



GÉANT Round Table  
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« *networking the networkers* »

## TERENA: Innovation and Collaboration in the Research and Education Networking Environment



# NRENs have long been play an innovative role

- › Original R&E networking activities:
  - › ad-hoc
  - › best efforts projects
  - › Often local or regional rather than national
- › Integrated available building blocks
  - › Phone circuits, modems, X.25, leased lines, routers, switches, dark fibre . . . . .
  - › Provided the glue to stick them together
  - › Built overlay networks
- › Innovated
  - › Added functionality
  - › Development of new paradigms
  - › New services
- › To SERVE EDUCATION and RESEARCH
  - › in doing so push the market and benefit society generally
    - › Technically and in liberalising the telecommunications market



# Many levels of collaboration and coordination

- › Collaboration crossing network domains, locally, nationally and internationally
  - › NRENs providing tailored services in close collaboration with their constituent institutions
- › Collaboration among different scientific disciplines and across sectors, including industrial and government
- › Exchange of knowledge/ expertise across different countries, leveraging communities and helping integration



# Success Story: eduroam



- › Wireless roaming service for research and education community. Allows users to access wireless networks at participating institutions in eduroam-enabled countries.
  - › Pioneering work in a small set of European countries, testing various options including VPNs, 802.1x + RADIUS prevailing
  - › European Confederation service in GÉANT - 37 countries and >1,000 sites.
  - › Asia-Pacific (JP, CN, HK, TW, AU + NZ) and Canadian confederations
- › Based on 802.1x/EAP and hierarchy of RADIUS servers.
  - › European top-level servers operated by SURFnet (NL) and UNI-C (DK).
  - › National RADIUS servers (NTLDs) usually operated by NRENs.
  - › Identity management system at institutions linked to RADIUS server.
- › Collaborations with local authorities and commercial providers to offer access across some cities (e.g. Luxembourg & Trondheim).
  - › Investigating WiMAX and 3G mobile options.

[www.eduroam.org](http://www.eduroam.org)



## About TERENA

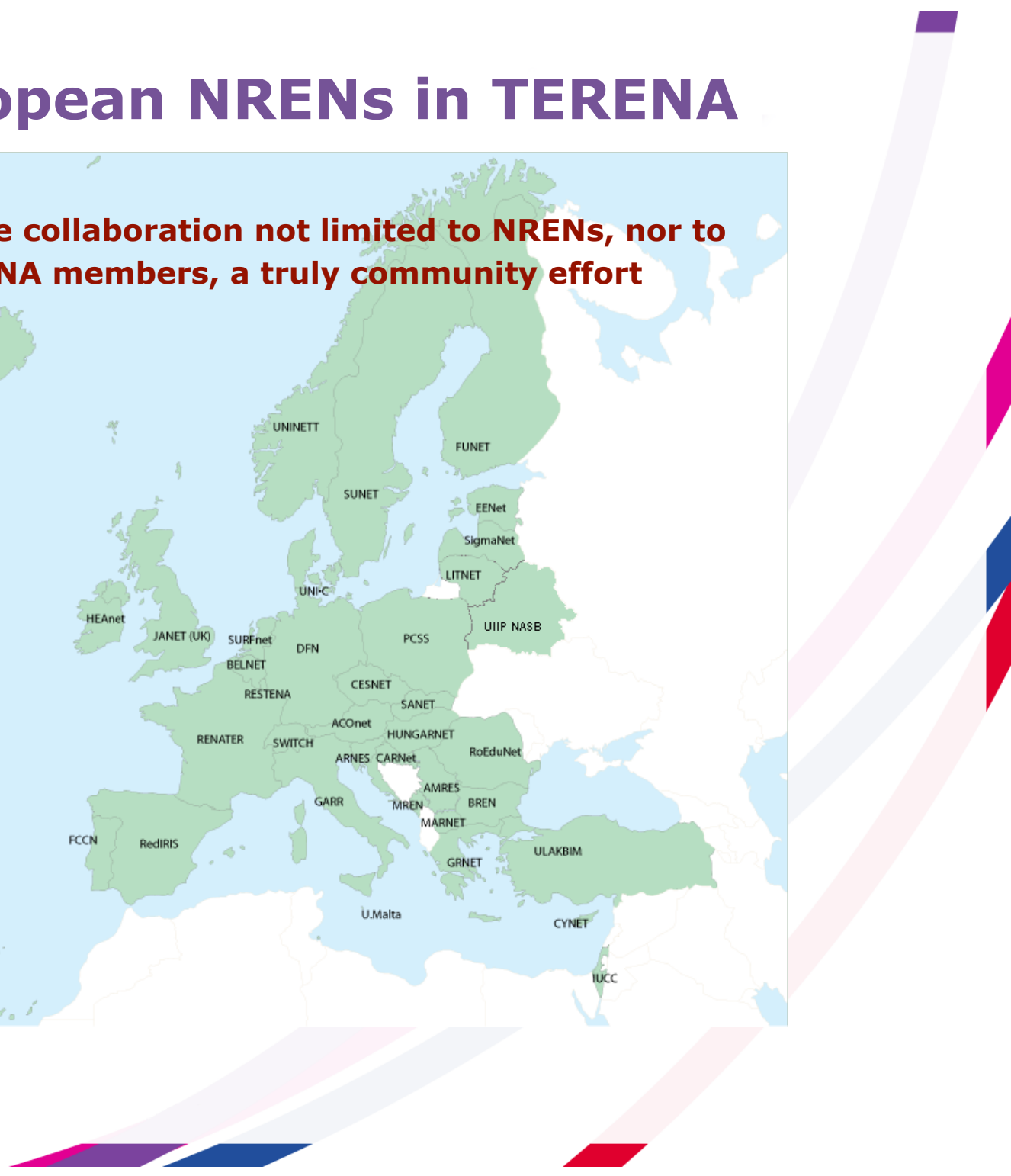
- › A forum to collaborate, innovate and share knowledge
- › fosters the development of Internet technology services for the research and education
- › A collaborative organisation bottom up
- › TERENA does not run a network infrastructure  
**GÉANT** is managed and operated by **DANTE**



# European NRENs in TERENA

Slide 6

**Active collaboration not limited to NRENs, nor to TERENA members, a truly community effort**





# TERENA and its Community

- › Work is organised on a voluntary basis
- › Task Forces
- › Physical Meetings, Video Meetings, Email lists
- › Participation open to all
- › Workshops on specific topics
- › TERENA commissions community projects and is involved in external projects
- › Acts as clearing-house for selected NREN services



# TERENA Networking Conference 2010

- › Vilnius, Lithuania 31 May to 3 June 2010
- › Theme: "Living The network Life"

The screenshot shows a web browser window with the URL <http://tnc2010.terena.org/>. The browser's address bar and search bar are visible. The website content includes a header with "TERENA NETWORKING CONFERENCE 2010" and navigation links for "Home", "Sponsors", and "Contacts". A large banner image features a night view of a building with a statue on top, overlaid with the TERENA logo and navigation buttons for "SCHEDULE", "VENUE", "MEDIA", and "PARTICIPATE". A pink starburst graphic on the right of the banner says "TNC 2010 Submit a paper!". Below the banner, the text reads "Welcome to TNC 2010" followed by a paragraph about the conference being hosted by the Lithuanian National Research and Education Network (LITNET) in Vilnius. A second paragraph describes LITNET's network capabilities. To the right, a "Sponsorship opportunities" section includes contact information for Gyöngyi Horváth and a link to a "SPONSORSHIP BROCHURE" for the 2010 conference.





# TERENA Task Forces and workshops

- › Small groups of volunteers working on specific problems
- › Limited duration, typically 2 years
- › Open to any individual or representative offering expertise, manpower, equipment or services
- › Exchange of information and best practice
- › Set of defined tasks and deliverables
- › Each task force has its own mailing list, list archive, web space/wiki
- › TERENA provides organisational and secretarial support
  
- › [www.terena.org/task-forces](http://www.terena.org/task-forces)
- › [www.terena.org/mail-archives](http://www.terena.org/mail-archives)



# How to find information [www.terena.org](http://www.terena.org)



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## TF-Mobility and Network Middleware

The development and deployment of mobile technologies and the usage of network middleware to support interoperable roaming services, are becoming key activities among NRENs and academic research institutions.

The TERENA task force on Mobility, which started in 2002, promotes the adoption of such technologies. In September 2008, new terms of reference were approved, and under these the remit has been slightly changed to reflect the outcome of the redefinition of focus of the two TERENA middleware-oriented taskforces, TF-EMC2 and TF-Mobility. Consequently, TF-Mobility will focus on roaming and networking middleware and will be known as TF-Mobility and Network Middleware.

Secretarial support for this task force is provided by TERENA with funding from the GN3 project.

## Goals of the Task Force

- To provide a forum for exchanging knowledge and for testing (new) mobile technologies;

### Shortcuts

- > [Task Force Activities](#)
- > [Meetings](#)
- > [Mailing List](#)
- > [Deliverables 2004-2006](#)
- > [Deliverables 2003-2004](#)
- > [Dissemination](#)
- > [Related activities](#)
- > [eduroam](#)
- > [Global Working Group](#)
- > [eduroam miniCAMP](#)
- > [ECAM](#)
- > [Terms of Reference](#)

### Upcoming events

- > [TF-Mobility](#)  
18 Feb 2010, Vienna, Austria

Slide 10



# TERENA's Technical Areas

- › Lower-layer technologies (Layers 0-4)
- › Virtualisation
- › Security
- › Middleware
- › Mobility
- › Voice and Video Collaboration

**Campus** issues, **End-to-End** coordination and **Grid** collaboration span many different areas

[www.terena.org/about/tech](http://www.terena.org/about/tech)

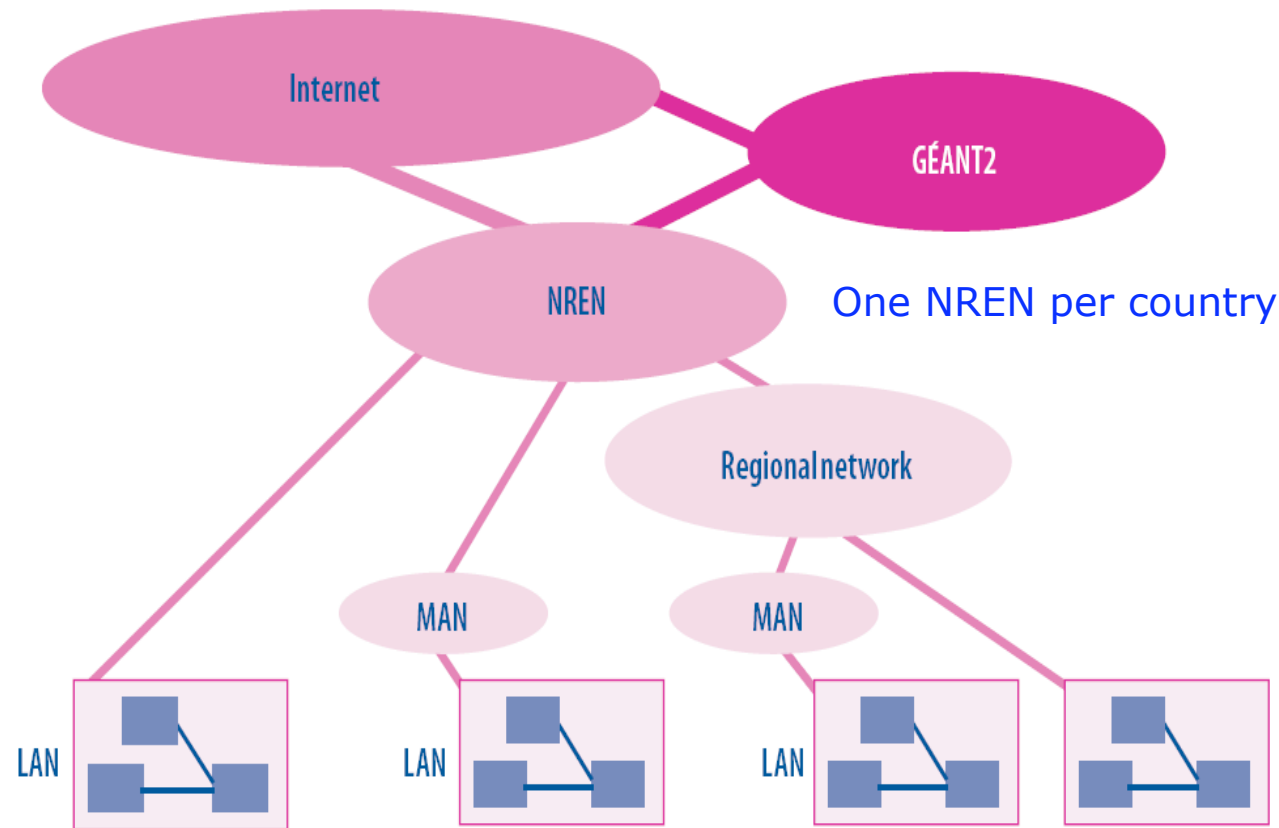


# Lower Layers and Virtualisation





# Federated Model of Research and Education Networking





# Network provisioning end-to-end

- › Meeting in Amsterdam 7 December 2009, followed by On-demand Infrastructure Services Provisioning Workshop jointly organised with POSPHORUS project
- › Follows up from the 1<sup>st</sup> workshop held on 1-2 December 2008
- › Targets NRENs, regional/metro, campus and local networking organisations to share expertise and experience in establishing real end-to-end connection services for universities and research labs in Europe
- › Talks include (among others)
  - › challenges for end-sites, virtualisation,
  - › service oriented approach,
  - › Overview on campus best practices
  - › and a presentation on the GÉANT end-to-end Coordination Unit



- › Network virtualisation: Many NRENs providing a virtual network infrastructure (GÉANT+national links) for research on new internet architecture, protocols etc. in the EU FEDERICA project
- › [www.fp7.federica.org](http://www.fp7.federica.org)
- › Service virtualisation: TF-STORAGE. distributed services, storage, Cloud Computing model
  - › Sharing information and ideas, building up the community, discussion on best practice and requirements
  - › Storage services, backup, disaster recovery, etc
  - › Small project from NRENs to develop a large-file sharing open source platform is available for testing
- › [www.terena.org/activities/tf-storage](http://www.terena.org/activities/tf-storage)



# Security







# TF-CSIRT

- › Promotes collaboration and knowledge transfer between European CSIRTs.
- › Includes NREN, ISP, government and commercial CSIRTs.
- › Meets three times per year, to discuss issues of common interest and new approaches.
- › Establish pilot services (e.g. **trusted introducer**, tracker database) and common standards and procedures).
- › Assist new CSIRTs (e.g. through training and mentoring), developed TRANSITS **training material** and runs training courses (with FIRST and ENISA).
- › Prevent miscommunication between NRENs, the EU, and national governments.
- › [www.terena.org/tf-csirt](http://www.terena.org/tf-csirt)



# Mobility and Middleware





# Middleware Across the Stack

**The Application**

**The Middleware**

**The Network**

- › Bottom layer of the application
  - › PKI
  - › Directories and schemas
  - › {Con-, inter}federation
  - › Reputation
- › Top layer of the network
  - › Mobility
  - › Network access
  - › Endpoint assessment
  - › Provider integration



# eQual Workshop

- › Amsterdam, 9 December 2009
- › Workshop on the topic of improving the quality of email services.
  - › email filtering
  - › National anti-spam initiatives
  - › Reputation systems
- › Staff of many NRENs have expressed an interest in such a workshop.
- › Presentations for community members of spam reduction approaches, technologies and practices



## TF-MNM (Mobility & Network Middleware)

- › Promotes, develops and tests technologies that allow roaming between networks.
- › Established the eduroam pilot service that permits inter-institutional WLAN roaming.
- › GÉANT activities to further develop eduroam into full production service.
- › Activities include:
  - › Exploring applications that might benefit from wireless, e.g. sensor and mesh networking.
  - › Considering how to facilitate interoperability with other roaming services, such as WIMAX and 3G.
  - › Looking at Mobile IP implementations, particularly MIPv6.
- › [www.terena.org/tf-mobility](http://www.terena.org/tf-mobility)



# TF-EMC<sup>2</sup>

## (European Middleware Coordination & Collaboration)

- › Discusses middleware issues and fosters collaboration.
- › Established Server Certificate Service (SCS).
- › Setup Schema Harmonisation Committee (SCHAC) to develop standard identity schema for higher education inter-institutional data exchange.
- › Currently working on REFEDS (Research and Education Federations) initiative:
  - › Investigating technical specifications for authentication and authorisation between identity federations
  - › Defining policies and guidelines for peering of federations, starting from common denominators.
  - › How to handle overlaps between R&E, government and commercial sectors.
  - › Agree "Levels of Assurance".
  - › Identify major projects that can benefit from cross-federation peerings.
  - › Organised regular REFEDS meeting since 2007.
- › [www.terena.org/tf-emc2](http://www.terena.org/tf-emc2)



# Community Services





# TERENA Certificate Service (TCS)

- › Server Certificate Service (SCS) originally established in 2006 in response to need for SSL server certificates in research and education community.
- › Many NRENs had set-up a CA, but certificates issued were not trusted by web browsers (the 'pop-up' problem).
- › Purchasing certificates directly from commercial CAs is expensive in bulk.
- › Agreement made with GlobalSign which allowed unlimited certificates to be issued for flat fee.
- › 18 participating NRENs issued >10K certificates between 2006 and 2009.
- › Contract re-tendered in early-2009, and awarded to Comodo Ltd.
- › Comodo will run dedicated (sub-)CAs for NRENs (and by extension their user communities) until at least 2012.
- › Service renamed to reflect additional types of certificate being offered.





# TERENA Certificate Service (TCS)

- › Five types of certificate available:
  - › Server Certificate - for authenticating servers and establishing secure sessions with end clients.
  - › e-Science Server Certificate - for authenticating Grid hosts and services.
  - › Personal Certificate - for identifying individual users and securing e-mail communications.
  - › e-Science Personal Certificate - for identifying individual users accessing Grid services.
  - › Code-signing Certificates - for authenticating software distributed over the Internet.
- › Also offering discounted prices on EV certificates.
- › Certificate issuing and management through web interface or customisable application (Djangora).
- › 21 NRENs signed up
- › Interest from 3-4 other NRENs
- › [www.terena.org/tcs](http://www.terena.org/tcs)



# TERENA Academic CA Repository (TACAR)



- › A trusted repository for holding verified root CA certificates of TERENA members.
- › Root certificates directly managed by the member NRENs, belonging to national academic PKIs, or related institutes or projects (e.g. EUGridPMA).
- › Operating since 2003.
- › Accreditation process for collection and updating of certificates in root CA.
- › Certificates made publicly available via secure website, along with policies.
- › [www.tacar.org/](http://www.tacar.org/)



# Engaging With New Communities





# TF-MEDIA

- Investigate open standards

## Content

- Security
- Federated access
- non-web based AAI
- **Potential collaboration with TF-EMC2**

## Protection

- From centralised to distributed approach
- Federating content storage
- **Potential collaboration with TF-Storage**

## Storage

**Task Force:  
to provide a forum  
for exchanging and  
promoting ideas,  
experience and  
knowledge**

## Access

- Compare/share existing modules

- Recommendations for METADATA types, formats, structures, levels, etc.

## Cost

## Searching

- Define the workflow/architecture
- Give guidelines / best practices
- **Liaise with OpenCast, EUNIS, ... ?**

## Others?

- Promote the concept
- Use Cases
- Legal issues
- **Potential collaboration with TF-PR**



# Performing Arts Production Workshop

- › Organised by TERENA Internet2, RENATER and IRCAM in Paris 22-24 November 2010
- › 2<sup>nd</sup> in a series of annual audio/video production events held in Europe targeting NRENs and institutions which produce events in the performing arts area
- › Tutorials on network, equipment and staffing requirements for interactive performing arts education, multi-site performance events, and high quality netcasting over advanced networks
- › email list [network-arts@terena.org](mailto:network-arts@terena.org)



**Thank You for the  
attention!**

**Questions?**

