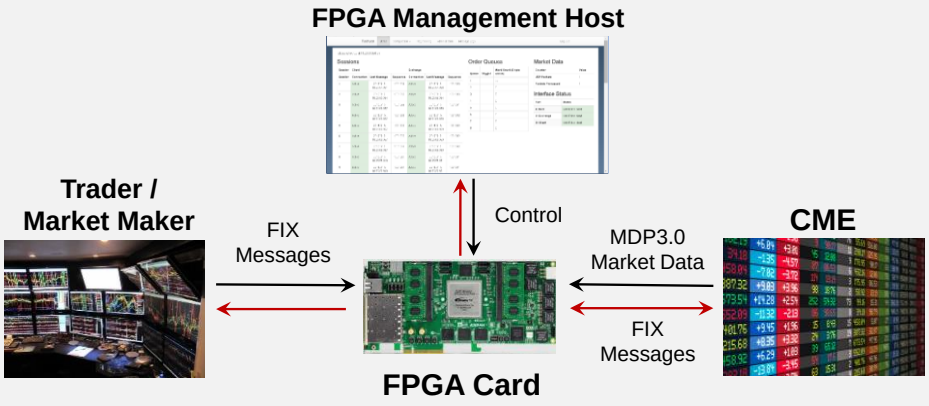
FPGA Accelerated CME Tick-To-Trade System



Sub-microsecond (µs) latency trading system

Description

Algo-Logic Systems' 2nd generation FPGA accelerated Gateware Defined Networking® (GDN) CME Tick-To-Trade (T2T) System is a sub-microsecond trading solution. The solution is built using Algo-Logic Systems' internally developed, pre-built IP cores that significantly reduce time-to-market and provide flexibility for customizations.

Sub-microsecond wire-to-wire latencies are achieved by receiving CME MDP 3.0 tick data directly into the FPGA on a 10G link, detecting opportunities, and placing trades in form of FIX messages encapsulated in TCP packets using the ultra low latency (ULL) 10G TCP Endpoint.

The CME T2T System is compatible with most servers and is seamlessly managed through software interfaces. A Graphical User Interface (GUI) and RESTful APIs are provided for control and monitoring of the accelerator. A low latency messaging protocol is used for specifying trigger conditions.

Control software includes:

- Device parameter configuration
- Status monitoring and reporting
- Logging and event notifications
- RESTful APIs in form of HTTP GET/POST requests-responses integrate with existing client Order Management System

Pre-Built Modules

ULL 10GE PHY+MAC:

- Lowest round trip latency of 89.6ns
- Cut through packet processing to avoid buffering delays

CME Feed Handler:

- A/B faster feed arbitration resulting in earliest possible market data event detection
- Filtering on subscribed multicast channels
- MDP3.0 message processing and parsing

CME Futures & Options Order Book:

- Book building for instruments that have real and implied orders
- Reporting L2 snapshots with the best bid offer (BBO) information
- Recovery based on CME Natural Refresh mechanism in the event of packet loss

10G TCP Endpoint:

- 100% FPGA accelerated full TCP termination
- Lowest packet processing latency
- Full TCP protocol support including fast retransmission

FIX Message Processing:

- Session tracking
- FIX message processing and parsing

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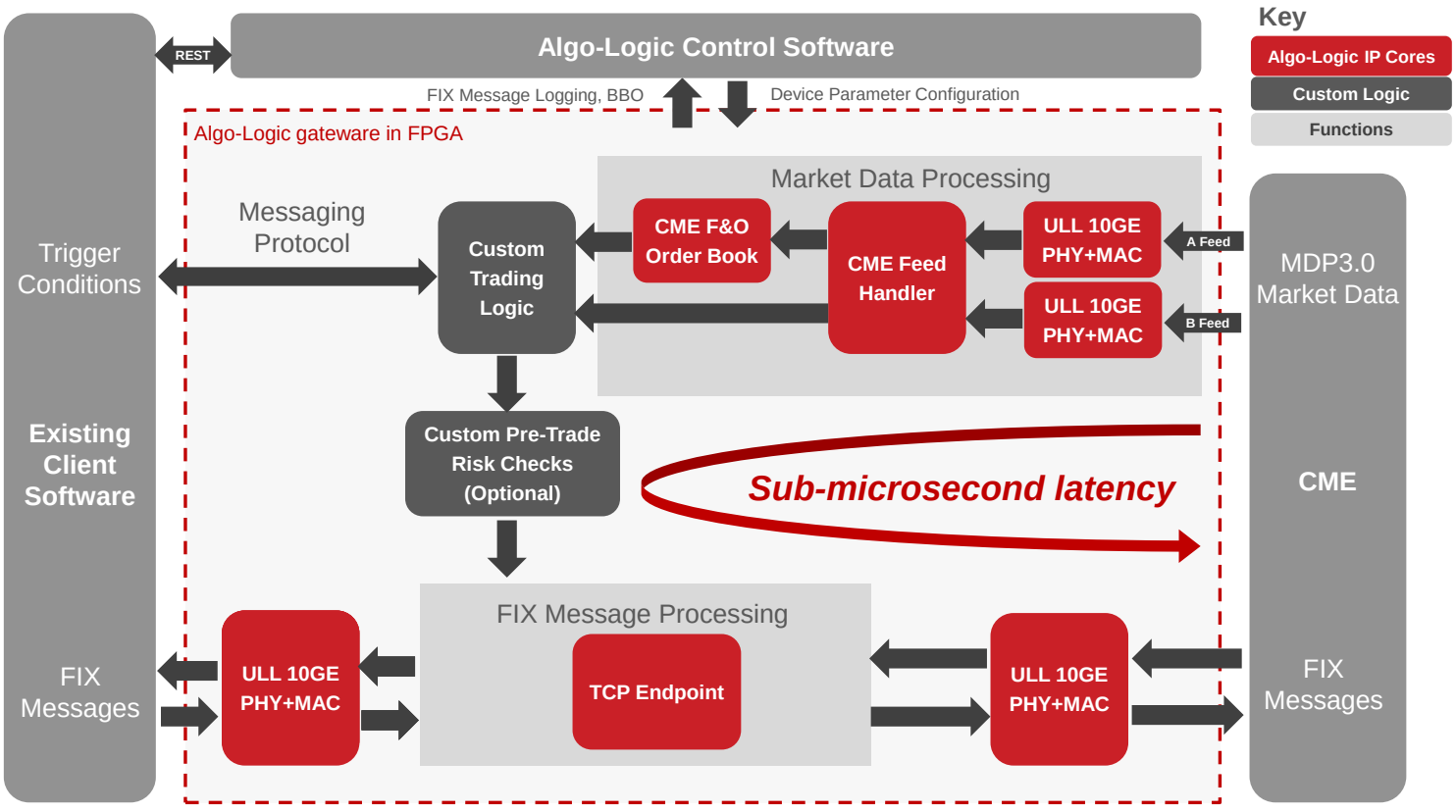
CME Tick-To-Trade System Base Specifications

Multicast Channels	Up to 16
Order Book Configuration	20 security IDs with L2 snapshots containing BBO
FIX Sessions	32
Network Interface Speed	10 Gbps Ethernet
Pre-Built IP Cores	CME Feed Handler, CME Futures & Options Order Book, 10G TCP Endpoint, ULL 10GE PHY+MAC
Application Programming Interface (API)	RESTful, low latency messaging protocol
FPGA Devices Supported	Stratix V
FPGA Platforms Supported	Terasic DE5-Net

CME Tick-To-Trade System Diagram



Algo-Logic Systems builds FPGA accelerated Gateware Defined Networking® (GDN) solutions that achieve high throughput with minimal power and sub-microsecond latency.

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