Next-Generation Firewall IPS Signature Database Update and Throughput Limits - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The Next-Generation Firewall (NGFW) IPS Signature Database Update and Throughput Limits platform represents a paradigm shift in enterprise security infrastructure. This document provides a comprehensive technical overview of the hardware architecture, silicon-level packet processing engines, and performance characteristics that define the industry's most advanced intrusion prevention system. Engineered for carrier-grade and large enterprise deployments, this platform delivers line-rate threat inspection without compromising network throughput. The system integrates a dedicated security processing ASIC (Application-Specific Integrated Circuit) capable of executing deep packet inspection (DPI) at multi-terabit speeds while maintaining sub-microsecond latency. This datasheet details the architectural innovations, signature database update mechanisms, and rigorous throughput validation methodologies that ensure your network remains both secure and performant under the most demanding traffic conditions.



HARDWARE ARCHITECTURE & SILICON

At the core of the Next-Generation Firewall platform lies a purpose-built security ASIC fabricated on a 7nm process node. This silicon integrates 128 custom RISC-based security cores, each dedicated to parallel signature matching and heuristic analysis. The architecture employs a three-stage pipeline: classification, inspection, and enforcement. During the classification stage, hardware-based flow tables identify application protocols and traffic patterns. The inspection stage utilizes a ternary content-addressable memory (TCAM) array that stores over 50,000 active IPS signatures, enabling single-pass pattern matching at wire speed. The enforcement stage applies policy decisions with hardware-accelerated packet filtering and traffic shaping.

The platform supports hot-swappable security modules and redundant control

plane processors. The data plane operates independently of the control plane, ensuring that signature database updates or management operations do not interrupt packet forwarding. A dedicated 100GbE internal fabric connects all modules, providing non-blocking throughput for full-mesh inspection.

KEY FEATURES & ROUTING LOGIC

- Line-Rate IPS Throughput: Up to 800 Gbps of aggregate IPS inspection throughput per chassis, with zero packet loss under full signature load.
- Parallel Signature Matching: 128 security cores execute concurrent pattern matching, achieving 99.999% detection accuracy for known threats.
- Dynamic Signature Database Updates: Atomic, non-disruptive updates delivered via encrypted channels every 15 minutes, with delta compression reducing update payloads by 85%.
- Hardware-Based SSL/TLS Decryption: Dedicated cryptographic engines offload TLS 1.3 decryption, enabling inspection of encrypted traffic without performance degradation.
- Deterministic Latency: Sub-500 nanosecond added latency for inspected flows, validated under RFC 2544 test methodologies.
- Advanced Routing Logic: Integrated Layer 3 forwarding engine supports OSPF, BGP, IS-IS, and MPLS, allowing seamless integration into existing core networks.

COMPLIANCE & STANDARDS

The Next-Generation Firewall platform complies with the following industry standards and certifications:

- NIST FIPS 140-3 Level 3 validated cryptographic module.
- Common Criteria EAL4+ certification for security functionality.
- NEBS Level 3 compliant for carrier-grade environmental tolerance.
- IEEE 802.1AE MACsec for link-layer encryption.
- RFC 2544, RFC 6349, and Y.1564 for throughput and latency benchmarking.
- MEF 3.0 CE 2.0 certified for Carrier Ethernet services.

TECHNICAL SPECIFICATIONS

The platform is available in both 1RU fixed-configuration and 4RU modular chassis options. The 1RU model supports 24x 25GbE and 4x 100GbE interfaces, while the modular chassis supports up to 32x 100GbE or 8x 400GbE line cards. All models feature dual hot-swappable redundant power supplies and field-replaceable fan trays with N+1 redundancy. The signature database is stored in non-volatile memory and can be updated via CLI, SNMP, or REST API. Throughput limits are enforced per policy, with granular bandwidth throttling and session limits.

Parameter	Specification

Form Factor	1RU Fixed / 4RU Modular Chassis
Switching Capacity	800 Gbps (1RU) / 3.2 Tbps (4RU Modular)
IPS Throughput	800 Gbps line-rate with all signatures enabled
Signature Database Capacity	50,000+ active signatures, 15-minute incremental updates
Latency	Sub-500 nanoseconds added latency for inspected flows
Power Supply	Dual Hot-Swappable Redundant AC/DC (2000W per PSU)
Cooling	N+1 Redundant Field-Replaceable Fan Trays
Management	CLI, SNMPv3, REST API, Web UI
Compliance	NIST FIPS 140-3 L3, Common Criteria EAL4+, NEBS Level 3, MEF 3.0

ORDERING SKU INFORMATION

Base Systems:

- NGFW-1RU-800G: 1RU chassis, 800 Gbps IPS throughput, 24x 25GbE + 4x

100GbE.

- NGFW-4RU-MOD: 4RU modular chassis, 3.2 Tbps IPS throughput, 8 line card slots.

Signature Database Subscriptions:

- SIG-DB-1YR: 1-year subscription with 15-minute update intervals.

- SIG-DB-3YR: 3-year subscription with priority update delivery.

- SIG-DB-ENT: Enterprise subscription with custom signature development.

Accessories:

- PWR-AC-2000W: 2000W AC hot-swappable power supply.

- FAN-N1: N+1 redundant fan tray.

- TRX-400G-SR: 400GbE short-reach transceiver.

