



Division of Interdisciplinary Sciences
Indian Institute of Science
Bangalore 560012

NOTICE INVITING OPEN TENDER

for

**Supply, installation, testing, & commissioning of Networking
Infrastructure at Smart X building of Interdisciplinary
Sciences Division, Indian Institute of Science, Bangalore**

Tender No: IISc/IDS/2023/Network

Date: 29/11/2023

Purchase Section

Indian Institute of Science

Bangalore 560012

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INDIAN INSTITUTE OF SCIENCE, BANGALORE

NOTICE INVITING TENDER (NIT)

Supply, installation, testing, & commissioning of Networking Infrastructure at Smart X building of Interdisciplinary Sciences Division, Indian Institute of Science, Bangalore

INDEX

Content	Page
1. Schedule of Events	1
2. Introduction	2
2.1 Scope of Work	2
3. Schedule of Requirements	4
3.1 Active Components	4
3.2 Installation and Services	5
4. Technical Specifications of Active Components	5
5. Technical Specifications Installation and Services	16
6. Terms and Conditions	19
6.1 Bidder's Eligibility Criteria (BEC)	19
6.2 Earnest Money Deposit (EMD)	21
6.3 Guidelines for Bid Submission	22
6.4 Evaluation of bids	24
6.5 Service Level Agreement and Warranty	26
6.6 Commercial Terms & Conditions	27
6.7 Payment Terms	28
6.8 Supply, Installation, and Acceptance	30
 Annexures	
Annexure 1: BOQ Compliance Sheet	31

Annexure 2: Technical Compliance Sheet for active components	33
Annexure 3: Technical Compliance Sheet for Installation & Services	42
Annexure 4: Techno-commercial Compliance Sheet	44
Annexure 5: Format for bank guarantee for performance security (performance bank guarantee)	45

1. Schedule of Events

Table 1 Schedule of Events

Release of Tender	November 29 th , 2023
Deadline for submission of queries (for Prebid clarification)	December 5 th , 2023, 05.00 pm IST
Prebid clarification Meeting	December 6 th , 2023, 04.00 pm IST
Deadline for submission of bid	December 20 th , 2023, 05.00 pm IST
Opening of Technical bid	December 21 st , 2023, 05.00 pm IST
Listing of technically qualified bidders	December 26 th , 2023 (Tentative)
Opening of price bids	December 27 th , 2023 (Tentative)

1. Query for pre-bid clarification may be sent to ar.purchase@iisc.ac.in or dr.purchase@iisc.ac.in
2. This meeting will be online on MS Teams. Vendors who wish to participate in this meeting may request the email address, upon which they will be sent a meeting link. No queries will be entertained after the pre-bid meeting.
3. All bids (including all supporting documents) should be submitted online on the Govt. of India CPP website. In addition, to the submission of bids online, a hard-copy of all the bids including supporting documentation should be delivered to the Deputy Registrar Purchase Section, IISc, Bangalore – 560012 by the deadline for submission of bids (December 15th, 2023, 5:00pm IST).
4. The Opening of the Technical and Price bids will be done on the CPP portal by the Purchase Section, IISc Bangalore.
5. Bidders are requested to submit the closed envelope tender document at Purchase Section, IISc, Bangalore – 56012 on/before the deadline and collect the acknowledgment slip.
6. The concerned must sign and seal each page of the submitted bid document.
7. The signed copy of compliance and cross reference should be submitted on OEM's letterhead.
8. All the proposed hardware and software licenses should be perpetual. It should continue to work even after support/warranty expiry.

- Note:**
- 1) No request for the extension of any timelines mentioned in the table above will be entertained
 - 2) Bidder on whom the order would be placed will have to execute the order and invoice the order before 1st March 2024
 - 3) IISc reserves the right to disqualify any bidder or agency due to lack of technical/nontechnical compliance at its discretion. This decision will be final, and no queries in this regard will be entertained.

- 4) IISc also reserves the right to cancel this tender and bidding process without any notice or prejudice.

2. Introduction

1. The Smart X building under division of Interdisciplinary Sciences at IISc campus is a state-of-the-art building that accommodates nearly 500 users comprising faculty, staff, and students. The department is planning a comprehensive Network with Wi-Fi-6 access points to provide hi-speed LAN/Wi-fi connectivity across all labs, office spaces, conference room, auditoriums, common lobbies within the department.
2. The scope of the work includes Supply, installation, and commissioning of Access Points & switches, comprehensive warranty, and two years of post-warranty AMC, etc.
3. Interested bidders are invited to submit proposals for the supply, installation, and commissioning of Network Switches, and Wi-Fi Access Points.
4. Class-I and Class-II local supplier will be eligible and are encouraged to bid notified vide (DPIIT) Notification No. P-45021/2/2017-PP (BE-II) dated 4th June 2020 amended from time to time. Submit a document stating if you are a class-I or class-II supplier of items listed below along with proof.

2.1 Scope of Work

1. The Institute invites proposals in a two-cover format from bidders who have the capability to provide a solution which includes:
 2. (a) Supply,
 3. (b) Transportation to the site
 4. (c) Transit insurance
 5. (d) Installation, including necessary cabling, testing, commissioning, and documentation
 6. (e) Integration with the existing environment
 7. (f) Three years of comprehensive warranty, and two years of post-warranty AMC.
8. The detailed technical scope of work and the technical specifications are mentioned in the subsequent sections. The bidders must ensure that the resources (personnel) allocated for each of the above tasks are competent and capable of meeting all the technical requirements to ensure that the broad objective of delivery of services as per expectations is fully met.
9. A broad overview of the network topology proposed for the network upgrade is shown in Fig. 1.

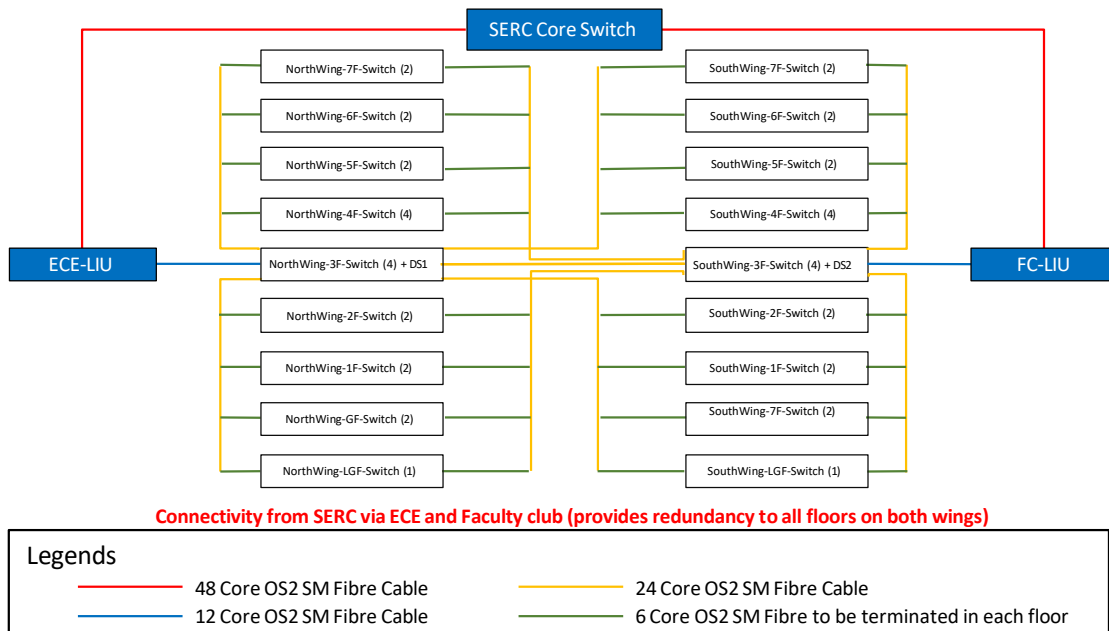


Fig. 1 Smart-X building Logical Topology

The network topology at the Smart X building shown in the above figure employs the following architecture.

- The topology involves redundant fibre-optic connections between the distribution (Layer-3) switches (DS1 & DS2) and the access (Layer-2) switches in the racks.
- There are 18 different racks in different locations.
- All switches (except the distribution switches) within a single rack are required to be inter-stackable/interconnectable via stacking/inter connection cables.
- All requisite licenses for achieving all the features mentioned in this document must be perpetual and must be included from the day of commissioning.
- The distribution switches must be configurable to create groups for each VLAN to act as a virtual logical gateway (default gateway) for all the hosts within the VLAN for redundancy. The switches must support at least 150 active groups. All licenses and hardware required for achieving the abovementioned feature must be included from day one.
- Switches must be rack mountable in a standard 19-inch network rack. All accessories required for mounting must be included in the quote.
- All quoted switches must contain at least two hot-swappable redundant power supplies and include IEC type D/M (3 round pin) power cords for all power supplies.
- All the quoted switches must support the following
 - IEEE 802.1Q VLAN tagging
 - 802.1Q VLAN on all ports with support for minimum 4000 VLANs.
 - Spanning Tree Protocol as per IEEE 802.1d
 - Multiple Spanning-Tree Protocol as per IEEE 802.1s
 - Rapid Spanning-Tree Protocol as per IEEE 802.1w
 - Self-learning of unicast & multicast MAC addresses and associated VLANs
 - Link Aggregation Control Protocol (LACP) as per IEEE 802.3ad.

- “Port Mirroring” functionality for measurements using a network analyzer
- Minimum 64 multiple Spanning-tree instances.
- RoHS Compliance
- IEEE 802.1x support
- IPV6 and IPV6 & IPV4 dual stack

The Schedule of Requirements for active components, passive components, civil works, and Installation & Servicing are given in Section 3. Additional technical specifications of the distribution L3 switches, L2 switches, Installation & Services are given in Sections 4 and 5

3. Schedule of requirements

The Bidder is expected to quote for the following items. Each item must be from the same OEM.

3.1 Active Components

Table 2 List of Active Components

S/No	Item Description	Total
1	Wi-Fi Access Point support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band with at least 8x8:8 5Ghz radio and at least 4x4 2.4Ghz radio. Must have at least one 5Gbps Ethernet interfaces. Must be Controller based locally hosted with H.A. Must be Wi-Fi CERTIFIED 6™. Must support POE+ on 802.3at/bt	15
2	Wi-Fi Access Point support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band with at least 2X2 MU-MIMO spatial streams on 5GHz radio and 4X4 MU-MIMO spatial streams on 2.4GHz radio. Must have at least one 2.5Gbps Ethernet interface. Must be Controller based locally hosted with H.A. Must be Wi-Fi CERTIFIED 6™. Must support POE+ on 802.3at/bt	235
3	24 SFP+ ports layer-3 manageable 1G/10G switch with dual power supply (DS 1 & 2)	2
4	Single Mode 1310nm SFP+ transceiver (10GBASE-LR)	76
5	Wireless Controller	2
6	Stacking cable or SFP+ Twinax cable 2 meters	36
7	Stacking cable or SFP+ Twinax cable 5 meters	6
8	48 UTP port non-POE switch with 4 SFP+ port layer 2, 10/100/1000 Mbps manageable switch with stacking capability and dual power supply	22
9	48 UTP 10/100/1000 Mbps and at least 24 ports of Mgig (1/2.5/5 Gbps) ports, all 24 ports must concurrently support (1/2.5/5 Gbps), and the switch should have at least 4 SFP+ port layer-2, manageable	20

	switch having at least 740 W power budget for POE (Support POE+ on all ports concurrently) with redundant power supply	
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The technical specifications of these items are detailed in **Section 4**. The Technical Bid should list the make and model of each item, including the various types of L2 switches that satisfy the requirements as separate line items and their quantities. Technical documentation about each distinct item must be included along with the technical bid.

3.2 Installation and Services

Table 3 List of Installation and Services

1	Configuration and Installation/mounting on ceiling/wall or angle bracket of Access points with radium reflective labelling	250	Nos
2	Configuration and Installation of Network Switches in network rack with radium reflective labeling	44	Nos
3	Testing and generating reports as mentioned in RFP	1	Nos
4	AMC charges for additional 2 years post 3 years warranty	1	Nos

The technical specifications of these passive items are detailed in **Section 5**.

The Technical Bid should list the make and model of each item that satisfy the requirements (see **Section 4 and 5**) as separate line items and their quantities. Technical documentation about each item must be included during tendering.

4. Technical Specification for Active Components

4.1 Access Point- Type 1

- i. Must have at least one 5 Gbps Ethernet interface.
- ii. Must be Controller based and be locally hosted.
 - a. The data plane and Controller plane must be separate. That is, even if the controller is down or out of network, the Access Points must continue to function normally.
 - b. High Availability of Controller must be ensured with easy Disaster Recovery possible.
 - c. Data transfer between Access Point and Controller must be encrypted.
- iii. The solution must be scalable to support up to at least 500 Access points
- iv. The Access points must be Wi-Fi CERTIFIED 6™.
- v. Must support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band.
- vi. Access Points must work with all features supported on PoE+.

- vii. Access Point shall support tri radio operation with 4x4 MIMO on all three radio interfaces and MU-MIMO technology with option to combine the 2 radio to operate on 8x8 operation.
- viii. Access Point shall be able to support Multigigabit Ethernet, support up to 5 Gbps PHY speed using single Cat5e or above (Cat6, Cat6a, Cat7) cable
- ix. Access Point should have Bluetooth5 radio to support use cases of location, asset tracking and analytics.
- x. Access Point shall be able to power up using 802.3at power with full radio operation of 12 Spatial streams and transmit power upto 22dBm.
- xi. Access Point shall support Dual 5GHz radios
- xii. Access Point shall have a dedicated radio/chipset 1x1/2x2 for spectrum monitoring capabilities, WIPS, and off-channel RRM without compromising and using the client-serving radios.
- xiii. Access Point shall support hardware driven beamforming
- xiv. Access Point should have 1x 5gig Multigigabit Ethernet (RJ-45) – IEEE 802.3bz
- xv. Access Point should have USB port for future requirement.
- xvi. Must have at least 3 dBi Antenna gain on each radio
- xvii. Must Support data rate up to 5 gbps.
- xviii. Must support minimum of 23 dbm of transmit power in both 2.4Ghz and 5 Ghz radios. And should follow the local regulatory Norms.
- xix. Must support AP enforced load-balance between 2.4 Ghz and 5 Ghz band.
- xx. Must incorporate radio resource management for power, channel, and performance optimization
- xxi. Must have -97 dB or better Receiver Sensitivity.
- xxii. Must support Proactive Key Caching and/or other methods for Fast Secure Roaming.
- xxiii. Must support Management Frame Protection.
- xxiv. Should support locally significant certificates on the APs using a Public Key Infrastructure (PKI).
- xxv. Access Points must support Hardware-based encrypted user data and management traffic between controller and Access point for better security.
- xxvi. Must support the ability to serve clients and monitor the RF environment concurrently.
- xxvii. Same model AP that serves clients must be able to be dedicated to monitoring the RF environment.
- xxviii. Must be plenum-rated (UL2043).
- xxix. Must support 12 WLANs per AP for SSID deployment flexibility.

- xxx. Access Point Must continue serving clients when link to controller is down. It should also have option to authenticate user through Radius server directly from Access Point during link unavailability to controller.
- xxxi. Must support telnet and/or SSH login to APs directly for troubleshooting flexibility.
- xxxii. Must support QoS and Video Call Admission Control capabilities.
- xxxiii. Access point should be Wi-Fi 6 certified

4.2 Access Points – Type 2

- i. Must have at least one 2.5Gbps Ethernet interface.
- ii. Must be Controller based and be locally hosted.
 - a. The data plane and Controller plane must be separate. That is, even if the controller is down or out of network, the Access Points must continue to function normally.
 - b. High Availability of Controller must be ensured with easy Disaster Recovery possible.
 - c. Data transfer between Access Point and Controller must be encrypted.
- iii. The solution must be scalable to support up to at least 150 Access points
- iv. The Access points must be Wi-Fi CERTIFIED 6™.
- v. Must support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band.
- vi. Apart from DC power, the Wi-Fi Access Points must work with all features supported on PoE+.
- vii. The Access Point must have at least 2X2 MU-MIMO spatial streams 2.4GHz radio and 4X4 MU-MIMO spatial streams on 5 GHz radio
- viii. The Access Point must support POE+ on 802.3at/bt.
- ix. Must support WPA2 and WPA3 Enterprise.
 - x. Must support two-way band steering (example from 2.4GHz band to 5GHz and from 5 GHz to 2.4 GHz).
 - xi. Must support auto channel allocation to avoid interference between APs.
 - xii. Must support auto transmission power selection based on neighbor count and loudness for both bands.
 - xiii. Must support manual transmission power selection per Access Point on a granularity scale of 1 dBm.
 - xiv. The Wi-Fi radio transmission parameters must comply with the Indian transmission regulations.
 - xv. The Wi-Fi radio must have a transmit power of 23 dBm (without considering antenna gain) or higher for both 2.4Ghz and 5Ghz.
 - xvi. Must support both Bridge and NAT modes.
 - xvii. Must support configurable management VLAN (support other than VLAN-1 as management VLAN).

- xviii. Must be ceiling mountable with all necessary accessories for ceiling mounting included.
- xix. The Controller and Access Point device should support dual stack for IPV4 and IPV6.
- xx. The Access Points must simultaneously broadcast at least 6 SSIDs as visible network to client.
- xxi. The solution should detect and identify all types of Wi-Fi enabled client devices.
- xxii. Both the controller and Wi-Fi device should support SNMP v2c, v3.
- xxiii. The solution should support RADIUS, Active Directory and LDAP based authentication.
- xxiv. The proposed Controller and Access Points must be of reliable and reputed brand only.
- xxv. The solution should be able to work in a heterogenous environment by not hindering the operation of existing APs of different makes already deployed at IISc.
- xxvi. The solution should maintain logs which includes all activities performed by the users like login, any configuration changes made on the system, device deletion, device authorization, log out etc., for at least 365 days.
- xxvii. The solution should support uploading of all logs to external Syslog Server in LAN/WAN on real-time and scheduled basis.
- xxviii. The solution should block traffic based on IP address, port, URL, hostname etc. and QoS (for example: bandwidth restriction for the SSID, QoS tagging of special traffic like Voice) at the edge (AP).
- xxix. The solution must allow VLAN segmentation at the edge.
- xxx. The solution must support Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP).
- xxxi. The solution must have the capability of auto classifying Wi-Fi clients as authorized (managed clients connecting to IISc, Bangalore network), guest, rogue (un-managed client attempting connection to IISc, Bangalore network) or external (unmanaged not connecting to IISc, Bangalore network e.g., neighbor), in addition to manual classification.
- xxxii. Access Point shall have dedicated radio/chipset for spectrum monitoring capabilities, WIPS and off channel RRM without compromising and using the client serving radios.
- xxxiii. Access Point should have 1x 100, 1000, 2500 Multigigabit Ethernet (RJ-45) – IEEE 802.3bz

4.2.1 Necessary licenses, warranty, and support for all access points

- i. The quote should include all required Hardware and Software licenses to support all the Access Points and Controllers. The solution should include these licenses from the first day of the installation. There should not be any additional licenses required for DR.

- ii. All the AP features should be active post-expiration of the subscription/license validity. All the features and signatures available at the time of expiration of the license should continue to work. Renewal of licenses should be required only for new features, Visibility, configuration changes, and updates/releases announced by the OEM after the contract expires. The vendor must propose a perpetual license.
- iii. The total solution should have 5 years' on-site warranty for Access Points and controller.
- iv. The total solution should include technical support for software/firmware and software upgrades for controller and Access Points for 5 years.
- v. TAC support must be from OEM not Bidder during the whole 5 years.
- vi. The total solution should be upgradable to the latest stable firmware version, as and when available, at no extra cost.
- vii. Warranty support should include NBD hrs. response time and provision of replacement along with appropriate configuration and installation in next business day for Hardware.

4.2.2 Possible access points models:

A. Indoor for Labs and general locations:

- Must have at least one 2.5 Gbps Ethernet interface.
- Must have at least 4x4:4 on 5Ghz and 2.4Ghz radio
- Must support DL-MU-MIMO and UL-MU-MIMO
- Must support DL-MU-OFDMA and UL-MU-OFDMA

B. Indoor auditorium and big classrooms:

- Must have at least one 5Gbps Ethernet interfaces.
- Must have at least 8x8:8 5Ghz radio and at least 4x4 2.4Ghz radio
- Must support DL-MU-MIMO and UL-MU-MIMO
- Must support DL-MU-OFDMA and UL-MU-OFDMA

4.3 48 Port Non-PoE

4.3.1 Specification

- i. Switch should be 1U and rack mountable in standard 19" rack.
- ii. Switch should support internal field replaceable unit redundant power supply from day of commissioning.
- iii. Switch should have minimum 2 GB RAM and 2 GB Flash.
- iv. Stacking/interconnection with ring-based topology to have minimum 48Gbps throughput or 20Gbps for Direct interconnects. All necessary interconnectors and cables must be supplied along with the switches up to a pod of 4 Switches.

4.3.2 Performance

- i. Switch shall have minimum 150 Gbps of switching fabric and 100 Mpps of forwarding rate with non-blocking architecture
- ii. Switch shall have minimum 10K MAC Addresses and 250 active VLAN.
- iii. Should support minimum 10K IPv4 routes or more
- iv. Switch shall have 1K or more multicast routes.
- v. Switch should support atleast 15K flow entries.
- vi. Switch should support 128 or more STP Instances.
- vii. Switch should have 4 MB or more packet buffer.

4.3.3 Functionality

- i. Switch should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z.
- ii. Switch must have functionality like static routing, RIP, REP PIM, OSPF, VRRP, PBR and QoS features from Day1.
- iii. Switch should support network segmentation that overcomes the limitation of VLANs using VXLAN and VRFs.
- iv. Switch shall have 802.1p class of service, marking, classification, policing and shaping and eight egress queues.
- v. Switch should support management features like SSHv2, SNMPv2c, SNMPv3, NTP, RADIUS and TACACS+.
- vi. Switch should support RFC 2460 Internet Protocol, Version 6 (IPv6) Specification RFC 2461 Neighbour Discovery for IP Version 6 (IPv6), RFC 2462 IPv6 Stateless Address Auto-configuration and RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
- vii. Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment.
- viii. Switch must have the capabilities to enable automatic configuration of switch ports as devices connect to the switch for the device type.
- ix. During system boots, the system's software signatures should be checked for integrity. System should be capable to understand that system OS are authentic and unmodified, it should have cryptographically signed images to provide assurance that the firmware & BIOS are authentic.

4.3.4 Interface

- i. Switch shall have 48 nos. 10/100/1000 Base-T ports and 4 nos of SFP+ port.

4.3.5 Certification

- i. Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.
- ii. Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.

- iii. Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.

4.4 48 Port Mgid switch

4.4.1 Specification

- i. Switch should be 1U and rack mountable in standard 19" rack.
- ii. Switch should support internal field replaceable unit redundant power supply from day of commissioning.
- iii. Switch should have minimum 2 GB RAM and 2 GB Flash.
- iv. Stacking/interconnection with ring-based topology to have minimum 48Gbps throughput or 20Gbps for Direct interconnects. All necessary interconnectors and cables must be supplied along with the switches up to a pod of 4 Switches.

4.4.2 Performance

- i. Switch shall have minimum 250 Gbps of switching fabric with non-blocking architecture
- ii. Switch shall have minimum 15 K MAC Addresses and 250 active VLAN.
- iii. Should support minimum 10K IPv4 routes or more
- iv. Switch shall have 1 K or more multicast routes.
- v. Switch should support atleast 15K flow entries
- vi. Switch should support 128 or more STP Instances.
- vii. Switch should have 6MB or more packet buffer.

4.4.3 Functionality

- i. Switch should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z.
- ii. Switch must have functionality like static routing, RIP, REP PIM, OSPF, VRRP, PBR and QoS features from Day1.
- iii. Switch should support network segmentation that overcomes the limitation of VLANs using VXLAN and VRFs.
- iv. Switch shall have 802.1p class of service, marking, classification, policing and shaping and eight egress queues.
- v. Switch should support management features like SSHv2, SNMPv2c, SNMPv3, NTP, RADIUS and TACACS+.
- vi. Switch should support RFC 2460 Internet Protocol, Version 6 (IPv6) Specification RFC 2461 Neighbour Discovery for IP Version 6 (IPv6), RFC 2462 IPv6 Stateless Address Auto-configuration and RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification

- vii. Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment.
- viii. Switch must have the capabilities to enable automatic configuration of switch ports as devices connect to the switch for the device type.
- ix. During system boots, the system's software signatures should be checked for integrity. System should be capable to understand that system OS are authentic and unmodified, it should have cryptographically signed images to provide assurance that the firmware & BIOS are authentic.

4.4.4 Interface

- i. 48 UTP 10/100/1000 Mbps and at least 24 ports of M gig (1/2.5/5 Gbps) ports, and the switch should have at least 4 SFP+ port layer-2, manageable switch having at least 740 W power budget for POE (Support POE+ on all ports concurrently) with redundant power supply.

4.4.5 Certification

- i. Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.
- ii. Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.
- iii. Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.

4.5 Core switch

4.5.1 General Features:

- i. Switch should be 1U and rack mountable in standard 19" rack.
- ii. Switch should support internal hot-swappable Redundant Power supply from day day of commissioning.
- iii. Switch should have redundant hot swappable fans.
- iv. Switch should have minimum 4 GB RAM and 4 GB Flash.
- v. Stacking/interconnection with ring-based topology to have minimum 48Gbps throughput or 20Gbps for Direct interconnects. All necessary interconnectors and cables must be supplied along with the switches up to a pod of 4 Switches.

4.5.2 Performance:

- i. Switch shall have minimum 500 Gbps of switching fabric with non-blocking architecture.
- ii. Switch shall have minimum 32K MAC Addresses and 1000 active VLAN.
- iii. Should support minimum 32K IPv4 routes or more and 16K IPv6 routes or more
- iv. Switch shall have 8K or more multicast routes.
- v. Switch should support atleast 64K flow entries
- vi. Switch should support 128 or more STP Instances.

- vii. Switch should have 16MB or more packet buffer.

4.5.3 Functionality:

- i. Switch should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z & 1588v2.
- ii. Switch must have functionality like static routing, RIP, PIM, OSPF, VRRP, PBR and QoS features from Day1
- iii. Should support advance Layer 3 protocol like BGPv4, BGPv6, MPLS, VRF, VXLAN, IS-ISv4, OSPFv3, MP-BGP
- iv. Switch shall have 802.1p class of service, marking, classification, policing and shaping and eight egress queues.
- v. Switch should support management features like SSHv2, SNMPv2c, SNMPv3, NTP, RADIUS and TACACS+.
- vi. Switch should support RFC 2460 Internet Protocol, Version 6 (IPv6) Specification RFC 2461 Neighbour Discovery for IP Version 6 (IPv6), RFC 2462 IPv6 Stateless Address Auto-configuration and RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
- vii. Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment
- viii. Switch must have the capabilities to enable automatic configuration of switch ports as devices connect to the switch for the device type.
- ix. During system boots, the system's software signatures should be checked for integrity. System should be capable to understand that system OS are authentic and unmodified, it should have cryptographically signed images to provide assurance that the firmware & BIOS are authentic.
- x. Switch shall have modular OS to support application 3rd party application hosting

4.5.4 Interface

- i. 24 SFP+ ports layer-3 manageable 1G/10G switch with dual power supply

4.5.5 Certification:

- i. Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.
- ii. Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.
- iii. Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.

4.6 Wireless Controller

4.6.1 Hardware

- i. The controller shall support deployment flexibility without compromising any features
- ii. The controller shall support min 5 Gbps tunneling capacity and shall be upgradable to 10 gbps.
- iii. The controller shall support 2x 10G/Multigigabit copper uplink.
- iv. Wireless Controller shall support link aggregation and load sharing between Access Point to WLC links
- v. The controller shall support hardware encrypted data plane between Access Point and Controller
- vi. The controller shall be proposed with complete feature set including licensed feature

4.6.2 High Availability

- i. High Availability mode shall support controller inline data plane mode as well as local switching mode and Mesh mode
- ii. High Availability mode shall allow geographically dispersed installation between Controllers
- iii. The controller failover shall not trigger client de-authentication and re-association
- iv. The controller shall support hot WLC software patching for fixing bugs
- v. The controller shall support hot AP software patching for fixing bugs
- vi. The controller shall support new AP hardware without need for upgrading entire controller software.
- vii. The controller shall support rolling AP upgrade
- viii. The controller shall support rolling AP upgrade without need for clustering
- ix. The redundant Controller shall sync Access Point and Client Status, including DHCP IP lease status

4.6.3 Software

- i. Access Point shall be able to proactively distributes Client connection before and after association
- ii. and tracking client condition in real time using data packet RSSI
- iii. The controller shall support standard-based, secure AP-Controller data & control protocol like CAPWAP. protocol that has known vulnerability like PAPI cannot be used.
- iv. The controller shall support Inter-Controller Wireless Roaming, or the controller should support at least 1000 APs
- v. The controller shall maintain per-user Application usage and shall be able to export it for network analytic.

- vi. The controller shall support Multi Languages options from embedded GUI Management
- vii. The controller shall provide per-Client Connection Scoring and provide reasoning of Client Connection Score
- viii. The controller shall support Cellular offload using IPv6 tunneling to Mobile Core network

4.6.4 RF management

- i. The controller shall be able to support multiple RF Management profile per group of APs, including Transmit Power Control and Dynamic Channel Assignment on both 2.4GHz and 5Ghz
- ii. The controller shall be able to identify and avoid interferers with network performance impact analysis report
- iii. The controller shall support optimized manual/automatic channel width (20~160Mhz) selection over 5GHz, 802.11ac

4.6.5 Mesh

- i. Mesh AP nodes shall provide quick convergence and fast failover to new root mesh node
- ii. Mesh Backhaul interface shall support full duplex operation using wired daisy chaining
- iii. Mesh AP shall support fast roaming for Wired-client through wired-to-wireless bridge client

4.6.6 Application Recognition and Control

- i. The controller shall support per-user and per-WLAN based application recognition and control that throttle usage by rate-limiting
- ii. The controller application recognition technology shall support exporting to 3rd party compatible format, such as NetFlow v9
- iii. The controller shall provide policy-based mDNS gateway including Chromecast gateway
- iv. The controller shall support new application signatures without upgrading controller software

4.6.7 BYOD & Security

- i. The controller shall provide Device Profiling using multiple profiling methods to reduce false detection
- ii. The system shall provide secure onboarding service for both employee and guest based on standard-based security protocol
- iii. Proposed system shall not use public cloud as user data repository
- iv. The controller shall be able to be embedded custom web portal page (HTML) to fully customize user experience without additional cost or extra box
- v. The controller shall provide rule-based rogue classification and automatically run rogue mitigation action

- vi. The controller shall be able to detect employee device connection to Rogue Access Point and contain it automatically. It should also support protection from Honeypot or Evil twin.
- vii. The system shall support control plane encryption on both IPv4 and IPv6
- viii. The Controller's image upgrade shall be done through secure, encrypted transport
- ix. The controller shall be able to provide unique pre-shared keys to the devices that do not support the 802.1x security protocol
- x. The controller shall support Identity PSK for on boarding
- xi. The controller shall support identification & mitigation of threats inside encrypted traffic

4.6.8 Network

- i. The controller shall support mapping of specific VLANs to single SSID, depending on Access Point location and user

4.6.9 Configuration

- i. The controller shall support automatic VLAN assignment per SSID to load-balance user connection.
- ii. Assigned VLAN pool shall be same as number of available VLAN in the system
- iii. The controller shall support embedded best practice configuration profile and setup
- iv. The controller shall support packet fragmentation between Access Point and controller communication

4.7 Transceivers

- i. Single Mode 1310 nm SFP+ transceiver (10GBASE-LR) of the same OEM as the quoted switch. The transceivers must be compatible with the quoted switches.
- ii. Each of the Eighteen (18) Stacks should have 4 Transceivers (18 x 4 = 72) and another 4 transceivers for the Core uplink connectivity.

5. Technical Specifications Installation and Services

5.1 License, Warranty and Support

- i. The total solution should include licenses for all necessary features from the first day of the installation. All the licenses quoted should be perpetual. All the features and signatures including WIPS available at the time of expiration of license should continue to work. Renewal of licenses should be required only for new features and updates/releases announced by the OEM after the contract expires.

- ii. The total solution should have 3 years' on-site warranty for Access Points, Switches, accessories, and controller.
- iii. The total solution should include technical support for software/firmware and software upgrades for controller, Access Points and Switches for 3 years.
- iv. The total solution should be upgradable to the latest stable version, as and when available, at no extra cost.
- v. The quote should also include additional 2 years' AMC specified as a separate line item.
- vi. Warranty support should include 4 hrs. response time and provision of replacement along with appropriate configuration and installation in next business day for Hardware.
- vii. Should provide single point of contact and should provide call logging and escalation matrix.

5.1.1 Acceptance Parameters for the Proposed Solution (Only Applicable during and post implementation)

5.1.1.1 Physical Installation

- i. Inspect installation of Network Switches.
- ii. Configuration check on controller including the policies.
- iii. Test the physical mounting of each Access Point.
- iv. Test each Access Point connectivity to the central controller.

5.1.1.2 Wi-Fi Controller Configuration Test:

- i. Check authorized Wi-Fi set up for each Subnet / VLAN / Location as the case may be.
- ii. Check both Authorized user and Guest user policies.
- iii. Test each Access Point if they have the right authorized and guest policy.
- iv. Check Wi-Fi prevention policy for each subnet, VLAN and location.
- v. Check the configured alerts and alert delivery methods.
- vi. Check the administrative users and their access rights.
- vii. Check the configured reports (content, delivery frequency, recipient list).
- viii. Check the automatic backup and archival parameters.
- ix. Check archival of logs.

5.1.1.3 Commissioning Test

- i. Test for all Access Points connectivity to the controller.
- ii. Test and verify authorized Access Points inventory and authorized client inventory.
- iii. Verify external Access Points list and verify uncategorized / unauthorized client list.

- iv. Verify if all authorized wireless devices are tagged to right location.
- v. Test for authorized client connection to authorized Access Point and respective SSID as per the set authentication policy.
- vi. Test for Guest client connection to authorized Access Points and respective SSID as per the set authentication policy.
- vii. Test if the Access Points are operational after shutting down the controller.
- viii. Test if automatic Rogue Access Points prevention is working on all types of rogue APs.
- ix. Test if unauthorized client association to authorized Access Point is automatically prevented.
- x. Test if automatic client Mis-association prevention is working.
- xi. Test if Ad-Hoc Networks are detected and automatically prevented.
- xii. Test if Mac-Spoofing is detected.
- xiii. Test if automatic prevention of Honeypot (with Multipot) is functional.
- xiv. Test is Denial of Service (DoS) Attack is detected.
- xv. Testing of deployment of policies, firmware updating remotely through the controller.
- xvi. Testing WIPS functionality across the subnet.
- xvii. The entire testing exercise should complete in two weeks' time from the Date of installation.

5.1.1.4 Documentation and Reports

- i. Documentation of the entire project along with testing reports must be submitted to IISc.
- ii. Documentation must include RF Coverage Heat Maps clearing showing that the -65 dBm RSSI requirement within all hostel rooms is met.
- iii. Documentation must include complete network diagram which clearly depicts Switch Management IP Address, Switch Location, AP Location and Switch Port to each AP.
- iv. Documentation must include complete configuration in a step-by-step manner.

5.1.1.5 Solution Fine Tuning and Handover to operations team of Interdisciplinary Sciences Division

- i. Fine tune Wi-Fi Access policies and security policies.
- ii. Rebuild authorized device inventory and remediate mis-configured APs.

6. Terms and Conditions

6.1 Bidder's Eligibility Criteria (BEC)

Compliance with the following conditions is mandatory.

1. The bidder (Tier-1/Tier-2/Highest level System Integrator (SI) partner of the OEM) must have successfully completed/ongoing three Wireless LAN Access Infrastructure (Wi-Fi / WIPS Solution) implementations in India in the last three years of which one must be Wi-Fi & WIPS Solution. The value of any one turnkey solution implemented must be at least **Rs. 7 crores**, or any two turnkey solutions must be at least **Rs. 4 crores each**. Complete list, along with the contact details of the customers (as mentioned above), must be provided.

Supporting Documents to be enclosed:

a)	Copies of the P. O.-s, stating clearly the duration of contract, value, and scope.	YES/NO
b)	Letter from the organization, supporting the claim of completion of the project and satisfactory delivery of services.	YES/NO
c)	Letter from the OEM to support the claim of Tier-1/Tier-2 relationship of SI with the OEM.	YES/NO

2. The bidder must have a registered office in India and been in operation for at least 10 years as on 31.10.2023. Joint venture or consortium are not permitted.

Supporting Documents to be enclosed:

a)	Documents supporting the above claim	YES/NO
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3. The OEM must provide all technical support to the bidder for the contract period. A letter to this effect must be submitted along with the bid.

Supporting Documents to be enclosed:

a)	Authorization letter from the OEM to support SI during the contract period	YES/NO
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4. The bidder is expected to be a profit-making company with an annual turnover of at least **Rs. 20 Crores** in each of the last 3 financial years.

Supporting Documents to be enclosed:

a)	Annual audited balance sheets for 3 years	YES/NO
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5. The bidder should be in a position to demonstrate its capability to deliver all the services expected during the contract period.

Supporting Documents to be enclosed:

a)	Documents supporting the above claim	YES/NO
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6. The bidder must have an office in Bangalore with Service/Support Engineers posted in Bangalore.

Supporting Documents to be enclosed:

a)	Documents supporting the above claim	YES/NO
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7. The bidder must not be blacklisted by Central Govt. /State Govt./PSUs/Other Govt. Agency/ Govt Educational Institute/University.

Supporting Documents to be enclosed:

a)	A declaration on company's letterhead.	YES/NO
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8. The bidder must submit Solvency Certificate of at least Rs. 20 Crores or above from Scheduled Commercial Bank. The Certificate should not older than 12 months.

Supporting Documents to be enclosed:

a)	Solvency Certificate from Scheduled Commercial Bank	YES/NO
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6.2 Earnest Money Deposit (EMD)

1. All bidders must submit **Rs. 10,00,000/- (Rs. Ten Lakh only)** as bid security in the form of RTGS/NEFT transfer, the bidder must submit e-receipt as a proof of EMD submission along with the technical bid. Failure to comply with this requirement will result in rejection of the bid. The account details of IISc are provided below.
2. After the placement of the purchase order on the successful bidder, the EMD amount will be returned to the unsuccessful bidders without interest.
3. The EMD amount will be returned to the successful bidder after the Institute places a firm purchase order for the procurement and the successful bidder then submits a performance security/bank guarantee (Annexure 5) followed by its verification.
4. Bidders registered with NSIC / MSME will be exempted for EMD and Tender Fee. The bidder must submit copy of valid certificate.
5. The bid must be valid for at least 180 days from the actual date of opening of the technical bid. Withdrawal of the bid within the period of validity will result in forfeiture of the EMD amount.

Table 6. Details of the Bank Account of IISc Bangalore for submitting EMD

Account's Name	Registrar, IISc	<p>Note:</p> <ul style="list-style-type: none"> • It is mandatory to write the Name & Address of the Bidder and Tender Reference No. & Date on the back side of the e-receipt of NEFT/RTGS. • Acceptance of the e-receipt of NEFT/RTGS is subject to its verification from the Finance & Accounts section, IISc.
Bank	State Bank of India	
Branch	IIS Bangalore	
Branch Code	02215	
Account No.	31728098170	
IFSC	SBIN0002215	
MICR	560002020	
GSTIN	29AAATI1501J2ZV	
PAN	AAATI1501J	
IEC Code	0788012428	

6.3 Guidelines for Bid Submission

1. If a bidder submits a response to the tender, then it is assumed that the bidder accepts all the conditions specified in this document. Tender submitted through any other mode will not be entertained.
2. The submission consists of two parts: Technical Bid and Commercial Bid.
 - 2.1. Technical bid should contain:
 - 2.1.1. Supporting documents mentioned in the BEC and Overall Compliance Statement.
 - 2.1.2. Terms and conditions of the offer.
 - 2.1.3. Supporting technical material, including brochures.
 - 2.1.4. A duly filled BOQ compliance sheet as mentioned in Annexure 1 of the RFP. No prices should be mentioned.
 - 2.1.5. A duly filled technical compliance sheet as mentioned in Annexure 2 and 3 of the RFP.
 - 2.1.6. A duly filled Techno-commercial compliance sheet as mentioned in Annexure 4 of the RFP.
 - 2.2. Commercial bid (Financial bid or Price Bid) should contain:
 - 2.2.1. The commercial bid must contain prices for every line item in the BOQ (Section 3.1-3.4).
 - 2.2.2. Any additional item over and above the items mentioned in Section 3.1 to 3.4 must be mentioned clearly as a separate line item, stating the quantity, unit of measurement and must be with 3 years of warranty.
 - 2.2.3. The final commercial evaluation will be based on Total Price of all the line items.

Points to Note:

- 1 Prices should not be mentioned in the Technical Bid.
- 2 All pages of technical bid must be page numbered.
- 3 Bidder on whom the order would be placed will have to execute the order and invoice the order before 1st March 2024
- 4 IISc is eligible for reduced customs duty for supply of equipment quoted in foreign currency; all such equipment must be shown as separate line items. Bidders planning to quote any imported solution must give the offer in the respective currency.
- 5 The offer must clearly state the components of pricing separately. For example, the supply part, F & I, I & C, Warranty services and any other charges must be quoted as separate line items.
- 6 A tender not complying with any of the above conditions is liable to be rejected. Incomplete proposals are liable to be rejected.
- 7 A Technical Committee at IISc, Bangalore reserves the right to modify the technical specifications or the required quantity at any time. In such case, the bidders will be notified.

- 8 A Technical Committee at IISc reserves the right to accept or reject any proposal, in full or in part, without assigning any reason.
- 9 The bidders are requested to go through the Terms and Conditions detailed in this document, before filling out the tender.
- 10 A pre-bid clarification meeting is scheduled as per the timeline given. Queries relating to the tender documents must be submitted in writing (Email address: ar.purchase@iisc.ac.in or dr.purchase@iisc.ac.in) on or before the specified timeline. Queries received after this deadline will not be entertained.

6.4 Evaluation of bids

The evaluation process to identify the successful bidder has two stages.

1. Evaluation of technical bids.

- i. A Technical Committee constituted by the Institute will evaluate the submitted bids and identify the Bidders whose solution meets meet the mandatory technical requirements mentioned in Sections 4 and 5 in this document.
- ii. The Committee will also verify from the documentation provided if the Bidder satisfies the Bidder's Eligibility Criteria.
- iii. Bidders whose bids are found responsive may be invited for a technical presentation at Interdisciplinary Sciences Division. The detailed timings for the presentation and demonstration and switch set-up slots will intimated via email correspondence.
- iv. The Bidder (if called for technical presentation) must submit all the original documents submitted for the technical bid (hard copy, properly spiral bound, in one volume only), to IISc for verification at the time of the technical presentation.
- v. The technical presentation will be limited to 30 minutes including Q&A. The first 5 minutes may be spent introducing the Bidder's company (1 slide), the solution and its salient aspects (4-5 slides). The next 25 minutes must be spent on a demonstration. The bidder is expected to physically show with the two quoted distribution switches and two quoted access switches (schedule for prior hardware set-up will be informed via email correspondence) that the redundancy required of the solution is satisfied. The HSRP/VRRP/GLBP features on the distribution switches must also be clearly demonstrated.
- vi. The Technical Committee will decide on the technically qualified bidders based on the bids and the demonstration. *The decision of the Technical Committee is final and binding on all the Bidders.*

2. Evaluation of commercial bids

- 2.1. Only technically qualified bidders' commercial bids will be taken up for evaluation in the e-tendering process. Commercial bids shall be opened only for the technically qualified bidders after the technical evaluation. The Institute will communicate the date and time of opening of the commercial bids.
- 2.2. Commercial bids which are not in compliance with the terms and conditions set out [Refer to "Commercial Terms and Conditions"] in the tender will be rejected.
- 2.3. For bids/components of bids submitted in foreign currency, the INR equivalent will be calculated using the exchange rate on the day of opening of the commercial bid.

Acceptance Criteria

1. The successful bidder must implement the solution at the site and complete the necessary integration of the solution with the core network infrastructure deployed at the Smart X building, IISc and demonstrate the performance of the deployed infrastructure to the technical committee.
2. The bidder is expected to adhere to the Acceptance Test Plan (ATP) given in technical specifications in section 4 and 5.
3. The warranty services will start only after installation and commissioning of the WLAN and WIPS solution.

6.5 Service Level Agreement and Warranty

1. In the event of failure of any of the sub-systems or components of the proposed solution, the bidder must ensure that defects are rectified, or the equipment is replaced with necessary configuration free of cost within 24 hours from the time it was reported.
2. Failure to meet the above requirement will result in extension of warranty services by 3 days for each day of delay during the warranty period.
3. The bidder must maintain a suitable stock of necessary spare equipment during the contract period.
4. The bidder must provide 3 years' warranty and thereafter 2 years' comprehensive AMC for all the hardware and software components of the solution, from the date on which the solution is accepted, as per the Acceptance Test Plan. During the warranty period and AMC period, the bidder must undertake comprehensive maintenance of all the equipment, hardware components, support, and accessories. The bidder must also perform periodic software upgrades, updates, and patches, as well as preventive maintenance.
5. Collection of faulty hardware from the site and provisioning the replacement hardware during the contract period (warranty & comprehensive AMC) on the site shall be the responsibility of the bidder.
6. IISc reserves the right to invoke the Performance Bank Guarantee (Annexure 5) submitted by bidder in case
 - a. Supplied equipment, hardware & software components fail to achieve the performance as stipulated in this document.
 - b. The bidder fails to provide satisfactory service in the scheduled time frame, during the contract period, as stipulated in this document.
7. The bidder should also clearly indicate post-warranty comprehensive AMC cost, covering all hardware and software upgrades, as a percentage of the equipment cost for a period of 2 years, on an annual basis, in the commercial bid.
8. Care shall be taken by the bidder while handling and installing the various equipment and component of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost failing which the same shall be got rectified/made good at the risk and cost of the contractor by the department and will be recovered in the bill. He shall also remove all unwanted and waste materials arising of the installation work every day at his cost.
9. The Passive Components of structured cabling distribution network will be free from manufacturing defects in material and workmanship under normal and proper use.
10. All Passive Components in the structured cabling distribution network shall meet or exceed the relevant component specification of the EIA/TIA 568-B and EIA/TIA 568-C.2 series and ISO/IEC 11801: 2002 standards; or later version as applicable at the time of installation.
11. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.
12. IISc holds the rights to withheld 5 % of the total project value if the quality of execution and workmanship is not found satisfactory by the Technical Committee at IISc.

6.6 Commercial Terms & Conditions

1. The commercial bid should contain among other things, payment terms, warranty, installation, commissioning, AMC charges etc. as per BOQ. All such conditions must be in line with the tender. In case of any deviation or conditional offer, the bid may be treated as non-responsive and hence will not be considered for evaluation. These charges will be paid only after successful supply, installation, and acceptance. IISc will enter into a contract with the successful bidder which will detail all contractual obligations during the warranty period. Bidders must quote for AMC charges for two (2) years after the three (3) years warranty period.
2. IISc is registered with DSIR in order to get concession in Customs Duty. IISc will provide necessary documents required for availing concession in Customs Duty. Bidders should consider these facts while offering their price bids for this tender. Please note that IISc will not be involved in custom duty / airport charges payment, custom clearance, forwarding and transportation / shipment of import items; IISc will only provide relevant documents for availing concession / exemption in Custom duty to submission of documents (viz. Invoice, Bill of Entry, Bill of Lading, airway Bill, etc.) by the vendor. Bill of Entry must be in the name of IISc. Customs duty must be paid by the vendor only. Before release of final payment, all original documents with regards to import must be handed over to IISc, failing which final payment may not be released.
3. In case of rupee offer, the component of tax, and any other statutory levies should be shown separately and not included in the total amount, to enable us to avail exemption.
4. In case of imports, the commercial bid should contain among other things, the name and address of the Indian agent, if any, and the agency commission payable to the agent. Please quote the prices for import items on 'DDP - Delivered Duty Paid' terms.
5. Proposals should contain the name and contact details, viz., phone, fax and email of the designated person to whom all future communication will be addressed.
6. Prices should be quoted in detail, for all the subsystems given in the Technical Specifications part of the tender. Further, price validity should be for six months.
7. IISc will place the purchase order only on the successful bidder.

6.7 Payment Terms

1. The total project cost will consist of two parts
 - 1.1. Equipment supplies part (Supply).
 - 1.2. Installation, testing, commissioning, documentation, warranty, and AMC charges / maintenance services part (referred to as “Services” in short).
2. Payment Terms: - Payment will be released as follows:
 - 2.1. For orders placed in foreign / INR currency, payment towards 70% of the total order value of the Supply part will be released only after delivery of all such items on site at IISc, Bangalore, followed by inspection and auditing by the IISc Committee and submission of report regarding delivery of correct items by the Committee. Rest of the amount (30% of the order value of Supply and 100% of Services) will be paid only after completion of installation, commissioning, Acceptance Test Plan (ATP) and acceptance by the IISc Committee, followed by submission of a report regarding completion of the work by the Committee. Payments will be released through RTGS only (*no payment through Letter of Credit (LC)*).
 - 2.2. Services part of the project is payable only in Indian Rupees and will be paid only after completion of installation, commissioning, Acceptance Test Plan (ATP) and acceptance by the IISc.
 - 2.3. At the time of installation, any additional requirement of Supply or Services, over and above the quantity mentioned in the attached BOQ must be supported at the same rate as originally quoted.
 - 2.4. At the time of installation, if additional or less quantity of various items of Supply or Services are needed, then payment will be released only for actual Supply and Services. Final payment will be adjusted accordingly. Any payment will be released only after submission of PBG followed by receiving of verification report of genuineness of the Bank Guarantee.
 - 2.5. Payment will subject to deduction of TDS as per rules/laws.
 - 2.6. After completion of the warranty period, AMC charges will be paid once in every six months after completion of six-month AMC period, subject to a report of satisfactory performance by the user department of IISc.
3. Performance Security / Performance Bank Guarantee (PBG) – After placement of order, the successful bidder must submit Performance Security / Performance Bank Guarantee (PBG) (Annexure 5) within two weeks of the issue date of the order, failing which order may be cancelled. The PBG will be 10% of the total order value. The performance security must be valid for five years and two months from date of successful installation accepted by IISc. Performance security may be furnished in the form of RTGS / NEFT payment issued by a scheduled commercial bank in India (preferably nationalized bank) in favour of “The Registrar, Indian Institute of Science, Bangalore.” Bank details of IISc are attached in Section 6.2. No interest will be payable by IISc on the Performance Security deposited. The Earnest Money Deposit (EMD) of the successful bidder shall be returned on receipt of Performance Security (Performance Bank Guarantee / PBG). If the successful bidder fails to

furnish the performance security or fails to deliver/provide the item/installation/service as per the order's terms and conditions within the stipulated period, the EMD shall be liable to be forfeited. The Performance Security will be forfeited and credited to IISc's account in the event of a breach of contract by the successful bidder. An undertaking to this effect must be submitted by the bidder.

4. Indian Agency commission (IAC), if any, must be mentioned in the commercial bid and it will be paid only after satisfactory installation & commissioning.

6.8 Supply, Installation, and Acceptance

1. Bidder on whom the order would be placed will have to execute the order and invoice the order before 1st March 2024.
2. The successful Bidder must install and configure the switches on site, ensure and demonstrate that they are all operating as required by this tender, and integrate the distribution switches with the IISc core network.
3. All relevant technical documentation related to the further configuration and customization must be provided by the Bidder at the end of the installation.
4. The Bidder should demonstrate the smooth operation of the installed infrastructure to Technical Committee. Only upon a successful demonstration will the provided solution be deemed accepted.
5. The warranty services will start only after the acceptance by IISc of the provided solution.

ANNEXURE-1

BOQ Compliance Sheet

S/No	Particulars	Quantity	Units	Included in the commercial bid (YES/No)	Remark or Model Name
Active Components					
1	Wi-Fi Access Point support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band with at least 8x8:8 5Ghz radio and at least 2x2 2.4Ghz radio. Must have at least one 5Gbps Ethernet interfaces. Must be Controller based locally hosted with H.A. Must be Wi-Fi CERTIFIED 6™. Must support POE+ on 802.3at/bt	15	Nos		
2	Wi-Fi Access Point support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band with at least 4X4 MU-MIMO spatial streams on 5Ghz radio and 4X4 MU-MIMO spatial streams on 2.4GHz radio. Must have at least one 2.5Gbps Ethernet interface. Must be Controller based locally hosted with H.A. Must be Wi-Fi CERTIFIED 6™. Must support POE+ on 802.3at/bt	235	Nos		
3	24 SFP+ ports layer-3 manageable 1G/10G switch with dual power supply (DS 1 & 2)	2	Nos		
4	Single Mode 1310nm SFP+ transceiver (10GBASE-LR)	76	Nos		
5	Wireless Controller	2	Nos		
7	Stacking cable or SFP+ Twinax cable 2 meters	36	Nos		
8	Stacking cable or SFP+ Twinax cable 5 meters	6	Nos		
9	48 UTP port non-POE switch with 4 SFP+ port layer 2, 10/100/1000 Mbps manageable switch with stacking capability and dual power supply	22	Nos		
10	48 UTP 10/100/1000 Mbps and at least 24 ports of MgiG (1/2.5/5 Gbps) ports, all 24 ports must concurrently support (1/2.5/5 Gbps), and the switch should have at least 4 SFP+ port layer-2, manageable switch having at least 740 W power budget for POE (Support POE+ on all ports concurrently) with redundant power supply	20	Nos		

Installation and Services					
1	Configuration and Installation/mounting on ceiling/wall or angle bracket of Access points with radium reflective labelling	250	Nos		

2	Configuration and Installation of Network Switches in network rack with radium reflective labeling	44	Nos		
3	Testing and generating reports as mentioned in RFP	1	Nos		
4	AMC charges for additional 2 years post 3 years warranty	1	Nos		

ANNEXURE 2

Technical Compliance Sheet for Active Components

Specifications	Yes/No	Remark
1. Access Point- Type 1		
i. Must have at least one 5 Gbps Ethernet interface.		
ii. Must be Controller based and must be locally hosted.		
a. The data plane and Controller plane must be separate. That is, even if the controller is down or out of network, the Access Points must continue to function normally.		
b. High Availability of Controller must be ensured with easy Disaster Recovery possible.		
c. Data transfer between Access Point and Controller must be encrypted.		
iii. The solution must be scalable to support up to at least 150 Access points		
iv. The Access points must be Wi-Fi CERTIFIED 6™.		
v. Must support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band.		
vi. Access Points must work with all features supported on PoE+.		
vii. Access Point shall support tri radio operation with 4x4 MIMO on all three radio interfaces and MU-MIMO technology with option to combine the 2 radio to operate on 8x8 operation.		
viii. Access Point shall be able to support Multigigabit Ethernet, support up to 5 Gbps PHY speed using single Cat5e or above (Cat6, Cat6a, Cat7) cable		
ix. Access Point should have Bluetooth5 radio to support use cases of location, asset tracking and analytics.		
x. Access Point shall be able to power up using 802.3at power with full radio operation of 12 Spatial streams and transmit power upto 22dBm		
xi. Access Point shall support Dual 5GHz radios		
xii. Access Point shall have a dedicated radio/chipset 1x1/2x2 for spectrum monitoring capabilities, WIPS, and off-channel RRM without compromising and using the client-serving radios.		
xiii. Access Point shall support hardware driven beamforming		
xiv. Access Point should have 1x 5gig Multigigabit Ethernet (RJ-45) – IEEE 802.3bz		
xv. Access Point should have USB port for future requirement.		
xvi. Must have at least 3 dBi Antenna gain on each radio		
xvii. Must Support data rate up to 5 gbps.		
xviii. Must support minimum of 23 dbm of transmit power in both 2.4Ghz and 5 Ghz radios. And should follow the local regulatory Norms.		
xix. Must support AP enforced load-balance between 2.4 Ghz and 5 Ghz band.		
xx. Must incorporate radio resource management for power, channel and performance optimization		

xxi.	Must have -97 dB or better Receiver Sensitivity.		
xxii.	Must support Proactive Key Caching and/or other methods for Fast Secure Roaming.		
xxiii.	Must support Management Frame Protection.		
xxiv.	Should support locally significant certificates on the APs using a Public Key Infrastructure (PKI).		
xxv.	Access Points must support Hardware-based encrypted user data and management traffic between controller and Access point for better security.		
xxvi.	Must support the ability to serve clients and monitor the RF environment concurrently.		
xxvii.	Same model AP that serves clients must be able to be dedicated to monitoring the RF environment.		
xxviii.	Must be plenum-rated (UL2043).		
xxix.	Must support 12 WLANs per AP for SSID deployment flexibility.		
xxx.	Access Point Must continue serving clients when link to controller is down. It should also have option to authenticate user through Radius server directly from Access Point during link unavailability to controller.		
xxxi.	Must support telnet and/or SSH login to APs directly for troubleshooting flexibility.		
xxxii.	Must support QoS and Video Call Admission Control capabilities.		
xxxiii.	Access point should be Wi-Fi 6 certified		
2. Access Points – Type 2			
i.	Must have at least one 2.5Gbps Ethernet interface.		
ii.	Must be Controller based and must be locally hosted.		
a.	The data plane and Controller plane must be separate. That is, even if the controller is down or out of network, the Access Points must continue to function normally.		
b.	High Availability of Controller must be ensured with easy Disaster Recovery possible.		
c.	Data transfer between Access Point and Controller must be encrypted.		
iii.	The solution must be scalable to support up to at least 150 Access points		
iv.	The Access points must be Wi-Fi CERTIFIED 6™.		
v.	Must support IEEE 802.11a/n/ac/ax on 5Ghz band and IEEE 802.11b/g/n/ax on 2.4Ghz band.		
vi.	Apart from DC power, the Wi-Fi Access Points must work with all features supported on PoE+.		
vii.	The Access Point must have at least 2X2 MU-MIMO spatial streams 2.4GHz radio and 4X4 MU-MIMO spatial streams on 5GHz radio.		
viii.	The Access Point must support POE+ on 802.3at/bt.		
ix.	Must support WPA2 and WPA3 Enterprise.		
x.	Must support two-way band steering (example from 2.4GHz band to 5GHz and from 5 GHz to 2.4 GHz).		
xi.	Must support auto channel allocation to avoid interference between APs.		
xii.	Must support auto transmission power selection based on neighbor count and loudness for both bands.		

xiii. Must support manual transmission power selection per Access Point on a granularity scale of 1 dBm.		
xiv. The Wi-Fi radio transmission parameters must comply with the Indian transmission regulations.		
xv. The Wi-Fi radio must have a transmit power of 23 dBm (without considering antenna gain) or higher for both 2.4Ghz and 5Ghz.		
xvi. Must support both Bridge and NAT modes.		
xvii. Must support configurable management VLAN (support other than VLAN-1 as management VLAN).		
xviii. Must be ceiling mountable with all necessary accessories for ceiling mounting included.		
xix. The Controller and Access Point device should support dual stack for IPV4 and IPV6.		
xx. The Access Points must simultaneously broadcast at least 6 SSIDs as visible network to client.		
xxi. The solution should detect and identify all types of Wi-Fi enabled client devices.		
xxii. Both the controller and Wi-Fi device should support SNMP v2c, v3.		
xxiii. The solution should support RADIUS, Active Directory and LDAP based authentication.		
xxiv. The proposed Controller and Access Points must be of reliable and reputed brand only.		
xxv. The solution should be able to work in a heterogenous environment by not hindering the operation of existing APs of different makes already deployed at IISc.		
xxvi. The solution should maintain logs which includes all activities performed by the users like login, any configuration changes made on the system, device deletion, device authorization, log out etc., for at least 365 days.		
xxvii. The solution should support uploading of all logs to external Syslog Server in LAN/WAN on real-time and scheduled basis.		
xxviii. The solution should block traffic based on IP address, port, URL, hostname etc. and QoS (for example: bandwidth restriction for the SSID, QoS tagging of special traffic like Voice) at the edge (AP).		
xxix. The solution must allow VLAN segmentation at the edge.		
xxx. The solution must support Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP).		
xxxi. The solution must have the capability of auto classifying Wi-Fi clients as authorized (managed clients connecting to IISc, Bangalore network), guest, rogue (un-managed client attempting connection to IISc, Bangalore network) or external (unmanaged not connecting to IISc, Bangalore network e.g., neighbor), in addition to manual classification.		
xxxii. Access Point shall have dedicated radio/chipset for spectrum monitoring capabilities, WIPS and off channel RRM without compromising and using the client serving radios.		
xxxiii. Access Point should have 1x 100, 1000, 2500 Multigigabit Ethernet (RJ-45) – IEEE 802.3bz		
Necessary Licenses, warranty, and support for all access points		
i. The quote should include all required Hardware and Software licenses to support all the Access Points and Controllers. The solution should include these licenses from the first day of the installation. There should not be any additional licenses required for DR.		

ii.	All the AP features should be active post-expiration of the subscription/license validity. All the features and signatures available at the time of expiration of the license should continue to work. Renewal of licenses should be required only for new features, Visibility, configuration changes, and updates/releases announced by the OEM after the contract expires. The vendor must propose a perpetual license.		
iii.	The total solution should have 5 years' on-site warranty for Access Points and controller.		
iv.	The total solution should include technical support for software/firmware and software upgrades for controller and Access Points for 5 years.		
v.	TAC support must be from OEM not Bidder during the whole 5 years.		
vi.	The total solution should be upgradable to the latest stable firmware version, as and when available, at no extra cost.		
vii.	Warranty support should include NBD hrs. response time and provision of replacement along with appropriate configuration and installation in next business day for Hardware.		
Possible access points models:			
A. Indoor for Labs and general locations:			
i.	Must have at least one 2.5 Gbps Ethernet interface.		
ii.	Must have at least 4x4:4 on 5Ghz and 2x2 2.4 Ghz radio		
iii.	Must support DL-MU-MIMO and UL-MU-MIMO		
iv.	Must support DL-MU-OFDMA and UL-MU-OFDMA		
B. Indoor auditorium and big classrooms:			
i.	Must have at least one 5Gbps Ethernet interfaces.		
ii.	Must have at least 8x8:8 5Ghz radio and at least 4x4 2.4Ghz radio		
iii.	Must support DL-MU-MIMO and UL-MU-MIMO		
iv.	Must support DL-MU-OFDMA and UL-MU-OFDMA		
3. 48 Port Non-PoE			
Specification			
i.	Switch should be 1U and rack mountable in standard 19" rack.		
ii.	Switch should support internal field replaceable unit redundant power supply from day of commissioning.		
iii.	Switch should have minimum 2 GB RAM and 2 GB Flash.		
iv.	Stacking/interconnection with ring-based topology to have minimum 48Gbps throughput or 20Gbps for Direct interconnects. All necessary interconnectors and cables must be supplied along with the switches up to a pod of 4 Switches.		
Performance			
i.	Switch shall have minimum 176 Gbps of switching fabric and 130 Mpps of forwarding rate with non-blocking architecture		
ii.	Switch shall have minimum 16K MAC Addresses and 250 active VLAN.		
iii.	Should support minimum 11K IPv4 routes or more		
iv.	Switch shall have 1K or more multicast routes.		
v.	Switch should support atleast 16K flow entries		
vi.	Switch should support 128 or more STP Instances.		

vii.	Switch should have 4MB or more packet buffer.		
Functionality			
i.	Switch should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z.		
ii.	Switch must have functionality like static routing, RIP, REP PIM, OSPF, VRRP, PBR and QoS features from Day1.		
iii.	Switch should support network segmentation that overcomes the limitation of VLANs using VXLAN and VRFs.		
iv.	Switch shall have 802.1p class of service, marking, classification, policing and shaping and eight egress queues.		
v.	Switch should support management features like SSHv2, SNMPv2c, SNMPv3, NTP, RADIUS and TACACS+.		
vi.	Switch should support RFC 2460 Internet Protocol, Version 6 (IPv6) Specification RFC 2461 Neighbour Discovery for IP Version 6 (IPv6), RFC 2462 IPv6 Stateless Address Auto-configuration and RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification		
vii.	Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment.		
viii.	Switch must have the capabilities to enable automatic configuration of switch ports as devices connect to the switch for the device type.		
ix.	During system boots, the system's software signatures should be checked for integrity. System should be capable to understand that system OS are authentic and unmodified, it should have cryptographically signed images to provide assurance that the firmware & BIOS are authentic.		
Interface			
i.	Switch shall have 48 nos. 10/100/1000 Base-T ports and 4 nos of SFP+ port.		
Certification			
i.	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
ii.	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
iii.	Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.		
4. 48 Port Mgif switch			
Specification			
i.	Switch should be 1U and rack mountable in standard 19" rack.		
ii.	Switch should support internal field replaceable unit redundant power supply from day of commissioning.		
iii.	Switch should have minimum 2 GB RAM and 2 GB Flash.		
iv.	Stacking/interconnection with ring-based topology to have minimum 48Gbps throughput or 20Gbps for Direct interconnects. All necessary interconnectors and cables must be supplied along with the switches up to a pod of 4 Switches.		
Performance			
i.	Switch shall have minimum 272 Gbps of switching fabric with non-blocking architecture		
ii.	Switch shall have minimum 16K MAC Addresses and 250 active VLAN.		

iii.	Should support minimum 11K IPv4 routes or more		
iv.	Switch shall have 1K or more multicast routes.		
v.	Switch should support atleast 16K flow entries		
vi.	Switch should support 128 or more STP Instances.		
vii.	Switch should have 4 MB or more packet buffer.		
Functionality			
i.	Switch should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z.		
ii.	Switch must have functionality like static routing, RIP, REP PIM, OSPF, VRRP, PBR and QoS features from Day1.		
iii.	Switch should support network segmentation that overcomes the limitation of VLANs using VXLAN and VRFs.		
iv.	Switch shall have 802.1p class of service, marking, classification, policing and shaping and eight egress queues.		
v.	Switch should support management features like SSHv2, SNMPv2c, SNMPv3, NTP, RADIUS and TACACS+.		
vi.	Switch should support RFC 2460 Internet Protocol, Version 6 (IPv6) Specification RFC 2461 Neighbor Discovery for IP Version 6 (IPv6), RFC 2462 IPv6 Stateless Address Auto-configuration and RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification		
vii.	Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment		
viii.	Switch must have the capabilities to enable automatic configuration of switch ports as devices connect to the switch for the device type.		
ix.	During system boots, the system's software signatures should be checked for integrity. System should be capable to understand that system OS are authentic and unmodified, it should have cryptographically signed images to provide assurance that the firmware & BIOS are authentic.		
Interface			
i.	48 UTP 10/100/1000 Mbps and at least 24 ports of MgiG (1/2.5/5 Gbps) ports, all 24 ports must concurrently support (1/2.5/5 Gbps), and the switch should have at least 4 SFP+ port layer-2, manageable switch having at least 740 W power budget for POE (Support POE+ on all ports concurrently) with redundant power supply		
Certification			
i.	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
ii.	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
iii.	Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.		
5. Core switch			
General Features:			
i.	Switch should be 1U and rack mountable in standard 19" rack.		
ii.	Switch should support internal hot-swappable Redundant Power supply from day of commissioning.		
iii.	Switch should have redundant hot swappable fans.		

iv.	Switch should have minimum 4 GB RAM and 4 GB Flash.		
v.	Stacking/interconnection with ring-based topology to have minimum 48Gbps throughput or 20Gbps for Direct interconnects. All necessary interconnectors and cables must be supplied along with the switches up to a pod of 4 Switches.		
Performance:			
i.	Switch shall have minimum 800 Gbps of switching fabric with non-blocking architecture.		
ii.	Switch shall have minimum 32K MAC Addresses and 1000 active VLAN.		
iii.	Should support minimum 32K IPv4 routes or more and 16K IPv6 routes or more		
iv.	Switch shall have 8K or more multicast routes.		
v.	Switch should support atleast 64K flow entries		
vi.	Switch should support 128 or more STP Instances.		
vii.	Switch should have 16MB or more packet buffer.		
Functionality			
i.	Switch should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3z & 1588v2.		
ii.	Switch must have functionality like static routing, RIP, PIM, OSPF, VRRP, PBR and QoS features from Day1		
iii.	Should support advance Layer 3 protocol like BGPv4, BGPv6 , MPLS, VRF, VXLAN, IS-ISv4, OSPFv3, MP-BGP		
iv.	Switch shall have 802.1p class of service, marking, classification, policing and shaping and eight egress queues.		
v.	Switch should support management features like SSHv2, SNMPv2c, SNMPv3, NTP, RADIUS and TACACS+ .		
vi.	Switch should support RFC 2460 Internet Protocol, Version 6 (IPv6) Specification RFC 2461 Neighbour Discovery for IP Version 6 (IPv6), RFC 2462 IPv6 Stateless Address Auto-configuration and RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification		
vii.	Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment		
viii.	Switch must have the capabilities to enable automatic configuration of switch ports as devices connect to the switch for the device type.		
ix.	During system boots, the system's software signatures should be checked for integrity. System should be capable to understand that system OS are authentic and unmodified, it should have cryptographically signed images to provide assurance that the firmware & BIOS are authentic.		
x.	Switch shall have modular OS to support application 3rd party application hosting		
Interface			
i.	24 SFP+ ports layer-3 manageable 1G/10G switch with dual power supply		
Certification:			
i.	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
ii.	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		

iii.	Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.		
6. Wireless Controller			
Hardware			
i.	The controller shall support deployment flexibility without compromising any features		
ii.	The controller shall support min 5 Gbps tunneling capacity and shall be upgradable to 10 gbps.		
iii.	The controller shall support 2x 10G/Multigigabit copper uplink.		
iv.	Wireless Controller shall support link aggregation and load sharing between Access Point to WLC links		
v.	The controller shall support hardware encrypted data plane between Access Point and Controller		
vi.	The controller shall be proposed with complete feature set including licensed feature		
High Availability			
i.	High Availability mode shall support controller inline data plane mode as well as local switching mode and Mesh mode		
ii.	High Availability mode shall allow geographically dispersed installation between Controllers		
iii.	The controller failover shall not trigger client de-authentication and re-association		
iv.	The controller shall support hot WLC software patching for fixing bugs		
v.	The controller shall support hot AP software patching for fixing bugs		
vi.	The controller shall support new AP hardware without need for upgrading entire controller software.		
vii.	The controller shall support rolling AP upgrade		
viii.	The controller shall support rolling AP upgrade without need for clustering		
ix.	The redundant Controller shall sync Access Point and Client Status, including DHCP IP lease status		
Software			
i.	Access Point shall be able to proactively distributes Client connection before and after association and tracking client condition in real time using data packet RSSI		
ii.	The controller shall support standard-based, secure AP-Controller data & control protocol like CAPWAP. protocol that has known vulnerability like PAPI cannot be used.		
iii.	The controller shall support Inter-Controller Wireless Roaming, or the controller should support at least 1000 APs		
iv.	The controller shall maintain per-user Application usage and shall be able to export it for network analytic.		
v.	The controller shall support Multi Languages options from embedded GUI Management		
vi.	The controller shall provide per-Client Connection Scoring and provide reasoning of Client Connection Score		
vii.	The controller shall support Cellular offload using IPv6 tunneling to Mobile Core network		
RF management			
i.	The controller shall be able to support multiple RF Management profile per group of APs, including Transmit Power Control and Dynamic Channel Assignment on both 2.4GHz and 5Ghz		

ii.	The controller shall be able to identify and avoid interferers with network performance impact analysis report		
iii.	The controller shall support optimized manual/automatic channel width (20~160Mhz) selection over 5GHz, 802.11ac		
Mesh			
i.	Mesh AP nodes shall provide quick convergence and fast failover to new root mesh node		
ii.	Mesh Backhaul interface shall support full duplex operation using wired daisy chaining		
iii.	Mesh AP shall support fast roaming for Wired-client through wired-to-wireless bridge client		
Application Recognition and Control			
i.	The controller shall support per-user and per-WLAN based application recognition and control that throttle usage by rate-limiting		
ii.	The controller application recognition technology shall support exporting to 3rd party compatible format, such as NetFlow v9		
iii.	The controller shall provide policy-based mDNS gateway including Chromecast gateway		
iv.	The controller shall support new application signatures without upgrading controller software		
BYOD & Security			
i.	The controller shall provide Device Profiling using multiple profiling methods to reduce false detection		
ii.	The system shall provide secure onboarding service for both employee and guest based on standard-based security protocol		
iii.	Proposed system shall not use public cloud as user data repository		
iv.	The controller shall be able to be embedded custom web portal page (HTML) to fully customize user experience without additional cost or extra box		
v.	The controller shall provide rule-based rogue classification and automatically run rogue mitigation action		
vi.	The controller shall be able to detect employee device connection to Rogue Access Point and contain it automatically. It should also support protection from Honeypot or Evil twin.		
vii.	The system shall support control plane encryption on both IPv4 and IPv6		
viii.	The Controller's image upgrade shall be done through secure, encrypted transport		
ix.	The controller shall be able to provide unique pre-shared keys to the devices that do not support the 802.1x security protocol		
x.	The controller shall support Identity PSK for on boarding		
xi.	The controller shall support identification & mitigation of threats inside encrypted traffic		
Network			
i.	The controller shall support mapping of specific VLANs to single SSID, depending on Access Point location and user		
Configuration			
i.	The controller shall support automatic VLAN assignment per SSID to load-balance user connection.		
ii.	Assigned VLAN pool shall be same as number of available VLAN in the system		
iii.	The controller shall support embedded best practice configuration profile and setup		

iv.	The controller shall support packet fragmentation between Access Point and controller communication		
7. Transceivers			
i.	Single Mode 1310 nm SFP+ transceiver (10GBASE-LR) of the same OEM as the quoted switch. The transceivers must be compatible with the quoted switches.		
ii.	Each of the Eighteen (18) Stacks should have 4 Transceivers (18 x 4 = 72) and another 4 transceivers for the Core uplink connectivity.		

ANNEXURE 3

Technical Compliance Sheet for Installation and Services

Specifications	YES/No	Remark
A. Installation and Services		
License, Warranty and Support		
i.	The total solution should include licenses for all necessary features from the first day of the installation. All the licenses quoted should be perpetual. All the features and signatures including WIPS available at the time of expiration of license should continue to work. Renewal of licenses should be required only for new features and updates/releases announced by the OEM after the contract expires.	
ii.	The total solution should have 3 years' on-site warranty for Access Points, Switches, accessories, and controller.	
iii.	The total solution should include technical support for software/firmware and software upgrades for controller, Access Points and Switches for 3 years.	
iv.	The total solution should be upgradable to the latest stable version, as and when available, at no extra cost.	
v.	The quote should also include additional 2 years' AMC specified as a separate line item.	
vi.	Warranty support should include 4 hrs. response time and provision of replacement along with appropriate configuration and installation in next business day for Hardware.	
vii.	Should provide single point of contact and should provide call logging and escalation matrix.	
Acceptance Parameters for the Proposed Solution (Only Applicable during and post implementation)		
Physical Installation		
i.	Inspect installation of Network Switches.	
ii.	Configuration check on controller including the policies.	
iii.	Test the physical mounting of each Access Point.	
iv.	Test each Access Point connectivity to the central cloud-based controller.	
Wi-Fi Controller Configuration Test:		
i.	Check authorized Wi-Fi set up for each Subnet / VLAN / Location as the case may be.	
ii.	Check both Authorized user and Guest user policies.	
iii.	Test each Access Point if they have the right authorized and guest policy.	
iv.	Check Wi-Fi prevention policy for each subnet, VLAN and location.	
v.	Check the configured alerts and alert delivery methods.	
vi.	Check the administrative users and their access rights.	
vii.	Check the configured reports (content, delivery frequency, recipient list).	

viii.	Check the automatic backup and archival parameters.		
ix.	Check archival of logs.		
Commissioning Test			
i.	Test for all Access Points connectivity to the cloud-based controller.		
ii.	Test and verify authorized Access Points inventory and authorized client inventory.		
iii.	Verify external Access Points list and verify uncategorized / unauthorized client list.		
iv.	Verify if all authorized wireless devices are tagged to right location.		
v.	Test for authorized client connection to authorized Access Point and respective SSID as per the set authentication policy.		
vi.	Test for Guest client connection to authorized Access Points and respective SSID as per the set authentication policy.		
vii.	Test if the Access Points are operational after shutting down the cloud-based controller.		
viii.	Test if automatic Rogue Access Points prevention is working on all types of rogue APs.		
ix.	Test if unauthorized client association to authorized Access Point is automatically prevented.		
x.	Test if automatic client Mis-association prevention is working.		
xi.	Test if Ad-Hoc Networks are detected and automatically prevented.		
xii.	Test if Mac-Spoofing is detected.		
xiii.	Test if automatic prevention of Honeypot (with Multipot) is functional.		
xiv.	Test is Denial of Service (DoS) Attack is detected.		
xv.	Testing of deployment of policies, firmware updating remotely through the controller.		
xvi.	Testing WIPS functionality across the subnet.		
xvii.	The entire testing exercise should complete in two weeks' time from the Date of installation.		
Documentation and Reports			
i.	Documentation of the entire project along with testing reports must be submitted to IISc.		
ii.	Documentation must include RF Coverage Heat Maps clearing showing that the -65 dBm RSSI requirement within all rooms is met.		
iii.	Documentation must include complete network diagram which clearly depicts Switch Management IP Address, Switch Location, AP Location and Switch Port to each AP.		
iv.	Documentation must include complete configuration in a step-by-step manner.		
Solution Fine Tuning and Handover to operations team of IISc Bangalore			
i.	Fine tune Wi-Fi Access policies and security policies.		
ii.	Rebuild authorized device inventory and remediate mis-configured APs.		
iii.	Fine tune events, alerts, reports, and other parameters.		

ANNEXURE-4

Techno-commercial Compliance Sheet

S/No.	Item	YES/ NO	Page No.
1.	E-receipt as a proof of EMD submission		
2.	Copies of the P. O.-s, clearly stating the duration of contract, value, and scope		
3.	Letter from the organization, supporting the claim of completion of the project and satisfactory delivery of services.		
4.	Letter from the OEM to support the claim of Tier-1/Tier-2 relationship of SI with the OEM.		
5.	Documents supporting the claim that the bidder has a registered office in India and been in operation for at least 10 years as on 31.10.2023		
6.	Authorization letter from the OEM to support SI during the contract period		
7.	Annual audited balance sheets for 3 years		
8.	Documents supporting the claim that the bidder in a position to demonstrate its capability to deliver all the services expected during the contract period.		
9.	Documents supporting the claim that the bidder has an office in Bangalore with Service/Support Engineers posted in Bangalore		
10.	A declaration on company's letterhead stating that the bidder is/was not blacklisted by Central Govt. /State Govt./PSUs/Other Govt. Agency/ Govt Educational Institute/University.		
11.	Solvency Certificate from Scheduled Commercial Bank		
12.	Detailed site survey report		
13.	Signed hard copy of technical compliance along with cross reference submitted in OEM's letter head		
14.	All the proposed hardware and software licenses proposed are perpetual in nature		

ANNEXURE 5

Format for Bank Guarantee for Performance Security (Performance Bank Guarantee)

To
The Registrar
Indian Institute of Science (IISc)
Bangalore – 560 012 (Karnataka, India)

Subject: Performance Bank Guarantee (PBG)

Reference: IISc Purchase Order No. _____ dated _____

Dear Sir,

1. We hereby issue a Bank Guarantee as follows: -
Bank Guarantee No. _____ Date: _____
Amount of Guarantee Rs. _____,
Guarantee covers from _____ To _____
Last Date for Lodgement of Claim: _____
2. This deed of Guarantee executed by the (Name of the Bank: _____)
constituted under _____ Act, _____ having its
Central Office at _____
and amongst other places a branch at _____
(hereinafter referred to as "The Bank") in favour of The Registrar, Indian
Institute of Science, Bangalore – 560 012 (hereinafter referred to as I.I.Sc.) for
an amount of not exceeding Rs. _____ (in words:
Rupees. _____ only) at the request of M/s
_____ (hereinafter referred to as the
"Contractor" / "Supplier").
3. In consideration of The Registrar, Indian Institute of Science, Bangalore – 560
012 (hereinafter called IISc.) having entered into an agreement vide IISc's
Purchase Order No. _____ dated _____
with M/s _____ (hereinafter called the Supplier) to
carry out the supply and installation of the
_____ <Name of the
equipment/work/Job> at Indian Institute of Science, Bangalore as per their
above order, the Supplier agreed to execute a Bank Guarantee for 10% of the
total order value viz. Rs. _____ (Rupees
_____) towards
Performance Security / Performance Guarantee obligation for a period of
year(s) / month(s) from _____ to _____.
4. We, the _____ Bank,
_____ Branch (hereinafter referred to as a Guarantor) at
the request of the supplier, irrevocably undertake to indemnify and to keep
indemnify I.I.Sc. without any demur to the extent of Rs. _____
(Rupees _____) in the event
of the aforesaid Supplier failing to comply the Warranty / contractual
Obligations as per the agreed terms to the full satisfaction of the Company as
mentioned in the I.I.Sc.'s purchase order.
5. NOW THIS BANK HEREBY GUARANTEES that in the event of the said
Supplier failing to abide by any of the conditions referred in tender document /
purchase order / performance of the equipment / Machinery / service, etc. this
Bank shall pay to Indian Institute of Science, Bangalore on demand and without
protest or demur Rs (Rupees).

6. We _____ Bank, further agree that the Guarantee herein contained shall remain in full force and affect during the period that would be taken for the performance of the equipment and / or services as stated in the Purchase Order issued by I.I.Sc. and that it shall continue to be enforceable till the completion of the period and certified that warranty and contractual obligations have been fully carried out by the supplier and accordingly discharges the Guarantee subject. However, I.I.Sc. shall have no right under after the expiry of the Guarantee, i.e., _____(date).
7. We, _____ Bank undertake not to revoke this Guarantee, during its currency except with the previous consent of I.I.Sc. in writing.
8. Notwithstanding anything contained herein,
 - (a) Our liability under the Bank Guarantee shall not exceed Rs. _____(Rupees _____).
 - (b) This Bank Guarantee shall be valid up to _____.
 - (c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if I.I.Sc. serve upon us a written claim or demand on or before expiry of date (i.e., _____).
9. NOTWITHSTANDING anything contained herein above, our liability under this Guarantee is restricted to Rs. _____ (Rupees _____ only) our guarantee shall remain in force until. Unless a Demand or claim under the guarantee is made on our Bank in writing on or before _____ all your rights under the said guarantee be forfeited and we shall be relieved and discharged from all liabilities thereunder.
10. This Bank further agrees that the decision of Indian Institute of Science, Bangalore as to whether the said Supplier has committed a breach of any of the conditions referred in tender document / purchase order shall be final and binding.
11. This Bank further agrees that the claims if any, against this Bank Guarantee shall be enforceable at our branch office atsituated at(Address of local branch) as following details:

Name of the Bank	
Branch Name	
Branch Code	
IFSC Code	
E-mail Id	
Phone / Mobile No.	

Seal & Signature of the Bank