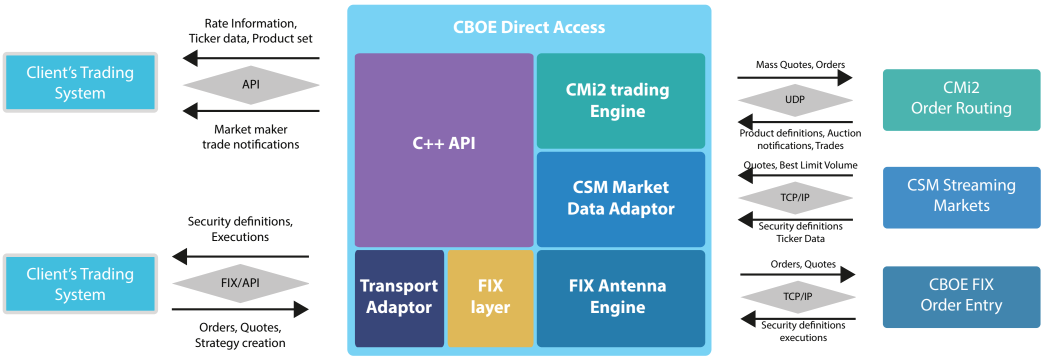
Excellence in Software Engineering

CBOE Direct Access

EPAM provides pre-certified connectivity solutions for direct access to CBOE Streaming Markets and order routing interfaces.
The solutions are based on high performance FIX Antenna™ engine and consist of the following modules:

> CMi2 Order Routing engine enabling access to CMi2 Order Routing interface of CBOE Command trading system
> CSM Market Data Adaptor allowing receiving market quotes, orders and trades data from CBOE Streaming Markets feed
> CBOE FIX Order Entry engine enabling trading in all major asset classes - options, futures, options on futures and equities on CBOEdirect



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CBOE Direct Access

Components Overview	
CSM Market Data Adaptor	• Maintains connection to the CBOE Streaming Markets Multicast Feeds via UDP • Supports all data types available at CSM (quotes, best limit volume, ticker data, security definitions) • Supports CBOE data recovery mechanism • Provides ability to load CBOE XML-based templates • Enables access to CBOE, CFE, CBSX, ONE, and CBOE2 product set
CMi2 Order Routing engine	• Enables connection to CMi2 Order Routing interface of CBOE Command trading system • Fully supports all the features of CBOE Command trading system for order routing and market making, including mass quoting, product information retrieval and status updates • Provides ability to define and trade multiple leg instruments, such as options strategies and futures calendar spreads • Supports GMD Acknowledgement of reports for an order or quote after a trade • Enables Quote Risk Monitoring (QRM) functionality and allows setting quote risk controls. • Provides ability for product downloading for trading session or for class (options, futures, strategy, equity) traded at CBOE • Maintains subscription for Auction notifications
CBOE FIX Order Entry	• Maintains connection to CBOE FIX Interface via TCP/IP • Fully supports CBOE FIX Order Entry Interface workflow • Supports CBOE FIX 4.2. and FIX 4.4. dictionaries

Key Features:

> User oriented:
- Support of all features of chosen CBOE interface

> High Throughput / Low Latency achieved by leveraging all relevant features of FIX Antenna™:
- The latency is < 1 microsecond between order creating and sending it to the socket and from the socket to call-back while getting a message

> Flexible API allowing user to:
- receive rate information, market maker trade notifications and all strategy related messages
- subscribe for Auction notifications
- get the entire CBOE, CFE, CBSX, ONE, and CBOE2 product set

> Ease of monitoring & administration

> Supported platforms:
- OS: Windows / Linux
- Compilers: GCC 4.0.X, 4.1.X, 4.3.X, 4.5.X / MS Visual Studio 2005, 2008, 2010 / NET Frameworks 2.0, 3.0, 3.5, 4.0)

Performance:

Test Scenario	This test measures latency of the CBOE CMi2 Session on commodity hardware. It consists of two stages: Order Entry sending and Order Response message receiving.	
Test Environment	• Intel Core i5-650 @ 3.33 GHz • Windows 7 SP1 64-bit • Nanosecond test accuracy	
Measured latency items include	*Order Entry sending:* • Generate Order Entry message • Session level processing. Message sequence handling • Generate buffer for message sending	*Order Response receiving:* • Split messages in the socket buffer • Handle messages sequence numbers • Parse buffer into C++ class

Measured Latency:

	Sending	Receiving
Min (ns)	62	66
Median (ns)	83	102
Max (ns)	20,767	16,545
Mean (ns)	87	106

CMi2 Session message sending/receiving