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EURONEXT CASH MARKETS ORDER ENTRY GATEWAY SESSIONS: PRICING AND CAPACITY

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PURPOSE

This document outlines important details regarding the new fee scheme for Cash order entry sessions, to be implemented with Phase 2 of the Optiq migration: Cash Order Entry Gateways (OEG) and Matching Engine (ME).

Euronext Derivatives markets are not in scope of this document.

TARGET AUDIENCE

The intended audience of this document is any client connecting to and trading on the Euronext Cash markets.

WHAT'S NEW?

The following lists only the most recent modification made to this revision/version.

REVISION NO./ VERSION NO.	DATE	AUTHOR	CHANGE DESCRIPTION
1.1	28 June 2018	Euronext	Second release
1.0	31 May 2017	Euronext	First release

ASSOCIATED DOCUMENTS

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

- Optiq OEG Documentation available on: <https://www.euronext.com/optiq/documentation>

CONTACT

For further information, please email the Optiq support desk at optiq@euronext.com (Tel: +33 1 70 48 25 55) or contact your relationship manager at ccc@euronext.com

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1. SUMMARY TABLE

The following table provides a summary of the pricing and capacity information which is described in more detail throughout this document.

Table 1: new fee scheme

PRICING	Standard Session	LP Dedicated Session	Free Package	Drop Copy
Flat Fee	€200/month/session	€600/month/session	Free	€1000/month/member group
Incremental Variable Fee Tier 1	€19/msg/s/member group	€4.5/msg/s/member N/A		N/A
Incremental Variable Fee Tier 2	€14.5/msg/s/member group			

Table 2: new capacity limits

CAPACITY	Standard Session	LP Dedicated Session	Free Package
Maximum Capacity per Member Group	Unlimited		30 msg/s
Maximum Capacity per Session	250 msg/s	1000 msg/s	
Minimum Capacity per Sessions per Partition	5 msg/s		2 msg/s
Minimum Capacity Increment per Sessions per Partition			

Table 3: Throttling

Throttling applies to the throughput allocated to a partition

All throughput numbers indicated below are per Partition

THROTTLING TYPE	Throughput	Allowance
Bursts	Throughput > 40msg/s	¼ of message throughput / s
	$10 \leq \text{Throughput} \leq 40 \text{ msg/s}$	10msg / (10/throughput) s
	Throughput < 10msg/s	Full throughput / s
Linear	1 message every "1 / throughput" of a second	

2. OEG LOGICAL ACCESSES PRICING AND CAPACITY: PRODUCTION ENVIRONMENT

2.1 GENERAL PRINCIPLES

The OEG Logical Accesses pricing model applies to all OEG Logical Accesses on the SFTI infrastructure for all supported protocols (SBE and FIX 5.0), directly, or indirectly via an Extranet Service Provider (ESP) or an Application Service Provider (ASP).

OEG Logical Accesses are invoiced by Euronext directly to members and independently from any network connectivity charges. As such, technology partners such as ASPs and ISVs are not invoiced for OEG Logical Accesses.

The price for an OEG connection is a combination of a fixed cost and a variable incremental cost based on the order entry capacity (throughput, measured in messages per second).

Once a new OEG Logical Access has been fully activated with Production connectivity access, billing will start automatically, regardless of whether the OEG Logical Access has been effectively used or not. Full payment is due for every calendar month, and OEG Logical Access fees are not pro-rated in the event of a cancellation or modification.

OEG Logical Accesses supporting several member codes from the same member Group¹ are charged only once. OEG Logical Accesses supporting several member codes from different member entities are charged per member code.

Drop Copy sessions are ~~is~~ charged at a flat rate regardless of the number of Drop Copy Logical Accesses ordered.

Euronext reserves the right to negotiate bilateral arrangements and/or pilot programmes relating to fees and charges with members from time to time when it considers it appropriate to do so.

Detailed Pricing and Throughput Allocation Models are described below.

¹ 'Member Group' as defined in Rule 3.4 of Euronext Rulebook 1: affiliates of the same firm with a 95% capital link are considered as part of the same Member Group.

2.2 STANDARD LOGICAL ACCESSES

OEG LOGICAL ACCESSES PRICING AND CAPACITY	
MONTHLY CHARGES PER MEMBER CODE/ MEMBER GROUP ON PRODUCTION ENVIRONMENT:	
Flat fee:	€200 per OEG Logical Access
Maximum Capacity:	250 messages/second per OEG Logical Access
Tier 1: Price per message/second	
Applicable between 1 and 1499 msg/s across all Optiq Segments for one Member Group*	
Order entry capacity charge:	€19/message/second
Tier 2: Price per message/second	
Applicable for 1500 msg/s and above across all Optiq Segments for one Member Group*	
Order entry capacity charge:	€14.5/message/second

*Variable fees per messages/second are incremental. Regardless of the total throughput of a Member, the first 1499 msg/s are charged at Tier 1 price and any capacity \geq 1500 msg/s is charged at Tier 2 price

Example 1: Total Throughput of Member Group is 1500 messages/second

When ordering a new OEG Logical Access at 100 messages per second, the cost for this Access is:

$$€200 + (100 \text{ m/s} \times €14.5) = €1,650/\text{month}.$$

Example 2: Total Throughput of Member Group is 1000 messages/second

When ordering one new OEG Logical Access at 100 messages per second, the cost for this Access is:

$$€200 + (100 \text{ m/s} \times €19) = €2,100/\text{month}.$$

Example 3: A Member Group holds 10 OEG Logical Accesses that each have a 200msg/s Capacity

Total capacity: 2,000 messages/second

Fixed price is: $10 \times €200 = €2,000$

Variable fee is: $1,499 \times €19 + 501 \times €14.5 = €35,745.5$

2.3 LOGICAL ACCESSES DEDICATED TO SPECIFIC USAGE

Specific Pricing and Capacity are available for OEG Logical Accesses entirely dedicated to:

- Liquidity Provision on Cash Equity Instruments
- Liquidity Provision on Exchange-Traded Funds (ETFs), Exchange-Traded Vehicles (ETVs) and Exchange-Traded Notes (ETNs)

OEG LOGICAL ACCESSES PRICING AND CAPACITY	
MONTHLY CHARGES PER MEMBER CODE ON PRODUCTION ENVIRONMENT:	
Flat fee:	€600 per OEG Logical Access
Maximum Capacity:	1000 messages/second per OEG Logical Access
Order entry capacity charge:	€4.5/message/second

Notes on Liquidity Provision dedicated OEG Logical Accesses

- Full details of Liquidity Provider fees and charges are based on individual Liquidity Provider Contracts².
- Capacity of Liquidity Provision dedicated Logical Accesses isn't included in the total capacity used to calculate fees for standard sessions.

2.4 EXTENDED RLP

Members participating in the Extended RLP Programme can benefit from two logical accesses free of charge, with a capacity up to 700msg/s.

These dedicated logical accesses may not be used for any other purpose than for providing RLP quotes.

Should these dedicated logical accesses be used fully or partially for other flow, standard logical access rates shall apply.

2.5 FREE PACKAGE

Each "Member Group"³ may have a free package consisting of:

- A maximum of one OEG Logical Access per Optiq Segment.
- 30 messages per second for the Member Group.

Additional Notes:

The Free Package cannot be combined with paid access.

The Member Group must either opt for the free package or choose a paid option.

2.6 DROP COPIES

Drop copy use is charged a flat fee of €1000 per "Member Group"³, regardless of the number of drop copy Logical Accesses created.

² For more information, please contact Euronext's Membership department at MCC@euronext.com.

³ 'Member Group' as defined in Rule 3.4 of Euronext Rulebook 1: affiliates of the same firm with a 95% capital link are considered as part of the same Member Group.

2.7 TCS (TRADE CONFIRMATION SYSTEM) OEG LOGICAL ACCESSES

OEG Logical Accesses dedicated to the Trade Confirmation System (TCS) with a maximum capacity of 10 messages/second are free of charge.

2.8 FEE TRANSITION

Order Entry Sessions Fee Cap

Following the implementation of the Optiq Order Entry Gateway (OEG) and Matching Engine (ME) in production for Equities, Funds, Warrants & Certificates instruments, session fees will be capped at their level prior to Optiq for a transitional period, using an average of fees paid in **Q1 2018**. The fee cap shall be applicable to all paid Logical Accesses, including both standard and liquidity provider (LP) sessions.

This fee cap period began once the Optiq OEG and ME was implemented in Production across all Cash Market segments, Equities, Funds, Warrants & Certificates, and Fixed Income, and will conclude on **30 September 2018**.

After this initial fee cap period, if a member does not use an aggregated throughput larger than **125%** of their average Q1 2018 capacity, then their fees will remain capped at the average of fees paid in **Q1 2018**. Session throughput **in excess of the 125% threshold** will be charged under the Optiq fee scheme detailed above.

All fee caps will be removed starting on **1 January 2019** and session rates will apply according to the fee guidelines detailed above.

3. OEG LOGICAL ACCESSES CAPACITIES: PRODUCTION ENVIRONMENT

3.1 OPTIQ SEGMENTS WITH ONE PARTITION:

- The order entry capacity per OEG Logical Access starts at 5 messages per second.
- It is capped at:
 - 250 messages per second per Standard OEG Logical Access
 - 1,000 messages per second per Liquidity Provision Dedicated OEG Logical Accesses
- Members may allocate capacity across OEG Logical Accesses according to principles described above and with a minimum increment of 5 messages/second.

3.2 OPTIQ SEGMENTS WITH MORE THAN ONE PARTITION

- The order entry capacity per OEG Logical Access starts at (5 x 'number of partitions') messages per second.
- It is capped at:
 - 250 messages per second for Standard OEG Logical Accesses for the segment (per partition : 250/4 = 62.5 rounded up to 63)
 - 1000 messages per second for Liquidity Provision Dedicated OEG Logical Accesses for the segment (per partition : 1,000/4 = 250)
- Members may allocate capacity across OEG Logical Accesses according to principles described above and with a minimum increment of (5 x 'number of partitions') messages/second.
- For each OEG Logical Access, the Euronext fee calculation equally allocates capacity across Partitions:

$$\text{Capacity per Partition} = \frac{\text{OEG Logical Access Capacity}}{\text{Number of Partitions in the Optiq Segment}}$$

Example 4: Optiq Segment with 4 partitions

The throughput of a given OEG Logical Access is 20 messages / second. Therefore, on a segment with 4 partitions, the throughput / capacity per partition is 20 divided by 4 = 5 msg / second. For each OEG Logical Access, Euronext allocates capacity equally across each partition by dividing the total capacity of the Logical Access by 4.

Members may allocate capacity across OEG Logical Accesses according to principles described above and with a minimum increment of (5 x 4) = 20 messages/second.

Capacity caps per OEG Logical Access are unchanged from the standard described above.

3.3 THROTTLING

Customers can choose to **inject messages in bursts or in a linear way within their allocated message throughput.**

Throughput rules apply per partition.

- Linear injections entitle customers to send a message every “1/throughput”.
- Bursts change depending on the size of the throughput as follows:
 - For a throughput > 40 messages/second, customers can send $\frac{1}{4}$ message throughput once every $\frac{1}{4}$ seconds in one go before being throttled. The minimal time between two bursts is $\frac{1}{4}$ second.
 - For a throughput between 10 and 40 messages/second, customers can send a burst of 10 messages in one go before being throttled. They will need to wait for $[\frac{10}{\text{throughput}}]$ before injecting the next burst. For example, a customer with a throughput of 30 will send a burst of 10 messages and will have to wait for 0.3 seconds before sending another burst.
 - For a throughput < 10 messages/second, customers can send their full injection rate in one go.

Example 5: Throttling on a Segment with a single Partition

With a 100 message/second throughput, customers can linearly inject up to 1msg/10ms without being throttled.

When injecting a burst, customers can inject up to 25 messages ($100/4$) once every $\frac{1}{4}$ second.

With a 20 message/second throughput, customers can linearly inject up to 1msg/50ms without being throttled.

When injecting a burst, customers can inject up to 5 messages ($20/4$) once every $\frac{1}{4}$ second.

Example 6: Throttling on a Segment with 4 Partitions

With a 400 message/second throughput on the segment, each partition has a throughput of 100 messages/second ($400/4$).

Customers can therefore linearly inject up to 1msg/10ms on each partition without being throttled.

When injecting a burst, customers can inject up to 25 messages ($100/4$) once every $\frac{1}{4}$ second on each partition.

Customers can use a combination of bursts and linear injections to manage their throughput. For example, a customer can choose to send nothing for $\frac{1}{4}$ second, then a burst of $\frac{1}{4}$ messages in the next $\frac{1}{4}$ second, and finally inject linearly during the last $2\frac{1}{4}$ seconds without being rejected or queued.

This is a generic view. For more details, please refer to the “Optiq OEG Throttling Mechanism - Functionality Description v1.0.0” document.

3.4 RECALCULATION AND REALLOCATION OF CAPACITY

In case of a change to the number of Partitions in a market segment, Euronext recalculates and reallocates capacity of all OEG Logical Accesses of the Segment.

The following rules apply for Recalculation and Reallocation:

Total capacity of each OEG Logical Access is modified so that the capacity remains unchanged on each partition.

$$\text{new OEG Logical Access Capacity} = \left(\frac{\text{old OEG Logical Access Capacity}}{\text{old Number of Partitions}} \right) \times \text{new Number of Partitions}$$

Capacity is then split equally across partitions as described above and using following formula:

$$\text{Capacity per Partition} = \frac{\text{OEG Logical Access Capacity}}{\text{New Number of Partitions in the Optiq Segment}}$$

Please note that because capacities are recalculated, these changes will have an impact on billing. Members will be informed before changes are effective and will have the option to choose a different allocation.

Example 7: Moving from 4 to 5 Partitions in a market segment

Before: For this example, the following configuration is used:

- 4 partitions in the segment
- one OEG Logical Access with a Capacity of 100 msg/s
- each partition is allocated $(100 / 4) = 25$ msg/s

After: When moving to 5 partitions, the total capacity of the OEG Logical Access is recalculated to $(100 / 4 * 5) = 125$ msg/s

This capacity is then allocated equally to each of the 5 partitions, resulting in a capacity of $(125 / 5) = 25$ msg/s on each Partition

- 5 partitions in the segment
- each partition is allocated $(125 / 5) = 25$ msg/s
- one OEG Logical Access with a capacity of 125 msg/s

3.5 FREE PACKAGE

For Customers opting for the Free Package, all principles described in this section apply with:

- A minimum capacity and minimum increment of 2 msg/s (vs. 5 msg/s for paid options)
- A maximum capacity of 30 messages per second across all market segments and Logical Accesses for the “Member Group” opting for the free package

4. OEG LOGICAL ACCESS PRICING AND CAPACITIES – EUA ENVIRONMENTS

All OEG Logical Accesses are free of charge in the External User Acceptance (EUA) test environments.

5. PROCESS FOR ORDERING / MODIFYING / CANCELLING OEG LOGICAL ACCESSSES

To order new OEG Logical Accesses in the Production or EUA environments, or to cancel or modify a Logical Access, an online form is available on the [Connect website](#). The form can only be completed by a nominated **Member Connectivity Administrator (MCA)**.