



**Shri Vithal Education & Research  
Institute Pandharpur**

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**Tender Notification**

Sealed tenders are invited for Campus Networking. Tender form with detailed specifications is available on our website [www.sveri.ac.in](http://www.sveri.ac.in) The completed tender form along with DD in favor of "Secretary, Shri Vithal Education and Research Institute, Pandharpur" payable at Pandharpur or Receipt of cash paid for Rs. 300/- be submitted or send on above address to reach on or before 16/03/2015 at 5:30 PM. The institute reserves the right to reject the tender without giving any reason in full or part thereof and will not be responsible for any postal delay.

Date: 10/03/2015  
Sr.No.SVERI/2014-15/19

(Dr. B.P. Ronge)  
SECRETARY

## **Tender Form**

1. NAME OF THE FIRM : \_\_\_\_\_
2. CORRESPONDENCE ADDRESS  
WITH TELEPHONE AND FAX NO : \_\_\_\_\_
3. LOCAL ADDRESS WITH TELEPHONE  
AND FAX NO. : \_\_\_\_\_
- 4 SALES TAX/VAT REGISTRATION PROOF : \_\_\_\_\_
5. COPY OF AUTHORISED DISTRIBUTORSHIP : \_\_\_\_\_
6. TECHNICAL SPECIFICATIONS OF  
THE GOODS ALONGWITH  
LITERATURE/BROCHURE : \_\_\_\_\_
- 7 PROOF OF PAST PERFORMANCE  
IF ANY : \_\_\_\_\_
8. LIST OF OWNERS/PARTNERS AND  
CERTIFICATION REG. BLACKLIST & CR.  
CASE ATTACHED OR NOT : \_\_\_\_\_
9. TENDER FEE : \_\_\_\_\_
- 10 EARNEST MONEY DETAIL : \_\_\_\_\_
- 11 COPY OF TERMS AND CONDITION  
DULY SIGNED & STAMPED : \_\_\_\_\_

SIGNATURE OF THE TENDERER  
WITH STAMP

\_\_\_\_\_

\_\_\_\_\_

1. **Active Components** (Cisco/HP/UBNT/Other Compatible/Nearest with below configuration)

a. **Core Switches**

<b><u>Sr. No</u></b>	<b><u>Specifications</u></b>	<b><u>Qty.</u></b>	<b><u>Rate In Rs.</u></b>
<b><u>1</u></b>	<b><u>Architecture</u></b>		
1.1	Shall be 1RU, 19" Rack Mountable		
1.2	The switch shall have twenty four (24) 10-Gigabit slots (SFP+/XFP)		
1.3	The switch shall have two autosensing 10/100/1000 ports		
1.4	1 RJ-45 serial console port and 1 RJ-45 out-of-band management port		
1.5	1024 MB flash, 512 MB SDRAM		
1.6	Shall have switching capacity of 484 Gbps		
1.7	Shall have up to 360 million pps switching throughput		
1.8	Shall provide Latency of 3 $\mu$ s and support cut-through switching		
1.9	Shall be 19" Rack Mountable, 1RU Height		
<b><u>2</u></b>	<b><u>Resiliency</u></b>		
2.1	Shall have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and Layer-3 router		
2.2	The modules/cables to create virtual switching fabric shall be provided		
2.3	The virtual switch shall support distributed link aggregation and distributed switching/routing		
2.4	Shall have hot-swappable, redundant power supplies		
2.5	Shall have hot-swappable, redundant fan trays with front-to-back airflow		
2.6	IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol		
2.7	IEEE 802.3ad Link Aggregation Control Protocol (LACP)		
2.8	Ring protocol support to provide sub-100 ms recovery for ring Ethernet-based topology		

2.9	Virtual Router Redundancy Protocol (VRRP) to allow a group of routers to dynamically back each other up to create highly available routed environments		
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2.10	Graceful restart for OSPF, IS-IS and BGP protocols		
2.11	Bidirectional Forwarding Detection (BFD) for OSPF, IS-IS and BGP protocols		
<b>3</b>	<b><u>Layer 2 Features</u></b>		
3.1	Shall support up to 4,000 IEEE 802.1Q-based VLANs		
3.2	Shall support GARP VLAN Registration Protocol or equivalent feature to allow automatic learning and dynamic assignment of VLANs		
3.3	Shall have the capability to monitor link connectivity and shut down ports at both ends if uni-directional traffic is detected, preventing loops		
3.4	Shall support IEEE 802.1ad QinQ and Selective QinQ to increase the scalability of an Ethernet network by providing a hierarchical structure		
3.5	Shall support Jumbo frames on GbE and 10GbE ports		
3.6	Internet Group Management Protocol (IGMP)		
3.7	Multicast Listener Discovery (MLD) snooping		
3.8	IEEE 802.1AB Link Layer Discovery Protocol (LLDP)		
<b>4</b>	<b><u>Layer 3 Features (any additional licenses required shall be included)</u></b>		
5.1	Static Routing for IPv4 and IPv6		
5.2	RIP for IPv4 (RIPv1/v2) and IPv6 (RIPng)		
5.3	OSPF for IPv4 (OSPFv2) and IPv6 (OSPFv3)		
5.4	IS-IS for IPv4 and IPv6 (IS-ISv6)		
5.5	Border Gateway Protocol 4 with support for IPv6 addressing		
5.6	Policy-based routing		
5.7	Unicast Reverse Path Forwarding (uRPF)		
5.8	IPv6 tunneling to allow IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet		
5.9	Dynamic Host Configuration Protocol (DHCP) client, Relay and server		
5.10	PIM Dense Mode (PIM-DM), Sparse Mode (PIM-SM), and Source-Specific Mode (PIM-SSM) for IPv4 and IPv6 multicast applications		
5.11	Multicast Source Discovery Protocol (MSDP) for inter-domain multicast applications		
<b>5</b>	<b><u>QoS and Security Features</u></b>		

6.1	Access Control Lists for both IPv4 and IPv6 for filtering traffic to prevent unauthorized users from accessing the network		
6.2	Port-based rate limiting and access control list (ACL) based rate limiting		
6.3	Congestion avoidance using Weighted Random Early Detection (WRED)		
6.4	Powerful QoS feature supporting strict priority (SP) queuing, weighted round robin (WRR) and weighted fair queuing (WFQ)		
6.5	IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port		
6.6	Media access control (MAC) authentication to provide simple authentication based on a user's MAC address		
6.7	Dynamic Host Configuration Protocol (DHCP) snooping to prevent unauthorized DHCP servers		
6.8	Port security and port isolation		
6.9	URPF to limit malicious traffic on a network		
6.10	Multi-Customer Edge (MCE) VPN or VRF-Lite support		
<b>6</b>	<b><u>Management Features</u></b>		
7.1	Configuration through the CLI, console, Telnet, SSH and Web Management		
7.2	SNMPv1, v2, and v3 and Remote monitoring (RMON) support		
7.3	sFlow (RFC 3176) or equivalent for traffic analysis		
7.4	Management security through multiple privilege levels		
7.5	FTP, TFTP, and Secure FTP support		
7.6	Port mirroring to mirror ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port		
7.7	RADIUS/TACACS+ for switch security access administration		
7.8	Network Time Protocol (NTP) or equivalent support		
7.9	Shall have Ethernet OAM (IEEE 802.3ah) management capability		
<b>7</b>	<b><u>Environmental Features</u></b>		
8.1	Shall provide support for RoHS and WEEE regulations		
8.2	Shall have features to improve energy efficiency like variable-speed fans, shutoff unused ports etc		
8.3	Operating temperature of 0°C to 45°C		
8.4	Safety and Emission standards including UL 60950-1; IEC 60950-1; VCCI Class A; EN 55022 Class A		

<b>8</b>	<b><u>Configuration Required (Per Switch)</u></b>		
9.1	Redundant power supplies and fan trays		
9.2	10G-SR Transceivers - 2 Nos		
9.3	10/100/1000 Mbps Ports - 2 Nos		
9.4	1G Singlemode Transceivers - 2 Nos		

<b>10</b>	<b><u>Warranty and Support</u></b>		
10.1	Three Year Warranty with 24x7 Support		

**b. Distribution Switch**

<b><u>Sr. No</u></b>	<b><u>Specifications</u></b>	<b><u>Qty.</u></b>	<b><u>Rate In Rs.</u></b>
<b>1</b>	<b><u>Architecture</u></b>		
1.1	Shall be 19" Rack Mountable		
1.2	Shall have dual, hot-swappable power supplies		
1.3	16 x Gigabit SFP Slots for 100Mb/1G Transceivers		
1.4	8 RJ-45 autosensing 10/100/1000 ports		
1.5	The switch shall have two expansion slots to support up to four 10G Ports additionally		
1.6	1 RJ-45 serial console port		
1.7	256 MB SDRAM, 32 MB flash		
1.8	Shall have switching capacity of 144 Gbps		
1.9	Shall have up to 107 million pps switching throughput		
<b>2</b>	<b><u>Resiliency</u></b>		
2.1	Shall have the capability to extend the control plane across multiple active switches making it a virtual switching fabric, enabling interconnected switches to perform as single Layer-2 switch and Layer-3 router		
2.2	Shall support virtual switching fabric creation across nine switches using 10G Ethernet Links		
2.3	The modules/cables to create virtual switching fabric shall be provided		
2.4	IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol		
2.5	IEEE 802.3ad Link Aggregation Control Protocol (LACP)		
2.6	Ring protocol support to provide sub-100 ms recovery for ring Ethernet-based topology		

2.7	Virtual Router Redundancy Protocol (VRRP) to allow a group of routers to dynamically back each other up to create highly available routed environments		
2.8	Graceful restart for OSPF, IS-IS and BGP protocols		
2.9	Bidirectional Forwarding Detection (BFD) for OSPF, IS-IS and BGP protocols		

<b>3</b>	<b><u>Layer 2 Features</u></b>		
3.1	Shall support up to 4,000 port or IEEE 802.1Q-based VLANs		
3.2	Shall support GARP VLAN Registration Protocol or equivalent feature to allow automatic learning and dynamic assignment of VLANs		
3.3	Shall have the capability to monitor link connectivity and shut down ports at both ends if uni-directional traffic is detected, preventing loops		
3.4	Shall support IEEE 802.1ad QinQ and Selective QinQ to increase the scalability of an Ethernet network by providing a hierarchical structure		
3.5	Shall support Jumbo frames on GbE and 10-GbE ports		
3.6	Internet Group Management Protocol (IGMP)		
3.7	Multicast Listener Discovery (MLD) snooping		
3.8	IEEE 802.1AB Link Layer Discovery Protocol (LLDP)		
3.9	Multicast VLAN to allow multiple VLANs to receive the same IPv4 or IPv6 multicast traffic		
<b>4</b>	<b><u>Layer 3 Features (any additional licenses required shall be included)</u></b>		
4.1	Static Routing for IPv4 and IPv6		
4.2	RIP for IPv4 (RIPv1/v2) and IPv6 (RIPng)		
4.3	OSPF for IPv4 (OSPFv2) and IPv6 (OSPFv3)		
4.4	IS-IS for IPv4 and IPv6 (IS-ISv6)		
4.5	Border Gateway Protocol 4 with support for IPv6 addressing		
4.6	Policy-based routing		
4.7	Unicast Reverse Path Forwarding (uRPF)		
4.8	IPv6 tunneling to allow IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet		
4.9	Dynamic Host Configuration Protocol (DHCP) client, Relay and server		
4.10	PIM Dense Mode (PIM-DM), Sparse Mode (PIM-SM), and Source-Specific Mode (PIM-SSM) for IPv4 and IPv6 multicast applications		
<b>5</b>	<b><u>QoS and Security Features</u></b>		

5.1	Access Control Lists for both IPv4 and IPv6 for filtering traffic to prevent unauthorized users from accessing the network		
5.2	Port-based rate limiting and access control list (ACL) based rate limiting		
5.3	Congestion avoidance using Weighted Random Early Detection (WRED)		
5.4	Powerful QoS feature supporting strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), and weighted random early discard (WRED)		
5.5	IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port		
5.6	Media access control (MAC) authentication to provide simple authentication based on a user's MAC address		
5.7	Dynamic Host Configuration Protocol (DHCP) snooping to prevent unauthorized DHCP servers		
5.8	Port security and port isolation		
<b>6</b>	<b><u>Management Features</u></b>		
6.1	Configuration through the CLI, console, Telnet, SSH and Web Management		
6.2	SNMPv1, v2, and v3 and Remote monitoring (RMON) support		
6.3	sFlow (RFC 3176) or equivalent for traffic analysis		
6.4	Management security through multiple privilege levels with password protection		
6.5	FTP, TFTP, and SFTP support		
6.6	Port mirroring to duplicate port traffic (ingress and egress) to a local or remote monitoring port. Shall support minimum four mirroring groups		
6.7	RADIUS/TACACS+ for switch security access administration		
6.8	Network Time Protocol (NTP) or equivalent support		
6.9	Shall have Ethernet OAM (IEEE 802.3ah) management capability		
<b>7</b>	<b><u>Environmental Features</u></b>		
7.1	Shall provide support for RoHS and WEEE regulations		
7.2	Shall be capable of supporting both AC and DC Power inputs		
7.3	Operating temperature of 0°C to 45°C		
7.4	Safety and Emission standards including UL 60950-1; IEC 60950-1; VCCI Class A; EN 55022 Class A		
<b>8</b>	<b><u>Warranty and Support</u></b>		



	The below Warranty shall be offered directly from the switch OEM.		
8.1	Lifetime warranty with advance replacement and next-business-day delivery		

**c. Edge PoE Switch**

<b><u>Sr. No</u></b>	<b><u>Specifications</u></b>	<b><u>Qty.</u></b>	<b><u>Rate In Rs.</u></b>
<b><u>1</u></b>	<b><u>Architecture</u></b>		
1.1	The switch shall have 24 RJ-45 auto-negotiating 10/100/1000 PoE ports		
1.2	The switch shall have 4 1000BASE-X SFP ports in addition to above ports		
1.3	The switch shall support IEEE 802.3af PoE on all 24 ports		
1.4	The switch shall have minimum 365 Watts for PoE Power		
1.5	Shall support 1000 Base- SX, LX, and LX Bi-directional SFP transceivers		
1.6	Switching capacity of 56 Gbps		
1.7	Switching throughput of up to 41.7 million pps		
1.8	1 RJ-45 console port		
<b><u>2</u></b>	<b><u>Layer 2 Features</u></b>		
2.1	MAC Address table size of 8,000 entries		
2.2	Shall support IEEE 802.3ad Link Aggregation Control Protocol (LACP)		
2.3	Shall support IEEE 802.1D Spanning Tree Protocol		
2.4	Shall support IEEE 802.1w Rapid Spanning Tree Protocol for faster convergence		
2.5	Shall support IEEE 802.1s Multiple Spanning Tree Protocol		
2.6	Shall support IGMP snooping for multicast filtering instead of flooding traffic to all ports, improving network performance		

2.7	Shall support MLD snooping to forward IPv6 multicast traffic to the appropriate interface, preventing traffic flooding		
2.8	Shall support IEEE 802.1AB Link Layer Discovery Protocol (LLDP)		
2.9	Shall support LLDP-MED (Media Endpoint Discovery) to automatically configure network devices such as IP phones		
<b>3</b>	<b>Layer 2 and Layer-3 features</b>		
3.1	Shall support IEEE 802.1Q (4,094 VLAN IDs) and 256 VLANs simultaneously		
3.2	Shall support Voice VLANs		
3.3	Shall support gratuitous ARP to allow detection of duplicate IP addresses		

3.4	Shall support Jumbo frames up to 9 kilobyte frame size		
3.5	Shall support Static IPv4 routing		
3.6	Shall support Static IPv6 routing		
3.7	Shall support DHCP relay to simplify management of DHCP addresses in networks with multiple subnets		
<b>4</b>	<b>Security and QoS Features</b>		
4.1	Shall support port security and port isolation		
4.2	Shall support packet storm protection to protect against broadcast, multicast, or unicast storms with user-defined thresholds		
4.3	Shall support MAC and IP-based ACLs enable network traffic filtering and enhance network control		
4.4	Shall support ACL and QoS for IPv6 network traffic		
4.5	Shall support time-based ACLs to allow for greater flexibility with managing network access		
4.6	Shall support IEEE 802.1X and RADIUS network logins to control port-based access for authentication and accountability		
4.7	Shall support web authentication or portal authentication		
4.8	Shall support traffic prioritization based on DSCP or IEEE 802.1p classification and SP/WRR queue scheduling		
4.9	Shall support ARP detection feature to block ARP packets from unauthorized clients		

4.10	Shall support DHCP snooping to block unauthorized DHCP Servers		
4.11	Shall support STP BPDU protection preventing forged BPDU attacks		
4.12	Shall support STP Root Guard to protect the root bridge from malicious attacks or configuration mistakes		
<b>5</b>	<b><u>Management Features</u></b>		
5.1	SNMPv1, v2c, and v3 and RMON support		
5.2	IPv6 host support to be managed using IPv6		
5.3	Shall support Port mirroring		
5.4	Shall support intuitive Web GUI (http/https) for easy management		
5.5	Shall support command-line interface to deploy and troubleshoot		
5.6	Shall support management security through multiple privilege levels		
5.7	Shall support single IP address management for up to 16 switches		
5.8	Shall support Network Time Protocol (NTP)		
5.9	Shall have an operating temperature of 0°C to 45°C		
<b>6</b>	<b><u>Warranty</u></b>		
6.1	Lifetime warranty with advance replacement and next-business-day delivery		

**d. Wireless Controller**

<b>Sr. No.</b>	<b>Specifications</b>	<b>Qty.</b>	<b>Rate In Rs.</b>
1	<b>The wireless LAN controller architecture</b>		
1.1	The controller shall have two 10Gbe ports		
1.2	Shall be offered with minimum 64 IEEE 802.11a/b/g/n/ac Access Points support for centralized management and control		
1.3	The controller shall support 500 access points without hardware change		
1.4	shall support 10k users form day one		
1.5	Shall support centralized and distributed architecture		
1.6	Shall support centralized and distributed architecture in same SSID .		
1.7	Shall support 32K ACLs		
1.8	Shall support 1+1 ,N+1 ,N+N redundancy models		

1.9	Shall support IPv6		
1.10	Shall support minimum 512 SSID		
1.11	The Controller shall have dual internal power supply		
2	<b>WLAN controller management features</b>		
2.1	Shall support RRM including auto power / auto channel		
2.2	Shall support spectrum analysis from day one - To detect ,and mitigate non Wi-Fi interference		
2.3	Shall support band navigation to enables redirection of 5Ghz clients to 5Ghz radio		
2.4	Shall support VLAN pooling which ensures dynamic assignemnt of VLANs to same SSID . VLAN pool shall be associated with multiple SSIDs		
2.5	Shall support policy based forwarding . Traffic shall be forwarded to centrally and local switched based on the L3 & L4 ACLs		
2.6	Shall support AP grouping to enables an admin to easily apply AP-based or radio-based configurations to all the AP that are in the same group		
2.7	Shall support staged firmware upgrades to enables an admin to selectively upgrade APs, typically a group of APs, to minimize the impact of upgrading large deployments of APs to a new version of firmware		
2.8	Shall support custom antenna settings to allow admin to select a custom antenna gain		
2.9	Shall support LDAP and SFLOW for network visibility		
2.10	Shall support QOS		
2.11	Shall support 802.1p prioritization		
2.12	Shall support class of sevrvice which Sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ		
2.13	Shall support IPv6 QOS		
3	<b>WLAN controller security features</b>		
3.1	Shall support radius authentication and web based user authentication		
3.2	Shall support WPA2 encryption		
3.3	Shall support integrated WIDS from day one		

3.4	Shall support integrated WIPS form day one which protects against honeypot attacks and enforces STA security		
3.5	Shall support location based authentication		
3.6	Shall support MAC based authentication		
3.7	Controller shall support wireless intelligent application aware feature which Provides a user, role, or SSID based firewall embedded in WLAN Controller via ACL-based packet filter firewall and ASPF firewall ; It should be supported from day one		
3.8	Controller shall have empeded firewall support form day one		
3.9	Controller shall have Source adress validation support which Records the wireless client's IP address and MAC address and at the next data traffic forwarding stage, SAVI will validate the client's IP address to prevent attacker spoofing other client's IP address		
3.10	Controller shall have a functionality to verify whether Client's IP address must be dynamically allocated and shall automatically block manually assigned ip address in both centralized and distributed WLAN architecture		
3.11	Shall support IPv6 ACLs		
3.12	Shall support 802.1x hot backup which enables two controllers to sync 802.1X state information and wireless client's 802.11 information from master to backup		
4	<b>WLAN controller performance features</b>		
4.1	Shall support local drop off after HTML authentication using the built-in portal server or external portal authentication		
4.2	Shall support defining settings such as Committed Access Rate (CAR), QoS profiles, and access control policies based on location for different applications		
4.3	Shall support layer 3 roaming and fast roaming		
4.4	Jumbo packet support		
4.5	Controller shall support NAT which provides an Application Layer Gateway that supports specific application protocols without requiring the NAT platform to be modified		
4.6	Shall support Airtime fairness		

4.7	Shall support client load balancing based on sessions and traffic load		
4.8	Shall support intelligent bandwidth assurance per SSID . Shall support bandwidth limiting per SSID and when bandwidth is not utilized in particular SSID , the remaining bandwidth should be shared by remaining SSIDs dynamically		
4.9	Shall support Adaptive rate control , identify characteristics of the application environment and adjust the Tx rate on purpose		
4.10	Shall support adjusting receiver sensitivity APs ,filter out weak signals in the vicinity to reduce AP noise		
4.11	Shall support multicast to unicast conversion for reliable communication over air		
5	<b>WLAN controller - Other essential features</b>		
5.1	Portal server across controllers should be active when controllers work in 1+1 redundancy model		
5.2	DHCP server across controllers should be active-active when controllers work in 1+1 redundancy model to avoids IP reallocation and service interruption in case of controller failure		
5.3	Shall support Ipsec encryption between AP and AC		
5.4	Shall support 802.11k and 802.11w and bonjour support from day one		
5.5	Shall support LDAP-GTC authentication		
5.6	Shall support remove RF-snooping for WLAN troubleshooting		
5.7	Shall support RF ping for WLAN troubleshooting		
5.8	Shall support VIP channel and anchor controller to prevent guest from accessing internal resources		
6	<b>Warranty</b>		
6.1	Shall support lifetime warrenty includes software update and hardware replacement		

**e. Outdoor AP**

<b><u>Sr. No</u></b>	<b><u>Specifications</u></b>	<b><u>Qty.</u></b>	<b><u>Rate In Rs.</u></b>
<b><u>1</u></b>	<b><u>Wireless Access Point Architecture</u></b>		
1.1	The access point shall have one RJ-45 auto-sensing 10/100/1000 Mbps port (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T)		

1.2	One RJ-45 serial console port		
1.3	Dual core processor for high performance		
1.4	Shall support dual-radio IEEE 802.11 b/g/n and 802.11a/n/ac access point		
1.5	Dual radio for IEEE 802.11a/n for high-throughput applications and IEEE 802.11b/g/n for legacy support and high-speed applications		
1.6	Shall support IEEE 802.11n Capabilities including 3x3 MIMO with three spatial streams delivering data rates up to 450 Mbps per radio		
1.7	Six outdoor standard N connectors for external antenna		

1.8	Shall be proposed with three-element outdoor antennas of the same make per radio for omnidirectional coverage - for 2.4 GHz band and for 5GHz band		
1.9	Shall be offered with lightning arrestor of the same make for each antenna element		
1.10	Radio operation modes - Client access, Local mesh, Packet capture		
1.11	The access point shall be IEEE 802.3af PoE compliant and shall be provided with PoE injector of the same make per AP		
1.12	Maximum Power rating of 12.9 W		
1.13	Both radios shall operate at full power and full performance on IEEE 802.3af PoE/Gigabit Ethernet		
1.14	Shall have built-in outdoor enclosure IP67 rate, NEMA 4X rated		
1.15	Wi-Fi Alliance Certification- a/b/g/n Wi-Fi Certified		
<b>2</b>	<b>Access Point Mobility Features</b>		
2.10	Shall support self-healing, self-optimizing local mesh extending network availability to areas without an Ethernet infrastructure		
2.2	Per-radio software-selectable configuration of frequency bands		
2.3	Shall support up to 16 virtual service communities (Service Set), each with a unique SSID and MAC address		
2.4	Individual security and QoS profiles per Service Set		
2.5	Configurable DTIM and minimum data rate per Service Set		
2.6	Each Service Set can be mapped to separate IEEE 802.1Q VLANs		

2.7	Shall support direct source-to-destination traffic forwarding (distributed traffic forwarding) to maximize application delivery		
2.8	Wireless Multimedia (WMM) support		
<b>3</b>	<b><u>Access Point Management &amp; Other Features</u></b>		
3.1	Shall support both centrally controlled mode (configured and updated via wireless controller) and autonomous mode (without controller) which is software selectable		
3.2	Shall support L2 and L3 controller discovery		
3.3	Shall support auto-selection of RF channel and transmit power		
3.4	Shall support per-client event log records association, authentication and DHCP activities for easy diagnosis		
3.5	Shall support PCAP packet capture on WLAN or LAN interface		
3.6	Shall support SNMPv3 and web-based secured management interfaces (SSL)		
3.7	Operating temperature - 0°C to 55°C		
<b>4</b>	<b><u>Warranty and Support</u></b>		
	The below Warranty shall be offered directly from the switch/wireless OEM.		
4.1	One Year warranty with advance replacement and next-business-day delivery		

**f. Indoor AP**

<b>Sr. No</b>	<b>Specifications</b>	<b>Qty.</b>	<b>Rate In Rs.</b>
<b>1</b>	<b><u>Wireless Access Point Architecture</u></b>		
-	-		
1.1	The access point shall have one RJ-45 autosensing 10/100/1000 port; (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)		
1.2	One RJ-45 serial console port		
1.3	Dual core processor for high performance		
1.4	Shall support dual-radio IEEE 802.11 b/g/n and 802.11a/n/ac access point		
1.5	Shall support three-spatial stream 802.11ac MIMO AP		
1.6	Shall support Up to 1.3 Gb/s on the 802.11ac radio and 450Mb/s on the 2.4GHz 802.11n radio		



1.7	Shall support Built-in Spectral Analysis scans the 2.4-GHz and 5-GHz bands to identify sources of RF interference		
1.8	Shall Support Comprehensive WLAN security with intrusion detection offers threat protection		
1.9	Dual radio for IEEE 802.11a/n/ac for high-throughput applications and IEEE 802.11b/g/n for legacy support and high-speed applications		
1.10	Integrated antennas for both IEEE radios, supporting two spatial streams and 3x3 MIMO reaching 450 Mb/s per radio		
1.11	Six embedded/internal antennas		
1.12	Radio operation modes - Client access, Local mesh, Packet capture		
1.13	The access point shall be IEEE 802.3af PoE compliant and shall be provided with PoE injector of the same make for mentioned quantity		
1.10	Maximum Power rating of 12.9 W		
1.11	Both radios shall operate at full power and full performance on IEEE 802.3af PoE/Gigabit Ethernet		
1.12	Shall have Indoor, plenum rated enclosure		
1.13	Wi-Fi Alliance Certification- a/b/g/n/ac Wi-Fi Certified		
1.14	Shall support three spatial stream MIMO technology , which allows for 1.3Gb/s in the 5GHz frequency band and 450 Mb/s in the 2.4GHz band of signaling		
<b>2</b>	<b><u>Access Point Mobility Features</u></b>		
2.1	Shall support self-healing, self-optimizing local mesh extending network availability to areas without an Ethernet infrastructure		
2.2	Per-radio software-selectable configuration of frequency bands		
2.3	Shall support up to 16 virtual service communities (Service Set), each with a unique SSID and MAC address		
2.4	Individual security and QoS profiles per Service Set		
2.5	Configurable DTIM and minimum data rate per Service Set		
2.6	Each Service Set can be mapped to separate IEEE 802.1Q VLANs		

2.7	Shall support direct source-to-destination traffic forwarding (distributed traffic forwarding) to maximize application delivery		
2.8	Wireless Multimedia (WMM) support		
2.9	Shall support enhanced survivability in case of controller failure by serving wireless clients, authenticate new wireless clients with RADIUS Server and preserve last known configuration upon reboot		
2.10	Shall supports per-wireless client ingress-enforced maximums and per-wireless client, per-queue guaranteed minimums		

2.11	Shall maintains Layer 2 and Layer 3 QoS settings when using centralized traffic or guest access		
2.12	Shall provides excellent coverage through use of embedded high-gain antennas (5 dBi antenna at 2.4 GHz and 7 dBi antenna at 5 GHz)		
2.13	Shall support Local wireless bridge client traffic filtering		
	Shall Support TKIP/WEP encryption		
<b>3</b>	<b><u>Access Point Management &amp; Other Features</u></b>		
3.1	Shall support both centrally controlled mode (configured and updated via wireless controller) and autonomous mode (without controller) which is software selectable		
3.2	Shall support L2 and L3 controller discovery		
3.3	Shall provide intelligent channel switching and real-time Interference detection		
3.4	Shall support per-client event log records association, authentication and DHCP activities for easy diagnosis		
3.5	Shall support PCAP packet capture on WLAN or LAN interface		
3.6	Shall support SNMPv3 and web-based secured management interfaces (SSL)		
3.7	Operating temperature - 0°C to 50°C		
<b>4</b>	<b><u>Warranty and Support</u></b>		
4.1	Lifetime warranty with advance replacement and next-business-day delivery		

g. Other Accessories

Sr. No.	Specifications	Qty	Rate in Rs.
01	10GBASE SFP+ Transceiver Module		

h. Other Additional Requirements

1	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP + Model ES-48-500W	
2	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP+ Model ES-48-750W	
3	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP Model ES-24-250W	
4	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP Model ES-24-500W	
5	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP + Model US-48-500W	
6	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP + Model US-48-700W	
7	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP Model US-24-250W	
8	Ubnt Edge Switch Managed PoE+ Gigabit Switch with SFP Model US-24-500W	
9	Ubnt Edge Router PoE Model ERPoe-5	
10	UniFi AP AC Outdoor 802.11ac Access Point Models: UAP-AC Outdoor	
11	Ubnt Tough Switch Model TS-16-Carrier	
12	Ubnt Tough Switch Model TS-8-PRO	
13	UbntTough Cable Outdoor Shielded Ethernet Cable, TC-Carrier	
14	Ubnt Tough Shield Connector TC-CON-100	
15	Catlyst 2960S 48Gibe E 4 x SFP+ LAN Base	
16	SMARTNET 8x5xNBD Cat 2960S STK48 GigaE4xSFP Lan base	
17	Catalyst 2960S FlexStack Stack Module Lan Base	
18	Layer 3 Manageable 24/48 1Gb 10Base-T & 2/4 SFP+ ports	

## 2. PASSIVE Components

Sr. No.	Specifications	Qty	Price in Rs.
01	6 Core Outdoor Fiber Single Mode Cable		
02	19" 24 Port Rack Mount LIU		
03	19" 12 Port Rack Mount LIU		
04	SC Pigtails		
05	SC LC fiber patch cord Single mode		
06	19" 42U 600X1000MM Floor standard rack		
07	CAT6 STP Cable		
08	10G CAT6 Cable		
09	24 Port Patch Panel		
10	3feet & 7 feet CAT6 Patch Cables		
11	SMB & IO's		
12	15U Wall Mount Rack		
13	12 U Wall Mount Rack		
14	8 U Wall Mount Rack		
15	HDPE PIPE ISI Mark		
16	1" PVC Pipe		
17	2" PVC Pipe		
18	Cable Manager		

## 3. Installation Charges

01	Cat 6 Cable Laying		
02	Fixing PVC Cassing		
03	Termination of CAT 6 I/O		
04	Fixing of Face Plate		
05	Fixing of Back Boxes		
06	Termination of 24 Port JP		
07	Fixing of Rack		
08	Testing		
09	Fiber Cable laying		
10	Fiber Core Splicing		
11	Fixing of HDPE Pipes		
12	Fixing of LIU		
13	Fixing of PVC Pipes		
14	Testing of Fiber		