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Report on
Session 2-2 (part 1) The European & South American Experience

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This document reports the conclusions and recommendations from Session 2-2 of the International Workshop on African Research & Education Networking held on Monday 26th of September 2005 in CERN, Geneva..

It is meant to provide input to the agenda of decision makers responsible for policies on deployment of National Research and Education Networks in Africa, and in particular provide key members of existing or incubating NRENs in Africa with information about Policy, Technology, and Financial issues they should look out for when deploying eInfrastructures in Africa; provide input regarding "best-practices" as well as "bad-practices" to the agenda of national governments and funding bodies interested to deploy eInfrastructures in Africa. The input comes from the European & South American Experience.

General

- African efforts can benefit by studying "best-practices" as well as "bad-practices" followed in more advanced, eInfrastructure-established regions and countries.
- There is no unique "success reference model": alternative technical roadmaps must be made available to fit to the needs and available infrastructures of each region.
- There is also no "silver bullet" to guarantee long-term growth of the deployed eInfrastructures; sustainability can only be achieved by persistently undertaking several complementary and well-coordinated actions.
- Establishing a "web of trust" that brings human capital together must be a key priority since the sociological element in the deployment of eInfrastructures is as challenging –if not more so- as the technological one.
- ICT is an equalizer that can be employed to ease all kinds of Digital Divide. There are various flavors of Digital Divide even within EU nations (North – South, Cities – Rural Areas, IT knowledgeable – IT novices within a Campus). The EC expects to reduce the digital divide, extend the benefits of the Information Society to all citizens and contribute to the social cohesion by co-funding actions like EUMEDIS or @ALIS outside the EU. One component of these actions is the improvement of connectivity between NRENs within the different regions and its interconnection to GEANT: EumedConnect (North Africa), SEEREN (South East Europe), SPONGE (Central Asia and Caucasus), ALICE (Latin America) and TEIN2 in Asia-Pacific etc.
- In 1996 the European network (TEN34) had only a few 34Mbps backbone connections. A similar situation exists within Africa today. Africa can leapfrog.
- Technology has indeed the potential to induce a leapfrog effect – in 1992 both Poland and Czech Republic had between 19.6 and 56 Kbps for their Internet connectivity – today their NRENs are among the leaders in deploying and using fiber.
- The Research Networking: extension of GEANT was setup on the common interest of the researchers worldwide.

Policy

- A 3-tier Federal Architecture, partially subsidized by National and EU Research & Education funds constitutes the European model for the development of Research and Education Networking: The Campus Network (LAN/MAN), The NREN (MAN/WAN), The Pan-European Interconnection (from TEN34 to GÉANT2). It must be noted that the pan-european interconnection and the NREN investments are 1% and 10% respectively of the required campus investments. Focus should be given to all three levels. The campus is often the weakest link.
- Bodies for governance in Europe and Latin America can be replicated in Africa: NREN Policy Committee, DANTE, TERENA, CEENet., CLARA Statues can be shared.
- TERENA Activities/Results (Compendium/Benchmarking, Foresight Studies, Country Missions, Technical & Managerial Workshops, etc) can be reused or extended to Africa. African NRENs are asked to fill in the Compendium. CEENet activities/results can be also reused (NREN Creation Cookbook, CEENet Tartu Declaration, Varna Statement).
- For the continental or regional interconnection the cost sharing model of GEANT can be reused. Model followed by the SEEREM and EUMEDCONNECT

initiatives (connectivity prices where initially unaffordably high) which opted for a strong a successful lobbying political campaign to persuade operators and governments to provide non-commercial prices as well as a cap on the circuit prices to ensure value for money.

- The Accepted Use Policy of European NRENs can be reused in Africa.
- Aggregate funds: EU, National, International Assistance bodies, but do not go for 100% funding. It is always good to complement with National funds (e.g. 80/20 model) to establish the future funding routes.
- National governments should understand that research networks are a national asset, an asset for economic growth and prosperity, a source of innovation, used also for fast and widespread technology transfer to society and industry. NRENs are absolutely necessary for national coordination.
- Need to respect national priorities but go for 1 NREN per country to avoid competition and misuse of resources (one point of International Contact, no competition for scare resources, finance, staff, etc). Furthermore an NREN is not a monopoly; should be seen as a public utility.
- Economies of scale exist in smaller countries that often connect to their NRENs also libraries, schools, etc.; not only the research institutes and universities
- NRENs should act proactively, inspiring, designing and deploying, should develop competition in the market and become partners of governments but also of the telecom providers. In areas with no competition the prices can be 25 times higher than in areas with 3-4 competitors.
- Apart from connecting the universities and the research institutes, NRENs should connect also the YOUNGSTERS that will bring the change (kindergardens, elementary and secondary schools)
- Governments can help on a regulatory approach that will give all players and perhaps even all market parties a non-discriminatory right of access to installed fibre at equitably negotiated pricing, ensure that NRENs are adequately resourced with sustained central funding. Governments should fund the start, after consensus is build in the country. But there is no single model for funding an NREN for its operations. Important is for the NREN to have the authority.
- The strategic priority should be: Empower your end-users, increasing the retention of talented scientists, make available the benefits of the Information Society for all citizens, improve the regional competitiveness, the regional political stability and cohesiveness.

Organizational
- Consider Regional Aggregations if cultural and economic factors allow (aka. SEEREN, EumedConnect, towards a NORDUNet & US Regional PoPs paradigm). It seems that Africa could develop 3-4 regional networks. Regional cooperation is necessity for Bargaining momentum and Exchange of expertise.
- Develop Federation amongst NRENs and/or Regional R&E Networks, well connected and managed, partially funded by constituent NRENs (aka. GEANT, RedCLARA) - Governance?
- Be an integral part of the Global R&E Networking Community. Integrate with Worldwide Structures.
- Continental, regional and national visions should be defined followed by memoranda of understanding ratifying the common understanding and plan.

- A local champion is needed to drive things per region/country. Only these individuals can create all other conditions. Execute your plan with a professional project manager, not a professor, researcher.
- Have a success story and become a credible national & international partner.
- Reassess your priorities and take special actions to keep everyone at the same speed.
- When looking for outside assistance should identify the right people, be very focused, start with equipment, expertise, and training – catalytic funding, help in lobbying and raising the awareness
- Sustainability = technological competence + managerial vision + appropriate policies + public awareness
- Sustainable NREN = Appropriate with respect to human resources and technology, nationally based, internationally oriented, inclusive (if possibly include many segments in addition to the primary users – the academic community), find young and vigorous politicians and educate and entice them for your work – stress content and public recognition.
- Do not concentrate on infrastructure alone, but also pay attention to the support of user groups and collaborative applications (VoIP, video-conferencing, etc).

Technical
- GÉANT2, a new generation HYBRID Network backbone: IP(v6) + switched end-to-end provision across interconnected networks (over DARK FIBER among 15 countries & growing) with ubiquitous global services to users across NRENs & beyond via IPv6 and manageable e2e lower layer paths (e.g. WAN GigaEthernet & Light-path switching) , end-user support, user access to e2e provisioning, AAA, collaborative services, roaming.
- The Internet enabled the ubiquitous global networked community based on IP services & the Web. The Next Generation Hybrid Network will enable the global knowledge – based society by providing advanced collaborative platforms via hybrid IPv6 & Manageable Layer 1-2 (Ethernet & Light-path switching over Dark Fiber) Services.
- Do not settle for expensive short term solutions, if possible (e.g. satellites). Acquire dark fibre for the NREN and for the international connectivity.
- Try to leap-frog in advanced solutions. Examples: Balkan dark fiber initiatives for NRENs, NRENs of new EU member states (Poland, Czech Republic ….) are champions of optical technologies.
- Use wireless links (license free?) to complement fiber optic feeds (WiMAX)
- Homogenize your network (end-to-end).
- Connect the sensors and databases (Grids).
- Build applications on top of your eInfrastructure (open to all scientific communities). NRENs from Latin America, South-East Europe and North Africa are developing research applications in Education, Telemedicine, Grids, etc…regional and also internationally (e.g. SEE-GRID, Eumedgrid, EELA, ExPress).