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Acme Packet Net-Net 4500

Overview

Acme Packet's Net-Net 4500 delivers unmatched performance and configuration capabilities in a 1 rack unit (RU) form factor. It satisfies all of the functionality, scalability, availability and manageability requirements of service providers, enterprises and contact centers and government security and defense agencies.

Solutions

For service providers, Net-Net 4500 product configurations deliver critical functionality in next-generation, fixed line and converged fixed-mobile architectures including 3GPP IMS, 3GPP2 MMD, ATIS, ETSI TISPAN, GSMA, the Multi-Service Forum and PacketCable.

For enterprises and contact centers, the Net-Net 4500 enables the secure delivery of a broad range of interactive communications services and applications ranging from basic VoIP to presence-enabled unified communications.

For government agencies, the Net-Net 4500 meets the stringent requirements needed to comply with standards such as the U.S. Federal Information Processing Standard (FIPS), without requiring special hardware. Net-Net OS configuration options mitigate security vulnerabilities as required by the U.S. Defense Information Services Agency (DISA) for products connected to Department of Defense networks.

With Acme Packet's Net-Net OS, the Net-Net 4500 supports all session border controller (SBC), session-aware load balancer (SLB), multiservice security gateway (MSG), policy exchange controller (PEC) and session routing proxy (SRP) configurations, functions and features. It provides all of the capabilities needed to deliver trusted, first-class interactive communications—voice, video and multimedia sessions—and data services across IP network borders. These capabilities span five key areas – security, service reach maximization, SLA assurance, regulatory compliance and cost and revenue management.

As a SBC, the Net-Net 4500 secures subscriber access and interconnect/peering borders and enables interoperability of heterogeneous endpoints, service infrastructure elements and networks to maximize service reach. It controls admission, overload, IP network transport and session routing to assure SLAs, maximize revenues and minimize costs. Lastly, it enables regulatory compliance with emergency service (E911), national government priority service (GETS) and lawful intercept (CALEA) requirements. In enterprise and contact center networks, it ensures interoperability of both legacy IP-PBX equipment and next-generation unified communications platforms and manages their traffic load and resource availability.

Acme Packet Net-Net 4500

As a SLB, it operates within a clustered configuration of Net-Net SBCs to enable linear, non-disruptive scaling of capacity to support millions of subscribers from a single SIP IP address. It supports the delivery of any IMS, RCS or NGN service; any SIP application – voice, video, presence, messaging and multimedia; over any mobile or fixed line access network including the Internet.

In MSG configurations, it enables fixed-mobile substitution (FMS) and convergence (FMC) by securing the delivery of voice and data services over untrusted Internet and WiFi networks to femtocells and dual-mode endpoints.

As a PEC, the Net-Net 4500 addresses critical challenges in securing, scaling and managing next generation all-IP networks by providing critical security, interoperability and routing functions for Diameter signaling. These functions reduce costs, streamline networks and ensure resiliency for LTE and IMS networks. Acme Packet's PEC, the Net-Net Policy Director (PD), supports multiple applications—LTE roaming, policy aggregation and federated service delivery— by enabling the exchange of policy information in service provider networks or across IP network boundaries.

As a SRP, it consolidates and simplifies the routing of large numbers of SIP-based voice, video, instant messaging and multimedia sessions within and between mobile, fixed-line and transit networks. Leveraging both internal and external best-of-breed routing databases via industry-standard protocols, the Net-Net Session Router (SR) helps service providers reduce capital and operating expenditures while optimizing service revenue.

System capacity, performance and availability

The Net-Net 4500 platform delivers industry-leading session performance, capacity and high availability in a 1RU form factor[†].

- Session capacity* – up to 32,000 simultaneous sessions
- IPsec tunnel capacity – up to 200,000 tunnels with IMS-AKA
- Route table capacity – up to two million routes
- SIP-TLS capacity – up to 200,000 connections
- SRTP capacity – up to 8000 call legs
- Transcoding capacity – up to 7200 transcoded sessions
- Diameter signaling performance – up to 16,000 messages per second
- System throughput – 5 Gbps
- Network Interface Unit (NIU) – provides multiple ports of 10/100/1000 Mbps Ethernet connectivity for signaling, media and data services as well as management
- Two-level encryption acceleration hardware – IPsec tunnel and TLS session set-up, IPsec and SRTP traffic encryption/decryption
- High-availability (HA) – active/standby systems (1:1 redundancy) with check-pointing of signaling, media and configuration state for no loss of service
- Management – Console and local storage interfaces and front panel display with keypad
- Packaging – 1U rack-mount system

* Performance and capacity vary by signaling protocol, call flow, codec, configuration and feature usage.

Session Border Controller (SBC) configurations

The Net-Net 4500 may be configured to support integrated or decomposed SBC deployment models. As an integrated SBC, the Net-Net 4500 tightly integrates signaling and media control on a single hardware platform and provides comprehensive support for SIP, H.323, SIP-H.323 interworking, MGCP/NCS and H.248 signaling and media sessions. Net-Net OS offers proven signaling interoperability with all major softswitches, IMS CSCF elements, SIP servers, H.323 gatekeepers, call agents, application servers, media servers, media gateways, IP PBXs, UC servers and numerous IP-based voice and video endpoints

SBC configuration options for the Net-Net 4500 include:

- **Net-Net Session Director (SD)** – integrated SBC with multi-protocol signaling and media control
- **Net-Net Border Gateway (BG)** – decomposed SBC with media control only, uses H.248 control interface to third-party SIP signaling element
- **Net-Net Signaling Firewall (SF)** – decomposed SBC with SIP signaling security and other control functions

The Net-Net 4500 SBC supports Acme Packet's Net-Net SIP Multimedia-Xpress (SMX) to deliver an extensive range of IMS and IMS-equivalent access and core functions. These functions can be used to enable a broad range of SIP services from basic voice to GSMA-defined Rich Communications Suite (RCS) services while providing an alternative to expensive, fully decomposed IMS infrastructures in an integrated, single systems delivery solution.

The Net-Net 4500 SBC can also be configured to operate as a member of a Net-Net SBC cluster when used in conjunction with Acme Packet's Net-Net 4500 Session-aware Load Balancer (SLB). Acme Packet Net-Net SBC clusters can support up to two million subscribers without requiring architectural forklifts or network disruptions. Net-Net SBC clusters support both integrated and decomposed Net-Net SBC configurations.

Session-aware Load Balancer (SLB) configurations

The Net-Net 4500 SLB may be deployed with two or more Acme Packet SBCs to create a Net-Net SBC cluster that can scale to support up to two million subscribers from a single SIP IP address. The Net-Net 4500 SLB is a high-performance Layer 5-7 aware SIP session load balancer optimized for Acme Packet SBC clustering. It provides dynamic, adaptive load balancing of subscribers based on SBC availability and health score; and subscriber capacity, load, and session state.

SBC clusters supported by the Net-Net 4500 SLB may be co-located or geographically distributed and may consist of Net-Net 3820, 4250, 4500 and 9200 Acme Packet SBC hardware platforms including all of the SBC configurations supported on those platforms. The solution preserves all of Acme Packet's industry-leading SBC functionality to support any service or application over any access network supported by the Net-Net SBC.

Like all Net-Net solutions, the Net-Net SLB features carrier-class high-availability to ensure no loss of active sessions in the event of single system failures. Deployed as 1:1 active-standby units, the SLBs checkpoint configuration and cluster state for uninterrupted service in the event the active SLB unit becomes unavailable.

Multiservice Security Gateway (MSG) configurations

The Net-Net 4500 may be configured to support MSG configurations for securing voice and data services over untrusted wireless or wireline networks using IPsec tunnels. The Net-Net Security Gateway (SG) supports the following roles within 3GPP and 3GPP2 architectures:

- **I-WLAN Tunnel Terminating Gateway (TTG)** – 3GPP Interworking-Wireless LAN (I-WLAN) Tunnel Terminating Gateway (TTG) secures SIP interactive communications services and packet data services
- **UMA/GAN Security Gateway (SeGW)** – 3GPP Unlicensed Mobile Access (UMA) Generic Access Network Security Gateway (SeGW) secures GSM voice and packet data for delivery to dual-mode handsets, femtocells or even POTS terminal adapters over IP networks
- **UMTS Home Node B Gateway (HNB-GW)** – 3GPP Home Node B Gateway (HNB-GW) aggregates traffic from a large number of Universal Mobile Telecommunications System (UMTS) femtocell access points (3GPP HNB) into the 3G core service network
- **LTE Evolved Packet Data Gateway (ePDG)** – 3GPP Long Term Evolution (LTE) Evolved Packet Data Gateway (ePDG) provides access to voice and data services via the LTE Evolved Packet Core (EPC) for untrusted non-3GPP networks such as a WiFi
- **Femtocell Security Gateway (SeGW)** – 3GPP2 security gateway (SeGW) securely connects CDMA femtocell access points (FAP) to the CDMA2000 service core network

The Net-Net 4500 SG can support multiple, separate logical instances of these roles and their associated functions within a single physical system. Virtualization enables service providers to use a single system to support multiple services— I-WLAN, UMA/GAN, UMTS, LTE, CDMA2000, residential and enterprise, retail and wholesale, or multiple mobile virtual network operator (MVNO) customers—minimizing capital and operating expenses. Acme Packet's industry-leading SBC functionality can also be physically integrated with the I-WLAN TTG or LTE ePDG configuration and virtualized, speeding time to service via proven interoperability and minimizing capital and operating expenses.

Policy Exchange Controller (PEC) configuration

Acme Packet's policy exchange controller (PEC), the Net-Net 4500 Policy Director (PD), controls Diameter signaling to enable the seamless communication and control of policy information between network elements within LTE or IMS networks and across LTE network borders. PECs reduce the mesh of Diameter connections that negatively impacts network performance, capacity and management.

The Net-Net 4500 PD scales to deliver high-performance transaction-stateful Diameter processing of over 750,000 messages per second in a 7-foot telco rack. It leverages Acme Packet's Net-Net OS software platform to offer industry-leading PEC capabilities in terms of security and control functions for policy exchange, carrier-class availability and manageability. These functions reduce costs, streamline networks and assure availability for LTE and IMS networks.

The Net-Net PD supports multiple applications that require the exchange of policy information within service provider LTE and IMS networks and across LTE network borders, including LTE data and voice roaming, policy aggregation and federated service delivery.

Session Routing Proxy (SRP) configuration

Configured as a session routing proxy (SRP) Acme Packet's Net-Net 4500 Session Router (SR) routes SIP-based voice, video, instant messaging and multimedia sessions within and between the mobile, fixed-line and transit networks of service providers. The Net-Net 4500 SR scales to support up to two million route entries and leverages its high-performance, carrier-class design to efficiently route sessions between all types of network borders, including access and interconnects, IP and TDM. SIP-based interactive communication sessions—voice, video, instant messaging and multimedia—within and between networks.

Acme Packet's route provisioning tool, Net-Net Route Manager Central (RMC), populates the Net-Net 4500 SR local route table, which is used for routing sessions between stateful service control elements such as Acme Packet SBCs, wireless Mobile Switching Centers (MSC), IMS subscriber call control elements, CLASS 5 softswitch-es, Cable Modem Termination Systems (CMTS) and softswitches controlling media gateways. Since the source and destination SIP signaling elements are session-stateful, the Net-Net 4500 SR can operate in a stateless or transaction-stateful mode, maximizing its performance.

The Net-Net 4500 SR also plays a central role in Acme Packet's Open Session Routing (OSR) architecture by working in conjunction with best-of breed routing database products and services from Acme Packet partners. These complementary product vendors and service providers offer centralized routing databases and database provisioning tools for dynamic route selection. Acme Packet's Net-Net SR queries these databases using industry-standard ENUM, SIP and DNS protocols.

Common functions

Net-SAFE, Acme Packet's security framework, is supported via the tight integration of the Net-Net 4500 hardware and Net-Net OS software. Net-SAFE features powerful denial-of-service/distributed denial-of service protection at the layer 3, layer 4, IPsec and SIP signaling level; and intrusion detection/prevention capabilities. Other security features support dynamic access control, topology hiding, privacy and confidentiality, service infrastructure DoS/DDoS protection, virus and SPIT mitigation, and service fraud and theft prevention.

Net-Net Central, our next-generation management platform, delivers highly-scalable configuration and fault, performance and security management for Acme Packet products and solutions. Its flexible high-availability architecture accommodates very large networks and provides extensibility for hosting advanced management application add-ons. Through its dashboard summary and multiple configuration views, Net-Net Central facilitates flow-through provisioning, capacity planning and comprehensive performance and fault-monitoring with "at-a-glance" status indicators that simplify real-time network-wide management. Through standard interfaces including SNMP, SFTP, XML and SOAP, Net-Net Central also integrates with OSS/BSS ecosystems to deliver advanced service fulfillment, service assurance, billing and mediation.

Net-Net 4500 Network Interface Units

The rear slot of the Net-Net 4500 accommodates a single Network Interface Unit (NIU) module. Net-Net 4500 NIUs are offered in a variety of configurations to address a wide range of network, service and application scenarios. All Net-Net 4500 NIUs include four Ethernet interfaces for signaling, media and data traffic. The NIUs also integrate the system alarm and management interfaces, including those used for the physical configuration of high-availability (HA) system pairs.

Net-Net 4500 NIUs are offered with the following interface speeds and connection types

- 10/100/1000 Mbps with copper RJ45 connectors
- 10/100/1000 Mbps via small form factor-pluggable (SFP) copper transceiver
- 1 Gbps via small form factor-pluggable (SFP) fiber optic transceiver

Encryption and QoS monitoring and reporting options

To meet the demands of scalable, high-quality interactive communications, Net-Net 4500 NIUs offer a variety of on-board hardware and processor options designed to offload the CPU from processor-intensive functions such as security and QoS monitoring and reporting.

Net-Net 4500 NIUs with SFP interfaces can accommodate on-board processor options for IPsec and SRTP encryption, QoS monitoring and reporting, or both.

On-board encryption acceleration hardware enables secure communications without compromising end user or subscriber quality of experience (QoE).

QoS monitoring and reporting hardware monitors and measures each media flow through the system, calculating quality scores (such as Mean Opinion Score, or MOS), and aggregating the information into data for transmission to external reporting or accounting systems. On-board QoS monitoring and measurement is also utilized for real-time functions such as QoS-based routing and load balancing, also without compromising end user or subscriber quality of experience (QoE).

Net-Net 4500 advanced function NIUs

Net-Net 4500 advanced function NIUs help the Net-Net 4500 deliver a combination of performance, capacity and functionality unmatched by other platforms in its class. With a distributed, multi-processor approach that leverages the latest DSP and multi-core processors, the Net-Net 4500 is capable of performing many of the functions offered by our high-end chassis-based system, the Net-Net 9200, at the reduced capacity levels required by many enterprises as well as smaller service providers.

Transcoding NIU

Acme Packet's Transcoding NIU for the Net-Net 4500 delivers a mid-range hardware-based transcoding solution that complements the high-capacity transcoding offered on our Net-Net 9200 platform. With this NIU, the Net-Net 4500 supports up to 7200 transcoded sessions. The Transcoding NIU also includes features QoS monitoring and reporting hardware for both transcoded and non-transcoded sessions. The Net-Net 4500 Transcoding NIU may be populated with up to twelve transcoding modules, each supporting up to 600 transcoded sessions, for pay-as-you-grow scalability.

Enhanced Traffic Control NIU

Acme Packet's Enhanced Traffic Control (ETC) NIU offers a unique and highly-advanced design, with enhanced capabilities that address a wide range of next-generation services and applications. The ETC NIU is a high-performance multi-processor engine for the Net-Net 4500 that combines multiple hardware-accelerated functions including:

- High-capacity SRTP encryption
- High-capacity termination for SIP-TLS
- Separate, dedicated processors for high capacity IPsec encryption and TCP termination
- Integrated hardware for QoS monitoring and reporting

The extensible multi-core, multi-processor architecture of the ETC NIU is also capable of supporting additional applications and functions as new requirements emerge.

Net-Net 4500 specifications	
Chassis	• 1U, rack-mount • Front – display, console and local storage interfaces • Rear – one network interface unit slot (signaling, media and management interfaces) • Optional mounting brackets for front/rear or center-mount in 19" or 23" rack
Memory	• 4 GB for configuration files and Net-Net OS software storage • 256 MB internal flash memory
Content addressable memory (CAM)	• 256K entries for static & dynamic ACLs, media control rules and ARP entries
Local storage	• Optional 500 GB storage expansion module for CDR backup
Secure services module (SSM)	• Hardware acceleration option for TLS, IPsec session establishment with use of non-manual keys • Standard for MSG configurations • Optional for SBC configurations - required for TLS, required for IPsec with use of non-manual keys
Network interface units (NIU)	• Supports network interfaces for signaling, media and data **Basic NIUs and options** • Four 10/100/1000 Mbps Ethernet copper ports (RJ-45 connector) • Four 1000 Mbps Ethernet fiber or four 10/100/1000 Mbps copper ports (requires SFP transceivers) • Four 1000 Mbps Ethernet fiber or four 10/100/1000 Mbps copper ports with inline IPsec/SRTP encryption processors (requires SFP transceivers) • Four 1000 Mbps Ethernet fiber or four 10/100/1000 Mbps copper ports with inline QoS measurement processors (requires SFP transceivers) • Four 1000 Mbps Ethernet fiber or four 10/100/1000 Mbps copper ports with inline IPsec/SRTP encryption and QoS measurement processors (requires SFP transceivers) **Transcoding NIU** • Four 1000 Mbps Ethernet fiber or four 10/100/1000 Mbps copper ports (requires SFP transceivers) • Up to twelve on-board transcoding digital signal processor (DSP) modules • Inline QoS measurement processors **Enhanced Traffic Control NIU** • Four 1000 Mbps Ethernet fiber or four 10/100/1000 Mbps copper ports (requires SFP transceivers) • Integrated high-capacity encryption (IPsec, SRTP, TLS) processors • Inline QoS measurement • Integrated hardware-based SIP-TLS and TCP processing **NIU management interfaces – included on all NIU options** • Two 10/100/1000 Mbps interfaces with RJ-45 connectors for HA node configurations • One 10/100/1000 Mbps interface with IPsec encryption processor and RJ-45 connector for management networks (Optional IPsec encryption of management interface via encryption capable NIU) • One RS-232 serial console interface with RJ-45 connector (only rear or front interface may be used at any time) • One alarm interface with RJ-45 connector
Front panel management interfaces	• One RS-232 serial console interface with RJ-45 connector (only rear or front interface may be used at any time) • One USB 2.0 interface • One system status display with keypad
Power	• Two redundant load sharing supplies, 300 VA max
AC power option	• Voltage: Autoranging 100-240 VAC wide input with power factor correction • Frequency: 50/60 Hz • Current: 3A x 2 rating • Cable: 2.0 meter 18 AWG 3-wire cable, with 3-lead IEC-320 receptacle on the power supply end and a country-dependent plug on the power source end
-48 VDC power option	• Voltage: -48 VDC (+-10%) nominal in North America. Maximum range is -40 to -60 VDC • Current: 7A x 2 rating • Cable: 18 AWG recommended minimum, with at least 3 conductors rated for at least 140° F (60° C)
-72 VDC power option	• Voltage: -72 VDC nominal in Russia • Cable: 18 AWG recommended minimum, with at least 3 conductors rated for at least 140° F (60° C)

Physical	
Dimensions	• 1.72 in H x 17.00 in W x 19.00 in D (not including mounting hardware) • 4.37 cm H x 43.18 cm W x 48.26 cm D (not including mounting hardware)
Weight	• 19 lbs, 8.62 kg
Colors	• Front panel - Midnight black with Glacier blue trim
Temperature	• Operating: 32°F to 104°F, 0°C to +40 °C • Storage: -4°F to 149°F, -20°C to +65 °C
Relative humidity	• 10 to 85%, non-condensing
Air flow	• 50 cfm front to back
Heat dissipation	• 100W (341 BTU/hour) typical, 200W (682 BTU/hour) maximum
Power dissipation	• 100W typical, 200W maximum
Regulatory	• Product bears CE[1] marking indicating compliance with the 99/5/EC directive, which includes the following EN and IEC standards for safety and EMI
Safety	• US: UL[2] 60950-1, 1st Ed. • Canada: CSA[3]-C22.2 No. 60950-1-03, 1st Ed. • EU: EN[4] 60950-1:2001
EMC	• US: FCC[5] Part 15 (CFR 47) Class A limits • Canada: ICES[6]-003 Issue 4, Class A limits • EU: EN55 22:2006 +A1:2007 Class A limits • Germany: 1 TR 9 • Japan: VCCI[7] Class A
Immunity	• EU: EN 300 386 v1.3.3
NEBS	• GR-63 • GR-1089 • SR-3580 - Level 3 certified
U.S. Department of Defense Security	• FIPS 140-2 compliant • Defense Information Systems Agency (DISA) Unified Communications Requirements (UCR) compliant • Listed – DISA Unified Capabilities Approved Product List (UCAPL)

[1]CE = European Compliance
[2]UL = Underwriters Laboratory
[3]CSA = Canadian Standards Association
[4]EN = European Norm
[5]FCC = Federal Communications Commission
[6]ICES = Interference-Causing Equipment Standard
[7]VCCI = Voluntary Control Council for Information Technology Equipment (Japan)

[†] Performance and capacity numbers reflect use of hardware-based QoS measurement/reporting and vary by signaling protocol, call flow, codec, configuration and feature usage.

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