Technical Specifications and Terms of Reference

Improvement of the UP Mindanao Fiber Optic Network, Phase III

BID NO :

DATE   :

REQUIRED SPECIFICATIONS	Statement of Compliance and Offered Specifications (please write down detailed offered specifications, brand and model) Note: Specify **"COMPLY"** for each technical specifications offer, TOR provisions and scopes of work	REFERENCES (include supporting documents) (attached brochure / technical data/ website, etc.)
TERMS OF REFERENCE **Improvement of the UP Mindanao Fiber Optic Network, Phase III** **I. RATIONALE** The University of the Philippines Mindanao's Information Technology (IT) Network Infrastructure has been designed to accommodate the increasing volume of electronic information accessed and stored by its users on a quotidian basis. It is thus imperative that a fast and resilient network and server infrastructure is built with greater computing capacity. To make the operation of the IT infrastructure more efficient, UP Mindanao, through its Information Technology Office (ITO), has endeavored to initiate a project titled "Improvement of the UP Mindanao Fiber Optic Network, Phase III". Said project will involve the use of fiber optic technology to provide 10Gbe interconnectivity between the old and new buildings. Fiber optic strands can travel greater distances and can carry more data thus providing greater internet connectivity and bandwidth among devices. This upgrade to fiber-optic technology can accommodate symmetrical upload and download speeds. This translates to the internet's capability to upload information just as fast as it can download it. This feature is thereby of significant use in facilitating the university's online classes,		

webinars, and other virtual activities. And support the infrastructure requirements to fully maximize the server, appliance and solution included in this project.		

This project also covers the acquisition of data center equipment such as Uninterruptible Power Supply (UPS), Precision Air-Conditioning Unit (PACU), Hyper-Converged Infrastructure (HCI) server, Enterprise Backup and Recovery server..

The UP Mindanao Network Infrastructure has been made to accommodate the growing number of information systems users and the increasing volume of electronic information accessed and stored daily. End-User demands a fast and resilient server infrastructure. Furthermore, UP Mindanao's Information System Services also requires additional computing capacity.

To make the operation of the server infrastructure more efficient, the Information Technology Office has embarked on the acquisition of new server infrastructure technology in the form of a Hyper-Converged Infrastructure (HCI). The HCI is set to replace the legacy infrastructure consisting of separate servers, storage networks, and storage arrays by leveraging the capabilities of a virtualized environment. Powered by a distributed software layer, it eliminates common pain points associated with legacy infrastructure such as large space requirements and multiple management interfaces. Through this procurement, UP Mindanao will benefit in terms of system availability, agility, maximized computing resources, scalability and ease of management.

When an unforeseen event takes place and brings day-to-day operation to a halt, an agency needs to recover as quickly as possible and continue to provide services to its client and stakeholders. From data security breaches to natural disasters, there must be a plan in place in case of catastrophe (hardware failure, accidental deletion, ransomware and malware). Not having disaster recovery plans in place can put the agency at risk of high financial costs, reputation loss and even greater risk for its clients and stakeholders.

Most agencies cannot afford unplanned and prolonged downtime and need to be able to recover from an unforeseen emergency as quickly as possible. In order to avoid bigger dangers and bigger threats of data loss, it is important for agencies to choose the right data recovery and backup strategies. The prevention methods and efficient backup disaster recovery strategies will definitely save the agency from bigger problems

in the future. UP Mindanao deems it necessary to acquire and implement a Backup and Disaster Recovery solution to mitigate data loss, minimize downtime, remain compliant with the Public Service Continuity Plan(PSCP) and ensure client/stakeholder records are safe and protected through the right data recovery and backup strategies/software. The project shall cover the upgrading of ICT network including network designs, supply, installation, configuration and testing of various ICT equipment and fiber and structured cabling for UP Mindanao, but shall not be limited to the following: ● Supply, Delivery, Installation and Configuration of Fiber Optic and Structured Cabling and Data Center Equipments ● Supply, installation, rehabilitation and testing of at least 10g Fiber Optic network, with related construction/fabrication and civil works, between key buildings in the University of the Philippines Mindanao ● Supply, installation, rehabilitation and testing of the FIBER Cable Runner System for the new route of the University Fiber Backbone ● Supply, installation, rehabilitation and testing of the related electrical requirements, works and components for the full-sizing and max capacity of possible equipments and devices of the admin data center, CHSS, CSM and other key buildings in the University of the Philippines Mindanao ● Supply, installation, configuration and testing of the new PACU and replacement of the defective PACU at the admin data center and includes the removal and decommissioning of the old PACU. ● Supply, installation, configuration and testing of the electrical component and requirements of the new PACU to the new location. ● Supply, installation, configuration and testing of the backup split type aircons and the required mechanism of alternate operations of aircons per locations (admin data center, CHSS, CSM and Carim) and includes the transfer and installation of the old split type aircon/s to the new location. ● Supply, installation, configuration and testing of the new server rack and it's corresponding electrical components and PDUs ● Supply, installation, configuration and testing of the new UPS and its corresponding electrical components and PDUs		

- Supply, installation, configuration and testing of the DNS, HCI and Enterprise Backup and Recovery Appliance
- **The HCI and Enterprise Backup and Recovery Appliance should have compatibility and interoperability with the existing VMWARE, vSphere Hypervisor (ESXi), vSphere High Availability (HA), vSphere vMotion, Cross Switch vMotion, vSphere Replication, vSphere Essentials Plus, vCenter Server Essentials**
- The DNS server, HCI and Enterprise Backup servers and appliance and included switches and transceivers must be compatible with the existing core switches, POE edge switches WIFI controller, WIFI access points, Wifi Clearpass, WAN-Load balancer, firewalls and servers
- Installation, configuration and integration of existing ICT Equipments: firewalls(Palo Alto PA 820 and PA 500),Wifi controller and access points (Aruba 7205 and it's access points), VOIP Server (YEASTAR S300 and it's IP Phones), CCTV Server (Bosch Server and CCTVS) and existing switches and servers; and
- Installation, configuration and integration of existing ICT Equipments:core switches, POE edge switches, WIFI controller, WIFI access points, Wifi Clearpass, WAN-Load balancer, firewalls, servers, CCTV Server with the DNS server, HCI and Enterprise Backup servers and appliance and included switches, transceivers

Existing ICT Equipments	Quantity
Palo Alto PA 820	1
Palo Alto PA 500	1
HP A5500	1
Aruba 7205 Controller	2
Aruba CX 8325	2
Aruba 6300M (JL659A)	14
Aruba 6300M (JL660A)	12
Aruba AP-215	90

Aruba AP-555	90			
BPL-135 Peplink Balance 1350	1			
Yeastar S300 IP-PBX	1			
Borderless Hub BH80P3/HTEK UC803P IP Phones	60			
Bosch DIVAR IP 7000 3U	1			
BOSCH Autodome IP Dynamic 7000 HD	5			
BOSCH DINION IP Bullet 5000 HD	15			
BOSCH Flexidome IP indoor 5000 HD	44			
HPE OfficeConnect 1920 24G POE	4			
HPE OfficeConnect 1920 8G POE	2			
3COM 2920	2			
CATALYST 2960	4			
CISCO SF 300	19			
CISCO SF 302	3			
HP 2620-24 (J9625A) PoE	2			
HP 2520-24 (J9623A)	2			
3Com Baseline Switch 2226 SFP Plus 1	8			
Fujitsu Rack Console	1			
Servers				

Dell Power Edge R300	1
Dell Power Edge R210	2
Dell Power Edge R410	2
Dell Power Edge R430	1
Dell Power Edge R630	1
Fujitsu Primergy RX2540 M2	1
Lenovo System X 3650 M5	1
Dell R740	1
HP Proliant DL380P GEN8	1

- Migration of all servers existing systems, applications, web applications, web sites, database, files, images, backups to the HCI servers/appliances
- Backup of all servers and HCI existing systems, applications, web applications, web sites, database, files, images, backups to the HCI and Enterprise Backup and Recovery Appliance.
- Supply, installation, configuration of necessary enterprise perpetual license and softwares in order for the HCI and Enterprise Backup and Recovery server/appliance to be fully functional.
- Supply, installation, configuration and testing of necessary electrical components to support a fully loaded Data Center
- Supply, installation, configuration of Microsoft Windows server 2022 datacenter for the HCI, Active Directory, DHCP Server, DNS Server and population of the needed data and database. This includes configuration and testing of the existing switches, Aruba controllers and Clearpass, firewall/s, wan-load balancer in order for all the necessary existing and new applications and services to work for the entire network infrastructure
- Assessment and Installation of Electrical Provisions for all the mentioned equipment and IDF/MDF in this Term of Reference that should meet the Industry Standards.
- Any conflicts found in the terms of reference and technical specifications will be resolved by choosing the most advantageous specifications, terms and provisions for the

end–user(UP Mindanao).

- The End-User(UP Mindanao) reserves the right to relocate the assigned locations of the Fiber Optic Cabling end to end points(building to building) during the project implementation provided that the new locations does not exceed the required lengths of the original fiber optic cable.
- The End-User(UP Mindanao) reserves the right to relocate/re-assign the assigned/allocated termination of the fiber cores during the project implementation provided that the new reassignment does not exceed the required no. of terminations of the fiber optic cable.
- Coordinate the end-user and provide assistance for the finalization of the designs and plans of the project
- Supply, delivery, assembly, installation, configuration, and commissioning of all project components
- Decommissioning, transfer, configuration and migration of UPMin Servers and components to the prescribed Data Center RAck and new Data Center Rack
- Provide training, technology and knowledge transfer
- Provide complete as-built project documentation of the project including designs, layouts, diagrams, configurations and all other necessary technical documentation.
- Provide maintenance, after-sales and technical support and services
- Conduct User Acceptance Testing (UAT) of the project.
- Secure all permits and licenses necessary for the implementation of the project with no additional costs to the office/end-user
- Splicing and termination of the Fiber Optic Cable will be done in the respective ODFs of each building and there should be no in between splicing in each endpoint of the ODFs.
- Installation, configuration and integration of existing ICT Equipments: firewalls(Palo Alto PA 820 and PA 500),Wifi controller and access points (Aruba 7205 and it's access points), VOIP Server (YEASTAR S300 and it's IP Phones), CCTV Server (Bosch Server and CCTVS) and existing switches and servers with the new components in the project

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II.   APPROVED BUDGET FOR THE CONTRACT

The total ABC for the project is **Php 28,216,920.00** inclusive of all applicable government taxes and service charges.

III. PROJECT DESCRIPTION

This project involves supply, delivery, installation, and configuration of fiber optic and structured cabling and data center equipment for UP Mindanao.

IV. QUALIFICATION OF BIDDER

A. Prospective bidders must have at least Ten (10) years' experience in providing similar contracts (supply, delivery, and installation of fiber and structured cabling and servers(HCI,Enterprise Backup and Recovery Appliance,VDI,) by submitting proof of documents (i.e. contract, P.O.) with active contact details. The Bidder must provide a Certificate of Completion and Acceptance by the client for the most recent, related and completed Data Center, Network Infrastructure and Structured Cabling Project.

B. Prospective bidder/s must be a fiber cabling and server solutions provider for at least five (5) years in the Philippines for the brand being offered.

C. Prospective bidder/s must have a 24/7 help desk system via phone and email support.

D. The bidder has already established a minimum of 10 years and has a local office here in Davao City to support UP Mindanao.

E. The Bidder must provide a list of technical personnel (as part of the technical submission) who shall form part of the implementation team and shall include personnel with the following certification, license and eligibility:

   ○ The Bidder must have an employed Certified Project Management Professional (PMP) or its equivalent during the project and warranty duration. The bidder warrants to employ a licensed/certified personnel when the project is awarded. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user.

- The bidder must have at least a minimum of 1 Local from Davao City Certified VCP-DCV Engineers to handle the implementation and support. (A known and leading Datacenter Virtualization brand). The Bidder must show proof of the training taken before the certification was taken and not issued directly from the vendor for the sake of the project. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. - The bidder must have at least a minimum 1 CompTIA Security+ Certified (A known and leading security firm) to ensure security advisors for this project with free consultancy The Bidder must have at least one (1) project manager certified for at least one (1) industry standard project management certification. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. The Bidder must have at least one (1) Professional-Level Certified Data Center Professional (design, integration and implementation). The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. The Bidder must have at least two (1) Professional-Level Certified Hyper converged Infrastructure for the HCI Solution vendor. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any		

changes of personnel at the start and during the project duration must be consulted and approved by the end user. ○ The Bidder must have at least one (1) Professional-Level Certified Network Security for the Next-Generation Firewall vendor. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. ○ The Bidder must have at least one (1) Professional-Level Certified Network Routing and Switching .The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. ○ The Bidder must employ at least one (1) Professional-Level Industry Certified Telecommunications professional. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. ○ The Bidder must have at least one (1) PRC registered electrical engineer with a minimum two (2) years experience in the UPS-Electrical System installation, configuration and troubleshooting. The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user. ○ The Bidder must have at least one (1) PRC registered		

The bidder should submit the name of the person and the license/certifications during the notice to proceed. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user.

- The Bidder must provide a copy of the certifications and licenses, certificate of employment, company ID, proof of experience as well as SSS, and PHIC/HDMF and/or other insurance/benefit remittances of the certified/licensed employees.

F. The bidder must have completed any virtualization projects with proof of acceptance.

G.   The bidder must have some **Backup Technologies project (ongoing or finished)** and at least 2 Certified engineers of any Backup technologies to handle the implementation and support.

H. The bidder must have at least a minimum of a Network Professional Certification of any leading network brand.

I.   The bidder must have at least Certified Data Center Professional certification or RCDD certification to ensure Data Center FOC design and upgrade are ready. The bidder must have that CDCP certified or RCDD certified with an Affidavit of Commitment to work on the contract during the project and warranty duration that are trained and certified in the design and installation of cabling systems, ICT and data center equipment. The bidder warrants to employ a licensed/certified personnel when the project is awarded. The bidder should submit the name of the person and the license/certifications during the post-qualification. Must have a certificate of employment or contract of services during the start of project duration. Any changes of personnel at the start and during the project duration must be consulted and approved by the end user.

J. 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 to be submitted during the bid opening.

K. 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, PACU,UPS, HCI and Enterprise Backup and Recovery SoluTion) to be submitted during the bid opening. The Bidder must be a Certified or Authorized Business Partner, Dealer or Installer of the manufacturer/vendor for the products being offered (including the HCI solution, Server Equipment, Network Equipment and Cables, Precision Air Conditioning Unit, and Uninterruptible Power Supply) to ensure technical expertise and availability of after-sales support. Certifications must be submitted (as part of technical submission) to prove business relationships to Manufacturer/Vendor. L. The Bidder must identify or provide a list of certified service centers of products offered within the Philippines. M. The bidder must have at least **any** of the following below from different organizations to choose. ○ Data Center Design Consultant (DCDC) -BICSI ○ Accredited Tier Designer (ATD) - Uptime Institute ○ Certified Data Center Expert (CDCE) - EPI ○ Certified data Center Professional (CDCP) - EPI ○ The certified must have an Affidavit of Commitment to work on the contract or an undertaking to the bidder and the certified must work onsite and includes supervision (KEY PERSONNEL'S AFFIDAVIT OF COMMITMENT TO WORK ON THE CONTRACT) N. Contractor must have at least a **(B / A / AA / AAA)** - Category License issued by the Philippine Contractors Accreditation Board (PCAB), classified under SP-CF (Specialty - Communication Facilities). O. Contractor must have at least a **(Small B)** - Category License issued by the Philippine Contractors Accreditation Board (PCAB), classified under SP-EE(Specialty - Electrical Works). P. Contractor must have at least 1 Project Management Professional (PMP) certified personnel for proper project management. Copy of the certificate must be submitted during the Bid. Q. Additional post-qualification requirements: ○ Letter from the Principal brand that the bidder is authorized and has a high partnership for the HCI and		

backup appliance offering. The letter is not instantly given to the bidder just for the sake of the project.
○ Certification or letter from the principal stating that the bidder is an Authorized Business Partner or installer of the Brand being offered (Switches, HCI, Enterprise Backup and VDI)
 	
R. 24/7 Help Desk Service Facility includes:
 	
● Single Point of Contact for Problem Reporting
● Technical Engineer Dispatch Facility
● Case Logging and Monitoring
● Technical Support History and Reporting
 	
S. The Bidder shall submit (as part of their technical submission) all pertinent additional documentary requirements as specified below. They shall ensure that all documents submitted complies with the requirements as specified in this document
    a. Program of Works (for Data Center Facility Construction)
    b. Detailed Implementation Schedule/Project Gantt Chart (For Facility Equipment and ICT related requirements)
    c. Detailed Engineering Design including but not limited to:
        i. Structural Plan
        ii. Architectural Design
        iii. Floor Plan/Layout (Data Center)
        iv. Electrical Plan
        v. Mechanical Plan
        vi. Facility Power Block Diagram
        vii. Electrical One-Line Diagram
    d. Bill of Materials for
        i. Data Center Facility
        ii. Data Center Equipment
        iii. Network Equipment
        iv. Fiber and Structured Cabling
    e. List items for deliverable and shall include brand and model number whenever applicable
    f. Pertinent Product Brochures or Technical Specifications for items offered.
T. The Bidder must conduct site inspection for the Data Center Facility, Network and Structured Cabling Requirements,		

and shall submit as part of their technical submission a copy of the Certificate of Inspection issued by the UPMin-ITO.
 	
General Requirements
 	
V.   **GENERAL REQUIREMENTS**
 	
1. Shall ensure compliance with pertinent government laws and policies, and nationally recognized standards and regulations such as:
    ● Presidential Decree No. 1096 or the National Building Code of the Philippines
    ● Republic Act No. 9514 or the Fire Code of the Philippines of 2008
    ● Latest edition of the Philippine Electrical Code (Institute of Integrated Electrical Engineers of the Philippines)
    ● All other existing pertinent ordinances, rules and regulations of the national and local government
 	
2. Shall abide to conformance with relevant and pertinent industry standards, and best practices such as:
    ● TIA 942 Data Center Infrastructure Standard Rated Level I and Uptime Institute Standard for Data Center Tier Level I
    ● ANSI/TIA-568 Commercial Building Telecommunications Cabling Standard and/or ISO/IEC 11801 Information technology — Generic cabling for customer premises
    ● Manufacturer/Vendor recommended design, installation, configuration, and hardening best-practices
 	
3. The Data Center Facility, and Network Infrastructure design and components shall be able to support 24 hours a day 7 days a week 365 days a year (24x7x365) operation.
 	
4. All plans, designs, layouts and configurations must be approved by the end-user before implementation. These documents must be duly signed by licensed,		

certified, accredited or authorized professionals.		

5. All major construction, installation and configuration, and other major project activities/works must be properly coordinated with the end-user.

6. All items must be brand new

7. All deliverable devices/equipment and software must not in its End-of-Life (EOL), End of-Support (EOS) or End-of-Service-Life (EOSL) for the next 5 years

8. All deliverable equipment warranty, support and service centers must be available locally within the Mainland Mindanao. Parts must be available within the Philippines.

9. All deliverable electronic and ICT devices/equipment's manufacturing company must not be based in China with exemption to the PACU, UPS, Wireless Access Point, IP Telephony, FDAS, Door Access Control and Surveillance System. Must have UL certification.

10. Shall ensure compatibility across all interrelated project components including but not limited to power supply, electrical components, equipment, parts, accessories, housing, connectors, modules, communication medium, and software.

11. Shall provide a Certified IT Security Professional that will provide consulting services to ensure security controls and measures are applied.

12. Shall ensure the latest firmware and software updates and security patches are installed.

13. Shall ensure safety and security measures are considered in the design, layout, construction, and implementation of the project.

14. Shall provide and assign a dedicated project engineer and a project manager to oversee the construction and overall project implementation; and

shall provide
their contact details.

15. Shall must provide a contact person responsible for restoring service due to outages and provide his/her contact details.

16. Shall be responsible and accountable for the removal and proper disposal of material and waste generated by this project. Debris, surplus materials, etc. shall be removed daily.

17. Shall be held solely responsible for any property or personal damages or claims, including damage to existing structures, systems, equipment, and/or site caused by the bidder shall repair or replace it to its original condition at no additional cost to the office/end-user.

VI.   **PROJECT COMPONENTS AND DELIVERABLES**

COMPONENT A : Supply, Delivery, Installation and Configuration of Fiber Optic and Structured Cabling and it's Active Component

A. **Overview**

These Terms of Reference (TOR) call for the supply and installation of a Fiber Optic network, with related construction/fabrication and civil works, between key buildings in the University of the Philippines Mindanao Campus, notably:

- Supply of Fiber Optic Cable (FOC), PE protective pipes and all necessary materials needed for cable layout and installation
- Supply, installation, rehabilitation and testing of the FIBER Cable Runner System for the new

route of the University Fiber Backbone ● This shall include the supply, installation, and testing of high-quality fiber optic cable (FOC), related cabling hardware, outlets, cable trays, racks, interconnect hardware, or any applicable or necessary materials, supplies or hardware, as well as construction, fabrication, restoration or other works necessary to undertake and complete the installation to the satisfaction of the End-User. ● Primarily aerial layout FOC installation ● The canal system, direct underground burial and concrete underground burial is in rare case/s where aerial installation is not possible or it is required during the actual implementation. ● Supply and installation of fiber optic housing hardware, fiber optic patch panel (LIU) and other necessary equipment and materials ● Testing and termination of all fiber cores ● Supply fiber patch cords ● Supply, installation, termination, testing High Density Optical Distribution Frames The key buildings included in the installation are the following: ■ Admin Data Center to CARIM II ● 971 meters 8 core single mode outdoor FOC ■ Admin Data Center to CHSS Cultural Complex ● 586 meters 8 core single mode outdoor FOC ■ Admin Data Center to Proposed Student Dormitory ● 393 meters 8 core single mode outdoor FOC		

■ Admin Data Center to Proposed Faculty and Staff Housing ● 420 meters 8 core single mode outdoor FOC ■ Admin Data Center to CHSS Data Center (NEW) ● 130 meters 24 core single mode outdoor FOC ■ Admin Data Center to Existing Football Stadium ● 1,942 meters 12 core single mode outdoor FOC ■ Training Gym to Football Stadium ● 35 meters 8 core single mode outdoor FOC ■ Admin Data Center to PPO/FORMER HKC Building ● 404 meters 8 core single mode outdoor FOC ■ Admin Data Center to SOM Building ● 90 meters meters 8 core single mode outdoor FOC ■ Kalimudan to Coconut Tissue Culture Building ● 130 meters meters 8 core single mode outdoor FOC ■ Carim II to Carim I ● 100 meters meters 8 core single mode outdoor FOC ■ Carim II to Carim III ● 220 meters meters 8 core single mode outdoor FOC ■ CSM to Infectious Disease Building ● 110 meters meters 8 core single mode outdoor FOC		

■ CSM to NICER ● 80 meters 8 core single mode outdoor FOC **Note**: *The distances mentioned above are just estimates and it is the responsibility of the supplier/bidder to conduct actual site surveys of the area to determine the appropriate and needed distances to complete the project. Any additional equipment, accessories, and/or additional fiber cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao. Suppliers should provide at least* **50 meters loop fiber.** **B.** **Rehabilitation of existing fiber optic connections** 1. **Locations and details** 1.1 CSM Building to CSM Dorm ANNEX Building 1.2 CSM Building to CSM Dorm ANNEX II Building 1.3 Admin Building to Guard House 1.4 Admin Building to EBL Building **1.5 Re-termination of Other Buildings(at least 20ports)** 1.6 Transfer and Retermination of the 78 ports fibers in Admin building to the new location and the new high density ODF and the corresponding ends of the 78 ports that are distributed in the differents buildings to the new data cabinets of each buildings 1.7 Supply and installation of fiber optic housing hardware, fiber optic patch panel (LIU) and other necessary equipment and materials **1.8 Supply of 420 pieces fiber patch cords for high density ODF ;** 1.9 Pulling, testing and termination of fiber optic cores to designated ODF **1.10 relocation for the new fiber path**		

2. Training

    Fiber Optic Training

C. Breakdown of Required Materials & Labor

    4.1. **Fiber Optic Cable**

- **Length:** as indicated above and subject to verification by the supplier; actual on-site distances shall govern without additional charges to the University
- **Features**: at least suitable for outdoor/indoor aerial installation, water-blocking, single-jacket/single metallic armor, polyethylene (PE) sheath or Low Smoke, Zero Halogen (LSZH) with fire-retardant sheath, steel wire or Fiber Reinforced Plastic (FRP) as central dielectric strength member
- **Optical Characteristics:** at least Single Mode fiber 9μm; Attenuation: @1310nm $\leqq$0.4dB/kilometers, @1550nm $\leqq$0.3dB/kilometers; Cladding Diameter 125 ± 1μm; Coating Diameter:245± 5μm
- **Mechanical Characteristics:**
  1. Fiber Count: as indicated above
  2. Buffer Tube Count: 6 per loose buffer tube, should be stranded around dielectric central member using reverse oscillation or S-Z stranding process.

  3. Messenger Wire Steel Wire (if applicable): Φ1.2mm
  4. Sheath Material: LSZH / PE
  5. Maximum Allowable Pulling Force: 2700 Newtons (Installation), 890 Newtons (Operation long-term). Must meet or exceed ISO 11808, ICEA-640 or Telcordia GR-20 standards

6. **Additional Characteristics:** 7. All fibers shall be 100% attenuation-tested, with tests provided at cable reel using Fluke OTDR Fiber Tester. 8. Cable manufacturer must be ISO 9001-registered 4.2. High Density Optical Distribution Frame, 4 RU with at least 576 ports capacity; at least 210 Fiber Ports LC will be terminated in the Admin Data Center side & 1 RU for other buildings. Should include all the necessary components, organizer, cable managers, Enclosures, Panels, Bracket, Fiber Optic Cassettes, Adapter Panel and other necessary accessories needed for full deployment. **Features**: ● Enclosures and panels are adaptable between 6 and 12-port configurations ● Increase space and minimize costs ● Ultimate flexibility to use anywhere ● Remove "cable congestion" with accessibility from left and right sides of the enclosure ● Front and back access allows moves, adds and changes (MACs) without disturbing adjacent connections ● Split tray feature allows each half of the tray to be pulled out independently, protecting connections from disruption meaning increased uptime and reliability ● Cassettes have lift-out design so patch cords can stay in place without impacting nearby circuits ● Equipped with an MPO parking feature, that reduces time to install fiber trunks		

Side trunk cable management The new design puts an end to the "cable congestion" that plagues today's data centers, instead making cables easily accessible from the left and right sides of the fiber enclosure. This provides greater access to installed connectors and cassettes as well as the ability to add new cabling whenever necessary—even when cable density reaches peak capacity. **Front and back cassette accessibility** Cassettes can be installed from the front or the back of the enclosure. With a split-tray design, described on the following page, they simply slide in and are locked into place. This not only speeds serviceability and deployment, but also streamlines migrations from 10G Ethernet to 40G/ 50G/100G Ethernet, when cassettes are replaced with fiber adapter panels. **Convertibility** Enclosures and panels can be converted to support either 6-port or 12-port cassettes and adapters, This gives you the maximum freedom to deploy any network architecture, fiber infrastructure, network type, either duplex or parallel. **Split-tray design** The split-tray design enables you to move only half of your fiber connections, providing greater access to both connections and cassettes without impacting nearby circuits. Cassettes can be installed and removed by dropping-in or pulling out vertically - this allows cassettes to be serviced without disturbing adjacent cassette patch cords The trays come with slide and lock capabilities and can be positioned in three locations:		

Home (closed), Service (fully extended) or midway in the MAC position, simplifying connection management and cassette access. ● Enclosures Drawers slide out into locked positions for easy MACs, and house cassettes and FAPs, trunks, connectors, and patch cords. Available in 1-RU, 2-RU, and 4-RU and 1-RU options, and can be reconfigured to accept 6-port or 12-port, cassettes or adapter panels This project requires 4-RU for the data center and 1RU for other buildings. ● Trunks Pre-terminated Trunk Cable Assemblies allow rapid gender and polarity changes in the field for standards-compliant cable plant migration from 10G Ethernet to 40G/100G Ethernet. Available in multimode or singlemode, 12-fiber, 24-fiber, and 48-fiber assemblies. **We required singlemode.** ● Patch Cords Available with Push-Pull LC Duplex or MPO Interconnects, in a variety of jacket, cable, and fiber types to meet any application. **The Push-Pull LC Duplex will be supplied.** ● Cable Management Has innovative cable management The rear trunk cable manager and plate provides a template for mounting of cables and side cable managers direct cable away from the rear of the enclosure, allowing easy access to critical connections. ● Cassettes and FAPs Modular cassettes in either 6-port or extra wide 12-port configurations are part of the system, and FAPs for deploying a fiber infrastructure as you migrate to higher network speeds. 6-port Duplex LC to MPO		

Cassette or 6-port Duplex LC Splice Cassette/Fiber Adapter Panel will be used. Depending on the appropriate implementation as stated in the provisions of the Terms of Reference. - Harnesses Round harness cable assemblies feature LC connectivity on one end, and PanMPO™ on the other, for easy changing of polarity and gender. Available in several configurations, multiple fiber types and cable jackets. 4.3. Single Mode Fiber Optic Patch Cords (LC-LC) - **at least 420** Should be designed for the High Density Optical Distribution Frame included in this project. Push-Pull LC Duplex Fiber Optic Patch Cords containing the custom push-pull strain relief boot and duplex clip, allow users easy accessibility when deploying very high density LC patch fields in data center applications. - Fiber count:Duplex (2-fiber) jacketed zipcord - Cable jacket ratings: Riser (OFNR) - Fiber types: Singlemode: OS1/OS2 9/125µm - Length: at least 6 meters - Fiber Compatibility: 9/125µm - Fiber Type: Singlemode - Fiber Cable Type: Jacketed - Cable outside diameter (OD):1.6mm duplex - Cable Color: Yellow - Cable Type: Duplex - Connector types,End 'A':Duplex LC - Connector types,End 'B':Duplex LC - Flammability Rating: Riser (OFNR) - Connector insertion loss:Standard: 0.35dB max (OS2) - Connector return loss: 55dB min (OS1/OS2)		

4.4. Roughing-ins (if applicable)

- Conduits (indoor): 2-inch diameter IMC Electrical Pipes
- Conduits (indoor): 2-inch diameter EMT Electrical Pipes
- Fittings: to match conduit and material, corner sweeps should use a long radius elbow.
- Cable Ladder: 350 millimeter x 80 millimeter, angle bar frame. Color can match against a building wall or ceiling.
- Pull Box with Cover: 500 millimeter x 300 millimeter x 150 millimeter, gauge # 14, powder-coated, gray in color (for corners)

4.5. Direct Underground Burial (incase it is needed in rare case/s during actual implementation)

- Depth: 0.5 meter or as required otherwise
- PE pipe diameter: at least 20 mm
- Pressure Grade: PN 16

4.6. Concrete Underground Burial (incase it is needed in rare case/s during actual implementation)

- Depth: 0.5 meter or as required otherwise
- PE pipe diameter: at least 20 mm
- Pressure Grade: PN 16
- Concrete Embankment: 4 inches height, 4 inches width, no base

4.7. Labor

- Cable Laying and Pulling
- **LC-Type Splicing and Termination**
- Installation and Roughing-ins of cable runways, pipes, clips, etc.
- Installation of Fiber Optic Housing Hardware, LIU's and other related equipment.
- Testing and Documentation

4.8 Codes and Standards

- Work shall be installed according to the latest Philippine Electric Code (PEC), Plumbing Code, National Structural Code of the Philippines, Fire Code of the Philippines,, the National Building Code and the "Compilation of Building Telecommunication Cabling Systems for Philippine Standards by BICSP".
- Minimum technical standards covering the inter-building fiber-optic cable system shall adhere to, but are not limited to the following standards:

  4.8.1. Optical Fiber Optic Cabling and Components:
    - ANSI/TIA/EIA-568-C.0, Generic Telecommunications Cabling for Customer Premises
    - ANSI/TIA/EIA-568-C.1, Commercial Building Telecommunications Cabling Standard
    - ANSI?TIA/EIA-568-C.3, Optical Fiber Cabling Components
  4.8.2. Telecommunication Pathways
    - ANSI/TIA/EIA-568-B, Commercial Building Standard for

Telecommunications Pathways and Spaces

4.8.3. Grounding and Bonding
- Philippine Electrical Code
- ANSI J/STD-607-A-2002, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

4.8.4. Administration and Labeling
- ANSI/TIA/EIA-606A-2002, Administration Standard for Commercial Telecommunications Infrastructure

4.9 Fiber Optic Cable Runner System for the New Route of the University Fiber Optic Cable Backbone and all buildings
- All cable trays/ladder shall be powder coated (must pass the AAMA 2605 rating) with its corresponding mounting brackets and all conduits for outdoor fiber cable runner shall be GI Pipe(Class B) with GI connector coupling and mounting brackets. The cable trays/ladder and the GI Pipe should be painted with the recommended color by the Campus Planning and Development Office.
  - Reference for GI pipe
    - Class A GI Pipes
    - Class A are the light gauge pipes with a yellow colour strip for identification. They are cheaper than other classes of GI Pipes.

    - Class B GI Pipes

■ Class B are medium gauge pipes with a blue colour strip for identification. They are Costlier than Class A and cheaper than class C. ■ Class C GI Pipes ■ Class C is heavy gauge pipes with a red colour strip for identification. They are costlier than other classes of GI Pipes. - The Contractor shall observe the bending radius and pulling strength requirements of the fiber optic cable during handling and installation - Each run of cable between the ODFs shall be continuous without any joints or splices - Installation practice shall comply to manufacture best practices - The cable manufacturer shall be ISO 9001 and 12001 registered - For the Admin building outdoor Fiber Cable Runner, the G.I. PIPE(Class B) size should at least accommodate the capacity of High Density Optical Distribution Frame in this project - For the Admin building outdoor Fiber Cable Runner, there should be 3 concurrent G.I. PIPE(Class B) Fiber Cable Runners. - For the Admin building outdoor Fiber Cable Runner, the size for each G.I. PIPE(Class B) Fiber Cable Runner should be at least 6" outside diameter - For the Admin building indoor Fiber Cable Runner, the powder coated fiber tray/ladder/runner size should at least accommodate the capacity of High Density		

Optical Distribution Frame in this project ● For the Admin building indoor Fiber Cable Runner, the entry size of the powder coated fiber tray/ladder/runner size should be at least 6" height x 20" width **D. FOC Installation, Documentation, and Testing** 1. Setup and Execution**:** ● The Contractor shall perform all items of work under the terms of reference; all equipment, labor, machinery, materials, tools, supplies, transportation and incidental expenses necessary to execute the work to completion shall be shouldered by the Contractor. ● Safety Measures: contractors are required to install warning signs and barricades for the safety of the general public. All workers shall wear the necessary safety devices to ensure safety and proper identification throughout the project. ● Identification and campus ingress/egress: contractors are required to submit the list of the names of their workers, machinery and vehicles that will be entering campus premises to the Office of the Vice Chancellor for Community Affairs, UP Police or offices of similar nature. ● Contractor shall observe proper pulling and bending of fiber optic cable at all times during installation to prevent kinking, damaging or shortening the life of the cable. The minimum bend radius for both inside and outside the cable is 20 times the cable outside diameter while the maximum tensile load during installation is 2,700 Newtons.		

- Cable Slack: A minimum of three (3) meters (or 10 feet) slack should be provided on both ends. The slack should be neatly organized and stored in an extended loop. **Singlemode fiber optic backbone cable shall be spliced through the electric arc fusion splicing method, using proper protection sleeves and enclosures to protect the splices. The maximum splice loss must not exceed 0.1 dB.** - Labeling: All cables and hardware shall be identified and properly labeled using machine printed labels. All fiber cables additionally shall be tagged with semi-rigid plastic tabs, attached using cable ties and labeled with the name of the building on the remote end termination. The fiber optic housing hardware shall be labeled with the Contractor's name, contact address and number, date of installation of the system, and the duration of the system warranty. 2. Testing Procedures: Testing of cable channels shall be performed prior to system cut over. Length shall be tested using an OTDR, optical length test measurement device or sequential cable measurement markings. Attenuation shall be tested at 1310 nm and 1550 nm for single mode fiber in at least one direction using the 1-jumper test procedure as specified in ANSI/TIA/EIA-526-14A and ANSI/EIA/TIA-526-7. (See Annex B: **Fiber (TIA) Field Test Specification)** 3. Submittals: The contractor shall submit the following during bidding. All technical drawings should be signed and sealed by a licensed Electronics and Communications Engineer.		

- Site Map and inter-building connectivity locations
- Technical data of system components;
- Cable routing and terminations
- Fiber conduit plan
- Floor plan showing placement of cable trays, LIUs and other major components.
  - Furthermore, the contractor shall provide three (3) sets of the following, upon project turn-over:
- Operation Manual(s) (if applicable)
- Fiber Optic Cable Test Reports; and
- As-Built Plans

4. Schedule of Payment

Payment will be released and processed upon completion of the project and acceptance.

COMPONENT B : Supply, Delivery, Installation and Configuration of Data Center Equipment

A. Overview

These Terms of Reference (TOR) call for the supply and installation of a Data Center Equipment in the Philippines Mindanao Campus, with related construction/fabrication, civil works, and technical specifications (minimum requirements unless otherwise specified), notably:

Description/Specification	Qty
HCI Server Appliance	
● **Technology**: Hyper-Converged Infra (HCI) is a	

software-defined IT infrastructure that virtualizes all the elements of conventional "hardware-defined" systems. HCI includes, at a minimum, virtualized computing (hypervisor), virtualized SAN (software-defined storage), and virtualized networking (software-defined networking). The HCI must be also capable and ready for network virtual security (Virtual Firewall, Bandwidth Manager, SSL VPN, WAN Optimization) • **Node size**: Maximum of 2U per node • **Storage type:** All Flash • **CPU:** at least Intel Xeon Scalable Gen 4 • **Processor**: At least 1 x Intel® Xeon® Gold 6430 2.1G, 32C/64T, 16GT/s, 60M Cache, per node • **Memory Capacity:** 64 GB to 4096 GB • **Memory**: At least 4 X 64 GB 3200MT/s RDIMMs DDR4 ECC or similar type or equivalent per node • **Storage class memory:** 256 GB to 8192 GB Intel Optane 200 Series • Cache drives capacity : Up to 800 GB or 1600 GB SAS 1600 GB NVMe • **Cache**: At least 800GB SSD SAS ISE, MU, up to 24Gbps 512e 2.5in Hot-Plug, AG Drive x 2 • **Storage capacity:** Up to 184 TB SAS or Up to 92 TB SATA • **Storage**: at least 3.84TB SSD SAS RI 24Gbps 512e 2.5in Hot-Plug, AG Drive 1DWPD x 6 / 800GB SSD SAS ISE, MU, up to 24Gbps 512e 2.5in Hot-Plug, AG Drive x 2 • **Onboard networking capacity:** Up to 2x: Dual 100GbE or Up to 2x: Dual 25 GbE or Up to 2x: Dual or quad 10 GbE • **Networking ports:** at least quad 10 GbE/ 4 x 10GbE SFP+ must be the new switches &	**3**		

existing switches stated here in the terms of reference
● **Fibre channel capacity:** Up to 2x Dual port 32Gb / 64Gb HBA capable
● **Power Supply**: At least Dual, Hot-plug, Power Supply Fault Tolerant Redundant (1+1), 1100W MM Titanium, Mixed Mode,NAF (Dedicated non-shared dual-PSUs and should be able to sustain single power supply failure)
 	
● **Warranty**: At least 3 years warranty and support
 	
● Each node must have the required licenses of Hypervisor and Software Define Storage
● Separate drives which are Boot Optimized Storage System (BOSS) apart from the capacity drives requested needs to be considered (in redundancy) for Booting the Virtualization Hypervisor.
● HCI system should be able to support NVDIMMs to support use cases like In Memory Databases.
● To ensure investment protection of customer's existing system, HCI system should be capable to support connecting External IP based or FC based storage array through PCIe based NICs or FC HBA cards respectively in the future.
● 3 Years Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time
● Physical Sever leveraged for HCI must include features such as:
    o   Secure Erase for user Data
    o Checking of cryptographic signatures of UEFI drives or other code loaded prior to OS running			

o Embedded Management and Lifecycle Automation o Out of band port with Lifecycle Controller o Server Management Software o Can use IOS or Android for server systems management o Must be capable of automated support case creation			
Top of Rack Switch Network Switch ● **Switch Type: Managed** ● **VLAN support: Yes** ● **Stackable: Yes** ● **Switching capacity:at least 1760 Gbit/s** ● **Throughput: at least 1320 Mpps** ● **Maximize performance, flexibility and cost-effectiveness with this ToR switch that features 48 x 10GbE SFP+ ports, 2 x 40GbE QSFP+ ports, and 4 x 100GbE QSFP28 ports, and ONIE for zero-touch installation of alternate network operating systems.(supply the needed transceivers, fiber patch cords and cable). Must be compatible with the existing Aruba Switches (Aruba CX 8325 JL624A, Aruba 6300M (JL659A), Aruba 6300M (JL660A))** ● **Note: HCI must be connected to two Top of Rack HCI switches for redundancy and ToR HCI Switches must be connected to the existing Core switches. All transceivers and cables will be produced by vendor and must be compatible with the existing aruba switches.** ● **Warranty**: At least 3 years warranty and support	**2**		

- Hardware Technical Specifications (Switches/TOR) - The proposed switch must include 2x Unit of Network Switches- 48x Ports of 10Gbe SFP Copper - The Top of Rack switches must have the following specifications and features PER UNIT: - Supports the open-source Open Network Install Environment (ONIE) for zero touch installation of alternate network operating systems - VXLAN gateway functionality support for bridging and routing the non-virtualized and the virtualized overlay networks with line rate performance - Redundant, hot-swappable power supplies and fans - Consistent DevOps framework across compute, storage, and networking elements - Standard networking features, interfaces, and scripting functions for legacy network operations integration - Standards-based switching hardware abstraction via Switch Abstraction Interface (SAI) - Pervasive, unrestricted developer environment via Control Plane Services (CPS). 3 Years Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time			

10G SFP+ LC SR 300m MMF Transceiver must be compatible with the existing ARUBA Switches, servers,	20	
10G SFP+ LC SR 300m MMF Transceiver must be compatible with the existing ARUBA Switches, servers,	4	
at least Windows server 2022 datacenter - 16 core (perpetual) commercial	6	
DNS Server for HCI at least Chassis Configuration 3.5" Chassis with up to 4 Hot Plug Hard Drives, Front PERC 321-BGVP at least Processor Intel Xeon E-2334 3.4GHz, 8M Cache, 4C/8T, Turbo (65W), 3200 MT/s 3200MT/s UDIMM 370-AGNY 1 at least Memory Capacity 16GB UDIMM, 3200MT/s, ECC 370-AGQU x 2 at least Hard Drives 600GB Hard Drive SAS ISE 12Gbps 10k 512n 2.5in with 3.5in HYB CARR Hot-Plug 400-BJOE x 3 at least Power Supply Dual, Hot-Plug, Redundant Power Supply (1+1), 600W at least Power Cords Jumper Cord - C13/C14, 0.6M, 250V, 13A (North American, Guam, North Marianas, Philippines, Samoa) x 2 at least Motherboard PowerEdge R350 Motherboard with Broadcom 5720 Dual Port 1Gb On-Board LOM,V2 iDRAC9, Enterprise 15G at least Broadcom 57412 Dual Port 10GbE SFP+ Adapter, PCIe Low Profile 540-BBVI	1	

at least Operating System Windows Server 2022 Standard,16CORE,FI,No Med,No CAL, Multi Language at least supply with installed with perpetual hypervisor (VMWARE) include installation, configuration and documentation of the DNS Server			

Note: *Any additional server device, equipment, accessories, and/or cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.*

Note: *Technical Evaluation shall be based on the documents submitted such as, but not limited to brochures and technical data sheet to be submitted during post-qualification within five (5) calendar days from receipt of Notice from the Bids and Awards Committee (BAC) declaring the bidder as having the lowest or single calculated bid.*

B. **HCI Features** (Minimum Features unless otherwise specified)

- 3 Years Support and Warranty
- Scalable (allow scale-up and scale-out expansion)
- Virtualize Compute, Storage, and Storage Networking
- Deduplicate, Compress & Optimize all data online
- Wide Area Network (WAN) optimization
- Virtual Machine Replication
- Single-pane or Graphical User Interface (GUI) for Virtualization Management
- Private Cloud (On-premise Cloud Infrastructure)
- Hybrid Cloud Support (Can be extended to Public Cloud)
- Disaster Recovery Site Support (Failover and Failback)
- The solution should process virtual machine I/O within the hypervisor kernel and should not require a storage virtual machine.
- Solution hypervisor must include virtual distributed switches spanned to allow their configurations to be handled as a single entity.
- Solution must have storage virtualization management

integrated with the management of virtual servers and not a separate console. ● Solution must be able to start small and scale-up to 64 nodes per cluster ● Solution must provide quality of service (QoS) on a per-VM (Object) basis, meaning IOPS threshold limits can be set as a part of the VM level policies that can be dynamically changed. ● Must have a unified lifecycle management that simplifies and consolidates experience of updating the full HCI stack (firmware and software update). ● Can support "Smart Fabric Services" that automates network setup which simplifies and accelerates deployment. ● Single point of support by default for all software and hardware. ● VDI Integration and Hardware ready ● **Software: Must be included to have Windows Server 2022(DC Edition) and the latest hypervisor and software-defined storage and at least 1x management virtualization management center tool.** ● **Must include all the necessary perpetual enterprise licenses for compute virtualization, integrated storage, virtual infrastructure management and HCI software per CPU/Processor basis.** ● Must have Virtualization Manager to manage your full server infrastructure of virtual machines. ● RecoverPoint for Virtual Machines enabling replication of virtual machines to remote sites and configuration of orchestrated failover and failback for disaster recovery ● Have a cloud-based analytics engine that utilizes machine learning to help prevent potential issues using predictive analytics and trending ● Full stack integration with VMware technologies, including VMware Cloud Foundation ● Software defined architecture that consolidates compute, storage, virtualization, and management ● Allows customers to either bring their own license or purchase one as part of the HCI solution ● HCI solution is fully integrated, preconfigured and pre-tested VMware HCI solution on the market. Based		

on VMware's vSphere, vSAN , the HCI systems should deliver a turnkey IT infrastructure transformation.
● Has a networking operating system feature/services that creates a fully integrated solution between the fabric and HCI cluster infrastructure.
    ○ Significantly simplify complex single and multi-rack deployments across multiple HCI clusters.
    ○ Flexible topology for multi-rack deployments
    ○ Greatly reduce the time and cost to deploy, scale and adapt networks for a HCI environment
    ○ Reduce risk of network configuration errors
    ○ User-friendly network management via single pane of glass leveraging existing VMware tools and OMNI plugin
    ○ Enhanced support experience with single vendor support
● Hyper-Converged Infrastructure (HCI) Appliance: The solution being described is a highly integrated and scalable infrastructure appliance designed to streamline and simplify IT operations. It combines computing, storage, networking, and virtualization resources into a single, unified platform.
● Simplified Management and Deployment: The HCI appliance offers a simplified management interface that allows administrators to easily deploy and manage virtualized workloads. It provides a centralized dashboard for monitoring and administering the infrastructure, reducing the complexity typically associated with traditional infrastructure deployments.
● Scalability and Flexibility: The appliance offers scalability to meet evolving business needs. It supports the addition of compute and storage resources as demand increases, allowing organizations to scale their infrastructure without disruption. This flexibility enables efficient resource allocation and cost optimization.
● Performance and Reliability: The HCI appliance is designed to deliver high performance and reliability for mission-critical workloads. It leverages advanced hardware and software technologies to optimize performance and ensure business continuity. This results in improved application responsiveness,		

reduced downtime, and enhanced user experience. ● Simplified Data Protection and Disaster Recovery: The appliance incorporates data protection and disaster recovery capabilities, enabling organizations to safeguard their critical data and minimize the impact of potential disruptions. It provides efficient backup and recovery mechanisms, ensuring data integrity and enabling quick restoration in the event of a failure or data loss. ● Virtualization and Application Support: The HCI appliance supports leading virtualization technologies, allowing organizations to run multiple virtual machines and applications on a single platform. It is compatible with various operating systems and application environments, enabling seamless integration and consolidation of workloads. ● Cost Efficiency: The appliance offers cost savings through reduced hardware and operational expenses. By consolidating compute, storage, and networking into a single appliance, it eliminates the need for separate infrastructure components, resulting in lower capital and operational costs. Additionally, it optimizes resource utilization, leading to increased efficiency and cost-effectiveness. ● Integration with Existing Infrastructure: The HCI appliance is designed to integrate seamlessly with existing IT infrastructure, allowing organizations to leverage their current investments. It supports interoperability with various systems, protocols, and management tools, enabling a smooth transition and integration into the existing IT environment. ● The HCI appliance that will be implemented harnesses industry-leading virtualization technology, which provides advanced capabilities for consolidating compute, storage, and networking resources into a unified infrastructure. This solution enables organizations to leverage a robust and scalable virtualization platform, offering enhanced performance, flexibility, and simplified management. Additionally, it incorporates a comprehensive suite of features for high availability, data protection, and disaster recovery, ensuring the integrity and availability of critical systems and data. The underlying virtualization technology utilized in this solution offers		

seamless integration with a wide range of applications and workloads, delivering optimal performance and efficiency.
● The industry-leading HCI solution that we are considering for implementation has gained recognition and validation from well-established market research and technology advisory firms. It has been acknowledged as a top-tier solution in the HCI market, demonstrating its ability to streamline IT operations and deliver exceptional performance, scalability, and reliability. This solution has also received positive evaluations from industry experts, who have praised its comprehensive features, seamless integration, and robust infrastructure. Its strong market presence and widespread adoption by organizations across various industries further validate its value and effectiveness.
● **HCI Storage**
    ○ HCI's Software Define storage Should provide high-resilient shared storage capacity for Virtual environment
    ○ The software defined storage as part of the HCI solution should ideally be integrated within the hypervisor kernel to provide better performance, resiliency, reduce less memory and CPU overhead.
    ○ The solution shall provide a data caching tier that supports SSD or NVMe. HCI system should be capable of supporting multiple Cache Drives for high availability and enhanced performance within the same HCI Node.
    ○ HCI Software Defined Storage system should be a self healing architecture and should re-balance/re-sync in event of hardware failure and during hardware expansion to aligned with Defined Storage Service Levels
● **HCI Scalability**
    ○ HCI system should be able to start as small as 2 nodes for Remote Office Branch Office requirement and 3 nodes for Standard Datacenter deployment and should be scalable up to 64 HCI nodes in the same cluster. All 64 nodes in within the same cluster should be able to provide storage and		

compute for virtual machines/applications

- o Storage scalability should be supported with minimum building block expansion based on required capacity and support as small as one disk expansion per HCI node.
- o Should be based on modular scalable architecture having the ability to add, auto-discoverable nodes, it must support automated cluster deployment, configuration, and non-disruptive updates.
- o Solution must be able to handle expected and unexpected growth easily, cost-effectively, and with minimal disruption to business activities by adding nodes and drives without taking the cluster offline.
- o Solution must be able to support multiple generations of server hardware with varied configurations in the same cluster to provide evergreen cluster for hyper-converged infrastructure.
- o HCI system should be Scale UP and SCALE OUT Design. Within the existing node should support hardware upgrade like Memory, Storage disks(Cache and Capacity), PCIe hardware FC HBA, NICs, GPU etc.

- **HCI Automation & Orchestration**
  - o HCI System should be an extensible infrastructure by providing integration with third party tools for automation and orchestration through industry standard toolset like REST API, PowerShell, Ansible etc.
  - o Proposed HCI solution should have native Swagger integration for REST API.
  - o Should be based on modular scalable architecture having the ability to add, auto-discoverable nodes, it must support automated cluster deployment, configuration, and non-disruptive updates.
  - o The solution should be scalable in a non-disruptive manner by adding additional nodes to the cluster at a later point of time without having to power down any nodes.
  - o Single button non-disruptive rolling upgrades

of Hyper converged system software and system hardware firmware from the same manage Solution must have an integrated GUI console that performs functions related to the hardware, such as the provisioning of new nodes, upgrading system patches, checking the status of the system, and shutting down the system GUI console.

- o Hardware maintenance task like Hard disk replacement and Node replacement and subsequent HCI node bring up task should be totally automated.
- o Hardware expansion and Cluster expansion by adding HCI Nodes into existing cluster tasks should be automated.
- **HCI Hypervisor**
  - o Virtualization software shall provide a virtualization layer that sits directly on the bare metal server hardware with no dependence on a general-purpose OS for greater reliability and security.
  - o It should support features like snapshots & cloning of individual virtual machines, non-disruptive Scale-Up & Scale-Out to grow capacity and/or performance whenever required. It should provide ease of use wizard for snapshot scheduling and instant batch cloning of Virtual machines.
  - o Hypervisor layer should support live migration of running virtual machines from one physical node to another with zero downtime, continuous service availability, and complete transaction integrity transparent to users.
  - o In the event of a node failure, virtual machines should automatically be restarted on another node.
  - o Hypervisor shall provide the ability to hot add CPU and memory, hot-plug disks and NICs (provided the same is supported by guest OS) to virtual machines.
  - o HCI solution should provide a centralized interface from which you can configure, monitor, and administer virtual machine access switching for the entire Virtual Data

Center. This will simplify virtual machine network configuration, Enhanced network monitoring and troubleshooting capabilities, Support Network QOS for virtual machines and support for advanced networking features.

- o The solution should allow administrators to manage and reserve (allocate a share of the memory, CPU, and storage) resources for a business group or LOB to use.
- o The virtualization management software should have the ability to live migrate VM files from one storage array to another without any downtime. Support this migration from one storage protocol to another (ex. iSCSI, NFS, VMFS).
- o HCI hypervisor should support Virtual Machine Fault Tolerance to eliminate downtime for VM/Application during HCI node failure
- o Virtualization software should provide enhanced visibility into storage throughput and latency of hosts and virtual machines that can help in troubleshooting storage performance issues.
- o The Hypervisor should have capabilities to load balance the utilization in the cluster.

- **HCI Business Continuity**
  - o Solution must have the capability to replicate virtual machines to an external system based on the same hypervisor. The external system may or may not be hyper-converged, made by the same manufacturer or a third party.
  - o Proposed solution should allow centralized creation and management of recovery plans directly. Automatically discover and display virtual machines protected by the HCI solution.
  - o Proposed solution should use VM based replication to asynchronously replicate VMs across hyper converged systems in different sites.
  - o Both Asynchronous and Synchronous replication to be supported per VM with any

point in time recovery for critical VM. Should be fully integrated with Storage Policy based management. ○ Proposed Solution should be able to customize the shutdown of low-priority virtual machines at the failover site to get more resources or proper utilization of resources for the critical workloads ○ Proposed solution should provide multiple point-in-time recovery which will allow reversion to earlier known states with data integrity. ○ Proposed Replication and DR software must have complete licenses that capable to have Failover and Failback when BCDR is required. ● **HCI Management & Operations** ○ The solution should support Online Analytics on Health of the storage and provide predictive alerts. ○ Online portal should provide advanced metrics, capacity planning, Global Visualization, collect and analyze telemetry data based on Machine Learning to detect patterns and behavior and subsequently trigger health events and remediation steps for HCI system. ○ Single dashboard to manage and provision virtual machines, network, storage, monitor performance and manage events & alerts. ○ The solution must provide consolidated view for the entire HCI to identify potential bottlenecks in performance. ○ The Virtualization Management Solution should provide APIs to cater to external orchestration and management tools. ○ For easy troubleshooting both hardware and software logs to be collected from a Single GUI. ○ Both hardware and software events of HCI system should be provided in single management GUI platform. ○ Single GUI for one click updates of entire HCI stack including both software and hardware components.		

Business Continuity Disaster Recovery Requirements   **Software Technical Specifications**
    o Solution must have the capabilities to replicate virtual machines to an external system based on the same hypervisor. The external system may or may not be hyper-converged, made by the same manufacturer or a third party.
    o Solution must have at least 15 licenses to replicate Virtual Machines from Production Site
    o Proposed solution should allow centralized creation and management of recovery plans directly. Automatically discover and display virtual machines protected by the HCI solution.
    o Solution must have complete licenses to have a capability of Business Continuity Disaster Recovery to do Fail Over and Fail Back of Virtual Machines.
    o 3 Years Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time
 	
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    VDI Integration for HCI (Note VDI is not included in the purchase in this project but the HCI should have a compatible VDI)   The HCI appliance is well-suited for supporting Virtual Desktop Infrastructure (VDI) deployments. Here are some key points to highlight the compatibility and benefits of HCI with VDI:
    o VDI Readiness: The HCI is designed to deliver the performance, scalability, and flexibility required for VDI deployments. It provides the necessary compute, storage, and networking resources to support virtual desktops.
    o Enhanced User Experience: VDI on HCI offers a seamless and responsive user experience. The appliance's high-performance architecture ensures that virtual desktops run smoothly, providing users with fast and reliable access to		

their applications and data. ○ Scalability and Flexibility: HCI allows organizations to scale their VDI environment as their needs grow. Additional nodes can be easily added to the cluster, increasing compute and storage capacity to accommodate more virtual desktops or handle peak workloads. ○ Simplified Management: HCI simplifies the management of VDI infrastructure. It provides centralized management and monitoring tools that streamline the provisioning, deployment, and ongoing management of virtual desktops. This reduces administrative overhead and enhances operational efficiency. ○ Data Protection and Availability: HCI ensures data protection and high availability for VDI environments. It includes built-in data protection and disaster recovery capabilities, enabling organizations to safeguard critical user data and quickly recover from any system failures or disruptions. ○ Integration with VDI Software: HCI is compatible with leading VDI software platforms such as VMware Horizon. It provides tight integration with VDI software components, ensuring seamless compatibility and optimized performance. ○ Cost Efficiency: HCI helps organizations achieve cost savings in VDI deployments. By consolidating compute, storage, and networking resources into a single appliance, it reduces hardware and operational costs. The efficient resource utilization also leads to lower infrastructure costs and improved ROI. ○ Support and Services: Provides comprehensive support and services for HCI, including deployment assistance, ongoing maintenance, and technical support. This ensures that organizations have access to reliable support resources to address any VDI-related challenges. ○ By leveraging the HCI Appliance for VDI, organizations can benefit.		

- Virtual Desktop Infrastructure (VDI): enables the deployment of virtual desktops, allowing users to access their personalized desktop environments from any device or location. This eliminates the need for traditional physical desktops and provides a consistent experience across devices. - Application Virtualization: With application virtualization, organizations can deliver applications to end-users without the need for local installations. Applications are hosted on central servers and streamed to users' devices on-demand, enhancing application compatibility and simplifying application management. - High-Performance Graphics: leverages advanced graphics virtualization technologies to deliver rich multimedia and graphics-intensive applications with exceptional performance. Users can seamlessly access applications that require high-quality graphics, such as 3D modeling or video editing software. - Remote Access: enables secure remote access to virtual desktops and applications, allowing users to work from anywhere, on any device. This promotes productivity and flexibility while maintaining data security. - Application Publishing: Organizations can publish specific applications to end-users, granting them access to only the applications they require. This enhances security, reduces complexity, and improves user experience by providing a streamlined and personalized application environment. - Centralized Management: provides a centralized management console for administrators to efficiently manage virtual desktops, applications, and user access. Administrators can easily provision and update desktops and applications, enforce policies, and monitor user activity from a single interface. - User Experience: The solution delivers a		

seamless and responsive user experience, with support for a wide range of devices and operating systems. Users can access their virtual desktops and applications with ease, enhancing productivity and satisfaction. o Security and Compliance: incorporates robust security features to protect sensitive data and applications. It ensures data encryption, user authentication, and compliance with regulatory requirements, maintaining the highest level of security for virtual desktop and application environments. o Benefits: o Increased Flexibility: empowers organizations to embrace flexible work arrangements by enabling secure remote access to virtual desktops and applications, allowing users to work from anywhere, on any device. o Enhanced Productivity: With virtual desktops and applications, users have consistent access to their work environment and applications, promoting productivity and collaboration across teams. o Improved IT Efficiency: Centralized management simplifies desktop and application provisioning, updates, and policy enforcement, reducing IT management complexity and improving operational efficiency. o Cost Savings: By leveraging virtual desktops and applications, organizations can reduce hardware and software costs, minimize maintenance efforts, and achieve greater resource utilization. o Secure Data and Applications: ensures data security through features like encryption, user authentication, and access controls, helping organizations meet compliance requirements and protect sensitive information. o Scalability and Performance: The solution provides the scalability and performance needed to support a growing user base, with features that optimize graphics-intensive applications and deliver an excellent user		

experience.

- o Should have a Data Protection, Backup and Recovery for the VDI Environment using the Enterprise Backup and Recovery Appliance/Server in this project
- o Below is the technical Specification of the VDI that must be compatible with the HCI and Enterprise Backup

Solution Requirements and Components	Minimum Features
Centralized Management System Server	Is a centralized management system for VMware vSphere. The **Centralized Management System Server** can be deployed on a physical or virtual machine, but deployment on a VM running on an ESXi host is preferred, as the advantages of virtualization are available in this case. It can be deployed as an Appliance from a preconfigured OVA template. If possible, avoid using existing **Centralized Management System Servers** in your vSphere environment for VDI. Deploying new servers especially for the VDI is recommended for licensing purposes – a VDI license includes a license for **Centralized Management System Servers**.
VDI View Agent	Is a software component that must be installed on all virtual machines that will be managed by VDI. This service provides connection monitoring, USB support, virtual printing, and single sign-on. VDI View Agent must be installed on any machine that should be used as a virtual desktop.
VDI Client	VDI Client is an application installed on a user's machine that communicates with vdi View Connection Server (see below) to establish a connection between endpoint user devices and VDI virtual desktops or applications. The client can be installed on Android, iOS, Windows, Linux, and MacOS

	operating systems.
VDI Connection Server	Is a server that authenticates users through Active Directory, provides single sign-on, associates virtual desktops with users, etc. The LDAP (Lightweight Directory Access Protocol) database that is used for Active Directory authentication is copied to the VDI Connection Server. This is one of the core components of VDI.
VDI ThinApp	Is an optional component that is used for application virtualization by VMware. This application virtualization tool is agentless, so nothing needs to be installed on a user's machine to run it.
VDI View Composer	Is used for managing virtual desktops on vCenter Server and provides rational storage consumption by using linked clones. Rather than creating full clones, linked clones are created from a parent virtual disk (VMDK). Linked clones use special differencing virtual disks to store the unique data that differs from the data on a parent disk. Linked clones don't work without their parent disks. You can save from 50% to 90% of your storage space by using this technology. VDI View Composer should be installed on each instance of vCenter Server separately.
VDI Administrator	Is the web interface for VDI management. It is recommended to use a dedicated VDI Administrator instance for each instance of a VDI Connection Server. The VDI Administrator portal allows you to add vCenter Server and VDI View Composer instances to your View configuration.
VDI Instant Clone Technology and Master Desktop Templates	Should include a cloning option with which you can create linked clones. Before creating linked clones, you should create a Master Desktop Template. A clone is a copy of an existing (source) virtual machine. The source VM is also called a parent VM. Two types of clones are

| | | usually used in virtual environments – full clone and linked clones.

A full clone is an exact reproduction of the parent VM that doesn't share any VM components with the parent VM. A full clone is not dependent on the parent VM during the operation. The performance of a full clone is the same as the performance of its parent VM. All data is copied from the parent VM to the VM clone in this case.

A linked clone is a VM copy that shares the virtual disks of the parent VM. This allows you to save storage space and time spent on clone creation. A linked clone is dependent on the parent VM and cannot function if the parent VM is missing or is not reachable. A snapshot of the parent VM is made to create each linked clone. Differencing virtual disks (delta disks) are created after the snapshots are made. Changes to the virtual disk of the linked clone don't affect the virtual disk of the parent VM, and vice versa.

Instant Clone is a technology that allows you to create clones near-instantly. This is achieved by providing rapid in-memory cloning of a parent VM in running state and using the "copy-on-write" approach. As a result, clones are created rapidly and without affecting the parent VM. Instant clones share the memory and disks of the parent VM. When a file of the VM clone is about to be changed, a copy of that data is first created, and then the changes are written to the copy of the data. Hence, all modifications made with clones are isolated from the parent VM. When a snapshot is created, the VM is momentarily frozen and a delta disk is created (VMware Tools must be installed on the VM). | | |
| **VDI Desktop** | When provisioning virtual desktops, you | | |

Pools	should create desktop pools. Desktop pools allow you to create and manage virtual desktops flexibly. There are two approaches to provisioning virtual desktops when creating desktop pools: using persistent desktops and using non-persistent desktops. A non-persistent virtual desktop is used when all changes made by a user with the desktop must be discarded after user logoff or VM reboot. In this case, a user is not assigned to any specific desktop, because all desktops in the pool are identical and created from one master desktop template. This type of provisioning makes sense in cases where users all need a standard application set for their working tasks, and do not need to save changes after their work or install new applications. A persistent virtual desktop is used when each user must have their own desktop with a personalized user profile and specific applications. This is also known as dedicated user assignment. After the user logs off or the VM is rebooted, the data is retained on the virtual desktop.		
Server Compatibility (Backend)	The Server Infrastructure(web, application, database) of the VDI solution must be compatible with VMware vSphere (vSphere 6 up to latest version) and can be deployed as a Windows Server Virtual Machine (Windows Server 2016 up to latest version) or as a Virtual Appliance or at the native Operating System supported by the proposed VDI solution to be provided by the Contractor.		
Database Compatibility	Must be compatible with MS SQL 2012 (must be provided by the Contractor)		
Authentication	Must support Microsoft Active Directory (AD) (must be provided by the Contractor)		

	Lightweight Directory Access Protocol (LDAP) (must be provided by the Contractor		
Authorization	Must have a Granular Role Based Permission System		
User Interface	- Must have a Web-based user interface that is compatible with Internet Explorer 10+ or Firebox 60+ browsers or Google Chrome - Must have an Agent-based user interface that is compatible with Windows 10 Pro		
Licensing	VDI software components must have perpetual licenses (licenses can be used indefinitely/without expiration)		
Manageability	Must be able to centrally monitor the health and performance of virtual desktops; manage software updates delivery; manage sessions; and dynamically attach applications, users, groups or devices when users logon to their desktop		
Redundancy	Must have the capability to configure VDI components as redundant pairs on a remote site		

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Note: *Technical Evaluation shall be based on the documents submitted such as, but not limited to brochures and technical data sheet to be submitted during post-qualification within five (5) calendar days from receipt of Notice from the Bids and Awards Committee (BAC) declaring the bidder as having the lowest or single calculated bid.*

C. **Enterprise Backup and Recovery Appliance/Server Features** (Minimum Features unless otherwise specified)

- Solution must deliver protection storage, protection software, search, advanced monitoring, and analytics in a single, easy-to-deploy appliance.

- Solution must include tools for effective management and must be a separate hardware from the HCI. - Solution must be able to protect both physical and virtual environments - Solution must support native tiering to public and/or private clouds for long-term retention **Solution must support at least an average 55:1 data deduplication rate.** - Solution must support reporting capabilities for physical capacity utilization for chargeback and capacity planning - Create unchangeable data copies in a secure digital vault and processes that create an operational air gap between the production / backup environment and the vault. - Machine learning and full-content indexing with powerful analytics within the safety of the vault. Automated integrity checks to determine whether data has been impacted by malware and tools to support remediation if needed - Should have workflows and tools to perform recovery after an incident using dynamic restore processes and your existing DR procedures. - Expert guidance to select critical data sets, applications and other vital assets to determine RTOs and RPOs and streamline recovery. - The appliance/server should offer multiple layers of protection to provide resilience against cyberattacks even from an insider threat. It moves critical data away from the attack surface, physically isolating it within a protected part of the data center and requires separate security credentials and multi- factor authentication for access. Additional safeguards include an automated operational air gap to provide network isolation and eliminate management interfaces which could be compromised. The appliance/server should automates the synchronization of data between production systems including open systems and mainframes, and the vault creating immutable copies with locked retention policies. If a cyberattack occurs you can quickly identify a clean copy of data, recover your critical systems and get your business back up and running. - The appliance/server should have a feature, technology		

and solution which adds an intelligent layer of protection to help find data corruption when an attack penetrates the data center. This innovative approach provides full content indexing and uses machine learning (ML) to analyze over 100 content-based statistics and detect signs of corruption due to ransomware. The solution/technology finds corruption with up to 99.5% confidence, helping you identify threats and diagnose attack vectors while protecting your business-critical content – all within the security of the vault. ● This integration allows for an automated approach towards regular scanning of backup data to validate the data's integrity and alert when suspicious behavior is detected. ● The appliance/server should have the ability to directly scan inside backup images, including Dell NetWorker, Avamar, PowerProtect Data Manager, and more, allowing for content to be analyzed without the need to rehydrate the data. ● The appliance/server delivers full-content analytics with every scan of the data to detect even the most sophisticated ransomware attacks that can easily go undetected by lightweight scanning tools that only inspect metadata. ● When an attack occurs, the appliance/server should provide post-attack forensic reports to understand the depth and breadth of the attack and provide a listing of the last good backup sets before corruption to facilitate the recovery process. ● The appliance/server should leverage data backups to observe how data changes over time and then utilizes analytics to detect signs of corruption indicative of a ransomware attack. Machine learning then examines these 200+ content-based analytics to find corruption with up to 99.5% confidence, helping you protect your business-critical infrastructure and content. The appliance/server detects mass deletions, encryption, and other suspicious changes in core infrastructure (including Active Directory, DNS, etc.), user files, and critical production databases resulting from common attacks. If The appliance/server detects signs of corruption, an alert is generated in the dashboard with additional information that details the scale and impact		

of the attack. ● When suspicious behavior occurs, the appliance/server provides post-attack forensic reports to diagnose the cyberattack further. When data corruption is detected, a listing of the last known good backup data sets is available to support rapid recovery and minimize business interruption. ● The Appliance/server monitors files and databases to determine if an attack has occurred by analyzing the data's integrity. Once data is replicated to the recovery vault and retention lock is applied, the appliance/server should automatically scan the backup data, creating point-in-time observations of files, databases, and core infrastructure. These observations enable the appliance/server to track how files change over time and uncover even the most advanced type of attack. ● This scan occurs directly on the data within the backup image without the need for the original backup software. Analytics are generated that detect encryption/ corruption of files or database pages, known malware extensions, mass deletions/creations of files, and more. Machine learning algorithms then use analytics to make a deterministic decision on data corruption that is indicative of a cyberattack. The machine learning algorithms have been trained with the latest trojans and ransomware to detect suspicious behavior. If an attack occurs, a critical alert is displayed in the dashboard. The post-attack forensic reports are available to diagnose and recover from the ransomware attack quickly. ● The appliance/server should deliver full-content-based analytics on all the protected data. This capability sets it apart from other solutions that take a high-level view of the data and use analytics that look for obvious signs of corruption based on metadata. Metadata-level corruption is not difficult to detect; for instance, changing a file extension to .encrypted or radically changing the file size. These types of attacks do not represent the sophisticated attacks that cybercriminals are using today. ● The appliance/server should go beyond metadata-only solutions because it is based on full-content analytics that provides up to 99.5% confidence in detecting data		

corruption. It audits files and databases for attacks that include content-only based corruption of the file structure or partial encryption inside a document or page of a database. These attacks cannot be found using analytics that do not scan inside the file to compare how it changes over time. Without full-content-based analytics, the number of false negatives will be significant, providing a false sense of confidence in your data integrity and security. ● The appliance/server should generate analytics from a comprehensive range of data types. This includes core infrastructure such as DNS, LDAP, Active Directory, unstructured files such as documents, contracts, intellectual property, and databases including Oracle, DB2, SQL, Epic Caché, etc. ● The appliance/server should provide automated restore and recovery procedures to bring business critical systems back online quickly and with confidence. Recovery is integrated with your incident response process. After an event occurs, the incident response team analyzes the production environment to determine the root cause of the event. The appliance/server also provides post-attack forensic reports to understand the depth and breadth of the attack and provides a listing of the last good backup sets before corruption. Then, when the production is ready for recovery the appliance/server should provide management tools and the technology that performs the actual data recovery. It automates the creation of the restore points that are used for recovery or security analytics. ● The data protection appliance being considered for implementation is a robust solution designed to ensure the security and integrity of critical data assets. ● This appliance offers comprehensive backup and recovery capabilities, enabling organizations to protect their valuable data against loss, system failures, and potential cyber threats. It leverages advanced technologies to optimize data management processes, including efficient deduplication and compression techniques that minimize storage requirements and reduce costs. ● The appliance seamlessly integrates with existing IT infrastructure and applications, providing a reliable and		

scalable solution for data protection. With centralized management and monitoring capabilities, it streamlines operational efficiency, simplifies backup scheduling, and enables streamlined data retention and archival strategies. ● By implementing this data protection appliance, organizations can confidently safeguard their data assets, ensure business continuity, and meet their data protection goals. ● **The Backup Appliance 24TB data protection appliance offers a unique combination of features and specifications designed to meet the data protection needs of modern businesses. Here are the specific specifications of the Backup Appliance 24TB model:** ● Storage Capacity: The Backup Appliance 24TB model provides a generous storage capacity of 24 terabytes (TB), allowing for the efficient backup and retention of large volumes of data. ● Scalability: The appliance is designed to scale easily to accommodate growing data storage requirements. It supports expansion options, allowing businesses to add additional storage capacity as needed. ● Data Deduplication and Compression: The Backup Appliance incorporates advanced deduplication and compression technologies to optimize storage utilization and reduce data footprint. This enables businesses to store more data within the available storage capacity. ● Performance: The appliance offers high-speed data backup and recovery operations, ensuring minimal impact on system performance and reducing downtime during data protection tasks. ● Network Connectivity: The Backup Appliance supports various connectivity options, including Ethernet and Fibre Channel, enabling seamless integration into existing network infrastructure. ● Data Encryption: The appliance provides robust data encryption capabilities to ensure the confidentiality and security of backed-up data. This feature safeguards sensitive information from unauthorized access. ● Centralized Management: The Backup Appliance comes with centralized management software, allowing administrators to efficiently manage and monitor data protection tasks across multiple devices and locations		

from a single console. ● Backup and Recovery Software: The appliance includes comprehensive backup and recovery software that offers features such as backup scheduling, data replication, and granular recovery options, ensuring data availability and business continuity. ● Compliance and Reporting: The Backup Appliance provides compliance reporting capabilities, enabling businesses to monitor and demonstrate adherence to industry regulations and internal data protection policies. ● Hardware Redundancy: The appliance is built with redundant components, including power supplies and cooling fans, ensuring high availability and reducing the risk of hardware failures impacting data protection operations. ● The Backup Appliance **24 TB data** protection appliance delivers a powerful and efficient solution for protecting critical business data. With its ample storage capacity, scalability, advanced data deduplication and compression, and comprehensive management software, it offers businesses the peace of mind of robust data protection and reliable disaster recovery capabilities. ● Solution must deliver protection storage, protection software, search, advanced monitoring and analytics in a single, easy-to-deploy appliance. ● Solution must be an integrated appliance. ● Solution must include tools for effective management ● Solution must deliver **24**TB usable capacity ● Solution must provide performance and scalability for large and midmarket enterprises ● Solution must include protection storage, protection software, search, advanced integration, reporting, analytics, and tiering to public and private clouds ● Solution must be factory-integrated to speed deployment and simplify day to day operations ● Solution must be able to protect both physical and virtual environments ● Solution must include simplified management tools ● Solution must include Google-like search capabilities for restore of files and folders ● Solution must include tools to optimize data protection service levels		

- Solution must provide instant access to Virtual Machines during a VM restore - Solution must provide native tiering to public and/or private clouds for long-term retention - Solution must include efficient storage efficient deduplication and compression features - Solution must perform inline deduplication - Solution must perform variable length segmenting deduplication providing the highest efficiency storage between 25x - 55x. - Solution must not require a minimum number of drives to achieve high performance - Solution must provide high deduplication ratios for typical backup retention periods - Solution must include reporting capabilities for physical capacity utilization for chargeback and capacity planning - Solution must store all data in a deduplicated and compressed format - Solution must not require content awareness to achieve high deduplication ratios - Solution must store all data in a single Global Deduplication Pool - Solution must be able to perform backups and replication at the same time - Solution must allow for replication bandwidth throttling - Solution must include the ability for in-flight data encryption - Solution must include the ability to natively tier data to public or private clouds for long term retention - Solution must support VMDK backups - Solution must provide features that enable simplify Disaster Recovery Testing - Solution must include features that ensure data integrity - Solution must have data encryption capabilities to maximize security - Solution must provide the option for encryption of data-at-rest - Solution must support encryption key management with RSA - Solution must allow for electronic shredding of data - Solution must allow for easy capacity increases		

- Solution must have features that improve day to day management and operational efficiency
- Solution must provide for role based access security
- Solution must not have a negative performance impact if the system is highly loaded (above 90% utilization)
- Solution must still be able to perform backups and restores during of regular cleaning & maintenance processes
- Solution must be able to survive a dual disk drive failure
- Solution must have redundant components for the most common failure types
- Solution must have hot-swappable components for the most common failures
- Solution must minimize regular administrative tasks
- Solution must provide a vehicle for remote system maintenance and support
- Solution must support both IPv6 and IPv4 for replication
- Solution must provide Instant Access capabilities for multiple Virtual Machines
- Solution must include a dense storage shelf option to maximize space efficiency
- **Must include all the necessary perpetual enterprise license and perpetual enterprise software to support at least 25 VMs..**
- **Enterprise Backup and Recovery Appliance/Server should have a Data Protection, Backup and Recovery for the VDI Environment for this project**
- **3 Years Support and Warranty**

Description/Specification	Qty
Enterprise Backup and Recovery Appliance/Server ● **INITIAL CAPACITY:** at least 24 TB ● **MAXIMUM THROUGHPUT:** At least Up to 9.0 TB/hr ● **MAXIMUM LOGICAL CAPACITY:** At least Up to 5.3 PB **W/ CLOUD TIER: At least Up to** 15.9 PB	

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● **MAXIMUM USABLE CAPACITY:** At least 24 to 96 TB
W/ CLOUD TIER: At least Up to 288 TB
 	
● **INSTANT ACCESS AND RESTORE:** At least 1,000 IOPS up to 32 VMs
 	
● **PROCESSOR:** At least Intel Xeon
 	
● **DRIVE TYPE:** At least SAS 24 TB
 	
● **BUILT-IN NETWORKING:** At least 8x10GbE;
 	
● **Supported Enterprise Applications:** At least the following:
    ○ Oracle, SAP, Microsoft Exchange,
    ○ SharePoint, SQL Server, Sybase,
    ○ MySQL, MongoDB, Pivotal
    ○ Greenplum, IBM DB2, Lotus Notes,
    ○ Hypervisors: VMware, Microsoft
    ○ Hyper-V and KVM
    ○ All major file systems, including
    ○ Windows, Linux, HP-UX, AIX,
    ○ Solaris, Mac OS and more
● **Capacity upgrade options:**
    ○ At least available in 12TB Increments 24TB, 36TB, 48TB, 60TB, 72TB, 84TB, 96TB
    ○ At least any capacity point can be ordered from the factory
    ○ At least can be upgraded to any supported capacity point in the field
    ○ At least upgrades only require license enablement (ELMS License)
    ○ At least Cloud Tier & Cloud DR are optional purchases which can be enabled in Factory or Field upgradable
    ○ Maximum expansion capacities:
        ▪ At least Active tier can be expanded to 96TB.			

▪ At least Cloud tier can be expanded to 192TB. ● **Warranty**: At least 3 years warranty and support			

Note: *Any additional server device, equipment, accessories, and/or cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.*

Note: *Technical Evaluation shall be based on the documents submitted such as, but not limited to brochures and technical data sheet to be submitted during post-qualification within five (5) calendar days from receipt of Notice from the Bids and Awards Committee (BAC) declaring the bidder as having the lowest or single calculated bid.*

D. Implementation

- The supplier must provide a solution that is branded and brand new. The solution must be from a reputable international brand with local presence and local depot of parts and supplies.
- The supplier shall perform the supply, delivery, installation, configuration, fine-tuning and testing of the System.
- The Supplier shall deliver the necessary software, hardware, materials, **perpetual enterprise licenses** and other components not mentioned in the specification but are required to operate the System(HCI and Enterprise Backup).
- The supplier shall perform the necessary fine-tuning, upgrade, redesign or replacement of appliances to ensure the optimum performance of the System.

E. Installation and Configuration

- Installation of all hardware devices
- Installation and/or configuration of HCI and Enterprise Backup Software
- Configuration and integration to UP Mindanao's existing Network Infrastructure

F. Testing

The testing and acceptance shall be conducted in accordance with the following:

- The testing will be undertaken for a period of one (1) calendar day and will be attested to by UP Mindanao IT Staff.
- If any of the foregoing conditions are not met, the count of the testing period shall be restarted until all conditions have been duly satisfied continuously for one (1) calendar day.

G. Brand Manufacturer Requirements

- ISO 9001:2015 Certification
- ISO 14001:2004 Certification

H. Training

1. Training certifications or vouchers shall be issued valid for one (1) year
2. Face-to-face or virtual HCI Management training shall be conducted with at least eight (8) designated ITO Staff
3. A certificate of completion shall be given to the attendees
4. All expenses relative to the training shall be on the account of the winning bidder
5. Training should include the following:
   a. Administration
   b. Troubleshooting

c. HCI and Enterprise Backup Architecture implementation 6. The Contractor shall provide and arrange the conduct of at least nine (9) pax administration training using the software version used in the implementation of the solution within the project period or at most one(1) year after project completion(i.e. During software maintenance period). The Contractor shall shoulder all direct/indirect costs/expenses for a classroom-type technical training. All training materials (hardcopy and softcopy) must be provided by the Contractor, and instructors must be certified or authorized by the product vendor. The Contractor may also opt to provide training vouchers valid until 1 year after project completion. **I.** **Warranty Certificate** – Valid for three (3) years after delivery and in favor of UP Mindanao which shall cover the following: 1. Hardware (parts and service) and software components of the project, subscription and technical support 2. Includes the quarterly preventive maintenance service and supply of parts and labor onsite 3. Software license subscription and update, upgrade license included for 3 years, technical support 7*24 for 3 years 4. Repair and maintenance within warranty 7*24*5 for 3 years 5. Hyper-converged must have direct LOCAL (Filipino Nationality) vendor support 6. 24/7 Email, phone and remote support 7. Software/firmware upgrade and updates 8. Full replacement of defective items and materials including parts and labor, free or charge 9. The HCI and Enterprise Backup Solution should include three (3) years software maintenance subscription and support from the software vendor/principal which shall commence upon project completion and acceptance. A software		

maintenance certificate or equivalent shall be submitted by the Contractor.

10. During three (3) years software maintenance subscription and support, the Contractor shall ensure that UP Mindanao has the necessary entitlement and access to the following services, particularly related to the implemented HCI and Enterprise Backup solution.
    a. Product updates
    b. Version upgrades
    c. 24x7 technical support
    d. Other online resources (online forum/fora, knowledge base portal, etc)

11. During the three(3) year software maintenance subscription and support, the Contractor shall provide local Technical Support Services, whenever deemed necessary or as the need arises, and must comply with the provisions of Service Level Agreement (SLA).

12. During the software maintenance period, the Contractor shall provide assistance with the configuration and deployment.

13. The Contractor must submit a warranty bond to ensure that local support shall be provided during the software maintenance period.

J. **Project Liability and Continuity of Services**– The Contractor shall be liable for all damages caused to any of UP Mindanao property due to the fault or negligence of their personnel. Damages shall be repaired by the Contractor at their own expenses and to the satisfaction of UP Mindanao. In case of failure by the Contractor to effect repair on damaged property, UP Mindanao may cause the repair and deduct the entire cost from any amount due to the Contractor, without prejudice to other legal remedies available to UP Mindanao.

- The Contractor shall take no action which may interrupt or interfere with the existing services unless prior arrangements have been made and approval is secured from UP Mindanao authorized representative. Work shall be arranged so that shutdown time is minimized.
- The Contractor shall agree to the scheduled

operational and security restrictions at the UP Mindanao site during implementation. ● For any system shutdown, the Contractor shall give three (3) days advance notice to UP Mindanao. Only UP Mindanao shall perform shutdown of production systems ● Should services be inadvertently interrupted, the Contractor shall immediately allocate appropriate labor, including overtime, material, and equipment necessary for the prompt restoration of interrupted service. **O. Period and Place of Delivery** The winning bidder shall supply and deliver the set of equipment at UP Mindanao through the Supply and Property Management Office (SPMO) located at the UP Mindanao, Main Admin Building, Barangay Mintal, Tugbok District, Davao City. Installation and configuration will be at the Information Technology Office located on the 1st floor of the above mentioned building. All within one-hundred eighty (180) calendar days from receipt of Notice. **P. DUTIES AND RESPONSIBILITIES OF UNIVERSITY OF THE PHILIPPINES MINDANAO** ● Grant the winning bidder's authorized representative access to its premises, equipment and facilities located therein to perform its obligations, provided that such representative shall be accompanied by a duly assigned UP Mindanao ITO Staff; **VI. SCOPE OF WORKS FOR ELECTRICAL** **GENERAL CONDITIONS** A. **General** - All tasks covered by this area of the specifications must be completed in compliance with all applicable laws, rules, and ordinances, which are now a part of these requirements. The		

specifications and the plans are complementary, and whatever is required in one must also be required in the other. For this portion of the work, all contractors must be registered with the PCAB (Philippine Contractors Accreditation Board) and have the required paperwork to support a renewed registration license.

B. **Work In General** - All items, materials, operations, and methods listed, implied, mentioned, or scheduled on the drawings and/or herein, as well as all labor, know-how, and equipment required to properly complete and execute the electrical works, with the exception of those portions of the work that are expressly stated to be completed by other trades, shall be provided as part of the work. In general, all drawings are diagrams and shouldn't be taken to represent the installation's actual path.

C. **Work Included** - the work shall include the furnishing and installation of the following items:
   1. A complete emergency power backup system excluding the supply and installation of all generator units.
   2. **All works within automatic transfer switch(es), their associated power and control wirings. There should be an automatic mechanism(hardware and system) that will detect brownout/power outage and unstable power source and current such as single phasing problem, erratic/fluctuating power, in this case the mechanism should automatically take action by either cutting off main power to the data center or automatically transfer to the generator unit/s if the admin building generator is enabled.**

   3. **All work and materials for PACU, Aircons(existing and new) UPS(existing and new), Data and Network Cabinet Rack PDU (existing and new), complete lighting and**

power systems including all distribution equipment, feeders, and conduits, wire ways and cable trays, branch circuits, circuit breakers, panelboards, disconnect switches, and connections to all lighting and power outlets.
 	
4. All wiring.
 	
5. Supply and installation of all **lighting fixtures and associated battery packs(4 units in the admin data center, CHSS Building, CSM Building, Carim Building**
 	
    Emergency lighting and battery packs:
 	
    2 units in the following locations:
       • Admin Building
       • CHSS Building
       • CSM Building
       • Carim Building
 	
    1 units in the following locations:
       • University Library
       • Former HKC Building
       • EBL Dormitory
       • Student Dormitory
       • Faculty and Staff Housing
       • EBL Dormitory 2
       • CSM Dorm Annex
       • CARIM Phase 2
       • CARIM Phase 3
       • CHSS Cultural Complex
       • SOM Building Phase 1
       • UP Mindanao Guard
       • Kalimudan Student Center
       • Infirmary
       • Coco Tissue Culture Lab Phase 1
       • Football Stadium
       • Human Kinetics Center/Training Gym		

6. All excavation work, backfilling, dewatering, removal of surplus earth, forming and pouring of concrete envelopes around underground conduits as indicated on drawings or as required to complete the installation.

7. All supports for conduits, wireways and cable trays, cables, panels, boxes, lighting fixtures, etc. as indicated or required to complete the installation.

8. A complete grounding system of equipment and others as required by governing codes.

9. A complete testing of all electrical systems.

10. Where materials are furnished and supplied by the owners, the contractor shall receive, unload, handle, transport, assemble, and install complete. This contractor shall be responsible for breakages, pilferage, etc. of such equipment from the time he accepts delivery until the owner accepts the installation.

11. All other items incidental to and/or required for the proper completion of the installation such as painting of boxes, conduits, etc.

D. **Visit Site** - It is suggested that the contractor go to the location and see for himself what amenities and conditions might affect his work there. Before drafting his proposal, he will be considered to have completed this, and any subsequent claims of incomplete or insufficient information will not be taken into consideration.

E. **Injury to Persons or Damage to Property** - The owners shall not be liable for any claims resulting from this injury and/or damages, and this contractor shall be responsible for all personal injuries and property damage brought on by the work or by his men. Additionally, this contractor must safeguard the owner's property from

weather and theft. The contractor is responsible for any damage or loss if the exposure to inclement weather and theft was caused by his work or negligence.

F. **Permits and Fees** - this contractor shall secure at his expense all permits including inspection fees and associated paperwork, as-built plans as required by the approving authorities.

G. **Shop Drawings/As-Built Plans** - this contractor shall furnish the Architect/Engineer with Four (4) sets of shop drawings which shall include details of the proposed installation (such as conduit runs, wiring, location of equipment, and other pertinent information) to illustrate deviation and changes from the original plans. Shop drawings for equipment shall include, but not be limited to, the type of equipment, physical dimensions, and other technical information. The Engineer shall review shop drawings. Review comments rendered on shop drawings shall not be deemed as a guarantee of exact measurement or actual building conditions. Where shop drawings are reviewed or approved, said review/approval shall not mean that the drawings have been checked in detail. Said review/approval does not in any way relieve the Contractor from his liability (including those caused by direct or indirect omissions), or the necessity of furnishing material or performing work as required by the contract drawings, governing codes, and these specifications.

H. **Materials/Substitution** - all materials shall be new and shall conform with the standards of the Philippine Electrical Code. All materials were not specified shall be the best of their respective kind. Samples of any material shall be submitted for approval if requested by the Engineer. The manufacturer's data of substitute materials shall be submitted for approval. This contractor shall within ten (25) days after the award of the

contract, submit a list of the materials he proposes to use. All materials installed without prior approval shall be at the risk of the contractor.

I. **Testing and Commissioning** - Electrical installations and machinery must undergo thorough testing and commissioning. Before the initial acceptance may be approved, the contractor or supplier must make the required arrangements and carry out the relevant tests to the satisfaction of the Engineer / OWNER at the conclusion of his work. All testing must be arranged at least seven (7) days in advance, following the Project Manager's adequate notification of all parties involved about wiring. The contractor must give a detailed test methodology for the consultant to validate prior to performing any tests. For each system, item, or piece of equipment evaluated, a report containing inspection and test records is required to be written up in full. These reports must be submitted by the contractor in quadruplicates.

>   *Test Instrument* – All test instruments to be used by the Contractor or equipment Supplier for both factory and site testing for the project shall comply with the following:

>   1.   Test equipment shall be properly calibrated with calibration certificates not more than 6 months old.

>   2.   Test equipment shall be in tiptop condition and free from damage, and if damaged during the testing, shall be replaced and the new test equipment calibrated again.

>   3.   test equipment shall always be complete with the manufacturer's user instructions.

Cables and Wires 1. Visual tests shall be conducted throughout the cable length. 2. Tests shall be made for continuity, phase rotation, voltage, and identification of each conductor. Both ends of a given conductor shall be identified alike and tag property. 3. Circuit test for grounds and shorts shall be made employing a 500 VDC megger Insulation test taken with all input and output switch devices, and breakers turned off, isolated, and any metering control made safe. 4. Any circuits showing an insulation level (less than 50 megohms) shall be inspected and corrected. 5. Wiring connections shall be subjected to a final operational test after energization to ascertain and validate their installation correctness and performance. **Main CB and Low Voltage MDP and Panelboards** 1. Visual examination of the low voltage switchboard / MDP and panelboards shall be made to take note of the state of the cabinet finish, panel labeling, and switchboard components such as metering/submetering, pilot lights, and relays. 2. Inspection shall ascertain that proper termination and management of control wiring are in order.		

3. Check the switchboard grounding connection. 4. Mechanical operational tests shall be conducted on compartment doors, hinges, and locks. Observation shall include manual switching operation of Main CB and MCBs branches. Sample torque check shall be performed on bolts and nuts. 5. Polarity check, voltage, and continuity test through the whole switchboard shall be performed with all sensitive electronic equipment, fuses, and links out of the circuit. 6. Insulation resistance test (500V DC) shall be taken from the incoming supply terminal with all load output breakers turned on. Test phase to ground, phase to neutral, phase to phase, and neutral to ground. 7. Functional / Operational Test – on energized condition, all meters (volt-meter, ammeters, kW-hr meters, etc) shall be checked for accuracy. Check the proper operation of all indicator lights and relays. 8. Protection Settings – set the MCBs and MCCB protection discrimination settings. **Ground Resistivity Test** The contractor shall perform a ground resistivity test. The result shall not be more than 1 ohm at the main grounding plate (Note: Philippine Electrical Code grounding requirement is 5 ohms). **Infrared Thermal Scanning** – shall be conducted after practical completion and in intervals of three months, or as required, until		

expiration of the work warrantee. Thermal scanning shall only be performed when the electrical installation is loaded or after it has been under load for at least a minimum period of one hour. The test shall be conducted on the Main Circuit Breaker, the Low Voltage Switchboard (busbars included), all panelboards, and connections. Thermal-colored images and recordings shall be downloadable to the PC. Submit a quadruplicate detailed report with hard copy printouts.

Uninterruptible Power Supply (UPS) – the existing UPS and UPS supplied together with the Contractor shall perform the following:

1. UPS full load test.

2. UPS battery autonomy at full load.

3. Load transfer test between modules (Rectifier, inverter, and Auto By-pass, and Manual By-pass).

4. Harmonic Measurement

5. Local Display accuracy check.

6. Alarm Point checks.

J.

Workmanship/Coordination/Guarantees/Suspension or Delay - the work throughout shall be executed in the best and thorough manner under the direction of and to the satisfaction of the owner or his works engineers, who shall have the power to reject any work and material which in their judgment, are not in full accordance with these specifications and drawings. This contractor shall be familiar with the specifications of the other trades, and coordinate with them thoroughly so that he

can arrange his work and dispose of his materials without interfering with the work of other contractors. This contractor shall guarantee that the electrical systems shall be free from all defects of workmanship and materials and that they will remain so for a period of one year from the date of acceptance by the owner. Any remedy to correct defects deemed to be caused by such shall be made at the expense of this contractor. This contractor shall not suspend or delay the work without justifiable cause. Subsequent delays shall be deemed as a sufficient cause for penalties or termination of the contract in which the owner shall have the right to take over the work and all materials on the site and make arrangements as necessary to complete the work.

K.   **Cleaning Up** - this contractor shall remove all dirt, debris, and rubbish and waste materials caused by him in the process of his work. He shall also remove all tools, temporary power installation, scaffoldings, and surplus materials after completion and acceptance of work.

MATERIALS AND METHODS

A.   **Wiring Methods**
     Unless otherwise specified that the wiring system shall be carried out in the form of wire way, or cable trays, the following wiring system shall be the general installation specification guidelines:
     1.   Intermediate Metal Conduit (IMC) shall be used for all feeder runs and risers, and in general all raceways 25 mm and larger.
     2.   Intermediate Metal Conduit (IMC) shall be used for all branch circuits horizontal runs (smaller than 25 mm) including short (branch circuit) risers to panelboards and switches.

B.   **Conduit**

All wires unless noted on the drawings or in these specifications shall be installed in conduit. Conduit shall be delivered to the site in not less than 3.05 meters (10') length and of standard weight. Flexible metal conduit shall be of the type and make that is corrosion resistant and has an excellent resistance to vibration. PVC conduits shall be rigid nonmetallic conduit, schedule 40, and conforming to PNS 14. Conduit runs shall be installed in such a manner as not to weaken or interfere with the structure of the building. No horizontal runs of embedded conduits or tubing shall be permitted in solid walls and partitions unless permitted by the structural engineer. Conduits below grade shall be caused in concrete envelopes with a minimum thickness of 0.10 M. Where conduits are installed in driveways, they shall be encased in 0.10 M concrete envelopes and shall be installed 0.30 M below the finished line if possible. This contractor shall provide all necessary excavation below rough grading and shall support and space conduits such that concrete may flow around and beneath them. All conduits and fittings on exposed work shall be secured by machine screws. All conduits on exposed work shall be run at right angles to and/or parallel to the surrounding walls unless unavoidable, in which case it shall be subject to the approval of the Architects or Engineer. Standard manufactured shall be used for all conduits 40 mm Ø (1 1/2") or larger in diameter. Field bends may be used for conduits 40 mm Ø (1 1/2") or smaller on condition that their radii conform to the minimums established by code. No sharper bends than those specified shall be permitted unless approved fittings with access to cables are supplied. Fields bends and offsets where necessary, shall be made with conduit bending machines. All		

field-cut threads shall be painted with white lead. All ends of conduits shall be provided with an insulated bushing except at coupling.

All empty conduits and raceways shall be provided with #14-gauge galvanized pull wire for future use.

C. **Conduit**

All conductor wires and cables for lighting and power wiring, shall be from virgin copper, soft drawn and annealed, of 98% conductivity, type THW, THWN or THHN as called for in the plans and shall be plastic insulated for 600 V working pressure. All wires 14 mm2 (AWG #6) or larger shall be stranded. Wires shall be of recent manufacture and in no case be more than six months old. Any conductor whose insulation shows signs of deterioration within one year from final acceptance of work shall be replaced by this contractor at his own expense. Wiring shall only be permitted if conduit installation has been completed and approved by the Engineer, works Engineer or their representatives. Permission to wire shall be given by the Engineer in writing.

All power and lighting circuit wires shall be color coded as follows:
Wiring for 400/230V, 4W shall be as follows:
red - all hot wires phase A
yellow - all hot wires phase B
blue - all hot wires phase C
white - for all neutral wires
green - for all grounding wires
brown and other colors - for control wires

D. **Pull Boxes**

Pull boxes for pulling, nesting, and concealment of wires or cables shall be provided where indicated or where required although not

indicated. Pull Boxes shall be provided on all conduit runs (horizontal) exceeding 30 meters between outlets. For vertical conduit runs: refer to the code for minimum distances for cable supports and/or as required.

E. Cable Connectors and Splices

The connection of conductors from size 8.0 mm2 (AWG #8) and larger shall be made without damaging or trimming wire strands and shall be made with the use of heavy-duty cast copper alley solderless connectors of the pressure double indent type. Connectors shall be provided with proper insulating covers wherever required. Branch circuit splices shall be soldered, or joined by the insulated splicing devices (wire nuts or push-wire by 3M or WAGO). All soldered joints shall be carefully soldered without the use of acid, then taped with plastic tapes to the thickness equal to that of the insulation with a covering of friction tape of two layers.

F. Panels and Cabinets

All panels shall be of dead front construction furnished with trims of flush or surface mounting as required. The manufacturer's shop drawings and/or samples shall be submitted for approval by the Engineer prior to manufacturing or fabrication. Disregarding of this instruction shall compel this contractor to assume all risk and burden in case of future rejection of panels and cabinets. All panels shall be provided with an engraved nameplate (black background and white letters) and with a clearly inked directory indicating circuit numbers and load thereof as reflected on the plans, or as installed. Minimum enclosure thickness shall be gauge 14 for all panels or molded case circuit breakers where no single dimension exceeds 600 mm and a surface area of not more than 2400 square cm; gauge 12 if no dimension exceeds 1200

mm and an area of 9500 square cm; and gauge 10 for those larger than the aforementioned.

All panels shall be made of fully galvanized metal sheet, epoxy painted, powder coat, and wrinkled finished. All panels shall be bolted type. The color shall be beige or gray. Copper busbars shall be oxygen-free with high conductivity and shall be silver or tin plated.

G. Circuit Breakers / Protective Devices

Circuit breakers shall be of the size and rating as shown and/or required in the plans. They shall be completely enclosed in a molded case or assembled in panel cabinets, operated by a toggle type handle, and shall have a quick-make quick-break over-center switching mechanism that is mechanically trip free from the handles so that the contacts cannot be held closed against short circuit and abnormal currents. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming the position mid-way (indicated by a trip indicator) and trip simultaneously. ***No bracing on handles of single pole breakers shall be used or allowed in lieu of two or three pole types***.

All breakers rated above 225 A shall have interchangeable trip units. Ampere ratings and breaker-type identification shall not be removed or tampered with for inspection purposes. All breakers shall be rated for reversed mounting without deration. When specified, all electronic trip breakers shall be 100% rated.

H. Grounding

All metallic conduits, cabinets, equipment, and the like shall be properly grounded and bonded by means of copper straps. All non-ground connections shall have clean contact surfaces and shall be tinned and sweated while being bolted. All

non-metallic conduits shall be provided with ground wires of the proper size and type approved by code, and shall continuously ground all fittings throughout the entire system. Appropriate ground tests shall be performed at this contractor's expense and remedies shall be made by him with no additional cost to the owner, until the test results are within the safe acceptable limits. Ground resistance shall not exceed 5 ohms. Additional ground rods (or embedded copper ground plates) shall be installed to obtain this value when necessary. Exposure of an accessible ground connection shall be secured by ground clamps, pressure connectors, and/or bushings. Concealed or inaccessible ground connections shall be braced. All system ground connections of 30 mm2 or larger shall be cadweld or thermoweld. 1. Supply and installation of the main and sub-feeders from electrical panel boards, gutter, pool box and accessories box as required. 2. Supply of wiring devices, receptacles, outlets, switches, etc. complete with suitable cover plates as per specifications. 3. Supply and installation for all branch feeders circuits from panel boards up to all outlets, switches, controls or other loads; others wiring as shown in plans. 4. Grounding system as per Electrical Engineering Code requirements. 5. All work hereunder shall be under the supervision of a licensed Electrical Engineer.		

6. All wire shall be protected and shall be laid inside solid approved pvc pipe conduits.

7. Required to submit Power Layout, SOL and SLD.

8. Site Inspection is required and will be provided with a site-inspection certificate.

Electrical Manpower Requirements

- At least 2 licensed Electrical Engineers - shifting schedules to make sure that all electrical works at the site will be checked.

- At least 2 Safety Officer SO2 DOLE accredited - shifting schedules ensure safety protocols at the site of work both for electrical and FOC.

- At Least 1 licensed Electronics Engineer - to ensure the precision of all electronics related works.

Note: *Any additional device, equipment, accessories, and/or cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.*

ITEM	Description/Specification	QTY	UNIT
	ELECTRICAL WORKS		
1	FEEDER LINE, WIRES AND WIRING DEVICES		

	100 mm^2 THHN Stranded Copper Wire	300	mtrs		
	38 mm^2 THHN Stranded Copper Wire	280	mtrs		
	22 mm^2 THHN Stranded Copper Wire (Shared with Grounding)	280	mtrs		
	14 mm^2 THHN Stranded Copper Wire (Shared with Grounding)	100	mtrs		
	8.0 mm^2 THHN Stranded Copper Wire (G)	100	mtrs		
	5.5 mm^2 THHN Stranded Copper Wire	4	Roll (s)		
	3.5 mm^2 THHN Stranded Copper Wire (G)	6	Roll (s)		
	2 Gang Universal Outlet (w/ ground terminal)	15	Pcs		
	1 Way 2 Gang Switch (Wide Series)	5	Pcs		
	I				
2	**CABLES TRAYS, CONDUITS AND ACCESSORIES**				
	1" Ø EMT Conduit	20	Length		
	3/8" Ø Circular Loom	1	Roll		
	1 1/2" IMC Conduit	23	Length		
	1 1/2" uPVC Conduit	16	Length		
	2" IMC Conduit	35	Length		
	2" uPVC Conduit	15	Length		
	2400mm x 300mm x 100mm Cable Tray w/ cover and complete accessories	8	Length		
	Fittings and Accessories	1	Lot		
3	**PANELBOARDS (Protection and Assemblies)**				
	MDP and ELECTRICAL ROOM (ECB) 200AT, 3P, 240V, MCCB, NEMA1 ENCLOSURE, WITH SINGPLE PHASING SENSOR TIRPPING PROTECTION, AND SURGE PROTECTION DEVICE PANEL "S", IN NEMA-1,BOLT-ON TYPE ENCLOSURE GA. 16, G.I, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, DEADFRONT AND LEVER HANDLE LOCK WITH KEY. MAIN:1-200AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 4-30AT/100AF, 10kAIC, 3P, 230V, MCCB; BRS: 4-100AT/100AF, 10kAIC, 2P, 230V, MCCB; BRS: 4-30AT/100AF, 10kAIC, 2P, 230V, MCCB; BRS:	1	set/s		

	UPS PANEL PANEL "U1 & U2", IN NEMA-1,BOLT-ON TYPE ENCLOSURE GA. 16, G.I, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, DEADFRONT AND LEVER HANDLE LOCK WITH KEY. MAIN: 1-100AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 6-30AT/100AF, 10kAIC, 3P, 230V, MCB;	1	set/s			
	RACK PANEL w/ ATS PANEL "Rack Panel", IN NEMA-1,BOLT-ON TYPE ENCLOSURE GA. 16, G.I, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, DEADFRONT AND LEVER HANDLE LOCK WITH KEY. MAIN: 2-100AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 6-30AT/100AF, 10kAIC, 2P, 230V, MCB; AUTOMATIC TRASFER SWITCH WITH TIMER WITH 2-30AT, 2P, 10kAIC, 230B, MCB 30AT, ECB, NEMA 3R ENCLOSURE (IP65)	1	set/s			
4	**PULL-BOX, BOXES AND ACCESORIES**					
	Utility box deep type gauge 16 metal	16	Pcs			
	Junction box gauge 16 metal	16	Pcs			
	Pull Box Metal Box (NEMA 3R)	10	Pcs			
	Pull Box Metal Box (NEMA 1)	4	Pcs			
5	**SYSTEM GROUNDING (Under Miscellaneous)**					
	Surge Protection Device	1	set/s			
	5/8" X 10ft Copper Weld Ground Rod	3	Pcs			
6	**OTHERS – Miscellaneous and Relocation of Existing Panelboard and Circuits**					
	Relocation of Existing Panelboard and Circuits	1	lot			
	Consumables (Terminal Lugs, Bolts, Hacksaw, Accessories, Conduit Connectors, Locknut & Bushing etc.)	1	lot			
	Electrical Tape	15	Roll (s)			
	3/8" Ø Expansion Bolt	50	Pcs			
	1/2" Ø Metal Clamp	120	Pcs			
	3/8" Ø Full Threaded Rod (3m)	15	Length			
	2" Ø Unistrut conduit clamp	15	Pcs			

	Rubber Tape	5	Roll (s)			
	3/8" Drill bit	15	Pcs			
	1/2" Drill bit	15	Pcs			
	Tie Wire	2	Kg			
7	**CHSS OFFICE - ADDITIONAL POWER SUPPLY**					
	PANEL "Q (CHSS)", IN NEMA-1, BOLT-ON TYPE ENCLOSURE GA. 16, G.I, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, DEADFRONT AND LEVER HANDLE LOCK WITH KEY. MAIN:1-80AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 4-30AT/100AF, 10kAIC, 2P, 230V, MCB; BRS: 6-20AT/100AF, 10kAIC, 2P, 230V, MCB;		1			
	Wiring and Rough Ins INCLUDED		1			
8	**CSM - ADDITIONAL POWER SUPPLY**					
	PANEL "CSM", IN NEMA-1, BOLT-ON TYPE ENCLOSURE GA. 16, G.I, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, WITH COMPLETE TERMINAL LUGS AND GROUNDING BUS, DEADFRONT AND LEVER HANDLE LOCK WITH KEY. MAIN: 1-100AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 4-30AT/100AF, 10kAIC, 2P, 230V, MCB; BRS: 6-30AT/100AF, 10kAIC, 2P, 230V, MCB;	1	set/s			
	Wiring and Rough Ins INCLUDED	1	lot			
9	**Emergency Lighting Fixtures and associated battery packs**	22	set/s			
	TECHNICAL DATA Housing: Injection-molded thermoplastic housing Wattage: 2 x 1w Lamp type: LED Battery Pack: at least Ni-cad 3.6V 1.0Ah Rated Duration: at least 2 hours Rated Average Life: at least 10,000 hours					

	Power Supply: 220-240V 50/60Hz at least IP Rating IP 50. Universal back plate for quick hook-up. **INSTALLATION** Includes Wall mounted installation and testing of electrical components and requirements.				
10	**PACU**				
	INROW SPLIT INDOOR INVERTER AIR COOLED at least PACU shall be direct expansion, air-cooled Inrow. at least cooling capacity: 41.6 kW Inrow split indoor unit, inverter compressor at least support the following power input: 380-415V/50-60Hz/3Ph,200-230V/50-60Hz/3Ph,460V/60Hz/3Ph at least PACU indoor unit shall have a compact footprint with dimension of 300x1080x2000mm. at least Unit shall be equipped with a single fixed scroll compressor that can withstand high vibration, low noise, and reliability. Must be compatible with R410A refrigerant. at least Indoor unit Air Volume-m3/h 8,600 CMH at least shall have an electronic expansion valve at least the PACU humidifier shall be of infrared type at least the PACU compressor is DC Inverter At least the PACU EC Fan is DC Driven - to do stepless speed regulation according to the change of heat load to make the unit more energy saving than traditional AC fan for more	1	Lot		

than 30%. Adopts N+1 redundancy configuration. Any broken fan will not influence the whole unit performance. at least the PACU unit shall have a minimum of 9" touch screen display for local monitoring that can display real-time values of the unit's status, active and history alarms. Air cooled, row mount, split type, ideal for micro data center, integrated modular data center solutions. Dynamically modulated cooling capacity with inverter compressor maintains temperature within envelope and prevents compressor from cycling during low heat load period.Air flow modulates with EC fans to match IT equipment requirements. Each fan module is easy to change with quick couple connections. R410A green refrigerant is highly efficient and has no ODP. - at least Power Requirement: 90AT 3P MCCB Breaker Tapping; 200-230V/3P/50Hz-60Hz - at least Full Load Current (FLA): 66.4 A including outdoor unit FLA - at least With SNMP license for precision cooling unit - at least With Water leaking detection Kit - at least 3 years warranty and support - Inclusive of Supply, Installation, Startup, Testing, and Commissioning - Inclusive of Supply, Installation, Startup, Testing, and Commissioning of the required electrical components and requirements for the PACU to fully operational and within the required industry standard - Inclusive of Basic Preventive Maintenance (3 years, SEMI-ANNUAL)			

11	Server Rack and UPS				
	42U Perforated Network Server Cabinet at least 600mm x 1200mm x 1991mm • the cabinet should be the same brand with the existing data center cabinets(APC Schneider) in order to provide compatibility and uniform integration • at least Feature-rich rack enclosure optimized for easy installation, managing cables, integrating power distribution, and maximizing airflow. • at least Includes: Baying hardware, Key(s), Keyed-alike doors and side panels, Leveling feet, Mounting hardware, Pre-installed casters, Side panels • at least Split rear doors: Split rear doors improve access and serviceability to rear of rack mounted equipment. The split rear doors help to maximize floor space. Only 11 inches (279 mm) of clearance is required behind the enclosures to allow for door swing. • at least A proven frame design, heavy-gauge mounting rails, and heavy-duty casters provide for a 3750 lb (1700 kg) static (leveling feet) • at least Integrated electrical grounding: • at least Protection Class: IP20 • at least Approvals: EIA-310E, UL	1	set/s		

	2416, UL 60950-1 ● at least Pre-installed full-enclosure height rear accessory channels: Integrated and adjustable rear accessory channel provides zero U mounting locations for toolless accessories. Each channel has two mounting bays to support a combination of up to four accessories such as PDUs and vertical cable organizers. 1070mm (42in), 825mm (32 in), and deep enclosures and networking enclosures include two channels. 1200mm (48in) deep enclosures include four channels. Channels are pre-installed at the factory in the rear of the enclosure but can be moved to other locations of the enclosure along the side brace to resituate cable management where it is needed most. ● at least Integrated joining hardware with multiple width enclosure alignment: Enclosures include pre-installed joining hardware to join enclosures in a row and provide additional stability to the enclosure. The pre-installed joining hardware includes holes for joining to an adjacent enclosure at 600mm centers or 24in centers depending upon the floor layout. ● at least the Adjustable mounting rails with captive hardware and rapid		

	alignment: The vertical mounting rails can be adjusted in 1/4 in (6.4 mm) increments covering virtually any mounting requirement for IT equipment. Easy alignment feature integrated into the enclosure mounting rail and side brace for quick alignment verification without the use of tools to verify alignment. U positions are numbered front and back for rapid installation of equipment.		
	Rack PDU Switched ● at least ZeroU, 11.5kW, 200-240V, (21) C13/C15 & (3) C19/C21 ● at least PDU Type: Switched ● at least Number of rack unit: 0U ● must includes the corresponding power cables(at least 3 meters) equal to the number of each corresponding outlets ● must be compatible with the included 42U Network Server Cabinet ● at least Mounting position: Vertical ● must be compatible with the included online UPS 10KVA in terms of their interfacing	2	set/s
	UPS 10kVA/10kW(2U) On-Line UPS with Rail Kit ● must be compatible with the included metered PDU in terms of	1	lot

their interfacing • at least online double conversion technology • at least rackmount • at least Efficiency at Full Load shall be at least 95.0 %. • at least Input Total Harmonic Distortion shall be less than 5% for full load. • at least Input Power Factor at Full Load shall be at least 0.99 • at least Communication Requirements: The UPS shall have a Network Management Card or Dry Contact I/O Smart Slot Card to provide real-time status information. The NMC shall support SNMP.		
UPS compatible 5-20KVA External Battery Pack(3U), 1 string of 12V9Ahx20pcs	2	set/s
Installation and Commissioning of Server Rack, PDU and UPS	1	lot
Warranty: At least 3 years warranty and support		

Note: *The bill of quantities mentioned above are just estimates and it is the responsibility of the supplier/bidder to conduct actual site surveys of the area to determine the appropriate and needed lengths, quantities, items, materials to complete the project. Any additional items, materials, device, equipment, accessories, and/or cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.*

ITEM	Description/Specification	QTY	UNIT
	BACKUP INVERTER SPLIT TYPE AIRCON		
1	**2.5 Inverter Split Type Aircon** **Location: Admin Data Center**	2	Lot
	Cooling Capacity : at least 2.5 HP		
	Power Consumption: within 1835W		
	Refrigerant : at least R32		
	COP: at least 3.59		
	CSPF: at least 6.10		
	with timer and mechanism to automatically alternate between the two split type Aircon		
	Includes supply, installation and commissioning of the split type aircon and electrical requirements needed to function in the assigned location		
	● **Warranty**: ● At least 3 years warranty for Outdoor PCB ● At least 1 year warranty for parts & labor ● At least 5 years warranty for compressor		
2	**3HP Inverter Split Type Aircon** **Location: CHSS Server Room**	2	Lot
	Cooling Capacity : at least 3HP		
	Power Consumption: within 1965W		
	Refrigerant : at least R32		
	COP: at least 3.58		
	CSPF: at least 6.00		

	with timer and mechanism to automatically alternate between the two split type Aircon		
	Includes supply, installation and commissioning of the split type aircon and electrical requirements needed to function in the assigned location		
	Warranty: - At least 3 years warranty for Outdoor PCB - At least 1 year warranty for parts & labor - At least 5 years warranty for compressor		
3	**2.5 Inverter Split Type Aircon Location:CSM Server Room**	2	Lot
	Cooling Capacity : at least 2.5 HP		
	Power Consumption: within 1835W		
	Refrigerant : at least R32		
	COP: at least 3.59		
	CSPF: at least 6.10		
	with timer and mechanism to automatically alternate between the two split type Aircon		
	Includes supply, installation and commissioning of the split type aircon and electrical requirements needed to function in the assigned location		
	Warranty: - At least 3 years warranty for Outdoor PCB - At least 1 year warranty for parts &		

	labor			
	● At least 5 years warranty for compressor			
4	**Relocation of Existing Split type aircon**	1	Lot	
	Includes relocation of existing Split type Aircon in Admin Building Data Center to the CARIM Server Room			
	Includes transfer, installation and commissioning of the split type aircon and electrical requirements needed to function in the assigned location			
	● **Warranty**: At least 3 years warranty and support			

Note: Bidders should conduct the needed site survey to determine the necessary length of materials needed. *Any additional device, equipment, accessories, copper tubes and/or electrical cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.* **Note**: *The bill of quantities mentioned above are just estimates and it is the responsibility of the supplier/bidder to conduct actual site surveys of the area to determine the appropriate and needed lengths, quantities, items, materials, copper tubes and/or electrical cabling requirements to complete the project. Any additional items, materials, device, equipment, accessories, and/or cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.*

VII. DELIVERY AND IMPLEMENTATION

● 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 UP Mindanao. 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

● The Project Management Plan should also include the deployment of project personnel to be assigned in UP Mindanao in the duration of the project.

● Supply, Delivery, Installation, Testing and Commissioning shall be within two hundred seventy (180) calendar days from the approval of the Project Management Plan.

● 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.

VIII. ANNEXES

● Annex A: UP Mindanao Site Plan
● Annex B: Fiber (TIA) Field Test Specification
● Annex C: Admin Building Power Layout
● Annex D: Admin, CHSS, CSM Buildings SOL AND SLD
● Annex E: HCI and Enterprise Backup Power Layout Network Diagram

IX. OTHER REQUIREMENTS

A. MAINTENANCE, SUPPORT AND WARRANTY

○ Provide Three (3) years maintenance support and services to include
■ 12 Hours per day (Monday-Friday) Technical Support (should be physically Davao Based)

■ Next Business Day Response Time ■ Provide Comprehensive Disaster Recovery Procedure ■ Project focal person where the UP Mindanao ITO personnel can directly communicate with to address concerns ○ 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. However, the end-users have the right to insist for on-site resolution if the end-user wants it. ○ The proponent shall resolve a problem within twenty-four (24) hours after it was reported by UPMin in any available and fastest means of communications. ○ Established procedure on support and problem escalation ○ Provide on-call and on-site (if requested by the end user) support personnel for three years after the acceptance of the project. ○ 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. ○ 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 ■ 25 Years of Product Warranty from the Cabling Manufacturer of the Product Offered. ■ Minimum Three (3) Years Warranty on Workmanship ○ To provide quarterly maintenance for the duration of the warranty period, adequate supply of parts must be readily available. Inspection and cleaning of equipment, data cabinets, switches, and routers shall be done by the bidder on a quarterly basis for three years.		

B. RISK MANAGEMENT PLAN
 	
The winning bidder shall submit a Risk Management Plan prior to UPMin's acceptance. Risk Management Plan shall include the following among others:
 	
● Step by step procedures to be undertaken during a 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
 	
● The solution provider shall provide complete documentation for every deliverable and at every end of each development stage and milestone which must be submitted to the Information Technology Office for approval. UPMin shall own any and all documents and shall reserve the right to reproduce at no additional cost.
● 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 documents
    ● Infrastructure Diagrams and Topology		

- Troubleshooting and Installation Guides - Single Line Diagram - System/Operation Manual - Documentation and Tagging Summary **Operational Manuals** - User Manuals (for Operations) - Disaster recovery Plan **D. TRAINING AND TECHNOLOGY TRANSFER** - The contractor must provide advance training for at least four (10) IT Personnel for the new and existing ICT Network Equipment, basic troubleshooting for the Fiber and Structured Cabling and Management of the Data Center for at least five (5) days. - To ensure that proper maintenance and sustainability an appropriate training shall be conducted by the proponent as Essential part of Technology Transfer to prepare and equip UPMin and its personnel in the overall operations and maintenance of its new Network Infrastructure and architecture. - The proponent shall submit a Program of Instruction (POI) detailing all the training activities to be conducted for review, evaluation and approval of UPMin. Hands-on training shall form part of the training program. - Operation and Training manuals shall be provided to each participant. - The Training shall be conducted and completed prior to the formal turnover and acceptance.		

• All expenses related to training (e.g. venue, meals, equipment, certificate..) shall be borne by the proponent. • Venue of Training shall be determined by the proponents unless UPMin opted to conduct said training inside UPMin premises. • Certificate of Participations/ Attendance to Training/s shall be given to all participants. • All documents and manuals must be submitted before project acceptance. **E. REMOVAL OF DEFECTIVE UNAUTHORIZED WORK** Any defective work and equipments(new and existing), whether the result of poor workmanship, defective materials, damaged through carelessness, misconfiguration, mishandle, or any other similar cause, found to exist prior to acceptance, shall be removed immediately and replaced by work and material and equipments 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 UPMin or its representative. **X. INSPECTION, TESTING, ACCEPTANCE AND PAYMENT** **A. PRE-BID SITE INSPECTION** The providers should conduct a pre-bid site inspection so they could assess the needs of the end users Actual Site Inspection Details: Date and Time: 9AM-4PM (Weekdays only)		

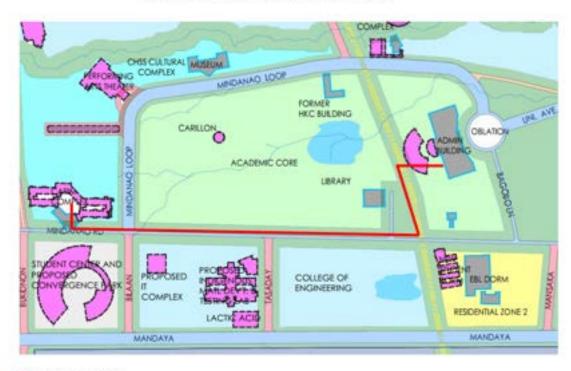|		
Contact Person: Mr. Bob Navarrete 09096651958 bsnavarrete@up.edu.ph Meet-up location: ITO, G/F Administration Building, UP Mindanao, Mintal, Davao City Safety Protocols: must wear a face mask Site Inspection Certificate will be issued by the ITO. Note: Those who will conduct site inspection should inform the ITO via email ahead of time. **B.INSPECTION AND TESTING** All ICT Equipment, cables and termination hardware shall be 100% inspected and tested for defects in installation and to verify ICT Equipment and cable performance under installed conditions. Any defect in the ICT Equipment and 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% usable conductors in all cables installed. Submit the corresponding reports of the testing conducted. **C. ACCEPTANCE** A certificate of acceptance for any of the bid items shall be issued by UPMin only after completion of the scope of work and compliance to all the requirements. **X1. TERMS OF PAYMENT** The source of funds for this project is the University of the Philippines System and payment shall be made after the completion and acceptance of the project.		

Prepared by: Bob Mitzel S. Navarrete **UP Mindanao IT office** **Approved By:** _____		

Annex A: UP Mindanao Site Plan

ADMIN BLDG. TO CARIM BLDG.

8-CORE FOC SM
Aerial installation Using existing poles