The contractor should supply and install new optical fiber network and integrate or reconnect the existing network nodes into the new network. The contractor must offer a solution which can provide dedicated 1/10Gbps bandwidth per optical node for all classrooms concurrently. The contractor MUST not provide any network solution with bandwidth sharing technologies such as EPON, GPON and XGON etc.

Overview

1.    Supply and installation of new optical fibers from N401A Server Room to the classrooms and the special rooms
    1.1.    The location of fiber nodes and switches are shown in Appendix A
    1.2.    Supply and install 56 optical fibers connecting Server Rooms and classrooms/special rooms
    1.3.    Supply and install 1 sets of high performance 48-port L3 10G core switches and 1 set 24-port L3 10G switch in N401A Server Room. The core switches should be stacked together by high speed stack cables.
    1.4.    Supply and install 50 sets 8-port or higher PoE+ Gigabit (with extra SFP+ ports for fibers) switches in classrooms and the special rooms.
    1.5.    Supply and install 2 set of 24-port Gigabit (10Gbps uplink) switch for Room 706 & G02.
    1.6.    Supply and install 5 set of 48-port Gigabit (10Gbps uplink) switch for Gen. Office, IOT LAB, N401A, 2*Staff Room.
    1.7.    Supply and install 380 sets new UTP network nodes (wall-mounted or specified by school) in classrooms/special rooms.
    1.8.    Set up the switches properly such that the network work properly.  The setup works includes VLAN settings to enable normal network services, e.g. video streaming from school Campus TV to classrooms, IP phones, IP cameras and so on.


2.    Supply and installation of 56 optical fibers
    2.1.    Dedicated optical fibers should be used to connect the core switches in N401A server room to the optical nodes in the classrooms and the special rooms
    2.2.    Single Mode Fiber should be used.
    2.3.    Optical fiber should support at least 40/100 Gbps for further upgrade
    2.4.    Optical fiber panels/cabinets should be installed in the Server Room
    2.5.    All optical ports in fiber panels/cabinets should be well labelled.
    2.6.    If existing pipes, conduits or risers cannot be used, new pipes, conduits or risers should be included.


3.    Supply and installation of 10Gbps optical nodes in the following areas:
    3.1.    The full duplex bandwidth should be 10Gbps or higher.
    3.2.    The switches should be installed properly in the existing racks.
    3.3.    The locations of optical nodes are shown as follows.

| | | |
|---|---|---|
| 3.3.1. | Rm706, G02 | 1 set of new 24-port PoE+ UTP Gigabit L2 Switch with 10Gbps uplink |
| 3.3.2. | IOT LAB | 1 set of new 48-port PoE+ UTP Gigabit L2 Switch with 10Gbps uplink |
| 3.3.3 | Gen.Office,2* Staff Rm | 3 sets of new 48-port PoE+ UTP Gigabit L2 Switch with 10/20Gbps uplink |
| 3.3.4 | Server Room | 1 set each of 48 port UTP Gigabit L2 switch with 10Gbps uplink |

Supply and installation of 50 sets of 1Gbps optical nodes in classrooms/special rooms

3.4. Each optical node should be connected by dedicated optical fiber to the Server Room
3.5. Each optical node should have dedicated full duplex bandwidth of 1 Gbps or above
3.6. Each optical node should provide at least 8 Gigabit Ethernet (GbE) UTP PoE+ ports for network access
3.7. Wall-mounted cabinet or protective case should be installed in each Fiber-to-the-Classroom node for termination of the distribution optical fiber and housing the optical network units /switches there.
3.8. The ventilation of cabinet or protective case should be good enough not to create overheat problem.
3.9. The location of wall-mounted cabinets or protective cases should be installed at the high level near the door as specified by school.
3.10. The switch should be able to configure VLAN and LACP trunking for difference concurrent network applications. It should be allowed web management.
3.11. Various VLANs and network setting should be done according to the IT-in-Charge of the school's direction
3.12. Each node can be easily upgraded to higher bandwidth
3.13. If existing pipes, conduits or risers cannot be used, new pipes, conduits or risers should be included.

4. Supply and installation of 380 sets new UTP network nodes
   4.1. The new network nodes should be connected to the switches stated in the Appendix B.
   4.2. Cat6 UTP cable should be used.
   4.3. The network connection speed should be 1Gbps or above.
   4.4. The network nodes should be wall mounted or installed at specified areas.
   4.5. The network nodes and cables should be labelled properly.
   4.6. New PVC conduits, socket and network panels should be provided and installed.
   4.7. Vendor should provide 1/2M long Cat.6 UPT patch cables for connection between desktop and ONU.

Testing

5. User Acceptance Test (UAT)
   5.1. Short Term UAT (1 to 2 days)
   5.2. Network Testing for New Optical Network and System 12.1.2. Physical testing for Optical Fiber Network
   5.3. Bandwidth testing for all Optical Nodes via ONUs or switches (at least 10 Gbps duplex bandwidth)
   5.4. Performance Evaluation (e.g. whole school HD video broadcast)
   5.5. Long Term UAT (4 weeks)
       5.5.1. After the completion of 2 weeks short term UAT, the school will perform long term UAT by fully utilize the new Optical Networks.
       5.5.2. During the period, all the network devices of the school e.g. PCs, mobile devices and servers will access the network as normal operation.
       5.5.3. The contractor should assign a dedicated person to handle any failure occurred during the period (a hot line should be assigned and the response time should be <4 hours).

6. Completion Report
   6.1. A Completion Report is required after completion of the project
   6.2. The Completion Report should comprise the following items:
       6.2.1. List of deliverable items
       6.2.2. An update network diagram showing optical network infra-structure, core and access Switches or ONUs
       6.2.3. IP assignment and Log-in information for core and access switches/ONUs
       6.2.4. Test report for all fiber nodes 13.2.5. Port label for all optical fiber panels

Maintenance

7. Maintenance and Services
    7.1. 3-year on-site maintenance and support included all materials and labor which covers
        7.1.1. Optical fiber network
        7.1.2. All network equipment: core switches, access switches and ONUsFirmware upgrade
        7.1.3. A service hotline should be set up for the school during the warranty period
        7.1.4. Any switch failure should have replacement within 24 hours (throughout the checking and repair period)
        7.1.5. 2 spare switches (e.g. 8-port switches) should be provided for emergency. School can resume the network services in case of emergency.

8. Maintenance and Support Fee
    8.1. Contractor should provide the annual maintenance and support fee of the new optical network of the 6th year and onward for school consideration.

Network changeover

9. The installation work should NOT interrupt the existing network and disturb school operation.

10. The network changeover from the existing to the new optical network should be within 1 working day. Network service should be resumed on the next working day.

Term s and Conditions

11. Terms and Conditions for Tender Submission:

    12.1 The contractor should provide network design (e.g. network diagram) and price breakdown for school consideration

    12.2 The contractor should provide makes and models of the equipment for school consideration.

    12.3 The school will not accept any network solution with bandwidth sharing technologies such as EPON, GPON and XGON etc.

    12.4 The contractor must offer a solution which can provide dedicated 10G bandwidth per optical node for all classrooms concurrently.