



Lessons learned in GÉANT2

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Connect. Communicate. Collaborate

Who are the NRENs?

Austria **ACOnet** Belgium **BELNET** Bulgaria **BREN** Croatia **CARNet**
Czech Republic **CESNET** Cyprus **CYNET** Denmark **UNI-C** Estonia **EENet**
Finland **FUNET** France **RENATER** Germany **DFN** Greece **GRNET**
Hungary **HUNGARNET** Iceland **RHnet** Ireland **HEANet** Israel **IUCC** Italy **GARR**
Latvia **LATNET** Lithuania **LITNET** Luxembourg **RESTENA** Malta **UoM**
Netherlands **SURFNET** Norway **Uninet** Poland **PSNC** Portugal **FCCN**
Romania **RoEduNet** Russia **JSCC** Slovakia **SANET** Slovenia **ARNES**
Spain **RedIRIS** Sweden **SUNET** Switzerland **SWITCH** Turkey **ULAKBIM**
United Kingdom **UKERNA**

- Organisations responsible for network layer of national e-infrastructure for the research and education community.
- They shape the communication behaviour of the next generation of engineers and scientists.

What is the NREN specific and unique role?



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- Provide leading edge network(ing) services for their community.
- Perform applied network research in a number of areas.
- Tailoring leading edge technology to meet the A&R community needs:
 - Integrating “Off The Shelf” advanced products.
 - Development of user friendly, value added services based on open source – open API modules.

Why have NRENs organised a consortium on a European scale?



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Because:

- Users collaborate internationally more and more.
- It is the most efficient way to catalyse national R&E network development.
- There is nothing equivalent to NREN/GÉANT services on the market.
- It makes ERA/EHEA achievable and possible.



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What are the reasons for advanced pan-European R&E Networking?



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- Technological:
 - Satisfy high demand *eScience* initiatives.
- Social:
 - Common culture of R&E community.
 - Virtual Organizations VOs, collaborative research, tele-education.
 - Smoothing the **Digital Inclusions** in Europe and beyond, affordable high bandwidth linkage to the Global R&E community.
 - **EU Lisbon Agendas**: Ubiquitous, secure, fast, cost-effective connectivity to all.

What are the reasons for advanced pan-European R&E Networking?



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Economic:

- Demand aggregators: University staff & students, school pupils, Researchers.
- Consolidation & control of diverse public expenditures.
- Promotion of Information Society (e-Government, e-Business, e-Health ...).
- Stimulation of technological developments and telecom markets
-> European Competitiveness.

Lessons learned – *About technologies*



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- The Pan-European Interconnection: TEN34 → TEN155 → GÉANT (GN1 in FP5) → GÉANT2 (GN2 in FP6) (**hybrid concept**).
- Technological progress is still very dynamic;
 - Consequence: the consortium has to follow and to actively shape this dynamic process.
- There is no technical decision we made at the beginning of GN2 project that was wrong!

Lessons learned – *About bandwidth*



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- The bandwidth of a network is either indirectly an innovation pusher (for new applications) or a show stopper for such innovation.
- Bandwidth is not an issue anymore in most of Europe, but it has been so for many years, and it is still in some part of EU:
 - Regulatory and economic circumstances make it easier than in the early days of NRENs to solve the “bandwidth problem”.
 - Need for political intervention in non-competitive telecoms markets.
 - Non-competitive telecoms markets continuing to cause Digital Divide.

Lessons learned – *About services*



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- Infrastructure is not all: Services and their usage are more important; but possible only when infra is there!
- The path from the pilot implementation to a real operational service is long and tedious, longer than expected for some cases.
- Appropriate policy should be developed to help qualify and select innovative technology.
- Demanding communities require demanding services.

Lessons learned – *About people*



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“Well then, eliminate the people, curtail them, force them to be silent.”
Fyodor Dostoevsky, Notebooks for The Brothers Karamazov

- Human capacity building alongside infrastructure and service development is essential.
- Alternative (important) sources of developers/contributors to development in the GN2 Joint Research Activities:
 - Campus IT staff & Network researchers.
- Introduction of Technical Authors & Training Activities:
 - Directly linked with the development of technical services and also with a clear presentation on the public relations and marketing side.

Lessons learned – *About building blocks (NRENs)*



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- The NREN organisation is a success story that has been used as a blueprint worldwide (ALICE, even NA with Internet2, ...) and also as an *inspiration* for other scientific infrastructures, like NGIs in the Grid case.
- Sustainability of the building blocks **HAS BEEN, IS and WILL CONTINUE TO BE** a real issue for NRENs and their organisations.
 - Political support of NRENs is required at the national level first.

Lessons learned – *About governance*



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- Governance and policy are key ingredients for success.
- Managing a 30 partner consortium is not easy, but success is rewarding.
- Current European landscape is still complicated with several overlapping organisations (Consortium, DANTE, etc...) but it is working!
- We are trying to *simplify* this situation by establishing an organisation that will include all NRENs.

Lessons learned – *About planning & building*



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- Things change over time. What shapes our infrastructure is technology development.
- Network and service building is possible only after effective planning.

*What seems to be the perfect plan today,
is imperfect tomorrow !*