Re-establishing and improving the experimental VoIP link with the University of Namibia: A Case Study

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Objective of Research

The aim of this project is to re-establish a consistent and reliable voice link over the internet between Rhodes University (RU) and the University of Namibia (UNAM). VoIP (Voice over Internet Protocol) is currently enabled and working on RU campus [1]. We need to re-establish and enable VoIP at UNAM. If permitted by UNAM we will need to implement traffic shaping and quality of service (QoS) so as to have consistent bandwidth flowing to the VoIP unit. If successful, we will attempt to send live video across this link to test for the possibility of enabling a SIP (Session Initiation Protocol)-based video conferencing facility.

Background

In August 2004, a VoIP link was established between RU and UNAM. The VoIP link had a countless number of problems due to limited and inconsistent bandwidth at UNAM. The UNAM network was not configured correctly which meant a degraded and inconsistent voice link could only be established.

The transmission of voice over a data network was first introduced in the 1970s using an experimental protocol called Network Voice Protocol [3]. It has now grown in a new area in telecommunications called Next Generation Networking (NGN) [4]. It provides a cheaper solution to the traditional fixed line and modern mobile/cell-phone networks. The diagram below illustrates the intended set-up of VoIP for this project:

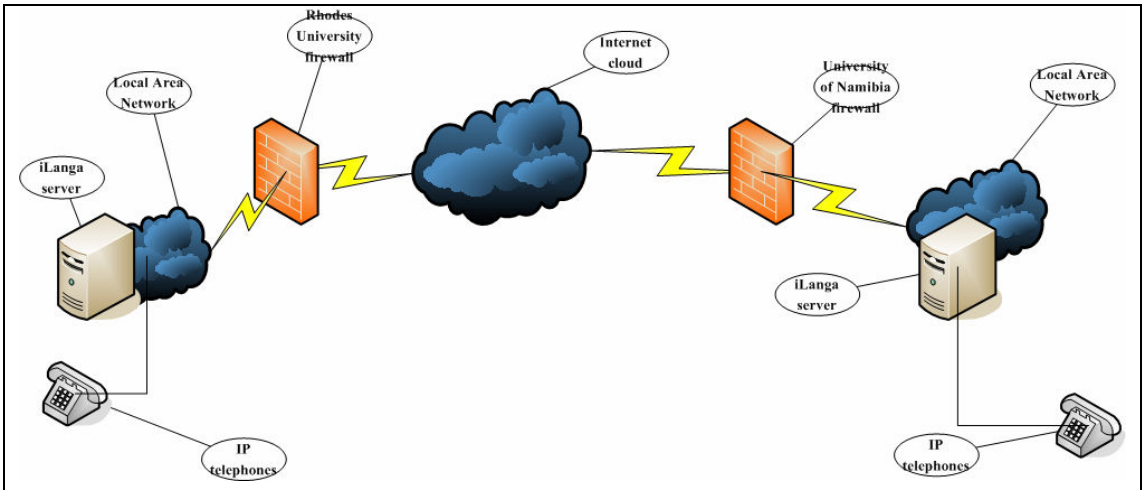

Figure 1: VoIP set-up

Approach of Study

Obtain in-depth knowledge on VoIP, methods of enhancing network traffic and implementation and deployment of VoIP.

First Semester	**Tentative Dates**
1st Term	**5/02/07 – 30/02/07**
Submit research proposal	*5/03/07*
Prepare for first project presentation	6/03/07 – 13/03/07
Design and implement project website	6/03/07 - 9/03/07
In-depth familiarization of UNAM network	14/03/07 – 16/04/07
2nd Term	**16/04/07 – 22/06/07**
Read material related to the topic	16/04/07 – 30/04/07
Prepare literature review	21/03/07 - 28/05/07
Start UNAM implementation phase of VoIP	01/05/07 – 20/07/07
Submit literature survey and plan of action	*28/06/07*
Second Semester	
3rd Term	**23/07/07 – 7/09/07**
Project presentation	*23/07/07 – 3/07/07*
Test data connectivity between RU and UNAM	23/07/07 – 15/07/07
Test VoIP link and troubleshoot	23/07/07 – 15/08/07
Design poster presentation	13/08/07 - 20/08/07
Present project poster	*20/08/07*
Test live video	20/08/07 – 7/09/07

4th Term	**17/09/07 - 29/11/07**
Submit draft of project paper/thesis outline	*17/09/07*
Submit final draft of project paper/poster/thesis structure	*24/09/07*
Submit chapter 1 of project paper	*1/10/07*
Prepare final project presentation	22/10/07 - 29/10/07
Project presentation	*29/10/07 – 02/10/07*
Final project write up	1/11/07 – 5/11/07
Project submission	*5/11/07*

Deliverables

- Establish a fully working VoIP model between RU and UNAM
- Possibly establish video conferencing using VoIP
- Possibly create a blueprint for connecting educational institutions in other parts of Africa using video and VoIP

Equipment Requirements

Using *Figure 1* illustration as a base model the equipment required for this project are IP telephones (one at RU and the other at UNAM). Two servers running iLanga [2]. iLanga was developed at RU and was designed to be a cost effective computer-based Private Branch Exchange (PBX) [2]. Internet connectivity is crucial in order to establish VoIP for this project. RU already has IP telephones, an iLanga server with internet connectivity. We will need to make sure that we can put the same in place at UNAM. We may need to travel to UNAM to negotiate for a decent or dedicated internet link.

Relevant Publications

Hitchcock, Jonathan. *Decorating Asterisk: Experiments in Service Creation for a Multi-protocol Telephony Environment Using Open Source Tools*. March 2006. This paper will help me understand more on the implementation of VoIP. It is a paper written by a Rhodes Masters graduate.

Penton, Jason. *iLanga: A Next Generation VoIP-based, TDM-enabled PBX*

SATNAC 2004. *Conference papers on telecommunications*. September 2004. This publication contains numerous papers on up-to-date trends in the telecommunications industry.

SATNAC 2005. *Conference papers on telecommunications*. September 2005. This publication contains numerous papers on up-to-date trends in the telecommunications industry.

Minoli, Daniel. Minoli, Emma. *Delivering Voice over IP Networks.* 1998.

Walker, Q, John. Hicks, T, Jeffrey. *Taking Charge of Your VoIP Project*. 2004.

For introductory knowledge into VoIP the following websites are an asset.
http://en.wikipedia.org/wiki/VoIP - introduction to VoIP
http://www.cisco.com/en/US/tech/tk652/tk701/tsd_technology_support_protocol_home.html - Document on VoIP
http://www.cisco.com/en/US/tech/tk652/tk698/tsd_technology_support_protocol_home.html - Document on voice quality (QoS)

Reference

[1] Hitchcock, Jonathan. *Decorating Asterisk: Experiments in Service Creation for a Multi-protocol Telephony Environment Using Open Source Tools*. March 2006
[2] Penton, Jason. *iLanga: A Next Generation VoIP-based, TDM-enabled PBX*
[3] *Voice over IP*. http://en.wikipedia.org/wiki/VoIP
[4] *Next Generation Networking*.
http://en.wikipedia.org/wiki/Next_Generation_Networking