TERMS OF REFERENCE
FOR THE SUPPLY, DELIVERY, INSTALLATION, TESTING, COMMISSIONING AND TRAINING OF VARIOUS ICT MONITORING TOOLS AND NETWORK SWITCHES.

A. OVERVIEW

DOST-PAGASA experienced network congestion that caused the local network slow and intermittent due to bulk of data that is yearly increase and in addition to this, DOST-PAGASA will acquire a network Monitoring that will give unified view, centralized alarm and performance monitoring.

The new network infrastructure will give a minimum of 10GB network link from access switch to distribution switch. That will address the problem of network congestion and from distribution to core switch the link will be 20GB. The purchased core switch will also create a high-speed routing and capable to create a thousand switch virtual interfaces that will be needed in future network segments and configuration.

The network monitoring will be use to check network congestion and failing components that notifies the network administrator in case of outage or other trouble.

B. APPROVED BUDGET FOR THE CONTRACT (ABC)

The Approved Budget for the Contract is **Six Million Nine Hundred Sixteen Thousand Eight Hundred Twenty-Four pesos (Php 6,916,824.00)** inclusive of VAT and all applicable government taxes.

C.BID VALIDITY

The bid shall remain valid for a period of 120 calendar days from the date of submission of bids

D.BID PROPOSAL CONTENTS

The prospective bidder is expected to comply and respond in accordance with the specific instructions to bidders and submit all the documentary requirements under the Checklist of Eligibility, Technical and Financial Requirements. The submission of documentary requirements must be properly arranged in order and with label.

E. PLACE AND DATE OF DELIVERY

The winning bidder shall supply, deliver, install, test and commission the ICT equipment for sixty (60) calendar days from receipt of the Purchase Order (PO) at PAGASA Central Office located at PAGASA Science Garden Compound, BIR Road, Diliman Quezon City.

F. TECHNICAL SPECIFICATION AND REQUIREMENTS

ITEM NO.	QUANTITY AND UNIT	DESCRIPTION	SPECIFICATION
1	**1 lot**	**ICT network facility**	
	2 UNITS	CORE SWITCH	**-** 44 x 10Gig SFP+, 4 x 40 Gig QSFP+, 2 x 100 Gig QSFP28 ports -64K MAC address entries. -IEEE 802.1d standards compliances -MAC address learning and aging -Static, dynamic and black hole MACC address entries -Packet filtering based on source MAC addresses **-**4094 VLANs -4094 Interface VLANs **-**Guest VLANs and voice VLANs -GVRP -MUX VLAN -VLAN assignment based on MAC addresses, protocols, IP subnets, policies, and ports -VLAN mapping **-**Static routes, RIP v1/2, RIPng, OSPF, OSPFv3, IS-IS, IS-SIv6, BGP, BGP4+,ECMP,routing policy **-**VLAN-Based Spanning Tree(VBST), working with PVST, PVST+, and RPVST link-type Negotiation Protocol (LNP) similar to DTP. -VLAN Central Management Protocol(VCMP), similar to VTP. **-**AP access control, AP domain management, and AP configuration templates management. -Radio management, unified static configuration, and dynamic centralized management. -WLAN basic services, QoS, security and user management. -CAPWAP, tag/terminal location and spectrum analysis. **-**RRPP ring topology and RRPP multi-instance. -Smart link tree topology and smart link multi-instance, providing millisecond-level protection switchover -SEP -ERPS (G.8032) -BFD for OSPF, BFD for IS-IS, BFD for VRRP and BFD for PIM. -STP (IEEE 802.1d). RSTP (IEEE 802.1w) and MSTP (IEEE802.1s) -BPDU protection, root protection and loop protection. **-**MPLS L3VPN -MPLS L2VPN (VPWS/VPLS) -MPLS-TE

			-MPLS QoS -Neighbour Discover (ND) -PMTU -IPv6 Ping, IPv6 Tracert, IPv6 Telnet -ACLs based on source IPv6 addresses, destination IPv6 addresses, Layer 4 port or protocol types. -Multicast Listener Discovery snooping (MLDv1/v2) -IPv6 addresses configuration for sub-interfaces, VRRP6, DHCPv6 and L3VPN. -IGMP v1/v2/v3 snooping and IGMP fast leave. -Multicast forwarding in a VLAN and multicast replication between VLANs -Multicast load balancing among member ports of a trunk -Controllable multicast -Port-based multicast traffic statistic -IGMP v1/v2/v3, PIM-SM,PIM-DM and PIM-SSM -MSDP -Multicast VPN -Rate limiting in the inbound and outbound direction of a port -packet redirection -port-based traffic policing and two rate three-color CAR -HQoS -Eight queues on each port -DRR, SP , and DRR+SP queue scheduling algorithms -WRED -Re-marking of the 802.1p and DSCP filed of Packets -Packet filtering at layer 2 to layer 4, filtering out invalid frame based on the source MAC address, destination MAC address, source IP address, destination IP address, TCP/UDP source/destination. -port number, protocol type and VLAN ID -Queue-based rate limiting and shaping on ports. -Hierarchical user management and password protection -DoS attack defense, ARP attack defense and ICMP attack defense -Binding of IP address, MAC address, port number and VLAN ID -Port isolation, port security and sticky MAC -MAC Forced Forwarding(MFF) -Blackhole MAC address entries -Limit on the number of learned MAC addresses -IEEE 802.1X authentication and limit on the number of users on a ort

			-AAA authentication, RADIUS authentication and HWTACACS authentication -NAC -SSH V2.0 -HTTPS -CPU Protection -Blacklist and Whitelist -Attack source tracing and punishment for IPv6 packet such as ND,DHCPv6 and MLD packets. -IPSec for management packet encryption. -LACP link aggregation maximum of 8ports. -E-Trunk -Ethernet OAM (IEEE 802.3ah and IEEE 802.1ag) -ITU-Y.1731 -DLDP -LLDP -BFD for BGP, BFD for IS-SI, BFD for OSPF, BFD for static routes. -VXLAN function, VXLAN L2 and L3 gateways, BGP EVPN -VXLAN configuration using NETCONFT/YANG. -Acting as the parent node to vertically virtualize downlink switches and APs as one device for management. -Two-layer client architecture -Ass can be independently configured. Services not supported by templates can be configured on the parent node. -Third-party devices allowed between SVF parent and client. -Marking services packet to obtain the packet loss ratio and number of lost packet in real time. -Cloud-based management -SNMP v1/v2c/v3 -RMON -Web-based NMS -System logs and alarm of different severities. -GVRP -2 x 600w AC power module (back to front, power panel side exhaust) -2 hot-swappable PSUs with support for 1+1 redundancy - Rated input voltage range (100V AC to 290 V AC,45Hz to 65 Hz - Maximum input voltage range (90V AC to290 V AC, 45 Hz to 65 Hz - Maximum input current (9A)

			-Maximum output current (50A) -Rated output voltage (12V) -Maximum output power (600W) **NOTE: THE CORE SWITCH MUST HAVE REDUNDANT/BACKUP CCORE SWITCH.**
	15 units	Distribution Switch	**-**24X10GE SFP+ 2X40GE QSFP+ ports - 32k MAC address learning and aging -Static, dynamic and blackhole MAC address entries -Packet filtering based on source MAC addresses -4094 VLANS -Guest VLANs and voice VLANs -VLAN assignment based on MAC addresses, protocol, IP subnet policies and ports. -VLAN mapping -Super VLAN -Basic QinQ and selective QinQ **-**Static routing, RIPv1, RIPv2, ECMP, URPF, OSPF, IS-IS, and BGP -VRRP -Policy-based routing -Routing policie -Static routing -RIPng -OSPFv3 BGP4+ -ISISv6 -Neighbor Discovery (ND) and ND snooping -IPv6 Ping -VRRP6 -DHCPv6 snooping, DHCPv6 server, and DHCPv6 relay -MLDv1 and MLDv2 -PIM-DM for IPv6 -PIM-SM for IPv6 -6 Over 4 tunnels -IGMP V1/V2/V3 snooping -Fast leave -IGMP snooping proxy -MLD snooping -Port-based multicast traffic suppression -Inter-VLAN multicast replication -Controllable multicast -IGMP v1/v2/v3 -PIM-SM and PIM-DM -Multicast Source Discovery Protocol (MSDP) -Multicast routing policies -Traffic classification based on ACLs

			-Traffic classification based on outer 802.1p fields, inner VLAN IDs, outer VLAN IDs, source MAC addresses, and Ethernet types -Access control after traffic classification -Traffic policing based on traffic classifiers -Re-marking based on traffic classifiers -Class-based packet queuing -Associating traffic classifiers with traffic behaviors -Rate limiting on inbound and outbound ports -Traffic shaping based on ports and queues -Tail drop -Priority Queuing (PQ) -Deficit Round Robin (DRR) - PQ + DRR scheduling -Weighted Round Robin (WRR) -PQ + WRR scheduling -STP (IEEE 802.1d), RSTP (IEEE 802.1w), and MSTP (IEEE 802.1s) -BPDU protection, root protection, and loop protection -RRPP ring topology and RRPP multi-instance -Smart Link tree topology and Smart Link multi-instance, providing millisecond-level protection switchover -Smart Ethernet Protection (SEP) -G.8032 Ethernet Ring Protection Switching (ERPS) -BFD for OSPF, IS-IS, VRRP, and PIM protocols -Enhanced trunk (E-trunk) -Defense against DoS, ARP, and ICMP attacks -Binding of the IP address, MAC address, port number, and VLAN ID of a user -Port isolation, port security, and sticky MAC -MAC-Forced Forwarding (MACFF) -Limit on the number of learned MAC addresses -IEEE 802.1X authentication, MAC address authentication, Portal authentication, and hybrid authentication -Authentication methods, including AAA, RADIUS, and HWTACACS -CPU defense -SVF Parent and Client -iStack (using service ports as stack ports) -Virtual Cable Test (VCT) -Ethernet OAM (IEEE 802.3ah and 802.1ag) -SNMPv1/v2c/v3 -RMON -Web-based network management system and relevant features -System logs and multi-level alarms

			-GVRP -MUX VLAN -sFlow -Hypertext Transfer Protocol Secure (HTTPS) -SSH1.5/SSH2
	154 units	10GB SFP + Transceiver	-SFP+ -10GE -850nm -10GBASE-SR -LC connector -applicable for Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.026 km -applicable for Multimode fiber (OM1): 0.033 km -applicable for Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.066 km -applicable for Multimode fiber (OM2): 0.082 km -applicable for Multimode fiber (OM3): 0.3 km -applicable for Multimode fiber (OM4): 0.4 km- -7.3 to -1.dBm0
	2 units	Power supply	2 x 600w AC power module (back to front, power panel side exhaust) -2 hot-swappable PSUs with support for 1+1 redundancy - Rated input voltage range (100V AC to 290 V AC,45Hz to 65 Hz - Maximum input voltage range (90V AC to290 V AC, 45 Hz to 65 Hz - Maximum input current (9A) -Maximum output current (50A) -Rated output voltage (12V) -Maximum output power (600W)
2	1 lot	Network analyzer, monitoring tool and server appliance	-Provides application software that unified the entire networked view of ICT devices helping administrator monitor the status of critical devices and of devices link over the network. -Provide centralized alarm severity level such as critical, major, minor and warning using different color or words. -Provides monitor of the performance of ICT devices such as CPU usage, memory usage, devices

			connectivity, devices response time, port traffic, network connectivity rate and utilization -Must be support batch configuration of ICT devices on the enterprise network allowing operation and maintenance personnel to easily configure the devices. -Provide display statistical data about the performance, resource and capacity of enterprise ICT devices in various formats. -2U, 2-socket rack server 1 Lot Network analayzer -1 or 2 2nd Generation Intel® Xeon® Scalable processors (3200/4200/5200/6200/8200 series), up to 205W. -24 DDR4 DIMM slots, 2,933 MT/s; up to 12 DCPMMs, 2,666 MT/s. -2TB StorageSupports the following hard drive configuration options: -8 x 2.5-inch SAS/SATA HDDs or SSDs -12/16/20 x 3.5-inch SAS/SATA HDDs -4, 8, 12, 24, or 28 NVMe SSDs -31 x 2.5-inch SAS/SATA HDDs or SSDs -2 M.2 SSDs -RAID 0, 1, 10, 1E, 5, 50, 6, or 60 Configured with a super capacitor for cache power-off protection (optional) RAID level migration, drive roaming, self-diagnosis, and web-based remote configuration. LOM: 2 x 10 GE + 2 x GE ports Flexible NIC: 2 x GE, 4 x GE, 2 x 10 GE, 2 x 25 GE, or 1/2 x 56G FDR IB ports -Up to 10 PCIe 3.0 slots, including 1 for a RAID controller card and 1 for a flexible NIC. -4 hot-swappable fan modules with optional N+1 redundancy -2 hot-swappable PSUs with support for 1+1 redundancy and the following configuration options : • 550W AC Platinum PSUs • 900W AC Platinum/Titanium PSUs • 1,500W AC Platinum PSUs • 1,500W 380V HVDC PSUs • 1,200W -48V to -60V DC PSUs
3	1 lot	Installation, Configuration and Training	-Provide configuration and installation of the network monitoring tools and equipment.

			-All workmanship, system parts, accessories, other materials and equipment and services shall be warranted by the Winning Bidder for three (1) year. During the warranty period, any workmanship, system parts, accessories, other materials and equipment that fails to provide satisfactory operation shall be timely replaced at the Winning Bidder's expense. The repair of any defective material or equipment may be permitted; provided, however, that, the item/s being repaired is/are restored to its/their original specifications.

Equipment User's Training, onsite training and technical training/meeting

The SAT shall be witnessed and accepted by at least five (5) member of PAGASA ICT Staff and shall be conducted within a total of seven (7) Calendar days.

A 5 –day on-site training on implemented network monitoring and appliance shall also be conducted. All expenses , such as, but not limited to the training materials, round trip airfare, local transportation, lodging/accommodation and allowable travel expenses related to the on-site training on network EQUIPMENT shall be provided to five (5) participants by the Winning Bidder All related expenses shall be borne by the Winning Bidder.

G. SYSTEM COMMISSIONING

After the satisfactory conclusion of the site acceptance test the winning bidder shall demonstrate the capability of the monitoring tools and network equipment for a period of 7days. The successful demonstration of the infrastructure signify that the project is being commission.

H. WARRANTIES

All workmanship, system parts, accessories, other materials and equipment and services shall be warranted by the Winning Bidder for three (1) years. The Winning Bidder shall be required to post a warranty bond in any acceptable form under the procurement law in order to assure that manufacturing defects will be corrected within the warranty period

I. AFTER SALES SUPPORT

The winning bidder shall include in its bid a commitment for (1) year support to PAGASA for the repair and maintenance of the equipment to be supplied.

J. SERVICE LEVEL AGREEMENT

Priority	**Incident**	**Description/Basic Support**	**Response Time**	**Commitment**
1	**Production or development**	An error that renders product	The winning bidder shall	The Winning Bidder will

	system down Technical Services Engineer on-site	inoperative or causes the product to fail catastrophically. Major system impact, system down. Inability to use the licensed product or a critical impact on operations requiring immediate solutions.	agree to use commercially reasonable efforts to respond to the Client's trouble calls within four (4) hours in Metro Manila area.	commit the necessary resources around the clock to resolve the situation or obtain workaround.
2	**Moderate system impact, system hanging** Technical Services Engineer on-site	An error that substantially degrades the performance of the product or materially restricts business. Ability to use licensed product, but an important function is not available and operations are severely impacted.	Within eight (8) hours in Metro Manila area.	The Winning Bidder will commit full-time resources during normal business hours to resolve the situation (or obtain workaround) and alternative resources.

K. SYSTEM DOCUMENTATIONS

The Winning Bidder shall likewise provide PAGASA with the monitoring tools and network equipment maintenance manuals. Said manuals shall contain among others the complete and detailed schematic diagrams, theory of operations, and maintenance procedures. In addition, the Winning Bidder shall provide a complete list of deliverables and installation materials.

Note: the core switch must have redundancy two each other