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Document title

NAV TRADING FACILITY: TCS MESSAGE FLOWS, RULES AND DETAILS OF THE MARKET MODEL

Subject

Global overview of the application message flow exchanged between SLEs and Euronext's Trade Confirmation System (TCS), and the associated broadcast messages; main rules and particularities associated with this model.

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CONTENTS

                   Revision Number: 1.2

1.   INTRODUCTION

Following the recommendations of the AFM's Winter Committee, in 2006 Euronext helped to put in place a new market model for investment funds, with a single forward execution moment. This market model was implemented on Euronext's existing Trade Confirmation System (TCS).

This model has now been extended to include Exchange-Traded Funds (ETFs), and the revised and extended service has been renamed the **NAV Trading Facility.**

This document provides the following information about the NAV Trading Facility:

- A global overview of the application message flow exchanged between SLEs and TCS and the associated broadcast messages;
- The main rules and particularities associated with the model.

The communication protocols used to access the TCS application are the same as those used to access the Universal Trading Platform (UTP): CCG Binary and FIX 4.2.

Note that the NAV Trading Facility may also be accessed using the TCS-Web application.

GENERAL ARCHITECTURE
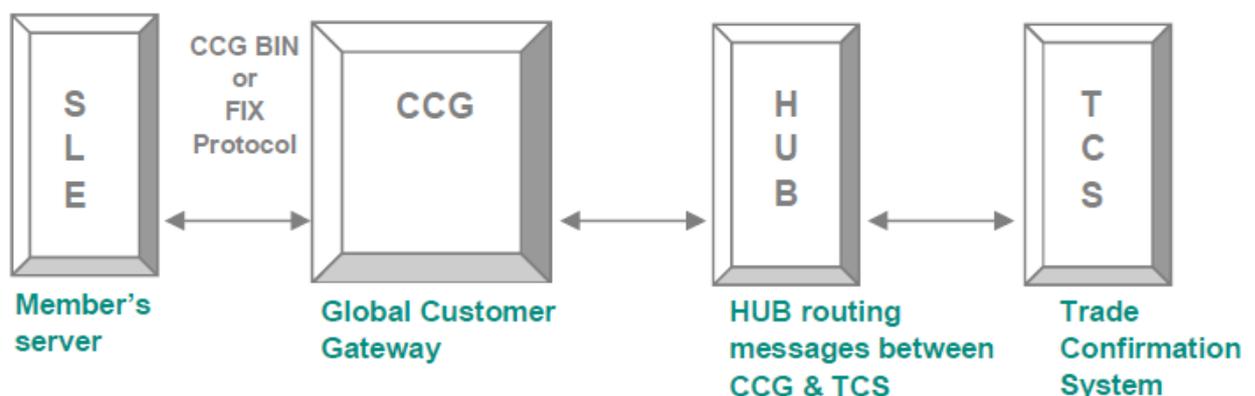
For a full description of specific messages please refer to the relevant documents on the Euronext

Euronext website :

- UTP for European Cash Markets – CCG FIX 4.2 message specifications
- UTP for European Cash Markets – CCG Binary Protocol message specifications
- Euronext European Cash Markets Exchange Data Publisher (XDP) Client Specification
- UTP & TCS for cash markets: Error list
- TCS-Web Euronext Fund Service User Guide

For more information, please see the NAV Trading Facility webpage:

https://www.euronext.com/fr/members/nav-trading-facility

2. OVERVIEW OF THE NAV TRADING FACILITY

2.1 MAIN PRINCIPLES

The NAV Trading Facility is based on a forward-pricing principle between a broker/dealer and a fund agent with a single execution moment.

■ The instruments concerned are open-ended investment funds, including ETFs.

■ Orders, also called "declarations," can be entered throughout the TCS session from 07:15 to 19:00 CET.

Two kinds of order are dedicated to this market model:

- **Fund orders in quantity** *(OperationTypeIndicator = **i**)*

- **Fund orders in cash** *(OperationTypeIndicator = **I**)*

■ No price is permitted for these order types.

■ The mandatory counterpart for any order is the fund agent.

■ The TCS system only recognises one fund agent as allowed to manage an investment fund instrument.

■ All the declarations confirmed by the fund agent will be matched on the relevant execution day.

■ Broker/dealers are not authorised to place cross-orders.

■ Both broker/dealers and fund agents can cancel or refuse a pending declaration. However, they are not allowed to cancel a pre-matched trade or a trade.

■ A fixed cut-off time separates one trading period from the next. A specific message is broadcast to inform the market of this changeover.

■ An additional fixed time period following the cut-off time, called the confirmation period, allows the fund agent to confirm orders. Unconfirmed orders expire after this additional period. This period is generally fixed at 30 minutes after the cut-off time.

■ Order confirmation:

- Orders entered by the broker/dealer before the cut-off time and confirmed by the fund agent before the end of the confirmation period, are executed on the next relevant trading day.

- Orders entered by the broker/dealer before the cut-off time but not confirmed by the fund agent before the end of the confirmation period, expire at the end of this additional period on the same day.

■ A fixed execution time is set to trigger matching of all the orders at the Net Asset Value (NAV) +/−1. The NAV+/−, which is defined as a price in TCS, is entered by the fund agent in the TCS system. For investment fund orders in cash, the execution is done in quantity, rounded down to the nearest whole number.

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[1] The **NAV +/−** is the NAV adjusted by a surcharge or discount covering the direct costs related to the net in- or outflow of the fund.

                   Revision Number: 1.2

■ Volumes and prices are immediately disseminated to the market following execution. A dedicated message is also broadcast to the market with all the existing NAVs +/−.

■ Following specific corporate events, as indicated in the trading manual, any pending orders and/or confirmed (pre-matched) orders are eliminated. A message with a dedicated indicator is sent to the counterparts.
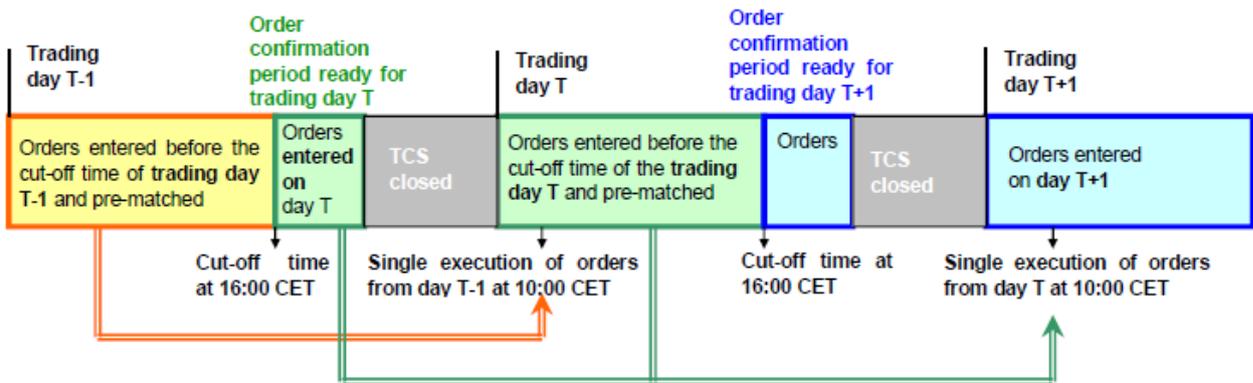
2.2   OVERVIEW OF ORDER PROCESSING FOR EXECUTION

The period covering the Order-Accumulation Phase, the Cut-Off Time, the Confirmation-Only Phase, the Notice Period, the Execution-Price Entry Phase and the Execution Time is defined as the Trading Session, for which different Execution Cycles are available, notably:

- Intra-day Execution Cycle;

- Daily Execution Cycle;

- Weekly Execution Cycle ;

- Monthly Execution Cycle;

- Quarterly Execution Cycle.

Each Execution Cycle consists of all the aforementioned Trading Session phases. The starting time, duration and ending time of each phase are fixed but may be configured as needed to provide for Execution Cycles with different timings, e.g. there may be a Daily Execution Cycle with a cut-off time at 16:00 CET and an Execution Time at 10:00, and another Daily Execution Cycle with a cut-off time at 15:00 CET and an Execution Time at 11:00. Please refer to the appendix for the current timing and duration of each cycle's phases.

For illustrative purposes, the current standard Daily Execution Cycle will be used in this document. Its phase configuration is as follows:

	Starting time	Duration	Ending Time
Order-Accumulation Phase	16:00 CET	24 hours	16:00 CET
Cut-Off Time	16:00 CET	Single point in time	N/A
Confirmation-Only Phase	16:00 CET	30 minutes	16:30 CET
Notice Period	16:30 CET	Overnight	10:00 CET
Execution-Price Entry Phase	07:15 CET	2 hours and 15 minutes	10:00 CET
Execution Time	10:00 CET	Single point in time	N/A

Please note that the Notice Period in the Daily Execution Cycle may have a duration of up to four nights. This means that execution won't be on Trading day T, but on Trading day T+1, T+2, T+3, T+4 or T+5 depending on the duration of the Notice Period and the time of order entry.

For example, the Notice Period is two trading day nights. The kinematics will be as follows:

	Starting time	Duration	Ending Time
Order-Accumulation Phase	16:00 CET	24 hours	16:00 CET
Cut-Off Time	16:00 CET	Single point in time	N/A
Confirmation-Only Phase	16:00 CET	30 minutes	16:30 CET
Notice Period	16:30 CET	2 Trading day nights	10:00 CET
Execution-Price Entry Phase	07:15 CET	2 hours and 15 minutes	10:00 CET
Execution Time	10:00 CET	Single point in time	N/A
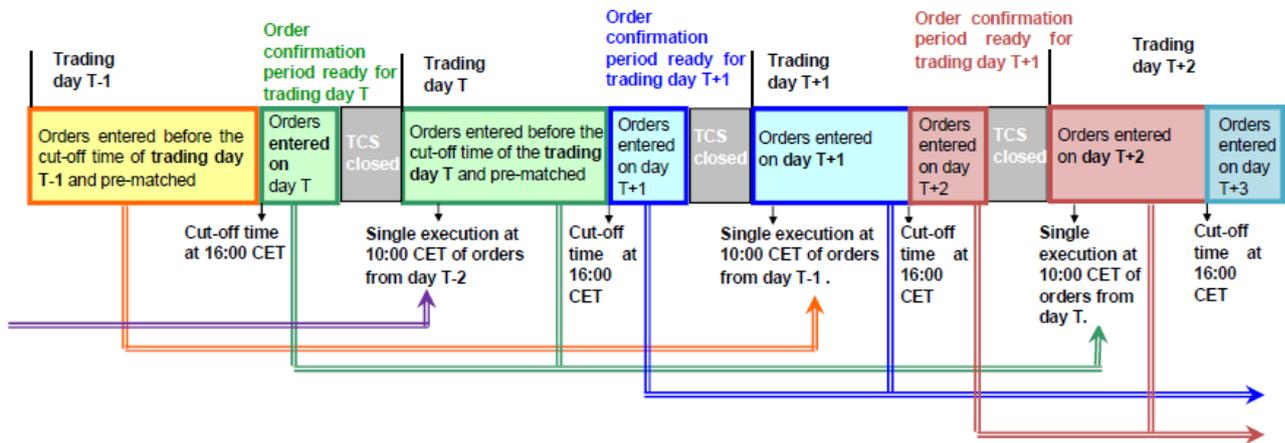
Consequently, in function of the Notice Period's duration, the possible values for the field (**PreMatchingIndicator**) for Daily Execution Cycles are:

Possible Value	Description
'0'	Not pre-matched
'1'	Pre-matched for the next fixing
'2'	Pre-matched for the second next fixing
'3'	Pre-matched for the third next fixing
'4'	Pre-matched for the fourth next fixing
'5'	Pre-matched for the fifth next fixing

3.   OVERVIEW OF MAIN MESSAGE FLOWS

Section 3A demonstrates the main principles of the market model by describing a standard process. Section 3B focuses on specific cases. For a full description of a specific message, please consult the documentation listed in the introduction to this document.

3.1   STANDARD PROCESS

- Entry of a valid declaration before the cut-off time
- Acceptance by the fund agent
- Cut-off time
- Entry of NAV+/− by the fund agent
- Matching on trading day, and information broadcast.

3.1.1   Entry of a valid declaration by the broker

The broker/dealer sends a **TCS Declaration** to TCS *(BIN: d - FIX UD)* on an eligible instrument.

In addition to the existing conditions applied by TCS, the system checks the following:

- The counterpart is the fund agent in charge of the related investment fund instrument
- The TCS operation type used is a **fund order in quantity** (i) or a **fund order in cash** (I)
- The field "Price" is blank for the format indicator & followed by "000000000"
    - For a fund order in quantity:
        - The field "quantity" is filled
        - The field "amount" is blank or filled with zero
    - For a fund order in cash
        - The field "quantity" is blank or filled with zero
        - The field "amount" is filled but with no decimals
- The account type *(CustomerOrFirm)* is not a liquidity provider/ fund agent account
- The side is not a cross (X)

If one or more of these conditions is not met, a TCS message Reject (BIN "d" – FIX "Uj") is returned to the broker with a sub-code indicating the reason for the rejection.

If the declaration is valid, TCS transmits a **TCS notice** to the issuer and the counterpart *(BIN "n"- FIX "U8")*.

- A TCS reference number is allocated to the declaration.
- The pre-matching indicator *(PreMatchingIndicator)* is filled with "0" (not pre-matched).

         Revision Number: 1.2

3.1.2   Entry of a declaration in response

Following the reception of the declaration from the broker/dealer, the fund agent answers with a TCS declaration.

Note that if one or more of the mandatory criteria is not the same as those specified in the declaration issued by the broker, a new declaration will be created and no match can occur.

The fund agent can also refuse the declaration issued by the broker. A declaration is refused by sending a **TCS declaration refusal (BIN "c" - FIX "UF"; TCSMsgType=403)**.

If the declaration is valid, TCS transmits an acknowledgement notice to the issuer of the declaration and a declaration notification to the counterpart following the same process described above.

For the NAV Trading Facility only, if the reply declaration matches the criteria, the two declarations (from the fund agent and from the broker/dealer) will be given the "pre-matched" status and will await the single

forward execution moment.

The example below highlights the value used in the current standard daily execution cycle:

- If the declaration is entered by the broker before the cut-off time and confirmed by the Fund Agent before the end of the confirmation period, the pre-matching indicator (*PreMatchingIndicator*) is filled with a "1" (matching will occur at the next execution moment).

- If the declaration is entered by the broker after the cut-off time and confirmed by the Fund Agent before the execution time, the pre-matching indicator is filled with a "2" (pre-matching will not occur at the following execution time/date but the subsequent execution time/date).

3.1.3   A fixed cut-off time

<u>At the end of the day a fixed cut-off time</u> separates one trading day (trading period) from another. This cutoff time is defined at the instrument group level and is set for all the instruments belonging to a specific group.

In order to inform the market of the change of the trading day (trading period), a dedicated message for the NAV Trading Facility is sent: Message **TCS State Change - 535 Message**. This message contains a single value •"C" for •"change trading cycle". This message is sent for the relevant NAV Trading Facility trading group only.

The <u>confirmation period</u> following the cut-off time allows the fund agent to manage the remaining pending orders. Unconfirmed orders entered before the cut-off time expire after this additional period.

For example, in the current standard daily execution cycle:

- An order is entered by a broker on a given day (T-1) at 17:00 CET (after the cut-off time set at 16:00)

- No match occurs on the following day (T) after 10:00 CET

- As the order has not been confirmed by the fund at (T) during the confirmation period, it expires after the cut-off time (T).

In this specific case an elimination notice is sent to both counterparts through the TCS Notice (**BIN "n" - FIX •"U8"**), with the relevant value in the **EliminationIndicator** field.

3.1.4   NAV+/− entry by the fund agent

Three main conditions are required to trigger a trade:

■ The declarations must have a pre-matched status for the relevant day;

■ The NAV+/− price must be present for the concerned instrument;

■ For a fund order in cash, the quantity when rounded down must be at least 1.

The fund agent may enter the NAV+/− at any time from the opening of TCS to the fixed execution time.

Only a fund agent may enter a NAV+/−.

The fund agent enters the NAV+/− for the instrument(s) it manages. The message used for this purpose is the *TCS Price Input (BIN "p" – FIX "Up")* message.

If valid, the *TCS Price Acknowledgement (BIN "q" – FIX "Ua")* message is sent to the fund agent.

Note that after the fixed execution time, and if a fund agent tries to enter a NAV+/− he will receive a TCS message Reject (BIN "d" – FIX "Uj") with the sub code 801.*

3.1.5   Matching at a single execution time and at a single price

Following the execution, the confirmation of the trade is immediately sent for each trade generated at the single execution moment to the counterparts through the TCS Notice (BIN "n" – FIX "U8").

This matching notice contains the following information, for the NAV Trading Facility only:

■ The matching price, which is the NAV+/−

■ The traded quantity. In the case of fund orders in cash (operation type = I), the quantity is calculated from the cash amount entered in the declaration, divided by the execution price (NAV+/−), and rounded down with no decimal places.

   Note that if the result of the division after rounding down is 0 then the trade is rejected (see below).

■ The amount for fund declaration. This field is only applicable for trades resulting from the execution of fund orders in cash (operation type "I"). It is the cash amount entered by the buyer and the seller. Note that it may be slightly different from the effective trade amount which is the result of the NAV+/− quantity calculated by TCS.

A clearing **M1** message is sent for clearing and settlement.

For each trade, a broadcast **TCS trade (242 message)** is sent immediately to the market.

The price and quantity traded are broadcast for each trade. However, please note that a single **TradeType** indicator "I" is broadcast to the market, regardless of whether the fund order is in quantity ("i") or cash ("I").

For each security eligible for the NAV Trading Facility, the NAV+/− price is sent immediately after the execution time in the Price Update 241 message, provided that the fund agent has entered a NAV+/−. Note that this message is sent even if no match occurs for the instrument concerned.

3.2 PARTICULARITIES OF THE MODEL

3.2.1 Elimination cases for a pending or a pre-matched order

After a set length of time, TCS eliminates any declaration awaiting matching and sends TCS Notice *(BIN "n" – FIX "U8")*, with "0" in the *EliminationIndicator* field to both counterparts. The countdown is triggered when the declaration is received by the TCS system.

However, for the NAV Trading Facility, elimination notices are sent under the following specific conditions:

- **Expiry of an unconfirmed order**

  - The elimination indicator is set to "0". This indicator is available for all the TCS operation types.
  - Note: While a TCS declaration expires 15 minutes after its entry in the TCS system, a non-confirmed "i" or "I" declaration expires after the confirmation period, which follows the cut-off time.

- **Expiry of a pre-matched order**

  - A pre-matched order can expire if the fund agent does not enter a NAV+/− before the execution time.
  - In case of a wrong quantity (=0) for a fund order in cash, the pre-matched declaration expires.
  - In both cases the elimination indicator is set to "0".

- **Elimination of an unconfirmed order following a corporate event**

  - The elimination indicator is set to "1".

- **Elimination of a pre-matched order following a corporate event**

  - The elimination indicator is set to "2"

- **Elimination of a pre-matched order by Euronext Cash Market Operations**

  - The elimination indicator is set to "3

3.2.2 Rejection of a declaration

- As described above, TCS checks all messages sent by members. If a message is not valid, TCS sends a *TCS message Reject (BIN "d" – FIX "Uj")*.

  For rejection messages dedicated to the NAV Trading Facility, please refer to the appendix to this document.

- **Specific case following the execution time:**

At the fixed execution moment, for an order in cash, if the calculated quantity is invalid (=0), the declaration is rejected and a TCS message **Reject** is sent to the counterpart with error code "**806**".

        Revision Number: 1.2

4.　APPENDIX

4.1　APPENDIX 1: Rejection Code Messages Dedicated To The Investment Fund Market (Nav Trading Facility)

For a full overview of reasons for message rejection, please refer to the "Universal Trading Platform for Cash Markets & TCS Error list" document.

Error Code Number	Error Code Message
129	THE INSTRUMENT IS NOT A FUND
801	NAV ENTRY IS SUPERIOR TO FIXING TIME
802	NO LINK BETWEEN THE MEMBER AND THE FUND
803	THE COUNTERPARTY IS NOT A FUND AGENT
805	INVALID CASH AMOUNT
806	TRADE REJECTED DUE TO INVALID QUANTITY

　　　　　　Revision Number: 1.2

4.2 APPENDIX 2: Configuration And Timing Of Execution Cycles: Starting Time, Duration And Ending Time Of Each Phase
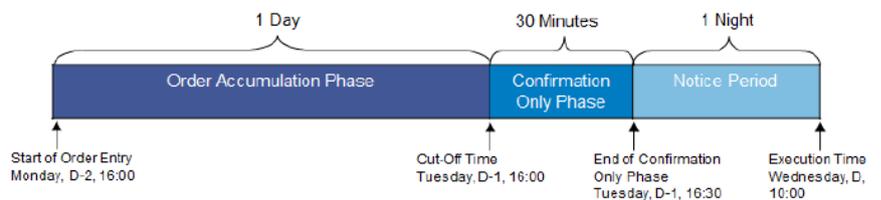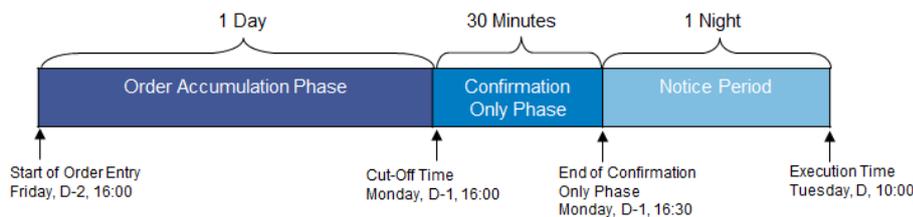
The NAV Trading Facility provides for flexibility in configuration and timing of the different Execution Cycles and their respective phases (Order-Accumulation Phase, the Cut-Off Time, the Confirmation-Only Phase, the Notice Period, the Execution-Price Entry Phase and the Execution Time). The starting time, duration and ending time of each phase are fixed but may be configured as needed to provide for Execution Cycles with different timings, e.g. there may be a Daily Execution Cycle with a cut-off time at 16:00 CET and an Execution Time at 10:00, and another Daily Execution Cycle with a cut-off time at 15:00 CET and an Execution Time at 11:00.

The standard configuration and timing of the different cycles is currently as follows:

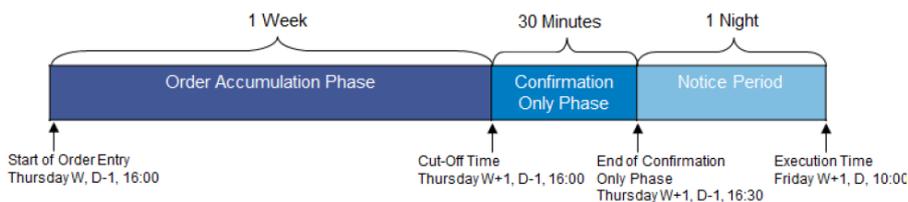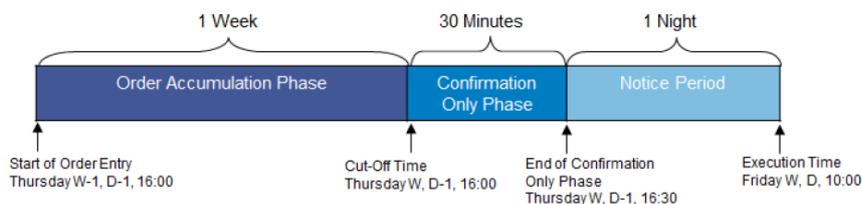### 4.2.1 Standard Daily Execution Cycle

Standard Daily Execution Cycle	Starting time	Duration	Ending Time
Order-Accumulation Phase	16:00 CET	24 hours	16:00 CET
Cut-Off Time	16:00 CET	Single point in time	N/A
Confirmation-Only Phase	16:00 CET	30 minutes	16:30 CET
Notice Period	16:30 CET	Overnight	10:00 CET
Execution-Price Entry Phase	07:15 CET	2 hours and 15 minutes	10:00 CET
Execution Time	10:00 CET	Single point in time	N/A

Please note that the Notice Period in the Daily Execution Cycle may have a duration of up to four nights.

4.2.2   Standard Weekly Execution Cycle

| Standard Weekly Execution Cycle	Starting time	Duration	Ending Time
Order-Accumulation Phase	16:00 CET	1 week	16:00 CET
Cut-Off Time	16:00 CET	Single point in time	N/A
Confirmation-Only Phase	16:00 CET	30 minutes	16:30 CET
Notice Period	16:30 CET	Overnight	10:00 CET
Execution-Price Entry Phase	07:15 CET	2 hours and 15 minutes	10:00 CET
Execution Time	10:00 CET	Single point in time	N/A

4.2.3   Standard Monthly Execution Cycle

| Standard Monthly Execution Cycle	Starting time	Duration	Ending Time
Order-Accumulation Phase	16:00 CET	1 month	16:00 CET
Cut-Off Time	16:00 CET	Single point in time (1 week before execution day)	N/A
Confirmation-Only Phase	16:00 CET	1 day (24 hours and 30 minutes, 1st trading day after cut-off time)	16:30 CET
Notice Period	16:30 CET	1 week	10:00 CET
Execution-Price Entry Phase	07:15 CET	2 hours and 15 minutes	10:00 CET
Execution Time	10:00 CET	Single point in time	N/A
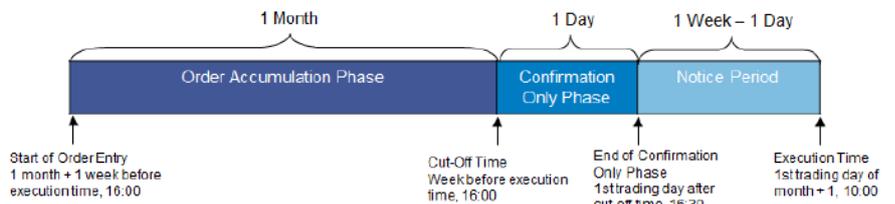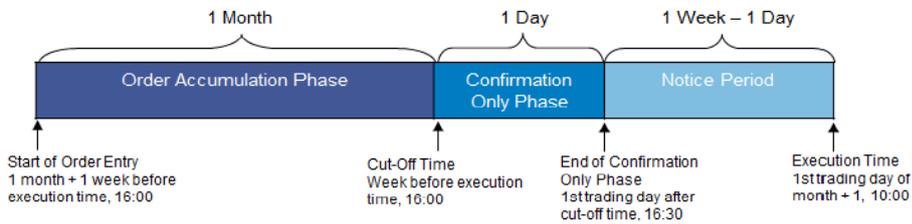
4.2.4   Standard Quarterly Execution Cycle

Standard Quarterly Execution Cycle	Starting time	Duration	Ending Time
Order-Accumulation Phase	16:00 CET	3 months	16:00 CET
Cut-Off Time	16:00 CET	Single point in time (last trading day 2nd month))	N/A
Confirmation-Only Phase	16:00 CET	1 day (24 hours and 30 minutes, last trading day of 2nd month + 1 trading day)	16:30 CET
Notice Period	16:30 CET	1 month	10:00 CET
Execution-Price Entry Phase	07:15 CET	2 hours and 15 minutes	10:00 CET
Execution Time	10:00 CET	Single point in time (1st trading day of 4th month)	N/A
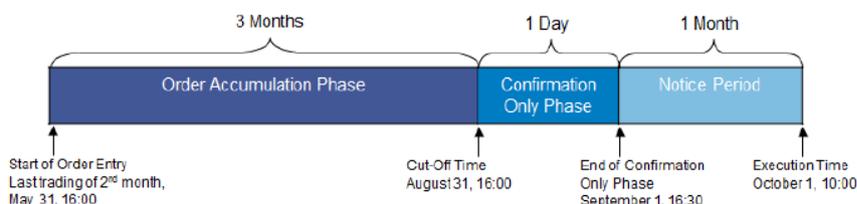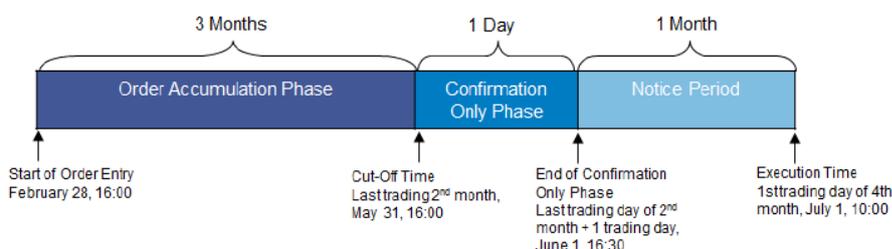
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       Revision Number: 1.2