



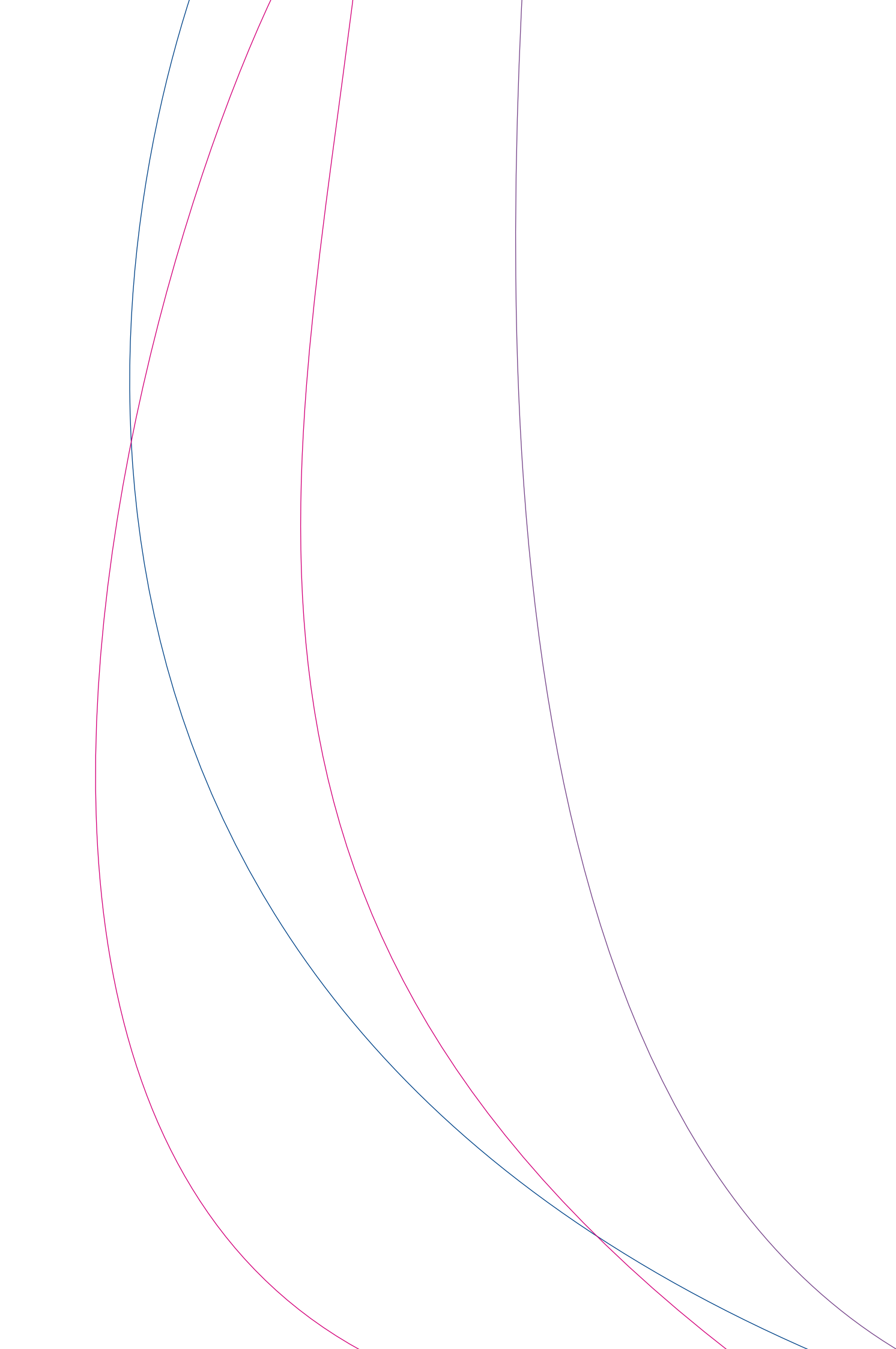
**TERENA**  
**ANNUAL REPORT**  
**2009**



« *networking the networkers* »

**TERENA**  
**ANNUAL REPORT**  
**2009**





Welcome to TERENA

**The Trans-European Research and  
Education Networking Association**

Today's students, teachers and researchers rely on electronic media and computer networks more than ever before for simple email communication, for remote learning, teaching and conferencing, for transferring and analysing large and complex data sets, and for experimenting with network technologies and applications.

Dedicated research and education networking organisations provide the necessary networking infrastructure and services to research institutes and educational establishments.

TERENA is the association in which Europe's research networking organisations, research institutes, equipment vendors and telecommunications operators meet, exchange information and experience, and collaborate on a range of activities.

Those activities - projects, task forces and events - are open to any organisation or individual who can offer appropriate expertise, manpower or other resources.

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

# Contents

## Memberships and Liaisons 48



## Technical Programme 18



## Policy and Outlook 8



## Outreach 12

## Services 26



## Conferences and Workshops 34



<b>6</b>	<b>Foreword</b>
<b>8</b>	<b>Policy and Outlook</b>
<b>10</b>	<b>TERENA Membership</b>
<b>12</b>	<b>Outreach</b>
12	Information Dissemination
13	Networking Development Support
14	TERENA Compendium
14	GN3 Status and Trends
14	Task Force on Management of Service Portfolios
15	Task Force on Public Relations and Information Dissemination
16	Partner Services Promotion
17	FEAST
<b>18</b>	<b>Technical Programme</b>
19	Task Force on Collaboration of Security Incident Response Teams
20	Task Force on European Middleware Coordination and Collaboration
22	Task Force on Mobility and Network Middleware
22	GN3 Multi-domain User Application Research
23	Task Force on Storage
24	FEDERICA
<b>26</b>	<b>Services</b>
27	Trusted Introducer
28	TERENA Certificate Service
29	TACAR
30	eduPKI
30	eduGAIN
30	NRENum.net
31	educonf
31	European eduroam Service
32	GLIF Secretariat
<b>34</b>	<b>Conferences and Workshops</b>
35	TERENA Networking Conference
37	NREs and Grids Workshop
38	EuroCAMP Workshops
39	CSIRT Training Workshop
40	Performing Arts Production Workshop
41	Next Generation Networking Workshop
42	End-to-End Provisioning Workshop
43	On-Demand Infrastructure Services Provisioning Workshop
43	International Federation Peering Workshops
44	Media Management and Distribution Workshops
45	Quality of Email Services Workshop
46	GN2/3 Training Workshops
<b>48</b>	<b>Memberships and Liaisons</b>
48	ENPG and European Commission
49	DANTE
50	Intercontinental Collaboration
51	Internet Society
<b>52</b>	<b>Financial Report</b>
<b>56</b>	<b>TERENA Staff</b>
<b>58</b>	<b>Acronyms and Abbreviations</b>

# Foreword



I am delighted and privileged to write my first foreword to a TERENA Annual Report. It was a great honour to be elected as President of TERENA in June 2009, and the first months have already offered a unique viewpoint on the exciting and eventful collaboration going on in our European research and education networking community.

2009 encompassed more TERENA activity than ever before. Preparations began for a new TF-Media task force to deal with the increased use of rich media in research and education. The TERENA Certificate Service was renewed on better terms and with more to offer: it has already been adopted by more than half of Europe's National Research and Education Networks (NRENs). The TERENA Networking Conference drew almost 500 people to Málaga and was very highly rated by participants. End-to-end and EuroCAMP workshops continued to involve campuses in our common efforts. I really hope to see NRENs bringing in ever more knowledgeable campus people and their close-to-the-end-user perspectives to benefit European-level research and education networking collaboration.

The year also witnessed many changes in our community. Most importantly, the GN3 project began in April and has already proved to be a big step forward. The project framework has built-in flexibility for new ideas and innovation, which is vital for such a long and comprehensive project. TERENA has a significantly bigger role in GN3 compared with previous projects, and I am happy to note that TERENA and its sister organisation DANTE complement each other there better and better. Unfortunately other changes in 2009 have not been as beneficial, as the financial crisis has forced many NRENs and TERENA associate members to adapt to quickly changing economics. We can surely lessen the impact of the crisis by cooperating and supporting each other even more closely.

Amid all the change, we must focus on our end users and their experience of using our services – both the big science projects and individual students, teachers and researchers. An important aspect of this is the interoperability and ease of use of e-infrastructure, from dynamic lightpaths to Authentication and Authorisation Infrastructure (AAI) and from database sharing and Grid computing to collaboration and communication tools. The trend of integration shows up in a host of workshops that big research projects are setting up to discuss e-infrastructures, as well as in talks and papers by the European Commission. In several European countries too, initiatives are underway to consider integrating infrastructures and even the organisations administering and operating them. TERENA has also played a role, for example, with the popular NRENs and Grids workshop series.

In addition to our community's long-standing and successful collaboration on innovative service development, we need to consider other aspects of our work in order to adapt to changing needs. We should share more thoughts and experiences on matters like the case for NRENs, strategy, business case analysis, service management and marketing, and on regulatory and other legal matters. I would very much like to see new initiatives to complement ongoing efforts in TF-CPR and TF-MSP, and we shall take up these themes during TERENA General Assembly meetings. Partly to this end, the TERENA Secretariat has initiated a round of in-depth discussions with all members in order to learn their expectations of TERENA and to find the best ways to support their goals.

TERENA prospered under the wise counsel of Dorte Olesen, my predecessor as President. She dedicated a lot of her time and effort during six successful years in office. Even though she helped to make things easier by leading the association into its current flourish, I am humbly looking forward to the challenge of continuing on the forward-looking path she laid out for TERENA.

Thank you all for your active contribution to making 2009 a success in research and education networking. And I give big thanks to the always very pleasant and dedicated TERENA Secretariat staff and Executive Committee for their efforts to support research and education by networking the networkers.

*Janne Kanner*  
President

# Policy and Outlook

TERENA activities are carried out under the guidance and responsibility of the TERENA Executive Committee and the ultimate authority of the TERENA membership as represented by the TERENA General Assembly.

## Making changes and setting priorities

The global economic crisis that erupted in 2008 impacted on European research networking in 2009, and is expected to have further consequences. But there is still room for flexibility.

In some countries, the crisis led to government budget cuts that affect research and education networking. In other countries, research networking may benefit from government investments in innovation to stimulate economic recovery. In some countries other changes are taking place that are partly or wholly unrelated to economic considerations. All these developments encourage research and education networking organisations to consider their portfolios of services and activities, and to set priorities.

At the European level, the start of the GN3 project in April 2009 was a major milestone. To a greater extent than in GN2, GN3 encompasses not only the provision of the pan-European backbone network, GÉANT, but also a number of services, plus coordination, support and joint research activities. Europe's research and education networking organisations have committed much more manpower to GN3 than to its predecessors. Therefore, a large part of the resources that TERENA's member organisations can contribute to international activities has been fixed for a four-year period.

This is also true for the TERENA Secretariat. Encouraged by the association's members, the TERENA Executive Committee attained a larger role for TERENA in GN3 than in the earlier projects. In 2010 - the first full calendar year within GN3's lifetime - the project will account for about 40% of TERENA's expenditure and about

## TERENA Executive Committee

President  
**Dorte Olesen**  
(until 12 June)  
**Janne Kanner**  
(from 12 June)

Vice President Conferences  
**Miroslav Milinović**

Vice President  
Technical Programme  
**Christoph Graf**

Treasurer  
**Lajos Bálint**

Members  
**Alberto Pérez**  
**Agathoclis Stylianou**

### meetings in 2009

11 March, 7 May, 8 July, 24 September, 17 December, TERENA Secretariat offices



(back) Agathoclis Stylianou, Janne Kanner, Lajos Bálint, Alberto Pérez, (front) Christoph Graf, Miroslav Milinović

30% of the association's income. Fortunately there is still room for new initiatives. Within the existing GN3 project framework there is flexibility to give attention to new areas. Moreover, TERENA has resources to support other and new activities that the membership finds important.

### Intensifying information exchange and collaboration

It is more important than ever for TERENA to understand the needs, wishes and priorities of its member organisations. While collaboration offers opportunities to combine forces and achieve critical mass and economies of scale, this requires matching of the organisations' requirements and resources in terms of manpower, experience and finances.

The TERENA Executive Committee wants to intensify information exchange

between member organisations and with the Executive Committee and Secretariat. Therefore, following an initiative in 2008, the Executive Committee and Secretariat held a number of bilateral meetings with TERENA member organisations in the second half of 2009. The frequency of these meetings will be increased further.

Better communication and more collaboration between campus-level providers of networks and services and national- and international-level research and education networkers is important to the achievement of a wider deployment and use of services. Promoting this collaboration is therefore one of TERENA's priorities. TERENA's national members will be needed to help us learn about the status, possibilities and limitations of local networkers, and to establish communication with them.

## General Assembly

### meetings in 2009

11-12 June, hosted by RedIRIS in Málaga, Spain  
22-23 October, hosted by RoEduNet in Bucharest, Romania



In June, Janne Kanner (Funet) was elected as TERENA's president, succeeding Dorte Olesen (UNI-C). Miroslav Milinović (Srce) and Lajos Bálint (HUNGARNET) were re-appointed to the Executive Committee as Vice-President for Conferences and Treasurer, respectively. Ekinops was welcomed as an associate member. The assembly approved TERENA's financial accounts for 2008. It lowered the 2009 membership fees to the 2008 level, because of the negative impact that the worldwide economic crisis had had on some member organisations.



(above) Agathoclis Stylianou helps Dorte Olesen open gifts at end of her TERENA Presidency. (below) Karel Vietsch (TERENA Secretariat) and Helmut Sverenyák (CESNET) sign agreement about TNC 2011.

Dorte Olesen presented the TERENA Executive Committee's 2008 annual report, explaining that almost all planned initiatives had been successfully implemented, as well as a few others, such as the establishment of the new task force, TF-Storage.

Assembly participants discussed the principles of financing services that are delivered by TERENA to paying customers. It was agreed that the cost of these services should eventually be fully borne by the customers.

In the autumn meeting, the assembly adopted the TERENA budget for 2010 and agreed not to raise the membership fees, despite ongoing inflation. This followed a presentation by Lajos Bálint on the Executive Committee's budget proposal and three-year financial prognosis. Representatives of SWITCH, RESTENA and HEAnet presented examples of collaboration between national research networking organisations and government institutions or commercial companies to provide network access. Some assembly members mentioned similar initiatives in their own countries, while several expressed interest in investigating such opportunities.

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

## TERENA'S ROLES IN THE GN3 PROJECT

On 1 April 2009, the GN3 (Multi-Gigabit European Research and Education Network and Associated Services) project succeeded GN2 (Multi-Gigabit European Academic Network). Some of TERENA's core activities are co-funded by the European Union through GN3: the production of the annual TERENA Compendium, the Networking Development Support activities and the support provided by the TERENA Secretariat to the technical TERENA task forces. The project also provides funding for the 'distributed GN3 workshops' at the TERENA Networking Conferences and for GN3 training workshops, as well as the European eduoam service, the eduPKI service, the eduGAIN service and the Partner Services Promotion activities to support the rollout and uptake of services. All this work is reported on in this annual report.

Two TERENA Secretariat staff members have a management role in the GN3 project. Licia Florio leads the Joint Research Activity 'Enabling Communities', which encompasses GN3's research in the middleware area. Karel Vietsch leads the Networking Activity 'Status and Trends', which currently includes work on the TERENA Compendium, support to TERENA's technical task forces, the promotion of best practices in campus networking, and a study on the environmental impact of research networks. The President and Secretary General of TERENA are members ex officio of the GN3 Project Board.

The TERENA Secretariat is also responsible for the organisation of GN3 project events. In 2009 the focus was the organisation of the first GN3 Project Symposium, which was held at Vienna Airport on 8-10 September.

[www.geant.net](http://www.geant.net)

# TERENA Membership in 2009

(as at 31 December)

## ASSOCIATE MEMBERS

**ADVA**  
Optical Networking  
Thomas Schneider

Cisco  
Systems  
Klaas Wierenga

**DANTE**  
Dai Davies

Ekinops  
Rob Adams

**EMBL**  
HEAnet  
Peter Stoehr

Extreme  
Networks  
Gerrie de Jongh

Juniper  
Networks  
Jean-Marc Uzé

Level 3  
Communications  
Bart van Aanholt

**NORDUnet**  
René Buch

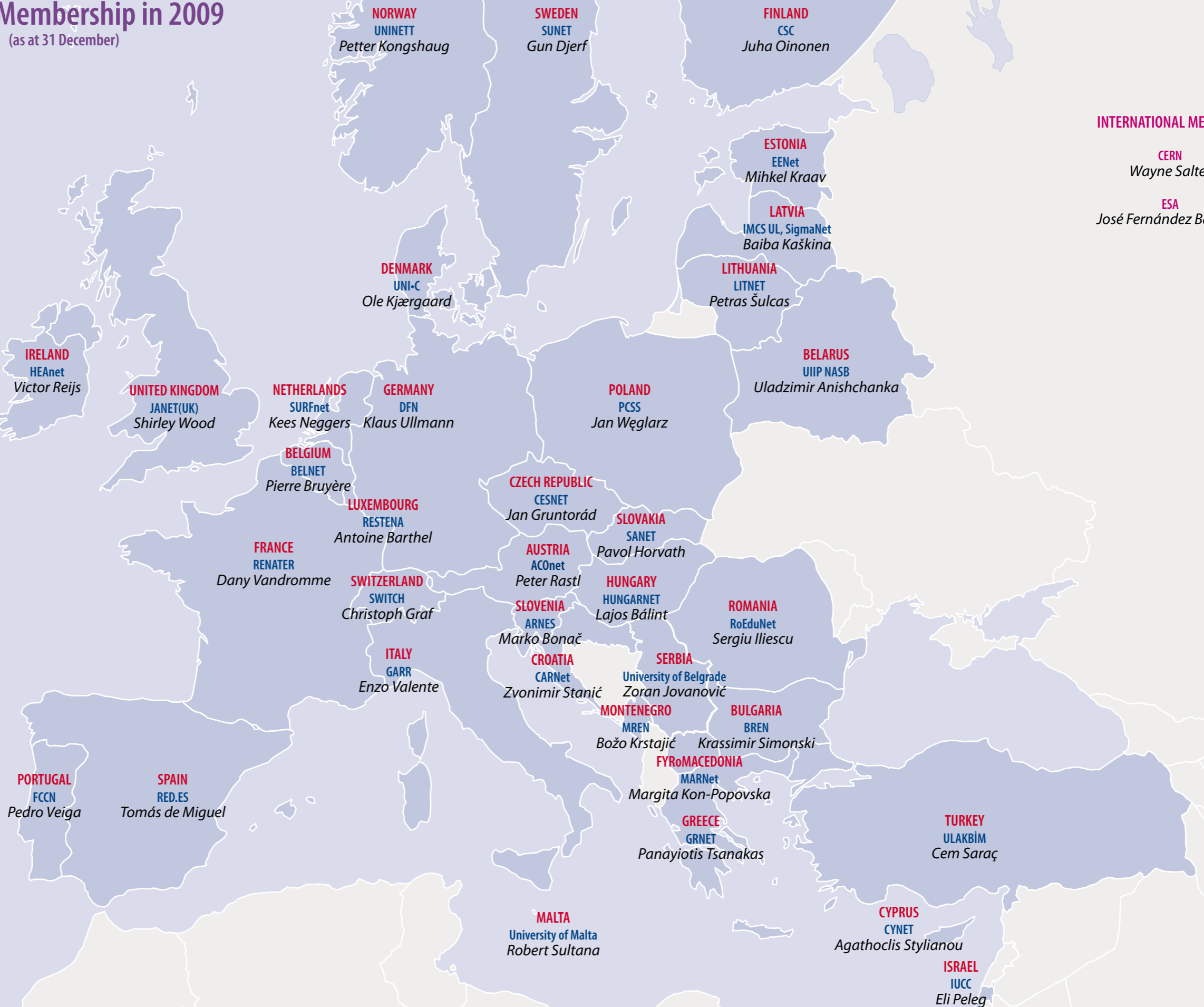
Nortel  
Networks  
Jan Willem Elion

Tata  
Communications  
Yves Poppe

## INTERNATIONAL MEMBERS

**CERN**  
Wayne Salter

**ESA**  
José Fernández Balseiro



# Outreach

As a trusted body of the European research and education networking community, TERENA plays a role in the exchange of information through various means: presenting TERENA activities at external events, participating in non-technical events and projects that benefit the wider research networking community, issuing printed materials and publishing news and events announcements online.

## COMMUNITY INFORMATION ONLINE

In addition to information about TERENA's many activities, the TERENA website publishes other information that is of value to the research networking community. In 2009, the online calendar listed more than 160 relevant events and the 'Pear' Community News column published around 150 news reports and announcements, 55% of which were posted directly by NREN staff.

## Information Dissemination

**Presentations at research networking conferences**

**Participation in relevant conferences is an important way to make TERENA's activities better known and to establish more contacts in the research networking community.**

Valentino Cavalli gave an overview of TERENA's activities at national research networking conferences in Murten, Switzerland in October and in Nantes, France in December, while John Dyer did the same at the Belgian national research networking conference in Brussels in November. The last presentation focused, in particular, on the TERENA Compendium, the 'Case for NRENs' and the results of the FEAST study. At the end of the year, TERENA President Janne Kanner presented an overview of TERENA activities to the Funet Association in Finland. All these presentations emphasised the possibilities for joining in the activities organised under the TERENA umbrella.

Licia Florio gave a presentation on TERENA's role in the middleware area and on REFEDs at the Internet2 Spring Member Meeting in Arlington, Virginia in April. At the EUNIS Conference in Santiago de Compostela, Spain in June, Péter Szegedi spoke about challenges for campus networking, reporting about the TERENA workshop on end-



Karel Vietsch with 'Shield of honour' presented to lecturers in first SAREN workshop.

to-end provisioning and other events that TERENA organises for campus networkers, and emphasising the need for closer collaboration between campus networkers and those who provide networks and related services at the national and international level.

**Research networking in Saudi Arabia**  
Karel Vietsch and Valentino Cavalli were invited to participate in a first workshop about the creation of SAREN, the Saudi Arabian Research and Education Network. At this event, which took place in Riyadh on 17-18 November, Valentino Cavalli spoke about innovation and the opportunities for international collaboration, while Karel Vietsch presented the 'Case for NRENs' and analysed commonalities and differences between research networking organisations in different countries.

**Meetings with TERENA members**  
In 2008, a series of meetings with TERENA members was started in order to gain a better understanding of the members' priorities and expectations of TERENA. In 2009, such meetings took place with AConet, CESNET, RENATER and GARR.

Participants at the event in Ukraine.



## Networking Development Support

**Advisory Panel 2009**  
Artur Binczewski (PSNC)  
Sabine Jaume-Rajaonia (RENATER)  
Baiba Kaškina (IMCS UL, SigmaNet)  
Agathoclis Stylianou (CYNET)

**Building on previous work**

**In 2009 work was done to follow up on Networking Development Support activities from previous years, plus a new effort was undertaken to assess the needs of research networking in Turkey.**

**Belarus**  
A workshop at the Belarus State University in Minsk on 16-17 November followed up on a country needs assessment that began in 2008 and was completed in February 2009. The event was organised by TERENA and was part of the national IST'2009 conference on information systems and technologies.

IT managers, network and system administrators, campus teaching staff and managers of research and education networking services in Belarus attended the event. Don Stikvoort (S-CURE) gave an overview of Internet security history, summarised the current status of international organisations and initiatives, and presented more specific information on the organisational issues of CSIRTs (Computer Security Incident Response Teams). Jan Radil (CESNET) presented an update on 40 and 100 Gigabit transmission infrastructures.

Joost van Dijk (SURFnet) gave an outline of developments in federation architecture, an overview of eduoam and a description of the TERENA Certificate Service. A more general overview of TERENA goals and activities, as well as of the GN3 project, was presented by Kevin Meynell (TERENA Secretariat).

**Ukraine**  
Opportunities for Ukraine to increase national and international scientific collaboration was the main theme of a round-table discussion on 8 December at the Polytechnic University of Kiev, following a country needs assessment carried out in 2008. The event was hosted by the Ukrainian research networking organisation URAN, and was organised by TERENA. Participants from several universities in Ukraine attended the discussion.

Presentations covered the advanced services offered by the GN3 project, the status of URAN connectivity to the GÉANT network, and TERENA activities in innovation and collaboration. Speakers were John Chevers (DANTE), Valentino Cavalli (TERENA Secretariat), Mikhail Dombrougov (URAN) and Jacek Gajewski (CEENet). A panel discussion focused on the needs of users and their interest in making use of advanced services.

**New assessment of country needs**

**Turkey**  
A country needs assessment of Turkey culminated in a visit to Ankara on 9-11 November by Valentino Cavalli and Kevin Meynell of the TERENA Secretariat and Stanislav Sima and Lada Altmannova of CESNET. Work on the assessment had

Ankara meeting.



included desk study, analysis of documentation and preparation of the visit, which comprised meetings with the management and staff members of the Turkish NREN ULAKBIM, Turkish government officials, regulators, telecommunications service providers and end users. The outcome of the study was reported in a confidential document that provided the basis for the planning of follow-up activities to commence in 2010.

[www.terena.org/development-support](http://www.terena.org/development-support)

## WHAT IS NETWORKING DEVELOPMENT SUPPORT?

Supporting the development of research and education networking in and around Europe and narrowing the gap between the most and the least advanced is a core activity of TERENA. This task is conducted by studying the needs of less advanced regions and carrying out specific actions to assist the development of research networking organisations in countries that will be connected, directly or indirectly, to the GÉANT network. This activity is funded by the European Union through the GN3 project, with overall guidance and quality control provided by an Advisory Panel of NREN experts.



## TERENA Compendium

### Review Panel

Lars Fischer (NORDUnet)  
Steve Hogger (JANET(UK))  
Sabine Jaume-Rajaonia (RENATER)  
Simon Leinen (SWITCH)  
Mike Norris (HEAnet)  
Milan Sova (CESNET)

### A new approach and a record-breaking response

A new approach was chosen for the TERENA Compendium in 2009. The survey questionnaire was revised and simplified, making it easier for NRENs to submit their data. More time was devoted to further analysis of the data received. This meant that publication of the printed edition was postponed from December 2009 to Spring 2010.

In 2009, information was actively sought from NRENs all over the world, resulting in at least basic information about a record-breaking 74 NRENs from 73 countries across all continents.

One key finding of the 2009 survey is that the typical connection capacity for universities within the European Union / European Free Trade Association area is now one Gigabit per second or greater - a tremendous difference compared with the situation a few years ago. Capacities of 10 Gigabit per second or more are starting to be introduced. Other categories of users have significantly lower capacities. Outside the European Union / European Free Trade Association area, Gigabit connections are not yet the norm.

[www.terena.org/compendium](http://www.terena.org/compendium)

## GN3 Status and Trends

TERENA leads the 'Status and Trends' activity in the GN3 project. In 2009, this consisted of four separate tasks. Two of them are reported on elsewhere in this document: the production of the TERENA Compendium and the support provided by the TERENA Secretariat to TERENA's technical task forces. Another task, led by UNINETT, addresses key challenges for campus networks in Europe by producing and disseminating best-practice documents on a number of technical and organisational topics. This builds on experience from the very successful Norwegian GigaCampus project. The final task, led by HEAnet, is a study of the environmental impact of research and education networks. In 2009, this team worked on baseline audits for the greenhouse gas emissions of a number of research networks.

## WHAT IS THE COMPENDIUM?

TERENA gathers information about national research and education networking organisations and the issues they face. An annual Compendium documents the work, budgets and users of these networks in Europe and beyond. Basic data and information about the organisation, staffing, finances, user base, capacity, services and developments are available online. The more important information, with interpretation, is available online and in print.

The TERENA Compendium provides an authoritative reference source for anyone with an interest in the development of research and education networking. Production of the TERENA Compendium of National Research and Education Networks in Europe was financially supported by the European Union through the GN2 and GN3 projects.

## WHAT IS TF-MSP?

TF-MSP promotes collaboration between research and education networking organisations in Europe in the management of service portfolios. It explores the business and organisational aspects of finding, developing and introducing new services, supporting them during their production phase and eventual withdrawal.



Joint meeting of TF-PR and TF-MSP

## TF-MSP Task Force on Management of Service Portfolios

Chair: **Alberto Pérez (RedIRIS)**

### meetings in 2009

3-4 February, Amsterdam, Netherlands  
15-16 April, hosted by RENATER in Paris, France  
8 June, hosted by RedIRIS in Málaga, Spain  
15 September, hosted by UNI-C and NORDUnet in Copenhagen, Denmark

### Developing new areas of common interest

**TF-MSP has a track record of discovering areas of common interest and promoting them for further attention within the community.**

Following a considerable amount of preparatory work and consultation in 2008, in January 2009 'The Case for NRENs' was published. The document summarises the many reasons for the existence of NRENs and had already attracted a lot of attention. John Dyer (TERENA Secretariat), who produced the document with contributions from TF-MSP and others, presented it on behalf of the task force to the TERENA General Assembly in Málaga in June.

In 2009, spam reduction was the topic of several presentations during task force meetings, so TF-MSP consulted with the

TERENA community and arranged a one day workshop on improving the quality of email services (see 'Conferences and Workshops' for more information).

### New users and new participants

For the first time, in its April meeting, the task force focused on a single theme - new user groups. Participants shared their very different experiences with providing services to new user groups - museums, libraries, administrative bodies, hospitals, performing arts, broadcasters and in one case, even emergency military communications - with the objective of sharing information about which user groups NRENs could serve and how they could best go about it.

2009 saw increased participation and interest in TF-MSP activities. During its Copenhagen meeting, the task force offered remote participation for the first time; Internet2 presented ideas about how to make services between Internet2 and the European NRENs interoperable; and the Australian NREN AARNet presented an overview of its network, current and developing activities in applications and services.

To address the fact that the task force's terms of reference would expire in February 2010, TF-MSP began discussions during 2009 about the renewal and revision of that document.

[www.terena.org/tf-msp](http://www.terena.org/tf-msp)

## NON-TECHNICAL TASK FORCES SHARE AREAS OF COMMON INTEREST

TF-PR and TF-MSP held a joint meeting on 8 June, immediately preceding the TERENA Networking Conference in Málaga. They discussed areas of common interest, including updates on the GN3 Service Portfolio and on the project's work with NRENs through the Partner Services Promotion task. Participants heard how a GN2 customer segmentation study could be used by NRENs, and a summary of customer segmentation discussions from a TF-MSP meeting that took place earlier in the year. It was reported that SURFnet had won a 'Best Business Case' award with a five-year collaborative project involving public and private organisations. The group also considered collaboration in the wider world, looking beyond Europe to the life cycle and product management model for the Latin American research networking organisation CLARA, and contemplating whether European NRENs may want to collaborate on a roaming deal with 3G providers.

## TF-PR Task Force on Public Relations and Information Dissemination

Chairs: **Maria Ristkok (EENet)** until 7 September  
**Goran Škvarč (CARNet)** from 7 September

### meetings in 2009

26-27 February, hosted by HEAnet in Dublin, Ireland  
7-8 June, hosted by RedIRIS in Málaga, Spain  
7 September, hosted by ACOnet in Vienna, Austria

### A new name reflects changing emphasis in 2009

**TF-PR reviewed its terms of reference and its name. In October the task force began its fourth two-year mandate, but as TF-CPR - the Task Force on Communications and Public Relations - which participants agreed better reflects the nature of their work activities. Fresh emphasis was placed upon enlivening task force meetings with hands-on activities and workshops. The group continued its tradition of meeting back-to-back with the GN3 PR Network and TF-MSP.**

Following a 2008 TF-PR discussion, which highlighted the issue of communications within the NRENs, a lively workshop was held early in 2009 that focused attention on internal communications in organisations of different size, structure and goals. Later meeting workshops covered basic training in podcasting techniques with ideas about how to deploy audio and video files and measure downloads; how to track the success of communications activities; and how to develop and improve the TF-PR Compendium.

Christine Dworak (ACOnet) and Maria Ristkok (EENet)

The TF-PR Compendium and 'PeaR', the news service by and for the research and education networking community in Europe, were re-assessed along with the group's terms of reference. The task force agreed that both PeaR and the TF-PR Compendium could be improved with some extra work, but also that the meetings themselves should be seen as a 'deliverable' - requiring more effort but resulting in a higher level of participant engagement and benefit.

### Sharing and networking

As in previous years, NREN representatives shared their experiences on a wide range of topics. Representatives of BELNET, SURFnet, EENet, and Funet presented results of user surveys, a major brand-evaluation exercise by SWITCH was explained, and ARNES raised the subject of best practice in communications to support the rollout of AAI federations.

Social networking tools such as Twitter, blogs and Facebook featured in task force discussions in 2009. Gyöngyi Horváth (TERENA Secretariat) presented an overview of how such tools can be used and there followed an exchange of ideas and concerns about whether they could help NRENs to achieve their goals.

[www.terena.org/tf-cpr](http://www.terena.org/tf-cpr)





Laura Durnford presents PSP at joint meeting of TF-MSP and TF-PR

## Partner Services Promotion

### Identifying a course of action

As a brand new area of work within the research networking community, the Partner Services Promotion task required work in 2009 to define how it would operate and which services it could help to promote.

The TERENA Compendium, TF-MSP materials and other sources provided some information about the services offered by research networking organisations, and the PR-communications staff who participate in the TF-CPR / GÉANT PR Network meetings provided further details about promotional priorities. Several meetings

with technical experts involved in GN3 Service Activities supplied information about which of the project-related services were ready for PSP promotional support to NRENs:

- eduroam
- point-to-point services (lightpaths)
- PERTs (Performance Enhancement Response Teams)

### Towards a 'toolkit'

PSP worked with colleagues from the project's Communication and Promotion Activity to develop marketing plans for these services, figuring out which parts of the work would involve PSP's liaison with NRENs and which parts would require action at the Activity level. In parallel, the question of how PSP would go about its work with NRENs was addressed: the ultimate goal is to create an online 'toolkit' of promotional materials that NRENs, and in some cases institutions, can adapt and use for their own promotional work. Achieving that will require further collaborative work to develop suitable tools and materials.

The first materials to be created with PSP support related to the promotion of eduroam. A leaflet that was developed for the GÉANT Launch event in December formed the basis for a new eduroam leaflet for ARNES.

### PSP 'at your service'

Another area of work begun in 2009 was to 'advertise' the availability of PSP 'as a service' to NRENs. This began with presentations to the PR-communications colleagues who attended TF-CPR and GÉANT PR Network meetings, introducing the idea of PSP and updating them as work progressed throughout the course of the year. In September, during the PR Network's meeting alongside the GN3 Symposium in Vienna, PSP led a brainstorming session about the promotional messages and materials that NRENs may need to promote eduroam to different categories of end users. Targeting libraries was an unexpected popular request. A report introducing PSP to the wider GN3 community was produced for the project's internal newsletter published in December.

[www.terena.org/activities/psp/](http://www.terena.org/activities/psp/)

## WHAT IS PSP?

TERENA leads the Partner Services Promotion (PSP) task in the GN3 project's Networking Activity, 'Communication and Promotion'. PSP is a new initiative, which was not part of the predecessor projects. It helps national research networking organisations to prepare and implement plans for the promotion of end-user services, by facilitating the exchange of ideas, experience and expertise between organisations in different countries, and by coordinating collaborative work to create and adapt promotional and training materials.

## FEAST

### Feasibility Study for African-European Research and Education Network Interconnection

#### Coordinating and twinning

TERENA's role in the FEAST study focused on the development of African national research and education networking organisations.

In May, John Dyer of the TERENA Secretariat organised a one-day research and education networking session at the IST-Africa conference in Kampala, Uganda. Later in the year, TERENA involved European research networking organisations in the project's work by 'twinning' them with African organisations. The objective was to build relationships and long-term contacts between staff in the African and European NRENs, so that both sides could learn from the sharing of skills and experience. TERENA coordinated the collection of information about NRENs for this purpose and facilitated a half-day twinning workshop in October. TERENA also produced two FEAST brochures and maintained the project website, agreeing to keep it updated until the AfricaConnect initiative starts in 2010.

[www.feast-project.org](http://www.feast-project.org)

## WHAT IS FEAST?

The FEAST study investigated the feasibility of the AfricaConnect initiative and prepared a 'roadmap' for its implementation. It explored the options for deploying sustainable and extensible regional backbone networks, that will be exclusively available for research and education and will connect national research and education networks in Africa to each other and to research and education resources worldwide, via the GÉANT network. FEAST was funded by the European Commission and was originally planned to cover ten months, but was extended by two months and was completed during December 2009.

The study was conducted by KTH Royal Institute of Technology in Sweden as the main contractor with DANTE and TERENA as subcontractors. Several other organisations offered volunteer support, including the International Centre for Theoretical Physics, the Ubuntunet Alliance and national research networking organisations in Africa, as well as several research networking organisations from Europe. In particular the Ubuntunet Alliance and DFN made significant contributions.

FEAST studied the readiness of the research and education networking community, the availability of terrestrial infrastructure, political and regulatory endorsement, and commercial conditions for access to necessary resources. Contrary to general expectations, the availability of infrastructure is no longer a major bottleneck. Most universities are located where optical fibre cables are or will soon be deployed. Policy and regulation do not pose barriers in

general, but awareness of the importance of research networks is still low. Often regulatory frameworks are under-developed or poorly enforced. Affordable access to links is an obstacle for the implementation of research networks. The primary bottleneck is, with a few exceptions, the readiness of the national research and education networking communities in Africa. Less than a third of the African states have communities that are ready to implement national research and education networks with international connections.

Research and education networking in Africa is organised in three sub-regions: North Africa - where national research and education networks are connected to GÉANT via EUMEDCONNECT, eastern and southern Africa - where the Ubuntunet Alliance has a thrust of its own and has a partial regional network up and running, and West and Central Africa.

FEAST concluded that it is possible to connect several national research networks in Africa to each other and to peers in other continents via GÉANT as part of the AfricaConnect initiative by reinforcing the work of the Ubuntunet Alliance. It made a number of recommendations about how to achieve that result in a rather short time, taking advantage of the existing momentum. At the same time, support should be given to the capacity building of national research networking organisations that are not yet ready to take part in the initiative, as well as to the establishment of a regional research networking organisation for West and Central Africa. The Association of African Universities is the obvious partner to coordinate that effort for countries outside the region covered by the Ubuntunet Alliance.

A TNC participant reads the FEAST brochure.



FEAST project leader Björn Pehrson at TNC 2009.



African students.



# Technical Programme

## Technical Advisory Council

meeting in 2009  
8 June, Málaga, Spain

The Technical Advisory Council is composed of nominated senior technical managers of the TERENA member organisations. During its annual meeting, the council heard how to deal with content providers that are not federated. Other topics for discussion were the business model that was chosen for TERENA's certificate service, Grid middleware and security, and activities in the area of media management and distribution.

The role of research networking organisations in the field of network research was also discussed, in view of growing attention for research towards the 'Internet of the Future'. NORDUnet proposed the creation of a TERENA task force for the exchange of experiences and best practices between network operation centres. This idea was discussed further in the TERENA Technical Committee, and in October the Executive Committee announced in its Activity Plan for 2010 that this proposal would be investigated further.

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

Technical Advisory Council meeting.



## TERENA Technical Committee

TERENA Technical Committee in 2009  
Christoph Graf (chair)  
Andrew Cormack (until 30 June)  
Josh Howlett (from 8 July)  
David Kelsey  
Diego Lopez (until 3 October)  
Jan Meijer (from 8 July)  
Ligia Ribeiro  
Afrodite Sevasti (until 24 September)  
Karel Vietsch (ex officio)  
Valentino Cavalli (secretary, ex officio)

meetings in 2009  
9 March, 22 June, 26 November,  
TERENA Secretariat offices

In its March meeting the committee assessed the results of the first End-to-End Provisioning Workshop, which had taken place in 2008, and agreed to a second workshop in December 2009.

An in-depth discussion that began in the TERENA Technical Committee early in 2009 and was followed up mid-year covered the relationship between NRENS and publishers, and the need for cooperation in establishing identity federations. It was concluded that this was a potential area for further development and should be closely monitored.

Feedback from a planning meeting on media management led to a new task force, TF-Media, to begin in January 2010.

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

## TECHNICAL TASK FORCES

TERENA task forces are open groups of experts from the research and education networking community at large. Each task force is a forum for discussion and information exchange as well as a platform for collaboration on specific work items. Task force participants work together on defined and focused programmes laid down in the task force's terms of reference. Secretariat support for the technical TERENA task forces is funded by the European Union through the GN3 project.

TF-CSIRT meeting in Riga



## WHAT IS TF-CSIRT?

TF-CSIRT promotes collaboration between Computer Security Incident Response Teams (CSIRTs) at the European level and liaises with similar groups in other regions, providing a forum where members of the CSIRT community can exchange experiences and knowledge in a trusted environment. Participants in TF-CSIRT are actively involved in establishing and operating CSIRT services in Europe and neighbouring countries.

## TF-CSIRT

### Task Force on Collaboration of Security Incident Response Teams

chair: Lionel Ferette (BELNET)

meetings in 2009  
19-20 January, hosted by CERT NIC in Riga, Latvia  
18-19 May, hosted by INTECO in León, Spain  
24-25 September, hosted by CERT-EE in Tallinn, Estonia

### Keeping up to date with old and new

The task force continued the tradition of hearing about the activities of new and established security teams. During 2009, there were updates from Jumper CSIRT (Ireland), CERT.PT (Portugal), BELNET CERT (Belgium), TS-CERT (TeliaSonera), the Raiffeisen Informatik CERT and CSIRT-MU of Masaryk University (Czech Republic). New CSIRTs were established in Croatia - HR-CERT (Croatian national CSIRT), Romania - RoCSIRT (RoEduNet), Belgium - CERT.be (Belgian national CSIRT) and in Lithuania - CERT-LT (Government CSIRT).

### Record attendance at joint seminar

TF-CSIRT organised a successful joint seminar with FIRST (Forum of Incident Response and Security Teams) in Riga, Latvia, as part of a four-day event that included separate meetings of both groups. There was a record-breaking attendance of over 120.

The seminar included FIRST updates, presented by the chairman Derrick Scholl, and presentations on a range of subjects: a feasibility study of denial of service attacks with a peer-to-peer system; a quantitative comparative analysis of tools for anomaly detection; whitelist implementation for DNS (Domain Name System) servers; the European Commission policy initiative on CIIP (Critical Information Infrastructure Protection) and the role of governmental and national CSIRTs; plus an overview of the evolution of the exploitation of command and control kits. These were followed by updates on team activities in Denmark, Spain, Georgia, Finland, France and the Netherlands.

### New liaisons

With the advance of Grid technologies in academic computing, security is becoming an increasingly important topic. In 2009, all major Grid initiatives joined forces to create 'GRID-SEC' in order

to foster incident handling across different Grid initiatives. This is an informal, virtual community with a very strict membership policy. TF-CSIRT is represented in GRID-SEC by two members, acting as liaison between the Grid and NREN communities.

Liaison with the Anti-Phishing Working Group (APWG) was inspired by a presentation by its Secretary General, Peter Cassidy, during the May meeting in Spain. APWG is committed to 'wiping out Internet scams and fraud' and its international membership includes many CSIRTs.

Following a presentation at the Tallinn meeting about the NATO-accredited Cooperative Cyber Defence Centre of Excellence, some members had the opportunity to visit the recently opened facility, which was established by some of NATO's member countries to enhance its cyber defence capability. The task force began investigations into future liaison with this organisation.

### Hands-on activities

Task force members were consulted and involved in the process of providing feedback for GN2 and subsequently GN3 security activities, including trials of tools for spotting anomalies in network traffic. GN3 security activities in 2009 included a survey of European CSIRTs to obtain a detailed picture of how multi-domain anomalies are handled by NRENS. It was found that CSIRT contact databases are often used to identify the responsible people on other networks or sites.

A workshop about IRT (Incident Response Team) objects was included in the Tallinn meeting. IRT objects link CSIRT contact details to blocks of IP addresses in the RIPE database; members learned how to use and update these objects.

### Ongoing responsibilities

TF-CSIRT maintains a supervisory role of TERENA's Trusted Introducer service, listing and accrediting incident response teams in the European region. The task force also reviews the requirements for training CSIRT staff on an ongoing basis and promotes the development and delivery of appropriate training materials to meet these needs. CSIRT training workshops and the Trusted Introducer service are covered in more detail elsewhere in this report.

[www.terena.org/tf-csirt](http://www.terena.org/tf-csirt)

## WHAT IS TF-EMC2?

TF-EMC2 focuses on identity infrastructure and application-oriented middleware. The goal of TF-EMC2 is to promote the development and deployment of open and interoperable middleware infrastructures among national and regional research and education networking organisations and academic and research institutions.

## WHAT IS REFEDS?

The REFEDs activity is a spin-off of TF-EMC2. It looks at the technical specifications and policies that define procedures and guidelines that allow for interoperability of federations. The increasing mobility of users and the growing number of international projects has resulted in the need for collaboration beyond institutional borders. REFEDs addresses the needs of existing and emerging e-identity federations operating in the field of education and research to collaborate on policy issues.

## TF-EMC2

### Task Force on European Middleware Coordination and Collaboration

chair: **Diego Lopez (RedIRIS)**

#### meetings in 2009

5-6 May, hosted by JANET(UK) in Loughborough, United Kingdom  
22 October, hosted by GARR in Rome, Italy

#### Providing support and feedback

**TF-EMC2 acts as an incubator for middleware experimentation and investigation leading to services and solutions.**

The use of established protocols, such as OpenID, InfoCard and SAML2 (Security Assertion Markup Language 2) was explored and promoted in 2009. This led to and facilitated discussion on emerging 'Beyond Web Single Sign-On' proposals at both task force meetings and a Birds of a Feather session at the TERENA Networking Conference. These proposals warrant further investigation and will see further development in the coming years.

The task force has spawned many activities such as SCHAC, REFEDs, TCS and TACAR and continues to monitor the activities of the community's PKI (Public Key Infrastructure) initiatives, including the Grid community's support of the TERENA Certificate Service. The investigation of reputation systems is already having an impact beyond the task force in the area of the quality of email services.

The task force liaises with other groups active in middleware at international level, such as those of the Open Grid Forum (OGF), the Rome Student Systems and Standards Group and Internet2's Middleware Architecture Committee for Education (MACE), as well as with numerous identity federations worldwide. The task force provides a forum where GN3 middleware-related activities can receive feedback from the wider middleware community. The task force chairman also chairs ECAM, the European Committee for Academic Middleware.

[www.terena.org/tf-emc2](http://www.terena.org/tf-emc2)

## REFEDs

### Research and Education Federations

**In 2009, REFEDs solidified its role as an international point of exchange for research and education federations, attracting strong support within Europe, Australia, Canada, the United States, Japan and Latin America.**

In March 2009 the REFEDs 'roadmap', drafted in 2008, was approved by the REFEDs group. Work progressed on items from the roadmap, on best practices, guidelines and recommendations to address interoperation between federations. There were clear results in four main areas:

- Thanks to documents produced by Andrew Cormack (JANET(UK)) in the area of data protection, best practice was developed for identity federation operators and participants with the goal of reducing the transfer of personal data while supporting accurate access management decisions.
- A group was created to investigate how to implement recommendations from JISC's publisher interface study and to look at the issues surrounding the user experience of federated access management.
- Work progressed on the coordination of attributes, reviewing and documenting the differences in local definitions and the standard values of the eduPerson vocabulary. Used consistently throughout different federations, this vocabulary can support cross-federation activities.
- REFEDs established a liaison with the Kantara Initiative, a new, independent, non-profit organisation that addresses the harmonisation and interoperability challenges that exist between enterprise identity systems, web 2.0 applications and services and web-based initiatives.

At the end of 2009, there were twenty-three higher-education federations listed within the REFEDs catalogue. This was an increase of three since 2008, with more than 50 content providers offering services to higher-education federations.

[www.terena.org/refeds](http://www.terena.org/refeds)



Middleware awareness is promoted via EuroCAMP workshops (left, Lukas Haemmerle (SWITCH)), and in TNC sessions (below, Ken Klingenstein (Internet2)).



## SCHAC

### Schema for Academia

**In 2009, the IETF accepted a request for a Uniform Resource Name (URN) for SCHAC, resulting in a dedicated SCHAC namespace that is both short and neutral.**

Towards the end of the year, the SCHAC team started to collaborate with the Rome Student Systems and Standards Group, RS3G. RS3G operates under the EUNIS umbrella and focuses on developing software to implement specifications related to the Bologna Process, which defines standards and procedures for the exchange of data to facilitate student mobility and lifelong learning. Due to the nature of the work carried out by RS3G, the SCHAC schema becomes very appealing to address this use-case. The adoption of SCHAC by the RS3G community would allow for wider adoption and use of SCHAC for data exchange beyond its common use as a directory storage schema.

[www.terena.org/schac](http://www.terena.org/schac)

## WHAT IS SCHAC?

SCHAC is a well-established directory schema used in Europe and other world regions. It was the product of the Schema Harmonisation Committee, which was a working group within TF-EMC2. The committee defined and promoted common schemas in the field of higher education with a view to inter-institutional data exchange. The need to improve data mobility for exchanging information across institutional and sometimes national borders increased awareness of the role that attributes play.

## ECAM

### European Committee for Academic Middleware

#### Advising on improvements

**In 2009, ECAM continued its monthly teleconference meetings with the chairs and work item leaders of TF-EMC2 and TF-Mobility and Network Middleware and with invited members of ECAM, including community experts in related middleware fields.**

These discussions contributed to the structure and focus for middleware activities, resulting in improvements to EuroCAMP events, REFEDs meetings and task force work items, improving opportunities for collaboration and reducing the duplication of effort.

ECAM also extended the structured exchange of information with government departments, MACE, RS3G and other relevant middleware activities worldwide.

[www.terena.org/ecam](http://www.terena.org/ecam)

## WHAT IS ECAM?

The European Committee for Academic Middleware (ECAM) promotes innovative and open middleware technologies and infrastructures and advises TERENA on new emerging middleware technologies. It helps TF-EMC2 and TF-Mobility and Network Middleware to coordinate their work.

The development and deployment of mobile technologies and the use of network middleware to support interoperable roaming services are becoming key activities among research networking organisations and research institutions. TF-Mobility and Network Middleware promotes the adoption of such technologies.

## TF-Mobility and Network Middleware

Chair: **Klaas Wierenga (Cisco Systems)**

### meetings in 2009

7 May, hosted by JANET(UK) in Loughborough, United Kingdom  
20 October, hosted by GARR in Rome, Italy

### Broadening understanding and intensifying interest

**The focus on location-awareness, large-scale deployments and network middleware intensified throughout 2009. The task force maintained its global reach with strong attendance and participation from outside Europe, with Australia, Canada, Japan and the United States all being represented.**

Interest in the adoption of DNSSEC accelerated in 2009, with the publication of 'roadmaps' for the signing of the DNS hierarchy, including mandates by some governments. The DNSSEC work item benefitted from this increased awareness and attracted additional support at a Birds of a Feather session at the TERENA Networking Conference. Task force

meetings were used to highlight the benefits of early adoption and to investigate trouble-shooting techniques.

The location-awareness work item was bolstered by work from the United Kingdom that reported use-cases and technologies available to develop location-aware services. These reports and presentations significantly benefitted the community's understanding of these technologies.

### Engaging in eduroam

In 2009, most of the technical development of eduroam in Europe was taking place as part of the GN2 and GN3 projects. However, in many cases, input from the wider community of eduroam providers and users is needed and it is one of the task force's work items to ensure the engagement of that wider community. A dedicated mailing list involves discussion between eduroam practitioners worldwide and helps to coordinate the participation of regions or countries in the global development of the eduroam service.

[www.terena.org/tf-mobility](http://www.terena.org/tf-mobility)

TF-Storage meeting



## GN3 Multi-domain User Application Research

TERENA leads the Joint Research Activity for federated applications in the GN3 project. The main goal is to expand the federated (web) framework to provide seamless access to (multi-domain) services and infrastructure. This research activity encompasses three different tasks. The first addresses roaming developments with the objective of enhancing the current eduroam infrastructure. Work on this area covers, among other things, the RadSec standardisation work within the IETF (Internet Engineering Task Force). The second task addresses issues that arise when different identity federations inter-operate. It will investigate how to improve single sign-on to support access to different applications and more efficient ways to distribute federation metadata using different authentication methods. The third research task will provide a set of application programming interfaces to allow access to both network and applications and to compose them on demand.

## TF-Storage Task Force on Storage

Chair: **Jan Meijer (UNINETT)**

### meetings in 2009

12-13 February, hosted by HEAnet in Dublin, Ireland  
15 September, hosted by UNI-C and NORDUnet in Copenhagen, Denmark

### Keeping up with the state-of-the-art

**Participants shared information about national activities and storage performance evaluations in 2009, and collaborated on a large-file transfer application.**

GRNET introduced the GRNET Simple Storage (GSS) system to provide 10 GB of free storage for each user in the Greek research and academic community. Users will be able to upload, index and share their files. The idea was inspired by Amazon S3, but goes beyond that application. UNINETT presented an initiative to provide a backup service for the Norwegian university colleges. The business case behind this is to provide cheaper, better storage in terms of reliability, scalability and functionality. PSNC introduced the Polish National Data Storage project that will provide a backup/archive storage service for the universities and institutes of the Polish Academy of Sciences. SURFnet presented

Jan Meijer and TF-Storage participants.



plans for the development of a new storage architecture in 2010. The goal is to provide fully integrated computing power, storage and network facilities in a single, reliable and scalable architecture.

Some cloud projects, such as the BalticCloud, were presented along with a practical perspective on mixing public and private clouds. In order to keep up to date with the latest technological developments, TF-Storage again invited large vendors and system / service providers to present their products. At the Dublin meeting, IBM, Sun Microsystems and Attoware spoke about the future of cloud computing solutions, storage systems and high-speed storage transfer.

### FileSender beta version ready for testing

A tangible outcome of the lively TF-Storage discussions in 2009 was a collaborative project to develop an application called FileSender, an open source implementation of the 'Poste Restante' service discussed in 2008. FileSender is the answer to the academic community's requirement to transfer large files in a fast, reliable, secure and trusted way. A project group of technicians from UNINETT, HEAnet and AARNet developed and issued the 1.7 beta version for testing; development is ongoing, based on the results.

[www.terena.org/tf-storage](http://www.terena.org/tf-storage)  
[www.filesender.org](http://www.filesender.org)

## WHAT IS TF-STORAGE?

TF-Storage facilitates discussions among national research and education networks and academic and research institutions about open and inter-operable data storage, management infrastructures and services. It provides a forum for the exchange and promotion of ideas, experience and knowledge and for gathering storage expertise. The task force liaises with other communities such as Internet2 and APAN and those involved in Grids and high-performance computing.

For smaller universities and colleges, the reliable and secure handling of large amounts of scientific data is not economically and/or technically viable. By moving data off campus, there is an opportunity for NRENs to provide backup services and maybe even complete disaster recovery or cloud services in the future. TF-Storage discussions help to further NRENs' efforts in this field.



Information servers.

## PROJECTS

TERENA Secretariat staff members undertake work that is fully or partially funded from external sources. Often such work is part of a Framework Programme project that is co-funded by the European Union and in which TERENA is a partner.

TERENA Projects are carried out by experts and engineers on the basis of a contract with TERENA. Except for very small projects, funding requires contributions from TERENA members or other interested organisations.



## TERENA'S ROLES IN FEDERICA

TERENA leads a joint research activity on novel architectural paradigms and user control, and networking activities to build and consolidate the user community and to disseminate information and organise training events related to use of the infrastructure.

## FEDERICA Federated E-infrastructure Dedicated to European Researchers Innovating in Computing Network Architectures

Prototype, business plan and conference sessions

In 2009, participants in the TERENA-led joint research activity delivered the first IPsphere–FEDERICA interoperability prototype.

This prototype allows users to automatically create and control any kind of virtual resources within the FEDERICA framework. It is even possible to activate homogenous services using those virtual resources over multiple domains. Taking this fact into account, it was considered highly relevant to research business models suitable for virtualised infrastructures, and a FEDERICA business model was worked out. Some disruptive research on multi-stage software router architectures was performed, as well as novel flow-based infrastructure slicing.

TERENA's work to 'build and consolidate the user community' progressed during the year. Requirements

were gathered, users were identified and a strong relationship with them was established, facilitating the flow of information and ideas between them, in particular between users in different research communities.

Contributing to project information dissemination, a FEDERICA workshop was organised at the TERENA Networking Conference covering two sessions. These were rated among the best sessions by conference participants. They presented the experimental network infrastructure and outlined the techniques being developed to enable trialling of new networking technologies and the mechanisms used to allocate and control network resources. The sessions also introduced related network virtualisation initiatives.

Course materials were developed to support training tutorials for researchers, network engineers and other potential users of the FEDERICA infrastructure. TERENA organised a FEDERICA dissemination and training session at FIREweek on 2 July in Luleå, Sweden, and two tutorials - one at SUNET's user conference 'TREFpunkt' on 13-14 May and one the day before the TERENA conference.

[www.fp7-federica.eu](http://www.fp7-federica.eu)

## FEDERICA IN 2009

The FEDERICA infrastructure was established and began running in 2009. More than thirty potential users in five European countries were approached and involved in consultation meetings. A User Policy Board, chaired by DFN, was set up to determine whether slice requests were appropriate.

Three slices were in use by project participants for demonstration and workshop purposes, for internal equipment testing, and for monitoring and measurement activities. Four further slices were given to users to carry out their experimental work: CESNET for a traffic-monitoring project; ELTE University (Hungary) for experiments attempting to interconnect OneLab monitoring nodes; CTVR (a communications networks research team in Ireland) for testing an optical IP switching architecture; and, at the end of 2009, the PHOSPHORUS project for testing the scalability of its resource allocation tool, Harmony.

Two articles by project members were published in prominent journals and thirteen presentations were made in Europe, Japan, Brazil and the United States.

## WHAT IS FEDERICA?

The FEDERICA project supports research on the Internet of the future. It has created a unique infrastructure that allows 'slices' of both network and computing resources to be allocated to researchers for potentially disruptive experiments. These slices provide a flexible but safe 'environment' for testing new technologies and architectures that will help shape the future Internet. Each allocated slice contains the virtual resources and topology requested by the user. Users then have total control over its use and can install any software and equipment required for their research.

The FEDERICA infrastructure depends on cooperation between researchers, vendors and NRENs, and on connections to the NRENs via the GÉANT network. The project is coordinated by GARR and involves CESNET, DANTE, DFN, FCCN, GRNET, HEAnet, HUNGARNET, Fundació i2CAT, ICCS, Juniper Networks, KTH, Martel Consulting, NORDUnet, Politecnico di Torino, PSNC, RedIRIS, SWITCH, TERENA and UPC. FEDERICA is co-funded by the European Union as part of its 7th Framework Programme.



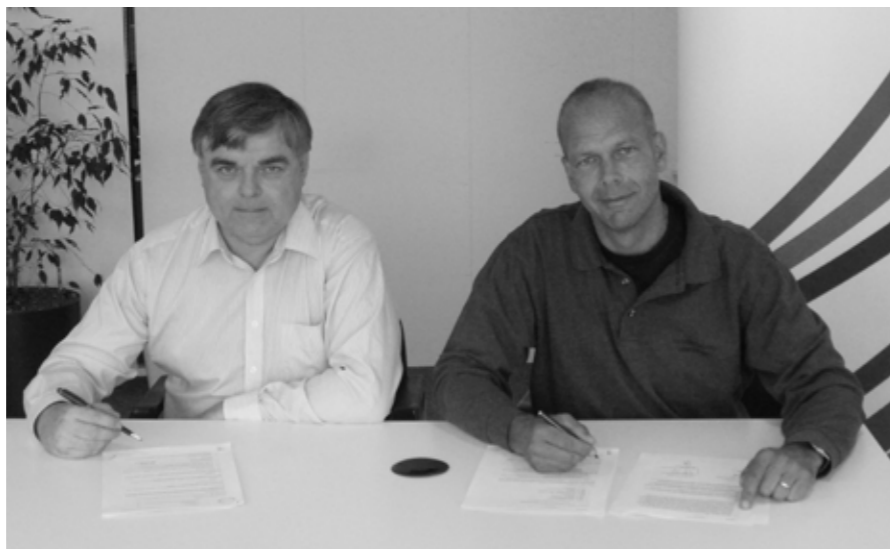
FEDERICA project leader Mauro Campanella (GARR) and the project team.

Björn Rhoads (KTH) at TNC 2009.



# SERVICES

Karel Vietsch (TERENA Secretariat) and Don Stikvoort (S-CURE) sign new Trusted Introducer contract.



Kees Neggers



Technical Working Group participants at GLIF event.

## Trusted Introducer

**Trusted Introducer Review Board**  
**Jimmy Arvidsson** (TeliaSonera CERT)  
**Lionel Ferette** (TF-CSIRT chair)  
**Przemek Jaroszewski** (CERT POLSKA)  
**Chelo Malagón** (IRIS-CERT)  
**Kevin Meynell** (TERENA Secretariat)

### A new contract and plans for development

The Review Board undertook a comprehensive assessment of the Trusted Introducer service in May 2009 and, given that it had been several years since the previous contract was signed, decided to update the contractual conditions in line with developments since then. To this end, TERENA negotiated a new contract with S-CURE for the provision of the service from 1 September 2009. This contract specifies the anticipated levels of service more precisely. It is for a one-year period and there will be an interim review early in 2010.

After the start of the service in 2001 the number of accredited CSIRTs grew significantly. Under supervision of the Review Board, the Trusted Introducer team worked on plans to complement the current accreditation service with a new certification service.

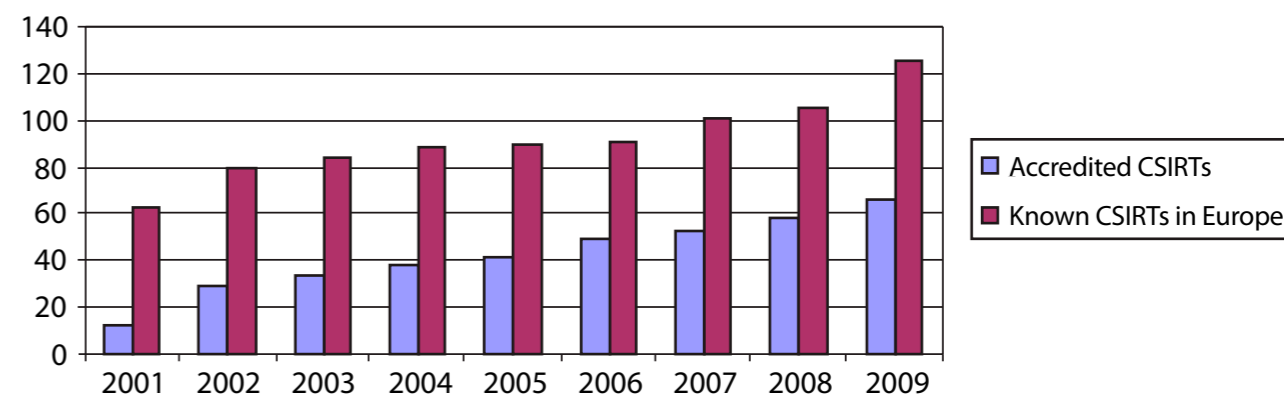
[www.trusted-introducer.org](http://www.trusted-introducer.org)

## HOW DOES TI WORK?

TERENA's Trusted Introducer (TI) offers an accreditation scheme that helps build a web of trust between Computer Security Incident Response Teams (CSIRTs). Many organisations have a CSIRT to deal with security incidents and collaboration between CSIRTs is important because, very often, incidents originate from outside the network that is affected. Collaboration requires strong trust between security teams. The TI fosters trust by collecting information about CSIRTs, accrediting those that meet certain criteria and publishing information about CSIRTs online. The information is checked on a regular basis to ensure that CSIRTs still fulfil the accreditation criteria.

Accredited CSIRTs can participate in closed meetings that are organised back-to-back with TF-CSIRT meetings. They hear sensitive and confidential information about incidents and threats. The TI also provides accredited CSIRTs with statistical information, a re-encrypting secure mail gateway and out-of-band alerting.

The Trusted Introducer service is provided by S-CURE B.V. and PRESECURE GmbH, under a contract between TERENA and S-CURE. TERENA pays S-CURE for provision of the service and re-charges these monthly fees to the accredited CSIRTs. The Trusted Introducer Review Board reviews the operations of the service and addresses any issues that may arise.



## TERENA Certificate Service

A successful start to a broadened service

The new TERENA Certificate Service started officially on 1 July 2009. It proved even more popular than its predecessor, the Server Certificate Service; eighteen TERENA member organisations participated from the start, and the University of Malta, JANET(UK), CSC/Funet and AMRES joined later in the year. Even though some of them needed more time to prepare the launch of the new service in their own country, and despite the fact that only server certificates were available in the initial months, the number of issued certificates had reached 10,000 by the end of the year and was then growing at a rate of 5,000 per month.

Comodo won a contract to provide the service after a unanimous recommendation of a committee of TERENA Secretariat staff and volunteers from organisations participating in the old Server Certificate Service. Under this

new arrangement, various certificates could be made available to research and education institutions. Consequently the name 'Server Certificate Service' was no longer appropriate and was replaced with 'TERENA Certificate Service'.

Only server certificates were issued to begin with. The handling of the issuance of these certificates was greatly helped by Djangora, an open-source application developed by SUNET and Linköping University that can be adapted to national needs and branding.

### Developing the personal certificate service

Getting the personal certificate part of the service under way was more complicated and time-consuming. Representatives from participating countries worked on the Certificate Practice Statement that needed approval by Comodo, and liaised with the European Policy Management Authority for Grid Authentication (EUGridPMA), which accredited these certificates towards the end of 2009.

In parallel, UNINETT and the Nordic DataGrid Federation were developing 'Confusa', an open-source application that handles the issuance of personal

certificates. In the last months of the year, plans were discussed for a common portal for handling the issuance of personal certificates, based on Confusa. Using a common portal service would offer significant opportunities for cost reduction. A number of TERENA member organisations expressed interest in joining a pilot of this service.

[www.terena.org/tcs](http://www.terena.org/tcs)

## TACAR® TERENA Academic Certification Authority Repository

### Building towards a new TACAR

Following plans agreed in 2008, TACAR began work in 2009 to collect requirements for new features from the Grid community and from the GN3 project.

The plan was to upgrade TACAR to meet two goals: to host the trust anchors of the Public Key Infrastructures (PKI) needed for services included in GN3 such as eduGAIN and perfSONAR, and to be used for the IETF's PKI Resource Query Protocol to

retrieve data. In 2009 the TACAR team ensured the second of these goals was taken into account during planning of the software development required to achieve the first goal. This development was funded by the GN3 project as part of its eduPKI task. The new software will make it easier to update the data in the TACAR repository.

The continued operation of the standard TACAR service during 2009 was funded by TERENA. Fifteen CAs joined TACAR during 2009, taking the total number of root certificates stored in the repository to 61.

\* TACAR is a registered trademark of TERENA.

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

## WHAT IS TACAR?

Since its launch in 2003, TACAR has become a trusted online store of trust anchor certificates, related certificate policies and certificate practice statements registered by the Certification Authorities (CAs) of organisations in the academic community.

A root CA certificate validates all certificates originating from a Certification Authority and may be used for this purpose if a CA is not recognised by operating systems and applications. Therefore users who want to trust certificates issued by a CA need to be able to obtain the root CA certificate in a secure way. TACAR allows users to securely download multiple root certificates at the same time.

Today TACAR is the official trust repository for the Grid community, which makes extensive use of digital certificates. TACAR's model has also been studied by the Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens (IDABC) programme of the European Union as a possible solution to address cross-border trust.

## WHAT DOES THE TERENA CERTIFICATE SERVICE DO?

TERENA member organisations participating in the TERENA Certificate Service have the possibility of offering their research and education constituencies five types of certificates:

- Server Certificate - for authenticating servers and establishing secure sessions with end clients.
- e-Science Server Certificate - for authenticating Grid hosts and services. The aim is for these to be IGTF-accredited in 2010.
- 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.

The contract between TERENA and Comodo also allows research and education institutions in the countries of the TERENA member organisations that participate in the service to buy Extended Validation (EV) certificates from Comodo at a significantly reduced price. EV certificates are issued after a more thorough vetting process than with other certificates, and can be used to secure online financial transactions.

### The evolution of TERENA's certificate services

The certificate service initiative started in 2005, when eight national TERENA member organisations joined forces to contract, via TERENA, a commercial Certification Authority (CA) to issue Secure Sockets Layer (SSL) server certificates to these organisations and their constituencies. With their combined buying power it was possible to obtain a lower cost per certificate. In January 2006,

TERENA and GlobalSign NV/SA of Leuven, Belgium, signed a one-year contract and TERENA's Server Certificate Service was launched.

A second, three-year contract with GlobalSign was due to expire in January 2010. Also, since launching the service, the number of participants had increased to nineteen and the market conditions had changed. Therefore, participating organisations and TERENA decided to test the market again in 2008 and issue a new call for proposals from potential contractors. This tender was won by Comodo CA Ltd. of Manchester, UK, and a three-year contract was signed on 14 April 2009. This new arrangement not only continued the provision of server certificates, but also included additional types of certificates and so the TERENA Certificate Service was created. The original Server Certificate Service continued in parallel throughout 2009 and into early January 2010.

Participation in TERENA Certificate Service (per 31 December 2009)			
	Server and e-Science Server	Personal and e-Science Personal	Code-signing
ACOnet	✓	✓	✓
AMRES	✓	✓	
ARNES	✓		
BELNET	✓	✓	✓
CARNet	✓		
CESNET	✓	✓	
CSC/Funet	✓	✓	
FCCN	✓		
GARR	✓		
GRNET	✓	✓	✓
HEAnet	✓	✓	
HUNGARNET	✓		
JANET(UK)	✓		
LITNET	✓	✓	
PSNC	✓	✓	✓
RedIRIS	✓	✓	✓
RENATER	✓	✓	
SUNET	✓	✓	✓
SURFnet	✓	✓	✓
UNI-C	✓		
UNINETT	✓	✓	✓
Univ. Malta	✓	✓	



## WHAT IS EDUPKI?

The eduPKI service will be fundamental to the smooth operations of other GN3 services. eduPKI creates a trust fabric to support GN3 services by defining their trust requirements and providing digital certificates. Whenever possible, eduPKI will rely on existing national Certification Authorities, thus offering a federated service.

## eduPKI

**TERENA leads the eduPKI service, which is a GN3 project task.**

In future, TACAR will be the central repository for eduPKI, hosting the trust anchors of the Public Key Infrastructures (PKI) needed for services included in GN3 such as eduroam, eduGAIN, perfSONAR and any other service using digital certificates. In 2009, software development required for this new version of TACAR was carried out as part of the eduPKI task, funded by GN3.

The other components of the eduPKI service will be a policy management authority that accredits national Certification Authorities, and a centrally operated Certification Authority that will issue certificates to end users who are unable to acquire certificates from one of the accredited Certification Authorities. Work was begun in 2009 to define the eduPKI business case and to investigate demand for the central CA.



## WHAT IS NRENUM.NET?

NRENum.net facilitates videoconferencing by translating the IP (Internet Protocol) addresses of videoconferencing resources to a code that uses the same format as telephone numbers. It provides a solution for seamless dialling interconnection between multiple technologies in countries where the standard system, using E.164 Number mapping (ENUM) is unavailable.

## NRENum.net

**In 2009 more than ten European countries participated in NRENum.net.**

TERENA ensured the continuation of this pre-existing service, following a proposal by the Task Force on Enhanced Communications Services (TF-ECS), which concluded its activities in September 2008. The NRENum.net service is hosted by SWITCH.

[www.nrenum.net](http://www.nrenum.net)

## eduGAIN

**There are many different Authentication and Authorisation Infrastructure (AAI) systems in use across Europe, all of which are designed to control access to networks and applications, and to ensure the secure movement of information. The eduGAIN service that is being developed as part of the GN3 project will enable different AAI systems to interact seamlessly, enabling the sharing of identity data between federations and providing a seamless interconnection framework to applications willing to provide their services to multiple federations.**

The TERENA Secretariat makes a limited contribution to work on eduGAIN. In 2009 this focused on writing and reviewing use cases for the service and contributing to policy development. Because TERENA itself is not committed to any particular AAI, the TERENA Secretariat staff can make expert contributions from an unbiased point of view.

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

eduroam and other GN3-related services were presented during GN3 Symposium in Vienna in September.

## educonf European Videoconferencing Service

**The TERENA Secretariat provided a small contribution to the work of the educonf team. In accordance with decisions made during preparations for the GN3 project, educonf was discontinued after the end of GN2 in March 2009.**

### What was educonf?

In 2006-2007, the TERENA task force on Videoconference Service Studies (TF-VSS) explored the feasibility and suitability of developing a Europe-wide videoconferencing service for the higher-education and research communities. In a one-year study, TF-VSS evaluated the need for such a service as well as the equipment and technology that would be required for its technical realisation.

Following the result of this study, educonf was introduced as a new service in the GN2 project in September 2007. The main focus of educonf was to support Voice-over-IP and videoconferencing services at international level by coordinating between the real-time services of national research and education networking organisations.

<http://educonf.geant2.net>

## European eduroam® Service

**Maintaining and updating the eduroam website is part of TERENA's role within the eduroam operational team and effort went into this area during 2009.**

TERENA staff also collaborated in the organisation of eduroam training workshops that were held as part of GN3 training work, and in stimulating the adoption and promotion of the service.

\* eduroam is a registered trademark of TERENA

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

eduroam was available on public buses to TNC 2009.



## WHAT IS THE EUROPEAN EDUROAM SERVICE?

'Open your laptop and be online' is the experience eduroam (education roaming) seeks to provide, allowing any eduroam user to obtain wireless network access at any institution connected to the service.

eduroam started in 2003 as a pilot service under the TERENA task force TF-Mobility. From September 2004, additional research work was undertaken in the GN2 project. Most of the work of deploying and supporting the eduroam service is done by technicians in participating institutions, which are assembled in federations at the national level. These federations are usually run by the national research networking organisation, and are interlinked by the European eduroam confederation. The policy specifying the eduroam service level agreement for national research networking organisations within the European confederation was agreed at the end of 2007.

From September 2007 to April 2009, the continued operation and maintenance of the European eduroam service was funded by the GN2 project and then, since April 2009, by GN3. NRENs formally joined the confederation from January 2008. The European eduroam service has been in regular operation since the end of August 2008, when a number of support services were put in place.

The TERENA Secretariat provides staff to the operational team, which is responsible for the daily operations of the European eduroam service. The other team members are staff from SURFnet, UNI-C and Srce, led by Miroslav Milinović.

## WHAT IS GLIF?

GLIF is an international virtual organisation that promotes lambda networking – using interconnected wavelengths of light (lambdas) over optical fibres – to support demanding scientific applications. GLIF makes lambdas available for use by scientists involved in data-intensive research. GLIF brings together leading network engineers to enable the development, testing and implementation of new lambda networking technologies, middleware and applications.

### GLIF's activities are organised in working groups:

The Governance Working Group is chaired by Kees Neggers (SURFnet). Maxine Brown (UIC) and Larry Smarr (UCSD) lead the Research and Applications Working Group, which promotes the use of super-networks by new generations of scientists. The Technical Issues Working Group is co-chaired by Erik-Jan Bos (SURFnet) and Gigi Karmous-Edwards (NCSC). The GLIF North America Working Group is an affiliated working group that considers future GLIF/GOLE requirements, and discusses ways to extend existing capabilities to more research and education sites and communities around the world. It is chaired by Joe Mambretti (Northwestern University).

## GLIF Secretariat Global Lambda Integrated Facility

### GLIF events in 2009

5 March - Technical Working Group meeting in Catania, Italy  
27-28 October, 9th Annual Global LambdaGrid Workshop, hosted by KISTI in Daejeon, South Korea

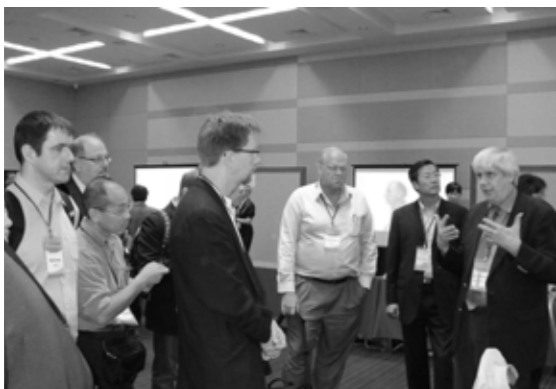
### New sponsors for secretariat support

**TERENA is contracted by GLIF participants to provide secretariat functions as a service to GLIF. This work is funded through voluntary contributions by a number of GLIF participants. In 2009, 25 organisations provided sponsorship amounting to more than 60,000 euro. New sponsors in 2009 were KAUST (Saudi Arabia), RIPN (Russia), and RNP and CPqD (Brazil). Currently 52 organisations are registered as GLIF participants. The TERENA Secretariat maintains the GLIF website and organises GLIF meetings.**

The March event consisted mainly of short meetings of the various task forces of the GLIF Working Group on Technical Issues, which reported good progress.

The 9th Annual Global LambdaGrid Workshop featured presentations on large-scale projects. Several practical applications were demonstrated, including high-definition streaming of live surgery, the HPMDnet high-performance service for high-quality, large-scale digital media, the perfSONAR performance monitoring tool, and fast data transfer techniques that will be used for the Large Hadron Collider.

[www.glif.is](http://www.glif.is)



Joe Mambretti with GLIF participants.



Natalia Bulashova of RIPN.

# Conferences and Workshops

TNC participants at the opening plenary session.



Victoriano Giralt (University of Málaga) giving press interviews at TNC.



Media management and distribution workshop.



## NEW AT TNC 2009

Recognising that today's students are the future leaders of the networking community, TERENA invited students of network communications, telecommunications and computer science to apply to attend the conference free-of-charge, with sponsorship provided by Cisco.

## TNC 2009 – FACTS AND FIGURES

Almost 500 people from 43 countries attended the conference, which was rated even more highly than the two previous TNCs. Particular praise went to the overall organisation, the quality of the network and the availability of eduroam in buses to the venue.

Sponsorship was provided by Telefonica, Telindus, Juniper Networks, Extreme Networks, Global Crossing, Cisco Systems, Vidyo, ADVA Optical Networking, Level 3 Communications, Ciena, Ekinops, Infinera, T-Systems, RedIRIS, the University of Málaga, the province of Andalucía, EMT and the European Commission.

Twelve out of more than one hundred papers presented at TNC 2009 were selected for online publication as the conference proceedings:

[www.terena.org/publications/tnc2009-proceedings](http://www.terena.org/publications/tnc2009-proceedings)

A record number of twenty-three posters were shown in the poster exhibition and can be seen online along with archived streams of presentations:

<http://tnc2009.terena.org/schedule>

## TERENA Networking Conference

8-11 June, hosted by RedIRIS and the University of Málaga in Málaga, Spain

Programme Committee

Chair: **Andrew Cormack (JANET(UK))**

Members

**Hansruedi Born (SWITCH)**

**Jacqueline Brown (Pacific Northwest Gigapop)**

**Serge Droz (SWITCH)**

**Victoriano Giralt (University of Málaga)**

**Baiba Kaškina (IMCS UL, SigmaNet)**

**András Kovács (NII/HUNGARNET)**

**Melanie Pankhurst (DANTE)**

**Jürgen Rauschenbach (DFN)**

**Lígia Ribeiro (University of Porto)**

**Esther Robles (RedIRIS)**

**Péter Szegedi (TERENA Secretariat)**

**How can research networking help real world situations to benefit from 'virtual world' solutions?**

**Climate change and health were two hot topics at the 2009 TERENA Networking Conference, which explored the theme 'Virtuality into Reality' – the emergence of ideas and technologies from research laboratories and networks into everyday life.**

Participants viewed a series of three-dimensional medical images with 3D goggles during the opening plenary presentation by Jorge Cortell of Kanteron Systems. He explained how such virtual depictions can be augmented to help surgeons operate with the minimum impact on patients. To achieve this, networking was crucial in bringing together three projects with participants in four countries so that experts in the healthcare, middleware, software and optical fields could collaborate.

Health-related topics continued in later sessions with presentations of e-health applications of network infrastructure, with examples from Brazil, Japan and the United States.

### Clouds and climate change

In his plenary presentation, Paul Watson from the University of Newcastle focused on the advantages cloud computing can bring to science. Drawing on lessons from web-based companies that cope with peaks and dips in demand for their services by using servers in computer clouds, rather than their own hardware, he described a UK project which uses

clouds to store and analyse data, and to share data and information with varying degrees of security.

Clouds could help reduce the contribution of research networks to global climate change, according to plenary speaker Bill St. Arnaud of CANARIE. He invited conference-goers to participate in a green computing project to build a zero-carbon NREN, arguing that alongside potential dangers for research networks from impending penalties on heavy carbon emitters there are also opportunities and responsibilities.

The idea that members of the research and education networking community could be 'agents of change' in this area was echoed by Stefan Rahmstorf of Potsdam University in his plenary presentation. He gave an overview of evidence for anthropogenic climate change and said that 'bottom-up' initiatives from sectors such as the research networking community would be essential if we are to achieve the social transformation necessary to slow or stop this change.

The networking needs of the climate modelling community are only just emerging said William E. Johnston of ESnet (the US Energy Sciences Network) in his plenary talk. He explained that work is being carried out to identify the networking implications of scientific instruments, supercomputers and processes, and to develop approaches to building a network environment that will enable the distributed aspects of science.

Such topics continued in parallel sessions on climate change and disaster forecasting, with talks about the role of high performance networks in efforts to improve weather simulation and hurricane forecasting, to predict tsunamis and to respond to pandemic disease.

### Identity and security

During a popular middleware session, it was shown how the concepts of network middleware and identity federations from ten years ago have become a reality, and it was demonstrated how middleware technologies are now applied at the very lowest layers, which for a long time were out of reach. One of the hottest topics in identity management was also discussed - the challenge of collecting from scattered sources data on people who have been authenticated.

Identity federations were further discussed in sessions on 'virtual people',

## HI-TECH LIVE DEMONSTRATIONS

- CESNET and Brno University of Technology showed a virtual collaborative environment to support applications of 3D geometrical modelling in the field of human medicine and the planning of complex surgery.
- Technology to preserve image quality in surgical teleconferencing was demonstrated by Kyushu University and the National Institute of Information and Communications Technology (Japan): four hospitals in Europe were connected live with the conference venue, using a combination of the academic network and a digital video transport system (DVTS).
- The Ancient instruments Sound/ Timbre Reconstruction Application (ASTRA) project showed how complex digital audio rendering techniques were used to recreate the sounds of extinct musical instruments.
- Poznan Supercomputing and Networking Center demonstrated a scenario for use of the common Network Information Service (cNIS) to create a unified repository to store all relevant information about a given single domain's network infrastructure.

starting with a ground-breaking proposal for metadata distribution that would help simplify the problem of interconnecting federations and allow the use of e-identity outside national boundaries. There followed a discussion about the flip-side of federated single sign-on: federated single log-out.

### Projects and industry

An overview of the new GN3 project was presented in a popular session called 'All Change', with emphasis on users as the focus of the project. In other sessions, the project's eduPERT and eduGAIN services were aired, and there was a presentation on the future GN3 service 'GEMBus' (GÉANT Multi-domain Bus), which will integrate the networking infrastructure and services provided by NRENs and the research community. Two conference sessions were dedicated to the FEDERICA project, which is closing the gap between middleware services and network infrastructure, and exploring the limits of virtualisation. Technology and products were the focus of two sessions featuring presentations by TERENA's industrial members.

### Progress in mobile computing and web services

A session on content portals featured the SWITCHcast system for simplifying the process of making videos available by embedding them in other information objects and accessing them once they are published. Another presentation introduced the concept of using social networking to foster the management of scientific papers and references. Other sessions showed what mobile computing can offer in different working environments, such as video conferencing and streaming on hand-held devices and inertial guidance systems.

The various web services offered by

Amazon.com were explained by Simone Brunozzi in his closing plenary talk. He also revealed the cost saving benefits that cloud computing can offer companies that have to make large investments in network infrastructure equipment. The talk prompted lively discussion of potential problems on ownership, privacy and copyright.

### Events around the conference

There was a rich offering of smaller events surrounding the conference, including TERENA meetings, project meetings and workshops. Two sponsors held their annual special workshops: the Juniper Networks R&E Summit 2009, and an Extreme Networks workshop on 'value through innovation'.

A workshop and demonstrations of on-demand network services for the scientific community showed different approaches to the provisioning of on-demand network services and tackled a number of implementations carried out by European projects. The FEDERICA project organised a tutorial on its virtualisation infrastructure and tool bench.

Birds of a Feather meetings (BoFs) were held on a range of topics: cooperation between NREN and Grid security teams; non-web-based applications that could be accessed in a federated way; the current status of DNSSEC deployment and possible coordination of the service among NRENs; and opportunities for bringing together NRENs and users in Europe and neighbouring countries. A discussion was held on policy findings as part of the e-Infrastructure Reflection Group white paper.

Other TERENA and project meetings held during the conference week are mentioned elsewhere in this report.

<http://tnc2009.terena.org>



Demonstrations at TNC



## NRENs and Grids Workshop

22 September, co-located with EGEE09 in Barcelona, Spain

### Workshop Advisory Group

David Kelsey (Rutherford Appleton Laboratory)

Diego Lopez (RedIRIS)

Milan Sova (CESNET)

### Renewed interest and strong cooperation

**The potential for better cooperation between NRENs and Grids was demonstrated through various use-cases that were presented at the 8th NRENs and Grids Workshop. More than thirty people from thirteen countries across Europe joined the event. Ideas were exchanged on four main topics of common interest: Grid monitoring solutions, advanced network services, project-wide network operations and Grid middleware.**

One presentation explained how the provision of lightpaths, as is being researched by GLIF, can be integrated with the dCache Grid middleware. Another covered the use of perfSONAR-Lite TSS, a troubleshooting tool, which exemplifies good collaboration between NRENs and Grids.

Cees de Laat (UvA) asks questions.



## WHY NRENS AND GRIDS?

TERENA runs one-day NRENs and Grids workshops to discuss and evaluate the implications of Grid services using the European NRENs' and GÉANT infrastructures. The workshops bring together members of the NREN community with members of Grid projects in order to understand the common issues for these communities, especially in the area of middleware and network service provisioning, and to seek agreements and recommendations.

During a session on network operations, use-cases made it clear that better information is still needed about network problems, and can be obtained via trouble ticketing systems and monitoring tools, especially in multi-domain environments. In a session on Grid middleware, presentations were given on eduGAIN and GEMBus, both of which are being developed in the GN3 project. eduGAIN is the infrastructure to enable web single sign-on, whereas GEMBus will produce a framework to define, discover, access and combine network services.

In the final presentation it was explained that the personal certificate element of the new TERENA Certificate Service would soon make it possible to issue very large numbers of e-science personal certificates very fast and at low cost. This will be of great importance to the Grids community.

[www.terena.org/nrens-n-grids](http://www.terena.org/nrens-n-grids)

TNC registration.



William E. Johnston (ESnet) at TNC plenary session.

## WHAT IS EUROCAMP?

TERENA's EuroCAMP (European Campus Architectural Middleware Planning) workshops reach out to the European campus community and promote state-of-the-art middleware technologies. Their aim is to develop the knowledge and skills needed by staff involved in the set-up of identity management (IdM) systems for authentication and authorisation. The events provide an opportunity to learn about identity management, authentication, authorisation, directories and other middleware related technologies.

## EuroCAMP Workshops

### EuroCAMPs in 2009

18-19 May, hosted by Cork Institute

of Technology, Ireland

17-18 November, hosted by Zrínyi Miklós National

Defense University in Budapest, Hungary

### EuroCAMP Programme Committee

**Licia Florio** (TERENA Secretariat)

**Victoriano Giral** (University of Málaga)

**Roland Hedberg** (University of Umeå)

**Jasmina Hodzic** (University of Oslo)

**Ken Klingenstein** (Internet2)

**Mikael Linden** (Funet)

**Diego Lopez** (RedIRIS)

**Miroslav Milinović** (Srce)

**Brook Schofield** (TERENA Secretariat)

**Andreas Solberg** (UNINETT)

**Klaas Wierenga** (Cisco Systems)

### Attention to campus middleware topics

Until 2009, EuroCAMPs have come in two 'flavours' – basic and advanced. Basic workshops brought non-specialist campus practitioners up to date with the technologies and systems available. At advanced EuroCAMPs, specialists discussed the latest developments in depth. At the end of 2009 it was decided to re-evaluate this approach in early 2010.

### How to build single sign-on systems - practical experiences

A basic workshop in Cork focused on the original aim of EuroCAMP: to provide those operating directories and identity

management systems on campuses with training and insight into the use and configuration of directory services, how to use schemas and how to ease the installation of authentication and authorisation software. It also included presentation of simpleSAMLphp and how it can be integrated with existing applications to enable federated access.

Almost 50 participants from universities and research and education networking organisations participated, sharing their experiences and being presented with case studies on practical implementations.

### Collaboration in domesticating applications

The aim of the two-day advanced EuroCAMP in Budapest was to develop middleware awareness and present some of the various identity management and authentication mechanisms available to developers, to bring 'off-the-shelf', open-source and home-grown applications into a federated environment.

With sponsorship from the Internet Society, this EuroCAMP brought together more than 40 developers and implementers to harmonise and understand group management, attribute translation, Levels of Assurance and attributes. Participants also heard various real cases of federated applications, and emerging ideas and developments for federated group and attribute management.

[www.terena.org/eurocamp](http://www.terena.org/eurocamp)

## CSIRT Training Workshop

12-13 March, co-organised and sponsored by ENISA and Jumper CSIRT in Dublin, Ireland

### CSIRT training around the world

The 2009 workshop was the fifteenth in this long-running series. It was attended by nineteen trainees from twelve European countries, who reviewed the event very positively. The tutors were Don Stikvoort, David Parker (CPNI), Wilfried Wöber (ACONet) and Serge Droz (SWITCH).

On 23 September, fourteen experienced trainers from all over Europe met in Tallinn, Estonia to discuss best practices in delivering the course materials, updates to the existing materials, and

opportunities for developing new materials that could develop into a follow-up course.

### Non-TERENA training workshops

TERENA regularly gives permission to experienced members of the CSIRT community to use the course materials for training workshops. FIRST (Forum of Incident Response and Security Teams), the global association of CSIRTs, organised a training workshop in Seoul, Korea on 11-15 May. There were also workshops organised by Funet CERT in Espoo, Finland (13-14 April), by CERT.at in Vienna (9-10 November), by NTT-CERT in Tokyo on four occasions and there were four workshops organised by SURFnet for engineers from its connected institutions.

[www.terena.org/csirt-training](http://www.terena.org/csirt-training)

## COURSE MATERIALS

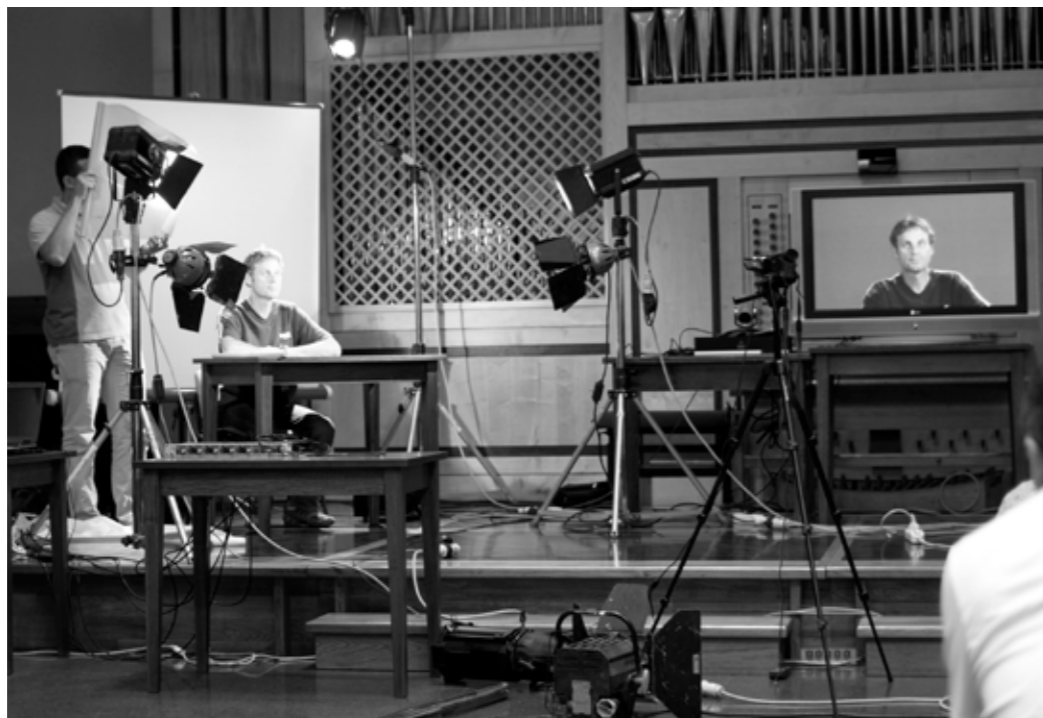
Since 2002, TERENA has been organising training workshops for members of Computer Security Incident Response Teams (CSIRTs). The course materials were originally developed as part of the TRANSITS (Training of Network Security Incident Teams Staff) project. They are now maintained by volunteers from the CSIRT community, coordinated by Don Stikvoort of S-CURE as a subcontractor to TERENA. The training covers the legal, technical, operational and organisational aspects of running a CSIRT, as well as the role of CSIRTs in dealing with vulnerabilities. It is usually presented as an intensive programme of two full days, with trainees working in two parallel groups.

EuroCAMP in Budapest.



CSIRT training





Lighting session by Il Rossetti theatre staff.

## WHY HOLD A PERFORMING ARTS WORKSHOP?

Advanced research and education networks and the newest multimedia technologies offer exciting possibilities to people who produce performing arts events and are involved in artistic higher education. The Performing Arts Production Workshop gave these pioneers a meeting place to share their ideas, experiences and initiatives with colleagues from all around Europe and the United States, and to learn about and play with the newest technological solutions.

This Trieste event followed a series of annual workshops that Internet2 and the New World Symphony have been holding in Miami, USA since 2002. The event was convened by GARR and hosted by the G. Tartini Music Conservatory of Trieste. Internet2 provided their expertise in the field as well as speakers and teachers, and TERENA contributed to the partnership by promoting the initiative at an international level.

## Performing Arts Production Workshop

13-15 July, hosted by GARR and the G. Tartini Music Conservatory of Trieste, in Trieste, Italy

### New technologies at a new event in Europe

Two new technologies were presented for the first time during the TERENA-Internet2-GARR Performing Arts Production Workshop. This very technical, hands-on audio / video production workshop brought together more than 40 attendees from Europe and the United States who are involved in the production of innovative performances in music, ballet and drama, in artistic higher education and in advanced multimedia technologies.

Highlights included the first ever presentation of EchoDamp, a fully integrated, computerised audio and echo control system, which 'compresses' into a single simple computer the equivalent of complex concert hall audio management, suppressing echoes and undesirable effects that long distances introduce in audio handling. Another novelty was LOLA (LOW Latency audio visual streaming system). This innovative system allows the streaming of high-quality

audio and video with latencies of only a few milliseconds, thereby enabling interactive musical and artistic performances among players located in widely distant sites.

Attendees had the chance to 'learn, touch and play' with diverse technologies in a large space dedicated to live demonstrations and a practical hands-on session. Many sessions involved very high capacity links between the venue and sites in the United States and participants listened to short musical performances in very high quality.

### Working towards long-term goals

The core goal of the European workshop was to create a wider community that can benefit from exchanging experiences in this pioneering field, and to start building tighter collaboration among protagonists in Europe. Many NRENs are investing heavily and working hard to support the technical needs of the arts and humanities departments in universities, and this workshop encouraged them to join a very active mailing list. Work was begun in 2009 for the next in what is anticipated to become a series of annual workshops, at the Institute for Acoustic Research (IRCAM) in Paris.

[www.garr.it/papws](http://www.garr.it/papws)



(top) Maria Fiore Mazzarini (Conservatorio Tartini) and Catherine Miller (New World Symphony) in violin masterclass.

(centre) Lighting session by Il Rossetti theatre staff.

(below) Brian Shepard (USC) focuses on audio.

## Next Generation Networking Workshop

23 February, Prague, Czech Republic

### Exploring wireless technologies

Wireless solutions can help bridge the digital divide, providing network services where fibre networks cannot reach easily or cheaply. They can also help to integrate laboratory work and research in the field. Practical experiences relating to the use of Worldwide Interoperability for Microwave Access (WiMAX), the third generation of standards for mobile telecommunications (3G), and satellite were shared during the third Next Generation Networking workshop, which focused on wireless technologies.

Technology was presented that can provide connectivity in remote areas by building your own regional broadband wireless network using existing radio masts. A new satellite, which improves coverage to many parts of Europe, was introduced. Another presentation revealed an experimental 'Internet in a backpack' that could allow researchers Internet access while in the field. And an example was shown of an NREN arranging a 'bulk deal' with a local provider, giving students cheaper than normal tariffs for their web-enabled devices.

The workshop concluded that wireless solutions can prove very useful in some cases, but they should not be considered a replacement for wired solutions. They have a future, but work most effectively when they are used in conjunction with, not instead of, conventional approaches.

[www.terena.org/ngn-ws](http://www.terena.org/ngn-ws)

TERENA holds workshops on next generation networking in order to exchange information about issues relating to lower network layers (typically 0-4), and to provide an open forum for discussing new initiatives. The 2009 event followed previous workshops in 2007 and 2008.

With the cooperation of CESNET, the third Next Generation Networking workshop was streamed live to around thirty people who participated online, in addition to twenty who attended in person.

Workshops on End-to-End Provisioning and on On-demand Infrastructure Services Provisioning took place back-to-back in Amsterdam in December. To make participation easy and to enable collaboration with as many interested parties as possible, TERENA offered the choice of participating in person or online. More than forty people attended the End-to-End Provisioning Workshop with another fifteen following the live video stream remotely. The second workshop had 35 attendees and another ten remote participants.

This was the second TERENA workshop to foster collaboration on both administrative and technical issues of end-to-end lightpath provisioning. This event had a wider scope than the first, which took place in 2008, by including the issues related to the operation and coordination of end-to-end connectivity services across the whole end-to-end work flow, as seen from various perspectives.

## End-to-End Provisioning Workshop

7 December, Amsterdam, Netherlands

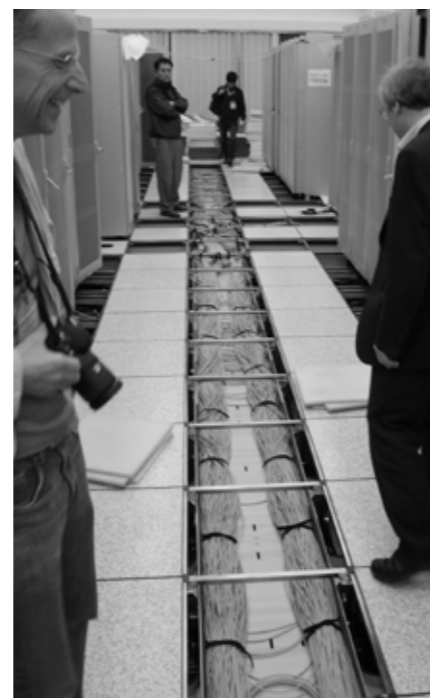
### Sharing needs and ideas

**Cooperation between NRENs, metropolitan, campus and local networks is critical for dealing with operational issues and meeting strict quality requirements for 'traffic engineered' end-to-end lightpath services over various network domains and architectures.**

The workshop brought together people from campuses, research laboratories, and metropolitan, regional and national research networks to share expertise, experience and ideas.

Presentations included a national use case for end-user lightpaths by SURFnet and SARA, the main Dutch academic supercomputing and networking centre. There was also information about ideas for a possible new TERENA task force, Task Force on Network Operation Centres (TF-NOC), with an opportunity for participants to express their views.

The workshop heard that DANTE and some NRENs that currently provide



static connection services are interested in exploring the possibility of offering automated, on-demand provisioning processes. A few NRENs will participate in a pilot to test AutoBAHN as a bandwidth-on-demand provisioning tool within a multi-domain production environment.

### Increasing understanding and finding a way forward

The complexities in delivering a uniform end-to-end service were discussed by participants, with an exchange of information about the various situations faced in different countries. A panel discussion emphasised that there is a critical distinction to be made between static and dynamic (on-demand) connection services when discussing user requirements and appropriate service definitions. A common control plane over various domains and service level definitions and policies is currently lacking in dynamic provisioning. The panel also recommended that support be provided to end site operators in the form of white papers, how-to documents, procedure descriptions and practical, hands-on training.

[www.terena.org/e2e/ws2](http://www.terena.org/e2e/ws2)

## On-demand Infrastructure Services Provisioning Workshop

8 December, Amsterdam, Netherlands

### Synchronising developments and aligning visions

**Major technology and standardisation issues were examined during this event.**

Representatives from national research and education networking organisations and from Alcatel-Lucent Bell laboratories, Cisco, Juniper and Nortel participated in the sessions. The Harmony and AutoBAHN multi-domain path provisioning systems, as well as the Grid-specific G2MPLS service were introduced. An overview of the security aspects of on-demand network resource provisioning was presented and attendees learned more about the Dynamic Resource Allocation Controller (DRAC). Nortel is committed to making the DRAC open source and available to the research and education community under General Public License (GPLv3).

The workshop about on-demand infrastructure services provisioning was organised by the PHOSPHORUS consortium and TERENA. It followed up on a workshop with demonstrations that the PHOSPHORUS project had organised as a side-event at the TERENA Networking Conference in June.

Panel discussion at On-demand Infrastructure Provisioning Workshop.



Virtualisation sessions featured presentations on the status of the OneLab project, the CARRIOCAS project results and the recently approved GEYSERS project proposal. Further sessions covered standardisation issues, an overview of the Network Markup and Network Description languages (NML/NDL) and a review of The Open Grid Forum Network Service Interface's potential for solving interoperability issues.

### Further challenges

The workshop panel agreed that although technical aspects are discussed extensively among NRENs and researchers, a lack of business models is blurring the future direction of on-demand infrastructure virtualisation and provisioning concepts. There is also still a challenge in reaching end-users and campuses with standardised provisioning tools and middleware solutions.

[www.terena.org/e2e/ws2/programme2.html](http://www.terena.org/e2e/ws2/programme2.html)

## International Federation Peering Workshops

7 June, Málaga, Spain  
21 October, hosted by GARR in Rome, Italy

### Working towards interoperability

**To promote Research Federations (REFEDs) and to gather participants together to focus on specific topics, the REFEDs group organises workshops each year; two were held in 2009.**

The first workshop was held in conjunction with the TERENA conference. Andrew Cormack (JANET(UK)) presented the results of his work in the 'Privacy and Data Protection' area, for which documents are available on the REFEDs website. Mikael Linden (Funet) presented his analysis of a survey of federations in higher education, the full data of which are hosted on the REFEDs wiki. He also reported on a newly created section of the wiki that deals with the product interoperability of SAML 2.0. The meeting discussed progress in other areas outlined by the REFEDs 'roadmap', including a proposal to agree on a list of mandatory attributes and to standardise their semantics and syntax in order to ease interoperability and Level of Assurance (LoA).

### Exploring how to improve user experience

Almost 50 participants from all over the world, including Australia, Japan and the United States attended the event that was held in Rome in conjunction with meetings of TF-EMC2 and TF-Mobility and Network Middleware.

eduGAIN policy was presented as an example of an inter-federation framework. Further, a report on the use of mandatory attributes and a proposal for how to use OpenID (an open, decentralised standard for authenticating users) to support low level of assurance services were presented and discussed. Participants also debated the benefits of standardising log-in names for educational applications. This led to discussion about recommendations for improving end user experience when accessing federated services in different countries. It was agreed to investigate the benefits of using a common log-in name as a solution. TERENA and JISC agreed to collaborate on a plan to move this 'eduID' concept forward.

[www.terena.org/refeds/meetings](http://www.terena.org/refeds/meetings)

Media Management Workshop,  
pictures courtesy of Andreas Hebeisen (SWITCH).



## Media Management and Distribution Workshops

29-30 January, hosted by SWITCH in Zürich, Switzerland  
5-6 November, hosted by CESNET in Prague, Czech Republic

### Paving the way for a new task force

**There was a very positive response to TERENA's relatively new topic area of media management and distribution. The first workshop filled so quickly that registration was closed early. Participants agreed this was a rich area for collaboration and a proposal for a new TERENA task force was developed.**

More than 40 representatives of European universities and national research and education networking organisations attended the first workshop on Media Management and Distribution, with many more joining the mailing list to stay abreast of developments.

Attendees heard about different systems for editing and managing content and distributing video footage of university lectures, two developed by NRENs and two by universities, and about issues related to federating media repositories. Lively panel discussions provided a good opportunity to explore different approaches and perspectives. Besides technical questions, concerns were voiced about aspects such as copyright, responsibility for checking content and how to promote services.

Participants agreed that a coordinated,

open-source approach is required to develop federated services and tools for video-recording, storing and distributing lectures. Also, further opportunities for exchanging information, experience and ideas would be useful. It was suggested that a new TERENA task force would be worthwhile.

### The birth of TF-Media

Preparation of initial terms of reference for the proposed new task force continued throughout 2009, culminating in a meeting in November where five work areas were identified. More than thirty people attended in person, while more participated online.

Prospective leaders of the work areas presented the objectives of their planned activities as stated in the draft terms of reference. One of these topics, fostering federated media content and / or metadata repositories, was discussed and it was agreed that there should be collaboration with TF-EMC2 on this and other federation-related issues in future.

Non-technical aspects were discussed, such as the role of NRENs in providing media management and distribution

services, and different models were evaluated. Issues related to content distribution were also considered, including intellectual property, privacy, copyright, content restriction in a federated environment, and on-demand streaming versus live streaming service provisioning.

The innovative use of media content was illustrated with presentations. An impromptu demonstration of the Politube system - which allows recording of a lecturer's upper or whole body and mixing with slides - sparked coffee-break discussion. A Polish initiative was introduced as an example of a current, relevant national activity: PSNC's 4K system displays and processes high resolution video and has been used at cultural and scientific events.

The terms of reference for TF-Media that were finalised during this event were agreed by the TERENA Technical Committee in November. Creation of the task force was approved by the TERENA Executive Committee at the end of December.

[www.terena.org/media](http://www.terena.org/media)



## Quality of Email Services Workshop

9 December, Amsterdam, Netherlands

### Gauging interest and enabling collaboration

**More than thirty participants from research networking organisations, universities and industry attended the first TERENA workshop on improving the quality of email services.**

Participants heard presentations on different methods and tools for fighting spam, from SURFnet, RedIRIS, RENATER, UNINETT, ETH Zürich, Cisco Systems and the TERENA Secretariat. They agreed that a surprising amount of work was already being undertaken in this area by the European research networking community, and that there was a strong desire to capitalise on available expertise by sharing information and establishing collaboration.

It was recognised that work on the improvement of the quality of email services cuts across several TERENA task forces, in particular TF-MSP, TF-CSIRT, TF-EMC2 and TF-Mobility and Network Middleware. TERENA was therefore asked to organise follow-up activities in an ad-hoc group, in which task force participants would be invited to take part. Suggestions for possible follow-up activities included continued exchange of information between TERENA member organisations, development of common policies, standards and best practices, and joint procurement of a commercial email filtering system. Several meetings of the group are expected in 2010.

[www.terena.org/tf-msp/meetings/20091209-equal](http://www.terena.org/tf-msp/meetings/20091209-equal)

Every year, malevolent individuals discover new ways to exploit people, networks and the Internet. In the past, unsolicited 'spam' email was considered simply an annoyance, but these days it is a significant drain on bandwidth and storage. Spam suppression is not easy. By coming together, there is hope of formulating a single, collaborative solution. Recognising a need in the community, TERENA's TF-MSP organised the first workshop on this subject.



Participants at Quality of Email Services Workshop





cNIS training



Marek Lewandowski (PSNC) explains the cNIS interface to Maribel Cosin (RedIRIS)

## GN2/GN3 Training Workshops

In 2009, TERENA and DANTE continued a close cooperative effort to develop and organise training courses. This work began as part of the GN2 project's Knowledge Transfer activity and continued under GN3 from 1 April.

Course tutors came from various TERENA member organisations. Logistical arrangements, including registration and the production of course materials, were handled by the TERENA Secretariat while overall coordination was done by DANTE.

[www.terena.org/training](http://www.terena.org/training)

## GN2 Security Toolset Training

2-4 February, hosted by SWITCH in Zürich, Switzerland

Eleven participants took part in this the second GN2 Security Toolset train-the-trainer course, from the European research networking community and the European CSIRT community.

This course enabled participants to understand and use the Netflow-based GN2 Security Toolset. It taught them how to analyse and acquire Netflow data and to identify and analyse network security threats. Participants also had the opportunity to practice in a well controlled environment. The ultimate goal was to facilitate pan-European use of the Security Toolset in campuses and other end-user facilities.

The course consisted of a technical session and a 'train-the-trainer' day. This gave participants both technical expertise and the skills required to run their own training courses, thus passing Toolset expertise on to others in their local areas.

## perfSONAR LHCOPN Training

22 June, hosted by CERN in Geneva, Switzerland

11 December, hosted by INFN in Bologna, Italy

As part of GN3 training activities, a one-day training workshop was organised in June to support the use of the perfSONAR tool to monitor the Large Hadron Collider Optical Private Network (LHCOPN).

The course was attended by twelve representatives of the LHCOPN's Tier-0 and Tier-1 sites. It equipped participants with the knowledge that they will need to use the perfSONAR infrastructure and visualisation tools to analyse the network's performance, and it included practical exercises designed to familiarise the participants with the tool. Participants were also given the opportunity to express their opinions about the future development of the user interfaces.

In December a half-day course was co-located with the LHCOPN meeting in Bologna. It provided meeting attendees with an overview of perfSONAR and, in particular, a familiarity with the LHCOPN 'weathermap' and the perfSONAR user interface.

## cNIS Training

23 July, hosted by TERENA in Amsterdam, Netherlands

The GÉANT common Network Information Service (cNIS) is a set of tools that automatically discovers network information from routers, switches and other devices, and provides tools for analysis and possible re-design of the network.

The first step in the rollout of cNIS was to provide training to five NRENs across Europe. Invited network administrators of these NRENs were trained on how to install and uninstall, configure and use cNIS on their servers, with attention to security considerations and known vulnerabilities of the software. A few real-world examples were shown and the trainees had a chance to work with the interface by editing the topology returned by the scan.

## ITIL Training

20-21 October, hosted by CESNET in Prague, Czech Republic

28-29 October, hosted by SWITCH in Zürich, Switzerland

The Information Technology Infrastructure Library (ITIL) is a comprehensive documentation of best practice for IT service management.

The GN3 project ran two, two-day customised ITIL training workshops for a total of twenty-four participants. The majority of these were GN3 activity or task leaders involved in the delivery of services.

Specific focus was given to providing an overview of the essential ITIL disciplines relevant to GN3, the need for ITIL service management within the project and the potential of its implementation in terms of improved service strategy, design, transition and operation.

## eduroam Administrator Training

24-25 November, hosted by Srce in Zagreb, Croatia

Ten eduroam administrators from six European countries attended the third European-level eduroam administrators 'train the trainers' workshop. The idea was for them to then go on and train other system administrators and to help set up and configure eduroam infrastructures in their own countries, preferably in their local languages.

The first part of the course was an overview and technical hands-on set of modules on how to set up an organisation as an eduroam service provider, including a step-by-step approach on how to set up as an identity provider. This covered installation and configuration of all the software needed, and potential hardware requirements. The second part of the course gave participants the necessary skills and knowledge to train others effectively.

# Memberships and Liaisons



Participants (above) and (right) Anna Everitt (DANTE) and Carrie Solomon (TERENA Secretariat) at the September GN3 Symposium that was organised by TERENA. (above right) John Chevers, Melanie Pankhurst and Domenico Vicinanza (DANTE) man the GÉANT booth at the TERENA Networking Conference.

## WHAT IS ENPG?

The European Networking Policy Group (ENPG) is the forum where civil servants from national governments who are responsible for the funding of, and government policy towards research and education networking meet on a regular basis to exchange information and coordinate their policies. TERENA has the status of a permanent observer in ENPG. On the basis of a contract with JISC, TERENA also hosts the ENPG website and mailing lists.

## ENPG and European Commission

### ENPG meetings in 2009

19-20 March, hosted by the European Commission in Brussels, Belgium  
25-26 June, hosted by JISC in Bath, United Kingdom

### Strategic planning towards closer collaboration

**The strategy and future of ENPG were considered in 2009, with a brainstorming session early in the year and further discussion in June.**

The first ENPG meeting of 2009 heard presentations from the European Commission about the e-Infrastructures Workplan 2010, Grid activities funded by the European Union and the European Grid Initiative, and the European Union's policy towards scientific data infrastructures. Special attention was given to the Communication from the European Commission on ICT Infrastructures for e-Science (COM(2009)108), an important policy

document that had been published a few days earlier.

In the June meeting were a number of presentations about JISC and JANET(UK) activities, as well as an update on the European Commission's initiatives. TERENA Secretary General Karel Vietsch highlighted some of TERENA's current activities.

Discussion that had begun in the previous meeting about the ENPG strategy was resumed and, in particular, the relationship with the e-InfraNET project was discussed. e-InfraNET will be funded by the European Union as an ERA-NET project and aims to create a policy body that will develop and strengthen cooperation and coordination between national e-infrastructure programmes, ensuring their smooth and efficient integration in the European Research Area. The e-InfraNET project was expected to start in January 2010, and it was concluded that close collaboration between ENPG and e-InfraNET would be essential.

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

## DANTE

### How TERENA and DANTE collaborated in 2009

**TERENA and DANTE are sister organisations that collaborate intensively. In 2009, this manifested itself particularly in the GN2 and GN3 projects, where each of the organisations is responsible for a number of project activities and tasks.**

TERENA's President and Secretary General were members of the Executive Committee of the GN2 project and continued that role in GN3. The latter is also an observer in the DANTE Board of Directors. Two staff members of the TERENA Secretariat are project activity leaders and met frequently in the GN3 Project Management Team, in which many leading DANTE staff members also took part.

Other TERENA Secretariat and DANTE staff actively collaborated through their roles as task leaders or participants. This collaboration was particularly close between the communications teams: TERENA leads the Partner Services Promotion task within the DANTE-led Communication and Promotion activity; and the GÉANT PR Network met twice back-to-back with the TERENA Task Force on Public Relations. The preparation of various events also required cooperation: the 'distributed workshop' of GN2-related topics at the TERENA Networking Conference, the series of training workshops that are documented elsewhere in this report, and the GN3 Symposium in Vienna in September.

Both organisations are partners in the FEDERICA project. During 2009 they also collaborated closely in the FEAST study.

[www.dante.net](http://www.dante.net)

## WHAT IS DANTE?

DANTE (Delivery of Advanced Network Technology to Europe Ltd.) is a limited-liability company and a not-for-profit organisation based in Cambridge, England. Its mission is to plan, build and operate pan-European networks for research and education. The company was established in 1993 and has since played a pivotal role in consecutive generations of the pan-European backbone research network: EuropaNET, TEN-34, TEN-155, GÉANT, GÉANT2 and GÉANT - this name coming back into use with the start of the GN3 project in April 2009. Many national research and education networking organisations in Europe are shareholders of DANTE. Since 2007, plans have been made to transform DANTE into a company limited by guarantee; discussions about these plans continued in 2009.

## LIAISON WITH COUNTERPARTS

TERENA liaises with its counterparts in other world regions both on a bilateral basis and through the Co-ordinating Committee for Intercontinental Research Networking (CCIRN).

### CCIRN

CCIRN meetings are attended by representatives of national and regional research networking organisations who are nominated by the continental research networking organisations: TERENA (Europe), APAN (Asia-Pacific), CLARA (Latin America) and the combination of Internet2, NLR and CANARIE (North America).

### Bilateral engagement

In 2009 TERENA Secretariat staff members attended the Internet2 Spring and Fall Member Meetings. TERENA's Kevin Meynell was invited to join the programme committee of the APAN Meetings.



Participants at the 2009 CCIRN meeting.



## Intercontinental Collaboration

### CCIRN meeting in 2009

29-30 April, hosted by Internet2 in Arlington, Virginia, United States

### Agreement on new focus in future

**The 2009 CCIRN meeting covered national strategic plans for research networking and developments in continental networks in various world regions.**

The meeting heard presentations on several intercontinental collaboration groups, including RENOG (Research and Education Network Operators Group) for IP networks, GLIF for worldwide collaboration on the development of lambda networking, REFEDs as the global forum in middleware and DICE (DANTE, Internet2, CANARIE and ESnet) for transatlantic circuit operations and

monitoring. Special guests at the CCIRN meeting were delegates from the Internet Society, who initiated a discussion about the involvement of the global research and education networking community with policy development in the Organisation for Economic Cooperation and Development (OECD) and International Telecommunications Union (ITU).

Noting that, in recent years, intercontinental collaboration in specific areas had come to fruition in groups such as RENOG, DICE, GLIF and REFEDs, CCIRN participants agreed to focus future meetings on a limited number of special topics, rather than updates on continental and intercontinental network deployment. On 10 June, at the TERENA Networking Conference, a number of regular CCIRN attendees convened for an informal lunch meeting to prepare the choice of topics for the 2010 meeting.

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

## Internet Society

For the period from 2008 to 2010, the Internet Society had decided to focus on three long-term strategic activities: the Enabling Access Initiative, the InterNetWorks Initiative and the Trust & Identity Initiative. 2009 was a very successful year for each of these activities. Moreover, the year was one of the society's most significant ever in terms of global engagement: with highly visible roles in the European Union, the ITU, the OECD, the Internet Governance Forum and many other major policy and technical forums, the Internet Society's reputation as a trusted and authoritative voice on critical Internet issues continued to grow stronger.

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

TERENA was one of the original charter members of the Internet Society, a non-profit organisation founded in 1992 to provide leadership in Internet-related standards, education and policy. The society has more than 100 organisational and more than 28,000 individual members in over 80 chapters around the world. It is the organisational home for groups responsible for Internet standards, including the Internet Engineering Task Force (IETF) and the Internet Architecture Board. TERENA remains a supportive member of the organisation, especially because of the society's role in the standards area, which TERENA considers to be the Internet Society's main reason for existence.

# Financial Report 2009

The balance sheet, statement of income and expenditure, and summary cash-flow statement for TERENA for the year 2009 that are presented below are extracted from the draft accounts of the association. A full understanding of the association's financial position and results can be obtained only from the final version of the annual accounts as adopted by the General Assembly in its meeting of 4-5 June 2010 and the accompanying auditor's report. These documents are available from the TERENA Secretariat upon request. All figures are in euros.

## Balance sheet as at 31 December 2009

<b>Assets</b>	<b>31 December 2009</b>	<b>31 December 2008</b>
<b>Fixed Assets</b>		
<i>Tangible Fixed Assets</i>		
Computer equipment	8,069	22,421
Other fixed assets	<u>34,795</u>	<u>39,383</u>
	42,864	61,804
<b>Current Assets</b>		
Accounts receivable	<u>587,354</u>	<u>663,726</u>
	587,354	663,726
Cash in bank and on hand	<u>3,256,147</u>	<u>2,365,927</u>
	3,886,365	3,091,457

<b>Liabilities</b>	<b>31 December 2009</b>	<b>31 December 2008</b>
<b>Equity</b>		
General reserves	<u>1,357,930</u>	<u>1,449,009</u>
	1,357,930	1,449,009
<b>Current Liabilities</b>		
Creditors	42,011	14,031
Taxes and social premiums	50,585	48,540
Deferred income TERENA projects	1,256,754	359,016
Pre-issued invoices	1,050,643	1,056,890
Other payables and deferred income	128,442	163,971
	<u>2,528,435</u>	<u>1,642,448</u>
	3,886,365	3,091,457

Statement of income and Expenditure 2009

	Budget 2009	2009	2008
<b>Income</b>			
Contributions	1,063,000	1,046,621	1,025,759
Projects, workshops and conferences	1,346,000	1,411,173	1,249,343
Interest received	80,000	68,868	89,738
Late payment charges	0	2,691	521
Other income	1,000	1,955	1,745
<b>Total Income</b>	<b>2,490,000</b>	<b>2,531,308</b>	<b>2,367,106</b>
<b>Expenditure</b>			
Personnel costs	442,000	445,872	395,275
Projects, workshops and conferences	1,835,000	1,970,174	1,680,669
Technical programme	39,000	27,286	47,961
Other administrative costs	152,000	143,346	169,083
Bad debts written off	0	414	0
Financial expenses	22,000	14,839	18,065
Project results from earlier years	0	20,456	19,989
<b>Total Expenditure</b>	<b>2,490,000</b>	<b>2,622,387</b>	<b>2,331,042</b>
<b>Result</b>	<b>0</b>	<b>-91,079</b>	<b>36,064</b>
<b>Destination of the result</b>			
General reserves	0	-91,079	36,064

Cash Flow Statement

	2009	2008
<b>NET RESULT</b>	-91,079	36,064
Depreciation charges	18,941	18,941
Investments in tangible assets	0	0
(Increase)/Decrease in accounts receivable	76,371	334,085
Increase/(Decrease) in current liabilities	885,987	62,656
(Increase)/Decrease in long-term liabilities	0	-12,000
<b>NET CASHFLOW</b>	<b>890,220</b>	<b>439,746</b>
Cash in bank and on hand, 1 January	2,365,927	1,926,181
<b>Cash in bank and on hand, 31 December</b>	<b>3,256,147</b>	<b>2,365,927</b>

Membership Fees

The annual membership fees for National Members are in eight categories, depending on the gross national income of the countries that they represent. A National Member pays the unit fee multiplied by the number of units linked to its category. The membership fees for National Members in categories 1 and 2 are further differentiated according to the gross national income per capita of their countries. National Members in categories 1 and 2 from countries that are classified by the World Bank as an 'upper-middle-income economy' receive a reduction in the fee and in the number of votes of 20%. That reduction is 40% if their country is classified as a 'lower-middle-income economy' and 60% if their country is classified as a 'low-income economy'.

International Members have 10 votes and pay the unit fee.  
Associate Members pay half the unit fee.

The unit fee for 2009 was initially set at 5,107 euro, and that figure was used for the 2009 budget. Later the General Assembly decided to reduce the unit fee for 2009 to 5,027 euro

Category	Units	Votes	Country
1	0.2	2	
1	0.3	3	FYRoMacedonia
1	0.4	4	Montenegro
1	0.5	5	Malta
2	0.4	4	
2	0.6	6	
2	0.8	8	Bulgaria, Latvia, Lithuania, Serbia
2	1	10	Cyprus, Estonia, Iceland
3	2	20	Belarus, Croatia, Luxembourg, Slovakia, Slovenia
4	4	30	Czech Republic, Hungary, Israel, Romania
5	6	40	Denmark, Finland, Greece, Ireland, Portugal
6	8	50	Austria, Belgium, Netherlands, Norway, Poland, Sweden, Switzerland, Turkey
7	12	60	Spain
8	16	70	France, Germany, Italy, United Kingdom

# TERENA Staff in 2009

**Secretary General**

**Karel Vietsch**

**Business and Technology Strategist**

**John Dyer**

**Chief Technical Officer**

**Valentino Cavalli**

**Project Development Officers**

**Licia Florio**

**Kevin Meynell**

**Péter Szegedi**

**Brook Schofield** (from 15 June)

**Dick Visser**

**Christian Gijtenbeek**

**Gijsbert Sliedrecht** (until 16 August)

**Senior IT Support Officer**

**Senior Webmaster**

**Webmaster**

**Chief Administrative Officer**

**Bert van Pinxteren**

**Financial Administrator**

**Wilma Overdeest**

**Assistant Bookkeeper**

**Harriëtte Raaymakers**

**Senior Communications Officer**

**Laura Durnford**

**Communications Officer**

**Carrie Solomon** (from 4 May)

**Conference and Workshop Organiser**

**Gyöngyi Horváth**

**Workshop Organiser**

**Jim Buddin**

**Secretary**

**Hanna Cherigui**

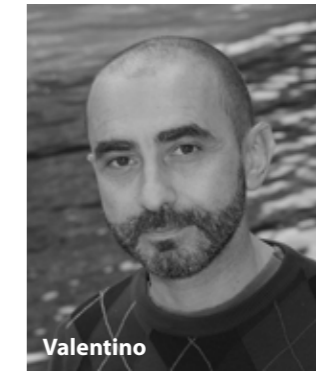
[www.terena.org/about/people](http://www.terena.org/about/people)



Karel



John



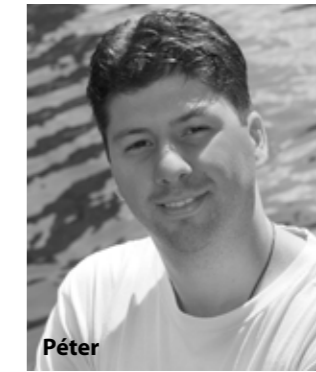
Valentino



Licia



Kevin



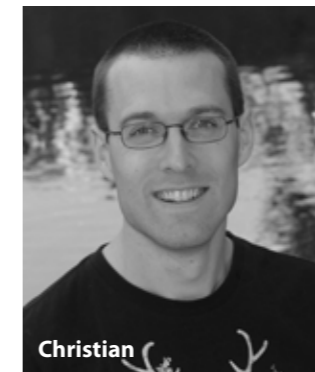
Péter



Brook



Dick



Christian



Gijsbert



Bert



Wilma



Harriëtte



Hanna



Laura



Gyöngyi



Jim



Carrie

# Acronyms and Abbreviations

	<b>3G</b>	Third generation of standards for mobile telecommunications
<b>A</b>	<b>AAI</b>	Authentication and Authorisation Infrastructure
	<b>APWG</b>	Anti-Phishing Working Group
	<b>APAN</b>	Asia-Pacific Advanced Network
	<b>ASTRA</b>	Ancient instruments Sound/Timbre Reconstruction Application
	<b>AutoBAHN</b>	Automated Bandwidth Allocation across Heterogeneous Networks
<b>B</b>	<b>BoF</b>	Birds-of-a-Feather
<b>C</b>	<b>CA</b>	Certification Authority
	<b>CANARIE</b>	Canadian Network for the Advancement of Research, Industry and Education
	<b>CARRIOCAS</b>	Calcul Réparti sur Réseau Internet Optique à Capacité Surmultipliée
	<b>CCIRN</b>	Co-ordinating Committee for Intercontinental Research Networking
	<b>CERN</b>	European Laboratory for Particle Physics
	<b>CERT</b>	Computer Emergency Response Team
	<b>CIIP</b>	Critical Information Infrastructure Protection
	<b>CLARA</b>	Cooperación Latino Americana de Redes Avanzadas
	<b>cNIS</b>	common Network Information Service
	<b>CSIRT</b>	Computer Security Incident Response Team
	<b>CPNI</b>	Centre for the Protection of National Infrastructure
	<b>CPqD</b>	Centro de Pesquisa e Desenvolvimento em Telecomunicações
	<b>CTVR</b>	Centre for Telecommunications Value-Chain Research
	<b>D</b>	<b>DANTE</b>
<b>DNS</b>		Domain Name System
<b>DNSSEC</b>		DNS Security Extensions
<b>DRAC</b>		Dynamic Resource Allocation Controller
<b>DVTS</b>		Digital Video Transport System

<b>E</b>	<b>e-InfraNET</b>	European network for co-ordination of policies and programmes on e-infrastructures
	<b>ECAM</b>	European Committee for Academic Middleware
	<b>educonf</b>	European Videoconferencing Service
	<b>eduGAIN</b>	Education GÉANT Authorisation Infrastructure
	<b>eduID</b>	Education Identity Federation
	<b>eduPKI</b>	Education PKI
	<b>eduroam</b>	Education Roaming
	<b>EGEE</b>	Enabling Grids for E-sciencE
	<b>EMT</b>	Empresa de Malagueña de Transportes
	<b>ENISA</b>	European Network and Information Security Agency
	<b>ENPG</b>	European Networking Policy Group
	<b>ENUM</b>	Telephone Number Mapping
	<b>ETH</b>	Swiss Federal Institute of Technology Zurich
	<b>EUNIS</b>	European University Information Systems
<b>EuroCAMP</b>	European Campus Architectural Middleware Planning	
<b>F</b>	<b>FEAST</b>	Feasibility Study for African-European Research and Education Network Interconnection
	<b>FEDERICA</b>	Federated E-infrastructure Dedicated to European Researchers Innovating in Computing Network Architectures
	<b>FIRST</b>	Forum of Incident Response and Security Teams
<b>G</b>	<b>GÉANT</b>	Gigabit European Academic Network Technology
	<b>GEMBus</b>	GÉANT Multi-domain Bus
	<b>GEYSERS</b>	Generalised architecture for dynamic infrastructure services
	<b>GLIF</b>	Global Lambda Integrated Facility
	<b>GN2</b>	Multi-Gigabit European Academic Network
	<b>GN3</b>	Multi-Gigabit European Research and Education Network and Associated Services
	<b>GOLE</b>	GLIF Open Lightpath Exchange
	<b>GPL</b>	General Public License
<b>GRID-SEC</b>	Grid Security Community	

<b>I</b>	<b>ICT</b>	Information and Communication Technologies
	<b>IdM</b>	Identity Management
	<b>IETF</b>	Internet Engineering Task Force
	<b>IGTF</b>	International Grid Trust Federation
	<b>INFN</b>	Istituto Nazionale di Fisica Nucleare
	<b>IP</b>	Internet Protocol
	<b>IRCAM</b>	Institut de Recherche et Coordination Acoustique / Musique
	<b>IRT</b>	Incident Response Team
	<b>IST-Africa</b>	Regional Impact of Information Society Technologies in Africa
	<b>IT</b>	Information Technology
<b>ITIL</b>	Information Technology Infrastructure Library	
<b>ITU</b>	International Telecommunications Union	
<b>J</b>	<b>JISC</b>	Joint Information Systems Committee
<b>K</b>	<b>KAUST</b>	King Abdullah University of Science and Technology
<b>L</b>	<b>LHC</b>	Large Hadron Collider
	<b>LHCOPN</b>	Large Hadron Collider Optical Private Network
	<b>LoA</b>	Level of Assurance
	<b>LOLA</b>	LOw LATency audio visual streaming system
<b>M</b>	<b>MACE</b>	Middleware Architecture Committee for Education
	<b>MPLS</b>	Multi Protocol Label Switching
<b>N</b>	<b>NATO</b>	North Atlantic Treaty Organization
	<b>NCSU</b>	North Carolina State University
	<b>NDL</b>	Network Description Language
	<b>NLR</b>	National LamdaRail
	<b>NML</b>	Network Markup Language
	<b>NREN</b>	National Research and Education Networking organisation
<b>O</b>	<b>OECD</b>	Organisation for Economic Cooperation and Development
	<b>OGF</b>	Open Grid Forum
<b>P</b>	<b>perfSONAR</b>	Performance focused Service Oriented Network monitoring Architecture
	<b>PERT</b>	Performance Enhancement Response Team
	<b>PHOSPHORUS</b>	Lambda User Controlled Infrastructure for European Research
	<b>PKI</b>	Public Key Infrastructure
	<b>PR</b>	Public Relations
	<b>PSP</b>	Partner Services Promotion

<b>R</b>	<b>R&amp;E</b>	Research and Education
	<b>REFEDs</b>	Research and Education Federations
	<b>RENOG</b>	Research & Education Network Operators Group
	<b>RIPE</b>	Réseaux IP Européens
	<b>RIPN</b>	Russian Institute for Public Networks
	<b>RS3G</b>	Rome Student Systems and Standards Group
<b>S</b>	<b>RNP</b>	Rede Nacional de Ensino e Pesquisa
	<b>SAML</b>	Security Assertion Markup Language
	<b>SARA</b>	Stichting Academisch Rekencentrum Amsterdam
	<b>SCHAC</b>	Schema for Academia
<b>T</b>	<b>SSL</b>	Secure Sockets Layer
	<b>TACAR</b>	TERENA Academic CA Repository
	<b>TCS</b>	TERENA Certificate Service
	<b>TERENA</b>	Trans-European Research and Education Networking Association
	<b>TF-CPR</b>	Task Force on Communications and Public Relations
	<b>TF-CSIRT</b>	Task Force on Collaboration of Security Incident Response Teams
	<b>TF-ECS</b>	Task Force on Enhanced Communication Services
	<b>TF-EMC2</b>	Task Force on European Middleware Coordination and Collaboration
	<b>TF-Media</b>	Task Force on Media
	<b>TF-Mobility and Network Middleware</b>	Task Force on Mobility and Network Middleware
	<b>TF-MSP</b>	Task Force on Management of Service Portfolios
	<b>TF-NOC</b>	Task Force on Network Operation Centres
	<b>TF-Storage</b>	Task Force on Storage
	<b>TF-VSS</b>	Task Force on Videoconference Service Studies
<b>TI</b>	Trusted Introducer	
<b>TNC</b>	TERENA Networking Conference	
<b>U</b>	<b>TRANSITS</b>	Training of Network Security Incident Teams Staff
	<b>TTC</b>	TERENA Technical Committee
	<b>UCSD</b>	University of California San Diego
	<b>UIC</b>	University of Illinois at Chicago
<b>W</b>	<b>URN</b>	Uniform Resource Name
	<b>US</b>	United States
	<b>USA</b>	United States of America
<b>W</b>	<b>WiMAX</b>	Worldwide Interoperability for Microwave Access



**Contributions**

TERENA Secretariat staff and task force chairs

**Writing and Production**

Carol de Groot  
Laura Durnford  
Karel Vietsch

**DTP**

5Up

**Printing**

Printed on recycled paper by Drukkerij G.B. 't Hooft

**Photographs**

TERENA secretariat and NREN staff

©TERENA 2010

For further information please contact:

**TERENA Secretariat**  
Singel 468 D  
1017 AW Amsterdam  
The Netherlands

t. +31 20 530 44 88  
f. +31 20 530 44 99  
secretariat@terena.org  
www.terena.org

