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PREFACE

PURPOSE

This document sets out the client connectivity configuration specifications for Optiq® Order Entry Gateways (OEG). It describes the sources of data for connectivity, manner in which clients should attempt to connect to the OEGs.

This document is a supporting document to the interface technical specifications.

ASSOCIATED DOCUMENTS

The following list identifies the associated documents, which either should be read in conjunction with this document, or which provide other relevant information for the user:

- Euronext Cash Markets – Optiq OEG Client Specifications – SBE Interface
- Euronext Cash Markets – Optiq OEG Client Specifications – FIX 5.0 Interface
- Euronext Cash Markets – Optiq TCS Client Specifications – SBE and FIX 5.0 Interface
- Euronext Cash Markets – Optiq Kinematics Specifications
- Euronext Cash Markets – Optiq CCG to OEG Changes Highlight
- Euronext Cash Markets – Optiq & TCS Error List
- Euronext Cash and Derivatives Markets – Optiq File Specification
- Euronext Cash and Derivatives Markets – Optiq MDG Client Specifications
- Optiq Euronext File Services User Guide
- Optiq Technical Note SBE

Clients are advised to also refer to the Euronext Rules and Regulations documents for more details.

For the latest version of documentation please visit <http://www.euronext.com/optiq>

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DOCUMENT & REVISION HISTORY

For the details of this and previous updates of this document please refer to the [Appendix](#) at the end of this document.

Version	Change Description
1.1.1	Corrections of the seconds release

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1. INTRODUCTION

The Euronext Optiq Order Entry Gateway (OEG) provides high-speed and real-time connection to the Euronext markets. This document provides information about the:

- features of the system that support client's ability to setup connection to Optiq
- sources of connectivity information
- recommended practices for the setup of connectivity

The scope of this version of the document is for Cash markets migration to Optiq (Phase 2). Harmonization between Cash and Derivatives systems and messages is in progress, however as it is not yet completed Derivatives functionalities are not yet fully covered. As such, functionalities, connectivity details and connectivity related configuration for Derivatives is subject to identification and/or change for the Phase 3 of migration (Derivatives to Optiq).



Important note: During migration to Optiq the platform used for testing purposes is Virtual External User Acceptance (V-EUA)

1.1 GLOSSARY

This section provides a list of some terms & abbreviations commonly used in this document. Please note that some of these terms are described in more details in the dedicated sections within this document or in the associated Optiq specifications documents.

- **Order Entry Gateway (OEG):** is the software that manages the access for exchanges' clients, and acts as the private interface between the clients and the Optiq matching engine.
- **Market Data Gateway (MDG):** is the software that provides high-speed, real-time market data (public messages) for the Euronext markets.
- **Optiq Segment:** defines a universe of instruments habitually sharing common trading properties. An Optiq Segment can contain one or several asset classes. An Optiq Segment access is setup through a Logical Access.
- **Partition:** is a technical subdivision of an Optiq Segment. An Optiq Segment may be comprised of at least one or several partitions, physically independent one from another, but connected to each other within the context of the Optiq Segment. Instruments may move from one partition to another within an Optiq segment.
- **Logical Access:** is an OEG (Order Entry Gateway) entry point, setup for clients to connect to a single Optiq Segment, containing the technical configuration for the client's connectivity. Multiple logical accesses can share the same SFTI line.
- **OE Session:** the individual physical connection, to a single Partition. A single Logical access may have as many OE sessions as there are partitions in the Optiq segment.
- **Secure Financial Transaction Infrastructure (SFTI):** The SFTI Network is a wide area network, which provides customers with domestic and international financial markets connectivity from a single SFTI port.
- **Disaster Recovery (DR):** A Euronext Disaster Recovery event occurs when Euronext switches client systems processing from the Euronext production environment to the Euronext DR environment. The DR environment provides redundant standby systems to be used upon the failure of the Euronext production environment.

2. OEG CONNECTIVITY

2.1 CONNECTIVITY MODEL & ASSOCIATED CONCEPTS

The connectivity model and associated concepts are explained in the beginning of the SBE and FIX message specifications.



Important note: Clients are strongly urged to review the explanations provided in the OEG message specifications in detail before continuing with this document.

2.2 CONNECTIVITY IN A NUTSHELL

To Connect to Optiq clients need to:

- Setup connectivity to the range of IP and Ports specified for each individual environment
- Obtain the partition ID and specific IP of that partition provided in the Cash Standing Data (9007) file
- Setup a Logical Access for each segment of interest or for Drop Copy (DC)
- Connect to the IP of the partition using the Logical access ID and the OE partition ID or DC partition ID

This document provides more details associated to these topics.

2.3 LOGICAL ACCESS

Upon creation each Logical Access clients will be provided the associated Logical Access ID and Port, as well as any other operational details (e.g. requirements for Conformance testing). For more information on provisioning of Logical accesses clients should review the section “[Obtaining or Modifying a Logical Access](#)”.

2.4 CONNECTIVITY INFORMATION & INSTRUMENT REFERENTIAL

Connectivity information for all Cash Order entry gateways should be retrieved from the Cash Standing Data file (9007). A Cash Standing Data file is produced for each individual Optiq Segment, and the information for each Optiq Segment is provided in the file for that segment. The Cash Standing Data files are made available on the Euronext File Service (EFS).

The files (for each Optiq Segment), amongst other data, contain the following information required for connectivity to Trading Order Entry (OE) and Drop Copy (DC) gateways:

- *Partition* field with its associated elements provided for each available partition, encapsulating all the connectivity characteristics of that partition, which include the following attributes:
 - *PartitionID* – the unique ID of each partition, and the associated connectivity information is made available for each individual partition hosting at least one tradable instrument within the segment.
 - *IPAddressPrimary* – the IP Address of the Primary OE or DC gateway. The same IP address is used for the Primary and Mirror (secondary, or back-up) instances of the gateways. The connectivity switch between the instances in case of High Availability (HA) event of individual partition is managed via

the recovery mechanism by the Exchange. It requires no additional connectivity setup or changes and is transparent to clients. This value is provided for all environments.

- *IPAddressDR* – the IP address of the Disaster Recovery instance of the OE or DC gateway, and is used in case of an Exchange Business Continuity event, and is only provided in the Production environment.
- *PartitionType* – used to differentiate the Order Entry (OE) and Drop Copy (DC) connectivity partitions. Use of Order Entry and Drop Copy gateways require separate and individual setup of the Logical access to each of these services.

Section below provides a representative excerpt of the Cash Standing Data file structure that represents the connectivity related data and an example of how this data would be represented in the XML file . For complete and accurate details of the file structure and its contents clients should refer to the *Euronext Cash and Derivatives Markets – Optiq File Specification* document.

This OEG connectivity information is associated to the *Partition ID* that is specified in the Cash Standing Data file for each individual instrument. By associating the *Partition ID* specified for the instrument and the connectivity information provided for that *Partition ID* clients should be able to identify to which Partitions they should connect to in order to establish the shortest path for lowest latency in trading.

In segments that contain multiple partitions, to achieve the best possible performance, clients are encouraged to connect to the individual partitions identified as hosting each instrument. For more information about meshed partitions, and benefits of connecting to individual partitions please refer to the SBE or FIX Interface message specifications.

Excerpt of the Connectivity Structures from the Cash Standing Data File:

The information in the excerpt below uses the standards of data identified in the *Euronext Cash and Derivatives Markets – Optiq File Specification* document, and the Length (Len) is expressed in number of characters. In the table below column F/A identifies if the row provides the Field or an Attribute of the field, where Attributes (indicated as A) are listed as indented rows under the field to which they belong.

Each *Partition* field will encapsulate all the connectivity attributes of that partition.

Field / Field Attributes	F/A	Short Description	Format	Len	Values
CashStandingDataFile	F				
LogicalAccessConnectivity	F				
Partition	F				
PartitionID	A	Identifies uniquely an Optiq OE partition across all the Exchange partitions	Numerical ID	3	From 10 to 999
IPAddressPrimary	A	IP Address of the Primary and Secondary (backup) access to the gateway. Provided for all environments (IP v4)	String	15	Valid IP v4 address
IPAddressDR	A	IP Address of the Disaster Recovery access to the gateway. Populated only for the Disaster Recovery environment, in the file generated for the Production environment. Blank for all other environments (IP v4)	String	15	Valid IP v4 address
PartitionType	A	Indicates the type of Partition, either Order Entry or Drop Copy. Use of Order Entry and Drop Copy gateways require separate and individual setup of the Logical access to each service.	String	2	OE = Order Entry DC = Drop Copy

Field / Field Attributes	F/A	Short Description	Format	Len	Values
/Partition	F				
/LogicalAccessConnectivity	F				
/CashStandingDataFile	F				

Example of Connectivity Structures for the Cash Standing Data XML File:

The example below is provided for illustration purposes only. Clients should refer to the standing data files to obtain the actual connectivity details for each environment, segment and partition. The notation “[...]” indicates the other data present in the file prior to the connectivity structures, which is omitted in this example.

```
<CashStandingDataFile version="#.#.#">
[...]
  <LogicalAccessConnectivity>
    <Partition PartitionID="10" IPAddresPrimary="212.197.223.23" IPAddressDR="" PartitionType="OE"/>
    <Partition PartitionID="11" IPAddresPrimary="212.197.223.24" IPAddressDR="" PartitionType="OE"/>
    <Partition PartitionID="12" IPAddresPrimary="212.197.223.25" IPAddressDR="" PartitionType="OE"/>
    <Partition PartitionID="13" IPAddresPrimary="212.197.223.26" IPAddressDR="" PartitionType="OE"/>
    <Partition PartitionID="990" IPAddresPrimary="212.197.223.61" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="991" IPAddresPrimary="212.197.223.62" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="992" IPAddresPrimary="212.197.223.63" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="993" IPAddresPrimary="212.197.223.64" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="994" IPAddresPrimary="212.197.223.65" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="995" IPAddresPrimary="212.197.223.66" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="996" IPAddresPrimary="212.197.223.67" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="997" IPAddresPrimary="212.197.223.68" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="998" IPAddresPrimary="212.197.223.69" IPAddressDR="" PartitionType="DC"/>
    <Partition PartitionID="999" IPAddresPrimary="212.197.223.70" IPAddressDR="" PartitionType="DC"/>
  </LogicalAccessConnectivity>
</CashStandingDataFile>
```

2.4.1 Trade Confirmation System (TCS)

Standing Data, Connectivity & EMM

TCS specific messages will be submitted via the Optiq Trader Order Entry Gateways. As for all other instruments in Optiq, submission of TCS message for a specific instrument is possible only via the Optiq Segment by which it is hosted. The instruments that are hosted by a specific segment are identified in the standing data file produced for the individual Optiq Segment. This should allow clients, that submit TCS declarations with order entry gateways, to use the same Logical Access, within an Optiq Segment, to submit messages for the same instrument, but intended for different EMMs that also cover the TCS service.

The standing data of the individual Optiq Segments includes the instruments that are eligible to submission of TCS messages, the partition it is hosted on, and the connectivity information for that segment. The connectivity information of the segment / partition is the same, whether client intends to send messages

for Central Order Book (COB) or TCS. The symbol Index for instruments that can be traded on COB and receive TCS declarations is the same.

Only Euronext instruments with EMM equal to 5 = Cash On Exchange Off book are eligible for submission of declarations and other TCS messages. As TCS allows for submission of declaration from instruments that are identified by the same Symbol Index and are made available under different EMMs clients need to make sure that for submission of TCS messages the correct EMM is specified.

The market data messages associated to the TCS messages will be sent in the individual partitions indicated for each instruments in standing data file.

Logical Accesses for TCS

To submit and/or to receive TCS specific messages via the Optiq OEGs the associated Logical Accesses has to be set with characteristic that indicates use of TCS service. Only the Logical Access that is setup this way will be able to submit and receive messages to/from TCS. If client has multiple logical accesses on the same Optiq Segment, only the Logical Access that is setup to indicate use of TCS service will receive the unsolicited messages from TCS. Unsolicited messages from TCS will be sent back only to the Optiq Segment on which the instruments are hosted.

TCS messages are not in scope of Cancel on Disconnect service.

TCS messages are included in the messages counted for throttling thresholds set for the Logical Access.

2.4.2 Indices

Indices segment has a standing data file, however it doesn't have order entry gateways. In this file, section for connectivity data will not be present.

2.4.3 Derivatives

Derivatives Standing data files will remain unchanged for the Phase 2 of migration to Optiq. Connectivity information for Derivative segments will be provided for Phase 3 of the migration. A communication and update of documentation will be provided for this in due course.

2.5 SEGMENTS

Table below provides the current overview of available Optiq Segments and the indicative number of partitions setup for each segment.

Drop Copy is not a trading segment, and uses different approach to partitions specified separately.

Optiq Segment	Number of Partitions
Equities	4
Funds	1
Fixed Income	1
Warrants and Certificates	1
Options	2
Futures	2
Commodities	1

Please note: Derivative segments and partitions are provided as indicative values. Associated information is subject to change for the Phase 3 of migration (Derivatives to Optiq).

2.6 DETERMINING THE “SHORTEST PATH”

In order to benefit from the best response times the clients should send messages directly to the partition on which the instrument is located. To identify on which partition each instrument is located, clients must use, and update on a daily basis, their referential data by downloading the **CashStandingData** (9007) files or using the **StandingData** (1007) real-time market data messages, where details of the *Partition ID* assigned to each instrument are provided.

2.7 RANGE OF IPS AND IPS OF INDIVIDUAL PARTITIONS

This section provides the ranges of IP addresses identified for Optiq per environment, and for individual Optiq segments. To facilitate ease of future upgrades (e.g. addition of new partitions) clients are encouraged to setup connectivity from their physical machines to the full range of IP addresses identified. In case new partitions are added to a segment, they’ll be added with the IP addresses within the range assigned to that Optiq Segment.

- Each partition as part of an Optiq Segment uses a unique IP address, by environment, from the ranges as specified in the tables below.
- In case of a new partition a new IP address, within the range associated to the Optiq Segment will be used for the new partition.

2.7.1 IP Ranges per Environment

Environment	Range of IPs
Virtual EUA (v-EUA)	212.197.223.0/25
Physical EUA (p-EUA)	212.197.222.0/25
Production	212.197.194.0/24
Disaster Recovery (DR)	212.197.229.0/24

Please note: Table above uses Classless Inter-Domain Routing (CIDR) notation (commonly used in network documentation) to represent the IP ranges. The notations /## indicates the size of the routing prefix used.

2.7.2 Segment & Partition IP Information

The OEG related IP addresses and associated Partition IDs are provided in tables below for each environment.

Important: Tables below indicate IP addresses of individual partitions, however clients are strongly advised to:

- setup connectivity for the full range of IP addresses for each environment, and to
- obtain the IP addresses of each partition provided on a daily basis in the standing data file.

Value of Partition ID column provided in tables below represents the value in the field *PartitionID* provided in the **CashStandingData** (9007) file and real-time market data **Standing Data** (1007) messages. This field corresponds to the *OE Partition ID* field used in private order entry messages.

Drop Copy is not a trading segment, and uses different approach to partitions specified separately.

Please note: Derivative segments and partitions are provided as indicative values. Associated information is subject to change for the Phase 3 of migration (Derivatives to Optiq).

Virtual EUA (test) environment

Optiq Segment Name	Partition ID	IP of Individual Partition
Equities	10	212.197.223.23
	11	212.197.223.24
	12	212.197.223.25
	13	212.197.223.26
Funds (ETFs)	20	212.197.223.27
Fixed Income (Bonds)	30	212.197.223.29
Warrants and Certificates	40	212.197.223.28
Options	60	<i>To be assigned in Step 3</i>
	61	<i>To be assigned in Step 3</i>
Futures	70	<i>To be assigned in Step 3</i>
	71	<i>To be assigned in Step 3</i>
Commodities	80	<i>To be assigned in Step 3</i>

Physical EUA (test) environment

Optiq Segment Name	Partition ID	IP of Individual Partition
Equities	10	212.197.222.2
	11	212.197.222.5
	12	212.197.222.8
	13	212.197.222.11
Funds (ETFs)	20	212.197.222.14
Fixed Income (Bonds)	30	212.197.222.20
Warrants and Certificates	40	212.197.222.18
Options	60	<i>To be assigned in Step 3</i>
	61	<i>To be assigned in Step 3</i>
Futures	70	<i>To be assigned in Step 3</i>
	71	<i>To be assigned in Step 3</i>
Commodities	80	<i>To be assigned in Step 3</i>

Production environment

Optiq Segment Name	Partition ID	IP of Individual Partition
Equities	10	212.197.194.2
	11	212.197.194.5
	12	212.197.194.8
	13	212.197.194.11
Funds (ETFs)	20	212.197.194.13
Fixed Income (Bonds)	30	212.197.194.17
Warrants and Certificates	40	212.197.194.19
Options	60	<i>To be assigned in Step 3</i>
	61	<i>To be assigned in Step 3</i>
Futures	70	<i>To be assigned in Step 3</i>
	71	<i>To be assigned in Step 3</i>
Commodities	80	<i>To be assigned in Step 3</i>

Disaster Recovery (DR) environment

Optiq Segment Name	Partition ID	IP of Individual Partition
Equities	10	212.197.229.2
	11	212.197.229.3
	12	212.197.229.4
	13	212.197.229.5
Funds (ETFs)	20	212.197.229.6
Fixed Income (Bonds)	30	212.197.229.8
Warrants and Certificates	40	212.197.229.9
Options	60	<i>To be assigned in Step 3</i>
	61	<i>To be assigned in Step 3</i>
Futures	70	<i>To be assigned in Step 3</i>
	71	<i>To be assigned in Step 3</i>
Commodities	80	<i>To be assigned in Step 3</i>

2.8 PORTS & PORT RANGES

This document provides a range of ports for each Optiq environment. To facilitate ease of future upgrades clients are encouraged to setup connectivity from their physical machines to the full range of ports identified.

Each Logical Access will be setup with a Port upon its creation. This port will be used by all OE Sessions used by that Logical Access, on all the partitions with the segment to which it belongs. The port assigned to the Logical Access will be unique at minimum within a single Optiq Segment and be specific to the Logical Access, no matter which message protocol is chosen to be used by the client.

The overall range of ports used by the Optiq system is 30000 – 59999. The tables below provide the port ranges used for each Optiq Segment and for each dedicated environment.

Virtual EUA (test) environment

Optiq Segment	Port Range
Equities, Funds (ETFs), Fixed Income (Bonds), Warrants and Certificates	30000 - 39999
Options, Futures, Commodities	To be assigned in Step 3

Physical EUA (test) environment

Optiq Segment	Port Range
Equities, Funds (ETFs), Fixed Income (Bonds), Warrants and Certificates	30000 - 39999
Options, Futures, Commodities	To be assigned in Step 3

Production environment

Optiq Segment	Port Range
Equities, Funds (ETFs), Fixed Income (Bonds), Warrants and Certificates	45000 - 59999
Options, Futures, Commodities	To be assigned in Step 3

Disaster Recovery (DR) environment

Optiq Segment	Port Range
Equities, Funds (ETFs), Fixed Income (Bonds), Warrants and Certificates	45000 - 59999
Options, Futures, Commodities	To be assigned in Step 3

2.9 NOTE FOR MIGRATION TO OPTIQ TESTING

While clients are urged to setup connectivity to the full range of IPs and ports specified tests of connectivity for the day 1 of Optiq setup will be checked to a single IP & port per environment as identified below

Environment	IP for Connectivity Tests	Port for Connectivity Tests
Virtual EUA (v-EUA)	212.197.223.23	30000
Physical EUA (p-EUA)	212.197.222.38	30000
Production	IP of every partition available in every segment	45000
Disaster Recovery (DR)	IP of every partition available in every segment	45000



Important note: During migration to Optiq the platform used for testing purposes is Virtual External User Acceptance (V-EUA)

2.10 DROP COPY

Unlike the “trading segment” OEGs, the Drop Copy (DC) gateways may provide clients with cross-segment data. Standing data file will contain multiple Drop Copy gateway IDs and associated connectivity information.

Clients can **not** connect to multiple Drop Copy gateways using the same Drop Copy Access, and should only use the connectivity information for the DC gateway assigned to their specific Drop Copy Access upon creation.

The associated information, i.e. Drop Copy ID & assigned port, is provided to the firm’s DMA on creation.

As Drop Copy is not a regular trading segment some of the differences associated to it are:

- partitions follow different connectivity and access logic and may not be segment specific
- made available only in FIX protocol
- throttling limits do not apply to the Drop Copy gateway

The range of ports that are used for Drop copy are the same as those used for other trading segment OEGs.

The overall range of ports used by the Optiq system is 30000 – 59999, with the following assignment for the environments as following:

- Virtual & Physical EUA: 30000 – 39999
- Production & DR: 45000 – 59999

For More information about Drop Copy clients should review the Drop Copy specifications document.

2.10.1 IP Addresses for Drop Copy per Environment

Virtual EUA (test) environment

Drop Copy ID	IP Address
990	212.197.223.61
991	212.197.223.62
992	212.197.223.63
993	212.197.223.64
994	212.197.223.65
995	212.197.223.66
996	212.197.223.67
997	212.197.223.68
998	212.197.223.69
999	212.197.223.70

Physical EUA (test) environment

Drop Copy ID	IP Address
990	212.197.222.51
991	212.197.222.52
992	212.197.222.53
993	212.197.222.54
994	212.197.222.55
995	212.197.222.56
996	212.197.222.57
997	212.197.222.58
998	212.197.222.59
999	212.197.222.60

Production environment

Drop Copy ID	IP Address
990	212.197.194.61
991	212.197.194.62
992	212.197.194.63
993	212.197.194.64
994	212.197.194.65
995	212.197.194.66
996	212.197.194.67
997	212.197.194.68
998	212.197.194.69
999	212.197.194.70

Disaster Recovery (DR) environment

Drop Copy ID	IP Address
990	212.197.229.21
991	212.197.229.22
992	212.197.229.23
993	212.197.229.24
994	212.197.229.25
995	212.197.229.26
996	212.197.229.27
997	212.197.229.28
998	212.197.229.29
999	212.197.229.30

For More information about Drop Copy clients should review the Drop Copy specifications document.

2.11 LOGIN OVERVIEW

Clients initiate a TCP/IP session to the Order Entry Gateway, and then initiate a logon by sending a **Logon** message. Session Logon is always initiated by the client.

The **Logon** message must be the first message sent by the client otherwise the OEG will drop the connection, and it needs to be sent individually to each partition to which physical connection will be established.

The **Logon** message must contain the following fields:

- **Logical Access ID:** to be populated with the value obtained from the CAS team upon creation of the Logical Access. The Logical Access ID is provided along with the corresponding **Port** number. Each Logical Access ID is authorized for access to a specific Optiq Segment. Providing a Logical Access ID that is not authorized for access to a Segment will result in the rejection of attempts to connect.
- **OE Partition ID:**
 - For Trading Order Entry Gateways: this field is to be populated with the unique ID of the partition to which client connects to. The ID provided in the Logon for the partition must correspond to the IP address of that partition. To identify the unique ID of the partition clients should use the value provided in the field *PartitionID* in the **CashStandingData** (9007) file and/or the real-time public **Standing Data** (1007) messages. The value corresponding to the ID of each Partition should be used to obtain the corresponding **IP address** which is also made available in the **CashStandingData**

(9007) file. The same applies to Logical accesses independently if they are used to submit messages for COB or TCS.

- **For Drop Copy Gateways:** this field is to be populated with the Drop Copy ID to which client is assigned on creation of the Drop Copy access and must connect to. The ID provided in the Logon for Drop Copy must correspond to the IP address of that Drop Copy gateway identified. The ID of the Drop Copy gateway is provided to the client on the creation of the Drop Copy access. The value corresponding to the ID of the Drop Copy gateway should be used to obtain the corresponding **IP address** which is also made available in the **CashStandingData** (9007) file.

Note

As was done in CCG, and is already in use in OEGs, Firm IDs provided in the private messages are left padded with zeroes to the full length of the field of eight (8) characters.

2.11.1 Cases of Disconnection Initiated by Exchange

In cases of aberrant technical behavior Exchange will automatically disconnect client OE sessions. This section identifies how to recognize the specific cases. As the cases identified are not part of expected behavior, clients are advised to avoid such cases.

Please note: Exchange rules identify other cases of connection suspension and disconnection, not listed above, which would be initiated based on regulatory rules; specific request from regulators or partners (e.g. Clearer); or decision of market operations.

2.11.1.1 Message sequence number inconsistencies

For clients using FIX protocol, if exchange receives messages with the sequence numbers that are inconsistent with what is expected by the OEG the connection will be disconnected. At the moment of disconnection OEG sends to the client a **Logout** (5) message.

These cases include the ones listed below and can be identified by values identified specifically for each case:

- Logon with next sequence number (tag 789) higher than the one expected by the OEG:
field *SessionStatus* (tag 1409) set to **10** = Received NextExpectedMsgSeqNum (789) is too high
- On first connection or re-connection with the first sequence number (tag 34) equal to zero (0) or lower than the one expected
field *SessionStatus* (tag 1409) set to **9** = Received MsgSeqNum (34) is too low

2.11.1.2 Unknown messages sent to exchange

- **For SBE:** in case of messages that can't be recognized & processed by the OEG the connection that sent the message will be disconnected from the OEG.

As in the External User Acceptance environments clients are testing new software, this disconnection will be triggered after client's connection sends more than ten (10) such messages. Messages below this threshold will be rejected using the **Technical Reject** (108) message.

In production environment this is an aberrant and unexpected behaviour – if it occurs, client's connection is immediately disconnected, and as such the number of such messages is equal to zero (0).

At the moment of disconnection OEG sends to the client a **Logout** (103) message. The case can be identified by the following values in the message:

- **SBE**: field *Log Out Reason Code* set to 2 = Too many unknown messages
- **For FIX**: in case of messages that can't be recognized & processed by the OEG Optiq uses the behaviour prescribed by the FIX protocol.
 - If such messages are received before the client is logged in, the messages are ignored
 - If such messages are received after the client is logged in, OEG uses standard FIX logic to identify if client should be disconnected, or if the message should be rejected.

2.11.1.3 Excessive breaches of the connection rate

Client connections are assigned a maximum message rate, which are enforced by the OEG, in part, by the Exchange's throttling mechanism for inbound messages. Upon breaching the throttling limit messages above the limit are either rejected or queued. In addition Exchange sets a limit for excessive breaching (either in number of messages or amount of data sent), of the assigned rate / size of connection. Excessive breaching means that client attempted to submit a number of messages, or amount of data in bytes, that is multiple times over their allowed rate.

This case takes into consideration only excessive breaches of limits, as identified below.

In this case, the connection is immediately disconnected, and will be prevented from re-connecting for during of 15 seconds.

This case could occur due to various reasons, including a technical issue in the client's system. To assist clients in identifying the issue and correcting it as quickly as possible, the **Logout** (103) / (FIX 5) message sent on disconnection in such a case provides specific values identified below.

Case	How to identify the case in Logout message	
	SBE [Log Out Reason Code]	FIX [SessionStatus (tag 1409)]
Excessive number of message	3 = Excessive Number of Messages	106 = Excessive Number of Messages
Excessive amount of data in bytes	4 = Excessive Amount of Data in Bytes	107 = Excessive Amount of Data in Bytes
Excessive number of messages and amount of data in bytes	5 = Excessive Number of Messages & Amount of Data in Bytes	108 = Excessive Number of Messages & Amount of Data in Bytes

2.12 OBTAINING OR MODIFYING A LOGICAL ACCESS

Clients should use the "Cash OEG Order Entry/Drop Copy Creation" forms that will be made available in the MCA web portal to request creation or a new or modification of existing Logical Access.

Obtaining additional Logical Accesses or increased connection size may require members to order extra bandwidth on their SFTI® infrastructure. Members wishing to make such modification should therefore liaise with CCC (Client Coverage Center) at ccc@euronext.com in order to validate that they have sufficient bandwidth.

For any additional information associated to the setup Logical Accesses, clients should contact Customer Access Services at cas@euronext.com.

Tables and descriptions below provide information only for the segments where the values are applicable. If the configuration is not applicable to a segment, it is not listed in the associated tables.

3. SEGMENT-WIDE CONFIGURATION SETTINGS

3.1 ADMINISTRATIVE MESSAGE SETTINGS

3.1.1 Delay of Inactivity

The OEG uses the **Heartbeat** and **TestRequest** messages as a mechanism to ensure the connection between the client and the Exchange is up and functioning properly. For more information on administration messages please refer to the SBE or FIX Interface message specifications and kinematics documentation.

The “delay of inactivity” parameter is used to set up the period (in seconds) after which the Heartbeat/TestRequest mechanism is triggered. The parameter is specific for each Optiq Segment and defined as follows (in number of **seconds**):

Optiq Segment	SBE (seconds)	FIX (seconds)
Equities	1	5
Funds	1	5
Fixed Income	1	5
Warrants and Certificates	1	5
Drop Copy	N/A	30
Options	To be set in Phase 3	To be set in Phase 3
Futures	To be set in Phase 3	To be set in Phase 3
Commodities	To be set in Phase 3	To be set in Phase 3

3.2 LP QUOTE DRIVEN MARKET SETTINGS

Optiq Segment	AFQ Delay Before Class Auction	AFQ Delay Before Instrument Unhalts
Warrants and Certificates	900 seconds / 15 minutes	2 seconds

For more information about the AFQ Delay and the LP quote driven market model, clients should review *New Warrants & Certificates Market Model – Functional Overview* document.

3.3 EXCHANGE ID IN PRIVATE MESSAGES

The field “Exchange ID” should be populated by the client with value “EURONEXT” in all environments. This value is used as following:

- SBE: In the field *Exchange ID* provided in outgoing messages
- FIX: For fields *TargetCompID* (Tag: 56) and *SenderCompID* (Tag: 49) as needed in incoming and outgoing messages

3.4 INTENTIONAL INCREMENT OF SEQUENCE NUMBER

In some cases when partition Primary instance fails over to the Mirror, or Production fails over to the DR environment the message sequence number may be intentionally increments by a pre-set number. This is being done specifically for cases of HA and Business Continuity to guarantee delivery of full scope of messages for resynchronization and to reduce number of unexpected rejections of client Logon attempts.

Table below provides the configured pre-setup increment number:

Optiq Segment	Intentional Increment of Sequence Numbers
Equities	1000
Funds	
Fixed Income	
Warrants and Certificates	
Drop Copy	N/A
Options	To be set in Phase 3
Futures	To be set in Phase 3
Commodities	To be set in Phase 3

APPENDIX A: REVISION HISTORY

SUMMARY OF CHANGES

Version	Change Description
1.1.1	<ul style="list-style-type: none"> - Correction of the IP address in Production for the Fixed Income (Bonds) segment, partition 30, corrected to be 212.197.194.17 - Added a note on existing practice of padding of firm id fields to its full length in section 2.11 "Login Overview"
1.1.0	<ul style="list-style-type: none"> - Added sections "Drop Copy" & "Trade Confirmation System (TCS)" - Added connectivity details for TCS and Drop Copy in section "Segment & Partition IP Information" - Removed section "Work in Progress" - Updated example of the XML for connectivity information in section "2.4 Connectivity Information & Instrument Referential" with the Drop Copy information - Renamed section 2.4.2 from "GIS" to "Indices" - Update section "2.9 Note For Migration to Optiq Testing", with guideline for Prod and DR IP addresses - Added clarification in section "2.7.1 IP Ranges per Environment" on the values within the range of IP addresses - Corrected references to field "PartitionID" from "PartitionsID" in sections "2.7.2 Segment & Partition IP Information" and "2.11 Login Overview" - Added TCS specifications to the section "Associated documents" - Added section "Cases of Disconnection Initiated by Exchange" - Added section "3.4 Intentional Increment of Sequence Number"
1.0.0	First Release for Optiq

DOCUMENT HISTORY

REVISION NO.	DATE	AUTHOR	CHANGE DESCRIPTION
1.1.1	January 2018	Euronext	Corrections of the seconds release
1.1.0	January 2018	Euronext	Second Release
1.0.0	August 2017	IT Solutions - DCO	First Release