



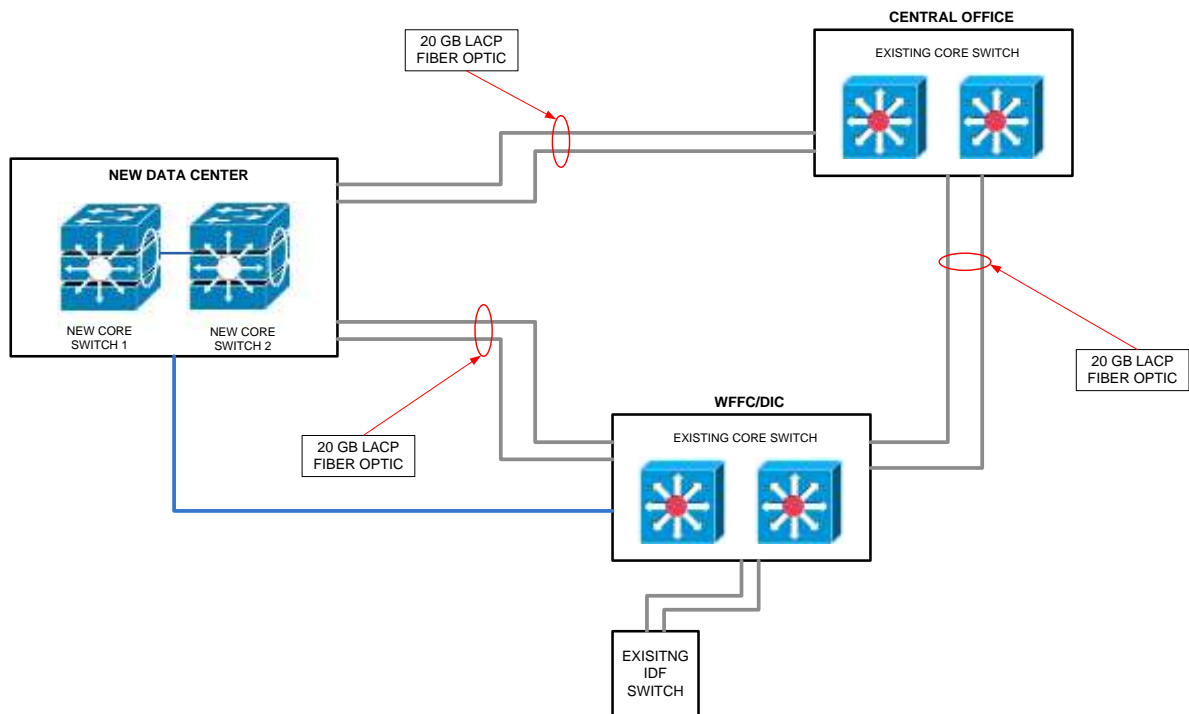
## SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF CORE NETWORK INFRASTRUCTURE FOR PAGASA BUILDINGS.

### 1. Introduction

We are currently working on 1Gbps network access increasing growth in the number of bandwidth demanding applications and user clients usually congest our existing network which results to many downtime incidents. Upon review and analysis of data traffic running through our existing network, the ICT group recommends to upgrade to a higher bandwidth network which can accommodate present traffic with ease and with consideration for future expansion as well.

The establishment of 10Gbps network system infrastructure can address the current network traffic difficulties PAGASA is experiencing.. Furthermore, the designed network upgrade is in anticipation of the increased number of high availability bandwidth many applications PAGASA will operating in the future. The network is also designed to accommodate the increase of nodes / clients upon the establishment of the new PAGASA building. The network will be layout at Central Office, WFFC, CAD bldg. and new Data Center building.

Attached is the basic network diagram for the 10Gbps network.



### 2. Approved Budget for Contract (ABC)

The ABC is Sixteen Million Seven Hundred Twenty Eight Thousand Pesos ( Php 16,728,000.00 inclusive of VAT and all applicable government taxes.



### **3. Delivery Period and Place of Delivery**

The winning bidder shall supply, deliver, install, test and commission **A.** One (1) lot Fiber Optic Backbone connection from existing Data Center to New Data Center, one (1) lot Fiber Optic Backbone connection from new Data Center to DIC IDF, **B.** Two (2) units Core Switch, **C.** One (1) unit of Network Cable Test Equipment for ninety (90) calendar days from receipt of the Purchase Order (PO) at PAGASA Central Office located at PAGASA Science Garden Compound, BIR Road, Diliman Quezon City.

### **4. Bid Proposal Contents**

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

The prospective bidder shall respond paragraph by paragraph and shall clearly indicate compliance to all the required specifications (*Please see Section VII. Compliance Matrix*) and shall specify the number of days or schedules within which to complete the delivery of all the goods required (*Please see Section VI. Schedule of Requirements*).

The prospective bidder shall be required also to include in this proposal, **original descriptive literatures and unamended brochures of all equipment/materials** to be supplied. The bidder should be able to provide **manufacturer's certificate** for the servers to be delivered. The certificate should clearly indicate that the manufacturer/s or their local representative will shoulder the responsibilities of the bidder that is specified in the warranty. The manufacturer's certificate should also clearly indicate that the bidder is authorized by the manufacturer to distribute, install, configure, operate and maintain the manufacturer's product offered.

These details will allow the **PAGASA-Bids and Awards Committee** to fully evaluate and determine compliance from the prospective bidders.

### **6. Technical Specifications**

The winning bidder shall supply, deliver, install, test and commission two (2) units of network core switch and necessary accessories with the following minimum specifications:

#### **A. Modular Multi-layer chassis core switch - 2 Units**

##### **1. Minimum Hardware Requirements**

1.1 The proposed core switch must be rack mountable not more than seven rack unit (7RU) in form factor.

1.2 The proposed core switch must have the following minimum requirements:

1.2.1 2 x 16 port GBE/10GbE SFP+ Module

1.2.2 2 X 48 port 1000BASE-T Module



- 1.2.3 4 x 2800W AC Power Supply
- 1.2.4 Full Layer 2 and Layer 3 routing services with hardware-based IPv4 and IPv6 support.
- 1.2.5 Switching and routing, IPv6, and multiprotocol label switching (MPLS)
- 1.3 Transceiver
  - 1.3.1 20 x 10G SFP+ LC Singlemode Transceiver
  - 1.3.2 10 x 1G SFP LC LX Transceiver
- 1.4 Memory and Processor
  - 1.4.1 1GHz, 1GB Flash, 4GB SDRAM
- 2. Performance
  - 2.1 Supports a maximum of 4,160Gbps switching capacity, capable of up to 2,380MPPS throughput with dual fabrics
- 3. Management
  - 3.1 Command-line interface (CLI)The proposed firewall must support the capability of hosting at least Ten (10) logical systems on a single virtual domain or physical appliance.
  - 3.2 Access through the terminal interface, Telnet, or Secure Shell (SSH)
  - 3.3 Provides access restriction to critical configuration commands; multiple privilege levels with password protection; uses ACLs for Telnet and SNMP access
  - 3.4 SNMPv1/v2c/v3
- 4. Security
  - 4.1 Access control lists (ACL), RADIUS/TACACS+, IEEE802.1X, MAC based authentication, Port Security
- 5. Layer 2 Switching
  - 5.1 VLANs: Supports up port-based or IEEE 802.1Q-based VLANs
  - 5.2 Supports MAC-based VLANs, protocol-based VLANs, and IP-subnet-based VLANs
- 6. Layer 3 Switching
  - 6.1 Static IP routing both IPv4/IPv6, OSPFv3, Policy based Routing, BGP+ and RIPv2Supports MAC-based VLANs, protocol-based VLANs, and IP-subnet-based VLANs
- 7. Other Features:
  - 7.1 Must Have sFlow support
  - 7.2 QoS: IEEE 802.1p prioritization
  - 7.3 Support LACP
  - 7.4 Green Award Certification
- 8. Other Required components:
  - 8.1 Comply Redundant Power Supply



8.2 Comply With 2 10Gbe SFP+ to SFP+ 2 Meters DAC Cable

8.3 Comply 1 Year Warranty for the Switch

8.4 3 Year support service with 24x7 technical support and 4 hours response time for onsite support service.

## B. Structured Cabling System (Fiber Optic Backbone Cabling)

### 1. Fiber Optic Cabling Requirements

1.1 Optical fiber cable backbone shall be install for the data backbone between the PAGASA Central Office Data Center to DIC Bldg. MDF.

1.2 Optical fiber cable backbone shall be install from DIC MDF to PAGASA New Data Center

1.3 Within the Central Office Data Center, DIC MDF and New Data Center, backbone fiber cores are terminated and housed in rack-mount fiber termination unit (enclosures).

1.4 The 19" rack mount fiber termination unit shall consist of a frame mountable housing for terminating and/or splicing fiber optic cables and allow for organization of the fiber optic interconnects.

1.5 Consideration should be given to the use of Pre-Terminated Optical Fiber cable for faster and easier installation.

### 2. Fiber Optic Cable Specifications

2.1 Bidder shall supply, deliver, install, test and commission at least twelve (12) core Singlemode optical fiber cable with loose tube armored construction suitable for outdoor applications containing 9/125 micron OS2 fibers surrounded by E-glass or aramid strength members and HDPE outer jacket.

2.2 The multi-core optical fiber cable shall consist of color coded fibers for identification purpose.

2.2.1 OS2 Specification (9/125  $\mu\text{m}$  Fiber)

### 3. Optical Fiber Connecting Hardware Specifications

#### 3.1 Fiber Optic Enclosure

3.1.1 Equipped with fixing mechanism that ensures cable retention and support of incoming cable.

3.1.2 Shall have sliding mechanism enabling front side installation and maintenance work to be carried out without the need to remove the entire panel.

3.1.3 Shall be able to accommodate both direct termination or splicing of fiber pigtails.

3.1.4 Shall have facilitate fiber management storage and accommodate multiple splice holders at the same time.

3.1.5 Accommodate up to 24 port SC duplex fiber within 1RU height

3.1.6 Modular design with snap in SC adaptors



- 3.1.7 Have front left and right lock to secure the sliding tray.
- 3.1.8 The optical fiber patch panel(s) for Central Office Data Center, DIC IDF and New Data Center shall be capable of containing at least 24 SC Duplex connectors in a 1U enclosure.
- 3.1.9 The optical fiber patch panel(s) for Central Office Data Center, DIC IDF and New Data Center shall be capable of containing at least 12 SC Duplex connectors in a 1U enclosure.
- 3.1.10 The optical fiber patch panel(s) shall have rear openings for cable entry, with posts to accept strain relief terminations and with fiber storage guide facilities for maintaining bend radius.
- 3.1.11 The LC connectors shall be 9 micron, single mode connectors, capable of terminating either 250 micron coated or 900 micron buffered fibers.
- 3.1.12 The connectors shall be field-installable, requiring no epoxy, or polishing. The connectors shall meet the intermateability requirements of IEC 61754-20.

### 3.2 Fiber Optic Patch Cable

- 3.2.1 Fiber optic cables shall consist of two single, tight buffered, singlemode 9-micron core with 125 micron cladding to suit the installed OS2 fiber optic cabling.
- 3.2.2 Be used for optical fiber cross connects and interconnects.
- 3.2.3 Have the fiber cladding covered by Kevlar fibers and a protective outer jacket.
- 3.2.4 Be factory terminated with LC to SC connectors at each end.

## 4. Fiber Cable Installation

### 4.1 All fiber backbone cables shall be install in the following manner:

- 4.1.1 Backbone cable routing shall be planned to ensure adequate segregation from electrical and hazardous services, ensuring system integrity and performance, ensuring that it does not present problems of maintenance or access, and ensuring there is no conflict with the operation and maintenance of other systems.
- 4.1.2 Backbone cables shall be installed in accordance with manufacturer's recommendations and best industry practices.
- 4.1.3 Backbone cables shall be install separately from horizontal distribution cables.
- 4.1.4 Where cables are housed in conduits, the backbone and horizontal cables shall be install in separate conduits.
- 4.1.5 Where backbone cables and distribution cables are install in a cable tray or wireway, fiber backbone cables shall be install first and bundle separately from the horizontal distribution cables.
- 4.1.6 All single mode fibers (SMF) shall be fusion splice on site for optimum
- 4.1.7 performance.



## 5. Labelling and Numbering

- 5.1 Each piece of equipment, patch panel and outgoing cable from the patch panels shall be labelled. Corresponding labelling and numbering shall also be provided on the termination panels.
- 5.2 All cable labels should be of clear wrap around self-adhesive type or slip-on plastic ring type or a long plastic strip type fixed onto each cable. Each cable is to be labelled at each end 100 - 150mm from the termination point. Lettering on the label is to be machine printed.

## C. Network Cable Test Equipment

### 1. Specifications:

- a. 9-inch touch screen for viewing and operation platform
- b. LAN and Bluetooth connectivity with WAN option

### 2. Module 1

- a. 10G Multi-rate module
- b. Up to 2.7G Dual Channel, SDH up to STM-16, SONET up to OC-48, PDH (E1, E3, E4), DS<sub>n</sub> (DS1, DS3), OTN up to OTU1,
- c. Ethernet (Traffic generation, Automated RFC 2544 tests of Throughput, Frame Loss, Latency or Packet Jitter, Burstability, Ethernet Service Activation Test (Y.1564),
- d. BER tests
- e. IP Channel Statistics, Frame capture for protocol analysis with Wireshark, Electrical cable tests,
- f. Stacked VLAN (Q-in-Q), MPLS tests, Frame capture for protocol analysis with built-in Wireshark, Electrical cable tests and optical signal level displays, Simultaneous monitoring in both line directions, In-band detection and control, PDF, CSV and XML report generation for documenting test results)
- g. Ethernet 10G Single Channel: Ethernet (Traffic generation, Automated RFC 2544 tests of Throughput
- h. Frame Loss
- i. Latency or Packet Jitter, Burstability, Ethernet Service Activation Test (Y.1564)
- j. BER tests
- k. IP Channel Statistics, Frame capture for protocol analysis with built-in Wireshark, Electrical cable tests
- l. Stacked VLAN (Q-in-Q), MPLS tests, Electrical cable tests and optical signal level displays, Simultaneous monitoring in both line directions, In-band detection and control, PDF, CSV and XML report generation for documenting test results)
- m. Transceiver: Source light 10G LR 1310 nm SFP+, 10G LR 1310 nm SFP+

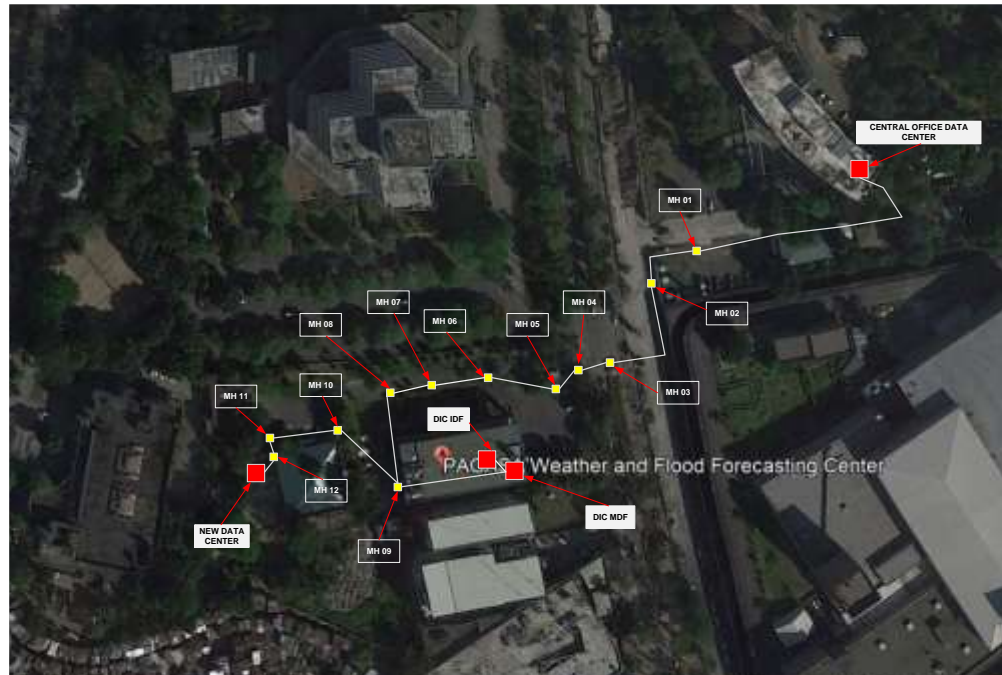


3. Module 2
  - a. OTDR Module (1310/1550 nm SMF)
  - b. Graphical summary and Pass/Fail evaluation display using Fiber Visualizer function
  - c. Optical Connector End Face Inspection with report generation
  - d. Remote operation via VNC
  - e. Report generation in PDF format
  - f. Multi-pulse measurement for high-accuracy event detection
4. Dynamic Range Type
  - a. Standard Dynamic Range (1310/1550 nm: 39/37.5 dB)
5. Polish Type
  - a. UPC Polish
6. Connector Adaptor Type
  - a. SC Connector
7. Accessories
  - a. AC adaptor
  - b. Li-On Battery
  - c. Stylus
  - d. Utilities ROM
  - e. Rear panel kit
  - f. Softbag



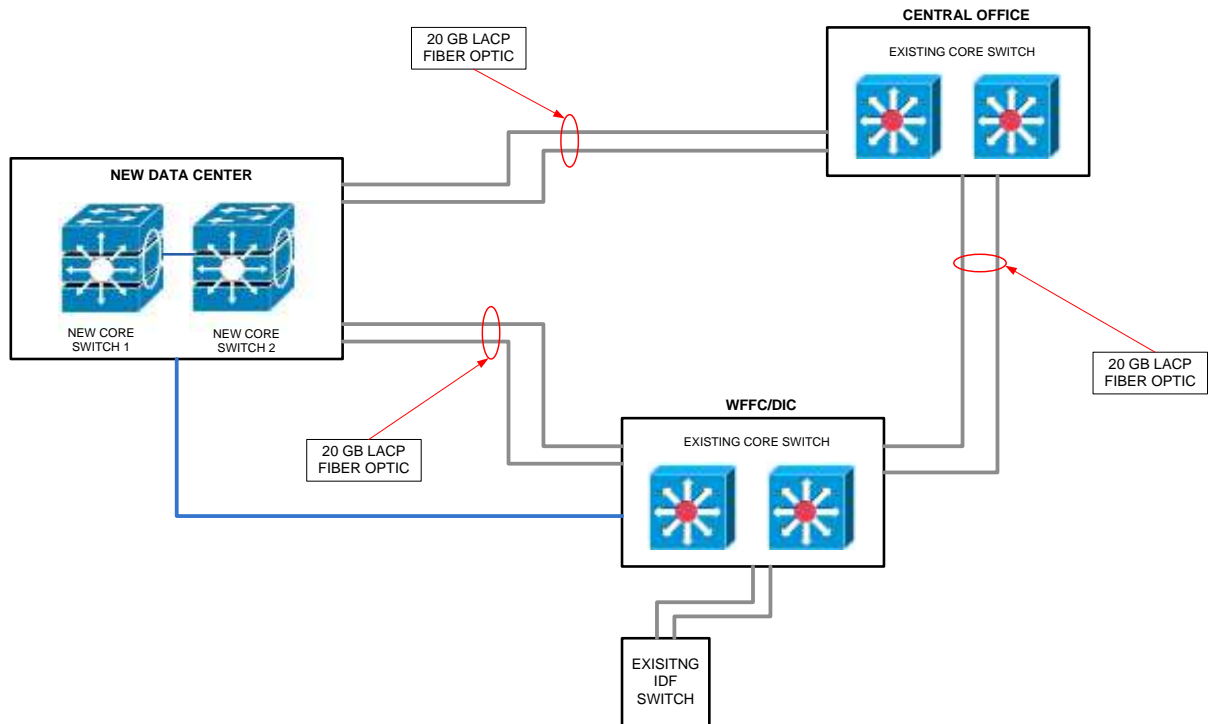
## D. Fiber Optic Backbone Physical Layout

CENTRAL DC TO DIC MDF  
- Approx. 600m  
DIC MDF TO DIC IDF  
- Approx. 50M  
DIC MDF TO NEW DATA CENTER  
- Approx. 200m



**PAGASA**  
01 FIBER OPTIC BACKBONE DESIGN

## D. Fiber Optic Backbone Logical Layout





#### E. Distribution

1. The brand must be distributed here in the Philippines via a locally declared company with global standard certification such as ISO, ITIL and D&B.
2. Must have at least 2 engineer that undergone technical certification training for the network equipment brand offered.

#### F. Warranty

1. The bidder warrants that it shall strictly conform to all the Terms and Conditions of this Terms of Reference.
2. The Core Switch shall be covered by a one (1) year warranty. ***The winning bidder will provide all parts and labor during the warranty period at no additional cost to the customer once validated by the manufacturer that the fault is from the manufacturer's side.***
3. Structured cabling components and corresponding works shall be covered by a one (1) year product warranty and twenty-five (25) year system warranty and shall commence upon customer acceptance of the installation.
4. This statement of work will not be modified in any way. Should additional services be required, a separate statement of work will be drafted.

