

# **CME Globex Technology Update 2012**

**Global Account Management**

July 2012

# Agenda

- CME Globex: Growth, Accomplishments and Enhancements
- 2012 Performance Release
- FIX/FAST Operator Release
- Performance and Bandwidth Projections
- Further Resources

# CME Globex: Growth, Accomplishments and Enhancements

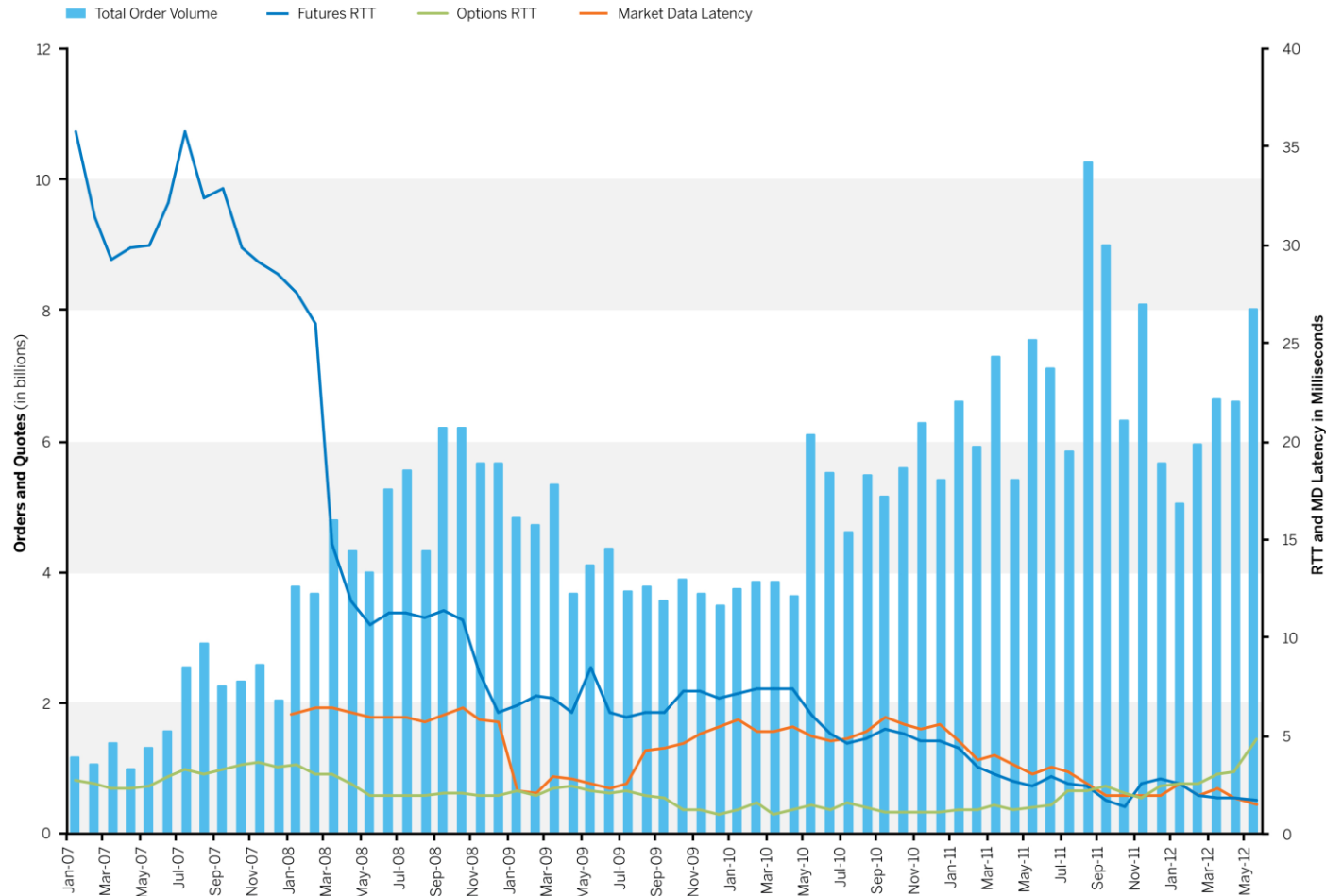
# CME Globex: A Platform for Growth

**CME Globex has grown in scope and complexity throughout its lifecycle**

	2005	2012
Exchanges	CME	CME, CBOT, NYMEX, COMEX, DME, KRX, BVMF, KCBT, MGEX, BMD and MexDer
Tools & Services	FirmSoft, AutoCert	FirmSoft, Autocert+, Drop Copy, Cancel on Disconnect, CME Globex Credit Controls, Risk Management Interface (2012), Firm Administrator Dashboard, SMART Click
Interfaces	iLink, Market Data API, CME Globex Trader	iLink, FIX/FAST, streamlined FIX/FAST, EOS Trader, ClearPort GUI and API, CME Direct
Environments	Production, Certification, Disaster Recovery	Production, Certification, New Release, Disaster Recovery, Out-of-Region Disaster Recovery
Network Access Options	CME-managed, Client-managed including 8 Hubs	CME-managed, Client-managed including 8 Hubs, Proximity services (LNet, Jackson Direct), Co-location Services

# CME Globex: Focus on Performance

## TOTAL ORDER VOLUME AND AVERAGE ROUND TRIP TIME



# CME Globex: Focus on Innovation

## Upgraded Match Engine Technology – Completed September 2011

- All CME Globex markets on a single leading-edge platform
- Reduced latency and variability
- Consistent functionality and messaging behavior

## CME Co-Location Services – January 2012

[www.cmegroup.com/colo](http://www.cmegroup.com/colo)

- Hosting, connectivity and support services provided in our state-of-the-art data center
- Lowest latency connectivity to CME Globex
- 1 and 10 Gb connections through CME GLink
- Over 100 customers globally

## Risk Management Interface (RMI) – April 2012

- Allows clearing firms to block/unblock order entry at the account level
- Available via either an Application Programming Interface (API) or an exchange-provided Graphical User Interface (GUI)

# CME Globex: Focus on Innovation

## CME Direct – June 2012

- Exchange-provided front-end offers free, side-by-side access to CME Group listed futures and OTC markets all on one screen.
- Straight-through processing and straight-through clearing via CME ClearPort
- Launched with NYMEX benchmark energy futures and select OTC markets
- Expansion into additional CME Group markets planned

## Global Backbone – Q4 2012

- High capacity, high availability, low latency, multi-purpose global network backbone
- Provides customers with business continuity via international and NY hub locations

## Out-of-Region Disaster Recovery – Q4 2012

- Leverages a geographically diverse datacenter to improve resiliency

## Consolidated Fill Messaging – 2013

- Improved messaging efficiency across iLink, market data and Clearing through fill message consolidation

## Market Data Protocol – 2013

- Evaluate and implement a new market data protocol

# 2012 Performance Release



# Architecture Enhancements & Reengineering

A comprehensive CME Globex release to **improve performance, increase throughput capacity and reduce variability**

Gains will be achieved through a combination of architectural enhancements and re-engineering

## Infrastructure

- Low latency network architecture
- High availability with low variability
- Hardware refresh

## iLink

- Software re-engineered for high performance
- Reduction of variability across iLink sessions and paths
- Hardware refresh

## Market Data Platform

- Component consolidation
- Software re-engineered for high performance
- Hardware refresh

# Significant Customer Benefits

## iLink order routing

- Faster performance and increased throughput per iLink session
- Reduced variability across sessions and throughout the trading day
- Messaging enhancements to improve FIX compliancy

## Market Data Platform

- Faster performance and better alignment with iLink messaging

## Simplified IP Model

- Only one set of IPs and ports per iLink session to manage
  - CME Group manages routing between production, in-region and out-of-region disaster recovery environments
- Only one set of source IPs for market data B-feed channels

# Performance and Bandwidth\*

## **Both iLink and market data will have significantly faster performance**

- iLink – 50-70% reduced Round-Trip Times (RTT) overall
- FIX/FAST – 60-80% faster dissemination across all channels

## **iLink variability throughout the trading day and across sessions will also be improved**

- 40-60% reduced variability overall

## **Market data bandwidth demands are expected to increase due to the faster performance**

- 10-20% growth across all channels for this release
- Forecast: **50-70%** growth this year, including the FIX/FAST operator release

\*Please note that the performance statistics above are based on production simulation done in a test environment

# IP and Port Changes

Because we are moving to all new hardware and supporting the new simplified IP model, IPs and ports will change for both market data and iLink

## Market Data Platform

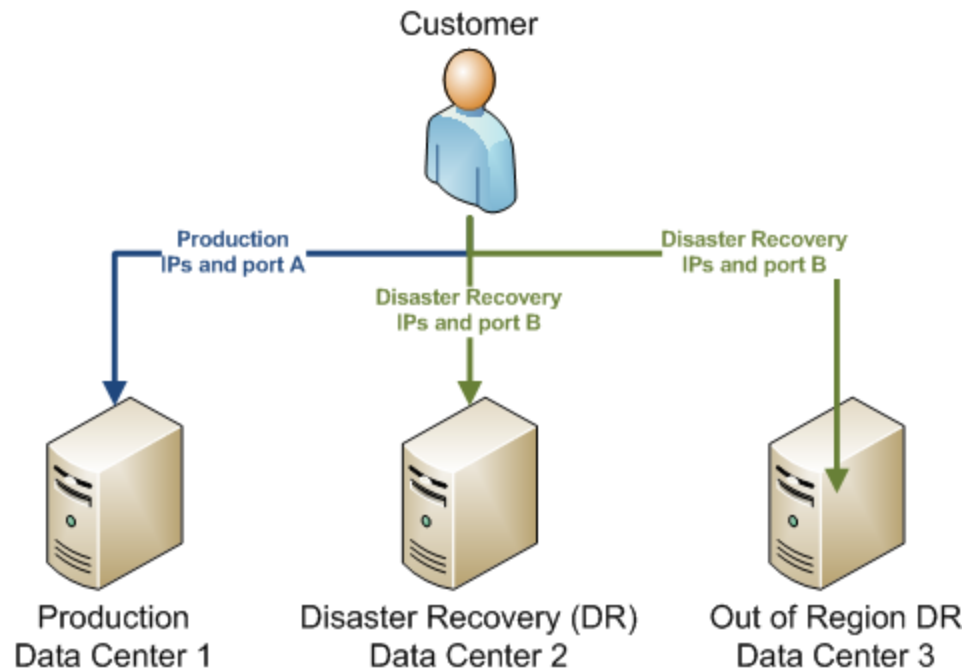
- As each market data channel launches, the source IP will change
  - Customers who permission traffic by source IP will need to update their network routing permissions
  - Multicast channel addresses will not change

## iLink Order Routing

- To access the new high performance iLink gateways, customers will need to use new IPs and ports for all iLink sessions
  - IP and port changes are required to participate in mock trading sessions
  - **All** sessions must change IPs and ports either for the Early Adopter period on October 7 or the full iLink launch on October 14

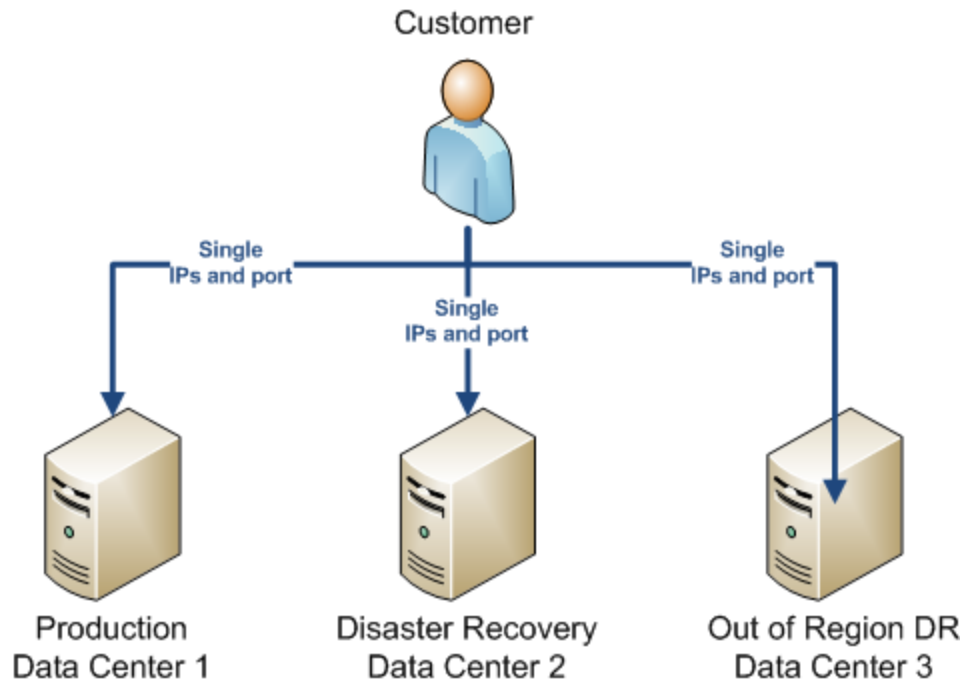
# Current IP Model - iLink

Currently, customers must manage two sets of IPs and ports for each iLink session.



# Simplified IP Model - iLink

Under the simplified IP model, the customer only has one set of IPs and a single port per iLink session. CME Group will route network traffic to each data center as needed.



# Simplified IP Model: iLink and Drop Copy

**Effective November 4, 2012**

- Customers must use their current DR IPs and ports until November 4
- Each iLink and Drop Copy session will use a single pair of IPs (primary and backup) to connect to the production, in-region and out-of-region disaster recovery (DR) environments
- CME Group will route network traffic to the in-region and out-of-region DR environments if necessary†

## **New iLink IPs And Ports available now in the Firm Administrator Dashboard**

- Drop Copy Target ID IPs (primary and backup) will remain the same

*†Note: the out-of-region DR environment is not accessible via Chicago-based connections.*

# Simplified IP Model – Market Data

- Currently, customers receive market data from different Source IP addresses during a Disaster Recovery (DR) event
  - The B-feed source IPs change during a DR event
  - A-feed is not supported during a DR event
- The simplified IP model will normalize the B-feed source IPs across all three datacenters
  - Customers will not need to modify their firewall rules during a DR event

*Note: CME Group does not recommend restricting message traffic by source IPs*



# iLink Messaging Changes

This release includes a number of minor iLink messaging changes.

## Improved FIX Compliancy

- Hardened sequence number processing for Administrative messages
- Logout and disconnect for critical customer messaging errors
- Replacing empty mandatory tags with the value “null” in rejects

## At Customers' Request

- More descriptive reject reasons to support consistent customer processing

## Better Environment Protection

- In-flight Order Status Requests limited to 50 to protect performance and environment components

# Related Enhancements

**Risk management tools and market protections are being enhanced to keep pace with improved performance and ensure highest levels of market integrity**

## **CME Globex Credit Controls (GC2) and Risk Management Interface (RMI)**

- Increasing performance of risk management tools to be consistent with iLink and infrastructure improvements

## **Volume Controls**

- Reviewing volume control functionality and settings for ideal throughput, performance and risk mitigation

## **iLink Capacity and Throughput Guidelines**

- Reviewing capacity and throughput guidelines for optimal performance

# Impacts on Partner Exchange Markets

## Hosted Exchanges

Hosted Partner Exchange markets will realize the same benefits from the improvements and must prepare for the same impacts

### Hosted Partner Exchanges

Bursa Malaysia Derivatives

Dubai Mercantile Exchange

GreenX

Kansas City Board of Trade

Korea Exchange

Minneapolis Grain Exchange

# Impacts on Partner Exchange Markets

## Order Routing Partner Exchanges

	Performance Improvements	Messaging Changes	iLink IP and Port Changes	Market Data Source IP Changes
BM&FBovespa North-to-South			Δ	Δ
BM&FBovespa South-to-North	Δ		Δ	Δ
MexDer North-to-South			Δ	Δ
MexDer South-to-North	Δ		Δ	Δ

Partner market data in ITC and streamlined FIX/FAST formats will not be impacted.

# Rollout Plan – Overview

**A phased approach to minimize risk for all customers**

**All market participants will have equal access to the new performance environment**

- Market Data Platform will be migrated incrementally first, followed by iLink
- New iLink gateways will be introduced through a 1-week Early Adopter program followed by a hard cutover

## Market Data Platform

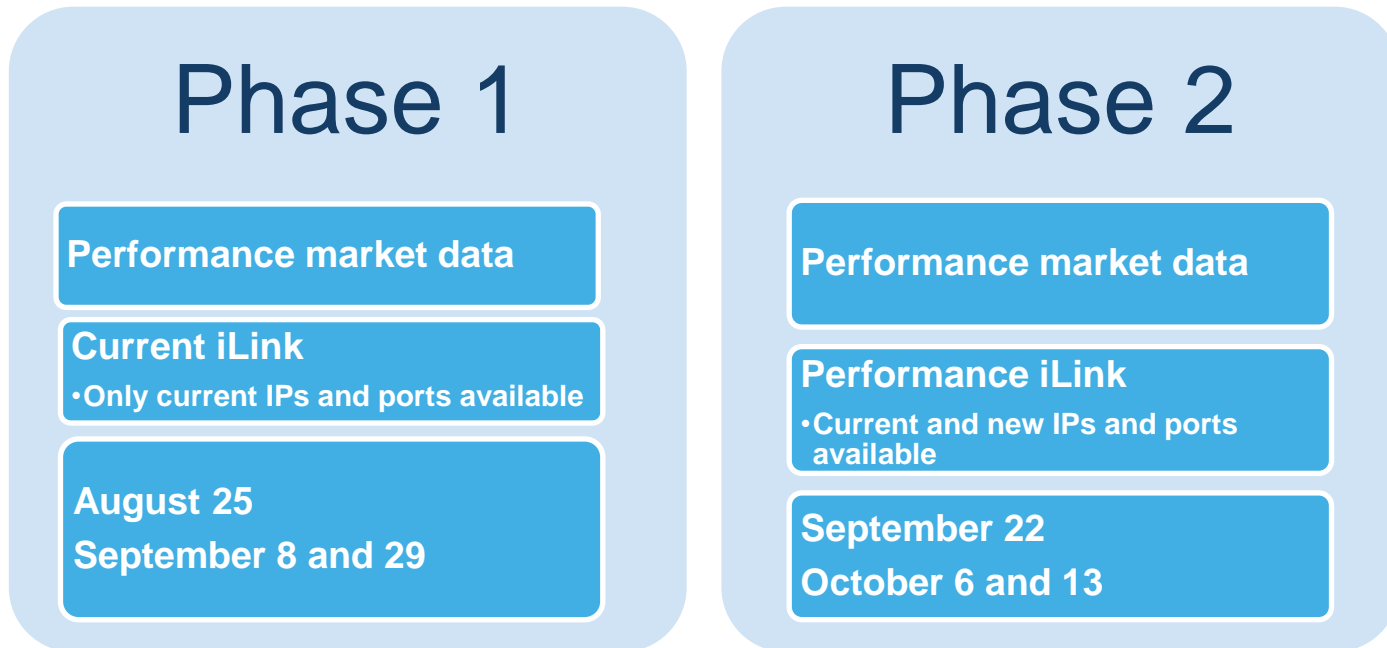
- 5-week cutover with the match engines
- New software and hardware
- Available now in New Release for testing

## iLink

- Early Adopter program
- Hard cutover
- New software and hardware
- Available now in New Release for testing

# Rollout Plan – Mock Sessions

Mock Trading Sessions for customer performance testing



Performance testing can only be done in the Production environment

- Functional testing available now in New Release

# Rollout Plan – Early Adopter Period for iLink

The iLink launch will occur in two phases

## Phase 1: Early Adopter (EA)

- One week, October 7-12
- Allows customers to experience the high performance iLink environment
- Sessions must be flagged for EA **by October 3<sup>rd</sup>**
  - Contact your FCM and Global Account Manager to flag EA sessions
- EA sessions **must** use their new IPs and Ports
- Limit your EA participation to **no more than 20%** of your iLink sessions to manage your risk during EA

**Note: In the event complications arise during EA, EA sessions will be unable to rollback to the legacy environment**

# Rollout Plan – Hard Cutover for all iLink Sessions

## Phase 2: iLink Hard Cutover

- October 14<sup>th</sup>
- All sessions **must** use their new IPs and Ports and move to the high performance environment
- The legacy environment will no longer be available



# Rollout Plan – New Release

May 21

- iLink messaging changes
- No change to IPs and ports

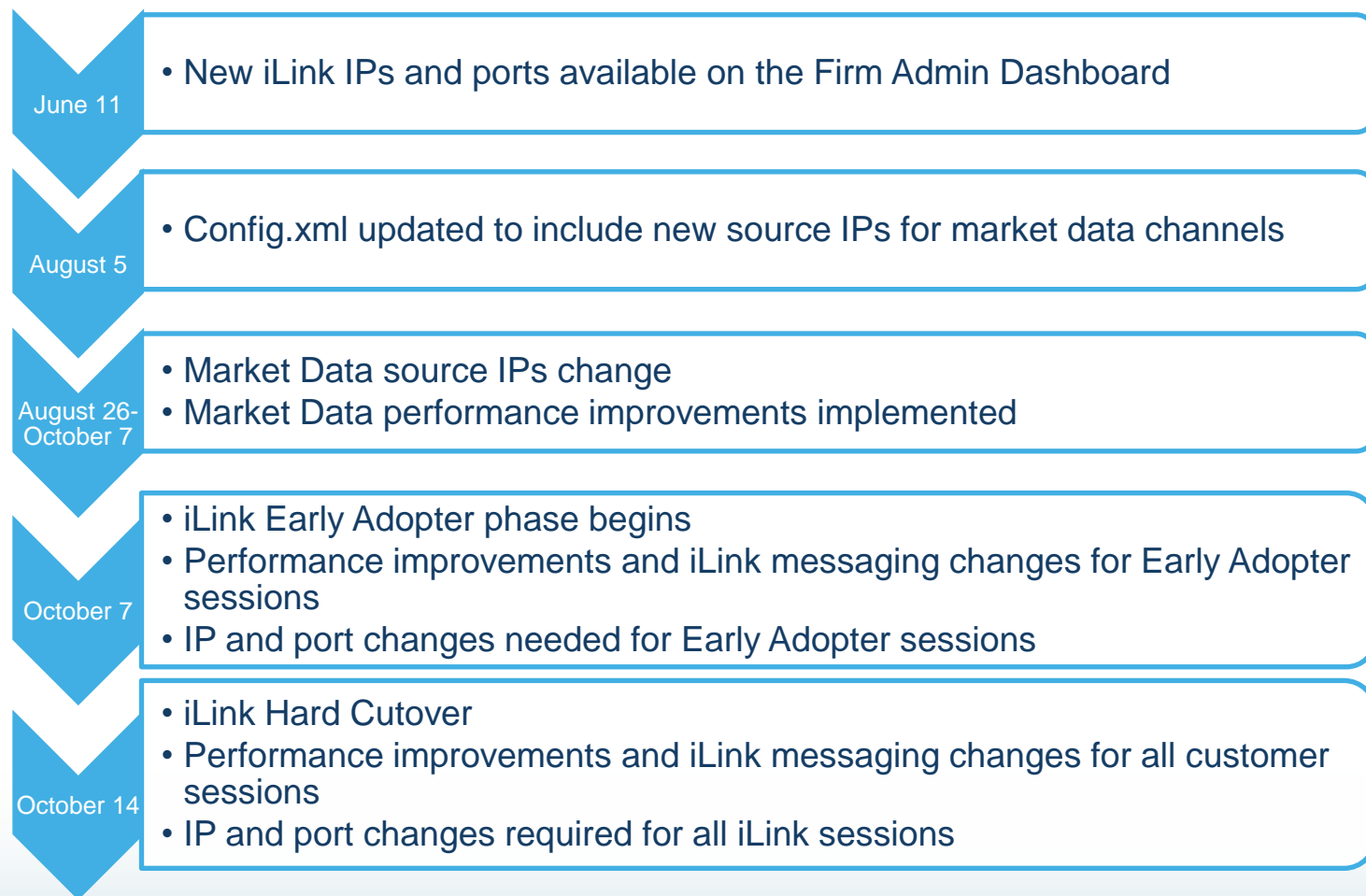
June 10

- Config.xml updated with new source IPs for market data

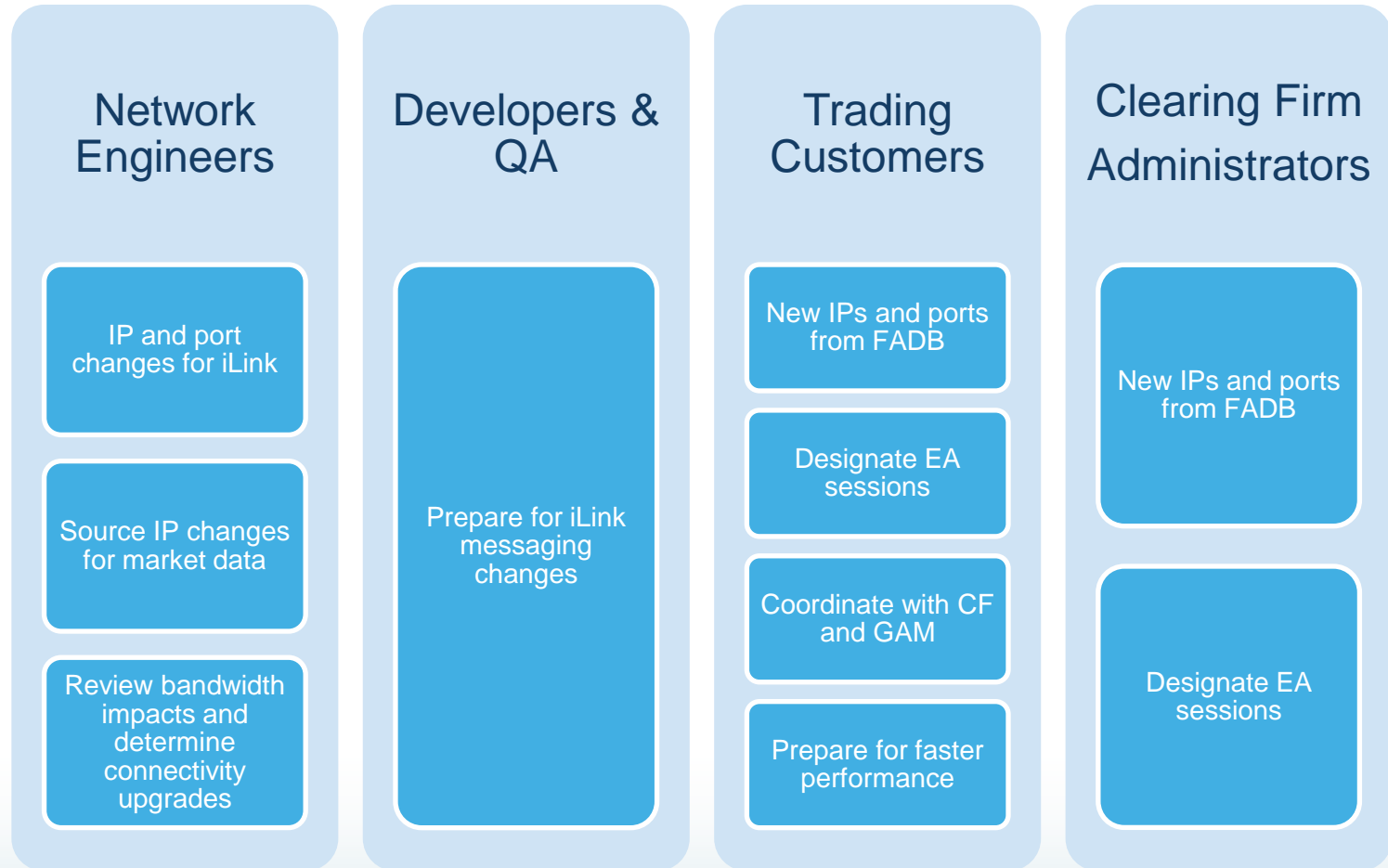
June 18

- **All** market data channel source IPs change

# Rollout Plan - Production



# Action Items



# FIX/FAST Operator Release

# Overview

## **FIX/FAST and streamlined FIX/FAST Operator Release**

The lifecycle of the FIX/FAST protocol, including streamlined FIX/FAST, is rapidly approaching its end as an industry standard in the United States.

- Compression is less critical
  - Increased availability of bandwidth
  - Availability of co-location services
- Industry concerns about litigation and licensing activities
- More efficient encoding and decoding needed
  - Reduces processing requirements

# Two-Phased Operator Release Plan

- Remove the copy, default, delta and increment operators from all FIX/FAST and streamlined FIX/FAST data feeds by **November 4th**
- Evaluate and implement next-generation market data protocol in 2013
- Full schedule of the Operator Release can be found here:  
[www.cmegroup.com/operatorrelease](http://www.cmegroup.com/operatorrelease)

# Impacts

New templates for all FIX/FAST and streamlined FIX/FAST message types

- Available now in their respective templates.xml files for testing in New Release

Bandwidth utilization will increase

- Amount of increase will vary by channel
- Estimated to increase as much as 20-50% across the Market Data Platform

# Partner Market Data

## Partner Market Data Scope

Operators will be removed from the FIX/FAST messaging for:

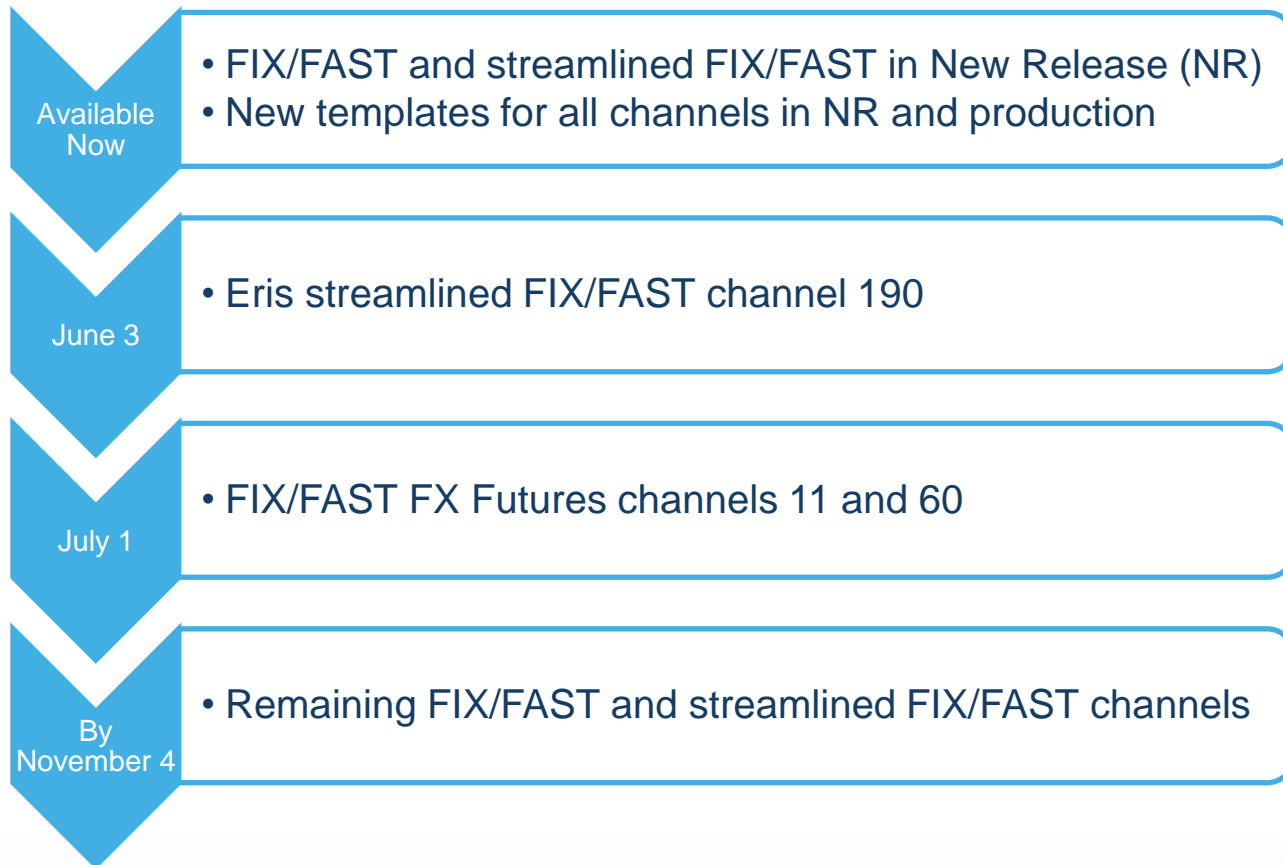
BM&FBovespa	Bursa Malaysia Derivatives
Dubai Mercantile Exchange	GreenX
Kansas City Board of Trade	Korea Exchange
MexDer BMV Group	Minneapolis Grain Exchange

Operators will be removed from the streamlined FIX/FAST messaging for:

Eris Exchange	Standard & Poor's
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# Rollout Plan



The production launch plan is available now in the CME Globex and Market Data Notices

# Performance and Bandwidth Projections

# iLink Round Trip Time (RTT) Projections\*

Improved median performance (50<sup>th</sup> percentile)

Reduced latency “spikes” throughout the trading day (95<sup>th</sup> percentile)

iLink RTT	50 <sup>th</sup> Percentile Improvement	95 <sup>th</sup> Percentile Improvement
Overall	50-70%	40-60%
Non-Implied Futures	60-80%	50-70%
Implied Futures	50-70%	30-50%
Options	50-70%	5-25%

\*Please note that the performance statistics above are based on production simulation done in a test environment

# FIX/FAST Performance Projections\*

Improved median performance (50<sup>th</sup> percentile)

Reduced latency “spikes” throughout the trading day (95<sup>th</sup> percentile)

FIX/FAST Performance	50 <sup>th</sup> Percentile Improvement	95 <sup>th</sup> Percentile Improvement
Overall	60-80%	40-60%
Non-Implied Futures	60-80%	50-70%
Implied Futures	60-80%	30-50%
Options	50-70%	5-25%

\*Please note that the performance statistics above are based on production simulation done in a test environment

# iLink and FIX/FAST: Performance Projections\*

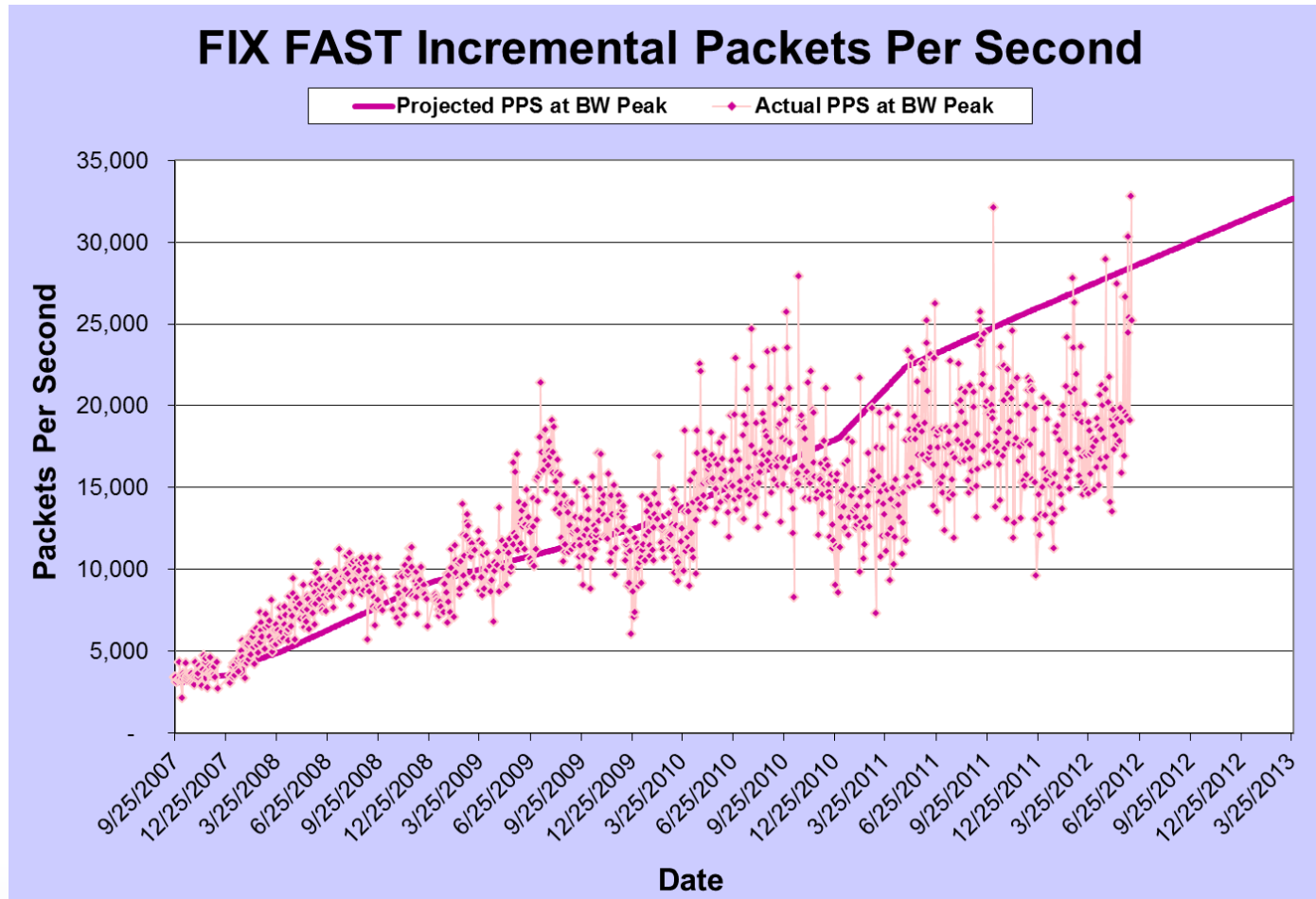
iLink order routing and FIX/FAST market data messaging will be brought into closer alignment

- Spread between dissemination of order routing and market data messages will be significantly reduced

iLink vs. FIX/FAST Performance	50 <sup>th</sup> Improvement	95 <sup>th</sup> Improved
Overall	75-95%	70-90%

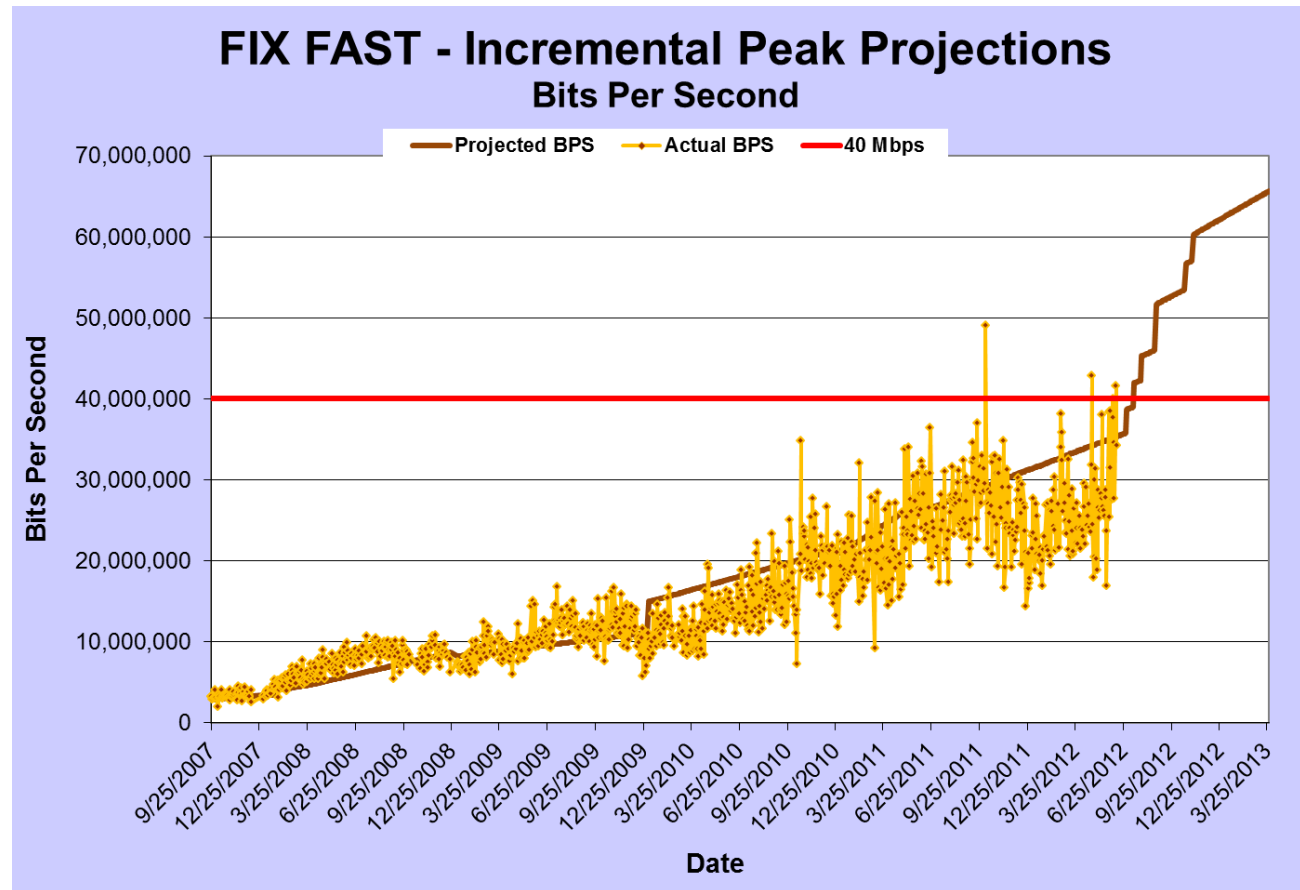
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# FIX/FAST Peak Packet Projections



- Includes both the Performance and FIX/FAST Operator Releases

# FIX/FAST Peak Bandwidth Projections



- Includes both the Performance and FIX/FAST Operator releases
- Previous projections forecast 40Mbps by December 2012
- 40% increase due to removal of operators boosts projection to **49Mbps** by December 2012

# Further Resources

## CME Globex and Market Data Notices

- [www.cmegroup.com/globexnotices](http://www.cmegroup.com/globexnotices)

## Client Impact Assessment in the new Client Systems Wiki

- <http://www.cmegroup.com/confluence/display/EPICSANDBOX/Pending+Client+System+Impacts>

## Questions? Feedback?

- Contact your Global Account Manager at [globalaccountmanagement@cmegroup.com](mailto:globalaccountmanagement@cmegroup.com)