



The NSRC cultivates collaboration among a community of peers to build and improve a global Internet that benefits all parties. We facilitate the growth of sustainable Internet infrastructure via technical training and engineering assistance to enrich the network of networks.

Our goal is to connect people.

September 2016



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NSRC

Network Startup Resource Center

Building international R&E
connections...

Google



...in more than 120 countries
since 1992

NSF award number 1451045



Roots of the NSRC

- Started by Randy Bush and John Klensin in late 1980s and early 1990s
- First email systems (FidoNet and/or UUCP) in many countries
- First NSF grant formalized the NSRC in 1992
- Operated from University of Oregon beginning in 1996
- Helped establish first Internet connections for
 - Peru, South Africa, Egypt, Indonesia, Kenya, Liberia, Morocco, Saudi Arabia, Sri Lanka, Tanzania, Togo, and assistance to many others
 - Development of Internet Exchange Points: Panama, Uganda, Democratic Republic of Congo, Swaziland, Ghana, Angola, Kenya, Haiti, Côte d'Ivoire, Tanzania and Thailand



Enabling International R&E Cooperation

- NSRC's activities are global in scope
- Addresses and solves problems in the field with local partners
- Technical training with Universities, NRENs and regional NOGs
- Direct engineering assistance to improve networks
- Network security and performance monitoring
- Wireless infrastructure to improve both faculty and student access
- DNS stability, security and ccTLD technical assistance
- Leveraging government, industry, and private investments
- Equipment donations improve core infrastructure and IP services
- Cyberinfrastructure enables international scientific collaborations



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NSRC On the Ground 2011-2016...

...82 countries

American Samoa

Armenia

Bangladesh

Benin

Bhutan

Bolivia

Brazil

Burkina Faso

Cambodia

Canada

China

Costa Rica

Czech Republic

Denmark

Djibouti

Ecuador

England

Fiji

Georgia

Germany

Gambia

Ghana

Guam

Guatemala

Haiti

India

Indonesia

Ireland

Italy

Japan

Jordan

Kazakhstan

Kenya

Korea

Laos

Lebanon

Lesotho

Madagascar

Malawi

Malaysia

Mali

Mexico

Micronesia

Mongolia

Morocco

Mozambique

Myanmar

Nepal

Netherlands Antilles

New Caledonia

New Zealand

Nicaragua

Nigeria

Panama

Peru

Philippines

Portugal

Rwanda

Samoa

Saudi Arabia

Senegal

Singapore

Solomon Islands

Sri Lanka

South Africa

Swaziland

Tanzania

French Polynesia

Thailand

Togo

Tonga

Trinidad & Tobago

Tunisia

Turkey

UAE

Uganda

USA

Vanuatu

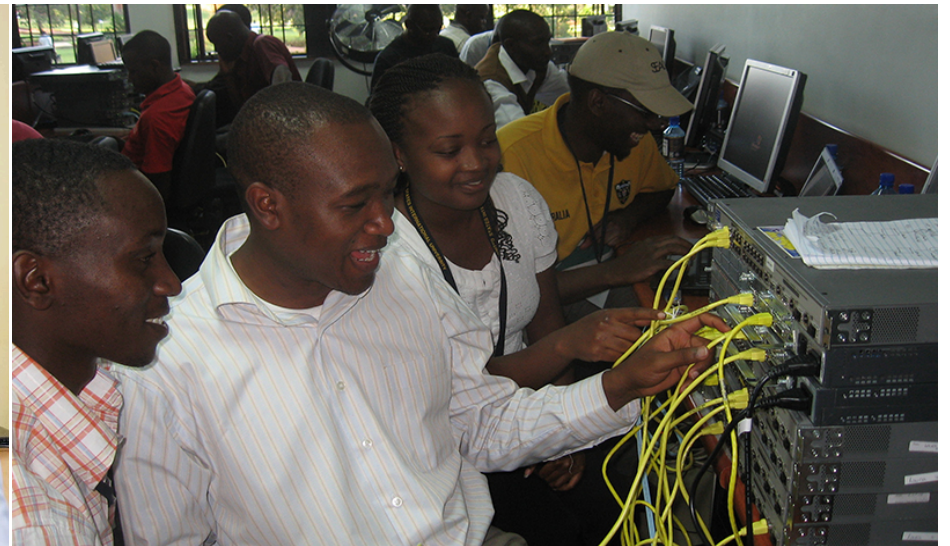
Vietnam

Zambia

Zimbabwe

The NSRC Model

- Technical training and human resource development activities
- Direct engineering assistance
- Participatory development
- Local hands cultivating local expertise



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VTP, MDP and DEA

- VTP: Virtualized Training Platform
 - Single, portable computer to support entire workshops
 - Leverage use of participant laptops to reduce cost
 - Runs entire network, servers and back-end infrastructure (DHCP, DNS, WiFi, Web) in compact form.
- MDP: Materials Development Platform
 - Push-button deployment of workshop topics
 - Presented as entire workshops, or topics grouped modularly
 - Deploys in conjunction with VTP, or not. Back-end store is Git.
- DEA: Direct Engineering Assistance
 - Work with local engineers to improve, build and optimize networks (L1/L2/L3, monitoring, security, services)
 - NSRC facilitates hardware donations as needed for DEA
 - Follow-on activity to workshops with engineers in attendance



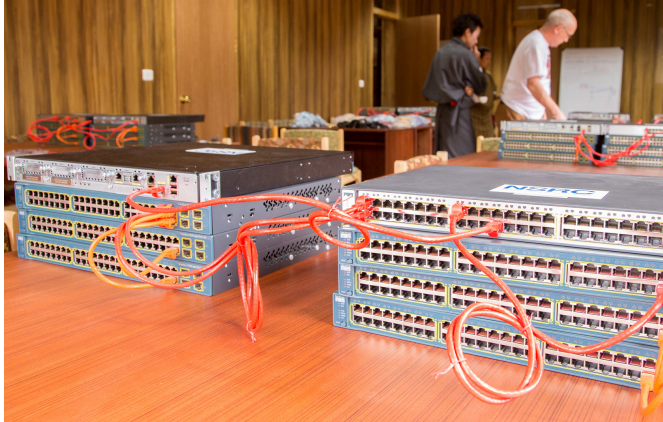
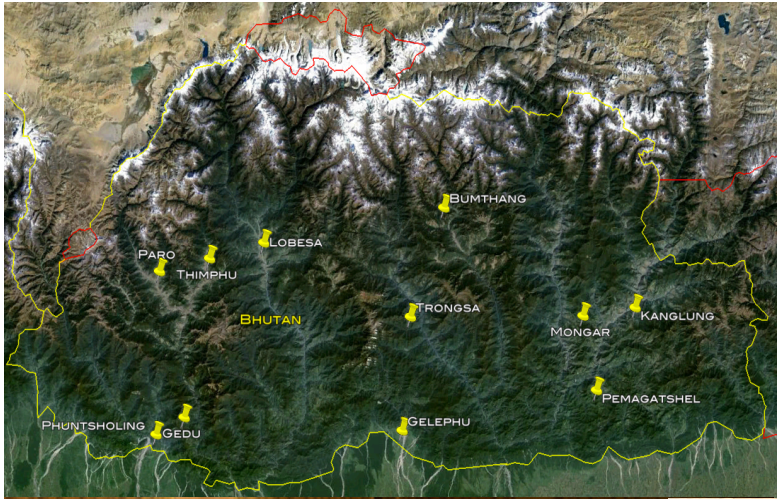


Sherubtse College, Royal University of
Bhutan

Direct Engineering Assistance Technical
Report

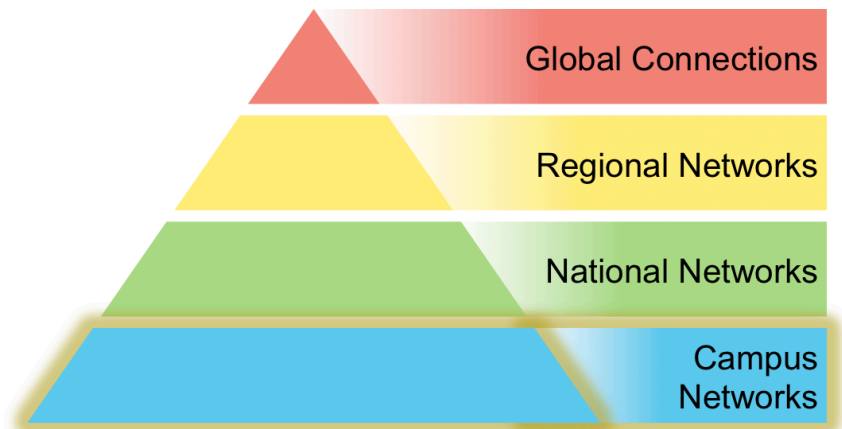
Philip Smith & Hans Kuhn
14th – 16th September 2015

DrukREN Network Training and Direct Engineering Assistance (DEA)



Why Focus on Campus Networks?

- Network is the transport layer
- The campus network is the foundation for research and education activities
- To optimally utilize network capacity, equipment and personnel
- No scientist is connected directly to a national R&E network.
They are all connected to campus or enterprise networks for access.



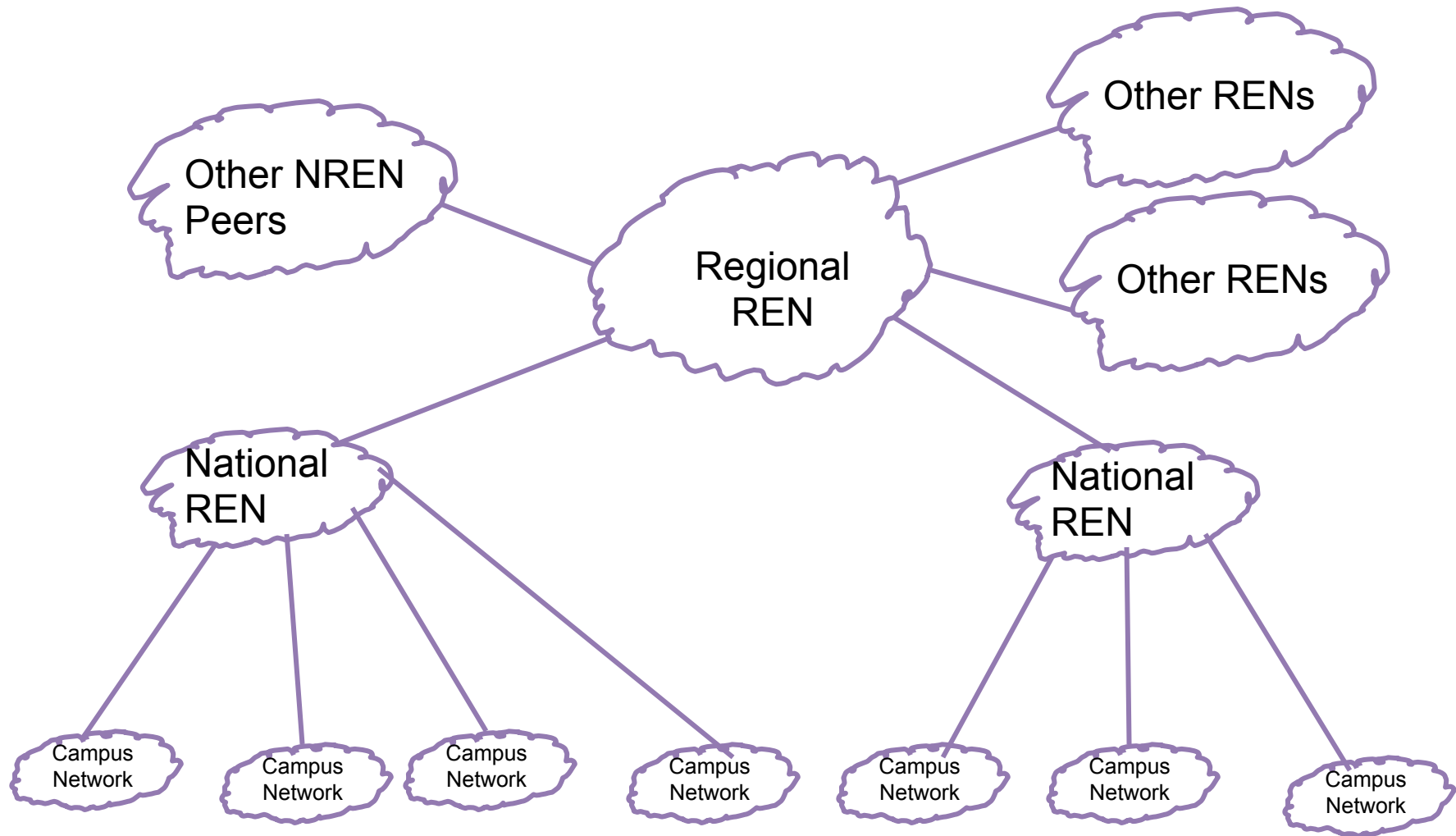
What is an NREN?

- NREN stands for National Research and Education Network
- Specialized ISP dedicated to supporting R&E institutions
- Universities often serve as an introduction to the Internet for many students and faculty, who then become the country's business and civil society leaders.

RENs: Serving the Educational Community

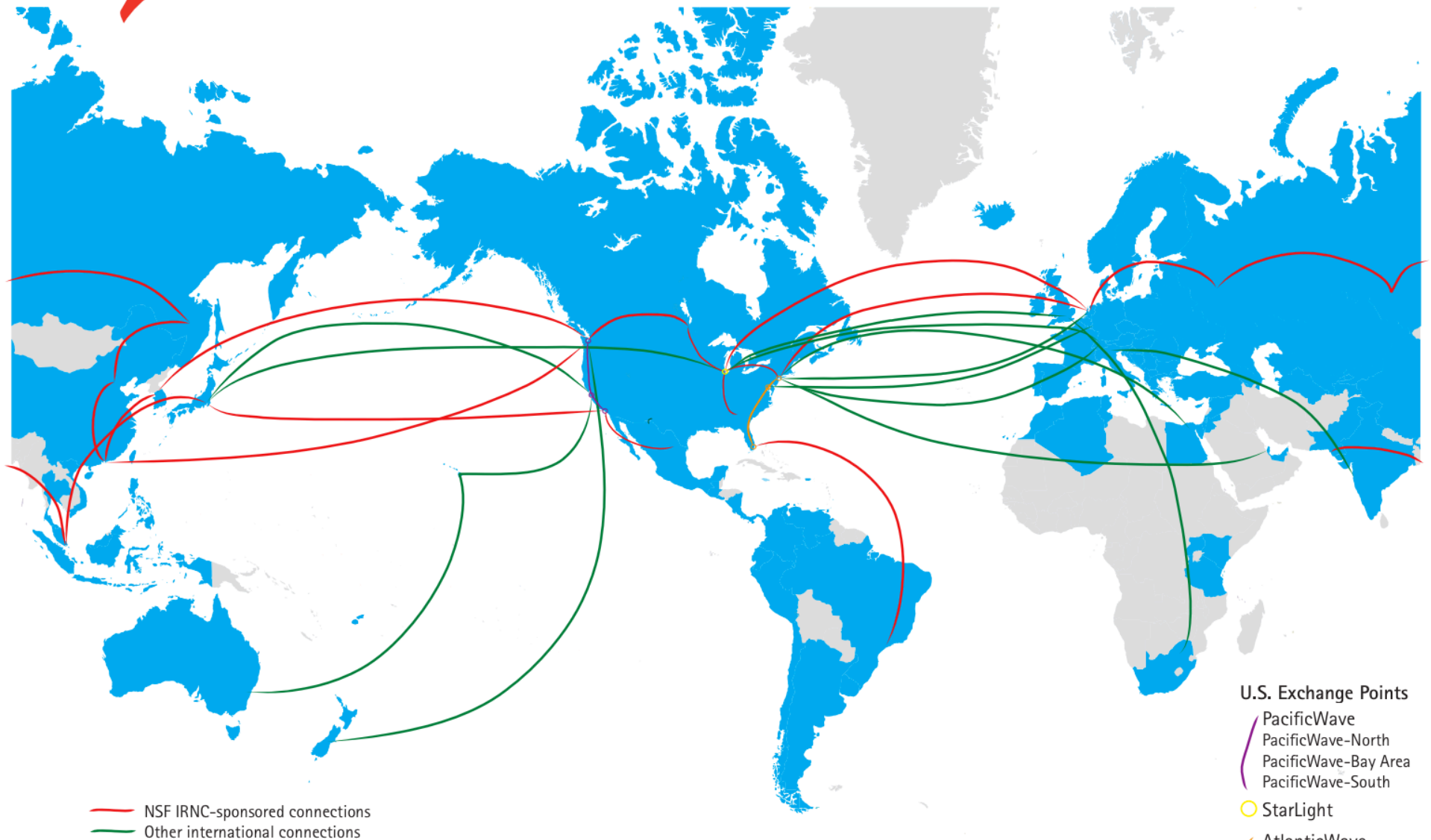
- An NREN leverages buying power to purchase more bandwidth, equipment and provide cost savings
- An NREN can keep traffic local
- NRENs can join Regional RENs
- Builds alliances in the educational community
- Over 135 national and regional RENs

Typical REN Architecture



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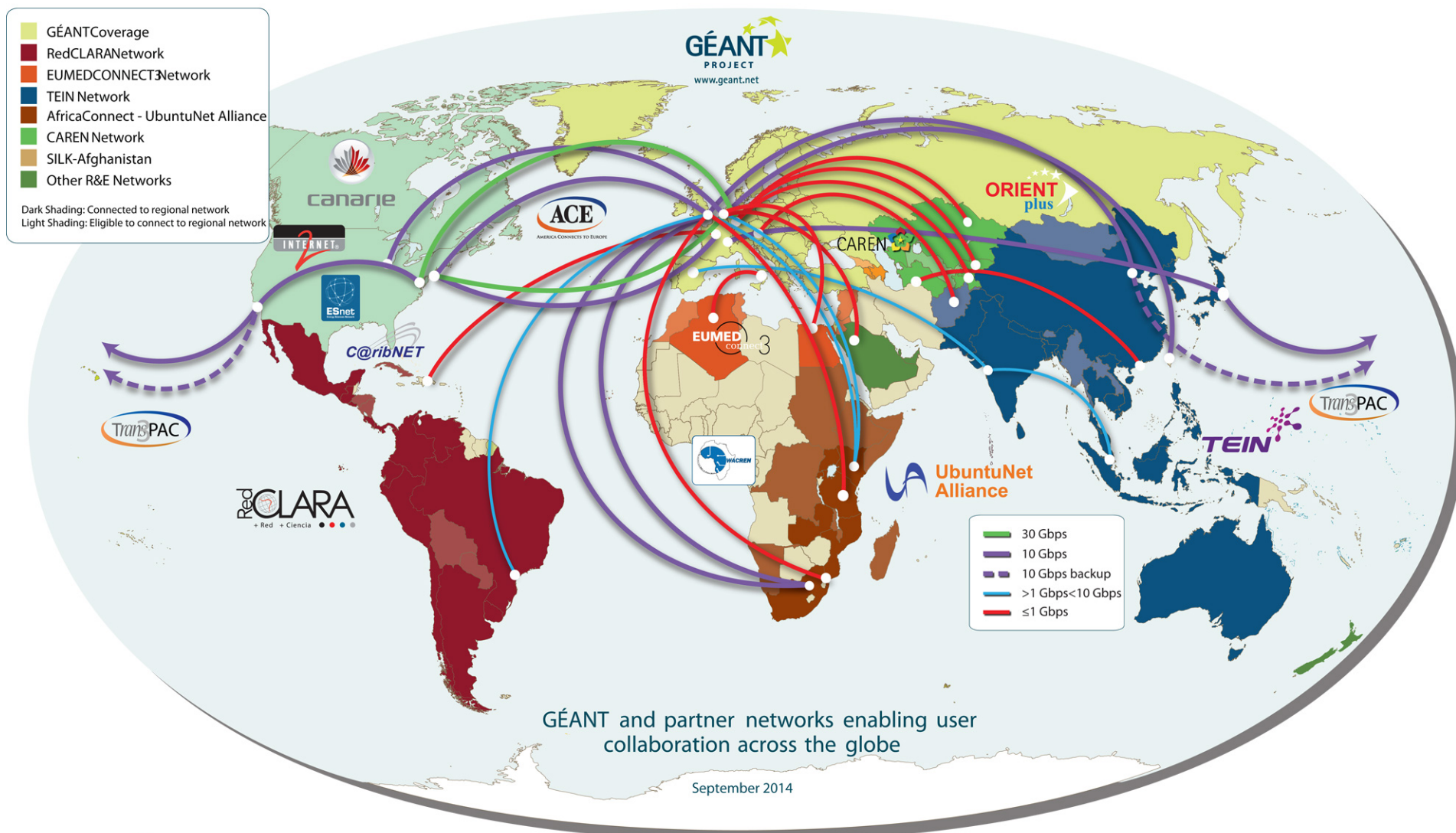


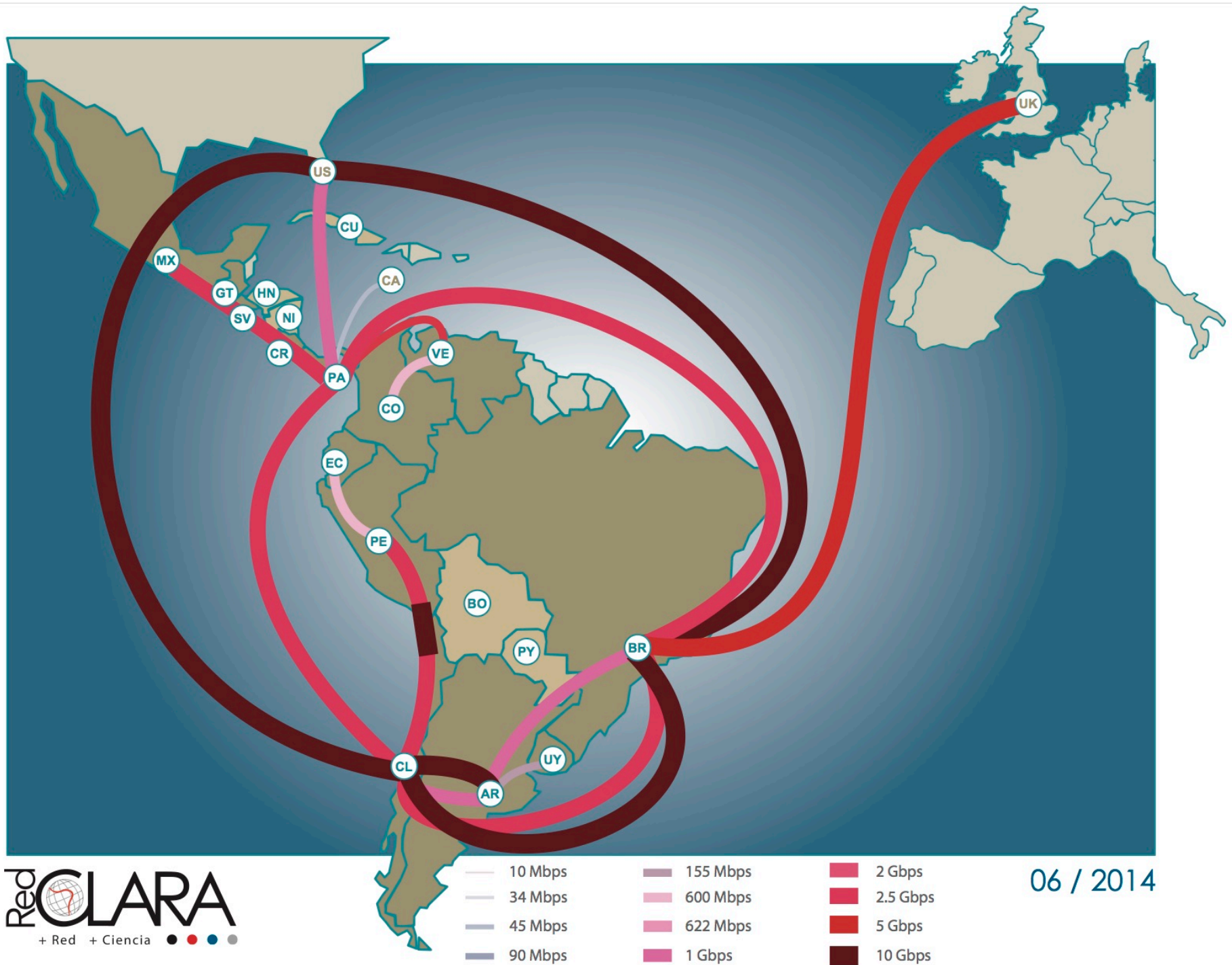


For further information regarding the international programs of Internet2, visit <http://internet2.edu/international> or contact Heather Boyles, International Relations Director, international@internet2.edu.

A listing of networks reachable via the Internet2 Network is found on the back of this page.

At the Heart of Global Research and Education Networking





Asia-Pacific Backbone Topology



As of February 8th, 2013

UbuntuNet Alliance



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NSRC Capacity Building 2014-2015

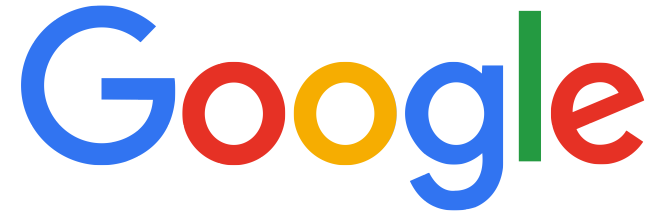
	Africa	AsiaPac	Europe	LA-Carib	NorthAm	Mid-East	Total
Men	1413	1825	155	194	79	135	3801
Women	359	313	83	38	28	39	860
Totals	1772	2138	238	232	107	174	4661

- 124 events with 189 activities
- Donated 3500kg of equipment and books worth over USD \$630,000
- Sponsored over 140 network engineers investing USD \$145,000



Reference Links

- NSRC
 - <https://photos.nsrc.org/>
 - <https://nsrc.org/workshops>
 - <https://learn.nsrc.org/>
 - <https://videos.nsrc.org/>
- Federated Identity Management
 - <https://www.eduroam.us/>
 - <http://services.geant.net/edugain/>



Vint and Sigrid Cerf
James Forster
Joel Jaeggli
Randy Neals
Jim Williams
Suzanne Woolf



FRENIA: Fostering Research & Education Networking in Africa



NetworkTheWorld.org

Richard M. Karp Charitable Foundation



Walnut Creek/FreeBSD Mail

The Andrew W. Mellon Foundation



MacArthur Foundation



ciscopress.com



RedHUCyT



O'Reilly Foundation



Sears, Fram and Associates, LLC



Foundation for Research Development
National Research Foundation



United Nations
Development Programme

