Title: The Brazilian Telemedicine University Network

Authors: Nelson Simões nelson@rnp.br
Wilson Coury wbcoury@rnp.br
José Luiz Ribeiro Filho jlribeirof@rnp.br
Luiz Ary Messina messina@rute.rnp.br
RNP- Rede Nacional de Ensino e Pesquisa
Rua Lauro Muller 116 sala 3902
Botafogo - Rio de Janeiro
CEP: 22290-906, Brasil

Keywords: telemedicine, e-health

Abstract

The Brazilian Telehealth initiative enables videoconferencing, diagnosis and second opinion, continuous education and web conferencing, by linking university hospitals via RNP, Brazil's national education and research network. It operates two significant national projects:
- The Telemedicine University Network, RUTE, currently connecting 19 University Hospitals, will connect 57 across all federal states in 2008.
- The National Telehealth Primary Care Program, initially rolled out across nine states and 900 municipalities.
How Brazil is improving medical and health education, diagnosis and treatment by connecting resources within their own country and overseas, (RUTE/RNP linked to ALICE linked to Internet2 and GN2).

Overview

After enabling telecommunication infra-structure to over 350 education and research institutions, helping an estimated public of over a million users, and linking all the Brazilian regional academic networks, RNP is heading to building user communities. Still at the beginning of the century there was no integration of Brazilian e-Health communities nor a national consensus. Isolated projects started late 90s. The e-health EU-@lis projects stimulated 2004-2006[1] both Federal Ministries of Health and Science & Technology. Examples of patient remote assistance from an underserved area through an University Hospital over to a second opinion or case study in Europe using Geant occur, but a real e-health integration to the European e-Health community is still to be constructed.

e-Health public policies connecting most LA countries through Alice RedClara to Europe and USA are being stimulated through workshops, projects and build a basis to regional development. See Fig.5.

[1] **IV EUROPEAN UNION – LATIN AMERICA AND THE CARIBBEAN MINISTERIAL FORUM ON THE INFORMATION SOCIETY, *An Alliance for Social Cohesion through Digital Inclusion,* Rio de Janeiro, 22-23 November 2004, RIO DE JANEIRO DECLARATION Lisbon, 28-29 April 2006, LISBON DECLARATION,**

The Brazilian Telehealth initiatives achieved its federal ministerial integration stage as the National Health Ministry, MS – Ministério da Saúde, created in March 2006 the Permanent Commission of Telehealth and in January 2007 the National Telehealth Program in the Primary Care www.telessaudebrasil.org.br . These acts followed the first initiative of the Brazilian National Science and Technology, MCT – Ministério da Ciência e Tecnologia, in establishing a Telemedicine University Network called RUTE – Rede Universitaria de Telemedicina www.rute.rnp.br , based on the implementation of telecommunication infra-structure in the University Hospitals, starting January 2006.

As the telecommunication infra-structure is run under the Brazilian National Education and Research Network, RNP – Rede Nacional de Ensino e Pesquisa, which is a governmental institution run by MCT and the Brazilian National Education Ministry, MEC – Ministério da Educação, the Telehealth formerly activities in Brazil received a new ministerial integration status involving all three Ministries - MS, MCT and MEC - and gaining consideration and respect from the academic researchers and institutions but also from the Federal Medical Council – CFM, which has been following the initiatives and is mainly since 2006 promoting national Workshops on Telemedicine and Telehealth throughout the country[2].

One of the most effective health programs in Brazil is the Family Health Program. It consists basically of a health team, usually two health professionals, that visit the families in their homes, collect health data, when necessary brings a family member to a health primary care attendance center, and orients the family in respect to healthier attitudes and health prevention. The teams receives therefore continuous education in order to be able to handle new trends in health family care. The National Telehealth Program in the Primary Care is exactly in charge of applying innovative TICs to the Family Health Program.

The Brazilian Telehealth National Program applies in its first phase to nine states (Amazon, Ceará, Pernambuco, Rio de Janeiro, Minas Gerais, Goias, São Paulo, Santa Catarina and Rio Grande do Sul) and uses as reference centers the nine University Hospital members from the Telemedicine University Network RUTE. These are all already equipped with TICs infra-structure and Videoconferencing systems, running education and collaborative research works also with European institutions. These will be improved, increased and stimulated.

In order to promote the coming forward of Tele-health Clusters in the States not yet participating in the National Tele-health Project in the first stage, a two point strategy of high speed Internet access and infra structure is being implemented, achieving hereby an initial nation wide health care network in all states in Brazil.

An ongoing project in Brazil, run by RNP – Rede Nacional de Ensino e Pesquisa (National Education and Research Network), is building MANs on the 27 state capitals where RNP has its PoPs (Redecomep - www.redecomep.rnp.br , Education and Research Community Network). The purpose of this project is to connect all major public universities and research centers in the country with optical fibers owned and managed by local consortia formed by these institutions and RNP. The initial capacity that will be available for the member institutions on

[2] I Telemedicine and Telehealth Workshops promoted by the Medical Councils in the Brazilian Regions: North, March 2007, Manaus; Northeast, May 2007, Recife; Center-West, July 2007, Brasília.

each MAN – Metropolitan Area Network is 1Gbps based on Gigabit Ethernet optical switching technology. Those MANs are being deployed at this time and they are expected to be operating along 2007 and 2008. (Figure -1)

The MANs will be interconnected nationwide over the new RNP backbone (Rede Ipê) which currently has Gigabit capacity connections to 10 major PoPs (10Gbps for Rio de Janeiro, Sao Paulo, Brasilia e Belo Horizonte and 2.5 Gbps for Porto Alegre, Florianopolis, Curitiba, Fortaleza, Recife e Salvador) - http://www.rnp.br/backbone/index.php (Figure -2)

On top of this infrastructure the network is being prepared to support specific areas such as health (telemedicine), grid computing, high energy physics, to give some examples.

The health area is showing the most interest and feasibility. The project Rute[3] - Rede Universitária de Telemedicina (www.rute.rnp.br) (Telemedicine University Network), funded by the Ministry of Science and Technology, is building and updating the application-level infrastructure of 19 university hospitals, in the major cities of the country. The project goal is to allow all the participating hospitals to use RNP network to run telemedicine and telehealth applications including video conferencing for information exchange, second opinion, continuous education and web conferencing. It builds the basis for the inter-hospital collaboration.

An additional funding also by the Ministry of Science and Technology has been recently approved to expand[4] the Rute project to include 38 more university hospitals and health universities, and therefore connect all the 45 public federal university hospitals in the country, yielding a telecommunication and Telehealth infrastructure project for 57 health institutions. RUTE, the Telemedicine University Network will then be represented in all states in Brazil.

As part of the RUTE project there is a council which includes members of the major university hospitals, RNP, the Brazilian Association of University and Education Hospitals, a representative of each Ministry of Health, Education, Science and Technology and FINEP, the National Funding Agency for Projects and Studies, which discusses and defines the policies, procedures and all the subjects related to the use of the Telemedicine Network.

The contributions of each RUTE member rely on their specialties knowledge and educational capabilities. These are detailed in each workplan attached to the agreement signed between RNP and the Rute members institution. Following recommendations from the Brazilian Medical Federal Council[5], they range from praxis oriented health educational broadcast programs, through teleducation health on-line undergraduate and graduate disciplines, video on demand health libraries, to web and videoconference on study cases, health family teams, students, researchers, professors and patients evolutions teleassistance on specialties diagnosis and second opinion, ranging from radiology to cardiology, certification of death,

[3] RUTE - Rede Universitária de Telemedicina, Convênio Encomenda-FNDCT Ação Transversal ref. 2738/05, (UFPR, UNIFESP, Pazzanese, UNIMAR, UNICAMP, UFES, UFBA, UFAL, UFPE, UFPB, UFC, UFMA, UFAM, FioCruz, HC – FMUSP, HU-USP, ISCMPA, UERJ, UFMG, UFSC), January 2006

[4] RUTE expansion, Implantação de Infra-Estrutura de Informação para Comunicação dos Hospitais Universitários Federais através da RNP, Referência Finep n.º 2365/06, December 2006.

5 Resolution CFM nº 1.643/2002 on Telemedicine focus on health care, research and education.

pediatrics, nephrology, pathology, surgery, nursing, tropical diseases, dermatology, ophthalmology, among others.

RNP is also part of the Latin American Cooperation for Advanced Networks (Clara): Argentina, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Peru, Uruguay and Venezuela. Clara connection to Europe is funded by the European Commission (program @LIS).

The approved RUTE expansion starting January 2008 applies to 9 specialties federal health institutes, including cardiology, oncology, rehabilitation, orthopedic and trauma, deaf, hearing impaired and blind, sanitary, aids and Indians complementing the Telemedicine University Network RUTE.

Acknowledgements:

This project is run by the Brazilian National Education and Research Network RNP – www.rnp.br , funded by the Brazilian Ministry of Science and Technology MCT, through the Brazilian National Funding Agency for Projects and Studies FINEP.

List of Images:

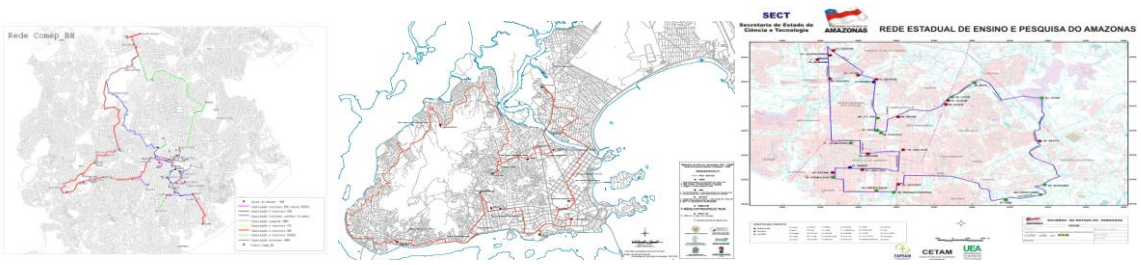


Figure -2: Redecomep, State Capital Launched 1Gbps Rings, Brazil

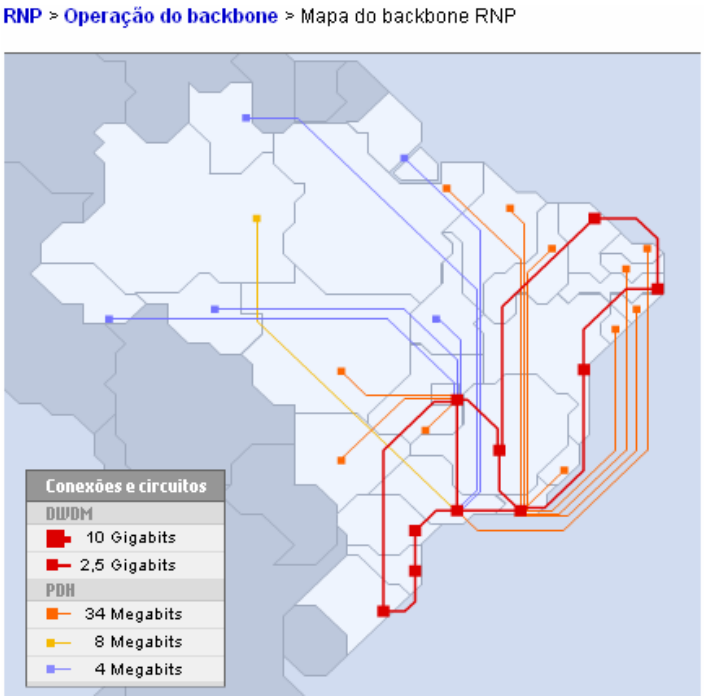


Figure -3 RNP Backbone in Brazil

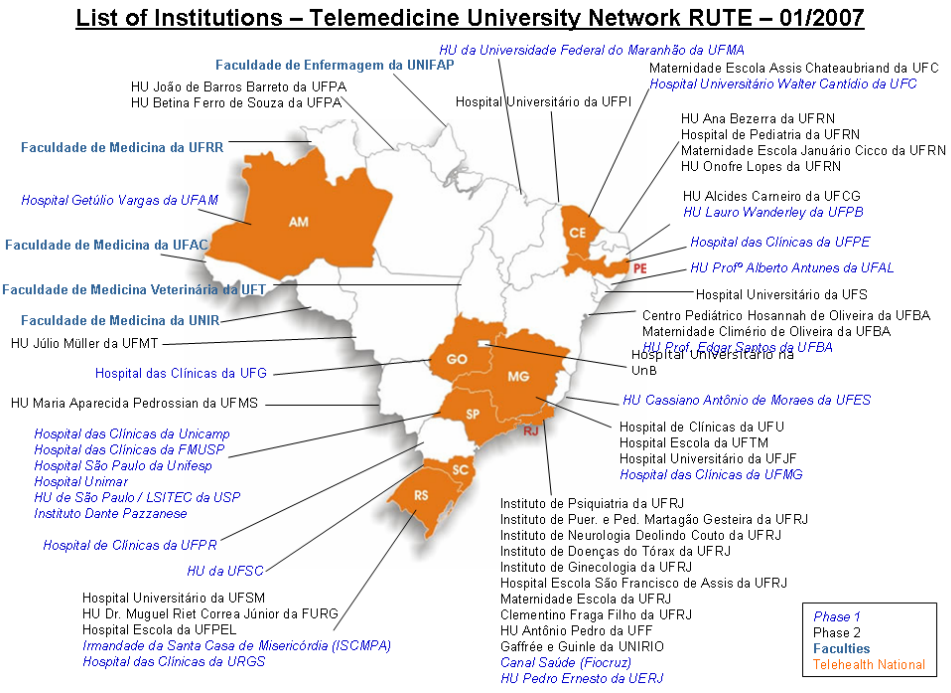
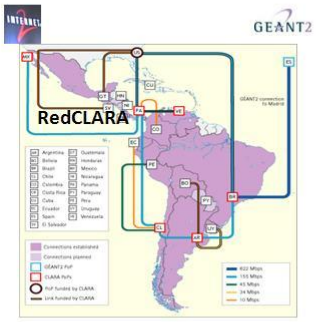


Figure 4: RUTE Members, University Hospitals

INTER-AMERICAN DEVELOPMENT BANK
Integration and Trade Sector

REGIONAL PUBLIC GOODS
Promoting Regional Solutions to Regional Problems



Ministries of Health participating:
Brasil, México, Colombia, Ecuador y Uruguay
Observers: Argentina, Chile, El Salvador y Peru

1. *Patrón regional de requisitos mínimos para la transmisión de datos e infraestructura*
2. *Estrategia para la promoción, prevención y asistencia de telesalud*
3. *Guías regionales para la gestión de telesalud*
4. *Estrategia para una red de investigación en temas de telesalud*
5. *Modelo de Capacitación y Certificación para personal en telesalud*

Project RG-T1509 : Protocolos Regionales de Política Pública Para Telesalud (eHealth Public Policies in Latin America)

Figure 5: Telehealth Public Policies in LA (RG-T1509), IADB