



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
**MATERIALS MANAGEMENT DIVISION**  
**Powai, Mumbai 400076.**

Ref No. (PR No. 1000035509)

(Rfx No. 6100001595)

## **Layer 2 Managed 48 ports switches [Qty 14]**

**Detailed Specifications for Access switches (Layer 2 Managed 48 ports switches) and also used for PoC**

<b>Parameters</b>	<b>Detailed Specifications</b>	<b>Compliance (Yes / No)</b>
<b>1. Details of 48 Port switch</b>	<ul style="list-style-type: none"><li>1.1 48 nos. of 10/100/1000 BaseT ports</li><li>1.2 The 48 ports above, four are additional uplink ports with 4 nos. of 1G/10GBase-SX SFP based Gigabit Ethernet Ports Auto Speed, Auto-negotiation capabilities.</li><li>1.3 Packet Forwarding Rate:130 Mbps</li><li>1.4 Switching capacity 176Gbps</li><li>1.5 With Stacking 40Gbps from Day 1</li><li>1.6 Minimum Packet Buffer 4MB</li><li>1.7 Minimum RAM 1GB</li><li>1.8 Minimum Flash 1GB</li></ul>	
<b>2. Layer 2 Security</b>	<ul style="list-style-type: none"><li>2.1 Rate limiting/Shaping based on Port, IP address, and MAC address</li><li>2.2 Port-based ACL</li><li>2.3 Time-based ACL (It should be possible to enforce an access list based on the time of day. It should allow the network administrator to define, permit and deny access).</li><li>2.4 MAC to IP address binding, Port to MAC address binding</li><li>2.5 MAC limiting, MAC address tracking/movement, and notification.</li><li>2.6 DHCP Snooping. DHCP option 82 with Port/VLAN ID.</li><li>2.7 DHCP Server (IPv4, IPV6) or DHCP Solution (IPv4, IPV6) per distribution</li><li>2.8 DoS protection, SYN attack protection, Protection against man in the middle attack or equivalent, ipv6 router advertisement filtering.</li><li>2.9 Port-based security- 802.1x, Port-based network access control</li></ul>	

	<p>2.10 Per-port Unicast, broadcast, multicast storm control.</p> <p>2.11 Role-based policy</p> <p>2.12 Layer 2 traceroute or equivalent</p> <p>2.13 IP security (Dynamic ARP protection, DHCP enforcement)</p> <p>2.14 1 to many port mirroring</p> <p>2.15 MAC authentication, web authentication</p> <p>2.16 SNMP, SSH, TELNET ACL to access the switch for admin and user restrictions.</p> <p>2.17 MACsec encryption</p> <p>2.18 The switch should support Role-based policy and integration with NAC</p>	
<b>3. L2 Protocols</b>	<p>3.1 Support for IEEE 802.1D (STP &amp; RSTP and PVST+), IEEE 802.1Q, 802.1w, 802.1s</p> <p>3.2 BPDU Guard or equivalent</p> <p>3.3 Support for IEEE 802.3ad Link aggregation and load sharing.</p> <p>3.4 Support for IEEE 802.1AB LLDP, LLDP-MED for autoconfiguration</p> <p>3.5 Port/MAC based VLAN</p> <p>3.6 MVRP 802.1ak or equivalent</p> <p>3.7 Stacking up to Max 8 switches</p> <p>3.8 Radius and TACACS+ for users</p> <p>3.9 IEEE 802.3az (Energy Efficient Ethernet)</p> <p>3.10 The switch should support VLAN with a minimum 1K active VLAN and 4K VLAN ID, 16K MAC</p>	
<b>4. Switch Management</b>	<p>4.1 Command Line Interface (CLI)</p> <p>4.2 SNMPv1, SNMPv2, SNMPv3,</p> <p>4.3 Secure Shell (SSH1/ SSH2), SFTP, SCP and Telnet</p> <p>4.4 Support for TFTP, NTP</p> <p>4.5 Support for RMON I and II</p> <p>4.6 RADIUS authentication enabled centralized control of the switch</p> <p>4.7 The switch should support Python/TCL Language scripting for automation, XML API.</p> <p>4.8 Should support open API for third-party application integration.</p> <p>4.9 Web-based management.</p> <p>4.10 Should support telemetry or equivalent</p> <p>4.11 The switch should support multiple firmware and configurations to restore easily from Flash.</p>	
<b>5. Multicast &amp; QoS Features</b>	<p>5.1 IGMP v1, v2, v3, and IGMP snooping</p> <p>5.2 The switch should support priority queuing</p> <p>5.3 The switch should support 8 hardware QoS queues per port</p> <p>5.4 The switch should support DSCP</p>	

<b>6. Hardware</b>	<p>6.1 ASIC based hardware for high performance</p> <p>6.2 Wire-speed storm control</p> <p>6.3 Wire-speed ACL enforcement</p> <p>6.4 IPV6 support</p> <p>6.5 Console port, USB or External Flash, and Out of band IP base management port</p> <p>6.6 sflow/NetFlow or equivalent support.</p> <p>6.7 Should support a 9K jumbo frame.</p> <p>6.8 Should support minimum 1K ACL</p> <p>6.9 Firmware should latest in nature.</p>	
<b>7. SDN / Automation</b>	<p>7.1 Software Defined Networking (SDN) based fabric network or equivalent Capability from day1</p> <p>7.2 OpenFlow/RESTCONF/Netconf or equivalent protocol capability to enable Software Defined networking</p> <p>7.3 Virtualizing and segregating. segmenting/dynamic segmentation users and services with isolation zones.</p> <p>7.4 The solution should be able to build/configure virtualized L2 and L3 encapsulated tunnels or fabric across multiple switches</p> <p>7.5 The solution should provide automated configuration of services (VLAN, Multicast), etc. end to end with minimal human intervention. (The vendor should showcase the automation technology)</p> <p>7.6 Should with IPv4 and IPv6</p> <p>7.7 The solution should support any topology regardless of the number of switches connected.</p> <p>7.8 The SDN based Fabric solution should support network automation from Day 1.</p> <p>7.9 The OEM/Bidder should provide all the requisite hardware and licenses for the SDN based Fabric solution from Day 1.</p> <p>7.10 Required orchestration tools to automate SDN based fabric networks should be provided from day 1.</p> <p>7.11 The proposed solution for Software Defined Networking and analytics should be on-premise.</p> <p>7.12 The Software Defined Networking and network switches from the same OEM.</p>	
<b>8. Basic L3 Functionality</b>	<p>8.1 The Switch should support static routes and dynamic routing protocols like RIPv1/v2, RIPv6, OSPFv1/v2 VRRPv2/v3, from day 1.</p> <p>8.2 Should support policy-based routing.</p>	
<b>9. Power, Fan &amp; Temperature</b>	<p>9.1 220V AC 50Hz. with Indian standard Power cable.</p> <p>9.2 The switch should support variable fan speed to adjust to varying weather conditions on the campus.</p>	

	<p>9.3 0-45 C operating temperature and 10-90 % Relative humidity</p> <p>** Note that the power cords in all components should comply with Indian standards. Adapters should not be used.</p>	
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## 2.0 Qualification Criteria for Bidder and OEM

The bidder/OEM's qualification will be determined based on their ability to execute this project and provide continuous support.

The Bidder/OEM should submit the tender documents with the indexing as mentioned in the criteria shown below with the proof of supporting documents. The sequence with page numbers and bookmarking should be clearly specified. In addition to the supporting documents, an undertaking for the fulfillment of each eligibility criterion should be submitted.

**The Bidder and OEM should satisfy the following criteria.**

Sr. No	Eligibility Criteria	Yes / No	Submit the Proof Documents
1	OEM must be in the core business of networking equipment (L2 and L3 Switches) and must have a presence for a minimum of 3 years in India.		
2	The bidder should be an authorized representative of the OEM. The bidder shall furnish the manufacturer's authorization (MAF) letter from the respective OEMs, specific to this tender mentioning the tender number for which bid the authorization is being provided.		
3	OEM should have 24x7x365 fully functional service and support centres in India. that can guarantee during the warranty and AMC period that any replacement if required can be done within 24 hours/Next business day. Provide the relevant documents.		
4	Bidder should be an OEM-certified network switches solution supplier and integrator.		
5	The bidder must have experience in Supply, Installation, Maintenance of Installation of LAN Networking solutions at any Government / Semi-Govt. / Government Undertaking / PSU / Institution / Educational Institutes of Higher Learning during previous 3 years ending last day of month previous to the month of publication of this tender.		
6	The bidder should be a solution supplier and integrator of an authorized OEM.		
7	The bidders should demonstrate all the specified features in the switches as the technical evaluation process as part of PoC whenever it is required.		
8	An undertaking (self-certified) is to be submitted by the bidder that neither the OEM nor the bidder should have been blacklisted for security or for any other reason by any state or central government in India or by any public sector unit in India to date.		
9	The proposed OEM product shall not be declared the end of support and end of life for the next 7 years from the date of submission of the bid.		
10	All network switching components (access switches (L2), transceivers (SX, LX, LR Modules), Stacking cables and Network Management Software (NMS), etc.) from the same OEM.		

<b>11</b>	The offered products access switches(L2) solution against the supply order shall be of the latest version, the latest product, and should be under support for the next 7 years. However, if any product, which is declared an end of life by the OEM during the supply period of material (During the Contract period), the bidder should supply a replaced model or next higher model/version with the same specification of higher specification of the product.		
<b>12</b>	The support facilities should be fully owned by the bidder / OEM and managed by their permanent employees (company payroll) and not through franchisee(s).		
<b>13</b>	The bidder should have local support in Maharashtra.		
<b>14</b>	Technical Assistance Centre (TAC) and research and development (R&D) should be based in India.		
<b>15</b>	The bidder should have valid documentary proof of GST registration number.		
<b>16</b>	The bidder should have a positive net worth during the last three financial years.		
<b>17</b>	It is mandatory to enclose all the supporting documents.		

### 3.0 Scope of Work and Terms & Conditions

The bidders who have the capability to provide a TOTAL TURNKEY solution which includes

1. The bidders should supply, including transportation to the site, install, configure and demonstrate all the specified features in the switches as a total turnkey solution.
2. The bidders should supply, install and operationalize Software Defined centralized network management and monitoring solutions for provisioning, monitoring and management of proposed LAN solutions.
3. The bidders should provide all the documentation including Architecture, Design, Deployment diagrams, test plans, operating and service manuals and test reports of the deployed LAN switches, both in hard and electronic copy versions.
4. The bidders should provide all documents/manuals useful for daily administration.
5. The bidder should bear all costs during the preparation and submission of the proposal, site visit (if required) etc.
6. The bidder must provide verifiable eligibility criteria documents to support their claims.
7. No new information will be accepted from the bidder after the submission of the bids. However, IIT Bombay may ask for clarifications if required, on submitted information to evaluate the bid. The bidder should respond to such clarification requests within the specified time defined by IIT Bombay during that phase.
8. Due to an extremely strict deadline for incurring the expenditure, IIT Bombay has the right to cancel the PO if the delivery, installation and acceptance testing is not completed within the stipulated timeline. Specifically,
  - 8.1 Delivery should be within 3-4 weeks of issuing of PO.
  - 8.2 Installation, commissioning, and acceptance testing should complete within 2-3 weeks of delivery.
9. The bidder should provide a comprehensive warranty for the 5 years.
10. The warranty period is to be counted from the date when the installation is completed and the acceptance certificate has been issued by IIT Bombay.
11. The installation will be executed by certified and trained engineers from Bidder/OEM for the complete LAN solution followed by well-documented, comprehensive user training.
12. Any item not specifically mentioned in the technical specification solution and bill materials but is required for successful implementation of the total overall solution (in the solution proposed by Bidder/OEM) must be brought to our notice and Bidder/OEM should include all the necessary components in the bid without any cost of product and licensing to the IIT Bombay.

13. At the time of installation, if it is found that some additional hardware or software items are required to meet the operational requirement of the configuration but not included in the OEM's original list of deliverables, the Bidder/OEM shall supply such items to ensure the completeness of the configuration at no extra cost and within the stipulated time.
14. The entire installation should be done at the proposed site only. Requests for remote access for installation/fine-tuning will not be entertained during the installation period.
15. The cover letter and all the tender documents should be submitted on the company letterhead of the bidder along with the technical proposal.
16. Bidders should quote for the products and models specified in the Technical Specification Table with service level agreement as mentioned in the document elsewhere.
17. If the specific model is not available, the bidder can quote for a product with higher specification and capability, and compatibility. Bidders cannot quote for products with inferior specifications.
18. Bidders have to be awarded by OEM as one of their certified partners and also have to produce such certificates.
19. The bidder should attach a compliance sheet with each of the specifications, and configuration manuals, and reference documents with proof of compliance.
20. IITB reserve the right to reject the quotation of any bidder who violates these conditions and reserve the right to cancel the tender at any time.
21. An undertaking of acceptance of the above terms & conditions should be given by the Bidder on their letterhead.
22. OEM must have support centres in India.
23. Any complaint / Breakdown call reported should be attended to on the same day within 2 hours by the local resident engineers or city-allocated engineer of the Bidder. The resolution of critical calls will be resolved within 8 hours while non-critical issues will be resolved within the next day.
24. Warranty: Each product deployed in the network shall be with a comprehensive on-site OEM warranty (including labours and spares) for the 5 Years starting from the date of Acceptance of the project implementation. IITB as well as the selected bidder should be able to log a call with the OEM as per the support contract offered. The service agreement contract copy from the OEM should be submitted to IITB within 1 months after the award of the contract.
25. Delivery and Installation Schedule: The time duration for the complete roll-out of the proposed solution is up to 2-3 weeks from the date of the formal purchase order. After issuing the purchase order, failing which the penalty clauses mentioned in the PO will be levied.
26. Bid will be followed by electronic reverse auction.

#### **4.0. Service Level Agreement and Warranty:**

All the following conditions must be agreed upon.

1. Proposed Products (software, firmware, and hardware) should have a comprehensive OEM onsite warranty pack for 5 years for the entire shipment starting from the date of installation.
2. IIT Bombay as well as the selected bidder should be able to log a call with the OEM as per the support contract offered.
3. The service agreement contract copy should be submitted to IIT Bombay within the 3 months after the award of the contract.
4. The defects, if any, during the guarantee/warranty period are to be rectified free of charge by arranging free replacement wherever necessary.
5. During the warranty period, OEM/bidder will have to undertake comprehensive maintenance of the entire hardware components, equipment, software support supplied by the vendor at the place of installation of the equipment (each six-month time span).
6. A letter of commitment for five years from the date of installation, concerning Hardware Software, and Firmware support from OEM should be enclosed in the bid cover. Offers will be rejected if they are not accompanied by a letter from the OEM.
7. Technical support from Bidder/OEM should be provided for system administration/ maintenance of the switching solution during the entire warranty period.

8. OEM/Bidder should protect any data during any upgrades of hardware/ firmware/ OS.
9. An inventory of common parts that require replacement shall be made available to IIT Bombay a prior on-site.
10. This comprehensive onsite warranty includes but is not limited to software releases, up-gradation and bug fixes.
11. The OEM quoting through the bidder must have local Technical Assistance Centre (TAC) support in India through a toll-free number and Returned Materials Authorization (RMA) depot in India wherein customers can directly log a complaint against any failure.
12. The technically qualified bidder will be allowed to participate in commercial bidding.  
Documentation to be provided (After installation)
  - 12.a. Network survey for proposed locations at BSBE, IIT Bombay.
  - 12.b. Step by step installation guide and configuration of switching solution from start.
  - 12.c. Network L2 Switches configuration and integration with IIT Bombay existing setup.
  - 12.d. Basic troubleshooting and Hands-on L2 security features like MAC to IP address binding and Time-based ACL in the access switches, Storm Control, DOS, IPV6, SDN based Fabric, and network management with the network traffic in-depth analysis, etc. features are critical for this network.
  - 12.e. Any other document/manual useful for daily administration.
  - 12.f. The L1 bidder should provide hands-on training of detailed configuration and debugging methodology to the BSBE network Team. It may be on-premises or in OEM/Bidder location, without charge.