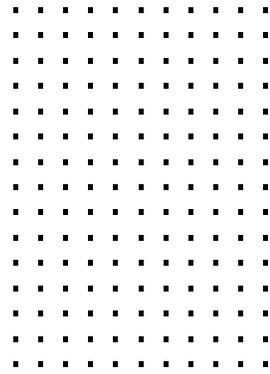


Deterministic Performance for High-speed Security

Protection for Esports Connections With the Industry's Lowest Latency and Jitter Rates



Executive Summary

Electronic-gaming configuration requires extremely high-performance systems, including the firewalls that protect traffic between applications or content and the rest of the institution and end consumers. FortiGate Next-Generation Firewall (NGFW) appliances provide the lowest latency in the industry, with near-zero jitter.

Media and entertainment (M&E) providers must present content and react to user interfaces in virtual real time, but the connections between these systems and the additional infrastructure of the institution are critical as well.

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 large global enterprise using FortiGate 3700D with ULL ports.

“Jitter” in the NGFWs that protect the connections between the M&E provider and the game consumer can interfere with user experience and change its measured outcomes. Much of this traffic consists of small packets containing different aspects of a transaction that must be understood by systems in real time. When transactions are executed in increments of fractions of seconds, packets that pass through the NGFW in non-sequential order can cause notable problems.

As a result, while higher throughput is a key consideration in selecting an NGFW to protect traffic, deterministic performance in most cases is equally as important. Specifically, latency must be below five 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. FortiGate 3700D appliances have the added inclusion of unbundled local loop (ULL) ports to further enhance performance.

Customer-supported tests measured the FortiGate 3700D and FortiGate 3800D with average latency below five 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
IPv4	Steady	4.548

Figure 2: Latency results at large global enterprise using FortiGate 3800D.



With such low latency and jitter, M&E producers and content distributors can count on consistent, predictable performance in communications between the core network, co-locations, and partners, while protecting data and user information. 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 need. And mobile security features built in to FortiGates 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 industry and the specific platform being used. Multiple high-speed interfaces make for a scalable solution, no matter the size of the overall institution or hosted event.

These security features enable organizations to achieve several business requirements:

- Ensuring traffic inspection between partners for enhanced security without compromising performance metrics
- 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 esports and competitive online gaming, a few microseconds of additional latency or jitter can make the difference between a successful event and dissatisfaction. FortiGate NGFWs provide unmatched speed, performance, and world-class protection for traffic and user information.

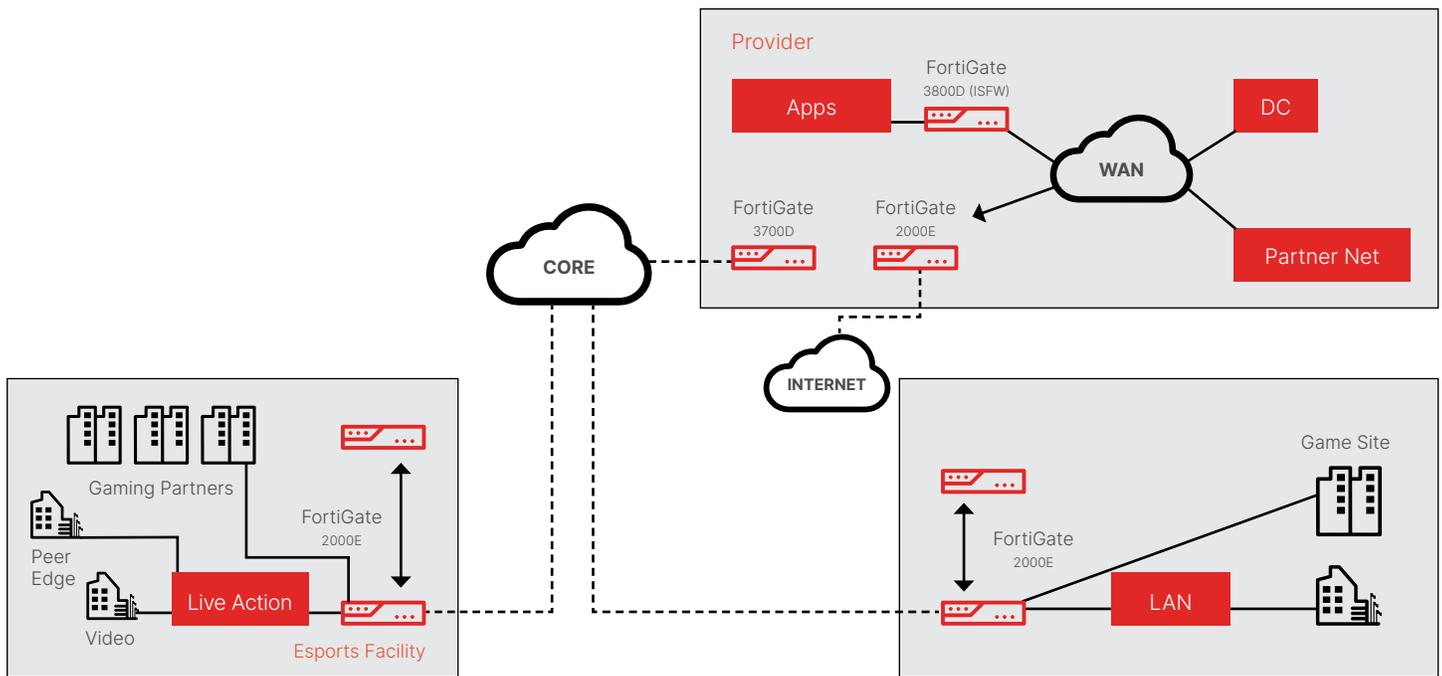


Figure 3: Sample high-performance M&E esports gaming architecture.