IT Webinar Nasdaq Nordics

Oct 12, 2021
Agenda

• General Updates
  • Long term plan
  • New Technical Pricelist and access agreement
  • Test survey review and presentation
  • Genium INET Failover Test
  Per Fröling

• New Equity Derivatives Trading System
  • Master Time Schedule
  • Nasdaq Nordic trader
  • Protocol and Market Model updates
  • Impact on Genium INET
  • Member Portal actions - Reminder
  • Port Requests – EqD Test and Pre-Production
  • EqD Test – Change of IPs / Ports
  • Conformance testing
  • Market Data
  Claes Boije af Gennäs
  Wictor Comstedt
  Anders Bergström

• INET Cash Equity
  • Mandatory Ouch 5, FIX 5.0 SP2 migration
  Lise Mejilholm
  Anders Green
Long term plans for Nasdaq Nordic
Nasdaq Financial Framework - Key Drivers and Benefits

**Resilience**
- Distributed Architecture
- Improved market monitoring and support
- Separation of trading and clearing infrastructure

**Efficiency**
- Commonality between Cash Equities and Equity Derivatives in the Nordic
- Aligning trading venues across continents and products
- Reducing and modernizing protocols (FIX, OUCH and ITCH)

**Agility**
- Reduced time to market
- Lower cost of ownership
Current Program

- The “Fusion Program” launched 2018 under which Nasdaq’s European and US markets will re-platform the trading in asset classes today traded on the Genium INET platform, onto a new platform based on INET technology.

- The first migration occurred in September 2020, Nasdaq BX Options market in the US.

- Nasdaq Stockholm AB is now undergoing its migration to the new platform (under the name **Nordic Derivatives Trading System**)

- Nasdaq Stockholm AB will continue to use Genium INET for all clearing functionality, and a gateway is built between the new trading platform and Genium INET.
The Global Fusion Program – timeline

- **Project Initiation**: September 14, 2018
- **Global Derivatives Commonality Assessment**: Q1, 2019
- **Nordic Equity Derivatives (Nasdaq Stockholm AB)**: February 21, 2022
- **External Launch**: September 14, 2020
- **BX Options**: September 14, 2020
- **Mercury (MRX)**: 2022
- **Gemini (GEMX)**: 2023
- **ISE**: 2022
- **Nasdaq Options Market (NOM)**: 2023
- **PHLX**: 2024
- **Nordic Fixed Income (Nasdaq Iceland hf, Nasdaq Copenhagen A/S, Nasdaq Helsinki Ltd and Nasdaq Stockholm AB)**: 2025
- **Nordic Commodities (Nasdaq Oslo ASA)**: 2026

**KEY**

- Complete
- European Markets
- US Markets
- In Progress

**Earlier discussed launch plan**

- **Nordic Commodities**: 2024
- **Nordic Fixed Income**: 2023
Illustrative timeline for upcoming Asset Classes

Nordic Fixed Income (Nasdaq Iceland hf, Nasdaq Copenhagen A/S, Nasdaq Helsinki Ltd and Nasdaq Stockholm AB)

- Preparations
  - Budget
  - Planning

- Pre-study
  - Fusion commonality assessment
  - Business requirements with Use Cases

- Nordic Fixed Income Project
  - Requirement's analysis
  - Design
  - Implementation
  - Member tests

- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
New Access Agreement
New Access Agreement

• One agreement to rule them all

• Replacing
  ▪ OMnet API Agreement
  ▪ Trading Workstation Agreement
  ▪ Clearing Workstations Agreement
  ▪ Old ISV Agreements

• Rolled out 2022-2023
2022 Technical Services
Equity Derivatives Trading

Nasdaq | REWRITE TOMORROW
Technical services - February 2022

- New Technical Pricelist: Split between Fixed Income Derivatives and Eq Der services
- Cancel on disconnect: No Charge
- Transaction reporting: Keep Current (Genium INET) price model
- Currency: Only EUR will be offered for Eq Derivatives
- Pre Trade Risk Mgmt: Keep Current price model
- Workstation: Keep Current price model, introducing “Nasdaq Nordic Trader”
Port setup for the Equity Derivatives Trading

• OUCH/FIX - Based on INET pricing model (final pricing TBA)
• Dedicated gateways - Only OUCH, keeping current price model
• ITCH - Keeping set up and price model

• Change from current 10-packs of “users” to OUCH/FIX port-pairs (primary/failover) pricing

• Major performance boost for every single FIX to FIX port and/or OMnet to OUCH port (>10x)

• There will automatic cancellations of non-usable OMnet or FIX ports after migration
Test System Survey
2021
Test Environment Survey

- 387 survey participants
- 192 responses
- 93 open to follow up discussions

50% Response rate

Rate Nasdaq’s test services 1-5

<table>
<thead>
<tr>
<th>Service</th>
<th>Rating</th>
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<tbody>
<tr>
<td>Stress testing simulation</td>
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<tr>
<td>System resilience/uptime</td>
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<tr>
<td>Availability – opening hours</td>
<td>3.84</td>
</tr>
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</table>
Improvements of test environments – client priorities

Functionality
- Enhanced liquidity
- Reserved orderbooks
- Customized configuration

Availability
- Added Failover tests
- Longer opening hours

Support
- Longer support hours
- Added Self Service tests and self analysis
How do you rate Nasdaq's test environments

7.1
September 18, Failover test
Genium INET
Nasdaq Yearly Failover test

• Around 100 different MPIDs could be seen logging into B-site
• Some customers conducted a successful telnet-test.
• A few customers faced minor issues

• Overall, we can state that Genium INET failover test 2021 was a customer success.

Thank you!
Equity Derivatives Trading Replatform
## New Nordic Derivatives Trading System

### Conformance Testing Period
- **All Participants Certified**

### Pre-Production environment
- **(Limited availability to members)**
  - Connectivity tests
  - Logon tests
  - Testing weeks
  - MWAT
- **MWAT Performed**

### Production environment

#### Mandatory “Logon”
- “Go” or “No Go” 19 Feb

#### Go-Live
- 21 Feb

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### Timeline

<table>
<thead>
<tr>
<th>2021</th>
<th>2022</th>
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<tbody>
<tr>
<td>May</td>
<td>Jun</td>
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#### EqD Test: External Test environment
- Available to members

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# Key Milestones & Activities

## Conformance
- **EqD Test environment**
  - Conformance period: 27 Sept - 17 Dec
  - Improvements in EqD Test to support Conformance tests
    - Creating liquidity in the market
    - Instrument set in “Auction” during major part of the day
  - Possibility for members to order ports: 15 October
  - Possibility for members to test connectivity: 28 October
  - Possibility for members to logon: 23 November
  - Test weeks (Test MWAT scenarios): 16 Dec & January
  - Improvements in EqD Test to support Conformance tests
    - Creating liquidity in the market
    - Instrument set in “Auction” during major part of the day
    - Available
    - Available soon

## Pre-Production
- **(Limited access)**
  - Possibility for members to order ports: 15 October
  - Possibility for members to test connectivity: 28 October
  - Possibility for members to logon: 23 November
  - Test weeks (Test MWAT scenarios): 16 Dec & January

## MWAT
- **(Mandatory)**
  - MWAT I (Market Wide Acceptance Test): 19 January
  - MWAT II (Market Wide Acceptance Test): 26 January

## Launch
- Production verification “Logon” mandatory for all members: 19 February
- “Go” or “No Go” (“No Go” decision means Rollback): 19 February
- Launch “Go Live” (No rollback post go live): 21 February
Nasdaq Nordic Trader
Nasdaq Nordic Trader - Intro

- The Next generation of front-end application for trading at Nasdaq Nordic Derivative market, named **Nasdaq Nordic Trader (NNT)**, is a web-based solution delivered by CQG Inc. NNT will replace Trading Workstation and Q-port in connection with migration of Genium Inet (trading) to Nasdaq Financial Framework (NFF) end of February 2022.

- **CQG Inc.** was selected to build a next generation white labelled Trading workstation for Nasdaq Nordic.
  - CQG is a well-established provider of trading applications and accessibility and began serving United States traders in 1980, expanding to Europe in 1988 and to Asia in 1998. In 2010, CQG launched Continuum, a new division for API Enterprise Solutions. CQG now leads the industry in providing reliable data, superior decision-making tools and order execution software.
  - CQG partners with more than 100 Futures Commission Merchant environments and provides Direct Market Access to more than 45 exchanges through its worldwide network of co-located CQG Hosted Exchange Gateways. CQG’s market data feed consolidates data from over seventy-five sources.

- **NNT is a web-based application** that allows seamless access and minimal infrastructure footprint on the client side. Enhanced usability with next generation trading and data visualization

- NNT is also the new front-end application for Nasdaq Nordic Equity market, which means that members now have the **opportunity to access and trade both shares/equities and derivatives via the same application**. Initial via two different logins, long-term strategy to merges into one login and username.
Nasdaq Nordic Trader (NNT) – Overview of features

• **White labelled** front-end trading application powered by CQG (based on CQG Desktop solution) replacing Trading Workstation for Equity Derivatives

• **Web based** customizable trading **interface** that allows **seamless access** with a modern user interface familiar from today’s web browsers. Making it easier for a user to get familiarized with navigating inside the application.

• **Easy to deploy**, no software download, and requires **less support and maintenance** by the members internal IT-department.

• **Primary front-end trading** application for both **Equity Derivatives** and **Cash Equities**, which means that members now have the opportunity to access and trade both shares/equities and derivatives via the same application
Nasdaq Nordic Trader (NNT) – Overview

- Custom built front end **supporting available derivative order/trading functionalities** in Trading Workstation and Q-port:
  - MiFID II features included (ORK).
  - PRM services for Equity Derivatives to be incorporated.
  - NNT will be replacing Q-port and CW1 for trade reporting
  - User Defined Strategy (UDS) / TMC builder functionality

- **Enhanced usability** with next generation trading and data visualization.
  - Chart and analytics, Quote boards, SpreadSheet and Heatmaps

- **First line support** and user management by **Nasdaq Equity Derivative Operations**.
Protocol and Market Model Updates
Protocol updates for the new Equity Derivatives Trading System

• Updated protocol specifications (minor adjustments) available in Member Portal/Nasdaq Resources/Equity Derivatives Trading Replatform.

• OUCH, FIX, FIX XML, ITCH and AMD specifications updated.
Updated Market Model

• An updated version of the upcoming Market Model will be published in the week starting with Oct 18. No breaking changes but highly recommended reading. Delta from previous version will be well specified.

• An IT-Notice will be sent notifying when the new version is available.
Impact on Clearing and Genium INET
Changes to Genium INET

• An updated version of the document “Changes to Genium INET” is available in Member Portal/Nasdaq Resources/Equity Derivatives Trading Replatform.

• Describes the impact of the equity derivatives trading platform migration on clearing and the Genium INET platform.

• Minor impact on equity derivatives.

• No impact on Fixed Income cash/derivatives or Commodities.
Genium INET release

- In conjunction with the go-live of the new equity derivatives trading system there will be a Genium INET release.
- Non-mandatory FIX and OMnet changes, minor impact.
- Clearing Workstation 1 (CW1) optional upgrade.
Onboarding
Conformance Testing
Member Portal Actions - REMINDER

• Requests sent to "Member Administrator" and/or "Authorized Requestor IT“
  ▪ See Member Portal start page, “My Required Actions”

• Contact person for Derivatives Re-Platforming project
  ▪ Appoint contact person for Derivatives Re-platforming project

• Trading Applications and Conformance Testing
  ▪ (If applicable) When will your in-house developed trading application be ready for conformance testing?
  ▪ (If applicable) Which 3rd party trading application are you planning to use?
  ▪ Or maybe you don’t use trading applications at all?
Port requests - EqD Test & Pre-Production

- **Member Portal** (see “Ports” on the start page), Pre-Production port requests available from October 15
  - OUCH Order Entry
  - FIX Order Entry & Tradereporting
  - FIX Drop
  - GLIMPSE
  - ITCH Re-request TCP ports

- **Data Feed Request Form for European Direct Access** (separate form)
  - Reference Data (FDS, GCF/TIP, ITCH Multicast)
  - Market Data (GCF/TIP, ITCH Multicast, AMD)

- **Technical access fees**
  - Initially free of charge
  - From go-live, prices are according to a future version of the “Nasdaq Nordic Technical Services Pricelist”.
  - Draft pricelist is now available in the **Member Portal** (see “Nasdaq Resources”)

宥 保密 | 请勿分发
EqD Test – Change of IPs / Ports

- On Wednesday October 13, some OUCH, FIX and FIX Drop sessions will receive new IP addresses and/or ports

- Affected customers have been contacted via e-mail

- New connectivity details can be seen in the Member Portal, under ”Technical Access” from October 13
Conformance Testing

- All trading applications connecting to Nordic Equity Derivatives markets must be conformance tested before production use
  - Assure correct messaging towards NDTS
  - Protocols: OUCH (Order Entry) and FIX (Order Entry & Tradereporting)

- Each ISV and member with in-house trading applications will be contacted in order to schedule a conformance test
  - Based on time period indicated in the “Trading Applications and Conformance Testing” query

- Conformance testing scripts
  - FIX and OUCH Order Entry scripts available in the Member Portal, under “Nasdaq Resources” > “Equity Derivatives Trading Replatform”
  - FIX Tradereporting script to be published shortly

- Conformance tests to be completed before Dec 17 (w39-w50)
Project webpage

“IT Information – Derivatives”:
Trading & Market Data Interfaces
Market Data Feeds Overview

<table>
<thead>
<tr>
<th>Functionality</th>
<th>ITCH</th>
<th>AMD</th>
<th>GCF</th>
</tr>
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<tbody>
<tr>
<td>Order &amp; Quote Level Data</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>Price Level Aggregated Data</td>
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<td>✓</td>
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<td>(executions)</td>
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<td></td>
<td></td>
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<tr>
<td>Off-Book Trades</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
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<tr>
<td>Trade Cancels/Corrections</td>
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<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Trade Statistics, Settlement Prices &amp; OI</td>
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<tr>
<td>Trading Ref Data</td>
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- **New ITCH feed**
  - Transaction data
  - Low latency
  - Off-book trades and trade cancels/corrections added enabling a complete trade feed

- **New Auxiliary Market Data Feed**
  - ITCH like format
  - Additional data which is not part of the ITCH feed (open interest, settlement prices etc)

- **Genium Consolidated Feed (GCF)**
  - Limited impact
  - New source, new source ID
  - New message: Quote Request

- **File Delivery Services (FDS)**
  - Limited impact
  - Same changes as for GCF
Market Data - Testing

• GCF TST4
  ▪ All existing accounts with EQUity derivatives content automatically changed to support the new Equity Derivatives trading source

• FDS TST4
  ▪ All existing accounts with EQUity derivatives content automatically changed to support the new Equity Derivatives trading source

• ITCH Multicast
  ▪ Access need to be requested, please contact dataeurope@nasdaq.com

• AMD Multicast
  ▪ Access need to be requested, please contact dataeurope@nasdaq.com

• Glimpse
  ▪ Access for test account can be requested via MemberPortal
Changes to GCF

• New source, new source ID
• New message: Quote Request
• New handling of Trade ID
INET Nordic Enhancements 2022
OUCH 5 & FIX 2.0
INET Nordic enhancements to OUCH and FIX

Background:

• Improve equity trading client experience

• Make OUCH and FIX Order Entry more functionally equivalent:
  ▪ Most features currently only available in FIX will also be available in OUCH
  ▪ Improve FIX latency by moving FIX Gateways closer to the matching engine

• Harmonize protocols with the new Nasdaq Derivatives Trading System and Nasdaq US, as much as possible and where feasible
Client impact new OUCH5 & FIX

• Mandatory OUCH, FIX Order Entry and FIX DROP updates
• New ports required
• Not backwards compatible
• New OUCH5, FIX Order Entry and FIX DROP ports will be made available in parallel to existing OUCH and FIX ports (duplication of existing ports at no extra cost)
• Smooth transition period, client upgrades at their own leisure during a migration window
Next steps

- Updated OUCH5, FIX Order Entry, FIX DROP and FIXT1.1 protocol specifications, and OUCH & FIX delta documents will be made available at the INET Nordic Technical Information website – October, 2021

- Production migration launch plan to be communicated in November 2021
2022 Migration milestones

- Updated IP Plan – Jan 17, 2022
- OUCH5 and FIX DROP for OUCH in INET Test* – March 14, 2022
- FIX Order Entry and FIX DROP in INET Test – March 28, 2022 (SOR & Algo April 25, 2022)*
- Conformance test period – From May 16, 2022

- New OUCH5, FIX DROP for OUCH, FIX Order Entry and FIX DROP ports for INET Production available in Nasdaq Member Portal – Tentative Sep 2022
- Production migration period* – Tentative earliest October 2022

* New and old ports available in parallel during the migration phases, at no extra cost
Tentative Project Timeline

- **2021**
  - Oct: Protocol specifications available
  - Nov: OUCH & FIX 2.0 test ports available in Member Portal
  - Dec: Conformance test cases available

- **2022**
  - Jan: Enable nanoseconds in SendingTime fields in FIX Trade Reporting in INET Test
  - Feb: IP Plan & Connectivity Guidelines available
  - Mar: OUCHS & FIX DROP for OUCH available in INET Test NTF
  - Apr: FIX 2.0 & FIX DROP available in INET Test NTF
  - May: FIX 2.0 SOR & Execution Algo available in INET Test NTF
  - June: Conformance test period
  - July: Production migration plan will be communicated during November 2021
  - Aug: Production migration plan will be communicated during November 2021
  - Sep: FIX 2.0 & FIX DROP available in INET Test NTF
  - Oct: OUCHS & FIX DROP for OUCH available in INET Test NTF
  - Nov: FIX 2.0 SOR & Execution Algo available in INET Test NTF
  - Dec: Conformance test period

- **2023**
  - Jan: OUCHS & FIX DROP for OUCH available in INET Test NTF
Thank you
Communication and where to find more information

- IT-Notices: 

- INET Nordic Functional Enhancement: 

- INET Nordic Protocol Specifications: 

- INET Nordic Environments (Production and NTF information, Conformance Testing): 

- Nasdaq Member Portal: 
  [https://memberportal.nasdaq.com/](https://memberportal.nasdaq.com/)

- Market Models: 
Derivatives Replatform - Support Channels

• For port requests:
  ▪ Member Services  
    E-mail: ms.gi@nasdaq.com  
    Tel: +46 8 405 6660

• For technical questions:
  ▪ Technical Support  
    E-mail: technicalsupport@nasdaq.com  
    Tel: +46 8 405 6750

• For order management questions:
  ▪ Trading Operations  
    E-mail: tradingoperations@nasdaq.com  
    Tel: +46 8 405 7360
Member Portal – My Required Actions

My Required Actions: [https://memberportal.nasdaq.com/](https://memberportal.nasdaq.com/)
Member Portal – Nasdaq Resources

Nasdaq Resources > Equity Derivatives Trading Replatform: https://memberportal.nasdaq.com/
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