

Document title

## **EXCHANGE TRADING ENGINE HIGH AVAILABILITY FOR CASH MARKETS**

Document type or subject

### **High Availability Enhancement in case of an Exchange Trading Engine Failover**

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## PREFACE

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### PURPOSE

This white paper describes the current and future EXCHANGE TRADING ENGINE High Availability mechanism in case of a failover.

Current		Future	
		Early Q2 2016, date confirmed via Info Flash	
Standard Failover	Non-Standard Failover	Standard Failover	Non-Standard Failover
Trading suspended	Trading suspended	Trading Active	Trading suspended

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### SCOPE

- The EXCHANGE TRADING ENGINE High Availability mechanism applies to the Euronext Regulated Cash markets (Equities, ETPs, Bonds, Warrants).

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### ASSOCIATED DOCUMENTS

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

- CCG Binary Client and Appendix Specifications, [HERE](#)
- CCG FIX 4.2 Client and Appendix Specifications, [HERE](#)

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### CONTACT INFORMATION

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## 1. EXCHANGE TRADING ENGINE HIGH AVAILABILITY OVERVIEW

EXCHANGE TRADING ENGINE High Availability is an Euronext exchange mechanism meant to reduce the impact on client trading in case of a technical failure.

In the unlikely scenario of a defective EXCHANGE TRADING ENGINE, the backup (failover) EXCHANGE TRADING ENGINE node will take over all the functionalities of the defective EXCHANGE TRADING ENGINE node.

Definitions:

- Standard fail over: refers to conditions where the fail over process take place automatically.
- Nonstandard fail over: refers to conditions where the fail over process require manual intervention.

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## 2. CURRENT EXCHANGE TRADING ENGINE HIGH AVAILABILITY IN CASE OF A STANDARD FAILOVER

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### 2.1 TECHNICAL OVERVIEW

In the unlikely event of an EXCHANGE TRADING ENGINE failover the backup EXCHANGE TRADING ENGINE will take over all the functionalities of the defective EXCHANGE TRADING ENGINE. The trading is being suspended pending business decision to start the EXCHANGE TRADING ENGINE application and resume the trading.

Suspended trading is an EXCHANGE TRADING ENGINE state where all the instruments which are being traded on that specific EXCHANGE TRADING ENGINE are halted – therefore no trading is possible.

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### 2.2 SEQUENCE OF EVENTS

- During the failover (backup EXCHANGE TRADING ENGINE replace the main EXCHANGE TRADING ENGINE, and the CCG to EXCHANGE TRADING ENGINE connection is being re-established) the CCG's will reject any order sent by the client with the error message "system unavailable".
- The EXCHANGE TRADING ENGINE application starts with all the instruments in the halted state.
- The trading engine will cancel all current day submitted orders for all the Order Entry Gateways (SLE) configured with "Cancel on disconnect" feature.
- The trading unit will send via the **Order Entry Gateway (SLE) feed** a Class Event (Q) message which confirms the failover and provides a timestamp until which messages received from the client are correctly guaranteed / processed.
- The trading unit will send via the **Market data feed** the Class Halted notice via 516 message.
- Until the instruments are being unhalted any order sent by the client on those instruments will be rejected

In this suspended EXCHANGE TRADING ENGINE state, trading is not possible, Order entry is not possible.

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### 3. FUTURE EXCHANGE TRADING ENGINE HIGH AVAILABILITY IN CASE OF A STANDARD FAILOVER

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#### 3.1 TECHNICAL OVERVIEW

In the event of an EXCHANGE TRADING ENGINE failover the backup EXCHANGE TRADING ENGINE will take over all the functionalities of the defective EXCHANGE TRADING ENGINE. The trading will remain active, will continue without interruption.

The instruments are not halted.
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#### 3.2 SEQUENCE OF EVENTS

- During the failover (backup EXCHANGE TRADING ENGINE replace the main EXCHANGE TRADING ENGINE, and the CCG to EXCHANGE TRADING ENGINE connection is being re-established) – this should take a short period of time- the CCG's will reject any order sent by the client with the error message "system unavailable"
- The EXCHANGE TRADING ENGINE application starts with all the instruments in active mode (unhalted)
- The trading engine will cancel all current day submitted orders for all the Order Entry Gateways (SLE) configured with "Cancel on disconnect" feature.
- The trading unit will send via the **Order Entry Gateway (SLE) feed** a Class Event (Q) message which confirms the failover and provides a timestamp until which messages received from the client are correctly guaranteed / processed.
- Order entry is allowed.

In this active EXCHANGE TRADING ENGINE state, trading and Order Entry is allowed.
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## 4. MINIMIZE CLIENT TRADING IMPACT

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### 4.1 EXCHANGE TRADING ENGINE FAILOVER DETECTION

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The client has the following options to detect an EXCHANGE TRADING ENGINE failover:

- Upon reception of Order Entry (CCG) rejection message “System unavailable” the client has a pre-indication of an EXCHANGE TRADING ENGINE failover, therefore risk mitigation measures should be prepared.

Please note this is just a pre-indication, the confirmation is needed via the Class Event (Q) message
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- Upon reception of the Class Event (Q) message the client has the confirmation that an EXCHANGE TRADING ENGINE failover has occurred.

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### 4.2 MITIGATE THE RISK OF A EXCHANGE TRADING ENGINE FAILOVER

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Once the Class Event (Q) message is being received the client has the opportunity to take either one of the following corrective actions:

For order book resynchronization:

- Automatic self-reconciliation.
- Cancel current day orders entered on the defective Exchange Trading Engine instruments

For trades resynchronization:

- Contact market surveillance to identify the list of lost trades.