

About Algo-Logic Systems Inc

- Algo-Logic Systems, Inc
 - Maps Algorithms into Logic
 - Established in 2009 and remains a privately-held C-Corporation
 - Motivated to productize Fintech products by HB, Raj, and Andy Bach of NYSE
 - Based in Silicon Valley (San Jose, CA)
- **Products and Solutions**
 - FPGA IP Cores for Ultra-Low-Latency (ULL) networking
 - MAC, TCP, UDP, EMSE
 - Complete FPGA Solutions in FPGA logic
 - for Accelerated Finance and Real-Time Data
 - Full Stack Development Frameworks to trade on multiple exchanges
- **Customers Include:**
 - Multinational Banks, Proprietary Trading Firms, and Stock Exchanges
 - Datacenter equipment providers
 - Real-Time Data providers

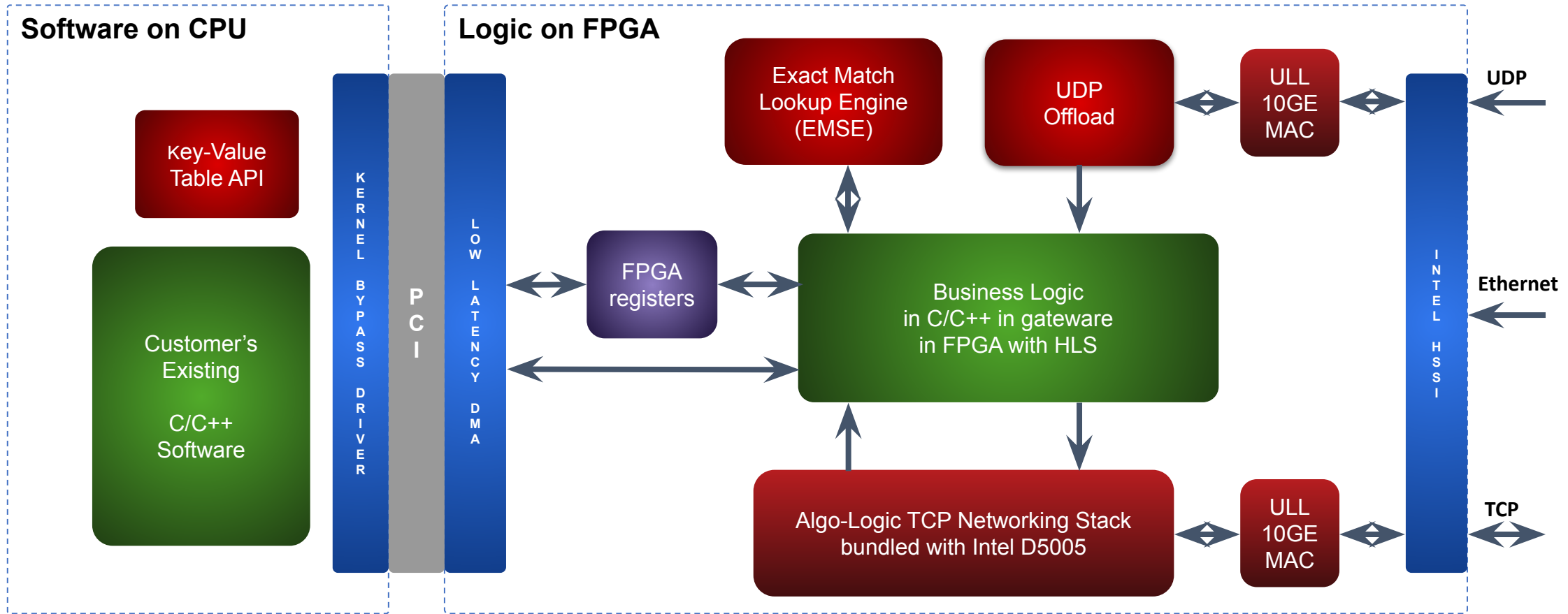
ALGORITHMS IN LOGIC



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



Algo-Logic's FPGA / SmartNIC Development Framework



- Algo-Logic IP Cores
- Card Vendor Hardware + Software Driver
- Customer Software and Business Logic

FPGA Cards are Ideal Solution for Ultra Low Latency Networking

- **FPGA Platform**

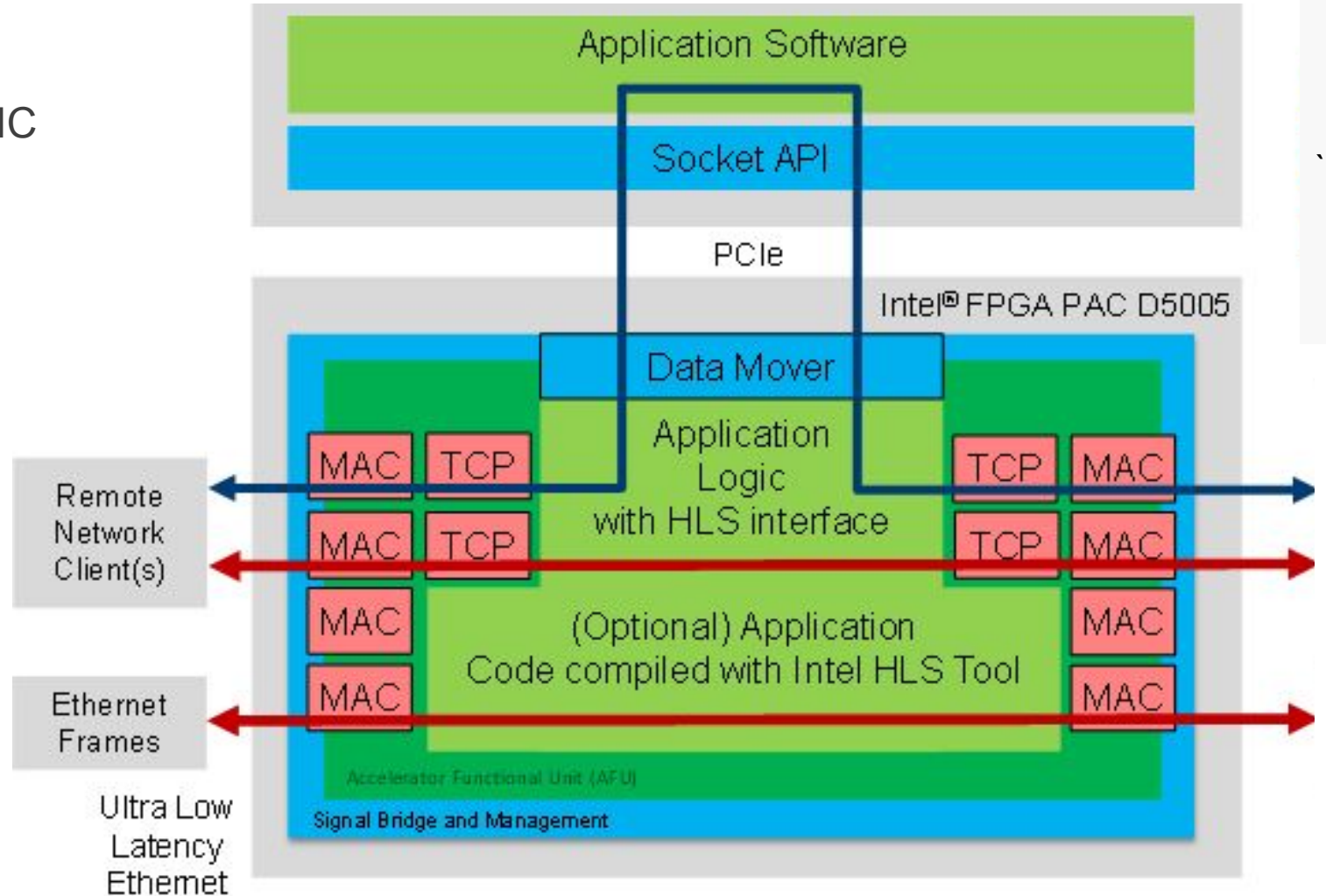
- PCIe card with FPGA
- Fast Data Mover / kernel-bypass NIC
- High Level Synthesis (HLS)

- **Algo-Logic Provides**

- Ultra-Low Latency MACs
- UDP/TCP Endpoints in Logic
- Cut-through data processing
- APIs for C/C++ software apps

- **Ideal Solution for**

- High-speed Trading
- Pre-Trade Risk Checks
- Trading Gateways



Round-Trip Application Latency

Other 3rd party NIC

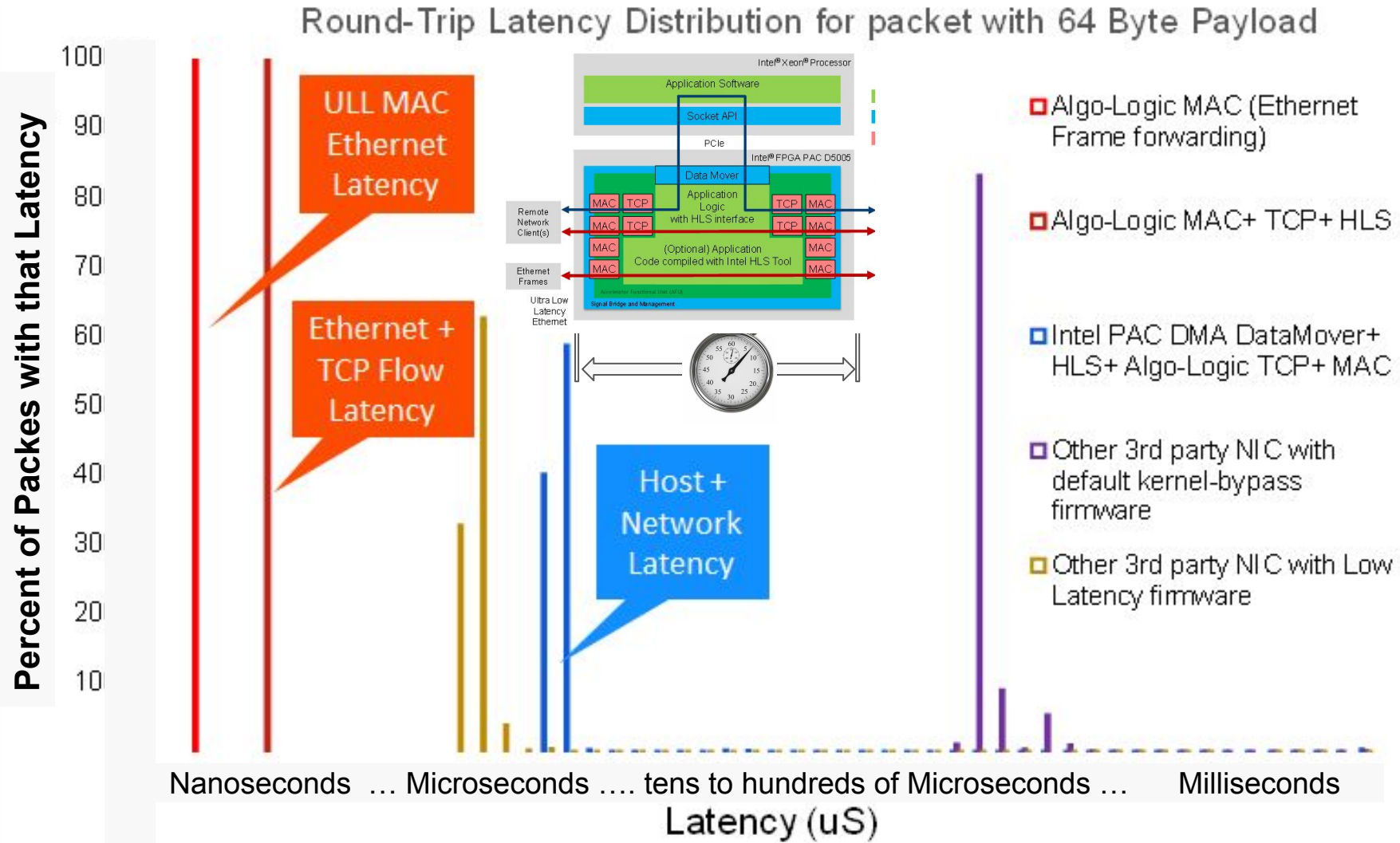
- Kernel Bypass
- Default Firmware
- Low Latency Firmware

This Host+Network

- Software API
- Intel Data Mover
- Algo-Logic MAC+TCP

Algo-Logic FPGA Logic

- ULL MAC, UDP, TCP
- Cut-through processing
- Deterministic latency
- HLS Interface for algorithms in logic coded in C/C++



Evolution of Trading Systems

- **From Specialists (humans) in a pit**

- Trade on behalf of clients
- Make markets by open outcry
- Trade in minutes to seconds



- **To Trading with Software**

- Automated trading using software from the desktop
- Trade in seconds to milliseconds



- **To Co-located Hyper-optimized Datacenters**

- Bypass the operating system kernel
- Run in servers at co-location datacenters
- Trade in milliseconds to microseconds

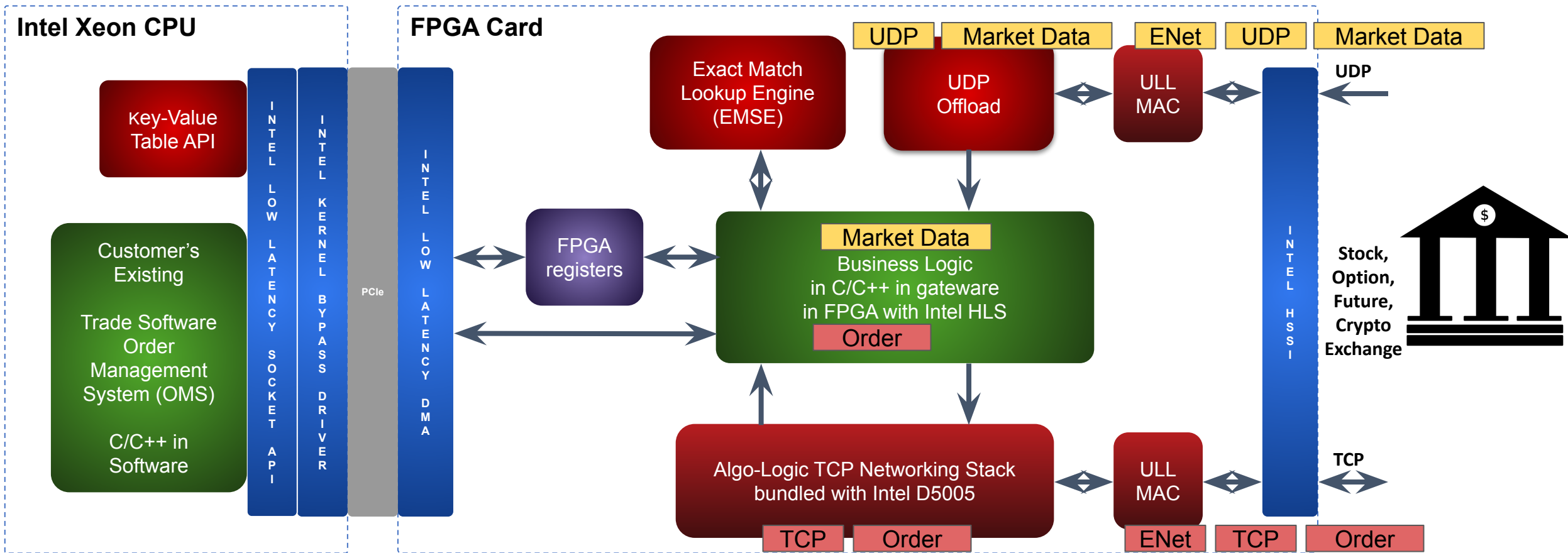


- **To FPGA-Accelerated**

- Implement algorithms in logic to offload application to logic
- Run on Field Programmable Gate Arrays (FPGA)
- Trade in nanoseconds (< 0.000001 seconds)



Algo-Logic Framework for FPGA-Accelerated Trading



- Algo-Logic IP Cores
- Intel Hardware + Software Driver
- Customer Software and Business Logic



Round-Trip Application Latency

Other 3rd party NIC

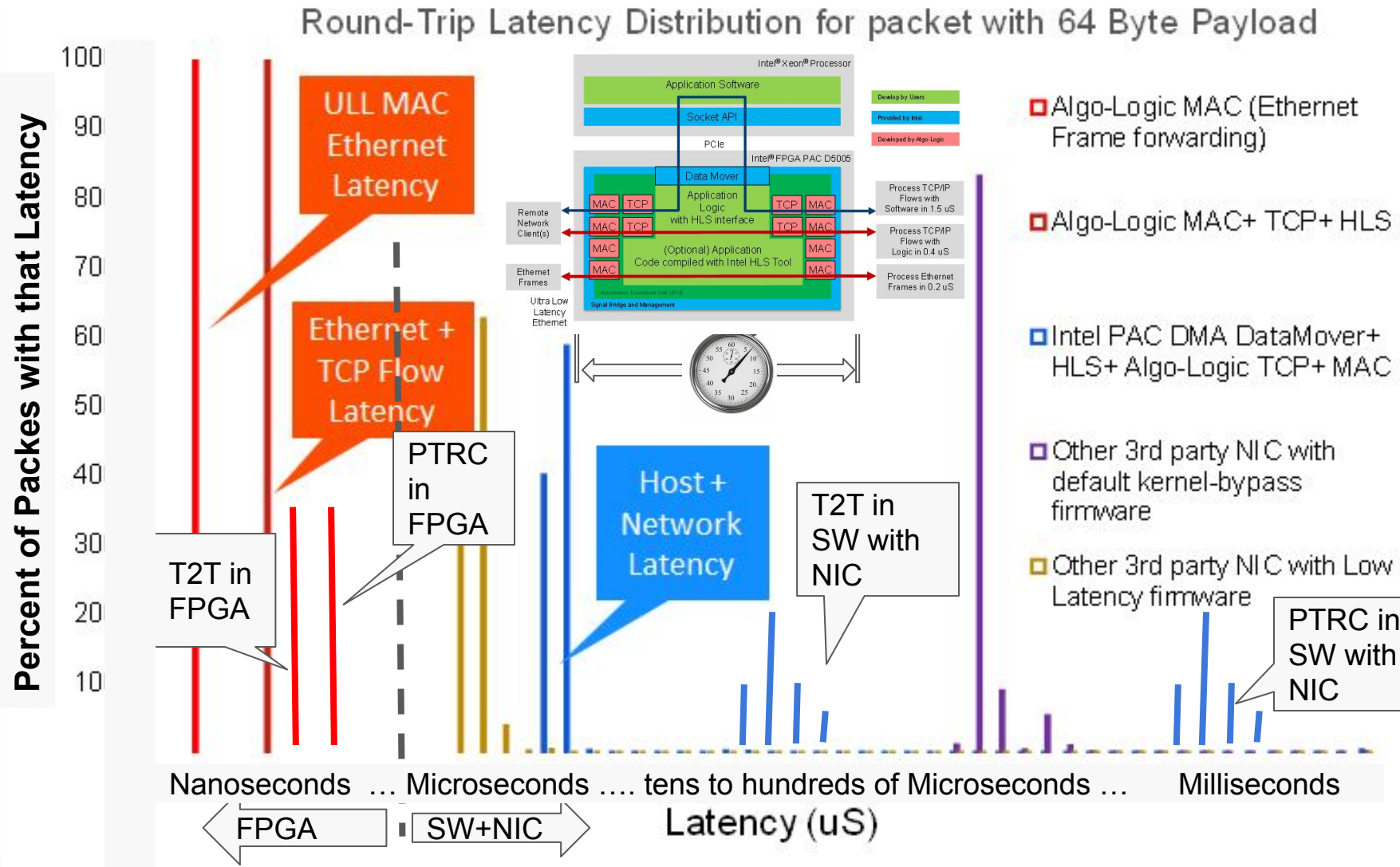
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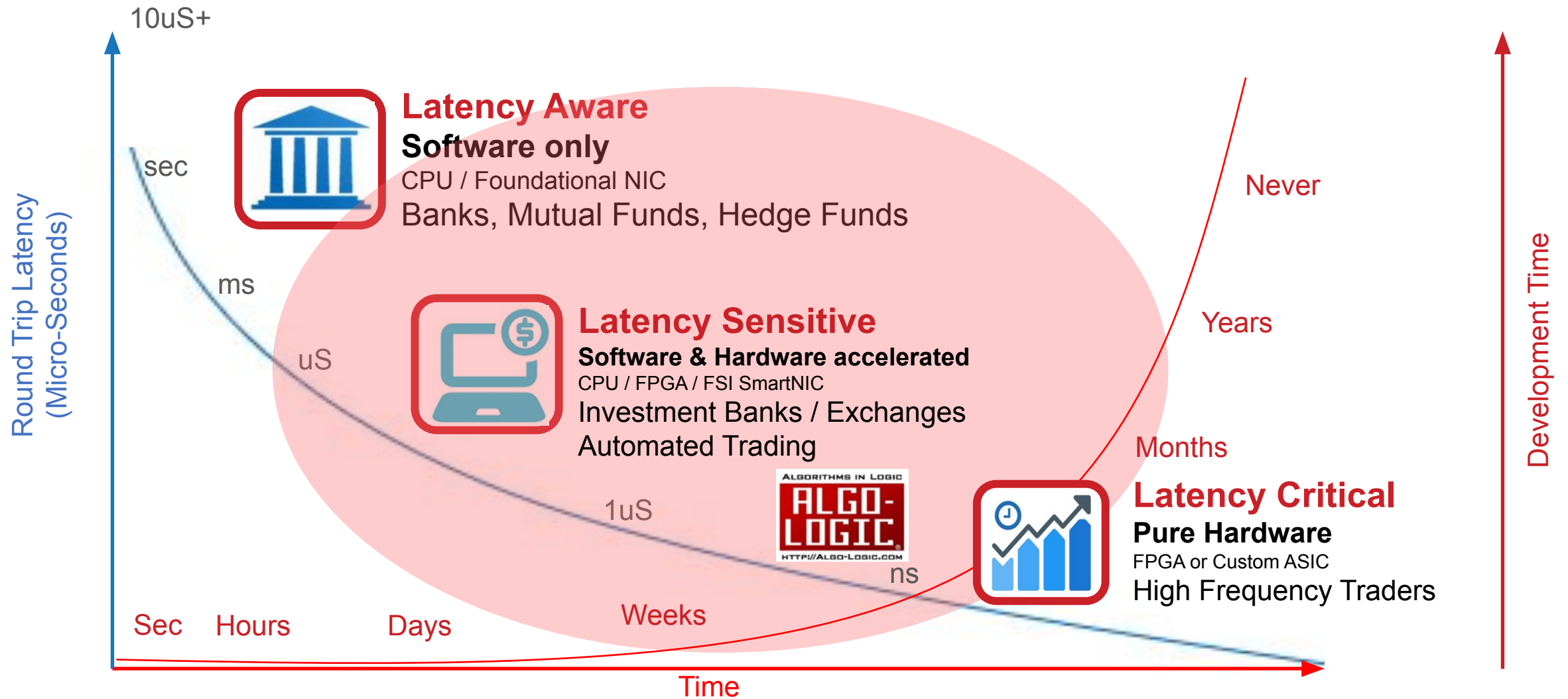
- Software API
- Intel Data Mover
- Algo-Logic MAC+TCP

Algo-Logic FPGA Logic

- ULL MAC
- TCP Endpoint
- HLS Interface for trading algorithms in logic

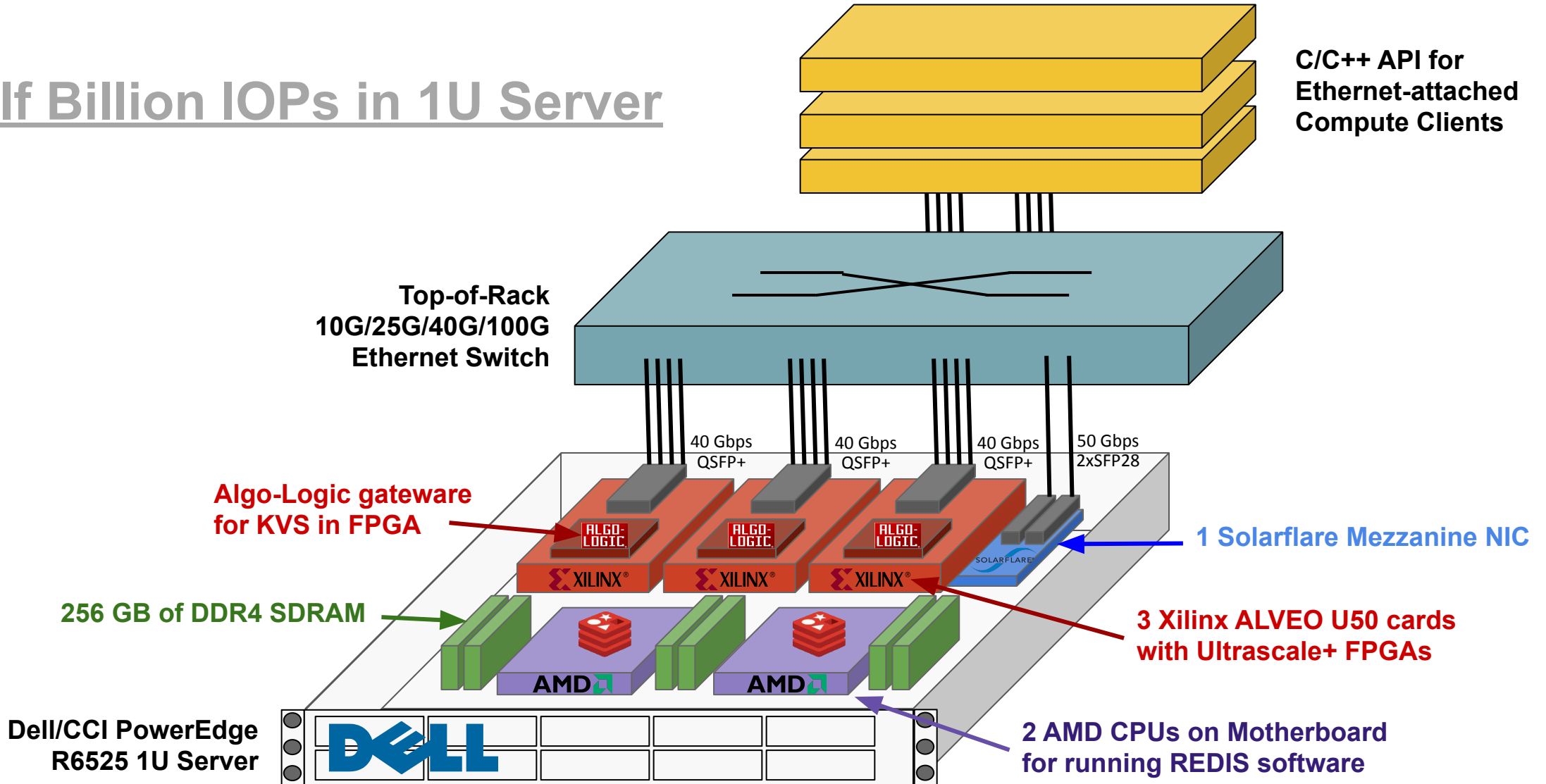


Trading Solutions: Latency vs. Development Effort

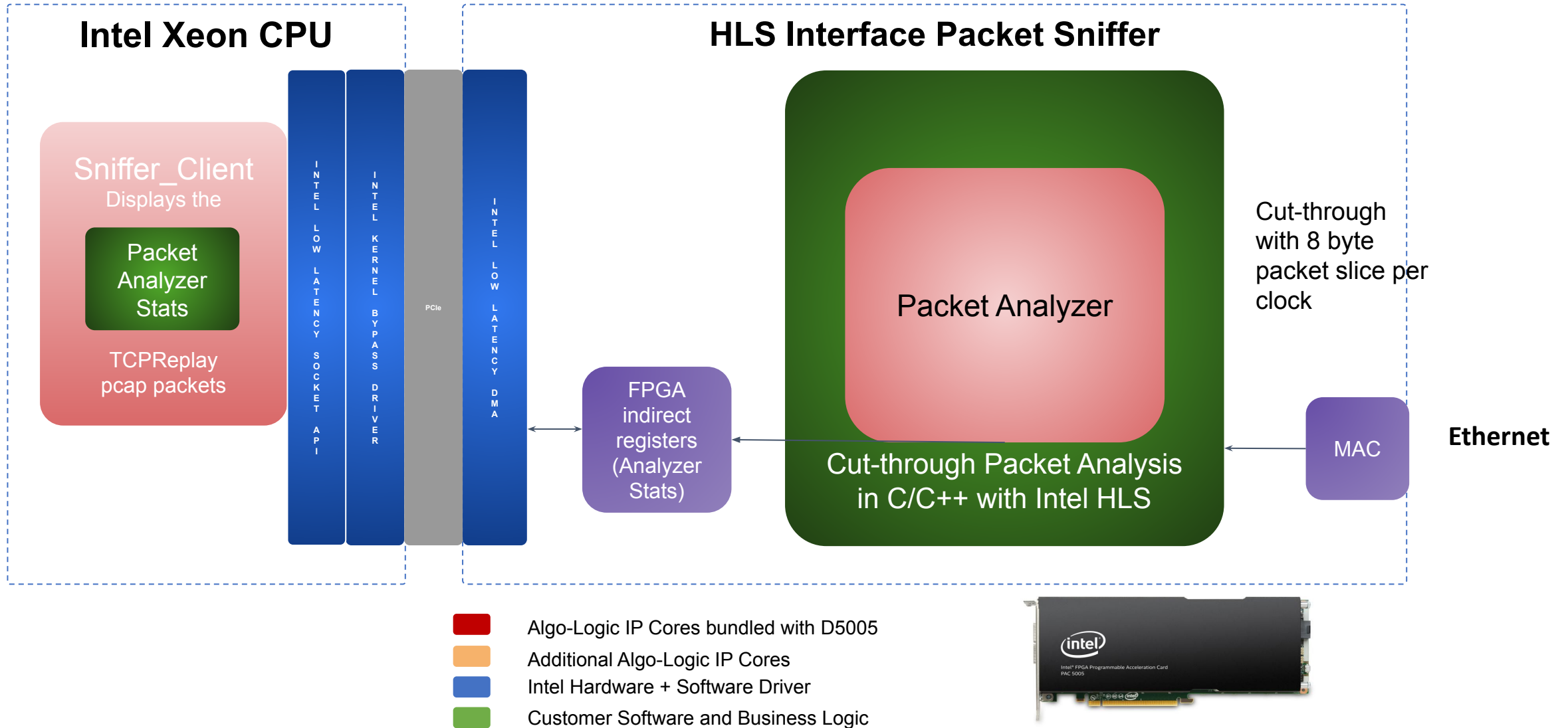


Algo-Logic's Key Value Store in FPGA

Half Billion IOPs in 1U Server



Algo-Logic's Cut-Through Packet Analyzer with HLS



Algo-Logic Partners & Supported FPGA Platforms

Algo-Logic provides the algorithms that run in logic on multiple FPGA platforms



Intel Programmable Acceleration Card: PAC D5005

- Stratix 10 FPGA
- On-chip SRAM
- DRAM
- 8 x 10G/25G Ethernet



Cisco Nexus SmartNIC+ V5P/V9P

- Ultrascale+ FPGA
- On+Off-chip SRAM
- DRAM
- 8 x 10G/25G Ethernet



Xilinx ALVEO U50/U200/U250

- Ultrascale+ FPGA
- On-chip SRAM
- DRAM
- HBM
- 8 x 10G/25G Ethernet

Conclusion

Solution enables Ultra-Low Latency (ULL) Networking

- Leverage existing software on CPU and kernel-bypass NICs
- Migrate time-critical functions to the FPGA

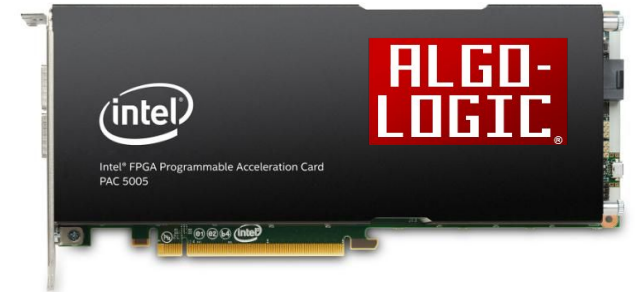
Algo-Logic Products Include:

- ULL MAC, UDP, and TCP networking stacks
- Associative Lookup for Key Value Store (KVS)
- Full-stack applications running in FPGA logic
 - Trading, Database, Real-time data

Algo-Logic's reference platforms

- Leverage's Tool Vendor's High Level Synthesis (**HLS**) frameworks
- Off-the shelf FPGA cards from Intel, Cisco, and Xilinx
- Pre-qualified systems available for purchase directly from Dell, HPE, ...

To learn more, email us at: Solutions@algo-logic.com



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