"Above the Net"
Global Products and Services of National Research and Education Networks

A report of a workshop held at the
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Executive Summary

The emergence of National Research and Education Networks data base to the 1990's at a time when increasingly critical exploration and discovery required large scale instrumentation (often funded at national and multinational levels) that depended on reliable yet flexible networking and identity infrastructure. While those environments continue to be broadly utilized, the dramatic rise of community and commercially available sources of computation, storage, and application on demand, and their access via NRENs, has generated a sense of urgency in the research community about how to best develop, deploy, consume, and sustain these resources. Given the growth of web scale providers including Amazon, Facebook, Google, Microsoft and others across the globe, with each deploying more computing capacity daily that is currently in production within the academy, the need for the NREN's to develop clear strategic positions on how to engage and benefit from these environments cannot be overstated. Simply put, twenty-five years after the launch of research and education networks, they are now the fabric that connects not just national resources or peer academic institutions but provides the best path to leverage global web scale computing environments.

The workshop brought together 45 researchers, technologists, and NREN leaders to explore directions of web scale solutions (those built and delivered by campuses or commercial providers) and to assess their possible impacts, challenges, opportunities and benefits. The workshop began with a structured discussion on three dimensions of above the net solutions: presentations focused on "BUILD" – experiences in development of community services examples of FileSender and Eduroam, "BUY" – how selection, tender, and deployment of commercial services have worked (AWS, Box, Zoom) and are being undertaken, and "RUN" – what can be done to achieve best practices in operating solutions in a long term sustainable way.

Post presentations (which are available online via links in the reference section), the workshop conducted as an "unconference" to identify areas of considerations for maximizing the NREN current and future capabilities. The unconference approach collected ideas that demonstrated a problem or proposed solutions into common framework. This matchmaking exercise resulted with 5 topic areas and 15 specific items of major interest. The final topic areas were: Tools, People, Process – both Problem and Solution – and Visibility. The main workshop then shifted to smaller breakout areas that focused on Tools, People, and Process, understanding that visibility is an overarching theme for all areas. Finally, after completed breakout deep dives, all workshop attendees reconvened to have each group present on proposals from their areas allowing for general discussion to clarify intent and ultimately work collectively to prioritize the various recommendations for consideration by NREN leadership. The prominent interest on Process is echoed in the overall finding of the workshop and a consistent theme that the attendees felt the importance of "how" we will achieve our objectives, rather than any disagreement or depth on the specifics of "what" needs be achieved. Recommendations are included in the following writeup and expected commitments to lead individual areas are included in the Appendix.

Recommendations from the Working Groups

The highest priority recommendations emanated from the Process category, where three major actions were identified;

- To establish a **Collaboration Framework** – **an NREN Platform for Information Exchange (PIE)** and ensure its wider adoption among NRENs.
- To share information and gain consensus around a compiled list of problems and/or challenges to be fed into the *Collaboration Framework*.
- To assign the necessary resources and encourage key people to take leadership on addressing problems and challenges under the actual *Collaboration Framework*.

These three themes were also identified by both the People and Tools groups who independently proposed the importance of implementing a regular structure where NREN's can consider and collaborate on solutions. Specific suggestions included;

- To find (purchase or develop/adopt) the collaboration tool that can serve as the PIE that is particularly well suited to supporting global communication and achieving consensus (when possible) around problem areas and potential solutions.
- To **identify and charter three pilot projects using the Collaboration Tool** that have the sufficient interest and support from the community.
- To establish a **Kickstarter Facility** that will help in both financial and technical terms developing the projects and executing them, as a common and predictable platform for joint investment.

Digging deeper into the actual method, the discussion identified the need to have explicit and consistent practice to build common expertise and experience in working together. To that end, the group recommended a global "**Spring of Deployment**" which would be modeled similarly to the well-known Summer of Code initiative originally sponsored by Google[1]. The main focus of this activity would initially be on the development/deployment of proof of concept community chartered services (aka. Minimum Viable Products) and moving those into production at NRENs that are able and willing to take the burden of piloting them.

One important element of this joint movement should be the establishment of a regular **Very Early Technology Scouting** exercise that may be successfully performed (in partnership with faculty) by students or interns working on problems that they find burning or fascinating for themselves. One step further, the idea was described as a **Skunkworks Facility** that creates the necessary background for those who are able and willing to progress independently on a particular project with seed funding or other support resources.

In fact, the various subgroups independently developed and submitted for consideration by the full workgroup attendance proposals regarding:

- the *Spring of Deployment* movement (from the Tools sub-group),
- the *Very Early Technology Scouting* exercise (from the People sub-group),
- the *Skunkworks Facility* establishment (also from the People sub-group) and
- the *Kickstarter Facility* creation (from the Process Solution sub-group)

The full group strongly recommends the NREN CEO's support **Harmonizing these four proposals** and bringing the most out of them in a combined action (best-of-breed) and do so with a strong joint communique and invitation to other NREN's for their participation.
It was further recommended that a regular ongoing **Global Forum for Product/Service Managers** of the NREN community be established. This forum would help identifying problem areas and potential projects to address using the *Collaboration Framework* and the online *Tools*.

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[1] https://summerofcode.withgoogle.com/

The work teams and the full group also discussed the difficulty of working with, and collectively influencing, the global cloud industry providers. It was recognized that previous multi NREN concerted attempts to develop global agreements with a number of different cloud providers proved unsuccessful. Some time was spent in discussion about root causes that contributed to those attempts not reaching the desired objectives. While many were outside the control or influence of NRENs (principally the organization and compensation structure for global technology companies and the complexity of differing legal systems) it was agreed that one barrier should and could be addressed – modified non disclosure agreements, perhaps through a common language or **Collective NREN NDA** that would allow for much easier and less restricted flow of information between participating NREN's.

Recognizing that ultimately, it is the people of the participant NREN's that will make the difference in the success of any collaborative activity. The success of such engagement was evident in the engaged and highly participatory unconference interaction during the Above the Net workshop demonstrating that we as a community should have a more structural and sustainable way of knowledge sharing. It was recognized that few NREN's are already formally (or informally) exchanging knowledge by having employees participate in position swaps – that is, work for a defined period of time as an assigned employ to another NREN. This gives both organizations the chance to learn directly from subject matter experts and embed that knowledge in a more sustainable way instead of the more volatile ways we are used to during conferences, VC's or project gatherings.

The workshop participants recommend NREN CEO's formally implement an **NREN People Exchange,** which would be coordinated in a central manner to support wider opportunities and easier position matching than is available through multiple bilateral agreements. Such a centrally coordinated People Exchange can expect to benefit all involved by
- Providing temporary assistance for positions where locating skills in the open market is particularly challenging.
- Retention of employees by offering them voluntary global opportunities that suits with respect to expertise, geographically, calendar and duration.
- Provide participating NREN's with staff that would have international experiences learning from best practices in other regions.

While this initial first phase of a people exchange can be successful on its own, it was also recognized the importance of adding new energy and ideas from individuals who would otherwise not be as attracted to NREN employment.   This may be achieved by sponsoring global internships where students in one region would be hired under a "**Split Internship**" model – working ½ a posting period at the home NREN and the second ½ at another participating NREN. Doing so would likely attract more qualified candidates and recent graduates into NREN employment supporting the introduction of new, unconventional or even rebellious ideas into our environment providing some "future proofing" against missing potentially critical trends and opportunities.

To support recruitment into the *Split Internship* program, it is also recommended that the NREN's collectively explore the establishment of an annual **Global Summer Student Program** where applied and accepted students would participant in a single location, multinational gathering that would rotate annually between participating NRENs for a limited duration (10 days 10 weeks). The community can provide a program that is an augmentation or addition to their student curriculum and working with our institutions perhaps provide some academic credit where they can participate in practical application of technology theory.   One way to achieve this is to support the collection of ideas and needs from campuses in a way that can provide global visibility to a shared "**Global Wish List**" that might have requirements documented as part of this program.

APPENDIX

TOPIC	PROBLEM/SOLUTION	COMMITMENTS
TOOLS	*Spring of Deployment - MVP*	Internet2 AARNet
PEOPLE	*NREN People Exchange*	NORDUnet GÉANT NIIF CEDIA
	Global Summer Student Program	Unidentified
	Split Internship	Unidentified
	Very Early Technology Scouting	NORDUnet PSNC SURFnet
	Skunkworks Facility	
PROCESS PROBLEM	*Collaboration Framework – an NREN Platform for Information Exchange (PIE)*	CANARIE SURFnet
	Maintain a list of problems / challenges *(related to Global Wish List)*	SURFnet
	Encourage staff to lead a project from the list	NREN CEO's
PROCESS SOLUTION	*Global Wish List (related to Maintaining a List of Problems)*	PSNC
	Identify and charter three pilot projects using the Collaboration Tool	AARNet
	Kickstarter Facility	NORDUnet GÉANT NIIF PSNC
VISIBILITY	*Global Forum for Product/Service Managers*	HEAnet AARNet REUNA RNP
	NREN Platform for Information Exchange (PIE)	Intrenet2 REUNA CESNET NIIF CEDIA
	Harmonizing The Proposals	NREN CEO Forum
	Collective NREN NDA	Intrenet2 GÉANT RNP AARNet