

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

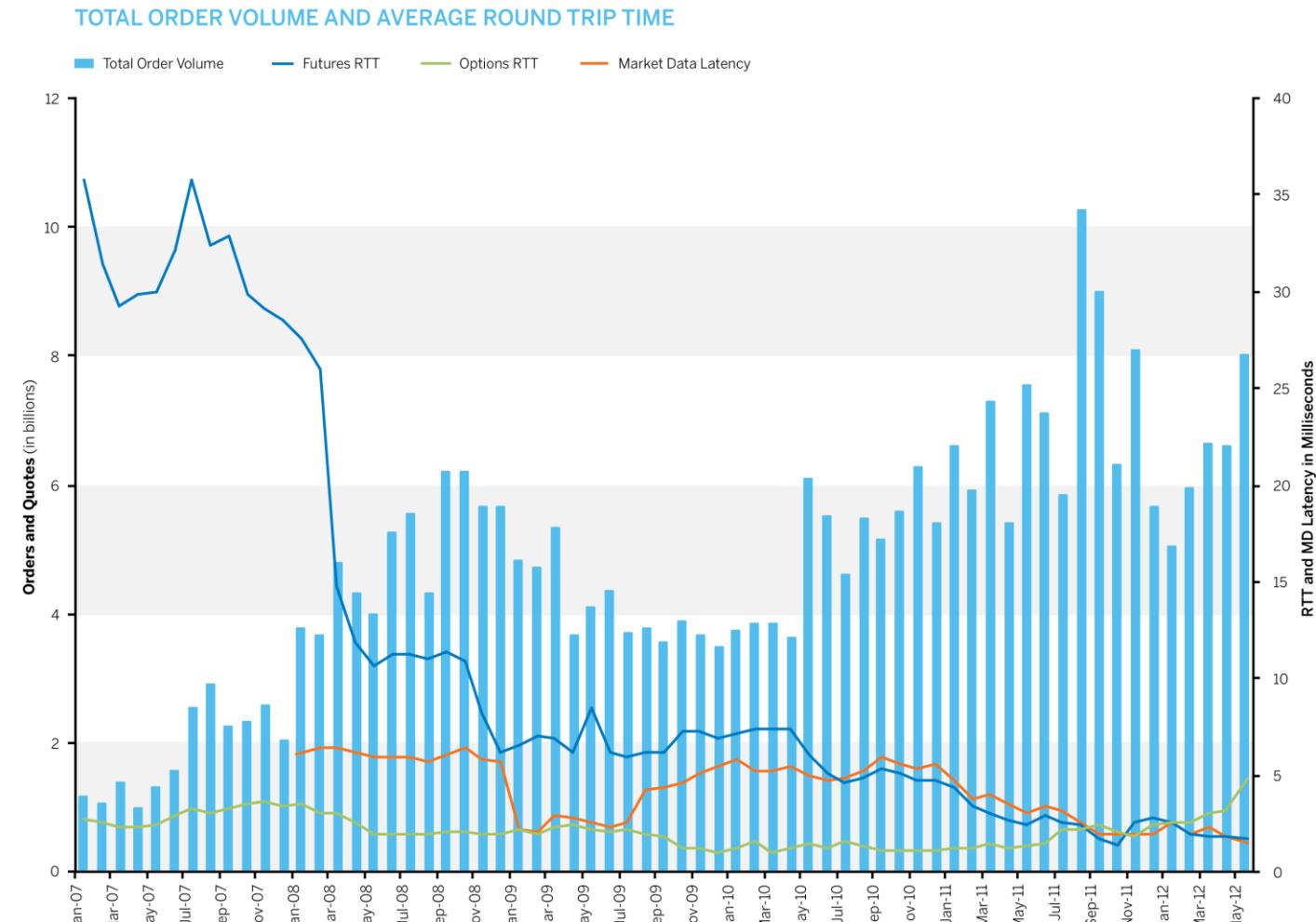
CME Globex: A Platform for Growth

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



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

- 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

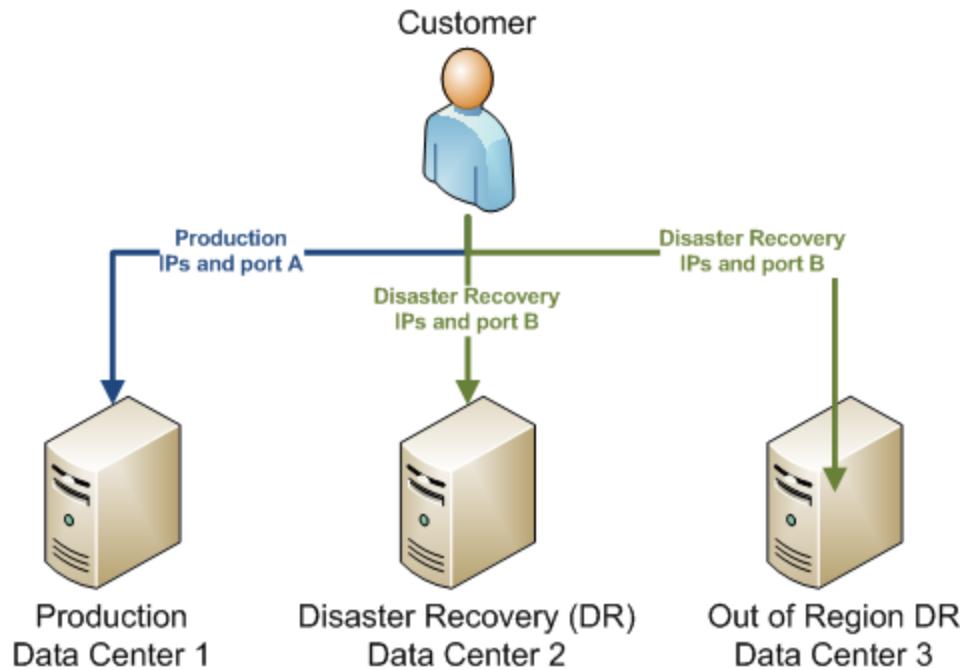
iLink Order Routing

- 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



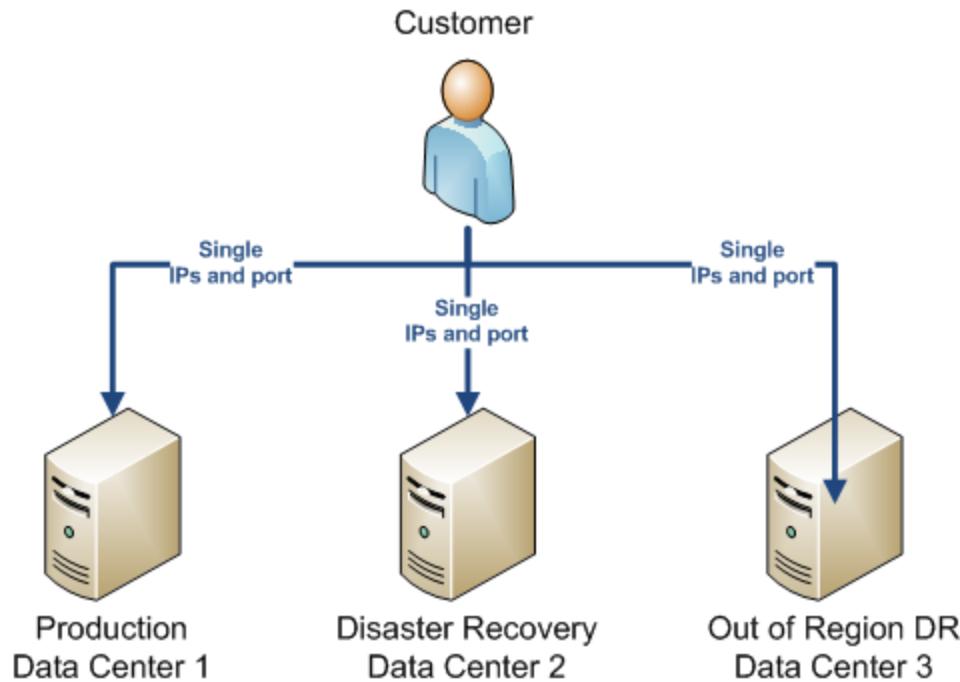
Current IP Model - iLink

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

Phase 1

Performance market data

Current iLink

- Only current IPs and ports available

August 25

September 8 and 29

Phase 2

Performance market data

Performance iLink

- Current and new IPs and ports available

September 22

October 6 and 13

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 3rd**
 - 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 14th
- 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

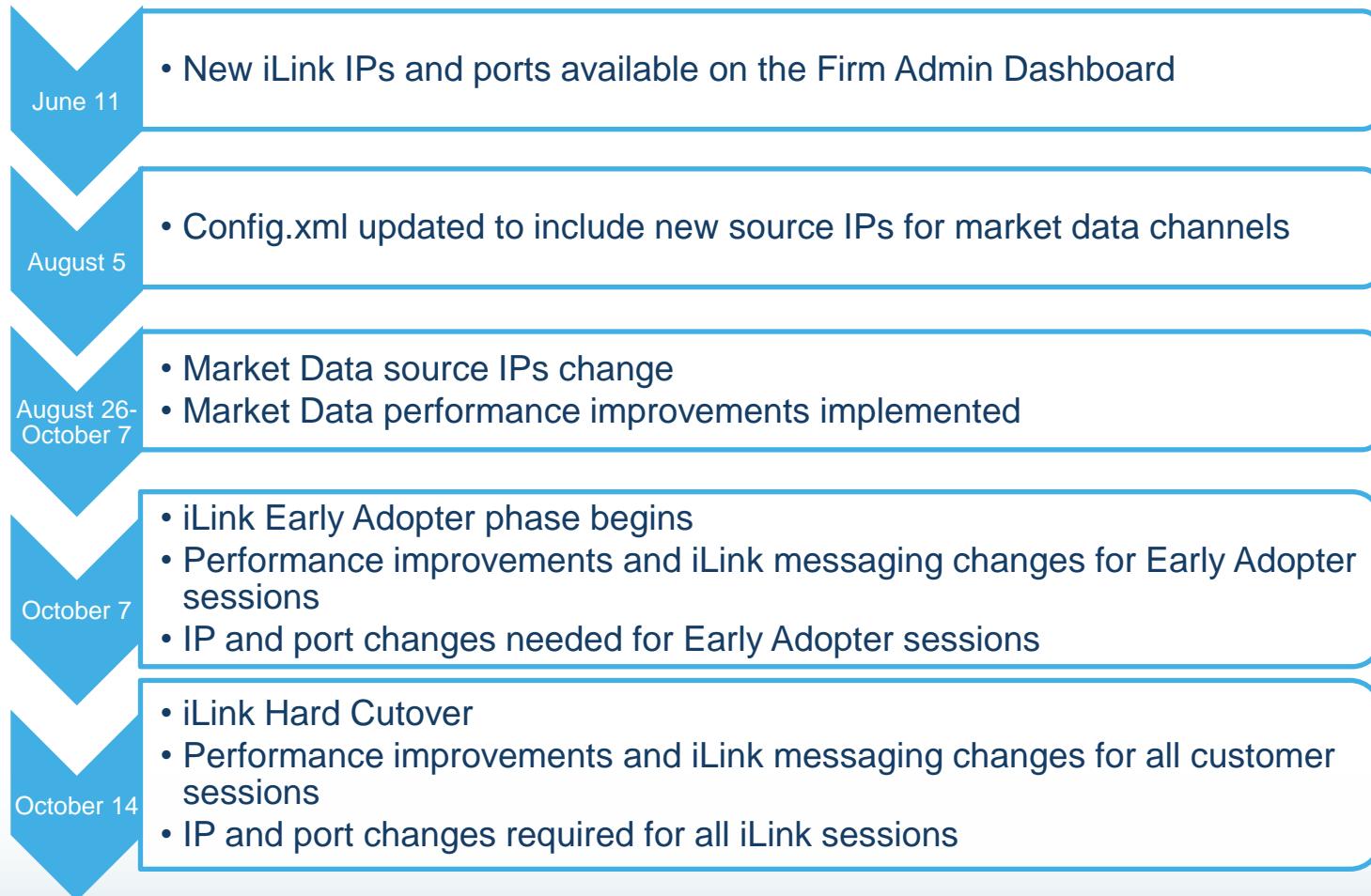
June 10

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

June 18

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

Rollout Plan - Production



Action Items

Network Engineers

IP and port changes for iLink

Source IP changes for market data

Review bandwidth impacts and determine connectivity upgrades

Developers & QA

Prepare for iLink messaging changes

Trading Customers

New IPs and ports from FADB

Designate EA sessions

Coordinate with CF and GAM

Prepare for faster performance

Clearing Firm Administrators

New IPs and ports from FADB

Designate EA sessions



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

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

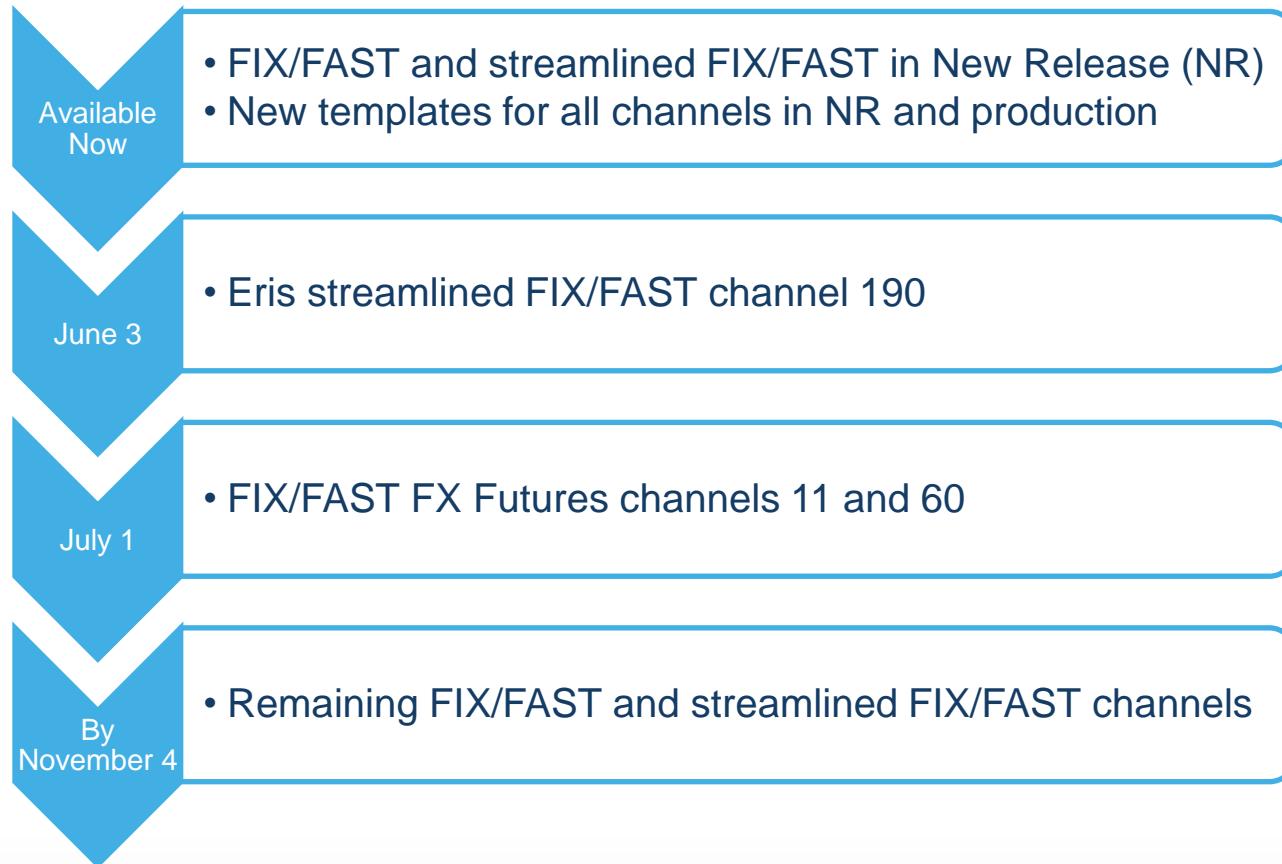
Operators will be removed from the streamlined FIX/FAST messaging for:

Eris Exchange

Standard & Poor's



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 (50th percentile)

Reduced latency “spikes” throughout the trading day (95th percentile)

iLink RTT	50 th Percentile Improvement	95 th 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 (50th percentile)

Reduced latency “spikes” throughout the trading day (95th percentile)

FIX/FAST Performance	50 th Percentile Improvement	95 th 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

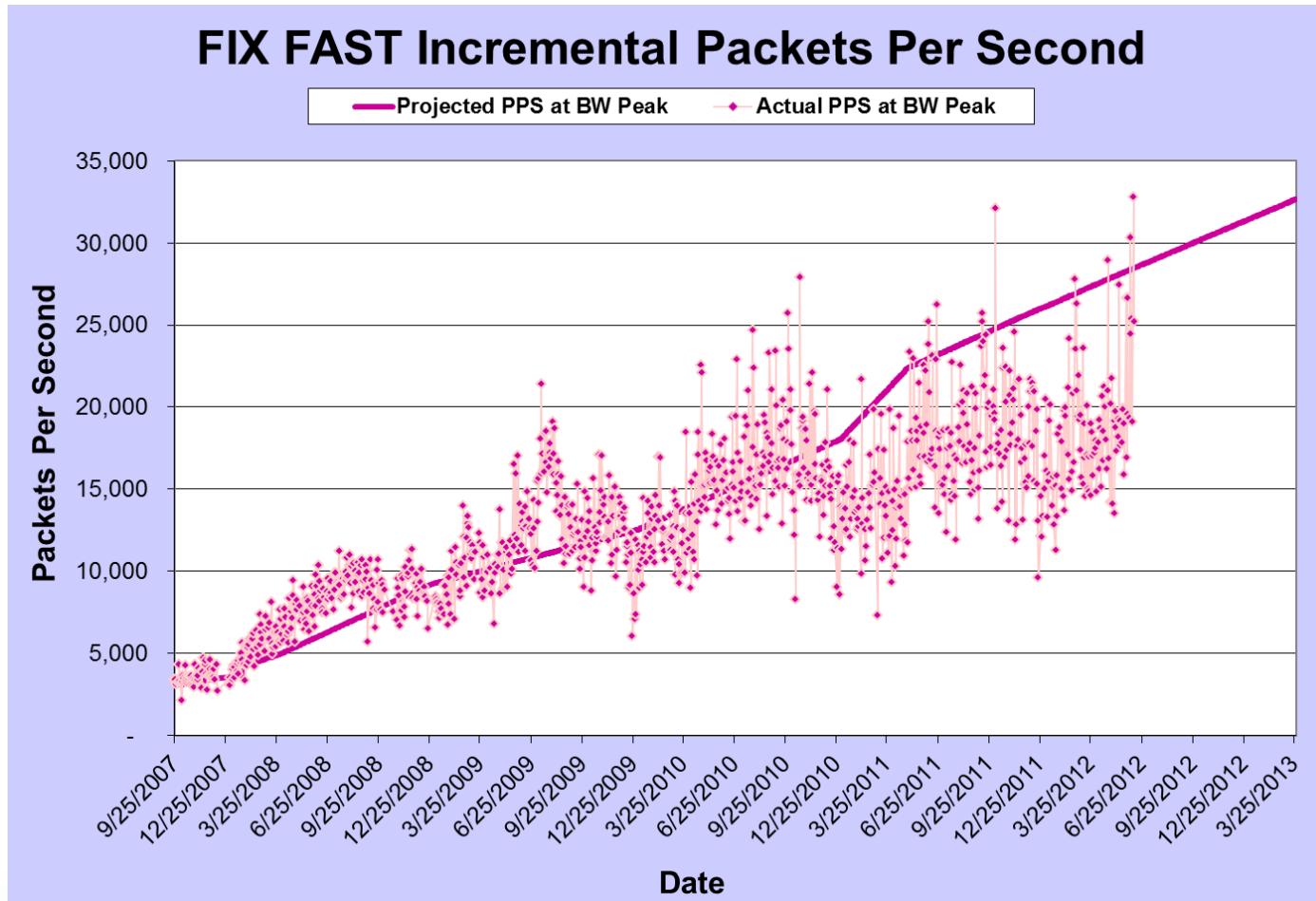
- Spread between dissemination of order routing and market data messages will be significantly reduced

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

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

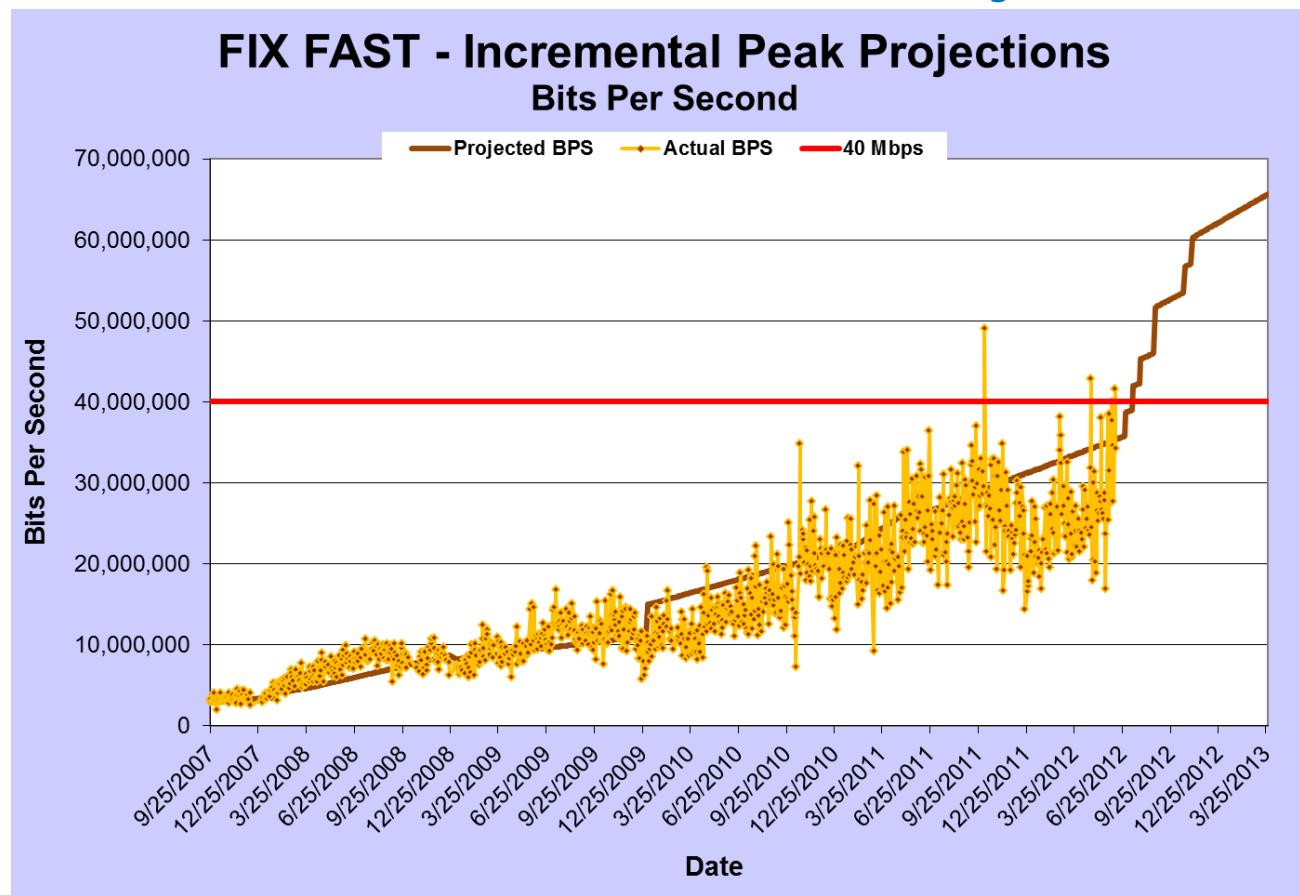


FIX/FAST Peak Packet Projections



- 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

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

