# TECHNICAL SPECIFICATIONS

| ITEM | SPECIFICATION | STATEMENT OF COMPLIANCE |
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| | **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. | |

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| | 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, Data Center Electrical Requirements and Data Center Equipment | |
| | ● 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 | |

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| | ● Supply, installation, rehabilitation and testing of the FIBER Cable Runner System for the new route of the University Fiber Backbone to the New Data Center (2nd Floor CHSS Building) | |
| | ● Pulling and transfer of the existing fiber optic backbones (UPMin and ISPs) in the admin data center to the new location and High Density Optical Distribution Frame | |
| | ● All cores of the existing fiber optic backbone (UPMin and ISPs) in the admin data center to the new location and High Density Optical Distribution Frame must be fusion splice using a ACTIVE CORE ALIGNMENT SPLICERS method. After fibers are spliced, they will be placed in a splice tray which is then placed in an outdoor type splice closure to ensure the quality of the splice. | |
| | ● Any fiber break cause by the pulling shall be repaired by fusion splice using a ACTIVE CORE ALIGNMENT SPLICERS method by the winning bidder with no additional cost to the end user | |
| | ● Testing of the quality of the bandwidth of the fiber optic cabling using a Fluke Fiber Optic Cable tester and should passed the required Fiber (TIA) Field Test Specification | |
| | ● Supply, installation, rehabilitation and testing of the related electrical requirements, works and components for the full-sizing and max capacity of possible equipment and devices of the following data center data centers: Admin, Main Data Center, CSM and other key buildings in the University of the Philippines Mindanao | |
| | ● Supply, installation, configuration and testing of the new PACU and removal 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. | |
| | ● Transfer, installation (with supply of the electrical components and power), configuration and testing of the Data Racks, UPSs, servers, switches, firewall appliance, wan load balancer appliance, Aruba controllers and its corresponding equipment and electrical components and requirements of these devices to the new location. | |

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| | ● Supply, installation, configuration and testing of the electrical component and requirements of the old and new Data Racks, UPSs, servers, switches, firewall appliance, wan load balancer appliance, Aruba controllers and its corresponding equipment | |
| | ● 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, Main Data Center, 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 network and server rack and it's corresponding electrical components and PDUs | |
| | ● Supply, installation, configuration and testing of the new network and 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 Active Directory, 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 HCI and Enterprise Backup and Recovery Appliance should have compatibility and interoperability with the existing VMWARE, vSphere Hypervisor (ESXi). | |
| | ● 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, Wi-Fi ClearPass, WAN- Load balancer, firewalls and servers<br>● Installation, configuration and integration of existing ICT Equipment: firewalls (Palo Alto PA 820 and PA 500), Wi-Fi 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 testing of EDUROAM, Radius, LDAP, Domain Controller, Active Directory (AD), LDAP, DHCP server, DNS server, | |

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| | ● Installation, configuration and integration of existing ICT Equipment: core switches, POE edge switches, WIFI controller, WIFI access points, Wi-Fi ClearPass, WAN-Load balancer, firewalls, servers, CCTV Server with the Radius, LDAP, AD, DHCP server, DNS server, HCI and Enterprise Backup servers and appliance and included switches, transceivers. | | |
| | **1. EXISTING EQUIPMENT** | | |
| | **Quantity** | **Item** | |
| | 1 | Palo Alto PA 820 | |
| | 1 | Palo Alto PA 500 | |
| | 1 | HP A5500 | |
| | 2 | Aruba 7205 Controller | |
| | 2 | Aruba CX 8325 (JL624A) | |
| | 14 | Aruba 6300M (JL659A) | |
| | 12 | Aruba 6300M (JL660A) | |
| | 90 | Aruba AP-215 | |
| | 90 | Aruba AP-555 | |
| | 1 | BPL-135 Peplink Balance 1350 | |
| | 1 | Yeastar S300 IP-PB | |
| | 60 | Borderless Hub BH80P3/HTEK UC803P IP Phones | |
| | 1 | Bosch DIVAR IP 7000 3U | |
| | 5 | BOSCH Autodome IP Dynamic 7000 HD | |
| | 15 | BOSCH DINION IP Bullet 5000 HD | |
| | 44 | BOSCH Flexidome IP indoor 5000 HD | |
| | 4 | HPE OfficeConnect 1920 24G POE | |
| | 2 | HPE OfficeConnect 1920 8G POE | |
| | 2 | 3COM 2920 | |

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| | 4 | CATALYST 2960 | |
| | 19 | CISCO SF 300 | |
| | 3 | CISCO SF 302 | |
| | 2 | HP 2620-24 (J9625A) PoE | |
| | 2 | HP 2520-24 (J9623A) | |
| | 8 | 3Com Baseline Switch 2226 SFP Plus 1 | |
| | 1 | Fujitsu Rack Console | |
| | **Quantity** | **Servers** | |
| | 1 | Dell Power Edge R300 | |
| | 2 | Dell Power Edge R210 | |
| | 2 | Dell Power Edge R410 | |
| | 1 | 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 | |
| | ● 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 software in order for the HCI and Enterprise Backup and Recovery server/appliance to be fully functional. | | |

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| | ● Supply, installation, configuration and testing of necessary electrical components to support a fully loaded Data Center | |
| | ● Supply and installation of soundproof partition and sound proof sliding door dividing the main data center and work station | |
| | ● Supply, installation, configuration of data 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 | |
| | ● Supply, installation, configuration of the needed perpetual licenses for the Microsoft Windows server 2022 datacenter, HCI, , DHCP Server, DNS Server, Active Directory (at least 350 CALs users) | |
| | ● Population and inputs of the needed data, information, users, for then of the needed perpetual licenses for the Microsoft Windows server 2022 datacenter, HCI, Active Directory (at least 350 users ), DHCP Server, DNS Server | |
| | ● 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 do 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 | |

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| | ● Provide training, technology and knowledge transfer | |
| | ● Provide complete as-built plan and 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 Equipment: firewalls (Palo Alto PA 820 and PA 500), Wi-Fi controller and access points (Aruba 7205 and it's access points), VOIP Server (YEASTAR S300 and IP Phones), CCTV Server (Bosch Server and CCTVS) and existing switches and servers with the new components in the project | |
| | ● The HCI and Enterprise Backup and Recovery Appliance should seamlessly integrate with multiple leading hypervisor clients from standalone servers, ensuring perpetual functionality and compatibility with current workloads. | |
| | ● HCI and Enterprise Backup and Recovery Appliance should support unlimited VMWare clients from standalone servers in terms of interoperability | |
| | ● HCI and Enterprise Backup and Recovery Appliance should be in the market for at least 10 years | |
| | ● The propose HCI should have a free software A V2V Converter / P2V Migrator is a free software for cloning and transforming VMs from one format to another, as well as converting physical machines into virtual ones. It is utilized when migration or Hypervisor Switch is required. Compared to the typical converters built into hypervisors, this tool offers bi-directional conversion between all the major VM formats: VMDK, VHD/VHDX (Windows Repair Mode aware), QCOW2, and native IMG. | |
| | ● The propose HCI should have a free VM Migration Tools, V2V Converter (cloning and transforming VMs from one format to another), P2V Migrator (converting physical machines into virtual ones) | |

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| | ○ Virtual to Virtual (V2V) | |
| | ■ Converting VM from Hyper-V to VMware ESXi (.vhdx to .vmdk) and VM of the HCI being offered | |
| | ■ Converting VM from HCI being offered to VMware ESXi (.vhdx to .vmdk) | |
| | ■ Converting VM from VMware ESXi to Hyper-V (.vmdk to .vhdx) and VM of the HCI being offered | |
| | ■ Converting VM from HCI being offered to Hyper-V (.vmdk to .vhdx) | |
| | ■ Converting VM from KVM Type 1 Hypervisor to Hyper-V, VMware and VM of the HCI being offered | |
| | ■ Converting VM from HCI being offered to KVM Type 1 Hypervisor | |
| | ■ Converting VM from AHV Hypervisor to Hyper-V, VMware and VM of the HCI being offered | |
| | ■ Converting VM from HCI being offered to AHV Hypervisor | |
| | ■ Converting Image File from Hyper-V to VMware ESXi Format and VM format of the HCI being offered | |
| | ■ Converting Image File from HCI being offered to VMware ESXi Format | |
| | ■ Converting Image File from VMware ESXi to Hyper-V Format and VM format of the HCI being offered | |
| | ■ Converting Image File from HCI being offered to Hyper-V Format | |
| | ■ Converting Local File to Local File | |
| | ○ P2V Migrator | |
| | ■ Convert Physical Machine to Hyper-V VM | |
| | ■ Convert Physical Machine to VMware ESXi VM | |
| | ■ Convert Physical Machine to Microsoft Azure VM | |

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| | ■ Convert Physical Machine to AWS VM | |
| | ■ Convert Physical Machine to HCI VM being offered | |
| | ○ Virtual to Cloud (V2C) & Cloud to Cloud (C2C) | |
| | ■ Converting VM from Microsoft Azure to AWS | |
| | ■ Converting VM from HCI being offered to AWS | |
| | ■ Converting VM from AWS to Microsoft Azure | |
| | ■ Converting VM from HCI being offered to Microsoft Azure | |
| | ■ Converting VM from Hyper-V to AWS | |
| | ■ Converting VM from Hyper-V to Microsoft Azure | |
| | ■ Converting VM from VMware ESXi to Microsoft Azure | |
| | ■ Converting VM from VMware ESXi to AWS | |
| | ● The Enterprise Backup and Recovery Appliance should support hypervisor based backup support for the HCI hypervisor and the existing servers hypervisor | |
| | ● Support Image base backup, Application and Database backup, with at least 3:1 Deduplication Ratio. | |
| | ● Support physical machine restoration to different or same brand, physical machine restoration to virtual machine, virtual machine restoration to physical machine and restoration of virtual machine from different hypervisor | |
| | ● The Enterprise Backup and Recovery Appliance should be a separate appliance from the HCI and not built-in or installed as a virtual machine. | |
| | ● The Enterprise Backup and Recovery Appliance should integrates well with Virtualized Infrastructure, Physical Infrastructure and Cloud Infrastructure | |
| | ● Must be capable of enabling automated disaster recovery testing of business- critical systems, applications & data. With Data Backup Replication including licenses. | |
| | ● Support AES 256 Encryption Password | |

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| | ● Unlimited license for Agent base back-up | |
| | ● Solution should be able to support source side deduplication and Global Deduplication. | |
| | ● The Enterprise Backup and Recovery Appliance should support agent or agentless backups of all major hypervisors:<br>o VMWare<br>o Microsoft Hyper-V<br>o Nutanix<br>o RedHat<br>o The Hypervisor of the HCI being offered in the project | |
| | ● The Enterprise Backup and Recovery Appliance should support agent or agentless backups and interoperable with the following physical servers:<br>o Microsoft Windows<br>○ Linux<br>○ Mac<br>○ Oracle Solaris<br>○ ABM AIX | |
| | ● The Enterprise Backup and Recovery Appliance should support backups and interoperable with cloud infrastructure. Should have support for cloud native solutions include:<br>o Backup for AWS (Amazon Web Services)<br>o Backup for Microsoft Azure<br>o Backup for Google Cloud<br>o + Many other S3 Compatible Cloud storage providers<br>o Own native cloud backup | |
| | ● Re-structured cabling(CAT6a) of the 14 units Cameras in CHSS Wing Admin Building to the Main Data Center. | |
| | ● The winning bidder must provide detailed documentation of the step by step configurations, user guides and troubleshooting. The end-user will test the correctness documentation by resetting and factory reset all equipment involved in the project configuration and implementing again the configuration from the documentation to ensure it's correctness, completeness and it is working. | |
| | ● The end user requires meeting every other week with the winning bidder company head/ branch head in order to address concerns with the implementation and their personnel performance. | |

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| | ● Retrieval and clean-up of old UTP cables from the different buildings of the UP Mindanao. | |
| | **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 Five (5) 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 5 years and has a local office here in Davao City to support UP Mindanao. | |
| | E. The Bidder must provide a list of **ON-SITE** technical personnel (as part of the technical submission) as required by UP Mindanao who shall form part of the **ON-SITE** implementation team and shall include **ON-SITE** personnel with the following certification, license and eligibility: | |

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| | ○ **The Bidder must have an employed Certified Project Management Professional (PMP**) or its equivalent during the project and warranty duration. The PMP must provide a GANTT chart and plans. 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. | |
| | ○ **1. The Bidder must have an employed Project Engineer** or its equivalent during the project and warranty duration that is responsible for the daily management of the project and must provide details and daily reports of the accomplishments and plans to the end users and the PMP to check the project is on track with the GANTT chart and plans. 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 | |
| | ○ **2. The Bidder must have at least two (1) Professional-Level Certified Hyper Converged Infrastructure Engineer certified by the principal, either individual or company certificate, for the HCI Solution vendor with experience with servers and systems (must show a list of projects completed related to servers and systems).** These engineers should be certified by a known and leading Datacenter Virtualization brand. During the project duration, the bidder is required to hire personnel who have completed virtualization projects with proof of acceptance. 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. | |

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| | ○ **3. The Bidder must have at least two (1) Professional-Level Certified Backup Solution Engineer** of the Backup Technologies Solution being offered. to handle the implementation and support **with experience with backup solutions (must show a list of projects completed related to servers and systems)**. The bidder must hire during the project duration a personnel who has some Backup Technologies project (ongoing or finished) or a Certified engineer of the Backup technologies being offered to handle the implementation and support. 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. | |
| | ○ **4. The Bidder must have at least one (1) Professional-Level Certified Data Center Professional(CDCP) (design, integration and implementation) or Registered Communications Distribution Designer (RCDD) who can demonstrate knowledge in the design, integration and implementation of telecommunications and data communications technology systems and related infrastructures** which is internationally recognized 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. | |
| | ○ **5. The Bidder must have at least one (1) Professional-Level Certified Network Security for the Next-Generation Firewall vendor of the existing Firewall(PALO ALTO) or with experienced with any firewall brands (must show a list of projects completed related to firewalls) or** at least a minimum 1 CompTIA Security+ Certified (A known and leading security firm) to ensure security advisors for this project with free consultancy **to ensure the success of the HCI and backup project, the selected vendor should possess knowledge of recommended security certifications and act as a trusted advisor.** 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. | |

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| | ○ **6. The Bidder must have at least one (1) Professional-Level Certified Network Routing and Switching or** at least a minimum of a Network Professional Certification of any leading network brand **with experience with network routing and switching (must show a list of projects completed related to 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. | |
| | ○ **7. The Bidder must have at least one (1) PRC registered electrical engineer with a minimum one (1) year experience in the UPS- Electrical System installation, configuration and troubleshooting. Responsible for the Electronics Permit** 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. | |
| | ○ **8. The Bidder must have at least one (1) PRC registered Mechanical engineer with minimum one (1) years of experience in building construction and completed at least one (1) Data Center Facility Construction Projects.** 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. | |
| | ○ 9. 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. | |
| | ○ 10. All the technical personnel must report on-site during the project implementation and warranty duration. | |
| | F. 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. | |

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| | G. 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. | |
| | H. The Bidder must identify or provide a list of certified service centers of products offered within the Philippines. | |
| | I. The bidder must have at least **any** of the following below from different organizations to choose. | |
| | o Data Center Design Consultant (DCDC) -BICSI | |
| | o Accredited Tier Designer (ATD) - Uptime Institute | |
| | o Certified Data Center Expert (CDCE) - EPI | |
| | o Certified data Center Professional (CDCP) - EPI<br>o 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) | |
| | J. Contractor must have at least a **(D/ C /B / A / AA / AAA)** - Category License issued by the Philippine Contractors Accreditation Board (PCAB), classified under SP-CF (Specialty - Communication Facilities). | |
| | K. Additional post-qualification requirements | |
| | o 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. | |
| | o 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) | |
| | L. 24/7 Help Desk Service Facility includes | |

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| | ● Single Point of Contact for Problem Reporting | |
| | ● Technical Engineer Dispatch Facility | |
| | ● Case Logging and Monitoring | |
| | ● Technical Support History and Reporting | |
| | ● Enterprise Email Account named from the bidder's company ( Example: helpdesk@company.com ) | |
| | M. 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:<br>i. Structural Plan<br>ii. Architectural Design<br>iii. Floor Plan/Layout (Data Center)<br>iv. Electrical Plan<br>v. Mechanical Plan<br>vi. Facility Power Block Diagram<br>vii. Electrical One-Line Diagram | |
| | d. Bill of Materials for<br>i. Data Center Facility<br>ii. Data Center Equipment<br>iii. Network Equipment<br>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. | |

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| | N. 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. | |
| | O. The end user reserved the right to request for replacement of non- performing technical personnel by the bidder. | |
| | **V. GENERAL REQUIREMENTS** | |
| | 1. The bidder should sign every page of the bid docs they would submit (technical, bid bulletin and financial components of their bid submitted). | |
| | 2. 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 | |
| | 3. 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 | |
| | 4. 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. | |

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| | 5. 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. | |
| | 6. All major construction, installation and configuration, and other major project activities/works must be properly coordinated with the end- user. | |
| | 7. All items must be brand new. | |
| | 8. 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. | |
| | 9. All deliverable equipment warranty, support and service centers must be available locally within the Mainland Mindanao. Parts must be available within the Philippines. | |
| | 10. All deliverable electronic and ICT devices/equipment's manufacturing company must have UL certification. | |
| | 11. Shall ensure compatibility across all inter-related project components including but not limited to power supply, electrical components, equipment, parts, accessories, housing, connectors, modules, communication medium, and software. | |
| | 12. Shall provide a Certified IT Security Professional that will provide consulting services to ensure security controls and measures are applied. | |
| | 13. Shall ensure the latest firmware and software updates and security patches are installed. | |
| | 14. Shall ensure safety and security measures are considered in the design, layout, construction, and implementation of the project. | |
| | 15. 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. | |
| | 16. Shall provide a contact person responsible for restoring service due to outages and provide his/her contact details. | |
| | 17. 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. | |

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| | 18. 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 Frame | |

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| | ● Transfer, installation, fusion, re-termination and testing of the 78 fiber cores plus all ISPs cores in the main Data Center | |
| | ● Transfer, installation, fusion, re-termination of all ISPs cores in the main Data Center should have it's own dedicated fiber cable and it's also includes the transfer of their equipment in the main Data Center | |
| | ● Transfer, installation, testing of ODFs/fiber cables in the new locations/cabinets and re-termination of the existing 78 fiber cores in the different buildings of UP Mindanao | |
| | The key buildings included in the installation are the following: | |
| | ■ Main Data Center to CARIM II<br>● 971 meters 8 core single mode outdoor FOC | |
| | ■ Main Data Center to CHSS Cultural Complex<br>● 586 meters 8 core single mode outdoor FOC | |
| | ■ Main Data Center to Proposed Student Dormitory<br>● 393 meters 8 core single mode outdoor FOC | |
| | ■ Main Data Center to Proposed Faculty and Staff Housing<br>● 420 meters 8 core single mode outdoor FOC | |
| | ■ Main Data Center to Admin Data Center<br>● 130 meters 24 core single mode outdoor FOC | |
| | ■ Main Data Center to Existing Football Stadium<br>● 1,942 meters 12 core single mode outdoor FOC | |
| | ■ Football Stadium to Training Gym<br>● 35 meters 8 core single mode outdoor FOC | |
| | ■ Main Data Center to PPO/FORMER HKC Building<br>● 404 meters 8 core single mode outdoor FOC | |
| | ■ Main Data Center to SOM Building<br>● 90 meters meters 8 core single mode outdoor FOC | |

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| | ■ Kalimudan to Coconut Tissue Culture Building<br>● 130 meters meters 8 core single mode outdoor FOC | |
| | ■ Carim II(1st flr) to Carim II(2nd flr)<br>● 100 meters meters 8 core single mode outdoor FOC | |
| | ■ Carim II to Carim III<br>● 220 meters meters 8 core single mode outdoor FOC | |
| | ■ CSM to Infectious Disease Building<br>● 110 meters meters 8 core single mode outdoor FOC | |
| | ■ CSM to NICER<br>● 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. In laying fiber cables in the posts, the Suppliers should provide at least 50 meters slack/ loop fiber for 400 meters cable laying. This is to ensure that enough cables will be available in the events that there are accidents/fiber breaks.* | |
| | **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 Main Data Center Building to Guard House | |
| | 1.4 Main Data Center Building to EBL Building | |
| | **1.5 Re-termination of Other Buildings (at least 40 ports)** | |

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| | 1.6 Transfer, fusion, Retermination and testing of the 78 ports/cores fibers plus ISPs fiber ports/cores 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 428 pieces fiber patch cords for high density ODF. The Push-Pull LC Duplex fiber patch cords will be supplied | |
| | 1.9 Pulling, testing and termination of fiber optic cores to designated<br>ODF | |
| | 1.10 relocation for the new fiber path | |
| | 1.11. Re-structured cabling (CAT6a) of the 14 units Cameras in CHSS Wing Admin Building to the Main Data Center. | |
| | **2. Training**<br>Fiber Optic Training and Knowledge transfer that involves hands-on actual splicing, termination and Fiber Testing using the OTDR. | |
| | **C. BREAKDOWN OF REQUIRED MATERIALS & LABOR** | |
| | 1. Fiber Optic Cable<br>● **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, Fiber Reinforced Plastic (FRP) as central dielectric strength member | |
| | ● **Optical Characteristics:** at least Single Mode fiber 9μm; Attenuation:<br><br>@1310nm ≦0.4dB/kilometers, @1550nm ≦0.3dB/kilometers; Cladding | |

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| | ● **Mechanical Characteristics:**<br>1. Fiber Count: as indicated above<br>2. Buffer Tube Count: at least 6 per loose buffer tube, should be stranded around a dielectric central member using reverse oscillation or S-Z stranding process.<br>3. Messenger Wire Steel Wire (if applicable): Φ1.2mm<br>4. Sheath Material: LSZH / PE<br>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 | |
| | ● **Additional Characteristics:**<br>6. All fibers shall be 100% attenuation-tested, with tests provided at cable reel using Fluke OTDR Fiber Tester.<br>7. Cable manufacturer must be ISO 9001-registered | |
| | 2. High Density Optical Distribution Frame, 4 RU with **at least 576 ports capacity (Loaded).** Loaded means that it should include all the necessary components, organizer, cable managers, Enclosures, Panels, Bracket, Fiber Optic Cassettes, Adapter Panel, LC Splice Cassette, Fiber Adapter Panel, Harnesses, Trunks, Patch Cords, and other necessary accessories needed for full deployment. At least **214 Fiber Ports** LC will be terminated in the Main Data Center side & 214 Fiber Ports will be terminated for the 1 RU ODF side of the other buildings. | |
| | **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 | |

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| | ● Equipped with an MPO parking feature, that reduces time to install fiber trunks | |
| | ● *Side trunk cable management*<br>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<br>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*<br>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*<br>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<br>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. | |

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| | ● *Enclosures*<br>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<br>This project requires 4-RU for the data center and 1RU for other buildings. | |
| | ● *Trunks*<br>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 single mode, 12-fiber, 24-fiber, and 48-fiber assemblies. **We require single mode.** | |
| | ● *Patch Cords*<br>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*<br>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*<br>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.<br>Depending on the appropriate implementation as stated in the provisions of the Terms of Reference. The 6-port Duplex LC Splice Cassette/Fiber Adapter Panel will be supplied and implemented. | |

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| | ● *Harnesses*<br>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. | |
| | 3. Single Mode Fiber Optic Patch Cords (LC-LC) - *at least 428* | |
| | 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 (maximum outside diameter)** | |
| | ● Cable Color: Yellow | |
| | ● Cable Type: Duplex | |
| | ● Connector types,End 'A':Duplex LC | |
| | ● Connector types,End 'B':Duplex LC | |
| | ● Flammability Rating: Riser (OFNR) | |

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| | ● Connector insertion loss:Standard: 0.35dB max (OS2) | |
| | ● Connector return loss: 55dB min (OS1/OS2). | |
| | 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) | |
| | 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 | |
| | 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 | |

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| | 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 | |
| | 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: | |
| | 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 | |
| | 8.2. Telecommunication Pathways | |

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| | ● ANSI/TIA/EIA-568-B, Commercial Building Standard for Telecommunications Pathways and Spaces | |
| | 8.3. Grounding and Bonding | |
| | ● Philippine Electrical Code | |
| | ● ANSI J/STD-607-A-2002, Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications | |
| | 8.4. Administration and Labeling | |
| | ● ANSI/TIA/EIA-606A-2002, Administration Standard for Commercial Telecommunications Infrastructure | |
| | 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 cable trays for outdoor fiber cable runner should be the same quality and rated the same to a GI Pipe(Class B) including the connector and mounting brackets. The cable trays/ladder be painted with the recommended color by the Campus Planning and Development Office. | |
| | ○ Reference for GI pipe | |
| | ■ Class A GI Pipes<br>■ Class A are the light gauge pipes with a yellow color strip for identification. They are cheaper than other classes of GI Pipes. | |

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| | ■ Class B GI Pipes<br>■ Class B are medium gauge pipes with a blue color strip for identification. They are Costlier than Class A and cheaper than class C.<br>■ Class C GI Pipes<br>■ Class C is heavy gauge pipes with a red color 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 size should at least accommodate the capacity of High Density Optical Distribution Frame in this project plus 50% allowance for future installation | |
| | ● For the Admin building outdoor Fiber Cable Runner, the size should be at least 6” height x 20” width | |
| | ● 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 plus 50% allowance for future installation | |
| | ● 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 | |
| | 10. Networks Cable+Network Tester Advanced Kit | |
| | ● Validate Cable Performance up to 10GBASE-T via frequency- based measurements | |

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| | ● Get connected switch data rate, switch name, IP address, port number, & VLAN | |
| | ● Detect the PoE class (1-8) and power, and perform a load test | |
| | ● Test connectivity to TCP/IP network through IP configuration and ping | |
| | ● Cable diagnostics including length plus IntelliTone™, remotes 2-8 or equivalent | |
| | ● Manage results and print reports from LinkWare™ PC or equivalent | |
| | ● Diagnostic Protocols<br>○ Link Layer Discovery Protocol (LLDP)<br>○ Cisco Discovery Protocol (CDP)<br>○ Fast Link Pulses (FLP)<br>○ Internet Control Messaging Protocol (ICMP),<br>○ Dynamic Host Configuration Protocol (DHCP) | |
| | ● Power Over Ethernet Compatibility<br>○ Ethernet Alliance Certified to IEEE 802.3af/at/bt,<br>○ Hardware negotiation with signature resistance,<br>○ Software negotiation with LLDP/CDP | |
| | ● Test Port<br>○ Shielded 8-pin modular jack accepts 8-pin modular (RJ45) plugs. | |
| | ● Commissioning Autotests<br>○ 10GBASE-T, 5GBASE-T, 2.5GBASE-T, 1000BASE-T, 100BASE-TX, 10BASE-T, Wire map Only.<br>○ Test Speed: 6 seconds for lengths < 70 m | |
| | ● Cable Types<br>○ Balanced twisted-pair cabling<br>○ Unshielded twisted-pair<br>○ Screened twisted-pair<br>○ 2-pair and/or 4-pair | |

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| | ● Wire Map-Only Tests<br>○ Document wire map<br>○ Length of each pair<br>○ Diagnose split pairs<br>○ User selectable T568A or T568B<br>○ User selectable crossover settings (Straight through, Half-crossover, Full-crossover)<br>○ Test speed: 1 second for lengths < 120 m | |
| | ● Nominal Velocity of Propagation (NVP)<br>○ User settable | |
| | ● Nominal Velocity of Propagation (NVP)<br>○ Generates digital tones compatible with Fluke Networks IntelliTone probe or equivalent.<br>○ Generates analogy tones compatible with general analog probes. | |
| | 11. Optical Power Meter and Fiber Test Kits | |
| | ● Simple-to-use fiber-loss tester with advanced time-saving features. Choose from various kits with configurations to meet your fiber verification, inspection, and cleaning needs. | |
| | ● Single-port, simultaneous dual-wavelength feature completes testing in half the time and saves measurements from both wavelengths into one record | |
| | ● Additional wavelengths of 1490 and 1625 nm | |
| | ● CheckActive™ or equivalent feature emits an audible tone and displays an icon when a live fiber is detected, eliminating the need to set up a measurement | |
| | ● FindFiber™ Remote ID or equivalent enables one individual to quickly identify cable connections or routings (especially useful at patch panels), eliminating the need for multiple technicians on opposite ends of a fiber link to match color combinations | |
| | ● Min/Max capability automates precision tracking of intermittent power fluctuations | |
| | ● Large internal memory save 1000 results which enables continuous testing and recording | |

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| | ● LinkWare Cable Test Management software or equivalent helps to analyze test results and create professional test reports | |
| | ● Various kit configurations for all “first line” fiber handling needs, including fiber verification, inspection, and cleaning – all housed in a professional, rugged carrying case | |
| | ● Mag Kit Strap Attachment or equivalent - Strong rare earth magnet attaches to metal surfaces in the testing environment, allowing the technician to work "hands free" | |
| | ● Detector Type<br>○ InGaAs | |
| | ● Calibrated Wavelengths<br>○ 850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm | |
| | ● Auto Dual-Wavelength Switching<br>○ Yes | |
| | ● Data Storage<br>○ 1000 records, multiple wavelengths per record | |
| | ● Optical Connector<br>○ Removable adapter, SC adapter as default, include adapters LC, ST | |
| | ● Multimode Optical Source | |
| | ○ Wavelength Accuracy<br>■ 850 nm: +/-30 nm<br>■ 1300 nm: +/- 20 nm | |
| | ● Singlemode Optical Source | |
| | ○ Wavelength Accuracy<br>■ 1310 nm: ±20 nm<br>■ 1550 nm: ±30 nm<br>■ 1490 nm: ±3 nm<br>■ 1625 nm: ±5 nm | |
| | 12. 90° Angled Speed Termination Tool - with 10 Blue & 10 White Cat6 Keystone Jacks | |

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| | ● Simple-to-use fiber-loss tester with advanced time-saving features. Choose from various kits with configurations to meet your fiber verification, inspection, and cleaning needs. | |
| | ● Single-port, simultaneous dual-wavelength feature completes testing in half the time and saves measurements from both wavelengths into one record | |
| | ● Additional wavelengths of 1490 and 1625 nm | |
| | **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 | |
| | ● 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.** | |

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| | ● 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 the Project Implementation. 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 | |

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| | ● 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: | | |
| | **Quantity:** | **Description/Specification:** | |
| | **3 nodes** | **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) | |
| | | Must be an appliance-based infrastructure commodity off-the shelf Hyper- converged Infrastructure Systems Solution | |
| | | Hybrid Cloud feature provides clustering with active-active data replication between on-premises and AWS, Azure, or any other public cloud. RDMA feature boosts application performance by offloading strain on CPU cores and eliminating I/O overhead. Fault Tolerance, High Availability, NVMe Powered Hot Tier, Secure Backups, Cloud DR, and more | |
| | | Must be fully compatible and have interoperability with the existing UP Mindanao VMWARE hosted in the UP Mindanao Datacenter and can be migrated to any platform which is perpetual. | |
| | | **Must have three (3) nodes with each node having the following minimum requirements:** | |
| | | ● **Node size**: Maximum of 2U per node | |

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| | | ● **Trusted Platform Module**: at least Trusted Platform Module 2.0 V3 | |
| | | ● **Chassis Configuration:** at least 2.5" Chassis with up to 24 SAS/SATA Drives, Front PERC 11 | |
| | | ● **Processor**: at least 2 x Intel Xeon Gold 6526Y 2.8G, 16C/32T, 20GT/s, 37.5M Cache, Turbo, HT (195W) DDR5-5200 | |
| | | ● **Processor Thermal Configuration:** at least Heatsink for 2 CPU configuration (CPU greater than 165W) | |
| | | ● **Memory Configuration Type:** at least Performance Optimized | |
| | | ● **Memory DIMM Type and Speed:** at least 5600MT/s RDIMMs | |
| | | ● **Memory Capacity:** at least 64GB RDIMM, 5600MT/s, Dual Rank x 8 DDR5 ECC or similar type or equivalent per node | |
| | | ● **Memory Slots:** At least 32x DDR5 DIMM slots, maximum of 12.0TB | |
| | | ● **RAID/Internal Storage Controllers:** at least PERC H755 SAS Front | |
| | | ● **RAID/Internal Storage Controllers: at least** Front PERC Mechanical Parts, for 2.5" x24 SAS/SATA Chassis | |
| | | ● **Storage type:** All Flash | |
| | | ● **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 | |
| | | ● **Hard Drives:** at least 3.84TB SSD SAS RI 24Gbps 512e 2.5in Hot- Plug 1DWPD, AG Drive x 6 | |

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| | | ● **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 | |
| | | ● **BIOS and Advanced System Configuration Settings:** at least Performance BIOS Settings | |
| | | ● **Fans: at least** High Performance Fan x6 | |
| | | ● **Power Supply**: At least Dual, Hot-plug, Power Supply Fault Tolerant Redundant (1+1), At least 1400W MM Titanium, Mixed Mode,NAF (Dedicated non-shared dual-PSUs and should be able to sustain single power supply failure) | |
| | | ● **Power Cords:** at least Jumper Cord - C13/C14, 4M, 250V, 10A (US, EU, TW, APCC countries except ANZ) x 2 | |
| | | ● **Power Cords:** at least Power Cord - C13, 3M, 125V, 15A (North America, Guam, North Marianas,Philippines, Samoa, Vietnam) x 2 | |
| | | ● **PCIe Riser:** at least Riser Config 2, 2x8 FH Slots (Gen4), 4x8 FH Slots (Gen5), 2x16 LP Slots (Gen4) | |
| | | ● **OCP 3.0 Network Adapters:** at least Broadcom 57504 Quad Port 10/25GbE, SFP28, OCP NIC 3.0 **must be the compatible the new switches & existing switches stated here in the terms of referenc**e | |
| | | ● **Ports:** Must have at least VGA ports and serial port, at least 6x usb 3.0 ports, at least 1 dedicated management type-c port or manufacturer's standard | |
| | | ● **Additional Network Cards:** at least Broadcom 5720 Dual Port 1GbE LOM | |
| | | ● **Additional Network Cards:** at least Nvidia ConnectX-6 Lx Dual Port 10/25GbE SFP28, No Crypto, PCIe Low Profile | |

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| | | ● **Boot Optimized Storage Cards:** at least BOSS-N1(or equivalent) controller card + with 2 M.2 480GB (RAID 1) | |
| | | ● **Optics & Cables for Network Cards:** at least 2U Server SFP+ SR Optic 10GbE 850nm x 8 | |
| | | ● **Embedded Systems Management:** at least iDRAC9, Enterprise 16G(or equivalent) | |
| | | ● **Advanced System Configurations:** at least UEFI BIOS Boot Mode with GPT Partition | |
| | | ● Each node must have the required licenses of Hypervisor and Software Define Storage | |
| | | ● Separate drives which are Boot Optimized Storage System (BOSS) (or equivalent to other brand) apart from the capacity drives requested needs to be considered (in redundancy) for Booting the Virtualization Hypervisor. | |
| | | ● Zero configuration, migration, and integration efforts | |
| | | ● Single-pane-of-glass operation via Command Center | |
| | | ● One browser tab to perform 20% of your IT-related routines in a few clicks that would otherwise take 80% of your time | |
| | | ● Provides easy, unrestricted scale-up and scale-out | |
| | | ● No-effort 100% data availability | |
| | | ● Supported Hypervisors: at least Microsoft Hyper-V 2012R2, 2016, 2019, 2022; VMware vSphere 6.5, 6.7, 7.0; KVM (coming soon) | |
| | | ● Supported Container Platforms: at least Docker, Kubernetes | |
| | | ● Supported IaaS Platforms: at least OVH vCloud Air | |
| | | ● Supported Storage Protocols: at least iSCSI, iSER, SMB3, SMB Direct, NFSv4.1, NVMe-oF | |
| | | ● Supported Storage Management & Integrations: at least SMI-S, VVols, Redfish™, Swordfish™ | |

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| | | ● Management and Security: Command Center, ProActive Services* | |
| | | ● The hci solution must be able to switch between hypervisors anytime at no additional cost. | |
| | | ● The hci licensing must be agnostic with no hardware lock-in and must be reusable to any other hardware. | |
| | | ● Optional Components: at least Microsoft SCVMM, Windows Admin Center; VMware vSphere Operations Management again optional only | |
| | | ● At least 2 x 3 meters cable SFP+ to SFP+ | |
| | | ● Operating System: Must support the following OS: At least Windows Server 2019, Redhat Enterprise Linux, Ubuntu, Centos, FreeBSD or Solaris for Intel x86. | |
| | | ● **Warranty**: **At least 5 years warranty and 5 years on-site Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time** | |
| | | ● Each node must have the required licenses of Hypervisor and Software Define Storage | |
| | | ● Separate drives which are Boot Optimized Storage System (BOSS)(or equivalent to other brand) 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. | |
| | | ● 5 Years Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time | |

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| | | ● Physical Server leveraged for HCI must include features such as:<br>○ Secure Erase for user Data<br>○ Checking of cryptographic signatures of UEFI drives or other code loaded prior to OS running<br>o Embedded Management and Lifecycle Automation<br>o Out of band port with Lifecycle Controller<br>o Server Management Software<br>o Can use IOS or Android for server systems management<br>o Must be capable of automated support case creation | |
| | 2 | **Top of Rack Network Switch for the HCI and Enterprise Backup and Recovery Appliance** | |
| | | The core switch should have the minimum or better specifications at listed below: | |
| | | a. Performance:<br>● High-speed fully distributed architecture<br>● At least Provides 2.5Tbps for switching and 1,905MppS Mpps for forwarding. All switching and routing are wire- speed to meet the demands of bandwidth-intensive applications today and in the future. | |
| | | b. Physical Interfaces:<br>● Compact 1U switch<br>● At least Model with 48 ports of 1GbE/10GbE(SFP/SFP+) and 6 ports of 40GbE(QSFP+)<br>● SFP+ ports support an optional 10GBASE-T Transceiver.<br>● At least 48p 10G SFP/SFP+ and 6p 40G QSFP+<br>● At least 5 Front-to-Back Fans<br>● At least 2 Power Supply Units included and installed (At least 400W 100-240VAC Front-to-Back Power Supply)<br>● Bidder to provide transceiver to connect backup appliance and HCI. | |

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| | | c. Management:<br>● SNMP<br>● RJ45 for Serial Console or<br>● USB-Type A for file management only<br>● RJ45 Ethernet for OOBM | |
| | | d. Three (3) Years Warranty(unit replacement , labor and parts) | |
| | | e. INCLUDED: Jumper Cable – ROW for the Fiber Core Switch | |
| | | f. 3 years warranty and 3 Years on-site support | |
| | | g. Fiber Core Switch 4-post Rack Kit (mounting kit) | |
| | | h. Globally known brand with ISO certifications distributed in the Philippines via a locally declared company with certified personnel of the said brand. The bidder warrants to employ a licensed/certified personnel when the project is awarded. Submission of certification is during the start of project duration. 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. | |
| | | ● 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 the vendor and must be compatible with the existing aruba switches. | |
| | | ● Installed at least Two hot-swappable PSUs with integrated fans for redundancy | |
| | | ● Warranty: At least 3 years warranty and on-site support | |

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| | | • Hardware Technical Specifications (Switches/TOR) | |
| | | • The proposed switch must include 2x Unit of Network Switches- 48x Ports of 10Gbe SFP+<br>- 3 Years Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time | |
| | **56** | 10G SFP+ LC SR 300m MMF Transceiver must be compatible with the HCI, Enterprise backup appliance and existing ARUBA Switches, servers | |
| | **56** | Warranty for 10G SFP+ LC SR 300m MMF Transceiver: At least 3 years warranty and 3 years on-site support | |
| | **4** | 40G QSFP+ LC LR4 SM Transceiver for the Top of the rack must be compatible with the HCI, Enterprise backup appliance and existing ARUBA Switches, servers | |
| | **4** | Warranty for 40G QSFP+ LC LR4 SM Transceiver for the Top: At least 3 years warranty and 3 years on-site support | |
| | **4** | 40G QSFP+ LC LR4 SM Transceiver for the existing Aruba Core Switch(Aruba CX 8325 (JL624A)) must be compatible with the HCI, Enterprise backup appliance and existing ARUBA Switches, servers | |
| | **4** | Warranty for 40G QSFP+ LC LR4 SM Transceiver for the existing Aruba Core Switch : At least 3 years warranty and 3 years on-site support | |
| | **4** | 40G QSFP+ LC LR4 SM Transceiver for connecting the 2 units of Top the Rack Switch for HCI and must be compatible with the HCI, Enterprise backup appliance and existing ARUBA Switches, servers | |
| | **4** | Warranty for 40G QSFP+ LC LR4 SM Transceiver for connecting the 2 units of Top the Rack Switch for HCI : At least 3 years warranty and 3 years on- site support | |
| | **8** | 25G SFP28 LC LR 10km SMF Transceiver for the ARUBA Core Switch(spares) must be compatible with the HCI, Enterprise backup appliance and existing ARUBA Switches, servers | |
| | **8** | Warranty for 25G SFP28 LC LR 10km SMF Transceiver for the ARUBA Core Switch(spares) : At least 3 years warranty and 3 years on-site support | |

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| | **1 lot** | At least 6 units of Windows server 2022 datacenter - 16 core (perpetual) commercial and installed with perpetual hypervisor and 350 units of Client Access License (CAL) | |
| | **1** | **DNS Server with perpetual Hypervisor and transceivers** | |
| | | 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 (must include the the needed transceivers that are compatible in the new switches & existing switches stated here in the terms of reference) | |
| | | at least Operating System Windows Server 2022 Standard (with Hyper- V),16CORE, FI,No Med,No CAL, Multi Language | |
| | | at least supply and installed with perpetual hypervisor<br>include installation, configuration and documentation of the DNS Server | |
| | | at least with option to install with perpetual hypervisor (existing VMWARE) if the end user decides to | |
| | 1 | Warranty for DNS Server with perpetual Hypervisor and transceivers: At least 3 years warranty and 3 years on-site support | |
| | 1 | Backup Core Switch for the 1Gb Backbone | |
| | 1 | The Backup Core Switch should have the minimum or better specifications at listed below: | |

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| | | At least System Switching Capacity: 880 Gbps At least System Throughput Capacity: 660 Mpps At least Stack Size: 10 member<br>At least Max. Stacking Distance: Up to 10 kms with long range transceivers At least Stacking Bandwidth: 200 Gbps<br>At least 24x 1G/10G SFP+ ports<br>At least 4x 1/10/25/50G SFP ports (50G capability for use with 50GbE DACs for interconnect and VSF stacking) | |
| | | At least 2 field-replaceable, hot-swappable power supply slots. 2 power supply must be installed and included | |
| | | At least 250 Watts for each power supply | |
| | | At least Two field-replaceable, hot-swappable fan trays (included), no empty slot | |
| | | Must be compatible with the existing Fiber Core Switch (Aruba JL624A), Edge Switch POE 24 Ports (JL660A), Edge Switch POE 48 Ports (JL659A), 1Gbe SFP Transceivers (J4859D) and 25GBe SFP28 Transceivers (JL486A) | |
| | | Management:<br>● SNMP<br>● RJ45 for Serial Console or USB - C Console Port<br>● USB-Type A for file management only<br>● RJ45 Ethernet for OOBM | |
| | | At least Three (3)) Years Warranty (unit replacement, labor and parts) | |
| | | At least 3 year warranty and 3 Year on-site support | |
| | | INCLUDED: Additional Jumper Cable – ROW for Edge Switch POE 24 ports\ | |
| | | Should be compatible with the existing Aruba Transceivers(J4859D) | |
| | | At least Globally known brand with ISO certifications distributed in the Philippines via a locally declared company with certified personnel of the said brand. The bidder warrants to employ a licensed/certified personnel when the project is awarded. Submission of certification is during the start of project duration. 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. | |

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| | | At least power plugs must be compatible with the existing PDUs in the Data Center and PDUs in this Term of Reference | |
| | **Note**: The bidder is responsible for the completeness of their proposed solution. *Any additional software, server device, network device, equipment, accessories, and/or cabling requirements shall be provided by the winning service provider without additional cost from UP Mindanao.*<br>*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)* | | |
| | ● Must be an enterprise-class storage, compute, and virtualization service to run nearly any application. | | |
| | ● Must combine virtualization, compute, storage area networking and storage in an appliance-based solution. | | |
| | ● Must be 100% software defined without being reliant on any hardware acceleration card, or hardware controllers. | | |
| | ● Must have deduplication and compression. It must have the ability to enable/disable these data services to save resources. | | |
| | ● Must be able to combine hybrid and all flash models in the same cluster. | | |
| | ● Must have a virtual management system node provides primary and secondary redundancy to ensure the availability of the platform | | |
| | ● Must support one key switching to display the screen function, intuitively displaying the health, alarm, resource usage of the virtual resource pool, and support user-defined display content. | | |
| | ● Must support using one click mouse button to analyze the use of historical resources of virtual machine and host, and provide data support for planning and decision-making. Provide screenshots of product functions. | | |

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| | ● Must support using one button mouse button to analyze invalid mirror files on back-end storage, and provide one button cleaning and free storage space capabilities. Provide product function screenshot | |
| | ● Must support using one click mouse button to export cluster, host and virtual machine configuration and status information in Excel and PDF format. Provide product function screenshot | |
| | ● Must support using one click mouse button to restore the virtual machine to the specified restore point state. Based on the backup function, false deletion of virtual machine does not affect the restore function. Provide product function screenshot | |
| | ● Must support using one click mouse button to quickly view, start, delete, batch start and batch delete virtual machines that have not been used for a long time and are in a closed state. Provide product function screenshot | |
| | ● Must be capable to provide visual real-time monitoring center, support real-time monitoring and hierarchical display from hardware reliability, system reliability and service reliability for hardware and software issues | |
| | ● Must have a host role/s can be divided flexibly, specified as storage type, computing type and HCI type. The three types of hosts in the same cluster can be combined arbitrarily | |
| | ● Must support the unified management of the virtual equipment in the whole platform. The virtual web management platform can complete the network topology construction, complete the self-service logic arrangement of various virtual equipment, support the connection, opening and closing of various virtual equipment on the management platform, and the topology presents the business flow information. | |
| | ● Must have a virtual machine support all the functions of physical machine with specify individual IP addresses and MAC addresses, also can be isolated and protected, support the mainstream OS on the existing market, including Windows, CentOS, Fedora, RedHat, SUSE, Ubuntu, FreeBSD, MacOS, etc. | |

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| | ● Must be able to provide the function of virtual machine recycle bin, manage the deleted virtual machine in a unified way, prevent the data loss caused by the false deletion of virtual machine, support recycle bin file saving cycle configuration, the overdue file will be automatically deleted. | |
| | ● Must support batch modification of virtual machine configuration parameters, including I / O priority, startup priority, automatic migration, CPU scheduling priority, number of CPUs, memory size, automatic startup, VM startup device, vnc agent enabled, tools automatic upgrade, etc. | |
| | ● Must be able to provide virtual machine snapshot function, support setting manual and scheduled snapshot to save virtual machine disk file and memory status information to image file | |
| | ● 5 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. | |

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| | ● 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). | |
| | ● 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 | |

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| | ● 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 | |
| | ● Has a networking operating system feature/services that creates a fully integrated solution between the fabric and HCI cluster infrastructure.<br>○ Significantly simplify complex single and multi-rack deployments across multiple HCI clusters.<br>○ Flexible topology for multi-rack deployments<br>○ Greatly reduce the time and cost to deploy, scale and adapt networks for a HCI environment<br>○ Reduce risk of network configuration errors<br>○ 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 | |
| | ● 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. | |

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| | ● 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. | |

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| | ● 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 | |
| | ○ 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. | |

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| | ○ 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. | |
| | ○ 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. | |
| | ○ 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. | |
| | ○ HCI system should be Scale UP and SCALE OUT Design.<br>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** | |
| | ○ 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. | |
| | ○ Proposed HCI solution should have native Swagger integration for REST API. | |
| | ○ 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. | |
| | ○ 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. | |

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| | ○ 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. | |
| | ○ Hardware maintenance task like Hard disk replacement and Node replacement and subsequent HCI node bring up task should be totally automated. | |
| | ○ Hardware expansion and Cluster expansion by adding HCI Nodes into existing cluster tasks should be automated. | |
| | ● **HCI Hypervisor** | |
| | ○ 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. | |
| | ○ 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. | |
| | ○ 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. | |
| | ○ In the event of a node failure, virtual machines should automatically be restarted on another node. | |
| | ○ 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. | |

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| | ○ 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. | |
| | ○ 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. | |
| | ○ 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). | |
| | ○ HCI hypervisor should support Virtual Machine Fault Tolerance to eliminate downtime for VM/Application during HCI node failure | |
| | ○ Virtualization software should provide enhanced visibility into storage throughput and latency of hosts and virtual machines that can help in troubleshooting storage performance issues. | |
| | ○ The Hypervisor should have capabilities to load balance the utilization in the cluster. | |
| | ● **HCI Business Continuity** | |
| | ○ 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. | |
| | ○ Proposed solution should allow centralized creation and management of recovery plans directly. Automatically discover and display virtual machines protected by the HCI solution. | |
| | ○ Proposed solution should use VM based replication to asynchronously replicate VMs across hyper converged systems in different sites. | |

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| | ○ 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 | |
| | ○ The 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 are capable of having 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<br>& 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. | |

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| | ○ Single GUI for one click updates of entire HCI stack including both software and hardware components. | |
| | ● **Business Continuity Disaster Recovery Requirements** | |
| | ● **Software Technical Specifications** | |
| | ○ 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. | |
| | ○ Solution must have at least 15 licenses to replicate Virtual Machines from Production Site | |
| | ○ Proposed solution should allow centralized creation and management of recovery plans directly. Automatically discover and display virtual machines protected by the HCI solution. | |
| | ○ Solution must have complete licenses to have a capability of Business Continuity Disaster Recovery to do Fail Over and Fail Back of Virtual Machines. | |
| | ○ 5 Years Support Warranty Maintenance 24/7 Mission Critical Support 4 Hours Response Time | |
| | ● **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: | |
| | ○ 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. | |
| | ○ 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. | |

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| | ○ 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. 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 computer, storage, and networking resources into a single appliance, it reduces hardware and operational costs. 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. | |

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| | ○ 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. | |

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| | ○ 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. | |
| | ***Benefits:***<br>○ 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. | |
| | ○ Enhanced Productivity: With virtual desktops and applications, users have consistent access to their work environment and applications, promoting productivity and collaboration across teams. | |
| | ○ Improved IT Efficiency: Centralized management simplifies desktop and application provisioning, updates, and policy enforcement, reducing IT management complexity and improving operational efficiency. | |
| | ○ Cost Savings: By leveraging virtual desktops and applications, organizations can reduce hardware and software costs, minimize maintenance efforts, and achieve greater resource utilization. | |
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| | ○ 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. | |
| | ○ 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. | |
| | ○ Should have a Data Protection, Backup and Recovery for the VDI Environment using the Enterprise Backup and Recovery Appliance/Server in this project | |
| | ○ Below is the technical Specification of the VDI that must be compatible with the HCI and Enterprise Backup | |

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| | ● **Deployment Requirements:** | |
| | 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: | |
| | ● Must be deployed using commodity off-the-shelf servers | |
| | ● Must be configured and deployed using web-based tools for simplicity and ease of deployment. | |
| | ● Must be fault tolerant, with no single points of failure and performance bottlenecks in its architecture. | |
| | ● Must have the capability for quick remediation of hardware or software problems. | |
| | ● Must distribute data and workloads on at least 3 nodes to avoid overloading remaining nodes in case of node failure. | |
| | ● Must deliver a solution that allows applications to move from one node to another in case of node failure or higher resource requirements. This capability must be either automatic or manually controlled. | |
| | ● Must be able to create local and remote copies of applications for data protection and availability. These copies can be on a similar combined network, storage, and compute appliance, a backup server, or cloud platform for flexibility of choice. These copies can be created on schedule or manually. | |
| | ● **Scalability and Efficiency Requirements:** | |
| | ● Must be upgradable through scale up and scale down options. These upgrade options may be available online and should be non-disruptive. | |
| | ● **Ease of Use Requirements:** | |
| | ○ Must use a single point of management tool without the need of dedicated machines, appliances, or additional software. The management tool should be capable of handling the Infrastructure Systems Solution regardless of solution size or scale. | |

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| | ○ The quick identification and resolution of issues shall also be the result of the certification training of UP Mindanao-IT personnel on the Hyper- Converged Infrastructure Systems Solution. | |
| | ○ Must provide a single interface in upgrading the network operating system, hypervisor, storage firmware, and other software, allowing ease and simplicity of management. | |
| | ● **SCOPE OF WORK** | |
| | The Winning Bidder (hereafter referred to as simply the "bidder") must: | |
| | ● perform the supply, delivery, installation, configuration, commission, and support services of the proposed Hyper converged Infrastructure Systems Solution for the Datacenter of the UP Mindanao. | |
| | ● perform the integration of the proposed Hyper-converged Infrastructure Systems Solution with the existing UP Mindanao VMWARE hosted in the UP Mindanao Datacenter. | |
| | ● provide all necessary perpetual and applicable licenses and/or subscriptions needed in the configuration and integration of the proposed Hyper-converged Infrastructure Systems Solution for the UP Mindanao Data Center | |
| | ● perform the supply and delivery of the proposed Hyper converged Infrastructure Systems Solution in the UP Mindanao Office for the installation, configuration and integration to the existing UP Mindanao VMWARE. The delivered and configured solution will be temporarily hosted in the UP Mindanao Datacenter until the UP Mindanao IT complex will be available. | |
| | ● provide certification training to at least five (5) UP Mindanao- ICTG personnel on the proposed Hyper-converged Infrastructure Systems Solution | |
| | ● conduct Project Management using the below framework: | |
| | ● create a project team for the UP Mindanao and the bidder | |
| | ● formulate project implementation plan | |

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| | ● conduct project kick-off | |
| | ● implement and coordinate project milestones identified in the project implementation plan | |
| | ● submit operation and maintenance documentation/manuals | |
| | ● provide weekly/monthly/milestone project updates | |
| | ● conduct hands-on technical training on the supplied solution | |
| | ● provide and execute user acceptance and test plans. | |
| | ● submit detailed project documentation in hard and soft copies:<br>○ Project Implementation Plan<br>○ Installation and Configuration Manuals<br>○ Service Level Agreement<br>○ Training Materials<br>○ Warranty Agreement | |
| | ● **TRAINING REQUIREMENTS:**<br>The bidder shall provide in-depth knowledge transfer on product installation, configuration, and integration of the proposed Hyper- converged Infrastructure Systems Solution for UP Mindanao Data Center to be conducted by a designated product expert. | |
| | ● **WARRANTY** | |
| | ● The bidder must warrant that the Goods supplied are new, unused, or the most recent or current models, and that they incorporate all recent improvements in design and materials, except when the technical specifications required by the UP Mindanao provides otherwise. | |
| | ● Bidders must further warrant that all Goods supplied shall have no defect, arising from design, materials, or workmanship or from any act or omission of the bidder/contractor that may develop under normal use of the supplied Goods. | |
| | ● To assure that manufacturing defects be corrected by the bidder, a 5-year warranty shall be provided by the bidder. | |

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| | ● The bidder must ensure a fully functional and well- maintained Hyper-converged Infrastructure Systems Solution in its deployment and integration for the existing UP Mindanao VMWARE and standalone servers | |
| | ● The UP Mindanao shall promptly notify the bidder in writing of any claims arising under this warranty. Upon receipt of such notice, the bidder shall, within the period specified and with all reasonable speed, repair or replace the defective Goods or parts thereof, without cost to the UP Mindanao. | |
| | ● If the bidder, having been notified, fails to remedy the defect(s) within the period specified, the UP Mindanao may proceed to take such remedial action as may be necessary, at the bidder's risk and expense and without prejudice to any other rights which the UP Mindanao may have against the bidder under the Contract and under the applicable laws. | |
| | ● In the event of any equipment failure, the winning bidder/manufacturer shall repair or automatically replace the defective products with the same product item at no additional cost/charge to UP Mindanao. | |
| | ● A functional and workable service unit that is equivalent or higher in specification should be provided in case replacement of hardware would take more than twenty-four (24) hours or if repair requires pull out the equipment from UP Mindanao premises | |
| | ● Bidders must provide a signed after sales service support certification that the bidder will be supported by their principal in terms of parts and services. | |
| | ● **SUPPORT AND MAINTENANCE**<br>The bidder must provide full-time support and managed services as specified: | |
| | ● single point of contact for all hardware and software components; | |
| | ● twenty-four by seven (24x7) service desk support via telephone, email, or online chat portal with at least two (2) hours response time upon escalation of issues or concerns; | |

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| | ● onsite support within four (4) hours while the proposed Hyper-converged Infrastructure Systems Solution is in the UP Mindanao premise; | |
| | ● The bidder must provide the procedure on support and issue escalation. | |
| | ● **CONFIDENTIALITY** | |
| | ● Information or rights acquired and obtained from the UP Mindanao, including but not limited to any and all obligations prior to the termination or expiration hereof and provisions on confidentiality and proprietary rights, will remain in effect after termination of the services rendered to the UP Mindanao. Hence, the undertaking of the bidder not to disclose and to keep information confidential shall subsist even after the expiration or termination of its obligation to the UP Mindanao nor can the bidder, at any time, disclose items mentioned or enumerated in this Terms of Reference or any information it acquires by virtue of the contract which the UP Mindanao deems confidential. | |
| | ● Records, documents, reports and relevant data, such as diagrams, plans, designs, estimates, specifications and other supporting records of materials complied and prepared in the courses of the performance of the services shall be absolute properties of UP Mindanao and shall not be used by the bidder for purposes not related to this agreement without prior written approval of UP Mindanao. Copies of such documents as required in this TOR shall be turned over to UP Mindanao upon completion of the project except that the bidder shall have the right to retain a copy of the same. | |
| | ● **BIDDER REQUIREMENTS** | |
| | General Requirements: | |
| | ● The bidder must provide during the post-qualification a certificate issued by the product manufacturer or solution provider that they are a certified partner and able to extend direct technical support to the end-user for the product being offered. The bidder must provide during the post-qualification a certificate issued by the product manufacturer or solution provider that they are a certified partner and able to extend direct technical support to the end-user for the product being offered. | |
| | ● Bidder must have at least ten (5) years of continuous existence and engagement in IT business. | |

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| | ● Bidder must have completed a similar contract for the supply, delivery, installation of Hyper-converged Infrastructure Systems Solution for the past three (3) years from the date of submission and receipt of bids. | |
| | ● Bidder must be a Platinum PhilGEPS registered supplier. | |
| | ● **MANPOWER REQUIREMENTS** | |
| | General Requirements: | |
| | ● The bidder must provide at least three (3) local manpower for the supply, delivery, installation, configuration and commissioning of the proposed Hyper-converged Infrastructure Systems Solution for the Data Center of the UP Mindanao:<br>○ one (1) Certified Project Manager for the implementation of the project.<br>○ one (1) Manufacturer Certified Engineer or equivalent Hyper-converged Infrastructure Systems Solution Specialist.<br>○ one (1) Manufacturer Certified Network Associate or Specialist.<br>○ The bidder must provide during the project implementation the photocopy of valid certifications, resume, and company ID of the identified three (3) local manpower. | |
| | ● **DELIVERY AND IMPLEMENTATION SCHEDULE** | |
| | ● The delivery of goods/solutions, project implementation, documentation and acceptance must be completed within ninety (180) calendar days from the receipt of the Notice to Proceed. | |
| | ● The bidder shall be subjected to the evaluation by the end- user after the implementation of the project | |
| | ***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)* | |

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| | ● Enterprise backup and recovery software solutions define as vendor- developed solutions that capture a point-in-time copy (backup) of enterprise workloads in on-premises, hybrid, multicloud and SaaS environments. These solutions write the data to one or more secondary storage targets for the primary purpose of recovering this data in case of loss. They can be offered as software-only, integrated hardware or virtualized appliance, or as a SaaS-based, backup as a service (BaaS). | |
| | ● The Enterprise Backup and Recovery Appliance should support agent or agentless backups of all the major hypervisors. | |
| | ● 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 third party and 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 reporting capabilities for physical capacity utilization for chargeback and capacity planning | |
| | ● Solution's real strength lies in the ease with which users can recover data. The Solution automates data recovery operations, as well as backup testing. These nondisruptive tests ensure that data is recoverable and that users can meet backup service-level agreements (SLAs). If necessary, recovery operations can be directed to a different location, meaning that an organization can recover to the cloud. The solution backups can instantly create a test lab that is based on production environments. These test labs are commonly used for patch testing and other tasks that would otherwise have the potential to disrupt IT operations. | |
| | ● Solution's notable capability is its protection against encryption from cyber attacks. The solution achieves this through an air-gapped, immutable file system. | |
| | ● The data protection appliance being considered for implementation is a robust solution designed to ensure the security and integrity of critical data assets. | |

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| | ● 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 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 model:** | |
| | ● Storage Capacity: The Backup Appliance **24TB** model provides a generous storage capacity of **24** terabytes (TB) usable capacity, 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. | |

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| | ● 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 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 | |

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| | ● 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 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 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 | |

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| | ● Solution must not require content awareness to achieve high deduplication ratios | |
| | ● 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 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 | |

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| | ● 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 | |
| | ● Support Image base backup, Application and Database backup, with 3:1 Deduplication Ratio including licenses | |
| | ● Support physical machine restoration to different or same brand, physical machine restoration to virtual machine, virtual machine restoration to physical machine and restoration of virtual machine from different hypervisor. | |
| | ● Must be capable of enabling automated disaster recovery testing of business-critical systems, applications & data. With Data Backup Replication including licenses. | |
| | ● Support AES 256 Encryption Password. | |
| | ● Unlimited license for Agent base back-up. | |
| | ● Advanced Reporting Tool. | |

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| | ● Solution should be able to support source side deduplication and Global Deduplication. | |
| | ● Must support backup of Microsoft Windows Server 2008/R2 2012/R2,2016 and 2019, 2022 HCI platform backup. | |
| | ● Must support both physical server and virtual guest OS backup and disk-to-disk-to-tape backup. | |
| | ● The virtualization backup must support hypervisor level backup for VMware and Microsoft Hyper-V. | |
| | ● The agentless virtualization backup should allow backup without a local server access right. | |
| | ● Must have the flexibility to configure daily, weekly, monthly, or repeated min/hourly backup schedule. | |
| | ● Must have the capability to provide ability to cut down backup duration by configuration of an incremental backup without the need of full backup and still allowing one-step full server recovery. | |
| | ● Should not require synthesize full process from the incremental backup collected in the backup storage. | |
| | ● Must provide image base / snapshot backup of physical and virtual server. | |
| | ● Should offer both sources based and global deduplication per backup destination / target /backup container increasing storage saving ratio. | |
| | ● Must provide built-in deduplication with compression to further increasing storage save ratio. | |
| | ● Should provide the ability to encrypt /password protect on the exported backup recovery point sessions as an immutable feature. | |

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| | ● Should offer ability to migrate the backup recovery point from disk to tape such that restoring from tape can select individual servers or granular restore. | |
| | ● Must support configurable block size for deduplication. The block size must be able to configure as small as 4K block for best deduplication ratio. | |
| | ● Ability to replicate backup recovery seamlessly to other location, namely to DR sites or from remote offices to primary site unlimited. | |
| | ● Ability to support active-active configuration for replication such that having ability to restore / recovery at the replicate site without suspending / shutdown / terminating the replication. | |
| | ● Ability to support different retention of backup recovery point for local site and remote site. | |
| | ● Ability to define when to replicate, namely, replicating immediately after backup or replicating at schedule time only within a specific schedule window. | |
| | ● Ability to throttle bandwidth usage during replication. | |
| | ● Ability to automatically retry on interval and number of retry (user defined) for failed replication. | |
| | ● Ability to show what are the latest recoverable recovery point status of individual server if there are any failure / suspend / stop of replication. | |
| | ● Ability to show replication status of each individual server, namely, which are the servers' recovery point in replication and its transfer status. | |
| | ● Must support a one pass backup with the following restore / recovery: Files, Folder/s, Database level. | |

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| | ● BMR - BareMetal recovery approach for all servers, physical or virtual machines. | |
| | ● Ability to instantly power on a backup image to a targeted VMware or Microsoft Hyper-V platform. | |
| | ● Must support a one pass backup with the following restore / recovery: Files, Folder/s, Database level. | |
| | ● Solution must deliver at least **24**TB or more usable capacity | |
| | ● Protect critical data backups from cyberattacks | |
| | ● Prevent ransomware from encrypting backup data | |
| | ● Secure your backups on immutable storSupports backup Job load balancing. High-concurrency data backup jobs achieve load balancing when calling the storage system and deduplication service to allocate storage nodes and deduplication nodes, ensuring the performance of massive data backup and high-concurrency backup. | |
| | ● Recover using the broadest set of recovery options | |
| | ● **System Functionalities**<br>○ A backup and recovery system that also supports Scheduled Backup protection, Copy Data Management, and Continuous Data Protection functions at the same time. | |
| | ● **Cluster Architecture** | |
| | ○ Supports online replacement of cluster nodes and deletion of failed nodes. | |
| | ○ The backup system supports cluster architecture and supports up to 16 backup nodes to form a cluster backup system to avoid the occurrence of backup system unavailability due to software and hardware failures, human misoperation, etc. | |

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| | ○ Supports high availability of storage media. Supports automatic monitoring of backup node service status. When a backup node fails, the backup tasks affected by the failure will be automatically assigned to the normally working backup node for execution. External NAS storage can be mounted to a normal backup node to continue backup. | |
| | ● **User Authority Management**<br>○ Supports multi-types of roles that is responsible for the following tasks: | |
| | ○ Responsible for system operation and maintenance and management operator role. System operation and maintenance includes managing system alerts, creating and editing fingerprint pools, authorization management, SMTP management, console communication, node management, disk management, RAID management, and volume management. And configure the snapshot pool, etc. | |
| | ○ Responsible for auditing the operating behaviors of system administrators and security administrators, recording system and device-related event information, and managing the log retention period | |
| | ○ Responsible for allocating and withdrawing resources such as clients, virtualization platforms, and fingerprint pools for operators, resetting operator passwords, supervising the operational behavior of audit administrators and operators, and recording all jobs related to the jobs and event information. | |
| | ○ Responsible for client configuration, backup job management, recovery job management, data cleaning, and management jobs alerts within the client scope granted by the security administrator. No authority to perform any system management and maintenance operations. | |
| | ○ Responsible for viewing all information of the backup system, but only has viewing permissions and does not have any operation or configuration permissions. | |
| | ○ All accounts must be forced to change the default password when logging in for the first time to improve management security. | |

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| | ● **Alert** | |
| | ○ Supports the alert function. Based on preset alert conditions, when an abnormality occurs in the system or jobs, through alerts display, alerts email notification, or SMS alerts, users can take timely measures to avoid risks. | |
| | ○ All types of backup and recovery tasks are supported, and the current execution operations can be displayed through real-time dynamically updated task logs. Task execution failures or exceptions can be accurately determined and handled through log execution operations. | |
| | ● **System Compatibility**<br>○ Has protection capabilities for Windows, Linux and Unix platforms to meet IT system complexity and compatibility needs | |
| | ● **Permanent Incremental Backup**<br>○ Supports permanent incremental backup. After the first full backup, all subsequent backups are incremental level backups. Each incremental backup is merged with the native format copy data after the last backup to form a new native format copy of the production data. Not only can it improve backup and recovery efficiency, but it also supports deleting any intermediate full backup time point, which will not affect subsequent time point recovery and improve data security. | |
| | ● **Backup Network Management**<br>○ Data transmission supports Open-SSL's TLS two-way authentication and encryption, and the authentication certificate is no less than 2048 bits.<br>○ Support backup and restore across intranet and internet.<br>Public network mapping of a single port and address can be set as the data backup IP of a node device. | |

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| | ● **Ransomware Protection**<br>○ Supports immutable storage function to avoid malware tampering and deletion of stored data. The root/administrator account cannot access and browse. Delete the RAID, LVM, file systems and disks where this data resides.<br>○ Supports Forced data retention policy, data cannot be deleted within the preset data retention time. | |
| | ● **Database Backup and Recovery**<br>○ Supports online backup and protection of mainstream databases such as Oracle, DB2, SAP HANA, MySQL, MariaDB, Sybase, PostgreSQL, SQL Server, Cache, etc. The backup job configuration process is completed with the guidance of a graphical wizard. You can select the corresponding database on the graphical interface without having to Write a script.) Supports database backup rate limiting function based on time period. | |
| | ● **System and Platform Protection**<br>○ Supports backup and recovery of AIX, Solaris, Windows, and Linux operating systems. | |
| | ● **File Backup and Recovery**<br>○ Supports the volume-level backup function of file systems under Windows and Linux platforms, and backs up data in units of entire volumes, improving backup efficiency in environments with massive small files. Supports full volume recovery<br>○ Supports Unix, Windows, and Linux file system backup, supports file aggregation backup capabilities, and improves backup efficiency.<br>○ Supports NAS mount recovery and can directly access NAS backup data to improve recovery efficiency. Agentless backup is supported.<br>○ Supports mutual recovery across Linux and Unix platforms to meet users' diverse platform protection needs. | |

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| | ● **Virtualization Protection**<br>○ Supports backup of virtualization platform The virtualization applications all support backup protection for virtual machines, resource pools and entire clusters, without the need to install any agent software inside the virtual machine. Supports concurrent backup and recovery of cloud hosts, concurrent backup and recovery of clients, and consistency verification of backup data.<br>○ Virtual machine backup supports viewing the backup progress bar, which allows you to view the backup progress percentage and backup speed.<br>○ Supports scheduled backup and recovery, supports virtual machine granular backup, supports automatic discovery of virtual machines, supports concurrent backup and recovery of virtual machines and traffic control<br>○ Supports the concurrent backup and recovery function of virtual machines, and supports setting the number of concurrent backup and recovery of virtual machines in a single backup and recovery task on the WEB page, which can greatly improve the efficiency of backup and recovery | |
| | ● **Data Security**<br>o The system supports automatically triggering periodic recovery tasks for data consistency verification | |
| | ● **System Security**<br>○ The system supports key encryption and key update, avoid data leakage caused by key leakage, and provide system and data security.<br>○ Supports encrypted transmission and storage of backup data, and supports two encryption algorithms, AES256 and SM4, to improve the security of the transmission process and storage. | |

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| | ● **Storage Management**<br>○ All scheduled backup jobs are used, and their backup data is stored in a unified storage media management system. There is no need to separately configure complex storage pools for different types of jobs, simplifying management and maintenance**.**<br>○ The backup storage media management system supports online expansion. All backup nodes can add disks online. The new disk space is automatically added to the storage media management system and is immediately available. Existing backup jobs do not require any adjustment, and backup data can be automatically written into new ones. within the increased space. | |
| | ● **Recovery Management**<br>○ Support resource protection mechanism to avoid misoperation data overwriting to the greatest extent. To initiate data recovery, two different confirmation mechanisms need to be used to unlock the data before data recovery can be initiated. | |
| | ● **Retain Management**<br>○ Set the backup data retention period based on a single backup job, and support two methods to control the backup data retention period based on the time range and the number of full backup copies. | |
| | ● **Remote Replication**<br>○ Supports the function of remotely copying local backup data to an offsite location. When a local site disaster occurs, the offsite backup data can be used for recovery.<br>○ The execution of remote replication jobs does not affect any functions of the target backup cluster. The backup tasks and backup data copied to the target backup cluster can be restored directly without any operations of rebuilding the backup index or re-identifying the backup data. | |
| | ● **Tape Archive**<br>○ Supports tape management, supports data tape import/export, formatting, ripping, verification, driver cleaning, label management and other functions. | |

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| | ● **Visualization**<br>○ Support Dashboard to visualize statistical results such as tasks, storage, objects, alerts, etc. | |
| | ● Supported at least the following Database Backup<br>○ Oracle<br>○ MS SQL<br>○ MYSQL<br>○ PostgreSQL<br>○ MariaDB<br>○ GBASE<br>○ etc. | |
| | ● Supported at least the following Email Backup<br>○ Lotus Domino<br>○ Exchange<br>○ Office 365 | |
| | ● File Backup must be supported | |
| | ● NAS Backup must be supported | |
| | ● Server Backup must be supported | |
| | ● Supported at least the following Cloud Infrastructure<br>○ Huawei<br>○ Tencnet<br>○ VMware<br>○ Alibaba<br>○ Azure<br>○ H3C<br>○ KVM<br>○ Openstack<br>○ etc. | |
| | ● Must support Data Deduplication | |
| | ● Must support Data Compression | |

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| | ● Must support Immutable Repository | | |
| | ● Must support Continuous Data Protection(CDP) | | |
| | ● Must support DR and Off-site Backup | | |
| | ● Must support Kubernetes Backup | | |
| | ● Must support Data Encryption | | |
| | ● Must support Instant Recovery | | |
| | ● Must Support multi-factor authentication (MFA) | | |
| | ● Must Support Report Management | | |
| | ● Must Support V2V Migrations | | |
| | ● Must include all the necessary and essential perpetual enterprise and premium license and perpetual enterprise software to support at least 50 VMs and all perpetual enterprise and premium licenses of all the CPUs or Sockets in the HCI and full perpetual enterprise and premium Front-end capacity licenses based on the enterprise backup and recovery solution total usable storage. | | |
| | ● Should have Zero licensing overhead for multiple backup copies Enterprise Backup and Recovery Appliance/Server should have a Data Protection, Backup and Recovery for the VDI Environment for this project | | |
| | **Quantity:** | **Description/Specification:** | |
| | **1** | Enterprise Backup and Recovery Appliance/Server | |
| | | ● **INITIAL CAPACITY:** at least 24 TB | |
| | | ● Chassis Configuration: at least 3.5" Chassis with up to 24 SAS/SATA Drives, GPU Capable, 1 or 2 CPU | |

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| | | ● Processor: at least 2 x Intel Xeon Gold 5415+ 2.9G, 8C/16T, 16GT/s, 22.5M Cache, Turbo, HT (150W) DDR5- 4400 | |
| | | ● Processor Thermal Configuration: at least Heatsink for 2 CPU configuration, Config | |
| | | ● Memory Capacity: at least 16GB RDIMM, 4800MT/s Single Rank 370-AGZO x 16 | |
| | | ● Hard Drives:<br>○ at least 480GB SSD SATA Mix Use 6Gbps 512 2.5in Hot-plug AG Drive,3.5in HYB CARR, 3 DWPD x 3<br>○ at least 1.92TB SSD SATA Mix Use 6Gbps 512 2.5in Hot-plug AG Drive,3.5in HYB CARR, 3 DWPD x 2<br>○ at least 1.2TB Hard Drive SAS ISE 12Gbps 10k 512n 2.5in with 3.5in HYB CARR x 4<br>o at least 4TB SAS ISE 12Gbps 7.2K 512n 3.5in Hard Drive x 14 | |
| | | ● Fans: at least High Performance Fan x6 | |
| | | ● Power Supply: at least Dual, Redundant (1+1), Hot-Plug Power Supply,1100W MM (100-240Vac) Titanium | |
| | | ● OCP 3.0 Network Adapters: at least Broadcom 57416 Dual Port 10GbE BASE-T Adapter, OCP NIC 3.0 | |
| | | ● Additional Network Cards: at least Broadcom 57414 Dual Port 10/25GbE SFP28 Adapter, PCIe Low Profile, V2 | |
| | | ● Optics & Cables for Network Cards: at least SFP+ SR Optic 10GbE 850nm | |
| | | ● Advanced System Configurations: at least UEFI BIOS Boot Mode with GPT Partition | |
| | | ● Operating System: at least Windows Server Datacenter 2022 16 Core | |

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| | | ● Protect critical data backups from cyberattacks | |
| | | ● Prevent ransomware from encrypting backup data | |
| | | ● Secure backups on immutable stores | |
| | | ● Recover using the broadest set of recovery options | |
| | | ● With included endpoint security embed on the backup server with management factory installed. | |
| | | ● Unified management console | |
| | | ● One, simple, unified, management & reporting console, to manage the full data protection lifecycle | |
| | | ● Getting started configuration wizard | |
| | | ● Intuitive workflow-based protection strategies, plans & tasks | |
| | | ● Web-based management console enables web browser- based | |
| | | ● access from anywhere, including mobile devices | |
| | | ● Designed to extend with 3rd party integrations | |
| | | ● Detailed reporting & logs | |
| | | ● Plan-Based Data Protection | |
| | | ● A backup plan enables one or more data protection tasks to be run automatically | |

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| | | ● Example tasks include: -<br>○ Host-Based Agentless Backup ○ Agent-based Windows Backup ○ Backup from UNC path<br>○ Recovery Point Server Replication<br>○ Remote replication<br>○ Copy Recovery Point (Disk/Tape/Cloud)<br>○ Virtual Standby<br>○ Tape Copy<br>○ File Copy or File Archive to Cloud (Optional with Cloud Capacity to backup data) | |
| | | ● Each task includes a set of activities to define the source, destination, schedule, advanced parameters etc. | |
| | | ● Workflow engine enables integration with future modules & 3rd Parties. | |
| | | ● Built-in replication | |
| | | ● Robust block-based RPS to RPS replication | |
| | | ● Data can be replicated to multiple RPS servers automatically, or on-demand | |
| | | ● Restart failed jobs at last block | |
| | | ● Supports cross-site replication in single plan, by setting up proxy and NAT in a Replicate task | |
| | | ● Advanced scheduling & differential retention | |
| | | ● Concurrent job support | |
| | | ● Supports compressed, encrypted & de-duplicated backups | |
| | | ● Enhanced performance & stability for RPS WAN replication (Up to 62% faster) | |

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| | | • Virtual Standby | |
| | | • Cost effective business continuity & disaster recovery | |
| | | • Periodic, image-based system, application & data | |
| | | • protection for Windows Servers & VMs | |
| | | • Supports P2V & cross-hypervisor V2V | |
| | | • Automatically converts recovery points into VHD or VMDK formats | |
| | | • Automatically registers with Hypervisor | |
| | | • Monitors production server | |
| | | • Automatic & manual failover | |
| | | • Perform end-user redirection | |
| | | • Fast, simple, agentless backup for Vmware, | |
| | | • Hyper-V and AHV host environments | |
| | | • Enables single-pass backup of all VMs, without the need to install software agents | |
| | | • Only backs up changed blocks | |
| | | • Integrates with Hyper-V, VMware and Nutanix API's (For VM discovery, events, vStorage etc.) | |
| | | • Application consistent Backup (Exchange, SQL, AD etc.) | |
| | | • transaction-log purge | |
| | | • Automatic protection of newly added VMware and Nutanix VMs | |

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| | | • Easily recover individual files & folders from within each VM | |
| | | • Centralized node, group & plan management from UDP Console | |
| | | • Instant VM & instant BMR recovery | |
| | | • Recover & power on failed Windows or Linux VM's quickly & easily, from a previous UDP recovery point | |
| | | • Minimize disruption & system downtime for business critical | |
| | | • applications, with VM recovery in as little as 2 minutes Supports instant recovery from agent-based & agentless backups, vSphere, Hyper-V, Nutanix AHV, AWS EC2, Azure | |
| | | • Supports virtual to virtual and virtual to physical restores | |
| | | • Instant BMR* enables local & remote recovery of physical machines from within the UDP console, without the need for | |
| | | • physical access to the system | |
| | | • Local & remote virtual standby | |
| | | • Periodic, image-based system, application & data protection for physical servers & VMs | |
| | | • Replicate to remote location (remote office, DR site, MSP & Cloud) | |
| | | • Run recovery point conversion into VHD, VMDK, AHV, or AWS EC2 formats at the remote site to a virtual server | |
| | | • Register with Hypervisor | |

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| | | ● Server heartbeat monitoring | |
| | | ● Automated or manual failover to remote resources. | |
| | | ● Fast, simple, efficient file copy & file archive to the cloud | |
| | | ● Copy or archive files & folders from a local RPS, or a replicated RPS, to a public/private cloud location | |
| | | ● Supports file copy with versioning, compression & encryption for security | |
| | | ● Includes advanced file/folder selection filters & scheduling options | |
| | | ● Supports Recovery Point copy to Amazon S3 blob storage volumes for off-site long-term storage of recovery points. | |
| | | ● Supports Amazon S3, S3 compatible, Windows Azure (Including Azure Zone-redundant Storage - ZRS), Azure compatible, HGST Active Archive, Fujitsu K5 & Eucalyptus-Walrus cloud platforms | |
| | | ● Easily shift on-premise backup environments to AWS EC2.or Azure | |
| | | ● Conversion of recovery points to hypervisor format | |
| | | **Windows:**<br>● Uses Virtual Standby (VSB) exclusively | |
| | | ● Highest performance; fast VM power-on; requires additional storage | |
| | | **Linux:**<br>● Users Instant Virtual Machine (IVM) exclusively | |

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| | | ● No additional storage; requires more time for VM power-on | |
| | | **With remote Recovery Point Server:**<br>● Backup optimized: full: incremental; deduplication | |
| | | ● Requires additional compute resources | |
| | | ● **Role-based administration** | |
| | | **Role-based Administration (RBAC) allows system administrators to assign different roles & access permissions (Based upon Active Directory/LDAP) to different features with the Enterprise Backup and Recovery Appliance Console, such as**: -<br>○ Backups<br>○ Nodes<br>○ Data stores<br>○ Restores<br>○ Monitoring & reporting<br>○ High Availability | |
| | | **Four pre-defined roles are provided, to minimize setup & configuration time:** ○ Backup admin ○ Monitor<br>○ Restore<br>○ RHA admin | |

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| | | **Unified reporting**<br>● Unified reporting:<br>○ Managed capacity reporting<br>○ Deduplication reporting<br>○ Detailed status reports across physical & virtual nodes<br>○ Backup size trend reporting<br>○ Virtual Standby reporting<br>○ Host-based Backup reporting<br>○ Alert reporting<br>○ SLA reporting<br>○ Dashboard view of last 7days<br>o Raw data size, actual data storage and restorable data size of all data | |
| | | ● Schedule the creation & email Distribution of reports in multiple formats (PDF, CSV, HTML). | |
| | | ● **Supported Enterprise Applications:** At least the following:<br>○ Oracle, SAP, Microsoft Exchange, ○ SharePoint, SQL Server, Sybase, ○ MySQL, MongoDB, Pivotal<br>○ Greenplum, IBM DB2, Lotus Notes,<br>○ Hypervisors: VMware, Microsoft<br>○ Hyper-V and KVM<br>○ All major file systems, including<br>○ Windows, Linux, HP-UX, AIX,<br>○ Solaris, Mac OS and more | |

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| | | ● **Capacity upgrade options:**<br>○ At least available in 12TB Increments<br>24TB, 36TB, 48TB, 60TB, 72TB, 84TB, 96TB<br>○ At least any capacity point can be ordered from the factory<br>○ At least can be upgraded to any supported capacity point in the field<br>○ At least upgrades only require license enablement (ELMS License)<br>○ At least Cloud Tier & Cloud DR are optional purchases which can be enabled in Factory or Field upgradable<br>○ Maximum expansion capacities:<br>▪ At least Active tier can be expanded to 96TB.<br>▪ At least Cloud tier can be expanded to 192TB. | |
| | | ● **Warranty**: At least 5 years warranty and on-site support and premium maintenance | |
| | | ● The delivery of goods/solutions, project implementation, documentation and acceptance must be completed within (180) calendar days from the receipt of the Notice to Proceed. | |
| | **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. | | |

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| | ● 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 | |
| | ● ISO27001: 2022 Certification (Enterprise backup) | |
| | **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 | |

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| | 4. All expenses relative to the training shall be on the account of the winning bidder | |
| | 5. Training should include the following:<br>a. Administration<br>b. Troubleshooting<br>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 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** | |
| | **A. 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 | |

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| | 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.<br>a. Product updates<br>b. Version upgrades<br>c. 24x7 technical support<br>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. | |

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| | ● 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. | |
| | **K. 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.<br>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. | |
| | **L. 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** | |
| | **1. 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. | |

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| | **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. | |

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| | 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**<br>Emergency lighting and battery packs: 2 units in the following locations:<br>● Admin Building<br>● CHSS Building<br>● CSM Building<br>● Carim Building<br>1 unit in the following locations:<br>● University Library<br>● Former HKC Building<br>● EBL Dormitory<br>● Student Dormitory<br>● Faculty and Staff Housing<br>● EBL Dormitory 2<br>● CSM Dorm Annex<br>● CARIM Phase 2<br>● CARIM Phase 3<br>● CHSS Cultural Complex<br>● SOM Building Phase 1<br>● UP Mindanao Guard<br>● Kalimudan Student Center<br>● Infirmary<br>● Coco Tissue Culture Lab Phase 1<br>● Football Stadium<br>● 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. | |

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| | 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. | |

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| | **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. | |
| | 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.<br>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 the Notice to Proceed. | |
| | **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. | |

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| | ***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:<br>1. Test equipment shall be properly calibrated with calibration certificates not more than 6 months old.<br>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.<br>3. Test equipment shall always be complete with the manufacturer's user instructions. | |
| | ***Cables and Wires***<br>1. Visual tests shall be conducted throughout the cable length.<br>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.<br>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.<br>4. Any circuits showing an insulation level (less than 50 megohms) shall be inspected and corrected.<br>5. Wiring connections shall be subjected to a final operational test after energization to ascertain and validate their installation correctness and performance. | |

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| | ***Main CB and Low Voltage MDP and Panelboards***<br>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.<br>2. Inspection shall ascertain that proper termination and management of control wiring are in order.<br>3. Check the switchboard grounding connection.<br>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.<br>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.<br>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.<br>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.<br>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. | |

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| | ***Uninterruptible Power Supply (UPS)*** – the existing UPS and UPS supplied together with the Contractor shall perform the following:<br>1. UPS full load test.<br>2. UPS battery autonomy at full load.<br>3. Load transfer test between modules (Rectifier, inverter, and Auto By-pass, and Manual By- pass).<br>4. Harmonic Measurement<br>5. Local Display accuracy check.<br>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. | |
| | 2. **MATERIALS AND METHODS** | |
| | **A. Wiring Methods**<br>**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:** | |

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| | 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**<br>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<br>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 | |
| | 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. | |

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| | All empty conduits and raceways shall be provided with #14-gauge galvanized pull wire for future use. | |
| | **C. Conduit**<br>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:<br>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<br>brown and other colors - for control wires | |
| | **D. Pull Boxes**<br>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**<br>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. | |

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| | **F. Panels and Cabinets**<br>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**<br>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 | |
| | 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. | |

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| | **H. Grounding**<br>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. | |

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| | 8. Site Inspection is required and will be provided with a site-inspection certificate. | | | | |
| | **3. ELECTRICAL MANPOWER REQUIREMENT** | | | | |
| | ● 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** : The bidder is responsible for the completeness of their proposed solution. Any additional software, server device, network 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** | **WIRES AND CABLES** | | | |
| | | 100mm2 THHN/THWN-2 Stranded Copper Wire | 300 | lm | |
| | | 38mm2 THHN/THWN-2 Stranded Copper Wire | 280 | lm | |
| | | 22mm2 THHN/THWN-2 Stranded Copper Wire | 20 | lm | |
| | | 22mm2 TW Stranded Copper Wire (G) | 80 | lm | |
| | | 14mm2 THHN/THWN-2 Stranded Copper Wire | 150 | lm | |
| | | 14mm2 TW Stranded Copper Wire (G) | 50 | lm | |
| | | 8.0mm2 TW Stranded Copper Wire | 200 | lm | |
| | | 5.5mm2 THHN/THWN-2 Stranded Copper Wire | 4 | lm | |

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| | | 3.5mm2 TW Stranded Copper Wire (G) | 4 | roll(s) | |
| | **2** | **CABLES TRAYS, CONDUITS AND ACCESSORIES** | | roll(s) | |
| | | 1/2"Ø uPVC Conduit | 40 | length | |
| | | 3/4" Ø EMT Conduit | 20 | length | |
| | | 1" Ø EMT Conduit | 50 | length | |
| | | 1 1/2" Ø EMT Conduit | 5 | length | |
| | | 1 1/2" Ø uPVC Conduit | 5 | length | |
| | | 2"Ø IMC Conduit | 35 | length | |
| | | 2"Ø uPVC Conduit | 15 | length | |
| | | 3/8" Ø Circular Loom | 1 | roll | |
| | | 2400mm x 300mm x 100mm Cable Tray w/ cover and complete accessories | 8 | length | |
| | | Fittings and Accessories | 1 | lot | |
| | **3** | **PANELBOARDS, ENCLOSED CB AND CONTROLS** | | | |
| | | **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.<br>MAIN:1-225AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 4-30AT/100AF, 10kAIC, 3P, 230V, MCCB; BRS: 2-100AT/100AF, 10kAIC, 2P, 230V, MCCB; BRS: 2-125AT/100AF, 10kAIC, 3P, 230V, MCCB;<br>BRS: 4-100AF, 2P, SPACE WITH BUS BAR EXTENSION | 1 | assy. | |

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| | | **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.<br>MAIN:1-125AT/250AF, 22kAIC, 2P, 230V, MCCB; BRS: 5-30AT/100AF, 10kAIC, 2P, 230V, MCB; BRS: 1-60AT/100AF, 10kAIC, 2P, 230V, MCB; | 1 | assy. | |
| | | PANEL "RP", 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.<br>MAIN: 2-125AT/250AF, 22kAIC, 2P, 230V, MCCB; BRS: 6-50AT/100AF, 10kAIC, 2P, 230V, MCB; | 1 | assy. | |
| | | AUTOMATIC TRANSFER SWITCH WITH TIMER MAIN: 2-40AT, 2P, 10kAIC, 230B, MCB | 1 | assy. | |
| | | 30AT, 2P, 240V, ECB, NEMA 3R ENCLOSURE (IP65) | 2 | assy. | |
| | | 40AT, 2P, 240V, ECB, NEMA 3R ENCLOSURE (IP65) | 3 | assy. | |
| | **4** | **ELECTRICAL ROOM** | | | |
| | | (ECB) 225AT, 3P, 240V, MCCB, NEMA1 ENCLOSURE, WITH SINGLE PHASING SENSOR PROTECTION, AND SURGE PROTECTION DEVICE. | 1 | assy. | |
| | **5** | **SYSTEM GROUNDING** | | | |
| | | Surge Protection Device | 1 | set/s | |
| | | 5/8" X 10ft Copper Weld Ground Rod | 3 | pcs | |
| | **6** | **Miscellaneous** | | | |
| | | Electrical Tape | 15 | rolls | |
| | | 3/8" Ø Expansion Bolt | 50 | pcs | |
| | | 1/2" Ø Metal Clamp | 120 | pcs | |
| | | 2" Ø Unistrut conduit clamp | 15 | pcs | |
| | | Rubber Tape | 5 | rolls | |

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| | | 3/8" Drill bit | 15 | pcs | |
| | | 1/2" Drill bit | 15 | pcs | |
| | | Tie Wire | 2 | kg | |
| | | Consumable & Accessories | 1 | lot | |
| | **7** | **CHSS OFFICE - ADDITIONAL POWER SUPPLY** | | | |
| | | PANEL "Q", 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.<br>MAIN:1-100AT/250AF, 22kAIC, 3P, 230V, MCCB; BRS: 4-40AT/100AF, 10kAIC, 2P, 230V, MCB; BRS: 6-20AT/100AF, 10kAIC, 2P, 230V, MCB; | 1 | assy. | |
| | | Wiring and Rough Ins INCLUDED | 1 | lot | |
| | **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;<br>BRS: 4-30AT/100AF, 10kAIC, 2P, 230V, MCB; BRS: 6-30AT/100AF, 10kAIC, 2P, 230V, MCB; | 1 | assy. | |
| | | Wiring and Rough Ins INCLUDED | 1 | lot | |
| | **9** | **Emergency Lighting Fixtures and associated battery packs** | 22 | set/s | |
| | | **TECHNICAL DATA**<br>Housing: Injection-molded thermoplastic housing Wattage: 2 x 1w<br>Lamp type: LED<br>Battery Pack: at least Ni-cad 3.6V 1.0Ah Rated Duration: at least 2 hours<br>Rated Average Life: at least 10,000 hours Power Supply: 220-240V 50/60Hz<br>at least IP Rating IP 50.<br>Universal back plate for quick hook-up. | | | |

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| | | **INSTALLATION**<br>Includes Wall mounted installation and testing of electrical components and requirements. | | | |
| | **10** | **PACU** | | | |
| | | **INROW SPLIT INDOOR INVERTER AIR COOLED** | 1 | lot | |
| | | Total Cooling-kW: at least 51.2 Air Volume-m3/h: at least 10,000<br>Mount Type: at least Row<br>Must be compatible with R410A refrigerant. Power Input: at least 200-230V/50-60Hz/3Ph | | | |
| | | ● At least Air cooled, row mount, split type | | | |
| | | ● 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. | | | |
| | | ● Precision cooling controller monitors and protects the unit constantly. Easy to be integrated into BMS to display, control and manage the system. | | | |
| | | ● R410A green refrigerant is highly efficient and has no ODP. | | | |
| | | ● Copper piping adopts quick connections and supports bottom and top connections. | | | |
| | | ● Easy to change G4 air filter and sealed doors help to build a clean and quiet MDC | | | |
| | | ● Slide drawer style electric box makes service easier. | | | |
| | | ● With condensate pump, leaking kit and long piping kit for diverse applications. | | | |
| | | ● At least EC Fan modulates airflow precisely matching heat load while saving energy by adjusting fan speed. | | | |

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| | | ● at least with a Smart Controller- an Intelligent controller automatically monitoring and adjusting the components outputs in the optimized balance. | | | |
| | | ● at least Electronic Expansion Valve EEV (electronic expansion valve) precisely maintain the refrigerant flow in the efficient way reducing the compressor/pump power consumption. | | | |
| | | ● Reliable Compressor - Inverter compressor adjusting capacity of whole system per heat load requirement, saving energy during part load application. | | | |
| | | - 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 Server Cabinet** | 1 | set/s | |

| | | | | | |
|---|---|---|---|---|---|
| | | • Cabinet shall consist of a welded and assembled steel frame construction available in 600mm widths, 1200mm depths and 42 RU heights. Cabinet shall include front single hinge door and split hinged rear doors with 80% open perforation, horizontally split locking side panels, include 1 set of PDU mounting bracket and casters. Fully adjustable front and rear cage nut equipment rails. The top of cabinet includes brush cable entry points to prevent air leakage. The entire cabinet shall be electrically bonded without the use of bonding wires. Cabinet shall have a 1588 kg (3500 lbs.) static load rating and 454 kg (1000 lbs.) rolling load rating. | | | |
| | | • Doors with 170 degree open angle when bayed to minimize aisle obstruction. | | | |
| | | • Cabinet includes all the essential features to improve cabinet deployment. Leveling legs, caster, ganging brackets and floor mounting brackets are all included with every cabinet. | | | |
| | | • Include finger kits, vertical cable management panels and front-to-back cable managers available to organize cables routed throughout the cabinet. | | | |
| | | • Cabinets and accessories are integrally bonded without the use of grounding wires to provide a safe and reliable network while reducing installation costs. | | | |
| | | • Cabinets are powder coated in a durable, low maintenance polyester epoxy paint available in Black | | | |
| | | • Compliance:EIA/ECA-310-E, TIA/EIA-942, UL2416Compliance:EIA/ECA-310-E, TIA/EIA-942, UL2416 | | | |
| | | • Material: Steel with durable Black or White polyester epoxy powder coat finish | | | |
| | | • Mounting and Positioning of Cabinets and PDU | | | |
| | | • Support Angled Patch Panel | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | **All cabinets include:** | | | |
| | | ● Single hinged front and split rear perforated doors with 80% perforation | | | |
| | | ● Side panels | | | |
| | | ● Fully adjustable front and rear cage nut equipment rails | | | |
| | | ● 1 set of PDU mounting brackets | | | |
| | | ● Heavy-duty leveling legs | | | |
| | | ● Casters | | | |
| | | ● Ganging brackets | | | |
| | | ● Standard floor mounting brackets | | | |
| | | ● 25 each M6 cage nuts and screws | | | |
| | | ● PDU Mounting Brackets- | | | |
| | | ● Vertical Cable Manager Panels - Tool-less panel for cable management. Accepts D-Rings; S1DR, S2DR and L-Rings; S1LR, S2LR. | | | |
| | | ● Cable Management Finger with Mounting Brackets (Long (6 in.)) for complete left side and for complete right side | | | |
| | | ● Cable Management Finger with Mounting Brackets (Long (6 in.)) for complete left side and for complete right side | | | |
| | | ● Air Dam Seal Kits - Provides a complete seal between outer perimeter of equipment rail and side panels, top cap and floor. | | | |
| | | ● Mounting and Positioning of Cabinets and PDU | | | |
| | | ● All cabinets must be the same brand of the existing Cabinets in the main Data Center which is PANDUIT to conform to uniformity and compatibility with the existing accessories | | | |

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| | | **Rack PDU Switched designed and compatible for the included 42U Perforated Server Cabinet** | **2** | **set/s** | |
| | | ● At least 2 units of PDUs for each rack are included. Installation and configuration of PDUs to the different power sources are included. | | | |
| | | ● at least VERTICAL PDU at least (28) C13, (4) C19, 220-250v, 30amp, (METERED), 2-meter long wire with input plug C309 | | | |
| | | ● Each PDU should have at least 32 number of outlets((28)C13, (4)C19) and should be compatible with the 42ru cabinet in this Term of Reference. Input Plug of the PDU should be compatible with the new and existing UPS. | | | |
| | | ● Mounting and Positioning of Cabinets and PDU | | | |
| | | ● **Must be compatible with the included 42U Network Server Cabinet and UPS included in the Terms of Reference** | | | |
| | | ● at least Mounting position: Vertical | | | |
| | | ● must be compatible with the included online UPS 10KVA in terms of their interfacing | | | |
| | | **UPS 10kVA/10kW(2U) On-Line UPS with Rail Kit** | **1** | **lot** | |
| | | ● must be compatible with the included metered PDU in terms of 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 | | | |

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| | | ● 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. | | | |
| | | ● must be compatible with the included PDU and 42U Perforated Server Cabinet | | | |
| | | ● 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 | | | |
| | **12** | **Network/FIber/Telco Rack and UPS** | | | |
| | | 42U Perforated Network Cabinet | 1 | set/s | |
| | | ● Cabinet shall consist of a welded and assembled steel frame construction available in 800mm widths, 1200mm depths and 42 RU heights. Cabinet shall include front single hinge door and split hinged rear doors with 80% open perforation, horizontally split locking side panels, include 1 set of PDU mounting bracket and casters. Fully adjustable front and rear cage nut equipment rails. The 800mm wide cabinet should come with provisions for front or rear cable management fingers and brackets that should be included as an accessory. The 800mm wide cabinet includes (4) 19" 1 RU covered openings for pass through. The top of the cabinet includes brush cable entry points to prevent air leakage. The entire cabinet shall be electrically bonded without the use of bonding wires. Cabinet shall have a 1588 kg (3500 lbs.) static load rating and 454 kg (1000 lbs.) rolling load rating. | | | |
| | | ● Doors with 170 degree open angle when bayed to minimize aisle obstruction. | | | |
| | | ● Cabinet includes all the essential features to improve cabinet deployment. Leveling legs, caster, ganging brackets and floor mounting brackets are all included with every cabinet. | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | ● Include finger kits, vertical cable management panels and front-to-back cable managers available to organize cables routed throughout the cabinet. | | | |
| | | ● Cabinets and accessories are integrally bonded without the use of grounding wires to provide a safe and reliable network while reducing installation costs. | | | |
| | | ● Cabinets are powder coated in a durable, low maintenance polyester epoxy paint available in Black | | | |
| | | ● Compliance:EIA/ECA-310-E, TIA/EIA-942, UL2416Compliance:EIA/ECA-310-E, TIA/EIA-942, UL2416 | | | |
| | | ● Material: Steel with durable Black or White polyester epoxy powder coat finish | | | |
| | | ● Mounting and Positioning of Cabinets and PDU | | | |
| | | ● Support Angled Patch Panel<br>**All cabinets include:** | | | |
| | | ● Single hinged front and split rear perforated doors with 80% perforation | | | |
| | | ● Side panels | | | |
| | | ● Fully adjustable front and rear cage nut equipment rails | | | |
| | | ● 1 set of PDU mounting brackets | | | |
| | | ● Heavy-duty leveling legs | | | |
| | | ● Casters | | | |
| | | ● Ganging brackets | | | |
| | | ● Standard floor mounting brackets | | | |
| | | ● 25 each M6 cage nuts and screws | | | |
| | | ● PDU Mounting Brackets- | | | |

| | | | | | |
|---|---|---|---|---|---|
| | | ● Vertical Cable Manager Panels - Tool-less panel for cable management. Accepts D-Rings; S1DR, S2DR and L-Rings; S1LR, S2LR. | | | |
| | | ● Cable Management Finger with Mounting Brackets (Long (6 in.)) for complete left side and for complete right side | | | |
| | | ● Cable Management Finger with Mounting Brackets (Long (6 in.)) for complete left side and for complete right side | | | |
| | | ● Air Dam Seal Kits - Provides a complete seal between outer perimeter of equipment rail and side panels, top cap and floor. | | | |
| | | ● Front-to-Back Cable Management Trough | | | |
| | | ● Mounting and Positioning of Cabinets and PDU | | | |
| | | ● **All cabinets must be the same brand of the existing Cabinets in the main Data Center which is PANDUIT to conform to uniformity and compatibility with the existing accessories** | | | |
| | | **Rack PDU Switched designed and compatible for the included 42U Perforated Server Cabinet** | **2** | **set/s** | |
| | | ● At least 2 units of PDUs for each rack are included. Installation and configuration of PDUs to the different power sources are included. | | | |
| | | ● at least VERTICAL PDU at least (28) C13, (4) C19, 220-250v, 30amp, (METERED), 2-meter long wire with input plug C309 | | | |
| | | ● Each PDU should have at least 32 number of outlets((28)C13, (4)C19) and should be compatible with the 42ru cabinet in this Term of Reference. Input Plug of the PDU should be compatible with the new and existing UPS.UPS. | | | |
| | | ● Mounting and Positioning of Cabinets and PDU | | | |

| | | | | | |
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| | | ● must includes the corresponding power cables(at least 3 meters) equal to the number of each corresponding outlets and the power cables plug type must corresponds to the type of outlets | | | |
| | | ● must be compatible with the included 42U Network Server Cabinet and UPS included in the Terms of Reference | | | |
| | | ● at least Mounting position: Vertical | | | |
| | | ● must be compatible with the included online UPS 10KVA in terms of their interfacing | | | |
| | | **UPS 10kVA/10kW(2U) On-Line UPS with Rail Kit** | **1** | **lot** | |
| | | ● must be compatible with the included metered PDU in terms of 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. | | | |
| | | ● must be compatible with the included PDU and 42U Perforated Server Cabinet | | | |
| | | ● 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 | | | |

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| | **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.*<br>*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:<br>❖ Scope of Work<br>❖ Project Organization<br>❖ Implementation Methodology<br>❖ Project Timeline<br>❖ Communication and Deployment Strategy<br>❖ 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: Main Data Center and CSM Buildings SOL AND SLD | |

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| | ● Annex D: IT Data Center Main Power Route | |
| | ● Annex E: HCI and Enterprise Backup Power Layout Network Diagram | |
| | ● Annex F: Data Center Perspective | |
| | **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 | |

| | | |
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| | ■ 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. | |
| | ○ All warranty periods in this project should take effect after the Final Acceptance by the Procuring Entity and the bidder should provide warranty and must shoulder the cost of the warranty during the project implementation and any delay period. | |
| | **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. | |
| | ● Procedural documentation and guide/manual, Detailed User and Administrative Manual will be verified and tested by resetting the equipment to the factory default and then following the configuration and setup in those documents and Technical Manuals. | |

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| | ● 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** | |
| | ● Procedural documentation and manual as prescribed by the client | |
| | ● As built documents and Complete As-Built Drawings | |
| | ● Complete Set of Technical Specifications | |
| | ● Infrastructure Diagrams and Topology | |
| | ● Troubleshooting and Installation Guides | |
| | ● Single Line Diagram | |
| | ● System/Operation Manual | |
| | ● Operations & Maintenance Manuals | |
| | ● Detailed User and Administrative Manual as prescribed by the client | |
| | ● Warranties | |
| | ● Commissioning and systems testing reports. | |
| | ● Project submittals and shop drawings | |
| | ● Documentation and Tagging Summary | |
| | **Operational Manuals** | |
| | ● User Manuals (for Operations) | |
| | ● Disaster recovery Plan | |
| | **D. TRAINING AND TECHNOLOGY TRANSFER** | |

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| | ● Supply, Delivery, Installation, Testing and Commissioning shall be within two hundred seventy (180) calendar days from the receipt of the Notice to Proceed. | |
| | ● 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**<br>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** | |

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| | **A. PRE-BID SITE INSPECTION** | |
| | The providers should conduct a pre-bid site inspection so they could assess the needs of the end users.<br>Actual Site Inspection Details:<br>Date and Time: 9AM-4PM (Weekdays only) Contact Person:<br>Mr. Bob Navarrete 09096651958<br>bsnavarrete@up.edu.ph Meet-up location: | |
| | ITO, G/F Administration Building, UP Mindanao, Mintal, Davao City Safety Protocols: must wear a face mask<br>Site Inspection Certificate will be issued by the ITO.<br>*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.<br>Submit the corresponding reports of the testing conducted.<br>● The winning bidder must provide detailed documentation of the step by step configurations, user guides and troubleshooting. The end-user will test the correctness documentation by resetting and factory reset all equipment involved in the project configuration and implementing again the configuration from the documentation to ensure it's correctness, completeness and it is working. | |

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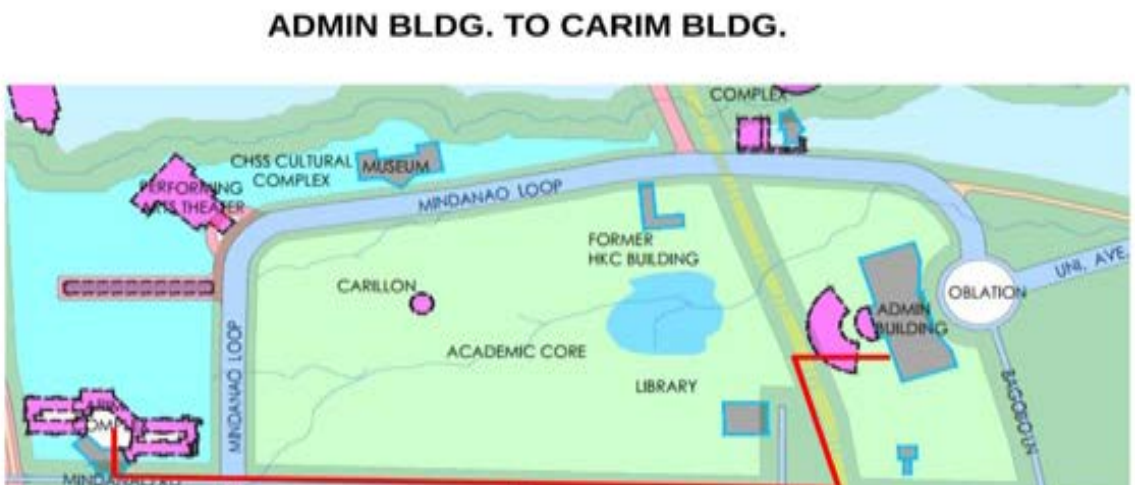
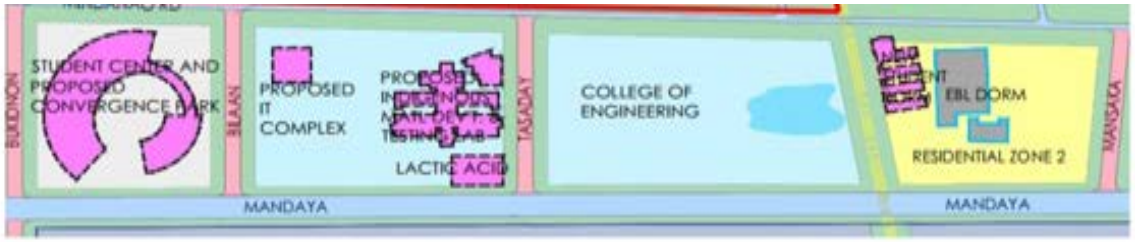
| | **C. ACCEPTANCE**<br>A certificate of acceptance for any of the bid items shall be issued by UPMin only after completion of the scope of work and compliance to all the requirements.<br>**Project Implementation Weight Distribution**<br>a. 30% Supply and Delivery of the Equipment<br>b. 30% Installation/Labor and Engineering/Setup and Configurations<br>c. 15% Testing<br>d. 10% Documentation<br>e. 15% Testing/Verification of the Procedural Documentation/Quality Assurance/Knowledge Transfer/Training | |
| | **XI. 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. | |

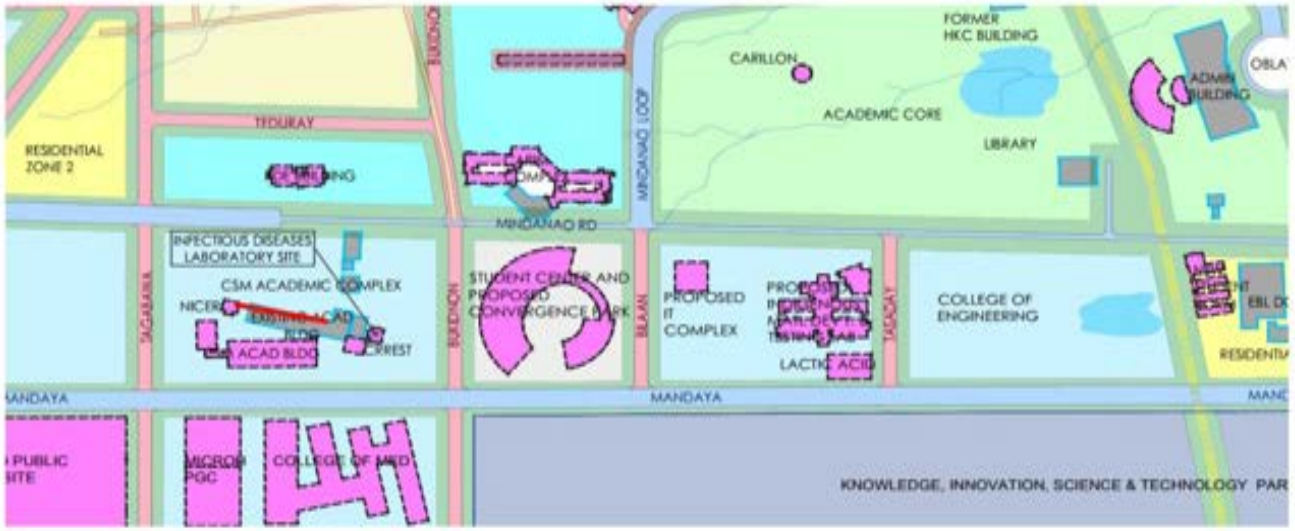
## Annex A: UP Mindanao Site Plan





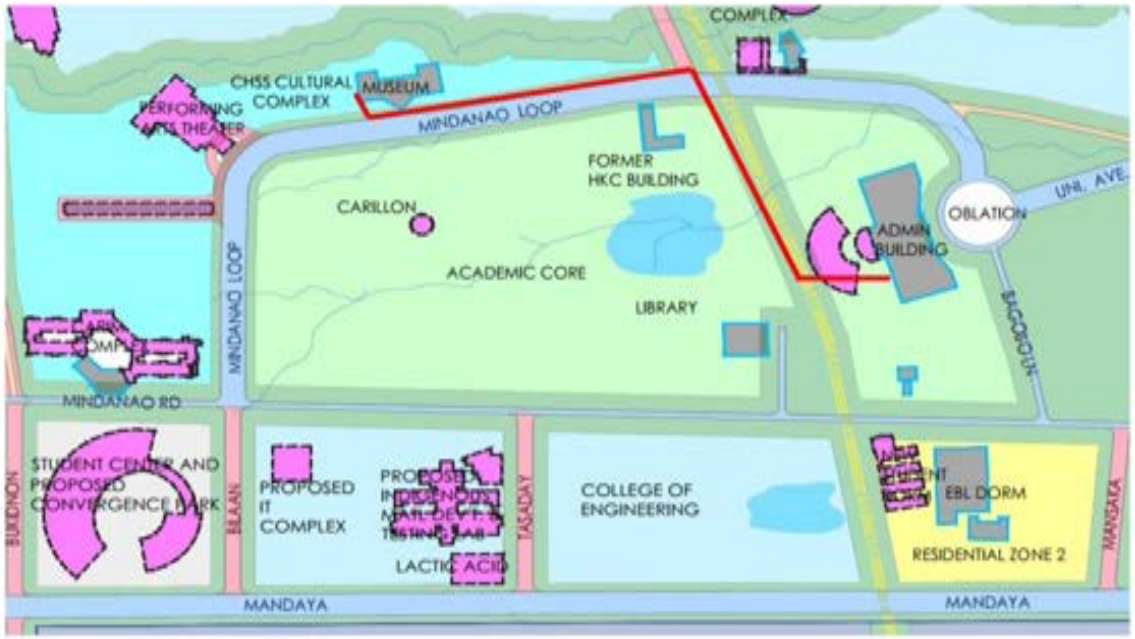

**8-CORE FOC SM**
*Aerial installation Using existing poles*

## CSM TO NICER BLDG.




**8-CORE FOC SM**
*Aerial installation Using existing poles*

## ADMIN BLDG. TO CHSS CULTURAL COMPLEX.




**8-CORE FOC SM**
*Aerial installation Using existing poles*

## ADMIN BLDG. TO STUDENT DORMITORY BLDG.


**8-CORE FOC SM**
*Aerial installation Using existing poles*

## ADMIN BLDG. TO FACULTY AND STAFF HOUSING


**8-CORE FOC SM**
*Aerial installation Using existing poles*

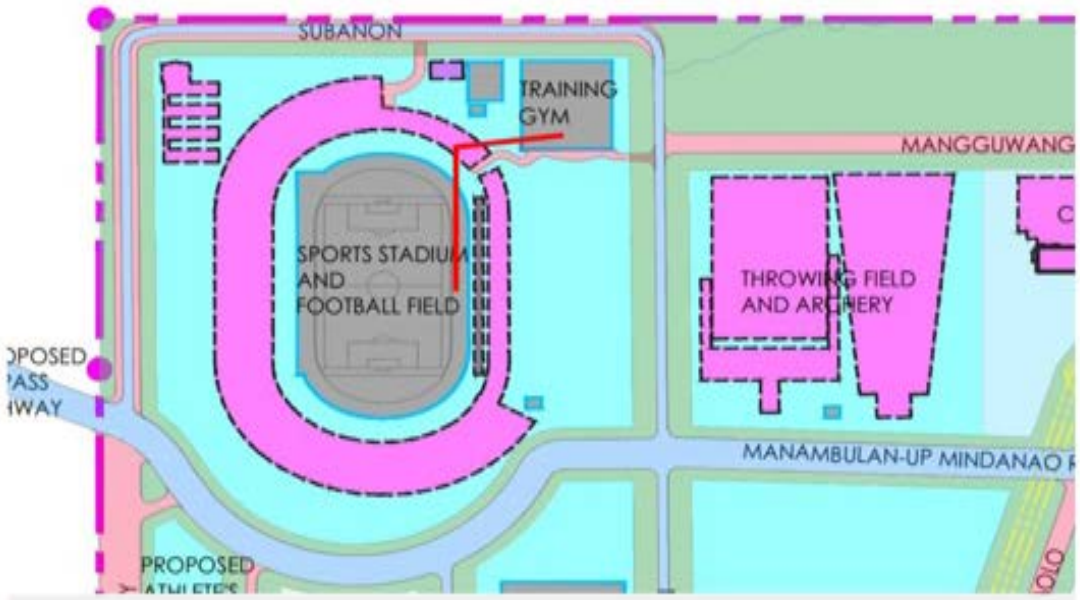
## OLD DATA CENTER TO NEW DATA CENTER


24 -CORE FOC SM

## ADMIN BLDG. TO FOOTBALL STADIUM

12 -CORE FOC SM
*Aerial installation Using existing poles*

**ADMIN BLDG. TO FOOTBALL STADIUM**




8 -CORE FOC SM
*Aerial installation Using existing poles*

## Annex B: Fiber (TIA) Field Test Specification

*This document was prepared to aid consultants or engineers in developing contractual specifications covering the testing*

*of duplex fiber optic cabling installations. It is offered as a general guide. Suitability for any intended use is the responsibility of the user.*

**SECTION 27 17 00**

**TESTING, IDENTIFICATION AND ADMINISTRATION OF FIBER INFRASTRUCTURE**

**PART 1** - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, tools, field-test instruments and equipment required for the complete testing, identification and administration of the work called for in the Contract Documents.

B. In order to conform to the overall project event schedule, the cabling contractor shall survey the work areas and coordinate cabling testing with other applicable trades.

C. In addition to the tests detailed in this document, the contractor shall notify the Owner or the Owner's representative of any additional tests that are deemed necessary to guarantee a fully functional system. The contractor shall carry out and record any additional measurement results at no additional charge.

1.2 SCOPE

A. This Section includes the minimum requirements for the test certification, identification and administration of backbone and horizontal optical fiber cabling.

B. This Section includes minimum requirements for:

1. *Fiber optic test instruments*
2. *Fiber optic testing*
3. *Identification*

a) Labels and labeling

4. *Administration*

a) Test results documentation

b) As-built drawings

C. Testing shall be carried out in accordance with this document. This includes testing the attenuation and polarity of the installed cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber end faces shall also be verified.

D. Testing shall be performed on each cabling link (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is identified by the owner.

1. *Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.*

F. All tests shall be documented including OLTS dual wavelength attenuation measurements and OTDR traces

with event tables as well as OTDR maps.

1. *Optionally, documentation shall also include optical length measurements and pictures of the connector end face.*

1.3 QUALITY ASSURANCE

A. All testing procedures and field-test instruments shall comply with applicable requirements of:

1. *ANSI Z136.2, ANS For Safe Use Of Optical Fiber Communication Systems Utilizing Laser Diode And LED Sources*
2. *ANSI/TIA52614-C, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant with full OTDR descriptions*
3. *ANSI/TIA5267-A, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant*
4. *TIA-TSB-4979, Practical Considerations for Implementation of Multimode Launch Conditions in the Field*
5. *ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises*
6. *ANSI/TIA-568.3-D, Optical Fiber Cabling and Components Standard*
7. *ANSI/TIA-606-B, Administration Standard for Commercial Telecommunications Infrastructure, including the requirements specified by the customer, unless the customer specifies their own labeling requirements*

B. Trained technicians who have successfully attended an appropriate training program, which includes testing with an OLTS and an OTDR and have obtained a certificate as proof thereof shall execute the tests. These certificates may have been issued by any of the following organizations or an equivalent organization:

1. *Manufacturer of the fiber optic cable and/or the fiber optic connectors.*
2. *Manufacturer of the test equipment used for the field certification or representative.*
3. *Training organization e.g. BICSI*

C. The Owner or the Owner's representative shall be invited to witness and/or review field-testing.

1. *The Owner or the Owner's representative shall be notified of the start date of the testing phase five (5) business days before testing commences.*
2. *The Owner or the Owner's representative will select a random sample of 5% of the installed links. The Owner or the Owner's representative shall test these randomly selected links and the results are to be stored in accordance with Part 3 of this document. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the representative shall repeat*

*100% testing at no cost to the Owner.*

1.4 SUBMITTALS

A. Manufacturers catalog sheets and specifications for fiber optic field-test instruments including optical loss test sets (OLTS; power meter and source), optical time domain reflectometer (OTDR) and video microscope.

B. A schedule (list) of all optical fibers to be tested.

C. Sample test reports.

1.5 ACCEPTANCE OF TEST RESULTS

A. Unless otherwise specified by the Owner or the Owners representative, each cabling link shall be in compliance with the following test limits:

1. *Optical loss testing*

a) Multimode and Singlemode links

1) The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA- 568.3-D.

(i) Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)

(ii) Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)

(iii) Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)

(iv) Maximum allowable connector_loss = 0.75 dB

*Check your application limits, you may need to reduce the allowable connector loss here*

***The project required*** **Maximum allowable connector_loss =**

**0.45 dB**

(v) Use of Reference Grade connectors in Test Reference Cords.

*Test Reference Cords shall use Reference Grade connectors and the mated loss budget value (first and last) for these cords for Multimode shall be 0.50 dB and for Single-Mode shall be 0.50 dB.*

(vi) Splice_Attn (dB) = number_of_splices * splice_loss (dB)

(vii) Maximum allowable splice_loss = 0.3 dB

*Check your application limits, you may need to reduce the allowable connector loss here*

***The project required*** **Maximum allowable splice_loss = 0.1 dB**

(viii) The values for the Attenuation_Coefficient (dB/km) are listed in the table below:

*Your cable may perform better than this, check the datasheet from the vendor and insert values here if desired*

| Type of Optical Fiber | Wavelength (nm) | Attenuation | Wavelength | Atten |
|---|---|---|---|---|
| Multimode 62.5/125 µm | 850 | 3.5 | 1300 | 1.5 |
| Multimode 50/125 µm | 850 | 3.0 | 1300 | 1.5 |
| Single-mode (Inside plant) | 1310 | 1.0 | 1550 | 1.0 |
| Single-mode (Outside plant) | 1310 | 0.5 | 1550 | 0.5 |

2. *OTDR testing*

a) Reflective events (connections) shall not exceed: *Check your application limits, you may need to reduce the allowable connector loss/reflectance here*

1) 0.75 dB in optical loss when bi-directionally averaged

***The project required the*** **0.45 dB in optical loss when bi- directionally averaged**

2) -35 dB Reflectance for multimode connections

3) -40 dB reflectance for UPC singlemode connections

4) -55 dB reflectance for APC singlemode connections

b) Non-reflective events (splices) shall not exceed 0.3 dB.

*Check your application limits, you may need to reduce the allowable splice loss here*

***The project required the*** **Non-reflective events (splices) shall not exceed 0.1 dB.**

3. *Magnified end face inspection*

a) Fiber connections shall be visually inspected to IEC 61300-3-35 Edition 2.0 for end face quality.

b) Scratched, pitted or dirty connectors shall be diagnosed and corrected.

B. All installed cabling links and channels shall be field-tested and pass the test requirements and analysis as described in Part 3. Any link or channel that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all

links and channels shall be provided in the test results documentation in accordance with Part 3.

C. Acceptance of the test results shall be given in writing after the project is fully completed and tested in accordance with Contract Documents and to the satisfaction of the Owner.

Note: High Bandwidth applications such as 10GBASE-SR, FC1200, and 40GBASE-SR4 impose stringent channel loss limits. Where practical, certification should consider loss length limits that meet maximum channel (transmitter to receiver) loss. 0.75 dB per connector pair loss may not support the intended application.

D. Performance specification for multimode fiber links at 850 nm.

| Fiber Type | | Bandwi | 10GBASE-SR | | FibreChannel 1200- | | 40GBASE-SR4 | |
|---|---|---|---|---|---|---|---|---|
| | µm | (MHz• | Length (m) | Loss (dB) | Lengt | Loss (dB) | Length | Loss |
| OM1 | 62.5 | 200 | 33 | 2.5 | 33 | 2.4 | N/A | N/A |
| OM2 | 50 | 500 | 82 | 2.3 | 82 | 2.2 | N/A | N/A |
| OM3 | 50 | 2000 | 300 | 2.6 | 300 | 2.6 | 100 | 1.9 |
| OM4 | 50 | 4700 | 400 | 2.9 | N/A | N/A | 150 | 1.5 |
| OM5 | 50 | 4700 | 400 | 2.9 | N/A | N/A | 150 | 1.5 |

**PART 2** - PRODUCTS

2.1 OPTICAL FIBER CABLE TESTERS

A. The field-test instrument shall be within the calibration period recommended by the manufacturer and a copy of the calibration certificate made available.

B. Optical loss test set (OLTS)

1. *Multimode optical fiber light source*

a) Provide dual LED light sources with central wavelengths of 850 nm (±30 nm) and 1300 nm (±20 nm). VCSEL sources are not permitted per ANSI/TIA-526-14-C.

b) Output power of –20 dBm minimum.

c) The launch shall meet the Encircled Flux launch requirements of ANSI/TIA526-14-C.

d) The test reference cords must demonstrate an insertion loss ≤ 0.15 dB when mated against each other, and this test shall be stored and delivered with the other test results.

e) Acceptable manufacturers

1) Fluke Networks

2. *Singlemode optical fiber light source*

a) Provide dual laser light sources with central wavelengths of 1310 nm (±20 nm) and 1550 nm (±20 nm).

b) Output power of –10 dBm minimum.

c) The test reference cords must demonstrate an insertion loss ≤ 0.25 dB when mated against each other, and this test shall be stored and delivered with the other test results.

d) Acceptable manufacturers

1) Fluke Networks

3. *Power Meter*

a) Provide 850 nm, 1300 nm, 1310 nm, and 1550 nm wavelength test capability.

b) Power measurement uncertainty of ± 0.25 dB.

c) Store reference power measurements.

d) Save at least 10,000 results to internal memory.

e) PC interface (USB).

f) Acceptable manufacturers

1) Fluke Networks

4. *Optional length measurement*

a) It is preferable to use an OLTS that is capable of measuring the optical length of the fiber using time-of-flight techniques.

C. Optical Time Domain Reflectometer (OTDR)

1. *Shall have a bright, color LCD display with backlight.*

2. *Shall have rechargeable Li-Ion battery for 8 hours of normal operation.*

3. *Weight with battery and module of not more than 4.5 lb and volume of not more 200 in³.*

4. *Internal non-volatile memory with capacity for storing at least 2,000 OTDR bi-directionally tested fiber links.*

5. *USB port to transfer data to a PC or thumb drive/memory stick.*

6. *Multimode OTDR*

a) Wavelengths of 850 nm (± 10 nm) and 1300 nm (+ 35 nm / - 15 nm).

b) Event dead zones not to exceed 0.7 m at 850 nm and 1300 nm.

c) Attenuation dead zones not to exceed 2.5 m at 850 nm and 4.5 m at 1300 nm.

d) Distance range not less than 9,000 m.

e) Dynamic range at least 28 dB for 850 nm and 30 dB at 1300 nm.

f) Allow bi-directional testing without moving the OTDR to the far end.

g) Perform on-board bi-directional averaging.

7. *Singlemode OTDR*

a) Wavelengths of 1310 nm (± 25 nm) and 1550 nm (± 30 nm).

b) Event dead zones not to exceed 0.6 m at 1310 nm and 1550 nm.

c) Attenuation dead zones not to exceed 3.7 m at 1310 nm and 1550 nm.

d) Distance range not less than 80 km at 1310 nm and 130 km at 1550 nm.

e) Dynamic range at least 32 dB for 1310 nm and 30 dB at 1550 nm.

f) Allow bi-directional testing without moving the OTDR to the far end.

g) Perform on-board bi-directional averaging.

8. *Acceptable manufacturers*

a) Fluke Networks

D. Fiber Microscope

1. *Field of view 420 µm x 320 µm*

a) Video camera systems are preferred.

b) Camera probe tips that permit inspection through adapters are required.

c) Test equipment shall be capable of saving and reporting the end face image to IEC 613003-3-35.

2. *Acceptable manufacturers*

a) Fluke Networks

E. Integrated OLTS, OTDR and fiber microscope

1. *Test equipment that combines into one instrument an OLTS, an OTDR and a fiber microscope may be used.*

2. *Acceptable manufacturers*

a) Fluke Networks

A. Labels

2.2 IDENTIFICATION

1. *Shall meet the legibility, defacement, exposure and adhesion requirements of UL 969.*

2. *Shall be preprinted using a mechanical means of printing (e.g., laser printer).*

3. *Where used for cable marking, provide vinyl substrate with a white printing area and a clear "tail" that self laminates the printed area when wrapped around the cable. If cable jacket is white, provide cable label with printing area that is any other color than white, preferably orange or yellow – so that the labels are easily distinguishable.*

4. *Where insert type labels are used provide clear plastic cover over label.*

5. *Provide plastic warning tape 6 inches wide continuously printed and bright colored 18" above all direct buried services, underground conduits and duct-banks.*

6. *Acceptable Manufacturers:*

a) Panduit

b) Silver Fox

c) W.H. Brady

d) d-Tools

e) Brother

f) Dymo

g) Epson

2.3 ADMINISTRATION

A. Administration of the documentation shall include test results of each fiber link and channel.

B. The test result information for each link shall be recorded in the memory of the field-test instrument upon completion of the test.

C. The test result records saved within the field-test instrument shall be transferred into a Windows™-based and/or cloud-based database utility that allows for the maintenance, inspection and archiving of these test records.

**PART 3** – EXECUTION

3.1 *GENERAL*

A. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.

B. All outlets, cables, patch panels and associated components shall be fully assembled and labeled prior to field-testing. Any testing performed on incomplete systems shall be redone on completion of the work.

3.2 *OPTICAL FIBER CABLE TESTING*

A. Field-test instruments shall have the latest software and firmware installed.

B. Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC and/or a cloud-based service in which the administrative documentation (reports) may be generated.

C. Fiber end faces shall be inspected using a video scope with a field of view not less than 425 µm x 320 µm.

1. *It is preferable that the end face images be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.*

D. Testing shall be performed on each cabling segment (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner's instructions.

F. Testing of the cabling shall be performed using high-quality test reference cords of the same core size as the cabling under test, terminated with reference grade connectors. Reference grade connectors are defined as having a loss not exceeding 0.1 dB for multimode and 0.2 dB for singlemode. The test reference cords for OLTS testing shall be between 2 m and 5 m in length. The length of the launch and tail fibers for multimode OTDR testing shall be at a least 100 m (328 ft.). For singlemode, the length of the launch and tail fibers will depend on the link under test. As a guide, the following table can be used for determining the length of the launch and tail fibers.

| Maximum Length of Link (km) | | Typical Pulse Width (ns) | Minimum Laun ch and Tail Cord Lengt h |
|---|---|---|---|
| 1310 nm | 1550 nm only | | |

| | | | |
|---|---|---|---|
| 0 to 35 | 0 to 50 | ≤ 1,000 | 160 |
| 35 to 45 | 50 to 65 | 3,000 | 400 |
| 45 to 50 | 65 to 75 | 10,000 | 1,000 |
| ≥ 50 | ≥ 75 | 20,000 | 2400 |

G. Optical loss testing

1. *Horizontal/Backbone link*

a) Multimode links shall be tested in one direction at 850 nm and 1300 nm in accordance with

ANSI/TIA-526-14-C, one-cord reference method, with an Encircled Flux compliant launch.

b) Singlemode backbone links shall be tested in one direction at 1310 nm and 1550 nm in accordance with ANSI/TIA-526-7-A, Method A.1 (One-cord reference method).

c) Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

H. OTDR Testing

1. *Fiber links shall be tested at these wavelengths for anomalies and to ensure uniformity of cable*

*attenuation, connector insertion loss and reflectance.*

a) Multimode: 850 nm and 1300 nm.

b) Singlemode: 1310 nm and 1550 nm.

2. *Each fiber link and channel shall be tested in both directions.*

a) The launch and tail fibers shall remain in place for the measurement in the opposite direction –

failing to do so will result in an increase in measurement uncertainty.

b) The use of a loop back fiber at the far end with a tail fiber at the near end on the adjacent fiber is permitted for bi-directional testing, so long as the OTDR is able to split the trace automatically into two traces for the two fibers under test.

3. *A launch cable shall be installed between the OTDR and the first link connection.*

4. *A tail cable shall be installed after the last link connection.*

I. Magnified End face Inspection

1. *Fibers shall be inspected using a video scope with a minimum field of view 425 µm x 320 µm to IEC*

*61300-3-35 Edition 2.0. The following test limits shall be used:*

a) Multimode connectors; Table 6 of IEC 61300-3-35 Edition 2.0

b) Singlemode field polished connectors; Table 5 of IEC 61300-3-35 Edition 2.0

c) Singlemode factory polished connectors; Table 3 of IEC 61300-3-35 Edition 2.0

d) Angled Physical Contact (APC) connectors; Table 4 of IEC 61300-3-35 Edition 2.0

J. Length Measurement

1. *The length of each fiber shall be recorded.*

2. *It is preferable that the optical length be measured using an OLTS or OTDR.*

K. Polarity Testing

1. *Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with Clause E.5.3 of ANSI/TIA568.3D. The polarity of the paired duplex fibers shall be verified using an OLTS.*

3.3 *IDENTIFICATION*

A. Labeling

1. *Labeling shall conform to the requirements specified within ANSI/TIA-606-B or to the requirements specified by the Owner or the Owner's representative.*

3.4 *ADMINISTRATION*

A. Test results documentation

1. *Test results saved within the field-test instrument shall be transferred into a Windows™-based and/or cloud-based database utility that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC or cloud unaltered, i.e., "as saved in the field-test instrument". The following formats do not provide adequate protection of these records and shall not be used.*

a) Portable document format (PDF)
b) Word (.doc & .docx)
c) Comma separated values (.csv)
d) Excel separated values (.xls & .xlsx)
e) Text (.txt)

2. *The test results documentation shall be available for inspection by the Owner or the Owner's representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of asbuilt information.*

3. *The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered in an electronic format or, preferably through a cloud-based service, prior to Owner acceptance of the building in the original format used by the cabling vendors' software.*

4. *Circuit IDs reported by the test instrument should match the specified label ID (see 3.3 of this Section).*

5. *The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information*

a) The identification of the customer site as specified by the end-user.
b) The name of the test limit selected to execute the stored test results.

c) The name of the personnel performing the test.

d) The date and time the test results were saved in the memory of the tester.

e) The manufacturer, model and serial number of the field-test instrument.

f) The version of the test software and the version of the test limit database held within the test instrument.

g) The fiber identification number.

h) The length for each optical fiber.

i) The index of refraction used for length calculation when using length capable OLTS.

j) The backscatter coefficient of the fiber under test when using an OTDR.

k) Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).

l) Test results to include OTDR link and channel traces, event tables at the appropriate wavelength(s) and a map of the link tested.

m) The length for each optical fiber as calculated by the OTDR.

n) The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements

o) Optional

1) A picture or image of each fiber end-face

2) A pass/fail status of the end-face using IEC 61300-3-35 Edition 2.0

B. Record copy and as-built drawings

1. *Provide record copy drawings periodically through out the project as requested by the Construction Manager or Owner, and at end of the project on CD/DVD. Record copy drawings at the end of the project shall be in CAD format and include notations reflecting the as built conditions of any additions to or variation from the drawings provided such as, but not limited to cable paths and termination point. CAD drawings are to incorporate test data imported from the test instruments.*

2. *The asbuilt drawings shall include, but are not limited to block diagrams, frame and cable labeling, cable termination points, equipment room layouts and frame installation details. The asbuilt shall include all field changes made up to construction completion:*

a) Field directed changes to pull schedule.

b) Field directed changes to cross connect and patching schedule.

c) Horizontal cable routing changes.

d) Backbone cable routing or location changes.

e) Associated detail drawings.