

**INDIAN INSTITUTE OF CHEMICAL BIOLOGY
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(COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH NEW DELHI)

**TENDER FOR ESTABLISHMENT OF LOCAL AREA NETWORK(LAN) &
Wi-Fi SYSTEM FOR NEW CAMPUS OF INDIAN INSTITUTE OF
CHEMICAL BIOLOGY SALT LAKE KOLKATA**

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TECHNICAL SPECIFICATION

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**TENDER FOR ESTABLISHMENT OF LOCAL AREA
NETWORK(LAN) & Wi-Fi SYSTEM FOR NEW CAMPUS
OF INDIAN INSTITUTE OF CHEMICAL BIOLOGY
SALT LAKE KOLKATA
Technical Specification
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Detailed Scope of Work

At its new upcoming campus at Salt Lake, IICB, wishes to setup a State-of-the-Art, high performance, scalable, fault-tolerant and highly available IT Networking infrastructure and shall utilize the best of products and latest, open standards based technology, high quality services and workmanship.

There are two buildings – ‘Lab building’ has G+3 floors while the ‘Guest house Building’ located approximately 70 meters away has G+3 floors.

The network architecture shall be two tiered in the Lab Building with a chassis based Core switch deployed on the 3rd floor server room. The core switch is proposed to have full redundancy for all its components and should not have any single point of failure. On each floor of the Lab building, there shall be two racks/wiring closets installed on middle of the floor. Thus, in the Lab building, there shall be eight racks/wiring closets – each of which shall have one edge switch.

From each of these edge switches, there shall be a single 10G uplink to the Core switch using multi-mode OFC link. In total, in the Lab Building, there shall be 08 nos. (Eight) of 10G uplinks from the Edge switch racks to the Core Switch.

In the second building (Guest House building), the architecture shall be three tiered. The core switch located in the Lab building shall have a 10G MM OFC connectivity with a Distribution switch located in the first floor of the Guest house building. On each floor of the Guest house, one Gigabit Edge switch shall be installed inside 12U wall mounted racks. Each of the edge switches on the Ground floor, 2nd floor and 3rd floor shall have Gigabit MM OFC uplinks to the Distribution switch. The Edge switch located on the same floor as Distribution switch shall have a Gigabit UTP uplink to the Distribution switch.

Wireless LAN is also being provisioned which should conform to the latest 802.11n standards. The deployed Wireless components shall also be backward compatible with legacy devices that support 802.11a/b/g standards. There shall be a single Wireless Controller that will connect to the Core switch. The Wireless Access Points shall be installed across the various floors of the building and shall be uplinked to the nearest Edge switch.

Wireless bridging or point to point backhaul is also being provisioned between the two buildings, namely – Lab building and Guest House Building. This wireless backhaul shall serve as a high speed backup or redundant link between the buildings in case of failure of the OFC link due to any unforeseen situations.

All switching devices and Wireless access points and other active network devices shall comply to network access control (NAC) or end point security solutions which can isolate any server or any user node (PC / workstation / laptop / PDA) which does not conform to the security policies enforced by IICB based on OS patches and/or Anti-Virus updates. One NAC device shall be deployed which will connect to the core switch.

There shall be high speed connectivity between IICB's Jadavpur and Salt Lake campus using leased circuit / optical link. Internet and WAN connectivity from the IICB Jadavpur campus shall be routed

through this link to the Salt Lake campus. In order to enforce network security at the Salt Lake campus, an appliance based stateful firewall with IPS/IDS shall be deployed at the Salt Lake campus.

For managing and monitoring the wired & wireless network, software or appliance based network management solution shall also be provisioned at the Salt Lake campus.

The network infrastructure thus provisioned shall be resilient and scalable to support future expansions without compromising on performance and any need for forklift upgrades. The proposed logical layouts and floor wise diagrams are given below.

Detailed Technical Specification:

All Switching, Security and Wireless LAN/Wi-Fi devices (From Sr. No. 1.0 to 8.0 except sr. no. 6.0 mentioned below in this Technical Specification) proposed herein shall be from a single OEM (**Cisco/Juniper/Brocade/HP**). Firewall shall be from a **Cisco/Juniper/Checkpoint/HP/Fortinet**.

1.0 Specifications for Active Components

All the active devices from Sr. no. 1.0 to 8.0 with 3 years onsite comprehensive warranty. Pl. indicate the warranty details on each item provided by OEM.

1.0 Core Switch

Items Description	Specification	Compliance (Y/N)	Deviation if any / Remarks
Model	Please specify		
The switch should be a chassis based high performance Layer 2, Layer 3 and Layer 4 switch	01 Chassis		
Minimum no of usable I/O slots excluding Supervisor/Processor Cards	08 or Higher		
Architecture	<ul style="list-style-type: none"> • The Switch should have a Truly Distributed Architecture. All Interface Modules should have all the resources for switching and routing and should offer True Local Processing. • At least 2 Switch Fabrics to support bandwidth for future Highly Scalable Ethernet Standards from Day 1 • Fully decoupled control plane and data plane • Wirespeed support for up to 128 x 10 Gigabit Ethernet or higher, and 384 Gigabit Ethernet ports or better 		
Redundancy	<ul style="list-style-type: none"> • Redundant Power Supply (N+N or N+1) • Redundant Switch Fabrics to be 		

	provided from day one.		
High Availability	<ul style="list-style-type: none"> Should Support software upgrades running on all CPU's with minimal traffic disruption during the upgrade 		
Aggregate bandwidth in a single chassis	Aggregate capacity of 2 Tbps or more		
Throughput per slot	300 Gbps		
Aggregate throughput	Up to 1200 Million pps or Higher		
Ports	a) 16 x 10G-Base Fiber ports b) 96 X 10/100/1000BaseT ports distributed amongst two line cards c) All ports of all line cards should be operational in any I/O slot of the chassis. (No blocked ports)		
Flash memory	Sufficient flash memory needs to be provisioned to ensure that all features can be enabled on the switch without any performance penalty		
RAM/ DRAM	1GB or Higher		
Fans	Redundant N+1		
Form Factor	19" rack mountable		

The features for the Core Switch that must be included in the offer are given below:

- a) The Switch Fabric and Performance of the switch should remain same in case of failure of one of the CPU.
- b) Support for 1000BaseT, 1000BaseSX, and 1000BaseLX/LH, 1000BASE-ZX SFP.
- c) Redundant Power Supply from day one.
- d) Hot swappable chassis Components such as power supply and interface modules
- e) Support for 4000 Active VLANs
- f) MAC address support min 160K
- g) Should have support for IPv6 from Day1
- h) RJ-45 console port.
- i) The switch should have a non-blocking architecture
- j) Should support the following High-Availability Features:
 - (i) VRRP
 - (ii) Rapid Spanning Tree Protocol (RSTP)
 - (iii) Multiple Spanning Tree Protocol (MSTP)

- (iv) Rapid convergence Layer 3 protocols
- (v) Should support virtualization so that multiple switches can be logically combined to form a single switch with enhanced switching capacity and port density
- k) For IP Routing the switch should have support for Static, RIP v1, RIP v2, OSPF, IS-IS, BGP from Day1
- l) Should have support for IPv6 routing for RIP, OSPF, BGP4+
- m) Should support minimum 128000 Route entries.
- n) Should support 50000 Security and QOS ACL's.
- o) Should support H/W based IPv4 and IPv6 Multicasting (PIM6-SM,PIM6-SSM)
- p) Should support Protocol Independent Multicast - Sparse Mode and PIM - SSM, PIM-DM, MSDP
- q) Required VLAN / Spanning Tree Support
 - (i) The switch should support 802.1Q VLAN support
 - (ii) The switch should support 802.1Q tag per port
 - (iii) The switch should support 802.1Q VLAN trunks
 - (iv) The switch should support MAC-based VLANs
 - (v) The switch should have support for 802.1p
 - (vi) The switch should support Integrated Routing and Bridging
 - (vii) The switch should have 802.1x based security for Port/MAC
- r) Required Protocol and Standards Support
 - (i) IEEE 802.1Q, 802.1p, 802.1D, 802.3x, 802.3ad, 802.1w, 802.1s.
 - (ii) IEEE 802.3u 100BASE-TX specification.
 - (iii) IEEE 802.3ab 1000BASE-T specification.
 - (iv) IEEE 802.3z 1000BASE-X specification.
 - (v) 1000BASE-X (SFP), 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX.
 - (vi) RMON I standard or better
 - (vii) SNMPv1, SNMPv2c, SNMPv3.
 - (viii) IGMP v1/v2/v3
 - (ix) IGMP Snooping
 - (x) RIP v1/v2, OSPFv3, BGPv4+
 - (xi) IPv6 in hardware.
 - (xii) QoS: Should support Weighted Round Robin
 - (xiii) QoS: Should support control plane policing.
 - (xiv) Should support MPLS and GRE tunnelling
- s) Required Security Features
 - (i) IPv6-routing in hardware with & MAC address Locking.
 - (ii) DHCP Server, DHCP Relay, Access control lists.

- (iii) 802.1x based Port security, SNMPv3, SSHv2
- (iv) Bridge Protocol Data Unit (BPDU) and Spanning Tree Root Guard (STRG).
- (v) Support for Terminal Access Controller Access Control System Plus (TACACS+) and Remote Authentication Dial-In User Service (RADIUS).
- (vi) Rate limiting feature
- (vii) Should support integrated Firewall Module. In case Firewall module is not supported internally, bidder to quote 4 x 10G SFP+ interfaces populated with 10G-Base-LR transceivers for integrating an external firewall in future

t) Required Management Features

- (i) Support Web View, Telnet, SNMP, Console, RMON, CLI, and Remote Monitoring (RMON) with 4 RMON groups (history, statistics, alarms, and events).
- (ii) The switch should support configuration verification and roll-back.
- (iii) IEEE 802.1s, IEEE 802.1w, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports.
- (iv) IEEE 802.1D Spanning-Tree Protocol, IEEE 802.1p CoS Prioritization.
- (v) IEEE 802.1Q VLAN and IEEE 802.3 10BASE-T specification.

2.0 Edge Switch (Type-1)

Item Description	Specification	Compliance (Y/N)	Deviation if any/Remarks
Architecture	1U or 2U Fixed port switch with non-blocking architecture		
Stacking Bandwidth	Should support 20Gbps or higher full duplex stacking bandwidth		
Interface	Minimum 24 Ethernet 10/100/1000BaseT, Additional 2 (two) x 10G ports each supporting single/multimode optical transceivers.		
Features	Switching Capacity: 88 Gbps		
	Throughput: 65 Mpps		
	Jumbo Frame: Max. Frame Size 9 KB		
	IEEE 802.3x flow control		
	VLAN: 1000 active VLAN's.		
	MAC addresses: up to 8000		
	VLAN: Port based, Protocol based		
Link Aggregation			

All 10/100/1000 base ports should be PoE enabled		
VLAN Mapping		
Mirroring		
STP, RSTP and MSTP		
IP Source Guard		
Broadcast/Multicast/Unicast Storm Suppression		
IPv4 Routing: Static, RIP, OSPF, BGP from Day 1		
Should support IPv6, OSPFv3, BGP4+ and RIPng from Day1		
Policy Based Routing, VRRP		
IGMPv1/v2/v3		
PIM-DM, PIM-SM, PIM-DM, MLD snooping		
DHCP: Client, Server		
ARP detection		
802.1p		
Support Strict Priority (SP), Weighted Round Robin (WRR)		
DSCP		
ACL:1000 entries		
Support for internal/external Redundant Power supply		
RADIUS, SSH		
Port isolation, Port Security		
HTTPs		
SNMP v1/v2/v3, RMON 4 groups		
CLI, Telnet, Web based Management		
Power supply alarms		
Fan and temperature alarms		

3.0 Distribution Switch

Item Description	Specification	Compliance (Y/N)	Deviation if any/Remarks
Architecture	Chassis/Fixed port switch with non-blocking architecture		
Interface	Minimum 48 (forty eight) 10/100/1000BaseT Ports supporting Gigabit single or multimode SFP transceivers. Additional 2 (two)x10G ports supporting single/multimode populated with 10G-BaseSR module Additional 4 (four) x 1G ports each supporting single/multimode optical fiber modules out of which atleast 3 ports should be populated with 1000BaseSX modules		
Features	Switching Capacity (Full Duplex): 200 Gbps		
	Throughput: 160 Mpps or more		
	Jumbo Frame: Max. Frame Size 9 KB		
	IEEE 802.3x flow control		
	VLAN: 1000 active VLAN's.		
	MAC addresses: up to 12000		
	VLAN: Port based, Protocol based		
	Link Aggregation		
	VLAN Mapping		
	Mirroring		
	STP, RSTP and MSTP		
	IP Source Guard		
	Broadcast/Multicast/Unicast Storm Suppression		

	IPv4 Routing: Static, RIP, OSPF, IS-IS, BGP from Day 1		
	Should support IPv6, OSPFv3, BGP4+, RIPng from Day1		
	Policy Based Routing, VRRP		
	IGMPv1/v2/v3		
	PIM-DM, PIM-SM, PIM-SSM, MLD snooping		
	DHCP: Client, Server		
	ARP detection		
	802.1p		
	Support Strict Priority (SP), Weighted Round Robin (WRR)		
	DSCP		
	ACL:1000 entries		
	Internal/external Redundant hot swappable Power supply to be present from day one.		
	RADIUS, SSHv2		
	Port isolation, Port Security		
	HTTPs		
	SNMP v1/v2/v3, RMON 4		
	CLI, Telnet, Web based Management		
	Power supply alarms		
	Fan and temperature alarms		

4.0 Edge Switch (Type-2)

Item Description	Specification	Compliance (Y/N)	Deviation if any/Remarks
Interface	Minimum 24 Ethernet 10/100/1000BaseT Copper ports with 4 x 1000Base-T/ SFP Ports that support variety of interfaces like 1000BaseT, 1000Base-SX/LX/LH Should support addition of 10-Gigabit modules if required in future		
Features	Switching Capacity (Full Duplex): 88 Gbps		

	or better		
	Throughput: 65 Mpps or higher		
	Jumbo Frame: Max. Frame Size 9 KB		
	IEEE 802.3x flow control		
	VLAN : 1000 Active VLANs		
	MAC addresses: up to 12000		
	VLAN: Port based, Protocol based		
	Link Aggregation		
	VLAN Mapping		
	Mirroring		
	STP, RSTP and MSTP		
	IP Source Guard		
	Broadcast/Multicast/Unicast Storm Suppression		
	IPv4 Routing: Static Routing from Day1		
	IGMP snooping		
	PIM-SM, PIM-SSM, PIM-DM		
	DHCP: Client Server		
	ARP detection		
	Should have 802.3at PoE+ on all copper ports, backward compatible to 802.3af PoE.		
	802.1p		
	Support Strict Priority (SP), Weighted Deficit Round Robin (WRR)		
	DSCP		
	Queue shaping		
Security & Management	RADIUS, SSH		
	Port isolation, Port Security		
	ACL-1000 entries		
	SNMP v1/v2/v3, RMON 4		
	CLI, Telnet, Web based Management		
	Power supply alarms		
	Fan and temperature alarms		

5.0 Wireless Access Point (Indoor)

Item Description	Specifications	Compliance / (Y/N)	Deviation if any/Remarks
General	Indoor AP with Dual Radios that supports concurrent operation on 802.11a/n (5 GHz) and 802.11b/g/n (2.4 GHz)		
	<ul style="list-style-type: none"> Internal Antenna with Optimized gain pattern for maximum radio coverage True omni-directional antenna that allows position-independent placement 		
Radio Transmit Power Setting	Granular Transmit Power Settings in single dBm increments Configurable power that allows control of RF cell size		
Ports	One 10/100/1000BaseT RJ-45 ports supporting PoE		
Encryption	Dedicated hardware-based line-rate encryption for certified operation of WPA (TKIP), WPA2, (AES), 40-bit WEP, 128-bit WEP, and Dynamic WEP with per session rotating keys		
Radio features	<ul style="list-style-type: none"> 3 x 3 MIMO (3 Radio Transmit and 3 Radio Receive chains) with two spatial streams 20 MHz and 40 MHz channels PHY data rates up to 300 Mbps per radio and 600 Mbps aggregate total 		
	<ul style="list-style-type: none"> 802.11n :Adaptive Frame Aggregation on L2 and L3 Maximal Ratio Combining Cyclic Delay Diversity (CDD) 		
Environmental	<ul style="list-style-type: none"> Operating temperature: 0°C to 45°C or better Humidity: 10% - 90% (non-condensing) or better 		
Status Indicators	LED indicators to indicate various states like Power and activity for both Radios		

Quality of Service	<ul style="list-style-type: none"> • 802.11e quality of service (QoS) (WMM), • 802.11i Fast Roaming (PMK Cache) • 802.1Q VLAN tagging 		
	Safety standard: UL 60950-1		
	Environmental: EN60601-1-2 (2001): EU Medical Directive		

5.1 Wireless Access Controller/Switch

Item Description	Specification	Compliance (Y/N)	Deviation if any/Remarks
Deployment	Wireless Access switch/controllers to be deployed for managing and controlling all Indoor/outdoor Wireless Access Points installed at the campus.		
Support for WLAN AP	The deployed controller/wireless switch should support the total quantity of Access Points to be deployed at the Campus (as given in the Bill of Quantity above). The controller/switch should be scalable to support 200 APs or more		
Redundancy	<ul style="list-style-type: none"> • Load-shared, redundant links • Spanning tree or per-VLAN spanning tree (PVST+) • Resilient network attachment via any controller port • N:1 and N:N redundant controller capabilities. Capability to configure two or more controllers in a cluster in future for additional redundancy and availability. 		
Interfaces	2 x 10/100/1000Mbps copper RJ45 ports,		
RF Management	Automated Power/channel auto-tuning, Dynamic Frequency Selection (DFS). The controller should be able to control/manage radio/Access points which are deployed as Point-to-Point backhaul / bridge.		
Management	Command Line Interface (Console serial port, telnet, SSHv2), web access (https), SSL,		
Standards	802.11 a/b/g/n, 802.3af, 802.11d, 802.11e, 802.11h, 802.11i, 802.1D Spanning Tree,		

compliance	802.3ad		
Management & control	Access Point configured by controller for Direct Data Path Forwarding, AP configured to switch data traffic locally or forward to the wireless switch/controller on a per-VLAN basis		
	Optimizes network and controller/switch capacity and performance		
Performance optimization	Client Load Balancing, Equalize client sessions across groups of Access Points with like service policies		
	Band Steering, Enable client steering across bands for efficient usage of the available spectrum, and reduce network load on the congested 802.11b/g band		
	Voice with Quality of Service (QoS), Prioritized per user, per session, per application and per-flow priority queuing Wi-Fi Multimedia (WMM) 802.11e Quality of Service to preserve voice priority across the network		
	WMM Power Save (802.11e) and Proxy ARP and broadcast suppression		
	Per-user bandwidth control with strict limiting of per-user traffic Support for QoS priority retagging of per-user traffic flows into higher or lower queues		
	Encryption and authentication	<ul style="list-style-type: none"> • Scalable Encryption with support for Encryption processing distributed amongst Access Points • IEEE 802.1x with multiple EAP types (TLS, PEAP/MSCHAP, TTLS), • X.509 support • Wi-Fi WPA2 Enterprise certified 	
Environmental compliance	<ul style="list-style-type: none"> • Operating temperature: 0C to 40C • Humidity: 10% - 90% (non-condensing) 		
Power	Power supply - 100-240 VAC 50-60 Hz		

5.2 Wireless Radio / Access Point (Outdoor) with external directional antenna

Item Description	Specifications	Compliance / (Y/N)	Deviation if any/Remarks
General	Outdoor AP with Dual Radios that supports concurrent operation on 802.11a/n (5 GHz) and 802.11b/g/n (2.4 GHz)		
	<ul style="list-style-type: none"> Outdoor directional Antenna with 10dB gain and supporting 5 GHz operation. Lightening arrestor kit to be supplied and installed by bidder. 		
Radio Transmit Power	At least 10 dBm; configurable		
Interface	<ul style="list-style-type: none"> Single 10/100/1000BaseT Ethernet Port 		
Power	Dedicated Power input from AC/DC Adapter.		
Encryption	Dedicated hardware-based line-rate encryption for certified operation of WPA (TKIP), WPA2, (AES), 40-bit WEP, 128-bit WEP, and Dynamic WEP		
Radio features	<ul style="list-style-type: none"> 3 x 3 MIMO (3 Radio Transmit and 3 Radio Receive chains) with two spatial streams 20 MHz and 40 MHz channels PHY data rates up to 300 Mbps per radio and 600 Mbps aggregate total 		
	<ul style="list-style-type: none"> 802.11n :Adaptive Frame Aggregation on L2 and L3 Cyclic Delay Diversity (CDD) 		
Environmental	<ul style="list-style-type: none"> Operating temperature: 0°C to 55°C or better Humidity: 10% - 95% (non-condensing) or better 150 Km/h wind speed survival capability 		
Status Indicators	LED indicators to indicate various states		

	like Power and activity for both Radios		
Quality of Service	<ul style="list-style-type: none"> • 802.11e quality of service (QoS) (WMM), • 802.11i Fast Roaming (PMK Cache) • 802.1Q VLAN tagging 		
	Safety standard: UL 60950-1		
	Environmental: EN60601-1-2 (2001): EU Medical Directive		

5.3 Wireless Management

Item Description	Specification	Compliance (Y/N)	Deviation if any/Remarks
General	Appliance or software based system for management, monitoring and configuration of Wi-Fi networks		
Configuration	Support for configuration of Wireless LAN		
	Capable of defining network policies for security, QoS, etc.		
	Support for policy based templates for applying common configurations to Wireless AP's or switches/controllers		
	Supports verification of configuration and detection of errors. Support for Change management to detect and review changes		
Management / Monitoring	Support for monitoring of Wi-Fi networks that displays real-time updates on device status, traffic, wireless clients and alarms generated.		
	Support for tree/directory like navigation with inventory based view.		
	Support for display of Access Point resiliency/redundancy.		
Reporting	Scheduling of reports with hourly, daily, monthly and yearly trends		

	Support for HTML and/or PDF formatted reports		
	Report for network utilization, RF status, security		
	Support for 'hot zone' reporting, where AP's with high usage are detailed.		

6.0 Firewall

Item Description	Specification	Compliance (Y/N)	Deviation if any/Remarks
Architecture	Comprehensive Site-to-Site and Remote Access Security		
	Web Filtering, AV, AntiSpam, Intrusion Detection from day one should be present with subscription for three (3) years.		
	<ul style="list-style-type: none"> At least 4 x 10/100/1000BASE-T Interfaces scalable to 14 x 10/100/1000 BaseT or more Should support 10G 		
Features	Firewall Performance: min 12 Gbps		
	Security Zones: Min. 120		
	Virtual Routers : 10		
	User authentication		
	IEEE 802.1Q VLAN support: 4000 VLANs		
	Concurrent sessions: 1,200,000 per sec		
	New Sessions/second: 70,000		
	IPSec VPN performance (168-bit DES): 3.5 Gbps or more		
	Appliance should have minimum 2.5 Gbps IPS throughput		
	Concurrent IPSec VPN tunnels: 3000 or better		
	Should have Dynamic routing RIP v1 and 2, OSPF, BGP from day one.		
	Should support L3 VPN		
IPv6 routing and multicast			

	Redundant Power Supply from day one.		
Security Features	Attack prevention: DoS, DDoS, DNS query/SYN/ICMP/UDP/ARP flood, SYN cookie proxy, SQL injection filtering, IP/MAC binding, IP spoofing detection, ARP reverse query checking, Management interfaces disabled by default, TCP reassembly for fragmented packet protection		
	Keying modes: manual key, IKE-PSK, IKE-X509		
	Encryption: DES, 3DES, AES		
	Should preferably have integrated support for Web Filtering, Gateway Antivirus and AntiSpam. Otherwise, this can be provided through external appliance(s) where the following parameters need to be met: Antivirus Throughput: 350 Mbps Web Filtering: For up to 500,000 concurrent sessions AntiSpam: For 1000 mailboxes		
	Web Browser based VPN client support		
	Application layer filtering: Application layer gateway support for FTP, SMTP, HTTP, RTSP, H323 and SIP, User-based Web HTTP URL content filtering, Custom SMTP mail subject/content/attachment filtering, antispam, Java/Active-X detection and blocking		
	Deployment modes: NAT, PAT, IPSec NAT Traversal		
	IP multicast routing		
	IGMP v1, 2 and 3, PIM SM, PIM SSM, PIM DM.		

7.0 Network Access/Admission Control

- i. The Network Admission control devices that operate on open standards like IEEE 802.1x. The appliance /software shall support clustering so that in future another identical device may be deployed in a high availability configuration, so that failure of one device does not hamper the enforcement of end point security restrictions and policies.
- ii. The NAC appliance/software should be based on a self administrative platform with the following features:
 - a) It shall be able to provide/enforce end-point security for at least 200 concurrent user nodes/clients from day one scalable to 500 user nodes or more.

- b) It shall intelligently quarantine non-compliant users and devices and extend automatic remediation capabilities
 - c) It shall enable the automatic quarantine and remediation of devices that do not meet policy prior to allowing them onto the network and during their network session
 - d) It shall map devices dynamically to an access role upon remediation
 - e) It shall support Agent-less deployment with cross-platform support
 - f) It should ensure the enforcement of network security policies across all platforms and environments and shall secure Windows, Mac OS, and Linux platforms even in situations where client downloads are not feasible, such as guest access.
- iii. Dynamic Anti Spyware / anti malware protection
- a) It should work in conjunction with any industry standard third party Anti-Virus/spyware solution and deliver industry-leading, dynamic anti-spyware protection which, before authentication, scans the memory of an endpoint device for spyware infections etc.
 - b) The device / software shall work with existing granular policy management framework to allow administrators to quarantine or restrict network access from infected devices
 - c) It shall include automatic remediation for non-compliant devices
 - d) It shall work with all Windows-based UAC Agents, including Microsoft Windows XP/Vista/7.
- iv. Role Based application level enforcement
- a) It shall offer access control solution to support full Layer 2 - Layer 7 enforcement
 - b) It should enable access control and security policies to be applied to the application-level, granularly protecting the network, applications, and data
 - c) It shall ensure that users adhere to application usage policies, controlling access to applications such as instant messaging, peer-to-peer, and other corporate applications
- v. The device / software should provide users—whether remote or local— with seamless access to corporate resources protected by uniform access control policies through a single login, offering a consistent user access experience
- vi. The NAC appliance / software shall leverage industry-standards like 802.1X, RADIUS, IPSec, etc., to deliver a standards-based access control solution.
- vii. Supported devices should include support for vendor agnostics 802.1x enabled switches and access points.
- viii. Should use 802.1x and not snmp for communication to switches for switch based enforcement.
- ix. RADIUS/AAA based authentication should be supported internally or externally by the device/ software
- x. It should use 802.1x compliant network switches and access points to provide standards-based, vendor-agnostic access control and seamless support for existing, heterogeneous network environments
- xi. The device should be capable of passing the SOH to a Microsoft NPS server for external enforcement and validation of the SOH and transmit the information back to the NAC device for use in access control decisions

- xii. The device/software should have innovative design that allows organizations to start controlling access virtually anywhere on their network
- xiii. The device/software shall have audit mode to enable organizations to track user and device policy compliance without enforcing policies and allow users and administrators to become familiar with policies and necessary compliance, and enables organizations to introduce policy enforcements in a phased manner.
- xiv. The device should support 802.1X, RADIUS, LDAP, Microsoft Active Directory, RSA ACE/Server, certificate servers (digital certificates/PKI), local login/password, RSA ClearTrust, and RADIUS Proxy
- xv. It should employ media access control (MAC) address authentication via RADIUS, in combination with MAC address white-listing and blacklisting; or, leverage existing policy and profile stores (through LDAP interfaces) or asset discovery or profiling solutions for role- and resource-based access control of unmanageable devices—such as networked printers, bar code scanners, VoIP handsets, etc.
- xvi. Should leverage industry standards like 802.1x, radius, IPsec and innovative open standards to deliver a standard based access control solution.

In case a software based solution is offered, necessary hardware required to install the software should also be included in the offer.

8.0 Network Management

Specifications	Compliance (Y/N)	Deviation if any / Remarks
The NMS should be able to manage the proposed network devices and also other 3rd party network devices reputed network OEMs like Cisco, Juniper, Brocade, HP, Enterasys, Huawei etc.		
The solution should include all required software and hardware units.		
It shall support multi-level role based access access for performing various activities with support for delegation of administrative roles. The access shall be authenticated using RADIUS / AAA systems.		
The solution should be able to manage at least 100 network devices scalable to 2000 or more devices.		
It should provide centralized device management with capability to configure and apply network settings and security policies.		

The solution shall have a centralized interface to discover and display network topology with capability to drill down and navigate through the various parts of the network.		
It should be possible to save and search through the topologies based on various criteria and parameters.		
The solution should allow collection and monitoring of logs and historical information including but not limited to network traffic, events, etc.		
It shall allow management of software/firmware of various devices from a central location and also be able to perform software updates when required.		
The solution should have audit logs to record configuration changes.		
The solution shall allow inventory management.		
It shall allow distribution of configuration to multiple devices using a common / master template		
The solution shall have the feature to support change management which should allow the administrators to keep track of changes made to security policies and roll back configurations to previous versions if required.		
The solution shall support configuration and management of network admission/access control devices.		
The solution shall allow generation of TopN reports for all network devices.		

Please Note:

- All switches, wireless controller and wireless access points should be from the same OEM for better manageability and simpler integration
- All transceivers supplied should be from the same make as the OEM for switches
- Lightning arresters need to be provided for all the antenna elements in the outdoor access points
- Training:

Administration training for all switching, wireless and security equipment for two engineers for four days to be provided by the successful bidder. The training should cover the following broad topics:

- Basic networking training covering TCP/IP and wireless technology
- Fundamentals of network security
- Basic understanding of network access control and its impact on user behavior
- Basic troubleshooting of switches, wireless devices and security products
- Hands on feel of the products provided

Space and infrastructure will be provided in a single location. The trainer will have to provide study materials both in document format and electronic format

- Earthing:
Chemical Earthing needs to be in provided in each of the buildings where the equipment is installed, as per the following specifications-
50mm dia, 2000 mm length , electrode thickness not less than 3 mm that does not required manual addition of water with HDGI pipe pre filled with hygroscopic powder along with ROHS certified backfill compound of 25 kg per earthing and Advance earth pit cover . Electrode current dissipating capacity not less than 15KA per second & product tested by CPRI

Specifications for Passive Items & others

Acceptable brands for Passive devices are Molex/Systimax/R&M/AMP/Panduit.

All UTP Components should be from the same OEM. The OEM should be ISO 9001:2000 & QS: 9000 Certified. In the changing needs of the global resources if the company has environmental management systems in place like ISO 14001 accreditation the same shall be added advantage.

All UTP components should have UL number.

CAT 6A S/FTP components should have independent lab verification like ETL certificates.

The cabling should be certified to have application support warrantee for next 20 years.

The complete cabling system (copper as well as fiber) offered shall be upgradeable to the intelligent system if required in future by retrofitting of sensors. The OEM should have at least 01 site on intelligent system within India. The bidder/OEM should be able to physically demonstrate intelligent system monitors (for both copper & fiber), patch cords etc. if so required by the customer.

9.0 UTP CABLING COMPONENTS

The OEM should be ISO 9001:2000 & QS: 9000 Certified. In the changing needs of the global resources if the company has environmental management systems in place like ISO 14001 accreditation the same shall be added advantage. The OEM should have local presence of certified installer.

CAT 6A S/FTP components should have independent lab verification like ETL certificates.

The cabling should be certified to have application support warranty for next 20 years.

The complete cabling system offered shall be upgradeable to the intelligent system if required in future by retrofitting of sensors. The OEM should have at least 1 site on intelligent system in India. The bidder/OEM should be able to physically demonstrate intelligent system monitors patch cords etc. if so required by the tendered.

Technical Specifications

(i) Category 6A S/FTP, 4 Pair

Characteristic	Min. Required Specification
Features	<p>Cat6A S/FTP indoor cable, conforming to ISO/IEC-11801 & IEC 61156-5, tested up to 1000MHz. The cable contains 4 individually foil-shielded twisted pairs cabled together, overall shielded with a tinned-copper braid overall jacketed with LSOH Compound for indoor use, conforming to IEC 60332-1.</p>

Mechanical Characteristics

Basic Conductor Solid 23AWG, bare annealed copper (0.57mm nom. OD)

Insulation: SFS-PO.

Total number of insulated conductors: 8, twisted in 4 pairs.

Color code Blue x White, Orange x White, Green x White, Brown x White.

Individual pair shield Aluminum foil, providing 100% coverage, foil face out.

Overall shield Tin-coated copper wire braid.

Drain wire None.

Outer jacket Low-smoke, Zero-halogen, Flame-retardant compound for indoor use.

Outer jacket thickness 0.6 mm nom.

Color Lilac-Blue RAL 4005.

Overall Diameter 7.2 mm nom.

Surface Marking See below.

Mechanical Properties

Bend Radius Dynamic: 8xD mm min. Static: 4xD mm min

Storage Temperature -20 to +75C

Temperature installation range 0 to +50C

Temperature operating range -20 to +60C

Flame Tests IEC 60332-1 (Fire), IEC 60754 (gas) & IEC 61034 (smoke).

Pulling force 150 N max.

Caloric value 650 KJ/m

Total Weight 68 Kg/Km nom.

Electrical Properties @ 20C

Mean Impedance 100±5 Ohm @ 1-1000 MHz

Vp 75-77% nom.

Capacitance 40 pF/m nom @ 1 KHz

Capacitance unbalance to ground 1.6 pF/m max. @ 1 KHz

Insulation Resistance 0.5 GOhm•Km min.

DC Resistance 72 Ohm/Km max. (2% max. resistance unbalance).

DC Loop Resistance 147 Ohm/Km max. (2% max. resistance unbalance).

(ii) FACE PLATE

Characteristic	Min. Required Specification
Features	Single Gang square plate, 86mmx86mm
	Write on labels in transparent plastic window – supplied with plate
	Screw hole covers – to be supplied with plate
	Plug in Icons – Icon tree – to be supplied with plate
	Should be able to support variety of jacks – UTP, F/STP, Fiber, Coax etc.

(iii) INFORMATION OUTLET

Characteristic	Min. Required Specification
Features	<p>The Cat 6A Shielded jack is a key component of the Cat 6A shielded end-to-end solution.</p> <p>The Cat 6A jack offers superior alien crosstalk suppression, excellent insertion loss, and provides enhanced electromagnetic interference (EMI) protection by utilizing robust die cast zinc alloy connector body housing. This shielded connector also features a unique spring loaded shutter that not only protects it from dust and contaminates, but the ingenious spring loaded design also ejects improperly seated patch cords. The shielded connector is dual colour coded for either 568A or 568B wiring schedules.</p> <p>The Cat 6A Shielded Jack was specifically designed for high-speed data transmission. The Cat 6A Shielded Jack is also backwards compatible with Shielded C6 and C5e systems</p> <p>Molex recommends the full range of Cat 6A Shielded products be used in a system to maximise cabling performance. This system is compliant with latest</p> <p>ISO/IEC 11801 A1.1 draft and ratified TIA/EIA 568-B.2-10 for the support of 10G BASE-T</p>

<p>Mechanical : Jack Connector</p>	<p>Housing: Zinc Alloy plated Bright Ni/Cu</p> <p>Operating Life: Minimum 750 insertion cycles</p> <p>Contact Material: Copper Alloy</p> <p>Contact Plating: 1.25 micrometres Au/Ni</p> <p>Contact Force: 100g minimum</p> <p>Plug Retention Force: 6.8kg minimum</p> <p>IDC Connector</p> <p>Housing: Polycarbonate, UL94V-0 rated</p> <p>Operating Life: Minimum 20 reterminations</p> <p>Contact Material: Copper Alloy</p> <p>IDC Contact Plating: Tin Matte Finish</p> <p>Contact Force: 100g minimum</p> <p>Wire Accommodation: 22-24 AWG solid</p> <p>Electrical Characteristics</p> <p>Interface Resistance: 20mΩ</p> <p>Initial Contact Resistance: 2.5mΩ Insulation Resistance: >100MΩ</p> <p>Minimum backbox requirement: 44mm</p> <p>Shipping Weight: 25g</p> <p>Dimensions</p> <p>25.5mm (W) x 21.5mm (H) x 42mm (L)</p>
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(iv) 24 PORT JACK PANEL

Characteristic	Min. Required Specification
Features	<p>The Cat 6A Shielded Angled Patch Panel is a key component of the Cat 6A shielded end-to-end solution.</p> <p>The 24 Port (1U) and 48 Port (2U) Cat 6A Shielded Angled Patch Panels are made from robust 1.6mm gauge sheet metal. These panels are also supplied with robust rear cable management trays for cable strain relief and neat cable dressing. Port numbering is provided on the front and rear of the panel and individual ports may be color coded using connector icon labels for site specific network administration. The angled design provides enhanced port access and minimizes patch cord bend radius whilst also eliminating the need for horizontal cable rack mangers, and therefore frees up rack space for higher port density.</p> <p>The Cat 6A Shielded Angled Patch Panel features the unique Shielded connector. This shielded connector offers superior alien crosstalk suppression, excellent insertion loss, and provides enhanced electromagnetic interference (EMI) protection by utilizing robust die-cast zinc alloy connector body housing. This shielded connector also features a unique spring loaded shutter that not only protects it from dust and contaminates, but the ingenious spring loaded design also ejects improperly seated patch cords. The shielded connector is dual colour coded for either 568A or 568B wiring schedules. The Cat 6A Shielded connector was specifically developed for high-speed data transmission; designed to exceed the highest electrical performance standards in the industry. The Cat 6A Shielded connector is also backwards compatible with Shielded C6 and C5e systems</p> <p>Molex recommends the full range of Cat 6A Shielded products be used in a system to maximise cabling performance. This system is compliant with latest Class ISO/IEC 11801 A1.1 and ratified TIA/EIA 568-B.2-10 for the support of 10G BASE-T.</p>

<p>Mechanical Characteristics</p> <p>Jack Connector</p>	<p>Housing: Zinc Alloy plated bright Ni/Cu</p> <p>Operating Life: Minimum 750 insertion cycles</p> <p>Contact Material: Copper Alloy</p> <p>Contact Plating: 1.25 micrometres Au/Ni</p> <p>Contact Force: 100g minimum</p> <p>Plug Retention Force: 6.8kg minimum</p>
<p>IDC Connector</p>	<p>Housing: Polycarbonate, UL9V-0 rated</p> <p>Operating Life: Minimum 20 re-terminations</p> <p>Contact Material: Copper Alloy</p> <p>IDC Contact Plating: Tin Matte finish</p> <p>Contact Force: 100g minimum</p> <p>Wire Accommodation: 22-24 AWG solid</p>

(v) MOUNTING CORDS

Characteristic	Min. Required Specification
Features	<p>The Cat 6A Shielded Patch Cords are key components of the Cat 6A Shielded end-to-end solution.</p> <p>Cat 6A Shielded Patch Cords were specifically designed to support high speed data networks for 10-Gigabit Ethernet (10GBASE-T) applications. The patch cable is made from high quality shielded four pair 26AWG stranded wire. Available in a range of colors and lengths, Cat 6A Shielded patch cords are pre-terminated with RJ45 shielded plugs and feature over-molded anti-snag strain relief boots.</p> <p>Molex recommends the full range of Cat 6A Shielded products be used in a end-to-end system to maximize cabling performance. This system is compliant with latest ISO/IEC 11801 A1.1 draft and ratified TIA/EIA 568-B.2-10 for the support of 10G BASE-T.</p> <p>Shielded 4 pair 26AWG stranded cable</p> <p>Pre-terminated with WE8W shielded plugs</p> <p>Over-moulded anti-snag strain relief boots</p> <p>Suitable for EIA 568A/B wiring applications</p> <p>C6A Performance when installed as a complete Cat 6A Shielded System</p> <p>PVC jacket</p> <p>RoHS Compliant</p>
Mechanical – Cable	<p>Operating Life: Minimum 750 insertion cycles</p> <p>Contact Material: Copper Alloy</p> <p>Contact Plating: 1.25 micrometres Au/Ni</p> <p>Plug dimensions & tolerances compliant with</p> <p>FCC Part 68 IEC 60603-7</p>

Mechanical Characteristics – Plug	<p>Conductor Size: 26AWG stranded bare copper</p> <p>Screen material: Aluminium/polyester shield with tinned copper drain wire</p> <p>Max OD: 6.5mm</p> <p>Jacket: PVC</p> <p>Temperature Range: -20°C to +60°C</p>
Electrical Characteristics – Plug	<p>Max Voltage: 150 VAC (max)</p> <p>Max Current: 1.5A @ 25°C</p> <p>Operating temperature: -40° to 85°C</p>

10.0 FIBER CABLING COMPONENTS

(i) Optical Fiber Cable

Specifications of 6 core outdoor 50/125µm OM3 Type Optical Cable:

Characteristic	Min. Required Specification
GENERAL:	The fiber type is a Matched Cladding Single Mode
	Cable containing up to 60 optical fibres in water blocked loose tubes (Maximum 12 fibres per tube) and solid polyethylene fillers, total of 5 elements laid-up around a Fibre reinforced plastic (FRP) central strength member, water blocked interstices, taped, polyethylene inner sheathed, corrugated steel tape armoured, polyethylene overall sheathed (UV Stabilised).
	Graded Index 50/125µm fibre is proven to satisfy Gigabit Ethernet applications. It will support link lengths greater than 1000 metres at both 850nm and 1300nm in local area network applications (LAN) and transmission rates of up to 10Gbit/s over a distance of 300 metres at 850nm.
	Fiber dual coated with acryl ate coating.
	The fiber is optimized for operation at 850nm and 1300nm

	Should fulfill the requirements of:	
	<ul style="list-style-type: none"> • ITU-T REC G 652D • ISO.IEC 11801 -2nd Edition, Type OM3 • AS/ACIF S008; AS/NZS 3080 	
	Testing methods are in accordance with the following standards:	
	<ul style="list-style-type: none"> • ITU-T G.650D • IEC 11801 	
GEOMETRICAL PROPERTIES:	Nominal mode field diameter	50.0 μm
	Mode field diameter tolerance	$\pm 10\%$
	Cladding diameter	125 μm
MATERIALS	CORE	Germanium doped core with no phosphorus i.e. reduced tendency for hydrogen degradation.
	COATING	UV-curable dual layer acrylate coating, which ensures excellent micro bending and abrasion resistance.
	Stripping force after conditioning at 23 ± 5 °C at 40 - 60 % RH for 24 h.	
	No of Fibers	6
	Min.	1.0 N
	Max.	3.5 N
	Stripping force after ageing in water at 70 ± 5 °C for 168 h.	
	Min.	1.0 N
	Max.	3.5 N
	OPTICAL PROPERTIES	Attenuation (of cable with fibers):
At 850 nm: nm		2.5 dB/km

	At 1300 nm	0.7 dB/km
	Fibre/Tube Identification	Colour Coded

(iv) FIBER PATCH PANELS – RACK MOUNT

Characteristic	Min. Required Specification
	Have sufficient slots accommodate duplex SC adapters individually.
	Should have fiber management provision inside
	Have earthing plugs and other accessories.
	Panel cover should be slide out for easy maintenance
	Provide self-adhesive, clear label holders (transparent plastic window type) and white designation labels with the panel, for front panel labeling.
	Should be upgradeable as Intelligent Patch Panel without changing the existing Patch Panel hardware by simple retro fitting of intelligent sensors as and when required.

(v) SC DUPLEX ADAPTORS

Characteristic	Min. Required Specification
Features	All SC adaptors should be duplex type with shutter for protection. Adapters should be snap mount for easy insertion and removal.

(vi) Optical Fiber Pigtails (SC)

Characteristic	Min. Required Specification
Features	<ul style="list-style-type: none"> _ Standard or custom assemblies _ Precision ferrule endface geometry _ Controlled fibre protrusion _ Factory polished, tested and serialized.
	<p>Connector End : 1 x SC connectors, Multimode, zirconia ceramic ferrule, composite body</p> <p>Insertion Loss : 0.35dB max.</p> <p>Retention Strength : 100N</p> <p>Operating Temperature : -10°C to 60°C</p>
	<p>Cable Sheath</p> <p>Material : PVC</p> <p>Colour : Random</p>
	<p>Characteristics</p> <p>Cable : 900µm Buffered</p> <p>Outside Diameter : 900µm</p> <p>Buffer Diameter : 900µm tight buffer</p> <p>Min. Bend Radius : 30mm</p> <p>Attenuation :</p> <p>@ 850nm <2.5dB/km</p> <p>@ 1300nm <0.7dB/km</p>

(vii) Optical Fiber Equipment Cords (minimum 3 meter)

Characteristic	Min. Required Specification
Features	All optical fiber patch leads shall comprise of Multimode mode 50/125µm fiber with SC, fiber connectors terminated at each end. The optical fiber patch leads shall comply with the following specifications:
	Connector: Zirconia ceramic ferrule
	Pre-radiuses and pre-polished ferrule
	Epoxy type fiber encapsulation
	Color-coded connector boots fitted to connectors on duplex patch leads.
	Dust caps shall be fitted on each connector at the assembly
	Cable: 50/125, OM3
	Strength member: aramid yarn
	Bandwidth : @ 850nm 2000MHz/km @ 1300nm 500MHz/km
	Attenuation : @ 850nm <2.5dB/km @ 1300nm <0.7dB/km

11.0 RACKS

1.

12U Rack:

Description:

These are 19" wall equipments which are meant to house small networks, distribution and sub-distribution boards. Robust welded frame yet lightweight and modular thus enabling easy transportation and installation.

Features:

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- **Adjustable 19” mounting angles** provided with skeleton frame structure. Facility to adjust rails at a 25 mm pitch increment.
- **Space for dressing cables at both sides: At least 1.5” clear space at the sides between mounting angle and side doors all along height.**
- **Ventilation slots at top and bottom of side doors on both sides.**
- **Side doors:** To be hinged type with slam latch facility. Hinge to be of spring loaded type so that the side door can be hinged at the front or the rear end of the rack.
- **Cable access** is possible from top/bottom through knockouts (1.5”dia) provided with **rubber grommets to ensure entry of pests into rack from cable entry location..**
- **Skeleton frame structure:** Allows easy population, fitting on the wall. Side door and front door to have easy hinging so that they can be fitted last.
- **Quick release, lockable glazed front door(toughened tinted glass only permanently pasted onto metal trims at both sides)** with single key security lock and right or left hand hinge availability.

Specification of Rack(12U wall mount rack)

The specification of the racks shall be as follows:

- The rack shall be of metallic structure with box type design.
- The racks shall be Wall Mountable : 19 “ frame structure
- The racks shall be provided with lock & key arrangement and toughened glass fitted front door.
- The racks shall be provided with proper ventilation arrangements and proper opening for cable entry.
- A/C main distribution Box with minimum 5 nos. of 5 amp sockets.
- Double section – openable from both front & back.
- 19” cable manager .

2.

42U Rack

- **Features** : Confirms to IEC 297 all the mounting dimensions on the 19” panel mounts & the spacing & entry dimensions, useable heights etc. are maintained as per IEC – 297 & DIN 41494
- **Construction:** - An Aluminium extruded frame structure design, i.e. Aluminium extruded depth support member, Aluminium extruded width support member joined with special locking keys to the aluminium extruded vertical member to form a robust frame structure to have a safe load carrying capacity of 500 kgs. This aluminium frame structure has to be chromate treated & later epoxy powder coated with shade RAL 7037.

Specification of Rack(42U – Floor Standing Network Rack)

The specification of the racks shall be as follows:

- The rack shall be of aluminum frame structure.
- The racks shall be Floor Standing Rack : 19 “ frame structure
- The racks shall be provided with lock & key arrangement and toughened glass fitted front door.
- The racks shall be provided with proper ventilation arrangements and proper opening for cable entry.
- A/C main distribution Box with minimum 15 nos. of 5/15 amp sockets.
- 19” cable manager
- Fan housing units with 4 Fans

12.0 Server Hardware – Supply, installation, testing and commissioning of Server Hardware

	Make	HP/Dell/IBM
1	Server Model	Server Model with below specification
2	Processor type	Intel Xeon Processor E5606 (2.13 GHz, 80W, 8MB L3 Cache) or Superior
3	Number of processors	2 Processor
4	Processor core available	Quad
5	System bus	800 MHz Front Side Bus or Superior
6	Standard memory	Minimum 8 GB
7	Maximum memory	Up-gradable up to 192 GB
8	Memory type	DDR3
9	Memory slots	18 DIMM Slots

10	Internal hard disk drive	Minimum 2 nos. 300 GB 6G SAS 15K rpm LFF (3.5-Inch) Dual port
11	Hard disk controller	Smart Array P410/256 2-ports Int PCIe X8 SAS Controller
12	Internal drive bays	hot plug advanced key (Raid 0/1/0+1)
13	Optical drives	Manufacturer SATA DVD+/- RW Drive
14	Form Factor	5U Tower
15.	Power Supply	Redundant power supply (provide additional power supply kit for power redundancy)
16	Network interface	Embedded NC326i PCI Express Dual Port Gigabit Server Adopter
17	Keyboard & Mouse	OEM standard keyboard and mouse (PS2)
18	Monitor	OEM standard 18.5"
19	Compatible operating systems	Microsoft® Windows® Server 2008 and Linux Operating System
20	Warranty	Three years onsite comprehensive maintenance including labour & parts shall be provided through Manufacturer Warranty/Care Pack/Support Pack.

13.0 UPS System - Supply, installation, testing and commissioning of 5 KVA UPS as mentioned below:

1.	5 KVA UPS with 2 hours battery backup on full load
	Make – APC/Emerson/Merlinzerin/Eaton Powerware
	Supply of 5 KVA True online double conversion and fully Microprocessor controlled UPS system with IGBT based Rectifier & IGBT/PWM technology based inverter, automatic bi-directional static switch, manual bypass switch, isolation transformer, input phase reversal protection, provision for separate input for rectifier and for bypass having 3 phase incoming and at least 4 outgoings of single phase with 32 Amp DP MCB for connection to different feeders.
	Rack mounted external battery bank 12 V sealed maintenance free battery bank for a total of 2 hours (120 minutes) backup on full load.

	Installation and commissioning of UPS with battery and accessories including battery rack etc. to be completed in all aspects.
	Three years onsite comprehensive maintenance including labour & parts shall be provided on UPS.

14.0 UPS System - Supply, installation, testing and commissioning of 10 KVA UPS as mentioned below:

1.	10 KVA UPS with 2 hours battery backup on full load
	Make – APC/Emerson/Merlinzerin/Eaton Powerware
	Supply of 10 KVA True online double conversion and fully Microprocessor controlled UPS system with IGBT based Rectifier & IGBT/PWM technology based inverter, automatic bi-directional static switch, manual bypass switch, isolation transformer, input phase reversal protection, provision for separate input for rectifier and for bypass having 3 phase incoming and at least 4 outgoings of single phase with 32 Amp DP MCB for connection to different feeders.
	Rack mounted external battery bank 12 V sealed maintenance free battery bank for a total of 2 hours (120 minutes) backup on full load.
	Installation and commissioning of UPS with battery and accessories including battery rack etc. to be completed in all aspects.
	Three years onsite comprehensive maintenance including labour & parts shall be provided on UPS.

15.0 LCD TV – Supply, Installation, Testing & Commissioning of 40” LCD TV

	40” (102cm) Full HD LCD TV with all the accessories - Make – Samsung/Sony/Panasonic
	<ul style="list-style-type: none"> - Resolution - 1920 x 1080 or better - USB Port - minimum one or more - HDMI - minimum two or more - USB play Video, music, Photo - PC/Laptop connectivity
	Warranty – Minimum One year standard warranty or as provided by the manufacturer

Details submitted by bidder for Make and Model of the items for establishment of Local Area Network (LAN) at IICB, Salt Lake Campus Kolkata

Sr. no.	Item Description	Make of the item	Model of the item
1	2	3	4
Active Devices (Details as pe the Schedule of Quantity)			
1	Core Switch (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		
2	Edge Switch Type-1 (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		
3	Distribution Switch (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		
4	Edge Switch Type-2 (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		
5	Wireless Devices (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		
6	Firewall (Make - CISCO/Juniper/Checkpoint/HP/Fortinet) - as per the technical specification mentioned		
7	Network Access Controller (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		
8	Network Management Solution (Make - CISCO/Juniper/Brocade/HP) - as per the technical specification mentioned		

9	Server Hardware - as per the technical specification mentioned (make - HP/IBM/Dell)		
10	40" LCD TV (make - Samsung/Sony/Panasonic)		
11	5 KVA online UPS with 2 hours battery backup - as per the technical specification mentioned (make - APC/Emerson/Merlinzerin/Eaton Powerware)		
12	10 KVA online UPS with 2 hours battery backup - as per the technical specification mentioned (make - APC/Emerson/Merlinzerin/Eaton Powerware)		
Passive devices (Make - Molex/Systimax/R&M/AMP/Panduit)			
13.0	UTP Components - as per the technical specification mentioned		
13.1	CAT 6A S/FTP Cable, 4 pair, Box of 305 Meters		
13.2	24 Port CAT 6A S/FTP Patch Panel		
13.3	CAT 6A S/FTP I/O with back box & Single Port Face Plate		
13.4	CAT 6A S/FTP UTP Patch Cord 2 mtrs		
13.5	CAT 6A S/FTP UTP Patch Cord 3 mtrs		
14.0	OFC Components - as per the technical specification mentioned		
14.1	6 core outdoor armoured Multimode, OM3 cable		
14.2	24 Port Rack Mountable LIU/OFC Patch Panel - loaded		
14.3	12 Port Rack Mountable LIU/OFC Patch Panel - loaded		
14.4	6 Port Rack Mountable LIU/OFC Patch Panel - loaded		
14.5	OM3 Multi Mode SC Pigtailes		

14.6	SC-LC Fiber Patch Cord Pigtail, MM OM3 1.5 mtrs.		
15.0	Cabling Accessories - as per the technical specification mentioned		
15.1	1" Casing / Caping		
15.2	1.5" Casing / Caping		
15.3	1 " PVC Conduit		
15.4	1" Flexible Pipe		
15.5	32 mm HDPE Pipe		
15.6	1" GI Pipe		
16.0	Equipment Racks - as per the technical specification mentioned		
16.1	42U floor standing Equipment Rack with accessories		
16.2	12U Wall mountable Equipment Rack with accessories		