

## **TERMS OF REFERENCE**

**TITLE:** Provision of Infrastructure Data Network, CCTV with VLAN Configuration, Voice Communication (PABX) with Paging system for the New 5-Storey Building

### **Background and Rationale:**

BGHMC has come a long way from a vastly different organization before to a more advance organization with the aid of information technology. A lot have changed, but in some areas, things still have a way to go. The important steps were made by laying out the BGHMC information technology infrastructure cornerstones a few years back in time, and continuously sustaining the much needed improvement amid difficulty along the way. With the right people, management support, financial assistance, and bright collective ideas, BGHMC have surpassed any government hospital and even lead in the number of running applications systems as well as high-end infrastructure that serves the community.

As of today, BGHMC has a new five-(5) storey building which houses OPD clinic, OPD Records, Laboratory Department, HOPS Division, Nursing Service Office, CMPS Office and the Medical Center Chief Office and its unit. The 5-Storey building is still bare from the infrastructure network connections away from BGHMC Data Center.

The existing communication system (PABX) of BGHMC has 109 nodes in use with some local numbers tapping/sharing. The maximum nodes capacity of NEC SL1000 is 132 nodes only. Therefore, it cannot accommodate the additional 55 nodes for the 5-Storey Building. It is recommended to replace and/or upgrade the existing PABX to a much larger node capacity in order accommodate and cover future expansion.

### **OBJECTIVE:**

To provide the new 5-storey building with infrastructure network core and access switches, UTP cables/Fiber Optics and active components, Paging System, Surveillance Security Cameras and integrate the same to the existing BGHMC Data Center. In line with the integration of network switches, VLAN technology will also be adopted for a more efficient management of network infrastructure.

|                              |   |   |
|------------------------------|---|---|
| <b>ABC</b>                   | : | PHP 7,000,000                               |
| <b>Project Delivery Date</b> | : | Sixty (60) Days                             |
| <b>Procurement Mode</b>      | : | Negotiated Procurement (Two Failed Bidding) |
| <b>Project Site</b>          | : | BATAAN GENERAL HOSPITAL AND MEDICAL CENTER  |

## SUMMARY OF INFRASTRUCTURE NETWORK FOR 5-STOREY OPD

| AREA              | Data | Voice | CCTV | Paging | WiFi AP |
|-------------------|------|-------|------|--------|---------|
| 5th Floor Area    | 6    | 1     | 8    | 0      | 12      |
| 4th Floor Area    | 22   | 5     | 31   | 3      | 0       |
| 3rd Floor Area    | 72   | 18    | 7    | 5      | 5       |
| 2nd Floor Area    | 42   | 11    | 10   | 5      | 1       |
| Ground Floor Area | 40   | 20    | 9    | 4      | 0       |
| TOTAL             | 182  | 55    | 65   | 17     | 18      |

### SCOPE OF WORK:

#### • FOR INFRASTRUCTURE DATA NETWORK

1. Provision of auxiliary pipes for data for the raceway from Data Center to the new 5-storey building.
2. The Fibre optic cable to be used should be **4 core multimode**, outdoor types.
3. The Fiber optic patch cord must be duplex multimode, fiber, indoor type.
4. The Fiber optic patch cord must be at least 2 meters in length.
5. The Fiber optic cable must be terminated in patch panel and not directly to the switch.
6. The copper patch cord should be CAT6 UTP Cable.
7. The copper cable must be terminated in patch panels and not directly to switch.
8. Using connectors to extend the existing horizontal copper is not allowed.
9. Provision of PVC conduit for the Fiber backbone layout;
10. PVC waterproof boxes should be use outdoor.
11. The conduit must have standard length and diameter depending of the cable run.
12. Provision of electrical grounding on all network switches including PABX at least 3 meters grounding rod, 3.25 grounding wire size 12.
13. Re-wiring of damaged existing connection must be replaced with new connection
14. All existing tapping connection must be removed and place a new line independently.
15. Cascading connection must also be removed to lessen and/or eliminate network traffic
16. All existing damaged/unused UTP that are no longer in use must be removed from the cabling system
17. The core switch must support both multimode and single-mode.
18. The bidder must submit detailed design of the network diagram.
19. The winning supplier is required to provide training for Fiber Optic and VLAN and turnover the complete necessary documentation and manuals relating to the services provided to BGHMC's IHOMP personnel.
20. The supplier must provide detailed amount for every service and equipment specified in the offer.

21. Linking of connections from 5-Storey Building to BGHMC Data Center
22. Cabling tagging for data, voice, paging and CCTV.
23. Documentation of the network diagram and its node (data, voice, paging and CCTV).
24. Training for the setup, configuration, administration and management should be provided for IHOMP Staff.
25. Provision of UPS System per IDF
26. Cable Color-Coding considerations must be identified for all horizontal cabling.
  - a. 3 Different Colors (DATA/AP,VOICE,CCTV)

## **TECHNICAL SPECIFICATIONS:**

### **1. CORE NETWORK SWITCH AT LEAST 2 UNIT**

- a. Must be compatible with the existing configuration
- b. Must have at least 128Gbps of switching capacity
- c. Forwarding rate At least 95 mpps Throughput.
- d. Must have a minimum of 24x Fixed GE copper ports
- e. Must have a minimum of 4x 10GE SFP+
- f. Bundled Module(s) per switch:
  - i. 4x SFP+ 10Gigabit Fiber Optics Transceiver, SR for Multimode
- g. Port Speed: At least 10/100/1000 Mbps autosense for copper and 1000/10000 Mbps for fiber.
- h. Layer 3 Capabilities
  - i. Must Support IPv4 routing of up to 7K Routes and up to 256 IP Interface
  - ii. Must Support configuration of Layer 3 interface on physical port, LAG, VLAN interface or loopback interface
  - iii. Must support Classless interdomain routing
  - iv. Must have a switch functions of an IPv4 DHCP Server serving IP Addresses for multiple DHCP pools/scopes.
  - v. Must support relays of DHCP traffic across IP Domains
- i. Layer 2 Switching
  - i. Must have spanning tree protocol
  - ii. Must support Link Aggregation Control Protocol of up to 32 groups or up to 8 ports per group with 16 candidate ports for each.
  - iii. Must support VLAN
  - iv. Up to 4094 active VLANs simultaneously.
  - v. Port based and tag-based VLANs
  - vi. Management VLAN
  - vii. Private VLAN
  - viii. Guest VLAN
  - ix. Voice Traffic must be automatically assigned to a voice-specific VLAN and treated with appropriate levels of QOS.
  - x. Must support DHCP Relay at layer 2
- j. Must have a hardware stacking of up to 8 units in a stack, with up to 400 ports managed as single system with hardware failover.
- k. Security
  - i. SSH
  - ii. SSL
  - iii. Web-based authentication

- iv. STP Root Guard
- v. DHCP Snooping
- vi. Dynamic ARP Inspection
- vii. Port Security
- viii. DOS Prevention
- ix. Multiple User privilege levels in CLI
- x. ACLs
- l. Quality of Service
  - i. Must Support 8 Hardware queues
  - ii. Must support strict priority and weighted round-robin
  - iii. Must support congestion avoidance
- m. Management
  - i. Web User interface
  - ii. SNMP
  - iii. Firmware upgrade
  - iv. Port mirroring
- n. VLAN mirroring

## 2. ACCESS NETWORK SWITCH AT LEAST 5 UNIT

- a. Must be compatible with the existing configuration.
- b. Must at least have **48x Fixed** GE Copper Ports.
- c. Must have at a least a minimum of 2x 10GE SFP+
- c. Bundled Module/s per switch:
  - i. 2x SFP+ 10Gigabit Fiber Optics Transceiver, SR for Multimode
- d. Switching Capacity: Minimum of 128 Gbps
- e. Forwarding rate: Minimum of 95 Mpps throughput
- f. Port Speed: At least 10/100/1000 Mbps autosense for copper and 1000/10000 Mbps for fiber.
- g. Layer 2 Switching
  - i. Must have spanning tree protocol
  - ii. Must support Link Aggregation Control Protocol of up to 32 groups or up to 8 ports per group with 16 candidate ports for each.
  - iii. Must support VLAN
  - iv. Up to 4094 active VLANs simultaneously.
  - v. Port based and tag-based VLANs
  - vi. Management VLAN
  - vii. Private VLAN
  - viii. Guest VLAN
  - ix. Voice Traffic must be automatically assigned to a voice-specific VLAN and treated with appropriate levels of QOS.
  - x. Must support DHCP Relay at layer 2
- h. Must have a hardware stacking of up to 4 units in a stack, with up to 208 ports managed as single system with hardware failover.
- i. Security
  - i. SSH
  - ii. SSL
  - iii. Web-based authentication
  - iv. STP Root Guard

- v. DHCP Snooping
- vi. Dynamic ARP Inspection
- vii. Port Security
- viii. DOS Prevention
- ix. Multiple User privilege levels in CLI
- x. ACLs
- j. Quality of Service
  - i. Must Support 8 Hardware queues
  - ii. Must support strict priority and weighted round-robin
  - iii. Must support congestion avoidance
- k. Management
  - i. Web User interface
  - ii. SNMP
  - iii. Firmware upgrade
  - iv. Port mirroring
  - v. VLAN mirroring

#### **b. WIRELESS ACCESS POINT 18 UNITS**

- a. Must be design for indoor environment
- b. Must have simultaneous Dual-band
- c. Must support 450 Mbps radio rate for 2.4hz
- d. Must support 1,300 Mbps radio rate for 5Ghz
- e. Mus have 3x3 MIMO for both 2.4Ghz & 5Ghz
- f. Must support 802.3af PoE or 802.3at PoE+
- g. Maximum Power consumption must be 9W
- h. Maximum TX power for 2.4Ghz & 5Ghz must be 22Dbm
- i. Must support Wi-Fi Standards 802.11 a/b/g/n/r/k/v/ac
- j. Must support wireless security WEP/WPA-PSK/WPA-Enterprise (WPA/WPA2/TKIP/AES)
- k. Must support up to 8 BSSID per radio
- l. Must be wall/ceiling mounted and kits included
- m. Must have a networking interface of 10/100/1000 Ethernet Ports
- n. Must have a physical reset button
- o. Must support advanced QOS per user rate limiting
- p. Must support guest traffic isolation
- q. Must support concurrent clients of up to 250 or higher
- r. Must have a centralized network wireless controller

#### **• FOR PABX SYSTEM**

1. New PABX System that could accommodate at least **400 (lines) local numbers** and cover future expansion to eliminate tapping/sharing of local number.
2. Provision of auxiliary pipes for voice (PABX) on the new 5-storey building.

3. The copper patch cord should be CAT5e branded heavy duty.
4. The copper cable must be terminated in patch panels and not directly to switch.
5. Using connectors to extend the existing horizontal copper is not allowed.
6. Provision of PVC conduit for the PABX UTP;
7. PVC waterproof boxes should be use outdoor, if necessary.
8. The conduit must have standard length and diameter depending of the cable run.
9. Reconfiguration and re-programming of PABX if necessary.
10. Provision of electrical grounding on all network switches including PABX at least 3 meters grounding rod, 3.25 grounding wire size 12.
11. Re-wiring of damaged existing connection must be replaced with new connection
12. All existing tapping connection must be removed and place a new line independently.
13. All existing damaged/unused UTP that are no longer in use must be removed from the cabling system
14. Training for the setup, configuration, administration and management should be provided for IHOMP Staff.

- **FOR PAGING SYSTEM**

1. Speakers and amplifier for paging system should also be compatible with the existing paging system.

- a. **CEILING MOUNT SPEAKERS**

- a. Rated Input must be 6 W (100 V line), 3 W (70 V line)
- b. Sensitivity must be 93 dB (1 W, 1 m) (500 Hz - 5 kHz, pink noise)
- c. Frequency Response must be 45 Hz - 20 kHz (peak -20 dB)
- d. Speaker Component must be 16 cm (6") double cone-type
- e. Connection must be Push-in connector (bridging terminal-2 branch type)

## **2. MICROPHONE STANDS**

- a. Power Source must be 3 V DC (R14P × 2)
- b. Current Consumption must be 2 mA during chime and microphone operation 10 µA at no operation
- c. Chime Tones must be 4-tone chime (up/down)
- d. Microphone must be Unidirectional dynamic type
- e. Microphone Frequency Response 200 Hz - 10 kHz
- f. Output must be Chime signal: -45 dB\*, 600 Ω, unbalanced (chime volume control set to maximum position) Microphone: -53 dB, 600 Ω, unbalanced (1 kHz, 0 dB = 1 V/Pa)

## **3. POWER AMPLIFIER**

- a. Power Source Must be 220 - 240 V AC, or 24 - 30 V DC

- b. Rated output must be 240 W
- c. Power Consumption must be 238 W (EN60065), 520 W (AC operation at rated output), 15 A (DC operation at rated output).
- d. Frequency Response must be 50 - 20,000 Hz ( $\pm 3$  dB)
- e. Distortion must be Under 1% at 1 kHz, 1/3 rated power
- f. S/N Ratio must be Over 60 dB
- g. Tone Control Must Be Bass:  $\pm 10$  dB at 100 Hz, Treble:  $\pm 10$  dB at 10 kHz
- h. Indicator must have Power, signal, peak
- i. Ventilation must be Fan cooling

- **FOR CCTV SECURITY SYSTEM**

1. Supply, installation, testing and commissioning high quality fast-acting IP CCTV surveillance system along with power supply, power distribution and required accessories for the new 5-storey building of BGHMC.
2. The entire system shall be as per technical specifications enclosed with documents.
3. The price quoted by the bidder should include all the expenses incurred in commissioning of all cameras with power supply, accessories and other devices complete with software.
4. The CCTV surveillance system should consist of fixed network dome cameras, software, network video recorder, power supply and cables.
5. Video management software shall offer both video stream management and video stream storage management. Recording frame rate and resolution in respect of individual channel shall be programmable.
6. The system is presently designed for 65 cameras whereas not limited to the same and scalable up to unlimited cameras if required in the future.
7. Provide a different VLAN network that can be integrated to the purchaser's network without degrading the supervisory specialists and technicians at the job to assist in all phases of system installation, start up and commissioning.
8. Cat 6 cable connectivity with all required hardware up to purchaser's networking switches of LAN, locations of networking switches.
9. 220 volts AC Power supply switch distribution from UPS to each location of cameras along with DBs, JBs, cabling work etc. with required accessories.
10. Power supply unit as required for cameras.
11. Integrated testing and commissioning of CCTV system on VLAN being provided by the bidder.
12. Training & handing over of all materials, equipment and appliances.
13. Any other items/accessories required for installation, testing and commissioning of CCTV system.
14. No extra cost shall be paid for miscellaneous items if required to complete the work as per the design concept.
15. Training for the setup, configuration, administration and management should be provided for IHOMP Staff.

## **TECHNICAL SPECIFICATIONS (CCTV):**

### **1. 65 UNITS FIXED NETWORK DOME CAMERA**

- a. Must have 1/2.8" 2MP Progressive Scan CMOS Image Sensor or Higher
- b. Capable of 1920 x 1080 Maximum Resolution
- c. Capable of a Maximum Frame rate of 60Hz:30fps
- d. Must have 2.8 mm Fixed Lens or Higher
- e. Ingress Protection rating must be IP67 or higher
- f. Must have IR Cut Filter for both Day and Night
- g. Must have an IR Range of 30m or higher
- h. Must be compatible with any of the following protocols TCP/IP, ICMP, HTTP, HTTPS, DHCP, DNS, RTP, RTSP, RTCP, NTP, IGMP, QoS, UDP
- i. Must operate at PoE (802.3af, class 3) or 12 VDC  $\pm$  25%, 5.5 mm coaxial power plug
- j. Video Bit Rate must support 32 Kbps up to 8 Mbps or higher
- k. Must have 3D Digital Noise Reduction

## **2. 1 UNIT NETWORK VIDEO RECORDER**

- a. Capable of 128 Channel IP Video Input
- b. Capable of incoming and outgoing bandwidth of 320Mbps or higher
- c. Must have 8 SATA Interface or Higher
- d. Must support a RAID Storage Configuration with any of the following RAID 1/5/6/10
- e. Must support HDD Hot Swappable
- f. Storage Capacity must be up to 8 TB per Hard Disk Drive
- g. Must have at least 2x network interface 10/100/1000
- h. Must have USB interface
- i. Must Support any of the following video format H.265+ /H.265/ H.264+ /H.264
- j. Must have an HDMI Output Interface that support up to 4K resolution

## **3. RECORDING STORAGE (HARD DISK DRIVE)**

- a. Must be a design for surveillance NVR system
- b. Total Disk Capacity must be a minimum of 1 Month Retention for 128 Channel System on a maximum resolution of 1080P (1920x1080) or higher using H.265 Encoding compression rate.
- c. Must provide proof or computation for required total recording storage disk capacity for a 128 Channel system with 1 Month Retention by 24 Hours Continuous recording time

## **4. POE SWITCH (IP CAMERA POWER SOURCE)**

- a. Must be unmanaged switch
- b. All ports must be 1000Gbase-T Gigabit Ethernet
- c. Switching capacity must be 48Gbps or higher
- d. Form factor must be rack mountable



**5. 1 UNIT UNINTERRUPTIBLE POWER SUPPLY FOR NVR SYSTEMS**

- a. Must have an Input of:
  - Voltage Range: 230V
  - Frequency: Minimum of 50Hz+/-5
- b. Must have Input connections: IEC -320 C14
- c. Must have a Battery:
  - Type: Sealed, maintenance free lead acid with suspended electrolyte; leak proof
  - Expected battery life (years) minimum of 3years
  - Transfer time 6ms typical :10ms maximum
- d. Must have an audible alarm
  - When on battery
  - Distinctive low battery
  - Overload
- e. max operating relative humidity 0-90%,
- f. Operating elevation 0-1968.3meters

**6. 2 UNIT OF 50" UHD TV**

- a. Must have panel size minimum of 50"
- b. Must have 3,840x2,160. Resolution
- c. Must have 16:9 Aspect Ratio, contrast Ratio 4000:1
- d. Must have Refresh rate 60Hz
- e. Must have HDMI port
- f. Must be wall mounted

**3. Bidding Requirements**

- a. Must have implemented similar project or contract
- b. The Bidder may submit offer which provides for superior specifications and/or better terms and conditions to the government at no extra cost. However, these shall not be given any bonus, credit or premium in the bid evaluation.
- c. Technical Documents
  - Certification of availability of at least one (1) trained Network Engineers and (1) Electronics Engineer to provide technical support for PABX, Structured Cabling, Fiber Optic Technology and VLAN configuration, include a photocopy of certificate of training
  - Certification of After Sales Service Support
- d. Post – Qualifications Documents
  - Company Profile
  - Equipment brochure or documentation downloaded from the internet
  - Warranty Proposal
  - Detailed network layout (Layer 3 and Layer 2)