Developing Modern Information Infrastructure in Africa

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Abstract

Unfortunately, the spread of information technology (IT) has followed the path of many other technologies. The affluent countries are quick to make use of it and gain benefits while the poorer countries must wait. The fact that computer networking technology is concentrated in wealthy parts of North America, Western Europe, and parts of Asia is but one example. In the last few years, several projects pertaining to the effort to bring the computer network technology to the economically less developed countries (ELDC) have been started under the initiatives of different organizations and governments of the developed countries and LEDC. In this paper, we present a survey of some of the pilot projects and some of the operational systems currently providing connectivity to and from African countries.

1. Introduction

Africa is a huge continent, made up of 52 countries partitioned into two major regions: Northern Africa and Sub-Saharan Africa. Each region is further subdivided into subregions such as Southern Africa, East Africa, Horn Africa, and West Africa. It is culturally diverse with many languages and religions.

The role of computer network as a tool for development and social changes in economically less developed countries (ELDC) have recently become an intense technical discussion among scholars and other international communities such as non-governmental organizations (NGO). Even though there is no accurate statistics on computing technology in Africa, reports from individual African countries are very encouraging.

Other uses of computers in general and computer networking infrastructure in particular is an important issue that needs to be addressed since computer networking is a major tool in academic and industrial research and a window to the developmental information desperately needed in the continent. In this paper, we present an overview of some of the obstacles for the effective computer networking and some of the projects currently underdevelopment to bring this technology in Africa.

2. Barriers to Effective Computer Networking

Currently, a number of African countries such as Ethiopia, Zimbabwe, Kenya, Senegal, Egypt, South Africa and Zambia have fully operational systems and

several studies show that computing technology in Africa is increasing rapidly. There are variety of hardware's in use in Africa: Super computers, Mainframes, Mini-computers and Microcomputers. However, the traditional methods of communications such as telex, surface mail and telephone are the main means of communications, which means that the use of computers in Africa have largely been limited to tasks such as word processing, spread sheet, and database applications.

In this section, we examine the telecommunication infrastructure which is essential for the development of computer networking in terms of availability, quality, and the skills required for maintenance of network infrastructure.

In terms of availability and quality, telecommunication infrastructure in Africa has been presented as being among the poorest in the world. Even though telephone densities are low and obtaining telephone lines are difficulty in most of the African countries, such generalized statements cannot, however, be applicable to all African countries. For example, Libya has respectable telephone density and services. However, in Sub-Saharan regions, obtaining telephone line may take as long as 5 years.

In Sub-Saharan region where terrestrial communication network is of poor quality packet radio finds wide application. The low quality of the telecommunication infrastructure in Africa is attributed to the fact that the telecommunication devices tend to deteriorate very rapidly due to climatic factor for which the equipments were not calibrated.

In addition to poor availability and quality, there is a very low pool of skilled manpower to maintain the network infrastructure in Africa. For example, the project to offer electronic mail connectivity to the Friends of the Earth Ghana host in Accra was severely affected due to several reasons the main one being lack of local skilled manpower.

The telecommunication policies are another major bottle-neck to the development of computer network in Africa. They include but not limited to the import and use of telecommunication devices, tariff structures; network traffic and structures. Telephone services are very expensive, especially long distance calls. For example, sending a 6-page fax from Benin to Nairobi can cost $300.

Apart from the fact that quality and quantity of telecommunication infrastructure

in the continent are inadequate, costs of telecommunication devices are falling relative to costs of other forms of communication equipments. Moreover, advances in telecommunication equipments coupled with ease of use of these devices has encouraged many ELDC to adopt them rapidly. Most important of all, however, is that telecommunications infrastructure is high on the list of development plan in Africa.

These and some other factors have stimulated the emergence of several network systems capable to operate within the existing and new communication infrastructure of the African continent. In the following section, we present a survey of some of the network and bulletin board systems currently in operation in Africa.

3. Computer Network in Africa

Some African countries are already connected and some are planning to be connected to the international research networks. There are several countries in Africa with an X.25 network operating such as Zimbabwe, Tunisia, Egypt, Senegal, Mauritius, South Africa, Ivory Cost, Gabon, Niger, Togo, Chad Mozambique and Namibia.

There is a public domain network (PDN) called AARENTO and a more general purpose network called Egyptian National Scientific and Technological Information Network (ENSTINET) in Egypt. In Senegal, the packet radio network called Alternet is in operation.

The main network in Tunisia is Afrimail which was initiated by the Center National de l'Informatique and the Inter-University Center for Informatics and Automatics of Tunisia in collaboration with the University of British Colombia (Canada) and the International Development Research Center (Canada) []. Its purpose is to develop a bilingual electronic mail capability, using both French and Arabic. In 1984, an X.21 circuit switching network become operational in Tunisia. Two years latter, X.25 packet switching network with three national switching centers, plus a node used for international connections to France and Italy was incorporated.

Several African countries such as Egypt, Tunisia and Ivory Coast are members of European Academic Research Network (EARN). The charter of EARN states that it is a network for Europe, the Middle East and Africa. EARN links more than 6000 hosts at more than 500 institutions and has more than

30,000 users. EARN hosts in Africa are IBM or Digital VAX machines.

The Consultive Group Network (CGNET) has subscribers in Mali, Burkino Faso, Niger, Ethiopia and Zimbabwe. CGNET is a conferrencing system specializing in agriculture. PDNs are mostly used, but there are also subscribers in places where such services are not available, such as Kenya. These are connected by international telephone direct dialing to a service in London. Still others cannot initiate international calls such as the International Corp Research Institute for the Semi-Arid Tropics in Niger and Mali and are instead connected by kermits from Palo Alto, California where the CGNET machine is located.

Several FidoNet systems in Africa operate as a host to a number of end users who are able to send and receive electronic mail. FidoNet was developed in 1983 by MS-DOS users who wanted capabilities like those of UUCP and USENET.

In Nairobi, Kenya, there is a Fido bulletin board system which is based at the Environment Lasion Center International (ELCI). It provides a conduit for electronic mail traffic in the region and to NGOs world-wide by connecting through direct long distance call to the GnNet Fido gateway in London, England.

Eastern and Southern African Network (ESABET) is a project to connect university researchers in the Eastern and Southern Africa with each other and with the rest of the world via electronic mail.

In Harare, Zimbabwe, there is a bulletin board called Microcomputer Assistance for NGO (MANGO) which makes daily connection with the Web Fido gateway in Toronto and to WorkNet in Johnnesbutg, South Africa.

The Pan African Documentation Centre Network (PADISNET) is based in United Nations Economic Commission for Africa in Addis Ababa, Ethiopia. It links 34 African countries for the purpose of exchanging development information.

The Regional INformatics Network for AFrica (RINAF) project was recently started by UNESCO, under Italian government funding. The aim of the project is to contribute to the interconnection of academic and research institutions in Africa among them and with the international research community.

HealthNet is a satellite based message service and has several subscribers in Africa such as Kenya, Tanzania, Uganda and Zimbabwe. The Boston based

Satelife organization distributes medical information in Sub-Saharan Africa by low-Earth orbit satellite and e-mail.

Rio is another operational network connecting French speaking African countries namely; Senegal, Mali, Niger, Burkina Faso, Togo, Cameron, Congo, and Ivery Cost. It is intended for researchers working on fields of development in healthcare, food, and environment.

UNINET is an academic and research network in South Africa currently providing connectivity among the universities in South Africa and to the internet.

4. Conclusion

Information Technology is the least expensive technology that can be transferred to ELDC. The poor communication infrastructure in Africa, however, should not be regarded as a total deterrent. New technologies such as wireless communication promises that networking can be made available even in the most isolated communities. In addition, in Sub-Saharan region where terrestrial communication network is of poor quality and packet radio finds wide application, a usable system can be put together with the cost of less than $400.

Reference

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