



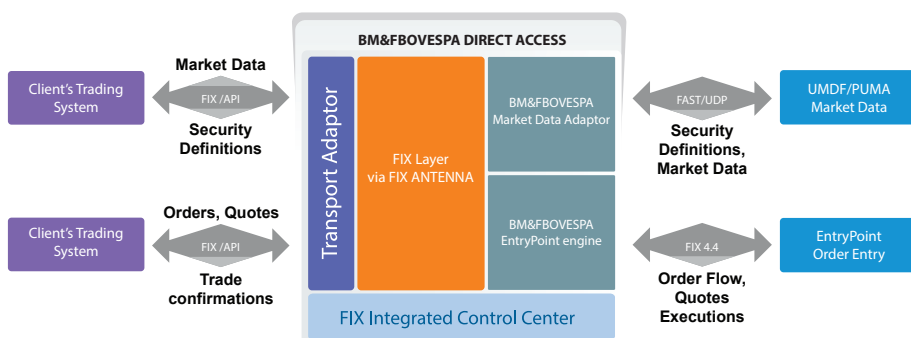
Excellence in Software
Engineering

BM&F BOVESPA Direct Access

EPAM provides pre-certified connectivity solutions for direct access to BM&FBOVESPA PUMA Trading System Unified Market Data Feed (UMDF) and EntryPoint order entry interface.

The solutions are based on high performance FIX Antenna™ engine and consist of the following modules:

- > FIX/FAST Market Data Adaptor enabling access to BM&FBOVESPA New Trading System Market data feeds
- > BM&FBOVESPA EntryPoint engine enabling access to multiple market segments (derivatives, Equities, FX) through a single EntryPoint session



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BM&FBOVESPA Direct Access

Components Overview

FIX/FAST Market Data Adaptor

- Maintains connections to the PUMA UMDf feeds via UDP
- Supports all market data types available at PUMA UMDf
- Hides FAST details from the client and applies FAST decoding automatically
- Provides high performance recovery methods:
 - TCP Recovery
 - Market Recovery
 - Natural Refresh
 - Market Recovery with Natural Refresh
- Provides ability to load BOVESPA configuration file to use connection parameters and FAST template file to adjust FAST decoder accordingly
- Automatically builds and updates order books from market data snapshot and incremental messages
- Provides ability to customize logic on the low level to define custom recovery strategy

EntryPoint engine

- Enables connection to BM&FBOVESPA order routing interface, submitting orders and receiving trades
- Fully supports message flow and functionality of EntryPoint order entry interface (Orders/Executions, Security Definitions, Quotes, Trade Confirmations)
- Provides ability for the confirmation of orders, modification requests, cancel requests and fill notifications entered via the EntryPoint interface
- Supports BM&FBOVESPA FIX 4.4 dictionary
- Provides ability for pre-trade risk control

Key Features:

- > User oriented:
 - Pre-configured for work with BM&FBOVESPA
 - Support of all features of chosen BM&FBOVESPA interface while hiding all feed specifics from end-user
- > High Throughput / Low Latency achieved by leveraging all relevant features of FIX Antenna™
- > Ease of monitoring & administration:
 - Rich UI assuring ease and simplicity of configuration and maintenance, as well as allowing real-time monitoring of session statuses and parameters
- > Flexible API allowing user to receive product and instrument definitions, market data events and order book updates, market data FIX messages via call-back interfaces
- > Supported platforms:
 - OS: Windows / Linux / Solaris
 - Compilers: GCC 4.0.X, 4.1.X, 4.3.X, 4.5.X / MS Visual Studio 2005, 2008, 2010 / JDK 1.5 and above/ NET Frameworks 2.0, 3.0, 3.5, 4.0

Performance:

Test Scenario

This test measures latency of the BM&F BOVESPA Market Data adapter and FIX Engine on Tick-to-Trade scenario. Test includes internal implementation and does not include sockets.

Test Environment

- Intel Core i5-650 @ 3.33 GHz
- Windows 7 SP1 64-bit
- BM&F BOVESPA Simulation Environment

Measured latency items include

- Messages sequencing and feed A/B arbitrage
- Decode FAST message
- Representing FAST message as FIX message
- FIX message processing and Order Book management
- New Order Single generation
- FIX session level processing up to TCP socket

Measured Latency:

Tick-to-Trade (null message storage), us

Min (us) 11

Median (us) 16

Max (us) 390

Mean (us) 19

