data transfer standards and optional protocol development tools.

The LCAP is an access server which supports the API's, compresses and stores data transiting between the Member and LCH SA's systems.

the LCAP is dedicated to clearing business environment and to production or testing platform.

The LCAP enables Members to set up their own server and workstation configuration with:

- the API and the messages specifications provided by LCH SA,
- or with an independent ISV.

The LCAP is located in LCH SA premises. It supports the **MMTP[®]** protocol (real time messages) and the **FTP/SFTP** protocol (file server).

To handle incoming and outgoing message flows, members must develop (or outsource the development) their own applications (SLEs), compliant with the LCAP specifications.

LCAPs are accessible only through the LCH SA's CMC Connectivity (see *LCH SA Connectivity Guide*).

1.1 MMTP Main Characteristics

The main characteristics of the MMTP[®] protocol are:

- Usage of TCP/IP transport layers,
- Secure transmission of data,
- Easy and secure reconnection following any kind of disconnection,
- Central access point allowing access to multiple clearing services and functions without requiring additional addressing,
- Transport and transfer of all clearing services and functions in a real-time mode via set of messages.

1.2 MMTP Session and Sequence Control Principles

The MMTP[®] protocol implements dialogs in connected mode. A client application must establish an MMTP[®] session before being able to communicate via MMTP[®].

An MMTP session involves three phases:

- Connection/authentication
- Transmission and retransmission
- Disconnection

Each DATA type MMTP® message must be assigned a sequence number that increases logically.

The sequence number allows:

- The receiver to check that it has received all messages in the correct order,
- The sender to request the acknowledgement of a specific message.

At the start of each MMTP® session, the sender selects the sequence number to be assigned to the first message of the session to be transmitted, and then communicates it to the receiver. A sequence number can be used several times in consecutive sessions. It is not specific to a single message, but rather to a single session.

When a receiver detects an error in the sequence, it alerts the sender to the problem, indicating the sequence number received and the number expected:

- if the number received corresponds to a message already received, the new message is ignored,
- -if the sequence number received is higher than the number expected, the receiver alerts the sender and then initiates a new connection.

The TCP transport protocol guarantees the integrity of the data exchanged by the MMTP® client application and the LCAP. However, in the event of an accidental disconnection, the information in the transmission or reception buffers may be lost causing messages to be lost.

Message delivery is guaranteed by using the following principles:

- Each message has a unique identifier, the message ID, assigned by the sender,
- At the beginning of each session, the receiver communicates the last message ID received to the sender.

1.3 MMTP® List of Primitives

MMTP PRIMITIVE	NUMBER	DESCRIPTION
CONX-REQ	10	Client connection request
CONX-ACK	11	Connection acceptance by the LCAP
CONX-NACK	12	Connection refusal by the LCAP
DCNX-REQ	13	Disconnection request
DCNX-ACK	14	Disconnection request acknowledgement
START-REQ	20	Transmission/retransmission request
START-ACK	21	Transmission/retransmission request acknowledgement
START-NACK	22	Transmission/retransmission request refusal
DATA-MSG	23	Data transmission
SYNC-REQ	24	Acknowledgement request by data source
SYNC-ACK	25	Acknowledgement by data receiver
ERR-IND	90	Error indication by data receiver
SRVC-MSG	93	Service message
PRSC-MSG	99	Heartbeat message

1.4 MMTP®: Typical Exchange Session Using the Base-level Protocol

Two separate paths are used for data exchange:

- From MMTP® client application to LCAP (MMTP® IN): application message feed transmitted by the MMTP® client application to the LCAP server.
- From LCAP to MMTP client application (MMTP® OUT): application message feed from the LCAP server to the client application.

The MMTP® IN and MMTP® OUT paths are bi-directional. For example, the MMTP® server can reply to a message from the MMTP® client on the MMTP® IN path.

1.4.1 MMTP® IN path (Client Application to LCAP)

Table 1. STEP 1: the MMTP® client application initiates the connection to LCAP

CLIENT APPLICATION	LCAP
CONX-REQ ==>	
	<== CONX-ACK

Table 2. STEP 2: the MMTP® client application transfers data to LCAP

CLIENT APPLICATION	LCAP
	<== START-REQ
START-ACK ==>	
DATA-MSG ==>	
DATA-MSG ==>	
DATA-MSG ==>	
DATA-MSG ==>	
...	

Table 3. STEP 3: the MMTP® client application disconnects from LCAP

CLIENT APPLICATION	LCAP
DCNX-REQ ==>	
	<== DCNX-ACK

1.4.2 MMTP® OUT path (LCAP to Client Application)

Table 1. STEP 1: the MMTP® client application initiates the connection to LCAP

CLIENT APPLICATION	LCAP
CONX-REQ ==>	
	<== CONX-ACK

Table 2. STEP 2: the MMTP® client application receives data from LCAP

CLIENT APPLICATION	LCAP
START-REQ ==>	
	<== START-ACK
	<== DATA-MSG
	<== DATA-MSG
	<== DATA-MSG
	<== DATA-MSG
	...

Table 3. STEP 3: the MMTP® client application disconnects from LCAP

CLIENT APPLICATION	LCAP
DCNX-REQ ==>	
	<== DCNX-ACK

2 Business Application Messages

All business clearing messages are transferred within the MMTP® DATA-MSG primitive (one business message per DATA-MSG).

The real-time clearing service messaging is available for Cash Equities Markets (Euronext) and Derivatives Markets (MONEP, MATIF); these private messages are also named SLE messages (Serveur Local d'Emission or Client Server Application).

The list of business application clearing messages and their associated market are listed below:

Message code	Message name	Cash Markets	Derivatives Markets
1021	COMMAND FOR POSTING CREATION	X	X
1022	COMMAND FOR POSTING MODIFICATION	X	X
1023	COMMAND FOR POSTING CANCELLATION	X	X
1031	COMMAND FOR GIVE-UP REQUEST	X	X
1033	COMMAND FOR GIVE-UP CANCELLATION	X	X
1034	COMMAND FOR TAKE-UP CREATION	X	X
1041	COMMAND FOR INTERNAL CORRECTION REQUEST	X	X
1051	COMMAND FOR EXTERNAL CORRECTION REQUEST	X	X
1053	COMMAND FOR EXTERNAL CORRECTION CANCELLATION	X	X
1054	COMMAND FOR EXTERNAL CORRECTION ACCEPTANCE AND	X	X
1061	COMMAND FOR INTERNAL TRANSFER REQUEST		X
1063	COMMAND FOR INTERNAL TRANSFER CANCELLATION		X
1071	COMMAND FOR EXTERNAL TRANSFER REQUEST		X
1073	COMMAND FOR EXTERNAL TRANSFER CANCELLATION		X
1074	COMMAND FOR EXTERNAL TRANSFER ACCEPTANCE AND PA		X
1081	COMMAND FOR ABANDONMENT CREATION		X
1083	COMMAND FOR ABANDONMENT CANCELLATION		X
1091	COMMAND FOR EXERCISE CREATION		X
1093	COMMAND FOR EXERCISE CANCELLATION		X
1121	COMMAND FOR OFFSETTING CREATION		X
1123	COMMAND FOR OFFSETTING CANCELLATION		X
1161	COMMAND FOR POSITION ACCOUNT CREATION	X	X
1162	COMMAND FOR POSITION ACCOUNT MODIFICATION	X	X
1163	COMMAND FOR POSITION ACCOUNT CANCELLATION	X	X
2031	REGISTRATION OF GIVE-UP REQUEST	X	X
2041	REGISTRATION OF INTERNAL CORRECTION REQUEST	X	X
2051	REGISTRATION OF EXTERNAL CORRECTION REQUEST	X	X
2054	REGISTRATION OF EXTERNAL CORRECTION ACCEPTANCE	X	X
2061	REGISTRATION OF INTERNAL TRANSFER REQUEST	X	X
2063	REGISTRATION OF INTERNAL TRANSFER CANCELLATION	X	X
2071	REGISTRATION OF EXTERNAL TRANSFER REQUEST	X	X
2073	REGISTRATION OF EXTERNAL TRANSFER CANCELLATION	X	X
2074	REGISTRATION OF EXTERNAL TRANSFER ACCEPTANCE	X	X
2081	REGISTRATION OF ABANDONMENT CREATION		X
2083	REGISTRATION OF ABANDONMENT CANCELLATION		X

2091	REGISTRATION OF EXERCISE CREATION		X
2093	REGISTRATION OF EXERCISE CANCELLATION		X
2161	REGISTRATION OF POSITION ACCOUNT CREATION	X	X
2163	REGISTRATION OF POSITION ACCOUNT CANCELLATION	X	X
3011	CONFIRMATION OF TRADE LEG CREATION	X	X
3021	CONFIRMATION OF POSTING CREATION	X	X
3022	CONFIRMATION OF POSTING MODIFICATION	X	X
3023	CONFIRMATION OF POSTING CANCELLATION	X	X
3031	CONFIRMATION OF GIVE-UP CREATION	X	X
3033	CONFIRMATION OF GIVE-UP CANCELLATION	X	X
3041	CONFIRMATION OF INTERNAL CORRECTION CREATION	X	X
3051	CONFIRMATION OF EXTERNAL CORRECTION CREATION	X	X
3053	CONFIRMATION OF EXTERNAL CORRECTION CANCELLATION	X	X
3061	CONFIRMATION OF INTERNAL TRANSFER CREATION	X	X
3071	CONFIRMATION OF EXTERNAL TRANSFER CREATION	X	X
3081	CONFIRMATION OF ABANDONMENT CREATION		X
3083	CONFIRMATION OF ABANDONMENT CANCELLATION		X
3091	CONFIRMATION OF EXERCISE CREATION		X
3093	CONFIRMATION OF EXERCISE CANCELLATION		X
3121	CONFIRMATION OF OFFSETTING CREATION		X
3123	CONFIRMATION OF OFFSETTING CANCELLATION		X
3161	CONFIRMATION OF POSITION ACCOUNT CREATION	X	X
3162	CONFIRMATION OF POSITION ACCOUNT MODIFICATION	X	X
3163	CONFIRMATION OF POSITION ACCOUNT CANCELLATION	X	X
3899	RESPONSE FOR TECHNICAL ERROR	X	X
3999	RESPONSE ERROR	X	X
4031	REJECTION OF GIVE-UP REQUEST	X	X
4041	REJECTION OF INTERNAL CORRECTION REQUEST	X	X
4051	REJECTION OF EXTERNAL CORRECTION REQUEST	X	X
4061	REJECTION OF INTERNAL TRANSFER REQUEST	X	X
4071	REJECTION OF EXTERNAL TRANSFER REQUEST	X	X
4081	REJECTION OF ABANDONMENT REQUEST		X
4091	REJECTION OF EXERCISE REQUEST		X
5011	NOTICE OF TRADE LEG CREATION	X	X
5012	NOTICE OF TRADE LEG MODIFICATION	X	
5013	NOTICE OF TRADE LEG CANCELLATION	X	X
5015	NOTICE OF TRADE LEG AND POSTING CREATION	X	X
5021	NOTICE OF POSTING CREATION	X	X
5022	NOTICE OF POSTING MODIFICATION	X	X
5023	NOTICE OF POSTING CANCELLATION	X	X
5031	NOTICE OF GIVE-UP CREATION	X	X
5032	NOTICE OF GIVE-UP MODIFICATION	X	
5033	NOTICE OF GIVE-UP CANCELLATION	X	X
5034	NOTICE OF TAKE-UP REQUEST	X	X
5036	NOTICE OF GIVE-UP REQUEST	X	X
5037	NOTICE OF GIVE-UP REJECTION	X	X
5051	NOTICE OF EXTERNAL CORRECTION ACCEPTANCE	X	X

5053	NOTICE OF EXTERNAL CORRECTION CANCELLATION	X	X
5054	NOTICE OF EXTERNAL CORRECTION ACCEPTANCE	X	X
5055	NOTICE OF EXTERNAL CORRECTION REJECTION	X	X
5061	NOTICE OF BATCH INTERNAL TRANSFER CREATION	X	X
5071	NOTICE OF BATCH EXTERNAL TRANSFER CREATION	X	X
5073	NOTICE OF EXTERNAL TRANSFER CANCELLATION	X	X
5074	NOTICE OF EXTERNAL TRANSFER ACCEPTANCE REQUEST	X	X
5075	NOTICE OF EXTERNAL TRANSFER ACCEPTANCE	X	X
5076	NOTICE OF EXTERNAL TRANSFER REJECTION	X	X
5081	NOTICE OF ABANDONMENT CREATION		X
5091	NOTICE OF EXERCISE CREATION		X
5101	NOTICE OF ASSIGNMENT CREATION		X
5102	NOTICE OF NON-ASSIGNMENT CREATION		X
5103	NOTICE OF UNDERLYING POSITION CREATION		X (MATIF)
5111	NOTICE OF RESETTING OF POSITION		X
5131	NOTICE OF OPENING OF POSITION CREATION	X	X
5140	NOTICE OF START OF POSITION TRANSMISSION	X	X
5141	NOTICE OF POSITION TRANSMISSION	X	X
5149	NOTICE OF END OF POSITION TRANSMISSION	X	X
5151	NOTICE OF POSITION UPDATES	X	
5551	NOTICE OF CLEARING OPERATION STATUS	X	X
5552	NOTICE OF END OF CLEARING BATCH	X	X
5553	NOTICE OF START OF INTRADAY SESSION		X
5999	NOTICE OF ERROR	X	X