CME Group Customer Forum

Spring 2016

Singapore  April 12
Hong Kong  April 14
London     April 28
U.S. Webinar  May 9
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Agenda

• Regulatory Updates
• E-Trading Update
• CME DataMine & Customer Center
• CME Europe Updates
• CME Product Updates
• Global Repository Service
EU Regulatory Update – Current Legislative Status

- REMIT
  Wholesale energy

- EMIR
  OTC, CCPs, TRs

- CRD IV
  Basel III

- MAR
  Market Abuse

- MiFID II / MiFIR
  Markets and participants

- FTT
  Financial Transaction Tax

- BENCH
  Benchmarks

- CCP R&R
  Resolution & Recovery

Legislative
Regulatory
Application
EU Regulatory Update – MiFID II / MiFIR

MiFID II / MiFIR is a broad regulatory reform package, the key provisions being:

- **Algo/HFT**: Regulatory controls on algorithmic trading/HFT and Market making
- **Commodities regulation**: Position limits and scope of regulation
- **Transparency**: Pre- and post-trade transparency requirements
- **Trading requirements**: TV obligations, and trading obligation (OTFs)
- **Clearing**: Indirect clearing, portfolio compression, STP
- **Reporting**: Transaction reporting for monitoring against market abuse
- **Data publication**: Data availability, disaggregation, reporting mechanisms, fees
Algorithmic trading/HFT regulation

- **Legislative outcome** → MiFID II is the first EU initiative to introduce regulatory controls for HFT / algorithmic trading. It includes a series of measures addressed to both trading venues and market participants that use algorithmic and HFT trading strategies. ESMA has prescribed in its RTS detailed organisational requirements, trading system controls and obligations for market-makers.

- **Implementation** → In its final RTS, ESMA has reduced the requirements on trading venues for algorithm testing and amended upwards the threshold defining market making activity. In addition, the obligations on trading venues regarding market making schemes are limited to equities, ETFs, and equity derivatives.
EU Regulatory Update – EMIR / Clearing Obligation
2016 EU Legislative and Policy Priorities

Scope

- **IRS - 14 products:**
  - Basis swaps (EUR, GBP, JPY, USD)
  - Fixed-to-float / plain vanilla (EUR, GBP, JPY, USD)
  - Forward rate agreements (EUR, GBP, USD)
  - Overnight index (EUR, GBP, USD)

  *Note:* Exemption for OTC IRS derivative contracts associated with covered bond programmes, subject to conditions as set out in RTS; also exemption for certain pension schemes.

- **6 additional IRS products** proposed by ESMA in RTS submitted to the Commission on 10 November 2015 (non-G4 IRS):
  - Fixed-to-float (NOK, PLN, SEK)
  - Forward rate agreements (NOK, PLN, SEK)

- **CDS – 2 products** adopted by the European Commission on 1 March 2015:
  - European untranched index (EUR)

- **Other asset classes / additional products** – pending review by ESMA
## EU Regulatory Update – EMIR / Clearing Obligation

<table>
<thead>
<tr>
<th>Year</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>18 March – first IRS-clearing CCP authorised, start of clearing obligation procedure</td>
<td></td>
<td></td>
<td>01 October – Final draft IRS RTS submitted by ESMA to the EC</td>
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<tr>
<td></td>
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<td>19 December – Commission proposed amendments</td>
</tr>
<tr>
<td>2015</td>
<td></td>
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<td>06 August – Formal endorsement of the IRS RTS by the Commission</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>01 October – ESMA submitted draft CDS RTS to the EC</td>
</tr>
<tr>
<td>2016</td>
<td>21 February - IRS Cat 1 frontloading starts</td>
<td>21 June - IRS CO for Cat 1</td>
<td>1 September - Phase-in of the non-cleared OTC margin requirements starts</td>
<td>CDS Cat 1 and Cat 2 frontloading starts (= 5 months after entry into force of CDS RTS)</td>
</tr>
<tr>
<td></td>
<td>1 March – publication of the final CDS RTS by the European Commission</td>
<td>21 May - IRS Cat 2 frontloading starts</td>
<td></td>
<td>21 December - IRS CO for Cat 2</td>
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<tr>
<td></td>
<td>May – CDS RTS entry into force expected</td>
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<td></td>
<td></td>
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<tr>
<td>2017</td>
<td>Non-G4 IRS CO for Cat 1 expected</td>
<td>21 June - IRS CO for Cat 3</td>
<td>Non-G4 IRS CO for Cat 2 expected</td>
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<tr>
<td></td>
<td>CDS CO for Cat 1 expected (= entry into force + 9 months phase-in)</td>
<td></td>
<td>CDS CO for Cat 2 expected (= entry into force + 15 months phase-in)</td>
<td></td>
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<tr>
<td>2018</td>
<td>Non-G4 IRS CO for Cat 3 expected</td>
<td></td>
<td>Non-G4 IRS CO for Cat 4 expected</td>
<td>21 December - IRS CO for Cat 4</td>
</tr>
<tr>
<td></td>
<td>CDS CO for Cat 3 expected (= entry into force + 21 months phase-in)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td>CDS CO for Cat 4 expected (= entry into force + 3 years phase-in)</td>
<td></td>
</tr>
</tbody>
</table>
Agenda

• Regulatory Updates

• E-Trading Update
  ➢ New iLink Architecture – MSGW & Drop Copy 4.0
  ➢ Implied Volatility-Quoted Options
  ➢ Streamlined Fix Binary
  ➢ New! Market by Order
  ➢ Cyber-Security Plans
  ➢ Consolidated Fills
  ➢ New! CME Group Referential Services

• CME DataMine & Customer Center

• CME Europe Updates

• CME Product Updates

• Global Repository Service
New iLink Architecture Updates

New Market Segment Gateways (MSGW)

• 1:1 with match engines; moves point of message prioritization from engine to MSGW
• Provides a consistent and predictable performance profile across sessions for all products on a Market Segment
• Reduces variability associated with multiple sessions across multiple gateways
• Busy periods for a group of products will not impact performance on other Market Segments

MSGW Pre-Launch: Completed in March 2016

• New iLink Failover Process in effect for all markets
• Performance consistent with announced forecasts
  - Options improvement 30-60%
  - Futures improvement 20-40%

Completed Optional Direct Access to MSGWs for

• FX futures and options
• Commodity futures and options
• Equity futures and options
Final Rollout Schedule for Direct Access to MSGW

- **Available Now**
- **FX & Commodities**

- **April 24, 2016**
- **Equities**
  - Mock trading session: Saturday, April 23

- **May 1, 2016**
- **Interest Rates**
  - Mock trading session: Saturday, April 30

- **May 15, 2016**
- **ALL Remaining Markets**
  - Mock trading session: Saturday, May 14
New iLink Architecture

Post Launch:

• New FIX tag 5979-RequestTime:
  - will be added to iLink outbound messages following the completion of all Phase 2 launches
  - The timestamp of a FIX message is taken when the MSGW received the last byte of the TCP packet containing the last byte of a FIX message.

• Retain traded-in CGW sessions until further notice in case of technical issues

Observations from FX and Commodity market segments:

• Current market dynamic for market data and order entry remains consistent.
• CME Group closely monitors market microstructure; all results have been positive.
Drop Copy 4.0

In August 2015, CME Group introduced Drop Copy 4.0

• Key Features:
  - Enhanced solution to support MSGW architecture
  - Harmonized session model and functionality to iLink and MSGW norms
  - More robust fault tolerance following the MSGW iLink model
  - XML encapsulated message to preserve an exact copy of the original iLink message

• Not backward-compatible. Fees remain unchanged. Parallel, duplicated Drop Copy groups are free of charge

• Implementation:
  - Certification required
  - Cutover or run CGW groups in parallel with the legacy Drop Copy implementation
  - All Drop Copy groups must be migrated in Production by Friday, May 29, 2016.
  - A $5000 fee will be charged for any group still in use in starting May 30.
  - Drop Copy 2.0 will be decommissioned on Friday, July 1 2016.

• Over 90% of the existing Drop Copy applications and Drop Copy groups have already certified and migrated to Drop Copy 4.0 in Production
Effective July 5, 2016 the following options products will be added to the Globex MEP:

<table>
<thead>
<tr>
<th>Product Group Code</th>
<th>Product Group Description</th>
<th>Tier #3 Ratio &gt;20k Messages</th>
<th>Tier #2 Ratio &gt;40k Messages</th>
<th>Tier #1 Ratio &gt;60k Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZ</td>
<td>E-Mini S&amp;P 500 Outright Options</td>
<td>300:1</td>
<td>200:1</td>
<td>100:1</td>
</tr>
<tr>
<td>EW</td>
<td>E-Mini S&amp;P 500 Weekly &amp; Monthly Options</td>
<td>300:1</td>
<td>200:1</td>
<td>100:1</td>
</tr>
<tr>
<td>QZ</td>
<td>E-Mini NASDAQ 100 Outright Options</td>
<td>300:1</td>
<td>200:1</td>
<td>100:1</td>
</tr>
<tr>
<td>NW</td>
<td>Mini NASDAQ 100 Weekly &amp; Monthly Options</td>
<td>300:1</td>
<td>200:1</td>
<td>100:1</td>
</tr>
<tr>
<td>C9</td>
<td>E-Mini Dow ($5) Outright Options</td>
<td>300:1</td>
<td>200:1</td>
<td>100:1</td>
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<tr>
<td>OL</td>
<td>E-Mini Dow ($5) Weekly &amp; Monthly Options</td>
<td>300:1</td>
<td>200:1</td>
<td>100:1</td>
</tr>
</tbody>
</table>

- These additions include orders, modifies and cancellation messages
- CME Group expects other options related product groups to be added to the MEP in the future.
- A separate initiative involving mass quoting is being reviewed
Volatility-Quoted Options with Implieds

New CME U.S. volatility-quoted options product with implied functionality

- **Volatility-Quoted options** are a new option product type on Globex that allows the submission of orders in terms of volatility percentages instead of premium
  - A volatility-quoted option match will cause the creation of a hedged position in terms of a premium-quoted option and an offsetting future
  - A Globex option pricing model will utilize inputs from the related CLOB’s

- **Triangulation implieds** provide complementary liquidity linkages between volatility-quoted options, premium-quoted options and the underlying futures market

- A direct vol-vs-vol real order match will create a market data update for the volatility option match price and quantity

- A Triangulation implied order vol match will create a market data update for the volatility option, the premium option and the underlying future

<table>
<thead>
<tr>
<th></th>
<th>Bid</th>
<th>10 6EH6 VC13500 @ 10.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ask</td>
<td>10 6EH6 VC13500 @ 10.05</td>
</tr>
<tr>
<td></td>
<td>Fill</td>
<td>10 6EH6 C13500 @ 0.0140</td>
</tr>
<tr>
<td></td>
<td>Fill</td>
<td>5  6EH6                @ 1.3502</td>
</tr>
</tbody>
</table>
Implied Volatility-Quoted Options Example

- Volatility-quoted orders allowed to be submitted to a maximum of two decimal places
- Globex will utilize the Bjerksund-Stensland (1993a) option pricing model
Implied Volatility-Quoted Options

- **Model inputs:**
  - **Interest Rate** is daily rate and is based on the settlement price of the previous day's Eurodollar future front month quarterly
  - **Time decay** is in daily terms or "calendar days to expiration". The calendar days to expiration will only be an integer value - there will be no fractional calendar days to expiration (e.g. decay not based on hours/minutes).
  - **Underlying futures price** is based off the futures order book

- Increased efficiency to quote option products and consume corresponding market data since re-quoting is only required when volatility changes instead of each futures price change.

- Implied order calculation will update in lock step with real order book changes in the futures, volatility-quoted options, and premium-quoted options.
Implied Volatility-Quoted Options

• Customer impacts
  - Options and Futures will move onto the same Market Segment; as a result, Market Segment ID and MDP 3.0 channel configurations will change.
  - New FIX tags on Premium Option iLink Execution Report used to determine the conversion from volatility value to premium price: future price, option delta, time to expiry, risk free rate.
  - MDP 3.x new schema and use of template extension for new Security Definition repeating group:
    - “Related Instrument” tag to link VQO and PQO products

• No Certification Requirements

• NR: target May/June

• PROD: target Oct/Nov

• Products
  - Phase 1 - Start with CME U.S. AUD/USD vol options, premium quoted option products and related futures
  - Phase 2 - Extend to other FX products
Implied Volatility-Quoted Options

Client Systems Wiki
Type “Triangulation” for more info
Streamlined FIX/FAST Migration to Streamlined SBE

Simple Binary Encoding (SBE) - Market Data

- Streamlined FIX/FAST market data is a dedicated data feed for products not found on Globex which include:
  - Block Trades
  - Equity Indices (e.g., S&P, Dow Jones, Bloomberg)
  - Eris Exchange products
  - OTC Daily Market Data (i.e., Clearport end of day information)

- Streamlined FIX/FAST has a distinct message specification and message template from those available for CME Globex

- Will migrate to SBE encoding in 2016
  - Aligns with MDP 3.0 encoding format
  - Blocks release will include bundled spread and leg executions enhancement
  - All other feeds will be ported to SBE data with standard functionality to ease migration
  - Legacy solutions FAST and ITC for blocks will be retired
Streamlined FIX/FAST Migration to Streamlined SBE

Simple Binary Encoding (SBE) – Market Data

• **Customer impacts**
  - New schema and new SBE messaging
  - Mandatory certification per feed to consume streamlined SBE in production
  - Rolling migration, starting with Block Trade data feeds
  - Streamlined FIX/FAST, SBE and ITC feeds will be available in parallel in production

• **New Release Timeline**
  - Blocks – May 2
  - Equity Indices - June
  - Eris Exchange – June/July
  - OTC Daily Market Data - July

• **Production Timeline**
  - Blocks – June 12
  - Equity Indices – July/August
  - Eris Exchange – August
  - OTC Daily Market Data – August/Sept

• **Decommission streamlined FIX/FAST for blocks by end of 2016**
CME Globex’s current Market by Price (MBP) solution offers price, quantity at the price, and the number of orders in the quantity.

Market By Order (MBO) shows individual order sizes that make up the total quantity at a price, including their priority in the queue.
New! Market By Order Market Data Coming Q4

CME Globex Market By Order (MBO) will provide:

- Individual queue position
- Full depth of book
- Size of individual orders at a price
- Increased confidence in execution by improved transparency into detailed book composition
- Maintained anonymity

MBO and Market By Price (MBP) Information on a Single Feed

- MBP remains unchanged
- Avoids the need to arbitrate between separate MBO and MBP feeds

Customer impacts

- No change to Presentation (SBE), Session, Transport, or Network layers
- New schema and use of template extension for new MBO fields
- Bandwidth increase
- Mandatory certification to use MBO data in production
- No certification required to continue to use MBP
Market By Order Market Data

- No book management instructions in the market data feed
  - Book is built on receipt by sorting by price and then order priority
  - Sequencing by order priority
  - No change in market data based on matching algorithm, FIFO vs. Pro-rata

<table>
<thead>
<tr>
<th>Action</th>
<th>Time priority</th>
<th>Quantity</th>
<th>Security ID</th>
<th>ID</th>
<th>Price</th>
<th>Side</th>
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<tbody>
<tr>
<td>Add bid 1 CLZ6 @46.70</td>
<td>400100</td>
<td>1</td>
<td>CLZ6</td>
<td>5436415</td>
<td>45.70</td>
<td>B</td>
</tr>
<tr>
<td>Add bid 1 CLZ6 @46.71</td>
<td>400101</td>
<td>1</td>
<td>CLZ6</td>
<td>5436416</td>
<td>45.71</td>
<td>B</td>
</tr>
<tr>
<td>Add bid 1 CLZ6 @46.70</td>
<td>400102</td>
<td>1</td>
<td>CLZ6</td>
<td>5436417</td>
<td>45.70</td>
<td>B</td>
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<tr>
<td>Cancel 5436416</td>
<td>400101</td>
<td>1</td>
<td>CLZ6</td>
<td>5436416</td>
<td>45.71</td>
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<tr>
<td>Modify 5436415</td>
<td>400103</td>
<td>2</td>
<td>CLZ6</td>
<td>5436415</td>
<td>45.70</td>
<td>B</td>
</tr>
</tbody>
</table>

- MBP order book updates continue to be the source of all implied prices which will be in line with MBO updates
CME Direct Will Reflect New MBO Information

In CME Direct, in addition to the usual Bid and Quantity columns, there would be Order Priority (number of orders ahead of you) and Quantity Priority (number of contracts ahead of you).
Market By Order Market Data

• New Release: Q3
• Phased Production Rollout in Q4 2016 – Q2 2017
  • Starting with NYMEX, COMEX, CME Europe and DME products in Q4
  • Targeting CBOT, MGEX in Q1 and CME, BMD, KRX in Q2 2017
  • Rollout on a channel by channel basis; Asset classes and DCM rollouts will be bundled over sequential weekends
  • Options and underlying futures will migrate together

• MBO historical data will be captured as products are enabled with MBO in production
Security Ecosystem

- As part of ongoing improvements, CME has significantly enhanced its security profile through external-facing enhancements and internal hardening.
  - New CME application portal has harmonized on SMART Click credentials and two-factor authentication.
  - Clearing applications have migrated from the legacy Clearing Portal to the CME Customer Center.
  - Ciphers have been enhanced and browser upgrades mandated.

- CME will implement further hardening of key services.
  - iLink and Drop Copy authentication will be enhanced along with expanded controls.
  - Clearing connectivity will be enhanced with encryption.

- To ensure the highest levels of security and compliance end-to-end, securing the trading and post-trade ecosystems needs to be a priority for all CME-connected systems.
  - CME has defined a set of security requirements and recommendations for all connecting systems.
Security Ecosystem

- Mandatory requirements for systems connecting to CME
  - 2 Factor authentication (human to machine)
  - Encryption of confidential or sensitive data over untrusted networks

- iLink and Drop Copy will transition to a self-service model using SMART Click
  - A secure login server will enable SMART Click authentication
  - Login server will be available over existing CME Globex connectivity
  - Authentication will still be at the session level (machine to machine)
  - A token system will be leveraged once SMART Click credentials are validated

- Additional optional iLink and Drop Copy controls will be added
  - Admins will be able to specify allowable IP addresses
  - Drop Copy will support filtering of specific accounts in addition to iLink sessions

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Date</th>
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<tbody>
<tr>
<td>CME Direct and CME Portal 2 Factor Authentication</td>
<td>Complete ✔</td>
</tr>
<tr>
<td>3rd Party 2 Factor Authentication for CME-certified systems</td>
<td>End of 2016</td>
</tr>
<tr>
<td>New iLink and Drop Copy Logon Procedure</td>
<td>2017</td>
</tr>
</tbody>
</table>
## iLink 3.0 Update

- iLink 3.0 is planned for 3 phases starting in 2017
  - Phase 1 adds the ability to cancel mass quotes by quote set ID
  - Phase 2 introduces the new logon procedure, presentation layer, and session layer
  - Phase 3 includes remaining application layer changes including Mass Order and Cancel on Behalf

<table>
<thead>
<tr>
<th>Layer</th>
<th>Responsibility</th>
<th>Future State</th>
<th>Phase</th>
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<tbody>
<tr>
<td>Application</td>
<td>Business Semantics</td>
<td>Optimized FIX semantics</td>
<td>Phase 1, Phase 2,</td>
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<td></td>
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<td>Phase 3</td>
</tr>
<tr>
<td>Presentation</td>
<td>Message encoding</td>
<td>Simple Binary Encoding</td>
<td>Phase 2</td>
</tr>
<tr>
<td>Session</td>
<td>Authentication, recovery, multiplexing</td>
<td>FIXP</td>
<td>Phase 2</td>
</tr>
<tr>
<td>Security</td>
<td>Authentication</td>
<td>New Logon Procedure</td>
<td>Phase 2</td>
</tr>
</tbody>
</table>
Consolidated Fills Approach

• Consolidation of Fill notices on all customer interfaces:
  - *MDP 3.0 – completed already with Trade Summary message*
  - iLink Order Entry
  - Clearing

• Consolidate to single fill:
  - Per aggressor order
  - Within an instrument
  - At a single price

• Benefits:
  - Reduce iLink, internal and clearing messaging
  - Improve performance and RTT; Improve the consistency of response time
**Example: Fill Consolidation**

**Scenario:** An aggressive order (A) of two contracts matches against two passive orders (B and C) of one contract each.

**Current fill messages:**
- Fill A for 1 contract
- Fill B for 1 contract
- Fill A for 1 contract
- Fill C for 1 contract

**Future consolidated fill messages:**
- Fill A for 2 contracts
- Fill B for 1 contract
- Fill C for 1 contract
Consolidated Fills

• 2017: Fill Consolidation
  - Fewer fill messages with quantity aggregated by price
  - Common ID will be used across iLink, MDP, and STP/Drop Copy to correlate all trade information together. More details forthcoming
  - Messages reflect match events at engine; order granularity still in Trade Summary
  - No major changes for customers; no certification anticipated.

• 2017 Clearing Instructions (i.e. Give-Ups, Average Pricing, and SLED)
  - Remove post-trade instructions from Tag1-Account (special characters)
  - New FIX tags will be added to facilitate post-trade instructions
CME Group Referential Data Services

First Offering: Product Referential API

- Request product and instrument information by exchange, MDP channel, or venue
  - Restful Services with query support and response formats including XML, CSV, and JSON
- Data can be used for a wide variety of use cases including
  - Simplified Cross-Exchange Risk Management
  - Comprehensive product and instrument information, consistently provided to better support like-for-like product risk, audit and reconciliation applications
- **Q4 2016:** Product and Instrument referential information for cleared and CME Globex-traded products
- **Coming in 2017:**
  - Product relationships
    - Within Exchange: WTI (CL) → WTI/Brent Spread (BK) ← Brent (BZ)
    - External Exchange (mirror or look-a-like): CME:GBP = CME Europe: GBP
  - Settlement and Statistical data
  - Human-readable specifications for UI presentation
    - E.g., Contract Termination: Trading in the current delivery month shall cease on the third business day prior to the twenty-fifth calendar day of the month preceding the delivery month.
  - 3rd-party product codes
  - Integration with Historical Data API

Contact your Global Account Manager for more information and to request future enhancements!
Agenda

• Regulatory Updates
• E-Trading Update
• CME DataMine & Customer Center
• CME Europe Updates
• CME Product Updates
• Global Repository Service
CME DataMine: Historical Data Service

CME DataMine is the official source of the most comprehensive historical price information available for CME Group markets.

- Provides a broad array of data types including:
  - Market Depth
  - End of Day
  - Block Trades
- Continuously growing product suite
- Provides the information the customers need to discover insights & capture market opportunity
- Dedicated sales staff
### Common Use Cases of Historical Datasets

<table>
<thead>
<tr>
<th>Strategy Backtesting</th>
<th>Data Quality Validation</th>
<th>Investment Consulting</th>
<th>New Strategy Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Asset Class Research</td>
<td>Academic Research</td>
<td>Internal Performance Surveillance</td>
<td>Regulatory Monitoring</td>
</tr>
<tr>
<td>Risk Analytics</td>
<td>Charting</td>
<td>Market Surveillance</td>
<td>Margin Calculations</td>
</tr>
</tbody>
</table>
DataMine - 2016 New Developments

- Migration of historical data to Amazon Cloud
- Web-based self service user interface
- REST API for data access & AWS Cloud delivery
- New financial datasets
- Improved pricing structure
Contact Us

We welcome client feedback and suggestions – please contact us!

Business Team: dataminesales@cmegroup.com

Product Management: matthew.williams@cmegroup.com

General Website
New! CME Customer Center

- Centralized access to all your tools and applications
- Access is single-sign on enabled using your SMART Click ID
New! CME Customer Center

- New self-service functionality is available via the Request Center
  - Drop Copy Management
  - Globex Firm IDs Requests
New! CME Customer Center

- View and manage your Drop Copy Groups. Add and remove sessions at your convenience.
- Eliminates the need for Schedule 12 paperwork for Drop Copy group management
New! CME Customer Center

- Request new Globex Firm IDs or update existing ones
- Clearing Firm authorized users can approve clearing relationship mapping
- Eliminates the need for Schedule 6, Exhibit B paperwork
New! CME Customer Center

- Track the progress of open requests you’ve submitted
- Get alerts via Notification Center to items pending in your To Do’s
New! CME Customer Center

- New capabilities coming soon:
  - Request new iLink session IDs (Q2)
  - Manage access and entitlements for CME Group applications:
    - Firm Admin Dashboard (Q2)
    - FirmSoft (TBA)

- Available to Clearing Firms and authorized customers - contact your Global Account Manager for further details
  
  Global Account Management (GAM)
  U.S.: +1 312 634 8700
  Europe: +44 203 379 3754
  Asia: +65 6593 5505
  globalaccountmanagement@cmegroup.com
Agenda

- Regulatory Updates
- E-Trading Update
- CME DataMine & Customer Center
- CME Europe Updates
- CME Product Updates
- Global Repository Service
CME Europe Overview

Status Since Launch

3 Asset Classes
147 Products
FX, Energy & Agriculture

1,300,000+ Contracts traded

>12,000 Record Daily Volume

$125 Billion FX notional value traded

>20,000 Record Nat Gas O.I. (in TTF & NBP monthly equivalents)

Award winning Cocoa futures contract
75K+ contracts traded

†Statistics 28 April 2014 – 15 April 2016
CME Europe Progress to Date

CME Europe Monthly Volume & O.I. (Rolling 12 Months)

- Ags
- Energy
- FX
- Total O.I.†

Volume (in contracts)

Mar-15
Apr-15
May-15
Jun-15
Jul-15
Aug-15
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16

0
10,000
20,000
30,000

O.I. (Month-End)

†exc. Nat. Gas "Dailies"
CME Europe – 2016 YTD Highlights

Record Exchange volumes; multiple milestones in FX, Gas & Cocoa

Foreign Exchange:  
*March Volume: 70,455 contracts. Open Interest (as of March 31st): 4,317 contracts*

- **Record CMEEL FX ADV of 3,203 lots** in March (↑8% Y-o-Y), in correlation with a six-month rising volume trend line
- Strong volume and open interest developments across our FX suite of products, specifically:
  - **Highest monthly ADV in GBP/USD** during March, exceeded 1.5K for the first time, including a daily record of 4,597;
  - **New monthly ADV high in USD/JPY** during February (193 lots, ↑4% on its previous high);
  - **New record O.I. in our FX products** (now above 5K lots in early April), with open positions through to March 2017
- Trading in our liquid calendar spread markets – **new record ADV of 2,512 lots** in March (↑63% on the previous monthly high), supported by trading in 19 distinct spread combinations along the curve in 5 currency pairs

Energy:  
*March Volume: 10,395 contracts. Open Interest (as of March 31st): 52,362 contracts*

- Strong recent developments in CME Europe’s Dutch TTF Gas:
  - **Record volume day 3,090 lots** as of Jan 28th = 32% ↑ from previous record set Dec 4th 2015
  - **New O.I. record of >18,800 lots** of monthly equivalents – positions out to Dec 2020
  - 20-day Moving-Average (MA) Dutch Gas **volume moved above 1,000 lots p/d**, as of Feb 12th
- New products trading – Mini European Premium Unleaded Gasoline Futures contract traded for the first time (Jan 22nd)
- New product launches – 4 weekly European Power Futures to be launched (first trade date: April 25th); adding to the 8 existing monthly Power Futures products
CME Europe – 2016 YTD Highlights

Record Exchange volumes; multiple milestones in FX, Gas & Cocoa

Agricultural

Volume for March 2016: 8,408 contracts. Open Interest (as of March 31st): 2,150 contracts

- CME Europe’s award winning Cocoa Futures contract marked its 1st year anniversary with over 50,255 contracts traded since launch, and including:
  - Record Cocoa volume (7,008 lots) in March as higher trading activity established a 3rd successive monthly record
  - Triple record volume days in April to-date with volumes rising from 2,427 and 3,254 lots to 4,476 lots on April 15th
- Fertiliser – first trades received in Urea (Prilled) FOB China Future (FCE) as of April 19th; becoming the 3rd Fertiliser contract traded on CMEEL alongside the Middle East (FME) and Egypt (FEY) Fertiliser futures
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• Regulatory Updates
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• CME DataMine & Customer Center
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• CME Product Updates
  ➢ Metals
  ➢ Energy
  ➢ FX & Rates
  ➢ Swaptions Clearing

• Global Repository Service
# Precious Metals Products

## Leading Contracts with Deep Liquidity

<table>
<thead>
<tr>
<th>Product Code</th>
<th>2015 ADV</th>
<th>2016 ADV (Jan-Feb)</th>
<th>Open Interest *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold Futures (100oz)</td>
<td>GC</td>
<td>165,000 lots</td>
<td>217,000 lots</td>
</tr>
<tr>
<td>Gold Options (100oz)</td>
<td>OG</td>
<td>30,000 lots</td>
<td>49,000 lots</td>
</tr>
<tr>
<td>Silver Futures (5000oz)</td>
<td>SI</td>
<td>53,000 lots</td>
<td>68,000 lots</td>
</tr>
<tr>
<td>Platinum Futures (50oz)</td>
<td>PL</td>
<td>14,000 lots</td>
<td>14,000 lots</td>
</tr>
<tr>
<td>Palladium Futures (100oz)</td>
<td>PA</td>
<td>5,000 lots</td>
<td>6,000 lots</td>
</tr>
</tbody>
</table>

* Open interest data on Feb 29th, 2016

- CME Group's flagship Gold, Silver, Platinum and Palladium futures contracts represent deep and liquid markets.
- Significant liquidity growth in the past five years.
- The futures contracts trade virtually 24 hours a day.
- The liquidity available for our precious metals contracts translates into tight bid-ask spreads and high-quality trade executions that help meet a variety of customers’ business and risk management objectives.
CME Group launched Gold Kilo Futures (GCK) in January 2015. GCK is listed on COMEX and physically delivered in Hong Kong, offering access to trade the Far East gold market.

- **Continuously quoted and traded** with tight markets and liquidity accessible across the Asian, European and U.S. hours

- **Less-expensive vehicle for exposure to gold prices.** At one-third the size of GC (100oz gold) contract, the GCK requires a smaller initial capital outlay and lower margin requirements

- **Enables precision trading of gold in kilo units** for exposure to gold prices and risk management

- **True intraday price transparency across the futures curve** for unique arbitrage and spread trading opportunities

- **Simplified Delivery Process** enables delivery in **9999 fineness** kilo bars in HK (three Exchange approved vaults in HK)

- **Deep margin offsets** (90% against GC) and financial safeguards from CME Clearing

---

### Increase in Liquidity since GCK Launch

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<thead>
<tr>
<th>CC</th>
<th>Product</th>
<th>Description</th>
<th>Status</th>
<th>+</th>
<th>Qty</th>
<th>Bid</th>
<th>Ofr</th>
<th>Qty</th>
<th>Last</th>
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</thead>
<tbody>
<tr>
<td>GCK</td>
<td>Gold Kilo Future</td>
<td>Apr16</td>
<td>Open</td>
<td>+1</td>
<td>1</td>
<td>1,269.1</td>
<td>1,269.3</td>
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<td>1,266.5</td>
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<td>6</td>
<td>1,269.9</td>
<td>1,269.5</td>
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<td></td>
</tr>
<tr>
<td>GCK</td>
<td>Gold Kilo Future</td>
<td>May16</td>
<td>Open</td>
<td>+6</td>
<td>1</td>
<td>1,269.9</td>
<td>1,270.5</td>
<td>6</td>
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</tr>
<tr>
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<td>1,269.8</td>
<td>1,270.7</td>
<td>6</td>
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</tbody>
</table>
### Base/Ferrous Metals Products

Leading Contracts with Deep Liquidity

<table>
<thead>
<tr>
<th>Product Code</th>
<th>2015 ADV</th>
<th>2016 ADV (Jan-Feb)</th>
<th>Open Interest *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper Futures (25,000lbs)</td>
<td>HG</td>
<td>74,335 lots</td>
<td>79,081 lots</td>
</tr>
<tr>
<td>Iron Ore Futures (500MT)</td>
<td>TIO</td>
<td>87 lots</td>
<td>1159 lots</td>
</tr>
<tr>
<td>Hot Rolled Steel (20ST)</td>
<td>HR</td>
<td>139 lots</td>
<td>361 lots</td>
</tr>
<tr>
<td>US Aluminium Premium Futures (25MT)</td>
<td>AUP</td>
<td>148 lots</td>
<td>313 lots</td>
</tr>
<tr>
<td>EU Aluminium Premium Futures (25MT)</td>
<td>AEP</td>
<td>54 lots</td>
<td>61 lots</td>
</tr>
</tbody>
</table>

* Open interest data on April 7th, 2016

- CME Group’s flagship Copper contract has just achieved an all time record in open interest (205,143)
- Significant liquidity growth in the past five years.
- Copper options (HX) is the world’s only electronically traded options contract (fees are currently waived with a broker rebate program)
- CME is expanding further into base metals by offering physically settled aluminium (ALI), Zinc (ZNC), and Lead (LED).
- [http://www.cmegroup.com/basemetals](http://www.cmegroup.com/basemetals)
Base Metals Product Update

Aluminum Premiums AUP, AEP, MJP, EDP

CME’s cash settled futures contracts offer the aluminium industry the ability to effectively mitigate premium exposure

- All are Cash Settled.
- Aluminum premiums have been very volatile recently
- AUP contract allows clients to manage the aluminium Mid West North America premium risk.
- AEP contract allows clients to manage regional European Aluminium Duty-Unpaid exposure. The sister contract - EDP - does the same for European Duty Paid exposure.
- MJP (Main Japan Ports) contract allows clients to manage regional Asian exposure
- Increasing ADV and OI have made CME’s contracts the leaders in the space
- Deep margin offsets (25%-35%) versus other base and ferrous metals contracts
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• Global Repository Service
New Crude Contracts: Brent Futures-Style Options and WTI Houston Futures

Brent Futures-Style Margin Options (BZO)
- CME’s first option with Futures-Style Margining
- Look-a-like to ICE’s Monthly Brent Option (B)
- Leverage WTI option (LO) screen liquidity to develop electronic markets for Brent options
- Underlying NYMEX Brent futures (BZ) trading 115,000+ contracts a day

WTI Houston (Argus) Futures
- Six related contracts launched on February 8th, main interest in:
  - HTT – WTI Houston (Argus) vs WTI Trade Month
  - HIL – WTI Houston (Argus) vs WTI Calendar Month
- First exchange cleared WTI Houston contract (code HTT) traded: 690 contracts on March 8th
- North American crude grades open interest now at 180,000 contracts
NYMEX: The Emerging WTI-Brent Exchange

- NYMEX front month exchange listed WTI-Brent (code CLBZ) spread now consistently 50% market share or greater.

- Bid/Ask spread on front two months CLBZ now consistently 1 tick wide, driven by robust liquidity in NYMEX WTI.

- New diagonal exchange listed CLBZ spread that reflects revised Brent expiration is active and trading, early-April roll out for diagonal Brent crack spreads.

Using a Chart Default:

- If the embedded chart is selected and the Chart Style is changed to one of the defaults (see screen cap), the chart will change to that color and remain in the correct size. However, the text will default to 18 pt.

- Select or Right-click the text on the x and y axis as well as the text for the legend and change to 10 pt. (see screen cap).

Screen Shot taken 2/26/16 12:45 PM EST
Reduced ticks in our most common Natural Gas Spreads.

Implieds for Natural Gas options are live and trading on Globex. Crude Options Implieds will be available to trade in April.

Physical NG Butterfly spread products to be listed in April 2016.

Average Priced user defined strips for energy options coming in May 2016.
Agenda

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  ➢ Energy
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  ➢ Swaptions Clearing
• Global Repository Service
FX tick size reduction

Effect on market quality

• Minimum tick increment in the standard size EUR/USD contract changed from $12.50 per tick to $6.25 per tick on January 11, 2016
  - Cost reduction of 36% for orders executed at the Top-of-Book □ Save $89.45 on average execution size of 18 contracts (~$2.5m notional)
  - 100-lot execution (~$13.7m notional) is now 19% cheaper - saves $512 □ Average bid/ask spread of 1.799 ticks post cut
  - 200-lot execution (~$27.4m notional) is now 11% cheaper - saves $844 □ Average bid/ask spread of 2.609 ticks post cut
FX

Highlights

• CNH New liquidity program launched March 15
  • Improved market making program with new market makers
  • Block price makers added
  • Aggressive customer outreach will commence early April

• New Bloomberg USD Index futures to commence trading on April 4
  • Cash settled futures referencing the Bloomberg Dollar Spot Index (BBDXY)
  • Index composed of 10 currency pairs (EUR, JPY, CAD, MXN, GBP, AUD, CHF, KRW, CNH & BRL)
  • Component currency weightings are rebalanced annually in December
Interest Rates

Highlights

- **Ultra 10 Contract** the most successful “new-launch” in CME’s history
  - 1 million contracts traded in just seven weeks; a record for CME
  - Successful first roll from March to June expiry
  - Open interest on a strong uptrend
  - Broad client participation across trade types
  - Focus in April will be on TN options push

- **Record setting start to 2016 for Rates products**
  - Treasury futures open interest hit all time high of 8.39MM contracts

- **Change to strike increments for Treasury options effective March 7**
  - 10yr Note & Ultra 10 yr Note: ¼ point increments (previously ½ point)
  - Bond & Ultra Bond: ½ point increments (previously 1 point)
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CME Group Swaptions Clearing

Launching April 11, 2016 Based on Strong Client Demand

Clearing Swaptions Amplifies our Unparalleled Capital Efficiencies

- Voluntary clearing allows market participants the flexibility to reduce the risk of their cleared IRS portfolios
- Margin offsets of up to 91% possible by adding swaptions to CME cleared IRS portfolios
- Portfolio margining with our cleared IRS and Eurodollar, Treasury, and Deliverable Swap Futures
- Reduces bilateral counterparty credit risk and frees up credit lines
- Improves Capital Ratios, lowering capital charges that could ultimately be passed onto end users

"With uncleared margin rules coming into greater focus for our clients, Credit Suisse is excited to facilitate voluntary swaptions clearing at CME Group. Clearing swaptions enables our clients to obtain the greatest operational and capital efficiencies from clearing, while reducing the risks in their portfolios."

John Dabbs, Global Head of Prime Derivatives Services at Credit Suisse

"RBS plc is pleased to take a leadership role as one of the first banks that will provide cleared swaption liquidity to our global client base. We are very supportive of the early adopters that use the CME swaption clearing solution to reduce bilateral counterparty exposure, particularly with the added cost of margin for non-cleared derivatives coming later this year."

Alan Mittleman, Head of Rates Trading, Americas at RBS plc.
## Cleared OTC IRS Swaptions Product Scope

### Initial Product Offering:

<table>
<thead>
<tr>
<th>Swaptions</th>
<th>Max Expiry</th>
<th>Final Settlement</th>
<th>Underlying Tenor</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Currency</strong></td>
<td><strong>Type</strong></td>
<td><strong>Years</strong></td>
<td><strong>Method</strong></td>
<td><strong>Years (up to)</strong></td>
</tr>
<tr>
<td>USD</td>
<td>European</td>
<td>&lt;= 2</td>
<td>&lt;= 5</td>
<td>&gt; 10</td>
</tr>
</tbody>
</table>

- USD vanilla swaptions
- Includes Straddles, cleared as a single trade or separate payer/receiver
- All enumerations for USD-denominated 3 month LIBOR vanilla interest rate swaps supported, with the exception of:
  - Compounding, forward starting swaps, spreads and stubs

### Future EUR Product Offering*:

<table>
<thead>
<tr>
<th>Swaptions</th>
<th>Max Expiry</th>
<th>Final Settlement</th>
<th>Underlying Tenor</th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Currency</strong></td>
<td><strong>Type</strong></td>
<td><strong>Years</strong></td>
<td><strong>Method</strong></td>
<td><strong>Years (up to)</strong></td>
</tr>
<tr>
<td>EUR</td>
<td>European</td>
<td>&lt;= 2</td>
<td>&lt;= 10</td>
<td>&lt;= 30</td>
</tr>
</tbody>
</table>

- Includes Straddles, cleared as a single trade or separate payer/receiver
- Standard strikes include 0-10y, 12y, 15y, 20y, 25y, 30y

*Pending regulatory approval
USD Swaptions Product Characteristics

- Straddles, the simultaneous right to pay and receive at the same strike & maturity, are supported & can be cleared as a single trade.

- Both upfront and forward premiums are supported:
  - Premiums may be settled on spot (T+1) through the expiration date +1 of the swaption and are denominated in USD.

- Physical delivery into a cleared CME OTC interest rate swap transaction:
  - Effective date equals exercise date +2.
  - Trade date & cleared date of the underlying swap equals swaption exercise date.

- CME performs three validations at the time a trade is submitted to clearing, same as current workflows:
  - Account ID must be valid.
  - Trade must pass credit limits and CME risk filters.
  - Must meet supported product attributes.

- At exercise, the underlying swap transaction bypasses validations (account, credit and product) & is automatically cleared.
Swaptions Exercise Process

With CME as the swaptions counterparty to every trade, both the long and short benefit from a streamlined exercise and assignment process.

**Bilateral Process**

- Prior to 11 am ET, Counterparties agree to swaption action.
- Long: Post 11 am ET and prior to EOD, long effects swaption action via platform.
- Short: Prior to 11 am ET, Long exercises swaption action via platform.
- Short: Records new position based upon agreement and hedges as appropriate.

**CME Cleared Process**

**Option 1**
- Prior to 11 am ET, Long exercises swaption in real-time using CME DMS or via Platform (E&A API).
- Short receives real-time notification of assignment, hedges as appropriate.

**Option 2**
- Prior to 11 am ET, Long sets an intent to exercise at expiry using CME DMS or via Platform (E&A API).
- Short receives notification at 11 am ET expiry time.

Long has the opportunity to take the desired action on the swaptions up until 11 am ET, & may use the CME Deal Management System or send instructions via API rather than calling each counterparty.

- If the Long exercises in real-time, prior to 11 am ET cutoff, the Short will be notified in real-time.
- If the Long sets an intent to exercise at expiry, the Short will not be notified until the 11 am ET cutoff.
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- CME DataMine
- New! CME Customer Center
- Global Repository Service
CME Global Repository Service

World class trade repository solutions combining global breadth with highly efficient real-time technology and aggressive pricing. www.cmegroup.com/GRS

1500+ Customers

Unique Trades reported

250+MM

Accept:

OTC-Bilateral
OTC-Cleared
ETD

US, EU, Canada, Australia

24hr ACCESS & SUPPORT

## CME GRS Value Proposition

<table>
<thead>
<tr>
<th>COVERAGE</th>
<th>TECHNOLOGY</th>
<th>COST</th>
<th>OPERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>In all major reporting jurisdictions; set up to be a true global offering.</td>
<td>Best in class technology to ensure your compliance and low maintenance costs.</td>
<td>Simple and cost effective fee plans. Expense certainty.</td>
<td>World class client service team. Intensive compliance discipline.</td>
</tr>
<tr>
<td>- US, Canada, EU, Australia, Singapore (‘16)</td>
<td>- Streamlined submission formats</td>
<td>- Annual fee caps per asset class</td>
<td>- Under 24 hour response times</td>
</tr>
<tr>
<td>- All asset classes</td>
<td>- TRs on a single global platform</td>
<td>- Supporting Master Account aggregation across entities</td>
<td>- Multi-jurisdictional knowledge</td>
</tr>
<tr>
<td>- Bilateral &amp; Cleared</td>
<td>- Real-time processing for all messages and instant reports</td>
<td>- No charge for View Only access</td>
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</tr>
<tr>
<td>- CME &amp; non-CME markets</td>
<td></td>
<td>- Delegated reporting on CME Markets free of charge</td>
<td></td>
</tr>
</tbody>
</table>
GRS New Developments

• Pursuing a Singaporean trade reporting license from MAS; targeting end of 2016.

• Australian Trade Repository (ATR) is live and accepting trades in all asset classes, CME/non-CME, bilateral and cleared.

• CME Clearing now supporting delegated reporting of CME Cleared trades to CME ATR to aid clients with Australian reporting obligations.

• Reduced Dodd-Frank (US) and EMIR (EU) reporting fees.

• New vendor partner commercial programs.

• Authorized by ACER to operate a Registered Reporting Mechanism (RMM) to comply with REMIT reporting regulation on European Wholesale Natural Gas and Power markets.
“Reporting 2.0”

- CME is a true Global TR. . . an alternative exists!

- Expense savings on trade reporting are real. Moves to CME often result in 50%+ per annum.

- Compliance risk is real. Regulatory reporting fines have begun.

- Your TR operator should offer more than just trade reporting.
Contact Us

Business Team:  Repository@cmegroup.com

Client Services:  RepositorySupport@cmegroup.com

Chicago +1 (312) 580 5352  |  London +44 (0) 203 379 3180

General Website
http://www.cmegroup.com/GRS