# Indian Ports Association

IPA/ICTD/PurchaseofIT/2023 07.11.2023

IPA intend to revamp and build a new robust network that will provide latest technology benefits like data security, guaranteed application response, reliability etc. The network will also support multimedia, audio and video streaming and accessing other latest facilities which can be integrated in the future. High speed connectivity will be offered.

**General**:
Indian Ports Association, invites budgetary offer for Supply, Setup/Installation and Commissioning of Networking & Infrastructure for the entire Office and Rest House and thus providing high connectivity, scalable, reliable, secure and robust network architecture.

1. **Scope of Work:**
   a. Supply & Installation of all LAN components mentioned in BOQ Table below.

   b. Approximately 222 connections (terminals) inclusive of associated laying of conduit/channel/cable and IO points. (Approx. 7500 square feet area of IPA building) The exact number of connections will be ascertained at the time of implementation.

   c. The LAN cabling works must be carried out using a structured cabling design with proper labelling of cables at ends, crimping of cables, fixing of patch panels, and proper fixing of LAN cables in PVC conduits.

   d. Wi-Fi facility should be available 24/7 without fail. The primary aim of Wi-Fi facility is to provide high speed internet access in all areas used by user in IPA. Connectivity must be activated within 30 seconds.

   e. The agency should provide the required equipment for access to the Wi-Fi facility and shall bear all the cost on account of development and setting up required infrastructure for the said services. The agency shall submit the details of drawing for approval prior to commencement of entire work.

   f. Manage Operations and Maintenance (O & M) of Wi-Fi access points and associated network components.

   g. Provide secure Wi-Fi internet access and back-end services as per policy finalised during the commencement of entire work.

h. Any structure, permanent or temporary, dismantled or destroyed during the execution of the work shall be refilled/remake or restore to its original condition by the bidder at his own cost.

i. Any extra electrical points and data points required in the server room shall be provided by the bidder at his own cost.

j. Detailed Bill of material included in this tender. However, IPA reserves the right for quantity variation due to increase/decrease in requirements. The bidder shall also provide all required equipment which may not be specifically stated herein but are required to meet the intent of ensuring completeness, maintainability and reliability of the total system covered under this specification.

k. The firm should satisfy themselves of the prevailing conditions (corrosion, power surge, rodents intrusion etc.) in the IPA and should guarantee and ensure that the equipment's would work / be made to work in case of any failure during the contract period.

**2. Site Survey:**

Site visit is scheduled for all bidders on 09.11.2023 & 10.11.2023 from 11.30 AM to 3.00 PM.

**3. LAN Point Station:**

| S. No | Station Name |
|---|---|
| 1. | Server Room (Admin Building) |
| 2. | South Side Corner |
| 3. | Accounts Side Corner |
| 4. | New Building |
| 5. | Conference Room |
| 6. | Rest House |

**4. Tentative Bill of Materials:**

| **S. No** | **Description** | **Qty** | **Model & Make** | **Price inclusive of GST** |
|---|---|---|---|---|
| 1. | Access Switch 24 port with 10GB SFP POE | 8 | | |
| 2. | WAN access point | 10 | | |
| 3. | WAN access controller | 1 | | |
| 4. | Rack - 42U | 2 | | |
| 5. | Rack – 6U | 4 | | |

| | | | | |
|---|---|---|---|---|
| 6. | 1 KVA online UPS for Racks | 4 | | |
| 7. | 2 KVA online UPS for Racks | 1 | | |
| 8. | LIU 6 fibre | 5 | | |
| 9. | CAT 6 UTP cable | Approx. 1000 meters | | |
| 10. | I/O Box | 222 | | |
| 11. | Patch Cord – End User (2m,5m) | 222 | | |
| 12. | Patch Cord – Switch | 222 | | |
| 13. | OFC Cable – 4 core | Approx. 750 mtr | | |
| 14. | Patch Panel | 5 | | |
| 15. | PVC Conduit Pipe Laying in Existing Tray / Trunch / wall (with required all fitting accessories) | (As required, stated at point 9 & 13 | | |
| 16. | Fiber Core Splicing with OTDR Testing, per splice | (As required, stated in the scope at point b.) | | |
| 17. | Rack Installation with required accessories | | | |
| 18. | Punching / Crimping / Fixing / Termination / Dressing of points (per point) (Testing of all individual points for cable length, cross talk, I/O & Jack Panel colour coding, attenuation, etc) | (As required, stated in the scope at point b.) | | |
| 19. | Project Implementation Charges | | | |
| 20. | AMC per annum (after completion of One Year Warranty) | | | |
| | 1st Year | | | |
| | 2nd Year | | | |
| | 3rd Year | | | |

a) Approved makes for all Active Components: CISCO, Juniper, Fortinet, HPE, DELL. All active components Like Network Switches, PoE switches,

Wireless Access Point and related SFP Fiber modules, etc must be of same single OEM.

b) Approved makes for all Passive Cabling Components: LEGRAND, COMMSCOPE, DLINK. All passive components must be of same single OEM.
c) Approved makes for UPS: APC, EATON, GE, Mitsubishi, Vertiv.
d) The Bidder has to submit authorization certificates from the OEMs.
e) Bidder has to submit operation and service manuals for each type of items supplied to be provided – 1 set of Service manuals will provide complete system details like operation, & maintenance of system with details configuration, relevant layout, diagrams.

## 5. Technical Specification:

a. Access Switch

| S. No | Description of Requirement | Compliance (Yes/No) |
|---|---|---|
| **1** | **Architecture** | |
| 1.1 | Shall be 1RU, 19" Rack Mountable | |
| 1.2 | 24 RJ-45 autosensing 10/100/1000 PoE+ ports | |
| 1.3 | The switch shall support up to two 1/10-Gigabit ports (SFP+) in addition to the above ports. | |
| 1.4 | 1 RJ-45 serial console port | |
| 1.5 | 128 MB SDRAM and 16 MB flash | |
| 1.6 | Shall have switching capacity of 120 Gbps "minimum. | |
| 1.7 | Shall have up to 65 mpps pps switching throughput | |
| **2** | **Resiliency** | |
| 2.1 | Switch should support stacking so as to operate as one unit | |
| 2.2 | Switch should support stacking so as to operate as one unit | |
| 2.3 | Shall support redundant power supply | |
| 2.4 | IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol | |
| 2.5 | IEEE 802.3ad Link Aggregation Control Protocol (LACP) | |
| **3** | **Layer 2 Features** | |
| 3.1 | Shall support up to 4,000 IEEE 802.1Q-based VLANs | |
| 3.2 | Shall support GARP VLAN Registration Protocol or equivalent feature to allow automatic learning and dynamic assignment of VLANs | |
| 3.3 | Shall support IEEE 802.3at | |
| 3.4 | Shall have the capability to monitor link connectivity and shut down ports at both ends if uni-directional traffic is detected, preventing loops | |
| 3.5 | Shall support IEEE 802.1ad QinQ | |
| 3.6 | Shall support Jumbo frames on GbE ports | |
| 3.7 | Internet Group Management Protocol (IGMP) | |
| 3.8 | Multicast Listener Discovery (MLD) snooping | |
| 3.9 | IEEE 802.1AB Link Layer Discovery Protocol (LLDP) | |
| 3.1 | Shall support Voice VLAN feature to automatically assigns VLAN and priority to devices like IP phones | |
| **4** | **Layer 3 Features (any additional licenses required shall be included)** | |
| 4.1 | Static Routing for IPv4 | |
| 4.2 | Static Routing for IPv6 | |
| 4.3 | User Datagram Protocol (UDP) helper function to allow UDP broadcasts to be directed across router interfaces | |
| 4.4 | Dynamic Host Configuration Protocol (DHCP) client and Relay | |

| S. No | Description of Requirement | Compliance (Yes/No) |
|---|---|---|
| 4.5 | Proxy ARP to allow normal ARP operation between subnets | |
| **5** | **QoS and Security Features** | |
| 5.1 | Access Control Lists for Layer 2 to Layer 4 traffic filtering | |
| 5.2 | Shall support global ACL, VLAN ACL, port ACL, and IPv6 ACL | |
| 5.3 | Traffic classification using multiple match criteria based on Layer 2, 3, and 4 information | |
| 5.4 | Powerful QoS feature supporting strict priority (SP) queuing, weighted round robin (WRR) / SP+WRR or equivalent | |
| 5.5 | Shall support applying QoS policies on a port, VLAN, or whole switch, to set priority level or rate limit selected traffic | |
| 5.6 | IEEE 802.1x to provide port-based user authentication with multiple 802.1x authentication sessions per port | |
| 5.7 | Media access control (MAC) authentication to provide simple authentication based on a user's MAC address | |
| 5.8 | Dynamic Host Configuration Protocol (DHCP) snooping to prevent unauthorized DHCP servers | |
| 5.9 | Port security and port isolation | |
| 5.1 | STP BPDU port protection to prevent forged BPDU attacks | |
| 5.11 | STP Root Guard to protect the root bridge from malicious attacks or configuration mistakes | |
| 5.12 | IP Source guard to prevent IP spoofing attacks | |
| 5.13 | Dynamic ARP protection blocking ARP broadcasts from unauthorized hosts | |
| **6** | **Management Features** | |
| 6.1 | Configuration through the CLI, console, Telnet, SSH and Web Management | |
| 6.2 | SNMPv1, v2, and v3 and Remote monitoring (RMON) support | |
| 6.3 | sFlow (RFC 3176) or equivalent for traffic analysis | |
| 6.4 | Management security through multiple privilege levels | |
| 6.5 | FTP, TFTP, and SFTP/SCP support | |
| 6.6 | Port mirroring to mirror ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port | |
| 6.7 | RADIUS/TACACS+ for switch security access administration | |
| 6.8 | Network Time Protocol (NTP) or equivalent support | |
| 6.9 | Shall have Ethernet OAM (IEEE 802.3ah) management capability | |
| **7** | **Environmental Features** | |
| 7.1 | Shall provide support for RoHS and WEEE regulations | |
| 7.2 | Shall have features to improve energy efficiency like variable-speed fans, shutoff unused ports etc | |
| 7.3 | Operating temperature of 0°C to 45°C | |
| 7.4 | Safety and Emission standards including UL 60950-1; IEC 60950-1; VCCI Class A; EN 55022 Class A | |

b. WAN Access Point

| S. No | Description of Requirement | Compliance (Yes/No) |
|---|---|---|
| **1** | **Wireless Access Point Architecture** | |
| 1.1 | The access point shall have one RJ-45 auto-sensing 10/100/1000 Mbps port (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T) | |
| 1.2 | One RJ-45 serial console port | |
| 1.3 | Dual core processor or equivalent or higher for high performance | |
| 1.4 | Shall support dual-radio IEEE 802.11 b/g/n and 802.11a/n access point | |

| S. No | Description of Requirement | Compliance (Yes/No) |
|---|---|---|
| 1.5 | Dual radio for IEEE 802.11a/n for high-throughput applications and IEEE 802.11b/g/n for legacy support and high-speed applications | |
| 1.6 | Integrated antennas for both IEEE radios, supporting two spatial streams and 3x3 MIMO with three spatial streams delivering data rates up to 450 Mbps per radio | |
| 1.7 | AP should support four/ Six external/embedded antennas | |
| 1.8 | Radio operation modes - Client access, Local mesh, Packet capturing to controller | |
| 1.9 | The access point shall be IEEE 802.3af/af PoE compliant and shall be provided with PoE injector of the same make for mentioned quantity | |
| 1.10 | Access points should be complied with 802.3at/af standard for power rating | |
| 1.11 | Both radios shall operate at full power and full performance on IEEE 802.3af/at PoE/Gigabit Ethernet | |
| 1.12 | Shall have Indoor, plenum rated enclosure | |
| 1.13 | Wi-Fi Alliance Certification- a/b/g/n Wi-Fi Certified | |
| **2** | **Access Point Mobility Features** | |
| 2.1 | Shall support self-healing, self-optimizing local mesh extending network availability to areas without an Ethernet infrastructure | |
| 2.2 | Per-radio software-selectable configuration of frequency bands | |
| 2.3 | Shall support up to 16 virtual service communities (Service Set), each with a unique SSID and MAC address | |
| 2.4 | Individual security and QoS profiles per Service Set | |
| 2.5 | Configurable DTIM and minimum data rate per Service Set | |
| 2.6 | Each Service Set can be mapped to separate IEEE 802.1Q VLANs | |
| 2.7 | Shall support direct source-to-destination traffic forwarding (distributed traffic forwarding) to maximize application delivery | |
| 2.8 | Wireless Multimedia (WMM) support | |
| **3** | **Access Point Management & Other Features** | |
| 3.1 | Shall support both centrally controlled mode (configured and updated via wireless controller) and autonomous mode (without controller) which is software selectable | |
| 3.2 | Shall support L2 and L3 controller discovery | |
| 3.3 | Shall support auto-selection of RF channel and transmit power | |
| 3.4 | Shall support per-client event log records association, authentication and DHCP activities for easy diagnosis | |
| 3.5 | Shall support PCAP packet capture on WLAN or LAN interface | |
| 3.6 | Shall support SNMPv3 and web-based secured management interfaces (SSL) | |
| 3.7 | Operating temperature - 0°C to 50°C | |

## c. Wireless LAN Controller

| S. No | Description of Requirement | Compliance (Yes/No) |
|---|---|---|
| **1** | **WLAN Controller Architecture** | |
| 1.1 | The wireless controller shall have 2 RJ-45 auto-sensing 10/100/1000 ports ((IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab Type 1000Base-T) | |
| 1.3 | Shall be offered with minimum 100 IEEE 802.11a/b/g/n Access Points support for centralized management and control in HA | |
| 1.4 | Supported 802.11a/b/g/n Access Point capacity shall be upgradeable to 200 Access Points without hardware change | |
| 1.5 | Shall support up to 500 Access Points in HA | |
| **2** | **WLAN Controller Mobility Features** | |

| S. No | Description of Requirement | Compliance (Yes/No) |
|---|---|---|
| 2.1 | Shall support fast roaming providing service transparency and fast hand- offs across Access Points within and across subnet boundaries | |
| 2.2 | Shall support per-user QoS and security services which follow users as they roam | |
| 2.3 | Shall support mobility domain interconnecting multiple wireless controllers and access points for scalable identity-based roaming across the enterprise | |
| 2.4 | Shall support controllers to provide high availability, license pooling and management ease ,Shall support up to 50Access Points in HA | |
| 2.5 | Shall have full service capabilities for wireless networks controlled across the WAN | |
| 2.6 | Shall support central configuration of virtual service communities (or SSIDs) for QoS, authentication, encryption, and VLANs | |
| 2.7 | The proposed WLAN Architecture shall support distributed traffic forwarding allowing traffic to flow directly from source to destination, eliminating needless traffic to pass through the controller, delivering better performance and faster, more-responsive applications | |
| 2.8 | Shall support distributed 802.1x authentication allowing controlled access points to directly authenticate users through an external RADIUS server | |
| **3** | **WLAN Controller Security Features** | |
| 3.1 | Shall support per-user or per-device security policies | |
| 3.2 | Shall support authentication based on user credentials (802.1X/EAP), hardware identifiers (MAC address, WEP key), and HTML login | |
| 3.3 | Shall support authentication and authorization through Microsoft Active Directory or internal or external RADIUS AAA services | |
| 3.4 | Shall support session tracking which compiles a log of user activity for security forensics | |
| 3.5 | Shall support Access Control Lists based on IP address, protocol types and port filtering and DSCP values | |
| 3.6 | Shall support VLAN mapping of guest access traffic for secure passage through corporate network | |
| 3.7 | Controller shall support eliminating rogue access points | |
| 3.8 | Shall have Captive portal for guest user authentication | |
| 3.9 | Shall support for Real-Time Location Services (RTLS) | |
| **4** | **WLAN Controller Management & Other Features** | |
| 4.1 | Shall control a network of 50 Access points (expandable up to 200 Access Points) ensuring consistent security, QoS, and roaming services from AP to AP | |
| 4.2 | Shall have scalability consistent in 802.11 a/b/g and 802.11n networks | |
| 4.3 | Shall support central management of wireless access point operating modes, including infrastructure (bridging) and Local Mesh | |
| 4.4 | Shall support plug-and-play auto-discovery and software installation for easy access point deployment | |
| 4.5 | Shall have easy-to-use web-based administrator interface | |
| 4.6 | Shall have one console port for local management access | |
| 4.7 | Shall support seamless integration with wired network, leveraging existing L2/L3 infrastructure resources, e.g., QoS, VLANs, NAC, MS Active Directory and RADIUS AAA | |
| 4.8 | Shall support RADIUS activity statistics collection per-user for billing by data volume and elapsed session time | |
| 4.9 | Operating temperature of 0°C to 40°C | |

d. Rack 42U

| S. No | Item | Description of Requirement | Compliance (Yes/No) |
|---|---|---|---|
| 1 | Make | | |
| 2 | Model | | |
| 3 | Dimension | 42U (600x1000) | |
| 4 | Material | Aluminum | |
| 5 | Cooling | Provision for heat dissipation for side-to-side and Front-to-Back units | |
| 6 | Cable Entry | Top and Bottom gland cable Entry trays with brush | |
| 7 | Side Panels | Full Side Panels for both sides | |
| 8 | Front Door | Front door with latch and ventilation holes. | |
| 9 | Back Door | Back door with latch and ventilation holes. | |
| 10 | PDU | 2* Dual 32 A PDU | |
| 11 | Power Outlets | 2* 16 receptacle Power Connectors each connected to separate PDUs | |
| 12 | Extra Units | Keyboard Drawer, 2x fixed tray | |
| 13 | Accessories | Nuts and washers for mounting equipment & slides. | |
| 14 | Cable Managers | Adequate cable managers for units. | |
| 15 | Depth Support | 4 * Depth Support channels | |
| 16 | Support | The rack should not be an end of life / end of service product. | |

e. UPS

| S. No | Item | Description of Requirement | Compliance (Yes/No) |
|---|---|---|---|
| 1 | Technology | True ONLINE (Double Conversion) PWM technology using IGBTs for switching at high frequency (>15 KHz) | |
| 2 | Connector | SNMP Connectivity | |
| 3 | Electrical Input | Single Phase / Three Phase - depending on the proposed solution, 230 V AC | |
| 4 | Electrical Input | Voltage Range 155 – 280 V on Full Load | |
| | | Voltage Range 110 – 280 V on less than 70% Load | |
| 5 | Electrical Input | Frequency Range 45 – 55 Hz | |
| 6 | Electrical Input | Efficiency AC to AC: > 85% (AC to AC) | |
| 7 | Electrical Output | 230V AC | |
| 8 | Electrical Output | Frequency: 50 Hz + 0.25Hz (free running); + 2Hz (sync mode) | |
| 9 | Electrical Output | Voltage Regulation: +1% on mains/batteries | |
| 10 | Electrical Output | Overload Capacity: 125% for 5 min., 110% for 10 mins. | |
| 11 | Electrical Output | Waveform; Pure Sine wave | |
| 12 | Protection | Electronic Overload Sensing, and circuit breaker protection. | |
| 13 | Protection | Overheating, Output short circuit, low battery, input over/under voltage etc. | |
| 14 | Battery Type | Sealed Maintenance Free Battery, Mains & Battery with necessary indicators, alarms and protection with proper battery storage stand | |
| 15 | Backup Time | Minimum 2 hour backup on rated load | |
| 16 | DC Voltage | MIN. : 240 V | |
| 17 | Charging Features | Adjusted to about 10% of battery capacity for fast charging. | |
| | | 1. Boost/trickle charging facility | |

| S. No | Item | Description of Requirement | Compliance (Yes/No) |
|---|---|---|---|
| | | 2. Uncontrolled rectifier with high efficiency and reliability. | |
| | | 3. Low battery protection to avoid deep discharging of batteries. | |
| | | 4. Self-test diagnostic feature | |
| 18 | Other Features | UPS Bypass Automatic on Overload or UPS Failure | |
| 19 | Other Features | Monitoring panel with LCD display to provide | |
| | | following information:- | |
| | | 1. Input/output voltage | |
| | | 2. Input/output frequency | |
| | | 3. Load current | |
| | | 4. Charging current | |
| | | LED display for:- UPS on, battery operation, bypass, alarm, battery charge level, etc. Alarms for :- Mains failure, low battery, overload etc | |
| 20 | Other Features | RS 232 Standard Interface port in conjunction with UPS monitoring software provides information about UPS health, status, battery backup, etc. | |
| 21 | Environmental | Temperature 0-400C operating, -10 to + 60 deg C | |
| 22 | Environmental | Humidity 0 – 95% RH non-condensing | |
| 23 | Environmental | Audible noise < 50 dB (A) | |
| 24 | Mandatory Compliance | Safety certified to IEC standards or as per applicable in Indian law | |
| 25 | Mandatory Compliance | EMC certified to IEC standards. | |
| 26 | Mandatory Compliance | ISO 9001:2000 and ISO 14001 certified ETDC/ERTL test reports for above specifications. | |
| 27 | Mandatory Compliance | Dimension Light Weight/Smaller Footprint | |

Budgetary offer for the said BoM should be received to the email id on or before by 20.11.2023 @ 1700 Hrs to the email id: Sivalingam.ipa@gov.in