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TERMS OF REFERENCE

SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF NETWORK EQUIPMENT AND STRUCTURED CABLE SYSTEM

I. BACKGROUND

The Maritime Industry Authority (MARINA) was created on 01 June 1974 as an attached Agency to the Office of the President (OP) with the issuance of Presidential Decree No. 474, otherwise known as the Maritime Industry Decree of 1974, to integrate the development, promotion and regulation of the maritime industry in the country and the creation of the Ministry (now Department) of Transportation (DOTr) by virtue of Executive Order No. 546, the MARINA was attached to the DOTr for policy and program coordination on 23 July 1979.By virtue of Republic Act No. 10635, the Maritime Industry Authority (MARINA) is established as the "Single Maritime Administration" responsible for the implementation and enforcement of the 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as amended, and International Agreements or Covenants related thereto.

The project shall cover the supply, delivery, installation, configuration, testing and implementation of structured cabling for the new MARINA Building, but shall not be limited to the following:

1. Assessment of Existing Condition
2. Installation of Voice, Data and Electrical Connection
3. Delivery, Installation and Configuration of Environmental Monitoring System
4. Delivery, Installation and Configuration of PDUs (Raised Floor)
5. Delivery, Installation and Configuration of Air Cooling System
6. Delivery, Installation and Configuration of Security Access for Data Center using Biometric.
7. Securing Work Permits

II. OBJECTIVE

Installation of Structured Cabling System (Voice and Data) and Electrical, Network Components, Raised Flooring, Fire Suppression System, Environmental Monitoring System, and Door Access System for the MARINA data Center. To be installed at the New MARINA Central Office Building located at Port Area, Manila.

III. APPROVED BUDGET FOR THE CONTRACT

The Approved Budget for the Contract (ABC) is Nineteen Million Five Hundred Thousand Pesos (₱19,500,000.00) through the General Appropriations Act of 2018 Capital Outlay inclusive of all government taxes and charges.

IV. VENDORS QUALIFICATIONS

1. The Bidder shall have at least 10years' experience in undertaking similar project.
2. Must have an updated valid accreditation and registered to Philippine Contractors Accreditation Board (PCAB) with at least Category B Communication facilities

3. The Bidder must have an employed Certified Project Management Professional (PMP) or its equivalent. Must attach valid certification certified true copy by the issuing entity.
4. The Contractor must have at least One Licensed Electrical Engineer and One Licensed Electronic Communication Engineer who are currently employed in the contractor's company trained and certified in the design and installation of cabling system.
5. Additional post qualification requirements:
    - Letter from the Cabling System Manufacturer that it manufactures end-to-end structured cabling system copper and fiber optic cables and their associated connecting hardware.
    - Certification from Manufacturer's main/regional office stating that the contractor is an Authorized Business Partner and Certified Installer of the Brand being offered (Switches andcabling).

V. SCOPE OF WORK AND DELIVERABLES

The contractor shall furnish all labor, materials, tools and equipment, and perform all operations necessary to complete the supply, delivery, installation, testing and commissioning of Structured Cabling for a minimum of 863Data, 212 Voice and 863 Electrical and Network Switches and renovation of MARINA's Data Center.

Detailed Scope of Work: StructuredCabling

1. Supply of labor, delivery and installation of various network equipment, cable and components for a minimum of 863Data, 212 Voice and 863 Electrical
2. Conduct of site survey and provisions of appropriate site specifications for the suppliedequipment.
3. Submission of the Bill of Materials for the project including software and hardware and its related networkarchitecture.
4. Provision of the in-house wiring, including the Telco lines, from the cable entrance to the network rack where the modem, routers and switches are located.
5. Supply delivery and pulling of Category 6A UTP cable and Fiber optic cable
6. Supply, delivery and installation of metal support for Cable Gutter, PVC conduits and other consumables
7. Testing and commissioning of installed components Migration to new cabling environment/equipment and components

OTHER REQUIREMENTS

The bidder should conduct actual site visit, they should submit a time-line (Gantt chart) of activities as part of technical proposal.

VI. DELIVERABLES

NR	PARTICULARS	QTY	UNIT
1.	Fiber Core Switch	1	unit
2.	Core Switch (Backbone Switch)	1	unit
3.	POE Distribution Switch (Edge Switch) 48 Port	18	units
4.	POE Distribution Switch (Edge Switch) 24 Port	15	units
5.	Server (Rack Mountable) with Operating System	3	units
6.	Rack (Data) Cabinet	2	unit
7.	Intermediate Distribution Frame (3' x 19")	10	units
8.	Uninterruptible Power Supply 6000VA (UPS)	2	units
9.	Uninterruptible Power Supply 2000VA (UPS)	22	units
10.	Firewall	1	unit
11.	Wireless Controller	1	unit
12.	Access Point (wireless)	20	units
13.	Wireless LAN Security	1	unit
14.	Wireless Management	1	unit
15.	Centralized Log and Analysis Appliance	1	unit
16.	Raised Flooring for the Data Center		
17.	Fire Suppression Systems		
18.	Environmental Monitoring System		
19.	Door Access System		
20.	Structured Cable System 863 Voice, 212 Data and 863 Electrical		

V. TECHNICAL SPECIFICATIONS

NETWORK EQUIPMENT

1. Fiber Core Switch

a. Must be designed with power-saving features including Energy **Efficient Ethernet (IEEE 802.3az), which will reduce per port power** consumption considerably when the link is idle, or if ports are inactive, as well as 80 PLUS certified power supplies and multi-speed fan operation, which together help decrease Cooling and power costs

b. Can deliver up to 285.7 Mbps throughput and a data rate of up to 480 Gbps (full duplex) for both Layer 2 and Layer 3 environments.

c. With lifetime warranty which guarantees Basic Hardware Service (repair or replacement) for life

d. 16 SFP+ fixed 1000/10000 SFP+; 1000BASE-T Full

e. IPv6 Ready Certified

f. Switch Fabric Capacity 508 Gbps, Up to 64,000 MAC Addresses

g. Memory and Processor: Dual Core @ 1.2GHZ, 4GB
h. Web-based management interface, IMC – Intelligent Management Center;Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro USB)
i. IEEE 802.1Q tagging and port-based, up to 1,000 user-configurable VLANs
j. Redundant Power Supply
k. Two (2) Years Warranty
l. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

2. <u>Core Switch</u>

a. Must be designed with power-saving features including Energy Efficient Ethernet (IEEE 802.3az), which will reduce per port power consumption considerably when the link is idle, or if ports are inactive, as well as 80 PLUS certified power supplies and multi-speed fan operation, which together help decrease Cooling and power costs
b. With lifetime warranty which guarantees Basic Hardware Service (repair or replacement) for life
c. 48 RJ-45 autosensing 10/100/1000 ports
d. Memory and Processor: Dual Core at 1.2GHz, 4GB
e. Web-based management interface, IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro USB)
f. IEEE 802.1Q tagging and port-based, up to 1,000 user-configurable VLANs
g. Redundant Power Supply
h. Two (2) Years Warranty
i. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand
j. Can deliver up to 285.7 Mpps throughput and a data rate of up to 480

Gbps (full duplex)

k. Switch Fabric Capacity 338 Gbps, Up to 64,000 MAC Addresses

l. Includes 4-port stacking module and stacking cable

3. <u>Distribution Switch (48 Port)</u>

a. Offering 48 built-in copper Gigabit Ethernet ports in a 1U form factor, which offers additional flexibility with its four SFP transceiver slots, which can be used in lieu of up to four copper ports to support fiber media

b. Must be easy-to-use embedded Web interface as well as an industry-standard Command Line Interface (CLI), which allows network administrators to utilize existing witch configuration skills. The switches can be managed remotely via a Web browser, Telnet or Simple Network Management Protocol (SNMP), and support a comprehensive agement Information Base (MIB) as well as four RMON groups.

c. Must be a centralized management of the network infrastructure, the switches also support remote logging via syslog. This broad management support eases the tasks of network management and ensures integration into a variety of third party network management applications.

d. Network traffic prioritization is a key requirement for deploying emerging applications like videoconferencing and voice-over-IP.

e. Packets can be classified based on the Layer 2 IEEE 802.1p standard as well as the Layer 3 IP Precedence or IP Differentiated Services Code Point (DSCP) standard. These capabilities help increase deployment flexibility and protect networking infrastructure investments

f. Up to 256 VLANs are supported, enabling limitation of broadcast domains as well as improved network security

g. GVRP (GARP VLAN Registration Protocol) provides for dynamic port-based VLAN configuration as per IEEE 802.1Q, and helps reduce administrative tasks associated with static VLANs. Other advanced features include port mirroring, dynamic link aggregation (LACP) and IP multicast support (IGMP v1 and v2).

h. Switch access password protection

i. Port-based MAC address alert and lock-down

j. RADIUS support for switch management access

k. SSL/SSH encryption for switch management traffic

l. SNMP access filtering

m. Redundant Power Supply

n. Two (2) Years Warranty

o. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

4. Distribution Switch (24 Port POE)

a. 24 RJ-45 autosensing 10/100/1000 ports in a 1U form factor, which offers additional flexibility with its SFP transceiver slots, which can be used in lieu of up to four copper ports to support fiber media
b. Must be easy-to-use embedded Web interface as well as an industry-standard Command Line Interface (CLI), which allows network administrators to utilize existing witch configuration skills. The switches can be managed remotely via a Web browser, Telnet or Simple Network Management Protocol (SNMP), and support a comprehensive agement Information Base (MIB)
c. Must be a centralized management of the network infrastructure, the switches also support remote logging via syslog. This broad management support eases the tasks of network management and ensures integration into a variety of third party network management applications.
d. Network traffic prioritization is a key requirement for deploying emerging applications like videoconferencing and voice-over-IP.
e. Packets can be classified based on the Layer 2 IEEE 802.1p standard as well as the Layer 3 IP Precedence or IP Differentiated Services Code Point (DSCP) standard. These capabilities help increase deployment flexibility and protect networking infrastructure investments
f. Up to 256 VLANs are supported, enabling limitation of broadcast domains as well as improved network security
g. GVRP (GARP VLAN Registration Protocol) provides for dynamic port-based VLAN configuration as per IEEE 802.1Q, and helps reduce administrative tasks associated with static VLANs. Other advanced features include port mirroring, dynamic link aggregation (LACP) and IP multicast support (IGMP v1 and v2).
h. Switch access password protection
i. Port-based MAC address alert and lock-down
j. RADIUS support for switch management access
k. SSL encryption for switch management traffic
l. SNMP access filtering
m. Redundant Power Supply
n. Two (2) Years Warranty
o. ARM Cortex-A9 @ 400 MHz, 256 MB
p. Throughput: 38.6 Mpps
q. Switching Capacity: 52 Gbps, 8000 entries
r. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

5. Distribution Switch (24 Port Non POE)

a. 24 RJ-45 autosensing 10/100/1000 ports in a 1U form factor, which offers additional flexibility with its SFP transceiver slots, which can be used in lieu of up to four copper ports to support fiber media
b. Must be easy-to-use embedded Web interface as well as an industry-standard Command Line Interface (CLI), which allows network administrators to utilize existing witch configuration skills. The switches can be managed remotely via a Web browser, Telnet or Simple Network Management Protocol (SNMP), and support a comprehensive agement Information Base (MIB)
c. Must be a centralized management of the network infrastructure, the switches also support remote logging via syslog. This broad management support eases the tasks of network management and ensures integration into a variety of third party network management applications.
d. Network traffic prioritization is a key requirement for deploying emerging applications like videoconferencing and voice-over-IP.
e. Packets can be classified based on the Layer 2 IEEE 802.1p standard as well as the Layer 3 IP Precedence or IP Differentiated Services Code Point (DSCP) standard. These capabilities help increase deployment flexibility and protect networking infrastructure investments
f. Up to 256 VLANs are supported, enabling limitation of broadcast domains as well as improved network security
g. GVRP (GARP VLAN Registration Protocol) provides for dynamic port-based VLAN configuration as per IEEE 802.1Q, and helps reduce administrative tasks associated with static VLANs. Other advanced features include port mirroring, dynamic link aggregation (LACP) and IP multicast support (IGMP v1 and v2).
h. Switch access password protection
i. Port-based MAC address alert and lock-down
j. RADIUS support for switch management access
k. SSL encryption for switch management traffic
l. SNMP access filtering
m. Redundant Power Supply
n. Two (2) Years Warranty
o. ARM Cortex-A9 @ 400 MHz, 256 MB
p. Throughput: 38.6 Mpps
q. Switching Capacity: 52 Gbps, 8000 entries
r. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

6. Server (Rack Mountable)

a. Intel® Xeon® E5-2620 2.00GHz, 15M Cache, 7.2GT/s QPI, Turbo, 6C, 95W, Max Mem 1333MHz
b. 8x8GB RDIMM, 1333 MT/s, Low Volt, Dual Rank, x4 Data Width
c. 2.5" Chassis with up to 8 Hard Drives
d. 2x146GB 15K RPM SAS 6Gbps 2.5in Hot-plug Hard Drive (RAID 1Configuration)
e. DVD ROM, SATA,
f. PERC H310 Integrated RAID Controller Dual Gigabit Ethernet
g. Server Management Express
h. Broadcom 5720 QP 1Gb Network Daughter Card
i. vSphere Standard v5.x 2CPU License, 3Y Subscription w/Dwngrd Rights
j. VMware ESXi v5.1U1 Embedded Image on Flash Media
k. Internal Dual SD Module with 2GB SD Card
l. Dual, Hot-plug, Redundant Power Supply (1+1), 495W
m. Warranty: 3 Year ProSupport and NBD On-site Service
n. Ready Rails™ Sliding Rails With Cable Management Arm
o. Certified to operate/run at up to 45 degree Celsius2U Rack Mounted
p. Dual SD card module to store the VmwareESXi Installer and for redundancy
q. Integrated Server management
r. Has Support for Intel Quick Path Interconnect (QPI) link: 6.4 GT/s; 7.2 GT/s; 8.0 GT/s
s. Must be have an interactive LCD panel in front of the server- This will tell the real status of the Server
t. Five (two front, two rear, one internal) USB Ports
u. Microsoft Windows Server 2013 (open licensed package)
v. Microsoft Exchange 2010
w. Must have a toll free hotline for Phone Support

7. Rack (Data) Cabinet

a. 4u Rack Cabinet Size, form factors adhere to the EIA-310-E standard for rack mounting of electronics
b. 42 U Height
c. Brand Must be the same as the Server
d. Must have removable tail-bars at both top and bottom of the rear of the rack
e. Can Accommodate four full height PDU's at rear of rack
f. Tool less PDU Mounting kit
g. Must include the 1U KVM Console with 18.5" LED Display
h. Designed for maximum airflow and the reduction of thermal issues, which means greater efficiency and power savings for your data center
i. Must Include the PDU to support all the Devices (Server, Storage, Switches)

8. Rack (Data) Cabinet *(3' x 19")*

a. 3ft, Standard 19 inch Enclosed Cabinet Rack
b. 600 mm width and 800 mm depth
c. Bare Structure with 4 vertical channels
d. Detachable side panels with lock
e. Swing out rear door with lock
f. Top panel with four (4) exhaust fans
g. Cable ladder with bridal rings
h. Swing out mounting channels
i. Electrical Power Strip
j. Clip nuts included

9. Uninterruptible Power Supply (UPS) 6000VA

a. Runtime of at least *15 minutes* at full load with input transformer
b. Load capacity of 6000VA 20kw True on Line Double Conversion
c. LAN capable
d. Includes monitoring software and related cables
e. Supports hot-swap battery with over-load indicator lights
f. True Online Double Conversion UPS System
g. Input and Output Voltage at 220 VAC with 60Hz; 3-phase in/out
h. No Load Shutdown
i. Related cables and accessories
j. Comes complete with sealed free-maintenance batteries
k. UPS battery must have at least 1-year warranty
l. Bundled with Redundant Parallel Architecture (RPA) Kit

10. Uninterruptible Power Supply (UPS) 2000VA

a. Runtime of at least *12 minutes*
b. Load capacity of 2000VA at 230V
c. Built-in Automatic Voltage Regulator
d. True online double conversion UPS System Software for UPS management
e. Related cables and accessories

11. Firewall

Must be unified threat management and have superior protection for MARINA applications and information assets using industry-leading IPS, firewall, and VPN technology. Firewall protection by blocking threats including worms, trojans, viruses, denial of service, distributed denial of service, reconnaissance, and attacks against operating system and application vulnerabilities. Antivirus, anti-spam, anti-spyware, anti-phishing, web content and URL filtering, ALG, LAN/WAN bandwidth optimization and other advanced content security services for additional layers of protection.

Interfacing Requirements

- Shall support at least 6 x 10/100/1000 GE Interfaces

Industry compliant

- Shall be compliant with EAL4+ Common Criteria Assurance Level

Capacity Requirements

- Shall support a sustained Firewall throughput of the firewall system without packet drop of at least 2.75 Gbps and above
- Shall support a sustained Gateway Antivirus throughput of the firewall system without packet drop of at least 690 Mbps and above
- Shall support a sustained Intrusion prevention throughput of the firewall system without packet drop of at least 1.4 Gbps and above
- Shall support a sustained Gateway level Anti-spyware throughput of the firewall system without packet drop of at least 690 Mbps and above
- Shall support a sustained Deep Packet Inspection (DPI/UTM) throughput of the firewall system without packet drop of at least 600 Mbps and above, with the following functions turned on simultaneously: Gateway Antivirus, Antispyware and Intrusion prevention
- Shall support at least 500,000 maximum firewall connections and 250,000 maximum DPI/UTM connections
- Shall support at least 10,000 new firewall connections per second
- Shall support a sustained 3DES/AES IPSEC VPN throughput of the firewall system without packet drop of at least 1.0 Gbps and above

Warranty and Support

- 3 Years Hardware Warranty & RMA with Exchange
- 24x7 Enhanced Plus Support via Telephone & Email
- Free Security Updates and Patches

12. Wireless Controller

a. WLAN controller must be located at MARINA's Data Center
b. WLAN controller should be an enterprise-class switch and scalable which will connects, controls, manage and intelligently integrates wireless Access Points (WAPs) and RF Monitors into the wired LAN.
c. WLAN controller must support 802.11n with backward compatibility to a/b/g
d. WLAN controller must support 802.11n WAP with backward compatibility to a/b/g
e. Uplink port that supports;
a. 10/100/1000Mbps (10/100/1000Base-T) copper port
f. All ports automatically sense and negotiate speed, duplex, and MDI/MDX Settings
g. High-speed Layer-2/Layer-3 packet forwarding
h. The WLAN controller must support seamless roaming across MARINA'S subnets
i. To maintain the health of WLAN, controller must capable of monitoring Switch and control the wireless network to reconfigure access point parameters as needed to maintain high service levels
j. WLAN controller must perform tasks such as client authentication, policy enforcement, configuration control, fault tolerance and network expansion.
k. High-performance packet processing provides value-added wireless services such as load balancing, rate limiting, self-healing, calibration, authentication, mobility, security, firewalls, encryption, intrusion detection and mitigation, centralized monitoring and configuration
l. WLAN controller must work seamlessly with all the wired LAN equipment
m. WLAN controller must support multiple APs per MARINA's building and offices and multiple users and sessions.
n. The controller firmware can be easily upgraded, as future software releases are made available
o. The controller must support 802.11e and Quality of Service (QoS)
p. The controller must support redundancy
q. Can be mounted in a standard 42U (19-inch) network equipment rack
r. Mounting kits and railings must included
s. Two (2) Years Warranty
t. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

13. Wireless Access Point

a. Locations of Wireless Access Points (WAPs) in all buildings and offices must be optimal to achieve total performance desired throughput.
b. WAPs have to be small, lightweight and can be securely deployed in a variety of locations such as on walls, cubicles, desktops, and in the ceiling.
c. The WAP antenna diversity should allow for the best possible signal processing using dual, Omni-directional antennas and directional antennas and other type of antennas that will assure signal strength in all areas.
d. WAPs should work with centralized wireless controllers to provide a high performance, centrally managed, wireless mobility solution for MARINA network. WAPs should have an extended lifespan and can be configured manually or automatically across any L2/L3 network, allowing easy upgrades when new features, capabilities, or standards emerge.
e. WAPs should function as “thin” WAPs which would provide 802.11n with backward compatibility to a/b/g user access. Functions should also include but not limited to wireless user authentication, link layer encryption, VPN termination. Support roaming and low-latency handoffs between APs, ideal for handling delay-sensitive applications such as voice over wireless.
f. WAP 802.11 services must be controllable
g. WAPs must supports operation in the radio frequency bands that will take advantage of higher density AP deployment, better overlapping coverage and reduced interference from other technologies (medical equipment, microwave ovens, cordless phones, Bluetooth devices)
h. WAPs activity must be coordinated by a wireless centralized controller
i. RF Management software must be available to automatically support channel selection, power levels, load balancing and failover
j. WAPs must support Power-over-Ethernet standard 802.3af
k. WAPs must supports 802.11e and Quality of Service (QoS)
l. WAPs must support access via Ethernet
m. Globally known brand distributed in the Philippines via a locally declared company with global standard certifications like ISO, ITIL and D&B and engineers certified of the said brand

14. Wireless LAN Security

WLAN security design and implementation must secure all MARINA DATA that passes thru Radio Frequency.

a. The WLAN solution must support separation of MARINA enterprise users (wired and wireless) and guest users
b. The WLAN solution must support 802.1X, IEEE standard for port-based network access control
c. The WLAN solution must support RADIUS, Active Directory and other authentication server.
d. The WLAN solution must support wide range and robust authentication

mechanism.

e. The WLAN solution must support different type of encryptions (data and voice)
f. The WLAN solution must support 802.11i, standard specifying increased security mechanisms for wireless networks
g. The WLAN solution must have strong security on Denial of Service (DoS),
   - Distributed Denial of Service (DDoS), Sniffing, Spoofing and Session
   - Hijacking, Eavesdropping, Man-in the-Middle attack and other wireless attacks that will compromise MARINA.
h. The WLAN solution must support;
   - Rouge APs detection and blocking of detected rouge APs
   - The solution supports rouge AP scan by schedule, by radio and by channel
   - Scan parameters for rouge APs must be configurable
i. The solution must support WPA in both enterprise and pre-shared, WEP with static and dynamic keys and other stronger authentication/encryption mechanism

14. Centralized Log and Analysis Appliance

- Minimum System FeaturesRequirement

  a. A real-time network logging, analyzing, and reporting systems is a series of dedicated hardware solutions that securely aggregate and analyze log data from firewall security appliances.
  b. Provides network administrators with a comprehensive view of network usage and security information, supporting the needs of enterprises and service providers responsible for discovering and addressing vulnerabilities.
  c. Minimizesthe effort required to monitor and maintain acceptable use policies, to identify attack patterns and prosecute attackers, and to comply with governmental regulations regarding privacy and disclosure of securitybreaches.
  d. Accept and process a fullrange of log records provided by Firewall systems, including traffic, event, virus, attack, content filtering, and email filtering data.
  e. Provides advanced security management functionssuchas quarantine archiving, event correlation, vulnerabilityassessments, trafficanalysis, and content archiving.

- Minimum Hardware Specification

  - Capacity and Performance

    a. GB/Dayof Logs - 75
    b. Sustained Log Rate (Standalone Mode)- 350

c. Peak Log Rate (Standalone Mode)*- 1,000
d. Devices/V DOMs/ADOMs (Maximum) - 2,000

- Hardware Specifications

a. Form Factor - 2 RU Rackmount
b. Total Interfaces - 6x GE, 2x GESFP
c. Storage Capacity- 8 TB (4x 2 TB)
d. Removable Hard Drives - Yes
e. RAID Levels Supported – RAID 0/1/5/10
f. Default RAID Level –10
g. Redundant Hot Swap Power Supplies

16. <u>Electrical Works</u>

a. Electrical works shall comprise of the supply and installation of power outlet (duplex type) per work station.
b. The installation of all electrical works shall be done in accordance with the provisions of the latest edition of the Philippine Electrical Code, the laws and ordinances of the local code enforcing authorities
c. The wiring to be used shall be 3.5mm sq. THW or THHN concealed on modular panel base plate and use of aluminum threshold for connection to other work station. Use of Mica Tubing shall be limited to a length of six inches (6") on outlet termination and there shall be no open wiring, no exposed or dangling wires seen at the work stations.

17. <u>Raised Flooring for the Data Center</u>

a. Supply and installation of 21 - 25.0 sq. meters Raised Floor with Metal Ramp.
b. Supply and installation of steel cement Raised Floor panel, SC100
c. Supply and installation of perforated R/F floor panel, 22% Open Ratio.
d. Supply and installation of metal ramp with anti-skid matting
e. Supply and installation of double Cup panel lifter 6. Labor and Installation at site

18. <u>Fire Suppression Systems</u>

a. Supply and installation of Fire suppression system for the area of 21 - 25.0 Sq. meters.
b. Supply and installation of Photoelectric Smoke Detector
c. Supply and installation of Ionization Smoke Detector
d. Supply and installation of Two wire strand detector base
e. Supply and installation of Multi Tone signal with Flashing Light
f. Supply and installation of Fire Alarm Bell (6-inch diameter), 24 VDC
g. Supply and installation of Discharge Nozzle
h. Supply and installation of FM200 gas extinguishing agent cylinder
i. Supply and installation of Control Panel
j. Labor and Installation at site

18. Environmental Monitoring System

a. Supply and installation of an Environmental Monitoring System
b. Supply and installation of temperature monitoring set for 19" rack.
c. Supply and installation of the EMS, power adaptor, Temp-1Wire
d. Rack19, Sensor components, door contact, Windows software
e. Proprietary enterprise license, Rack mounting brackets 19" and corresponding materials (e.g. Screwdriver, etc.)
f. Labor and Installation at site

19. Door Access System

a. Shall have Fingerprint Identification system: Optical fingerprint collector (Resolving power 500DPI)
b. Identification angle: 360-degree rotation with high sensitive and accurate identification.
c. Shall have verification method via fingerprint + password
d. Shall be in English language for machine and its software
e. Alarm function: Intimidation alarm Dismantlement alarm break-in alarm unlock overtime alarm entrance point alarm
f. Shall have the Function of inquiring the record
g. Shall be capable to provide intelligent study fingerprint from year to year.
h. Shall have Exit release button : can be connected with usual exit button or remote control release button
i. Shall have Lock combination function
j. Shall have bell function and voice display
k. Shall have finger print capacity of 2000
l. Shall be capable to record 50000 events.
m. Shall have the capability to communicate in TCT/IP, RS485, USB
n. Shall have electromagnetic locks that withstand 600lbs.
o. Shall have Bracket, magnetic door contact, metal push button exit, emergency break glass, and enclosure panel for the controls and power supply.

STRUCTURED CABLE SYSTEM

General Specification

a. Fiber Optic Cable shall be used as the backbone of the network that interconnects Main Distribution Frame (MDF) and Intermediate Distribution Frame (IDF).
b. Cat 6 Unshielded Twisted Pair (UTP) Cable shall be primarily use for distribution that will run through from IDF to Switches and Routers.
c. All cable trays for horizontal homeruns shall be sized accordingly based on the number of nodes per floor with at least thirty percent (30%) provision for expansion. Minimum size of cable tray should be at least 300mm width and 100mm depth (W x D);

d. All cable trays/ladder shall be power coated or hot dip galvanized and all conduits for horizontal homeruns shall be PVC with connector coupling;
e. All conduits for the backbone cables shall be an Electrical Metallic Tubing (EMT) pipe with connector coupling and all cable trays/conduit support or hangers shall be permanently anchored on the ceiling.
f. Deployment and installation of network racks are related to structure cabling technical implementation.

PASSIVE COMPONENT

1. Fiber Optic Cable

a. Designed and tested to conform to the fiber and cable performance requirements of the TIA 568, ISO 11801, and ICEA-569 standards.
b. Cable must meet or exceed all of performance requirements for current and proposed applications such as IEEE 802.3 Ethernet including 10 Gigabit Ethernet, ATM, Fiber Channel, FDDI and others.
c. Shall be all-dielectric and consist of eight (8) tight-buffered, 850nm laser-optimized 50/125 :m multimode fibers surrounded by aramid strength members and PVC outer jacket.
d. Optical fibers are made of silica glass surrounded by acrylate coating. Tight-buffer material is flame rated PVC. Strength members are aramid yams. Central members are glass-reinforced plastic (GRP). Cable and subunit jackets are flame-rated PVC.
e. Shall have a UL/NEC rating of OFNR (Riser).
f. Performance characteristics must be 3.5dB/km max attenuation at 850nm and 1.5 dB/km max attenuation at 1300nm; OFL bandwidth 1500 MHz-km at 850nm and 500 MHz-km at 1300nm; 850nm laser bandwidth at 2000 MHz-km; 1000BaseSX distance of 900m; 1000BaseLX distance at 550m; 10Gbase-SR distance of 300m; and 10GbaseLX4 distance of 300m

2. Fiber Optic Panel

a. Rack-mounted drawer-type Fiber Optic Panel loaded with 12 SC ports
b. Must have sensor strip conductive pads within the panel.

3. End-Connectors

a. Duplex SC connectors at fiber panel termination
b. Duplex LC connectors for network equipment connection

4. Fiber Optic Patch Cords

a. 3 ft Duplex multimode SC to LC Equipment Patch Cord length.
b. Patch cable assembly must contain copper conductor connected to an

external probe.
c. External probes must contact with sensor pad on the sensor strip.
d. One wire/one probe design to monitor duplex fiber port as single connection

5. Category 6 Cables

a. Horizontal cabling shall be 23 AWG, 100-Ohm, 4-pair UTP; UL/NEC CMR rated, round design, round solid filler, non-bonded pairs, in white PVC jacket.
b. Cable jacketing shall be lead-free.
c. Cable performance characterized up to 600MHz.
d. Cable shall meet or exceed the performance requirements of ANSI/TIA/EIA-568B.2-1. Must be confirmed by independent testing laboratory.
e. Must be Gigabit Ethernet Zero-bit Error Rate tested and confirmed by independent testing facility.
f. Cable shall be UL listed.
g. Must be US, Japan or European made or origin

6. Category 6 Patch Panels

a. Patch panels shall be 1RU and provide 24 modular jack ports, with universal wiring that maybe terminated to T568A or T568B.
b. Patch panel modular jacks shall be configured as 6-port, replaceable modules.
c. The front of each module shall be capable of accepting 9mm to 12mm labels. Each port shall be capable of accepting an icon to indicate its function.
d. Patch panel shall terminate the building cabling on 110-style insulation displacement connectors.
e. Patch panel shall meet or exceed the performance requirements of ANSI/TIA/EIA-568B.2-1.
f. Must have sensor strip conductive pads within the panel.
g. Must include a rear clip that secures and protects the mated connection of the sensor strip and analyzer I/O cable assembly.
h. Patch panel must be UL Listed.

7. Category 6 Data Outlet/Modular Jacks

a. Modular jacks shall be terminated using a 110-style pc board connector, color-coded for both T568A and T568B wiring.
b. Category 6 modular jacks shall meet the performance requirements listed in ANSI/TIA/EIA-568B.2-1.
c. Flexibility to support 180º or 90º cable termination with bend-limiting strain relief.
d. Modular jack shall be UL Listed

8. Faceplates

a. Must be surface-mounted, 2-port single-gang.
b. Each port shall be provided with an icon to indicate its function.
c. Faceplates shall accommodate two labels and provide a clear polycarbonate cover for each. Faceplates shall be light almond in color.

9. Category 6 Patch Cords

a. Patch cable assemblies must be factory-manufactured with stranded CMR UTP cable and color-matched snag less rubber boots.
b. Work area patch cord shall be 7 ft while Equipment cords shall be 4 ft in length.
c. Must contain a 9^{th} conductor that is external to the original copper cable assembly.
d. External probes must contact with a conductive pad on the sensor strip.
e. One patch cord per user outlet and equipment connectivity must be provided.

10. Cable Organizer

a. Horizontal cable management hardware must be 1 RU.
b. Must have black-coated finish.

11. Connectivity Management Software

Related Connectivity Management Software Features:

a. Must be customizable based on MARINA network infrastructure setup with user-defined tracking and reporting options.
b. Capable to discover, map, document, and report the status of network from one end to another.
c. Must be a 32-bit Window-based, web-enabled software.
d. Must support and run on MS SQL relational database with AutoCAD graphics engine (.DWG and .DXF file formats)
e. 100% user defined data structure (supports all infrastructure topologies and unlimited connections or "circuit hops")
f. Optional Change control module
g. Circuit connection Wizard
h. Comma Separated Value (CSV) file importing and exporting
i. Links to external data-sources (including ODBC databases) over TCP/IP
j. Multi-select and drag and drop support throughout for all operations
k. Multi-threading (tasking) operations
l. Naming and renaming wizards for custom sequences
m. New database field Wizard
n. New "dictionary window" creation Wizard and editing tools
o. Open OLE/Automation architecture
p. Search and filter Wizards
q. SNMP - Simple Network Management Protocol data collection module
r. User defined icons
s. User-friendly controls for looking up and displaying relational data

t. Web Browser (IE 5.0+) GUI for browsing your data over the Internet/intranet
u. Wizards to ease most of the user-defined functions
v. Customizable report generator
w. Other features may be optional

OTHER INSTRUCTIONS:

a. The homerun of all network connectivity and network resource access shall be in the MARINA Data Center except for the Examination Area at 4th Floor which homerun in the Server Room located inside the examination room. The Main Distribution Frame (MDF) will serve as central termination of the 12-core multi-mode Fiber Optic linking MARINA Central Offices.
b. An Intermediate Distribution Frame (IDF) shall be the consolidation point of all CAT 6 UTP cable that runs on every floor of the building/s.
c. All cable terminations and patching shall be properly and neatly managed with appropriate cable organizer every IDF and equipped with network accessories and fittings.
d. Network infrastructure shall support the existing IPV4 the new IPV6 structure.

Labeling

- All jacks, panels and frames shall be clearly labeled. Labels should be tamper resistant and made with a label maker at the station end. Data frames should be created with label maker. Label color shall be black on white and a CD/DVD copy of the labeling software including label sheets/package shall be provided to MARINA. Label sheet shall be both laser and ink jet compatible.

Fiber Optic Cable Installations

Shall pass the following bi-directional Testing Parameters using Level III Cable Tester:

- Propagation Delay
- Attenuation

CAT 6 UTP Cable Installations

Shall pass the following end-to-end Testing Parameters using Level III Cable Tester:

- Attenuation
- Attenuation to Crosstalk Ratio (ACR)
- PowerSum Attenuation to Crosstalk Ratio (PSACR)
- Near End Crosstalk (NEXT)
- PowerSum Near-End Crosstalk (PSNEXT)
- Equal Level Far-End Crosstalk (ELFEXT)
- PowerSum Equal Level Far-End Crosstalk (PSELFEXT)
- Return Loss
- Propagation Delay

- Delay Skew
- Transfer Impedance

Distribution of Nodes

Location	Voice	Data	Electrical
1st Floor	2	1	1
2nd Floor	15	78	78
3rd Floor	11	87	87
4th Floor	8	67	67
		111	111
5th Floor	16	69	69
6th Floor	30	93	93
7th Floor	25	55	55
8th Floor	19	67	67
9th Floor	28	92	92
10th Floor	24	88	88
11th Floor	24	38	38
12th Floor	10	18	18
TOTAL	212	863	863

VI. DELIVERY AND IMPLEMENTATION

1. The winning bidder shall submit Project Management Plan Fifteen (15) calendar days upon receipt of Notice to Proceed for the implementation of the proposed solution that is subject for review and approval of the MARINA. The project Management Plan Shall include but not be limited to the following:

    - Scope of Work
    - Project Organization
    - Implementation Methodology
    - Project Timeline
    - Communication and Deployment Strategy
    - Capacity Building Program Strategy

2. Supply, Delivery, Installation, Testing and Commissioning shall be within one hundred twenty (120) calendar days from the approval of the Project Management Plan.

3. The winning bidder shall submit manufacturer's certification as the distributor or dealer/reseller of the offered product as a requirement for issuance of Certificate of Acceptance.

VII. OTHER REQUIREMENTS

A. MAINTENANCE, SUPPORT AND WARRANTY

1. Provide one (1) year maintenance support and services to include
   - 12 Hours per day (Monday-Friday) Technical Support
   - Next Business Day Response Time
   - Business Planning and Review
   - Provide Comprehensive Disaster Recovery Procedure
2. The Bidder shall provide technical support via telephone/fax, on-site assistance to resolve technical and other related problems. Resolution can be delivered in the form of telephone, electronic and/or on-site resolution. It shall refer to a condition wherein the reported problem is resolved by the proponent to the satisfaction of the end-user.
3. The proponent shall resolve a problem within twenty-four (24) hours after it was reported by MARINA in any available and fastest means of communications.
4. Provide Four (4) hours response time for hardware and related problems and issues.
5. Established procedure on support and problem escalation
6. Provide at least two (2) support personnel two (2) months after the acceptance of the project.
7. Within the warranty period, equipment that cannot be repaired within twenty-four (24) hours shall be immediately replaced with a service unit of similar specifications or better.
8. The Contractor shall guarantee that the entire structured cabling and networks are free from all defective workmanship and materials, and will remain so for the period of:
   - 20-25 Years of Product Warranty from the Cabling Manufacturer of the ProductOffered.
   - Minimum Two (2) Years Warranty onWorkmanship
9. Inspection and cleaning of data cabinets, switches, and routers shall be done by the bidder on a quarterly basis.
10. To provide monthly maintenance for the duration of the warranty period, adequate supply of parts must be readily available.

B. RISK MANAGEMENT PLAN

- The winning bidder shall submit Risk Management Plan prior to MARINA's acceptance.Risk Management Plan shall include the following among others:
  - Step by step procedures to be undertaken during disaster must be clearly identified to avoid loss of data.
  - Retrieval and restoration procedure that includes troubleshooting flowchart shall be incorporated in the plan.
  - Personnel responsible to undertake the plan and procedures shall be identified and drawn up in the Risk Management Plan Organizational Chart.

C. PROVISION OF DOCUMENTATION

1. The solution provider shall provide a complete documentation for every deliverable and at every end of each development stage and milestone which must be submitted to the Maritime Industry Authority for the approval. MARINA shall own any and all documents and shall reserve the right to reproduce at no additional cost.
2. The documentation must be written in English of durable construction with concise and high quality presentation to include but not limited to the following:
    - Technical Manuals
        - As built Document
        - Infrastructure Diagrams and Topology
        - Troubleshooting and Installation Guides
        - Single Line Diagram
        - System/Operation Manual
    - Operational Manuals
        - User Manuals (for Operations)
        - Disaster recovery Plan

D. TRAINING AND TECHNOLOGY TRANSFER

1. The contractor must provide advance training for at least four (4) IT Personnel for the Network Equipment/switches, basic trouble shooting for the Structured Cabling and Management of Data Center for at least five (5) days.
2. To ensure that proper maintenance and sustainment an appropriate training shall be conducted by the proponent as Essential part of Technology Transfer to prepare and equipped MARINA and its personnel in the overall operations and maintenance of its Network Infrastructure.
3. The proponent shall submit Program of Instruction (POI) detailing all the training activities to be conducted for review, evaluation and approval of MARINA. Hands-on training shall be form part of the training program.
4. Operation and Training manuals shall be provided to each participant.
5. The Training shall be conducted and completed prior the formal turnover and acceptance.
6. All expenses related to training (e.g. venue, meals, equipment, certificate..) shall be borne by the proponent.
7. Venue of Training shall be determined by the proponents unless MARINA opted to conduct said training inside MARINA premises.
8. Certificate of Training/s shall be given to all participants.

E. REMOVAL OF DEFECTIVE UNAUTHORIZED WORK

1. Any defective work, whether the result of poor workmanship, defective materials, damaged through carelessness or any other cause, found to exist prior to acceptance, shall be removed immediately and replaced by work and material which shall conform to the approved specifications, or shall be otherwise remedied in an acceptable manner. This clause shall have full effect regardless of the fact that the work may have been done with the approval of MARINA or its representative.

IX. INSPECTION, TESTING AND ACCEPTANCE

A. TESTING

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions. Any defect in the cabling system installation including but not limited to cable, connectors, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
2. Submit the corresponding reports of the testing conducted.

B. ACCEPTANCE

1. A certificate of acceptance for any of the bid items shall be issued by MARINA only after completion of the scope of work and compliance to all the requirements.