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**USING E-MAIL FOR COMMUNICATION IN JOS, NIGERIA
PROBLEMS AND PROSPECTS**

By

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INTRODUCTION

Jos is the capital of Plateau state - one of the 30 states making up Nigeria. The climate is mild and pleasant and as such has a lot of expatriates and mission agencies and foreign NGOs. One of such NGO's, the River Blindness foundation with headquarters in Houston commissioned Volunteers in Technical Assistance (VITA) in 1991 to look into ways of improving communication between its head office in the United States and Nigeria and locations within Nigeria.

A survey was done by VITA and they suggested a radio based communication system for communication within Nigeria but gave 3 alternatives for communication between Houston and Jos. The pros and cons of each method were:

1. Standard C - Immarsat satellite terminal for use in transmission of text only messages from remote areas. Disadvantages: that non-text files such as graphics files, word processing or spreadsheet files could not be used. Although the cost of the terminal was reasonable the cost of air time was thought to be exorbitant.

2. Telex for text transmission had the advantage that telex transmission costs are cheap but there was no practical way to bridge data from a computer to the telex terminal and therefore all messages generated locally using the computer would have to be re-keyed to enter the message into the telex system.

3. The telephone based E-mail system using a computer, a modem and ordinary telephone lines. The advantage of this would be the ability to transfer all types of files - wordprocessing, spreadsheets and graphic files. One limitation was the speed of the modem limiting size of files to be transferred.

Nothing much was done about setting up a communication system until in 1993 when I was doing some computer consulting for River Blindness Foundation and since I had some knowledge with modems, I was asked to help setup and trouble-shoot the test e-mail system in association with VITA, USA.

The equipment and the software was already available. We choose to use a Toshiba 286 laptop with an external Hayes 2400 modem. Because Jos does not have a international direct dial service, the system would be based on the calls originating in Houston and using the Software SEADOG, the computer could be set up to receive the calls and upload and download the files and messages without any intervention. The only requirement was to leave the computer and modem on at night. This setup also eliminated the need of a dedicated machine as the computer could be used for normal work during office hours.

TRIAL RUN

The SEADOG software is produced by Sea Enhancement Associates and is simple to use and configure and allows electronic mail on the personal computer using standard telephone lines. It has many features and can be used to send and receive messages and files - which can be of any type including binary files, programs, word processing files, spreadsheet and graphic files. It has a CRC-16 checking polynomial which ensures a close to zero error transmission rate.

The features of this sophisticated store and forward mail system with automatic message routing and redundant backup allow the automatic operation of the system. The operator does not need to bother with the technical details - only entering and reading the messages. Seadog can also be configured to allow users request files from other Seadog systems which can be automated to allow for automatic distribution and update of any file or programs.

The system was set up with the laptop and the modem and the software configured to wait to incoming calls from the US. Gary Garriot of VITA handled the US end and using their software (Frontdoor), the computer in the US could be programmed to call the Jos computer at regular intervals.

We made some voice calls to sort out the configuration and the timing of the call. The initial report proposed that the US computer call Jos about 5 a.m. United States Eastern Standard Time (EST) to take advantage of the low call volume in both countries at that time and the lower USA telephone rates and the dialling computer was to be programmed to make at least 20 tries to connect with the Jos computer.

We decided to start with the US computer calling at 9pm EST and to limit the retries to a one hour window - this was partly due to the fact that VITA was running the system from their bulletin board as part of the VITANET e-mail network and the computer needed to call other computers in other places. We also decided on a frequency of three times a week for the calls.

The first time the transmission was tried, I stayed awake to monitor the call and the transmission and it was largely uneventful. The computers connected after about 2 to 3 tries of unsuccessful handshaking and were able to download and upload the messages Gary and the RBF left for each other. Subsequent transmissions went on uneventfully and the computer could be left on and unattended to.

One problem we had was the unreliability of the phone lines - they phone could go off for days or weeks at end and it would take persistence and following up of NITEL (the phone company) repair technicians to get the line fixed and working again.

While visiting the US that summer, I was able to call at VITA and meet Gary Garriot and sort out other minor problems. I was also able to see their packet radio network and the VITANET centre. It was a very informative and helpful tour. We then tried to sort out the

logistic problem connecting the US River Blindness Foundation office in Houston with that in Jos, Nigeria.

We also decided that when the communication link was fully operational, RBF could have it's Houston office call it directly or use VITA as a communication hub for transmitting messages electronically to designated RBF personnel and offices in various parts of the world. Another alternative would be to have a RBF Houston - Jos - Lagos link with the a computer system being setup in the Lagos office. The Lagos office could then communicate with the Jos office and ship its traffic to the USA first. This would delay the traffic by one day if only one call was made to Jos location from the US.

Back in Nigeria, we continued the testing and were able to transfer wordprocessing files and binary files. I remember I got the latest version of PKZIP via electronic mail - it took about 30mins to download. The line quality was fair but sometimes it would get so bad that the modems would not connect after many tries or rarely transmission would drop before the completion.

OVERCOMING PROBLEMS ENCOUNTERED

One very serious problem we encountered was that of power supply and this was in form of outages and unstable electricity with power surges. We lost one of the modems during one such incident. Apparently, there was power outage and when the power came back, a power surge must have occurred because the next morning, we found the modem all burnt up and melted. Luckily, there was no combustible material nearby as there was a likelihood the fire could have spread and set the office on fire.

To protect against this and other hazards, a UPS and a surge protect for the modem and the phone line itself were got. A UPS was necessary even though we were using a laptop with a battery because an external modem was being used and needed power in event of a power failure.

One other limitation of this system was that you had to wait to be polled since the calls originated in the States and if you missed a transmission, a delay of up to a day (depending on the frequency of the polling) in transmitting the information occurred. Jos at of present does not have International direct dial facilities and connection of the modem via operator is possible but fraught with difficulties and then the changes for calls from Nigeria to the US was about 2-3 times that from the US to Nigeria. Sadly however, after the initial test period of about 3-6 months, River Blindness Foundation did not follow it up and the e-mail was not implemented with them. However, with the potential and advantages involved, they may be ready to give it a second look. however, the Sudan Interior Mission (SIM) mission is operating a private e-mail system in Jos using a trailblazer modem and a UUCP e-mail software. The calls are initiated from the US and has been working fairly okay except for the occasional problem of poor line connection or dead phone lines.

FUTURE PROSPECTS

Pro-Health Foundation, the organisation I am involved with has been using limited e-mail setup in Jos mainly for communication with the US. We were interested in setting up an AIDS information center in collaboration with ICRC World Lab in Switzerland and USA who have set up a research lab in Jos but did not get any funding after submitting a proposal.

The advantages of e-mail over the conventional means of communication -telex, fax, phone, cable, post are many and I will list just a few. ^G E-mail is cheap and convenient -a fifty page document could be transmitted in less than three minutes while a one page fax could take about the same time and in Nigeria, the minimum charge for international calls is 3 minutes so you pay for three minutes for a one page fax regardless of how long it takes.

^G Document files, spreadsheets, binary files and even sound files and video files can be transmitted across different protocols. ^G E-mail can be sent to one or a thousand people at practically the same cost and can be forwarded, re-directed regardless of time zones. Considering these, a full information centre can be setup as an independent organisation and developed into offer all or some of following these services at subsidised rates to the University, NGO's missions bodies and the general public.

^G Information centre - by send technical questions to relevant usenet groups for answers, gathering, storage, spreading of important information on Health, AIDS, agriculture, news etc. ^G Bulletin Board - offering on-line library and searching ^G Distance education and research and teaching ^G Commercial services - e-mail bureau by providing mailboxes, e-mail node for organisations, consultancy services etc.

External funding will be needed for capital costs - equipment, subscription services, phone line acquisitions and international phone bills. Prohealth Foundation could provide furnished office space at subsidised rates. The charges made could cover some of the running costs like staff salaries and other overheads. We are interested in obtaining funding to set up a reliable country-wide e-mail system for Nigeria as none exists as of now. It is even more of a priority now that the postal services are becoming unreliable and very slow. A trial network connecting a few of the major cities can be setup and the main gateway to the US can be setup in Jos.

With the improvement in modem technology and advent of digital phone services in Nigeria (leading to an improved line quality), the new V.34 modems can be used to increase speed of transmission and cut down on telephone bills. The limitation here is the international telephone rates especially in Nigeria at the moment. One way round this is to subscribe to one the companies that offer Call back services from the U.S. and get the cheaper US rates for international calls and improved digital and fiber-optic connection. The system works by assigning you a trigger no which you call and then allow to ring a certain number of times. the

computer at the other end has been programmed with a number that you give it in advance and calls that number and gives you a US dial tone which you can use to connect to anywhere in the world including U.S. 800 numbers.

Three options exist for the gateway to connect with the US for mail exchange with Internet and this are discussed briefly below.

1. Set up a similar computer system (with access to Internet) in the US with calls that originate from the US and call the computer at Jos. Similar to the RBF trial. Mainly e-mail possible.

2. Get one of the call back services and subscribe to one of the On-line services like CompuServe and America Online and dial into them directly from Jos. Automation is possible with both services allowing automated delivery of e-mail. Both introducing 28.8k bps access soon so real time online access may be done to retrieve information or participate in online conferences.

3. Many organisations in the US are offering dialup services using SLIP or PPP connections to the Internet and one of this services could be subscribed to and accessed from Jos initially for e-mail services but as time goes on, limited to full internet access -ftp, gohper, World Wide Web could be offered. This would offer the ability to have a domain name and offer users a chance to subscribe the a personal e-mail account on the Internet.

The city of Jos will soon get a digital telephone network and International Direct Dial (IDD) will be possible. One would like to find out from NITEL in Nigeria if the digital services offer ISDN capability and at what extra cost. It will then be feasible to obtain faster 56k bps that is possible with full ISDN and this would make online access much faster.

The gateway in Jos can also run a 24 hour bulletin board and serve as information centre and allow users with modems access information, e-mail at any time. It can also allow dial up services directly with any of the nodes setup and with a software as Seadog or other similar e-mail, the system in Jos could poll the other computers at the other nodes once or twice a day to download and upload messages and files.

The other nodes for the trial national; e-mail system could be setup in the University or with a NGO in the location. Dedicated equipment would not be needed for the nodes as they could use the computer during the day and leave it on at night for the transmissions.

Drawing from the experience with RBF, a note book with an integrated fax-modem and surge protector would be the computer of choice as it removes the need for a UPS system needed for a desktop system. If a desktop system is chosen, apart from the UPS and surge protector, a device available allows the computer to be put off and the devices turns on the system when the telephone rings and shuts it down after communication has taken place. This reduces the risk of fire or other damage to the computer or modem.

The gateway and main information centre in Jos can use a notebook or a desktop with the provisions as described in the previous paragraph. Because of the telephone services in Jos are still not very reliable, about 2-4 lines can be obtained and a 2 line bulletin board setup. Mail boxes can be set up to enable remote users access the system for their e-mail. The other lines will serve as a backup in case the main lines are disrupted or go dead as is common.

The gateway in Jos can serve as an information centre and provide information to the University, NGO's and other organisations by install a CD-ROM changer and some CD-ROMS with titles covering AIDs, medicine, education etc and other relevant areas and arrangements can be made with VITA and other organisations to serve as a local agent for all their information documents and technical papers. Local requests to the most of the information required from VITA can be provided faster and cheaper. All that may be needed is to have the documents on the hard disk and print what is required on demand.

Training can be arranged for the node operators at the Information centre in Jos and it will be recommended to train up to 2 persons per node to as to provide backup in case one person is sick or indisposed. The co-ordinator of the project can attend the E-mail course organised by VITA in the US and any other relevance courses on using Internet.

CONCLUSION

It would be great if funding for such a project could be obtained so that an experimental system to provide e-mail could start and this can be expanded as over time to cover the major towns in Nigeria. This will help Nigeria join the technological revolution faster especially in this time of economic crisis.