

THE TERENA TASK FORCE ON NEXT GENERATION NETWORKS (TF-NGN)

Revised Terms of Reference

1. The mandate of the Task Force established under the auspices of the TERENA Technical Programme (<http://www.terena.nl/tech/ToR.html>) to investigate the suitability of advanced networking technologies for future implementation in European research and education networks, is hereby extended until the date given in Article 4. It will continue to be known as TF-NGN (Next-Generation Networking).
2. The aim of the Task Force shall be:
 - 2.1 to provide a forum for exchanging experience and knowledge;
 - 2.2 to promote development and testing of innovative networking technologies;
 - 2.3 to define, develop and test new networking services, which can subsequently be introduced by national research and education networks and/or in the European backbone infrastructure;
 - 2.4 to provide a forum for wider discussion of the work of the GN2 joint research activities (JRAs) and service activity on end-to-end Quality of Service (SA3). This might include active collaboration on GN2 related research with organisations who are non-GN2 partners.

Activities shall generally be restricted to technologies that operate at Layers 1-4 of the OSI reference model. The work items are listed in Article 9 (and, with a lower priority, those listed in Article 10), and will include the piloting of new services on the GÉANT2 and NREN backbones in addition to those described in the relevant work items of the GN2 project and yearly roadmaps. For piloting services that require potentially disruptive testing, the GN2-JRA4 and NREN testbeds will be used.

3. The Task Force shall be open to any individual who can offer appropriate expertise, manpower, equipment or services.
4. The Task Force shall continue to operate until 1 November 2006. Any continuance beyond this date requires the approval of the TERENA Technical Committee, with the Task Force being dissolved upon expiry of its mandate. The TERENA Technical Committee may also dissolve the Task Force if it considers that it is making insufficient progress, that its activities are no longer useful or relevant, or if the Task Force chair resigns and no replacement can be found.

5. The Task Force shall meet approximately 3-4 times per year (although this may be via telephone or video conference). Physical meetings will be held at locations agreed by the Task Force, taking care to reduce overall costs to participants.
6. TERENA shall provide administrative support to the Task Force and its sub-groups. This includes taking the minutes at meetings, preparing meeting agendas in consultation with the Chair, and making logistical arrangements as necessary.
7. The Chair of the Task Force shall be Michael Enrico of DANTE, who shall have responsibility for overall coordination. Each work item shall additionally be coordinated by an activity leader who shall be responsible for ensuring any agreed deliverables are produced, and preparing the agendas of any sub-group meetings.
8. The results of Task Force activities shall be placed in the public domain, with the exception of information that has been provided on a non-disclosure basis, or when disclosure would jeopardise the interests of the organisations involved.
9. The Task Force shall focus on the activities listed below. This is subject to revision by the participants; further details of each activity (including named activity leaders) can be found in Annex 1.
 - 9.1 Improvement of current multicast services
 - 9.2 IPv6
 - 9.3 IP routing
 - 9.4 MPLS for Layer 2/3 VPNs and VPLS
 - 9.5 Intelligent control plane architectures
 - 9.6 Transport Protocols (TCP limitations and tuning, fast TCP, new transport protocols)
 - 9.7 Optical Networking
 - 9.8 Hands-on evaluation of new router and switching hardware
10. Activities which were previously included within the remit of the task force but are now largely covered by GN2 Joint Research Activities (JRAs) or Service Activities (SAs) are listed below. These will still be discussed within TF-NGN in order to provide the relevant JRA or SA team with feedback from a wider technical community.
 - 10.1 Tools for network monitoring and flow measurement (GN2-JRA1)
 - 10.2 Definition, Testing, Implementation and Monitoring of Differentiated IP Services (GN2-SA3)
 - 10.3 AAA development (GN2-JRA5)
 - 10.4 Performance Enhancement Response Team (PERT) development (GN2-SA3)

Annex 1: Descriptions of Activities Listed in Article 9

(With current activity leaders.)

9.1 Improvement of current multicast services (Steve Williams, University of Swansea/UKERNA)

At the moment it is difficult to effectively and easily monitor multicast performance in large networks. The aim of this work will be to look at the tools available, and the presentation of multicast measurement data, in an attempt to encourage improvements, where possible, to the underlying multicast network infrastructure. This will assist NRENs who need to support multicast for Access Grid, media streaming or other applications.

9.2 IPv6 (Tim Chown, University of Southampton/UKERNA and Stig Venaas, UNINETT)

The IPv6 studies and trials in TF-NGN from 2004 onwards will be focused on helping drive the deployment of IPv6 services from the GÉANT2 and NREN backbones into the universities, while complementing the GN2 work. To this end work items will include IPv6 Multicast (including SSM), transition tools, network measurement and monitoring, and application deployment. TF-NGN will also act as a "think tank" for IPv6 issues in a number of activities in the GN2 project, like mobility (for GN2 JRA5), monitoring (JRA1) and security (JRA2), and assist in producing deployment oriented guidelines as appropriate.

9.3 IP routing (Mauro Campanella, GARR)

The activity aims at deeper understanding of the new challenges and developments faced by routing architectures.

The latest developments in optical technology, the growth of the physical infrastructure and the Grid paradigm bring new requirements to routing protocols. Specific attention will be devoted to routing protocol awareness of capability of dynamically establishing a path at the physical or data link layer.

9.4 MPLS for Layer 2/3 VPNs and VPLS (János Mohácsi, HUNGARNET)

Ethernet is the technology of choice for LANs, since it is relatively cheap and simple to implement and operate. Ethernet has gained popularity in Metropolitan and Wide Area Networks due to large fibre deployments and different carrier offerings based on Gigabit Ethernet or 10 Gigabit Ethernet. The Virtual Private LAN Service (VPLS) can extend the switch-based Ethernet deployment and make it a solution in WAN environment. There are already several such Ethernet service deployment options: Ethernet over MPLS, Ethernet over SDH, Ethernet bridging over ATM, and ATM LAN emulation.

However, only VPLS might provide a scalable multipoint solution or requires dedicated network architecture.

Topics of interest within this activity include:

- Follow the design and applicability of VPLS
- Scalability testing of VPLS
- Interoperability testing
- Interoperability and coexistence of VPLS and L3 MPLS VPNs
- Development of guidelines for VPLS application (migration scenarios from Layer 3 MPLS VPNs to Layer 2 MPLS VPNs)
- Management of VPLS networks
- Multicast over VPLS network

9.5 Intelligent control plane architectures (Otto Kreiter, DANTE)

The aim of this work is to monitor the development and test intelligent control plane architectures in particular those relating to the MPLS and GMPLS frameworks.

The main focus of the activity will be directed towards:

- Diffserv-Traffic Engineering for MPLS networks;
- Dynamic provisioning, setup and control of end-to-end intra-domain LSPs for different switching technologies;
- Inter-domain aspects of (G)MPLS;
- Recovery (protection and restoration) techniques for (G)MPLS;
- Migration techniques from MPLS to GMPLS.

This work is intended to complement that done by GN2-JRA3 with regards to (G)MPLS and will aim to provide appropriate results as inputs into the development of NRENs' and GÉANT2's advanced services.

9.6 Transport protocols (Radoslaw Krzywania, PSNC)

The main concern of the Transport Protocols task for TF-NGN is to improve TCP transmissions, especially for multi-gigabit networks and wireless connections. At the beginning the existing TCP enhancement implementations and ideas shall be tested and compared. Then the task activity will focus on transport protocols improvements for specific groups of users and services. The Transport Protocols studies require testbed facilities offering broadband connections with large latencies.

9.7 Optical Networking (Victor Reijs, HEANet and Stanislav Sima, CESNET*)

(* for the coordination with the CEF forum)

This activity will coordinate the discussion between NRENs in the optical networking environment. It will concentrate on new technologies for optical networking (not covered by GN2-JRA3/GN2-JRA4); so looking at pure optical switching/routing and the control protocols around this. If (local, national or international) testing is feasible, such test will be pursued. Additionally, longer term study will be stimulated by getting research institutes involved in subjects that could become important for NRENs in a 3-5 year time frame. Work on issues related to dark fibre networks will be handled as part of the CEF (Customer Enabled Fibre) networks work coordinated by CESNET.

9.8 Hands-on evaluation of new router and switching hardware (Marcin Garstka, PSNC)

This activity will aim at testing new (recently released or even in alpha/beta phases) routers and switches (including hardware developed within the R&E networking community). It will focus on two important features of the hardware:

- new functionality, which may be interesting for the research community and
- performance.

The results of the activity will lead to recommendations for the NRENs on using the tested devices and technologies as well as feedback for the vendors.