Millennium Exchange - Oslo Børs cash equities and fixed income markets

OSLMIT 306 FIX/FAST News and Indices Gateway

Issue 3.0
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Important note

This document has been produced by Oslo Børs to assist customers in the use of the Millennium platform on the Oslo Børs and Burgundy market places. Part of the documentation is based on documentation from Millennium IT and the London Stock Exchange Group. Where the document title includes a number (i.e. OSLMIT 201), the number corresponds to similar documentation from The London Stock Exchange and/or from Borsa Italiana. For more details, please see references in the appendix.

If you have any general queries relating to this document, please email: technicalsupport@oslobors.no

Further copies of this document can also be downloaded from the Oslo Børs website http://www.oslobors.no/ob_eng/Oslo-Boers/Trading/Trading-systems/Millennium-Exchange/Technical-documentation

Disclaimer

This document has been prepared on the basis of the best information available. Oslo Børs has taken reasonable efforts to ensure that the information in this publication is correct at the time of publication, but shall not be liable for decisions made in reliance on it. Oslo Børs will seek to provide notice to customers of changes being made to this document, but this notice cannot be guaranteed. Therefore, please note that this publication may be updated at any time. The information contained is therefore for guidance only. This document does not form part of the contractual documentation between the Oslo Børs and its customers.

Change log

This document can be updated at any time, and has been through the following iterations:

Issue	Date	Description
1.0	06 March 2012	Initial document release
1.1	07 June 2012	Added information about frame length specifier. Details in Appendix 1.
1.2	20 September 2012	Third release, please refer to Appendix 1 for details.
2.0	12 November 2012	New release of the document as the Millennium platform is launched and the migration project is finalized. Minor wording changes to remove references to project and document links updated.
2.1	04 March 2013	7.4.2 Index: Added extra description for Bond Indices, in field *NetChgPrevDay(451).*
2.2	19 April 2013	7.4.1 News: Added MIC codes for Burgundy markets in field *MarketID* (1301)
2.3	9 December 2013	Added information about Nibor, please refer to Appendix 1 for details
3.0	22 May 2014	7.4.1 News: Updated description of the field *OrigTime* (42).

Please note that only the latest issue of this document will be available from the Oslo Børs website. Details of the changes made in each issue of the document are described in the appendix.

Changes from the previous issue of the document are indicated by a left margin bar.

Content

1. Introduction

In November 2012, Oslo Børs migrated its equity and fixed income trading to the Millennium platform, a flexible, highly scalable trading platform with ultra-low latency from MillenniumIT, a company in the London Stock Exchange Group. Oslo Børs aims to strengthen its competitive position by migrating to this new technology, and is pleased to offer customers a trading system of the highest standard that offers all the functions one might expect from a state-of-the-art trading platform.

The Burgundy markets has alen migrated to the Millennium platform and information relevant for the Burgundy migration has been added.

1.1 Purpose

The purpose of this document is to provide full details of the FIX/FAST message specifications for the Oslo Børs Distribution Network (from now on referred to as **OBDN**) and Indices Service (from now on referred to as **IS**) following the migration to Millennium Exchange.

1.2 Readership

This document outlines the detailed message types and fields for the OBDN and IS FIX/FAST interface as well as details on how to connect to the replay and recovery services available on Millennium Exchange.

Messages are highlighted in **bold text** in this document. Fields within messages are indicated by use of *italic* letters. References to other documents in the series are indicated by use of *underlined italic* letters.

Headers and message definitions are described in detail in section 7. References to FIX fields are given as *name(tag)*, and enumerated values are given as *name(value)*.

When read in conjunction with the *OSLMIT 201 Guide to New Trading System* it is intended that these documents provide all of the details customers directly connected Oslo Børs require to develop to the new services.

This document is particularly relevant to technical staff within the Oslo Børs' member firms, information vendors and other market participants interested in receiving OBDN stories and indices directly from the Millennium Exchange.

1.3 Document series

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

The current series of documents are outlined below:

General

OSLMIT Oslo Børs and Burgundy Market Model Equities
OSLMIT Oslo Børs and Burgundy Market Model Fixed Income
OSLMIT Oslo Børs Market Model Nibor

Trading

OSLMIT 201 Guide to New Trading System
OSLMIT 202 FIX Trading Gateway (5.0 SP2)
OSLMIT 203 Native Trading Gateway
OSLMIT 204 Post Trade Gateway (FIX 5.0 SP2)
OSLMIT 205 Drop Copy Gateway (FIX 5.0 SP2)

Market Data
OSLMIT 302 FIX/FAST
OSLMIT 303 ITCH Gateway
OSLMIT 306 FIX/FAST News and Indices Gateway
OSLMIT 401 Reference Data
OSLMIT Derived Information Guidelines

Other
OSLMIT 501 Guide to Testing Services
OSLMIT 502 Guide to Application Certification
OSLMIT 504 Guide to Dress Rehearsals *(only relevant to migration projects)*
OSLMIT 505 Guide to Go-live *(only relevant to migration projects)*
OSLMIT 601 Guide to Trading Services Disaster Recovery
OSLMIT 602 Network Guide
OSLMIT 604 Technical Parameters
OSLMIT 605 Live Environment Connectivity
OSLMIT 606 CDS Environment Connectivity
OSLMIT 808 Reject Codes

The latest version of this documentation series can be found on:
http://www.oslobors.no/ob_eng/Oslo-Boers/Trade/Trading-systems/Millennium/Technical-documentation

1.4 Definitions, Acronyms and Abbreviations

Acronyms/ Abbreviations	Description
Nibor	Norwegian interbank offered rate. Nibor is calculated for a number of durations specified and regulated through Finans Norges Nibor Rules.
IDR	Indicative deposit rate. Represents an indicator of the interest rate that panel bank will demand for loans in NOK to another leading bank which is active in the Norwegian money market and foreign exchange market.
IDR Average	Indicative deposit rate average. The calculation is based on indicative deposit rates submitted by the Nibor panel banks and follows the same pattern for inclusion/deletion of orders in the calculation as for Nibor. Separate ticker code from the official fixing rates.
Finans Norge	Association representing Norwegian financial organizations and responsible for the Nibor-rules.
Panel bank	A market participant enabled to submit orders to the indicative deposit rate instruments in the Nibor market.

2. Service Overview

2.1 News

The changes to the OBDN service from the existing Infolect model are outlined below:

- Replacement of the 5NC/5NT messages with the FIX 35=B (News) messages
- Market Identifier Code will replace the Announcement Group Code from the 5NC message.
- OBDN will send the *Category* field in the FIX message tag.
- The FIX message will split the announcement up into blocks of text instead of "lines of text" in the current system. This will be extended from 9,999 to 99,999. OBDN will not initially use any larger announcements, however, this allows for the possibility of embedding larger pieces of content such as XBRL in the future.

Each news update will be disseminated via the **News** message. Each **News** message will contain the news headline on the *Headline(148)* field and the details of one or more companies the news is related to. Details of the companies involved will be disseminated in the *NoRelatedSym(146)* repeating group.

The actual news text published by OBDN will be disseminated in the same **News** message in the *NoLinesOfText(33)* repeating block. The **News** texts will be available in the form of NewsML wrapped in the FIX field.

2.2 Indices

The IS feed will include some changes to enhance the existing service including:

- Replacement of the 5ON/5OU messages with the FIX 35=X (Index) messages
- Index Volume and Index VWAP fields are added to the message and disseminated within a *NoMDEntries(268)* repeating group, with *MDEntryType(269)* field having the values 'B' and '9' respectively.

The IS feed will from December 2013 also disseminate IDR average rates and Nibor fixing rates. The IDR average and Nibor fixing instruments can only be identified based on the ISIN value of an Index message (within a *Symbol(55)* field). Nibor rates are disseminated within a *NoMDEntries(268)* repeating group, with *MDEntryType(269)* field having the value '3'.

2.3 Gaining Access to the Services

Access to the services described in this document is gained through the enablement process. Refer to the information posted on http://www.oslobors.no/ob_eng/Oslo-Boers/Trade/Trading-systems/Millennium/Technical-documentation for more information.

2.4 Enquiries and Comments

Technical support related to this migration is available from 08:00-16:00 CET:

Phone: +47 2234 1990
Email: technicalsupport@oslobors.no

3. FAST News Gateway Service Description

3.1 System Architecture

Each FAST regulatory news gateway includes a multicast real-time channel for the dissemination of real-time news.

A TCP replay channel will be available per each FAST gateway. A recipient may connect to the replay channel to recover from any data losses occurred.

3.2 Real-Time Channel

The real-time channel is the primary means of disseminating news. Real-time news updates supported by the feed are available on this multicast channel.

The real-time channel will disseminate the news updates via News message.

The server will use the **Heartbeat** message to exercise the communication line during periods of inactivity. A **Heartbeat** will be sent in a regular interval when the real-time channel is inactive (please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact duration of the interval between two **Heartbeat** messages).

Recipients have access to two identically sequenced real-time feeds; one from the main site (Feed A) and one from the backup feed (Feed B). It is recommended that recipients process both feeds and arbitrate between them to minimize the probability of a data loss.

3.3 Replay Channel

The TCP replay channel permits recipients to request the retransmission of a limited number of messages already published on the real-time channel. This channel may be used by recipients to recover from a small data loss.

The replay channel supports the retransmission of the certain number of the messages last published on the real-time channel (please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the messages available for retransmission). The channel does not support the retransmission of messages published from previous trading days.

All messages sent by the server are transfer encoded in terms of the FAST protocol. While the application messages (e.g. **News**) sent by the server is field encoded, the administrative messages it sends (e.g. **Logon**, **Heartbeat**, etc.) are not. All messages (i.e. both administrative and application) initiated by the client should be transfer encoded but not field encoded.

While a replay channel is available from the backup feed, it will only be activated in the unlikely event of an outage at the main site.

3.4 Overview of a Trading Day

Opening hours are defined in the *OSLMIT 603 Business Parameters* document. The news feed will operate each trading day according to these operating hours.

Each news update obtained from the incoming feed will be disseminated via the **News** message. Each **News** message will contain the news headline on the *Headline(148)* field

and the details of one more companies the news is related to. Details of the company involved will be disseminated in the *NoRelatedSym(146)* repeating group.

The actual news text published by Oslo Børs will be disseminated in the same **News** message in the *NoLinesOfText(33)* repeating block. The news texts will be available in the form of NewsML wrapped in the FIX field.

3.5 Frame length encoding

Each FIX/FAST message is preceded by a stop bit encoded frame length specifier. The use of the frame length specifier applies to messages published on UDP, as well as messages from the TCP-based replay/recovery services.

Clients are also required to include a frame length specifier in messages sent to the server.

The frame length is represented using 1 or more bytes. The most significant bit serves as an indicator of the last byte in the sequence of bytes representing the frame length.

Example:

00000001 **1**0001011

After removing stop bits, we have:
0000001 0001011

When converted to decimal, we get:
00000010001011 = 139

In this case, the frame size is 139 bytes, meaning that 139 bytes of FIX/FAST encoded message data will now follow.

3.6 News Messages Spanning Across Multiple Packets

The length of the **News** message could be larger than the maximum transmission unit (MTU) of a packet. Therefore, a single **News** message could span across multiple packets.

Each **News** message spanning across multiple packets will contain a *NewsID(1472)* - unique identifier of the announcement, *NewsCounter(1689)* - number of packets the News message will span across, and *NewsSequence(1688)* the unique sequence number of the **News** message sharing the same NewsID.

Upon receiving multiple **News** messages which span across multiple packets the recipients may collate all the **News** messages available under the same NewsID to interpret the news on their side. However, the recipients should wait till they receive the number of **News** messages which is specified in *NewsCounter(1689)*.

4. FAST Indices Gateway Service Description

4.1 System Architecture

Each FAST indices gateway includes a multicast real-time channel for the dissemination of real-time indices.

A TCP replay channel will be available per each FAST gateway. A recipient may connect to the replay channel to recover from any data losses occurred.

4.2 Real-Time Channel

The real-time channel is the primary means of disseminating index information. Real-time index updates supported by the feed are available on this multicast channel.

The real-time channel will disseminate the indices via **Market Data Incremental Refresh** message.

The server will use the **Heartbeat** message to exercise the communication line during periods of inactivity. A **Heartbeat** will be sent in a regular interval when the real-time channel is inactive (please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact duration of the interval between two **Heartbeat** messages). The Heartbeat message will contain the field *ApplNewSeqNum(1399)*, which will populate the next expected application sequence number to enable recipients to detect gaps on the Real-Time channel.

Recipients have access to two identically sequenced real-time feeds; one from the main site (Feed A) and one from the backup feed (Feed B). It is recommended that recipients process both feeds and arbitrate between them to minimize the probability of a data loss.

4.3 Replay Channel

The TCP replay channel permits recipients to request the retransmission of a limited number of messages already published on the real-time channel. This channel may be used by recipients to recover from a small data loss.

The replay channel supports the retransmission of the certain number of the messages last published on the real-time channel (please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the messages available for retransmission). The channel does not support the retransmission of messages published from previous trading days.

All messages sent by the server are transfer encoded in terms of the FAST protocol. While the application messages (e.g. **Market Data Incremental Refresh**) sent by the server is field encoded, the administrative messages it sends (e.g. **Logon**, **Heartbeat**, etc.) are not. All messages (i.e. both administrative and application) initiated by the client should be transfer encoded but not field encoded.

While a replay channel is available from the backup feed, it will only be activated in the unlikely event of an outage at the main site.

4.4 Overview of a Trading Day

Opening hours are defined in the *OSLMIT Oslo Børs Market Model Equities* and *OSLMIT Oslo Børs Market Model Fixed Income* documents. The news feed will operate each trading day according to these operating hours.

At the start of the day we will be sending the Indices status messages, but no closing indices values from the last trading day. The normal indices updates will commence at start of the opening auction call for the pre-trading indices and at the start of the regular trading for the normal indices.

Each update to an index or its status will be disseminated by the **Market Data Incremental Refresh** message. Index change will be broadcast with *MDUpdateAction(279)* of *New(0)* and *MDEntryType(269)* of *Index Value(3)*. The index value will be indicated in *MDEntryPx(270)*.

Index status change will be broadcast with *MDUpdateAction(279)* of *New(0)* and *MDEntryType(269)* of *Index Status (b)*. The index status will be indicated in the *Text(58)* field.

IDR average rate updates and Nibor fixing rates will be disseminated by the **Market Data Incremental Refresh** message. IDR average rate change and Nibor fixing will be broadcast with *MDEntryType(269)* of *Nibor Rate (3)*. The Nibor rate will be indicated in *MDEntryPx(270)*. Nibor fixing rates will be announced at 12:00 CET each day. Nibor fixing rates will be disseminated by a set of dedicated ISINs which uniquely identify each Nibor fixing rate. IDR average changes will be disseminated through a different set of dedicated ISIN values which also uniquely identify each IDR average rate.

5. Connectivity

5.1 Transmission Standards

5.1.1 Multicast Channels

The real-time channel utilize IP version 4 (IPv4) over UDP and Ethernet standards. UDP header information will be as defined in the IETF RFC 791 (IPv4) and RFC 768 (UDP) transmission protocol standards. One or more FAST encoded FIX messages may be included in a single UDP packet.

5.1.2 Point-to-Point Channels

The recovery and replay channels utilize IP version 4 (IPv4) over TCP and Ethernet standards. TCP header information will be as defined in the IETF RFC 793 standard and IPv4 will be as defined in the RFC 791 standard.

5.2 Application IDs (ApplIDs)

5.2.1 Clients

The CompID of each client wishing to connect to the recovery and replay channels must be registered with the Oslo Børs before communications can begin. A CompID may, at any particular time, only be logged into one TCP channel across all market data groups.

5.2.2 Passwords

Each new CompID will be assigned a password on registration. Clients will be required to change their password on first use via the **Logon** message. The acceptance of a logon request indicated that the new password has been accepted. The new password, will, if accepted, be effective for all subsequent logons.

New passwords should adhere to the below rules:

- Minimum length – 8 characters
- Maximum length – 14 characters
- Minimum numeric characters – 1 character
- Minimum alpha characters – 1 character
- Minimum special characters – 1 character

5.3 Production IP Addresses and Ports

The IP addresses and ports of the real-time, recovery and replay channels for each market data group will be published in the *OSLMIT 604 Technical Parameters* document.

6. Recovery

6.1 Recipient Failures

It is recommended that recipients process both multicast feeds (i.e. primary and secondary) to minimize the probability of a data loss.

A message loss can be detected using the *ApplSeqNum(1181)* included in each message on the real-time channel. If a gap in sequence numbers is detected, the recovery processes outlined below should be initiated.

6.1.1 Replay Channel

The TCP replay channel should be used by recipients to recover from a data loss. It permits recipients to request the retransmission of a limited number of messages already published on the multicast channel. Please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the messages available for retransmission for a particular day.

Each CompID may login to the replay channel of a particular market data group up to a limited number of times each day. The total number of **Application Message Requests** that a client may send on the replay channel of a particular market data group is also limited.

Recipients may request the Oslo Børs to reset its login and request counts. This feature is intended to help manage an emergency situation and should not be relied upon as a normal practice.

If a client submits multiple requests on the replay channel, they will be processed serially (i.e. one at a time).

A client may cancel an outstanding request via the **Application Message Request** message. Such a message should include an *ApplReqType(1347)* of *Cancel Retransmission(5)* and the *ApplReqID(1346)* of the request to be cancelled. While the server will not confirm a successful cancellation, it will transmit a **Business Message Reject** if the request is rejected. A cancellation request submitted by a client will take priority over all the requests of the client being queued.

If a cancellation request is received for an **Application Message Request** message which has already started processing, then a **Business Message Reject** will be sent with the Reject Reason '1' (Unknown ID) to reject the request.

All messages sent by the server are transfer encoded in terms of the FAST protocol. While all application messages sent by the server (e.g. **Market Data Incremental Refresh**, **Security Definition**, **Indices** etc.) are field encoded, the administrative messages it sends (e.g. **Logon**, **Heartbeat**, etc.) are not. All messages (i.e. both administrative and application) initiated by the client should be transfer encoded but not field encoded.

6.1.2 Establishing a Connection

The client should use the relevant IP address and port to establish a TCP/IP session with the replay channel. The client should initiate the session by sending the **Logon** message. The client should identify itself by specifying its CompID in the *Username(553)* field. The server will validate the CompID, password and IP address of the client.

Once the client is authenticated, the server will respond with a **Logon** message. The *SessionStatus(1409)* of this message will be *Session Active* (0).

If a logon attempt fails because of an invalid CompID or IP address, the server will break the TCP/IP connection with the client without sending a **Logout** message.

If a logon attempt fails because of an invalid or expired password, a locked CompID or if logins are not currently permitted, the server will send a **Logout** message and then break the TCP/IP connection with the client.

Each CompID may login to the replay channel of a particular indices gateway up to a predetermined number of times each day (please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the allowed logins during the day). Once this limit is reached, the server will reject any additional logon attempt with a Logout and then break the TCP/IP connection with the client. The *SessionStatus(1409)* of such a **Logout** message will be *Logons Not Allowed(7)*.

If an **Application Message Request** is not received within a predetermined number of seconds after a successful logon, the server will send a **Logout** message and then break the TCP/IP connection with the client (please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the seconds before a **Logout** messages is sent). The *Text(58)* field of **Logout** will contain the value 'c' (i.e. Logout Due to Inactivity).

Each time the TCP/IP connection is terminated, it will increment the counter of the maximum amount of times each CompID may login to the replay channel.

A second attempt to log in by an already logged in client will be rejected via a **Business Message Reject**.

6.1.3 Heartbeats

The server will not send heartbeats on the replay channel during periods of inactivity.

6.1.4 Requesting Missed Messages

The client is expected to transmit an **Application Message Request** within a predetermined period of time after establishing the connection. Please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the seconds within which the client has to send an **Application Message Request**.

The message should include the server ApplID of the multicast channel to which the retransmission request applies along with the list of messages to be resent. The *ApplBegSeqNum(1182)* and *ApplEndSeqNum(1183)* fields should be used to specify the *ApplSeqNum(1181)* of the first and last message in the range to be resent.

The **Application Message Request** can be used in four modes:

(i) To request a single message. The *ApplBegSeqNum(1182)* and *ApplEndSeqNum(1183)* should both be the message sequence number of the missed message.

(ii) To request a specific range of messages. The *ApplBegSeqNum(1182)* should be the message sequence number of the first message of the range and the *ApplEndSeqNum(1183)* should be that of the last message of the range.

(iii) To request all messages after a particular message. The *ApplBegSeqNum(1182)* should be the message sequence number immediately after that of the last processed message and the *ApplEndSeqNum(1183)* should be zero (0).

(iv) To request all messages available. The *ApplBegSeqNum(1182)* should be one (1) and the *ApplEndSeqNum(1183)* should be zero (0).

The retransmission request will be serviced from the server's cache. Please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the messages cached on the multicast channel. If the retransmission request includes one or more messages that are not in the server's cache, the entire request will be rejected and no messages will be retransmitted.

6.1.5 Response to a Retransmission Request

The server will respond to the **Application Message Request** with an **Application Message Request Ack** to indicate whether the retransmission request is successful or not. If the request is unsuccessful, the reason will be specified in the field *ApplResponseType(1348)*.

The total number of **Application Message Requests** that a client may send on the replay channel of a particular market data group is capped for each business day. Once this limit is reached, the server will reject any additional request via a **Business Message Reject**. Please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact value of this limit.

In the case of a successful retransmission request, the server will transmit the requested messages immediately after the **Application Message Request Ack**. The message sequence number from the multicast channel will be included in the *ApplSeqNum(1181)* field of each retransmitted message. Once the last of these messages is sent, the server will indicate that the retransmission is complete via an **Application Message Report**.

6.1.6 Termination of the Connection

If the client does not terminate the connection within a predetermined number of seconds after the transmission of the last missed message, the server will send a **Logout** message and then break the TCP/IP connection with the client. Please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact number of the seconds within which the client has to terminate the connection. The *Text(58)* field of **Logout** will contain the value 'd' (i.e. Retransmission Complete), with the *Session Status(1409)* containing value 100.

The server will terminate the TCP/IP connection if the number of messages that are buffered for a client exceeds a predetermined limit. Please refer to the parameters document *OSLMIT 604 Technical Parameters* for the exact value of this limit.

6.2 Failures at the Oslo Børs

6.2.1 Resetting Sequence Numbers

If the market data feed is, due to the unlikely event of an outage, restarted during a trading day, the message sequence numbers and instrument level sequence numbers of the multicast channel will be reset to 1. Upon restarting, the real-time channel will continue to disseminate the indices updates.

It should be noted that after a fail over of the gateway, clients can only recover the information that was sent through the real time channel after the point of fail over.

7. Message Formats and Templates

This section provides details on the three administrative messages and six application messages utilized by the regulatory news feed.

All messages sent by the server are transfer encoded in terms of the FAST protocol. While all application messages sent by the server (e.g. **News** etc.) are field encoded, the administrative messages it sends (e.g. **Logon** etc.) are not. All messages (i.e. both administrative and application) initiated by the client should be transfer encoded but not field encoded.

The FIX format of each is described along with the applicable FAST template.

7.1 Variations from the FIX Protocol

The OBDN feed conforms to the FIX protocol except as follows:

(i) The *NoRelatedSym(146)* repeating block is being used to define the details of the related companies involved in the announcement/news. The field *NewsSource(6940)* is added to the block to define the description of a related company which will be the short code given to the related company.
(ii) Custom enumerations define for *NewsCategory(1473)* as *Regulatory(101)* and *Non-Regulatory(102)*.
(iii) *NewsSequence(1688)* and *NewsCounter(1689)* introduced to be used in the **News** message when news spans across multiple packets.

7.2 Administrative Messages

7.2.1 Logon

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	A = Logon
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1180	ApplID	N	Identifier of the server sending the message. Required if the message is generated by the server.
553	Username	N	CompID of the client. Required if the message is generated by the client.
554	Password	N	Password assigned to the CompID. Required if the message is generated by the client.
925	NewPassword	N	New password for the CompID.
1409	SessionStatus	N	Status of FIX session or request to change password. Required if message is generated by server. **Value** / **Meaning** 0 – Session Active 2 – Password Due to Expire
Standard Trailer			

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1180	ApplID	ASCII String	None	
553	Username	ASCII String	None	
554	Password	ASCII String	None	
925	NewPassword	ASCII String	None	
1409	SessionStatus	Unsigned Integer	None	

7.2.2 Logout

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	5 = Logout
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1180	ApplID	N	Identifier of the server sending the message. Required if the message is generated by the server.
1409	SessionStatus	N	Status of the FIX session. Required if the message is generated by the server. **Value** / **Meaning** 4 – Session logout complete 5 – Invalid password 6 – Account locked 7 – Logons not allowed 8 – Password expired 100 – Other
58	Text	N	Reason for the logout. **Value** / **Meaning** a – Logout requested by client b – Forced logout c – Logout due to inactivity d – Retransmission complete
Standard Trailer			

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1180	ApplID	ASCII String	None	
1409	SessionStatus	Unsigned Integer	None	
58	Text	ASCII String	None	

7.2.3 Heartbeat

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	0 = Heartbeat
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1180	ApplID	Y	Identifier of the server sending the message.
1399	ApplNewSeqNum	Y	Sequence number of the next expected Application Message.
Standard Trailer			

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1180	ApplID	ASCII String	None	
1399	ApplNewSeqNum	ASCII String	None	

7.3 Application Messages (Client-Initiated)

7.3.1 Application Message Request

FIX Message

Tag	Field Name		Req	Description
Standard Header				
35	MsgType		Y	BW = Application Message Request
Message Body				
52	SendingTime		Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1346	ApplReqID		Y	Client specified unique identifier of the request.
1347	ApplReqType		Y	Type of request. **Value** / **Meaning** 0 – Retransmission of messages 5 – Cancel retransmission
1351	NoApplIDs		N	If specified, the value in this field should always be '1'. Required if *ApplReqType(1347)* is Retransmission of Messages (0).
➡	1355	RefApplID	N	ApplID of the Real-Time channel for which the retransmission is requested. Please refer to Section 5.2.1 for more info. Required if *NoApplIDs(1351)* is specified.
➡	1182	ApplBeg SeqNum	N	*ApplSeqNum(1181)* of the first message in the range to be resent from the Real-Time channel. Required if *NoApplIDs(1351)* is specified.
➡	1183	ApplEnd SeqNum	N	*ApplSeqNum(1181)* of the last message in the range to be resent from the real-time channel. Required if *NoApplIDs(1351)* is specified.
Standard Trailer				

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1346	ApplReqID	ASCII String	None	
1347	ApplReqType	Unsigned Integer	None	
1351	NoApplIDs	Unsigned Integer	None	
1355	RefApplID	ASCII String	Copy	
1182	ApplBegSeqNum	Unsigned Integer	None	
1183	ApplEndSeqNum	Unsigned Integer	None	

7.4 Application Messages (Server-Initiated)

7.4.1 News

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	B = News
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1180	ApplID	Y	Identifier of the server sending the message.
1181	ApplSeqNum	N	Sequence number of the message on the real-time channel. Required if the message is disseminated via the real-time or replay channel.
912	LastRptRequested	N	Indicates the last message sent in response to a retransmission request. **Value** / **Meaning** Y – Last message
1472	NewsID	Y	Unique identifier of the news/announcement.
1473	NewsCategory	N	This field is derived from the news category field of the message. **Value** / **Meaning** 101 – Regulatory 102 – Non-Regulatory
42	OrigTime	N	Time the announcement was published which will be specified in CET and in the YYYYMMDD-HH:MM:SS format. Required when the NewsSequence = 1.
148	Headline	Y	Headline or subject of the announcement.
1688	NewsSequence	Y	The unique sequence number of the News message under a NewsID.
1689	NewsCounter	Y	The number of news messages spanning across multiple packets sharing the same NewsID.
1300	MarketSegmentID	N	Announcement Group Code. Always set to 'EXCH'.

Tag	Field Name		Req	Description
1475	NoNewsRefIDs		N	If message is a correction of a previously published news message this field will be set to '1' when NewsSequence field is set to '1'.
➡	1476	NewsRefID	N	The News ID of the **News** which needs to get corrected.
➡	1477	NewsRefType	N	Type of correction made to **News**. **Value** / **Meaning** 0 – Replacement
33	NoLinesOfText		Y	Number of NewsML blocks available for the announcement.
➡	354	EncodedTextLen	N	Byte length of *EncodedTextLen(355)*.
➡	355	EncodedText	N	Text of the **News** message in NewsML.
146	NoRelatedSym		N	Number of related companies. Maximum value '1'. The first ever record in the repeating block will be of the primary company the announcement is related to. If available for the NewsID, the field will be required when NewsSequence = 1.
➡	1301	MarketID	N	The market to which the news applies. **Value** / **Meaning** XOSL – Oslo Børs XOAM – Oslo ABM (Alternative Bond Market) XOAX – Oslo Axess BURG – Burgundy Nordic MTF BURM – Burgundy Regulated Market
➡	470	CountryOfIssue	N	Place of company listing.
➡	454	NoSecurityAltID	N	If present, value in this field will always be '1'.
➡	➡	455 Security AltID	N	Identification number for the security.
➡	➡	456 SecurityAlt IDSource	N	Type of security identification number used. Required if *SecurityAltID(455)* is specified. **Value** / **Meaning** 4 – ISIN
➡	6940	NewsSource	N	The related company description. This will be the Company Short Name (Shortcode). Required if *NoRelatedSym(146)* is specified.
Standard Trailer				

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1180	ApplID	ASCII String	None	Please refer to section 5.2.1.
1181	ApplSeqNum	Unsigned Integer with NULL support	None	
912	LastRptRequested	ASCII String	None	
1472	NewsID	ASCII String	None	
1473	NewsCategory	Unsigned Integer	None	
42	OrigTime	ASCII String	None	
148	Headline	Byte Vector	None	
1688	NewsSequence	Unsigned Integer	None	
1689	NewsCounter	Unsigned Integer	None	
1300	MarketSegmentID	ASCII String	None	
1475	NoNewsRefIDs	Unsigned Integer	None	
1476	NewsRefID	ASCII String	None	
1477	NewsRefType	Unsigned Integer	None	
33	NoLinesOfText	Unsigned Integer	None	
354	EncodedTextLen	ASCII String	None	
355	EncodedText	Byte Vector	None	
146	NoRelatedSym	Unsigned Integer with NULL support	None	
1301	MarketID	ASCII String	None	
470	CountryOfIssue	ASCII String	None	
454	NoSecurityAltID	Unsigned Integer with NULL support	None	
455	SecurityAltID	ASCII String	None	
456	SecurityAltIDSource	ASCII String	None	
6940	News Source	Byte Vector	None	

7.4.2 Index

FIX Message

Tag	Field Name		Req	Description
Standard Header				
35	MsgType		Y	X = Market Data - Incremental Refresh
Message Body				
52	SendingTime		Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1180	ApplID		Y	Identifier of the server sending the message.
1181	ApplSeqNum		N	Sequence number of the message on the real-time channel. Required if the message is disseminated via the real-time or replay channel.
912	LastRptRequested		N	Indicates the last message sent in response to a retransmission request. **Value** / **Meaning** Y / Last message
268	NoMDEntries		Y	Number of index (or IDR average or Nibor rate) entries in the message.
➡	279	MDUpdate Action	Y	Indicates the type of update. **Value** / **Meaning** 0 / New
➡	55	Symbol	Y	The ISIN of the instrument. Please refer to the Index Record Layout reference data file for a mapping between the ISIN and the name of the index
➡	269	MDEntryType	Y	Indicates the type of index related market data being published. **Value** / **Meaning** 3 / Index value oIDR average/Nibor x / Index status 9 / Index VWAP B / Index volume

Tag	Field Name		Req	Description
➡	270	MDEntryPx	N	Required if *MDEntryType(269)* is Index Value (3) or *MDEntryType(269)* is Index VWAP (9) or *MDEntryType(269)* is Index Volume (B). Either the value of the index or the IDR Average/Nibor rate being published if *MDEntryType(269)* is Index Value (or IDR Average/Nibor rate) (3). Volume of the index being published if *MDEntryType(269)* is Index Value (B). VWAP of the index being published if *MDEntryType(269)* is Index Value (9).
➡	451	NetChgPrevDay	N	Required if *MDEntryType(269)* is Index Value (or IDR Average/Nibor rate) (3). Difference between the present value of the quoted index (or of the IDR Average/Nibor rate) and its previous day's closing value (or fixing rate) if *MDEntryType(269)* is Index Value (or IDR Average/Nibor rate) (3). For Bond Indices, difference between the present value of the quoted index and its previous day's closing value plus accrued interest.
➡	58	Text	N	The status of the index. The possible statuses are available in section 7.1 Index status codes. Required if *MDEntryType(269)* is Index Status (x).
➡	273	MDEntryTime	N	The time at which the index (or IDR Average/Nibor rate) was disseminated by Oslo Børs. The time will be specified in UTC and in the HH:MM:SS.sss format.
Standard Trailer				

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1180	ApplID	ASCII String	None	Please refer to section 5.2.1.
1181	ApplSeqNum	Unsigned Integer with NULL support	None	
912	LastRptRequested	ASCII String	Copy	
268	NoMDEntries	Unsigned Integer	Default	1
279	MDUpdateAction	Unsigned Integer	Copy	
55	Symbol	ASCII String	Copy	
269	MDEntryType	ASCII String	Copy	

270	MDEntryPx	Scaled Number	Copy	
451	NetChgPrevDay	Scaled Number	Copy	
58	Text	ASCII String	Copy	
273	MDEntryTime	ASCII String	Tail	

7.4.3 Application Message Request Ack

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	BX = Application Message Request Ack
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1353	ApplResponseID	Y	Server specified identifier of the acknowledgement.
1346	ApplReqID	Y	Identifier of the request being acknowledged.
1347	ApplReqType	Y	Type of request being acknowledged. **Value** / **Meaning** 0 – Retransmission of Messages 5 – Cancel Retransmission
1348	ApplResponse Type	Y	Whether the retransmission request was successful. **Value** / **Meaning** 0 – Request Successful 1 – Unknown ApplID 2 – Messages Not Available
Standard Trailer			

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1353	ApplResponseID	ASCII String	None	
1346	ApplReqID	ASCII String	None	
1347	ApplReqType	Unsigned Integer	None	
1348	ApplResponse Type	Unsigned Integer	None	

7.4.4 Application Message Report

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	BY = Application Message Report
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
1356	ApplReportID	Y	Server specified identifier of the report.
1346	ApplReqID	Y	Identifier of the **Application Message Request** the report relates to.
1426	ApplReportType	Y	**Value** / **Meaning**: 3 – Retransmission Completed
Standard Trailer			

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
1356	ApplReportID	ASCII String	None	
1346	ApplReqID	ASCII String	None	
1426	ApplReportType	Unsigned Integer	None	

7.4.5 Business Message Reject

FIX Message

Tag	Field Name	Req	Description
Standard Header			
35	MsgType	Y	j = Business Message Reject
Message Body			
52	SendingTime	Y	Time the message was transmitted specified in UTC and in the YYYYMMDD-HH:MM:SS.sss format.
379	BusinessReject RefID	N	*ApplReqID(1346)* of the rejected message.
371	RefTagID	N	If a message is rejected due to an issue with a particular field its tag number will be indicated.
372	RefMsgType	Y	*MsgType(35)* of the rejected message.
380	BusinessReject Reason	Y	Code specifying the reason for the reject. Please refer to section 9.1 for a list of reject codes.
58	Text	N	Oslo Børs specific code specifying the reason for the reject.
Standard Trailer			

FAST Template

Tag	Field Name	Field Type	Field Encoding	Description
35	MsgType	ASCII String	None	
52	SendingTime	ASCII String	None	
379	BusinessRejectRefID	ASCII String	None	
371	RefTagID	Unsigned Integer with NULL support	None	
372	RefMsgType	ASCII String	None	
380	BusinessReject Reason	Unsigned Integer with NULL support	None	
58	Text	ASCII String	None	

8. Index Status Codes

8.1 Index Status Codes

Status	Description
PRE_MQP	Before Mandatory Quote Period, quotes not firm
LIVE	Market is live, index is normal
PART	Part of the constituent market is not live
INDICATIVE	Index is indicative
HELD	A data link has failed or index has exceeded parameters
POST_MQP	After Mandatory Quote Period
CLOSE	Official closing index

9. Reject Codes

9.1 Business Message Reject

Business Reject Reason	Text	Reason
0	400	Other
0	403	Incorrect data format for this tag
0	404	Value is invalid for this tag
0	405	Required tag missing
0	450	Request limit for day reached
1	-	Unknown ID
5	-	Conditionally required field missing

Appendix 1 – Issue Updates

This appendix describes the details of the changes made in each issue of this document.

Issue 1.0 – Released 06 March 2012

Initial release of the document.

Issue 1.1 – Released 07 June 2012

Changes are made to the following sections:

Section	Description
7.4.1 News	Clarified the definition of the FIX Message fields: 1473 - NewsCategory, 1300 - MarketSegmentID and 1475 – NoNewsRefIDs

Issue 1.2 – Released 20 September 2012

Changes are made to the following sections:

Section	Description
1.3 Document Series	Added *OSLMIT Derived Information Guidelines* and *OSLMIT 504 Guide to Dress Rehearsals.*
4.2 Real-Time Channel	Added *ApplNewSeqNum(1399)* to the heartbeat message.
4.4 Overview of a Trading Day	Updated references to the market model documents, and the description of Index messages at the start of each trading day.
7.2.3 Heartbeat	Added *ApplNewSeqNum(1399)* to the heartbeat message.
7.3.1 Application Message Request	Corrected field encoding for *RefApplID*.
7.4.1 News	Fixed description to *NewsCategory(1473), NoNewsRefIDs(1475)* and *MarketSegmentID(1300).*
7.4.2 Index	Updated description of the *Symbol(55)* field, this field contains the ISIN of the instrument.

Issue 2.0 – Released 12 November 2012

New issue of the document post migration to the Millennium platform. No changes to content, except minor wording changes to remove references to migration project and updated document links.

Issue 2.1 – Released 04 March 2013

Changes are made to the following sections:

Section	Description
7.4.2 Index	Added extra description for Bond Indices, in field *NetChgPrevDay(451).*

Issue 2.2 – Released 19 April 2013

Changes are made to the following sections:

Section	Description
7.4.1 News	Added MIC codes for Burgundy markets in field *MarketID* (1301).

Issue 2.3 – Released 9 December 2013

Changes are made to the following sections:

Section	Description
1.4 Definitions, Acronyms and Abbreviations	Added new section with IDR Average and Nibor descriptions
2.2 Indices	Added IDR average and Nibor fixing information.
4.4 Overview of a Trading Day	Added the details of the IDR average and Nibor fixing during the trading day.
7.4.2 Index	Added extra description for fields affected by the introduction of the IDR averages and Nibor fixings calculated by Oslo Børs.

Issue 3.0 – Released 22 May 2014

Section	Description
7.4.1 News	Changed the timezone in the field *OrigTime* (42) from UTC to CET.

Appendix 2 – NewsML Definitions

This appendix describes the NewsML exchange format.

NewsML is a media-independent news exchange format for general news. Complete specification of the NewsML Document Type Definition Version 1.0 standard can be found at http://www.iptc.org/site/News_Exchange_Formats/NewsML_1/

Appendix 3 - References

For the corresponding Millennium Exchange documentation for Borsa Italiana and London Stock Exchange, please see:

http://www.borsaitaliana.it/borsaitaliana/intermediari/gestione-mercati/migrazionemillenniumit-mit/millenniumitmigration.en.htm

http://www.londonstockexchange.com/products-and-services/millennium-exchange/technicalinformation/technicalinformation.htm