

part of eex group



Introduction to the T7 Trading Architecture

May 23, 2018
Tysons Corner, VA

Version 1.0

Table of Contents

1.	Introduction	4
1.1	Communication Calendar T7 Release 6.1	4
1.2	Getting access to the new trading architecture	5
1.2.1	Production	5
1.2.1.1	Nodal Trading Application	5
1.2.1.2	CQG Trading Applications	5
1.2.1.3	Direct Connections	5
1.2.2	Simulation (Trading and Clearing)	5
1.2.3	Connectivity	6
2.	Interfaces, Files and FIX messages	7
2.1	Interfaces	7
2.2	Trading API	7
2.2.1	T7 Order Management (ETI)	7
2.2.2	CQG's Web API	8
2.3	Market Data	8
2.3.1	T7 Market Data and Reference Interfaces (EOBI, EMDI, MDI & RDI)	8
2.3.1.1	The T7 Market Data Interface (T7 MDI)	8
2.3.1.2	The T7 Enhanced Market Data Interface (T7 EMDI)	8

2.3.1.3	T7 Enhanced Order Book Interface (T7 EOBI)	9
2.3.1.4	The T7 Reference Data Interface (T7 RDI)	9
2.3.2	Nodal Files	9
2.3.2.1	Access Nodal Platform and sFTP server	9
2.3.3	FIX Gateway (Trade Capture)	10
3.	Risk Tools	11
3.1	Pre-Trade	12
3.2	Post-Clearing	13
3.2.1	Alert Threshold Email Functionality	13
3.2.2	Emergency Controls	15
4.	Support	16

1. Introduction

The production launch for Nodal's new trading system, based on Release 6.1 of Deutsche Boerse Group's T7 trading system, is planned for the third quarter in 2018. Nodal Exchange and Nodal Clear are committed to providing Trading Participants, Clearing Members and ISVs with information updates to support adequate planning and to ensure a successful launch. The T7 documentation will be made available on www.nodalexchange.com with the latest content prior to launch, and further, a dedicated page on Nodal's website will provide Trading Participants, Clearing Members and ISVs access to all required trading environments (Trading Production) including the current Nodal platform. The following sections will provide a high-level overview of the enhancements and impacted areas with introduction of the T7 trading system. Additionally, there are also new risk management tools made available for Clearing Members.

1.1 Communication Calendar T7 Release 6.1

This table provides an overview on when T7 related documents for the different areas will be made available:

T7 Release 6.1 – Nodal Exchange	Q1 2018			Q2 2018			Q3 2018			Q4 2018		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Introduction												
Introduction to T7 Release 6.1					◆		●					
Simulation												
T7 Simulation Calendar					●							
T7 Known Limitations						●						
Overview and Functionality												
T7 Functional and Interface Overview				●								
T7 Functional Reference				●								
Trading Interfaces												
T7 Enhanced Trading Interface – Manual incl. Repository and Header				■	●							
T7 Enhanced Trading Interface – XML Representation				■	●							
Market and Reference Data Interfaces												
T7 Market-, Enhanced Order Book- and Reference Data Interfaces, Manual incl. Fast Message Template and Repository				■	●							
Network Access												
N7 Network Access Guide						●						

Diamonds, squares, and circles represent preliminary, simulation, and final versions of each document

1.2 Getting access to the new trading architecture

1.2.1 Production

1.2.1.1 Nodal Trading Application

Nodal is going to provide its participants access to a web-based feature-rich trading screen based on CQG's front end technology. Once logged in, traders will have the ability to customize the default view to their own needs and requirements using a variety of widgets. The trading application can be accessed directly through a designated link on Nodal's website.

1.2.1.2 CQG Trading Applications

In certain situations, Trading Participants may also be able to integrate Nodal Exchange as an additional trading venue in their existing CQG Desktop, CQG Integrated Client or QTrader environments. Please reach out to your CQG sales representative for more information.

1.2.1.3 Direct Connections

Nodal's new technology will offer market participants to write directly to T7's native order management interface – Enhanced Trading Interface (ETI). Connectivity to this interface will be offered through a non-normalized cross-connect connection which is explained in section 1.2.3.

Furthermore, Nodal's FIX Trade Capture interface will be enhanced with additional fields that support clients' Straight Through Processing (STP) for the new trading architecture; this interface will maintain backwards compatibility.

Further details of the different interface types are highlighted in the interface section 2.

1.2.2 Simulation (Trading and Clearing)

Trading

In order to provide interested Trading Participants the opportunity to familiarize themselves with the new trading screen and environment prior to production launch, the following link allows signing up for a free trial/demo account to test drive the CQG trading system:

<https://mdemo.cqg.com/cqg/desktop/demorequest>

Nodal is going to offer a simulation environment with a range of Nodal contracts/products with the new trading screen and will make connectivity information available at a later date.

The following overview shows the availability of the different trading and clearing environments:

Environment	Availability
CQG Desktop (Trading) - Demo	Immediately
CQG Desktop with selection of Nodal contracts - Demo	To be announced
Nodal Clear Simulation	See simulation calendar

Simulation Calendar

A simulation calendar will be made available with this document to provide an overview and to structure testing activity.

Interested Clearing Members can reach out to Technology & Operations Customer Service at clearing@nodalexchange.com to have Nodal Clear simulation credentials set up and to receive further information on how to access the clearing simulation.

1.2.3 Connectivity

Nodal's participants can choose among the following three connection types based on their requirements:

- Internet – The Nodal trading application supported by CQG and CQG Desktop application will connect through the internet. Firms connecting over the internet are responsible for the quality and reliability of their internet connections.
- Web API – CQG's Integrated Client and QTrader, as well as third-party trading applications, can utilize web API to connect through their associated Clearing Member – more details are available in section 2.2.2;
- Non-normalized Cross Connect – For firms that wish to connect to Nodal T7 interfaces, latency and reliability of the connections are critical. Thus, Nodal will offer a cross connection service within the Primary data center. This service will be provided to customer firms by Nodal and implemented, with a firm's approval, by Equinix. These cross-connects will not be normalized (i.e. guaranteed to be at a constant minimum allowed length) by Nodal Exchange.

While the exact details of the Nodal installation are still being finalized, you can get an overview from the following Deutsche Boerse materials:

<http://www.xetra.com/blob/3194800/c414799cc3d478ee58c2454e90b0934e/data/Insight-into-trading-system-dynamics.pdf>

2. Interfaces, Files and FIX messages

2.1 Interfaces

Nodal Trading Participants, Clearing Members and ISVs will have access to multiple interfaces to connect to the T7 trading architecture depending on their individual needs and requirements. The following section describes the available interfaces on a high level – Nodal is going to make detailed interface description documents available on www.nodalexchange.com at RESOURCES > TECHNOLOGY > T7 TRADING ARCHITECTURE RELEASE 6.1 in Q2/2018 (also see communication calendar in section 1.1).

2.2 Trading API

2.2.1 T7 Order Management (ETI)

This interface should be used for order entry and management by those who need system-to-system order management capabilities, have sponsored access approved for them by their Clearing Member, must have the possible lowest latency, and have high-end technical capabilities. While the products will be limited to those that trade on Nodal, the specification for this API will be identical to that used by Eurex. Trading Participants will need to establish a separate connection to Nodal's instance of T7 but any existing technology that interacts with Eurex will also be able to interact with Nodal with little to no changes.

More detailed information about the T7 ETI is available on www.nodalexchange.com at RESOURCES > TECHNOLOGY > T7 TRADING ARCHITECTURE RELEASE 6.1 > T7 Enhanced Trading Interface - Manual v1.1

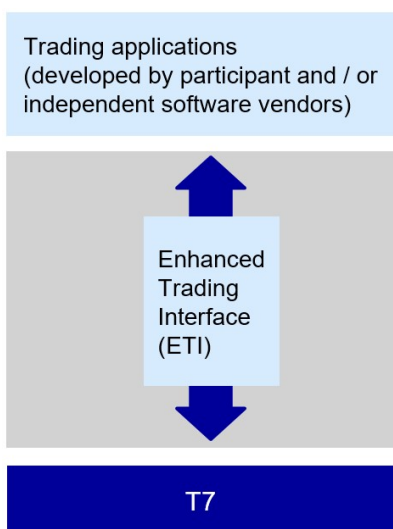


Figure 1 - Enhanced Trading Interface (ETI)

2.2.2 CQG's Web API

This interface should be used for order management, market data, and reference data by those who need system-to-system order management capabilities, have sponsored access approved for them by their Clearing Member, do not need the lowest possible latency, and have reasonable technical capabilities. At launch this service will be available only via the internet. More details are available at

<http://partners.cqg.com/api-resources/web-api>

2.3 Market Data

Nodal's new technology set will launch with the following market data-related APIs:

2.3.1 T7 Market Data and Reference Interfaces (EOBI, EMDI, MDI & RDI)

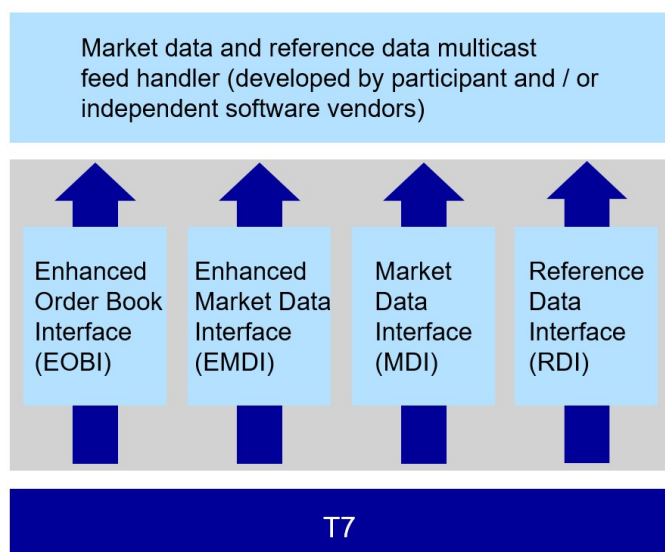


Figure 2 - Overview Market and Data Interfaces

2.3.1.1 The T7 Market Data Interface (T7 MDI)

The T7 MDI interface is one of the two offered public market data interfaces which is intended for a low bandwidth network. This interface provides netted, price-level aggregated market data, i.e. the updates of the order book are sent at regular intervals; they are not provided for every order book change. On-exchange trades are not reported individually; however, statistical information (daily high/low price, last trade price and quantity) is provided instead.

2.3.1.2 The T7 Enhanced Market Data Interface (T7 EMDI)

The T7 EMDI is the second offered public market data interface intended for a high bandwidth network. This interface provides unnetted, price-level aggregated market data, i.e. the updates of the order book

are delivered for all order book changes up to a given level; all on-exchange trades are reported individually.

More detailed information about the T7 MDI and EDMI public market data interfaces is available on www.nodalexchange.com at RESOURCES > TECHNOLOGY > T7 TRADING ARCHITECTURE RELEASE 6.1 > T7 Market and Reference Data Interfaces - Manual v.6.1

2.3.1.3 T7 Enhanced Order Book Interface (T7 EOB)

This interface provides the entire visible order book, by publishing information on each individual order and quote along with state information in unnetted manner. The entire order book is published incrementally when order book is open and via snapshots periodically.

More detailed information about the T7 EOB is available on www.nodalexchange.com at RESOURCES > TECHNOLOGY > T7 TRADING ARCHITECTURE RELEASE 6.1 > T7 Enhanced Order Book Interface - Manual v.6.1

2.3.1.4 The T7 Reference Data Interface (T7 RDI)

This interface provides reference data for products and instruments that are available for trading, including exchange-listed spreads. The reference data is delivered on a product and instrument level. Every tradable instrument is referenced by a unique identifier; for this reason, the reference data information is absolutely essential for any trading application.

More detailed information about the T7 RDI is available on www.nodalexchange.com at RESOURCES > TECHNOLOGY > T7 TRADING ARCHITECTURE RELEASE 6.1 > T7 Market and Reference Data Interfaces - Manual v.6.1

2.3.2 Nodal Files

Nodal offers a range of file and report services to their Trading Participants and Clearing Members which are available via sFTP as well as via the browser-based Nodal Suite. There are no changes planned to the file formats of the existing files with the introduction of the T7 trading architecture. These files will continue to be available and will continue to include all trading done in the central limit order book as well as blocked trades. Contact Technology & Operations Customer Service at clearing@nodalexchange.com for details, including format and delivery specifications.

2.3.2.1 Access Nodal Platform and sFTP server

With the introduction of the T7 trading architecture there will be changes to the environment connection details as described in Nodal's flat file interface specification. Although the hostnames of the Production and Market Test Production Support environments remain unchanged, the underlying IP address information will change. Hence, once Nodal has published the new IP address information for these environments, clients are advised to make the changes in their firewall configurations at their earliest convenience to mitigate any service interruption.

The ideal configuration is for external clients to have parsing software/tools pointing to the provided host names while firewalls are configured to allow traffic to all listed IP addresses and ports. This will ensure that, in the case of a failover from a primary to a secondary IP, client parsing software/tools will be able to seamlessly connect to the secondary service without firewall configuration changes required at the time of the failover.

2.3.3 FIX Gateway (Trade Capture)

Nodal currently offers a FIX Gateway (Trade Capture) that supports both drop copy (a message pushed by Nodal to clients) and trade search (a message pulled by clients). These messages' scope include all trade messages – those flowing from matches in the central limit order book on T7 as well as those entered as block trades into Nodal's legacy trading and clearing platform. Nodal is adding fields to its FIX Trade Capture feed to accommodate the STP needs of clients using the new trading system, but will maintain full backwards compatibility with the existing message format.

3. Risk Tools

Currently, Clearing Members and Trading Participants can set up Trade Risk Limits (TRL) for block trades at the trading account and account group (client) levels. Once a block trade is concluded and entered in the Nodal system, the total margin requirement including the new trade is compared with the set TRL – if the margin requirement is below the TRL the trade will be cleared, while if the margin requirement breaches the set TRL the new trade will be rejected by Nodal Clear (Figure 3 - Nodal trade risk validation). Additionally, lot limits can be set on expiry level based on the contract underlying, i.e. zones, hubs, nodes, gas and options on power and gas.

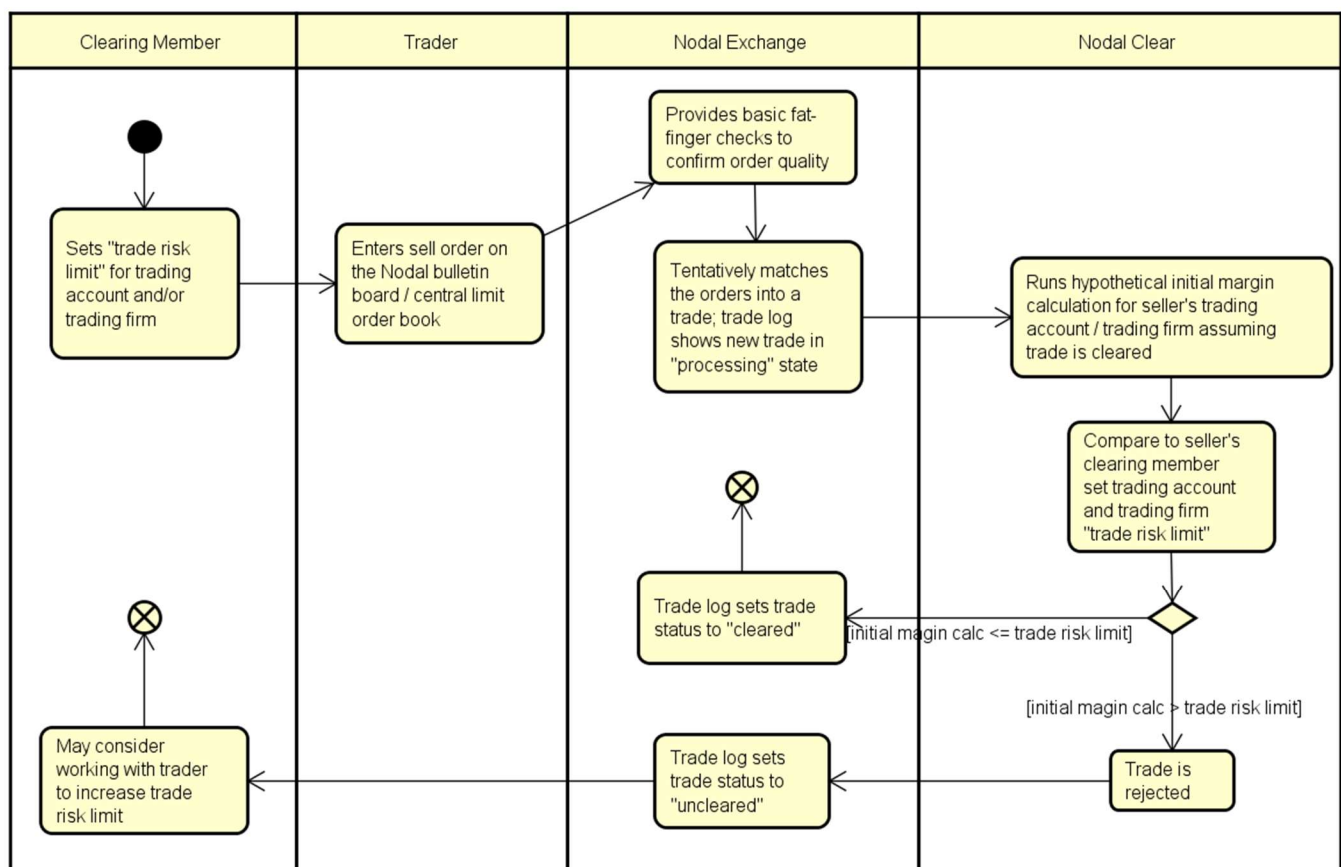


Figure 3 - Nodal trade risk validation Block Trades

With the introduction of the T7 trading architecture, Nodal is moving to a technology offering that enables highly liquid market trading and is therefore introducing a range of new risk tools to better cater to the Clearing Members' risk management needs. Clearing members will be able to select from both pre-trade and post-trade risk functionalities. The following picture provides an overview of the available risk tools including the enhancements which are being introduced with T7:

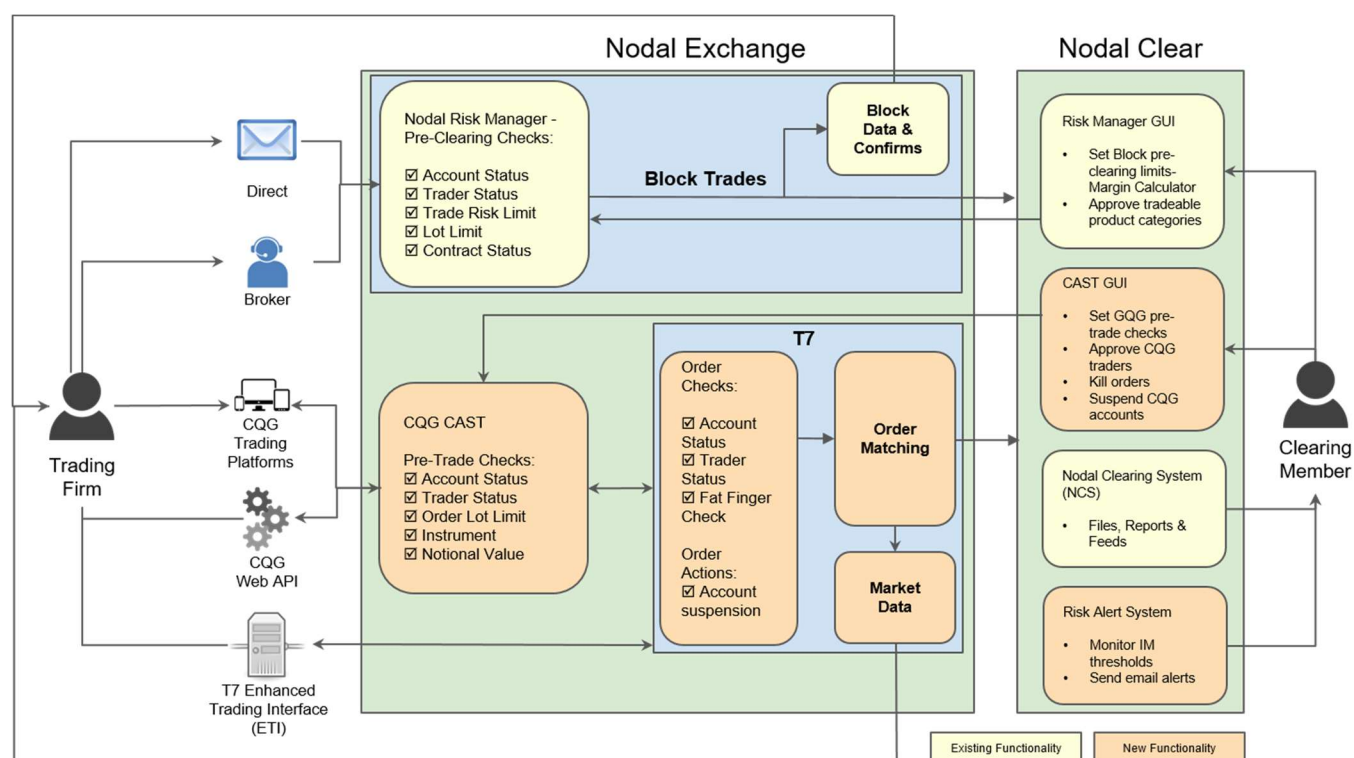


Figure 4 - Overview Risk Tools

3.1 Pre-Trade

A new GUI – CQG's Customer and Account Service Tool (CAST) will be made available that enables Clearing Members to utilize a whole range of pre-trade risk functionalities including trading configurations for governed users.

Detailed documentation for this tool including the description of the highlighted pre-trade risk functionalities can be accessed here:

<http://help.cqg.com/fcm/#!/Documents/customerandaccountservicetoolcast.htm>

Nodal Clear Risk will be able to set-up and maintain the following risk functionalities for Clearing Members where their associated Trading Participants (e.g. Sponsored Access) use the non-normalized cross-connect for the T7 trading architecture:

- Transaction Size Limits
 - Maximum order quantity
 - Maximum calendar spread quantity

3.2 Post-Clearing

3.2.1 Alert Threshold Email Functionality

A new screen is introduced in the Nodal Platform that allows Clearing Members to set up a configurable number of alert thresholds on trading account and/or account group levels which, on a post trade¹ basis, compares the total margin requirement of the current open positions (portfolio) with the TRL set by the Clearing Member. Once an entered threshold is breached an email will be sent to the Clearing Member informing them about the breach.

The following emails will be sent to the Clearing Member based on the actual event:

- Warning
 - Escalating risk level when breaching through thresholds starting with the set minimum threshold - new emails are sent whenever any single client or client trading account reaches a higher Initial Margin utilization threshold;
- Info
 - De-escalating risk level but still above the set minimum threshold
 - Initial Margin TRL utilization drops below set minimum threshold

¹ Note that these same full portfolio risk checks will continue to be used on a pre-clearing basis to validate block trades entered on behalf of the relevant trading accounts and firms.

The following picture depicts sample threshold levels that trigger the above highlighted emails once breached:

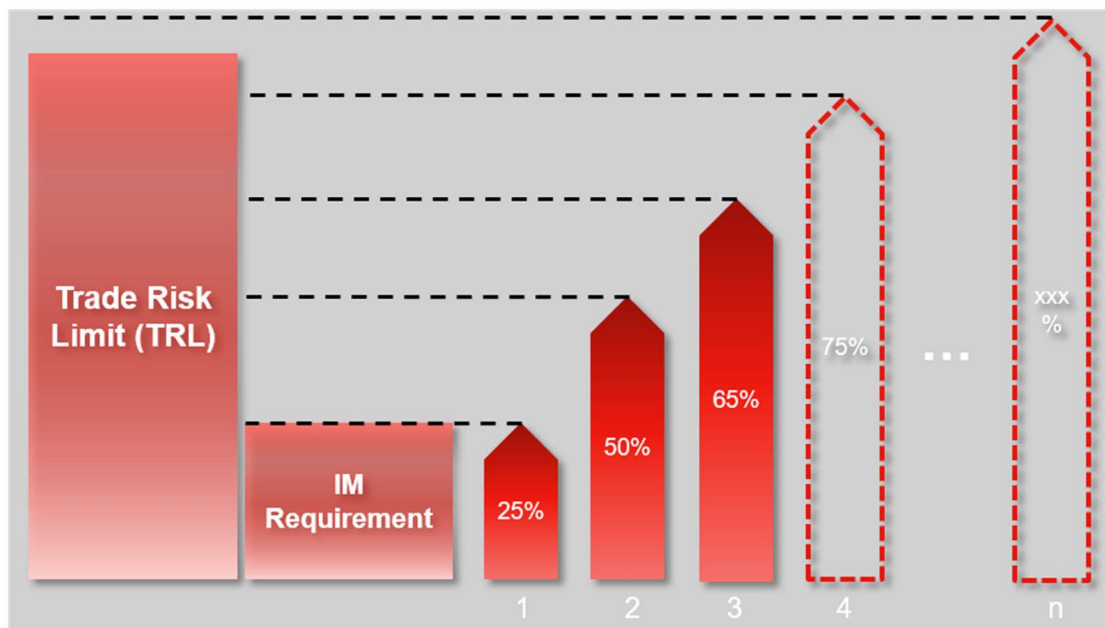


Figure 5 - Trade limits - IM Requirements

Future Risk Management Enhancements

Additional risk management functionalities will be made available with a future release which enables Clearing Members to assign specific actions to their maintained Trade Risk Limits such as

- Halt a Trading Participant
- Delete all open orders and quotes for a trading participant or client

Cleared block trades will be taken into consideration with any globally set position limits on product/product group level.

3.2.2 Emergency Controls

Nodal will make a range of emergency controls available for Clearing Members and Trading Participants such as Stop Trader/Trading Participant, mass order deletion, liquidate only, etc.

The following table outlines the different types of actions that can be taken:

Action	Description	Performed By	System
Kill Switch/Mass Order Deletion	Delete Order/Quotes by Trader, Account	Clearing Member/ Select Trading Participant	CQG CAST
Liquidate Only	Prevent new order entry/increase of quantity on existing orders	Clearing Member/ Select Trading Participant	CQG CAST
Stop Trading Participant	All open orders and quotes are deleted – no new orders or quotes can be added	Nodal on behalf	Trading System Backend
Stop Trading for User	All open orders are deleted; open quotes aren't touched – no new orders can be added	Nodal on behalf	Trading System Backend
Set Initial Margin Trade Risk Limit	Compares the total margin requirement of current open position (portfolio) with set risk limit	Clearing Member/ Trading Participant	Nodal Platform
Set Trade Risk Limit Alert Thresholds	Email will be sent once thresholds are breached	Clearing Member	Nodal Platform

Figure 6 - Overview Alert Threshold and Emergency Controls

4. Support

If you have any questions or need further assistance please contact markets@nodalexchange.com or clearing@nodalexchange.com.