

INTERNAL MATCHING SERVICE

NSC-VE TEST SCRIPT

Document produced by Customer Technical Support

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OVERVIEW

In preparation for the implementation of the European Union's Markets in Financial Instruments Directive (MiFID), Euronext is offering a new service on its NSC trading system that aims to optimise order execution on equity instruments. This offer is based on a new matching algorithm within the NSC orderbook, which ensures best execution directly in the order book.

This algorithm introduces a new priority for trade matching: **the Member Firm ID**. Therefore, the current mechanism, "**Price/Timestamp**", will now become:

- **1st matching criteria: "Price"**
- **2nd matching criteria: "Member Firm ID"**
- **3rd matching criteria: "Timestamp"**

Euronext requires that clients who subscribe to this new offer install trading software that conforms to the terms of the offer, i.e. that is certified by an ISV or in-house development department.

Purpose of the 'Internal Matching Service: NSC-VE test script'

The purpose of this script is to enable clients to test their solution(s), in order to check that any developments made on client trading solution(s) are consistent with the new NSC matching algorithm.

This script is designed to allow clients to confirm their readiness for the new NSC matching algorithm, whatever communication protocol they are using:

- FIX API
- MMTP API

When and how should the validation test be carried out?

The validation tests will take place on the NSC Testing Environment, the External User Acceptance platform (EUA Test platform 1), on which the MiFID-compliant version of NSC has been implemented for testing purposes. The '*Internal Matching Service: NSC-VE test script*' must be completed before the client uses this new service on the live environment. The MiFID-compliant version of NSC will be implemented on the production platform from **October 2007 in preparation for the implementation of MiFID from 1 November and the launch of Euronext's new MiFID service.**

Support that will be provided by Euronext for the 'Internal Matching Service: NSC-VE test script'

A dedicated and specially trained team within Euronext Customer Technical Support (CTS) will provide assistance and support during the monitored test sessions with those clients who have requested it. **These tests should be scheduled with CTS at least two days in advance.**

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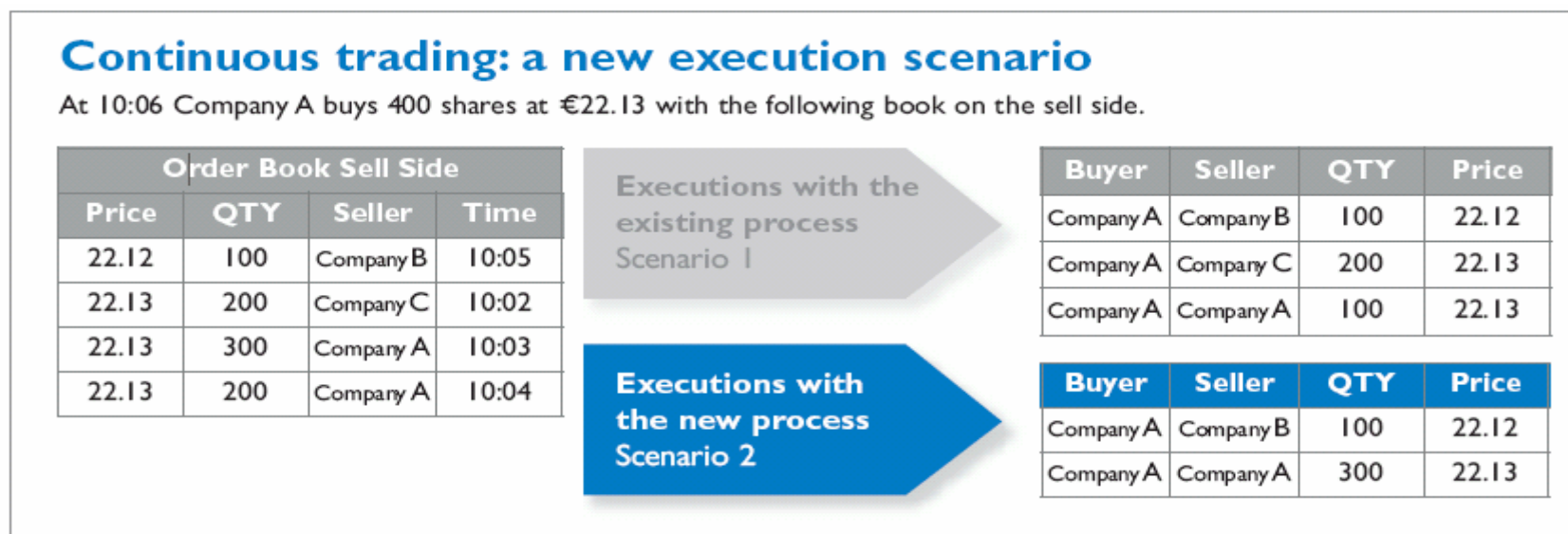
I- INTERNAL MATCHING SERVICE: HOW DOES IT WORK?

A NEW MATCHING ALGORITHM

Within the Internal Matching Service, a new matching algorithm identifies and executes internalisation opportunities (applying a **Price–Member–Time priority**). Orders may be settled directly by the originating member firm, thus eliminating counterparty risk and removing the need for clearing services.

The figure below shows two execution scenarios for Company A. Company A wishes to buy 400 shares at 22.13.

- **In scenario 1** (top right), under the existing transaction process, Company A is trading against Company B for 100 shares at 22.12, Company C for 200 shares at 22.13 and against itself for a quantity of 100 shares at 22.13.
- **In scenario 2** (bottom right), Company A is using Euronext's new Internal Matching Service to benefit from the best price on 100 shares at 22.12 against Company B and trades against itself for a quantity of 300 shares at a price of 22.13, thus optimising its order flow by internalising, and benefiting from reduced overall transaction costs.



"PRINCIPAL MEMBERS", "SUBSIDIARIES" AND "INTERNALISERS"

Principal & Subsidiary

A principal member is identified as the principal entity within a company or a financial institution. This principal member may or may not have one or several subsidiaries. One subsidiary is linked to one single principal member.

Internaliser

An internaliser is a member firm (principal or subsidiary) that executes orders preferentially against its own orderbook, or that of another internaliser from the same internaliser group, within the NSC trading engine.

An internaliser group is a group of internalisers containing one and only one principal entity, and which may contain either no, one or several subsidiary entities. All entities contained in a group of internalisers count as internalisers with each other, and their orders are matched preferentially between them.

An internaliser cannot be in two different groups of internalisers.

CLEARING SERVICE

An internaliser member (principal entity) has the choice whether or not to clear his internalised trades via the C21 application. This must be configured by Euronext at the level of the principal entity for all the internalisers in the group. If a group is configured to clear internal trades via the C21 clearing service, all the internalisers belonging to the group will clear their trades via C21.

Note: If a group is configured not to use the C21 clearing service (as will be the case for most users), only standard trades are sent to the C21 clearing application.

M1 clearing messages related to the internal trades are generated by the NSC trading engine, but routed to the C21 clearing application only for those internaliser groups that have requested that their clearing is processed through this application.

II- STANDARD CASES OF THE NEW MATCHING ALGORITHM

TEST UNIT 01: INTERNAL TRADE RESULTING FROM NORMAL ORDER TYPES

The aim of this test unit is to generate internal trades from an instrument book which does not contain any order with special conditions (ie: no iceberg or stop orders). The internaliser client can complete this test using his single principal code or his principal code associated with his subsidiary code, if applicable.

Test UNIT preparation:

The internaliser client and Euronext select a stock instrument listed on NSC-VE to use during this test unit. The internaliser client and Euronext create one of the following order book situations according to the client's internaliser group constitution:

Single Principal code					Principal + Subsidiary code				
Buy side	Sell Side				Buy side	Sell Side			
Empty	Price	Qty	Member ID	Order number	Price	Qty	Member ID	Order number	
	60	10	NYX 2	3	60	10	NYX 2	3	
	62	10	NYX 4	8	62	10	NYX 4	8	
	62	10	PRINCIPAL	3	62	10	SUBSIDIARY	3	
	62	20	NYX 8	1	62	20	NYX 8	1	
	65	5	NYX 1	2	65	5	NYX 1	2	
	65	30	PRINCIPAL	9	65	30	PRINCIPAL	9	

Action required ☛ The internaliser client enters an aggressive buy Market Order type for 80 shares (or an order limited at 65) using his principal code.

UNIT completion criteria ☛ The internaliser client must acknowledge the following trade sequence:

Single Principal code						Principal + Subsidiary code						
Trade Seq	Buyer	Seller	Qty	price	Comments	Trade Seq	Buyer	Seller	Qty	price	Comments	
1 st	PRINCIPAL	NYX 2	10	60	Standard trade	1 st	PRINCIPAL	NYX 2	10	60	Standard trade	
2 nd	PRINCIPAL	PRINCIPAL	10	62	Internal trade	2 nd	PRINCIPAL	SUBSIDIARY	10	62	Internal trade	
3 rd	PRINCIPAL	NYX 4	10	62	Standard trade	3 rd	PRINCIPAL	NYX 4	10	62	Standard trade	
4 th	PRINCIPAL	NYX 8	20	62	Standard trade	4 th	PRINCIPAL	NYX 8	20	62	Standard trade	
5 th	PRINCIPAL	PRINCIPAL	30	65	Internal trade	5 th	PRINCIPAL	PRINCIPAL	30	65	Internal trade	

Remarks: ☛ In both scenarios, the sell order number 2 is not matched and remains alone in the book.

- ☛ SLE execution notices corresponding to **standard trades do not contain the counterpart ID** (empty field).
- ☛ SLE execution notices corresponding to **internal trades contain the client's own Principal or Subsidiary counterpart ID**
- ☛ SLC trade messages corresponding to all these trades (whether internal or not) **contain the new field "transact ID"** and are **displayed with a "standard trade" indicator type**.

TEST UNIT 02: INTERNAL TRADE RESULTING FROM CROSS ORDER TYPES

The aim of this test unit is to generate internal trades from a Cross order and/or a Basket Cross order entry. The internaliser client can complete this test using his single principal code or one of his subsidiary code(s), if applicable.

Test UNIT preparation:

The internaliser client and Euronext select a stock instrument listed on NSC–VE to use during this test unit. Euronext checks that, within the order book situation described below, the cross or basket cross order entered by the internaliser client will be accepted by NSC.

Single Principal code or single Subsidiary code							
Buy side				Sell Side			
Order number	Member ID	Qty	Price	Price	Qty	Member ID	Order number
6	PRINCIPAL	50	58	60	10	NYX 2	3
11	NYX2	100	57	62	10	NYX 4	8

Action required ☛ The internaliser client enters a Cross or a Basket Cross order limited at 59 for 200 shares using his principal or his subsidiary code.

UNIT completion criteria ☛ The internaliser client must acknowledge the resulting trade as an internal Cross or Basket Cross trade:

Single Principal code or single Subsidiary code						
Seq	Buyer	Seller	Qty	price	Comments	
1 st	PRINCIPAL or SUBSIDIARY	PRINCIPAL or SUBSIDIARY	200	59	Internal trade	

- Remarks:**
- ☛ SLE Execution notice corresponding to the **internal Cross or Basket Cross trade contains the client’s own Principal or Subsidiary counterpart ID**
 - ☛ SLC trade message corresponding to the **internal Cross trade contains the new field “transact ID” and are displayed as “standard Cross trade” indicator type.**
 - ☛ SLC trade message corresponding to the **internal Basket Cross trade contains the new field “transact ID” and are displayed as “standard Basket Cross trade” indicator type.**

III- SPECIAL CASES OF THE NEW MATCHING ALGORITHM

TEST UNIT 03: INTERNAL TRADE RESULTING FROM ICEBERG ORDER TYPE

The aim of this test unit is to generate internal trades from an instrument book containing iceberg orders. The internaliser client can complete this test using his single principal code or his principal code associated with his subsidiary code, if applicable.

Reminder of the procedure:

With the internalization functionality, iceberg orders (with hidden quantity) involved within an internal trade are matched like a regular order without any replenishment. If not completely matched, a new displayed quantity must then be calculated as follows:

If the Total Match Quantity is less than the Displayed Quantity

- $New\ Displayed\ Qty = Displayed\ Qty - Match\ Qty$

If the Total Match Quantity is greater than the Displayed Quantity

- $New\ Displayed\ Qty = Disclosed\ Qty - [(Match\ Qty - Displayed\ Qty) \text{ MOD } Disclosed\ Qty]$
- *Loss of time priority*

Note that if the match quantity is equal to the displayed quantity of the iceberg order, the new displayed quantity equals the disclosed quantity

Test UNIT preparation:

The internaliser client and Euronext select a stock instrument listed on NSC-VE to use during this test unit. The internaliser client and Euronext create one of the following order book situations according to the client's internaliser group constitution:

Single Principal code						
Buy side	Sell Side					
Empty	Price	Displayed Qty	Disclosed Qty	Remaining Qty	Member ID	Order no
	25	50	50	200	NYX 2	23
	25	20	20	60	PRINCIPAL	6
	25	50	50	100	NYX 3	7
	26	20	20	80	NYX 2	9
	26	10	10	100	PRINCIPAL	1
	26	20	-	20	NYX 1	25

Principal + Subsidiary code						
Buy Side	Sell Side					
Empty	Price	Displayed Qty	Disclosed Qty	Remaining Qty	Member ID	Order no
	25	50	50	200	NYX 2	23
	25	20	20	60	SUBSIDIARY	6
	25	50	50	100	NYX 3	7
	26	20	20	80	NYX 2	9
	26	10	10	100	PRINCIPAL	1
	26	20	-	20	NYX 1	25

Action required ☛ The internaliser client inserts an aggressive buy Market Order type for 450 shares (or an order limited at 27) using his principal code.

UNIT completion criteria ☛ The internaliser client should acknowledge the following trade sequence:

Single Principal code					
Trade Seq	Buyer	Seller	Qty	price	Comments
1st	PRINCIPAL	PRINCIPAL	60	25	Internal trade
2 nd	PRINCIPAL	NYX 2	200	25	Standard trade
3 rd	PRINCIPAL	NYX 3	100	25	Standard trade
4th	PRINCIPAL	PRINCIPAL	90	26	Internal trade

Principal + Subsidiary code					
Trade Seq	Buyer	Seller	Qty	price	Comments
1st	PRINCIPAL	PRINCIPAL	60	25	Internal trade
2 nd	PRINCIPAL	NYX 2	200	25	Standard trade
3 rd	PRINCIPAL	NYX 3	100	25	Standard trade
4th	PRINCIPAL	PRINCIPAL	90	26	Internal trade

Remarks: ☛ After the transactions have taken place, in both scenarios the order book remains in the following situation:

Single Principal code					
Buy side	Sell Side				
Empty	Price	Displayed Qty	Remaining Qty	Member ID	Order no
	26	20	80	NYX 2	9
	26	20	20	NYX 1	25
	26	10	10	PRINCIPAL	1

Principal + Subsidiary code					
Buy Side	Sell Side				
Empty	Price	Displayed Qty	Remaining Qty	Member ID	Order no
	26	20	80	NYX 2	9
	26	20	20	NYX 1	25
	26	10	10	PRINCIPAL	1

- ☛ Order number 1 is partially filled for a quantity of 90 and remains in the book for a quantity of 10. **This order has lost its priority.**
- ☛ SLE execution notices corresponding to **standard trades do not contain the counterpart ID** (empty field).
- ☛ SLE execution notices corresponding to **internal trades contain the client's own Principal or Subsidiary counterpart ID.**
- ☛ SLC trade messages corresponding to **all these trades (whether internal or not) contain the new field "transact ID"** and are displayed with a "standard trade" indicator type.

TEST UNIT 04: INTERNAL TRADE RESULTING FROM STOP ORDER TYPE

The aim of this test unit is to generate internal trades from an instrument book containing Stop orders. The internaliser client can complete this test using his single principal code or his principal code associated with his subsidiary code, if applicable.

Reminder of the procedure:

Whether specified as a stop-loss order or stop-limit order, the order is triggered only when the trigger price has been reached as a traded price. In both cases, when the trigger price is reached, one of two situations can occur:

- **Stop-limit orders:** The order is traded if its limit is compatible with opposing orders in the order book. Otherwise, it is displayed in the order book at its limit price.
- **Stop-loss orders:** Either the order is traded or it triggers a freeze, because of a price above an upper threshold or below a lower threshold, or it remains in the order book without a price

Once an incoming order causes the quotation of a price equal to the trigger price, the system fills the incoming order. The triggered stop-loss or stop-limit order is only taken into account by the system once the incoming order has been entirely processed.

Test UNIT preparation:

The internaliser client and Euronext select a stock instrument listed on NSC-VE to use during this test unit. The internaliser client and Euronext create one of the following order book situations according to the client's internaliser group constitution:

Single Principal code								
Buy side (Stop orders only)					Sell side			
Order no	Member ID	Qty	Limit Price	Trigger Price	Price	Qty	Member ID	Order no
4	NYX 1	100	22	20	20	40	NYX 2	6
14	PRINCIPAL	400	22	20	20	100	PRINCIPAL	2
					22	50	NYX 3	12
					22	100	NYX 4	5
					22	50	PRINCIPAL	1

Principal + Subsidiary code								
Buy side (Stop orders only)					Sell side			
Order no	Member ID	Qty	Limit Price	Trigger Price	Price	Qty	Member ID	Order no
4	NYX 1	100	22	20	20	40	NYX 2	6
14	PRINCIPAL	400	22	20	20	100	PRINCIPAL	2
					22	50	NYX 3	12
					22	100	NYX 4	5
					22	50	SUBSIDIARY	1

Action required ➡ The internaliser client inserts an aggressive buy Market Order type for 100 shares (or an order limited at 20) using his principal code.

UNIT completion criteria ☛ The internaliser client should acknowledge the following trade sequence:

Single Principal code					
Trade Seq	Buyer	Seller	Qty	price	Comments
1st	PRINCIPAL	PRINCIPAL	100	20	Internal trade
2 nd	NYX 1	NYX 2	40	20	Standard trade
3 rd	NYX 1	NYX 3	50	22	Standard trade
4th	NYX 1	NYX 4	10	22	Standard trade
5th	PRINCIPAL	PRINCIPAL	50	22	Internal trade
6th	PRINCIPAL	NYX 4	90	22	Standard trade

Principal + Subsidiary code					
Trade Seq	Buyer	Seller	Qty	price	Comments
1st	PRINCIPAL	PRINCIPAL	100	20	Internal trade
2 nd	NYX 1	NYX 2	40	20	Standard trade
3 rd	NYX 1	NYX 3	50	22	Standard trade
4th	NYX 1	NYX 4	10	22	Standard trade
5th	PRINCIPAL	SUBSIDIARY	50	22	Internal trade
6th	PRINCIPAL	NYX 4	90	22	Standard trade

Remarks: ☛ After the triggering of stop orders, in both scenarios the order book remains in the following situation:

Single Principal code				
Buy side				Sell side
Order no	Member ID	Qty	Price	Empty
14	PRINCIPAL	260	22	Empty

Principal + Subsidiary code				
Buy side				Sell side
Order no	Member ID	Qty	Price	Empty
14	PRINCIPAL	260	22	Empty

- ☛ Stop Order number 14 is partially filled for a quantity of 140 shares and remains in the book for a quantity of 260.
- ☛ SLE execution notices corresponding to **standard trades do not contain the counterpart ID** (empty field).
- ☛ SLE execution notices corresponding to internal trades contain the **client's own Principal or Subsidiary counterpart ID**.
- ☛ SLC trade messages corresponding to all these trades (whether internal or not) **contain the new field "transact ID"** and are **displayed with a "standard trade" indicator type**.

IV- RECEPTION OF TRADE RETRANSMISSION

The aim of this test unit is to check the internaliser's capacity to receive and process the trade retransmission messages (MMTP 0142 & FIX U0142) corresponding to all internal trades generated.

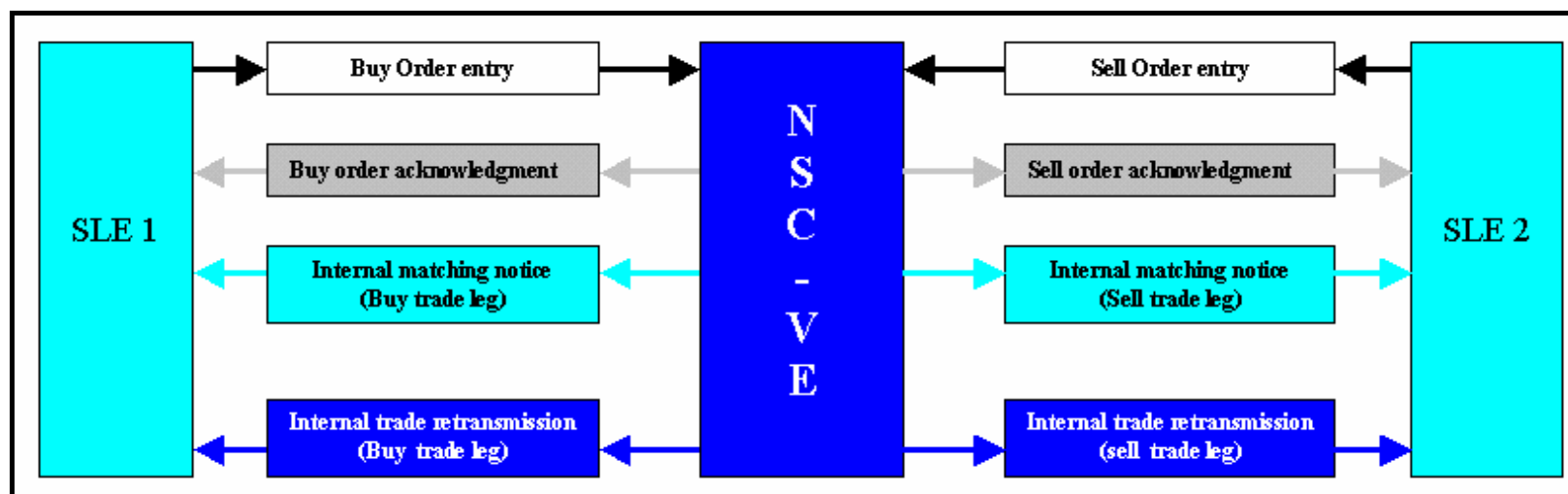
TRADE RETRANSMISSION PROCEDURE

All internal trades will automatically be re-sent by NSC-VE, after the Market Closing Session to each member firm identified (buy & sell). In this case, the "Trade Retransmission" message will be used, but will not be preceded/followed by the standard Begin/End messages.

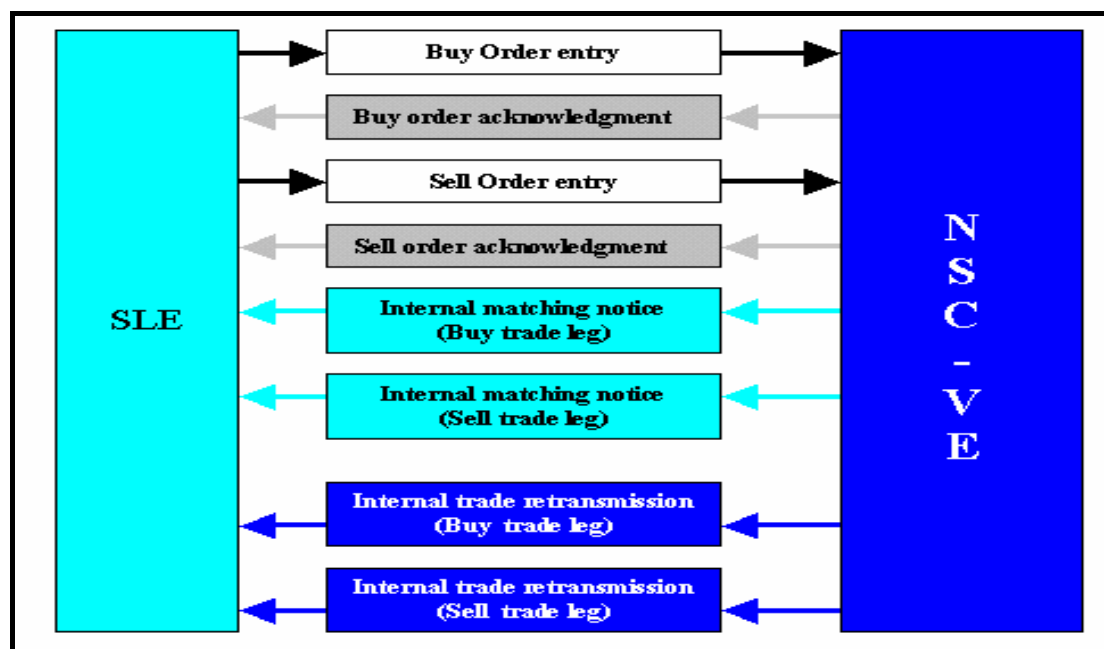
In the MiFID-compliant EUA test platform 1, this retransmission is operated **from 20:00 CET**.

Trade retransmission messages are considered as Private Unsolicited messages and therefore are sent to the internaliser's order server, which has received the original internal matching notice in real time. Examples:

Case of internal matching resulting from orders issued from different order servers (SLE)



Case of internal matching resulting from orders issued from the same order server (SLE)



Test UNIT preparation ☛ The Internaliser client must leave his order server(s) connected to the Euronext systems in order to make sure that all trade retransmission messages issued from 20:00 CET were received.

UNIT completion criteria ☛ The Internaliser must confirm to CTS the correct number of trade retransmission messages received by his order server(s). For each internal trade performed by the Internaliser, a corresponding trade retransmission message will be issued at the end of the day. This confirmation should be sent by email the following day to the CTS contact person with whom the tests have been performed.