48 Port First Level (Access) Gigabit Ethernet Switch with 10G uplink – Qty 30 (Thirty)

1. Architecture

- The proposed switch should be Enterprise grade switch
- 48 RJ-45 autosensing 10/100/1000 ports with wire speed performance in non-blocking mode
- The switch should support at least four 10-Gigabit ports populated with SFP+ modules in addition to the above ports
- Switch should support 1RU, 19" Rack Mountable
- Out-of-band interface for management
- 1 GB DRAM and 512 MB flash or above
- Switch should be SDN ready (hardware) with support for Openflow v1.3 or above
- Auto MDIX and Half/Full duplex on copper ports
- The switch should support at least 8 switches in a stack including POE/POE+

2. Performance

- Switching capacity should be 176 Gbps or above excluding stacking bandwidth
- Switching throughput should be 120 million pps or above
- The switch should support 320 Gbps or above stacking bandwidth (full duplex) per switch
- Stacking failover should provide automatic failover without resetting any of the units in the stack with sub-second and no packet loss
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)

3. Layer 2 Features

- Switch should support 1,000 VLANs or more
- Switch CAM Table should support 8K or more MAC addresses.
- IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol and IEEE 802.1s Multiple Spanning Tree Protocol
- Should support Private VLAN or equivalent
- Should support GVRP or equivalent
- Should support Per-VLAN Spanning Tree (PVST/PVST+/PVRST)
- Should support Uni-Directional Link Detection(UDLD) or equivalent
- Should support IP multicast snooping and filtering IGMP v1,v2,v3
- Should support MLD snooping v1/v2
- ACLs based on MAC
- Should have Link Layer Discovery Protocol (LLDP)
- Should support Jumbo Frames (up to 9216 bytes)
- Port mirroring to mirror ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port
- Switch should support Voice VLAN feature to automatically assigns VLAN and priority to devices like IP phones

4. Layer 3 features support

- Static Routing for IPv4 and ipv6

5. QoS and Security Features

- Access Control Lists for Layer 2 to Layer 4 traffic filtering
- Shall support global ACL, VLAN ACL, port ACL, and IPv6 ACL
- Traffic classification using multiple match criteria based on Layer 2, 3, and 4 information
- Powerful QoS feature supporting strict priority (SP) queuing, weighted round robin (WRR) and SP+RR
- Should support QoS policies on port, VLAN, or whole switch basis to set priority level or rate limit selected traffic
- Should support IEEE 802.1x port-based user authentication
- Media access control (MAC) authentication to provide simple authentication based on a user's MAC address
- Dynamic Host Configuration Protocol (DHCP) snooping to prevent unauthorized DHCP servers
- Port security and port isolation
- STP BPDU port protection to prevent forged BPDU attacks
- STP Root Guard to protect the root bridge from malicious attacks or configuration mistakes
- IP Source guard to prevent IP spoofing attacks
- Dynamic ARP protection blocking ARP broadcasts from unauthorized hosts
- Switch should support for RADIUS and TACACS/TACACS+
- Local Authentication should support LDAP
- Should support Denial of Service (DoS) protection
- Should support storm control for broadcast, unicast and multicast traffic on port basis
- Should support dynamic VLAN assignment

6. Management Features

- Configuration through the CLI, console, SSH and Web Management (HTTPS) (browser independent) - The switch should provide complete control of the switch with CLI and GUI.
- GUI should be browser independent (at least Firefox, chrome and IE)
- SNMPv1, v2, and v3 and Remote monitoring (RMON) support
- sFlow (RFC 3176) or equivalent for traffic analysis
- Management security through multiple privilege levels
- Switch should support FTP and TFTP
- Switch should support Network Time Protocol (NTP)
- Switch should support DNS client
- Switch should support Traceroute, ping and telnet or equivalent
- Should be able to manage and monitor all stacked switches through single IP address
- Should provide restore option to bring back to previous configuration
- Switch should support Syslog for logging
- The bidder should provide network management software (NMS) for managing the switches

7. Operating Conditions and Certifications

- Should support for RoHS or WEEE regulations
- Operating temperature of 0°C to 45°C
- Safety and Emission standards including UL 60950-1; IEC 60950-1; VCCI Class A; EN 55022 Class A

8. Software Defined Networking (SDN) Capability

- OpenFlow protocol capability to enable software-defined networking
- Allows the separation of data (packet forwarding) and control (routing decision) paths, to be controlled by an external SDN Controller, utilizing Openflow protocol
- Switch hardware should support OpenFlow V1.3 or above and should support Open Daylight SDN controller southbound API from Day 1
- By software upgrade switch should support higher versions of OpenFlow in future

9. Packaging contents

- 48 port 1G switch with atleast 4 Ports 10G SFP+ (fully populated)
- AC power cord supporting residential voltage 220-250V,frequency 50Hz with D or M types of plug
- Rack Mounting kit
- CD with User manual or links
- Console cable
- SFP+ Transceivers (Multi mode LC)
- Enough number of Stack Cable (5mtr) with connector to provide 320 Gbps stacking bandwidth(full duplex)

10. Warranty and Support

- All the items offered / ordered, shall carry minimum 5 (five) years on site comprehensive warranty from the date of installation & commissioning
- All bundled license should be perpetual and should be quoted on Day 1
- SFP+ module should also carry minimum 1 years warranty from the date of installation and commissioning

11. Other Requirements

- For all requirements listed above, the necessary cables, connectors, external software media, manuals or any other hardware and software must be bundled and included in the Supply.
- Vendors should submit technical document showing the compliance to all the technical specifications mentioned in the annexure.
- **Abbreviations:**

GE	**Gigabit Ethernet**
SNMP	**Simple Network Management protocol**
BPDU	**Bridge Protocol Data Unit**
NTP	**Network time protocol**
DNS	**Domain name server**
DHCP	**Dynamic host configuration protocol**
VLAN	**Virtual LAN**
RIP	**Routing information protocol**

OSPF	Open shortest path first
BGP	Border Gateway protocol
VRRP	Virtual route redundancy protocol
IGMP	Internet group management protocol
MLD	Multicast listener discovery
COS	Class of service
DSCP	Differentiated services code point
SFP+	Enhanced small form-factor pluggable
IEEE	Institute of Electrical and Electronics Engineers
SDN	Software Defined Networking

NOTE:

1. Bidder need to demonstrate Open Daylight SDN controller integration with the quoted switches applicable to all L2 (POE and POE+).
2. Bidder should quote for all the items; failing to quote for all the items, the respective bid will be rejected.
3. Bidder should quote products of same OEM L2 POE and POE+ switches mentioned.
4. Bidder should provide single NMS (Network management software) for L2 POE and POE+ switches mentioned. NMS should have the perpetual license for managing at least 30 switches from Day one
5. Grand total mentioned in the commercial bid and the respective terms and conditions will be considered for finalizing the L1 bidder.
6. Bidder should not quote products, which are going to be end-of-life / end-of-support three years down the line from the date of bidding.
7. Bidder should quote per unit price and the price should be valid for at least three months.
8. Bidder should supply the above items mentioned at the same unit price if NIA place on order with-in 3 months from the date of Purchase order.
9. Installation, configuration and support for 30 days for network architectural changes will be responsibility of the vendor.