



Republic of the Philippines

DEPARTMENT OF SCIENCE AND TECHNOLOGY

**Philippine Atmospheric, Geophysical and Astronomical Services
Administration (PAGASA)**

TERMS OF REFERENCE

FOR THE SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF HIGH-AVAILABILITY AND SYSTEMS SECURITY OF WEATHER DIVISION IT OPERATIONS AND SERVICES

A. OBJECTIVE

The Weather Division (WD) of PAGASA undertakes continuous monitoring, analysis and prediction of atmospheric conditions and issues forecasts daily for the general public, shipping, and civil aviation. It issues warnings and bulletins on tropical cyclones and other potentially dangerous meteorological conditions for the welfare of the general public.

Primarily, the project aims to ensure continuous operation of critical computer systems and delivery of IT services. High-availability technique ensures the systems, database, and applications operate when as needed, or will automatically failover to a redundant facility to take over the operation when an active system component fails. The project will also provide necessary IT management solutions to secure WD endpoints, optimize IT-related processes, and drive WD digital transformation. Forecasting operation is highly dependent on computer systems where the forecasting tools and visualizations are installed, and continuous reliable Internet access. Without the high-availability approach, failure of any computer systems may provide unexpected disruption of service during operation.

Another possible cause of operation and service disruptions are security breaches on computer systems. These devices and underlying systems have vulnerabilities that, when exploited, undermine the daily routine computer operations and activities of the forecasters and support staff of the division. It is believed that the increase of cyber-attacks maybe due to the transition of work-from-home arrangements, and cunning of new vector attacks from hackers and other malicious groups. Reinforcing the security of WD IT system facilities will warrant the WD computer desktop and servers including data and applications, to be secured and always stay operational.

B. APPROVED BUDGET FOR THE CONTRACT (ABC)

The Approved Budget for the Contract is **TWENTY MILLION PESOS (PHP 20,000,000.00)** inclusive of VAT and all applicable government taxes.

C. DELIVERY PERIOD AND PLACE OF DELIVERY

The Winning Bidder shall deliver all hardware and software components including configurations and testing at PAGASA WFFC Building in BIR road, Quezon City within the period of ninety calendar days (90 c.d.) commencing from the date of issuance of the Notice to Proceed (NTP).

D. TECHNICAL SPECIFICATIONS AND REQUIREMENTS

The following are the requirements for the supply, delivery, install, test, and commission of the High-Availability and IT Systems Security of Weather Division IT Operations & Services.

1. SOFTWARE PACKAGES

The offered software solutions can be integrated into one dashboard and must have the following basic features and capabilities:

a) ENDPOINT MANAGEMENT AND SECURITY SOLUTION.

- 1) Must be capable of managing server and desktop workstations, including mobile devices and other IT assets, from a single management console or dashboard.
- 2) Must be capable of deploying applications, patches, software licenses, OS images, and other endpoint management procedures.
- 3) Must be capable of providing exhaustive reports on system vulnerabilities, patches, OS, and deploy periodic updates on the patch deployment status.
- 4) Must be capable of providing complete and comprehensive statistics from monitored endpoints hardware and software events.
- 5) Must be capable of scanning the endpoints regularly to detect vulnerabilities and can immediately deploy missing patches/hotfix for all systems.
- 6) Must be capable of automatic handling of patch inter-dependencies & patch sequencing.
- 7) Must be capable of automating patch deployment related to OS and other 3rd-party applications to shield Windows/Mac machines from security threats.
- 8) Must be capable of installing and uninstalling software with built-in templates for package creation.
- 9) Must have pre-defined desktop configurations including power management, USB device management, security policies, and so on.
- 10) Must be capable of deploying OS or image in both offline and online modes.
- 11) Must capable of scan and detect missing service packs of OS and applications and automate deployment to stay up-to-date.
- 12) Must capable of restricting and controlling the usage of USB Devices in the network both at the user-level and at the computer-level.
- 13) Must be capable of troubleshooting remote desktops with multi-user collaboration, file transfer, video recording, chat and more.
- 14) Must be capable of curbing insider attacks with a trusted device only policy by gaining visibility into the peripheral devices plugged to your network.
- 15) Must provide application control by blacklisting malicious applications, whitelisting business critical applications and streamline the usage of applications in your network.
- 16) Must capable of hardening browsers by filtering websites and monitoring the plug-ins, add-ons, and extensions used in your network and ensure browser compliance with security standards like STIG and CIS.
- 17) Must prevent data loss and achieve zero data-loss by mirroring, monitoring, and restricting data transfer through corporate devices.
- 18) Single installation license fee for at least 100 Endpoints and 2 User license.

- 19) Must provide at least one-day systems administrator training for up to 5 attendees.
- 20) Must provide a 3-year software maintenance, updates & support services.

b) IT OPERATIONS MANAGEMENT SOLUTION.

- 1) Must capable of obtaining get end-to-end visibility and analytics of network infrastructure including local devices, wireless network, WAN links, non-computing devices like printers and even access points.
- 2) Must capable of providing integrated troubleshooting capabilities with planning and configuration management.
- 3) Must be capable of viewing the performance, bandwidth consumption, recent device configuration changes on a single snapshot page. This is to identify and fix trouble before it impacts end users.
- 4) Must be capable of viewing in 3D on created racks with populated devices and design data center floors to mimic the data center.
- 5) Must be capable of visualizing device health, traffic flowing between departments or branch offices, application widely accessed on a link, and others.
- 6) Must be capable of notifying the system admins of any faults or troubles in the monitored system via email and SMS.
- 7) Must have Failover and Failback support. This is to ensure that the network environment is always monitored with automatic and uninterrupted secondary standby server switching.
- 8) Must have WAN link monitoring to monitor key metrics such as latency, jitter, RTT, and packet loss to eliminate network issues.
- 9) Single installation license fee for 250 Devices Pack with 2 users' license.
- 10) Must provide at least one-day systems administrator training for up to 5 attendees.
- 11) Must provide a 3-year software maintenance, updates & support services.

c) LOG AND COMPLIANCE MANAGEMENT SOLUTION.

- 1) Must have the capability to collect, manage, analyze, correlate, and search log data from monitored sources using agentless or agent-based log collection, & log importing.
- 2) Must analyze any human-readable log format with custom log parser, which can read and extract fields automatically, and allow to mark additional fields for better analysis of unsupported or third-party application log formats.
- 3) Must have built-in syslog server to configure & collects syslogs from network devices, allowing to perform syslog analysis & provide in-depth insights into security events.
- 4) Must capable of generating reports and alerts in canned, and customizable format.
- 5) Must automatically archive all collected event logs and syslogs from different devices and the server itself to be used for forensic analysis and determining performance and usage statistics of the devices.
- 6) Must capable of encrypting, hashing, or time stamping the event log archived files to ensure that the log data is secured and tampered proof for future forensic analysis.
- 7) Must perform automated periodic log auditing for bolstering security and to meet the standards of several compliance regulations.
- 8) Must have a threat detection mechanism, to detect server-related security threats, including port-scan attacks, unauthorized access on accounts, suspicious activities on the monitored devices
- 9) Single installation license fee for at least 100 Endpoints and 2 User license.

- 10) Must provide at least one-day systems administrator training for up to 5 attendees.
- 11) Must provide a 3-year software maintenance, updates & support services.

d) IP ADDRESS AND SWITCH PORT MANAGEMENT SOLUTION.

- 1) Must track all IPv4 & IPv6 addresses with periodic address space scanning and IP address monitoring using pre-defined user policy.
- 2) Must capable of scanning different subnetwork and provide availability status of the IP address if reserved, available, or in IP conflicts.
- 3) Capable in providing comprehensive insights from performance metrics and utilization of each subnet through agile tree-based hierarchy view of each subnet.
- 4) Capable of periodically scans networks & subnets to detect new systems or devices found in the network, and list all discovered systems or devices.
- 5) Capable of resolving and fetching MAC address from any SNMP-enabled node and view specific details of the discovered physical address of the device.
- 6) The MAC address tool must show the SNMP availability, IP address, DNS name, port number, community, system type, and system description.
- 7) Must have DHCP scope monitor tool to fetch all the scopes defined in the DHCP server and display the total IP addresses in each scope indicating if used or available.
- 8) IP address monitoring must capable of broadcasting periodical queries to devices and subnets, collects the detailed information and stores in the system's database for view.
- 9) Must be integrated with network switch port mapper tool to identify each switch port where the device is connected, eliminating needs to manually trace the network cables
- 10) Must have the capability to discover devices plugged into each port of a specified switch with its integrated port mapper tool.
- 11) Switch port management must have role-based administration, group scanning, switch port history & audit, intensive search, alert notifications, and report features.
- 12) Must support multi-vendor network switches like Cisco, HP, 3com, Nortel, etc.
- 13) Single installation license fee for at least 100 Endpoints and 2 User license.
- 14) Must provide at least one-day systems administrator training for up to 5 attendees.
- 15) Must provide a 3-year software maintenance, updates & support services.

e) REMOTE DESKTOP MANAGEMENT SOLUTION.

- 1) Must be capable of connecting and controlling remote desktop in LAN and in WAN. Access in WAN should be through VPN or Internet.
- 2) Must support web-based access to remote computers anywhere. Support connection to remote computer using mobile phones or tablets.
- 3) Must support locking of user's keyboard and mouse during remote session.
- 4) Must have the ability to blacken out user's screen during remote troubleshooting.
- 5) Must have the shortcuts provided for 'Ctrl+Alt+Del' and 'Alt+Tab' command.
- 6) Must have the ability to remotely transfer files across machines.
- 7) One-click access to control panel, command prompt, power options, disk cleanup, etc.
- 8) Usage of 256-bit Advanced Encryption Standard (AES) encryption protocols during remote access operations. And supports HIPAA and PCI ready remote access.
- 9) Multi-monitor support with easy switching options.
- 10) Configurable screen resolution to fit the screen size.
- 11) Must have integrated text chat as well as voice and video call to improve collaboration.
- 12) Must be capable of auditing users by shadowing their remote access session.
- 13) Must support multi-browser, and supports both Html5 Viewer and Active-X Viewer.

- 14) Must support multiple & recording remote sessions, and detects multi-monitor.
- 15) Single installation license fee for at least 100 Endpoints and 2 User license.
- 16) Must provide at least one-day systems administrator training for up to 5 attendees.
- 17) Must provide a 3-year software maintenance, updates & support services.

f) CENTRALIZED IMAGE BACKUP SOLUTION.

- 1) Must be a robust centralized backup software for enterprise and MSP, independent or stand-alone, or can be integrated to other software solution.
- 2) Must capable to manage and set backup tasks for all computers within the LAN from one central management console.
- 3) Must have backup tools for Windows system drive, computer workstations & servers, including OS, applications, and custom settings.
- 4) Must support partition backup of FAT16, FAT32, NTFS, ReFS, Ext2, Ext3, ExFAT, etc
- 5) Must capable of backing up entire hard disk to protect everything contains system, application, data, and files.
- 6) Must have automatic backup or sync for selected files and folders.
- 7) Must support backup of SQL server databases on any network connected computers, and capable of performing scheduled full/differential backup.
- 8) Must perform fast restore that once backed up, recovery from the centralized backup management console anytime to less downtime.
- 9) Must have check image feature to check the data integrity of all backup image files.
- 10) Must have space management feature scheme to automatically delete old backup, and with high data compression to get smaller image & minimize systems storage capacity.
- 11) Must be capable of full, incremental, or differential backup.
- 12) Must be capable of encrypting backup images for security purposes.
- 13) Must perform backup process set on scheduled task to automatically perform backup on specific time, or daily, weekly, or monthly.
- 14) Must provide backup tasks to unlimited numbers of computer workstations and servers, and have lifetime upgrades and support.

2. HARDWARE SPECIFICATIONS

The hardware deliverables must conform with the following minimum specifications:

a) 2 SETS OF HYPERCONVERGED SERVER APPLIANCE.

- 1) Rackmount 2U 2.5" Chassis with 8, 16 or 24 Bays
- 2) 1 x Intel Xeon Gold 6346 16-Core 205W 3.1 GHz Processor or better
- 3) Minimum memory of 12 x 64GB, TruDDR4 3200MHz (2Rx4 1.2V) RDIMM
- 4) 2 x 2.5" 800GB SAS 12Gb Hot Swap SSD (Mainstream SAS or equivalent)
- 5) 2 x M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD
- 6) 10 x 2.4TB 2.5" 10K SAS 12GB Hot-Swap HDD
- 7) At least 4 SFP+ LOM ports including 4 x SFP+ SR Transceiver
- 8) Redundant Hot-Swap Power Supply
- 9) Software installed: VMware vSphere 7 Enterprise Plus and vSAN 7 Enterprise, VMware ESXi 7.0 (Factory Installed), or latest version
- 10) Must have 5-year warranty on hardware parts, firmware & software updates, and technical support services on hardware and software.

b) 2 SETS OF HYPERCONVERGED SERVER APPLIANCE WITH GPU.

- 1) Rackmount 2U 2.5" Chassis with 8, 16 or 24 Bays
- 2) 1 x Intel Xeon Gold 6346 16-Core 205W 3.1 GHz Processor or better
- 3) 12 x 64GB TruDDR4 3200MHz (2Rx4 1.2V) RDIMM
- 4) 2 x 2.5" 800GB SAS 12Gb Hot Swap SSD (Mainstream SAS or equivalent)
- 5) 2 x M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD
- 6) 10 x 2.4TB 2.5" 10K SAS 12GB Hot-Swap HDD
- 7) At least 4 SFP+ LOM ports including 4 x SFP+ SR Transceiver
- 8) 1 x NVIDIA T4 16GB PCIe Passive GPU (Graphics Processing Unit) or better
- 9) Redundant Hot-Swap Power Supply
- 10) Software installed: VMware vSphere 7 Enterprise Plus and vSAN 7 Enterprise, VMware ESXi 7.0 (Factory Installed), GPU-acceleration libraries, and other relevant NVIDIA virtual GPU (vGPU) software.
- 11) Must have 5-year warranty on hardware parts, firmware & software updates, and technical support services on hardware and software.

c) 1 SET OF 10G SFP+ MANAGED SWITCH.

- 1) At least with 8 x 10G SFP+ fixed ports and 8 x 10G Ethernet ports.
- 2) Switching capacity and forwarding rate of at least 238 mpps (64-byte packets) and switching capacity of 320 Gbps minimum.
- 3) Layer 2 switching features: must support Spanning Tree Protocol (STP), Port grouping /link aggregation, Port-based and 802.1Q tag-based VLANs; MAC-based VLAN; protocol-based VLAN; IP subnet-based VLAN, Management VLAN, Unidirectional Link Detection (UDLD), Dynamic Host Configuration Protocol (DHCP) Relay at Layer 2, IGMP (versions 1, 2, and 3) snooping, IGMP querier, HOL blocking, and Loopback detection.
- 4) Layer 3 routing: must support IPv4/IPv6 routing, L3 interface, Classless Interdomain Routing (CIDR), RIPv2 for dynamic routing, DHCP server and relay at L3, User Datagram Protocol (UDP) relay.
- 5) Supports hardware stacking and link aggregation across multiple units in a stack.
- 6) Supports SSL for highly secured access on browser-based management GUI, and SSH.
- 7) Supports STP Bridge Protocol Data Unit (BPDU) Guard, STP Root Guard, STP Loopback Guard, DHCP Snooping, Storm control, DOS prevention, and ACLs.
- 8) Supports QoS for priority levels, scheduling, rate limiting, & congestion avoidance.
- 9) Must include all necessary patch cable (optical or copper) and modules/transceivers to connect on uplinks/downlinks and for integration on existing network.
- 10) Must have 3-year warranty on hardware parts, firmware updates, and technical support services.

d) 1 SET OF GIGABIT 48-PORT ACCESS SWITCH.

- 1) At least with 48 x Gigabit Ethernet ports and 4 x 10G SFP+ ports
- 2) Switching capacity and forwarding rate of at least 130 mpps (64-byte packets) and switching capacity of 176 Gbps minimum
- 3) Wire speed routing of IPv4 and IPv6 packets with at least up to 990 static routes and up to 128 IP interfaces
- 4) Supports configuration of L3 interface on physical port, Link Aggregation (LAG), VLAN interface, or loopback interface

- 5) Supports classless interdomain routing & RIPv2 for dynamic routing.
- 6) Flexible routing control to direct packets to different next hop based on IPv4/IPv6 ACLs
- 7) Can function as an IPv4 DHCP server serving IP addresses for multiple DHCP pools/scopes, and support DHCP options
- 8) Capable of relaying DHCP traffic across IP domains & broadcast information across L3 domains for application discovery or relaying of Bootstrap Protocol (BOOTP) packets.
- 9) Must include all necessary cable (optical or copper) and modules/transceivers to connect on uplinks and downlinks. This is to integrate the system on existing network.
- 10) Must have 3-year warranty on hardware parts, firmware updates, and technical support services.

e) 1 SET OF MULTI-WAN FIREWALL ROUTER.

- 1) Must have at least 3 GE LAN and 3 GE WAN ports with load balancing, automatic hot failover, and LAC NIC bonding
- 2) The WAN load balancing features must have: Intelligent Failover, Session Persistence, Per-Service Load Distribution, and Multiple Algorithms (Weighted, Enforced, Persistence, Priority, Overflow, Least Use and Lowest Latency).
- 3) WAN ports must support PPPoE, Static IP, DHCP; WAN Link Health Check by PING, DNS Lookup, or HTTP; Bandwidth Allowance Monitor, IPv6; Support for USB 4G/3G Modem; Support for Dynamic DNS services.
- 4) LAN ports must have DHCP Server for LAN Clients; Extended DHCP Option; DHCP Reservation; DNS Proxy for LAN Clients; and VLAN on LAN Support.
- 5) Security features must have DoS Prevention, Stateful Firewall, & Web Blocking.
- 6) Stateful firewall throughput of at least 1Gbps and VPN throughput of 150Mbps.
- 7) Supports IPSec, L2TP, PPTP, Site-to-site VPN, 256-bit AES Encryption, Pre-shared Key Authentication, OpenVPN Server.
- 8) With have a 3-year warranty on hardware parts, firmware updates, and technical support services.

f) 1 SET OF UNINTERRUPTIBLE POWER SUPPLY.

- 1) Form factor must be in 3U rack or tower.
- 2) Topology: Online, double conversion, sinewave output
- 3) Must have VA/Watts rating: At least 6000 VA / 5400 W
- 4) Online mode up to 94% & high efficiency mode up to 98%
- 5) Input voltage of 200-240 V AC and input frequency of 50/60 Hz
- 6) Must have maximum input amperage of 30 A
- 7) Output voltage settings of 200/208/220/230/240 V AC & output frequency of 50/60 Hz
- 8) Output power capacity of 200-240 V AC: 6000 VA / 5400 W
- 9) Battery type: Valve Regulated Lead Acid (VRLA): Maintenance-free, sealed, leak-proof
- 10) Battery management: ABM technology or temperature-compensated charging method (user selectable), automatic battery test and deep discharge protection, automatic recognition of external battery units, or equivalent features
- 11) With USB port (Type B), RS-232 serial port (RJ-45), Ethernet port (RJ-45), graphical LCD, and LED indicators for Online/On-Battery/Bypass/Fault
- 12) With have a 3-year warranty on hardware parts, firmware updates, and technical support services.

g) 3 SETS OF DESKTOP COMPUTER.

- 1) 12th Generation Intel® Core™ i9-12900 vPro Processor (2.40 GHz up to 5.10 GHz)
- 2) 2 x 16 GB DDR5-4400MHz (UDIMM) memory
- 3) 1TB GB Solid State Drive M.2 2280 PCIe Gen4
- 4) Integrated Intel Gigabit Ethernet RJ45 port or equivalent
- 5) Intel Wireless-AC9560 2x2 AC + Bluetooth 5.0 or equivalent
- 6) Three (3) sets of LED-backlit LCD monitor 22", Full HD 1920 x 1080
- 7) USB-C 4 Front and 4 Rear USB ports
- 8) USB keyboard, English, black and USB optical mouse (pad included), black
- 9) USB Stereo Headset with built-in noise cancelling mic and easy call management and audio clarity for optimized voice call
- 10) Full HD Webcam with resolution of up to 1920 x 1080, frame rate up to 30 FPS, pixels 2 million, view angle at least 83°, USB 2.0 interface
- 11) Include with UPS with surge protector, 650VA, Nominal input voltage 230V, Input frequency 50/60Hz +/-1Hz (Auto-sensing), maintenance-free sealed battery
- 12) Include with computer desk, MDF table top, metal frame, with dimensions of at least L120cm x W60cm x H74cm
- 13) Software installed: Windows 11 Pro 64 English, Office Home & Business 2021 (one-time purchase), licensed & latest version of Adobe Acrobat PDF reader, WinRAR, and subscription license for bundled EdrawMax + EdrawMind.
- 14) With 1-year warranty on parts, firmware updates, and support services.

h) 3 SETS OF NOTEBOOK COMPUTER.

- 1) Intel® Core™ i7-12700H Processor 2.3 GHz (24M Cache, up to 4.7 GHz, 6P+8E cores)
- 2) 16GB LPDDR5 memory and 1TB M.2 NVMe PCI 4.0 Performance SSD
- 3) With display of at least 14.0-inch, 2.8K (2880 x 1800) OLED 16:10 aspect ratio, LED Backlit, 0.2ms response time, 90Hz refresh rate
- 4) Backlit Chiclet Keyboard, 1.4mm Key-travel, Support NumberPad
- 5) Compact wireless mouse, smooth optical tracking, 3-button w/ scrolling, 2.4GHz wireless connection w/ unifying USB receiver, mousepad & 1 x AA battery included
- 6) I/O ports: 1 x USB 3.2 Gen 2 Type-A, 2x Thunderbolt™ 4 supports display / power delivery, 1x HDMI 2.0b, 1x 3.5mm Combo Audio Jack, Micro SD card reader
- 7) Network and Communication: Wi-Fi 6E(802.11ax) (Dual band) 2*2 + Bluetooth 5
- 8) Type-C, 100W AC Adapter, Output 20V DC, 5A, 100W, Input: 100~240V AC 50/60Hz U
- 9) Software installed: Windows 10/11 Pro, Office Home & Business 2021 (one-time purchase), licensed & latest version of Adobe Acrobat, and WinRAR
- 10) Must include with portable external HDD, at least 1TB, USB 3.0 or Firewire 800, serial bus transfer rate (USB 2.0) at 480 Mb/s or (1394b) at 800 Mb/s.
- 11) Must include with USB 3.0 to RJ45 Gigabit Ethernet Adapter cable, and USB to RJ45 Console RS232 Serial Adapter cable.
- 12) Must include with casual backpack for notebook, lightweight, black
- 13) With 1-year warranty on parts, firmware updates, and support services.

i) 2 SETS OF INK TANK PRINTER.

- 1) Print Method: On-demand inkjet (Piezoelectric)
- 2) Maximum Print Resolution: 5760 x 1440 dpi (with Variable-Sized Droplet Technology)
- 3) Minimum Ink Droplet Volume: 3pl
- 4) Print Direction: Bi-directional printing, Uni-directional printing

- 5) Standard Paper Input Capacity: Up to 100 sheets, A4 Plain paper (75g/m2), and up to 20 sheets, Premium Glossy Photo Paper
- 6) Output Capacity: Up to 50 sheets, A4 Plain paper, 30 sheets, Glossy Photo Paper
- 7) Maximum Paper Size: 12.95 x 44"
- 8) Paper Sizes: A3+, A3, B4, A4, A5, A6, B5, 10x15cm (4x6), 13x18cm (5x7"), 16:9 wide size, Letter (8.5x11"), Legal (8.5x14"), Half Letter (5.5x8.5"), 9x13cm (3.5x5"), 13x20cm(5x8"), 20x25cm(8x10")
- 9) Paper Feed Method: Friction feed
- 10) With extra 2 sets of Ultra High-Capacity refill or replacement ink bottles
- 11) With 1-year warranty on parts, firmware updates, and support services.

j) **2 SETS OF KVM OVER IP SWITCH.**

- 1) 8-Port USB VGA Rack KVM Over IP Switch
- 2) 1-Local/Remote Share Access
- 3) 1 x RJ-45 LAN Port and 1 x USB Type A
- 4) Port selection: OSD/GUI, Hotkey, Push Button
- 5) LED indicators for Online, Selected, Power, and LAN port
- 6) 1 x 2-digit, 7-segment Station ID LED
- 7) Include 5 sets of compatible USB KVM cable, at least 1.2M length
- 8) Include rack mounting kit
- 9) With 1-year warranty on parts, firmware updates, and support services.

E. **SCOPE OF WORKS**

The following are the minimum tasks and configurations to be perform by the Winning Bidder:

1. Prior to deployment, kick-off meeting with PAGASA team shall be held to discuss the following: system overview, assignment of tasks, implementation phase, configuration requirements, timeline, progress reports, and other pre/post activities.
2. Setting-up and configuration of high-availability hyperconverged system with failover & failback mechanism including the integration of existing VMware hyperconverged infrastructure.
3. Conversion and migration of physical computer workstations and servers into a virtual machine (VM) using the VMware Converter for P2V. The VMs will serve as a cold or hot backup.
4. Using VMware vSphere vMotion, selected live virtual machines from existing vSphere host shall be move to this new vSphere host without disrupting the running applications.
5. Creation of virtual machines, primary and backup, as on-prem servers for IT management and security solutions. To be setup and configured with high-availability features.
6. Deployment of management and security solutions including the discovery of endpoints and devices for monitoring from centralized dashboard.
7. Perform configuration of system, general settings, administration, security including mail server setting for email notifications and alerts.
8. Check and validate policies on rule management and reports.
9. Conduct server testing and burn test performance review including quality test, errors and fixes.
10. Conduct knowledge transfer, go live, and documentations.

F. DATA NETWORK CONNECTIVITY

To integrate the system to the existing PAGASA network, the Prospective Bidder shall coordinate with the technical IT personnel of WFFC building regarding the location of data cabinet where the equipment specifically the server appliance, switches, and UPS will be installed and the provisioned uplink switch port where the system's data communication will be connected. This will include the IP configurations. The Prospective bidder shall conduct ocular visit to NOC server room at PAGASA WFFC building, where the equipment will be installed. All necessary networking peripherals, accessories, switch modules, and network cables for the connectivity of the system facility to the existing local area network (LAN) and all expenses incurred thereof must be shouldered by the Winning Bidder.

G. ELECTRICAL REQUIREMENTS

The Prospective Bidder shall coordinate with the Electrical group of Engineering and Technical Services Division (ETSD) Central Office regarding the electrical layouts, electrical accessories, electrical wires, distribution box and other peripheral needs for tapping the system's UPS to the electrical source.

The Prospective Bidders are advised to conduct ocular survey to NOC server room and electrical power room at PAGASA WFFC building because all expenses incurred for the integration of the system to the building's electrical system must be shouldered by the Winning Bidder. They must submit all necessary electrical plans, diagrams, and other documents as required and approved by the Electrical group of ETSD.

H. TRAINING REQUIREMENTS

To provide knowledge and proficiency, the Winning Bidder must provide a comprehensive training for personnel who will manage the system as recommended by the end-user or the project proponent. The training workshop can be conducted through face-to-face, online classroom-type, online self-phased, or hybrid environment. If conducted in face-to-face environment, the Winning Bidder must provide the training participants with meals, transportation allowance (if outside PAGASA office), and necessary health test/certificate expenses. If conducted in online environment, the Winning Bidder must provide the training participants with voucher meals. The training workshop shall include visual demonstrations and interactive simulations labs.

The Cybersecurity Incident Response training will provide the participants necessary knowledge and skills in monitoring and detecting security incidents in information systems and networks, and executing proper response to such incidents. It shall provide tools and tactics to manage cybersecurity risks, identify various types of common threats, evaluate the organization's security, collect, and analyze cybersecurity intelligence, and handle incidents as they occur. It also aims to promote a comprehensive approach to assess and respond to security threats and operate a system and network security analysis platform. The 5-day workshop will be attended by at least 5 participants.

The Security Operation Centre (SOC): Network with Threat Detection and Analysis workshop will provide the participants advanced skills to detect, analyze, respond to, report on, and prevent

cybersecurity incidents using sophisticated detection and prevention technologies. It is one of the first few steps to do and take proactive approach to network and infrastructure security. The 5-day workshop will provide the participants a firm understanding of Network Security Threats using non-vendor biased technology and to create actionable intelligence which could provide advanced preparation on the likelihood of attacks. The 5-day workshop will be attended by at least 5 participants.

The VMware Hyperconverged training will provide extensive hands-on training that primarily focuses on installing, configuring, and managing the VMware vSphere 7, which include ESXi 7 and vCenter Server 7. The training, with certification included, will provide the designated system administrators the necessary skills in administering the vSphere infrastructure. The 5-day workshop will be attended by at least 2 personnel who will directly manage the hyperconverged system.

I. SITE ACCEPTANCE TEST, SYSTEM COMMISSIONING AND DOCUMENTATION

The Site Acceptance Test (SAT) shall be conducted at NOC server room, WFFC building. The purpose of the test is to verify the functioning and performance of the system in accordance with the specifications and functional requirements. The series of tests must be based on a detailed checklist test provided by the Winning Bidder and to be performed by the technical team of the end-user. The SAT must be witnessed by at least one middle and/or top management staff from the Weather Division (WD).

After the satisfactory conclusion of the Site Acceptance Test, the Winning Bidder shall show, operate, and demonstrate the capability and performance of the commissioned system facility. Acceptance tests shall also be conducted on other components such as the UPS, switches, printers, and desktop workstations. The successful demonstration based on acceptance checklist thereof, shall mean that the system has been successfully commissioned.

Furthermore, the Winning Bidder shall provide installation, operations, and maintenance manuals to the end-user. The manuals shall include the system configuration of the software and hardware packages. It shall also contain among others the complete and detailed schematic diagrams, systems management, operations, and maintenance procedures. All other relevant documents pertaining to the project shall also be turned-over to PAGASA prior to the issuance of Final Inspection and Acceptance report.

J. WARRANTIES AND AFTER-SALES SUPPORT

All workmanship, system components, accessories, and services shall be warranted by the Winning Bidder and shall have 3-year maintenance support and services warranty on software packages, hyperconverged server appliance, switches, and UPS. The desktop computers, printers, and UPS shall have at least 1-year warranty on parts, support, and services.

Software and firmware updates, replacement parts or units must be available immediately during the warranty subscription period. Technical support services 24/7 via telephone, text, and email, which include Remote Access Assistance thru Internet web or VPN access must also be readily available.

