PA-400 Series

The Palo Alto Networks PA-400 Series Next-Generation Firewalls (NGFWs) comprise the PA-410, PA-415, PA-415-5G, PA-440, PA-445, PA-450, PA-455, PA-455-5G, and PA-460. They bring ML-Powered NGFW capabilities to distributed enterprise branch offices, retail locations, and midsized businesses.

The world's first ML-Powered NGFW enables you to prevent unknown threats, see and secure everything—including the internet of things (IoT)—and reduce errors with automatic policy recommendations.

Highlights

- World's first ML-Powered NGFW
- Eleven-time Leader in the Gartner Magic Quadrant for Network Firewalls
- Leader in the Forrester Wave: Enterprise Firewalls, Q1 2024
- Spans a range of performance needs for the distributed enterprise with a broad lineup
- Offers security in a desktop form factor
- Supports high availability with active/active and active/passive modes
- Delivers predictable performance with security services
- Features silent, fanless design with optional redundant power supply for branch and home offices
- Simplifies the deployment of large numbers of firewalls with optional Zero Touch Provisioning (ZTP)
- Supports centralized administration with Panorama® network security management
- Maximizes security investments and prevents business disruptions with Strata™ Cloud Manager

The controlling element of the PA-400 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 applications, content, and users—the elements that run your business—serve as the basis of your security policies, resulting in an improved security posture and reduced incident response times.

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; is a cloud-delivered and natively integrated service on the NGFW.
- Automates policy recommendations that save time and reduce the chance of human error.

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 (SSL/TLS). In addition, it 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 rules based on App-ID with Policy Optimizer built in, 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 User Devices Anywhere While Adapting Policies 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, and Linux desktops and 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 multifactor 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 move quickly toward 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 SSL/TLS-encrypted traffic, both inbound and outbound, including for traffic that uses TLSv1.3 and HTTP/2.
- Offers rich visibility into TLS traffic, such as the amount of encrypted traffic, SSL/TLS 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, for example, URL category, 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, undecrypted TLS, and non-TLS) to third-party security tools with a network packet broker and optimize your network performance and reduce operating expenses.

Refer to this decryption whitepaper 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. PA-410, PA-415, PA-415-5G, PA-440, PA-445, PA-450, PA-455, PA-455-5G, and PA-460 export session logs to Panorama and Strata Cloud Manager. PA-415, PA-415-5G, PA-440, PA-445, PA-450, PA-455, PA-455-5G, and PA-460 also support on-box session logging.
- Enables users, through the Application Command Center (ACC), to obtain deep visibility and comprehensive insights into network traffic and threats.

Offers AI-Powered Unified Management and Operations with Strata Cloud Manager

- **Prevent network disruptions:** Forecast deployment health and proactively identify capacity bottlenecks up to seven days in advance with predictive analytics to proactively prevent operational disruptions.
- **Strengthen security in real time:** AI-powered analysis of policies and real-time compliance checks against industry and Palo Alto Networks best practices.

- **Enable simple and consistent network security management and ops**: Manage configuration and security policies across all form factors, including SASE, hardware and software firewalls, and all security services to ensure consistency and reduce operational overhead.

Best-in-Class Cloud-Delivered Security Services Powered by Precision AI

The typical enterprise's attack surface has grown significantly with the mass adoption of hybrid work, cloud, IoT, and SaaS. Furthermore, the threat landscape is rapidly intensifying due to the ability to easily access and use hacker-friendly tools and resources in their campaigns. Traditional network security solutions and approaches are no longer effective. With Palo Alto Networks Cloud-Delivered Security Services, customers can benefit from best-in-class, real-time security to help them protect all users, devices, and data in their network, regardless of location.

Palo Alto Networks security services use the power of Precision AI® inline to stay ahead of threat actors and stop new and never-before-seen threats in real time. Through shared threat intelligence across over 70,000 customers worldwide, they have insights into emerging threats and can act proactively. Finally, seamless integration with NGFW and SASE eliminates security gaps and offers customers a single pane of glass to view and manage their security.

Services include:

- **Advanced Threat Prevention:** Stop known and unknown exploits, malware, spyware, and command-and-control (C2) threats, including 60% more injection attacks and 48% more highly evasive C2 traffic than traditional IPS solutions with industry-first zero-day attack prevention.
- **Advanced WildFire®:** Ensure safe access to files with the industry's largest malware prevention engine, stopping up to 22% more unknown malware and turning detection into prevention 180X faster than competitors.
- **Advanced URL Filtering:** Ensure safe access to the web and prevent 40% more threats in real time than traditional filtering databases with industry-first prevention of known and unknown phishing attacks, stopping up to 88% of malicious URLs at least 48 hours before competitors.
- **Advanced DNS Security:** Protect your DNS traffic and stop advanced DNS-layer threats, including DNS hijacking, all in real time with 2X more DNS-layer threat coverage than competitors.
- **Next-Generation CASB:** Discover and control all SaaS consumption in your network with visibility into 60,000+ SaaS apps and protect your data with 28+ API integrations.
- **IoT Security:** Secure your blind spots and protect every connected device unique to your vertical with the industry's most comprehensive Zero Trust solution for IoT devices, discovering 90% of devices within 48 hours.

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.

Integrated 5G Cellular Modem

The integrated 5G Next-Generation Firewall is expanding the entry-level appliance portfolio to include the PA-415-5G, with integrated 5G cellular modem. With this new appliance, enterprise and remote branches can ensure optimal uptime with 5G leveraged as a backup WAN transport for business-critical applications. In addition, other mobile businesses that require cellular as their primary WAN can simply deploy this appliance and ensure rapid deployment without the hassle of adding additional appliances to leverage 5G.

Supported radio frequency (RF) bands:

- **5G NR Sub-6GHz (FR1):** n2, n3, n5, n66, n71, n77, n78, n79
- **LTE:** B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B46, B48, B66, B71
- **3G:** B1, B2, B4, B5, B6, B8, B9, B19

Table 1: PA-400 Series Performance and Capacities

	PA-410	PA-415	PA-415-5G	PA-440	PA-445	PA-450	PA-455	PA-455-5G	PA-460
Firewall throughput (appmix)*	1.4 Gbps	1.5 Gbps	1.5 Gbps	2.6 Gbps	2.7 Gbps	3.3 Gbps	3.6 Gbps	3.2 Gbps (preliminary)	4.6 Gbps
Threat Prevention throughput (appmix)†	0.8 Gbps	0.8 Gbps	0.8 Gbps	1.2 Gbps	1.25 Gbps	2.1 Gbps	2.3 Gbps	1.8 Gbps (preliminary)	3 Gbps
IPsec VPN throughput‡	0.65 Gbps	0.65 Gbps	0.65 Gbps	1.1 Gbps	1.1 Gbps	1.7 Gbps	1.8 Gbps	650 Mbps (preliminary)	2.3 Gbps
Max concurrent sessions§	64,000	64,000	64,000	200,000	200,000	300,000	300,000	300,000	400,000
New sessions per second‖	11,000	11,000	11,400	34,000	34,000	48,000	56,000	48,000	67,000
Virtual systems (base/max)#	1/1	1/1	1/1	1/2	1/2	1/5	1/5	1/5	1/5

Notes: Results were measured on PAN-OS 11.2. Adding Virtual Systems requires a separate license.

* Firewall throughput is measured with App-ID and logging enabled, utilizing appmix transactions.

† Threat Prevention throughput is measured with App-ID, IPS, antivirus, antispyware, WildFire, DNS Security, file blocking, and logging enabled, utilizing appmix transactions.

‡ IPsec VPN throughput is measured with 64 KB HTTP transactions and logging enabled.

§ Max concurrent sessions are measured utilizing HTTP transactions.

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

Adding virtual systems over base quantity requires a separately purchased license and at minimum PAN-OS 11.0 and 11.1 for PA-415-5G and PA-455. PA-455-5G needs 11.2 for VSYS.

Table 2: PA-400 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)
Multicast: PIM-SM, PIM-SSM, IGMP v1, v2, and v3
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

Table 2: PA-400 Series Networking Features (continued)
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
VLANs
802.1Q VLAN tags per device/per interface: 4,094/4,094
Aggregate interfaces (802.3ad), LACP

Table 3: PA-400 Series Hardware Specifications
I/O
PA-410: 1G RJ45 (7)
PA-440, PA-450, PA-460: 1G RJ45 (8)
PA-415, PA-445: 1G SFP/RJ45 combo (1), 1G RJ45 (4), 1G RJ45/PoE (4)
PA-415-5G: Embedded 5G cellular module, 1G SFP/RJ45 combo (1), 1G RJ45 (4), 1G RJ45/PoE (4)
PA-455: 1G SFP/RJ45 combo (2), 1G RJ45 (2), 1G RJ45/PoE (4)
PA-455-5G: Embedded 5G cellular module, 1G SFP/RJ45 combo (2), 1G RJ45 (6), 1G RJ45 PoE (4)
Management I/O
PA-410: 10/100/1000 out-of-band management port (1), RJ45 console port (1), USB port (2)
PA-415, PA-415-5G, PA-445: SFP/RJ45 (1 GB) combo management port (1), RJ45 console port (1), USB port (2) Micro USB console port (1)
PA-440, PA-450, PA-455, PA-460: 10/100/1000 out-of-band management port (1), RJ45 console port (1), USB port (2), Micro USB console port (1)
PA-455-5G: SFP/RJ45 (1 GB) combo management port (1), RJ45 console port (1), USB port (1)
Storage Capacity
PA-410: 64 GB eMMC
PA-415, PA-415-5G, PA-440, PA-445, PA-450, PA-455, PA-455-5G, PA-460: 128 GB eMMC
Trusted Platform Module (TPM)
Integrated with TPM for secure boot, hardware root of trust, and securing system secrets.
Power Over Ethernet (PoE)
PA-415, PA-415-5G, PA-445, PA-455, PA-455-5G
PoE 1G RJ45 ports (4)
Total PoE Budget: 91 W
Maximum loading on a single port: 60 W
Power Supply

	Average Power Consumption	Max Power Consumption
PA-410	17 W (unit + traffic + DC input)	23 W (unit + max stress + DC input)
PA-415 or PA-415-5G (with the provided AC adapter(s))	133 W (unit + traffic + 90W PoE + 91% efficiency AC adapter)	142 W (unit + max stress + 90W PoE + 91% efficiency AC adapter)
PA-440	28.9 W (unit + traffic + DC input)	34.3 W (unit + max stress + DC input)
PA-450 or PA-460	32.6 W (unit + traffic + DC input)	41.3 W (unit + max stress + DC input)
PA-445 (with the provided AC adapter(s))	140 W (unit + traffic + 90W PoE + 91% efficiency AC adapter)	146 W (unit + max stress + 90W PoE + 91% efficiency AC adapter)
PA-455 (with the provided AC adapter(s))	125.2 W (unit + traffic + 90W PoE + 91% efficiency AC adapter)	143.4 W (unit + max stress + 90W PoE + 91% efficiency AC adapter)
PA-455-5G (with the provided AC adapter(s))	195 W (unit + traffic + 150W PoE + 91% efficiency AC adapter)	212 W (unit + max stress + 150W PoE + 91% efficiency AC adapter)

Table 3: PA-400 Series Hardware Specifications (continued)
Max BTU/hr
PA-410: 78 PA-415, PA-440, PA-445: 117 PA-450, PA-460: 141 PA-415-5G: 150 PA-455: 205 PA-455-5G: 655
Input Voltage (Input Frequency)
100-240 VAC (50–60 Hz)
Max Current Consumption
PA-410: 1.5 A @ 12 VDC PA-415, PA-440, PA-445: 2.9 A @ 12 VDC PA-450, PA-460: 3.4 A @ 12 VDC PA-415-5G: 3.7 A @ 12 VDC PA-455: 5 A @ 12 VDC PA-455-5G: 3.6 A @ 54 VDC
Max Inrush Current
PA-410: 2.1 A PA-415, PA-440, PA-445: 3.3 A PA-450, PA-460: 4.2 A PA-415-5G: 3.5 A PA-455: 4.4 A PA-455-5G: 5.2 A @ 54 VDC input
Dimensions
PA-410: 1.63" H x 6.42" D x 9.53" W PA-415: 1.73" H x 9" D x 13" W PA-445: 1.66" H x 8.87" D x 13" W PA-440, PA-450, PA-460: 1.74" H x 8.83" D x 8.07" W PA-415-5G: 1.73" H x 9" D x 13" W PA-455: 1.7" H x 9.4" D x 15.4" W PA-455-5G: 1RU H x 283 mm D x 303 mm W
Weight (Standalone Device/As Shipped)
PA-410: 3.1 lbs/5.9 lbs PA-415: 7.85 lbs/12.2 lbs PA-445: 8.7 lbs/12.6 lbs PA-440, PA-450/PA-460: 5.0 lbs/7.8 lbs PA-415-5G: 7.85 lbs PA-455: 9.8 lbs/14.1 lbs PA-455-5G: 9 lbs/TBD
Safety
cTUVus, CB
EMI
FCC Class B, CE Class B, VCCI Class B
Certifications
See paloaltonetworks.com/legal-notices/trust-center/compliance
Environment
Operating temperature: 32˚F to 104˚F, 0˚C to 40˚C Nonoperating temperature: -4˚F to 158˚F, -20˚C to 70˚C Passive cooling

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