# Johannesburg Stock Exchange

## Post-trade and Information Services

## ITaC Position Paper
## Post-trade PP02 – Risk Management

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# 1 DOCUMENT CONTROL

## 1.1 Table of Contents

## 1.2 Document Information

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| 23 May 2016 | 1.0 | Initial Published Version |
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## 1.4 References

| Name | Version | Description |
|---|---|---|
| | | |

## 1.5 Contact Details


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### Clearing specifications disclaimer

## 1.6 Definitions, Acronyms and Abbreviations

| | |
|---|---|
| **ITaC** | Integrated Trading and Clearing – a JSE project aimed at implementing an integrated Trading and Clearing solution across all of its markets i.e. Equity, Bonds and Derivatives. |

# 2 RISK MANAGEMENT IN AN INTEGRATED WORLD

JSE Clear, the central counterparty (CCP) for the derivative markets operated by the JSE, has built a strong, internationally recognised risk management framework. The JSE Integrated Trading and Clearing (ITaC) project aims to consolidate all JSE derivative markets onto a central platform with enhanced risk management and clearing capabilities. This paper focuses on the key ITaC changes with regards to pre- and post-trade risk management in support of the integrated clearing objectives of centralised, sophisticated and more real-time and proactive risk management.

## 2.1 Pre-trade risk management

### 2.1.1 Introduction

The new ITaC solution provides a range of pre-trade risk controls that allow the exchange to protect the market against systemic risk and ensure market integrity and quality. In designing the pre-trade risk management capabilities consideration has been given to the existing exchange-level pre-trade controls for the JSE derivative markets, industry best practices and recommendations from international regulatory bodies and the availability of additional pre-trade risk controls afforded by the MillenniumIT trading system.

Pre-trade risk controls reside at 3 levels i.e. at the Trading Member, Clearing Member and Exchange levels. This document describes the pre-trade risk controls at the exchange level i.e. controls that will be facilitated by the MillenniumIT trading system. A summary of pre-trade controls recommended at the Trading and Clearing Member levels can be found in the ITaC Technical Working Group presentation covering this topic:

Link to JSE ITaC Website (Related document: "20150921 ITaC Technical Working Group FINAL.pdf")

### 2.1.2 Market-wide limits

All orders entered by an Interface User ID (CompID) will be validated against the specified maximum order size and value applicable to the market in question. If the submitted volume or value is larger than the specified maximum parameter the order will be rejected.

Each side of a quote[1] , i.e. the bid and the offer, will be separately validated against the maximum order parameters, with the bid validated first.

### 2.1.3 Permissions

CompIDs belonging to each Trading Member will be enabled and permissioned at a market level, with the following market gateways available:

- Equity Market
- Equity Derivatives, Currency Derivatives and Interest Rates Markets
- Commodities and Bond Markets

[1] A quote is a single messages used to generate a buy and sell order simultaneously

The CompIDs will be assigned, created and permissioned by the JSE on a market level during the enablement process and IP address validation will be performed by the system on connection and login. Only the specific link of a CompID login originating from the specified IP address will be granted access to the gateway. A CompID will be specifically assigned to trade on a Market.

### 2.1.4 Cancel on Disconnect/Logout

This functionality will provide users with the ability to cancel all open orders/quotes, with the option to exclude *Good Till Day* and *Good Till Time* orders. This will provide users with the confidence that they will not be adversely affected by positions still active in the market whilst having no connectivity.

Enabling this functionality will cancel all active orders in the event of disconnection and can be set up per order, where the field "Cancel On Disconnect" must be set to 'YES'.

The option will exist to delay the cancelation which allows management of orders in case millisecond disconnects are experienced.

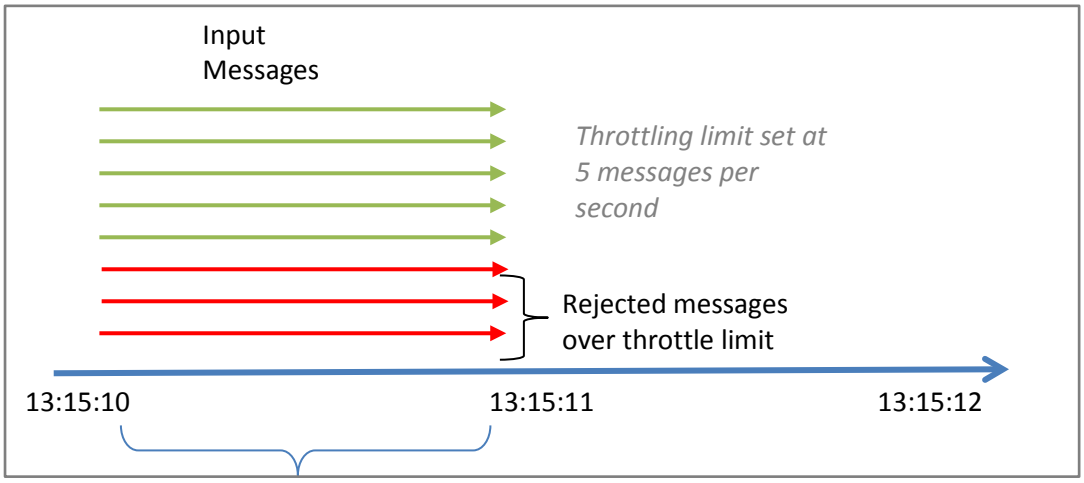
The table below represents the combinations available in the trading engine:

| Enablement Setup: Mass Cancel on Disconnect/Logout | User Activity: User Specified Value in Order/Quote | Result: Order/Quote Cancelled (YES/NO) |
|---|---|---|
| Yes | No | No |
| No | No | No |
| No | Yes | No |
| Yes | Yes | Yes |
| Yes | Not set | No |
| No | Not set | No |

### 2.1.5 Input Message Rate Throttling

The Exchange will have the ability to manage and throttle message input rates on a CompID level which will limit the number of messages entered into the system within a second, in order to limit the level of order "noise" in the market. This "noise" has historically been attributed to the trading style of certain market participants and algorithms. The setup will form part of the enablement process when Interface User IDs (CompIDs) are created per firm.

Inbound messages are received by the gateway up to the limit set for the respective CompID e.g. 100 messages per second. Any orders that are received that breach this limit within the same second will be rejected. The representation below illustrates message rate throttling and rejection:




The JSE will communicate the preferred throttle limits in due course and members are welcome to engage with the trading team should they believe these limits too stringent. Users are advised to design systems with limits in mind and set in-house message input rates to ensure no breaches of the CompID order rate. Should excessive breaching of the limits occur, the offending CompID could be potentially locked.

### 2.1.6 Disabling Access to Trade (Kill Switch Concept)

Operations can immediately disable the access of a CompID/Firm/Trader Group on instruction by Market Surveillance or the Trading Member. JSE Market Operations can also, as it deems fit, suspend any user, trader, trader group or Trading Member firm.

### 2.1.7 Price Bands on Off Book Trades

Off Order Book Trades will be subject to a pricing range away from the Central Order Book Price in order to ensure that the pricing of these transactions are within a fair range.

In the event that an Off Book Trade breaches a price band, an alert is sent on the trade capture report to the trading member and a notification of the breach is sent to the clearing member on the deal message published by the clearing system. JSE Market Operations and Surveillance are also notified of the breach via an alert and JSE Surveillance may request transaction to be reversed or cancelled.

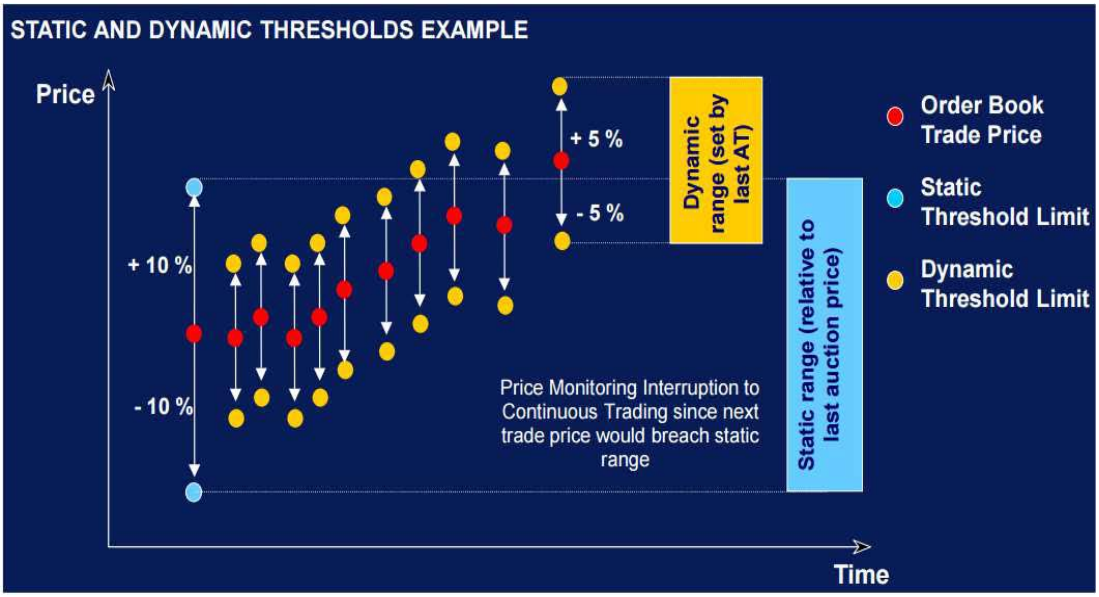
### 2.1.8 Circuit Breakers

Circuit Breakers are necessary in order to protect market participants against sudden large changes in instrument prices as well as maintain market quality in the face of potential market manipulation.

Two types of circuit breakers will exist in the Trading System, the more restrictive of which, will always take precedence:

- Static Reference Price Circuit Breaker – which refers to either the previous day's closing price or the last auction price
- Dynamic Reference Price Circuit Breaker - refers to last traded price

The circuit breaker thresholds can be illustrated as follows:




These can be set to either percentage values or static values, and will be applicable to all orders aggressing the order book with matching potential on a pre-execution basis. JSE will be implementing percentage values for all markets except for the commodities market where price limits will apply.

When an order breaches the relevant limit, a volatility auction is triggered, which will allow users to manage orders where no executions will take place. These volatility auctions will be subject to price monitoring extensions or market order extensions, depending on market conditions.

## 2.2 Post-trade Risk Management

### 2.2.1 Introduction

The following section summarises the key post-trade risk management enhancements to be delivered through the ITaC project. These are enhancements to the current post-trade risk management framework; for an overview of the current framework and policies please refer to the Risk Management page on the JSE website.

### 2.2.2 Intraday Risk Monitoring

A new service that will be introduced through ITaC in support of the move to more real-time and proactive risk management is the intraday risk monitoring service. This will support the monitoring of risk throughout the trading day.

Updated exposures and other risk metrics will be calculated and published on the Clearing system interface (EMAPI) to Trading Members and Clearing Members throughout the day as positions are updated by trading and deal management activity and as new prices are made available to the Clearing system (on a periodic snapshot basis).

The exposure and risk information will be aggregated to Client, Trading Member and Clearing Member levels and includes:

- Initial Margin (IM), Additional Margin and Settlement Margin per account recalculated and published with each position update. The IM amount includes the J-SPAN figure and the Large Position and Liquidation Period Add-ons.
- Variation Margin per account per position recalculated and published at regular intervals
- Collateral revalued at regular intervals
- By consolidating these elements, an estimation of the margin call that the client will face at the end of the day is also published.

### 2.2.3 Thresholds

A threshold can be set on the margin call of a client i.e. (Initial Margin + Additional Margin + Variation Margin) - Collateral is compared to the threshold set. Notifications of margin calls that breach thresholds are published on the Clearing system external interface.

The JSE sets a global threshold, Clearing Members can set a more conservative threshold for their Trading Members and clients and Trading Members can set a more conservative threshold for their clients.

**Example of a dashboard that can be created based on the risk information published on the Clearing system interface (EMAPI)**

**Client Level**

| Clearing Member | Trading Member | Client | J-SPAN | Liquidation Period Add-on | Large Position Add-on | Settlement Margin | IM | AM | VM | Collateral Value | Indicative Call |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AAA CM | AAA TM | AAA TM House | 82 780 | 0 | 0 | 0 | 82 780 | 0 | -16 507 557 | 100 000 | -16 524 777 |
| AAA CM | AAA TM | AAA TM BR1 | 439 700 | 25 000 | 0 | 35 000 | 499 700 | 0 | 558 317 | 499 700 | 558 317 |
| CCC CM | CCC TM | CCC TM House | 8 520 000 | 350 000 | 2 500 000 | 15 000 | 11 385 000 | 1 707 750 | -2 869 199 | 9 200 000 | 1 023 551 |
| CCC CM | CCC TM | CCC TM BR1 | 12 727 800 | 15 000 000 | 20 000 000 | 0 | 47 727 800 | 7 159 170 | 26 985 363 | 60 000 000 | 21 872 333 |
| AAA CM | AAA2 TM | AAA2 TM House | 59 200 | 0 | 15 000 | 0 | 74 200 | 0 | 37 338 | 100 000 | 11 538 |
| AAA CM | AAA TM | AAA BR1 CL1 | 134 800 | 0 | 0 | 5 000 | 139 800 | 0 | 58 317 | 400 000 | -201 883 |
| BBB CM | BBB TM | BBB CL2 | 0 | 0 | 0 | 0 | 0 | 0 | 89 950 | 1 000 | 88 950 |
| CCC CM | CCC TM | CCC TM CL1 | 46 620 | 0 | 0 | 0 | 46 620 | 6 993 | 26 985 363 | 50 000 | 26 988 976 |
| DDD CM | DDD TM | DDD TM CL1 | 5 000 | 0 | 0 | 0 | 5 000 | 0 | -47 500 | 0 | -42 500 |

**Trading Member Level**

| Clearing Member | Trading Member | J-SPAN | Liquidation Period Add-on | Large Position Add-on | Settlement Margin | IM | AM | VM | Collateral Value | Indicative Call |
|---|---|---|---|---|---|---|---|---|---|---|
| AAA CM | AAA TM | 657 280 | 25 000 | 0 | 40 000 | 722 280 | 0 | -15 890 922 | 999 700 | -16 168 342 |
| CCC CM | CCC TM | 21 294 420 | 15 350 000 | 22 500 000 | 15 000 | 59 159 420 | 8 873 913 | 51 101 526 | 69 250 000 | 49 884 859 |
| AAA CM | AAA2 TM | 59 200 | 0 | 15 000 | 0 | 74 200 | 0 | 37 338 | 100 000 | 11 538 |
| BBB CM | BBB TM | 0 | 0 | 0 | 0 | 0 | 0 | 89 950 | 1 000 | 88 950 |
| DDD CM | DDD TM | 5 000 | 0 | 0 | 0 | 5 000 | 0 | -47 500 | 0 | -42 500 |

**Clearing Member Level**

| Clearing Member | J-SPAN | Liquidation Period Add-on | Large Position Add-on | Settlement Margin | IM | AM | VM | Collateral Value | Indicative Call |
|---|---|---|---|---|---|---|---|---|---|
| AAA CM | 716 480 | 25 000 | 15 000 | 40 000 | 796 480 | 0 | -15 853 584 | 1 099 700 | -16 156 804 |
| CCC CM | 21 294 420 | 15 350 000 | 22 500 000 | 15 000 | 59 159 420 | 8 873 913 | 51 101 526 | 69 250 000 | 49 884 859 |
| BBB CM | 0 | 0 | 0 | 0 | 0 | 0 | 89 950 | 1 000 | 88 950 |
| DDD CM | 5 000 | 0 | 0 | 0 | 5 000 | 0 | -47 500 | 0 | -42 500 |

### 2.2.4 Margin methodology

Initial Margin, at go-live, will be calculated according to the J-SPAN methodology, with minor changes to the way in which volatilities are adjusted when constructing contract level risk-arrays. Additional Margin charged by the Clearing Member, as well as JSE calculated Liquidation Period and Large Exposure initial margin requirements, if applicable, will then be added to the J-SPAN calculation to complete the Initial Margin calculation. The Liquidation Period initial margin caters for positions that could take longer to liquidate than assumed under J-SPAN, whilst the Large Exposure initial margin covers stressed exposure not covered by margin and losses that could exceed half the size of the JSE Clear default fund.

For an overview and step-by step walkthrough of the J-SPAN methodology refer to the ITaC Technical Working Group presentation at the following link:

Link to JSE ITaC Website (Related document: "20150921 ITaC Technical Working Group FINAL.pdf")

The J-SPAN technical specification can be found at Link to J-SPAN technical specification

The JSE expects to replace the J-SPAN margin methodology with the Historical Value at Risk (HistVaR) methodology in due course. Any changes proposed in this regard will follow the current rigorous approval process, including market consultation and approval required at the relevant governance committees before being implemented. The move to a HistVaR is envisioned to allow a larger degree of flexibility and more intuitive margin off-setting. HistVaR will be based on the historic performance of the portfolio and adjusted for Vega and Calendar Spread Risk.

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