

ALGORITHMS IN LOGIC



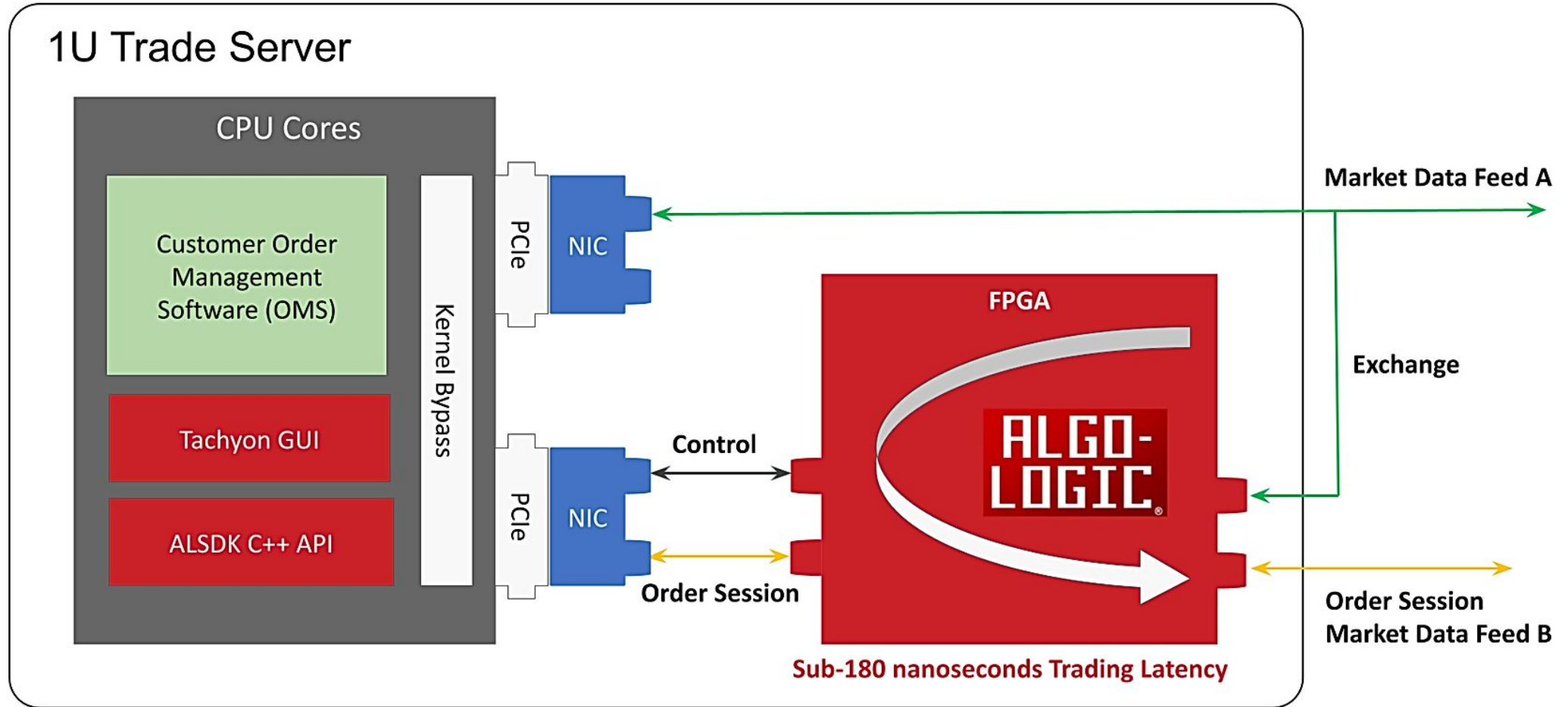
[HTTP://ALGO-LOGIC.COM](http://ALGO-LOGIC.COM)

Frameworks and solutions for Ultra-Low-Latency Trading with Algorithms in Logic

John Lockwood, CEO, Algo-Logic Systems, Inc.

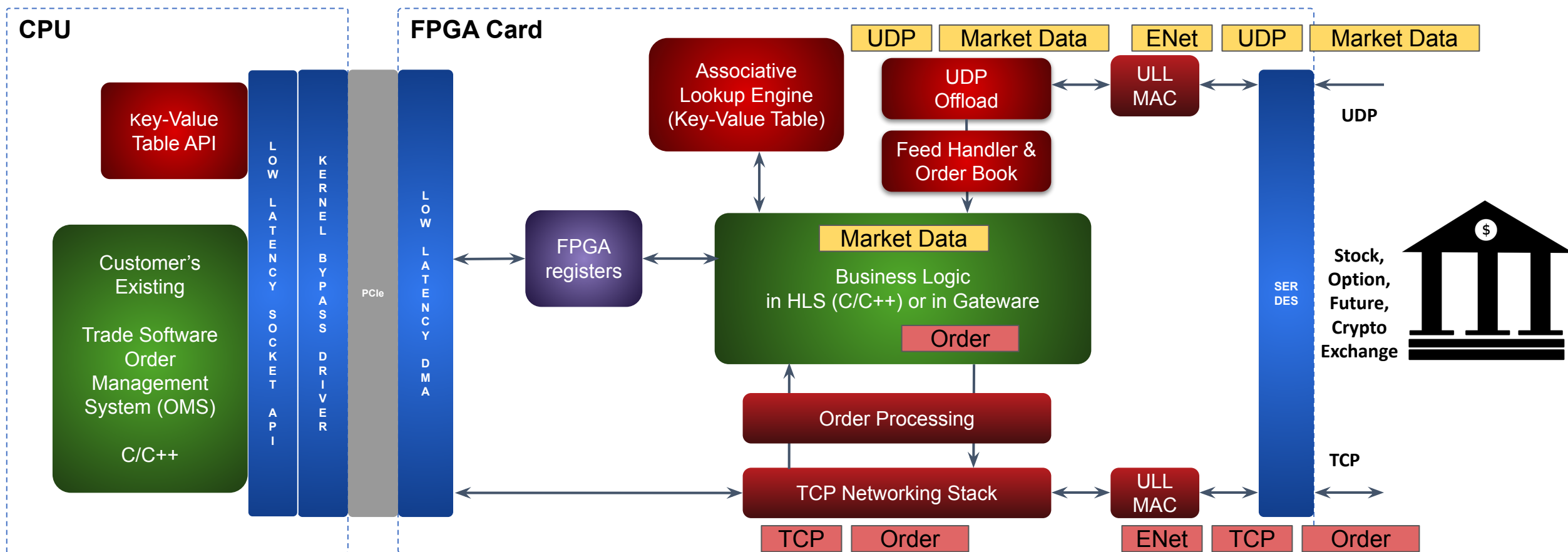
STAC: Spring 2022

Acceleration of Trading with Logic

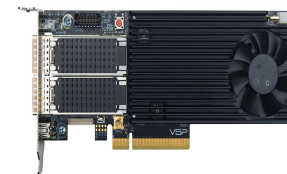


FPGA Accelerator with
Algo-Logic Gateway

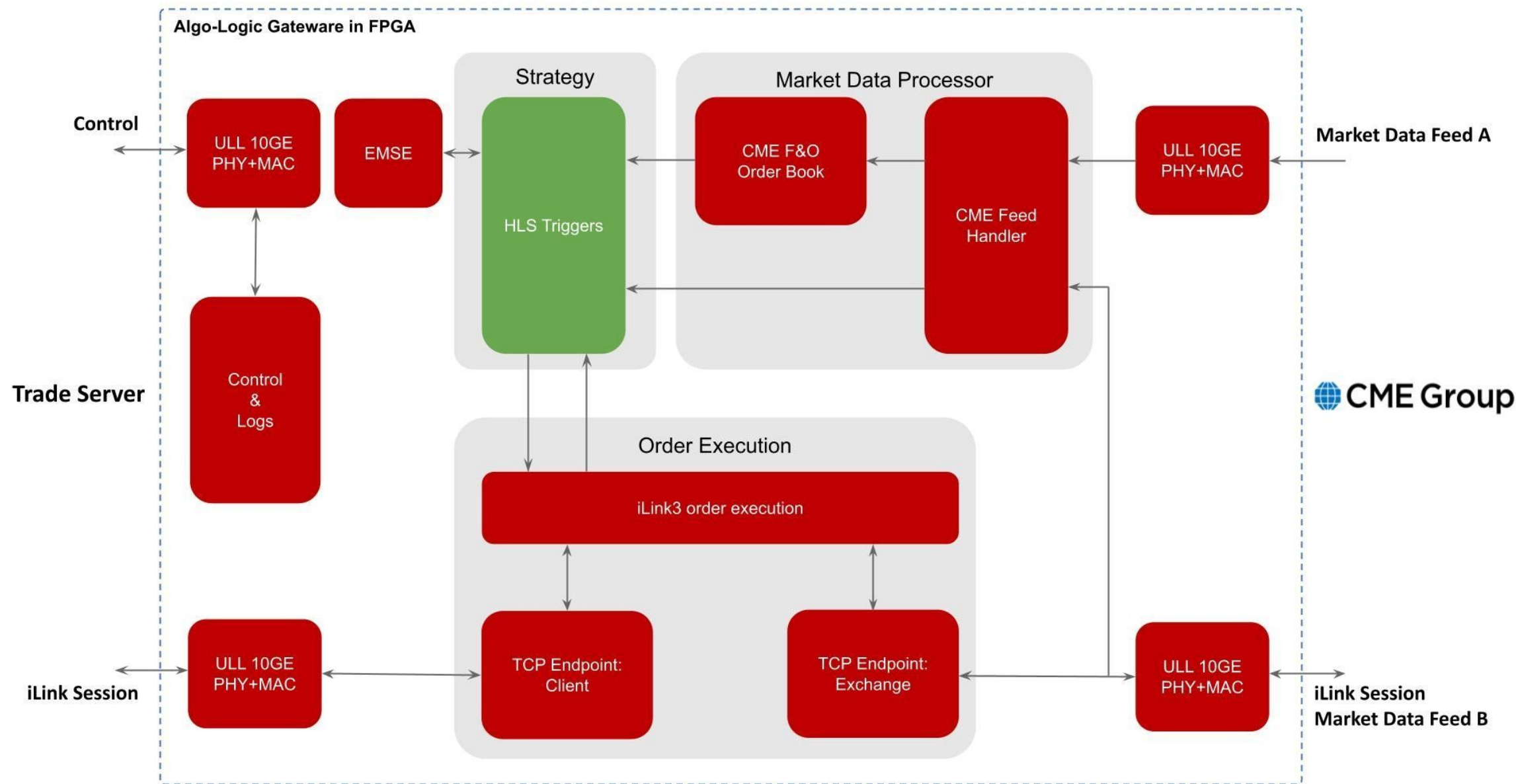
Algo-Logic Framework for FPGA-Accelerated Trading



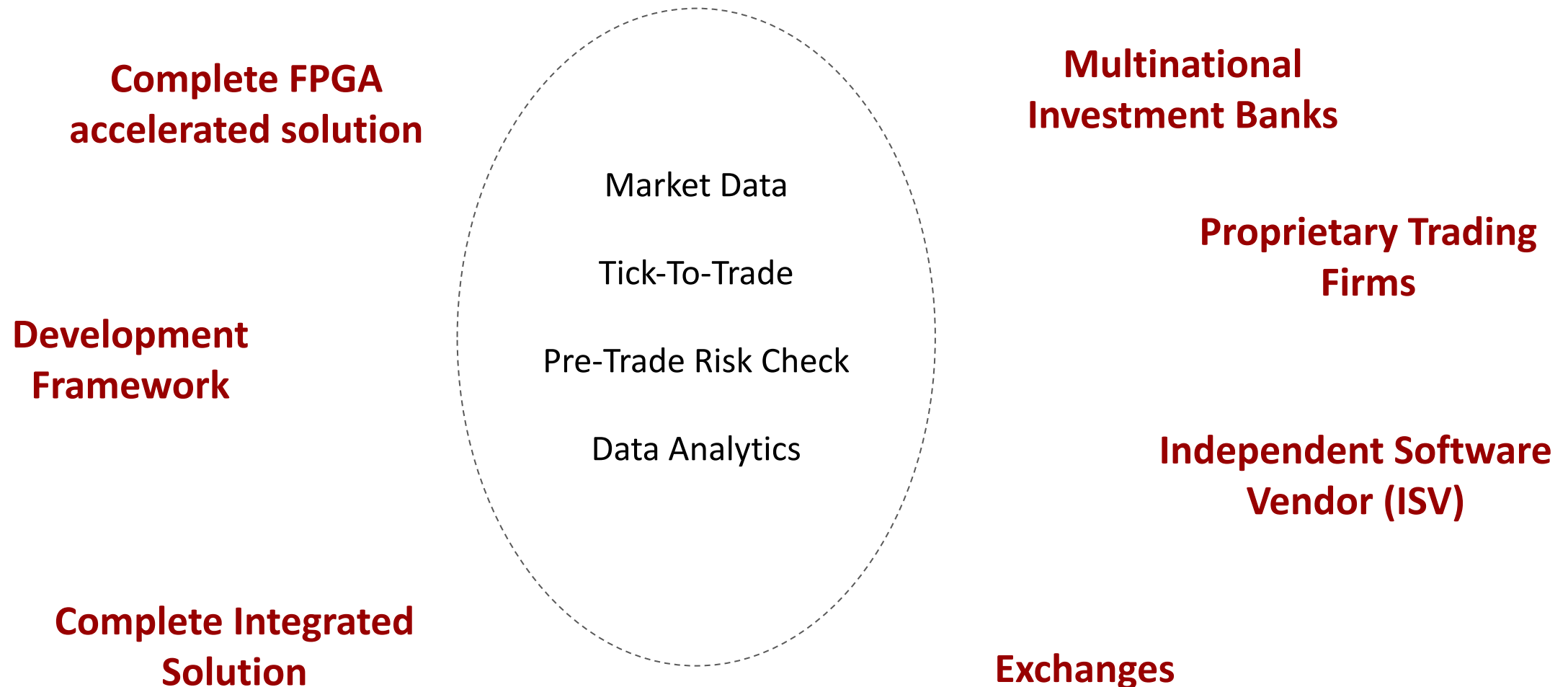
- Algo-Logic IP Cores
- NIC vendor kernel-bypass software driver
- Customer Software and Business Logic



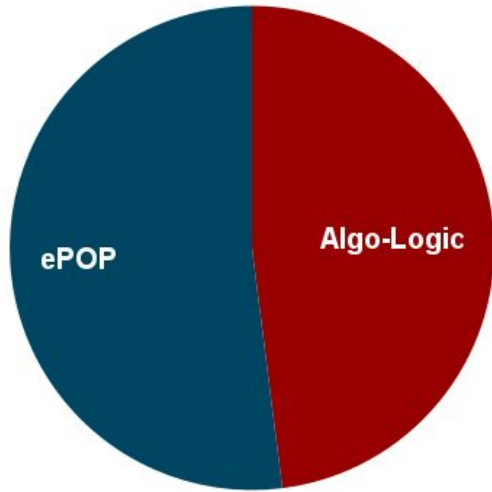
Algo-Logic CME Tick-To-Trade Framework - Example



Algo-Logic Offerings, Products, and Customer Profiles

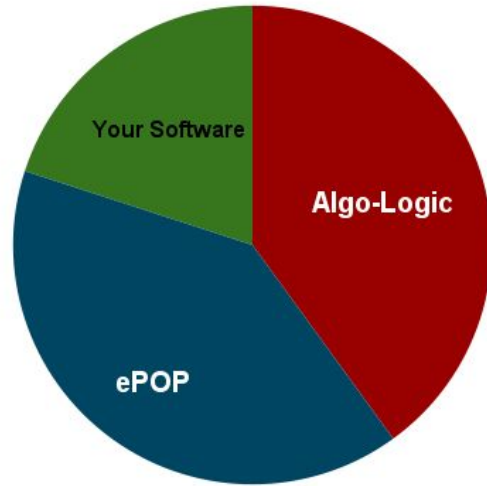


Algo-Logic / ePOP Customer Engagement Alternatives



Integrated End-to-End Trading Solution

- For Trading Firms that do not have Trading Software
- Integrated Algo-Logic FPGA technology and FB Lab ePOP software in a fully integrated solution
- No software or FPGA development required



FPGA Accelerated Trading as a Service

- For Trading Firms that have Trading Software
- Connect to FPGA service via TCP
- Simple messages FIX format



Your Trading Software with Integrated FPGA Acceleration

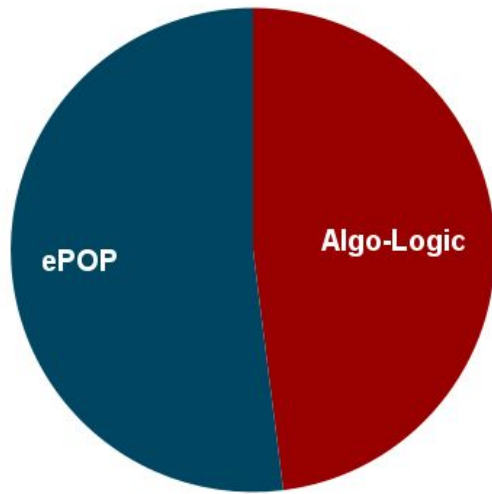
- For Trading Firms with their own Software
- Integrate FPGA into your trading platform
- Continue to use your front-end and servers



Customized FPGA Accelerated Trading Solution

- For Firms with Software and FPGA development experience
- Firms implement highly confidential proprietary strategies

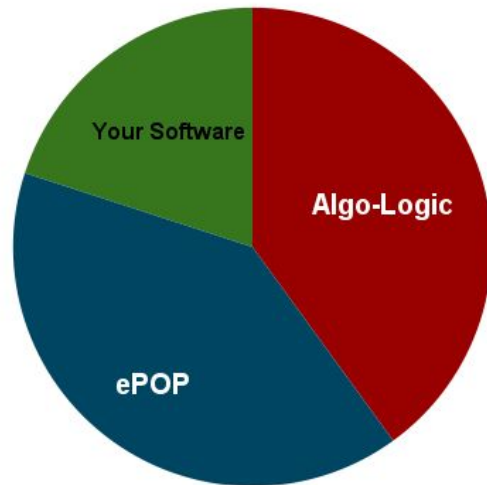
Algo-Logic / ePOP Customer Engagement Alternatives



Integrated End-to-End Trading Solution

No Software Development
No FPGA Development

Time to 1st Trade < 1 week



FPGA Accelerated Trading as a Service

Limited Software Development
No FPGA Development

Time to 1st Trade < 1 month



Your Trading Software with Integrated FPGA Acceleration

Software Development Required
Limited FPGA Development

Time to 1st Trade 1-2 months



Customized FPGA Accelerated Trading Solution

Software Development Required
FPGA Development Required

Time to 1st Trade = 4-12 months

Algo-Logic Technology Stack



Client Describes Value of FPGA Acceleration?

Client compare two trading systems:

- Software only, vs.
- Software plus Algo-Logic FPGA Acceleration

Results

- Software system hit intended Hedge **53%** of the time, while
- FPGA Accelerated system hit **95%** of the time.

With FPGA Acceleration

- Hit ratio on hedge improved **2:1**
- And used more often and with larger quantities

Conclusions: Algo-Logic Offers Ultra-Low-Latency

- **Frameworks**

- Algo-Logic technology stack
 - Core building blocks (ULL MAC, UDP, and TCP)
 - Market data parsers (MDP3, ITCH..)
 - Protocol parsers (iLink3, OUCH..)
 - Order execution (CME, Cboe, OUCH)
- Your customizable trading logic
 - Implement you own strategies in logic
 - Write your own C++ trading code with HLS

- **Trading solutions**

- Pre-built FPGA triggers
 - Quoting
 - Hedging
 - Spreading
- Pre-integrated with software
- Hosted at co-location for CME (Cbot, COMEX, NYMEX)
- On-boarding as fast as 1-2 days



Web: <https://Algo-Logic.com>

Twitter: [@Algo_Logic_Inc](https://twitter.com/Algo_Logic_Inc)

Phone: (408) 707-3740

Email: Solutions@Algo-Logic.com



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