

Pan-African e-Network

Heralding new era in providing
Tele-Education & Tele-Medicine
services to African countries



His Excellency the President of India Dr. A.P.J. Abdul Kalam, during the inaugural session of the Pan-African Parliament held at Johannesburg proposed in his talk a programme to connect all the 53 African nations by a Satellite and Fiber Optic Network that would provide effective communication and connectivity among the Nations. The proposed network would primarily provide Tele-education, Tele-medicine, Internet, video-conferencing and VOIP services and also support e-governance, e-commerce, infotainment, resource mapping and meteorological services.

TCIL has been designated as
Implementing Agency by the Ministry
of External Affairs, Govt. of India for
this prestigious project.

Ethiopia Pilot Project Highlights

India End

- IGNOU, New Delhi
- CARE Hospital, Hyderabad

Ethiopia End

Tele-education

- University centre, Addis Ababa
- Haramaya University, Alemaya

Tele-medicine

- Black Lion Hospital, Addis Ababa
- Nekempte Hospital



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Pan-African e-Network Project

The Pan-African e-Network Project, estimated at INR 5429 million, envisages setting up an e-network connecting Indian institutions with 53 countries of the Africa, through Satellite and Fiber optic links, and providing tele-education and tele-medicine services. TCIL, as an Implementing Agency will set up the network and maintain it for a period of 5 years after commissioning. The network is designed to have 169 VSAT terminals, with 3 VSAT terminals in each country to provide Tele-education, Tele-medicine and Heads of State (VVIP) connectivity with a Satellite Hub earth station in Senegal. Expansion of the network to the other locations by adding more VSAT terminals as well as broadband, wireless connectivity will be possible by adding additional hardware/ elements and bandwidth. The Tele-education services will be provided from 7 reputed Universities in India and 5 leading regional universities in Africa. The Tele-medicine programme for specialist healthcare services to the African countries will be provided through 12 Super Speciality Hospitals in India and 5 Super Specialty Hospitals in Africa. The project is conceived as a turnkey solution to provide e-education and e-healthcare services and make it sustainable so that Pan-African countries will be able to carry on with their own services after 5 years duration.

As a precursor to the Pan-African e-Network project, Ethiopia Pilot project was initiated to provide Tele-education services from IGNOU at New Delhi and Tele-medicine services from CARE Hospital, Hyderabad. The project is commissioned in last quarter of 2006. As part of this project, 40 students of Addis Ababa University and Haramaya University are taking MBA course from IGNOU through tele-education, whereas Black Lion Hospital of Addis Ababa and the Nekempte Hospital in Ethiopia are receiving on-line medical consultation from medical specialists of CARE Hospital, Hyderabad.

A brief description of the Ethiopia Pilot project is given below.

Tele-education and Tele-medicine Pilot Project in Ethiopia

The pilot project in Ethiopia was awarded to TCIL by the Ministry of External Affairs, at an estimated cost of USD 2.12 million. The project involved the following major activities:

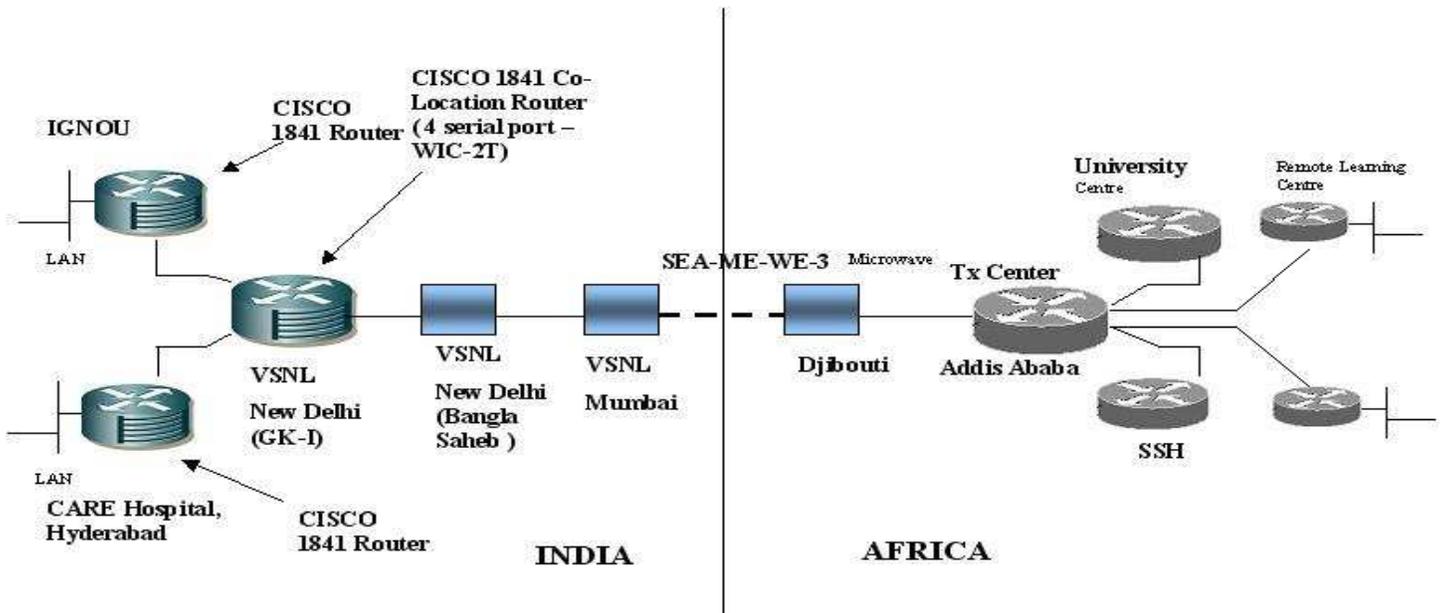
Design of Network Architecture;

Procurement of hardware and software required for the project on open tender basis

Installation and commissioning of:

- Tele-education centre (equipped with servers, PCs, UPS, network elements and multi-media studio set up) at Addis Ababa University, Addis Ababa
- Tele-education centre (equipped with PCs, UPS, multi-media set up) in Haramaya University, Alemaya
- Tele-medicine centre (equipped with servers, PCs, UPS, medical equipments) in Black Lion Hospital, Addis Ababa
- Tele-medicine centre in Nekempte Hospital, Nekempte similar to Black Lion Hospital
- Tele-education set up (equipped with application, database, control and streaming servers, PCs, network elements, UPS) in IGNOU, New Delhi
- Tele-medicine set up (equipped with servers, PCs, network elements, multimedia set up for continuing medical education) in CARE Hospital, Hyderabad

Both IGNOU and CARE Hospital are connected to VSNL facilities in New Delhi through 2Mbps leased lines. The interactive educational and medical content from these two sites are transmitted to Ethiopia on submarine cable based 2Mbps International Private Leased Circuit (IPLC) between India (landing station Mumbai) and Ethiopia (via Djibouti). The local connectivity between the IPLC and end terminals in Ethiopia is provided by the Ethiopian authorities through a heterogeneous network consisting of MPLS, wireless, OFC, ADSL.



CONNECTIVITY FOR TELE-EDUCATION & TELE-MEDICINE NETWORK OF ETHIOPIA PILOT PROJECT

Tele-education Services

An integrated Tele-education delivery system software has been provided to bring virtual remote classrooms in a multi-studio and multi-class environment with seamless two-way interaction between the teachers and students through collaborative tools. This system provides seamless, one-to-one, one-to-many connectivity through heterogeneous network platform in an IP-based multicasting mode of delivery.

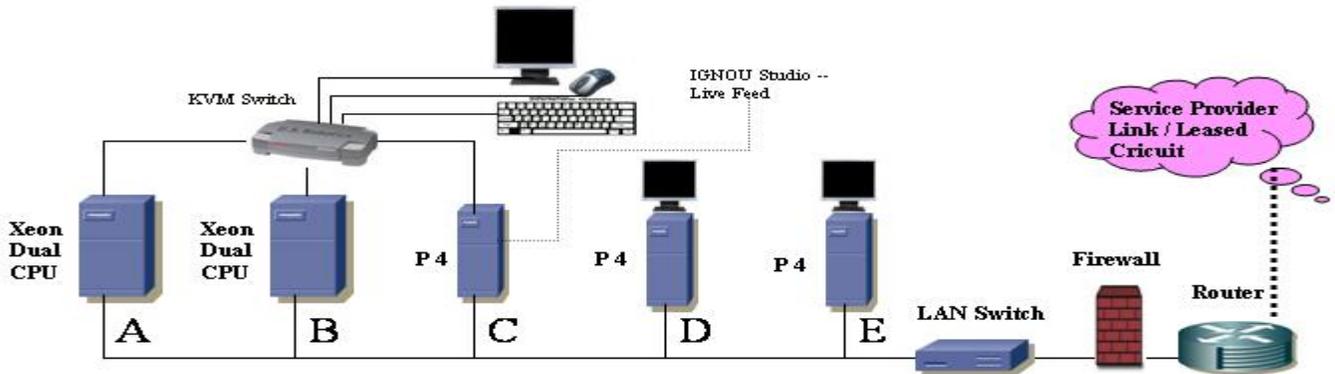
The architecture of the Tele-education system is based on the widely accepted network protocols for the interconnectivity and Client-Server model. The whole system is designed and developed using Java platform and its components with object-oriented, modular design and implementation that includes server side applications, multimedia delivery, request handling services, and client side applications for remote end learning with real time interaction.

The infrastructure consists of one Application server, one Database server, one Control server, one Agent server and one workstation for the Tele-Education applications. These servers are capable of running on Windows and Linux Operating system. The Application server, Database server and workstation for live streaming purpose (Total of three servers) are connected to the Storage Area Network (SAN).

The application server has various modules such as content management, portal management, knowledge management, user profile management etc. The database server maintains the user profiles and account information. The control server has the user authentication module and interact with the database (in database client-server mode) to obtain account profile information. The agent server has the capability to receive the external requests from clients, queue them based on predefined logic. The content itself is provided through the agent server; the agent server extracts the data from the SAN storage through the content management module from the application server.

A dedicated website www.panafricanenetwork.com/org/net/in has been hosted to facilitate dissemination of information to various countries of African union and interested groups. The website has various sections about Tele-education and Tele-medicine project, important events, photo gallery, schedules, feedback etc. It endeavors to act as a central resource to provide information for the benefit of people of Africa in the area of education and healthcare.

Tele-education Setup at IGNOU, New Delhi

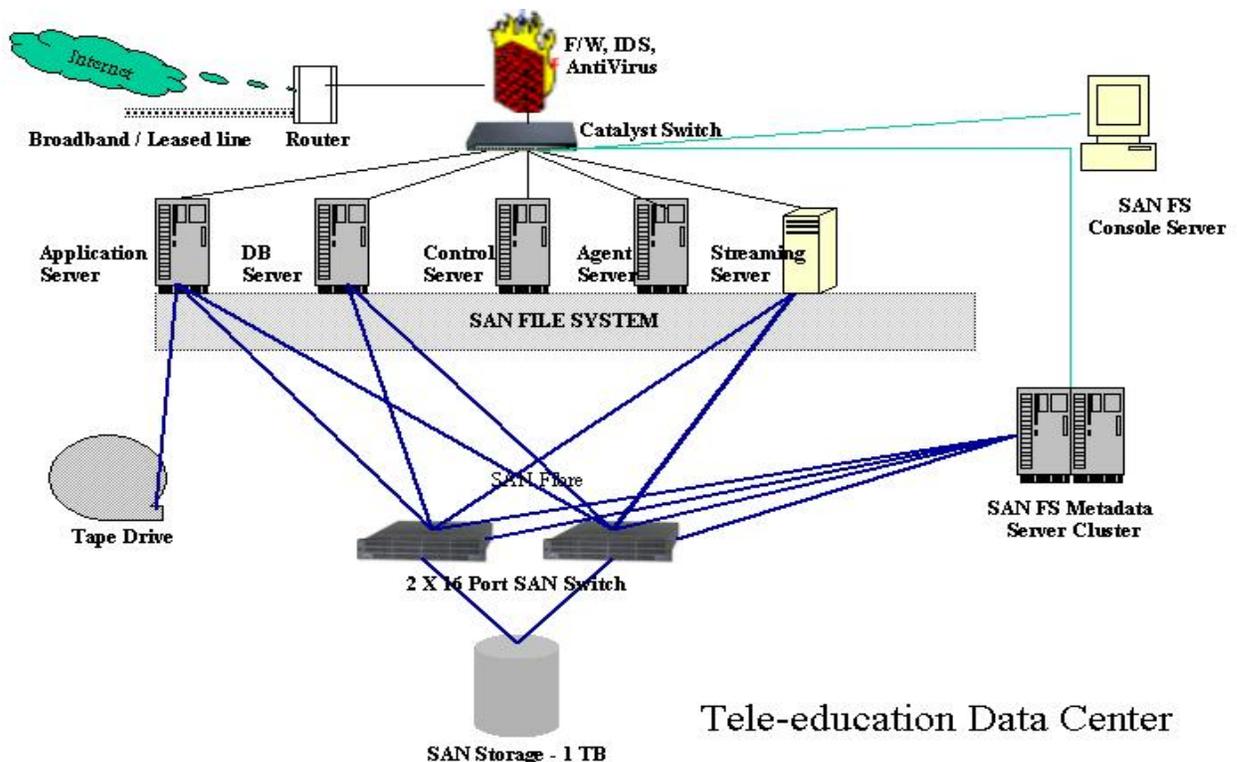


- A. Application & Data Base Server {In Rack}
- B. Control Server {In Rack}
- C. Streaming PC {In PCR}
- D. Student PC {In PCR}
- E. Agent PC {In SPR}

PCR - Production Control Room
 SPR - Studio Presentation Room

Tele-Education centre at Addis Ababa University and Haramaya University, Ethiopia

TCIL has successfully installed and commissioned the equipment at both the centres. Tele-Education content is received by the students at University center at Addis Ababa and Haramaya learning center in Ethiopia. Professors from IGNOU are delivering lectures on MBA course from the Studio of Tele-education set up at IGNOU, New Delhi. Acoustically designed studio environment has been created at the learning centre at Addis Ababa University which in future can be utilized for transmission of learning material or courses from Addis Ababa University.



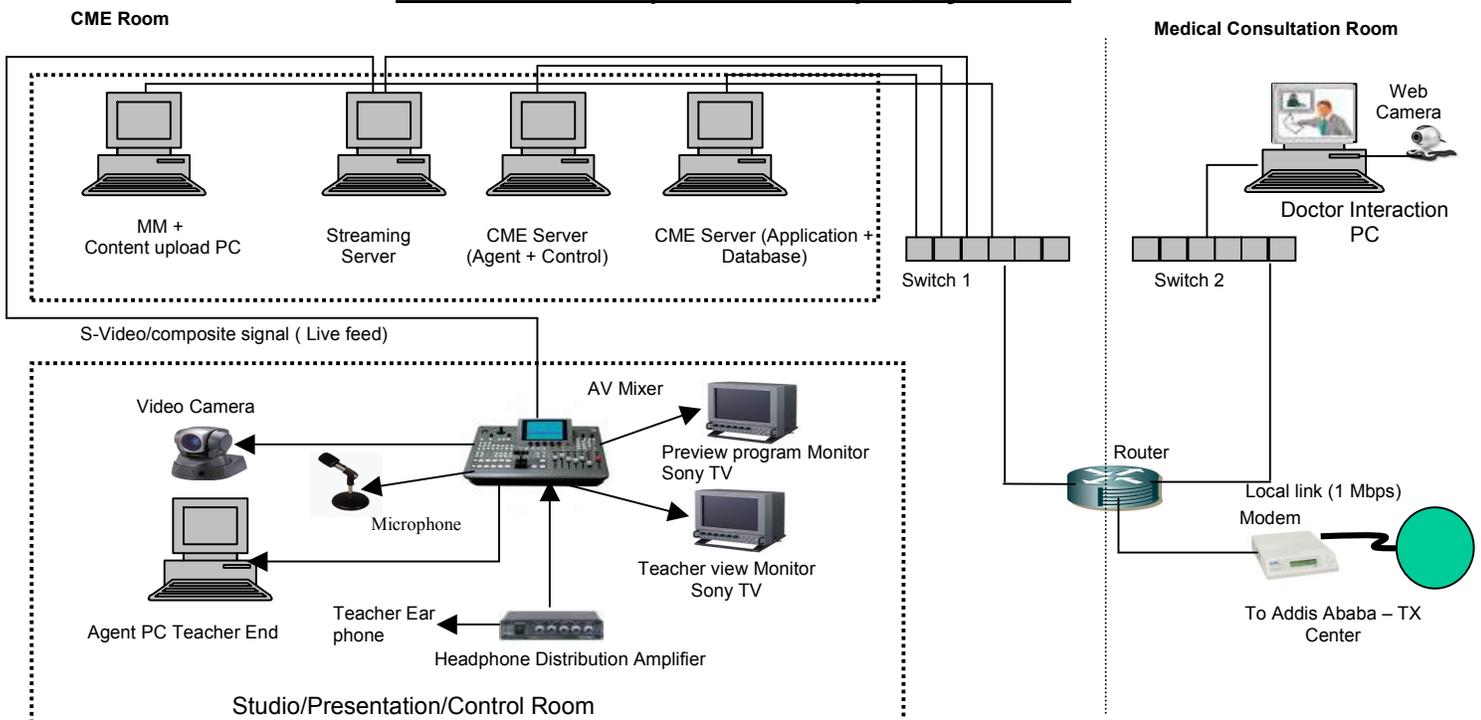
The Tele-education project provides a universal platform for distance learning with a synchronized multimedia delivery in number of platforms to the remote end through VSAT, Broadband and Internet coupled with collaborative tools, Return video and audio, e-learning and campus management system, Integrated digital library and content management system as an integrated package under the educational portal. The educational portal comprising the above-mentioned modules installed at the University centre and a centralized management system provided at for scheduling, organizing and managing the Tele-education system in co-ordination with various universities in Africa and India.

Tele-Medicine Services

The Tele-Medicine network provides connectivity of tele-medicine set-up of CARE Hospital, Hyderabad with two Tele-medicine centres in Ethiopia, which enables the Indian medical specialists to provide on-line medical consultation to the doctors in the tele-medicine centres in Ethiopia. In the present network, Black Lion Hospital at Addis Ababa and one remote hospital in Nekempte have been chosen to receive Tele-medicine services from the CARE Hospital, Hyderabad.

Tele-medicine system consists of customized medical software for patient demographics and workflow for Tele-advice with PACS server and DICOM Server with computer hardware, medical diagnostic instruments which are DICOM compatible and connected to the network. The medical record/history of the patients can be captured and stored in the DICOM format in the server and sent to the specialist doctors in India, who in turn study and provide diagnosis and treatment during live Tele-interactions with the doctor at the patient-ends in Ethiopia. The facility caters normally for transmission of patient’s medical images, records, output from medical devices, and sound files, besides live two-way audio and video. With the help of these EMR, a specialist doctor would advise a doctor or a paramedic at the patient’s end on-line, saving critical time and resources. Initially the telemedicine is planned to provide services of medical consultation and treatment in the areas like cardiology, radiology, neurology, pathology, gynecology, general medicine and infectious diseases etc. as per the requirement of Ethiopian authorities. The tele-medicine equipment in India and Ethiopian centres has already been commissioned to provide services to Ethiopian people.

Tele-medicine Setup at CARE Hospital, Hyderabad



This Hardware and medical equipments support Tele-medicine software, PACS Server, DICOM server that conforms to HL7 and DICOM 3.0 standards. Medical equipments are DICOM-enabled and are able to send DICOM images directly to the DICOM server as per the standards.

Tele-Medicine facility at CARE hospital Hyderabad enables Doctor to patient and Doctor to Doctor interaction for various treatments by transmitting digitized form of X-Rays, ECG, Ultrasound and other test reports from Hospitals in Ethiopia. This facility enables patient to consult with doctor even from remote areas in Africa.

In addition, to facilitate continuous learning in the Medical Sciences, doctors in Ethiopia can get it through the Continuing Medical Education (CME) programme available through this project. Here Doctors at Addis Ababa can interact with specialist doctors to discuss case study and can enhance their knowledge in the respective field.

Tele-medicine set-up at Black Lion Hospital, Addis Ababa

