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Header @ 5

List View

- General Information**
- Contact
- Default Values
- Discount
- Document Information
- Clarification Request

Procurement Folder: 1027717

Procurement Type: Central Purchase Order

Vendor ID: VS0000020308

Legal Name: WORLD WIDE TECHNOLOGY LLC

Alias/DBA:

Total Bid: \$197,280.94

Response Date: 05/03/2022

Response Time: 11:23

Responded By User ID: WWTsled

First Name: Carol

Last Name: Harting

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SO Doc Code: CRFQ

SO Dept: 0506

SO Doc ID: WIC2200000002

Published Date: 4/27/22

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Status: Closed

Solicitation Description: NETWORKING EQUIPMENT

Total of Header Attachments: 5

Total of All Attachments: 5



Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

**State of West Virginia
 Solicitation Response**

Proc Folder: 1027717
Solicitation Description: NETWORKING EQUIPMENT
Proc Type: Central Purchase Order

Solicitation Closes	Solicitation Response	Version
2022-05-04 13:30	SR 0506 ESR05032200000006871	1

VENDOR
 VS0000020308
 WORLD WIDE TECHNOLOGY LLC

Solicitation Number: CRFQ 0506 WIC2200000002
Total Bid: 197280.9400000000023283064365 **Response Date:** 2022-05-03 **Response Time:** 11:23:10
Comments:

FOR INFORMATION CONTACT THE BUYER
 Crystal G Husted
 (304) 558-2402
 crystal.g.husted@wv.gov

Vendor Signature X **FEIN#** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	24 Port Network Switch	49.00000	EA	1976.810000	96863.69

Comm Code	Manufacturer	Specification	Model #
84111600			

Commodity Line Comments: <https://www.juniper.net/content/dam/www/assets/datasheets/us/en/switches/ex3400-ethernet-switch-datasheet.pdf>
Will also add as attachment

Extended Description:

4.1.1 24 Port Network Switch

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	48 Port Network Switch	6.00000	EA	3683.900000	22103.40

Comm Code	Manufacturer	Specification	Model #
84111600			

Commodity Line Comments: <https://www.juniper.net/content/dam/www/assets/datasheets/us/en/security/srx300-line-services-gateways-branch-datasheet.pdf>

Extended Description:

Spec 4.1.2 48 Port Network Switch

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Routers and Security License	55.00000	EA	1316.070000	72383.85

Comm Code	Manufacturer	Specification	Model #
84111600			

Commodity Line Comments:

Extended Description:

4.1.3 and 3.5 Routers and Security License

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
4	Wireless Access Point, Management License & Service	10.00000	EA	593.000000	5930.00

Comm Code	Manufacturer	Specification	Model #
84111600			

Commodity Line Comments: Mist AP32 - <https://www.juniper.net/content/dam/www/assets/datasheets/us/en/access-points/ap32.pdf>
Mist Wifi Assurance - <https://www.juniper.net/content/dam/www/assets/datasheets/us/en/cloud-services/wi-fi-assurance-overview.pdf>

Extended Description:

4.1.4 9 and 10 Wireless Access Point, Management License & Service

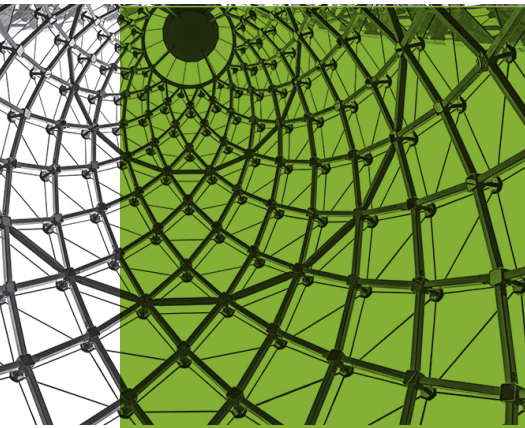
Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
5	Shipping and Delivery	1.00000	EA	0.000000	0.00

Comm Code	Manufacturer	Specification	Model #
84111600			

Commodity Line Comments:

Extended Description:

Shipping and Delivery



JUNIPER MIST™ WI-FI ASSURANCE

Product Overview

The Juniper Mist Cloud Architecture is moving IT operations closer to the intelligent Self-Driving Network™ in the era of the AI-Driven Enterprise.

Juniper's machine learning, the engine of our Wi-Fi Assurance service, replaces manual troubleshooting tasks with automated wireless operations. Minimize costs while maximizing Wi-Fi performance and reliability.

The Juniper Mist platform is built on a modern microservices cloud architecture, which enables elastic scalability to meet your changing wired and wireless network market requirements. Our platform delivers operational simplicity, 100% API-based programmability, and customer engagement through location-based services.

Wi-Fi Assurance replaces manual troubleshooting tasks with automated wireless operations. This subscription service makes Wi-Fi predictable, reliable, and measurable with unique visibility into user service levels. For example, you can set up and track service-level thresholds for key wireless criteria.

Anomaly detection automates triggers to capture packets for event correlation and builds network intelligence with Radio Resource Management (RRM) at the client level. These functions deliver unprecedented visibility into each user's wireless network experience, allowing you to reliably extend Wi-Fi quality to the end user.

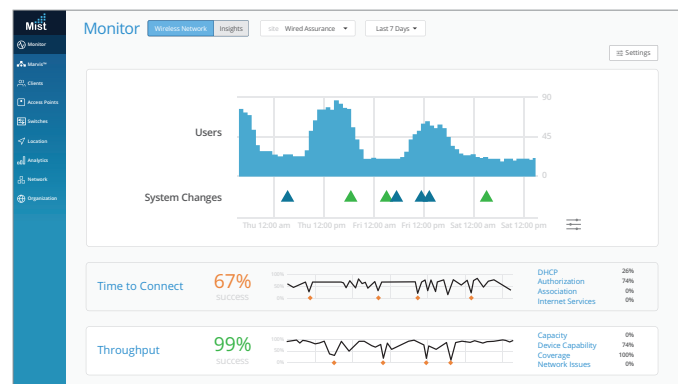
The Juniper Mist cloud services are 100% programmable with all functions (provisioning, monitoring, alerts) available through open APIs, which enable you to integrate with your IT applications to automate your network and line-of-business operations.

Key Benefits of Wi-Fi Assurance

Maximize Wi-Fi User Experience	Minimize IT Support Costs
Proactively optimize performance	Dynamic packet capture for troubleshooting
Prioritize applications, resources, and users	Proactive root cause identification
Gain simple and secure access to resources	Network automation with APIs

Set, Monitor, and Enforce Service Levels

Set up and track service-level thresholds for key wireless pre- and post-connection metrics, such as time to connect, capacity, coverage, and throughput. At any given time, you can see how your network is performing against service level expectations (SLEs) with deep visibility, including location context into impacted users, applications, and devices.

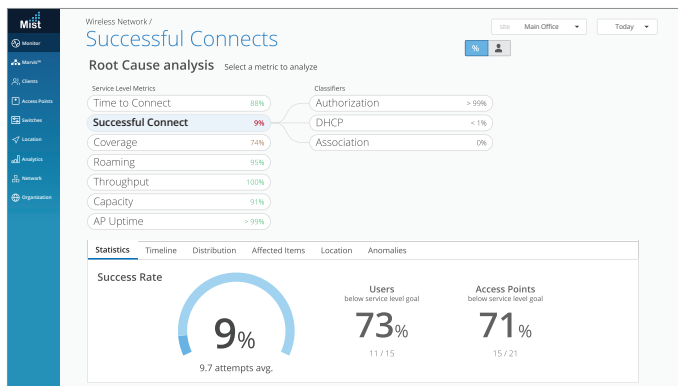


Comprehensive Network Performance and SLE Dashboard Analytics

In addition to proactively correlating events and providing remediation recommendations, the platform also provides a daily and weekly trend of the SLE metrics. These reports provide unprecedented visibility over the last week for longer-term trend analysis into anomalies seen at the AP, device, application, and OS levels. The current set of available SLEs are: Time to Connect, Successful Connects, Throughput, Roaming, Coverage, Capacity, AP Uptime, WAN.

Simple Root-Cause Analysis and Remediation

Juniper dynamically collects information from all endpoints and correlates it for quick wireless, wired, and device problem identification. More than 150 state changes are captured for each client device and access point every few seconds. Predictive recommendations and automated workflows let you quickly remediate problems or prevent them entirely. This root-cause analysis feature can be further enhanced by the Marvis Virtual Network Assistant service.



Automation for Deployment and Provisioning

The Juniper Mist platform is 100% programmable, using open APIs, for full automation and seamless integration with complementary products across LAN, WAN, security, engagement, and asset location domains.

Network Rewind and Dynamic Packet Capture

The Wi-Fi Assurance service automatically detects and starts capturing packets when an anomaly is detected. With this record, you are able to rewind back in time to see what was going on exactly when the event occurred. This eliminates hours or even days of guesswork or time spent trying to reproduce an issue.

Client Events		47 Total	31 Good	7 Neutral	9 Bad
Association	Scanner 2	12:25:50.827 AM, Jun 30			
Fast BSS Assoc Failure	Scanner 2	12:25:48.458 AM, Jun 30			
IP Assigned	Scanner 2	12:25:47.385 AM, Jun 30			
DNS OK	Scanner 2	12:25:45.523 AM, Jun 30			
Default Gateway ARP Success	Scanner 2	12:25:42.837 AM, Jun 30			
DHCP Stuck - Blind Failure	Scanner 2	12:25:39.947 AM, Jun 30			
Authorization	Scanner 2	12:25:39.207 AM, Jun 30			
DNS OK	Scanner 2	12:25:36.104 AM, Jun 30			
Fast Roaming 802.11R	Scanner 2	12:25:37.099 AM, Jun 30			
Reassociation	Scanner 2	12:25:36.099 AM, Jun 30			

Reason	AP	Main	Server IP Address	10.1.1.1
Falling DHCP DISCOVER from 5d:5d:25:10:10:d2 on vlan 1 with Xid 1234567728- No DHCP Request seen from client in response to the Offer from the Server			BSSID	5d:5d:25:10:10:d2
			SSID	Network 1
			Subnet	10.1.1.1/16
			Transaction ID	92234945

Reason	RSSI	-53
	VLAN	1
	Failure Count	1

Client Profiling

Juniper Mist profiles clients for device types, operating systems, applications, location, and user role. This enables WxLAN to autodetect printers, Apple TVs, and other IoT devices and to categorize them for security and audit reasons, without requiring any manual database management.

Risk Profiling Driven by Mist AI

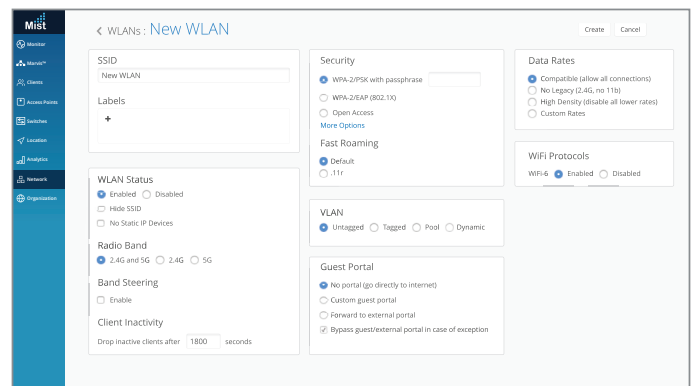
WAN Assurance is a key component of the Risk Profiling solution, which brings network security to the distributed network edge. Risk Profiling provides visibility into infected wired or wireless clients that's observable within the Juniper Mist cloud and assigns a threat score determined by the Juniper ATP cloud. From within the Juniper Mist cloud you can geospatially locate infected devices and take one-touch mitigation actions like ban or deauthenticate.

AI-Driven Radio Resource Management

Unlike other solutions, Mist uses data science and cumulative SLE performance to learn and improve radio settings to assure performance, while also instantaneously adapting to intermittent outside interference. Our AI-driven Radio Resource Management proactively feeds coverage and capacity anomalies based on client experience (SLE metrics) into RF decisions so that RF planning continues to improve and adapt.

WxLAN Policy Creation and Enforcement

Juniper Mist delivers operational simplicity by allowing you to create policies for role, device type, and user-based access on the network with our inline policy engine, WxLAN. Global labels created for physical and logical resources (users, WLAN, AP, IP addresses, IP subnets, applications) enable policies to be enforced at the edge on our access points.



Personal WLAN

Create your own personal wireless network (with personalized preshared key) through a self-serve portal. This feature can be used to secure IoT and guest traffic as well as provide a scalable solution for multitenant networks.

With the Wi-Fi Assurance service, the Juniper Mist AI-driven WLAN solution is the platinum standard for any digital deployment, helping you deliver a dynamic user experience while simplifying management, planning, and troubleshooting for your IT team. This service includes comprehensive wireless, security, guest access, and network management functions with a single subscription.

Guest Portal

Juniper Mist enables customers to create custom guest portals that can optionally include: terms of service, email/text login, or even social media login to help boost customer engagement.

Accelerate Your Digital Transformation with Network Insights

Wi-Fi Assurance includes a base analytics capability for analyzing up to 30 days of data. These analytics enable you to simplify the process of extracting network insights from data and analytics across your enterprise. Review your network throughput peaks to properly align your support resources. To extend these capabilities to third-party network elements, gain the ability to consume up to one year's worth of data, and have the option to generate customized reports, you can tap into the Mist Premium Analytics service as an additional subscription service.

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

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JUNIPER AP32 ACCESS POINT

Product Overview

The AP32 series automates network operations and boosts Wi-Fi performance. It delivers an aggregate data rate of up to 3 Gbps concurrently on 2.4GHz and 5GHz radios. Managed by the Juniper Mist™ Cloud Architecture, the AP32 series delivers unprecedented user experiences at a lower cost for retail, warehouse, school, clinic, and home office environments.

Juniper AI-Driven Network

Juniper brings true innovation to the wireless space with the world's first AI-driven wireless LAN (WLAN).

The Juniper AI-Driven Enterprise makes Wi-Fi predictable, reliable, and measurable with unprecedented visibility into the user experience through customizable service level expectation (SLE) metrics. Time-consuming manual IT tasks are replaced with AI-driven proactive automation and self-healing, lowering Wi-Fi operational costs and saving substantial time and money.

All operations are managed via our open and programmable microservices architecture, which delivers maximum scalability and performance while also bringing DevOps agility to wireless networking and location services.

The Juniper Mist Cloud Architecture

Mist AI leverages a cloud-native microservices architecture to bring unparalleled agility, scale, and resiliency to your network. It leverages an AI engine to lower OpEx and deliver unprecedented insight by using data science to analyze large amounts of rich metadata collected from Juniper Access Points.

Juniper Access Point Family

The Juniper enterprise-grade access point family consists of:

- AP45 and AP34 Series which support Wi-Fi 6E, 802.11ax (Wi-Fi 6), and Bluetooth LE
- AP43, AP12, AP32, AP33, and AP63 Series, which support 802.11ax (Wi-Fi 6), Bluetooth LE, and IoT
- AP21, AP41, and AP61 Series, which support 802.11ac Wave 2, Bluetooth LE, and IoT
- BT11, which supports Bluetooth LE

These access points are all built on a real-time microservices platform and are managed by the Juniper Mist cloud.

The table below compares the supported major functions of the Juniper Wi-Fi 6E and Wi-Fi 6 access points to help in selecting the most appropriate model(s).

	AP45	AP34	AP43	AP63	AP33	AP32	AP12
Deployment	Indoor	Indoor	Indoor	Outdoor	Indoor	Indoor	Indoor Wall Plate/Desk Mount
Wi-Fi Standard	802.11ax (Wi-Fi 6) 4x4 : 4SS	802.11ax (Wi-Fi 6) 2x2 : 2SS	802.11ax (Wi-Fi 6) 4x4 : 4SS	802.11ax (Wi-Fi 6) 4x4 : 4SS	802.11ax (Wi-Fi 6) 4x4 : 4SS 2.4GHz: 2x2 :2SS	802.11ax (Wi-Fi 6) 5GHz: 4x4 : 4SS 2.4GHz: 2x2 : 2SS	802.11ax (Wi-Fi 6) 2x2 : 2SS
Wi-Fi Radios	Dedicated fourth radio	Dedicated fourth radio	Dedicated third radio	Dedicated third radio	Dedicated third radio	Dedicated third radio	Dedicated third radio
Antenna Options	Internal/External	Internal	Internal/External	Internal/External	Internal	Internal/External	Internal
Virtual BLE	✓	–	✓	✓	✓	–	–
IoT Interface	–	–	✓	–	–	–	–
IoT Sensors	Temperature, Accelerometer	Temperature	Humidity, Pressure, Temperature	–	–	–	–
Warranty	Limited Lifetime	Limited Lifetime	Limited Lifetime	One Year	Limited Lifetime	Limited Lifetime	Limited Lifetime
Frequencies Supported	2.4GHz 5GHz 6GHz	2.4GHz 5GHz 6GHz	2.4GHz 5GHz	2.4GHz 5GHz	2.4GHz 5GHz	2.4GHz 5GHz	2.4GHz 5GHz

Services Available for the Juniper AP32

Wi-Fi Cloud Services

Juniper Mist Wi-Fi Assurance



For IT and NOC Teams

- Predictable and Measurable Wi-Fi
- Service-Level Expectation (SLE) Support
- WxLAN Policy Fabric for Role-Based Access
- Customizable Guest Wi-Fi Portal
- Radio Resource Management

Marvis Virtual Assistant



For IT Helpdesk Teams

- AI-Powered Virtual Network Assistant
- Natural Language Processing Conversational Interface
- Anomaly Detection
- Client SLE Visibility and Enforcement
- Data Science-Driven Root-Cause Analysis

Bluetooth Cloud Services

Juniper Mist Asset Visibility



For Process and Resource Improvement Teams

- Identification of Assets by Name and View Location
- Zonal/Room Accuracy for Third-Party Tags
- Historical Analytics for Asset Tags
- Telemetry for Asset Tags (temperature, motion, and other data)
- APIs for Viewing Assets and Analytics

Analytics Cloud Services

Juniper Mist Premium Analytics



For Network Teams

- Baseline Analytics Features Come Included with Wi-Fi Assurance, Mobile Engagement, and Asset Visibility Subscriptions
- End-to-End Network Visibility
- Orchestrated Networking and Application Performance Queries
- Simplified Network Transparency

For Business Teams

- Baseline Analytics Features Come Included with Wi-Fi Assurance, Mobile Engagement, and Asset Visibility Subscriptions
- Customer Segmentation and Reporting Based on Visitor Telemetry
- Customized* Dwell and Third-Party Reporting for Traffic and Trend Analysis
- Correlated Customer-Guest Traffic and Trend Analysis

Access Point Features

High Performance Wi-Fi

The AP32 series offers six-stream wireless access points. They support 4x4:4SS in the 5GHz band, delivering a maximum data rate of 2,400 Mbps for high-bandwidth applications. They also support 2x2:2SS in the 2.4 GHz band, delivering a maximum data rate of 575 Mbps. The integrated third radio functions as a network, location, and security sensor, a synthetic test client radio, as well as a spectrum monitor.

With 802.11ax Orthogonal Frequency Division Multiple Access (OFDMA), Multi-User Multiple Input Multiple Output (MU-MIMO), and BSS Coloring technologies supported, AP32 series performance reaches unprecedented levels to support new bandwidth-hungry applications and soaring device densities.

AI for AX

With the new features that 802.11ax (Wi-Fi 6) introduces to boost performance and efficiency, configuring and operating an access point has grown far more complex. Juniper automates and optimizes these features with our AI for AX capabilities, which improve data transmission scheduling within OFDMA and MU-MIMO and assign clients to the best radio to boost the overall performance of the network.

Greater Spectral Efficiency

OFDMA improves spectral efficiency so that an increasing density of devices can be supported on the network. Density has become an issue with the rapid growth of IoT devices, which often utilize smaller data packets than mobile devices and hence increase contention on the network. Additionally, BSS Coloring improves the coexistence of overlapping BSSs and allows spatial reuse within a given channel by reducing packet collisions.

Automatic RF Optimization

Radio Resource Management automates dynamic channel and power assignment, taking Wi-Fi and external sources of interference into account with its dedicated sensor radio. The AI engine continuously monitors coverage and capacity SLE metrics to learn and optimize the RF environment. The learning algorithm uses hysteresis on a 24-hour window to conduct a sitewide rebalancing for optimal channel and power assignment.

Unprecedented Insight and Action

A dedicated, dual-band third radio collects data for Juniper's patent-pending Proactive Analytics and Correlation Engine (PACE), which uses machine learning to analyze user experience, correlate problems, and automatically detect their root cause.

These metrics are used to monitor SLEs and provide proactive recommendations to ensure problems don't occur (or are fixed as quickly as possible when they do). This radio also functions as a synthetic test client to proactively detect and mitigate network anomalies.

Dynamic Packet Capture

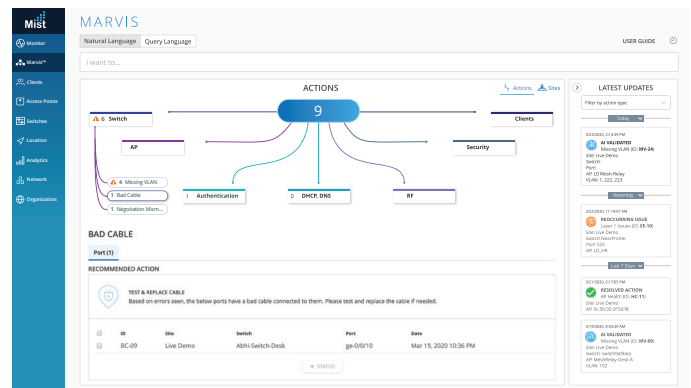
The Juniper Mist platform automatically captures packets and streams them to the cloud when major issues are detected. This saves IT time and effort and eliminates the need for truck rolls with sniffers to reproduce and capture data for troubleshooting.

Client Events		47 Total	31 Good	7 Neutral	9 Bad
Association	Summer 2	12:25:55:827 AAJ Jun 30			
Fast BSS Assoc Failure	Summer 2	12:25:48:498 AAJ Jun 30			
IP Assigned	Summer 2	12:25:47:335 AAJ Jun 30			
DNS OK	Summer 2	12:25:45:029 AAJ Jun 30			
Default Gateway ARP Success	Summer 2	12:25:43:837 AAJ Jun 30			
DHCP Stuck - Bind Failure	Summer 2	12:25:39:947 AAJ Jun 30			
Authorization	Summer 2	12:25:35:257 AAJ Jun 30			
DNS OK	Summer 2	12:25:34:154 AAJ Jun 30			
Fast Roaming 802.11R	Summer 2	12:25:37:098 AAJ Jun 30			
Reassociation	Summer 2	12:25:36:098 AAJ Jun 30			

Reason	Server IP Address
Falling DHCP DISCOVER from 54-56:25-10-10-42 on vlan 1 with XID 123456789. No DHCP Request seen from client in response to the Offer from the Server	10.1.1.1
	SSID: 54-56:25-10-10-42
	SSID: Network 1
	Subnet: 10.1.1.1/16
	Transaction ID: 922349945

Marvis Virtual Conversational Assistant

Marvis is a natural language processing (NLP)-based assistant with a Conversational Interface to understand user intent and goals, simplifying troubleshooting and the collection of network insights. It uses AI and data science to proactively identify issues, determine the root causes and scope of impact, and gain insights into your network and user experiences. It eliminates the need to manually hunt through endless dashboards and CLI commands.



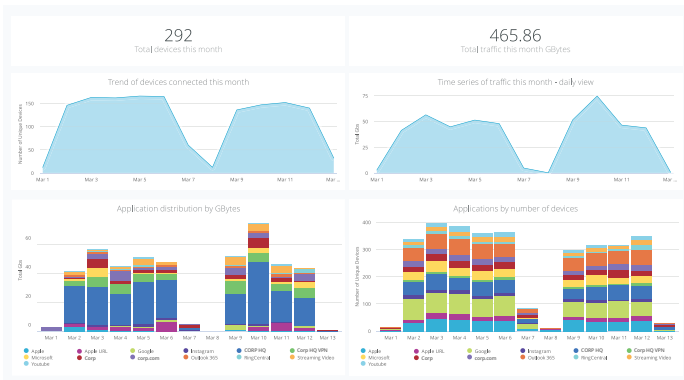
Effortless, Cloud-Based Setup and Updates

The AP32 series automatically connects to the Juniper Mist cloud, downloads its configuration, and joins the appropriate network. Firmware updates are retrieved and installed automatically, ensuring that the network is always up to date with new features, bug fixes, and security updates.

*Juniper Mist Premium Analytics service subscription is needed

Premium Analytics

Juniper Mist Wi-Fi Assurance, User Engagement, and Asset Tracking services include a base analytics capability for analyzing up to 30 days of data, which enables you to simplify the process of extracting network insights across your enterprise. If you require dynamic insights like motion paths* and other third-party* data and would like the option of customized reports, the Juniper Mist Premium Analytics service is available as an additional subscription.

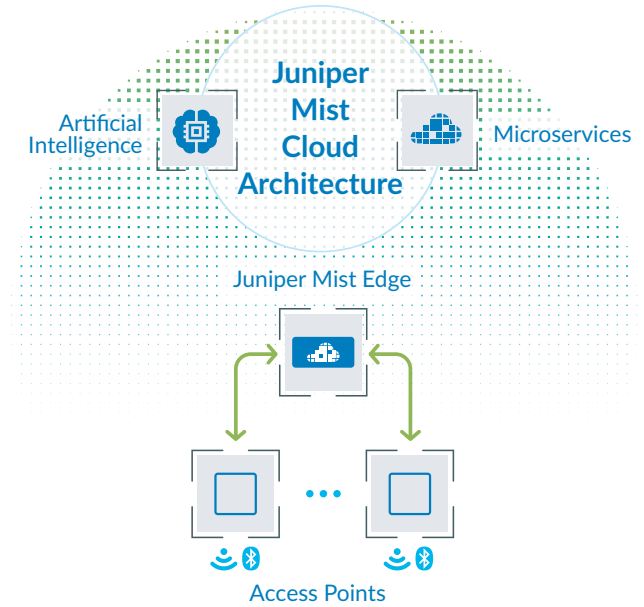


Improves Battery Efficiency for IoT Devices

By incorporating the 802.11ax target wake time (TWT) capability and Bluetooth 5.0, AP32 access points help extend the battery life of IoT devices, particularly as additional ones join the network.

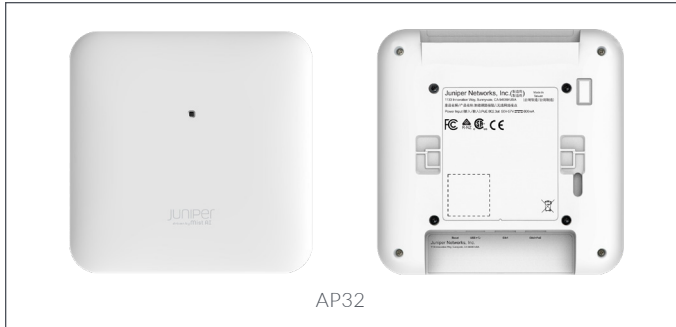
Dynamic Debugging

Constantly monitor services running on the AP32 series and send alerts whenever a service behaves abnormally. Dynamic debugging relieves IT of having to worry about an AP going offline or any services running on it becoming unavailable.



Juniper Mist Edge

Juniper Mist Edge is an on-premises appliance that runs a tunnel termination service. Juniper APs offer a flexible data plane. Traffic can be broken out locally, or tunneled to Juniper Mist Edge. There are many use cases the Juniper Mist Edge solves, including seamless mobility in large campus environments, tunneling of guest traffic to a DMZ, IoT segmentation, and teleworker. Learn more about [Juniper Mist Edge](#).



Specifications

Wi-Fi Standard	802.11ax (Wi-Fi 6), including support for OFDMA, 1024-QAM, MU-MIMO, Target Wake Time (TWT), Spatial Frequency Reuse (BSS Coloring). Backwards compatibility with 802.11a/b/g/n/ac
Combined Highest Supported Data Rates	3.0 Gbps
2.4 GHz	2x2 : 2 802.11b/g/n/ac up to 400 Mbps data rate; 2x2 : 2 802.11ax up to 575 Mbps data rate
5 GHz	4x4 : 4 802.11ax up to 2,400 Mbps data rate
MIMO Operation	Four spatial stream SU-MIMO for up to 2,400 Mbps wireless data rate to individual 4x4 HE80 Four spatial stream MU-MIMO for up to 2,400 Mbps wireless data rate to up to four MU-MIMO-capable client devices simultaneously
Dedicated Third Radio	2.4GHz and 5GHz dual-band WIDS/WIPS, spectrum analysis, synthetic client and location analytics radio
Internal Antennas	Two 2.4GHz omnidirectional antennas with 5 dBi peak gain Four 5GHz omnidirectional antennas with 6 dBi peak gain
Bluetooth 5.0	Omnidirectional Bluetooth antenna Supports superbeacon mode with iBeacon and Eddystone
Beam Forming	Transmit Beamforming and Maximal Ratio Combining

Power Options	802.3at PoE, 802.3bt PoE
Dimensions	202 x 202 x 44 mm (7.95 x 7.95 x 1.73 in)
Weight	0.83 kg (1.83 lbs) excluding mount and accessories AP32E: 0.81 kg (1.78 lbs) excluding mount and accessories
Operating Temperature	Internal antenna: 0° to 40° C External antenna: -20° to 50° C
Operating Humidity	10% to 90% maximum relative humidity, non-condensing
Operating Altitude	3,048 m (10,000 ft)
Mean Time Between Failures (MTBF)	Indoor MTBF in hours is 846,297*
Trusted Platform Module (TPM)	Includes a TPM for infrastructure security

*Based on Telcordia SR-332 issue 3, Method I, Case 3 and measured at temperature of 25°C (77°F) for indoor access points, and 65°C (149°F) for outdoor access points.

I/O and Indicators

USB	USB 2.0 support interface
Eth0	100/1000Base-T, 2.5GBase-T (802.3bz); RJ45; PoE PD
Eth1	10/100/1000Base-T; RJ45
External Antennas (AP32E)	Five RP-SMA: four for Wi-Fi data; one for sensor. Male connectors
Reset	Reset to the factory default settings
Indicators	One multicolor status LED

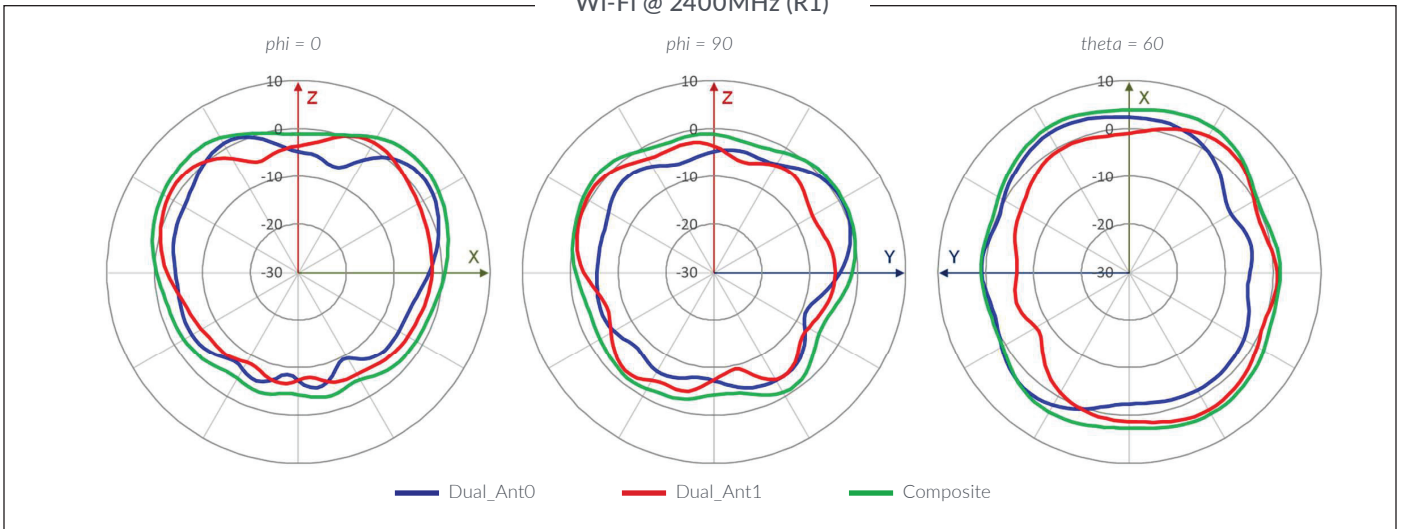
Mounting Brackets

APBR-U*	Universal bracket
APBR-T58	3/8" threaded rod
APBR-M16	16mm threaded rod (M16-2)
APBR-ADP-CR9	9/16" T-Rail
APBR-ADP-RT15	15/16" T-Rail
APBR-ADP-WS15	1 1/2" T-Rail
APBR-ADP-T12	1/2" threaded rod

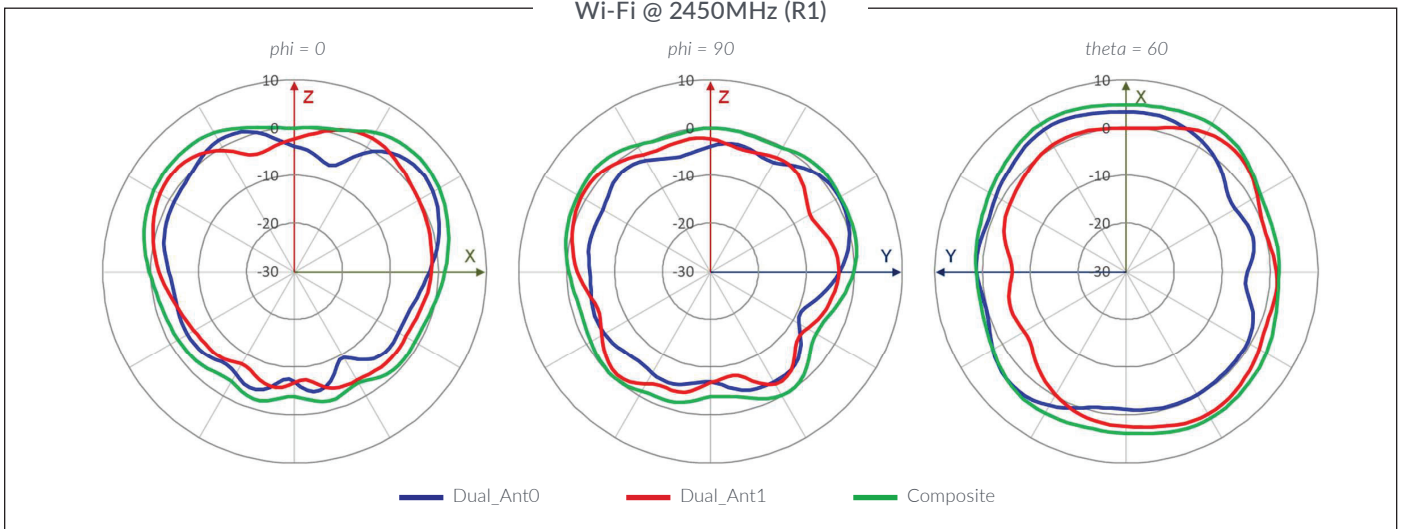
*The AP package includes one Universal Bracket. APBR-U is available separately as an accessory.

AP32 Wi-Fi Antenna Plots

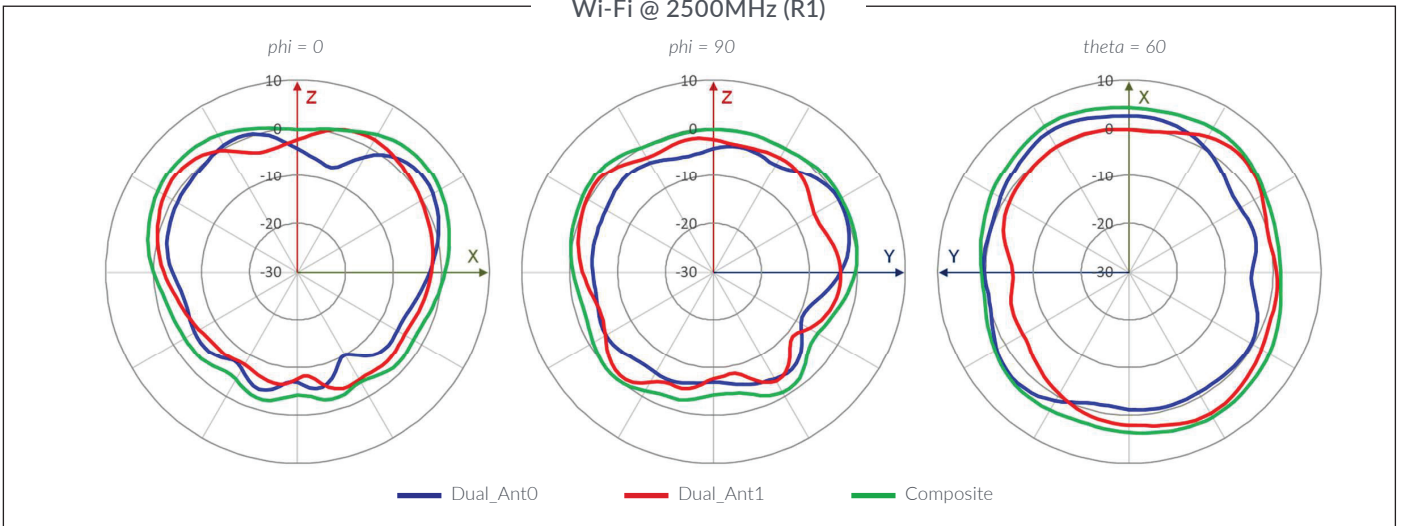
Wi-Fi @ 2400MHz (R1)



Wi-Fi @ 2450MHz (R1)

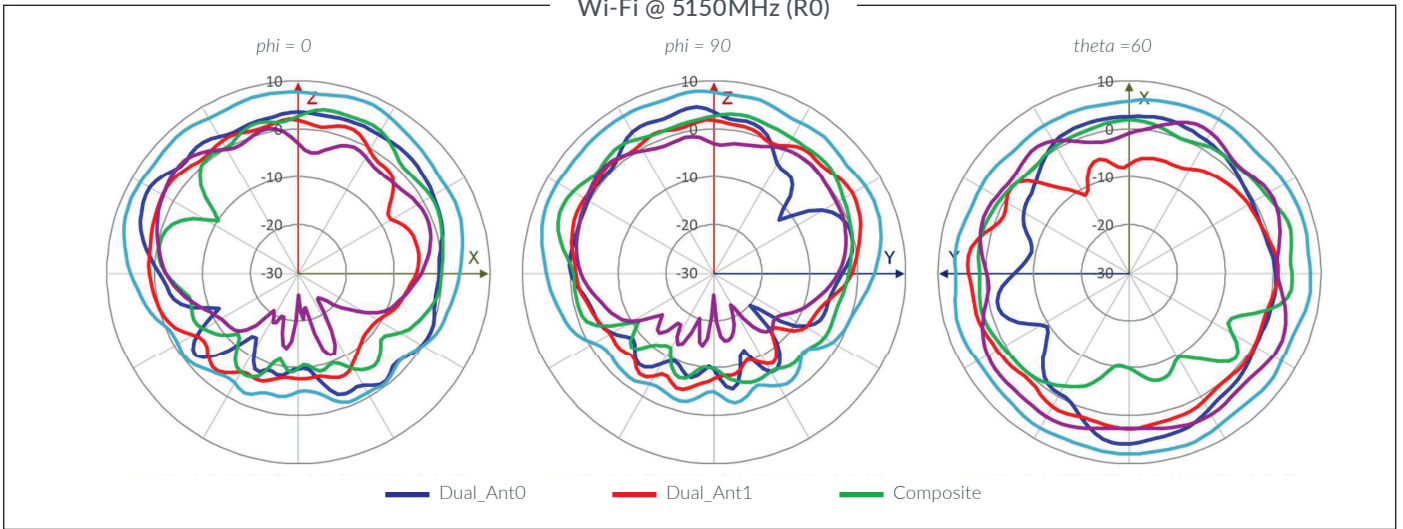


Wi-Fi @ 2500MHz (R1)

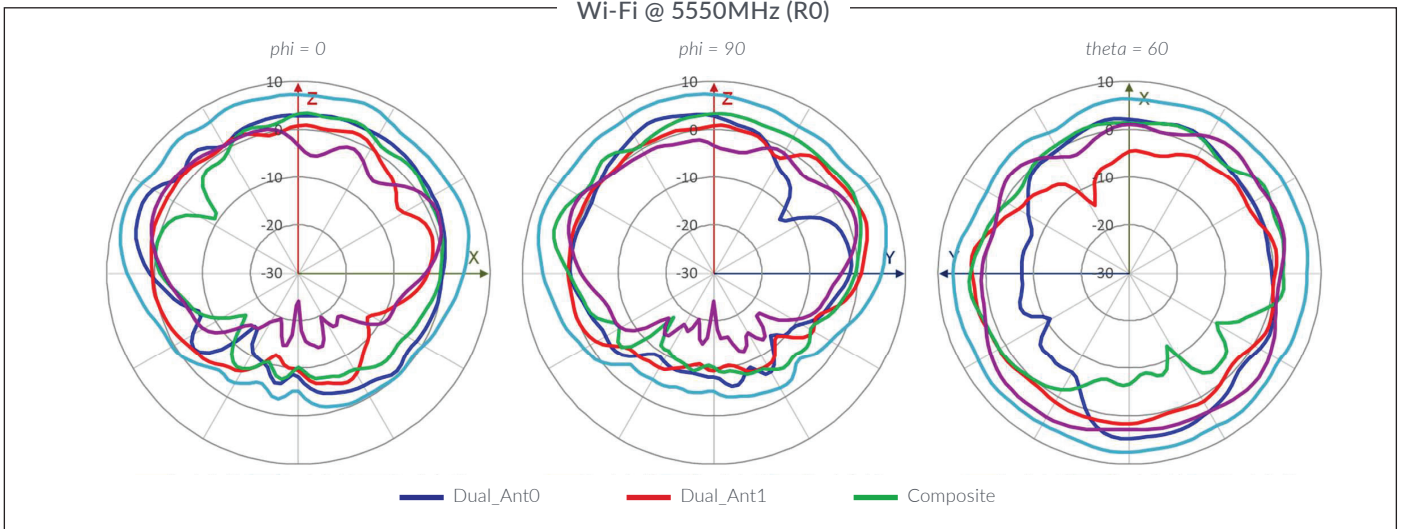


AP32 Wi-Fi Antenna Plots

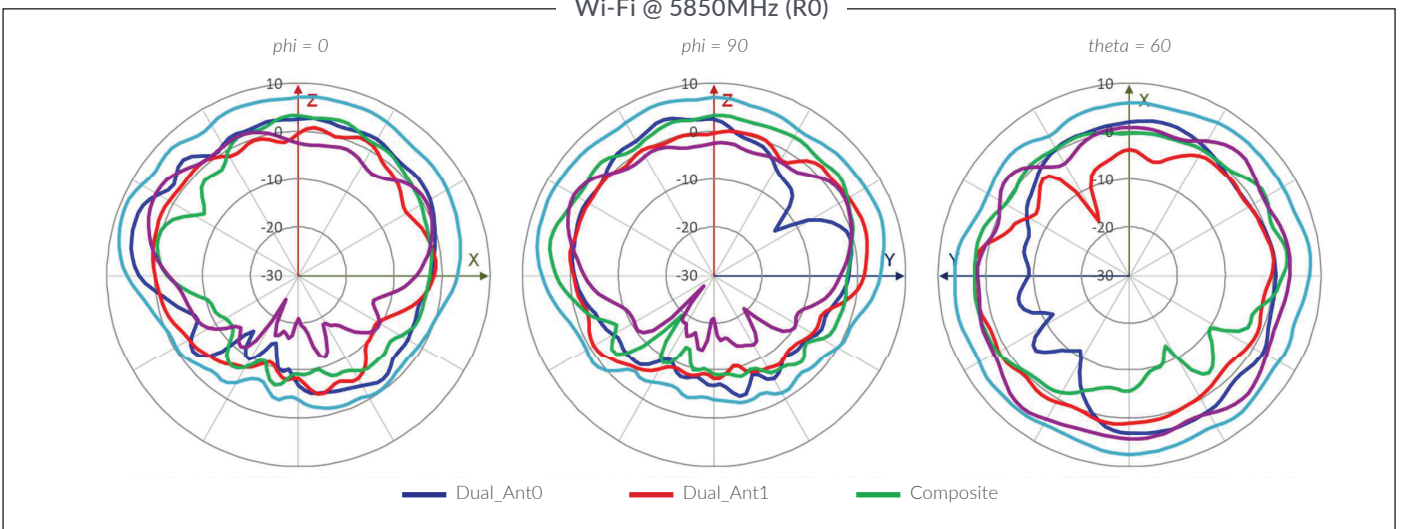
Wi-Fi @ 5150MHz (R0)



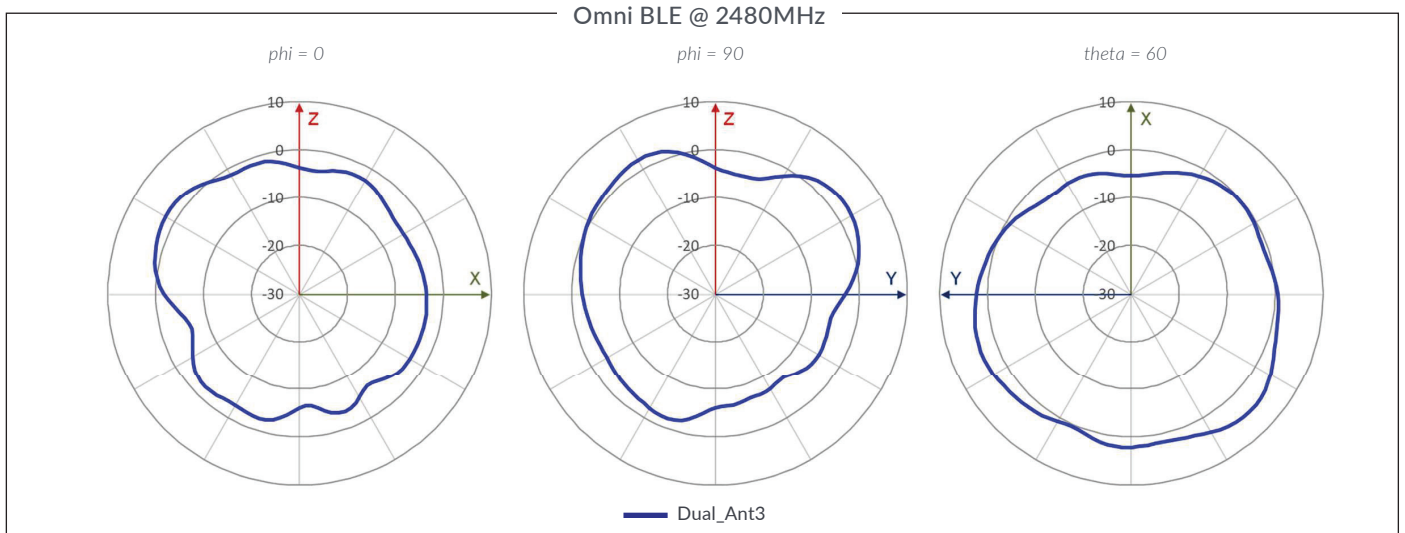
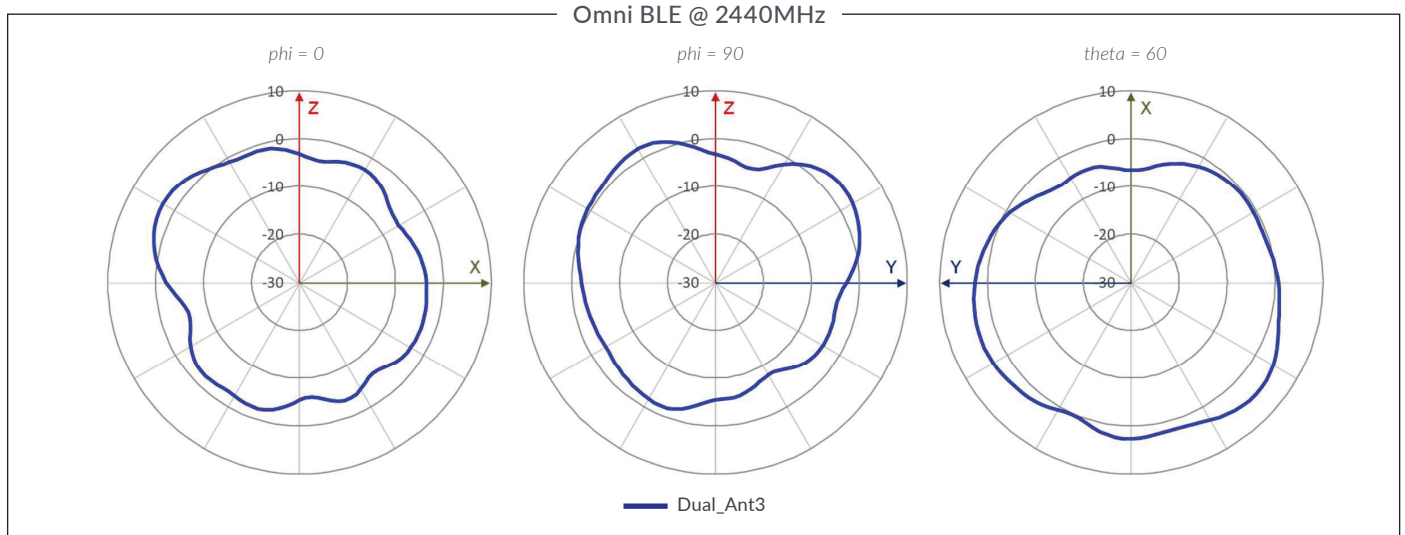
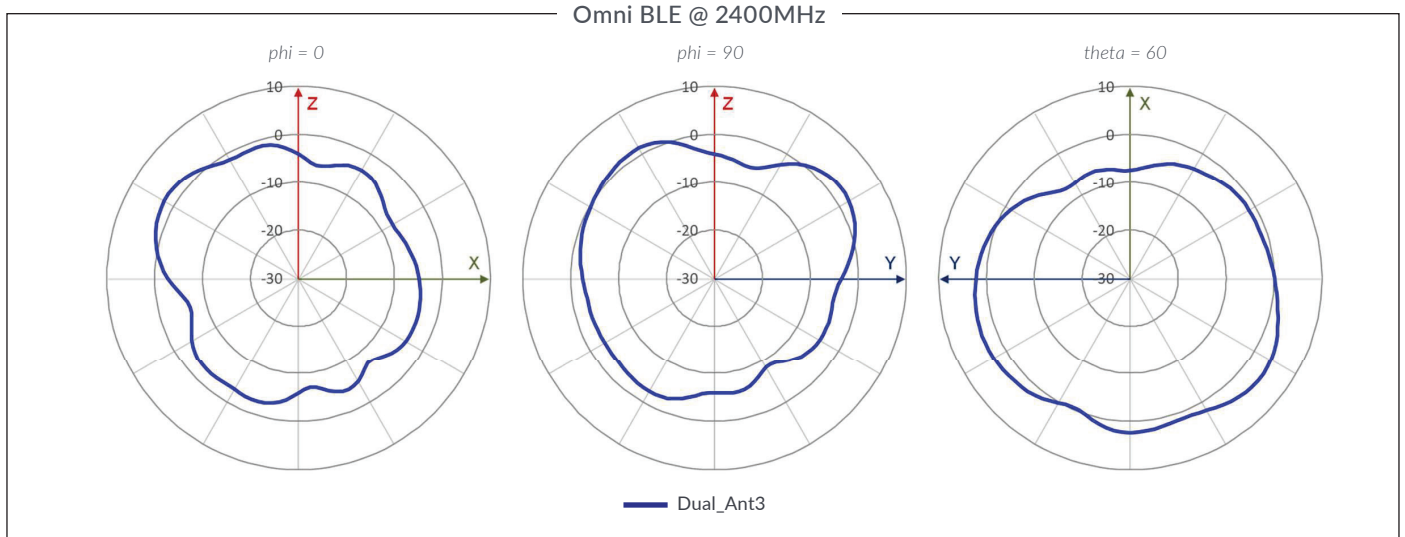
Wi-Fi @ 5550MHz (R0)



Wi-Fi @ 5850MHz (R0)



AP32 Omni BLE Antenna Plots



About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

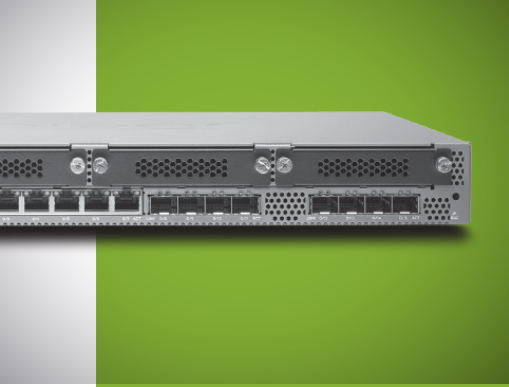
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SRX300 LINE OF SERVICES GATEWAYS FOR THE BRANCH

Product Overview

The SRX300 line of services gateways combines security, SD-WAN, routing, switching, and WAN interfaces with next-generation firewall and advanced threat mitigation capabilities for cost-effective, secure connectivity across distributed enterprise locations. By consolidating fast, highly available switching, routing, security, and next-generation firewall capabilities in a single device, enterprises can remove network complexity, protect and prioritize their resources, and improve user and application experience while lowering total cost of ownership (TCO).

Product Description

Juniper Networks® SRX300 line of services gateways delivers a next-generation secure SD-WAN and security solution that supports the changing needs of cloud-enabled enterprise networks. Whether rolling out new services and applications across locations, connecting to the cloud, or trying to achieve operational efficiency, the SRX300 line helps organizations realize their business objectives while providing scalable, easy to manage, secure connectivity and advanced threat mitigation capabilities. Next-generation firewall and unified threat management (UTM) capabilities also make it easier to detect and proactively mitigate threats to improve the user and application experience.

The SRX300 line consists of five models:

- **SRX300:** Securing small branch or retail offices, the SRX300 Services Gateway consolidates security, routing, switching, and WAN connectivity in a small desktop device. The SRX300 supports up to 1 Gbps firewall and 300 Mbps IPsec VPN in a single, cost-effective networking and security platform.
- **SRX320:** Securely connecting small distributed enterprise branch offices, the SRX320 Services Gateway consolidates security, routing, switching, and WAN connectivity in a small desktop device. The SRX320 supports up to 1 Gbps firewall and 300 Mbps IPsec VPN in a single, consolidated, cost-effective networking and security platform.
- **SRX340:** Securely connecting midsize distributed enterprise branch offices, the SRX340 Services Gateway consolidates security, routing, switching, and WAN connectivity in a 1 U form factor. The SRX340 supports up to 3 Gbps firewall and 600 Mbps IPsec VPN in a single, cost-effective networking and security platform.
- **SRX345:** Best suited for midsize to large distributed enterprise branch offices, the SRX345 Services Gateway consolidates security, routing, switching, and WAN connectivity in a 1 U form factor. The SRX345 supports up to 5 Gbps firewall and 800 Mbps IPsec VPN in a single, consolidated, cost-effective networking and security platform.
- **SRX380:** A high-performance and secure SD-WAN gateway, the SRX380 offers superior and reliable WAN connectivity while consolidating security, routing, and switching for distributed enterprise offices. The SRX380 features greater port density than other SRX300 models, with 16x1GbE PoE+ and 4x10GbE ports, and includes redundant dual power supplies, all in a 1 U form factor.

SRX300 Highlights

The SRX300 line of services gateways consists of secure SD-WAN routers that bring high performance and proven deployment capabilities to enterprises that need to build a worldwide network of thousands of remote sites. WAN or Internet connectivity and Wi-Fi module options include:

- Ethernet, T1/E1, ADSL2/2+, and VDSL
- 3G/4G LTE wireless
- 802.11ac Wave 2 Wi-Fi

Mist AI

WAN Assurance

Mist WAN Assurance is a cloud service that brings AI-powered automation and service levels to Juniper SRX Series Services Gateways, complementing the Juniper Secure SD-WAN solution. Mist WAN Assurance transforms IT operations from reactive troubleshooting to proactive remediation, turning insights into actions and delivering operational simplicity with seamless integration into existing deployments.

- SRX Series firewalls, deployed as secure SD-WAN edge devices, deliver the rich Junos streaming telemetry that provides the insights needed for WAN health metrics and anomaly detection. This data is leveraged within the Mist Cloud and AI engine, driving simpler operations, reducing mean time to repair (MTTR) and providing greater visibility into end-user experiences.
- Insights derived from SRX Series SD-WAN gateway telemetry data allows WAN Assurance to compute unique “User Minutes” that indicate whether users are having a good experience.
- The Marvis assistant for WAN allows you to ask direct questions like “Why is my Zoom call bad?” and provides complete insights, correlation, and actions.
- Marvis Actions identifies and summarizes issues such as application latency conditions, congested WAN circuits, or negotiation mismatches.

Simplifying Branch Deployments (Secure Connectivity/SD-WAN)

The SRX300 line delivers fully automated SD-WAN to both enterprises and service providers.

- A Zero-Touch Provisioning (ZTP) feature simplifies branch network connectivity for initial deployment and ongoing management.
- SRX300 firewalls offer best-in-class secure connectivity.
- The SRX300 firewalls efficiently utilize multiple links and load balance traffic across the enterprise WAN, blending traditional MPLS with other connectivity options such as broadband internet, leased lines, 4G/LTE, and more.
- Policy- and application-based forwarding capabilities enforce business rules created by the enterprise to steer application traffic towards a preferred path.

Comprehensive Security Suite

The SRX300 line offers a comprehensive suite of application security services, threat defenses, and intelligence services. The services consist of intrusion prevention system (IPS), application security user role-based firewall controls and cloud-based antivirus, anti-spam, and enhanced Web filtering, protecting networks from the latest content-borne threats. Integrated threat intelligence via Juniper Networks SecIntel offers adaptive threat protection against Command and Control (C&C)-related botnets and policy enforcement based on GeolIP. Customers can also leverage their own custom and third-party feeds for protection from advanced malware and other threats. Integrating the Juniper Networks Advanced Threat Protection solution, the SRX300 line detects and enforces automated protection against known malware and zero-day threats with a very high degree of accuracy.

Industry-Certified Junos Operating System

SRX300 Services Gateways run the Junos operating system, a proven, carrier-hardened OS that powers the top 100 service provider networks in the world.

The rigorously tested, carrier-class, rich routing features such as IPv4/IPv6, OSPF, BGP, and multicast have been proven over 15 years of worldwide deployments.

The SRX300 line also enables agile SecOps through automation capabilities that support Zero Touch Deployment, Python scripts for orchestration, and event scripting for operational management.

Features and Benefits

Business Requirement	Feature/Solution	SRX300 Advantages
High performance	Up to 5 Gbps of routing and firewall performance	<ul style="list-style-type: none"> Best suited for small, medium and large branch office deployments Addresses future needs for scale and feature capacity
Business continuity	Stateful high availability (HA), IP monitoring	<ul style="list-style-type: none"> Uses stateful HA to synchronize configuration and firewall sessions Supports multiple WAN interface with dial-on-demand backup Route/link failover based on real-time link performance
SD-WAN	Better end-user application and cloud experience and lower operational costs	<ul style="list-style-type: none"> ZTP simplifies remote device provisioning Advanced Policy-Based Routing (APBR) orchestrates business intent policies across the enterprise WAN Application quality of experience (AppQoE) measures application SLAs and improves end-user experience Controls and prioritizes traffic based on application and user role
End-user experience	WAN assurance	<ul style="list-style-type: none"> Complements the Juniper Secure SD-WAN solution with AI-powered automation and service levels Provides visibility and insights into users, applications, WAN links, control and data plane, and CPU for proactive remediation
Highly secure	IPsec VPN, Remote Access/SSL VPN, Media Access Control Security (MACsec)	<ul style="list-style-type: none"> Creates secure, reliable, and fast overlay link over public internet Employs anti-counterfeit features to protect from unauthorized hardware spares Includes high-performance CPU with built-in hardware to assist IPsec acceleration Provides TPM-based protection of device secrets such as passwords and certificates Offers secure and flexible remote access SSL VPN with Juniper Secure Connect
Threat protection	IPS, antivirus, anti-spam, enhanced web filtering, Juniper Advanced Threat Prevention Cloud, Encrypted Traffic Insights, and Threat Intelligence Feeds	<ul style="list-style-type: none"> Provides real-time updates to IPS signatures and protects against exploits Protects from zero-day attacks Implements industry-leading antivirus and URL filtering Integrates open threat intelligence platform with third-party feeds Restores visibility that was lost due to encryption without the heavy burden of full TLS/SSL decryption
Application visibility	On-box GUI, Security Director	<ul style="list-style-type: none"> Detects 4,275 Layer 3-7 applications, including Web 2.0 Inspects and detects applications inside the SSL encrypted traffic
Easy to manage and scale	On-box GUI, Security Director	<ul style="list-style-type: none"> Includes centralized management for auto-provisioning, firewall policy management, Network Address Translation (NAT), and IPsec VPN deployments, or simple, easy-to-use on-box GUI for local management
Minimize TCO	Junos OS	<ul style="list-style-type: none"> Integrates routing, switching, and security in a single device Reduces operation expense with Junos automation capabilities



SRX300



SRX320



SRX340



SRX345



SRX380

SRX300 Specifications

Software Specifications

Routing Protocols

- IPv4, IPv6, ISO, Connectionless Network Service (CLNS)
- Static routes
- RIP v1/v2
- OSPF/OSPF v3
- BGP with Route Reflector
- IS-IS
- Multicast: Internet Group Management Protocol (IGMP) v1/v2, Protocol Independent Multicast (PIM) sparse mode (SM)/dense mode (DM)/source-specific multicast (SSM), Session Description Protocol (SDP), Distance Vector Multicast Routing Protocol (DVMRP), Multicast Source Discovery Protocol (MSDP), Reverse Path Forwarding (RPF)
- Encapsulation: VLAN, Point-to-Point Protocol (PPP), Frame Relay, High-Level Data Link Control (HDLC), serial, Multilink Point-to-Point Protocol (MLPPP), Multilink Frame Relay (MLFR), and Point-to-Point Protocol over Ethernet (PPPoE)
- Virtual routers
- Policy-based routing, source-based routing
- Equal-cost multipath (ECMP)

QoS Features

- Support for 802.1p, DiffServ code point (DSCP), EXP
- Classification based on VLAN, data-link connection identifier (DLCI), interface, bundles, or multifield filters
- Marking, policing, and shaping
- Classification and scheduling
- Weighted random early detection (WRED)
- Guaranteed and maximum bandwidth
- Ingress traffic policing
- Virtual channels
- Hierarchical shaping and policing

Switching Features

- ASIC-based Layer 2 Forwarding
- MAC address learning
- VLAN addressing and integrated routing and bridging (IRB) support
- Link aggregation and LACP
- LLDP and LLDP-MED
- STP, RSTP, MSTP
- MVRP
- 802.1X authentication

Firewall Services

- Stateful and stateless firewall
- Zone-based firewall
- Screens and distributed denial of service (DDoS) protection
- Protection from protocol and traffic anomaly
- Integration with Pulse Unified Access Control (UAC)
- Integration with Aruba Clear Pass Policy Manager
- User role-based firewall
- SSL Inspection (Forward-proxy)

Network Address Translation (NAT)

- Source NAT with Port Address Translation (PAT)
- Bidirectional 1:1 static NAT
- Destination NAT with PAT
- Persistent NAT
- IPv6 address translation

VPN Features

- Tunnels: Site-to-Site, Hub and Spoke, Dynamic Endpoint, AutoVPN, ADVPN, Group VPN (IPv4/ IPv6/ Dual Stack)
- Juniper Secure Connect: Remote access / SSL VPN
- Configuration payload: Yes
- IKE Encryption algorithms: Prime, DES-CBC, 3DES-CBC, AEC-CBC, AES-GCM, SuiteB
- IKE authentication algorithms: MD5, SHA-1, SHA-128, SHA-256, SHA-384
- Authentication: Pre-shared key and public key infrastructure (PKI) (X.509)
- IPsec (Internet Protocol Security): Authentication Header (AH) / Encapsulating Security Payload (ESP) protocol
- IPsec Authentication Algorithms: hmac-md5, hmac-sha-196, hmac-sha-256
- IPsec Encryption Algorithms: Prime, DES-CBC, 3DES-CBC, AEC-CBC, AES-GCM, SuiteB
- Perfect forward secrecy, anti-reply
- Internet Key Exchange: IKEv1, IKEv2
- Monitoring: Standard-based dead peer detection (DPD) support, VPN monitoring
- VPNs GRE, IP-in-IP, and MPLS

Network Services

- Dynamic Host Configuration Protocol (DHCP) client/server/relay
- Domain Name System (DNS) proxy, dynamic DNS (DDNS)
- Juniper real-time performance monitoring (RPM) and IP-monitoring
- Juniper flow monitoring (J-Flow)¹
- Bidirectional Forwarding Detection (BFD)
- Two-Way Active Measurement Protocol (TWAMP)
- IEEE 802.3ah Link Fault Management (LFM)
- IEEE 802.1ag Connectivity Fault Management (CFM)

High Availability Features

- Virtual Router Redundancy Protocol (VRRP)
- Stateful high availability
- Dual box clustering
- Active/passive
- Active/active
- Configuration synchronization
- Firewall session synchronization
- Device/link detection
- In-Band Cluster Upgrade (ICU)
- Dial on-demand backup interfaces
- IP monitoring with route and interface failover

Management, Automation, Logging, and Reporting

- SSH, Telnet, SNMP
- Smart image download
- Juniper CLI and Web UI
- Mist AI
 - Simplified management
 - WAN Assurance
- Junos Space and Security Director
- Python
- Junos OS event, commit, and OP script
- Application and bandwidth usage reporting
- Auto installation
- Debug and troubleshooting tools
- Zero-Touch Provisioning with Contrail Service Orchestration

Advanced Routing Services

- Packet mode
- MPLS (RSVP, LDP)
- Circuit cross-connect (CCC), translational cross-connect (TCC)
- L2/L3 MPLS VPN, pseudowires
- Virtual private LAN service (VPLS), next-generation multicast VPN (NG-MVPN)
- MPLS traffic engineering and MPLS fast reroute

Application Security Services¹

- Application visibility and control
- Application-based firewall
- Application QoS
- Application-based advanced policy-based routing
- Application quality of experience (AppQoE)

Enhanced SD-WAN Services

- Application-based advanced policy-based routing (APBR)
- Application-based link monitoring and switchover with Application quality of experience (AppQoE)

Threat Defense and Intelligence Services¹

- Intrusion prevention
- Antivirus
- Antispam
- Category/reputation-based URL filtering
- Protection from botnets (command and control)
- Adaptive enforcement based on GeoIP
- Juniper Advanced Threat Prevention to detect and block zero-day attacks
- Adaptive Threat Profiling
- Encrypted Traffic Insights
- SecIntel to provide threat intelligence

¹Offered as advanced security services subscription licenses.

Hardware Specifications

Specification	SRX300	SRX320	SRX340	SRX345	SRX380
Connectivity					
Total onboard ports	8x1GbE	8x1GbE	16x1GbE	16x1GbE	20 (16x1GbE, 4x10GbE)
Onboard RJ-45 ports	6x1GbE	6x1GbE	8x1GbE	8x1GbE	16x1GbE
Onboard small form-factor pluggable (SFP) transceiver ports	2x1GbE	2x1GbE	8x1GbE	8x1GbE	4x10GbE SFP+
MACsec-capable ports	2x1GbE	2x1GbE	16x1GbE	16x1GbE	16x1GbE 4x10GbE
Out-of-band (OOB) management ports	0	0	1x1GbE	1x1GbE	1x1GbE
Mini PIM (WAN) slots	0	2	4	4	4
Console (RJ-45 + miniUSB)	1	1	1	1	1
USB 3.0 ports (type A)	1	1	1	1	1
PoE+ ports	N/A	6 ²	0	0	16
Memory and Storage					
System memory (RAM)	4 GB	4 GB	4 GB	4 GB	4GB
Storage	8 GB	8 GB	8 GB	8 GB	100GB SSD
SSD slots	0	0	1	1	1
Dimensions and Power					
Form factor	Desktop	Desktop	1 U	1 U	1U
Size (WxHxD)	12.63 x 1.37 x 7.52 in. (32.08 x 3.47 x 19.10 cm)	11.81 x 1.73 x 7.52 in. (29.99 x 4.39 x 19.10 cm)	17.36 x 1.72 x 14.57 in. (44.09 x 4.36 x 37.01 cm)	17.36 x 1.72 x 14.57 in. (44.09 x 4.36 x 37.01 cm) / 17.36 x 1.72 x 18.7 in. (44.09 x 4.36 x 47.5 cm) ³	17.36 x 1.72 x 18.7 in. (44.09 x 4.37 x 47.5 cm) / 17.36 x 1.72 x 20.47 in. (44.09 x 4.37 x 52 cm)
Weight (device and PSU)	4.38 lb (1.98 kg)	3.28 lb (1.51 kg) ⁴ / 3.4 lb (1.55 kg) ⁵	10.80 lb (4.90 kg)	10.80 lb (4.90 kg) / 11.02 lb (5 kg) ⁵	15 lb (6.8 kg) with 1xPSU / 16.76 lb (7.6 kg) with 2xPSU
Redundant PSU	No	No	No	Yes	Yes
Power supply	AC (external)	AC (external)	AC (internal)	AC (internal) / DC (internal) ⁶	1+1 hot-swappable AC PSU
Rated DC voltage range	N/A	N/A	N/A	-48 to -60 VDC (with -15% and +20% tolerance)	NA
Rated DC operating voltage range	N/A	N/A	N/A	-40.8 VDC to -72 VDC ⁶	N/A
Maximum PoE power	N/A	180 W ⁵	N/A	N/A	480W
Average power consumption	24.9 W	46 W ⁴ /221 W ⁵	122 W	122 W	150 W (without PoE) 510 W (with PoE)
Average heat dissipation	85 BTU/h	157 BTU/h ⁴ /755 BTU/h ⁵	420 BTU/h	420 BTU/h	511.5 BTU/hr (without PoE)
Maximum current consumption	0.346 A	0.634 A ⁴ /2.755 A ⁵	1.496 A	1.496 A / 6A @ -48 VDC ⁶	1.79A/7.32A
Acoustic noise level	0dB (fanless)	37 dBA ⁴ /40 dBA ⁵	45.5 dBA	45.5 dBA	< 50dBA @ room temperature 27C
Airflow/cooling	Fanless	Front to back	Front to back	Front to back	Front to back
Environmental, Compliance, and Safety Certification					
Operational temperature	-4° to 140° F (-20° to 60° C) ⁷	32° to 104° F (0° to 40° C)	32° to 104° F (0° to 40° C)	32° to 104° F (0° to 40° C) -22° to 131° F (-30° to 55° C) for SRX345-DC	32° to 104° F (0° to 40° C) with MPIMs 32° to 122° F (0° to 50° C) without MPIMs
Nonoperational temperature	-4° to 158° F (-20° to 70° C)	-4° to 158° F (-20° to 70° C)	-4° to 158° F (-20° to 70° C)	-4° to 158° F (-20° to 70° C) -22° to 158° F (-30° to 70° C) for SRX345-DC	-4° to 158° F (-20° to 70° C)
Operating humidity	10% to 90% noncondensing	10% to 90% noncondensing	10% to 90% noncondensing	10% to 90% noncondensing	10% to 90% noncondensing
Nonoperating humidity	5% to 95% noncondensing	5% to 95% noncondensing	5% to 95% noncondensing	5% to 95% noncondensing	5% to 95% noncondensing

SRX300 Line of Services Gateways for the Branch

Specification	SRX300	SRX320	SRX340	SRX345	SRX380
Mean time between failures (MTBF)	44.5 years	32.5 years ⁴ / 26 years ⁵	27 years	27.4 years	28.1 years
FCC classification	Class A	Class A	Class A	Class A	Class A
RoHS compliance	RoHS 2	RoHS 2	RoHS 2	RoHS 2	RoHS 2
FIPS 140-2	Level 2 (Junos 15.1X49-D60)	Level 1 (Junos 15.1X49-D60)	Level 2 (Junos 15.1X49-D60)	Level 2 (Junos 15.1X49-D60)	N/A
Common Criteria certification	NDPP, VPNER, FWER, IPSEP (based on Junos 15.1X49-D60)	NDPP, VPNER, FWER, IPSEP (based on Junos 15.1X49-D60)	NDPP, VPNER, FWER, IPSEP (based on Junos 15.1X49-D60)	NDPP, VPNER, FWER, IPSEP (based on Junos 15.1X49-D60)	N/A

⁴SRX320 with PoE+ ports available as a separate SKU: SRX320-POE.

⁵SRX345 with dual AC PSU model.

⁶SRX320 non PoE model.

⁷SRX320-POE with 6 ports PoE+ model.

⁸SRX345 with DC power supply (operating temperature as per GR-63 Issue 4 2012 test criteria).

⁹As per GR63 Issue 4 (2012) test criteria.

Performance and Scale

Parameter	SRX300	SRX320	SRX340	SRX345	SRX380
Routing with packet mode (64 B packet size) in Kpps ⁸	300	300	550	750	1700
Routing with packet mode (IMIX packet size) in Mbps ⁸	800	800	1,600	2,300	5000
Routing with packet mode (1,518 B packet size) in Mbps ⁸	1,500	1,500	3,000	5,500	10,000
Stateful firewall (64 B packet size) in Kpps ⁸	200	200	350	550	1700
Stateful firewall (IMIX packet size) in Mbps ⁸	500	500	1,100	1,700	4,000
Stateful firewall (1,518 B packet size) in Mbps ⁸	1,000	1,000	3,000	5,000	10,000
IPsec VPN (IMIX packet size) in Mbps ⁸	100	100	200	300	1,000
IPsec VPN (1,400 B packet size) in Mbps ⁸	300	300	600	800	3,500
Application visibility and control in Mbps ⁹	500	500	1,000	1,700	6,000
Recommended IPS in Mbps ⁹	200	200	400	600	2,000
Next-generation firewall in Mbps ⁹	100	100	200	300	1,000
Route table size (RIB/FIB) (IPv4 or IPv6)	256,000/256,000	256,000/256,000	1 million/600,000 ¹⁰	1 million/600,000 ¹⁰	1 million/600,000 ¹⁰
Maximum concurrent sessions (IPv4 or IPv6)	64,000	64,000	256,000	375,000	380,000
Maximum security policies	1,000	1,000	2,000	4,000	4,000
Connections per second	5,000	5,000	10,000	15,000	50,000
NAT rules	1,000	1,000	2,000	2,000	3,000
MAC table size	15,000	15,000	15,000	15,000	16,000
IPsec VPN tunnels	256	256	1,024	2,048	2,048
Number of remote access/SSL VPN (concurrent) users	25	50	150	250	500
GRE tunnels	256	256	512	1,024	2,048
Maximum number of security zones	16	16	64	64	128
Maximum number of virtual routers	32	32	64	128	128
Maximum number of VLANs	1,000	1,000	2,000	3,000	3,000
AppID sessions	16,000	16,000	64,000	64,000	64,000
IPS sessions	16,000	16,000	64,000	64,000	64,000
URLF sessions	16,000	16,000	64,000	64,000	64,000

⁸Throughput numbers based on UDP packets and RFC2544 test methodology.

⁹Throughput numbers based on HTTP traffic with 44 KB transaction size.

¹⁰Route scaling numbers are with enhanced route-scale features turned on.

WAN and Wi-Fi Interface Support Matrix

WAN and Wi-Fi Interface	SRX300	SRX320	SRX340	SRX345	SRX380
1 port T1/E1 MPIM (SRX-MP-1T1E1-R)	No	Yes	Yes	Yes	Yes
1 port VDSL2 Annex A/M MPIM (SRX-MP-1VDSL2-R)	No	Yes	Yes	Yes	Yes
4G / LTE MPIM (SRX-MP-LTE-AA and SRX-MP-LTE-AE)	No	Yes	Yes	Yes	Yes
802.11ac Wave 2 Wi-Fi MPIM	No	Yes	Yes	Yes	Yes

WAN and Wi-Fi Interface Module Performance Data

Interface Module	Description	Performance
4G/LTE	Dual SIM 4G/LTE-A CAT 6	Up to 300 Mbps download and 50 Mbps upload
Wi-Fi MPIM	Dual band 802.11 a/b/g/n/ac Wave 2 (2x2 MIMO)	Up to 866 Mbps at 5GHz / 300 Mbps at 2.4GHz

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 <https://www.juniper.net/us/en/products.html>.

Ordering Information

To order Juniper Networks SRX Series Services Gateways, and to access software licensing information, please visit the How to Buy page at <https://www.juniper.net/us/en/how-to-buy/form.html>

	SRXnnn-SYS-JB
Hardware	Included
Management (CLI, JWEB, SNMP, Telnet, SSH)	Included
Ethernet switching (L2 Forwarding, IRB, LACP etc)	Included
L2 Transparent, Secure Wire	Included
Routing (RIP, OSPF, BGP, Virtual router)	Included
Multicast (IGMP, PIM, SSDP, DMVRP)	Included
Packet Mode	Included
Overlay (GRE, IP-IP)	Included
Network Services (J-Flow, DHCP, QOS, BFD)	Included
Stateful Firewall, Screens, ALGs	Included
NAT (static, SNAT, DNAT)	Included
IPSec VPN (Site-to-Site VPN, Auto VPN, Group VPN)	Included
Firewall policy enforcement (UAC, Aruba CPPM)	Included
Remote Access/SSL VPN (concurrent users) ¹¹	Optional
Chassis Cluster, VRRP, ISSU/ICU	Included
Automation (Junos scripting, auto-installation)	Included
MPLS, LDP, RSVP, L3 VPN, pseudo-wires, VPLS	Included

¹¹ Based on concurrent users; two free licenses included

Base System Model Numbers

Product Number	Description
SRX300-SYS-JB	SRX300 Services Gateway includes hardware (8GbE, 4G RAM, 8G Flash, power adapter and cable) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching). RMK not included.
SRX320-SYS-JB	SRX320 Services Gateway includes hardware (8GbE, 2x MPIM slots, 4G RAM, 8G Flash, power adapter and cable) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching). RMK not included.
SRX320-SYS-JB-P	SRX320 Services Gateway includes hardware (8GbE, 6-port POE+, 2x MPIM slots, 4G RAM, 8G Flash, power adapter and cable) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching). RMK not included.
SRX340-SYS-JB	SRX340 Services Gateway includes hardware (16GbE, 4x MPIM slots, 4G RAM, 8G Flash, power supply, cable and RMK) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching)
SRX345-SYS-JB	SRX345 Services Gateway includes hardware (16GbE, 4x MPIM slots, 4G RAM, 8G Flash, power supply, cable and RMK) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching)
SRX345-SYS-JB-2AC	SRX345 Services Gateway includes hardware (16GbE, 4x MPIM slots, 4G RAM, 8G Flash, dual AC power supply, cable and RMK) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching)
SRX345-SYS-JB-DC	SRX345 Services Gateway includes hardware (16GbE, 4x MPIM slots, 4G RAM, 8G Flash, single DC power supply, cable and RMK) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching)
SRX380-P-SYS-JB-AC	SRX380 Services Gateway includes hardware (16GbE PoE+, 4x10GbE, 4x MPIM slots, 4GB RAM, 100GB SSD, single AC power supply, cable and RMK) and Junos Software Base (firewall, NAT, IPSec, routing, MPLS and switching)

Software Licenses

Product Number	Description
S-SRXnnn-A1-1	SRXnnn Advanced 1 - JSE/SD-WAN, includes SD-WAN features App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack) and IPS; 1-year subscription (example: S-SRX380-A1-1)
S-SRXnnn-A1-3	SRXnnn Advanced 1 - JSE/SD-WAN, includes SD-WAN features App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack) and IPS; 3-year subscription (example: S-SRX380-A1-3)
S-SRXnnn-A1-5	SRXnnn Advanced 1 - JSE/SD-WAN, includes SD-WAN features App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack) and IPS; 5-year subscription (example: S-SRX380-A1-5)
S-SRXnnn-P1-1	SRXnnn Premium 1, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS and Juniper ATP; 1-year subscription (example: S-SRX380-P1-1)
S-SRXnnn-P1-3	SRXnnn Premium 1, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS and Juniper ATP; 3-year subscription (example: S-SRX380-P1-3)
S-SRXnnn-P1-5	SRXnnn Premium 1, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS and Juniper ATP; 5-year subscription (example: S-SRX380-P1-5)
S-SRXnnn-A2-1	SRXnnn Advanced 2, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS and Content Security (UTM, Cloud AV, URLF and AS); 1-year subscription (example: S-SRX380-A2-1)
S-SRXnnn-A2-3	SRXnnn Advanced 2, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS and Content Security (UTM, Cloud AV, URLF and AS); 3-year subscription (example: S-SRX380-A2-3)
S-SRXnnn-A2-5	SRXnnn Advanced 2, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS and Content Security (UTM, Cloud AV, URLF and AS); 5-year subscription (example: S-SRX380-A2-5)
S-SRXnnn-P2-1 ¹²	SRXnnn Premium 2, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS, Content Security (UTM, Cloud AV, URLF and AS) and Juniper Sky ATP; 1-year subscription (example: S-SRX380-P2-1)
S-SRXnnn-P2-3 ¹²	SRXnnn Premium 2, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS, Content Security (UTM, Cloud AV, URLF and AS) and Juniper Sky ATP; 3-year subscription (example: S-SRX380-P2-3)
S-SRXnnn-P2-5 ¹²	SRXnnn Premium 2, includes App+ (AppID, AppFW, AppQoS, AppRoute, AppQoE, AppTrack), IPS, Content Security (UTM, Cloud AV, URLF and AS) and Juniper Sky ATP; 5-year subscription (example: S-SRX380-P2-5)

¹²The S-SRXnnn-P2-1/3/5 year SKUs are only available for the SRX340, SRX345, and SRX380 models.

Remote Access/Juniper Secure Connect VPN Licenses

Product Number	Description
S-RA3-SRX300-S-1	SW, Remote Access VPN - Juniper, 25 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-SRX320-S-1	SW, Remote Access VPN - Juniper, 50 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-SRX340-S-1	SW, Remote Access VPN - Juniper, 150 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-SRX345-S-1	SW, Remote Access VPN - Juniper, 250 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-SRX380-S-1	SW, Remote Access VPN - Juniper, 500 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-5CCU-S-1	SW, Remote Access VPN - Juniper, 5 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-25CCU-S-1	SW, Remote Access VPN - Juniper, 25 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-50CCU-S-1	SW, Remote Access VPN - Juniper, 50 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-100CCU-S-1	SW, Remote Access VPN - Juniper, 100 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-250CCU-S-1	SW, Remote Access VPN - Juniper, 250 Concurrent Users, Standard, with SW support, 1 Year

Product Number	Description
S-RA3-500CCU-S-1	SW, Remote Access VPN - Juniper, 500 Concurrent Users, Standard, with SW support, 1 Year
S-RA3-SRX300-S-3	SW, Remote Access VPN - Juniper, 25 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-SRX320-S-3	SW, Remote Access VPN - Juniper, 50 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-SRX340-S-3	SW, Remote Access VPN - Juniper, 150 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-SRX345-S-3	SW, Remote Access VPN - Juniper, 250 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-SRX380-S-3	SW, Remote Access VPN - Juniper, 500 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-5CCU-S-3	SW, Remote Access VPN - Juniper, 5 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-25CCU-S-3	SW, Remote Access VPN - Juniper, 25 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-50CCU-S-3	SW, Remote Access VPN - Juniper, 50 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-100CCU-S-3	SW, Remote Access VPN - Juniper, 100 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-250CCU-S-3	SW, Remote Access VPN - Juniper, 250 Concurrent Users, Standard, with SW support, 3 Year
S-RA3-500CCU-S-3	SW, Remote Access VPN - Juniper, 500 Concurrent Users, Standard, with SW support, 3 Year

Interface Modules

Product Number	Description
SRX-MP-1T1E1-R	1 port T1E1, MPIM form factor supported on SRX320, SRX340, SRX345, SRX380, and SRX550M. ROHS compliant
SRX-MP-1VDSL2-R	1 port VDSL2 (backward compatible with ADSL / ADSL2+), MPIM form factor supported on SRX320, SRX340, SRX345, SRX380, and SRX550M. ROHS compliant
SRX-MP-LTE-AA	4G / LTE MPIM support 1, 3, 5, 7-8, 18-19, 21, 28, 38-41 LTE bands (for Asia and Australia). Supported on SRX320, SRX340, SRX345, SRX380, and SRX550M
SRX-MP-LTE-AE	4G / LTE MPIM support 1-5, 7-8, 12-13, 30, 25-26, 29-30, 41 LTE bands (for Americas and EMEA). Supported on SRX320, SRX340, SRX345, SRX380, and SRX550M
SRX-MP-WLAN-US	Wireless access point (Wi-Fi) MPIM for SRX320, SRX34x, SRX380, and SRX550M. Supported for U.S. regulatory bands only.
SRX-MP-WLAN-WW	Wireless access point (Wi-Fi) MPIM for SRX320, SRX34x, SRX380, and SRX550M. Supported for worldwide regulatory bands (excluding U.S. and Israel).
SRX-MP-WLAN-IL	Wireless access point (Wi-Fi) MPIM for SRX320, SRX34x, SRX380, and SRX550M. Supported for Israel regulatory bands only.
SRX-MP-ANT-EXT	Antenna extension cable for WLAN MPIM on SRX Series platforms

Accessories

Product Number	Description
SRX300-RMK0	SRX300 rack mount kit with adaptor tray
SRX300-RMK1	SRX300 rack mount kit without adaptor tray
SRX300-WALL-KITO	SRX300 wall mount kit with brackets
SRX320-P-RMK0	SRX320-POE rack mount kit with adaptor tray
SRX320-P-RMK1	SRX300-POE rack mount kit without adaptor tray
SRX320-RMK0	SRX320 rack mount kit with adaptor tray
SRX320-RMK1	SRX320 rack mount kit without adaptor tray
SRX320-WALL-KITO	SRX320 wall mount kit with brackets
SRX34X-RMK	SRX340 and SRX345 rack mount kit
EX-4PST-RMK	SRX380 rack mount kit
JSU-SSD-MLC-100	Juniper Storage Unit, SSD, MLC, 100GB
JPSU-600-AC-AFO	SRX380 600W AC PSU, front-to-back

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

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EX3400 ETHERNET SWITCH



Product Overview

Juniper Networks EX3400 Ethernet Switch delivers a high-performance, flexible, and cost-effective solution for today's most demanding converged data, voice, and video enterprise access environments.

The EX3400 supports Juniper Networks Virtual Chassis technology, allowing up to 10 switches to be interconnected over uplink ports and managed as a single device, delivering a scalable, pay-as-you-grow solution for expanding network environments.

The EX3400 is onboarded, provisioned, and managed in the Juniper Mist Cloud Architecture. Mist Wired Assurance delivers better experiences for connected devices through AI-powered automation and service levels.

Product Description

The Juniper Networks® EX3400 Ethernet Switch with Juniper Networks Virtual Chassis technology provides enterprises with the flexibility and ease of management that previously was only available with higher-end access switches. The fixed-configuration EX3400 supports a number of key features, including:

- 24-port and 48-port models with and without Power over Ethernet (PoE/PoE+) are for campus wiring closet deployments.
- Cloud-ready and zero-touch provisioning (ZTP)-enabled for Juniper Mist Wired Assurance
- Data center-optimized cooling options offer both front-to-back and back-to-front airflows, making the EX3400 suitable for GbE data center access deployments.
- Two redundant, field-replaceable power supplies each provide up to 920 watts of power.
- 24-port data center models are included for metro deployments.
- Four dual-mode (GbE/10GbE) small form-factor pluggable transceiver (SFP/SFP+) uplink ports and two 40GbE QSFP+ ports are available.
- Uplink ports can be configured as Virtual Chassis interfaces and connected via standard 10GbE/40GbE optic interfaces (40GbE uplink ports are preconfigured by default as Virtual Chassis ports).
- Comprehensive Layer 2 functionality with RIP and static routing is provided.
- A compact, 13.8-inch deep 1 U form factor supports flexible deployment options.
- An easy-to-manage solution includes centralized software upgrades.
- Support is available for the same consistent modular Juniper Networks Junos operating system control plane feature implementation used by all other Juniper fixed-configuration Juniper Networks EX Series Ethernet Switches.
- Support is provided for Layer 3 (OSPF v2, IGMP v1/v2/v3, PIM, VRRP, BFD, virtual router) via an enhanced feature license (optional license required).
- Support is available for IPv6 management, including neighbor discovery, stateless auto configuration, telnet, SSH, DNS, system log, NTP, ping, traceroute, ACL, CoS static routing, and RIPng.
- IPv6 routing features (OSPFv3, virtual router support for unicast, VRRPv6, PIM, MLDv1/v2) are supported via an enhanced feature license.
- Support is available for Border Gateway Protocol (BGP), multiprotocol BGP (MBGP), and Intermediate System-to-Intermediate System (IS-IS) via an optional Advanced Feature license.
- Energy Efficient Ethernet (EEE) capability is provided.

¹Software to come in future

Architecture and Key Components

Cloud Management with Juniper Mist Wired Assurance

Juniper Mist Wired Assurance, a cloud-based service driven by Mist AI to claim, configure, manage, and troubleshoot the EX3400, delivers AI-powered automation and service levels to ensure a better experience for connected devices. Wired Assurance leverages rich Junos switch telemetry data to simplify operations, reduce mean time to repair, and improve visibility. Wired Assurance offers the following features:

- **Day 0 operations**—Onboard switches seamlessly by claiming a greenfield switch or adopting a brownfield switch with a single activation code for true plug-and-play simplicity.
- **Day 1 operations**—Implement a template-based configuration model for bulk rollouts of traditional and campus fabric deployments, while retaining the flexibility and control required to apply custom site- or switch-specific attributes. Automate provisioning of ports via Dynamic Port Profiles.
- **Day 2 operations**—Leverage the AI in Juniper Mist Wired Assurance to meet service-level expectations such as throughput, successful connects, and switch health with key pre- and post-connection metrics (see Figure 1). Add the self-driving capabilities in Marvis Actions to detect loops, add missing VLANs, fix misconfigured ports, identify bad cables, isolate flapping ports, and discover persistently failing clients (see Figure 2). And perform software upgrades easily through Juniper Mist cloud.

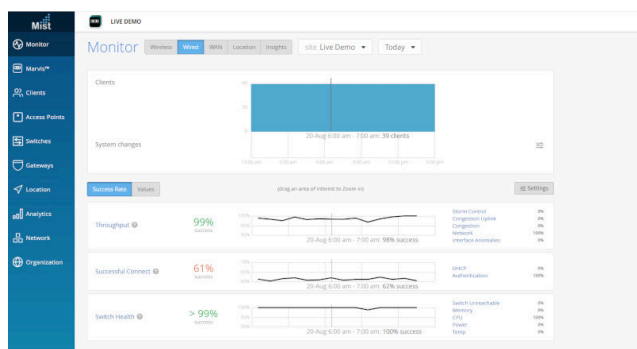


Figure 1: Juniper Mist Wired Assurance service-level expectations

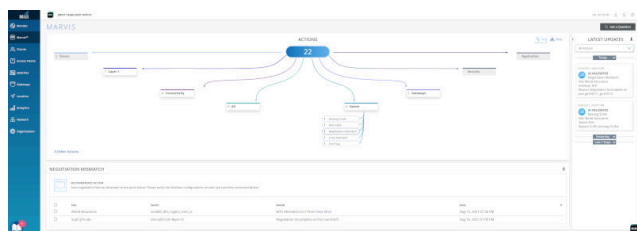


Figure 2: Marvis Actions for wired switches

The addition of Marvis, a complementary Virtual Network Assistant driven by Mist AI, lets you start building a self-driving network that simplifies network operations and streamlines troubleshooting via automatic fixes for EX Series switches or recommended actions for external systems.

For more information see [Juniper Mist Wired Assurance](#).

Virtual Chassis Technology

The EX3400 supports Juniper Networks Virtual Chassis technology, allowing up to 10 switches to be interconnected over uplink ports and managed as a single logical device, delivering a scalable, pay-as-you-grow solution for expanding network environments.

When deployed in a Virtual Chassis configuration, the EX3400 switches elect a primary and backup switch based on a set of criteria or preconfigured policies. The primary switch automatically creates and updates the switching and optional routing tables on all switches in the Virtual Chassis configuration. Virtual Chassis technology allows switches to be added or removed without service disruption. An EX3400 Virtual Chassis configuration operates as a highly resilient unified system, providing simplified management using a single IP address, single telnet session, single command-line interface (CLI), automatic version checking, and automatic configuration. The EX3400 switches are also capable of local switching, so that packets coming into a port destined for another port on the same switch do not have to traverse the Virtual Chassis, increasing the forwarding capacity of the switch.

The EX3400 implements the same slot/module/port numbering schema as other Juniper Networks chassis-based products when numbering Virtual Chassis ports, providing true chassis-like operations. By using a consistent operating system and a single configuration file, all switches in a Virtual Chassis configuration are treated as a single device, simplifying overall system maintenance and management.

The two QSFP+ ports on the EX3400 switch can be configured as Virtual Chassis ports or as uplinks to aggregation devices.

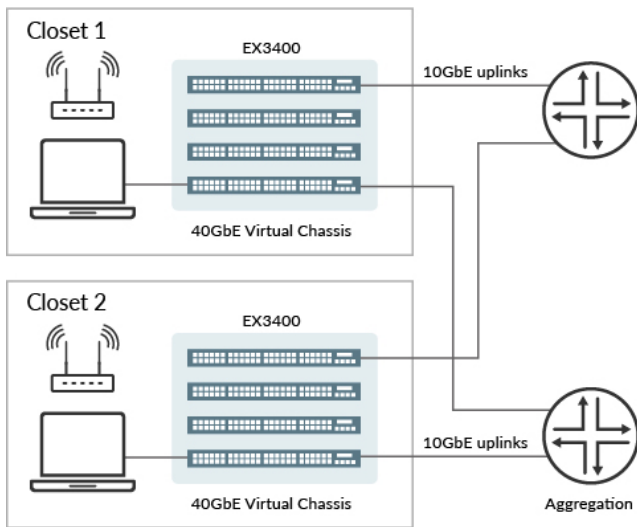


Figure 3: EX3400 Virtual Chassis deployments

Campus Fabric Deployments

Juniper campus fabrics support these validated architectures with the EX3400 switch playing the role of access switch:

- EVPN multihoming (collapsed core or distribution):** A collapsed core architecture combines the core and distribution layers into a single switch, turning the traditional three-tier hierarchal network into a two-tier network. This eliminates the need for STP across the campus network by providing multihoming capabilities from the access to the core layer. EVPN multihoming can be deployed and managed using the Juniper Mist cloud.
- Core/distribution:** A pair of interconnected EX Series core or distribution switches provide L2 EVPN and L3 VXLAN gateway support. The EVPN-VXLAN network between the distribution and core layers offers two modes: centrally or edge routed bridging overlay.

In all these EVPN-VXLAN deployment modes, EX3400 switches can be used as an access layer switch.

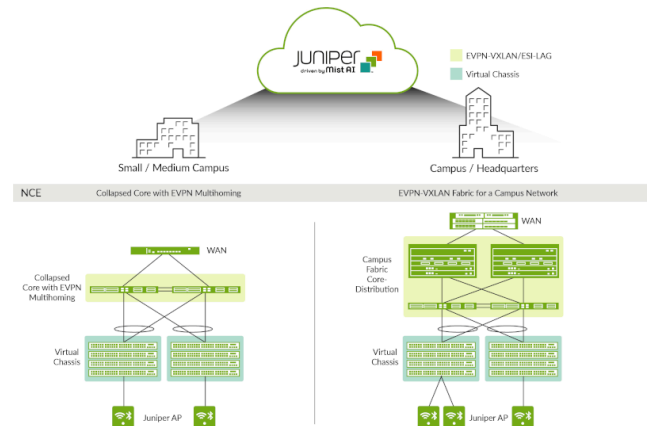


Figure 4: Campus fabrics showing Virtual Chassis and EVPN-VXLAN-based architectures

Features and Benefits

Managing AI-Driven Campus Fabric with the Juniper Mist Cloud

Juniper Mist Wired Assurance brings cloud management and Mist AI to campus fabric. It sets a new standard moving away from traditional network management towards AI-driven operations, while delivering better experiences to connected devices. The Juniper Mist Cloud streamlines deployment and management of campus fabric architectures by allowing:

- Automated deployment and zero touch deployment
- Anomaly detection
- Root cause analysis

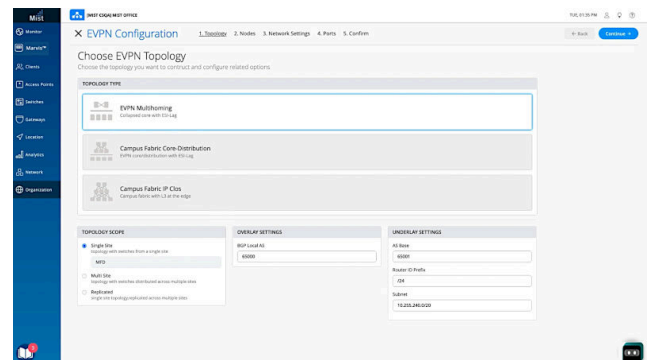


Figure 5: EVPN multihoming configuration via the Juniper Mist cloud

Juniper Virtual Chassis

Virtual Chassis technology simplifies network management for smaller deployments. Up to 10 interconnected EX3400 switches can be managed as a single device utilizing a single Junos OS image and a single configuration file, reducing the overall number of units to monitor and manage. When the Junos OS is upgraded on the primary switch in an EX3400 Virtual Chassis configuration, the software is automatically upgraded on all other member switches at the same time.

In addition, a feature called system snapshot makes a copy of all software files used to run the switch, including the Junos operating system, the active configuration, and the rescue configuration. These copies can be used to reboot the switch the next time it is powered up or as a backup boot option. The Junos OS software can also be preinstalled on a flash drive and used to boot the EX3400 at any time.

Another feature, called automatic software download, enables network administrators to easily upgrade the EX3400 using the DHCP message exchange process to download and install software packages. Users simply configure the automatic software download feature on EX3400 switches acting as DHCP clients and establish a path to the server where the software package file is installed. The server then communicates the path to the software package file through DHCP server messages.

The ZTP feature allows a DHCP server to push configuration details and software images to multiple switches at boot-up time.

Power

The EX3400 supports the 802.3af Class 3 Power over Ethernet (PoE) and 802.3at PoE+ standards for supporting networked devices such as telephones, video cameras, IEEE 802.11ac WLAN access points, and videophones in converged networks. While EX3400 switches ship with a single power supply by default, they can support redundant 600W or 920W power supplies that provide PoE (15.4W) or PoE+ (30W) power to all ports in the switch. Spare power supplies can be ordered as needed.

There are two PoE power mode settings on the EX3400 switches:

- Static mode allows customers to specify the maximum PoE power setting on an individual port.
- Class mode allows end devices to specify PoE class and negotiate whether the switch can provide PoE power to the device.

The EX3400 also supports the industry-standard Link Layer Discovery Protocol (LLDP) and LLDP-Media Endpoint Discovery (LLDP-MED), which enable the switches to automatically discover Ethernet-enabled devices, determine their power requirements, and assign virtual LAN (VLAN) parameters. LLDP-MED-based granular PoE management allows the EX3400 to negotiate PoE usage down to a fraction of a watt on powered devices, enabling more efficient PoE utilization across the switch.

The EX3400 supports the IEEE 802.3az standard for Energy Efficient Ethernet (EEE) functionality, reducing power consumption of copper physical layers during periods of low link utilization.

In addition, the EX3400 supports rich quality-of-service (QoS) functionality for prioritizing data, voice, and video traffic. The switches support 12 QoS queues (8 unicast and 4 multicast) on every port, enabling them to maintain multilevel, end-to-end traffic prioritization. The EX3400 also supports a wide range of scheduling options, such as priority and shaped-deficit weighted round-robin (SDWRR) scheduling.

Table 1. EX3400 PoE Power Budget

SKU	Total 10/100/1000BASE-T Ports	Total 30 W PoE+ Ports That Can Be Enabled	Total 15.4 W PoE Ports That Can Be Enabled	Power Supply Type	PoE+ Power Budget (W)
EX3400-24P	24	24 ports up to 30W	24 ports up to 15.4W	AC	370W/720W
EX3400-48P	48	48 ports up to 30W	48 ports up to 15.4W	AC	740W/1440W

Security

The EX3400 switches fully interoperate with Juniper Networks Access Policy Infrastructure, which consolidates all aspects of a user's identity, device, and location, enabling administrators to enforce access control and security down to the individual port or user levels. Working as an enforcement point in the Access Policy Infrastructure, the EX3400 provides both standards-based 802.1X port-level access control and Layer 2-4 policy enforcement based on user identity, location, device, or a combination of these. A user's identity, device type, machine posture check, and location can be used to not only grant or deny access but also to determine the duration of access. If access is granted, the switch assigns the user to a specific VLAN based on authorization levels. The switch can also apply QoS policies or mirror user traffic to a central location for logging, monitoring, or threat detection by an intrusion prevention system (IPS).

The EX3400 also provides a full complement of port security features, including Dynamic Host Configuration Protocol (DHCP) snooping, dynamic ARP inspection (DAI), and media access control (MAC) limiting to defend against internal and external spoofing, man-in-the-middle, and denial-of-service (DoS) attacks.

MACsec

EX3400 switches support IEEE 802.1ae MACsec, providing support for link-layer data confidentiality, data integrity, and data origin authentication. The MACsec feature enables the EX3400 to support 88 Gbps of near line-rate hardware-based traffic encryption on all GbE and 10GbE ports.

Defined by IEEE 802.1AE, MACsec provides secure, encrypted communication at the link layer that is capable of identifying and preventing threats from DoS and intrusion attacks, as well as man-in-the-middle, masquerading, passive wiretapping, and playback attacks launched from behind the firewall. When MACsec is deployed on switch ports, all traffic is encrypted on the wire but traffic inside the switch is not. This allows the switch to apply all network policies such as QoS, deep packet inspection, and sFlow to each packet without compromising the security of packets on the wire.

Hop-by-hop encryption enables MACsec to secure communications while maintaining network intelligence. In addition, Ethernet-based WAN networks can use MACsec to provide link security over long-haul connections. MACsec is transparent to Layer 3 and higher-layer protocols and is not limited to IP traffic—it works with any type of wired or wireless traffic carried over Ethernet links.

Junos Operating System

The EX3400 switches run the same Junos OS that is used by other Juniper Networks EX Series Ethernet Switches, QFX Series Switches, Juniper Routers, Juniper SRX Firewalls, and the Juniper NFX Series Network Services Platform. By utilizing a common operating system, Juniper delivers a consistent implementation and operation of control plane features across all products. To maintain that consistency, Junos OS adheres to a highly disciplined development process that uses a single source code and employs a highly available modular architecture that prevents isolated failures from bringing an entire system down.

These attributes are fundamental to the core value of the software, enabling all Junos OS-powered products to be updated simultaneously with the same software release. All features are fully regression tested, making each new release a true superset of the previous version. Customers can deploy the software with complete confidence that all existing capabilities are maintained and operate in the same way.

Converged Environments

The EX3400 switches provide a flexible solution for demanding converged data, voice, and video environments. The EX3400-24P and EX3400-48P support PoE+, delivering up to 30 watts of power per port to support networked devices such as telephones, video cameras, IEEE 802.11ac wireless LAN (WLAN) access points, and videophones. The PoE+ standard provides nearly double the 15.4 watts per port available with the IEEE 802.3af PoE standard.

Product Options

Table 2. EX3400 Ethernet Switch Models

SKU	Total 10/100/1000 BASE-T Ports	Uplinks	Airflow	Power Supply Type	PoE+ Power (Budget W)	Max. System Power Consumption (W)*	Power Supply Rating (W)
EX3400-24T	24	10GbE/GbE SFP+/SFP ports 2 40GbE QSFP+ ports	Front-to-back	AC	0	100	150W
EX3400-48T	48		Front-to-back	AC	0	120	150W
EX3400-48T-AFI	48		Back-to-front	AC	0	120	150W
EX3400-24P	24 PoE+		Front-to-back	AC	370W ² /720W ²	110	600W
EX3400-48P	48 PoE+		Front-to-back	AC	740W ² /1440W ²	120	920W
EX3400-24T-DC	24		Front-to-back	DC	0	100	150W
EX3400-48T-DC	48		Front-to-back	DC	0	120	150W

¹ 1 power supply

² 2 power supplies

* Input power without PoE

High Availability

The EX3400 line of Ethernet switches is designed to support many of the same failover capabilities and high availability (HA) functionality as other Juniper EX access switches with Virtual Chassis technology.

Each EX3400 switch is capable of functioning as a Routing Engine (RE) when deployed in a Virtual Chassis configuration. When two or more EX3400 switches are interconnected in a Virtual Chassis configuration, all member switches share a single control plane. Junos OS automatically initiates an election process to assign a primary (active) and backup (hot-standby) Routing Engine. An integrated Layer 2 and Layer 3 graceful Routing Engine switchover (GRES) feature maintains uninterrupted access to applications, services, and IP communications in the unlikely event of a primary Routing Engine failure.

When more than two switches are interconnected in a Virtual Chassis configuration, the remaining switch elements act as line cards and are available to take on the backup Routing Engine position should the designated primary fail. Primary, backup, and line card priority status can be assigned by the network operations team to dictate the order of ascension. This N+1 Routing Engine redundancy—coupled with GRES, the nonstop routing (NSR), and, in the future, the nonstop bridging (NSB) capabilities of Junos OS—ensures a smooth transfer of control plane functions following unexpected failures.

The EX3400 also supports the following HA features:

- **Redundant trunk group**—To avoid the complexities of Spanning Tree Protocol (STP) without sacrificing network resiliency, the EX3400 employs redundant trunk groups to provide the necessary port redundancy and simplify switch configuration.

- **Cross-member link aggregation**—Cross-member link aggregation allows redundant link aggregation connections between devices in a single Virtual Chassis configuration, providing an additional level of reliability and availability.
- **Nonstop bridging (NSB) and nonstop active routing (NSR)**—NSB and NSR on the EX3400 switch ensure control plane protocols, states, and tables are synchronized between primary and backup REs to prevent protocol flaps or convergence issues following a Routing Engine failover.
- **Nonstop software upgrade (NSSU)**—With NSSU, all members of an EX3400 Virtual Chassis configuration can be upgraded with a single command. Mission-critical traffic can be configured as a link aggregate across multiple Virtual Chassis switch members, ensuring minimal disruption during the upgrade process.

Flex Licensing

Juniper Flex licensing offers a common, simple, and flexible licensing model for EX Series access switches, enabling customers to purchase features based on their network and business needs.

Flex licensing is offered in Standard, Advanced, and Premium tiers. Standard tier features are available with the Junos OS image that ships with EX Series switches. Additional features can be unlocked with the purchase of a Flex Advanced or Flex Premium license.

The Flex Advanced and Premium licenses for the EX Series platforms are class based, determined by the number of access ports on the switch. Class 1 (C1) switches have 12 ports, Class 2 (C2) switches have 24 Ports, and Class 3 (C3) switches have 32 or 48 Ports.

The EX3400 switches support both subscription and perpetual Flex licenses. Subscription licenses are offered for three- and five-year terms. In addition to Junos features, the Flex Advanced and Premium subscription licenses include Juniper Mist Wired Assurance. Flex Advanced and Premium subscription licenses also allow portability across the same tier and class of switches, ensuring investment protection for the customer.

For a complete list of features supported by the Flex Standard, Advanced, and Premium tiers, or to learn more about Junos EX Series licenses, please visit <https://www.juniper.net/documentation/us/en/software/license/licensing/topics/concept/flex-licenses-for-ex.html>.

Enhanced Limited Lifetime Warranty

The EX3400 includes an enhanced limited lifetime hardware warranty that provides return-to-factory switch replacement for as long as the original purchaser owns the product. The warranty includes lifetime software updates, advanced shipping of spares within one business day, and 24x7 Juniper Networks Technical Assistance Center (JTAC) support for 90 days after the purchase date. Power supplies and fan trays are covered for a period of five years. For complete details, please visit <https://support.juniper.net/support/>



EX3400-24T/P



EX3400-48T/P

Physical Specifications

Dimensions (W x H x D)

- Base unit: 17.36 x 1.72 x 13.78 in (44.1 x 4.37 x 35 cm)
- With power supply installed: 17.36 x 1.72 x 15.05 in (44.1 x 4.37 x 38.24 cm)
- With power supply and front module installed: 17.36 x 1.72 x 15.19 in (44.1 x 4.37 x 38.58 cm)

Backplane

- 160 Gbps (with QSFP+ ports) or 80 Gbps (with SFP+ ports) Virtual Chassis interconnect to link up to 10 switches as a single logical device

Uplink

- Fixed 4-port uplinks can be individually configured as GbE (SFP) or 10GbE (SFP+) ports; 2 x 40G QSFP+ ports.

System Weight

- EX3400 switch (no power supply or fan module): 10.49 lb (4.76 kg) maximum
- EX3400 switch (with single power supply and two fan modules): 12.65 lb (5.74 kg) maximum
- 150 W AC power supply: 1.43 lb (0.65 kg)
- 600 W AC power supply: 1.82 lb (0.83 kg)
- 920 W AC power supply: 1.87 lb (0.85 kg)
- 150 W DC power supply: 1.43 lb (0.65 kg)
- Fan module: 0.16 lb (0.07 kg)

Environmental Ranges

- Operating temperature: 32° to 113° F (0° to 45° C)
- Storage temperature: -40° to 158° F (-40° to 70° C)
- Operating altitude: up to 10,000 ft (3048 m)
- Nonoperating altitude: up to 16,000 ft (4877 m)
- Relative humidity operating: 10% to 85% (noncondensing)
- Relative humidity nonoperating: 0% to 95% (noncondensing)

Hardware Specifications

Switching Engine Model

- Store and forward

DRAM

- 2 GB with ECC

Flash

- 2 GB

CPU

- Dual Core 1 GHz

GbE Port Density per System

- EX3400-24T/EX3400-24P/EX3400-24T-DC: 30 (24 host ports + four 1/10 GbE and two 40GbE uplink ports)
- EX3400-48T/EX3400-48T-AFI/EX3400-48P/EX3400-48T-DC: 54 (48 host ports + four 1/10 GbE and two 40GbE uplink ports)

Physical Layer

- Cable diagnostics for detecting cable breaks and shorts
- Auto medium-dependent interface/medium-dependent interface crossover (MDI/MDIX) support
- Port speed downshift/setting maximum advertised speed on 10/100/1000BASE-T ports
- Digital optical monitoring for optical ports

Packet-Switching Capacities (Maximum with 64-Byte Packets)

- EX3400-24T, EX3400-24P, EX3400-24T-DC: 144 Gbps (unidirectional)/288 Gbps (bidirectional)
- EX3400-48T, EX3400-48T-AFI, EX3400-48P, EX3400-48T-DC: 168 Gbps (unidirectional)/336 Gbps (bidirectional)

Software Specifications**Layer 2/Layer 3 Throughput (Mpps) (Maximum with 64 Byte Packets)**

- 24P/24T/24T-DC: 214 Mpps
- 48P/48T/48T-BF/48T-DC: 250 Mpps

Layer 2 Features

- Maximum MAC addresses per system: 32,000
- Jumbo frames: 9216 bytes
- Number of VLANs supported: 4,096
- Range of possible VLAN IDs: 1-4094
- Port-based VLAN
- MAC-based VLAN
- Voice VLAN
- Layer 2 Protocol Tunneling (L2PT)
- Compatible with Per-VLAN Spanning Tree Plus (PVST+)
- RVI (routed VLAN interface)
- Persistent MAC (sticky MAC)
- RSTP and VSTP running concurrently
- IEEE 802.1AB: Link Layer Discovery Protocol (LLDP)
- LLDP-MED with VoIP integration
- IEEE 802.1ae Media Access Control Security (MACsec)
- IEEE 802.1ak Multiple VLAN Registration Protocol (MVRP)
- IEEE 802.1br: Bridge Port Extension
- IEEE 802.1D: Spanning Tree Protocol
- IEEE 802.1p: CoS prioritization
- IEEE 802.1Q-in-Q: VLAN stacking
- IEEE 802.1Q: VLAN tagging
- IEEE 802.1s: Multiple Spanning Tree Protocol (MSTP)
- Number of MST instances supported: 64
- Number of VSTP instances supported: 510
- IEEE 802.1w: Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1X: Port access control
- IEEE 802.3: 10BASE-T
- IEEE 802.3ab: 1000BASE-T
- IEEE 802.3ad: Link Aggregation Control Protocol (LACP)
- IEEE 802.1ad Q-in-Q tunneling
- IEEE 802.3ae: 10-Gigabit Ethernet
- IEEE 802.3af: PoE
- IEEE 802.3at: PoE+
- IEEE 802.3u: 100BASE-T
- IEEE 802.3z: 1000BASE-X
- IEEE 802.3x: Pause Frames/Flow Control

- Layer 3 VLAN-tagged subinterface
- PVLAN support
- Multicast VLAN routing
- Adding/removing single tag
- Filter-based SVLAN tagging
- Flexible CoS (outer .1P marking)

Layer 3 Features: IPv4

- Maximum number of ARP entries: 16,000
- Maximum number of IPv4 unicast routes in hardware: 14,000 prefixes; 36,000 host routes
- Maximum number of IPv4 multicast routes in hardware: 18,000 groups; 4,000 multicast routes
- Routing Protocols: RIP v1/v2, OSPF v2
- Static routing
- Layer 3 redundancy: VRRP
- IP directed broadcast—traffic forwarding
- Virtual router (VRF-Lite) supporting RIP, OSPF
- Routing policy
- Filter-based forwarding (FBF)
- Unicast reverse-path forwarding

Layer 3 Features: IPv6

- Maximum number of Neighbor Discovery entries: 8,000
- Maximum number of IPv6 unicast routes in hardware: 3,500 prefixes; 18,000 host routes
- Maximum number of IPv6 multicast routes in hardware: 9,000 groups; 2,000 multicast routes
- Neighbor discovery, system logging, Telnet, SSH, Junos Web, SNMP, Network Time Protocol (NTP), Domain Name System (DNS)
- Routing protocols: RIPng, OSPF v3
- Static routing
- IPv6 ACL (PACL, VACL, RAACL)
- IPv6 CoS (BA, MF classification and rewrite, scheduling based on TC)
- MLDv1/v2 snooping
- IPv6 ping, traceroute
- IPv6 stateless auto-configuration
- IPv6 Layer 3 forwarding in hardware
- IPv6 Layer 3 redundancy: VRRP v6
- Virtual Router support for IPv6 unicast
- PIM for IPv6 multicast

Access Control Lists (ACLs) (Junos OS Firewall Filters)

- Port-based ACL (PACL)—ingress and egress
- VLAN-based ACL (VACL)—ingress and egress
- Router-based ACL (RAACL)—ingress and egress
- ACL entries (ACE) in hardware per system: 1500
- 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
- Trusted Network Connect (TNC) certified
- Static MAC authentication
- MAC-RADIUS
- Control plane denial-of-service (DoS) protection
- Firewall filter on me0 interface (control plane protection)
- Captive portal—Layer 2 interfaces
- Fallback authentication
- Media Access Control Security (MACsec)

Access Security

- MAC limiting
- Allowed MAC addresses, configurable per port
- Dynamic ARP inspection (DAI)
- Proxy ARP
- Static ARP support
- DHCP snooping
- 802.1X port-based
- 802.1X multiple supplicants
- 802.1X with VLAN assignment
- 802.1X with authentication bypass access (based on host MAC address)
- 802.1X with VoIP VLAN support
- 802.1X dynamic access control list (ACL) based on RADIUS attributes
- 802.1X supported EAP types: MD5, Transport Layer Security (TLS), Tunneled Transport Layer Security (TTLS), Protected Extensible Authentication Protocol (PEAP)
- IPv6 RA Guard
- IPv6 Neighbor Discovery Inspection
- Media Access Control security (MACsec)

High Availability

- Link aggregation:
 - 802.3ad (LACP) support
 - Number of link aggregation groups (LAGs) supported: 128
 - Maximum number of ports per LAG: 16
 - Tagged ports support in LAG
- Graceful Route Engine switchover (GRES) for IGMP v1/v2/v3 snooping
- Nonstop routing (OSPF v1/v2/v3, RIP/RIPng, PIM)
- Nonstop software upgrade (NSSU)

Quality of Service (QoS)

- Layer 2 QoS
- Layer 3 QoS
- Ingress policing: two-rate three-color
- Hardware queues per port: 12 (8 unicast, 4 multicast)
- Scheduling methods (egress): Strict Priority (SP), SDWRR
- 802.1p, DiffServ code point (DSCP/IP) precedence trust and marking
- L2-L4 classification criteria, including Interface, MAC address, EtherType, 802.1p, VLAN, IP address, DSCP/IP precedence, and TCP/UDP port numbers
- Congestion avoidance capabilities: Tail drop

Multicast

- IGMP snooping entries: 1000
- IGMP snooping
- IGMP v1/v2/v3
- PIM SM, PIM SSM, PIM DM
- VRF-Lite support for PIM and IBMP
- MLD v1/v2 snooping
- IGMP filter
- Multicast Source Discovery Protocol (MSDP)
- PIM for IPv6 multicast

Management and Analytics Platforms

- Juniper Mist Wired Assurance for Campus
- Junos Space® Network Director for Campus
- Junos Space® Management

Device Management and Operations

- Junos OS CLI
- Junos Web interface (J-Web)
- Out-of-band management: Serial, 10/100BASE-T Ethernet
- ASCII configuration
- Rescue configuration
- Configuration rollback
- Image rollback
- Real-time performance monitoring (RPM)
- 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
- VR-aware DHCP
- RADIUS authentication
- TACACS+ authentication
- SSHv2
- Secure copy

- HTTP/HTTPS
- DNS resolver
- System logging
- Temperature sensor
- Configuration backup via FTP/secure copy
- sFlow
- Interface range
- Port profile associations
- Uplink failure detection
- Zero Touch Provisioning using DHCP

Supported RFCs

- RFC 768 UDP
- RFC 783 Trivial File Transfer Protocol (TFTP)
- RFC 791 IP
- RFC 792 Internet Control Message Protocol (ICMP)
- RFC 793 TCP
- RFC 826 Address Resolution Protocol (ARP)
- RFC 854 Telnet client and server
- RFC 894 IP over Ethernet
- RFC 903 Reverse ARP (RARP)
- RFC 906 Bootstrap Loading using TFTP
- RFC 951, 1542 BootP
- LLDP-MED, ANSI/TIA-1057, draft 08
- RFC 1027 Proxy ARP
- RFC 1058 RIP v1
- RFC 1122 Host requirements
- RFC 1256 IPv4 ICMP Router Discovery (IRDP)
- RFC 1492 TACACS+
- RFC 1519 Classless Interdomain Routing (CIDR)
- RFC 1591 Domain Name System (DNS)
- RFC 1812 Requirements for IP Version 4 routers
- RFC 2030 Simple Network Time Protocol (SNTP)
- RFC 2068 HTTP/1.1
- RFC 2131 BootP/DHCP relay agent and DHCP server
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2267 Network Ingress Filtering
- RFC 2328 OSPF v2
- RFC 2453 RIP v2
- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)
- RFC 2710 Multicast Listener Discovery Version (MLD) for IPv6
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations
- RFC 3569 PIM SSM
- RFC 3579 RADIUS Extensible Authentication Protocol (EAP) support for 802.1X
- RFC 3618 Multicast Source Discovery Protocol (MSDP)
- RFC 3768 VRRP
- RFC 3973 PIM DM
- RFC 4601 PIM SM
- RFC 5176 Dynamic Authorization Extensions to RADIUS

Supported MIBs

- RFC 1155 Structure of Management Information (SMI)
- RFC 1157 SNMPv1
- RFC 1212, RFC 1213, RFC 1215 MIB-II, Ethernet-like MIB, and Traps
- RFC 1493 Bridge MIB
- RFC 1643 Ethernet MIB
- RFC 1724 RIPv2 MIB
- RFC 1905 RFC 1907 SNMP v2c, SMIv2, and Revised MIB-II
- RFC 1981 Path MTU Discovery for IPv6
- RFC 2011 SNMPv2 Management Information Base for the IP using SMIv2
- RFC 2012 SNMPv2 Management Information Base for the Transmission Control Protocol using SMIv2
- RFC 2013 SNMPv2 Management Information Base for the User Datagram Protocol using SMIv2
- RFC 2096 IPv4 Forwarding Table MIB
- RFC 2287 System Application Packages MIB
- RFC 2328 OSPF v2
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
- RFC 2570-2575 SNMPv3, user-based security, encryption, and authentication
- RFC 2576 Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework
- RFC 2578 SNMP Structure of Management Information MIB
- RFC 2579 SNMP textual conventions for SMIv2
- RFC 2665 Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 2819 RMON MIB
- RFC 2863 Interface Group MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2922 LLDP MIB
- RFC 2925 Definitions of Managed Objects for Remote Ping/Traceroute, and Lookup Operations
- RFC 3413 SNMP application MIB
- RFC 3414 User-based Security Model for SNMPv3
- RFC 3415 View-based access control model (VACM) for SNMP

- RFC 3484 Default Address Selection for IPv6
- RFC 3621 PoE-MIB (PoE switches only)
- RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6
- RFC 4188 STP and Extensions MIB
- RFC 4213 Basic Transition Mechanisms for IPv6 Hosts and Routers
- RFC 4291 IPv6 Addressing Architecture
- RFC 4363 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and VLAN Extensions
- RFC 4443 ICMPv6 for the IPv6 Specification
- RFC 4861 Neighbor Discovery for IPv6
- RFC 4862 IPv6 Stateless Address Autoconfiguration
- RFC 5643 OSPF v3 MIB Support
- IEEE 802.1ad Q-in-Q
- Draft – blumenthal – aes – usm - 08
- Draft – reeder - snmpv3 – usm - 3desede -00

Troubleshooting

- Debugging: CLI via console, telnet, or SSH
- Diagnostics: Show and debug command statistics
- Traffic mirroring (port)
- Traffic mirroring (VLAN)
- Filter-based mirroring
- Mirroring destination ports per system: 4
- LAG port monitoring
- Multiple destination ports monitored to 1 mirror (N:1)
- Maximum number of mirroring sessions: 4
- Mirroring to remote destination (over L2): 1 destination VLAN
- Encapsulated Remote Switched Port Analyzer (ERSPAN)
- IP tools: Extended ping and trace
- Juniper Networks commit and rollback

Safety Certifications

- UL-UL60950-1 (Second Edition)
- C-UL to CAN/CSA 22.2 No.60950-1 (Second Edition)
- TUV/GS to EN 60950-1 (Second Edition), Amendment
- A1-A4, A11
- CB-IEC60950-1, (Second Edition with all country deviations)
- EN 60825-1 (Second Edition)

Electromagnetic Compatibility Certifications

- 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

Telecom Quality Management

- TL9000

Environmental

- Reduction of Hazardous Substances (ROHS) 6

Telco

- CLEI code

Noise Specifications

- Noise measurements are based on operational tests taken from bystander position (front) and performed at 23° C in compliance with ISO 7779.

Table 3: Noise Test Results

Model	Acoustic Noise in DBA
EX3400-24T	36
EX3400-24P	37
EX3400-24T-DC	36
EX3400-48T/EX3400-48T-DC	35
EX3400-48T-AFI	39
EX3400-48P	46

Warranty

- Limited lifetime switch hardware warranty

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 <https://www.juniper.net/us/en/products.html>.

Ordering Information

Product Number	Description
Switches	
EX3400-24T	EX3400 24-port 10/100/1000BASE-T with 4 SFP+ and 2 QSFP+ uplink ports (optics not included)
EX3400-24P	EX3400 24-port 10/100/1000BASE-T (24 PoE+ ports) with 4 SFP+ and 2 QSFP+ uplink ports (optics not included)
EX3400-24T-DC	EX3400 24-port 10/100/1000BASE-T with 4 SFP+ and 2 QSFP+ uplink ports (optics not included) and DC power supply
EX3400-48T	EX3400 48-port 10/100/1000BASE-T, 4 x 1/10GbE SFP/SFP+, 2 x 40GbE QSFP+, redundant fans, front-to-back airflow, 1 AC PSU JPSU-150-AC-AFO included (optics sold separately)
EX3400-48T-AFI	EX3400 48-port 10/100/1000BASE-T, 4 x 1/10GbE SFP/SFP+, 2 x 40GbE QSFP+, redundant fans, back-to-front airflow, 1 AC PSU JPSU-150-AC-AFI included (optics sold separately)
EX3400-48P	EX3400 48-port 10/100/1000BASE-T (48 PoE+ ports) with 4 SFP+ and 2 QSFP+ uplink ports (optics not included)
EX3400-48T-DC	EX3400 48-port 10/100/1000BASE-T with 4 SFP+ and 2 QSFP+ uplink ports (optics not included) and DC power supply
EX3400-24T-TAA	EX3400 TAA 24-port 10/100/1000BASE-T, 4 x 1/10GbE SFP/SFP+, 2 x 40GbE QSFP+, redundant fans, front-to-back airflow, 1 AC PSU JPSU-150-AC-AFO included (optics sold separately)
EX3400-24P-TAA	EX3400 TAA 24-port 10/100/1000BASE-T PoE+, 4 x 1/10GbE SFP/SFP+, 2 x 40GbE QSFP+, redundant fans, front-to-back airflow, 1 AC PSU JPSU-600-AC-AFO included (optics sold separately)
EX3400-48T-TAA	EX3400 TAA 48-port 10/100/1000BASE-T, 4 x 1/10GbE SFP/SFP+, 2 x 40GbE QSFP+, redundant fans, front-to-back airflow, 1 AC PSU JPSU-150-AC-AFO included (optics sold separately)
EX3400-48P-TAA	EX3400 TAA 48-port 10/100/1000BASE-T PoE+, 4 x 1/10GbE SFP/SFP+, 2 x 40GbE QSFP+, redundant fans, front-to-back airflow, 1 AC PSU JPSU-920-AC-AFO included (optics sold separately)

Accessories

EX-4PST-RMK	Adjustable 4-post rack-mount kit for EX2200, EX3200, EX3400, and EX4200
EX-RMK	Rack-mount kit for EX2200, EX3200, EX3400, and EX4200
EX-WMK	EX4200, EX3200, EX3400, and EX2200 wall-mount kit with baffle
CBL-EX-PWR-C13-AU	AC power cable, Australia (10 A/250V, 2.5m)
CBL-EX-PWR-C13-C14	AC power cable, patch cord (10 A/250V, 2.5 m) for EU only
CBL-EX-PWR-C13-CH	AC power cable, China (10 A/250V, 2.5m)
CBL-EX-PWR-C13-EU	AC power cable, Europe (10 A/250V, 2.5m)
CBL-EX-PWR-C13-IT	AC power cable, Italy (10 A/250V, 2.5m)
CBL-EX-PWR-C13-JP	AC power cable, Japan (12 A/125V, 2.5m)
CBL-EX-PWR-C13-KR	AC power cable, Korea (10 A/250V, 2.5m)
CBL-EX-PWR-C13-SZ	AC power cable, Switzerland (10 A/250V, 2.5m)
CBL-EX-PWR-C13-UK	AC power cable, UK (10 A/250V, 2.5m)
CBL-EX-PWR-C13-US	AC power cable, U.S. (13 A/125V, 2.5m)—not to be used with EX3400-48P SKUs
CBL-PWR-C13-US-48P	AC power cable, US/Canada (15A/125V, 2.5m)—for EX3400-48P only

Subscription Licenses

S-EX-A-C2-3	Software, EX Series Advanced license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches, 3 year
S-EX-A-C2-5	Software, EX Series Advanced license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches, 5 year

Product Number	Description
S-EX-P-C2-3	Software, EX Series Premium license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches, 3 year
S-EX-P-C2-5	Software, EX Series Premium license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches, 5 year
S-EX-A-C3-3	Software, EX Series Advanced license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 3 year
S-EX-A-C3-5	Software, EX Series Advanced license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 5 year
S-EX-P-C3-3	Software, EX Series Premium license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 3 year
S-EX-P-C3-5	Software, EX Series Premium license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 5 year
S-EX-A-C2-3-COR	Software, EX Series Advanced license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches, 3 year with SVC CORE support, 3 year
S-EX-A-C2-5-COR	Software, EX Series Advanced license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches with SVC CORE support, 5 YEAR
S-EX-P-C2-3-COR	Software, EX Series Premium license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches with SVC CORE support, 3 YEAR
S-EX-P-C2-5-COR	Software, EX Series Premium license, Class 2 (24 ports), includes Wired Assurance subscription for EX Series 24-port switches with SVC CORE support, 5 YEAR
S-EX-A-C3-3-COR	Software, EX Series Advanced license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 3 year with SVC CORE support, 3 YEAR
S-EX-A-C3-5-COR	Software, EX Series Advanced license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 3 year with SVC CORE support, 5 YEAR
S-EX-P-C3-3-COR	Software, EX Series Premium license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 3 year with SVC CORE support, 3 YEAR
S-EX-P-C3-5-COR	Software, EX Series Premium license, Class 3 (32 or 48 ports), includes Wired Assurance subscription for EX Series 48-port switches, 3 year with SVC CORE support, 5 YEAR

Perpetual Licenses

S-EX-A-C2-P	Software, EX Series Advanced license, Class 2 (24 ports), Perpetual license for EX3400 24-port switches
S-EX-P-C2-P	Software, EX Series Premium license, Class 2 (24 ports), Perpetual license for EX3400 24-port switches
S-EX-A-C3-P	Software, EX Series Advanced license, Class 3 (32 or 48 ports), Perpetual license for EX3400 48-port switches
S-EX-P-C3-P	Software, EX Series Premium license, Class 3 (32 or 48 ports), Perpetual license for EX3400 48-port switches
EX-24-EFL	Enhanced feature license for EX3400 24-port switches
EX-48-EFL	Enhanced feature license for EX3400 48-port switches
EX-24-AFL	Advanced feature license for EX3400-24T, and EX3400-24P switches
EX-48-AFL	Advanced feature license for EX3400-48P, EX3400-48T, EX3400-48T-AFI, EX3400-48T-DC, and EX3400-48T-DC-AFI switches
EX-QFX-MACSEC-ACC4	MACsec software license for EX3400, EX4300, and EX4200 access switches

Power Supplies

JPSU-150-AC-AFI	EX3400 150W AC power supply, back-to-front airflow (power cord ordered separately)
JPSU-150-AC-AFO	EX3400 150W AC power supply, front-to-back airflow (power cord ordered separately)

Product Number	Description
JPSU-150-DC-AFO	EX3400 150W DC power supply, front-to-back airflow (power cord ordered separately)
JPSU-600-AC-AFO	EX3400 600W AC power supply, front-to-back airflow (power cord ordered separately)
JPSU-920-AC-AFO	EX3400 920W AC power supply, front-to-back airflow (power cord ordered separately)
Fans	
EX3400-FAN-AFI	EX3400 back-to-front fan, spare
EX3400-FAN-AFO	EX3400 front-to-back fan, spare
Optics	
EX-SFP-10GE-DAC-1M	SFP+ 10-Gigabit Ethernet Direct Attach Copper (twinax copper cable), 1m
EX-SFP-10GE-DAC-3M	SFP+ 10-Gigabit Ethernet Direct Attach Copper (twinax copper cable), 3m
EX-SFP-10GE-DAC-5M	SFP+ 10-Gigabit Ethernet Direct Attach Copper (twinax copper cable), 5m
EX-SFP-10GE-DAC-7M	SFP+ 10-Gigabit Ethernet Direct Attach Copper (twinax copper cable), 7m
EX-SFP-10GE-ER	SFP+ 10GBASE-ER 10-Gigabit Ethernet Optics, 1550 nm for 40 km transmission on SMF
EX-SFP-10GE-ZR	SFP+ 10GBASE-ZR; LC connector; 1550 nm; 80 km reach on single-mode fiber
EX-SFP-10GE-LR	SFP+ 10GBASE-LR 10-Gigabit Ethernet Optics, 1310 nm for 10 km transmission on single-mode fiber-optic (SMF)
EX-SFP-10GE-LRM	SFP+ 10-Gigabit Ethernet LRM Optics, 1310 nm for 220m transmission on multimode fiber-optic (MMF)
EX-SFP-10GE-SR	SFP+ 10GBASE-SR 10-Gigabit Ethernet Optics, 850 nm for up to 300m transmission on MMF
EX-SFP-10GE-USR	SFP+ 10-Gigabit Ethernet Ultra Short Reach Optics, 850 nm for 10m on OM1, 20m on OM2, 100m on OM3 multimode fiber
EX-SFP-1GE-LX	SFP 1000BASE-LX Gigabit Ethernet Optics, 1310 nm for 10 km transmission on SMF
EX-SFP-1GE-LX40K	SFP 1000BASE-LX Gigabit Ethernet Optics, 1310 nm for 40 km transmission on SMF
EX-SFP-1GE-SX	SFP 1000BASE-SX Gigabit Ethernet Optics, 850 nm for up to 550m transmission on MMF
EX-SFP-1GE-LH	SFP 1000BASE-LH Gigabit Ethernet Optics, 1550 nm for 70 km transmission on SMF
EX-SFP-1GE-T	SFP 10/100/1000BASE-T Copper Transceiver Module for up to 100m transmission on Category 5
EX-SFP-GE10KT13R14	SFP 1000BASE-BX Gigabit Ethernet Optics, Tx 1310 nm/Rx 1490 nm for 10 km transmission on single strand of SMF
EX-SFP-GE10KT13R15	SFP 1000BASE-BX Gigabit Ethernet Optics, Tx 1310 nm/Rx 1550 nm for 10 km transmission on single strand of SMF
EX-SFP-GE10KT14R13	SFP 1000BASE-BX Gigabit Ethernet Optics, Tx 1490 nm/Rx 1310 nm for 10 km transmission on single strand of SMF

Product Number	Description
EX-SFP-GE10KT15R13	SFP 1000BASE-BX Gigabit Ethernet Optics, Tx 1550 nm/Rx 1310 nm for 10 km transmission on single strand of SMF
EX-SFP-GE40KT13R15	SFP 1000BASE-BX Gigabit Ethernet Optics, Tx 1310 nm/Rx 1550 nm for 40 km transmission on single strand of SMF
EX-SFP-GE40KT15R13	SFP 1000BASE-BX Gigabit Ethernet Optics, Tx 1550 nm/Rx 1310 nm for 40 km transmission on single strand of SMF
EX-SFP-GE80KCW1470	SFP Gigabit Ethernet CWDM, LC connector; 1470 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1490	SFP Gigabit Ethernet CWDM, LC connector; 1490 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1510	SFP Gigabit Ethernet CWDM, LC connector; 1510 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1530	SFP Gigabit Ethernet CWDM, LC connector; 1530 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1550	SFP Gigabit Ethernet CWDM, LC connector; 1550 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1570	SFP Gigabit Ethernet CWDM, LC connector; 1570 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1590	SFP Gigabit Ethernet CWDM, LC connector; 1590 nm, 80 km reach on single-mode fiber
EX-SFP-GE80KCW1610	SFP Gigabit Ethernet CWDM, LC connector; 1610 nm, 80 km reach on single-mode fiber

For 40G VCP Ports

QFX-QSFP-40G-SR4	QSFP+ 40GBASE-SR4 40-Gigabit Optics, 850 nm for up to 150m transmission on multimode fiber
QFX-QSFP-DAC-1M	QSFP+ 40-Gbps QSFP+ Passive DAC Cable, 1 meter
QFX-QSFP-DAC-3M	QSFP+ 40-Gbps QSFP+ Passive DAC Cable, 3 meter
EX-QSFP-40GE-DAC-50CM	QSFP+ 40-Gbps QSFP+ Passive DAC Cable, 50 cm
JNP-QSFP-DAC-5M	QSFP+ 40-Gbps QSFP+ Passive DAC Cable, 5 meter
QFX-QSFP-40G-eSR4	QSFP+ 40-Gbps QSFP+ on OM3/OM4 multimode fiber
JNP-QSFP-40G-LR4	QSFP+ 40-Gbps QSFP+, 10 km range on single-mode fiber

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

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WWT LIST OF EXCEPTIONS: STATE OF WEST VIRGINIA CRFQ 0506 WIC2200000002

WWT provides to the State of West Virginia (the “State” or the “Agency”) the following List of Exceptions to Centralized Request for Quote 0506 WIC2200000002 (Networking Equipment).

WWT’s response is submitted subject the State’s acceptance of any and all assumptions, conditions, exceptions, provisions, disclaimers, milestones, clarifications, or similar terms contained throughout this proposal, including, but not limited to, those noted below. If WWT is down selected, WWT reserves its right to review and negotiate terms and conditions to come to a mutually agreeable set of terms to govern a final award.

The products and/or services as described in this response are the only ones in scope for this project and collectively constitute the “turnkey” solution. For all purposes under the contract, acceptance of products and/or services shall be deemed to occur as follows: for products, upon delivery at the designated location unless rejected within five (5) days due to non-conformance; and for services, upon completion in a manner consistent with the proposal. All timelines provided in this response are estimates. Any OEM products and services provided in this response are solely subject to standard OEM warranties. As a reseller, WWT will pass through to the State the warranties extended by the OEM for such products and services. WWT does not require and shall not have visible access to or control over personally identifiable, protected health, customer, cardholder, or other protected information as defined by applicable laws outside of the State’s controlled environment under this contract and, accordingly, takes exception and does not agree to any terms and conditions to the extent the same suggest otherwise. Given the commercial nature of this offering, WWT takes exception to any limitation of liability greater than one time the aggregate amount payable to WWT. Any OEM software provided under this Agreement is subject to and governed by applicable OEM license agreements. WWT reserves the right to conduct an Information Security review of the State’s policies and practices, provided to WWT in writing prior to the commencement of work. All delivery dates are approximate and not guaranteed. Products will be shipped in accordance with FCA WWT's shipping point (Incoterms 2010), unless otherwise stated herein or agreed to by both parties in writing in a contract. Title and risk of loss will transfer to Buyer at WWT's shipping point.

RFP Section #	RFP Section Name	Requirement	Proposed Language	Notes
GENERAL TERMS AND CONDITIONS Section 8	INSURANCE	The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of	The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty-Ten (3010) days prior to the expiration of the insurance policies, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of	Proposed language from WWT Risk Management.

WWT LIST OF EXCEPTIONS: STATE OF WEST VIRGINIA CRFQ 0506 WIC220000002

		<p>any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether that insurance requirement is listed in this section.</p>	<p>any changes in its insurance policies <u>outlined in this agreement</u>, including but not limited to, policy cancelation, or policy reduction, or <u>change in insurers</u>. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications <u>outlined in this agreement</u> prior to Contract award regardless of whether that insurance requirement is listed in this section.</p>	
<p>GENERAL TERMS AND CONDITIONS</p> <p align="center">Section 28</p>	<p>WARRANTY</p>	<p>The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.</p>	<p>The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship. <u>The Vendor will pass through to the Agency any warranty extended to the Vendor by the Original Equipment Manufacturer ("OEM"). THE FOREGOING ARE THE SOLE AND EXCLUSIVE WARRANTIES GIVEN BY THE VENDOR AND ARE IN LIEU OF AND EXCLUDE ALL OTHER EXPRESS OR IMPLIED WARRANTIES OR CONDITIONS ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A</u></p>	<p>WWT is a reseller of OEM products and services. WWT is not the manufacturer of the OEM products or the provider of any OEM support or OEM professional services. WWT will pass through to the State any warranty extended to WWT by the OEM.</p>

WWT LIST OF EXCEPTIONS: STATE OF WEST VIRGINIA CRFQ 0506 WIC2200000002

			<u>PARTICULAR PURPOSE, AND NON- INFRINGEMENT.</u>	
<p>GENERAL TERMS AND CONDITIONS</p> <p>Section 36</p>	<p>INDEMNIFICATION</p>	<p>The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws .</p>	<p>The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) <u>all claims, losses, liabilities and damages, and to pay all claims, judgments, awards, costs and expenses, including attorneys' fees, to the extent arising out of or related to any third party claims of death, personal injury or property damage resulting from the gross negligence or willful misconduct of the indemnifying Party or its employees.</u>Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws</p>	<p>WWT proposes indemnification of third party claims resulting from gross negligence or willful misconduct.</p> <p>WWT is not in the business of hosting, processing, or storing customer data. As such, the State will not provide WWT any personally identifiable information, protected health information, State or Agency information or other structured personal information as defined by applicable data protection laws.</p> <p>WWT proposes insertion of Limitation of Liability language. Having predictable exposure allows us to predict the extent of our liability and better manage our costs to our customers. WWT is willing to negotiate in good faith mutually agreeable limitation of liability terms.</p>

WWT LIST OF EXCEPTIONS: STATE OF WEST VIRGINIA CRFQ 0506 WIC220000002

			<p>including, but not limited to, labor and wage and hour laws. <u>In no event shall the Vendor's aggregate liability to the State and the Agency under this Contract or in any Statement of Work or Purchase Order issued hereunder exceed the total amount paid by the State and the Agency to the Vendor for the products or services giving rise to the claim. SUBJECT TO THE FOREGOING LIMITATIONS, IN NO EVENT SHALL EITHER PARTY BE LIABLE TO ANY PERSON FOR LOST BUSINESS OR LOST PROFITS OR ANY INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, HOWEVER ARISING, EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.</u></p>	
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