TENDER SPECIFICATION - UPGRADATION OF PABX INTO SINGLE SERVER BASED IP PABX ALONG WITH ACCESSORIES AND INFRASTRUCTURE FOR BANGLADESH NAVY

INTRODUCTION

1. Bangladesh Navy (BN) planned to upgrade BN PABX system to single server based IP PABX system using BNNET and VSAT NET. The scope of work includes supply, installation and commissioning of IP PABX network on “Turn Key” basis. The scope also includes integration, functional testing & commissioning of the IP PABX system with the existing Grandstream IP Phones.

2. For better understanding and to evaluate all the prospective bidders, the tender specification has been divided into three parts:

a. Part-1: General Information and Bidder’s Responsibility.

b. Part-2: Technical Specification.

c. Part-3: General Terms and Conditions.

3. Prospective bidders are to submit their offer in two envelopes:

a. Technical Offer (Hard copy and soft copy in CD).

b. Financial Offer(Hard copy and soft copy in CD).

PART- 1: GENERAL INFORMATION AND BIDDER’S RESPONSIBILITY

4. **General Information**. Prospective bidders are to comply with all the requirements, terms and conditions mentioned in Part-1, Part-2 and Part-3 of the tender specifications as mentioned below:

a. Bidders are requested to provide a detailed explanation of the technical matters wherever necessary and cross-reference mentioning annex/ appendix/ article number/ relevant pages of their offer/ original supporting documents. Bidders are also to provide brand, model, performance data, technical data, specific figures and information as asked against each condition.

b. In Part-2, there may be essential and optional features of IP PABX system. Bidders failing to comply with essential features shall be considered disqualified. If any other features/ items not listed in the technical specification are found by the bidder which is necessary to run the system, the bidder must mention that item with remarks and quote the price separately.

c. In Part-3, Bidder shall have to quote all main and optional equipment separately in local currency basis. BN reserves the right to accept or discard some or all optional features of IP PABX system as per BN requirements. If any other item to be imported from a foreign market, their price also needs to be quoted in local currency. The only selected item from the optional list shall be included with the essential item to determine the lowest bidder. BN reserves the right to select all/ partial/ none of the optional items.

d. Bidders who will qualify in the technical offer, only their financial offer shall be opened for further evaluation. The final selection of the bidder shall be done based on financial

competitiveness amongst the technically accepted bidders. The lowest bidder shall be selected based on all essential items and services, training, and optional item (selected by BN).

5. **Eligibility of the Bidders**. Only the authorized agent/ dealer (agent/ dealership certificate is to be submitted) of any IP PABX system can submit quotation at DGDP. The bidder is to provide manufacturer's authorization certificate for all IP PABX server, phone, online ups and networking equipment of IP PABX system along with submitted offer. The bidder shall have the following qualification to participate in the tender:

a. The bidder shall have at least 5 years working experience on the IP PABX system and supplied, installed, commissioned, and maintained at least one IP PABX network with more than 2000 IP phone lines in Bangladesh (Government/ Semi government/ Autonomous/ Multinational Company). Bidder's qualification must necessarily be satisfied by relevant experience documentation and client list.

b. Bidder must be capable to provide service support 24 × 7 for the specified period on three area of BN (Dhaka, Chattogram and Khulna). A separate certificate on the consensus of setting up of local office is to be submitted by the bidder with the offer.

6. **Equipment Manufacturer & Reliability**. The equipment should be from a well-known manufacturer, brand new, unused and of recent model, proven reliability in the field at least one year of operation and the bidder ensuring continuity of the network operation in case of equipment obsolete over time. Further, the system shall be capable of satisfying the future BN requirement with the least modifications.

7. **Bidder's Responsibility**. Bidder is to comply with all the clauses of this tender specification as specified below:

a. Bidder is to submit full specifications and relevant documents, the latest brochures for the equipment/ system along with the offer. The information in the brochure needs to be self-explanatory and must support and validate the information mentioned in the specification. Deviation or variation of information between the brochure and formally offered documents would be treated as non-compliance.

b. Bidder is to provide a detailed explanation of the technical matters if deemed necessary and cross-reference relevant pages of their offer/ original supporting documents.

c. Bidder is to provide performance/ technical data, specific figures and information as asked against each condition of the tender specification.

d. Bidder is to mention detailed compliance/ non-compliance and their agreement (as applicable) against each condition. BN reserves the right to reject those offers which merely mentioned: "Complied/ Agreed" without highlighting required information/ data/ figures/ graphs as asked against each condition.

e. Bidder is to obtain necessary data/ info/ documents from NHQ (Dte of Signal) for planning and interfacing of equipment/ system with IP PABX network such as (but not limited to):

(1) Existing Grandstream IP PABX system IP telephones which are running under UCM 6510 along with available technical details.

(2) Existing analogue Numbers and PABX

(3) TNT Number plan (If Needed)

8. **Pre-bid Site Survey**. The Bidder shall conduct a pre-bid site survey with prior permission and on a pre-agreed schedule from the Directorate of Signal (DSIG), Naval Headquarters (NHQ) to determine any site restriction and identify the best solution for the installation of Single server based IP PABX server, Networking equipment, UPS, Networking cable, IP Phones and training. The bidder shall assess all the installation requirements of IP PABX server which may include the site preparation works such as earthling, laying of Inter-facility (IFL) cables in conduit metal pipes, antenna foundation, civil, electrical and other works; Also lighting protection for IP PABX server. Bidder shall propose the IP PABX server Indoor equipment layout, Power Arrangement, Network Management Room, Data Center Room, access control and CCTV Monitoring System. Bidder may also request for clarifications on any issue relating to the information contained in the tender specification from DSIG, NHQ in writing with an information copy to DGDP and apply for a pre-bid meeting at NHQ (If felt necessary) on pre-agreed schedule from DSIG and DGDP.

9. **Pre-Bid Meeting**. If purchaser feels necessary, a pre-bid meeting shall be arranged. All prospective bidders, who have purchased the tender document, may be requested to attend that meeting with the purchaser's representative to be held at NHQ, Banani, Dhaka-1213. The meeting shall be held under the arrangement of DGDP. The date and time of the Pre-Bid meeting shall be informed to all concerned.

10. **Project Schedule**. The project schedule is to be submitted with offer.

11. **Evaluation Procedure**. The offers submitted by the bidders shall be evaluated based on the following elements (Not in any priority order):

a. Compliance with eligibility criteria for bidding.

b. Compliance with the Technical Specifications and General Terms and Conditions.

c. Financial competitiveness.

12. **Additional Features Offered by the Bidders**. Single server based IP PABX network shall be integrated and interlinked with the existing Grandstream IP PABX IP telephones which are running under UCM 6510 server. The bidder must fully understand the scope of work and BN requirements. If anything, else is required to fulfill BN requirements in configuration and software arrangement that must also be provided by the bidder within the quoted price. The bidder may suggest and/or offer features for the system that adds to what is described in this tender schedule. In this case, bidders have to explain the detailed advantage of that/ those features of the system.

13. **Presentation by Bidder**. Bidder shall be required to give a presentation at Bidder’s expense for any clarification at NHQ as desired by BN any time during the evaluation of the offers. In that case, Bidder is to submit necessary information and bio-data including photographs and passport for foreign nationals of the team to BN Headquarters (DSIG) at least 02 weeks before the presentation. The presentation may cover more aspects than those which have been covered in Bidder’s proposal.

14. **Purchaser Reserves the Right**. DGDP/ BN reserves the right to accept or reject any bid or to annul the bidding process and reject all bids at any time prior to contract award (without thereby incurring any liability to the bidders).

15. **Additional Certificates/ Documents to be Provided by Bidder**. In addition, to the certificates/ documents in respect of bidder's eligibility and experience, following certificates are also to be provided by the bidder:

a. The bidder must provide OEM certificate for all active equipment Mentioned (as per individual item) including warranty certificate. Distributor certificate not allowed for bidder's eligibility.

b. Any other certificate, which is not mentioned above, but required for installation, commissioning and certification, must be provided for compliance of respective certification process.

c. Attested copy of Valid trade license.

d. Attested copy of Latest Income Tax certificate

e. Attested copy of Latest VAT registration certificate.

f. Bank Solvency (Original).

g. JV/ Consortium Agreement Copy (If needed)

h. For the server cluster proposal (if using more then one server) bidder will have to submit user/ OEM certificate of more than 3000 IP line capacity.

PART-2: TECHNICAL SPECIFICATION

16. **Name of the Equipment**. Single server based IP PABX network along with accessories and infrastructure for BN.

17. **Quantity**. 01 set of IP PABX Network along with accessories.

18. **Scope of Supply**. The system should be an integrated and scalable system that is to be offered as a "Turn-Key" basis and all Networking equipments shall be unified for the project. The scope of supply is as follows but not limited to:

a. Supply and installation of the following system/ equipment:

(1) 01 x Single server based IP PABX system minimum 8000 line capacity with perpetual license with all necessary equipment/ module, user services equipment and associated accessories. IP PABX server will be working as active standby. Not more than 03 (Three) server cluster is allowed to achieve min 8000 line capacity as per para 30.

(2) 26 X secure gateway with all necessary equipment/ module, user services equipment and associated accessories as per para 21 (a,b,c,d,e).

(3) 02 X Server Farm firewall with all necessary equipment/ module, user services equipment and associated accessories as per para 23.

(4) 02 X Server Farm switch with all necessary equipment/ module, user services equipment and associated accessories as per para 24.

(5) 04 x 48 core switch with all necessary equipment/ module, user services equipment and associated accessories as per para 22.

(6) 28 x 48 distribution switch with all necessary equipment/ module, user services equipment and associated accessories as per para 25.

(7) 230 x Access switch along with necessary items as per para 26 (a,b,c)

(8) 420 x Transceiver as per para 27 (a & b).

(9) 01 x Centralized Management System with server as per para 28 & 29.

(10) 3650 x IP Phone as per para 31 (a,b,c).

(11) 01 x 55” crystal UHD 4K Smart TV as per para 32.

(12) 336 x online UPS as per para 33 (a, b & c)

(13) 342 x network Rack as per para 34 (a, b, c & d)

(14) 350 x box UTP Cable Cat-6 as per para 35.

(15) 2750 x modular as per para 36.

(16) 2750 x faceplate as per para 37.

(17) 2750 x MK box as per para 38.

(18) 5200 x RJ45 Connector as per para 39.

(19) 65000 mtr x Optical Fiber 4 Core as per para 40.

(20) 630 x TJ Box as per para 41.

(21) 5520 x UTP Patch Cord 2 Meter as per para 42.

(22) 2740 x UTP Patch Cord 0.5 Meter as per para 43.

(23) 33 x Port Fiber Patch Panel as per para 44 (a & b).

(24) 687 x Fiber Patch Cord 5 Meter LC/LC as per para 45.

(25) 10 x Fiber Patch Cord 3 Meter LC/LC as per para 46.

(26) . 548 x 1U Horizontal Wire Manager as per para 47.

(27) 80 roll x 4 Rm Electric Cable as per para 48

(28) 553 x 24 Port UTP Patch Panel Loaded as per para 49.

(29) 1950 x Fiber Splicing as per para 50.

(30) 66500 x Fiber Laying as per para 51.

(31) 3000 x UTP Node Wiringas per para 52.

b. Training (Local).

c. Spares (as optional).

d. Backup Software and software Licenses.

e. System layouts, installation diagrams and Manuals.

f. Installation, Supervision, Setting to Work and Commissioning.

g. Test/ Trial and Acceptance.

h. On-site Technical Support Team during the warranty period.

19. **General Information**.

a. **Name and Addresses of Major Hardware Manufacturer(s)**. To be mentioned by bidder.

b. **Name and Address of the Principal/ Bidder**. To be mentioned by bidder.

c. **Brand & Model**. To be mentioned for all equipment (A list is to be submitted mentioning Brand/Model, Manufacturer, Country of origin, Country of assembling, Year of Manufacture and Manufacturer address).

d. **Country of Origin**. USA/ Canada/ UK/ Denmark/ France/ Germany/ Netherlands/ Norway/ Spain/ Switzerland/ Sweden /Japan for main equipments (IP PABX server, NMS, Networking items, and online UPS).

e. **Country of Manufacture/ Assembly**. USA/ Canada/ EU countries/ Japan/ China/ Malaysia/ Singapore/ Turkey/ Vietnam/ Thailand.

f. **Year of Production**. 2025 or later.

g. **Equipment Quality**. The offered system should be designed and implemented with proven equipment. All main items such as IP PABX server, NMS, Networking items, online UPS, Network Cable, Power supply systems are to be as proven design and from renowned Manufacturer.

20. **Network Design and Services Requirements**.

a. **Design Requirements**. Proposed single server based IP PABX network will have the following features:

(1) Server will be installed in Dhaka and all area will be connected via fiber backbone and secondary backbone will be satellite network. Initially 18 Bases will be connected with the server. Server will have 8000 line capacity; initially 6000 lines will be activated. In order to achieve 8000 IP line capacity, bidder may use several servers in cluster formation. However, not more than 3 server in cluster is allowed.

(2) All the equipments must be installed on a ‘Turn-Key’ basis.

(3) Primarily, Existing backbone/ BN NET of DNIT shall be used as backbone for the IP network. VSAT NET will be used as secondary backbone for the Bases and for ships with VSAT NET will be the primary backbone.

(4) Proposed IP server should be interfaced with the existing IP telephones which are running under UCM 6510.

b. **Bandwidth and Data Rate requirement**. Min 20 Mbps of bandwidth will be allocated for the network.

c. **User/ Services Requirement**. Proposed single server based IP PABX system should have the capable of handling the followings:

(1) Telephone Connectivity (IP, SIP and analogue phone connectivity of BN).

(2) Data Connectivity (File sharing) through app.

(3) Video calling facility via dedicated video IP phones.

d. **Encryption and Security**. Proposed server and all equipment must be designed such that, it provides end to end encryption during transmission. The encryption may be 256 AES or 256 bits customized version. Details of encryption hardware, software and type to be mentioned. If encryption hardware is not in-built, Bidder is to mention the price separately (Details features of an encryption system to be mentioned).

e. **Network Segment**.

(1) **Server and Network Hardware**.

(a) High-quality fiber optics (850 nm) and UTP (CAT 6 or higher grade) cable to be used in the network.

(b) All computer system shall have the licensed operating system, anti-virus and software.

(c) The price of user license (minimum, increment and maximum) of all offered network devices must be mentioned and the list is to be submitted with a financial offer.

(2) **Software and Software Update**. All operating system (OS) must be genuine and registered version. Software update shall be done from the server via backbone. The network should have backward compatibility to ensure older version remotes can function in a newer version of NMS/ Network software.

f. **Licensing of Software**. All software shall have 03 years of license.

DETAIL TECHNICAL SPECIFICATION OF ALL EQUIPMENTS

21. **Secure Gateway**

a. **Type 1**

Sl. No.	Item Description	Required Specifications	Bidder's Response
1.	Quantity	Two (02)	
2.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	

Sl. No.	Item Description	Required Specifications	Bidder's Response
3.	Brand	To be mentioned by the bidder	
4.	Model	To be mentioned by the bidder	
5.	Country of Brand Origin	USA/UK/EU	
6.	Environmental	Maintain International Quality Environmental Safety standard	
7.	Enclosure Type	Rack-mountable 1U Chassis	
8.	Part No	Bidder should submit BOQ of proposed device including the details part numbers. Bidder should submit the required performance document for the proposed device.	
9.	Architecture	The router should be modular in architecture with a services-based hardware architecture	
10.	Router Processor	The Router Should have Dedicated Route Processor with Multicore Core Processor	
11.	Memory	The Router Should have Minimum 32-GB DRAM from Day one and can be upgraded to 64 GB for higher scale	
12.	Power supply	The Router Should have Redundant N+1	
13.	Forwarding and Crypto throughput	The Router should support IPv4 Forwarding Throughput minimum 38 Gbps from day 1	
14.		Router must support Advantage Stack throughput - upto 10G (Aggr, 20G) from day one	
15.		The Router should support in SD-WAN crypto Throughput (Ipsec) minimum 18 Gbps from day 1.	
16.		The Router should support in Non SD-WAN crypto Throughput (Ipsec) minimum 19 Gbps from day 1.	
17.	Interface	Should have at least 4 x 1/10 GE SFP based ports and 8 x 1G SFP port from day 1. Bidder should propose 2 x 10G short range, 2 x 1G Short range and 8 x 1G copper transceivers module from day 1 with each device. All the modules should be OEM's original and same as Router brand.	
18.	System Scalability	Number of ACLs per system minimum 3900	
19.		Number of IPv4 ACEs per system minimum 49K	
20.		Number of IPv4 Routes: 3.5M w/ default 16GB	
21.		Number of IPv6 Routes: 3.2M w/ default 16GB	
22.		Number of Queues minimum 15K	
23.		Number of NAT Sessions minimum 1.9M	
24.		Should support firewall session minimum 1.9 M	
25.		Number of VRFs: 8000	
26.	Core Features	The proposed router should support centralized control plane architecture from day one.	
27.		The proposed router should support end to end segmentation with different routing table per segment and it should be possible to create per segment topology on WAN like HUB &Spoke, full mesh, partial mesh, point to point in SD-WAN mode form day one.	
28.		WAN controllers should provide key wan	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		capabilities like WAN edge device authentication on wan network, secure control communication with edge device, building overlay network as per requirement like hub & spoke, full mesh etc., best path computation, link performance computation based on latency, loss and jitter, traffic load balancing on secure overlay network based on policy, build and apply various policies and control from central locations like change in topology, applying ACL, QoS, centralize monitoring and management from day one.	
29.		IPv4, IPv6, static routes, Routing Information Protocol Versions 1 and 2 (RIP and RIPv2), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol Version 3 (IGMPv3), Protocol Independent Multicast Sparse Mode (PIM SM), PIM Source-Specific Multicast (SSM), Resource Reservation Protocol (RSVP), CDP, Encapsulated Remote Switched Port Analyzer (ERSPAN), IOS IP Service-Level Agreements (IPSLA), Call Home, IOS Embedded Event Manager (EEM), Internet Key Exchange (IKE), Access Control Lists (ACL), Ethernet Virtual Connections (EVC), Dynamic Host Configuration Protocol (DHCP), Frame Relay, DNS, Locator ID Separation Protocol (LISP), Hot Standby Router Protocol (HSRP), RADIUS, Authentication, Authorization, and Accounting (AAA), Application Visibility and Control (AVC), Distance Vector Multicast Routing Protocol (DVMRP), IPv4-to-IPv6 Multicast, Multiprotocol Label Switching (MPLS), Layer 2 and Layer 3 VPN, IPsec, MACsec Layer 2 Tunneling Protocol Version 3 (L2TPv3), Bidirectional Forwarding Detection (BFD), IEEE 802.1ag, and IEEE 802.3ah	
30.	Security	Hardware-based cryptography acceleration (IPsec)	
31.		Should support Layer 7 context-aware / application aware Firewall features	
32.		Should support stateful Firewall, transparent firewall, advance application inspection and control for HTTP, ACL bypass, VRF aware Firewall features, Advanced NGFW Stack, Advanced Multicloud and SaaS, Analytics, and Visibility, and URL Filtering Sandboxing with AMP and IPS.	
33.		The proposed router should support DIA w. NAT + NGFW + IPS + URLF + AMP with minimum	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		throughput 5.3 Gbps	
34.	High Availability	Software redundancy with dual IOS, Box-to-Box application-level redundancy	
35.	Encapsulations	Generic Routing Encapsulation (GRE), Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP), Multilink Point-to-Point Protocol (MLPPP), High-Level Data Link Control (HDLC), and PPP over Ethernet (PPPoE)	
36.	Traffic management	Quality of Service (QoS), Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing (PfR), and Network-Based Application Recognition (NBAR)	
37.		Device should support per-VPN QoS, adaptive QOS support, dynamic on-demand tunnel support from day one.	
38.	Cryptographic algorithms	Encryption: DES, 3DES, AES-128, or AES-256 (in CBC and GCM modes), Authentication: RSA (748/1024/2048 bit), ECDSA (256/384 bit), Integrity: MD5, SHA, SHA-256, SHA-384, SHA-512	
39.	Management	Support diagnostic commands and system health checks within the Router	
40.		Should support application policy management, software image management, custom reporting, Encrypted Traffic Analytics and reporting from day one.	
41.	Manufacturer Authorization	Manufacturer Authorization Certificate must be submitted along with the bid documents	
42.	Warranty	Manufacturer's warranty part number should be mentioned, minimum 3 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support.	

b. **Type 2**.

Sl. No.	Item Description	Required Specifications	Bidder's Response
1.	Quantity	Two (02)	
2.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	
3.	Brand	To be mentioned by the bidder	
4.	Model	To be mentioned by the bidder	
5.	Country of Brand Origin	USA/UK/EU	
6.	Environmental	Maintain International Quality Environmental	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		Safety standard	
7.	Enclosure Type	Rack-mountable 1U Chassis	
8.	Part No	Bidder should submit BOQ of proposed device including the details part numbers. Bidder should submit the required performance document for the proposed device.	
9.	Architecture	The router should be modular in architecture with a services-based hardware architecture	
10.	Router Processor	The Router Should have Dedicated Route Processor with Multicore Core Processor	
11.	Memory	The Router Should have Minimum 16-GB DRAM from Day one and can be upgraded to 32 and 64 GB for higher scale	
12.	Power supply	The Router Should have Redundant N+1	
13.	Forwarding and Crypto throughput	The Router should support IPv4 Forwarding Throughput minimum 35 Gbps from day 1	
14.		Router must support Advantage Stack throughput - upto 1G (Aggr, 2G) from day one	
15.		The Router should support in SD-WAN crypto Throughput (Ipsec) minimum 17 Gbps from day 1.	
16.		The Router should support in Non SD-WAN crypto Throughput (Ipsec) minimum 18 Gbps from day 1.	
17.	Interface	Should have at least 4 x 1/10 GE SFP based ports and 8 x 1G SFP port from day 1. Bidder should propose 2 x 10G short range, 2 x 1G Short range and 8 x 1G copper transceivers module from day 1 with each device. All the modules should be OEM's original and same as Router brand.	
18.	System Scalability	Number of ACLs per system minimum 3900	
19.		Number of IPv4 ACEs per system minimum 49K	
20.		Number of IPv4 Routes: 3.2M w/ default 16GB	
21.		Number of IPv6 Routes: 2.2M w/ default 16GB	
22.		Number of Queues minimum 15K	
23.		Number of NAT Sessions minimum 1.7M	
24.		Should support firewall session minimum 1.5 M	
25.		Number of VRFs: 8000	
26.	Core Features	The proposed router should support centralized control plane architecture from day one.	
27.		The proposed router should support end to end segmentation with different routing table per segment and it should be possible to create per segment topology on WAN like HUB & Spoke, full mesh, partial mesh, point to point in SD-WAN mode form day one.	
28.		WAN controllers should provide key wan capabilities like WAN edge device authentication on wan network, secure control communication with edge device, building overlay network as per requirement like hub & spoke, full mesh etc., best path computation, link performance computation	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		based on latency, loss and jitter, traffic load balancing on secure overlay network based on policy, build and apply various policies and control from central locations like change in topology, applying ACL, QoS, centralize monitoring and management from day one.	
29.		IPv4, IPv6, static routes, Routing Information Protocol Versions 1 and 2 (RIP and RIPv2), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol Version 3 (IGMPv3), Protocol Independent Multicast Sparse Mode (PIM SM), PIM Source-Specific Multicast (SSM), Resource Reservation Protocol (RSVP), CDP, Encapsulated Remote Switched Port Analyzer (ERSPAN), IOS IP Service-Level Agreements (IPSLA), Call Home, IOS Embedded Event Manager (EEM), Internet Key Exchange (IKE), Access Control Lists (ACL), Ethernet Virtual Connections (EVC), Dynamic Host Configuration Protocol (DHCP), Frame Relay, DNS, Locator ID Separation Protocol (LISP), Hot Standby Router Protocol (HSRP), RADIUS, Authentication, Authorization, and Accounting (AAA), Application Visibility and Control (AVC), Distance Vector Multicast Routing Protocol (DVMRP), IPv4-to-IPv6 Multicast, Multiprotocol Label Switching (MPLS), Layer 2 and Layer 3 VPN, IPsec, MACsec Layer 2 Tunneling Protocol Version 3 (L2TPv3), Bidirectional Forwarding Detection (BFD), IEEE 802.1ag, and IEEE 802.3ah	
30.		Hardware-based cryptography acceleration (IPsec)	
31.		Should support Layer 7 context-aware / application aware Firewall features	
32.	Security	Should support stateful Firewall, transparent firewall, advance application inspection and control for HTTP, ACL bypass, VRF aware Firewall features, Advanced NGFW Stack, Advanced Multicloud and SaaS, Analytics, and Visibility, and URL Filtering Sandboxing with AMP and IPS.	
33.		The proposed router should support DIA w. NAT + NGFW + IPS + URLF + AMP with minimum throughput 4.3 Gbps	
34.	High Availability	Software redundancy with dual IOS, Box-to-Box application-level redundancy	
35.	Encapsulations	Generic Routing Encapsulation (GRE), Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP),	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		Multilink Point-to-Point Protocol (MLPPP), High-Level Data Link Control (HDLC), and PPP over Ethernet (PPPoE)	
36.	Traffic management	Quality of Service (QoS), Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing (PfR), and Network-Based Application Recognition (NBAR)	
37.		Device should support per-VPN QoS, adaptive QOS support, dynamic on-demand tunnel support from day one.	
38.	Cryptographic algorithms	Encryption: DES, 3DES, AES-128, or AES-256 (in CBC and GCM modes), Authentication: RSA (748/1024/2048 bit), ECDSA (256/384 bit), Integrity: MD5, SHA, SHA-256, SHA-384, SHA-512	
39.	Management	Support diagnostic commands and system health checks within the Router	
40.		Should support application policy management, software image management, custom reporting, Encrypted Traffic Analytics and reporting from day one.	
41.	Manufacturer Authorization	Manufacturer Authorization Certificate must be submitted along with the bid documents	
42.	Warranty	Manufacturer's warranty part number should be mentioned, minimum 3 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support.	

c. <u>Type 3</u>

Sl. No.	Item Description	Required Specifications	Bidder's Response & Reference
1.	Quantity	Two (02)	
2.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	
3.	Brand	To be mentioned by the bidder	
4.	Model	To be mentioned by the bidder	
5.	Country ofBrand Origin	USA/UK/EU	
6.	Environmental	Maintain International Quality Environmental Safety standard	
7.	Enclosure Type	Rack-mountable 1U Chassis	
8.	Part No	Bidder should submit BOQ of proposed device including the details part numbers. Bidder should	

Sl. No.	Item Description	Required Specifications	Bidder's Response & Reference
		submit the required performance document for the proposed device.	
9.	Architecture	The router should be modular in architecture with a services-based hardware architecture	
10.	Router Processor	The Router Should have Dedicated Route Processor with Multicore Core Processor	
11.	Memory	The Router Should have Minimum 8GB DRAM from Day one and can be upgraded to 16 and 32 GB for higher scale	
12.	Power supply	The Router Should have Redundant N+1	
13.	Forwarding and Crypto throughput	The Router should support IPv4 Forwarding Throughput minimum 17.5 Gbps from day 1	
14.		Router must support Advantage Stack throughput - upto 1G (Aggr, 2G) from day one	
15.		The Router should support in SD-WAN crypto Throughput (Ipsec) minimum 1.8 Gbps from day 1.	
16.		The Router should support in Non SD-WAN crypto Throughput (Ipsec) minimum 1.9 Gbps from day 1.	
17.	Interface	Should have at least 4 x 1/10 GE SFP based ports and 6 x 1G Copper ports from day 1. Bidder should propose 2 x 10G short range, 2 x 1G Short range transceivers module from day 1 with each device. All the modules should be OEM's original and same as Router brand.	
18.	Interface support	Support Gigabit Ethernet, T1/E1, Channelized E1/T1, FXO, 4G/LTE Service Card	
19.	System Scalability	Number of ACLs per system minimum 3900	
20.		Number of IPv4 ACEs per system minimum 70K	
21.		Number of IPv4 Routes: 1.6M w/ default 8GB, up to 4M w/ 32GB	
22.		Number of IPv6 Routes: 1.5M w/ default 8GB, up to 4M w/ 32GB	
23.		Number of Queues minimum 8K	
24.		Number of NAT Sessions minimum 1.2M w/ default 8GB, up to 2M w/ 32GB	
25.		Should support firewall session minimum 510K	
26.		Number of VRFs: 4000	
27.	Core Features	The proposed router should support centralized control plane architecture from day one.	
28.		The proposed router should support end to end segmentation with different routing table per segment and it should be possible to create per segment topology on WAN like HUB & Spoke, full mesh, partial mesh, point to point in SD-WAN mode form day one.	
29.		WAN controllers should provide key wan capabilities like WAN edge device authentication on wan network, secure control communication	

Sl. No.	Item Description	Required Specifications	Bidder's Response & Reference
		with edge device, building overlay network as per requirement like hub & spoke, full mesh etc., best path computation, link performance computation based on latency, loss and jitter, traffic load balancing on secure overlay network based on policy, build and apply various policies and control from central locations like change in topology, applying ACL, QoS, centralize monitoring and management from day one.	
30.		IPv4, IPv6, static routes, Routing Information Protocol Versions 1 and 2 (RIP and RIPv2), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol Version 3 (IGMPv3), Protocol Independent Multicast Sparse Mode (PIM SM), PIM Source-Specific Multicast (SSM), Resource Reservation Protocol (RSVP), CDP, Encapsulated Remote Switched Port Analyzer (ERSPAN), IOS IP Service-Level Agreements (IPSLA), Call Home, IOS Embedded Event Manager (EEM), Internet Key Exchange (IKE), Access Control Lists (ACL), Ethernet Virtual Connections (EVC), Dynamic Host Configuration Protocol (DHCP), Frame Relay, DNS, Locator ID Separation Protocol (LISP), Hot Standby Router Protocol (HSRP), RADIUS, Authentication, Authorization, and Accounting (AAA), Application Visibility and Control (AVC), Distance Vector Multicast Routing Protocol (DVMRP), IPv4-to-IPv6 Multicast, Multiprotocol Label Switching (MPLS), Layer 2 and Layer 3 VPN, IPsec, MACsec Layer 2 Tunneling Protocol Version 3 (L2TPv3), Bidirectional Forwarding Detection (BFD), IEEE 802.1ag, and IEEE 802.3ah	
31.	Security	Hardware-based cryptography acceleration (IPsec)	
32.		Should support Layer 7 context-aware / application aware Firewall features	
33.		Should support stateful Firewall, transparent firewall, advance application inspection and control for HTTP, ACL bypass, VRF aware Firewall features, Advanced NGFW Stack, Advanced Multicloud and SaaS, Analytics, and Visibility, and URL Filtering Sandboxing with AMP and IPS.	
34.		The proposed router should support DIA w. NAT + NGFW + IPS + URLF + AMP with minimum	

Sl. No.	Item Description	Required Specifications	Bidder's Response & Reference
		throughput 1.9 Gbps	
35.	Encapsulations	Generic Routing Encapsulation (GRE), Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP), Multilink Point-to-Point Protocol (MLPPP), High-Level Data Link Control (HDLC), and PPP over Ethernet (PPPoE)	
36.	Traffic management	Quality of Service (QoS), Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing (PfR), and Network-Based Application Recognition (NBAR)	
37.		Device should support per-VPN QoS, adaptive QOS support, dynamic on-demand tunnel support from day one.	
38.	Cryptographic algorithms	Encryption: AES-256 (in CBC and GCM modes), Internet Key Exchange (IKE), Cisco PKI Authentication: AAA, RSA (2048 bit), ESP-256-CBC, HMAC-SHA1, ECDSA (256/384 bit) Integrity: SHA-1, SHA-2	
39.	Management	Support diagnostic commands and system health checks within the Router	
40.		Should support application policy management, software image management, custom reporting, Encrypted Traffic Analytics and reporting from day one.	
41.	Manufacturer Authorization	Manufacturer Authorization Certificate must be submitted along with the bid documents	
42.	Installation, Testing and Commissioning	Bidder must carry out on site installation, testing and commissioning. In consultation with IT Department, bidder must configure appropriate security and administration related policies, must do integration with other related hardware/software required to make the Network functional and shall provide respective documentation to IT Department.	
43.	Warranty	Manufacturer's warranty part number should be mentioned, minimum 3 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support.	

d. Type 4

Sl. No.	Item Description	Required Specifications	Bidder's Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	
2.	Brand	To be mentioned by bidder	
3.	Model	To be mentioned by bidder	
4.	Quantity	8 Nos	
5.	Country of Brand Origin	To be mentioned by bidder	
6.	Country of Manufacture	To be mentioned by bidder	
7.	Environmental	Maintain International Quality Environmental Safety standard	
8.	Enclosure Type	Rack mountable maximum 1 RU	
9.	Part No	Bidder should submit BOQ of proposed device including the details part numbers. Bidder should submit the required performance document for the proposed device.	
10.	Router Processor Type	High-performance multi-core minimum 8 core processors	
11.	General / Functional Requirement	Should support WAN architecture with centralized control plane architecture.	
12.		It should provide transport layer independence and will allow to use any transport like MPLS, internet, point to point links between locations.	
13.		It should support various last mile connectivity i.e. ethernet, T1/E1, ADSL, 4G LTE.	
14.		It should build secure WAN network on any transport and will allow to create various topology like Hub & spoke, full mesh, partial mesh.	
15.		It should build secure IPsec network between locations for secure communication and allow various last mile connectivity.	
16.	DRAM	Min. 8GB (installed)	
17.	Flash Memory	Integrated Min. 8 GB (installed) Flash Memory	
18.	Interfaces	The proposed router should have minimum twelve (12) Ethernet WAN ports. Two (2) Ethernet ports are small form-Factor pluggable (SFP) and ten (10) are RJ45 ports, enabling fiber as well as copper connectivity from Day-1. All WAN Port will be able to function as LAN port. Bidder should propose 2 x 1G short range, transceivers module from day 1 with each device.	
19.		Management: 1 x console and 1 x Gigabit Ethernet port or mini-USB for device management	
20.	Forwarding and Crypto throughput	The Router should support IPv4 Forwarding Throughput minimum 3.5 Gbps from day 1	
21.		Router must support Advantage Stack throughput - upto 250 Mbps (Aggr, 500 Mbps) from day one	
22.		The Router should support in SD-WAN crypto Throughput (Ipsec) minimum 900 Mbps from day 1.	

Sl. No.	Item Description	Required Specifications	Bidder's Response
23.		The Router should support in Non SD-WAN crypto Throughput (Ipsec) minimum 1 Gbps from day 1.	
24.	System Scalability	Number of ACLs per system minimum 3500	
25.		Number of IPv4 ACEs per system minimum 65K	
26.		Number of IPv4 Routes: 1.6M w/ default 8GB, up to 4M w/ 32GB	
27.		Number of IPv6 Routes: 1.5M w/ default 8GB, up to 4M w/ 32GB	
28.		Number of Queues minimum 8K	
29.		Number of NAT Sessions minimum 1.2M w/ default 8GB, up to 2M w/ 32GB	
30.		Should support firewall session minimum 500K	
31.		Number of VRFs: 3500	
32.	Security hardware:	Hardware-based cryptography acceleration (IPsec)	
33.	Security	Should support Layer 7 context-aware / application aware Firewall features	
34.		Should support stateful Firewall, transparent firewall, advance application inspection and control for HTTP, ACL bypass, VRF aware Firewall features, Advanced NGFW Stack, Advanced Multicloud and SaaS, Analytics, and Visibility, and URL Filtering Sandboxing with AMP and IPS.	
35.		Should support DIA w. NAT + NGFW + IPS + URLF + AMP minimum 900 Mbps	
36.		Router should support strong encryption like AES 256 or higher with hardware-based encryption from day 1.	
37.		Support Built-in end-to-end zone based segmentation, PKI, DNA Layer Security.	
38.		Should support ACL for IPv4 and IPv6, Time based ACL,	
39.		Should support Dynamic VPN to connect remote VPN devices.	
40.	Supporting Protocols	IPv4, IPv6, static routes, OSPF, BGP, Traffic Engineering, zero trust, IPsec, classification, prioritization, low latency queuing, remarking, shaping, scheduling, policing, mirroring, Multicast IPv4 support, Simple Network Management Protocol (SNMP), Network Time Protocol (NTP), DNS proxy with split DNS, DHCP, DHCP client, DHCP server, DHCP relay archival, syslog, Secure Shell (SSH), IPv6 for transport side, Virtual Router Redundancy Protocol (VRRP), MPLS, NAT (DIA, service-side, overload/PAT, NAT64, etc.), NAT pools, ACLs, BFD, NETCONF/RestConf, CLI, NTP server support.	
41.	Encapsulations	Generic Routing Encapsulation (GRE), Ethernet, 802.1q VLAN	
42.	Application experience	QoS, FBF QoS, Class of Service (CoS) marking, Weighted Random Early Detection (WRED),	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		Weighted round robin, Policy-based Routing (PBR), Guaranteed bandwidth, Diffserv marking, Ingress traffic marking	
43.	Management	Support automation capabilities including Zero Touch Deployment, Python scripts for orchestration, and event scripting for operational management.	
44.		Telnet and SSH	
45.		Support real time performance monitoring	
46.		Should support Network Flow Statistic and Service Level assurance feature.	
47.		Bidder must submit the required performance document and compliance reference document for the proposed device	
48.	Warranty	The OEM should have local Depo in Bangladesh and 24x7x365 Global TAC support	
49.		Manufacturer's warranty part number should be mentioned, minimum 03 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided for this unit from the date of commissioning.	

e. <u>Type 5</u>

Sl. No.	Item Description	Required Specifications	Bidder's Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	
2.	Brand	To be mentioned by bidder	
3.	Model	To be mentioned by bidder	
4.	Quantity	12 Nos	
5.	Country of Brand Origin	To be mentioned by bidder	
6.	Country of Manufacture	To be mentioned by bidder	
7.	Environmental	Maintain International Quality Environmental Safety standard	
8.	Enclosure Type	Rack mountable maximum 1 RU	
9.	Part No	Bidder should submit BOQ of proposed device including the details part numbers. Bidder should submit the required performance document for the proposed device.	
10.	Router Processor Type	High-performance multi-core minimum 4 core processors	
11.	General / Functional Requirement	Should support WAN architecture with centralized control plane architecture.	
12.		It should provide transport layer independence and will allow to use any transport like MPLS, internet, point to point links between locations.	

Sl. No.	Item Description	Required Specifications	Bidder's Response
13.		It should support various last mile connectivity i.e. ethernet, T1/E1, ADSL, 4G LTE.	
14.		It should build secure WAN network on any transport and will allow to create various topology like Hub & spoke, full mesh, partial mesh.	
15.		It should build secure IPsec network between locations for secure communication and allow various last mile connectivity.	
16.	DRAM	Min. 4GB (installed)	
17.	Flash Memory	Integrated Min. 8 GB (installed) Flash Memory	
18.	Interfaces	The proposed router should have minimum twelve (12) Ethernet WAN ports. Two (2) Ethernet ports are small form-Factor pluggable (SFP) and ten (10) are RJ45 ports, enabling fiber as well as copper connectivity from Day-1. All WAN Port will be able to function as LAN port. Bidder should propose 2 x 1G short range, transceivers module from day 1 with each device.	
19.		Management: 1 x console and 1 x Gigabit Ethernet port or mini-USB for device management	
20.	Forwarding and Crypto throughput	The Router should support IPv4 Forwarding Throughput minimum 3.1 Gbps from day 1	
21.		Router must support Advantage Stack throughput - upto 250 Mbps (Aggr, 500 Mbps) from day one	
22.		The Router should support in SD-WAN crypto Throughput (Ipsec) minimum 450 Mbps from day 1.	
23.		The Router should support in Non SD-WAN crypto Throughput (Ipsec) minimum 500 Mbps from day 1.	
24.	System Scalability	Number of ACLs per system minimum 3200	
25.		Number of IPv4 ACEs per system minimum 60K	
26.		Number of IPv4 Routes: 800k w/ default 4GB, up to 4M w/ 32GB	
27.		Number of IPv6 Routes: 800k w/ default 4GB, up to 4M w/ 32GB	
28.		Number of Queues minimum 8K	
29.		Number of NAT Sessions minimum 600k w/ default 4GB, up to 2M w/ 32GB	
30.		Should support firewall session minimum 400K	
31.		Number of VRFs: 3200	
32.	Security hardware:	Hardware-based cryptography acceleration (IPsec)	
33.	Security	Should support Layer 7 context-aware / application aware Firewall features	
34.		Should support stateful Firewall, transparent firewall, advance application inspection and control for HTTP, ACL bypass, VRF aware Firewall features, Advanced NGFW Stack, Advanced Multicloud and SaaS, Analytics, and Visibility, and URL Filtering Sandboxing with AMP and IPS.	

Sl. No.	Item Description	Required Specifications	Bidder's Response
35.		Router should support strong encryption like AES 256 or higher with hardware-based encryption from day 1.	
36.		Support Built-in end-to-end zone based segmentation, PKI, DNA Layer Security.	
37.		Should support ACL for IPv4 and IPv6, Time based ACL,	
38.		Should support Dynamic VPN to connect remote VPN devices.	
39.	Supporting Protocols	IPv4, IPv6, static routes, OSPF, BGP, Traffic Engineering, zero trust, IPsec, classification, prioritization, low latency queuing, remarking, shaping, scheduling, policing, mirroring, Multicast IPv4 support, Simple Network Management Protocol (SNMP), Network Time Protocol (NTP), DNS proxy with split DNS, DHCP, DHCP client, DHCP server, DHCP relay archival, syslog, Secure Shell (SSH), IPv6 for transport side, Virtual Router Redundancy Protocol (VRRP), MPLS, NAT (DIA, service-side, overload/PAT, NAT64, etc.), NAT pools, ACLs, BFD, NETCONF/RestConf, CLI, NTP server support.	
40.	Encapsulations	Generic Routing Encapsulation (GRE), Ethernet, 802.1q VLAN	
41.	Application experience	QoS, FBF QoS, Class of Service (CoS) marking, Weighted Random Early Detection (WRED), Weighted round robin, Policy-based Routing (PBR), Guaranteed bandwidth, Diffserv marking, Ingress traffic marking	
42.	Management	Support automation capabilities including Zero Touch Deployment, Python scripts for orchestration, and event scripting for operational management.	
43.		Telnet and SSH	
44.		Support real time performance monitoring	
45.		Should support Network Flow Statistic and Service Level assurance feature.	
46.		Bidder must submit the required performance document and compliance reference document for the proposed device	
47.	Installation, Testing and Commissioning	Bidder must carry out on site installation, testing and commissioning. In consultation with IT Department, bidder must configure appropriate security and administration related policies, must do integration with other related hardware/software required to make the Network functional and shall provide respective documentation to IT Department.	
48.	Manufacturer authorization	Bidder must submit Manufacturer Authorization Letter Certificate from the OEM	
49.	Warranty	The OEM should have local Depo in Bangladesh	

Sl. No.	Item Description	Required Specifications	Bidder's Response
		and 24x7x365 Global TAC support	
50.		Manufacturer's warranty part number should be mentioned, minimum 03 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided for this unit from the date of commissioning.	

22. **Core Switch– Qty. 4**

Sl. No.	Feature List	Feature Description	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC for quality assurance	
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Country of Origin	To be mentioned by the bidder	
5.	Environmental	Maintain International Quality Environmental Safety standard	
6.	Enclosure Type	Rack-mountable	
7.	Reputed Brand	Proposed solution must be international reputed Brand.	
8.	Part No	Bidder should submit BOQ of proposed device including the details' part numbers. Bidder should submit the required performance document for the proposed device.	
9.	General Features	The switch should have minimum 24 x 1/10/25G Ethernet and 4 x 40/100GE uplink ports with 20 x 10 GE short range optical transceiver & 4 x 40G short range optical transceiver modules with each devices from Day 1. The bidder shall supply the required number of modules, all of which must be from the same OEM.	
10.		Switch should have stacking feature	
11.		Should have minimum 16GB DRAM & 16GB Flash	
12.		Switch should have redundant power supply from day 1.	
13.	Performance	Minimum Switching capacity min 2 Tbs	
14.		Minimum Forwarding Throughput min 1Tbs	
15.	Layer-2 Features	Layer 2 switch ports and VLAN trunks	
16.		IEEE 802.1Q VLAN encapsulation	
17.		Support for up to 4000 VLANs ID	
18.		Minimum 82,000 MAC Address	
19.		Support minimum 9216 bytes Jumbo frame	
20.		Switch should have Layer 2, Routed Access (RIP, OSPF) PBR, PIM Stub Multicast (1000 routes), PVLAN, VRRP, PBR, QoS, FHS, 802.1X, MACsec-256 bit, CoPP, SXP, IP SLA Responder from day 1.	

Sl. No.	Feature List	Feature Description	Bidder Response
21.		Must have 16 MB of shared buffer for traffic/packet Queuing and processing	
22.	Layer-3 Feature	The Switch should support routing protocols such OSPF, BSR, IS-ISv4, LISP, VXLAN, VRF.	
23.		Support Routing protocols IS-IS, IP SLA, OSPFv3	
24.		Minimum Up to 255,000 IPv4 route and IPv6 route	
25.		Support minimum 4000 L3 VLAN Interfaces or Switched Virtual Interfaces	
26.		The Switch should support IP Multicast and PIM, PIM Sparse Mode & Source-Specific Multicast for Wired and Wireless Clients.	
27.		The Switch should support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).	
28.		The Switch should support IPv6 & IPv4 Policy Based Routing (PBR)	
29.		Minimum 64,000 flow entries for security and traffic visibility.	
30.		Support Internet Group Management Protocol (IGMP), PIM Stub etc.	
31.		Switch should support 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port.	
32.	Security features	Support 802.1X, Flexible Authentication, 802.1x Monitor Mode, and RADIUS Change of Authorization.	
33.		Support minimum 1600 ACL entries. Access switch must support power redundancy across all models, either internally or via external RPS.	
34.		Support L2 IEEE 802.1AE -256-bit security from day 1. Switch shall support MACSec on access and uplink ports.	
35.		Support Port Security, Dynamic ARP Inspection, and IP Source Guard	
36.		Switch Should support Policy-based Automation & Assurance for Wired & Wireless features.	
37.		Support OS, Firmware/BIOS & patch authenticity as encrypted images to protect from unauthorized and modified/cracked images.	
38.		Support OS validation during booting to protect from threats.	
39.	Management features	Support SNMP, syslog, NetFlow or SFlow, Data telemetry collection and correlation for performance monitoring.	
40.		Switch should support API Driven configuration and support Netconf and Restconf using YANG data model. It should support automation tool like python	
41.		Switch should support Patch Management feature.	
42.		Switch should support port mirroring based on	

Sl. No.	Feature List	Feature Description	Bidder Response
		Inbound & outbound, mirroring based on ports, vlans, RSPAN, ERSPAN	
43.		The switch must have at least 335,000 hours Mean Time Between Failure (MTBF) for hardware reliability.	
44.	Compliance & Reference	Bidder must provide the detail compliance report with reference. The reference URL / information of RFP technical specification compliance should be publicly available and accessible document.	
45.	Warranty	Minimum 3 (Three) years warranty for OEM, Manufacturer's warranty part number should be mentioned. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support	

23. **Server Farm Firewall- Qty. 2**

Sl. No.	Item	Required Specification	Bidder Response
1.	Brand	Internationally reputed brand.	
2.	Model	To be mentioned by the bidder	
3.	Country of Origin	To be mentioned by the bidder	
4.	Country of Manufacture	To be mentioned by the bidder	
5.	Environmental	Maintain International Quality Environmental Safety standard	
6.	Industry recommendations	The Firewall solution must be rated leader in the Magic Quadrant Report for Enterprise Firewall published by Gartner or Forrester wave report.	
7.	Hardware Architecture	The appliance based security platform should provide firewall, Application Visibility Control, IPS, and Advance Malware Protection functionality in a single appliance from day one. Solution should have zero-day threat protection coverage from day one.	
8.		The appliance should have at least 8 x RJ45 & 8 x 1/10G SFP+ ports. The bidder shall supply the required number of modules, all of which must be from the same OEM.	
9.		The appliance hardware should be a multicore CPU architecture with a hardened 64 bit operating system to support higher memory and should support minimum of 128-GB of RAM and 16 CPU Cores.	
10.		Proposed Firewall should not be proprietary ASIC based in nature & should be open architecture based on multi-core cpu's to protect & scale against dynamic latest security threats.	
11.		The proposed solution shouldn't use a proprietary ASIC hardware for any kind of performance Improvement. If option to disable ASIC is there than	

Sl. No.	Item	Required Specification	Bidder Response
		OEM must mention the performance numbers in datasheet.	
12.		Proposed firewall should not consume more than 1RU of rack space	
13.	Performance & Scalability	Should support at least 20 Gbps of Firewall throughput with 1024B packet size.	
14.		There should not be degradation in performance on enabling application control (AVC) and Intrusion Prevention (IPS) security features, and should support at least 20 Gbps of NGFW (FW, AVC and IPS) with 1024B packet size.	
15.		Firewall should support at least 4,000,000 concurrent sessions with application visibility turned on	
16.		Firewall should support at least 7000 VPN peers. Bidder should propose 500 Client VPN license from Day one.	
17.		Firewall should support at least 1,60,000 new connections per second with application visibility turned on	
18.	NG Firewall Features	Firewall should support creating access-rules with IPv4 & IPv6 objects, user/groups, application, geolocation, url, zones, vlan, etc	
19.		Firewall should support manual NAT and Auto-NAT, static nat, dynamic nat, dynamic pat	
20.		Firewall should support Nat66 (IPv6-to-IPv6), Nat 64 (IPv6-to-IPv4) & Nat46 (IPv4-to- IPv6) functionality	
21.		Should support Static, RIP, OSPF, OSPFv3 and BGP, BGPv6	
22.		Should support Multicast protocols like IGMP, PIM, etc	
23.		Should support capability to integrate with other security solutions to receive contextual information like security group tags/names	
24.		Should have the capability of passively gathering information about virtual machine traffic, network hosts and their activities, such as operating system, services, open ports, client applications, and vulnerabilities, to assist with multiple activities, such as intrusion event data correlation, elimination of false positives, and policy compliance.	
25.		Solution must be capable of passively gathering details unique to mobile devices traffic to identify a wide variety of mobile operating systems, mobile applications and associated mobile device hardware.	
26.		Should support more than 3000 (excluding custom application signatures) distinct application signature as application detection mechanism to optimize security effectiveness.	
27.		Should be capable of dynamically tuning IDS/IPS	

Sl. No.	Item	Required Specification	Bidder Response
		sensors (e.g., selecting rules, configuring policies, updating policies, etc.) with minimal human intervention.	
28.		Should support more than 25,000 (excluding custom signatures) IPS signatures or more. Should support capability to configure correlation rule where multiple rules/event can be combined together for better efficacy	
29.		Should be capable of automatically providing the appropriate inspections and protections for traffic sent over non-standard communications ports.	
30.		Should be able to link Active Directory and/or LDAP usernames to IP addresses related to suspected security events.	
31.		Should be capable of detecting and blocking IPv6 attacks.	
32.		Should support the capability to quarantine end point by integrating with other security solution like Network Admission Control	
33.		The solution must provide IP reputation feed that comprised of several regularly updated collections of poor reputation of IP addresses determined by the proposed security vendor	
34.		Solution must support IP reputation intelligence feeds from third party and custom lists of IP addresses including a global blacklist	
35.		The Appliance OEM must have its own threat intelligence analysis center and should use the global footprint of security deployments for more comprehensive network protection.	
36.		The detection engine should support capability of detecting and preventing a wide variety of threats (e.g, network probes/reconnaissance, VoIP attacks, buffer overflows, P2P attacks, etc.).	
37.		Should be able to identify attacks based on Geo-location and define policy to block on the basis of Geo-location	
38.		The detection engine should support the capability of detecting variants of known threats, as well as new threats	
39.		The detection engine must incorporate multiple approaches for detecting threats, including at a minimum exploit-based signatures, vulnerability-based rules, protocol anomaly detection, and behavioral anomaly detection techniques.	
40.		Firewall should support time based policies, where policies can be enforced for certain time ranges like hours, days, weeks, etc.	
41.		Firewall should provide integrated DNS security, where firewall should block traffic based on the domain name requested by a client	
42.		Should support Open based Application ID for access to community resources and ability to easily	

Sl. No.	Item	Required Specification	Bidder Response
		customize security to address new and specific threats and applications quickly	
43.	Management	The solution should have separate hardware/ Virtual management appliance for centralized management of Firewalls and Logging & Reporting.	
44.		The management platform must be accessible via a web-based interface and ideally with no need for additional client software	
45.		The management platform can be a dedicated OEM appliance/ or Virtual appliances. For VM instances, Bidder need to mention and propose necessary Hardware details for catering the requirements.	
46.		The management platform must provide a highly customizable dashboard.	
47.		The management platform must domain multi-domain management	
48.		The management platform must provide centralized logging and reporting functionality	
49.		The management platform must be capable of integrating third party vulnerability information into threat policy adjustment routines and automated tuning workflows	
50.		The management platform must be capable of role-based administration, enabling different sets of views and configuration capabilities for different administrators subsequent to their authentication.	
51.		Should support troubleshooting techniques like Packet tracer and capture	
52.		Should support REST API for monitoring and config programmability	
53.		The management platform must provide multiple report output types or formats, such as PDF, HTML, and CSV.	
54.		The management platform must support multiple mechanisms for issuing alerts (e.g., SNMP, e-mail, SYSLOG).	
55.		The solution should be able to give insights on hosts/users on the basis of Indicators of Compromise. Any license required for this should be included from day one.	
56.		The management platform must provide built-in robust reporting capabilities, including a selection of pre-defined reports and the ability for complete customization and generation of new reports.	
57.		The management platform support running on-demand and scheduled reports	
58.		The management platform must risk reports like advanced malware, attacks and network	
59.		The management platform must include an integration mechanism, preferably in the form of open APIs and/or standard interfaces, to enable	

Sl. No.	Item	Required Specification	Bidder Response
		events and log data to be shared with external network and security management applications, such as Security Information and Event Managers (SIEMs), and log management tools.	
60.	URL Filtering Features	Should support URL threat intelligence feeds to protect against threats.	
61.		Should support Reputation- and category-based URL filtering offering comprehensive alerting and control over suspect web traffic and enforces policies on more than 270 million of URLs in more than 78 categories.	
62.		Should support safe search for YouTube EDU enforcement	
63.	Manufacturer's part number	Bidder should submit BOQ of proposed device including the details' part numbers and Manufacturer's Warranty letter.	
64.		Bidder must submit the required performance document and compliance reference document for the proposed device.	
65.	Warranty	Minimum 3 (Three) years warranty for OEM, Manufacturer's warranty part number should be mentioned. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support.	

24. **Server Farm Switch – Qty. 2**

Sl. No.	Feature List	Feature Description	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC for quality assurance	
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Country of origin	To be mentioned by the bidder	
5.	Industry Certifications and Evaluations	Proposed OEM should be listed in Gartner Leader Quadrant for DC Networking for last 2 years	
6.	Part No	Bidder should submit BOQ of proposed device including the details' part numbers. Bidder should submit the required performance document for the proposed device.	
7.	Solution Requirement	The Switch should support non-blocking Layer 2 switching and Layer 3 routing	
8.		All relevant software, licenses and hardware for mentioned features should be quoted along with switch from Day-1.	
9.		The proposed switches must be using the latest chipsets developed by the respective switch OEM.	
10.		There switch should not have any single point of failure like power supplies and fans etc should have 1:1/N+1 level of redundancy	
11.		Switch should support the complete STACK of	

Sl. No.	Feature List	Feature Description	Bidder Response
		IPv4 and IPv6 services. Switch must have IPv6 phase 2 ready logo certifications.	
12.		The Switch used have the capability to function in line rate for all ports	
13.	Hardware and Interface Requirement	Switch should have the following interfaces:	
14.		Minimum 24 ports support 1/10/25 Gbps SFP ports for host connectivity and 6 x 40/100Gbps QSFP28 ports for Fabric connectivity. The bidder shall supply the required number of modules, all of which must be from the same OEM.	
15.		Switch should have console port for local management & management interface for Out of band management	
16.		1 RU fixed form factor	
17.	Performance Requirement	Modular OS with dedicated process for each routing protocol	
18.		The switch should support uninterrupted forwarding operation for OSPF, BGP etc. routing protocol to ensure high availability during primary controller failure	
19.		Switch should re-converge all dynamic routing protocol at the time of routing update changes i.e., graceful restart for fast re-convergence of routing protocols (OSPF, IS-IS, BGP)	
20.		Switch Should have Minimum 4 Core Processor, System memory Minimum 30 GB and Storage Minimum 120 GB SSD from Day One.	
21.		Switch should support minimum 1000 VRF instances with route leaking functionality	
22.		The switch should support Minimum 1,750,000 LPM routes	
23.		The Switch should support intelligent buffer management with a minimum buffer of 40MB.	
24.		The switch should have Maximum number of MAC address 512k.	
25.		The switch should support Minimum 125K multicast routes	
26.		Switch should support Minimum 4000 VLANs	
27.		Switch should support 64 nos of ECMP paths	
28.		Switch should support minimum 3.5 Tbps of switching Bandwidth and minimum 1.15 billion packets per second (bpps).	
29.	Network Virtualization Features	Switch should support Network Virtualization using Virtual Over Lay Network using VXLAN (RFC 7348)	
30.		Switch should support VXLAN (RFC7348) and EVPN symmetric IRB (RFC 7432) for supporting Spine - Leaf architecture to optimize the east - west traffic flow inside the data center	
31.	Layer 2 Features	Spanning Tree Protocol (IEEE 802.1D, 802.1W, 802.1S)	

Sl. No.	Feature List	Feature Description	Bidder Response
32.		Switch should support VLAN Trunking (802.1q)	
33.		Switch should support VLAN tagging (IEEE 802.1q)	
34.		Switch should support IEEE Link Aggregation and Ethernet Bonding functionality (IEEE 802.3ad) to group multiple ports for redundancy	
35.		Switch should support Link Layer Discovery Protocol as per IEEE 802.1AB for finding media level failures	
36.		Switch should support layer 2 extension over VXLAN (RFC7348) across all Datacenter to enable VM mobility & availability	
37.		The Switch should support DC Briding i.e. IEEE 802.1Qbb Priority Flow Control (PFC), Data Center Bridging Exchange (DCBX), IEEE 802.1Qaz Enhanced Transmission Selection (ETS), Explicit Congestion Notification (ECN).	
38.		Maximum number of port channels should be 500	
39.		Maximum no of ports in the port channel should be 32	
40.		The switch should support BGP EVPN (RFC 7432) Route Type 2, Type 4 and Route Type 5 for the overlay control plane	
41.	Layer3 Features	Switch should support static and dynamic routing	
42.		Switch should support segment routing and VRF route leaking functionality from day 1	
43.		Switch should support Segment Routing and Layer3 VPN over Segment Routing	
44.		Switch should support multi instance routing using VRF/ VRF Edge/ Virtual Router routing and should support VRF Route leaking functionality	
45.		Switch should provide multicast traffic reachable using:	
46.		a) PIM-SM (RFC 4601)	
47.		b) PIM-SSM (RFC 3569)	
48.		Support Multicast Source Discovery Protocol (MSDP) (RFC 3618)	
49.		Switch Should Support IGMP v1, v2 and v3	
50.	Quality of Service	Switch system should support 802.1P classification and marking of packet using:	
51.		a) CoS (Class of Service)	
52.		b) DSCP (Differentiated Services Code Point)	
53.		Switch should support for different type of QoS features for reaL time traffic differential treatment using:	
54.		a) Weighted Random Early Detection	
55.		b) Strict Priority Queuing	

Sl. No.	Feature List	Feature Description	Bidder Response
56.		Switch should support Rate Limiting - Policing and/or Shaping	
57.		Switch should support to trust the QoS marking/priority settings of the end points as per the defined policy	
58.		Switch should support control plane Protection from unnecessary or DoS traffic by control plane protection policy	
59.		Switch should support for external database for AAA using:	
60.		a) TACACS+	
61.		b) RADIUS	
62.		Switch should support to restrict end hosts in the network. Secures the access to an access or trunk port based on MAC address. It limits the number of learned MAC addresses to deny MAC address flooding	
63.		Switch platform should support MAC Sec (802.1AE) encryption in hardware	
64.		VXLAN and other tunnel encapsulation/decapsulation should be performed in single pass in Hardware	
65.		Switch should support for Role Based access control (RBAC) for restricting host level network access as per policy defined	
66.		Switch should support DHCP Snooping	
67.	Security	Switch should support Dynamic ARP Inspection to ensure host integrity by preventing malicious users from exploiting the insecure nature of the ARP protocol	
68.		Switch should support IP Source Guard to prevents a malicious host from spoofing or taking over another host's IP address by creating a binding table between the client's IP and MAC address, port, and VLAN. IEEE 802.1ae MAC Security (MACsec) support on all ports with speed greater than or equal to 10-Gbps, allows traffic encryption at the physical layer and provides secure server, border leaf, and leaf-to-spine connectivity from day 1.	
69.		Switch should support unicast and/or multicast blocking on a switch port to suppress the flooding of frames destined for an unknown unicast or multicast MAC address out of that port	
70.		Support for broadcast, multicast and unknown unicast storm control to prevent degradation of switch performance from storm due to network attacks and vulnerabilities	
71.		The Switch should support LLDP.	
72.		Switch should support Spanning tree BPDU	

Sl. No.	Feature List	Feature Description	Bidder Response
		protection	
73.	Manageability	Switch should support for sending logs to multiple centralized syslog server for monitoring and audit trail	
74.		Switch should provide remote login for administration using:	
75.		a) Telnet	
76.		b. SSHv2	
77.		Switch should support for capturing packets for identifying application performance using local and remote port mirroring for packet captures	
78.		Switch must have Switched Port Analyzer (SPAN) with minimum 4 active session and ERSPAN on physical, Port channel, VLAN interfaces	
79.		The switch must have at least 286,000 hours Mean Time Between Failure (MTBF) for hardware reliability.	
80.		Switch should support for management and monitoring status using different type of Industry standard NMS using:	
81.		SNMP v1 and v2, SNMP v3 with Encryption	
82.	Switch should provide different privilege for login in to the system for monitoring and management	Should have Open APIs to manage the switch through remote-procedure calls (JavaScript Object Notation [JSON] or XML) over HTTPS after secure authentication for management and automation purpose.	
83.		The Switch Should support monitor events and take corrective action like a script when the monitored events occur.	
84.		• Flow path trace (ingress to egress switch)	
85.		• Per Flow Hop by Hop packet drop with reason of drop	
86.		• Per Flow latency (per switch and end to end)	
87.	Availability	Switch should have provisioning for connecting to 1:1/N+1 power supply for usage and redundancy	
88.		Switch should provide gateway level of redundancy Ip V.4 and IP V.6 using HSRP/VRRP	
89.		Switch should support for BFD For Fast Failure Detection as per RFC 5880	
90.	Miscellaneous Points	Power cable (As per C13-C14 Connectors, 2 Meter Length) as per customer requirement to be provided. All Cables shall be factory-terminated	
91.		All Functionalities of Switch shall be IPv6 compliant and it should work on IPv6 Platform without any additional hardware/ software	
92.		All the components should be from same OEM	
93.	Warranty	Minimum 3 (Three) years warranty for OEM,	

Sl. No.	Feature List	Feature Description	Bidder Response
		Manufacturer's warranty part number should be mentioned. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support	

25. **Distribution Switch – Qty. 28**

Sl. No.	Feature List	Feature Description	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC for quality assurance	
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Country of Origin	To be mentioned by the bidder	
5.	Environmental	Maintain International Quality Environmental Safety standard	
6.	Enclosure Type	Rack-mountable	
7.	Reputation	Proposed solution must be international reputed Brand.	
8.	Part No	Bidder should submit BOQ of proposed device including the details' part numbers. Bidder should submit the required performance document for the proposed device.	
9.	General Features	The switch should have minimum 24 x 1/10/25G Ethernet and 4 x 40/100GE uplink ports with 20 x 10 GE short range optical transceiver & 4 x 40G short range optical transceiver modules with each devices from Day 1. All the modules are OEM original and same as "Switch" brand	
10.		Switch should have stacking feature	
11.		Should have minimum 16GB DRAM & 16GB Flash	
12.		Switch should have redundant power supply from day 1.	
13.	Performance	Minimum Switching capacity min 2 Tbs	
14.		Minimum Forwarding Throughput min 1Tbs	
15.	Layer-2 Features	Layer 2 switch ports and VLAN trunks	
16.		IEEE 802.1Q VLAN encapsulation	
17.		Support for up to 4000 VLANs ID	
18.		Minimum 82,000 MAC Address	
19.		Support minimum 9216 bytes Jumbo frame	
20.		Switch should have Layer 2, Routed Access (RIP, OSPF) PBR, PIM Stub Multicast (1000 routes), PVLAN, VRRP, PBR, QoS, FHS, 802.1X, MACsec-256 bit, CoPP, SXP, IP SLA Responder from day 1.	
21.		Must have 16 MB of shared buffer for traffic/packet Queuing and processing	
22.	Layer-3 Feature	The Switch should support routing protocols such OSPF, BSR, IS-ISv4, LISP, VXLAN, VRF.	
23.		Support Routing protocols IS-IS, IP SLA, OSPFv3	

Sl. No.	Feature List	Feature Description	Bidder Response
24.		Minimum Up to 255,000 IPv4 route and IPv6 route	
25.		Support minimum 4000 L3 VLAN Interfaces or Switched Virtual Interfaces	
26.		The Switch should support IP Multicast and PIM, PIM Sparse Mode & Source-Specific Multicast for Wired and Wireless Clients.	
27.		The Switch should support basic IP Unicast routing protocols (static, RIPv1 & RIPv2).	
28.		The Switch should support IPv6 & IPv4 Policy Based Routing (PBR)	
29.		Minimum 64,000 flow entries for security and traffic visibility.	
30.		Support Internet Group Management Protocol (IGMP), PIM Stub etc.	
31.		Switch should support 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port.	
32.	Security features	Support 802.1X, Flexible Authentication, 802.1x Monitor Mode, and RADIUS Change of Authorization.	
33.		Support minimum 1600 ACL entries. Access switch must support power redundancy across all models, either internally or via external RPS.	
34.		Support L2 IEEE 802.1AE -256-bit security from day 1. Switch shall support MACSec on access and uplink ports.	
35.		Support Port Security, Dynamic ARP Inspection, and IP Source Guard	
36.		Switch Should support Policy-based Automation & Assurance for Wired & Wireless features.	
37.		Support OS, Firmware/BIOS & patch authenticity as encrypted images to protect from unauthorized and modified/cracked images.	
38.		Support OS validation during booting to protect from threats.	
39.	Management features	Support SNMP, syslog, NetFlow or SFlow, Data telemetry collection and correlation for performance monitoring.	
40.		Switch should support API Driven configuration and support Netconf and Restconf using YANG data model. It should support automation tool like python	
41.		Switch should support Patch Management feature.	
42.		Switch should support port mirroring based on Inbound & outbound, mirroring based on ports, vlans, RSPAN, ERSPAN	
43.		The switch must have at least 335,000 hours Mean Time Between Failure (MTBF) for hardware	

Sl. No.	Feature List	Feature Description	Bidder Response
		reliability.	
44.	Compliance & Reference	Bidder must provide the detail compliance report with reference. The reference URL / information of RFP technical specification compliance should be publicly available and accessible document.	
45.	Warranty	Minimum 3 (Three) years warranty for OEM, Manufacturer's warranty part number should be mentioned. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support	

26. **Access Switch**

a. Type 1 :Qty – 5

Sl. No.	Feature List	Feature Description	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC for quality assurance	
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Country of origin	To be mentioned by the bidder	
5.	Reputation	Proposed solution must be international reputed Brand.	
6.	Environmental	Maintain International Quality Environmental Safety standard	
7.	Form factor	Rack Mountable with Rack Mounting Kit	
8.	Part No	Bidder should submit BOQ of proposed device including the details' part numbers. Bidder should submit the required performance document for the proposed device.	
9.	Architecture	The Switch should have 48 x 10/100/1000 POE+ (740W) ports and 4 x 1G/10G SFP slots.	
10.		The switch should support at least 170 Gbps switching capacity and 129 Mpps forwarding rate	
11.		Switch should have 2GB RAM and 4 GB Flash.	
12.		The switch should support 16K MAC Addresses and 4000 VLAN IDs.	
13.		Switch should have slot/ports (excluding uplinks ports) for minimum 80 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack	
14.		Switch must comes with hardware stacking capabilites from Day 1	
15.		The Switch stack should be based on Distributed forwarding Architecture, where in each stack member forwards its own information on network.	
16.		Switch should be able to support 3000 IPV4 & 1500 IPV6 routing entries from Day 1	
17.		Switch should support minimum 500 Switched	

Sl. No.	Feature List	Feature Description	Bidder Response
		Virtual Interfaces.	
18.		The switch should support Jumbo frames of 9198 bytes	
19.		The Switch must have dual redundant power supply from Day 1	
20.	General Features	Proposed switch should be enterprise grade switch with x86 based CPU architecture	
21.		The Switch should support Layer 2 features, Routed Access (RIP, OSPF), Policy Based Routing, PIM Stub Multicast, Private VLAN, VRRP, QoS, FHS, 802.1X, MACsec-128, CoPP, SXP, IP SLA Responder from Day 1	
22.		The Switch should support IS-IS, BSR, MSDP, IP SLA, OSPF, VRF, VXLAN, LISP	
23.		The proposed switch should be software defined networking capable and be able to at least integrate easily with the SDN controller from the same OEM.	
24.		Switch shall support application visibility and traffic monitoring with minimum 16K netFlow/sflow/jflow entries.	
25.		Switched should support both front and back beacon LEDs for easy identification of the switch being accessed.	
26.		Switches should have hardware support to connect a Bluetooth dongle to your switch, enabling you to use this wireless interface as an IP management port interface.	
27.	High availability & Resiliency	Switch should support redundant field replaceable power supplies	
28.		Switch should support redundant field replaceable fans	
29.		Switch should support cross-stack EtherChannel.	
30.	L2 Features	The switch should support Automatic Negotiation of Trucking Protocol, to help minimize the configuration & errors	
31.		The switch should support IEEE 802.1Q VLAN encapsulation	
32.		The switch should support Spanning-tree PortFast and PortFast guard for fast convergence	
33.		The switch should support UplinkFast&BackboneFast technologies to help ensure quick failover recovery, enhancing overall network stability and reliability	
34.		The switch should support Spanning-tree root guard to prevent other edge switches becoming the root bridge.	
35.		The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN	
36.		The switch should support Auto-negotiation on all ports to automatically selects half- or full-duplex	

Sl. No.	Feature List	Feature Description	Bidder Response
		transmission mode to optimize bandwidth	
37.		The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.	
38.		The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.	
39.		The switch should support IGMP v1, v2 Snooping	
40.		Switch should support IPv4 and IPv6The Switch should be able to discover (on both IPv4 & IPv6 Network) the neighboring device giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.	
41.	Network security features	The switch should support IEEE 802.1x providing user authentication, authorization and CoA	
42.		The switch should support SSHv2 and SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions	
43.		The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration	
44.		The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network	
45.		The switch should support MACSec-128 bit from Day 1	
46.	Management features	Support SNMP, syslog, NetFlow or SFlow, Data telemetry collection and correlation for performance monitoring	
47.		Support sampled NetFlow/SFlow, Switched Port Analyzer, Remote SPAN, shared NetFlow/SFlow policy, RSPAN and packet capture tool like Wireshark for troubleshooting and network visibility	
48.		Support Network automation with Open PnP, Containers, Python scripting, NETCONF, RESTCONF using YANG	
49.	QoS	Switch should support 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port	
50.	Warranty	Minimum 3 (Three) years warranty for OEM, Manufacturer's warranty part number should be mentioned. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support	

b. **Type 2: Qty – 175**

Sl. No.	Feature List	Feature Description	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Country of Origin	To be mentioned by the bidder	
5.	Reputation	Proposed solution must be international reputed Brand.	
6.	Environmental	Maintain International Quality Environmental Safety standard	
7.	Form factor	Rack Mountable with Rack Mounting Kit	
8.	Part No	Bidder should submit BOQ of proposed device including the details' part numbers. Bidder should submit the required performance document for the proposed device.	
9.	Architecture	The Switch should have 24 x 10/100/1000 Base-T POE+ (370W) from day 1 & 740w scalable with secondary power suppy and 4 x 1G/10G SFP slots.	
10.		The switch should support at least 125 Gbps switching capacity and 92 Mpps forwarding rate	
11.		Switch should have 2GB RAM and 4 GB Flash.	
12.		The switch should support 16K MAC Addresses and 4000 VLAN IDs.	
13.		Switch should have slot/ports (excluding uplinks ports) for minimum 80 Gbps of stacking bandwidth with dedicated stacking ports and cables with minimum 8 switch in stack	
14.		Switch must comes with hardware stacking capabilites from Day 1	
15.		The Switch stack should be based on Distributed forwarding Architecture, where in each stack member forwards its own information on network.	
16.		Switch should be able to support 3000 IPV4 & 1500 IPV6 routing entries from Day 1	
17.		Switch should support minimum 500 Switched Virtual Interfaces.	
18.		The switch should support Jumbo frames of 9198 bytes	
19.		The Switch must have dual redundant power supply from Day 1	
20.	General Features	Proposed switch should be enterprise grade switch with x86 based CPU architecture	
21.		The Switch should support Layer 2 features, Routed Access (RIP, OSPF), Policy Based Routing, PIM Stub Multicast, Private VLAN, VRRP, QoS, FHS, 802.1X, MACsec-128, CoPP, SXP, IP SLA Responder from Day 1	
22.		The Switch should support IS-IS, BSR, MSDP, IP	

Sl. No.	Feature List	Feature Description	Bidder Response
		SLA, OSPF, VRF, VXLAN, LISP	
23.		The proposed switch should be software defined networking capable and be able to at least integrate easily with the SDN controller from the same OEM.	
24.		Switch shall support application visibility and traffic monitoring with minimum 16K net Flow/sflow/jflow entries.	
25.		Switched should support both front and back beacon LEDs for easy identification of the switch being accessed.	
26.		Switches should have hardware support to connect a Bluetooth dongle to your switch, enabling you to use this wireless interface as an IP management port interface.	
27.	High availability & Resiliency	Switch should support redundant field replaceable power supplies	
28.		Switch should support redundant field replaceable fans	
29.		Switch should support cross-stack Ether Channel.	
30.	L2 Features	The switch should support Automatic Negotiation of Trucking Protocol, to help minimize the configuration & errors	
31.		The switch should support IEEE 802.1Q VLAN encapsulation	
32.		The switch should support Spanning-tree Port Fast and Port Fast guard for fast convergence	
33.		The switch should support Uplink Fast Backbone Fast technologies to help ensure quick failover recovery, enhancing overall network stability and reliability	
34.		The switch should support Spanning-tree root guard to prevent other edge switches becoming the root bridge.	
35.		The switch should support Voice VLAN to simplify IP telephony installations by keeping voice traffic on a separate VLAN	
36.		The switch should support Auto-negotiation on all ports to automatically selects half- or full-duplex transmission mode to optimize bandwidth	
37.		The switch should support Automatic media-dependent interface crossover (MDIX) to automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.	
38.		The switch should support Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD to allow for unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.	
39.		The switch should support IGMP v1, v2 Snooping	
40.		Switch should support IPv4 and IPv6The Switch	

Sl. No.	Feature List	Feature Description	Bidder Response
		should be able to discover (on both IPv4 & IPv6 Network) the neighboring device giving the details about the platform, IP Address, Link connected through etc, thus helping in troubleshooting connectivity problems.	
41.	Network security features	The switch should support IEEE 802.1x providing user authentication, authorization and CoA	
42.		The switch should support SSHv2 and SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions	
43.		The switch should support TACACS+ and RADIUS authentication enable centralized control of the switch and restrict unauthorized users from altering the configuration	
44.		The switch should support MAC address notification to allow administrators to be notified of users added to or removed from the network	
45.		The switch should support MACSec-128 bit from Day 1	
46.	Management features	Support SNMP, syslog, NetFlow or SFlow, Data telemetry collection and correlation for performance monitoring	
47.		Support sampled NetFlow/SFlow, Switched Port Analyzer, Remote SPAN, shared NetFlow/SFlow policy, RSPAN and packet capture tool like Wireshark for troubleshooting and network visibility	
48.		Support Network automation with Open PnP, Containers, Python scripting, NETCONF, RESTCONF using YANG	
49.	QoS	Switch should support 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port	
50.	Warranty	Minimum 3 (Three) years warranty for OEM, Manufacturer's warranty part number should be mentioned. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support	

c. **Type 3: Qty – 50**

Sl. No.	Item Description	Required Specifications	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Environmental	Maintain International Quality Environmental Safety	

Sl. No.	Item Description	Required Specifications	Bidder Response
		standard	
5.	Form factor	Rack Mountable with Rack Mounting Kit	
6.	Reputation	Proposed solution must be international reputed Brand.	
7.	Architecture	Should have minimum of 8x 10/100/1000 30W PoE+ ports with 120W power budget & 2x Gigabit copper/SFP combo ports.	
8.		Switch should have 120W PoE budget from day 1	
9.		Must have minimum 1G DRAM & 1GB Flash	
10.	Switching Performance	Minimum Switching capacity 20 Gbps full duplex or more	
11.		Minimum Forwarding Throughput 14 Mpps or more	
12.	Switch Layer 2 Services	Layer 2 switch ports and VLAN trunks	
13.		IEEE 802.1Q VLAN encapsulation	
14.		Support for up to 4000 VLANs ID	
15.		Minimum 16,000 MAC Address	
16.		Support minimum 9000 bytes Jumbo ethernet frame	
17.		Support STP, RSTP, EtherChannel/LACP, VLAN Trunking, Q-in-Q/IEEE VLAN Tunneling	
18.	Security features	Support 802.1X, Router Advertisement guard, IPv6 snooping, IPv6 ND inspection, IPv6 device tracking	
19.		Support OS, Firmware/BIOS & patch authenticity as encrypted images to protect from unauthorized and modified/cracked images.	
20.	Management features	Support SNMP, syslog, NetFlow or SFlow, Data telemetry collection and correlation for performance monitoring.	
21.		Support sampled NetFlow/SFlow, Switched Port Analyzer, Remote SPAN, shared NetFlow/SFlow policy, RSPAN and packet capture tool like Wireshark for troubleshooting and network visibility.	
22.		The switch must have at least 2,865,360 hours Mean Time Between Failure (MTBF) for hardware reliability.	
23.	Manufacturer's part number	Bidder should submit BOQ of proposed device including the details part numbers and Manufacturer Warranty.	
24.	Warranty	Manufacturer's warranty part number should be mentioned, minimum 3 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided. The OEM should have local office & Depo in Bangladesh and 24x7x365 Global TAC support.	

27. **Transceiver**

a. Type 1

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name	Same as switch OEM	

2.	Brand	To be mentioned by the Bidder	
3.	Model	Same as Distribution access switch's OEM	
4.	Country of Origin	To be mentioned by the bidder	
5.	Quantity	400 in no.	
6.	Features	10Gbps SFP+ Optical Transceiver reach of 10 KM with SMF fiber and compliance with SFF-8472	
7.		Connector: Duplex LC	
8.		Transmitter wavelengths from 1260 nm to 1355 nm and Receive lane wavelengths from 1260 nm to 1355 nm	
9.		Support Digital Diagnostic Monitoring	
10.		Support Digital Optical Monitoring	
11.		Transmitter output power, each lane minimun -8.2 dBM to -0.5 dBM	
12.		Receiver input power, each lane minmum -14.4 dBM to -0.5dBM	
13.		Operating temperature Standard : 0 to +70°C	
14.		Storage temperature : -40 to +85°C	

b. <u>Type 2</u>

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be mentioned by the Bidder	
2.	Model	To be mentioned by the bidder	
3.	Country of Origin	To be mentioned by the bidder	
4.	Quantity	20 in no.	
5.	Country of Manufacture	To be mentioned by the bidder	
6.	Features	10Gbps SFP+ Optical Transceiver. 300m Reach	
7.		Connector: Duplex LC	
8.		Dual data-rate of 10Gbps operation 850nm FP laser and PIN photo detector for 300M transmission	
9.		Support Digital Diagnostic Monitoring	
10.		Support Digital Optical Monitoring	
11.		Transmitter output power, each lane minimun -7.3 dBM to -1 dBM	
12.		Receiver input power, each lane minmum -9.9 dBM to -1 dBM	
13.		Operating temperature Standard : 0 to +70°C	
14.		Storage temperature : -40 to +85°C	

28. **<u>Centralized Management System</u>**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Quality	ISO 9001/9002 for manufacturer, FCC Class A/B for quality assurance	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
2.	Brand	To be mentioned by the bidder	
3.	Model	To be mentioned by the bidder	
4.	Quantity	1 Lot	
5.	Country of Origin	To be mentioned by the bidder	
6.	Enclosure Type	Rack-mountable fixed chassis	
7.	General Specification	The solution could be in form of virtual machine or appliance. Bidder should supply specification of server and VM. In case of appliance Bidder should submit hardware specification with maximum scale.	
8.		Centralized management Solution must support redundancy to provide high availability	
9.		The solution should be capable of managing active networking devices including router, switch and firewall. Quantity is mentioned in the "List of Active Networking Devices".	
10.	Network Infrastructure Automation	Uses multilayered network abstractions, operator-centric automation schemes, and the simplicity of a point-and-click user interface to help network operators in enterprise organizations scale their operations, reduce operational complexity, and enable new applications and services to be brought to market quickly	
11.		Centralized management Solution must provide features like zero touch provisioning (ZTP), operations and event scripts, automatic rollback, and Python scripting	
12.		Centralized management Solution provide dynamic device inventory of the Fabric as well as current network topology.	
13.		The solution should fully automate the provisioning, configuration, and deployment of complex network topologies.	
14.		The solution should automatically provision all port-related parameters including VLAN, 802.1x, and security policies to comply with port profiles.	
15.		The solution should simplify the deployment of networks without requiring user intervention, providing policy-driven plug-and-play provisioning and network bring-up operations for both fabrics and individual devices.	
16.		The solution should have automated policy-driven Flow collector and flow analysis which quickly identifies and isolates users, applications and protocols consuming the most bandwidth.	
17.	Functionality for Operation and Management	Provides a wizard-based interface for near real-time device discovery to enable operators to quickly bring network devices under management	
18.		Enables visualization storage and management	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		of hardware inventory, including chassis-related information such as serial numbers, software version, location, and physical subcomponent information such as slots, cards, and ports for all managed devices. Included is automated synchronization between hardware inventory, interface information, and configuration of the device	
19.		Provides centralized, network-wide deployment of software images and patches to enable customers to efficiently manage the deployment of Networks software. Includes the ability to import software images from local or networked file system, flexibly schedule software deployments, stage or deploy software image to one or multiple devices in a single workflow, image verification for accuracy, and use of golden image.	
20.		Enables creation of cookie-cutter, model-based configuration templates to help optimize and scale device configurations. Includes schema-driven GUI for fully customizable configurations, and an audit trail to track configuration changes. CLI-based template options are also available.	
21.		Enables simplified configuration management that includes import, edit compare, and backup/restore for individual devices or device groups. Provides instant visibility into network configuration and performance correlation, automated configuration deployment scheduling, validation to minimize syntax errors, and entry forms for easy creation of template definitions and bulk modification of configurations.	
22.		Using a schema-driven GUI, operators can view and edit all attributes of a device's configuration, including being able to work with portions of the configuration.	
23.		Includes cross-vendor enterprise-grade event and performance management for insight and visibility across all network devices.	
24.	Security Surveillance Features	Should provide long term collection, archival, search, and reporting of event logs, flow logs, and application data that enables logging taxonomy from a centralized view.	
25.		Should provide users not only the convenience of canned reports but also the flexibility to create and customize their own reports according to their business needs.	
26.		Should enable organizations to archive event and flow logs for whatever time period is specified by a specific regulation.	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
27.		Should enable full audit of all original events and flow content without modification.	
28.		Should protect event and flow logs are protected by SHA-x (1- 256) hashing for tamper proof log archives and support extensive log file integrity checks including National Institute of Standards and Technology (NIST) log management standards.	
29.		Should visualize current and potential network traffic patterns with a network topology model, based on security device configurations.	
30.		Should have a vulnerability dashboard that provides a single, integrated view into multiple vulnerability assessment feeds and threat intelligence sources, allowing security teams to quickly identify exposures that pose the greatest risks.	
31.		Should be able to quantify and prioritize risks with a policy engine that correlates network topology, asset vulnerabilities, and actual network traffic, enabling risk-based remediation and facilitating compliance.	
32.		Should provide compliance-focused regulation workflow • Payment Card Industry Data Security Standard (PCI DSS) • Health Insurance Portability and Accountability Act (HIPAA) • Sarbanes-Oxley Act (SOX) • Graham-Leach-Bliley Act (GLBA) • Federal Information Security Management • Act (FISMA)	
33.	Security Management Features	Should display where threats are originating in near real time via a global map and allow you to take action to stop them.	
34.		Should provide an easy and intuitive way to see which applications use the most bandwidth, have the most sessions, or are most at risk.	
35.		Should feature which users are accessing non-productive applications and by how much and top talkers should be displayed in an easy-to-understand manner.	
36.		Should allow administrators to maintain an efficient firewall rule base by easily identifying ineffective and unnecessary rules.	
37.		Should show hit counts for each firewall via meters, as well as filters that display which rules are hit the least.	
38.		Should be able to enforce security policies at firewalls and access switches, aggregating threat feeds from various sources and on-premises	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		custom threat intelligence solutions with white and black list support.	
39.		Should have the ability to manage all phases of security policy life cycles, including create, deploy, monitor, remediate, and maintain.	
40.		Should allow firewall, IPS, and NAT rules to be reordered by simply dragging them to a new location.	
41.		Should allow devices, policies, and objects to be placed within domains and assigns read/write permissions to a user.	
42.		Should enable integrated logging and reporting.	
43.	Policy Management	The Security Management solution should support a Policy Engine which should natively integrate with Threat Prevention System, orchestrating security workflows to protect both perimeter-oriented traffic as well as lateral threat propagation within the network.	
44.		It should support custom feeds option, allowing users to leverage solutions other than OEM ATP as their trusted threat feed source.	
45.		It should provide security operators with the granular control required to take automated remediation actions depending upon the severity of the threat.	
46.		The Policy Engine should keep track of infected host movement and enforce consistent security both pre- and post-mobility, delivering a coherent system that makes it difficult to circumvent security policies	
47.		The policy action should include perimeter firewall related actions like deny or log traffic, network switch-related actions like quarantine of infected hosts, router-related actions like updates to BGP FlowSpec, SDN-related actions like dynamic security service chaining, or public cloud-related actions like updates to security groups.	
48.		The Policy Engine should integrate with Third party SDN controller i.e. VMware NSX, Contrail, Tungsten Fabric etc. for micro segmentation use cases.	
49.		The Policy Engine should integrate with AWS for workload discovery, allowing enterprises to configure a dynamic workload metadata-based policy.	
50.	Log Collector	The solution should enables log collection across multiple networking devices i.e router, switch, firewall etc. provided by the bidder and enables log visualization from Day 1.	
51.		The log collection should be consider for 5 years	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		of retention period.	
52.		The solution should be capable of handling 500 EPS from Day 1.	
53.	Integration	Centralized management Solution must expose RESTful API, allowing cloud management platforms such as OpenStack and CloudStack to automate the delivery of network services.	
54.		Centralized management Solution must support TACACS+, RADIUS, LDAP or Local Authentication. It must also provide an integration with the Syslog servers.	
55.	Compliance & Reference	Bidder must provide the detail compliance report with reference. The reference URL / information of RFP technical specification compliance should be publicly available and accessible document.	
56.	Manufacturer's part number	Bidder should submit BOQ of proposed device including the details part numbers and Manufacturer Warranty.	
57.		Bidder should submit the required performance document for the proposed device. If the additional accessories are essential, Bidder will provide by this additional accessory according to the proposed model.	
58.	Manufacturer authorization	Bidder must submit Manufacturer Authorization from the OEM.	
59.	Warranty	The OEM should have local Depo in Bangladesh and 24x7x365 Global TAC support	
60.		Manufacturer's warranty part number should be mentioned, minimum 3 (Three) years warranty for OEM technical solution support, Patch & New Software Upgrade, RMA replacement should be provided for this unit from the date of commissioning.	

29. **Centralized Management Server**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
Server			
1.	Brand	To be mentioned by the bidder	
2.	Model	To be mentioned by the bidder	
3.	Country of Origin	To be mentioned by the bidder	
4.	Country of Manufacturing	To be mentioned by the bidder	
5.	Qualification criteria	ISO 9001:2015 or higher for manufacturers, FCC Class A/B or Energy Star for quality assurance Bidder must submit appropriate documents for the certifications.	
6.	Quantity	01 in no	
7.	Processors	Rack Server shall have a minimum of two (2) Intel Scalable Platform - Intel Xeon Gold	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		54165S 2G, 16C/32T processor or better in terms of core count and clock speed and L3 cache	
8.	Chipset	Intel chipset compatible with the offered processors.	
9.	Internal Storage	The server must Support at least 8 hot-swappable 12Gbps SAS and SSD drives.	
		Server should be configured with minimum 4 x 2.4TB Hard Drive	
		The Server RAID controller should support the following configurations RAID 0, 1, 5, 10, 50 and 60	
		Server should be configured minimum with 8GB of cache module.	
10.	Memory	The Server should be configured with 4x64GB of DDR4/5 Memory (maximum 256GB module) from day one	
11.	Network	Should have 2 x 1GbE Base-T & 2 x 10GbE LAN ports.	
		All necessary transceivers and connective cables must be delivered from same OEM.	
12.	PCIe Slots	Must have at least 4 x PCIe slots	
13.	Form Factor	2 RU	
14.	Management & monitoring	Should support out of band upgrades, Agentless out-of-band management, integrated diagnostics and Power monitoring and reporting.	
		The server should support industry standard management protocols like IPMI v2 and SNMP v3	
		One 1-Gbps RJ-45 management port	
		HTML 5 based management GUI	
		The server should support multiple management interfaces including web user interface and command line interface.	
		Automatic Configuration of management port, using a central repository for the configurations and XML files to configure the server	
		Automatic updates of all firmware, using a central repository to handle the upgrade	
		At the server management with Android or iOS devices where admins can configure, monitor, and troubleshoot	
		Server must have cloud-based application that leverages machine learning to proactively monitor and measure the overall health of the system through intelligent, comprehensive, and predictive analytics.	
15.	Security	Following security features must be available with the servers	
		Should have the ability to securely erase data	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		from local storage (HDDs, SSDs, NVMs) and embedded flash devices.	
		Should prevent unauthorized or malicious change with Server Lockdown	
		Maintain data safety with cryptographically signed firmware packages and Secure Boot	
16.	Ports	Must have at least following ports for various connectivity	
		Front ports: 1 x Dedicated management port, 1 x USB 2.0, 1 x VGA	
		Rear ports: 1 x USB 2.0, 1 x USB 3.0, 2 x RJ-45	
17.	Others	Should have at least 5 fans with N+1 redundancy	
		Supports hot swappable energy efficient redundant power supply	
		Rail Kit and cable management arm to be provided along with the server	
18.	Operating Systems Support	Canonical Ubuntu	
		Citrix XenServer	
		Microsoft Windows Server with Hyper-V	
		Red Hat Enterprise Linux	
		SUSE Linux Enterprise Server	
		VMware ESXi	
19.	Warranty & Support	3 yrs Technical Support & Assistance	
		OEM/ Distributor must have in country product depot/warehouse for faster replacement and local office for any escalation, bidder must have to provide depot and office address details in a letter from OEM/ Distributor.	
		Customer must have access for support and toll-free contact number to contact OEM directly for any support/trouble shooting	

30. **IP-PABX**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be mentioned by bidder	
2.	Model	To be mentioned by bidder	
3.	Country of Origin	To be mentioned by bidder	
4.	Quantity	01 in no with active standby	
5.	Enclosure Type	Rack-mountable	
6.	Server System	Redundant Industry Standard Server based on IP at core with hot standby configuration. From day one the system should support minimum 8000 extensions in network mode and expandable up to 15000 extensions. At any point of failure of any node the system should support min 8000 extension from day one.	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		Redundant power supply must be available for each node to connect different power source.	
7.	System Architecture	The telephony system should be designed with IP at the core Server & Gateway type communications system, allowing fully distributed IP solutions across data networks. The system will be call servers based and it should support traditional TDM or mixed IP-TDM or full 100% IP configurations, telephony, gateway, end points & all telephony application should be from same OEM & PRI card should not be installed in any PC / Server It should support the following devices :-	
8.		(i) IP Communication Devices e.g. IP Phones, Video Phones, Multimedia PCs, SIP phones, Soft phones or H.323 terminal devices etc.	
9.		(ii) Legacy TDM communication devices (Digital and analog 2 Wire telephone instruments with Caller-ID	
10.		The call control servers should be fully redundant solution. The solution must provide geographical redundancy by separating the servers over LAN/WAN. I.e. if the server in the main data center fails, the other server, which is installed at geographically different location over LAN/WAN should take over the entire communication network load automatically without any manual intervention.	
11.		Call control server / appliance should be Intel based hardware with necessary configuration to support the desired expandability. The offer system must consist of two separate servers deployed in redundant mode. The call servers, Phone set, IP Gateway/Media Gateway should be of the same OEM make and must be rack mountable. This is required so that there is uniform support available for the entire solution including Call Servers, Media Gateways/IP Gateway/Phone Set etc.	
12.		The system should be capable of supporting analog and IP Telephones. Necessary licenses for the asked users should be enabled from day-1. However, the IP EPABX system should have the capability to scale up to 15000 users to achieve the future capacity on the same hardware that is supplied as part of this RFP.	
13.		The system should manage CAC (Call Admission Control) mechanisms to optimize the usage of the bandwidth in the WAN for multi-	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		site configurations.	
14.		The system should be capable of supporting a very high traffic and should support a Busy Hour Completion (BHCC) of 2, 50,000 per hour.	
15.		The IP PBX should be day one ready with full telephony Feature/Functionality, all necessary hardware should be provisioned from day one for this. Full SIP (able to connect 3rd Party SIP Phone & SIP Trunk (Public & Private) capability. The main functions of SIP capability should provide SIP networking (Public & private) and support SIP endpoints in a converged communications network.	
16.		All the users to be managed in a single database, which is managed centrally, no multiple databases & bundling of Telephony system will not consider to meet Specification & scalability.	
17.		The voice network architecture and call control functionality should support both SIP & H.323.	
18.		The system should be based on server gateway architecture with external server running on Linux OS.	
19.		The system should be able to operate with SIP compliant device and it should be able to support internal gatekeeper for the same.	
20.		The SIP proxy, SIP registrar should be inbuilt in the system and should support open SIP stack compliant hard phones or soft phones also.	
21.		The offered system should be equipped with redundant media gateways that can be placed in different geographic locations to offer availability of minimum 50% of trunk circuits. Media Gateway Must have Redundant power supply to connect redundant power source simultenously.	
22.		The system should support for voice encoding using following standards:-	
23.		(i) G.711, G.722, G.729 (G, B, A/G)	
24.		(ii) G. iLBC, iSAC, Opus	
25.		(iii) H.264 (SVC, AVC), H.265 (HEVC)	
26.		(iii) XH.264UC (Lync)	
27.		Call Switching. Internal calls : Based on the G.711 uncompressed PCM standard.	
28.		The System should support Network Time Protocol V4.1.2 (RFC 1305) to synchronize the system date/time of network devices.	
29.		IP EPABX should Support built-in ACD to achieve future requirement.	
30.		The offer system should be provided with at least 30 built in DSP resources without adding	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		any additional modules.	
31.		VoIP Support. System should support VoIP solutions as an integral part of the system.	
32.		(i) The system should be fully compliant to VoIP standards like H.323 (or equivalent) and SIP (Session Initiation Protocol). Vendor to give clear compliance for the requested standards.	
33.		(ii) The system should be able to operate with any H.323 (or equivalent) /SIP compliant device and it should be able to support internal gatekeeper for the same.	
34.		(iii) The SIP proxy, SIP registrar should be inbuilt in the system and should support any open SIP stack compliant hard phones or soft phones.	
35.		(iv) System should support the QOS features for the VOIP implementation. It should be compliant with both QOS standards (Layer 2 – 802.1 p/q) and Layer 3- Diffserv/ TOS).	
36.		The proposed system should Support Automatic Route Selection (ARS) and Least Cost Routing (LCR) features to route the calls based on priorities related to user profile and network availability, along the most cost-effective path. This service should be transparent for users and irrespective of the physical carrier connection.	
37.		Should provide a cloud-based, enterprise-grade, Communication Platform thus delivering a collaborative business application extending features viz. Instant Messaging/Telephony Presence, click to call (dial by name, answer, release), Call Log, P2P Audio/Screen Sharing. The same should be included in BoQ for all extensions	
38.		The system must support an IP Soft phone application that allows the users to manage their calls from a PC or MAC/ iPhone/ iPAD/ Android. This user must have access to the full set of telephony services without any degradation. The voice should be manage by the multimedia resources of the PC.	
39.		Offered solution must support at least 200 remote media gateways	
40.	System Security	The System must support Syslog services for both internal and external command and configuration control accounting with a minimum of 30 day history.	
41.		The Call Server must be provided adequate	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		protection from possible virus, worm and Trojan infestation	
42.		The Call Server must be provided adequate protection from possible virus, worm and Trojan infestation points such as internal e-mail servers and they must be updated every month. In case customized hardened linux distributions are being provided this clause will not be applicable.	
43.		The password and access control must include at least :-	
44.		(i) Management console access to be provided by dual role based authentication (one of user rep and one of administrator rep).	
45.		(ii) Management console access must allow only access to level of viewing of running configuration and status of current configurations and sys logs.	
46.		(iii) For any configuration changes again a dual role based authentication system for write access fully integrated with the management console application for carrying out the authorized configuration changes must be provided.	
47.		(iv) Logs of all activities to include configuration change, housekeeping activities and any other action on the system grouped user wise and specifying the time of activity must be available for each day.	
48.		(v) Account access authentication/ restriction using external RADIUS/ LDAP	
49.		IP Phones must support 802.1 x (EAP-MD5, EAP-TLS and EAP-FAST or more better) for authentication and access control to the network, this mechanism must allow the user to be connected to the call server once he has passed the authentication process, not before.	
50.		The system should have the capability to, based on standard mechanism (such as 802.1Q and DHCP), assign automatically the corresponding voice VLAN number to the IP station clients during IP station initialization, allowing for the separation of voice and data traffic at IP station.	
51.		Support for Commercial grade encryption security with minimum 128 bit key security for both signaling and voice with in a node for all IP subscribers – IP subscriber communications.	
52.		Support for Commercial grade secrecy with	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		minimum 128 bit key encryption security for both signaling and voice for inter-node communication between same type of exchs over IP trunks in which all traffic between analog/digital/IP over the IP trunk must be encrypted for both signaling and data.	
53.		The system should incorporate IP tables software firewall for traffic filtering	
54.		All management traffic between a remote console/session and the call server must be secured. (SSHv2 for secure sessions, TLS1.2 for secure HTTP session, SFTP for file transfer, LDAPS for directory access)	
55.	System Management	The management platform or Admin Platform must be a web browser based interface to allow the administrator to manage the system from any PC with any standard browser based web interface over HTTPS.	
56.		The management platform must provide different levels for accessing the system based on the role being played by the user who is accessing the system. The administrator should have the highest authority	
57.		The management platform should provide the following tasks, as per the ask :-	
58.		(i) <u>Configuration and programming</u> (aa) Services, users, categories and all system parameter and features. (ab) Provide centralized management in local or remote environments of a single system or a network. (ac) The network manager will be able to quickly and easily edit, create or delete any subscriber profile/network object by the use of import/export functions and multiple operations.	
59.		(ii) <u>Faults and Alarms management</u> (aa) All the incidents and fail reports generated by the systemitself informing date, hour and severity. (ab) This module must be able to centralize the alarms and Events of the System and give colors according to the severity level of the alarm. (ac) Notify an alarm depending on the severity level sending an e-mail or activating a script performing a specific action. (ad) Register and generate statistics for the	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		alarms and events in the network on a daily basis.	
60.		(iii) Fault diagnosis Generate reports and graphics about the statistics of the alarms.	
61.		(iv) Directory module It shall be possible to provide display equipped voice terminals with access to system directory on digital and IP phones. Should also support exchange directory access via web browser. This must be LDAP compatible and the exchange directory should be supported for all users via web browser thus allowing click to call features to the users.	
62.		(v) Call Metering and Accounting The log of local to local call should be supported. The log of local to trunk call in both directions (incoming as well as outgoing) should be maintained in the exchange in the hard disk. Should support Malicious Call Trace.	
63.		(vi) Monitoring Module which allows the administrator to easily monitor the accounting thresholds of the users of cost centers in graphical interface and must allow to send an e-mail or an alarm in case of threshold crossing.	
64.	System Survivability	The system should offer maximum availability, with the switchover of call control processing functions to an alternate or redundant processor in the event of significant fault. The redundancy scheme should conform to the model used in most computer systems: the complete "mirroring" of the information (both static and dynamic data.) The switch over between 2 call servers in LAN (L2 network) or WAN location (L3 Network) should not interrupt existing and established communications to include all analog, digital, hard, soft and Video IP Phones. The complete set of programs and software modules must be duplicated in real time. In case of failure of the main Server (hardware or software), the standby Server (emergency mirror) must take over the control of communications instantaneously.	
65.		Centralized Licensing Structure - The offered platform should have centralized licensing structure where a user license (Analog, digital, IP) can be used anywhere in the telephone network like main site or the various geographically displaced site with RLU Media	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		gateway	
66.		Remote Media Gateway/Branch Gateway should support survival mechanism that allows them to maintain minimum number of the telephony services for their users, in case of failure in the WAN links where the signaling with the call server drops. In case of failure in IP connectivity with central EPABX system the remote unit should work for a minimum duration of 30 days. Once the IP connectivity between remote unit & central EPABX system is restored back, the remote unit shall work with central EPABX system.	
67.		The management platform must provide a backup mechanism for all critical system information in a both manual and an automatic/schedule archival and a Disaster Recovery Mechanism.	
68.		Replacement of cards All the peripheral cards (Extension card, Trunk Card, ISDN PRI Card, etc) should be Hot Swappable, i.e. It should be possible to replace any peripheral card even when the system is in the working state	
69.		All the tone generation and tone detection should be local to the gateway if WAN connection fail to Central PABX Server	
70.		The operating system of EPABX should be reliable and should be protected against loss / alteration of memory due to power failure / unauthorized command or due to any other faulty condition The system should support Auto Restore of data in case of Power Failure; No Manual intervention should be required and all Features and facilities should be working on Power Restore.	
71.		The call server should support the two or more different Geographically locations without any distance limit. Maximum 80-100ms latency should be acceptable for the two/multiple server clustering.	
72.		Life Cycle of entire exchange system being provided should be minimum Five years, 1 year warranty & 5 year AMC support	
73.		OEM should have Technical Assistance Center world wide with a Toll free number for calling from Bangladesh as free. Any time TAC team should be available to provide technical support by connecting remotely with online meeting and support.	
74.	Physical	Call Server Should support expansion up to 15000 subscribers without changing or adding	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		additional call server. Only License purchased should allow to use 15000 Subscriber by the same Cluster.	
75.		Environmental Conditions The equipment offered shall be capable of maintaining its guaranteed performance when operating continuously for 24 hours a day and 365 days a year under the following environmental conditions:- MTBF Document to be provided	
76.		(i) Operating temperature : 0 to 40 degree C	
77.		(ii) Storage -5 degree C to +45 degree C.	
78.		(iii) Humidity 20% to 80% without condensation	
79.	System Features	Numbering Scheme The IP PBX should be suitable for up to 12-digit extension numbering scheme. This numbering scheme should be flexible. System should also allow mixed numbering scheme.	
80.		The system should support the attribution of an external number DDI or individual line or a bundle head to a trunk, a bundle, an attendant, a group of attendants, a subscriber, a group of subscribers or virtual equipment. The unanswered DDI communication can overflow, to Attendant or attendant group, Local subscriber, Network subscriber, Voice mailbox.	
81.		The proposed system should support automatic route selection (ARS) and least cost routing (LCR) features to route the calls based on priorities related to user profile, tariff, and network availability, along the most cost-effective path. This service will be transparent for users and irrespective of the physical carrier connection.	
82.		Voice guidance Telephone features to be offered as standard.	
83.		DTMF and Busy Tone Resources As many busy tone detectors are to be offered as the number of trunks.	
84.	Basic Telephone Features	Abbreviated dialing, Appointment reminder, Automatic call-back on busy trunk/bundle/network link, Automatic DISA, user authentication, call forwarding unconditional on busy/no reply to extension, hunting group, Voice mail, operator etc.	
85.		Immediate forwarding Call pick-up. Call parking, Call waiting indication/ voice prompt.	
86.		Calling line identification restriction for internal calls, Camp on busy telephone/hunting group, Controlled private call by Pin code and password.	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
87.		Do not disturb, Dynamic call baring General night service Hunting group (fix head cyclic, longest idle time, parallel)	
88.		Internal/external music on hold internal/external inquiry call individual hold instrument locking to prevent the outgoing.	
89.		28 Party Meet-me Conferencing, Mastered conference allowing a group of up to 29 users to be connected with each other, or to perform announcement on loud speaker of prerecord or live message	
90.		Last internal/external number redial, Personal code modification, Store and redial external number, Transfer in conversation on free/busy telephone.	
91.		CLI coming in from ISDN PRI trunks should be displayed on Analog Telephones, Digital Telephones and IP Telephones.	
92.		External Holding Tone The offered system should be ready to accept music on hold from an external PC of CD player.	
93.		When all attended consoles are engaged, the external caller shall be informed of this situation by voice message. The call should be routed to the least loaded operator.	
94.		System should support Mobility of user. If any high official user travel to other branch should be able to login and get his extension and name on the same model of device without any configuration changes	
95.	System Network Support	Should Support Q SIG standards over IP/ TDM/ WAN trunks.	
96.		Heterogeneous, open numbering plan.	
97.		Calling/Connected Line Identification Presentation and Restriction.	
98.		Calling/Connected Name Identification Presentation and Restriction.	
99.		Call Forwarding Unconditional, Busy, No Reply Call Transfer.	
100.		Call Completion to Busy Subscriber, on No Reply, call Offer.	
101.		The system should have options to network over any of MPLS, IP, ISDN	
102.		The system must support the following external telephony interface signaling:-	
103.		E1 CCS PRI	
104.		E1 CAS (R2 MFC)	
105.		ISDN PRI (ETSI)	
106.		Analog Loop Start and Ground Start	
107.	Voice Mail Features	Voice Messaging system must be software	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		based and fully integrated to the call server and should not require external server to be hosted. Card based or 3rd party Voice Mail solution are not Acceptable/Disqualified	
108.		Voice Messaging system must be manageable from the system management platform	
109.		Answering or answering with date stamp - The system should provide voice mailbox holders with the choice of two functions: answering the messages or answering them with a date stamp	
110.		When a call is forwarded to the voice messaging system, the box holder will be able to chose between two personalized announcements. If the personal announcement has not been recorded, the standard system announcement will be substituted automatically.	
111.		Recording of calls conversation - The IP/Digital holder of a voice mailbox must be able to take advantage of this service to record internal or external calls. Recorded calls will receive the same service as messages that have been left by callers.	
112.		Forwarding of voice mail messages - The box holder will be able to send a copy of previously received messages to other boxes (with or without requesting acknowledgement of receipt).	
113.		Call by name - To provide universal access, it must be possible to select a voice mailbox by its name by using the telephone dialing keypad. The caller will be guided in this operation by voice prompts.	
114.		The notification of messages must be on: LED/icon on the phone, Voice Guide	
115.		The voice messaging systems must provide silence detection to avoid recording of blanks at beginning or end of recording	
116.		The System should allow distribution lists for message broadcast	
117.		Additionally, the voice mail system must provide the following features: Record of standard Greeting, Record of alternate greeting, Record Name, Urgent delivery option, Skip Greeting, Confirmation to send recorded message, Visual user interface with sensitive keys on large screen phones, Autoplay of unheard/new messages, Delete messages, Save messages, Reply messages	
118.	Analog Subscriber card.	Should have 04/08/16 or more ports	
119.		Each port should support CLIP features (FSK or DTMF)	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
120.	Warranty	Minimum 03(Three) years	

31. **IP Phone**

a. **Video IP Phone**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be mentioned by bidder	
2.	Model	To be mentioned by bidder	
3.	Country of Origin	To be mentioned by bidder	
4.	Quantity	30 in no.	
5.	General Specification	The phone should have 1024 × 600 high resolution with min 7-inch LED touch screen with coloured display.	
		The phone should support Power over Ethernet IEEE 802.3af class 1/2/3/4 and should also have AC power adapter option	
		The phone should have min 2 x 10/100/1000BASE-T Ethernet network, one for the LAN connection and the other for connecting to PC/laptop.	
		Ready access to missed, received or placed calls (plus intercom history and directories).	
		The phone should support QoS mechanism through 802.1p/q.	
		The phone should support Wi-Fi 802.11a/b/g/n/ac, 2.4 GHz/5 GHz dual bands.	
		The phone should provide user the flexibility while using the headset i.e. RJ-9, USB-C, USB-A, 3.5mm AUX	
		The phone should have atleast 2 multi-purpose USB ports that could be used for charging mobile phones, connecting USB headsets.	
		IP address Assignment by DHCP or statically configured	
		Hands-free operation with full-duplex speaker-phone	
		The phone should be a SIP based Phone i.e session Initiation protocol (SIP) supported	
		The phone should support XML based services and applications.	
		The phone should have a distinct LED indicator for message waiting.	
		Should have keys for specific functionalities such as – voicemail, directories, settings, transfer, speakerphone, mute on/off, headset etc	
		Media Encryption (SRTP)	
		Signalling Encryption (TLS)	
		802.1x support	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		Encryption of Configuration Files	
		The phone should have the ability to register to call control server over an internet link with or without VPN.	
		The phone should support IPv4 and IPv6 from day1.	
		The phone should support backlit indicators for the audio path keys (handset, headset, and speakerphone), Home key, and message waiting.	
		Should support following audio codec - G.711a, G.711u, G.729a, iSAC, Internet Low Bitrate Codec (iLBC), OPUS	
		The phone should also have a separate headset key	
		Should have a built-in auto-focus camera with 1080p30 resolution (encode & decode). The camera should have a shutter to open/close camera. Should support standards based video protocol H.264. The camera should have 70° horizontal field of view, 45° vertical field of view	
		Should support self-view video, picture in picture (pip) with adjustable positions of pip.	
		Should support Bluetooth (v4.2 LE) for hands free earphones	
		The phone should support call history i.e. missed, received, placed etc.	
		The handset should be hearing aid-compatible	
6.	Features	The phone should support the following features at a minimum: a. Call forward b. Call pickup c. Call waiting d. Call hold/resume e. Call park f. Conference g. Privacy h. Barge i. Speed Dial j. Do not Disturb k. Music on hold (MoH) l. SIP URI dialing m. URL Dialing n. Message waiting indicator o. Personal directory p. Favourates q. Call history lists	
7.	Power Supply	Phones should be provided with local power supply.	
8.	Warranty	Minimum 03 (Three) years	

b. **IP Phone (Executive)**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be mentioned by bidder	
2.	Model	To be mentioned by bidder	
3.	Country of Origin	To be mentioned by bidder	
4.	Quantity	120 in no.	
5.	General Features	The phone should support Power over Ethernet IEEE 802.3af class 1/2/3 and should also have AC power adapter option. Also phone whoudl be in white colour.	
		The phone should have 2 x 1GE ports, one for the LAN connection and the other for connecting to PC/laptop.	
		Corporate directory and Lightweight Directory Access Protocol (LDAP) integration.	
		Ready access to missed, received or placed calls (plus intercom history and directories).	
		The phone should support QoS mechanism through 802.1p/q.	
		The phone should have a multi-purpose USB port that could be used for charging mobile phones, connecting USB headsets.	
		IP address Assignment by DHCP or statically configured	
		Hands-free operation with full-duplex speaker-phone	
		The phone should be a SIP based Phone i.e session Initiation protocol (SIP) supported	
		The phone should support XML based services and applications.	
		The phone should have a distinct LED indicator for message waiting.	
		Should have keys for specific functionalities such as – voicemail, directories, settings, transfer, speakerphone, mute on/off, headset etc	
		Media Encryption (SRTP) using AES	
		Signalling Encryption (TLS) using AES	
		802.1x support	
		Encryption of Configuration Files	
		The phone should have the ability to register to call control server over an internet link with or without VPN.	
		The phone should support IPv4 and IPv6 from day one.	
		Should have min 5" screen with colour display with at least 4 programmable line keys	
		The phone should support backlit indicators for the audio path keys (handset, headset, and speakerphone), select key, line keys, and message waiting.	
		Should support following audio codec - G.711a, G.711u, G.729a, G.722, iSAC, Internet Low	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
		Bitrate Codec (iLBC)	
		The phone should have RJ9 headset port to connect any standards based headset. The phone should also have a separate headset key	
		Should support Bluetooth (v4.1 LE) for handsfree earphones	
		Should support Call history synchronization to view placed and missed calls of mobile device from the IP Phone	
		Should support Contact synchronization to synchronize the contacts from the mobile device to IP Phone	
		The phone should support mounting against a wall	
		The phone should support at least 100 entries for call history i.e. missed, received, placed etc.	
		The phone should support the ability to add expansion modules to increase the line capacity i.e. for use by Operators/Receptionists	
		Should support busy lamp indicator (BLF) to indicate the presence	
		Should support boss-secretary feature, so that secretary can answer calls on behalf of Manager	
		The handset should be hearing aid-compatible	
		The phone should be available in white colour	
6.	Calling Features	The phone should support the following features at a minimum: a. Call forward b. Call pickup c. Call waiting d. Calback e. Call park f. Conference g. Extension Mobility h. Auto answer i. Auto-detection of headset j. Immediate Divert k. Music on hold (MoH) l. SIP URI dialing m. URL Dialing n. Message waiting indicator (MWI) o. Personal directory p. Forced Authorization Code (Account/FAC) q. Call history lists	
7.	Power Supply	Phones should be provided with local power supply.	
8.	Expansion Module	Phone should support 28 one touch button expansion module	
9.	Warranty	Minimum 03 (Three) years	

c. **IP Phone (Basic)**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be mentioned by bidder	
2.	Model	To be mentioned by bidder	
3.	Country of Origin	To be mentioned by bidder	
4.	Quantity	3500 in no.	
5.	General Features	The phone should support atleast 1 line.	
		It should support the following codec G.711a/μ, G.729a	
		It should have graphical display with a minimum resolution of 128 x 32 pixels	
		The phone should support QoS mechanism through 802.1p/q.	
		Should have built-in high-quality full-duplex speakerphone	
		Should include audio controls for the full-duplex speakerphone and handset.	
		IP address Assignment by DHCP or statically configured	
		The Phone should support the ability to provide different ringtones for internal and external calls.	
		Should have volume control button for easy decibel-level adjustments for the speakerphone, handset and ringer.	
		The phone should support mounting against a wall	
		The phone should support IPv4 and IPv6 from day1.	
		The phone should support Power over Ethernet IEEE 802.3af class 1/2/3 and should also have AC power adapter option	
		The phone should be a SIP based Phone i.e session Initiation protocol (SIP) supported	
		The phone should provide basic 3-way conferencing	
		The phone should support atleast 50 entries for call history i.e. missed, received, placed etc.	
		Should have keys for specific functionalities such as – Redial, settings, transfer, speakerphone, mute on/off, hold/resume	
		Should have 4 MB flash memory and 30 MB or more SDRAM.	
6.	Warranty	Minimum 03 (Three) years	

32. **55” Crystal UHD 4K Smart TV**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be mentioned by bidder	
2.	Model	To be mentioned by bidder	
3.	Country of Origin	To be mentioned by bidder	
4.	Quantity	01 in no.	
5.	Brand	Internationally Reputed Brand (To be mentioned by the bidder)	
6.	Model	To be mentioned by the bidder	
7.	Country of Origin	To be mentioned by the bidder	
8.	Country of Manufacturer	To be mentioned by the bidder	
9.	Quantity	01 Nos	
10.	Screen Size	55 Inch	
11.	Operating System	Tizen™ Smart TV	
12.	Motion Technology	Motion Xcelerator	
13.	Picture Engine	Crystal Processor 4K	
14.	Resolution	3,840 x 2,160	
15.	HDMI Ports	Minimum 3 HDMI ports	
16.	USB Ports	Minimum 1 USB port	
17.	Ethernet (LAN)	Minimum 1 LAN port	
18.	Wifi& Bluetooth	Yes	
19.	Design	Slim Look	
20.	Bezel type	3 Bezel-Less	
21.	Low Vision Support	Audio Description, Zoom Menu and Text, High Contrast, See Colors, Color Inversion, Grayscale, Picture Off	
22.	Power Supply	AC100-240V~ 50/60Hz	
23.	Remote Controller Model	TM2360E	
24.	Zigbee / Thread Module	Dongle Support	
25.	Installation & Commissioning	Bidder will provide necessary Installation with accessories	
26.	Warranty	Minimum 3 Year	

33. **Online UPS**

a. **6 KVA**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Brand	To be Mentioned	
2.	Model	To be mentioned.	
3.	Country of Origin	USA/ Japan/ Canada/ UK/ EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Quantity	02 in no.	
INPUT PARAMETERS			
6.	Rectifier type	IGBT	
7.	Rated voltage	220Vac single-phase 3-wire	
8.	Input voltage range	120-276V	
9.	Input frequency range	45-55 Hz	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
10.	Input power factor	Single phase >= 0.99 / 3-phase >=0.95	
BATTERY			
11.	Charging capability	<3h for recharging to 90% of standard model	
12.	Battery Number	Maintenance free (6Blks),	
OUTPUT PARAMETERS			
13.	Rated power	5.4 kW/ 6 kVA	
14.	Voltage precision	230Vac±1%	
15.	Frequency precision	50+/-0.2%	
16.	Output voltage THD	<3% for linear load, <5% for non-linear load	
17.	Load crest factor	3:1 (comply with IEC 62040-3) or better	
18.	Step load performance	100	
System parameters and standard			
19.	Whether rack mounting mode is supported	Yes	
20.	System efficiency	>91% (with intelligent fan speed regulation function)	
21.	Switching time (power failure)	0	
22.	Noise	<51 DB	
23.	Language	Chinese/English	
24.	Whether LCD display is available	Yes (optional)	
25.	Safety	GB4943-1995	
26.	EMC	Conducted emission: EN50091-2 EN55022ClassA Immunity: EN61000-4-2.3.4.6.8.11 Level III EN61000-4-5 Level IV	
27.	Surge protection	Meet installation requirements of IEC60664-1 IV Be able to withstand at least 6KV/ 3KA 1/ 2/ 50uS+8/ 20uS	
Communication and management			
28.	Smart RS -232/USB	Support windows 2000/ 2003/ XP/ Vista/ 2008,Windows 7,Linux,Unix and MAC	
29.	Interface type	USB/intelligent slot (SNMP)(Auto shutdown feature for Networking level)(Optional)	
Environmental parameters			
30.	Operating temperature	0 - 40˚C	
31.	Relative humidity	5 - 95%	
32.	Altitude	1500m	
33.	Back up time	50-60 Minutes	
34.	Warranty	2 Years (Minimum)	

b. **3KVA**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1	Brand	To be Mentioned	
2	Model	To be mentioned.	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
3	Country of Origin	USA/ Japan/ Canada/ UK/ EU Countries	
4	Manufacturing Country	To be mentioned.	
5	Quantity	04 in no.	
INPUT PARAMETERS			
6	Rectifier type	IGBT	
7	Rated voltage	220Vac single-phase 3-wire	
8	Input voltage range	120-276V	
9	Input frequency range	45-55 Hz	
10	Input power factor	Single phase >= 0.99 / 3-phase >=0.95	
BATTERY			
11	Charging capability	<3h for recharging to 90% of standard model	
12	Battery Number	Maintenance free (6Blks)	
OUTPUT PARAMETERS			
13	Rated power	2.4 kW / 3 kVA	
14	Voltage precision	230Vac±1%	
15	Frequency precision	50+/-0.2%	
16	Output voltage THD	<3% for linear load, <5% for non-linear load	
17	Load crest factor	3:1 (comply with IEC 62040-3) or better	
18	Step load performance	100	
System parameters and standard			
19	Whether rack mounting mode is supported	Yes	
20	System efficiency	>91% (with intelligent fan speed regulation function)	
21	Switching time (power failure)	0	
22	Noise	<51 DB	
23	Language	Chinese/English	
24	Whether LCD display is available	Yes (optional)	
25	Safety	GB4943-1995	
26	EMC	Conducted emission: EN50091-2 EN55022ClassA Immunity: EN61000-4-2.3.4.6.8.11 Level III EN61000-4-5 Level IV	
27	Surge protection	Meet installation requirements of IEC60664-1 IV Be able to withstand at least 6KV/3KA 1/2/50uS+8/20uS	
Communication and management			
28	Smart RS -232/USB	Support windows 2000/2003/XP/Vista/ 2008, Windows 7, Linux, Unix and MAC	
29	Interface type	USB/intelligent slot (SNMP)(Auto shutdown feature for Networking level)(Optional)	
Environmental parameters			
30	Operating temperature	0 - 40˚C	
31	Relative humidity	5 - 95%	
32	Altitude	1500m	
33	Back up time	15-30 Minutes	
34	Warranty	2 Years (Minimum)	

c. **1 kVA Online UPS**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1	Brand	To be Mentioned	
2	Model	To be mentioned.	
3	Country of Origin	USA/Japan/Canada/UK/EU Countries	
4	Manufacturing Country	To be mentioned.	
5	Quantity	330 in no.	
6	PHASE	1 phase in / 1 phase out	
7	CAPACITY	1000 VA / 900 W	
INPUT			
8	Nominal Voltage	230 Vac	
Voltage Range			
9	Low Line Loss	110 VAC ± 3% at 50% Load 176 VAC ± 3% at 100% Load	
10	Low Line Comeback	120 VAC ± 3% at 50% Load 186 VAC ± 3% at 100% Load	
11	High Line Loss	280 VAC ± 3%	
12	High Line Comeback	270 VAC ± 3%	
13	Frequency Range	40 Hz ~ 70 Hz	
14	Power Factor	≥ 0.9 @ 100% load	
OUTPUT			
15	Nominal Voltage	208/220/230/240VAC	
16	AC Voltage Regulation	± 1%	
17	Frequency Range (Synchronized Range)	46Hz ~ 54 Hz or 56Hz ~ 64 Hz	
18	Frequency Range (Batt. Mode)	50 Hz ± 0.1 Hz or 60 Hz ± 0.1 Hz	
19	Current Crest Ratio	3:1 (max.)	
20	Harmonic Distortion	≤ 3 % THD (Linear Load), ≤ 7 % THD (Non-linear Load)	
Transfer Time			
21	Bypass to Inverter (Line mode)	Zero	
22	Inverter to Bypass(Line mode)	4 ms (Typical)	
23	Waveform (Batt. Mode)	Pure Sine wave	
24	EFFICIENCY on AC to AC mode@ 100% load.	88%	
25	Inbuilt Isolation Transformer	No	
BATTERY			
26	Battery Type	Maintenance free seal lead acid	
27	Numbers	12V x 18 AH x3 Blks	
Standard Run Model			
28	Typical Recharge Time	4 hours recover to 90% capacity	
29	Charging Current (max.)	1.0 A	
30	Charging Voltage	27.4VDC ±1%	
Long Run Model			
31	Battery Type	12V-18 Ah	
32	Numbers	3Blks	
33	Charging Current	1.0A/2.0A/4.00.0A, 6.0A default	
34	Float Charging Voltage	41.0 VDC *1%	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
INDICATORS			
35	LCD Panel	UPS status, Load level, Battery level, Input/ Output voltage, Discharge timer, and Fault conditions	
ALARM			
36	Battery Mode	Sounding every 4 seconds	
37	Low Battery	Sounding every second	
38	Overload	Sounding twice every second	
39	Fault	Continuously sounding	
PHYSICAL			
40	"Standard Run Model Long Run Model*		
41	Dimension, D x W x H (mm)	282 x 145 x 220	
42	Net Weight (kgs)	9.8	
43	Dimension, O x W x H (mm)	282x145x220	
44	Net Weight (kgs)	4.1	
ENVIRONMENT			
45	Operation Humidity and Temperature	20-90 % RH @ 0- 45°C (non-condensing)	
46	Noise Level	Less than 50dBA @ 1 Meter	
MANAGEMENT			
47	Smart RS-232/USB	Supports Windows® 2000/2003/XP/ Vista/2008, Windows® 7, Linux, Unix, and MAC	
48	Optional SNMP	Power management from SNMP manager and web browser	
49	Warranty	2 Years (Minimum)	
50	Backup Time	15-30 Mins	

34. **NETWORK RACK**

a. **42U Rack**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	42U Perforated Double Door Network Rack	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network.	
3.	Country of Origin	USA/ Japan/ Canada/ UK/ EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	02	
9.	Dimension (HxDxW)	To be mentioned.	
10.	Color	Black (Powder Coated)	

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
11.	Static Loading Capacity	1000Kgs or above	
12.	Front Door	Perforated Double Door with Advanced Swivel Lock	
13.	Rear Door	Lockable and removable perforated rear door (double Section).	
14.	Side Panels	Solid side panels with security key locks and quick release slide latches	
15.	Bottom Plate	Bottom plate with strengthen RIB with over 150 Kgs loading capacity	
16.	Castors & Leveling Feet	4-Castors & 4-Leveling Feet	
17.	No. of Trays	1-Heavy Duty Fixed Tray & 1-Sliding Tray and each 650 mm depth	
18.	Anti-Dust Cable Entry	Convenient cable brush panel on top and bottom for both cable entry and anti-dust.	
19.	Cooling Fan	4 pcs with UK Power Cord on Top	
20.	Mounting Rail	Adjustable 19 inch	
21.	Material	SPCC cold rolled steel with 5-Stage Iron Phosphate Pretreatment followed by touch scratch resistant textured powder coat paint	
22.	Thickness of Mounting Profile & Frame	2.0mm	
23.	Power Distribution Unit (PDU)	2 Pcs 25-Way 32 Amp Industrial PDU	
24.	Grounding Kit	Required between all parts with 10AWG and UL rated wire.	
25.	Warranty	Minimum 3 Year	

b. **15U Wall Mount Network Rack**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	15U Wall Mount Network Rack	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network.	
3.	Country of Origin	USA/ Japan/ Canada/ UK/ EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	03 Nos	
9.	Warranty	3 Years (Minimum)	

c. **9U Wall Mount Network Rack**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	9U Wall Mount Network Rack	

2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network.	
3.	Country of Origin	USA/ Japan/ Canada/ UK/ EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	32 in Nos	
9.	Warranty	3 Years (Minimum)	

d. **6U WALL MOUNT NETWORK RACK**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	6U Wall Mount Network Rack	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network.	
3.	Country of Origin	USA/Japan/Canada/UK/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	305 in Nos	
9.	Warranty	3 Years (Minimum)	

35. **UTP CABLE CAT 6**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	UTP Cable Cat6	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be mentioned.	
7.	Type	Cat 6, UTP cable, 30 AWG, Length: 305m/box	
8.	Conductor Gauge	30 AWG	
9.	General Specification	CAT6 U/ UTP 4 Pair Cable, shielded.	
10.	Quantity	350 Box	
11.	Warranty	Minimum 03 Years	

36. **MODULAR**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	Modular	

2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be mentioned.	
7.	Model	To be mentioned.	
8.	Quantity	2750 Nos	
9.	Warranty	3 Years (Minimum)	

37. **Faceplate**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	Faceplate	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be mentioned.	
7.	Model	To be mentioned.	
8.	Quantity	2750 Nos	
9.	Warranty	3 Years (Minimum)	

38. **MK Box**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	MK Box	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	To be Mentioned	
4.	Manufacturing Country	To be Mentioned	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	2750 Nos	
9.	Warranty	3 Years (Minimum)	

39. **RJ45 Connector**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	RJ45 Connector	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh	

		Navy (BN) Network	
3.	Country of Origin	USA/ UK/ Canada/ Japan/ Taiwan/ EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	5200 Nos	
9.	Warranty	1 Year (Minimum)	

40. **Optical Fiber 4 Core**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	Optical Fiber 4 Core	
2.	Purpose	To be used for IP telephone network for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/ UK/ Canada/ Japan/ Taiwan/ china/ EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	65000 Mtr	
9.	Warranty	3 Years (Minimum)	

41. **TJ Box (4Way)**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	TJ Box (4Way)	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	To be Mentioned	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	630 Nos	
9.	Warranty	3 Years (Minimum)	

42. **UTP Patch Cord 2 Meter**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	UTP Patch Cord 2 Meter	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh	

		Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	Panduit/ Schneider Electric/ Vivanco/ R&M/ CommScope	
7.	Model	To be mentioned.	
8.	Quantity	5520 Nos	
9.	Warranty	3 Years (Minimum)	

43. **UTP Patch Cord 0.5 Meter**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	UTP Patch Cord 0.5 Meter	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	Panduit/ Schneider Electric/Vivanco/R&M/ CommScope	
7.	Model	To be mentioned.	
8.	Quantity	2740 Nos	
9.	Warranty	3 Years (Minimum)	

44. **Fiber Patch Panel**

a. **24 Port**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	24 Port Fiber Patch Panel	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries.	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Description of Item	Patch Panel must be fully loaded LC-LC adapter and pigtail	
9.	Quantity	15 in Nos	
10.	Warranty	3 Years (Minimum)	

b. **12 Port Fiber Patch Panel**

Sl.	Name of Item or	Technical Specifications and Standards	Bidder

No.	Related Services		Response
1.	Name of Item	12 Port Fiber Patch Panel	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries.	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Description of Item	Patch Panel must be fully loaded LC-LC adapter and pigtail	
9.	Quantity	18 in Nos	
10.	Warranty	3 Years (Minimum)	

45. **Fiber Patch Cord 5 Meter LC/LC**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	Fiber Patch Cord 5 Meter LC/LC	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/China/EU Countries.	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	687 Nos	
9.	Warranty	3 Years (Minimum)	

46. **Fiber Patch Cord 3 Meter LC/LC**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	Fiber Patch Cord 3 Meter LC/LC	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/China/EU Countries.	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	10 Nos	
9.	Warranty	3 Years (Minimum)	

47. **1U Horizontal Wire Manager**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
2.	Country of Origin	USA/Japan/Canada/UK/EU Countries	
3.	Manufacturing Country	To be mentioned.	
4.	Manufacturer	To be mentioned.	
5.	Brand	To be Mentioned	
6.	Model	To be mentioned.	
7.	Quantity	548 Nos	
8.	Warranty	3 Years (Minimum)	

48. **4 RM Electric Cable**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	4 RM Electric Cable	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	To be mentioned.	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be Mentioned	
7.	Model	To be mentioned.	
8.	Quantity	80 Roll	
9.	Warranty	3 Years (Minimum)	

49. **24 Port UTP Patch Panel Loaded**

Sl. No.	Name of Item or Related Services	Technical Specifications and Standards	Bidder Response
1.	Name of Item	24 Port UTP Patch Panel Loaded	
2.	Purpose	To be used for Establishing Unified Communication Systems for Bangladesh Navy (BN) Network	
3.	Country of Origin	USA/UK/Canada/Japan/EU Countries	
4.	Manufacturing Country	To be mentioned.	
5.	Manufacturer	To be mentioned.	
6.	Brand	To be mentioned.	
7.	Model	To be mentioned.	
8.	Quantity	553 Nos	
9.	Warranty	3 Years (Minimum)	

50. **Fiber Splicing-** 1950 Nos

51. **Fiber Laying and Channeling (66,500 Mtr)**

Ser	Types of Laying	Mtr (approx)
1.	Open Cutting	26694 Mtrs
2.	Road Boring	768 Mtrs
3.	Channeling	35538 Mtrs
4.	Horizontal Directional Drilling (HDD)	3500 Mtrs

52. **UTP Node Wiring-** 3000 Node

53. **Spares, Tools and Test Equipment (Optional Items as Optional Pack)**. Price quotation of optional items is mandatory. Bidder is to mention item wise price so that BN may choose all items or partial items or may reject all optional items. The price of optional items is to be quoted as follows:

a. **Spares**.

(1) The bidder shall submit a list of recommended spares/ first moving spares with the price required for maintenance of the IP PABX network for the next 02 (two) years after the warranty period.

(2) The Bidder shall maintain sufficient backup stock of spare parts and tools locally at sites, for the maintenance of the supplied equipment, during the warranty period.

(3) The Bidder shall ensure availability of spare parts and technical assistance for all components for at least 02 (two) years, without major changes, after the completion of final acceptance.

(4) The Bidder shall give six months advance notice on any discontinued part(s) with a suggestion for appropriate alternatives.

(5) The Bidder shall also identify and provide the following:

(a) Items (repairable spares, parts and consumable supplies) that are needed to maintain design performance, reliability and availability standards prescribed in the Technical Specifications. The quantity of spare parts and consumable items provided and kept shall be equal to the requirements for one year of operating stock.

(b) Critical items, whose failure would cause a system failure.

(c) Items of high cost and/or long lead time (over thirty working days).

(d) Items whose design reliability is such that normal stock replenishment would not justify maintaining a level of the item in stock.

b. **Consumables**. The bidder shall provide a list of consumables with part no and manufacturer and same shall be quoted considering for next 02 year maintenance period from the date of acceptance of VSAT Network.

c. **Test Equipment and Tools**. The bidder shall submit list of Test Equipments and Tools with the make, model, brand, Country of Origin and indicative part numbers along with the offer. Price to be quoted for min test equipment and tools.

d. **Guaranty for Spare Support.** Minimum 10 (Ten) years spares support assurance from the date of acceptance of the proposed system for Bangladesh Navy (BN) is to be provided by the bidder. A certificate for providing minimum 10 (Tern) years spares support is to be provided by the bidder. In case of any vendor/manufacturer's supplied items, warranty/ guaranty certificate from the OEM is to be provided with the equipment/ item by the bidder.

54. **Installation and Commissioning of Proposed for Single Server based IP PABX for Bangladesh Navy (BN):**

a. The bidder will be responsible for installation and commissioning of proposed to upgrade BN PABX into single server based IP PABX network by bidder's own competent experts/ specialists. BN engineers and technicians will work with the installation team and gain training during installation of the proposed network

b. After completion of installation and commissioning of the proposed IP PABX network, bidder shall carry out necessary Test Run. Test run shall be for 30 days in presence of bidders expert.

c. The bidder shall quote the cost of Installation which will be included in the fin part of the contract. All other expenditures including food, accommodation, medical support and transportation etc of Installation Team will be borne by the bidder. However, on request of bidder, BN may arrange food and accommodation (subject to availability of such facilities). In that case, bidder is to pay necessary bills as per existing regulation.

55. **Technical Support Team (TST)**:

a. The bidder is to appoint 03 (Three) local experts for each 03 (Three) Zonal area of Bangladesh Navy (Dhaka, Chattogram and Khulna) as TST member to the proposed Single Server based IP PABX for Bangladesh Navy (BN) site for a period of 12 (Twelve) months from the date of acceptance of the Single Server based IP PABX for Bangladesh Navy (BN). The Bidder is to quote the cost of TST in the offer. The bidder is to mention cost of TST per month in case BN decides to increase/ decrease duration of TST. Bidder shall bear all related costs of food, accommodation, transportation etc. for TST members. However, on request of bidder, BN may arrange food and accommodation (subject to availability of such facilities). In that case, bidder is to pay necessary bills as per existing regulation. The bidder is to submit bio-data and qualification/ experience (with appropriate supporting documents/ certificates) of the TST members to the purchaser (BN) at least 08 (eight) weeks before commencement of the TST for necessary approval.

b. **TST is to ensure followings:**

(1) Routine maintenance and care of proposed Single Server based IP PABX for Bangladesh Navy (BN) in respect of all active and passive equipment.

(2) Diagnosis, troubleshooting and repair of all active and passive equipment.

(3) Provide necessary support for uninterrupted operation of the Single Server based IP PABX for Bangladesh Navy (BN).

(4) Train BN personnel on all types of scheduled inspections and rectifications of all equipment/ maintenance/ system. TST is to ensure transfer of knowledge on operation and maintenance to BN personnel as far as possible.

(5) The TST is to raise warranty for unserviceability of proposed Single Server based IP PABX for Bangladesh Navy (BN) equipment and expedite for quick arrival of replaced item. They will be responsible for making proposed Single Server based IP PABX for Bangladesh Navy (BN) or equipment serviceable as quick as possible.

(6) To ensure the network security and cyber security of the Single Server based IP PABX for Bangladesh Navy (BN).

56. **Software, Manual and Publication.** The bidder has to quote necessary software with licenses. The bidder will also provide 03 (Three) sets of manuals, publications, parts catalogue of the system, hardware and software in hard copy and soft copy in English as applicable for the offered system at free of cost.

57**.** **Local Training.** The bidder has to arrange 01 (One) week (05 working days) local training for 20 × Naval personnel on operation, configuration and maintenance of the proposed system. The training must be conducted after acceptance of the system. The bidder is to provide training completion certificate to each trainee. The bidder shall quote the cost of local training which will be included in the financial part of the contract. All other expenditures including food, accommodation, medical support and transportation etc of the specialist team will be borne by the bidder.

58. **Warranty**

a. **Equipment Warranty.** Minimum 36 months warranty of all products (except UPS battery and accessories) from date of acceptance is to be provided if not mentioned specifically in technical specification of specific equipment.

b. Un-serviceability of any features/ items/ spares of the system up to 24 (twenty-four) hours will be considered as normal but more than 24 hours, if any, will be added to the warranty period of that particular features/ items/ spares.

c. Replacement/ Repair of defective equipment or services, if needed during inspection/ warranty period, bidder is to provide the same free of cost within 02 (two) months from date of reporting. Cost for site visit by manufacturer/ Bidder engineer (in respect of replacement/ repair if needed) are to be borne by bidder. Supplied items/ equipment on warranty will be identified by attaching a warranty label/ disc or stenciling as shown below:

Contract No & Date	
Warranty begins on	
Expires on	

59. **After Sales Service**. Minimum 36 months after sales support of all products of the proposed system from expiry of warranty of individual equipment/ system is to be provided by the bidder. After sales service/ technical back up support must be provided as and when required during and after Warranty/ Guaranty period as per demand of purchaser. A certificate for providing after sales service is to be provided by the bidder. Bidder is to ensure technical advisory service through electronic or conventional mail or online servicing (if available) provided by manufacturer/Bidder as and when required after warranty period. On call engineer's support at

site, if needed for any unscheduled repair/ maintenance of equipment after warranty period, are to be provided by the bidder/ manufacturer. In such case, separate agreement may be done between BN and bidder/ manufacturer.

60. **Annual Maintenance Contract**. The bidder must agree to sign Annual Maintenance Contract (AMC) for a period of 02 years after warranty period. The cost of the AMC must be separately quoted with the financial offer as optional. Details of the AMC plan must be submitted with the technical offer.

61. **Consignee.** Commanding Officer, Naval Stores Depot Chattogram, New Mooring Chattogram.

62. **Terms of Payment.** Payment shall be made under following terms and conditions:

a. **Equipment Supply**. In respect of equipment supplied, the following payments shall be made:

(1) Sixty percent (60%) of the total amount (Minus TST Service, Installation & Training) shall be released upon receipt of all contracted goods and documents as per DGDP rules (Including Inspection certificate, Supplier signed invoice, Items list and billing clearance letter of DGDP).

(2) Remaining forty percent (40%) of the total amount (Minus TST Service, Installation & Training) shall be released upon receiving the “Final Acceptance Certificate” rendered by BN after successful test and trial.

b. **TST Service.** 100% cost of TST shall be released after satisfactory completion of TST service as per the contract and on production of TST completion certificate from BN.

c. **Installation and other Services.** 100% cost of Installation and other Services shall be released after satisfactory completion of Installation and other Services as per the contract and on production of Installation and other Services completion certificate from BN.

d. **Local Training.** 100% cost of Local Training shall be released after satisfactory completion of Local Training as per the contract and on production of Local Training completion certificate from BN.

63. **Validity of Offer:** The offer should valid until 6 Month from the date of tender Submission.

64. **Standard Accessories;** Standard accessories/ License must include all items and accessories which are essential to operate the items, whether those are mentioned in the specification or not. The accessories items list has to be provided with the quotation. All hardware (major and minor) must be compatible to each other.

65. **Test, Trial and Acceptance:** The Supplier will carry out test and trial of the supplied equipment at Employer premises and hand over the items in fully operational condition. An acceptance certificate will be signed between representatives of Employer after satisfactory test/ trail. The supplier must complete the connection and run all equipment at Bangladesh Navy.

66. **Condition for Acceptance of Quotation:** Quotation has to have supporting documents (booklets, leaflet, catalogue, brochure etc) having detailed particulars of the offered items in English. If detailed information regarding specifications, maker’s book and catalogue about the same model of the offered item, accessories, scope of supply etc are not provided, the quotation will not be accepted.

67. **Compliance Statement:** A compliance statement fulfilling all the requirement of the tender is to be submitted for evaluation of the quotations. Stating mere 'Yes' or 'No' will not suffice and detailed description/information as required is to be given. An incomplete compliance statement may attribute to cancellation of the offer.

68. **Delivery Schedule:** Procurement quantity is to be delivered and installed in full within 6 (six) Months from the date of issuing work order.

69. **Supplier's Service and Responsiveness:** Supplier must reply to buyer's query within 03 days of raising the query.

70. **Financial Offer**: Price of individual items and total price to be quoted including VAT and AIT in Local currency.

71. **Liquidated Damage (LD)**: LD will be applicable as per DGDP Policy.

72. **Packaging;** All items are to be delivered in standard commercial packaging.