

Update on NSRC Activities in the UbunutuNet Alliance region

Patrick Okui



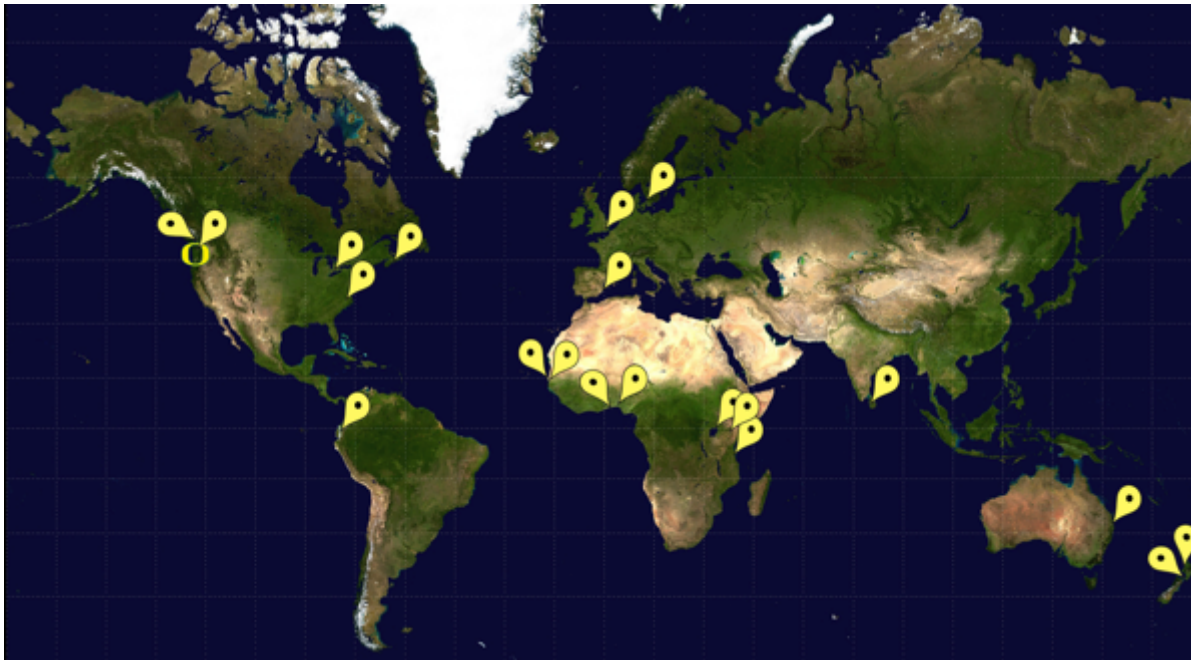
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Who is the NSRC?

Nine University of Oregon staff and students, and...

...**twenty five contractors** from Eugene to Denmark to Senegal and New Zealand and everywhere in-between...

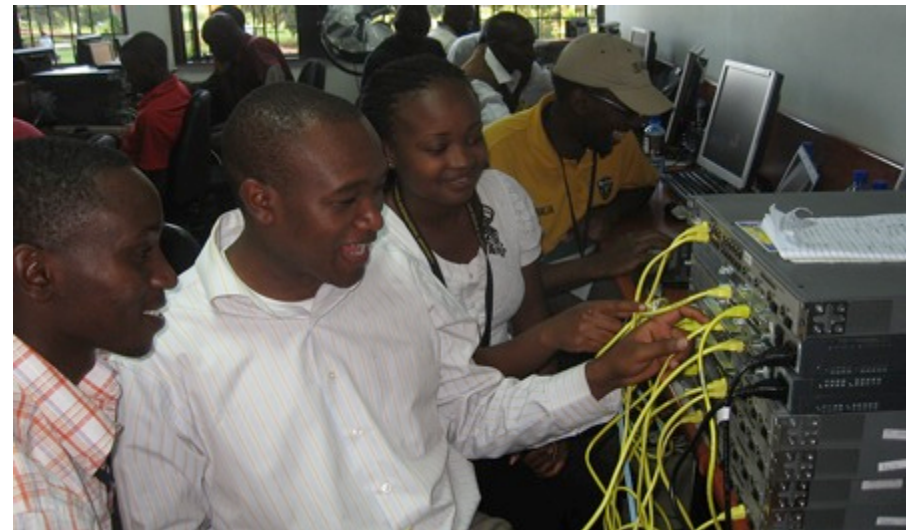


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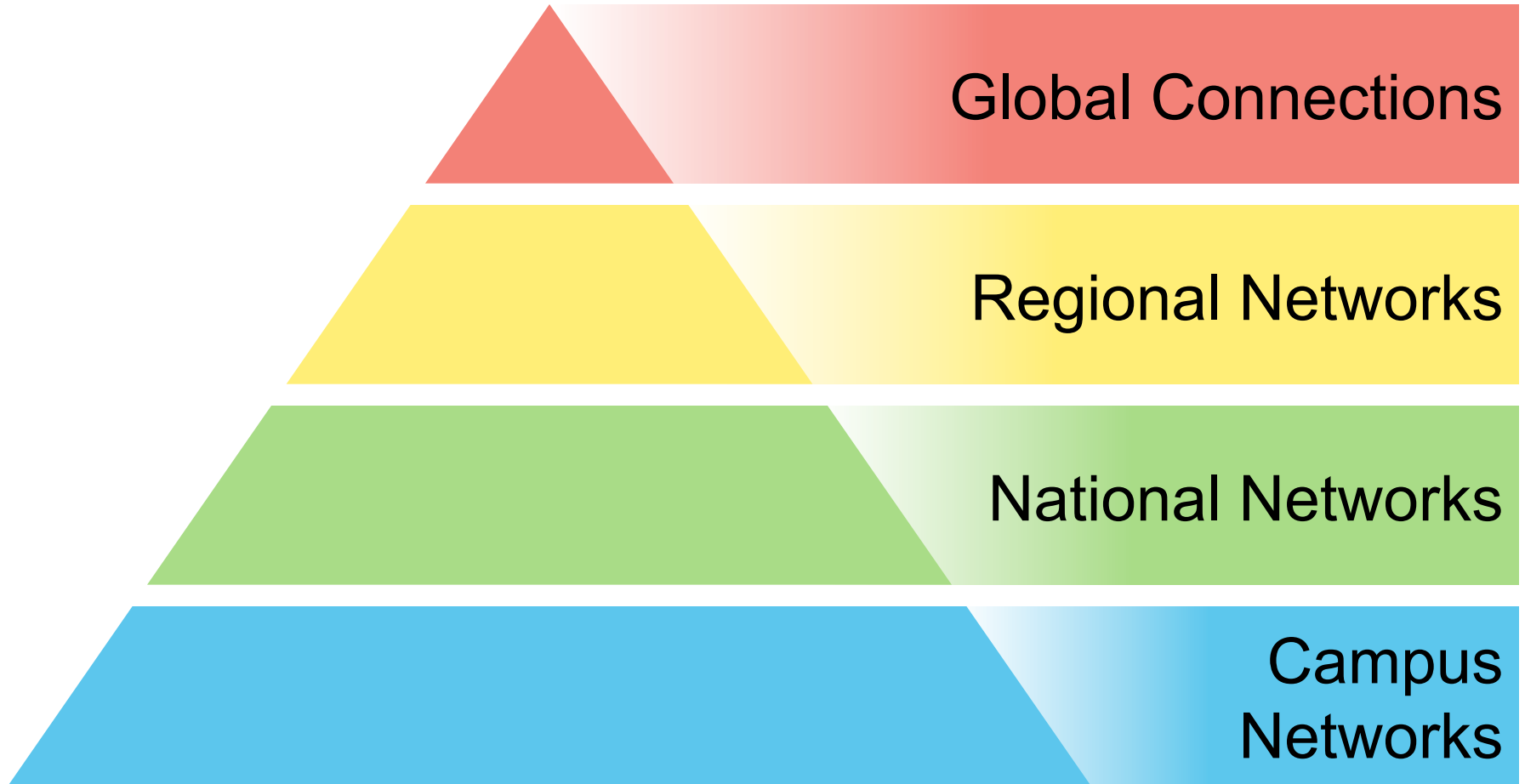


The NSRC Model

- Technical training and human resource development activities
- Direct engineering assistance
- Participatory development



NREN Ecosystem



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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 faculty members or students are connected directly to a national R&E network. They are all connected to campus or enterprise networks for access.



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NSRC On the Ground 2011-2015

Bangladesh (6)	Guam (2)	Mongolia (2)	South Africa (3)
Benin	Guatemala (2)	Morocco (3)	Sri Lanka (4)
Bhutan (11)	Haiti (3)	Myanmar (4)	Tanzania (18)
Burkina Faso	India (3)	Nepal	Thailand (18)
Cambodia (3)	Indonesia	New Caledonia (4)	Togo
Canada (3)	Ireland	New Zealand (3)	Tonga (2)
China (5)	Italy (5)	Nicaragua (3)	Trinidad & Tobago
Costa Rica	Japan (5)	Nigeria (5)	Tunisia (7)
Denmark	Jordan	Panama (3)	Turkey (3)
Djibouti (10)	Kazakhstan	Peru	UAE (5)
Ecuador (7)	Kenya (8)	Philippines (3)	USA (38)
England	Korea	Rwanda (5)	Uganda (10)
Fiji (8)	Laos (2)	Samoa	Vanuatu (4)
Gambia (6)	Lebanon	Swaziland (3)	Vietnam (4)
Georgia (2)	Madagascar	Senegal (13)	Zambia (8)
Germany	Malawi (2)	Singapore (4)	Zimbabwe
Ghana (11)	Malaysia (5)	Solomon Islands (3)	



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NSRC Capacity Building 2011

	Africa	AsiaPac	Europe	LA-Carib	NorthAm	Mid-East	Total
Men	389	359	20	223	60	0	1030
Women	246	57	10	64	21	0	398

- Donated 1,200+ KG of equipment and books worth over USD \$229,000
- 37 events with 49 activities. 15 events in Africa with 24 activities.
- Sponsored 31 network engineers investing USD \$52,746.
- 4 FTE NSRC staff and 2 FTE/month contractor staffing.

NSRC Capacity Building 2012

	Africa	AsiaPac	Europe	LA-Carib	NorthAm	Mid-East	Total
Men	590	532	20	228	35	38	1306
Women	453	180	10	105	13	2	447

- Donated 3,500 KG of equipment and books worth USD \$200,000,
- 46 events with 56 activities. 12 events in Africa with 24 activities.
- Sponsored 51 network engineers investing USD \$100,000.
- 4.5 FTE NSRC staff and 3 FTE/month contractor staffing

NSRC Capacity Building 2013

	Africa	AsiaPac	Europe	LA-Carib	NorthAm	Mid-East	Total
Men	468	576	21	172	156	39	1432
Women	95	128	6	47	53	2	331

- Donated 3000 KG of equipment and books worth USD \$220,000,
- 55 events with 72 activities. 17 events in Africa with 28 activities.
- Sponsored 116 network engineers investing USD \$116,000.
- 5 FTE NSRC staff and 4 FTE/month contractor staffing.

NSRC Capacity Building 2014

	Africa	AsiaPac	Europe	LA-Carib	NorthAm	Mid-East	Total
Men	830	865	128	121	50	103	2105
Women	178	145	73	30	13	37	478

- Donated 2000 KG of equipment and books worth over USD \$263,000
- 65 events with 92 activities. 22 events in Africa with 32 activities.
- Sponsored 100 network engineers investing USD \$90,446.
- 6 FTE NSRC staff and 5 FTE/month contractor staffing.

NSRC Capacity Building 2015 (through May)

	Africa	AsiaPac	Europe	LA-Carib	NorthAm	Mid-East	Total
Men	370	430	25	0	40	32	882
Women	106	83	10	0	25	2	216

- Donated 400 KG of equipment and books worth USD \$50,000
- 29 events with 45 activities. 9 events in Africa with 17 activities.
 - Projecting 65-70 events with 90-100 activities for 2015.
- To date sponsored 45 network engineers investing USD \$50,000.
- 6 FTE NSRC staff and 6 FTE/month contractor staffing

NSRC Train the Trainer Numbers Dec 2013-May 2015

Train the Trainer workshops held in November 2013 (Rwanda) and 2014 (Zambia). Since these trainings:

- 20 Events in 7 African countries run by NSRC trained network personnel
- 382 men and 84 women network engineers trained for a total of 466
- 2 events in December 2013
- 12 events in 2014
- 6 events, so far, in 2015, with 3 in planning (May)

Chart of Increased Capacity Building Activities 2011-2015

NSRC Activities by Year

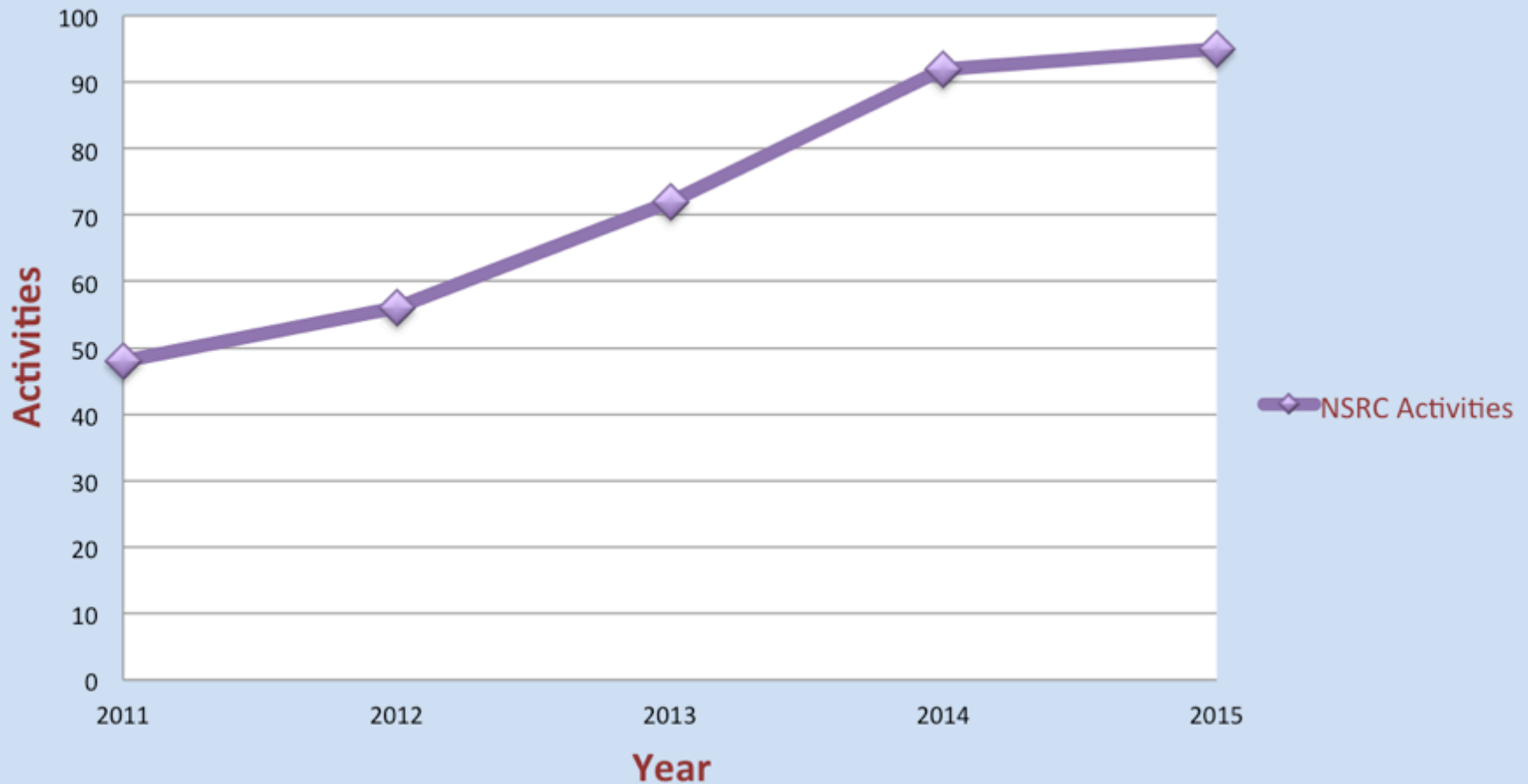
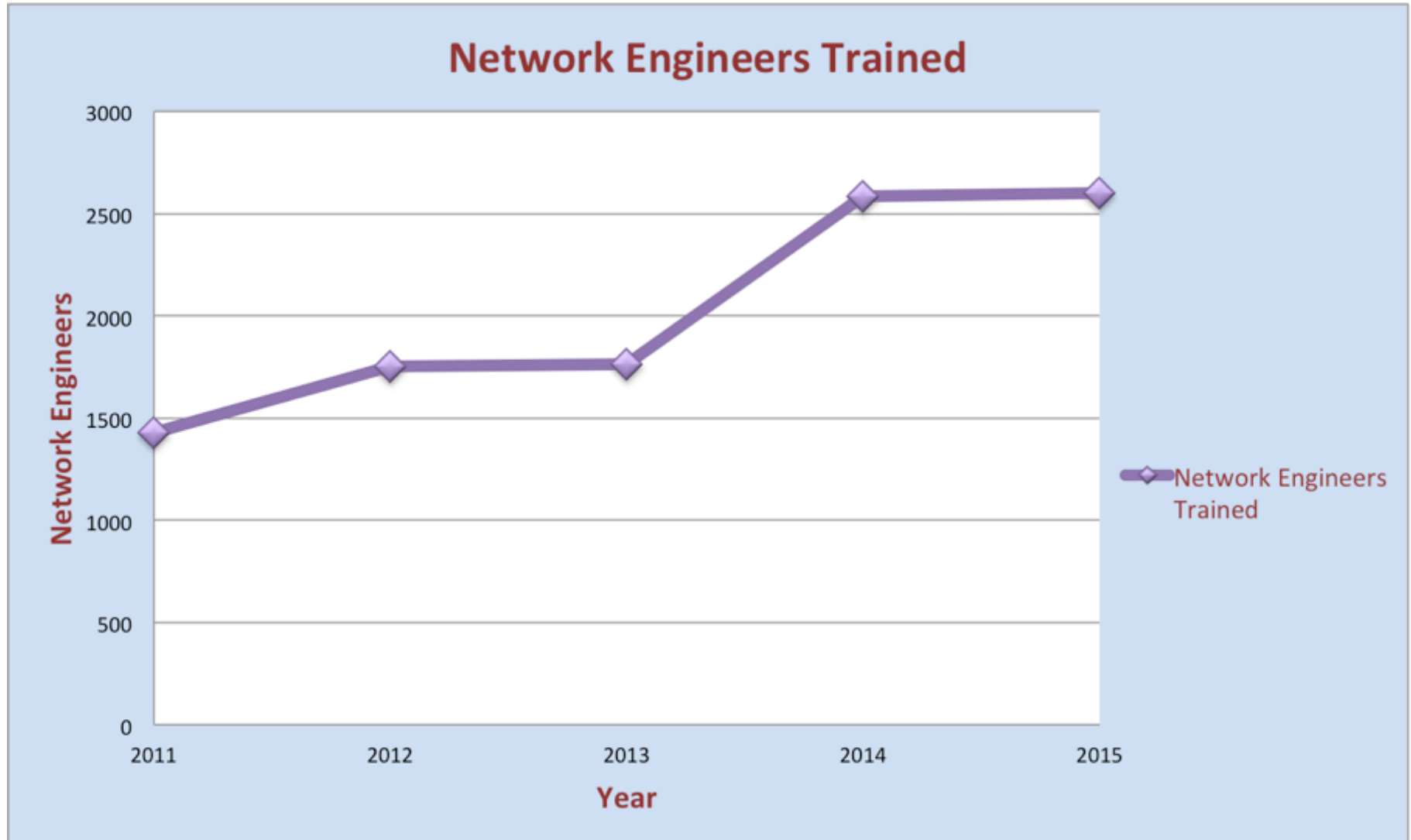
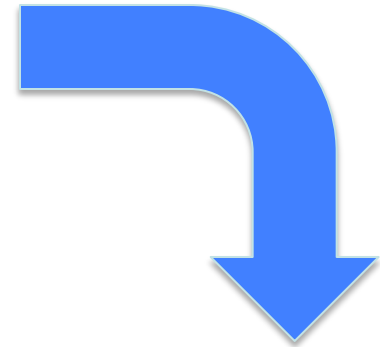
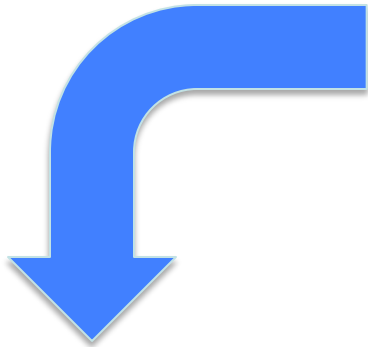


Chart of Network Engineers Trained 2011-2015



Facing our challenges - focus areas



**Train
The
Trainers**

**Campus
Network
Design**

**Evolving
Technologies**



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Train The Trainers

**Helps to answer how we are
going to...**

1. Scale our effect, and
2. Retain qualified technical staff



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Train The Trainers

1. Scale our effect

First two programs with the
UbuntuNet Alliance

Kigali, Rwanda – November 2013

- 16 trainers from 9 NRENs
- Resulted in 10 workshops and 2 DEAs in 1 year



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Train The Trainers

1. Scale our effect cont.

- Lusaka, Zambia– Nov 2014
 - 17 trainers from 8 NRENs
 - In 6 months 7 workshops and 3 DEAs
- Scheduled for Mozambique in November



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**Train
The
Trainers**

1. Scale our effect cont.

- Additional TtT workshops in Africa

Potential to double our impact in terms of
trained network techs within 2 to 3 years



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Train The Trainers

Additional benefits have included:

- Direct Engineering Assistance organized by local engineers
- RREN network engineers assisting across national boundaries to support neighbors
- Cooperation with orgs to enhance employment opportunities for skilled technicians (see next slide)



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**Train
The
Trainers**

2. Retain qualified technical staff:

- Always an issue and no easy solution
- NSRC has offered supplemental contracts to engage local talent
- Work with employers to empower employees
- Creating a sense of community



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**Helps to answer how we
resolve...**

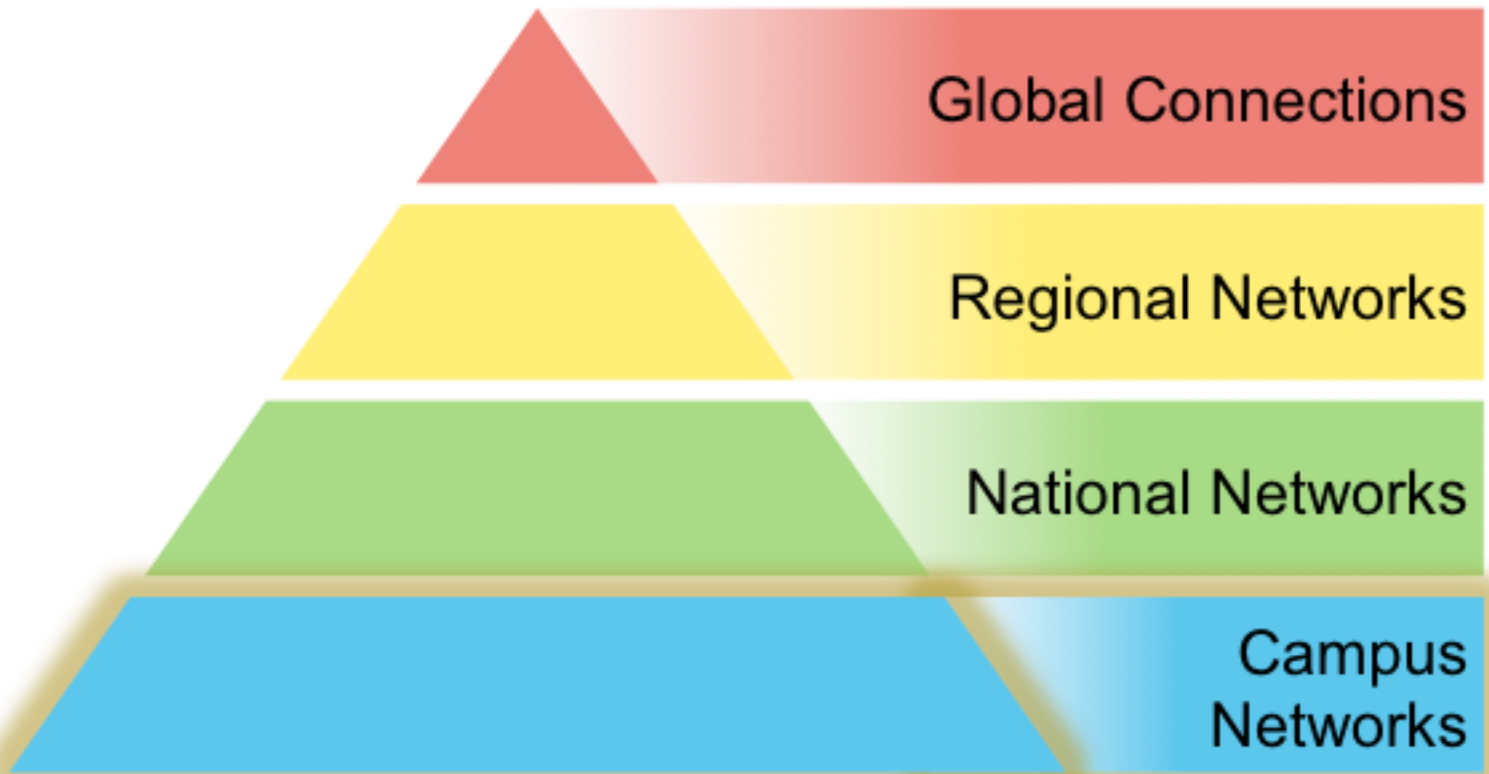
3. Network requirements and utilization for
increased international science education
and collaboration

4. How to build, improve and support these
networks



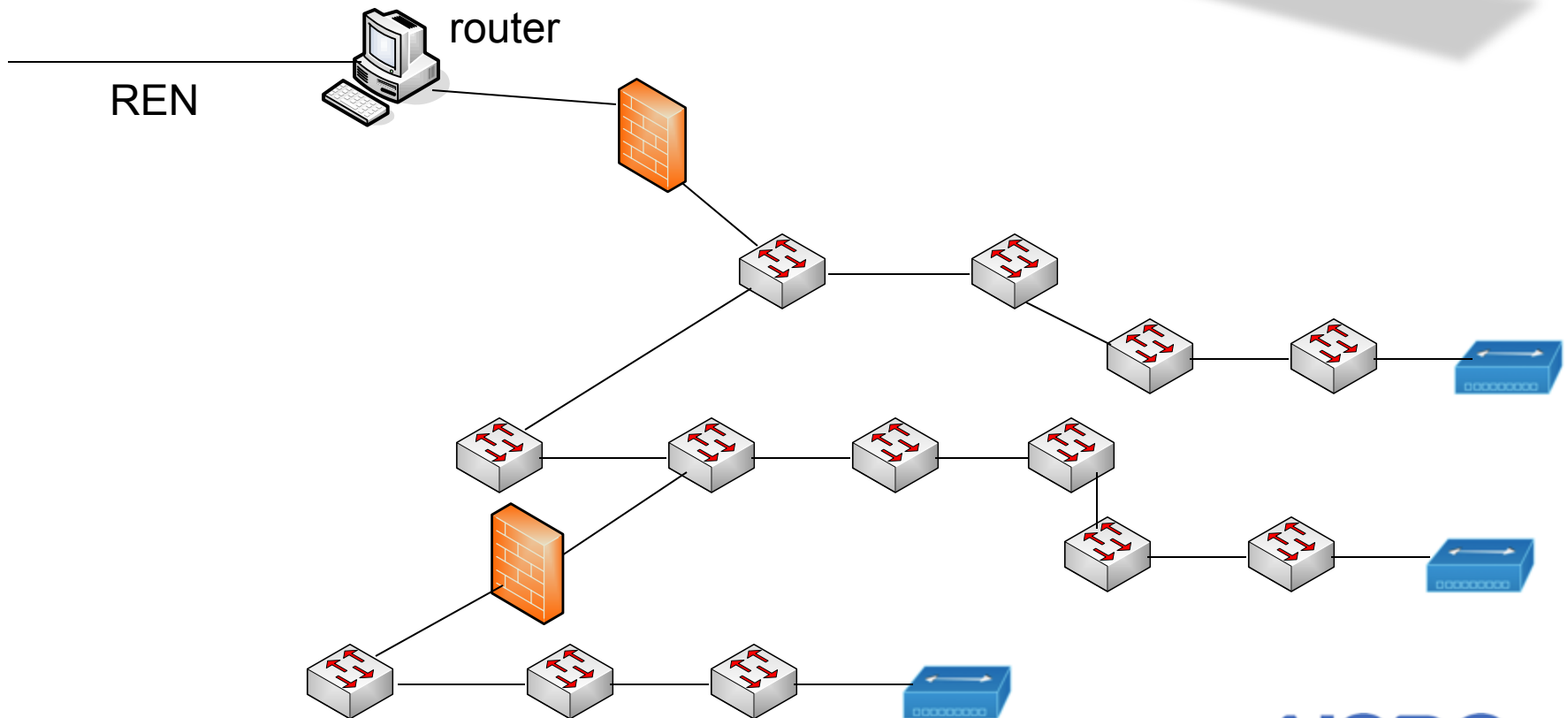
Remember this?

**Campus
Network
Design**



Poorly designed (campus) network...

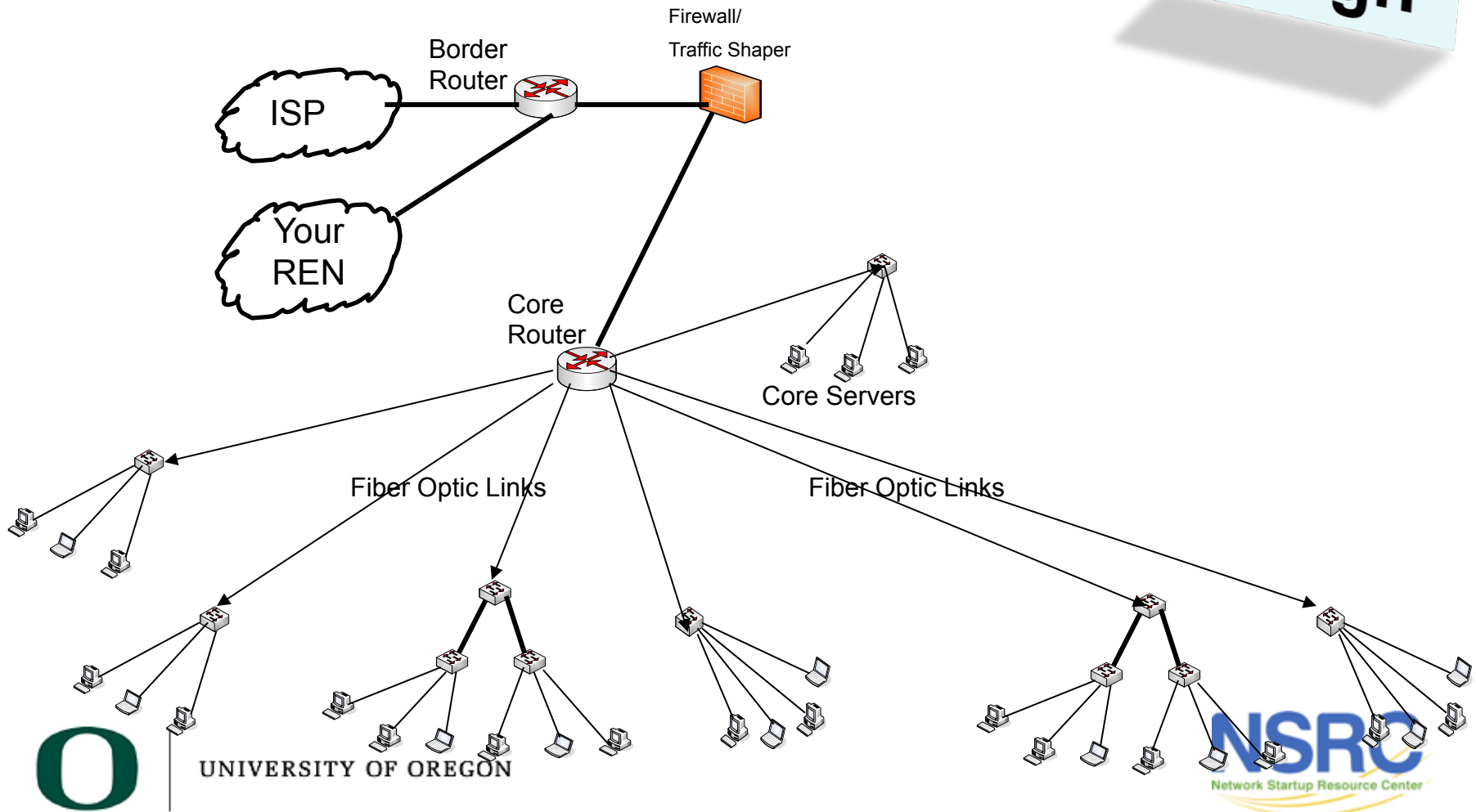
Campus Network Design



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Reasonably designed (campus) network...

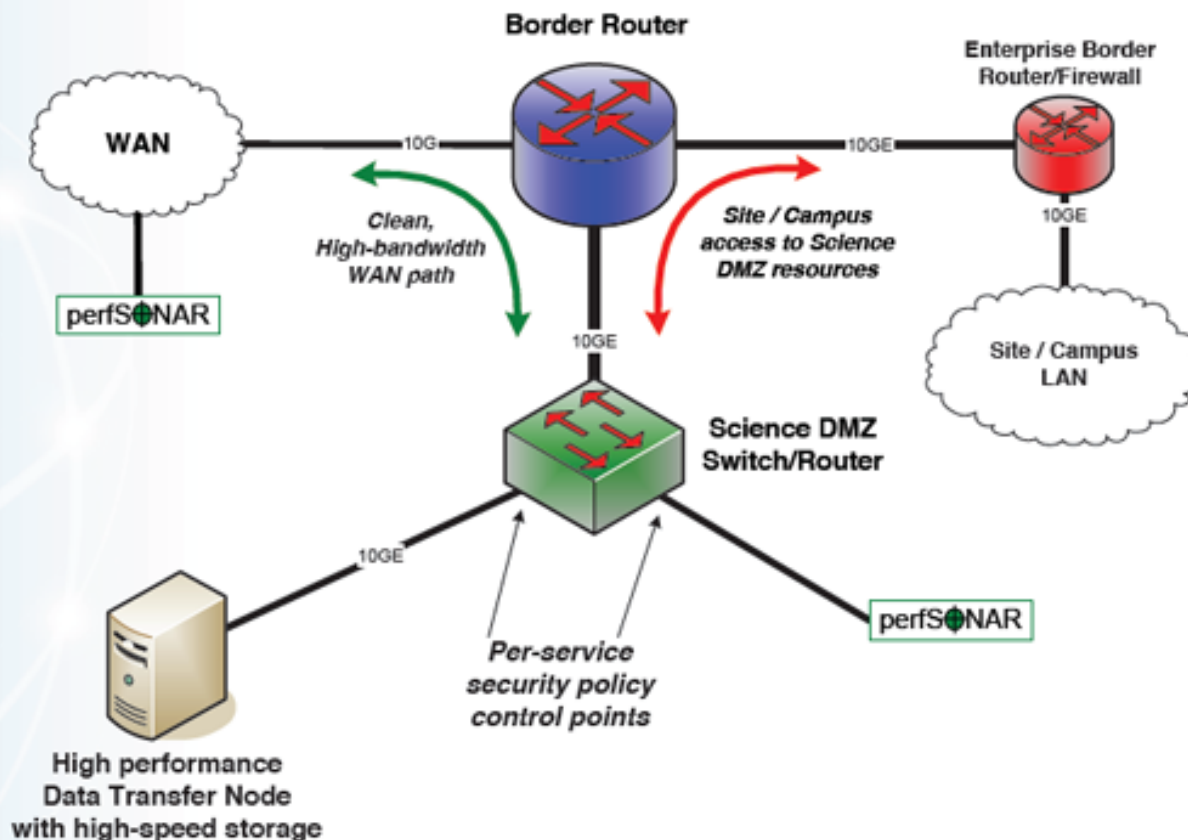
Campus Network Design



Take it a step further as collaboration increases...

Campus Network Design

Prototype Science DMZ



...which leads us to

- perfSONAR
- and
- Software Defined Networks (SDN)
- TV White Spaces (TVWS)
- Wireless Sensor Networks (WSN)
- Internet of Things (IoT)



perfSONAR (network monitoring and management)

- Verify viability of campus network design
- Verify viability of NREN design
- Verify viability of RREN design
- Investigate what's possible internationally



Other paths

- Software Defined Networks (SDN)
 - Individual org control of flows at SDXs
 - Reduction in cost for HW as RENs go > 1G

Data collection

- TV White Spaces (TVWS)
- Wireless Sensor Networks (WSN)
- Internet of Things (IoT)



Thank You

[**https://nsrc.org/**](https://nsrc.org/)



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