

SPRING ISD NETWORK SWITCH REFRESH

NETWORK SWITCH TECHNICAL SPECIFICATIONS

SCOPE OF WORK

Spring Independent School District (the “District”) is seeking proposals from qualified vendors to provide, configure, and support a network switch refresh at eligible school sites. Replacement of the Category 2 network infrastructure equipment components (hardware and software) necessary to maintain data connectivity within each site, including network switches. The District intends to standardize on Juniper EX4400 switches or equivalent models that meet or exceed the specifications outlined in this RFP. The network switch project will be a turnkey refresh, as quotes will include the setup, installation, and configuration. All services necessary to implement this project, including, but not limited to, planning, installation, configuration, testing, documentation, project management, calling, and quality control management.

All equipment or supplies offered shall be new, currently in production, and of the manufacturer's latest design unless otherwise stated. Bidders proposing equipment they consider to be an “equivalent” to the specified equipment will be considered, but bidders must include supporting documentation such as manufacturer technical specifications, data sheets, white paper, or other documentation that supports equivalence to the specified equipment. Should said documentation not be included with the RFP submission, the vendor will be considered non-responsive and the vendor’s response will be disqualified. All Bidders must submit complete manufacturer’s specifications and current catalog number/identifier if bidding other than manufacturer specified. Failure to submit complete specifications will result in the bid being disqualified.

The selected vendor will be responsible for supplying all required hardware, software licensing, warranty coverage, and professional services necessary for a successful deployment.

The proposed solution must offer built-in automation capabilities to optimize operations and elevate service levels across enterprise campus switching environments. It should streamline the entire lifecycle of wired switching from Day 0 (automated onboarding and zero-touch provisioning), through Day 1 (initial configuration and deployment), and into Day 2 and beyond (ongoing operations, monitoring, and lifecycle management). To effectively manage the evolving needs of the network, the solution must leverage AI-driven capabilities for continuous monitoring, proactive alerting, and intelligent automation. Operational simplicity must be maintained throughout.

While Day 0 and Day 1 are essential for establishing a solid operational foundation, Day 2 and beyond are even more critical for sustaining network performance and reliability.

Therefore, the system must be designed with a strong focus on:

- AI-powered monitoring for real-time visibility and insights
- Proactive alerting to identify and address issues before they impact users
- Automation of routine tasks to reduce manual intervention and operational overhead
- Comprehensive analytics to support in-depth troubleshooting and performance optimization

Key objectives include:

- Upgrading access and distribution switches to Juniper EX4400 (or equivalent) platforms.
- Increasing network performance and bandwidth capacity.
- Enhancing manageability through Juniper Mist cloud management (or equivalent).
- Ensuring long-term supportability, security, and compliance with District standards.

MINIMUM REQUIREMENTS

Spring ISD requires the following system capabilities:

- A centralized cloud-based system for the management of the network switches.
- Knowledge Transfer for at least four (4) district engineers to support and maintain all aspects of the network switches.
- The awarded vendor needs to be a certified Extreme partner that understands and knows how to integrate Juniper switches with Extreme campus fabric.
- A centralized cloud-based system for monitoring, reporting, and providing network switch infrastructure analytics.
- Comply with all service provider E-Rate registration, guidelines, and policies as outlined by the Universal Service Administration Company (USAC).
- Solutions proposed need to be "turnkey", including all necessary hardware, wiring (when needed), and configuration.
- Bids provide appropriate device software license and support maintenance for 5 years.
- Removal of existing and installation of new switches and cabling, if necessary, as part of a "Rip and Replace" project.

The vendor shall:

- Provide Juniper EX4400 switches or equivalent, with required optics, power supplies, and accessories.
- Ensure proposed switches support:
 - 1/10/25Gb uplinks

- Link aggregation grouping
- Stackable architecture or virtual chassis for resiliency
- Advanced Layer 2/Layer 3 functionality
- IEEE 802.1X and role-based access control
- QoS suitable for voice, video, and data traffic
- Cloud-based management and monitoring (Juniper Mist or equivalent).
- Include a multi-year hardware warranty and software subscription.
- Provide professional services for staging, configuration, and installation (optional line item if District staff performs installation).
- Provide training and knowledge transfer for District network staff.
- The Seller is responsible for supplying a spreadsheet containing the location label information and Spring ISD asset tag (SISD will provide) that has been placed on the network switch, Model of the Network Switch, and the Serial Number of the Network Switch. The electronic spreadsheet must be given to the designated District technical representative **prior to starting** each school. See **Chart A below** for the expected format of the spreadsheet.

Chart A, Network Switch Labeling and Spreadsheet Example

The Seller will be responsible for placing a "location label" on each installed network switch that is visible and consists of the campus acronym, MDF/IDF number, and room number.

The network switch will be labeled as such:

Location label: School Acronym – MDF/IDF number - Room Number

Internal AP EXAMPLE: AES-MDF01-RM225
AES-IDF04-RM105

The Seller is responsible for supplying a spreadsheet containing the SISD asset tag, switch serial number, label on network switch, model of switch, and room number

SISD Asset Tag	Switch Serial No.	Label on Network Switch	Model of Switch	Room #
		AES-MDF01-RM205	MyOwn 9039	B1
		AES-IDF03-RM105	MyOwn 9039	A25

QUANTITIES

The quantities requested are the district's best estimate and may be adjusted as recommended by the offeror. The district reserves the right to increase or reduce quantities and buy some, all, or none of the listed equipment.

Proposals must include all costs associated with providing the requested products/services to the district, including but not limited to taxes, shipping, etc. When applicable, offerors must include all costs associated with the installation of the equipment and components, including, but not limited to, power supplies, DAC cables, network modules, transceivers, etc. Vendors that submit proposals that fail to list applicable fees or charges will be responsible for those missing fees or charges - these will not be paid by the District.

Offerors must provide unit pricing for each item. Bids that do not include all of the items listed below (or functional equivalents of the items below) will be disqualified.

Proposed service fees for each piece of equipment should:

- be shown as separate line-item charges,
- include the E-rate eligible percentage, and
- be categorized as Internal Connections (IC) or Basic Maintenance of Internal Connections (BMIC)

Additional Information

Quantity (Approx.)	Function	Model Number
250	Network Switch	Juniper EX4400-48MP
250	Additional power supply and power cable for PoE	JPSU-1600-CAC-APO & CBL-PWR-C15M-HITMEP-US
187	DAC Cables	JNP-100G-DAC-1M & JNP-100G-DAC-3M
171	Network Modules	EX4400-EM-4S Network Module 1G/10G & EX4400-EM-4Y Network Module 10G/25G
230	Transceiver	SPF-1G-SX-C & SPF-25G-LR & SPF-25G-DAC-3M
250	Software Licenses	Juniper Mist AI Cloud Services or equivalent
250	Support	Support covering a period of 5 years for each WAP

TECHNICAL SPECIFICATIONS

Proposed switches must meet or exceed the following:

- **Form Factor:** 1RU fixed configuration switch.
- **Access Ports:** 48 × 1GbE/Multigigabit ports (RJ45).
- **Stacking/Virtual Chassis:** Up to 10 switches stackable with 480Gbps fabric bandwidth.
- **Throughput:** Minimum 600 Gbps switching capacity.
- **Features:** L2/L3 support, EVPN-VXLAN readiness, PoE/PoE+ (90W per port on select models).
- **Management:** Compatible with Juniper Mist cloud management or equivalent.
- **Warranty:** Minimum 5 years hardware replacement and software updates.

Architecture

- **Cloud Connectivity** - The system should support connections for switches integrating with the cloud.
- **Site Assignment & Naming** - Site-specific switch assignment and auto-generated device names using user-defined text, variables, and counters based on a predefined format.
- **Switch Onboarding Options:**
 - Scanning individual device codes
 - Using a single activation code for multiple devices
- **Zero Touch Provisioning (ZTP)** - Support automated ZTP for streamlined switch deployment.
- **ZTP Professional Services** - If registration requires vendor support, the process and any associated costs should be clearly outlined.

Security & Compliance

- **Role-Based Access Control (RBAC)** - Support granular RBAC to refine administrator access based on the following roles:
 - Global Administrator
 - Global Read-Only
 - Administrator with access to a user-defined list of sites/networks
 - Limited Administrator (Read-Only) with access to a user-defined list of sites and networks, along with additional permissions to:
 - Reboot individual devices
 - Conduct cable tests
 - Upgrade firmware on specific devices
 - Manage switch port configurations for a designated subset of ports
- **Administrator Login & Change Logs** - Automatically log administrator login events and configuration changes, capturing:
 - Login details, including username, timestamp, and RBAC access level

- Configuration modifications, recording username, timestamp, and before-and-after changes
- Data retention for a minimum of 60 days
- Filtering options based on administrator name, time range, or event type
- **Configuration Review & Change Differentiation** - The system should allow administrators to review changes before applying new configurations, clearly distinguishing:
 - New settings being added
 - Existing configurations being removed

Performance & Testing

- **Comprehensive Key Performance Indicators (KPIs)** - Provide measurable KPIs for all networks, locations, and individual devices without requiring manual baselines or deployment of additional sensors. KPIs should include:
 - Performance Metrics:
 - Uplink and downlink congestion
 - Storm control
 - Interface anomalies (Cable issues, MTU mismatch, and Negotiation issues)
 - Network delays (latency/jitter)
- **Wired Network Experience Monitoring with Configurable Performance Benchmarks** - The solution offers end-to-end visibility into wired network performance by leveraging customizable performance benchmarks to monitor key indicators such as connection success, throughput, switch health, and device onboarding. By capturing both pre- and post-connection metrics, it enables IT teams to proactively identify and address issues, ensuring reliable connectivity for users, devices, and IoT endpoints.
- **Automated & Manual Packet Capture** - The platform should facilitate:
 - Automatic packet capture upon a port-up event
 - Manual packet capture on a user-selected subset of interfaces, spanning multiple switches

Switch Services

- **Template Configuration Scope** - Templates should support:
 - RADIUS, NTP, DNS configurations
 - Routing
 - VLAN definitions (including Layer-3 VLANs)
 - Port/Interface settings, including:
 - Trunk/Access ports
 - Native VLAN & allowed tagged VLANs
 - MTU, PoE (Enable/Disable)
 - Port Speed/Duplex settings
 - Spanning Tree

- Storm Control configuration, including the ability to distinguish broadcast, Multicast, and/or unknown unicast
 - MAC-based Port Security and persistent MAC addresses
 - Automated switchport configuration based on user-defined match criteria, applicable to user-selected switches and ports.
- **Port Assignment** - Must support assigning ports to predefined interface profiles.
- **Port Bouncing** - Enable administrators to perform port bouncing as needed.
- **PoE Utilization Monitoring** - Since PoE plays a critical role in network operations, reporting should include:
 - PoE port details and overall usage
 - Total PoE budget vs. used PoE capacity
 - Endpoint PoE classification
 - Individual PoE usage metrics
 - Top PoE-consuming ports
- **Configuration Templates** - During onboarding, templates should support multiple levels of configuration:
 - Organization-wide settings
 - Model-specific configurations
 - Role/label-based definitions
 - Site-specific settings
 - Device-specific customization

Device Management

- **Management IP Address Assignment** - Allow dynamic or static assignment of management IP addresses to each switch.
- **Remote Switch Upgrade/Downgrade** - The system should support remote software updates from the management platform, including:
 - Selecting a specific software release and applying it to individual switches, a user-defined subset, or all switches within a site.
 - Upgrading to newer versions or downgrading to older versions.
 - Rebooting switches immediately post-upgrade or deferring the reboot.
 - Scheduling upgrades for a user-selected day/time, specifying which switches to update.
- **Automated Firmware Upgrades** - Automatic upgrade of switches to a user-selected firmware version upon first connection to the management platform.
- **Configuration Backup & Viewing** - Administrators should be able to download switch configurations to a local device in a standard format (text or CSV) for backup or review.
- **Configuration Overrides** - Ability for administrators to override template-based configurations for selected individual configuration elements.
- **Full CLI Access** - Support full Command Line Interface (CLI) access via cloud management, SSH, and local console ports.

- **Direct CLI Configuration via Template** - Platform should allow command-line configurations to be added directly within templates.

Monitoring & Analytics

- **Network Wired Switch Reporting** - The system should allow reporting to be filtered by:
 - Time period (ranging from 1 day to 90 days)
 - Switch name or keyword
 - Specific switch selection
 - Individual port
 - Event type categorization
- **Detailed Reporting Metrics** - The system should provide in-depth switch analytics, including:
 - Port ID
 - Switch name and model
 - Stack member count
 - Active ports trend
 - Traffic trend per switch
 - PoE status and usage details
 - Number of utilized ports
 - RX/TX bytes data
 - Connected client count
- **Advanced AI Analytics and Troubleshooting Engine** - Provide concise, low-noise, and actionable insights into enterprise wireless network issues affecting real clients. Each insight must be automatically correlated with a detected root cause and presented in a format that enables rapid remediation. The analytics engine should leverage machine learning or rule-based correlation to reduce false positives and prioritize critical issues. These insights must include, but are not limited to:
 - Missing VLANs
 - Bad cables
 - Negotiation mismatch
 - Loop detection
 - Port flap
 - High CPU
 - Port stuck
 - Traffic anomaly
 - Misconfigured ports
 - Traffic loops
- **User Connectivity and Switch Status Metrics** - The system must be capable of collecting, storing, and reporting on the following across all networks, locations, and individual devices without requiring manual baseline configurations or the deployment of additional sensors:
 - User Connectivity Metrics:

- DHCP performance
- Spanning Tree port blocking state
- Switch Status Metrics:
 - ARP Table, Route Table, and MAC Address Table capacity
 - Power cycle and status monitoring
 - CPU utilization
 - Temperature monitoring
 - Memory utilization
 - **Reachability to the management portal**

Automation & AI

- **Automated Switchport Configuration** - Automatic configuration of switchports based on user-defined rules, enabling seamless client identification through customized matching criteria.
- **API Usability** - Full accessibility via API, enabling individual API queries, automation, and scripting.
- **AI - Natural Language Chat Interface** - Must include a natural language chat interface that allows IT administrators to query network performance and connectivity using conversational language. The chatbot must:
 - Understand and respond in natural language
 - Provide insights across the entire campus network stack (wireless, wired, WAN) when deployed with the same vendor's infrastructure
 - Identify and explain root causes of performance degradation
 - Support proactive recommendations and historical context
- **Microsoft Teams and Zoom Integration** - Must integrate with Microsoft Teams and Zoom to ingest call quality telemetry for organizational users, including:
 - Automatically correlate call quality issues with related full-stack network performance problems.
 - Present this data in a simple, intuitive troubleshooting view for IT staff

VENDOR QUALIFICATIONS

- Be an authorized Juniper Networks partner or equivalent manufacturer's partner.
- Have demonstrable K-12 or public sector experience with switch deployments.
- Provide at least three (3) references from similar projects.

ADDITIONAL FACTORS

- **DISQUALIFICATION FACTOR INTERNAL CONNECTIONS:** The applicant will not accept bids from manufacturers of equipment deemed a national security threat by the Federal Communications Commission. The list of prohibited equipment is available here: <https://www.fcc.gov/supplychain/coveredlist>. Vendors that submit bids that include these manufacturers will have their bids disqualified.

- DISQUALIFICATION FACTOR INTERNAL CONNECTIONS: Service providers are required to bid on the entire hardware project. Bids for individual components, or bids that do not include all of the requested items for the project, will be disqualified.
- DISQUALIFICATION FACTOR INTERNAL CONNECTIONS: Applicant will not accept bids for refurbished equipment. Any bids containing refurbished equipment will be disqualified.