SOLUTION BRIEF

Delivering Fast and Secure Entertainment Experiences with Hyperscale Data Centers

Executive Summary

Digital innovation is forcing the world's largest enterprise organizations to implement hyperscale architectures. These architectures are designed to meet unprecedented business demands generated by the need for enormous capacity and astronomical performance. For media and entertainment companies, hyperscale data centers empower better customer experiences, such as streaming high-quality content on-demand with low latency, even when demand peaks.

Securing these data centers requires hyperscale-enabled firewalls that offer high-performance Layer 4 security and the ability to transfer massive datasets. These "elephant flows"—where a single session consumes a large amount of bandwidth—enable organizations to meet customer demands with high performance that reduces churn.

FortiGate next-generation firewalls (NGFWs), based on the Fortinet seventh- generation network processor (NP7), allow media and entertainment companies to apply access controls to secure content and user data while maintaining high performance and throughput. They support high-speed traffic encryption while transferring large volumes of data in hyperscale environments. NP7-powered FortiGate NGFWs defend against volumetric attacks with hardware-accelerated distributed denial-of-service (DDoS) protection and offer low power consumption without sacrificing performance, resulting in compact and cost-effective hyperscale firewalls.

NP7-powered FortiGate NGFWs:

Fortinet FortiGate SDN Fabric Connector for IBM Cloud (Gen 1 and Gen 2)

- Support for 40 Gbps and 100 Gbps elephant flows
- High-speed IPsec encryption
- Multiple 40 Gbps and 1000 Gbps interfaces in a compact form factor
- Low power consumption
- Delivers industry's best threat protection performance and ultra-low latency using purpose-built security processor (SPU) technology
- Provides dedicated Ultra Low Latency (ULL) ports providing <2us latency for time-sensitive applications, such as media streaming and live event content delivery

Introduction

From content creation to consumption, digital innovation has irrevocably changed the media and entertainment industry. High performance and low-latency are critical when dealing with large files and fluctuating demand. Content is being created and consumed from more devices than ever, and consumers expect delivery to work wherever and whenever they want. That requires speed and reliability for content delivery, as well as the ability to quickly analyze data to optimize experiences.

These organizations are adopting hyperscale architectures to get the enormous capacity and astronomical performance required to meet unprecedented business demands. Hyperscale architectures are used for more than media streaming—they're critical to support branch locations and onsite customer experiences, as well. Hyperscale data centers ensure all locations run smoothly and experiences are optimized by supporting fluctuating demand and analyzing data quickly.

At the Walt Disney World Resort theme parks, data from sensors, cameras, and user devices is collected and analyzed to monitor crowds and make adjustments to operations, allowing them to increase park capacity by as much as 30%. Data and machine learning algorithms are also used to predict when rides or equipment will need service in order to address the issue before it impacts the customer experience.[1]

At Disney+, the company's video streaming service, hyperscale data centers were needed to process terabytes of data to support millions of users in multiple regions. Microservices, databases, and data warehouses were slow and led to silos between internal teams. Moving to a hyperscale architecture allowed them to get real-time data and insights as well as conduct A/B testing and create prototypes to improve the service. Their streaming data platform enables the company to make more data-driven decisions.[2]

Today's consumers have a wide variety of media options, meaning a poor user experience can lead to subscriber churn quickly. Many media and entertainment organizations have invested in routing and switching infrastructures capable of carrying 100 Gbps flows in order to provide high-quality streaming and to collect and process customer and usage data for analysis. While these flows can handle extremely large files efficiently, organizations with hyperscale data centers often struggle to source firewalls that can keep up with demand. As a result, these organizations often do not implement security at the network edges in order to avoid compromising performance—creating a significant challenge for network security leaders.

Hyperscale Architectures Require Hyperscale Security

Media and entertainment companies now realize that foregoing security is no longer a viable business strategy. However, not all NGFWs implement Layer 4 security, and many struggle to achieve just 10 Gbps throughput on a single flow, leaving much of an organization's bandwidth investment unused. That's a particular challenge for an industry where video is so important.

Video is a great example of a high-throughput single data session or elephant flow, as it takes up significant amounts of network capacity relative to other types of data sessions. For example, based on data from the FCC, a three-minute YouTube stream accounts for 20,000 times more bandwidth than three minutes consuming Twitter. Just 3% of data sessions account for 70% of all the traffic on mobile networks.[3]

To provide security without constraining bandwidth, Fortinet NP7-powered hyperscale NGFWs support high-performance firewalling for elephant flows, which in turn allow organizations to deliver high-quality video streams as well as analyze data faster using AI/ML techniques to optimize the customer experience.

NP7 dramatically increases the FortiGate NGFW's Layer 4 performance to meet the demands of video streaming. Specifically, the Fortinet NP7 security processing unit (SPU) has multiple very high-speed ports that are capable of handling traffic flows at 100 Gbps. This support for multiple parallel 100 Gbps flows can dramatically increase the rate of data transfer, providing more than 1 Tbps throughput. This allows organizations to deliver high performance with low latency to meet customer demands while also enabling access control to ensure bandwidth is used for legitimate business purposes and protect against volumetric attacks.

High-speed IPsec Processing Supports Compliance

Data protection regulations like the EU's General Data Protection Regulation (GDPR) require strict security controls on protected data. For organizations transmitting sensitive data that contains customer payment, location, or other personally identifiable information over network connections, these regulations mandate the use of IPsec or similar encryption mechanisms to achieve data privacy.

The NP7-powered FortiGate NGFWs help organizations maintain compliance without sacrificing performance by processing IPsec traffic at a very high throughput rate and encrypting elephant flows when needed. Encryption protocols do not encumber network performance or put the customer experience at risk.

Low Power Consumption

When processing massive network traffic flows, power efficiency is a significant concern. For example, achieving 60 Gbps IPsec transmission using a cluster of Intel CPUs consumes 2,380 watts.[4] However, the Fortinet NP7 processor is optimized to provide extremely high performance with low power consumption. Achieving the same IPsec throughput on the NP7 processor uses only 20 watts, less than 1% of the consumption of the Intel CPUs. These significant efficiency gains enable media and entertainment companies to deploy the security they need in hyperscale architectures without significant additional expense or overhead. And as most organizations now have green computing objectives,[5] this reduction in power consumption enables them to reduce the carbon footprint of their network security.

By providing the industry's best price and performance, the NP7-powered FortiGate NGFW enables organizations to deploy a firewall solution that can scale to meet their business needs while maximizing return on investment (ROI). Full solution integration allows organizations to purchase, deploy, and maintain fewer standalone appliances, helping them reduce costs and complexity while lowering the overall total cost of ownership (TCO).

NP7-powered FortiGate NGFWs:

- Integral part of Security Fabric, providing visibility and protection across the entire attack surface
- Reduce cost and complexity by eliminating point products
- Managed by Fortinet's single pane-of-glass management, the Fabric Management Center

Hyperscale Security Begins with Fortinet

Most NGFWs are incapable of supporting the high bandwidth needed by media and entertainment organizations to transfer large files such as video. This has made it challenging for companies to employ the security they need to protect their content and users. It also creates a challenge to comply with data privacy laws, like GDPR and the California Consumer Privacy Act (CCPA), which mandate the protection of sensitive data at all times.

The NP7-based FortiGate NGFWs are capable of supporting up to 100 Gbps elephant flows, placing Fortinet at the forefront of security in hyperscale environments. This empowers global enterprises to meet today's challenges of unprecedented scale, performance demands, and rapid application delivery with security solutions that don't hinder the customer experience.

[1] "Disney World. Theme Park or Massive Data Collection Apparatus?," AI Data & Analytics Network, March 4, 2021.

[2] "How Disney+ uses fast data ubiquity to improve the customer experience," Databricks, December 14, 2020.

[3] "What Are Elephant Flows And Why Are They Driving Up Mobile Network Costs?," Forbes, February 28, 2019.

[4] Based on Fortinet internal research.

[5] "Data Centers 'Going Green' To Reduce A Carbon Footprint Larger Than The Airline Industry," Data Economy, January 27, 2017.

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May 10, 2022 3:16 PM
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