SOLUTION BRIEF

Mellanox End-to-End Lowest Latency Ethernet Solution for Financial Services

Featuring Mellanox ConnectX®-2 EN, VMA Messaging Accelerator™ and Vantage™ 6024

Unmatched trading application performance

Data volumes in the financial services industry are seeing dramatic growth, bringing existing systems to their limits. In a business where profits are directly measured by system speed, low latency, high volume infrastructures are needed with higher speeds and greater scalability.

Mellanox's unique software and switching platforms offer the lowest latency and highest volume end-to-end networking solutions for high frequency trading.

The Mellanox low latency solution package – including ConnectX-2 EN with RoCE (RDMA over Converged Ethernet) NIC, VMA messaging acceleration and Vantage™ 6024 10 Gigabit Ethernet L2/3 switching platform - provides the performance required for transaction-based applications through seamless Ethernet IP connectivity. The combined solution features application-to-application latency (RTT/2) as low as 2 microseconds, and less than 700 nanoseconds of port-to-port latency under full load.

End-to-end optimized solution backed by Mellanox renowned support

VMA is a dynamically-linked user-space Linux library for accelerating unicast or multicast messaging traffic. Applications that utilize standard BSD sockets use the library to offload network processing from a server's CPU. The traffic is passed directly to the ConnectX-2 EN 10GigE Network Interface Cards (NIC) from the application user space, bypassing the kernel and IP stack and thus minimizing context switches, buffer copies and interrupts resulting in extremely low latency.

The Mellanox Vantage 6024 switch is a low latency, high performance Layer 2/3 protocol stack top-of-rack switch optimized for financial services environments. It features 24 ports of 10GigE line-rate connectivity and power consumption as low as 115 Watts (4.8 Watts/port). It features the industry's most power-efficient and lowest latency capabilities on 10GigE, enabling new levels of efficiency, scalability and real-time application performance, while at the same time consolidating multiple/redundant network tiers and significantly reducing infrastructure expenses. The Mellanox Vantage 6024 L3 Routing feature may be used for both exchange connectivity as well as external clients. As a result, end-to-end application performance is improved without having to modify application code and latency-sensitive applications, and algorithms can perform at their best.

Mellanox ConnectX-2 EN with RoCE NIC enables servers and storage systems to run the most efficient RDMA transport over Layer 2 Ethernet with IEEE 802.1q VLAN tagging and Ethernet Priority-based Flow Control (PFC). The RoCE software stack maintains existing and future application compatibility for bandwidth and latency sensitive clustering applications.

Mellanox has a successful track record providing groundbreaking low latency solutions for the financial services industry backed by a world class support team with proven expertise in the financial industry.

KEY ADVANTAGES

- Ultra-low application latency of as low as 1.3 µsec
- Ultra-low switching latency of less than 700 nanoseconds (port-to-port)
- Extremely high packet per second rate of up to 3 million
- Seamless Ethernet IP connectivity using standard commodity servers
- No application code changes required and fully compatible with Linux socket API
- Direct L3 connectivity to the Exchange/WAN
- Low jitter minimizing maximum and average latencies

Certified with leading market data messaging middleware and compatible with homegrown solutions

Mellanox's solution boosts the performance of financial market data and messaging applications, including NYSE Technologies' WDF, 29West Latency Busters® Messaging (LBM) and customers' homegrown trading systems. The solution is proven to cut latency by a factor of 2-3X and increases application throughput per server, as compared to applications running on standard Ethernet interconnect networks – all without making any changes to the application.

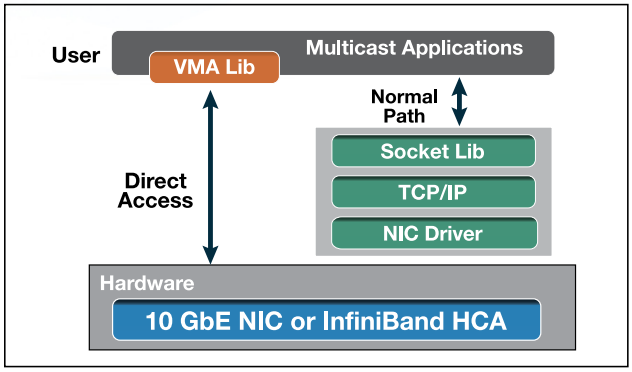

Figure 1. *VMA Block Diagram.*

Due to the transparent and high-performance nature of VMA, many multicast applications with heavy traffic volumes and/or low messaging latency requirements gain a measurable increase in application performance. Ideal candidates for VMA include:

- Market data feed handler software that consumes multicast data feeds and uses multicast as a distribution mechanism
- Messaging applications that produce or consume large amounts of multicast data including applications that utilize messaging middleware
- Caching/data distribution applications that utilize multicast for cache creation or to maintain data state
- Any data acquisition application that makes heavy use of multicast and requires high packet per second (PPS) rates, low data distribution latency, low CPU utilization or increased application scalability

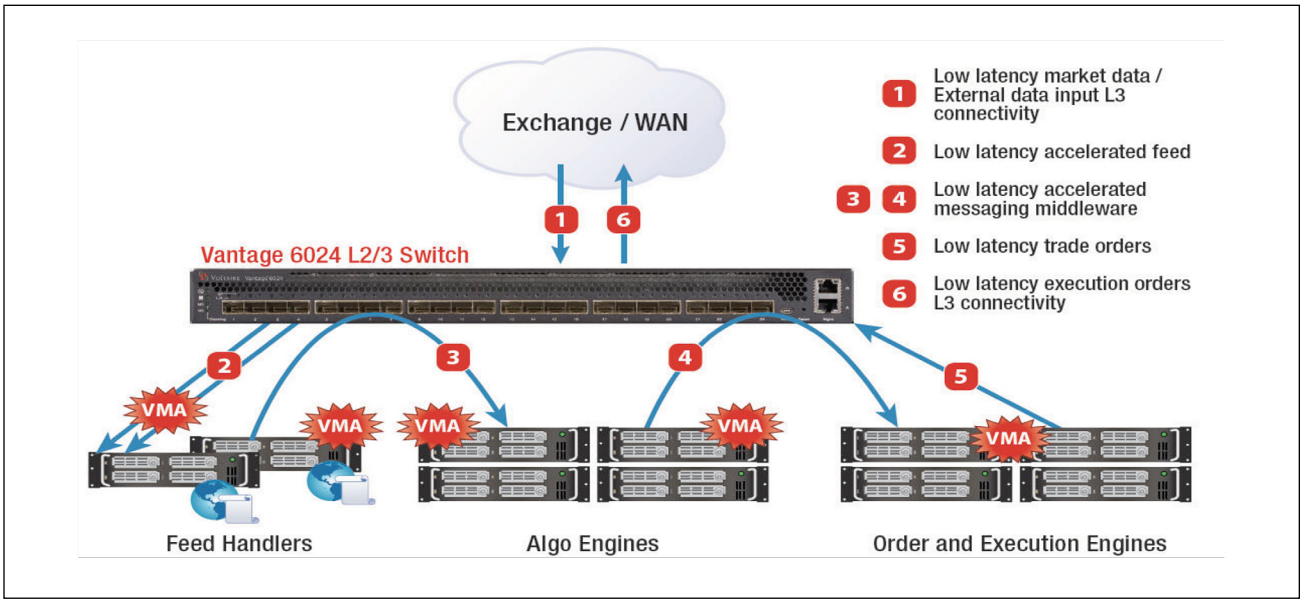

Figure 2. *End-to-end optimized solution for high frequency trading.*

Proven lowest latency solution

Notable results are achieved by presenting OS bypass technology while using low latency switching/routing network, as detailed in the following graphs.

VMA+ 6024 + 29West vs. Competition

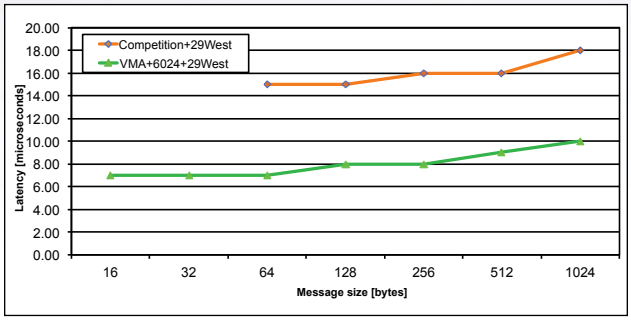

Figure 3. *29West middleware latency comparison - Mellanox's solution outperforms by more than 2X at any message size.*

VMA Latency

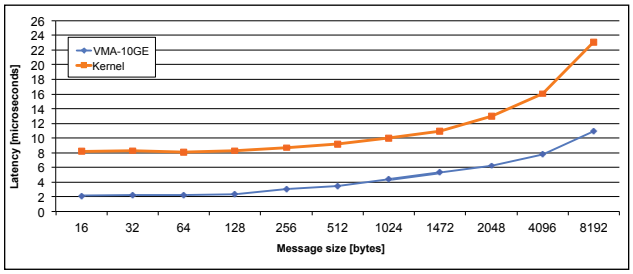

Figure 4. *Latency comparison - Mellanox's solution outperforms by more than 2X at any message size.*

VMA Throughput

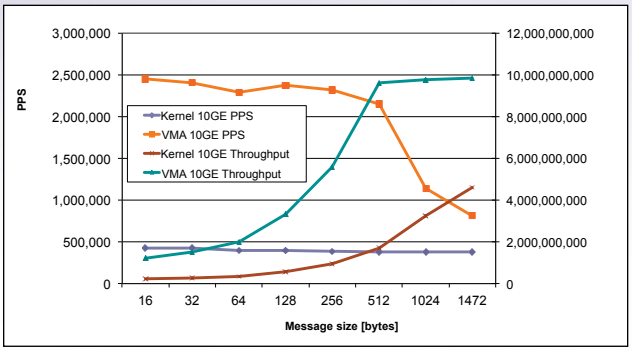

Figure 5. *Application throughput - Mellanox's solution can handle the highest message rate arriving from the exchange.*

Mellanox's solution is the ideal choice for enterprises that are seeking end-to-end low-latency solutions while avoiding code changes or using additional proprietary hardware units.

Part Number	Description
Turnkey Solution Bundle	
VMA-XXX	Mellanox VMA™ Package License
VLT-30057	Mellanox Vantage™ 6024 24-PORT 1/10GE Switch
MNPH29D-XTR	ConnectX®-2 EN network interface card, Dual Port SFP+ PCIE2.0
GPS-00003	On-site Mellanox Professional Services

Part Number	Description
Bundle Add-ons	
SFP+ Copper – DAC	
CBL-00239	ETH CABLE SFP+ (10GE) 1M 30AWG
CBL-00240	ETH CABLE SFP+ (10GE) 3M 28AWG
CBL-00242	ETH CABLE SFP+ (10GE) 5M 26AWG
CBL-00244	ETH CABLE SFP+ (10GE) 7M 24AWG
CBL-00245	ETH CABLE SFP+ (10GE) 10M 24AWG
SFP+ Optic Transceivers	
OPT-90003	6024 ETH SFP+ SR Transceiver (UP TO 300M)
OPT-90004	6024 ETH SFP+ LR Transceiver (UP TO 10KM)

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