NFX250 Network Services Platform

Product Overview

The NFX250 Network Services Platform is a secure, automated, software-driven CPE platform that delivers virtualized network and security services on demand. An integral part of Juniper's fully automated Cloud CPE solution suite for NFV, this high-performance virtualized services platform helps service providers improve overall operational efficiency and service agility while empowering enterprise customers with immediate access to custom-designed managed services. Simultaneously supporting multiple Juniper and third-party VNFs on a single device and providing built-in, dynamic, policy-based routing, the NFX250 addresses the needs of small to midsize businesses as well as large multinational or distributed enterprises with a single, highly scalable solution.

Product Description

The Juniper Networks® Cloud CPE solution allows users to create and deliver network services with agility at scale, enabling service providers to deliver innovative services from the data center or at the customer edge. While traditional customer premises equipment (CPE) devices have served the market well for years, they do not provide the flexibility and the scalability required for this new, agile deployment model. As a result, service providers typically employ diverse proprietary and closed platforms that inhibit innovation and complicate configuration, provisioning, and management.

Juniper Networks NFX250 Network Services Platform eliminates the challenges associated with deploying, managing, maintaining, and evolving CPE. Leveraging Network Functions Virtualization (NFV) and built on the Juniper Cloud CPE solution, the NFX250 allows service providers to deploy and service chain multiple, secure, high-performance virtual network functions (VNFs) in a single device. This automated, software-driven solution dynamically provisions new services on demand, resulting in a near instantaneous service delivery experience. Subsequent service updates and policy changes can be dynamically inserted into the existing device, resulting in operational efficiency for service providers and enterprise customers alike by limiting or even eliminating service interruptions and business disruption.

Architecture and Key Components

The Juniper Cloud CPE solution consists of the following key components:

- **NFX250 Network Services Platform:** The NFX250 leverages IP and virtualization technologies as the cornerstones for delivering managed services to enterprise customers. The NFX250 is based on field-proven Juniper technology, including carrier-class architectures and the Juniper Networks Junos® operating system, to deliver high-performance and scalability for routing, switching, and security applications.

- **Contrail Service Orchestration:** Juniper Networks Contrail Service Orchestration is a comprehensive management and orchestration solution that delivers VNFs to the NFX250. A simple GUI customer portal gives enterprise customers the flexibility to select and build customized services from a catalog. Contrail Service Orchestration automates service activation and provisions newly requested services instantaneously under an open NFV environment.

- **Network Service Activator:** The Network Service Activator application intelligently automates service life cycle management on the NFX250 across managed VPN networks, in-region secured Internet connections, and out-of-region IPsec connections. Automation eliminates complex manual intervention, replacing truck rolls with a simple mouse roll for service providers to improve overall operational efficiency and service agility.

Your ideas. Connected.™

- **Virtual Network Functions:** The NFX250 is capable of hosting and chaining multiple network functions on a single platform. The NFX platform supports multiple VNFs, including the Juniper Networks vSRX virtual firewall, the industry's most efficient and full-functioned virtualized security appliance.

- **Open Framework:** The NFX250 is based on an open framework that gives service providers the same service consistency and operational model found in the telco cloud. The open framework supports industry standards, protocols, and seamless API integration.

- **Flexible Deployments:** The NFX250 supports a variety of flexible deployments. A distributed services deployment model ensures high availability, performance, and compliance. The Cloud CPE solution is also extensible to an overlay model; these flexible deployment models help service providers satisfy ever-growing business requirements for both multinational enterprise and small to midsize business customers.

Features and Benefits

New Addressable Markets

Unlike traditional CPE devices that inhibit agility, the NFX250 is highly scalable, supporting multiple concurrent VNFs on a single device. This substantially reduces hardware costs and up-front CapEx, facilitating the adoption of virtualization functions with a minimal investment and giving service providers the ability to extend into new markets.

Cost Efficiency

The NFX250 improves the overall cost efficiency of managed services. CapEx efficiency is enhanced where a single and scalable NFX250 replaces multiple on-premises devices. OpEx efficiency is achieved through automation, which simplifies operations and eliminates the extensive manual processes required by traditional CPE devices. Cost efficiency helps service providers achieve operational agility and boost profitability.

Security and Reliability

The NFX250 incorporates many advanced security features. The embedded Trusted Platform Module (TPM) ensures platform integrity from factory to the customer site. A Secure Boot feature safeguards device credentials, automatically authenticates system integrity, verifies system configuration, and enhances overall platform security.

As a VNF for the NFX250, the vSRX provides the same capabilities as Juniper Networks SRX Series Services Gateways in a virtual form factor, providing perimeter security, IPsec connectivity, and filtering for malicious traffic without sacrificing reliability, visibility, or policy control. The carrier-class architecture ensures reliability and high availability for every application.

Agility

Customers' IT requirements are always evolving, reflecting constantly changing market dynamics and seasonality. The NFX250 lets enterprise customers select and automatically implement new services from an extensive service catalog to address IT requirements in real time, enabling service providers to drive a closer partnership with customers and increase profitability.

Features	Benefits
Field-proven Juniper technology, including carrier-class architecture and Junos operating system, provides a tested solution.	Modular software architecture provides high performance and scalability for routing, switching, and security enhanced by carrier-class reliability.
Additional vSRX virtual firewall provides the same capabilities as SRX Series Services Gateways.	vSRX is a comprehensive virtual security and routing appliance that enables the NFX250 to deliver the highest performance at the lowest total cost of ownership.
Seamless integration with Contrail Service Orchestration ensures an automated management and a consistent service life cycle experience.	Contrail Service Orchestration automates service chaining and delivery on demand to increase revenue-generating service delivery opportunities.
Network Service Activator enables fast device discovery and provisioning.	Automated configuration eliminates complex device setup and delivers a plug-and-play experience.
Local wire-speed performance ensures 1GbE rates.	High performance simplifies network topologies and operations.

NFX250 Network Services Platform

Specifications

Specification	NFX250-S1	NFX250-S2
Dimensions (H x W x D)	1.72 x 17.36 x 12 in (4.37 x 44.09 x 30.48 cm)	1.72 x 17.36 x 12 in (4.37 x 44.09 x 30.48 cm)
Rack units (U)	1 U	1 U
Weight	4.3 kg (9.48 lb)	4.3 kg (9.48 lb)
Airflow	Front-to-back (AFO) forced cooling	Front-to-back (AFO) forced cooling
Power	Fixed PSU 100-240 VAC	Fixed PSU 100-240 VAC
Mean time between failures (MTBF)	200,000 hours at 25º C	200,000 hours at 25º C
CPU	Intel 6 Core Xeon D	Intel 6 Core Xeon D
Software	Wind River Linux 7	Wind River Linux 7
Memory	16 GB DDR4 RAM	32 GB DDR4 RAM
Storage	100 GB* SSD	400 GB* SSD
Network interfaces	• 8 x 10/100/1000BASE-T RJ-45 LAN ports • 2 x 10/100/1000BASE-T RJ-45 LAN/WAN ports • 2 x 100/1000BASE-X small form-factor pluggable transceiver (SFP) WAN ports • 2 x 1GbE/10GbE SFP+ WAN ports • 1 x 10/100/1000BASE-T RJ-45 management port	• 8 x 10/100/1000BASE-T RJ-45 LAN ports • 2 x 10/100/1000BASE-T RJ-45 LAN/WAN ports • 2 x 100/1000BASE-X SFP WAN ports • 2 x 1GbE/10GbE SFP+ WAN ports • 1 x 10/100/1000BASE-T RJ-45 management port
Out-of-band interfaces	• RJ-45 console port • Mini USB console port • USB 2.0 port	• RJ-45 console port • Mini USB console port • USB 2.0 port
Maximum number of VNFs	6	8

Packet Switching Capacities

- Packet Forwarding Engine (PFE) capacity: 88 Gbps
- VNF capacity: 20 Gbps full-duplex path to CPU for VNF traffic
- Throughput via VNFs will vary depending on network function and acceleration technologies supported

Layer 2 Switching

- Maximum media access control (MAC) addresses in hardware: up to 16,000
- Jumbo frames: 9,216 bytes
- Number of VLANs: up to 1,024 (VLAN IDs: 4,096)
- Port-based VLAN
- MAC-based VLAN
- Voice VLAN
- Private VLAN (PVLAN)
- Number of MST instances supported: 64
- Multicast VLAN Registration (MVR)
- Compatible with Per-VLAN Spanning Tree Plus (PVST+)
- Routed VLAN interface (RVI)
- Link Layer Discovery Protocol–Media Endpoint Discovery (LLDP-MED) with VoIP integration

Layer 3 Features: IPv4

- Maximum number of Address Resolution Protocol (ARP) entries: up to 512
- Maximum number of IPv4 unicast routes in hardware: up to 512
- RIP v1/v2
- OSPF v1/v2 (with 4 active interfaces)

- Static routing
- Bidirectional Forwarding Detection (BFD)
- IP directed broadcast
- VRF-Lite

Access Control Lists (ACLs) (Junos OS firewall filters)

- Port-based ACL (PACL)—ingress
- VLAN-based ACL (VACL)—ingress and egress
- Router-based ACL (RACL)—ingress and egress
- ACL entries (ACE) in hardware per system: 1,500
- ACL counter for denied packets
- ACL counter for permitted packets
- Ability to add/remove/change ACL entries in middle of list (ACL editing)
- L2-L4 ACL

Security

- MAC limiting
- Allowed MAC addresses—configurable per port
- Sticky MAC (persistent MAC address learning)
- Dynamic ARP inspection (DAI)
- Proxy ARP
- Static ARP support
- Dynamic Host Configuration Protocol (DHCP) snooping
- IP source guard
- 802.1X port-based
- 802.1X multiple supplicants
- 802.1X with VLAN assignment

* Raw capacity; actual capacity will be lower due to over-provisioning.

- 802.1X with authentication bypass access (based on host MAC address)
- 802.1X with VoIP VLAN support
- 802.1X dynamic ACL based on RADIUS attributes
- 802.1X supported EAP types: Message Digest 5 (MD5), Transport Layer Security (TLS), Tunneled Transport Layer Security (TTLS), Protected Extensible Authentication Protocol (PEAP)
- Captive portal
- Trusted Network Connect (TNC) certified
- Static MAC authentication
- MAC-RADIUS
- Control plane denial-of-service (DoS) protection
- Fallback authentication

High Availability

- Link aggregation
- 802.3ad Link Aggregation Control Protocol (LACP) support:
  - Number of link aggregation groups (LAGs) supported: 32
  - Maximum number of ports per LAG: 8
- LAG load sharing algorithm—Bridged unicast traffic:
  - IP: S/D MAC, S/D IP
  - TCP/UDP: S/D MAC, S/D IP, S/D port
  - Non-IP: S/D MAC
- LAG sharing algorithm—Routed unicast traffic:
  - IP: S/D IP
  - TCP/UDP: S/D IP, S/D port
- LAG load sharing algorithm—Bridged multicast traffic:
  - IP: S/D MAC, S/D IP
  - TCP/UDP: S/D MAC, S/D IP, S/D port
  - Non-IP: S/D MAC
- LAG sharing algorithm—Routed multicast traffic:
  - IP: S/D IP
  - TCP/UDP: S/D IP, S/D port
- Tagged ports support in LAG
- Uplink failure detection

Quality of Service (QoS)

- Layer 2 QoS
- Layer 3 QoS
- Ingress policing: 1 rate 2 color
- Hardware queues per port: 8
- Scheduling methods (egress): Strict priority (SP), shaped-deficit weighted round-robin (SDWRR)
- 802.1p, DiffServ code point (DSCP)/IP precedence trust and marking
- L2-L4 classification criteria: Interface, MAC address, Ethertype, 802.1p, VLAN, IP address, DSCP/IP precedence
- TCP/UDP port numbers
- Congestion avoidance capabilities: Tail drop

Multicast

- Internet Group Management Protocol (IGMP) snooping entries: 1,000
- IGMP: v1, v2, v3
- IGMP snooping
- PIM-SM, PIM-SSM, PIM-DM

Services and Manageability

- Junos OS CLI
- Web interface (J-Web)
- Out-of-band management: Serial, 10/100BASE-T Ethernet
- ASCII configuration
- Rescue configuration
- Configuration rollback
- Image rollback
- Element management tools: Juniper Networks Junos Space Network Management Platform
- Real-time performance monitoring (RPM)
- Simple Network Management Protocol (SNMP): v1, v2c, v3
- Remote monitoring (RMON) (RFC 2819) Groups 1, 2, 3, 9
- Network Time Protocol (NTP)
- DHCP server
- DHCP client and DHCP proxy
- DHCP relay and helper
- RADIUS authentication
- TACACS+ authentication
- SSHv2
- Secure copy
- HTTP/HTTPs
- Domain Name System (DNS) resolver
- System logging
- Temperature sensor
- Configuration backup via FTP/secure copy
- Interface range

Troubleshooting

- Debugging: CLI via console, telnet, or SSH
- Diagnostics: Show and debug command statistics
- Traffic mirroring (port)
- Traffic mirroring (VLAN)
- ACL-based mirroring
- Mirroring destination ports per system: 1
- LAG port monitoring
- Multiple destination ports monitored to 1 mirror (N:1)
- Maximum number of mirroring sessions: 1
- Mirroring to remote destination (over L2): 1 destination
- VLAN
- IP tools: Extended ping and trace
- Juniper Networks commit and rollback

Optics

- EX-SFP-10GE-USR
- EX-SFP-10GE-DAC-1M
- EX-SFP-1GE-SX
- EX-SFP-1GE-SX-ET
- EX-SFP-1GE-LX
- EX-SFP-10GE-SR
- EX-SFP-10GE-LR
- EX-SFP-10GE-DAC-3M
- EX-SFP-10GE-DAC-5M
- EX-SFP-10GE-ER
- EX-SFP-10GE-ZR
- EX-SFP-1GE-LH
- EX-SFP-1GE-T
- EX-SFP-1GE-LX40K
- EX-SFP-GE10KT13R14
- EX-SFP-GE10KT14R13
- EX-SFP-GE10KT13R15
- EX-SFP-GE10KT15R13
- EX-SFP-GE40KT13R15
- EX-SFP-GE40KT15R13
- EX-SFP-GE80KCW1470
- EX-SFP-GE80KCW1490
- EX-SFP-GE80KCW1510
- EX-SFP-GE80KCW1530
- EX-SFP-GE80KCW1550
- EX-SFP-GE80KCW1570
- EX-SFP-GE80KCW1590
- EX-SFP-GE80KCW1610

Environmental Ranges

- Operating temperature: 32º to 122º F (0º to 50º C)
- Storage temperature: -40º to 158º F (-40º to 70º C)
- Operating altitude: Up to 10,000 ft. (3,048 m)
- Relative humidity operating: 5 to 90% (noncondensing)
- Relative humidity nonoperating: 5 to 95% (noncondensing)
- Seismic: Designed to meet GR-63, Zone 4 earthquake requirements

Safety and Compliance

Safety

- cNRTL-UL60950-1 (Second Edition)
- C-UL to CAN/CSA 22.2 No.60950-1 (Second Edition)
- TUV/GS to EN 60950-1 (Second Edition)
- CB-IEC60950-1 (Second Edition with all country deviations)
- EN 60825-1 (Second Edition)

Electromagnetic Compatibility

- FCC 47CFR Part 15 Class A
- EN 55022 Class A
- ICES-003 Class A
- VCCI Class A
- AS/NZS CISPR 22 Class A
- CISPR 22 Class A
- EN 55024
- EN 300386
- CE

Environmental Compliance

- Restriction of Hazardous Substances (ROHS) 6/6
- ROHS 7a exemption for power supply components acceptable
- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- Waste Electronics and Electrical Equipment (WEEE)

Telco

- Common Language Equipment Identifier (CLEI) code

Standards Compliance

IEEE Standards

- IEEE 802.1AB: Link Layer Discovery Protocol (LLDP)
- IEEE 802.1ag: Connectivity Fault Management (CFM)
- IEEE 802.1ak: Multiple VLAN Registration Protocol (MVRP)
- IEEE 802.1D: Spanning Tree Protocol
- IEEE 802.1p: CoS prioritization
- IEEE 802.1Q: VLAN tagging
- IEEE 802.1Q-in-Q: VLAN Stacking
- IEEE 802.1w: Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1s: Multiple Spanning Tree Protocol (MSTP)
- IEEE 802.1X: Port Access Control
- IEEE 802.3: 10BASE-T
- IEEE 802.3u: 100BASE-T
- IEEE 802.3ab: 1000BASE-T
- IEEE 802.3z: 1000BASE-X
- IEEE 802.3x: Pause Frames/Flow Control
- IEEE 802.3ad: Link Aggregation Control Protocol (LACP)
- IEEE 802.3ah: Ethernet in the First Mile

Supported RFCs

- RFC 768 UDP
- RFC 783 Trivial File Transfer Protocol (TFTP)
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 894 IP over Ethernet
- RFC 903 Reverse ARP (RARP)
- RFC 906 TFTP Bootstrap
- RFC 951, 1542 BootP
- RFC 1058 Routing Information Protocol
- RFC 1112 IGMP v1
- RFC 1122 Host requirements
- RFC 1256 IPv4 ICMP Router Discovery (IRDP)
- RFC 1492 TACACS+
- RFC 1519 Classless Interdomain Routing (CIDR)
- RFC 1587 OSPF not-so-stubby area (NSSA) Option
- RFC 1591 Domain Name System (DNS)
- RFC 1812 Requirements for IP Version 4 routers
- RFC 2030 SNTP, Simple Network Time Protocol
- RFC 2068 HTTP server
- RFC 2131 BOOTP/DHCP relay agent and dynamic host
- RFC 2138 RADIUS authentication
- RFC 2139 RADIUS accounting
- RFC 2267 Network ingress filtering
- RFC 2338 Virtual Router Redundancy Protocol (VRRP)
- RFC 2362 PIM-SM (edge mode)
- RFC 2453 RIP v2
- RFC 2474 Definition of the Differentiated Services Field in the IPv4 and IPv6 Headers
- RFC 2597 Assured Forwarding PHB (per-hop behavior) Group
- RFC 2598 An Expedited Forwarding PHB
- RFC 2925 MIB for remote ping, trace
- RFC 3176 sFlow
- RFC 3569 SSM
- RFC 5176 Dynamic Authorization Extensions to RADIUS
- RFC 5880 Bidirectional Forwarding Detection (BFD)

Supported MIBs

- RFC 1155 SMI
- RFC 1157 SNMPv1
- RFC 1212, RFC 1213, RFC 1215 MIB-II, Ethernet-Like MIB and TRAPs
- RFC 1901 Introduction to Community-based SNMPv2
- RFC 2011 SNMPv2 for Internet protocol using SMIv2
- RFC 2012 SNMPv2 for transmission control protocol using SMIv2

- RFC 2013 SNMPv2 for user datagram protocol using SMIv2
- RFC 2233 The Interfaces Group MIB using SMIv2
- RFC 2287 System Application Packages MIB
- RFC 2570 Introduction to Version 3 of the Internet-standard Network Management Framework
- RFC 2571 An Architecture for describing SNMP Management Frameworks (read-only access)
- RFC 2572 Message Processing and Dispatching for the SNMP (read-only access)
- RFC 2576 Coexistence between SNMP Version 1, Version 2, and Version 3
- RFC 2578 SNMP Structure of Management Information MIB
- RFC 2579 SNMP Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2665 Ethernet-like interface MIB
- RFC 2787 VRRP MIB
- RFC 2790 Host Resources MIB
- RFC 2819 RMON MIB
- RFC 2863 Interface Group MIB
- RFC 3410 Introduction and Applicability Statements for Internet Standard Management Framework
- RFC 3411 An architecture for describing SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for the SNMP
- RFC 3413 Simple Network Management Protocol (SNMP)— (all MIBs are supported except the Proxy MIB)
- RFC 3414 User-based Security Model (USM) for version 3 of SNMPv3
- RFC 3415 View-based Access Control Model (VACM) for the SNMP
- RFC 3416 Version 2 of the Protocol Operations for the SNMP
- RFC 3417 Transport Mappings for the SNMP
- RFC 3418 Management Information Base (MIB) for the SNMP
- RFC 4188 Definitions of Managed Objects for Bridges
- RFC 4318 Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol
- RFC 4363b Q-Bridge VLAN MIB

Juniper Networks Services and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit www.juniper.net/us/en/products-services.

Ordering Information

Model Number	Description
NFX250-S1	NFX250, 10 10/100/1000BASE-T ports, 2 100/1000BASE-X SFP ports, 2 10GBASE-X SFP+ ports, 6 core x86 processor, 100 GB SSD, 16 GB memory (optics sold separately)
NFX250-S2	NFX250, 10 10/100/1000BASE-T ports, 2 100/1000BASE-X SFP ports, 2 10GBASE-X SFP+ ports, 6 core x86 processor, 400 GB SSD, 32 GB memory (optics sold separately)
NFX250-SEC	NFX Series Junos Security Base software license
NFX250-SECE	NFX Series Junos Security Edge software license

For information on how to buy, please visit www.juniper.net/us/en/how-to-buy.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

Corporate and Sales Headquarters

Juniper Networks, Inc.

1133 Innovation Way

Sunnyvale, CA 94089 USA

Phone: 888.JUNIPER (888.586.4737)

or +1.408.745.2000

Fax: +1.408.745.2100

www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.

Boeing Avenue 240

1119 PZ Schiphol-Rijk

Amsterdam, The Netherlands

Phone: +31.0.207.125.700

Fax: +31.0.207.125.701

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