PA-7000 Series

Palo Alto Networks PA-7000 Series ML-Powered Next-Generation Firewalls (NGFWs) enable enterprise-scale organizations and service providers to deploy security in high-performance environments, such as large data centers and high-bandwidth network perimeters. Designed to handle growing throughput needs for application-, user-, and device-generated data, these systems offer amazing performance, prevention capabilities to stop the most advanced cyberattacks, and high-throughput decryption to stop threats hiding under the veil of encryption. Built to maximize security-processing resource utilization and automatically scale as new computing power becomes available, the PA-7000 Series offers simplicity defined by a single-system approach to management and licensing.

Highlights

- World's first ML-Powered NGFW
- Ten-time Leader in the Gartner® Magic Quadrant™ for Network Firewalls
- Leader in the Forrester Wave™: Enterprise Firewalls, Q3 2020
- Highest Security Effectiveness score in the 2019 NSS Labs NGFW Test Report, with 100% of evasions blocked
- Operates on a unified and scalable architecture
- Delivers 5G-native security built to safeguard service provider, enterprise 5G transformation, and multi-access edge computing (MEC)
- Extends visibility and security to all devices, including unmanaged IoT devices, without the need to deploy additional sensors
- Supports high availability with active/active and active/passive modes
- Delivers predictable performance with security services

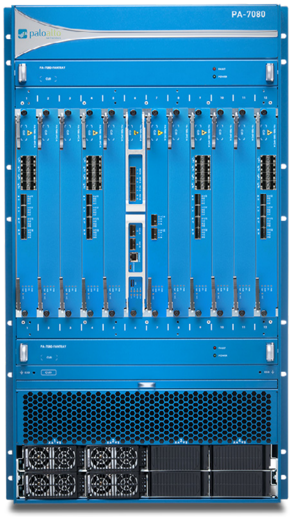
The controlling element of the PA-7000 Series is PAN-OS®, the same software that runs all Palo Alto Networks NGFWs. PAN-OS natively classifies all traffic, inclusive of applications, threats, and content, and then ties that traffic to the user regardless of location or device type. The application, content, and user—in other words, the elements that run your business—then serve as the basis for your security policies, resulting in improved security posture, reduced incident response time, and lower administrative overhead associated with keeping security policies current in a highly dynamic environment.

Key Security and Connectivity Features

ML-Powered Next-Generation Firewall

- Embeds machine learning (ML) in the core of the firewall to provide inline signatureless attack prevention for file-based attacks while identifying and immediately stopping never-before-seen phishing attempts.
- Leverages cloud-based ML processes to push zero-delay signatures and instructions back to the NGFW.
- Uses behavioral analysis to detect Internet of Things (IoT) devices and make policy recommendations; cloud-delivered and natively integrated service on the NGFW.
- Automates policy recommendations that save time and reduce the chance of human error.

PA-7050



PA-7080

Identifies and Categorizes All Applications, on All Ports, All the Time, with Full Layer 7 Inspection

- Identifies the applications traversing your network irrespective of port, protocol, evasive techniques, or encryption (TLS/SSL).
- Automatically discovers and controls new applications to keep pace with the SaaS explosion with SaaS Security subscription.
- Uses the application, not the port, as the basis for all your safe enablement policy decisions: allow, deny, schedule, inspect, and apply traffic-shaping.
- Offers the ability to create custom App-ID™ tags for proprietary applications or request App-ID development for new applications from Palo Alto Networks.
- Identifies all payload data within the application (e.g., files and data patterns) to block malicious files and thwart data exfiltration attempts.
- Creates standard and customized application usage reports, including software-as-a-service (SaaS) reports that provide insight into all sanctioned and unsanctioned SaaS traffic on your network.
- Enables safe migration of legacy Layer 4 rule sets to App-ID-based rules with built-in Policy Optimizer, giving you a rule set that is more secure and easier to manage.
- Check out the App-ID tech brief for more information.

Enforces Security for Users at Any Location, on Any Device, While Adapting Policy Based on User Activity

- Enables visibility, security policies, reporting, and forensics based on users and groups—not just IP addresses.
- Easily integrates with a wide range of repositories to leverage user information: wireless LAN controllers, VPNs, directory servers, SIEMs, proxies, and more.
- Allows you to define Dynamic User Groups (DUGs) on the firewall to take time-bound security actions without waiting for changes to be applied to user directories.
- Applies consistent policies irrespective of users' locations (office, home, travel, etc.) and devices (iOS and Android® mobile devices, macOS®, Windows®, Linux desktops, laptops; Citrix and Microsoft VDI and Terminal Servers).

- Prevents corporate credentials from leaking to third-party websites and prevents reuse of stolen credentials by enabling multi-factor authentication (MFA) at the network layer for any application without any application changes.
- Provides dynamic security actions based on user behavior to restrict suspicious or malicious users.
- Consistently authenticates and authorizes your users, regardless of location and where user identity stores live, to quickly move towards a Zero Trust security posture with Cloud Identity Engine—an entirely new cloud-based architecture for identity-based security. Check out the Cloud Identity Engine solution brief for more information.

Prevents Malicious Activity Concealed in Encrypted Traffic

- Inspects and applies policy to TLS/SSL-encrypted traffic, both inbound and outbound, including for traffic that uses TLS 1.3 and HTTP/2.
- Offers rich visibility into TLS traffic, such as amount of encrypted traffic, TLS/SSL versions, cipher suites, and more, without decrypting.
- Enables control over use of legacy TLS protocols, insecure ciphers, and misconfigured certificates to mitigate risks.
- Facilitates easy deployment of decryption and lets you use built-in logs to troubleshoot issues, such as applications with pinned certificates.
- Lets you enable or disable decryption flexibly based on URL category and source and destination zone, address, user, user group, device, and port, for privacy and regulatory compliance purposes.
- Allows you to create a copy of decrypted traffic from the firewall (i.e., decryption mirroring) and send it to traffic collection tools for forensics, historical purposes, or data loss prevention (DLP).
- Allows you to intelligently forward all traffic (decrypted TLS, non-decrypted TLS, and non-TLS) to third-party security tools with Network Packet Broker, optimize your network performance and reduce operating expenses.
- Refer to this decryption white paper to learn where, when and how to decrypt to prevent threats and secure your business.

Offers Centralized Management and Visibility

- Benefits from centralized management, configuration, and visibility for multiple distributed Palo Alto Networks NGFWs (irrespective of location or scale) through Panorama™ network security management in one unified user interface.
- Streamlines configuration sharing through Panorama with templates and device groups and scales log collection as logging needs increase.
- Enables users, through the Application Command Center (ACC), to obtain deep visibility and comprehensive insights into network traffic and threats.

Maximize Your Security Investment and Prevent Business Disruption with AIOps

- AIOps for NGFW delivers continuous best practice recommendations customized to your unique deployment to strengthen your security posture and get the most out of your security investment.
- Intelligently predicts firewall health, performance and capacity problems based on ML powered by advanced telemetry data. It also provides actionable insights to resolve the predicted disruptions.

Detects and Prevents Threats with Cloud-Delivered Security Services

Today's sophisticated cyberattacks can spawn 45,000 variants in 30 minutes using multiple threat vectors and advanced techniques to deliver malicious payloads. Traditional siloed security causes challenges for organizations by introducing security gaps, increasing overhead for security teams, and hindering business productivity with inconsistent access and visibility.

Seamlessly integrated with our industry-leading NGFWs, our Cloud-Delivered Security Services use the network effect of 80,000 customers to instantly coordinate intelligence and protect against all threats across all vectors. Eliminate coverage gaps across your locations and take advantage of best-in-class security delivered consistently in a platform to stay safe from even the most advanced and evasive threats.

Services include:

- **Advanced Threat Prevention**: Stop known exploits, malware, malicious URLs, spyware, and command and control (C2) with 96% prevention of web-based Cobalt Strike C2 and 48% more unknown C2 detected than the industry's leading intrusion prevention (IPS) solution.
- **WildFire® malware prevention**: Ensure files are safe by automatically detecting and preventing unknown malware 180X faster with industry's largest threat intelligence and malware prevention engine.
- **Advanced URL Filtering**: Enable safe access to the internet, with the industry's first real-time prevention of known and unknown websites, stopping 76% of malicious URLs 24 hours before other vendors.
- **DNS Security**: Gain 40% more DNS attack coverage and disrupt the 80% of attacks that use DNS for command and control and data theft without requiring any changes to your infrastructure.
- **Enterprise DLP**: Minimize risk of a data breach, stop out-of-policy data transfers, and enable compliance consistently across your enterprise, with 2X greater coverage of any cloud-delivered enterprise DLP.
- **SaaS Security**: Stay ahead of the SaaS explosion with the industry's only Next-Generation CASB to automatically see and secure all apps across all protocols.
- **IoT Security**: Safeguard every "thing" and implement Zero Trust device security 20X faster, with the industry's smartest security for smart devices.

Delivers a Unique Approach to Packet Processing with Single-Pass Architecture

- Performs networking, policy lookup, application and decoding, and signature matching—for all threats and content—in a single pass. This significantly reduces the amount of processing overhead required to perform multiple functions in one security device.
- Avoids introducing latency by scanning traffic for all signatures in a single pass, using stream-based, uniform signature matching.
- Enables consistent and predictable performance when security subscriptions are enabled. (In table 1, "Threat Prevention throughput" is measured with multiple subscriptions enabled.)

Enables SD-WAN Functionality

- Allows you to easily adopt SD-WAN by simply enabling it on your existing firewalls.
- Enables you to safely implement SD-WAN, which is natively integrated with our industry-leading security.
- Delivers an exceptional end-user experience by minimizing latency, jitter, and packet loss.

PA-7000 Series Architecture

The PA-7000 Series is powered by a scalable architecture for the purposes of applying the appropriate type and volume of processing power to the key functional tasks of networking, security, and management. The PA-7000 Series is managed as a single, unified system, enabling you to easily direct all available resources to protect your data. The PA-7000 Series chassis intelligently distributes processing demands across three subsystems, each with massive amounts of computing power and dedicated memory: the processing card(s), the Switch Management Card, and the Dedicated Logging Card.

Processing Cards

The PA-7080 offers 10 slots for processing cards, while the PA-7050 offers six. Processing cards are available as Network Processing Cards (NPCs), which support both networking functions and data processing, or Data Processing Cards (DPCs), which maximize data processing performance. For network connectivity, the PA-7000 Series requires at least one NPC.

Network Processing Card

The NPC is dedicated to executing all packet-processing tasks, including networking, traffic classification, and threat prevention. The 100G-NPC (PA-7000-100G-NPC-A) has 144 processing cores (three 48-core CPUs) with offload processing, all focused on protecting your network. The PA-7000-100G-NPC-A offers 100G, 40G, 10G, and 1G connectivity options.

Data Processing Card

The DPC-A (PA-7000-DPC-A) maximizes security processing by packing 192 processing cores (four 48-core CPUs) on a single card capable of protecting your network. The DPC-A leverages the design of the 100G-NPC, adding a fourth compute complex and an additional offload processor in place of Ethernet I/O.

Switch Management Card

Acting as the control center of the PA-7000 Series, the Switch Management Card (PA-7000-SMC-B) intelligently oversees all traffic and executes all management functions, using a combination of three elements: the First Packet Processor (FPP), a high-speed backplane, and the management subsystem.

First Packet Processor

The key to maximizing performance and delivering linear scalability to the PA-7000 Series, the FPP constantly tracks the shared pool of available processing and I/O resources across all NPCs and DPCs, intelligently directing inbound traffic to the appropriate data processor based on the configured policy. As processing cards are added to increase performance and capacity, the FPP automatically detects and utilizes new resources added to the system, meaning no traffic management changes are required, nor is it necessary to re-cable or reconfigure your PA-7000 Series. Scaling throughput on the PA-7080, and on the PA-7050, is as easy as adding a new DPC-A or 100G-NPC and allowing the FPP to determine the best use of the new processing power.

High-Speed Backplane

Each processing card has access to more than 100 Gbps of non-blocking traffic capacity with a high-speed backplane.

Management Subsystem

This subsystem acts as a dedicated point of contact for controlling all aspects of the PA-7000 Series.

Dedicated Logging Card

The Log Forwarding Card (PA-7000-LFC-A), an integral part of every system, utilizes a multi-core CPU design, creating a dedicated subsystem to manage the high volume of logs the PA-7000 Series generates. The PA-7000-LFC-A is a high-performance card dedicated to exporting log messages. It enables forwarding of logs to Panorama network security management, Cortex® Data Lake, and syslog for offline analysis.

Table 1: PA-7000 Series Performance and Capacities

	PA-7080[*]	PA-7050[*]	PA-7000 DPC-A	PA-7000-100G-NPC-A
Firewall throughput (HTTP/appmix)[†]	572.4/635 Gbps	336.8/384.8 Gbps	67.2/76.8 Gbps	50.6/57.8 Gbps
Threat Prevention throughput (HTTP/appmix)[§]	309/387.6 Gbps	188.8/226.2 Gbps	34.3/43 Gbps	25.8/32.4 Gbps
IPsec VPN throughput[‖]	314.6 Gbps	192.2 Gbps	34.9Gbps	26.3 Gbps
Max sessions	416M	245M	43M	32M
New sessions per second[**]	6M	4M	775,000	585,000
Virtual systems (base/max)[††]	25/225	25/225	–	–

Note: Results were measured on PAN-OS 10.2.

[*] Results in this column were derived from an optimum combination of PA-7000-DPC-A and PA-7000-100G-NPC-A cards populated in all available slots.

[†] Throughput is measured with App-ID and logging enabled, with 64 KB HTTP/appmix transactions.

[§] Threat Prevention throughput measured with App-ID, IPS, antivirus, antispyware, WildFire, DNS Security, file blocking, and logging enabled, utilizing 64 KB HTTP/appmix transactions.

[‖] IPsec VPN throughput is measured with 64 KB HTTP transactions, and logging enabled.

[**] New sessions per second is measured with application override, utilizing 1 byte HTTP transactions.

[††] The base system includes 25 virtual systems at no cost, and up to 200 additional licenses may be purchased. The maximum number of virtual systems supported is 225.

Table 2: PA-7000 Series Networking Features
Interface Modes
L2, L3, tap, virtual wire (transparent mode)
Routing
OSPFv2/v3 with graceful restart, BGP with graceful restart, RIP, static routing
Policy-based forwarding
Point-to-point protocol over Ethernet (PPPoE) and DHCP supported for dynamic address assignment
Multicast: PIM-SM, PIM-SSM, IGMP v1, v2, and v3
Bidirectional Forwarding Detection (BFD)
SD-WAN
Path quality measurement (jitter, packet loss, latency)
Initial path selection (PBF)
Dynamic path change
IPv6
L2, L3, tap, virtual wire (transparent mode)
Features: App-ID, User-ID, Content-ID, WildFire, and SSL Decryption
SLAAC
IPsec VPN
Key exchange: manual key, IKEv1 and IKEv2 (pre-shared key, certificate-based authentication)
Encryption: 3DES, AES (128-bit, 192-bit, 256-bit)
Authentication: MD5, SHA-1, SHA-256, SHA-384, SHA-512
GlobalProtect large-scale VPN for simplified configuration and management
VLANs
802.1Q VLAN tags per device/per interface: 4,094/4,094
Aggregate interfaces (802.3ad) intra-card and/or inter-card, and LACP
Network Address Translation
NAT modes (IPv4): static IP, dynamic IP, dynamic IP and port (port address translation)
NAT64, NPTv6
Additional NAT features: dynamic IP reservation, tunable dynamic IP and port oversubscription
High Availability
Modes: active/active, active/passive, HA clustering
Failure detection: path monitoring, interface monitoring
Mobile Network Infrastructure*
GTP Security
SCTP Security

* For additional information, refer to our ML-Powered NGFWs for 5G datasheet.

Table 3: PA-7000 Series Hardware Specifications

	PA-7000 NPC	PA-7080 Full System	PA-7050 Full System
PA-7000-100G-NPC-A	SFP/SFP+ (8), QSFP+/QSFP28 (4)	SFP/SFP+ (80), QSFP+/QSFP28 (40)	SFP/SFP+ (48), QSFP+/QSFP28 (24)
PA-7050-SMC-B PA-7080-SMC-B	–	SFP MGT (2), SFP HA1 (2), HSCI HA2/HA3 QSFP+/QSFP28 (2), RJ45 serial console (1), Micro USB serial console (1)	
PA-7000-LFC-A	–	480 GB SSD, system drive RAID1 (2 x 240 GB)	
AC input voltage	–	100–240 VAC (50–60 Hz)	100–240 VAC (50–60 Hz)
Rated input current	–	65-27A	27-12A
AC power supply output	–	2500 W @ 240 VAC 1200 W @ 120 VAC	2500 W @ 240 VAC 1200 W @ 120 VAC
DC input voltage	–	-40 to -60 VDC	-40 to -60 VDC
Rated input current	–	135A	60A
DC power output	–	2500 W / power supply	2500 W / power supply
Max current / power supply	–	12 A @ 240 VAC In 75 A @ >40 VDC In	16 A @ 180 VAC In 75 A @ 37.5 VDC In
Power supplies (base/max)	–	4/8	4/4
Max inrush current / power supply	–	30 AAC / 100 ADC peak	50 AAC / 75 ADC peak
Mean time between failure (MTBF)	Configuration dependent; contact your Palo Alto Networks representative for MTBF details.		
Max BTU/hr	–	20,132	10,236
Rack mount (dimensions)	–	19U, 19" standard rack (32.22" H x 19" W x 24.66" D)	9U, 19" standard rack (15.75" H x 19" W x 24" D)
Weight (standalone device/ as shipped)	–	299.3 lbs. AC / 298.3 lbs. DC	187.4 lbs. AC / 185 lbs. DC
Safety	–	cTUVus, CB	
EMI	–	FCC Class A, CE Class A, VCCI Class A	
Certifications	–	NEBS Level 3	
Environment			
Operating temperature	–	32° to 122° F, 0° to 50° C	
Non-operating temperature	–	-4° to 158° F, -20° to 70° C	

To view additional information about the features and associated capacities of the PA-7000 Series, please visit paloaltonetworks.com/network-security/next-generation-firewall/pa-7000-series.

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