

Role of NSRC in starting and developing Internet in developing countries



**Celebrating 20 Years of
• LK**

Phil Regnault - NSRC



UNIVERSITY OF OREGON

NSRC: Core principles

- Assisting those who take ownership of the problems or challenges they are trying to solve.
- Proactively help to improve cyberinfrastructure at the institutional, national and regional level through training, expertise and proper design.
- Work with our many friends we have made over the years to leverage what we do and to put people in contact with the right resources to solve problems and improve infrastructure.

NSRC: Some history

- Started by Randy Bush and John Klensin in the late 1980s / early 1990s
- First NSF fund in 1992
- Moved to the University of Oregon in 1996
- 2 full time employees, several part time contract employees, and lots of volunteer effort

Our Core Funding

From the *US National Science Foundation Office of Cyberinfrastructure*:

<http://www.nsf.gov/dir/index.jsp?org=OCI>

The current NSRC award is part of the *International Research Network Connections (IRNC)* funding process of the NSF.

We received a new award on May 1, 2010:

[http://nsf.gov/awardsearch/showAward.do?](http://nsf.gov/awardsearch/showAward.do?AwardNumber=0963081&WT.z_pims_id=503382)

[AwardNumber=0963081&WT.z_pims_id=503382](http://nsf.gov/awardsearch/showAward.do?AwardNumber=0963081&WT.z_pims_id=503382)

Strategy

- Leverage funding by encouraging other institutions to match donations
- Bottom approach, act "on-demand"
 - Respond to requests from universities, research centers, RENs, ISPs and user/operator groups
 - Approach them once they have expressed a need
- Match competence and projects, equipment donations and recipients – cost sharing
- No agenda other than building networks

Strategy

"To build sustainable networks, you've got to have local hands cultivating local expertise. They understand how to work in their country and culture in a way outsiders never can."

– Steven Huter

Leverage the local expertise!

Motivation

- The primary goal of the NSRC is to make it easier for U.S. Scientists and engineers to collaborate via the Internet with their international colleagues.
- Originally, this meant email
- Some researchers couldn't accept tenures in universities in developing countries because of lack of email

Motivation

- Email (UUCP, FidoNet) was one of the first steps on the way to "real" connectivity.
- Email meant real time collaboration for scientists, both local and guests, around the world
- But also, having connectivity and email meant that science in developing countries could finally get exposure

First steps on the Internet

```
From: Randy Bush <randy@psg.com>  
Subject: The first ping  
To: ccfj@quagga.ru.ac.za (F.F. Jacot Guillarmod),  
    ccdw@quagga.ru.ac.za (Dave Wilson),  
    barrett@daisy.ee.und.ac.za (Alan Barrett),  
    fsg@ucthpx.uct.ac.za (Fred Goldstein),  
    nerd@percival.rain.com (Michael Galassi)  
Date: Tue, 12 Nov 91 0:57:21 PST  
Message-Id: <m0kgtvt-000b0LC@rain.psg.com>
```

Well, the line keeps going up and down, and the telcos have not completed testing yet. But, for the record book, the first ping from North America to [Sub-Saharan] Africa

```
rain:/home/randy> ping 146.231.64.2  
146.231.64.2 is alive  
rain:/home/randy> date  
Tue Nov 12 00:44:47 PST 1991
```

And to push the envelope, all mail for Africa which comes to rain.psg.com will now go SMTP, i.e. this message!

Fantastic!

randy

More first steps on the Internet

From: sghuter@psg.com (Steven Huter)
To: randy@psg.com, shem@arcc.or.ke
CC: ocl@ic.ac.uk, sghuter@nsrc.org
Date: Tue, 24 Oct 1995 21:23:45 -0800

Congrats, guys. This is great news.....

steve

```
psg.com:/usr/home/sghuter> traceroute arcc.or.ke
traceroute to arcc.or.ke (199.2.222.254), 30 hops max, 40 byte packets
 1 gw.psg.com (147.28.0.58)  3 ms  3 ms  3 ms
 2 s0.r5.pdx.rain.rg.net (199.2.96.129)  40 ms  57 ms  15 ms
 3 e0.t1.pdx.rain.rg.net (199.2.96.37)  17 ms  15 ms  17 ms
 4 arcc.or.ke (199.2.222.254)  3124 ms  2428 ms  2414 ms
```

And another...

From: Randy Bush <randy@psg.com>
To: goldstein@nsf.gov
CC: John C Klensin <klensin@infoods.unu.edu>, Olivier
Crepin-Leblond <o.crepin-leblond@ic.ac.uk>
Date: Tue, 7 Jun 1994 12:18:18 -0700

Indonesia is up on the new 64kb link,

traceroute caddsys.iptek.net

traceroute to caddsys.iptek.net (202.46.1.2), 30 hops max, 40 byte packets

1	e0.r0.psg.rain.rg.net (147.28.0.58)	6 ms	5 ms	5 ms
2	e0.r1.pdx.rain.rg.net (199.2.96.34)	16 ms	15 ms	16 ms
3	e0.r0.pdx.rain.rg.net (199.2.96.33)	20 ms	44 ms	19 ms
4	144.228.201.193 (144.228.201.193)	66 ms	43 ms	56 ms
5	sl-stk-1-F0.sprintlink.net (144.228.8.225)	474 ms	42 ms	87 ms
6	* * *			
7	* * *			
8	202.46.1.2 (202.46.1.2)	1830 ms	755 ms	759 ms

[...]

randy

This one might seem familiar :)

From: randy (Randy Bush)
To: Saman Amarasinghe <saman@wildhog.stanford.edu>
CC: Chand Samaratinga <chand@lanka.net>, Vadim Antonov
<avg@sprint.net>, Steve Goldstein <sgoldste@nsf.gov>
Date: Thu, 11 May 95 13:05 PDT

```
traceroute to sri.lanka.net (202.51.128.1), 30 hops max, 40 byte packets
 1 gw.psg.com (147.28.0.58)  3 ms  2 ms  2 ms
 2 sl.rl.pdx.rain.rg.net (199.2.97.65)  9 ms  9 ms  9 ms
 3 e0.r0.pdx.rain.rg.net (199.2.96.33)  11 ms  24 ms  16 ms
 4 sl-stk-3-S16-T1.sprintlink.net (144.228.43.17)  38 ms  59 ms  44 ms
 5 sl-stk-5-F0/0.sprintlink.net (144.228.40.5)  44 ms  203 ms  35 ms
 6 sl-dc-6-H1/0-T3.sprintlink.net (144.228.10.1)  106 ms  99 ms  100 ms
 7 sl-dc-11-F0/0.sprintlink.net (144.228.20.11)  131 ms  110 ms  103 ms
 8 sl-lis-1-S0-64k.sprintlink.net (144.228.121.114)  415 ms  412 ms  414 ms
 9 sri.lanka.net (202.51.128.1)  426 ms  1024 ms  418 ms
```

thanks all!

randy

... but it started earlier:

- UUCP link in 1993 (1990 in fact)

<http://www.nsrc.org/db/lookup/report.php?id=890202382518:497434979&fromISO=LK>

(some guy named Gihan Dias is mentioned :)

- First IP link in 1994 (scheduled dialup modems)

Date: Sun, 2 Oct 94 09:43 PDT
From: randy (Randy Bush)
To: Tony Rutkowski <amr@isoc.org>
Cc: Chand Samartunga <chand@lanka.net>,
Saman Amarasinghe <saman@wildhog.stanford.edu>
Subject: TCP/IP link to Sri Lanka

On 7 September 1994, a part-time scheduled TCP/IP link to Sri Lanka was commissioned. The connection is by Lanka Internet Services, Ltd., an open provider, i.e. academic, commercial, NGO, ... are all welcome. LISL is in the process of providing a higher speed dedicated link. Within Sri Lanka, LISL currently provides the full range of dialup PPP/SLIP services, as well as dedicated lines, POPmail with DOS/Mac clients, ...

[...]
randy

More recently...

Date: Fri, 02 Apr 2010 21:56:43 +0530
From: Nimal Ratnayake <nimalr@learn.ac.lk>
To: Tein3-project@dante.net
Cc: George McLaughlin <george@mclaughlin.net>,
"mfoley@worldbank.org" <mfoley@worldbank.org>,
Steven G. Huter <sghuter@nsrc.org>, Jim Williams <william@indiana.edu>,
crowed@nero.net,
"southasia-interest@internet2.edu" <southasia-interest@internet2.edu>
Subject: LEARN connected to TEIN3

Dear All,

It is with great pleasure that I share with you the news of Lanka Education and Research Network (LEARN) getting connected to the [TEIN3](#) network. The link was brought up on April 1, 2010.

This is a major milestone for LEARN, as this is the first time we are getting connected to the Academic Internet. Although LEARN has been in operation for almost two decades now, we only had access to commodity Internet so far.

[...]

Nimal Ratnayake

Lanka Education and Research Network (LEARN)



Evolution of Internet connectivity

- Early stages, connections happened via the ICM program (International Connections Management program), thanks to Steve Goldstein
- Many institutes around the world wanted to connect to the U.S. (it made sense for multiple reasons)
- But some countries had already established connections via Europe – for example, Egypt

Evolution of Internet connectivity

- Many got connected with the help of NSRC:

Egypt, Guinea, Indonesia, Kenya, Liberia, Morocco, Peru, Saudi Arabia, South Africa, Sri Lanka, Tanzania, Togo, ...

- Once connectivity was available, other countries jumped online, using whatever was available
 - IP over X.25, VSAT, dialup modem PPP links, to external providers (US and Europe)
 - Some of these solutions were costly, and benefited mostly foreign telecom companies

Evolution of NSRC's work and goals

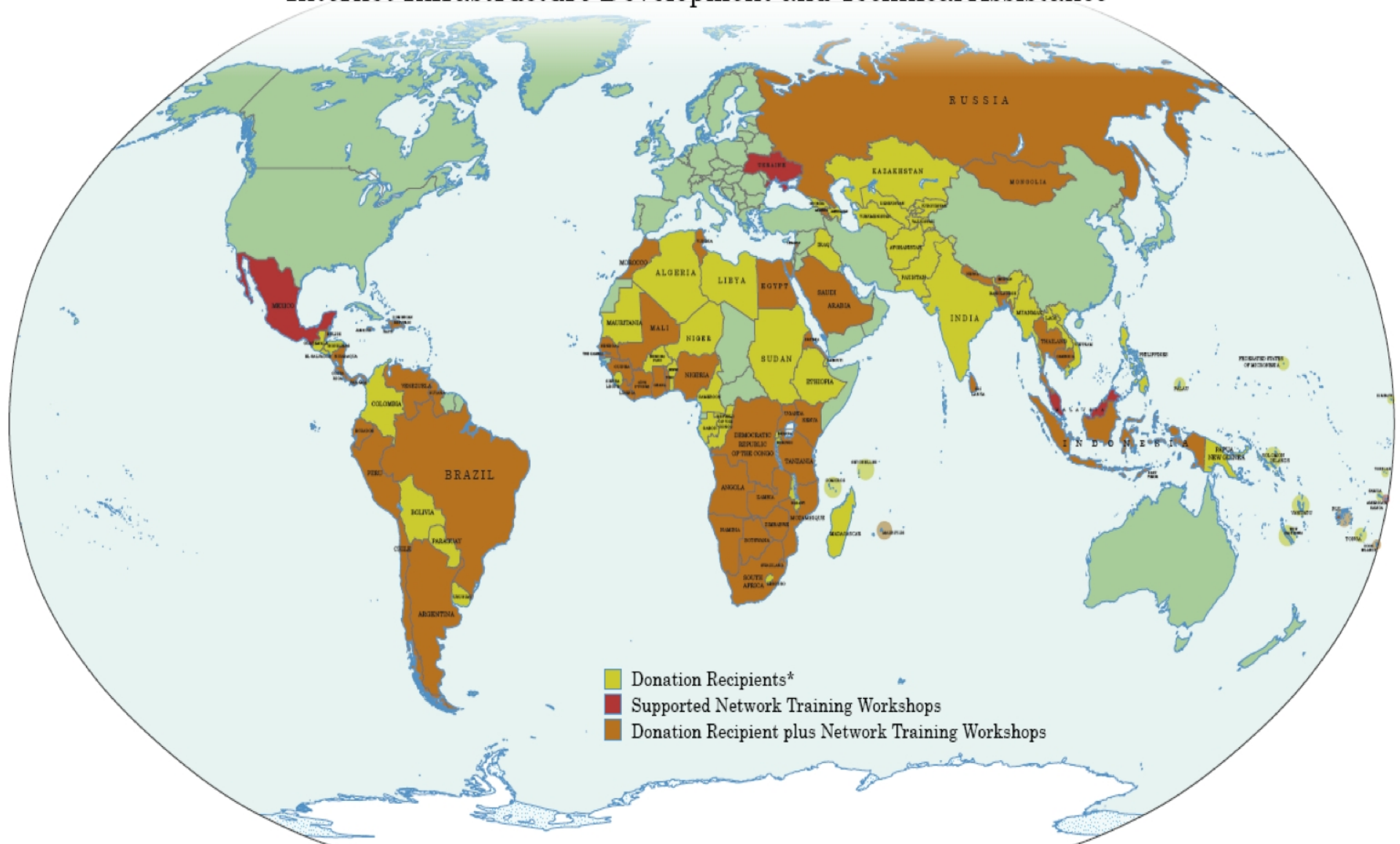
- NSRC's work did not stop at helping countries get connected
- Building out the national and regional network infrastructure
- Support technological training that enhances stability and security of the Internet (IPv6, DNSSEC), both on a national and regional level
 - Campus network design
 - Wireless internet, bandwidth management

Evolution of NSRC's work and goals

- Help keep local traffic local: NSRC contributed to building Internet Exchange Points in many countries – from Panama in 1997 to Haiti in 2009 – thus helping to keep local traffic local
- Peering on a technical *and human* level:
 - Supporting operator groups such as PacNOG, SANOG and AfNOG over the last 10 years
 - "Helping catalyze development of nascent national and education networks where there is good local initiative"

Network Startup Resource Center (NSRC)

Internet Infrastructure Development and Technical Assistance



* From 1992 through July 2008, the NSRC has facilitated the distribution of approximately \$3,500,000 worth of donated technical reference books about Internet technology and \$12,000,000 worth of networking equipment to engineering and computer science departments, university libraries, non-governmental organizations (NGOs), and networking training facilities in more than one countries around the world.

Achievements

- From 1992 through 2009 the NSRC distributed
 - networking equipment worth about \$35 million
 - technical reference books (donated by O'Reilly Media, Pearson Education, and other publishers) worth about \$6 million
 - And many thousands of hours of materials development, training, and direct engineering assistance

Summer School of Network Design



Supporters and sponsors

- We receive support from many organizations and individuals to help make all this happen.
- IDRC, ISOC, Carnegie and others have contributed over \$250.000 in 2006-2008
- In the same period, individuals donated \$175.000
- Many other supporters: Google, Cisco, O'Reilly, ...
- A complete list is available here:

<http://nsrc.org/sponsors/>

Thank you...

NSRC wouldn't have a mission without all of you