Introducing CME Group

Data that enables the global economy
CME Group offers the widest range of benchmark futures and options products, covering all major asset classes – all through our technology.
Our business began in mid-19th-century Chicago as a marketplace for agricultural products. Soon after, the city became the center for commodity trading.
Our technology enables price discovery to bring those who want to manage risk together with those who want to profit from accepting that risk.
Integrating NEX Acquisition

Two trading-industry trailblazers brought together to form a global markets company

Value Creation

Technology, Operational and Trading Efficiencies Across Cash and Listed Futures

- Listed FX futures liquidity
  - FX futures/options notional ADV of $102 billion+

- Leading listed interest rate futures complex with deep liquidity
  - Treasury futures/options notional ADV of $579 billion

- Industry-leading clearinghouse for listed and OTC cleared derivatives
  - Broad suite of futures/options data

Combined Post-Trade Value Chain: Cleared and OTC

- Leadership in fragmented $5 trillion notional ADV FX market with ~$90 billion notional ADV
  - Deeply embedded into entire FX ecosystem

- Cash fixed income liquidity
  - Meaningful presence in U.S. cash Treasuries and U.S. and European Repo

- Network assets across post-trade value chain
  - Spot FX, Non-Deliverable Forward (NDF), cash Treasuries and Repo data products

EBS

BrokerTec

Optimisation

FX

Interest Rates

Clearing & Information Services

Note - ADVs referenced are for 2018 full year
Today, electronically transmitted and matched computer-driven systems drive global price discovery and risk management
Where The World Comes To Manage Risk

Short-Term interest rate risk management - $3,160,572,250,000 ($3.1T) notional open interest in CME Eurodollars
The Effect Of Heavy Data

Order Messages and Units of Work

- Order Messages
- Units of Work

Graph showing the trend of order messages and units of work from January 2016 to November 2018.
Technology Innovation Drives Business Growth

And creates new challenges to process “heavy data” – Billions of messages < 200 microseconds
CME Globex Electronic Matching Software Architecture

Market Segment Gateway improves the trading experience with greater predictability, transparency and consistency

Multiple gateways created variability and uncertainty

Legacy

Trading Firm Server

Energy Order
Equity Order

iLink Session Gateway

Energy Match Engine
Equity Match Engine

Latest

Trading Firm Server

Energy Order
Equity Order

Energy Segment Gateway

Energy Match Engine

Equity Segment Gateway

Equity Match Engine

Eliminates variability
CME Globex Electronic Matching Network Architecture

Now where’s the variability?
Top of Rack Network Design

What are the latency implications?

Where would you want to connect?

10 ft = 10 nanos
Technology Enabled Spread Trading

Liquidity measured in nanoseconds

- Adds liquidity to order books
  - Especially in illiquid back month contracts – takes the liquidity in front months of the curve and corresponding spreads to generate liquidity into back month contracts

- Tightens bid-ask spreads
  - Takes the best top of book in each related market and displays implied best bid/ask in other related markets

- No Leg Risk
  - Spread orders are fully executed on legs of spread

- Compliments market maker quotes
  - Market makers feel quoting spreads with liquid front month contracts as less riskier than directly quoting on back month contracts
  - Majority of new products listed offers implied functionality to compliment market makers quotes on front month contracts and related spreads.
Technology Enabled Spread Trading

Liquidity measured in nanoseconds

GEZ5-GEZ6

GEZ6-GEZ7

explicit
implied

contracts
price

contracts
price

contracts
bids asks
price

contracts
price

1st generation implied
2nd generation implied
Schematic of a Clearing House

- Real-time risk management
- Challenges in compute, scalability, monitoring – all event driven
CME Clearing Process And Monitor All Trades Ensuring The Financial Integrity Of Markets and Counterparties

- Interest Rates
- Equities
- FX
- Metals
- Energy
- Agriculture

Market Data
Real-Time Quotes and Charts, Volume and Open Interest by Product, Historical Data and Daily Settlements

Exchange Traded Derivatives (ETD)
Over-The-Counter (OTC) Cleared

Trading Floor
CME Globex
Central Limit Order Book Globally Distributed
CME Clearport
Global Access To Clearing Services

CME Clearing
Data Is Core To Our Business

Our business transforms data into information through technology enablers and services

AI is a natural fit, but data privacy is critical