

Nepal Research and Education Network

An Update at APAN/Intenret2 Joint Meeting
Honolulu 2013



Executive Summary

- Nepal Research and Education Network (NREN) has been established as a facilitator to support for advanced research and education network through the means of Information and Communication Technology.
- Extending national networking and connected to Internet2/GEANT.
- Facilitation of different research activities
- Run a network connecting 25 institutions at end of 2012, and also facilitating Nepal Wireless Project.



Formation of NREN

- NREN was formalized in 2006, but activities have been ongoing since 2003
- Connect institutions of higher learning together into a network that can facilitate research and sharing of knowledge
- Become member of Asia Pacific Advanced Network (APAN)
- Locally Supported by
 - Academicians, Educationists, Internet Exchange, Industry Associations, Individuals



Structure of NREN

- Board of Directors
 - Elected from the members
- NREN Secretariat
 - Also provides services to other similar organizations
- Technical Department
 - Partially Outsourced NOC operations
 - Facilitate research and training activities.
- Working Groups
 - Medical Working Group
 - Wireless Working Group
 - Sensor Networks Group



Key Points

- NREN is formed and registered as a NGO, as an initiative of it's own members, not government activity.
- Self sustaining (from membership fees, training, other activities) for domestic operations and secretariat
- Government funding limited to the payment for TEIN connection.
- We need to fund raise further to expand the network.



NREN Network

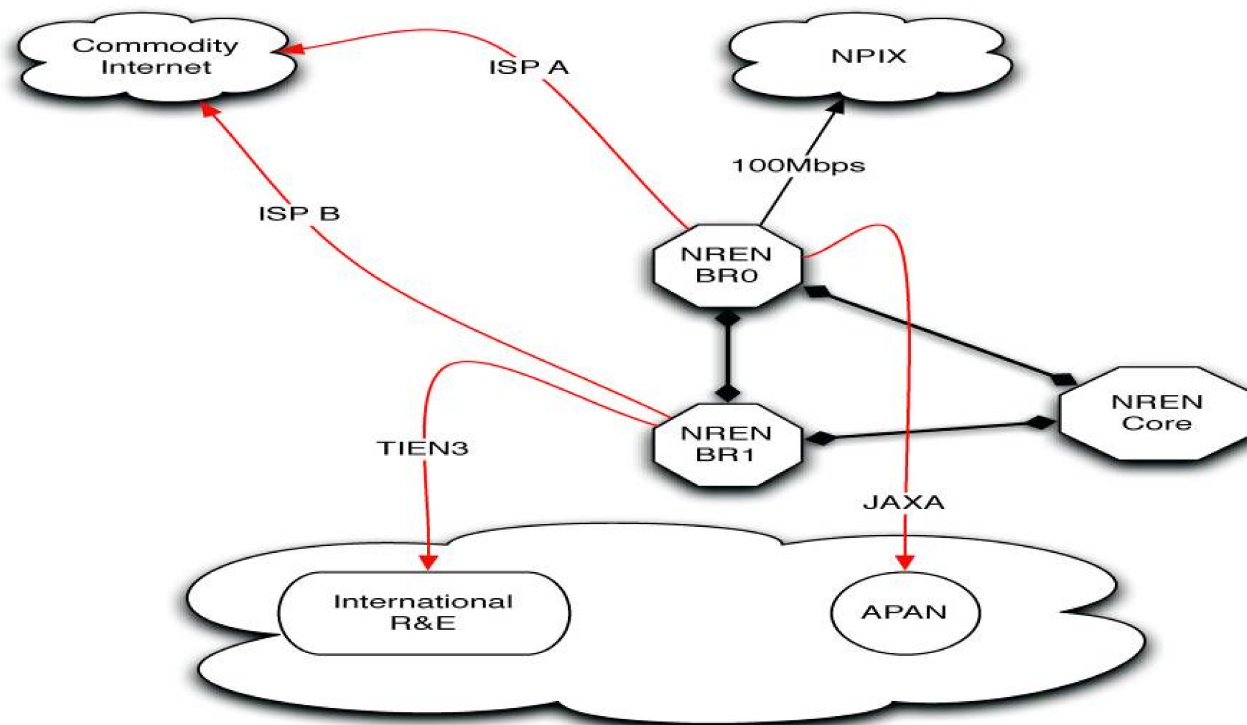
- Own IPv4 and IPv6 address blocks from APNIC, including own ASN
- Using the best practices in IP Networking
- Networking hardware of various kinds used in the network. e.g Cisco, HP, Soerkis, Mikrotik, Linksys ...
- Have 10Mbps Internet Transit for R&E purpose
- Donated by one of the local ISPs - World Link Communications
- Currently has a 45Mbps connection to TEIN3 and onwards to GEANT and Internet2.



Domestic Network

- Connected to 22 members by Fiber, including TU Central Campus and KU campus in Dhulikhel
- Bandwidth allocation on network varies from 2Mbps to 100Mbps, can be increased with little additional costs
- All fiber connections are specially negotiated pricing with the local service providers
- Network already extended to Pokhara, in western Nepal, to facilitate Nepal Wireless Project.
- Soon to extend to eastern region of Nepal.

Current Network



Nepal Research and Education Network (NREN)
Proposed Core Logical Network
v2008042102

JAXA Link is proposed, but not likely to happen

Partnerships- NWP

- Nepal Wireless Project
 - A pioneer Wireless networking project initiated by Dr. Mahabir Pun in the rural mountainous areas of Myagdi
 - Using Wireless networking with relays in mountain tops
 - Provide communications as well as education, telemedicine and other services.
 - NREN staff help in network operations and NREN provide backbone connectivity between many sites.



Partnerships - PHECT

- Public Health Concern Trust (PHECT)
- A public initiative to provide affordable and good healthcare in Nepal
- Runs and Manages the Kathmandu Model Hospital
 - KMH is the core site for Tele-medicine efforts of NREN and NWP
 - NREN and NWP jointly provide the technical support and network for telemedicine
 - The medical working group chaired by Dr. Saroj Dhital



Partnerships - KEIO University, Japan

- Collaboration in the area of monitoring climate change and melting of glaciers in the himalayan region
- Worked to establish high altitude wireless network in the Everest region to establish field servers and sensor cameras
- Supported in the project by APAN-JP and local providers
- The infrastructure built for the research work can be utilized to provide additional services to the locals.

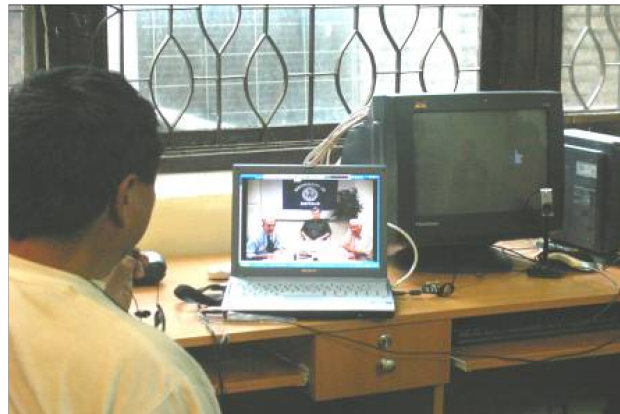
Other Partnerships

- Nepal Internet Exchange - Commercial ISPs's IX
- Healthnet - ISP focusing on health/education sector
- Local Service Providers
- Government Agencies
 - HLCIT, NITC, etc
- Nepal Medical College
- Skin Hospital and Research Center

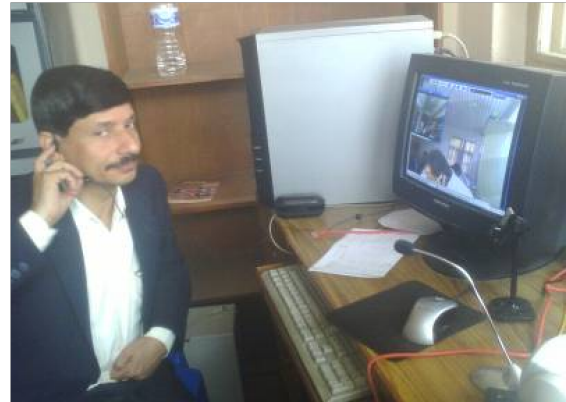
Telemedicine Activity

- Kathmandu Model Hospital functions as the hub for telemedicine activities
- KMH is connected with multiple fiber providers to the NREN NOC and network, enabling us to provide full service
- Wireless connection to the Gaurishankar Hospital in Dolkha, and to Trishuli Health Post is from the hospital.
- Basic Videocon facilities available already
 - Polycom Multi Conference Unit - 16 simultaneous Users
- Additional facilities for Video Conferencing being developed





Telemedicine



Climate Change

- Imja_Tso Monitoring System
 - Establish a network and facilitate climate change observation in the Everest Region by setting up a monitoring station at 5300m and Relay at 5250m.
 - Ongoing work, though hampered by extreme climate and decreasing funds
- Myagdi Weather Station (with NWP at 3650m)
 - Use the existing Nepal Wireless Network to setup weather monitoring and sensor system in Khopra and other Relays. Also aids the airlines flying in those area.





Imja Monitoring

- Initial work was in 2007-2008
 - Major activity and I presented about it at TIP2008
- Follow up work in late 2009
 - Replace batteries, re-locate a few devices, simplify the wireless connection (removal of one relay)
- 2nd Followup in 2011 : Need to replace batteries again. Proving difficult to manage the batteries and thus keep the sites running. NREN managed to pay for bandwidth.
- Current Situation: Bandwidth options are much better now, but capex/opex is difficult for power and transport.



Current Focus

- Applications
 - Need to enhance the current network and video capabilities. Add a more capable MCU for more partners
 - Need to identify/test in-expensive digital medical equipment that can connect to the network directly.
 - Involve more students in being able to use high speed networking capabilities.
 - Enhance the using of Collaborative global cloud platforms like Google Apps.



Local Telecom Partners

- Preferred and at-cost facilities provided by
 - World Link Communications, also donates 10mbps of commodity, and the 100mbps link to Pokhara
 - Subisu Cable net (local fiber at-cost)
 - Websurfer Communications (local fiber at-cost, below market rates)



Thanks

- gaurab@nren.net.np
- info @ nren.net.np

