

**Report on Extension of University of Ghana Fibre Optic
Backbone to Hostels and Departments under the College
of Health Sciences (CHS), Korle-Bu**

PHASE I

Prepared by CHS IT

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Introduction

The extension of University of Ghana Fibre Optic Backbone to Hostels and Departments under the College of Health Sciences, Korle-Bu is part of Phase II of University of Ghana ICT-based Distance Project which seeks to enhance Distance and Continuing education using Information and Communication Technologies. This also involves the University-wide computer and networking upgrade and expansion. The project is being funded by the Chinese Government and Government of Ghana through the Ministry of Education. The University of Ghana Computing Systems (UGCS) is also playing a leading role to enable the University to achieve this object.

One of the targets of the project is to bring all the departments under the College of Health Sciences to be connected to the Network Operating Center (NOC) at the CHS Central Administration Block through Vodafone link to University of Ghana main campus and that of NITA backbone terminating at the Korle-Bu Teaching Hospital. This will greatly enhance the efficient use of network resources on the Korle-Bu Campus and the Internet in general.

There are four major administrative buildings, namely the College Central Administration, Dental School, Medical School and the School of Allied Health Sciences which are already connected by fibre optic cable to the University backbone as shown below:

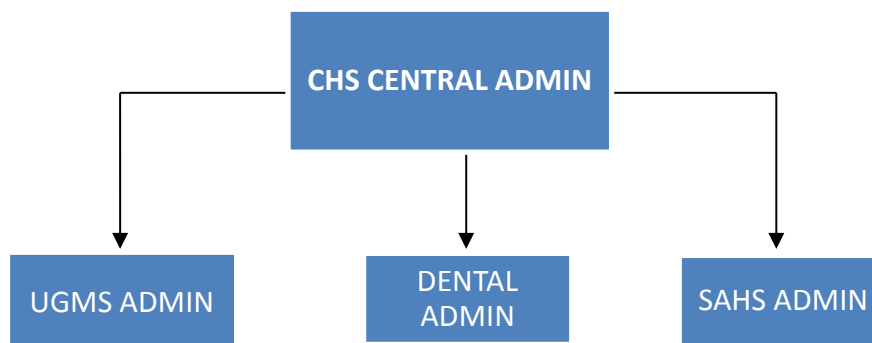


Figure 1- Sketch of existing fiber-backbone at Korle-Bu Campus

Nature of work

The work involves excavation, laying of pipes (HDPE) to carry fibre optic cables, construction of chambers for interconnection and diversion, passing of the fibre optic cables in all the pipes, termination of the fibre optic cables in the various buildings, installation of various accessories and setting up of nodes (Data Centre), and testing of the various nodes and commissioning. The extension work was executed by SATCONSULT & DATASOFT Ltd under the supervision of Chinese Project Manager and Head of IT, College of Health Sciences. Below is the list of nodes and buildings to be connected to the backbone:

Extension of Korle-Bu Campus Fiber-Optic Backbone: Nodes and Buildings

<p>Node 1: CHS Building</p>	<ul style="list-style-type: none"> • Upgrading of Datacenter and Provision of Servers, Routers and Switches • Upgrading of Local Area Networks (LAN)- CHS Ground Floor, SAHS Offices and College Library • Extension of Backbone to Security Post 	<p>Node 3: Red Building Area</p> <ul style="list-style-type: none"> • Community Health • Chemical Pathology • Pathology • SAHS Hematology • Virology • Maintenance Unit • SAH S Library • Diet Lab • Physiology • SAHS Lecture Hall • Basic Sciences Building • UGMS Morgue • Occupational Therapy 	<ul style="list-style-type: none"> • Setting up of Data rooms • Extension and upgrading of Local Area Networks
<p>Node 2: Hostels</p> <ul style="list-style-type: none"> • Block R, B and D • UGMS BQ • SAHS Hostel 	<ul style="list-style-type: none"> • Setting up of data rooms at Block R, B, D and BQ • Extension of Local Area Network to hostels floors • Wi-Fi Deployment • Provision of additional Access Points 	<p><i>This will greatly enhance the efficient use of network resources on the UG Campus and the Internet in general.</i></p>	

Figure 2 - The proposed extended backbone

Phases of work

In consultation with the Chinese Project Manager, CHS IT and the subcontractors; it was agreed that the project should be carried out in two Phases. Phase I involves connecting the hostels and the security post to the NOC. Phase II takes care of Red Building area which extends to the Occupational Therapy Department. The initial excavation and laying of pipes under each phase started on 2nd January, 2014.

Phase I

This includes digging from the College Administration Block to and around CHS Security Post, Hostel Blocks R, B, D, BQ, SAHS hostel and some offices of SAHS.

Blocks R, B and BQ are exclusive hostels for medical students. Block D is hostel for students who have something to do under the schools in CHS on Korle-Bu campus.

The layout of the extension from the CHS Administration to the CHS Security Post and SAHS hostel are shown in figures 3 and 4 below:

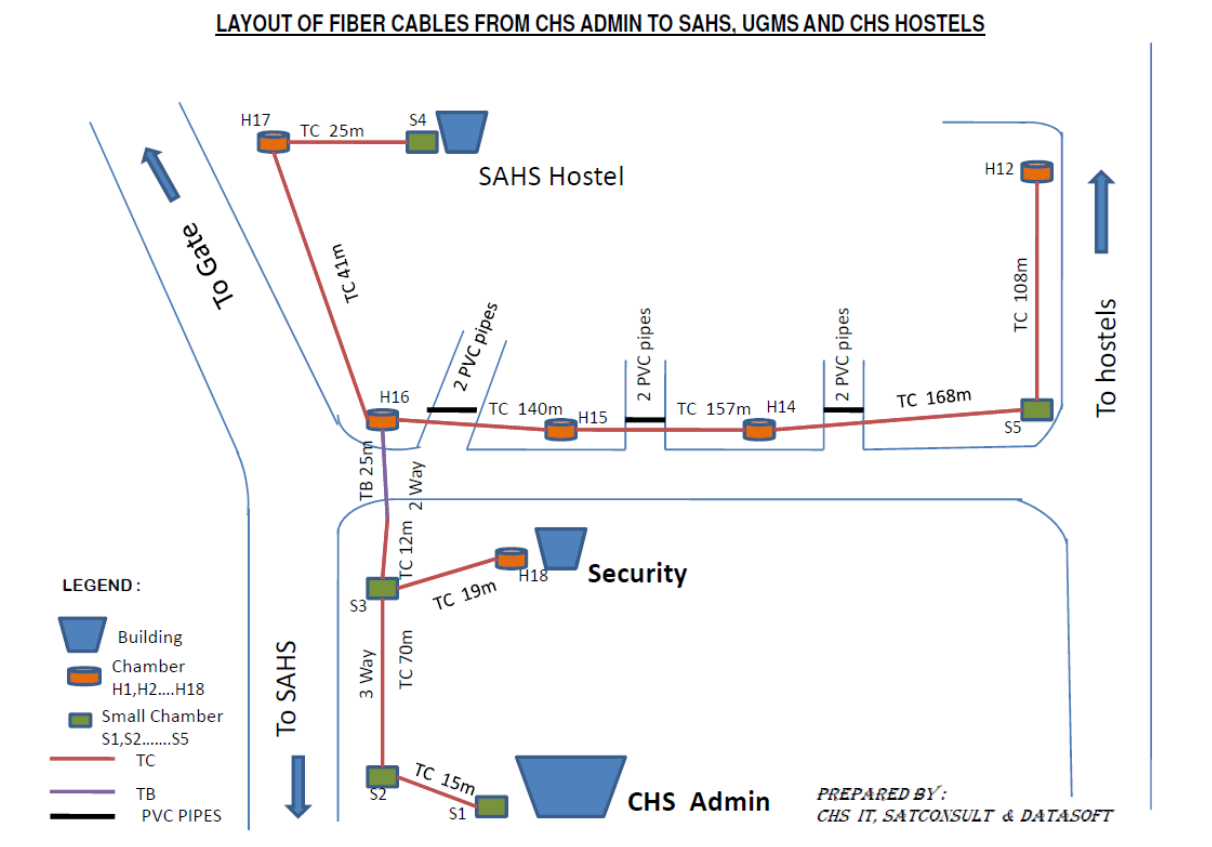


Figure 3 - Layout from NOC to Security Post and SAHS Hotel

Five (5) small chambers labelled S1 to S5 were constructed and eighteen (18) pre-fabricated chambers were also installed. A 12-core single mode fibre was laid from the NOC to the

Node 2 in the Block D hostels which was extended to Block R, B and BQ hostels by a 6-core fibre.

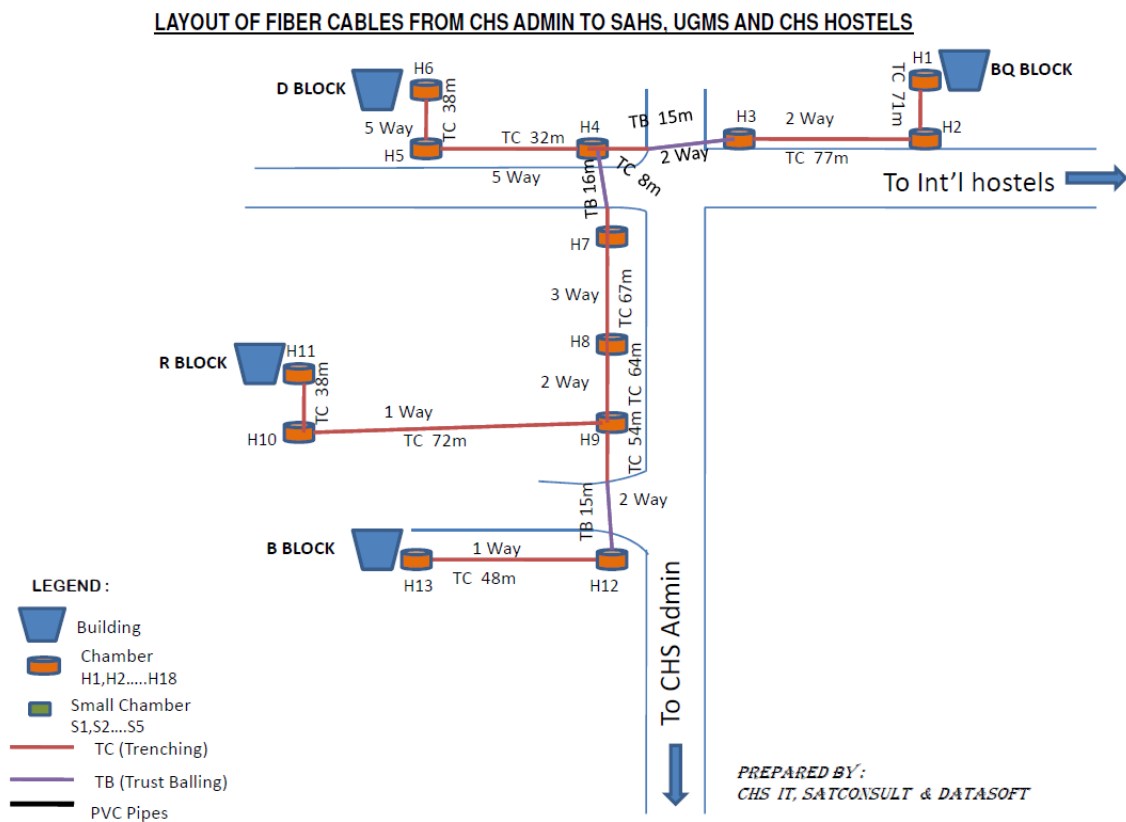


Figure 4 - Layout from NOC to UGMS, CHS & BQ Hostels

Active devices for fibre-optic extension- Phase I

ITEM	QTY	DESCRIPTION	REMARKS
1	6	CISCO SWITCHES WITH 4 SFP PORT FOR FIBER UPLINKS (3 with POEs were provided)	Supplied by UNIS
2	8	SFP TRANCEIVERS 1000SX	Supplied by UNIS
4	2	SERVER	Supplied by UNIS
5	5	UPS (<i>Standard</i>) 2KVA	Supplied by UNIS
6	1	UPS (<i>High-Capacity</i>) 40KVA	Supplied by UNIS
7	6	AIR CONDITIONERS 1.5 HP	Yet to be supplied

Table 1: Active devices for the project

Figure 5 shows the number of active devices requested by CHS IT for the project. Out of six (6) CISCO Switches requested, 3 ordinary managed switches and 3 other with POEs were supplied. The 6 airconditioners required to control temperature in the Nodes and the data rooms are yet to be provided. All the devices received with the exception of the two IBM servers and 40KVA UPS have been installed and tested.

Hostel information sheet for access points

#	Hostel/Block	Floors	Rooms	Capacity	Estimated APs
1	Block D Hostel	5	160	320	15
2	Block R Hostel	3	100	200	9
3	Block B Hostel	3	100	200	9
4	BQ Hostels	8 (blocks)	25	50	8
5	SAHS Hostel	3	90	200	9
6	Security Post	1	3	10	1
	Total		478	880	51

Table 2 - Information Sheet for the Access Points in the Hostels

The Information Sheet for the deployment of the wireless Access Points (APs) in the hostels is shown in Table 2 above. Our estimation (*using Ubiquiti Aps*) is that, 3 APs would be required on each floor making a total of 51. If *Ubiquiti Pro* version is deployed, the numbers will reduce. There are 478 rooms in the hostels with approximately 880 students.

Completion of Phase I

Phase I of the project has been completed by the subcontractor and tested. Currently the CHS IT has deployed four (4) APs in Blocks D, R, B and BQ hostels to test the connectivity. The test results are encouraging and it is the responsibility of CHS IT, UGCS and Hostel management to provide devices and equipment to make the services available to the students in the hostels. A screenshot of actives on the link between the NOC, Hostels and the Internet is shown below:

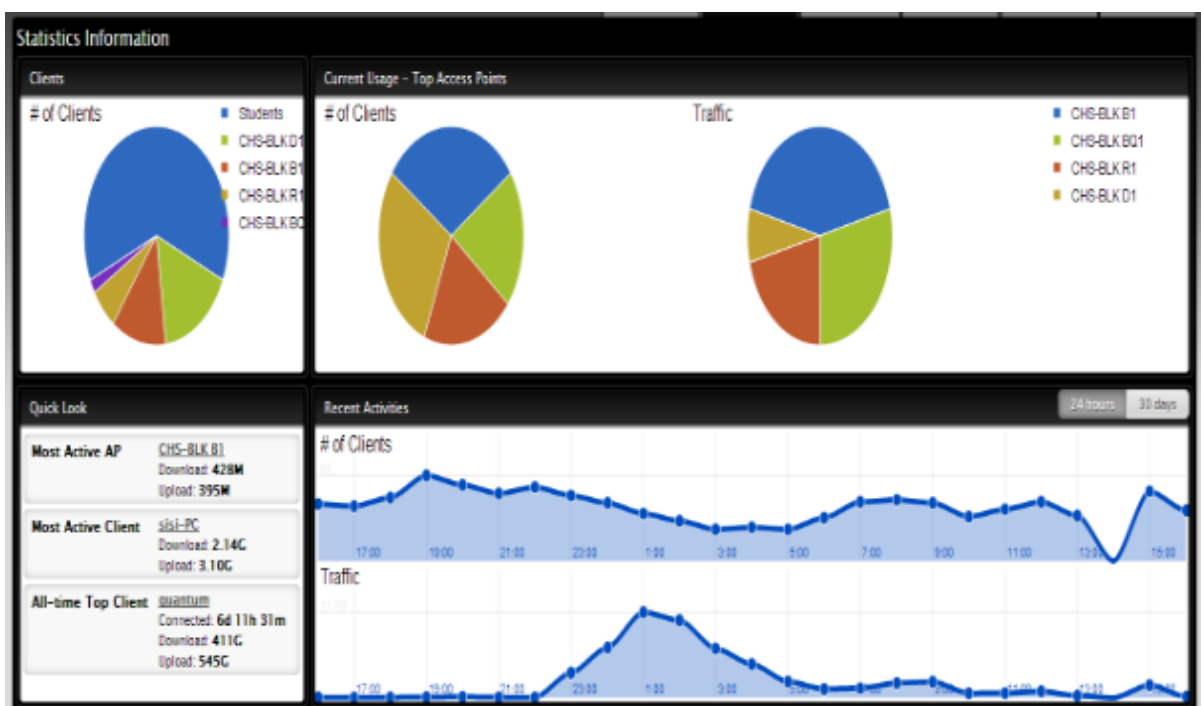


Figure 5: A Screenshot on Internet connection at the hostels

The College, Schools and Hostel managers are to upgrade their reading rooms with furniture, provide some computers for student use and general security by installing IP cameras in and around the hostels. It is also their responsibility to provide the short fall in the number of APs that would be provided by the University through UGCS and CHS IT. The provision of electrical outlets, air conditioners and some civil works in the data rooms are to be considered by the Hostel Management.

Phase II

Phase II of the project has started and ongoing. This includes digging from the College Administration Block to and around Community Health, Micro Biology, Chemical Pathology, Pathology, SAHS Hematology, Virology Lab, Maintenance Unit, UGMS Stores, SAHS Library, Dietetics Lab, Physiology, SAHS Lecture Hall, Basic Sciences Building, UGMS Mortuary, UGMS Credit Union and Occupational Therapy.

In all the buildings to be connected, various secured rooms have been identified where the cables will be terminated into appropriate switches and racks.

On-going

1. Construction of various chambers to interconnect and split the various fibre optic cables. Some of the chambers especially the precast types are yet to be supplied and installed in appropriate locations.
2. Drilling (Thrust Balling) under some sections of roads to link both ends of the roads
3. Sub ducts have also been installed

Challenges

Though the sub-contractor's excavation and laying of the pipes had been in a record time the under listed challenges were encountered:

1. Very hard grounds in certain places
2. Numerous unmarked underground service lines – water and electricity
3. Blocked existing underground ducts for electricity and telephone
4. Delays in the delivery of some active devices to the CHS IT Unit from the main University

Conclusion

We hope that, the remaining items needed for the project would be supplied by UGCS and Project Mangers (Chinese Phase II) to complete Phase II of the project on time. The College, Schools and Hostels managers are encouraged speeding up the furnishing of the Reading Rooms, providing funds for the deployment of IP cameras in and around the Hostels and completing the civil and electrical works in the data rooms.

Further request have been made by the University of Ghana Medical School to extend the link to the International Students Hostel and Skills Lab. as well as the Psychiatry and Clinical

Lecture Hall within the Korle-Bu Teaching Hospital. We proposed that the Psychiatry and Clinical Lecture Hall should be added to the project by connecting them to the Occupational Therapy building which is a little over 300 meters away.

The partnership between UGCS, CHS IT, Project Managers (Chinese & UG) and the subcontractors (SATCONSULT & DATASOFT Ltd.) worked well in executing the project.