AGENDA

- OTC CDS Clearing Overview

- CDS Client Clearing Model Overview
  - Client Clearing Overview
  - Risk Management
  - CDS Connectivity and SEF Trade Workflow
  - Client Clearing Tools

- Appendix
ICE OTC EXPERTISE

Intercontinental Exchange (ICE) is the global leader in cleared credit derivatives markets, clearing over $100 trillion in gross notional across ICE Cleared Credit and ICE Clear Europe:

- Global leader in OTC credit as well as listed derivatives in credit indices, interest rates, equity, energy, agriculture and foreign exchange
- March 2009 - ICE is the first to clear index credit default swaps (CDS)
- July 2009 – ICE Clearing Europe launches CDS clearing
- December 2009 – ICE is the first to clearing single name credit default swaps and client activity
- July 2012 – ICE Clear Credit designated a Systemically Important Financial Market Utility
- March 2016 – Global clearing volume surpasses $75 trn
- July 2017 – Global clearing volume surpasses $90 trn
- March 2018 – Global clearing volume surpasses $100 trn

ICE Global Cleared Activity – Gross Notional vs. Open Interest

![Graph showing ICE Global Cleared Activity: Gross Notional vs. Open Interest from Q1 2009 to Q1 2018.](image)
ICE GLOBAL INSTRUMENT COVERAGE

- Over 550 different clearable instruments, broadest coverage amongst all Credit Clearinghouses
- Coverage in all three global markets; US, European & Asia-Pacific
- 100% coverage of IG index constituents and EM index constituents

**CDX**
- IG – Series 8+
- HY – Series 18+
- EM – Series 17+

**iTraxx**
- Main – Series 7+
- Xover – Series 17+
- HiVol – Series 17-20
- Snr Fins – Series 17+
- Sub Fins – Series 22+
- Asia Ex-Japan – Series 24+
- Australia – Series 24+

**Corporates**
- 251 North American
- 198 European
- 8 Australian
- 9 Asia & EM

**Sovereigns**
- 35 Sovs

A full listing of clearing eligible products can be found at [theice.com/clear-credit](http://theice.com/clear-credit) (ICE Clear Credit) & [theice.com/clear-europe/cds](http://theice.com/clear-europe/cds) (ICE Clear Europe)
ICE CDS EXPERTISE

- Global leader in CDS with expertise in execution, post-trade processing, clearing and other operational and risk management processes
- Open platform architecture – each process is available individually and can connect to multiple alternative service providers
- Integrated ICE CDS solution offers an easier, more efficient execution and processing experience

EXECUTION
- ICE’s SEF, ICE Swap Trade, offers all-all anonymous execution leveraging its highly successful existing technology platform. Coupled with ICE’s non-SEF execution, market participants are offered a singular view of the credit market
- Innovative CDS electronic services: credit event auctions, delta neutral auctions and portfolio compression

PROCESSING
- ICE Link; the leading post trade affirmation service for CDS
- Connected to over 1200 CDS buy-side firms in addition to all major dealers, clearing brokers, IDBs, SEFs and SDRs
- Helps clients meet new regulatory requirements for automation and standardization

CLEARING
- ICE Clear Credit (formerly ICE Trust) launched March 2009, the first clearing house to process CDS transactions
- ICE Clear Europe launched July 2009
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CDS CLIENT CLEARING MODEL OVERVIEW

**CDS Product**
- Standard coupons, adherence to ISDA DC on credit and succession events
- Upfront fees netted with margin movements
- Ability to retain individual trades or benefit from operational netting

**Customer Protections**
- Segregation of gross margin at the clearing house through Cleared OTC Derivatives Account Class (4d(f))
- Indices and single names held in the 4d(f) account to allow for portfolio margining
- Pre and Post default portability of positions and collateral supported
- “LSOC” customer segregation model

**Risk Management**
- Specifically designed for CDS
- Guaranty Fund covers simultaneous default of 2 largest Clearing Participants
- EOD settlement process based on price submissions subject to execution ensuring fidelity of quotes

**Margin Methodology**
- Dynamic Stress-Based Regime
- Margin Calculator provides transparency and detailed analysis of requirements
- Portfolio margining methodology (Index Decomposition) to provide capital efficiencies

**Infrastructure**
- Open Access: supporting multiple SEF execution and middleware providers
- Trades cleared intra-day, on a near real-time basis
- Allows users to leverage existing infrastructure – no costly technology build
- Supports all trade life cycle events: backloading, netting, portability, credit events

**Customer Documentation**
- Client relationship to FCM/BD governed by a bilateral futures/securities agreement
- No additional ICE Clear Credit documentation for Client and FCM/BD to bilaterally execute
- ICE Clear Credit rules govern CDS clearing
ICE CDS RISK MANAGEMENT FRAMEWORK
WATERFALL APPROACH FOR MANAGING SYSTEMIC RISK

Layers of Protection

- **Membership Criteria**: Ensure counterparty has operational capabilities, risk management experience and financial resources
- **Mark-To-Market Margin Requirement**: Daily MTM based on end of day (EOD) settlement prices
- **Initial Margin Requirement**: Daily margin call based on dynamic stress-based regime
- **Intra-day Risk Monitoring Special Margin Call Execution**: Additional margin can be called due to unusual market fluctuations
- **Guaranty Fund**: Additional collateral to mutualize losses under extreme market scenarios
- **Additional Assessment Rights**: Oblige CPs to contribute additional default funding
## Initial Margin Requirement
### Dynamic Stress-Based Regime

<table>
<thead>
<tr>
<th>Component</th>
<th>Risk Captured</th>
<th>Approach</th>
</tr>
</thead>
</table>
| Spread Response Requirement    | Instrument spread level variability and changes in credit spread term structure (“curve”) shape | Consider six scenarios  
- Widening / contracting credit spread scenarios  
- 3 curve shapes per credit spread scenario |
| Recovery Rate Sensitivity Requirement | Fluctuations of Recovery Rate (RR) assumptions                              | Consider min. and max. reference entity specific RR to determine additional losses |
| Jump-To-Default Requirement    | Unexpected credit event losses not accounted for in the market valuation of Single Name (SN) instruments | Include Loss-Given-Default for sold protection  
Consider liability associated with 1 credit event using an assumed SN-specific minimum RR |
| Basis Risk Requirement         | Differences in trading behavior of index-derived and outright SN positions    | Account for liquidity differences (market views are priced into more liquid index instruments sooner than SNs), and expected cash flow differences |
| Liquidity Requirement          | Transaction (bid-offer) costs associated with unwinding CDS instruments in the event of a Clearing Participant default | Capture the proper liquidation cost for directional as well as well-hedged portfolios  
Estimate costs based on bid-offer width, derived from the end of day price discovery process |
| Interest Rate Sensitivity Requirement | Fluctuations in interest rates                                           | Assess sensitivity of portfolio Net Asset Value to default-free discount interest rate changes |
| Concentration Requirement      | Costs associated with large position liquidation                            | Reflect market depth and liquidity  
Apply to positions that exceed pre-specified thresholds  
Increase requirements exponentially |

**Total Risk Requirement**
PORTFOLIO MARGINING - QUANTIFYING THE BENEFITS
INDEX DECOMPOSITION MARGIN METHODOLOGY

Portfolio Margining Example

- ICE has formulated an index decomposition margin methodology which provides benefits to long/short index and single name positions
- Capital efficiencies are achieved by allowing market participants to clear index and single name CDS in a single segregated CFTC customer account while maintaining strong risk management protections
- Voluntarily clearing single names will allow you to achieve these margin benefits against mandatorily cleared indices

<table>
<thead>
<tr>
<th>Margin Requirements</th>
<th>Total Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Margin Percentage</td>
<td>Portfolio Size</td>
</tr>
<tr>
<td>125 SN Positions</td>
<td>1.25%</td>
</tr>
<tr>
<td>(Bought Protection on 125 names of $4MM each 5Y tenor)</td>
<td></td>
</tr>
<tr>
<td>Index Position</td>
<td>2.00%</td>
</tr>
<tr>
<td>IG Series 26 5Y</td>
<td>(Sold Protection on $500mm)</td>
</tr>
<tr>
<td>Index Arb</td>
<td>0.50%</td>
</tr>
<tr>
<td>(Bought SN/Sold Index)</td>
<td></td>
</tr>
</tbody>
</table>

Margin Requirements
If margined on a separate basis
Margined on a portfolio basis

$16.25MM
$5.00MM

- Margin reduction of $11.25MM achieved through portfolio margining
DEFAULT CDS RISK WATERFALL

Further information on Risk and Default Management can be found at:
ICE CLEAR CREDIT – CDS CONNECTIVITY

ICE CLEAR CREDIT CONNECTS TO MULTIPLE TOUCH POINTS IN TRADE ECOSYSTEM

Execution Venues
- ICE SWAP TRADE
- Bloomberg
- +BGc
- Dealerweb
- ICAP
- MarketAxess
- GFI
- Tradeweb
- Tradition
- Tullett Prebon

Middleware Platforms
- ICE LINK
- markitSERV
- Bloomberg

Clearing Members
- Bank of America
- Merrill Lynch
- BNP Paribas
- Credit Suisse
- Goldman Sachs
- Deutsche Bank
- LGBC
- Morgan Stanley
- Societe Generale
- J.P. Morgan
- Nomura
- Scotiabank
- UBS
- Wells Fargo

Data Repositories
- ICE TRADE VAULT
- DTCC GTR
- DTCC Deriv/SERV
- TIW & EVENT PROCESSING
OVERVIEW OF ICE CDS EOD SETTLEMENT PROCESS

ESTABLISHES RELIABLE END-OF-DAY VALUATIONS FOR MARGIN/RISK CALCULATIONS

Quote Submission
- ICE requires CPs to submit quotes for 9 benchmark tenors and all standard coupons cleared by ICE for which the CP has a cleared interest

End Of Day Valuation
- Using the submitted quotes, ICE performs an end-of-day valuation for every cleared instrument using a multi-stage crossing/matching algorithm
- EOD prices for non-benchmark tenors interpolated from calculated Settlement Prices for benchmark tenors

Firm Trade Obligation
- To encourage the best possible submissions, ICE requires Clearing Participants to enter into bilateral Firm Trades if submitted quotes are crossed/locked

Controls to Limit Impact on Risk
- Controls ensure that Firm Trades do not have adverse market impact
- “Default” bid offer width (default spread width)
- Fixed notional size
ICE SUPPORTS ALL MAJOR SEF PLATFORMS VIA THE SEF DIRECT WORKFLOW
CLIENT CLEARING TOOLS
CDS MARGIN CALCULATOR

- Available to all clients through the ICE Link GUI
- Provides full transparency into our CDS initial margin methodology with results broken down by component
- Run what-if scenarios on existing positions or custom portfolios

Select existing positions in the ICE Link Positions Blotter and click on Margin

Ability to upload custom portfolios directly into Calculator

Review Margin Results / Export in CSV format

Training materials available on ICE Link Web GUI (Help Documents) or at [www.theice.com/clearcredit](http://www.theice.com/clearcredit)
Contact ICE for a demonstration: [icelinhelp@theice.com](mailto:icelinhelp@theice.com) or call +1 770 738 2101 / +44 (0)20 7488 5100
### CLIENT CLEARING TOOLS

#### CDS REPORTS

<table>
<thead>
<tr>
<th>REPORT</th>
<th>DESCRIPTION</th>
<th>FORMAT</th>
<th>AVAILABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing Eligible Instruments</td>
<td>A full list of indices and single names eligible for clearing; includes ICE Clear Credit and ICE Clear Europe eligible instruments</td>
<td>CSV</td>
<td>Daily</td>
</tr>
<tr>
<td>Clearing Activity</td>
<td>Provided at allocated trade level; includes new trades cleared on a specific day</td>
<td>CSV and PDF</td>
<td>Daily</td>
</tr>
<tr>
<td>Cleared Positions</td>
<td>Provided at allocated trade level; includes all open cleared positions from current day in a per trade format</td>
<td>CSV and PDF</td>
<td>Daily</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>Provides the portfolio level margin requirements (initial margin and mark-to-market)</td>
<td>CSV and PDF</td>
<td>Daily</td>
</tr>
<tr>
<td>Early EOD Pricing file</td>
<td>Provides end-of-day closing clearing house prices. Available at 5 pm local time.</td>
<td>CSV</td>
<td>Daily</td>
</tr>
<tr>
<td>Mark-to-Market Margin Interest Report</td>
<td>Provides the daily interest earned on margin collateral using the MTM balances</td>
<td>CSV and PDF</td>
<td>Daily</td>
</tr>
<tr>
<td>Netting</td>
<td>Provides netting results for accounts set to net; includes terminations and new net trades</td>
<td>CSV</td>
<td>Daily / Ad hoc / Selective</td>
</tr>
</tbody>
</table>

- All reports available in production and test environments for ICE Clear Credit and ICE Clear Europe.
- Available at 9 pm local time (except for the EOD pricing file which is available at 5pm and 8 pm local); NY for ICE Clear Credit and LDN for ICE Clear Europe
- Access through the ICE Link web interface or electronically via secure MFT
CLIENT NEXT STEPS

- To begin clearing CDS, Clients need to:
  - Establish relationships with one or more ICE CDS Clearing Participants and execute legal documentation
  - Establish connectivity

- For more information, please contact us:
  - Corry Bazley (212) 323-6021 corry.bazley@theice.com
  - Laura Edelman (212) 323-6005 laura.edelman@theice.com
  - Joseph Miller (212) 323-6023 joseph.miller@theice.com

- Visit theice.com/clear-credit for further information on clearing eligible products, EOD prices, eligible collateral, margin methodology and clearing workflows
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CDS SEF BUNCHE D TRADE WORKFLOW
ALLOWS CLIENTS TO EXECUTE AT THE BUNCHE D LEVEL AND ALLOCATE POST CLEARING

Step 1. Bunched trade SEF executed & cleared by ICE via the SEF Direct workflow

- **SEF**
  - Clearing Broker approves Client risk check at the bunched level
  - Bunched trade executed

- **ICE CCP**
  - ICE runs risk checks & accepts trade
  - Bunched trade cleared

- **SDR**
  - ICE submits cleared bunched trade to ICE

Step 2. Allocations provided by client & cleared by ICE

- **ICE Link**
  - Client allocates bunched trade & selects Take-Up FCM
  - Give-Up FCM affirms offsetting allocations
  - Take-Up FCM affirms final allocations

- **ICE CCP**
  - ICE runs risk checks & accepts allocations
  - Allocations Cleared

- **SDR**
  - ICE submits allocations to SDR

---

1 *Client may allocate via ICE Link (GUI, API or Auto Affirm) or via authorized Middleware Platform or SEF*
CDS OFF-FACILITY TRADE WORKFLOW
ICE SUPPORTS THE EXISTING OTC MODEL AND MULTIPLE EXECUTION AND AFFIRMATION PLATFORMS

Trade Execution & Capture

Voice or non-SEF → Trade Capture

Executing Broker Alleviates Block Trade

Multiple Execution Platforms Supported

Affirmation & Clearing Consent

ICE Link

Buy-side Affirms, Allocates and Routes to FCM¹

FCM Affirms and Routes to ICE

Multiple Affirmation Platforms Supported

Clearing by ICE

ICE CCP

ICE Runs Risk Filter Checks & Accepts Trade

Trade Cleared

Trade Routed to SDR

Trades Cleared Intra-day on a Real-Time Basis

¹ Client may allocate via ICE Link (GUI, API or Auto Affirm) or via authorized Middleware Platform or SEF