SOLUTION BRIEF

Deterministic Communications for Secure High-speed Performance

Fortinet Protects Connections to Electronic Trading Platforms with the Industry's Lowest Latency and Jitter Rates

Executive Summary

Electronic trading is a specialty in the financial services industry that requires extremely high performance in its digital systems, including in the firewalls that protect traffic between electronic trading platforms and the rest of the financial institution. FortiGate 3700D and 3800D next-generation firewalls (NGFWs) provide the lowest latency in the industry, with near zero jitter, while providing highly scalable protection for this critical business function. At the same time, they provide a platform designed for peak operational efficiency.

Electronic trading is a lucrative business for some financial services institutions, but it requires extremely robust performance from its systems to be successful. The trading platforms themselves must present market data and execute trades in virtual real time, but the connections between these systems and the larger infrastructure of the institution are crucial as well. If there is a delay in this communication, or if misleading information is transmitted to the banking side of the business in the first seconds after a trade occurs—or fails to occur—customer satisfaction suffers, even when the trade was ultimately successful.

Frame Size (bytes)	Intended Load (%)	Offered Load (%)	Frame Loss (%)	Average Latency (µs)	Average Jitter (µs)
64	50	50	0	1.34	0.036
128	67.2	66.9	0	1.37	0.054
256	100	100	0	1.88	0.008
512	100	100	0	2.08	0.005
1024	100	100	0	2.49	0.004
1518	100	99.9	0	2.68	0.091
9216	96.1	96.0	0	8.92	0.043

Figure 1: Latency and jitter results by frame size at global financial institution using FortiGate 3700D with ULL ports.

"Jitter" in the NGFWs that protect the connections between the electronic trading infrastructure and the financial institution are a primary source of such misleading information. Much of this traffic consists of small packets containing different aspects of a transaction that must be understood by systems in real time—including market data feeds, telemetry from market data applications, which transactions went through, and the ask price and executed price of those trades. When transactions are executed in increments of fractions of seconds, packets that pass through the NGFW in nonsequential order can cause significant problems.

As a result, while higher throughput is a consideration in selecting an NGFW to protect traffic from the electronic trading platform to corporate systems, deterministic performance in most cases is more important. Specifically, latency must be below 5 microseconds (µs) and jitter should ideally be very close to zero.

FortiGate Next-generation Firewalls Deliver Superior Performance

FortiGate 3700D and 3800D series NGFWs use purpose-built security processing unit (SPU) technology to deliver high-performance threat protection with the industry's lowest latency and jitter for trading infrastructures. FG-3700D appliances have the added inclusion of unbundled local loop (ULL) ports to further enhance performance.

In tests conducted at two of the world's largest global financial services institutions, the FG-3700D and FG-3800D had average latency below 5 µs and average jitter well below 0.1 µs—significantly lower than any other NGFW in the marketplace (Figures 1 and 2). In fact, one of the tests confirmed average latency below 2 µs for the smallest packets—64, 128, and 256 bytes (Figure 1).

Protocol	State	Average Latency (µs)
IPv4	Steady	4.435
IPv4	Policy Push	4.750
IPv6	Steady	4.548

Figure 2: Latency results at global financial institution using FortiGate 3800D.

With such low latency and jitter, institutions offering electronic trading services can count on consistent, predictable performance in communications between the electronic trading system, the core network, co-locations, and partners while protecting data and guarding against intrusions. Traffic can scale to 160 gigabits per second (Gbps) and up to 50 million concurrent sessions.

Broad, Operationally Efficient Network Security for Business-critical Traffic

The feature set in FortiGate NGFWs results in comprehensive protection. Built-in intrusion prevention system (IPS) functionality protects against more sophisticated intrusion attempts and attacks. Intent-based segmentation enables different services and workflows to be segmented based on business needs.[1] And mobile security features built into FortiGate network firewalls protect traffic coming from smartphones, tablets, and Internet-of-Things (IoT) devices.

FortiGate network firewall appliances are also designed for optimal operational efficiency. Single-pane-of-glass visibility and control simplifies management, and API-enabled automation helps organizations tailor policies and processes to the unique needs of the electronic trading business and the specific trading platform being used. Multiple high-speed interfaces make for a scalable solution, no matter the size of the overall institution or the electronic trading business.

These security features enable organizations to achieve several business requirements for their electronic trading environments:

- Ensuring traffic inspection between partners for enhanced security without compromising performance metrics in critical market data environments
- Improving security effectiveness by segmenting critical customer and business data
- Improving visibility by facilitating automation and enabling ease of management

Conclusion

In the high-speed, high-stakes world of electronic trading, a few microseconds of additional latency or jitter can make the difference between a highly profitable business and a marginal one. FortiGate NGFWs provide high performance and world-class protection for traffic to and from electronic trading systems, no matter which platform is in use.

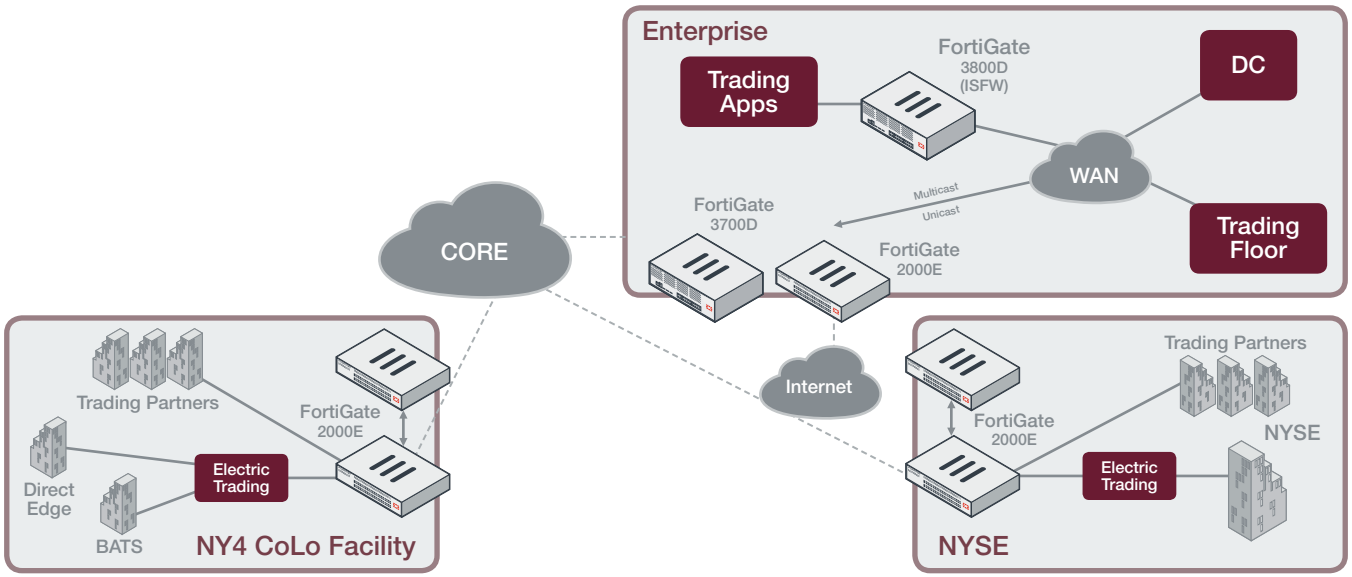

Figure 3: Sample high-performance B2B trading infrastructure architecture.

[1] "How to Achieve Optimal Intent-based Segmentation with FortiGate NGFWs and the Fortinet Security Fabric," Fortinet, August 6, 2019.

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