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Abstract:

This Deliverable describes the plans for the dissemination of knowledge gained during the work, and (to the extent that can be foreseen at this stage) the exploitation plans of the results for the consortium as a whole, for individual participants, and groups of participants. It expresses as far as possible in concrete terms, the dissemination strategies, the target groups and the strategic impact of the project in terms of improvement of competitiveness or creation of market opportunities for the participants.

One of the purposes of this Deliverable is to disseminate information about the project, and its progress, in such a way that other workers in the area can make use of the results, or see how they can feed information into the project. In this way it acts as a vehicle for the cross-fertilisation of ideas and a means of establishing co-operation. This document will be regularly updated.

Keywords:

Exploitation, dissemination, trials, standards

Executive Summary

In the scope of the 6NET project, new concepts and technological results are being derived that will have an impact on the future of the Internet. It is therefore seen as being of crucial importance to publish and disseminate the results from the project through the appropriate channels and in a timely fashion.

This *Dissemination and Use Plan* will be treated as a living document and will be updated during the life of the project. It will include at each update a summary of changes since the previous release and an outline of expected future additions or changes. Being a publicly available document, it will be made available on the project web site.

One of the purposes of this *Dissemination and Use Plan* is to disseminate information about the project, and its progress, in such a way that other workers in the area can make use of the results, or see how they can feed information into the project. In this way it acts as a vehicle for the cross-fertilisation of ideas and a means of establishing co-operation.

The contents of the Deliverable include:

- plans for the dissemination of knowledge
 - standards
 - publications
 - deliverables
 - conferences and other events
- exploitation plans
 - project as a whole
 - individual partners

This second edition (December 2002) of Deliverable 7.2. includes new or updated contributions from the following partners: GARR, FhG Fokus, GRnet, HUNGARnet, NORDUnet, TELIN, UKERNA, ULANC, ULB, University of Southampton.

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1. Plans for the Dissemination of Knowledge

1.1. Standards Bodies

1. IETF:

The most important body in terms of Internet standards is the Internet Engineering Task Force (IETF). Meeting three times a year, the IETF embraces all aspects of Internet technology. For IPv6, there are three directly relevant working groups:

- **IPng**, defining the IPv6 standards.
- **v6ops**: defining methods for IPv4 and IPv6 transition, integration and coexistence
- **multi6**: defining methods for site and network multihoming in IPv6

Other working groups of interest include:

- **mobileip** (including Mobile IPv6)
- **manet** (mobile ad-hoc networks, currently typically using ad-hoc 802.11b WLANs)
- **zeroconf** (zero configuration)
- **dnsex** (DNS extensions)
- **dhc** (dynamic host configuration, including DHCPv6).

6NET participants attend the IETF meetings and participate in mailing list discussions where relevant work is being undertaken in the workpackages (eg. IPv6 transition in WP2). 6NET work contributes directly to the standards process.

2. ETSI:

The European Telecommunications Standards Institute (ETSI) has a focus more directed at wireless and 3G systems, but also has a strong reputation for other services including hosting of interoperability tests. 6NET will seek to take advantage of such services where appropriate in the project. Interaction with ETSI is of direct benefit to Europe.

ULB, in particular, is closely associated with the IPv6 interoperability “Plugtests”. They took part in the *re-routing* tests in Cannes (September 2002), and will be responsible (with VUB) for organising the infrastructure for the next IPv6 Plugtest event in Brussels in 2003. The event will be combined with a 1-day workshop.

3. RIPE:

RIPE (Réseaux IP Européens) is a series of 4-monthly open meetings attended by technical experts running IP networks in Europe. The logistics for the RIPE meetings are provided by the staff of the RIPE NCC association. The RIPE NCC is the European Internet Registry responsible for the management of Internet address assignments in the European region. The RIPE NCC allocates IPv4 and IPv6 address space, autonomous system (AS) numbers, and reverse address delegations (for IPv6, under ip6.int). 6NET contributes to the determination of address assignment policies and towards establishing best practices for organisational and site addressing for IPv6. 6NET has gained operational experience of DNS servers and reverse delegations (under ip6.int or ip6.arpa). The experience from 6NET is being fed back via RIPE IPv6 Working Group meetings. Representatives of a number of 6NET partners, especially AConet (WP3 leader), attend these meetings.

1.2. Publications

Many publications have been made by partners in journals, conferences and to IETF meetings. All publications are being placed on the project's Web server.

1.3. Deliverables

Almost all Deliverables from the project are available as public material. All public Deliverables are placed on the project's Web server.

1.4. Conferences and other events

TERENA and ULB organise workshops and conferences. Some of these will be joint events with EURO6IX. ULB bring a location that is geographically well situated, and which also has the capability (EuroDemo facility) to host technical demonstrations. They have a wealth of well-established relations with people in strategic positions in many international institutions.

Two first events organised in the scope of the 6NET project were joint workshops with the EURO6IX project, that took place during the Madrid IPv6 Summit (March 2002) and during the TERENA Conference in Limerick (June 2002).

6NET has also been represented at the following events:

- RENATER Conference (Paris, October 2002)
- IST Conference (Copenhagen, November 2002)

Further conferences where 6NET will be represented include, at this point in time:

- Global IPv6 Summit (Madrid, May 2003)
- TERENA Conference (Zagreb, May 2003)

2. Exploitation Plans

2.1. Exploitation Plans for the project as a whole

A specific workpackage (WP7) has been established to co-ordinate the dissemination activities of the project.

The objective of this workpackage is to provide an analytical and comprehensive approach and concrete basis for the strategies of visibility, dissemination, implementation and exploitation of the research results.

Obvious forms of dissemination are through the professional Website, presentations at workshops and conferences, journal papers, and contributions to the IETF, TF-NGN, etc. Disseminating information on 6NET to people active in standardisation bodies, technical development work and the operations of networks, and receiving feedback from them, brings significant added value to both parties. Results from 6NET are being taken on board in the work of, among others, the IETF, TF-NGN and operational networks. Conversely, the inputs from standardisation bodies, technology development groups and operational networks contribute to the steering of the 6NET project. Information on 6NET is also being disseminated via press releases, leaflets, newsletters and brochures.

The dissemination and liaison activities have as one of their target groups the research and education networks in Europe, including those that are not themselves participating in 6NET. In this way, the results of 6NET are being made available to the European research and education networking community at large, thereby promoting the widespread deployment. Research networking organisations outside Europe are also being targeted, eg. Internet2 and CANARIE in North America, APAN in the Asia-Pacific region and ENRED in Latin America. An enquiry for collaboration has also been received recently from the Australian NREN (ARNet), which will receive \$42.5 million over the next two years to invest in bandwidth infrastructure for Australian universities.

The 6NET work is featured at the TERENA Networking Conferences. These annual conferences are prominent events bringing together leading figures from the research networking community in Europe and worldwide.

The most important entities that will be addressed by the dissemination and liaison activities are:

- Standards and Policy Bodies
- IPv6 Projects
- IPv6 Promotion
- External Communities
- Clustering Expertise

2.2. Exploitation plans of the individual partners

2.2.1. CISCO Systems

Cisco Systems (Europe) is a leading global provider of internetworking solutions. Cisco solutions are the internetworking foundation of thousands of companies, universities, utilities and government agencies worldwide. Cisco is a driving force behind the global Internet.

Cisco intends to use the 6NET network to:

- test out new features on a large scale in conditions that can “break” the network. These features include:
 - co-existence and migration strategies for integrating IPv6 with the existing IPv4 infrastructure (core and access networks), including the utilisation of standard PC architectures and open source operating systems and software
 - transition tools (inc. dual stack)
 - interoperability between IPv6 implemented in different devices based on various network technologies such as ATM and Ethernet
 - access to new IPv6 applications, legacy IPv4 applications and content
 - auto-configuration techniques to enable a large numbers of IP hosts to easily discover the network and get an IPv6 address associated with their location. Nodes can assemble their own addresses with stateless auto configuration
 - support for class-of-service (‘Traffic Class’ field) compliant with the IETF Differentiated Services (DiffServ) model
 - security (IPSec)
 - mobility (many facets are considered, ranging from wireless-only LAN networks in an end-site environment, through to the convergence of mobile and fixed network technologies).

Specifically: MIPv6 support, handoff latencies, the relationship between autoconfiguration and User/Terminal management, multihoming, multicast, performance, and roaming

- VPNs (current methods of managing the establishment, maintenance and teardown of VPNs are also largely manual, relatively time consuming, and not scalable. Automation will be introduced into these procedures. Operations staff and end users will be provided with web-based systems to make their interactions with the services as easy to use as possible)
- network management tools for (as a minimum):
 - configuration management
 - performance and capacity management
 - fault management
 - security management
 - availability management
- network services like DNS (names to address resolution: IPv4 - IPv6), registries, multicast routing, etc.
- testing under high traffic loads
- testing of the handling of traffic class segregation (eg. for QoS, security) under real operating conditions
- exploit the synergy between the work they are doing and that being performed on IPv6 by other manufacturers such as IBM and Sony, European NRENs and universities.
- validate that the demands for the continuous growth of the global Internet can be met with the new IPv6 technology.

Cisco will also disseminate the results, and explore broader exploitation opportunities via the academic and research networking communities, including in the Newly Associated States (3 new partners from the Czech Republic, Hungary and Poland were incorporated into the project in September 2002 as a result of such activities by Cisco).

They will generally play a leading role in defining the next generation of networking technologies that go beyond the current state of the art.

All of these activities map closely onto the main aims of the project.

2.2.2. Universite Libre de Bruxelles (ULB)

ULB will extend the dissemination process through their proven ability to produce newsletters, leaflets, presentation material, etc. and in conjunction with TERENA will organise workshops and conferences. Some of these will be joint events with EURO6IX. ULB bring a location that is geographically well situated, and which also has the capability (EuroDemo facility) to host technical demonstrations. They have a wealth of well-established relations with people in strategic positions in many international institutions.

Through their involvement in other IST projects directly related to Next Generation Networks and the IPv6 protocol (eg. NGN-LAB, Eurov6), ULB will bring an extra synergy with the 6NET project.

The particular and very active relation between ULB and ETSI will also help disseminate the results of the 6NET projects, in particular through the participation to - and organisation of - ETSI IPv6 interoperability Plugtest events. The next comprehensive ETSI Plugtest event devoted to IPv6 will

take place in Brussels in September 2003. At that time, a Belgian IPv6 Summit will take place, including a one-day international IPv6 Symposium and a Eurov6 Showcase event.

ULB will lead the Belgian IPv6 Task Force activities, and Paul Van Binst has been invited to become a member of the European IPv6 Task Force.

2.2.3. DANTE

DANTE has a long-standing experience of building and operating pan-European research networks, including the liaison with network service providers. They are also in the perfect position to assess the feasibility of exploiting the GÉANT network for providing the connectivity for this dedicated IPv6 pilot network. DANTE are the leaders of WP1 (Build and operate an IPv6 Network). DANTE supervise the provisioning of native IPv6 connectivity that the project needs to fulfil its commitments; both in the core of the network and in local loops.

2.2.4. TERENA

TERENA has a specific role in the project for the dissemination of technical information concerning the project results. TERENA has built on its long-standing relationships with the European NRENs to provide a two-way information conduit between the project partners and the academic and research community. TERENA will continue this important information dissemination role in 6NET with the expectation that the increased information that the project will bring combines in a synergistic fashion to attract growing interest in the project results and workshops.

Activities include:

- Hosting the project Web site
- Hosting project mailing lists
- Organising workshops to disseminate information about the project activities to third parties, and to get inputs from the wider user community into the project progress planning
- Support for project organisation
- Liaisons with National Research and Education Networks in Europe
- Liaison with research networking organisations in other continents (eg. Internet2, APAN, ENRED)
- Liaison with IETF

2.2.5. SONY

As a major commercial application provider to the end-user, SONY's role will become more visible in the later stages, when the supporting network services are available.

2.2.6. IBM

IBM has been a leading participant in IPv6 design since its inception. IBM staff have co-authored numerous IPv6 specifications, and IBM was a founding member of the IPv6 Forum. IBM launched the first commercial UNIX IPv6 product (AIX) in 1997, and each AIX release since then, including the current AIX 5L version, has enhanced those initial capabilities. The z/OS Operating System on the z-Series platform (formerly System 390) is being IPv6 enabled as a key element in the IBM server family of products. IPv6 functionality is being phased in over various releases of z/OS as market requirements emerge, with an initial release in the z/OS V1R4 version in September 2002. Similarly, OS/400 on the IBM iSeries platform is also being IPv6 enabled in a phased approach, with initial support in version V5R2 in September 2002. IPv6 is available on the Linux and

Windows operating systems on certain IBM platforms. IBM also supports IPv6 on its Network Processor chips.

IBM's Tivoli Netview, the premier z/OS network management system, will be enabled with IPv6 capability in conjunction with the z/OS platform IPv6 enablement. This will impact every aspect of NetView panels, code logic, GUI displays, and IP services used and provided by NetView. IPv4 applications will continue to be supported but v4 addressing will be virtual addresses for backward compatibility and will be mapped to IPv6 actual addresses.

IBM is starting the process of enabling its middleware to support IPv6, based on market needs and IPv4/v6 interoperability requirements. This evolution will be done product by product according to emerging market demand, but 6NET is very important in this context as it gives us both technical experience in porting and deploying middleware over IPv6, and initial feedback on user requirements and operational issues. Thus IBM's leadership of workpackage 5 (WP5) feeds directly back into our corporate approach to IPv6 enablement. It also fits our strategy of partnering with both other vendors and customers during the early stages of IPv6 deployment.

Finally, in addition to laboratory tests and our planned connection to 6NET, IBM is preparing a strategy for progressive internal deployment of IPv6, initially for testing and familiarisation. This will require us to:

- Obtain an IPv6 prefix for the IBM Intranet
- Define the address allocation methods world-wide for IBM
- Create a strategy and standards document for IBM internal use
- Port the strategy and knowledge into our commercial e-business services
- Gather requirements from IBM Business Units active in IPv6 working with the internal Internet / software team

IBM intends to use the success of 6NET as a reference point when discussing IPv6 adoption with its customers worldwide. IBM Global Services is receiving daily requests on IPv6 from customers who want to consider or use this technology in their operations. Our activities in WP5 and other 6NET workpackages is feeding our experience database to help in customer projects ranging from consulting and planning to integration and operations both at the infrastructure level as well as at the IT solution and application levels.

2.2.7. NTT Communications Corporation (NTT Com)

NTT Com provides an opportunity to bring an IPv6 link into the Asia-Pacific region.

2.2.8. RENATER

RENATER is the leader of WP6 (IPv6 network management architecture and tools). RENATER organised the IPv6 conference in Paris on October 28-29, 2002.

2.2.9. UKERNA

UKERNA is participating in WP1, WP2, WP6 and WP7, in order to understand the issues involved in migrating to IPv6 over a production network and to gain operational experience of running IPv6. UKERNA has been supporting the IPv6 work carried out by University College London, University of Southampton (leader of 6NET WP2) and University of Lancaster (leader of 6NET WP4) since the mid 1990s, and will continue to support these three UK Universities in terms of facilitating the provision of connectivity into the 6NET backbone across JANET.

UKERNA uses a number of dissemination routes to promote 6NET, including:

- Regular articles in “UKERNA News”
- Distribution of the 6NET newsletter with “UKERNA News”
- An IPv6 event, planned for early 2003
- Presence on the JANET WWW
- Participation in the UK IPv6 Task Force
- Annual presentations on IPv6 at the UK Networkshop event, attended by UK academic network managers

2.2.10. NORDUnet

NORDUnet participates mainly in WP1, and organises the connectivity for the NRENs in the Nordic countries. Apart from Sweden, this includes, for 6NET: Denmark, Finland and Norway.

NORDUnet uses the following dissemination routes to promote 6NET:

- IPv6 pages in the web sites of NORDUnet and the Nordic national R&E networks
- Articles in the newsletters from Forskningsnet, FUNET, and UNINETT
- IPv6 presentations at the NORDUnet Conferences

2.2.11. DFN

The DFN-Verein has been involved in the IPng development for many years. Together with the two national research organisations, WWU Münster and FhG Fokus, they participate in all of the workpackages WP1-7. Specific activities of FhG Fokus are in the area of VoIP in IPv6: SIP platform to be demonstrated over IPv6 (end systems, proxies and registries), and VoIP in heterogeneous networks: interoperation between an IPv6 SIP phone and an IPv4 SIP phone.

2.2.12. SURFnet

SURFnet focuses its 6NET activities on IPv6 multicast in WP3 and leads the corresponding Activity (A3.4). They have been active in IPv4 multicast since 1993 and offer state of the art high bandwidth IPv4 multicast services to their customers. As the SURFnet5 network will be a dual stack network they expect to offer IPv6 multicast services too. The major part of the work is interconnecting the IPv6 multicast networks of the 6NET partners and creating a pan-European IPv6 multicast network with connections to the rest of the IPv6 multicast world.

2.2.13. SWITCH

SWITCH is a founding member of the Swiss IPv6 Task Force, and the leader of the Network Group, within that organisation.

As the Internet Service Provider to the Swiss Education and Research community, SWITCH favours an implementation-oriented approach to dissemination. they target the following groups:

2.2.13.1 Educational and research organisations

SWITCH works closely with these customers to both apply the results from the 6NET project to their own network, and help their customers apply them to theirs. Through the 6NET participation of the University of Geneva as their subcontractor, they are gaining insights into the IPv6 requirements and deployment issues of a large campus network, which is helping them understand the needs of other types of customers.

2.2.13.2 Regional ISPs

SWITCH has peering relationships with the main commercial Internet Service Providers (ISPs) in Switzerland as well as with a few international ones. Due to its early involvement in 6BONE, they have become a natural point of contact when such ISPs want to experiment with IPv6. SWITCH provides tunnelled 6BONE connectivity to several other ISPs in Switzerland and the surrounding countries. They expect to leverage this position for the dissemination of 6NET results.

2.2.13.3 General Public

In this category, SWITCH includes commercial and other Internet users that have a general interest in IPv6 for the evolution of the Internet. As a service organisation for a basically closed group, SWITCH has limited outreach to the general public, although they do have a few publication channels that enjoy distribution above and beyond their member community.

There is one important exception to the closed-user-group aspect of SWITCH, and that is the domain name registry function that they perform for the .CH and .LI top-level domains. With 440'000 second-level domain name delegations, the Internet Identifiers division of SWITCH interacts directly with a large part of the Swiss Internet users that hold domain names. Future enhancements of the registry service to support IPv6 addresses will significantly raise IPv6 awareness among these, as well as provide opportunities to lead interested users to more information about 6NET results.

2.2.13.4 Means of Dissemination

2.2.13.4.1 Co-ordination Committee Meetings

The "Co-ordination Committee" meeting is a regular one-day gathering to which SWITCH invites representatives of all connected sites. This serves as a forum for informing about updates on SWITCH's service offerings, as well as providing an opportunity to exchange information between the sites. They regularly update their user community on the progress within the 6NET project, in particular concerning intra-site deployment issues.

2.2.13.4.2 IPv6 Web pages

SWITCH has been maintaining Web pages on its IPv6 activities for more than five years, and this well-established site is being continually enhanced to include up-to-date information on SWITCH's 6NET activities.

Reference: <http://www.switch.ch/network/ipv6/>

2.2.13.4.3 "SWITCH Bulletin" Electronic Newsletter

An electronic newsletter is sent to members and some subscribers from the interested public at irregular intervals. This newsletter contains short updates about important events and developments concerning the network. Issues 2001-2 and 2002-2 included announcements concerning 6NET; the former about the 6NET proposal process and the latter about the uptake of operation on 6NET and SWITCH's connection to it. The newsletter reaches a wide audience and is designed to point interested readers to Web pages for more information. For example, the latest 6NET announcement in issue 2002-2 contained pointers to the main 6NET site as well as SWITCH's IPv6 pages.

Reference: <http://www.switch.ch/bulletin/>

2.2.13.4.4 Dedicated Workshops

If and when there is sufficient interest in IPv6 within the user community - stimulated by the dissemination measures mentioned above - SWITCH will hold theme-specific workshops on IPv6-related topics.

2.2.13.4.5 One-to-One Deployment and Assistance

The 6NET participants both at SWITCH and the University of Geneva are also active in the day-to-day operations of their respective networks, and so are directly involved in bringing IPv6 to their users.

2.2.13.4.6 SwiNOG Meetings

The Swiss Network Operators' Group (SwiNOG) is an informal association of Internet Service Providers, focussed on technical issues. It holds meetings about twice a year, as a forum for technical presentations and discussions. SWITCH made a presentation on IPv6 operations issues at the March 2001 meeting. As commercial interest in IPv6 services increases, there will be other opportunities to disseminate specific 6NET results in this forum.

Reference: <http://www.swinog.ch/>

2.2.13.4.7 SWITCH Journal

The SWITCH Journal is a paper publication that is issued approximately twice a year. It is widely distributed within member sites and to a number of outside subscribers.

Reference: <http://www.switch.ch/about/switch-journal.html>

2.2.13.4.8 SWITCH's "Internet Identifiers" Division

SWITCH is working with the technical group of their "Internet Identifiers" division to implement IPv6 support for the domain delegation processes, database, and other registry functions. Once functional, this will be documented on the domain registration Web server, which is used by .CH/.LI domain holders for all data modifications or online subscription payments. They will provide links to additional IPv6 information in the documentation sections of the registration Web site (<http://www.switch.ch/id/>)

2.2.14. ACOnet

ACOnet is the leader of WP3 (Basic network services). ACOnet will have a major role in Vienna's hosting of the IETF meeting in July 2003.

2.2.15. GRnet

GRnet, as one of the NRENs in the consortium, has an important role to the dissemination of information about the project with the presentation of papers in conferences, workshops, and writing papers in journals.

GRnet in cooperation with the other NRENs, exchanges information with the related European and International Research Task Forces (TF-NGN, Internet2). Additional dissemination will be accomplished by distributing publicity material and setting demonstrations in academic events in Greece. In particular such events are planned during 2003 gathering the academic, research and Internet community of Greece, in order to promote IPv6, inform about 6NET's achievements and demonstrate IPv4 to IPv6 migration mechanisms. GRnet has developed a 6to4 relay and other tunnelling services to access the 6BONE and 6NET (the latter only for GRnet institutes). More details are given on <http://www.grnet.gr/6NET>.

These activities will promote the widespread knowledge and awareness of IPv6 and 6NET to the research and academic communities and to the Greek Internet scene in general. GRnet, as the operator of the Athens Internet Exchange (<http://www.aix.gr>), which is the peering point of all commercial ISPs, will exploit the results of 6NET and co-operate with them for the promotion of IPv6 to the commercial Greek Internet. GRnet will also promote IPv6 and 6NET awareness to the

South East Europe research area through linking and co-operating with the SEEREN (South East European Research Networking) project (<http://www.seeren.net>).

Further exploitation is expected to be performed during the 6th Framework Programme by the continuation of 6NET research and development, while education/training based on 6NET results is being planned.

2.2.16. INFN-GARR

The Italian Academic and Research Network carried out the following dissemination activities:

2.2.16.1 Means of Dissemination

2.2.16.1.1 Italian 6NET Web Site

The main site (<http://www.6net.garr.it>) contains all the information about GARR's 6NET activities, network tools and a co-ordination area for Italian partners.

Several Italian local partners (universities and research institutes) are involved in the local 6NET testbed and have realized their own local Web sites, containing information about their own specific activities:

- <http://www.caspur.6net.garr.it>
- <http://www.polito.6net.garr.it/>
- <http://www.unibo.6net.garr.it/>
- <http://www.unifi.6net.garr.it/>
- <http://www.uniroma3.6net.garr.it/>
- <http://www.cnr.6net.garr.it>

These Web sites are available in IPv4 and in IPv6.

2.2.16.1.2 Tutorials

GARR organized 3 IPv6 tutorial during the last quarter of 2002, in Turin, Rome and Florence. Usually, a tutorial is divided in two parts: a tradition tutorial during the first day and a "IPv6 Live session" with hands-on experience in configuration, routing, services and mobility for all the people attending the tutorial.

The number of participants was 70 for the first event, 90 during the second one and 120 during the last one.

The Rome tutorial was also transmitted live over the Internet using streaming media technologies. The archives are available on-line at: <http://www.6net.garr.it/tutorial/>

2.2.16.1.3 Press

GARR wrote a press release about their participation in 6NET.

Other news has been published in specialized press releases.

The public national radio station carried out an interiew about 6NET and IPv6:

<http://www.radio.rai.it/grr/tema/vediuna.cfm?CodeNot=15274>

2.2.16.1.4 Conferences

GARR made presentations on 6NET and IPv6 during the 4th GARR-B Workshop: "Applications and Advanced Services on the Next Generation GARR Network", held in Bologna 24-26 June 2002.

2.2.17. University College London

Members of the University College London are recognised experts in the IPv6 field, and, through their contacts, facilitate liaison with other IPv6 initiatives, worldwide.

2.2.18. University of Southampton

The Department of Electronics and Computer Science at the University of Southampton has been running IPv6 since 1996/97, and is currently involved in a wide range of IPv6 projects. In the context of the EU 5th Framework Programme, those projects include 6INIT (completed), 6WINIT (finishing January 2003), 6NET, Euro6IX, 6LINK and the IPv6 Task Force Steering Committee. In the UK, the department is active in assisting UKERNA in deploying IPv6 in the UK academic community, and in building the UK IPv6 Task Force. The University of Southampton also acts in an advisory capacity for - and gives presentations and workshops to - various UK groups, eg. at the UKUUG (Unix Users Group) Winter Conference 2003.

UoS uses a number of dissemination routes to promote 6NET, including:

- active contribution to the IPv6 Cluster, as a partner of 6LINK and various European projects
- active contribution to the EU and UK IPv6 Task Forces
- membership of the IPv6 Forum, and presence on the Forum's Technical Directorate
- attendance of - and collaboration with - Internet2 events and IPv6 partners
- active role in the deployment of IPv6 in the UK academic network (JANET)
- active role in IPv6 experiments for GÉANT (chairing the TF-NGN IPv6 WG)
- publishing IPv6 papers, eg. at the IEEE SAINT 2003 Conference in Orlando, Florida, January 2003
- IPv6 presentations and workshops for external groups
- IPv6 advisory role for external commercial groups
- attendance at IPv6 Forum events

The usage plans of UoS include:

- development of IPv6 testbeds and experiments in areas including IPv6 multicast (on the m6bone) and Mobile IPv6 (a local testbed)
- local deployment of IPv6 to 1'500 potential users in the Department
- development of IPv6-enabled applications (including porting work on the Vocal VoIP package and the Globus Toolkit)
- promoting IPv6 use in other related research projects in our Department
- using IPv6 in pervasive computing and GRID environments
- using IPv6 in campus Wireless LAN environments
- attendance at the IETF, and contribution to IETF standards
- establishing new IPv6-related research projects under the IST 6th Framework Programme

2.2.19. University of Lancaster

ULANC uses the following dissemination routes to promote 6NET:

- Participation in the UK IPv6 Task Force
- Giving IPv6 tutorials - the most recent tutorial was on Mobile IPv6 and IPv4/IPv6 transition given at Telekom Austria

- Conference / workshop participation: e.g. Presentation at the JANET Network Access Conference in January 2003
- Publishing papers (a paper has been submitted to the IEEE Internet Computing Special Edition on IPv6)
- Web site: Maintenance of the UK IPv6 Resource Centre

2.2.20. Telematica Institute

TELIN present their 6NET work at conferences, and actively disseminates the objectives of 6NET within their own community (see www.telin.nl).

TELIN uses the knowledge obtained in 6NET with respect to the status of IPv6 deployment on both the network and the application layer in its joint projects with various partners, ranging from vendors, mobile network operators and ISPs to end-user communities.

They are promoting 6NET as an opportunity to link national testbed-programmes on advanced networking with international parties.

2.2.21. UNINETT (Assistant Contractor to NORDUnet)

2.2.22. CSC/FUNET (Assistant Contractor to NORDUnet)

2.2.23. Polytechnic Institute Oulu (Assistant Contractor to NORDUnet)

2.2.24. University of Oulu (Assistant Contractor to NORDUnet)

2.2.25. Invenia Innovation (Assistant Contractor to NORDUnet)

Invenia Innovation is convinced that the success of IPv6 will depend largely on the smooth running of Application Level Gateways, and DNS issues related to migration. They have a long established IPv6-only network, and together with the Department of Computer Science at the University of Tromsø, Norway, they use this network to give students first hand experience with IPv6-only networking. They continuously work to understand how to best present the issues involved, and how to structure the software that needs to be installed.

By running an ever-growing IPv6-only network, their community effort is geared towards finding and fixing all the fine details in software that was originally written for IPv4.

2.2.26. Westfälische Wilhelms-Universität Münster (Assistant Contractor to DFN)

The Westfälische Wilhelms-Universität Münster (WWU) runs the JOIN project. This project deals exclusively with IPv6 and acts as an IPv6 competence and reference centre for Germany and the German research and education community. The project is executed on behalf of the German research network (DFN), Germany's NREN.

One of their main goals is the propagation and distribution of IPv6 in the German R&E facilities. Accordingly, they develop solutions to migrate to IPv6 for a large range of possible network scenarios. Likewise they actively help R&D facilities to integrate IPv6 into their network, software and management environment. Their goal is to share knowledge and gain experience in the 6NET project. WWU(JOIN) also have other strong partners to communicate results with, such as Deutsche Telekom or other European NRENs in TF-NGN. To share knowledge with 6NET partners and any R&E institution, they disseminate the results by means of instructional and documentary papers, at conferences and in self-organised introductory workshops.

Apart from Germany's 6BONE backbone node, JOIN also operates the national IPv6 test network of DFN called 6WiN, which establishes connections to German R&D facilities and to 6NET. It is a

large scale network - quite similar to the 6NET core - which can be used for further tests of routing protocols, management strategies and to gain operational experience.

2.2.27. Fraunhofer Gesellschaft (Assistant Contractor to DFN)

The initial objective for dissemination and use was to announce the start of the project and to raise awareness of its aims, objectives and scope. It was also intended to encourage interested parties – particularly those involved in related projects and initiatives – to find out more about the project’s work.

2.2.27.1 Exploitable Results

A main value for FhG Fokus on the technical side is to advance their understanding and operational experience of the IPv6 technology implemented in a large-scale IPv6 network. There are four significant areas, which are of main interest for FhG Fokus in this respect:

2.2.27.1.1 Mobility

Mobility is a significant area of attention in 6NET. The testing and evaluation of Mobile IPv6 functionality as an integrated part of the IPv6 protocol is of utmost importance. FhG Fokus provides one of the most advanced Mobile IP platforms. Based on the work and experience to be gained during 6NET, their Mobile IPv6 platform will be further extended with IPv6 specific security enhancements. Further, a major output is the knowledge and experience gained about the appropriate integration strategy for deploying Mobile IP in IPv6 networks.

2.2.27.1.2 VoIP Demonstrator

A VoIPv6 capable infrastructure based on SIP will be provided. Appropriate translation and mechanisms enabling the co-operation of IPv6 and IPv4 users will be developed and investigated.

2.2.27.1.3 WLAN

Wireless LAN access currently shows an explosive growth worldwide. Support of IPv6-only WLAN access will be an important step to the provision of IPv6 “end-to-end”. Mobile IPv6, AAA and performance issues with respect to header compression techniques and TCP improvements will be treated.

2.2.27.1.4 AAA Infrastructure

An evaluation of the issues relating to AAA within an IPv6-only wireless LAN is of particular importance.

In all of these fields, 6NET will allow FhG Fokus to develop its expertise on these technologies. Also, practical experience gained in deploying - and interworking between - these technologies on the basis of a large-scale IPv6 network will enable FhG Fokus to take part in realizing the next Internet generation.

2.2.27.2 Exploitation and Dissemination Strategy

During the last few years FhG Fokus has established strong connections to different companies and potential customers in the area of Mobile IP and VoIP. The results of 6NET in the form of knowledge and innovative components will further enhance these relations. For future business, FhG Fokus is targeting customers such as operators, ISPs and further research opportunities.

2.2.27.2.1 ISPs and Networks Operators

Network operators are aiming at expanding their service with roaming and mobile computing services as well as VPN and secure communication support. FhG Fokus has a close relation with Deutsche Telekom as a network operator and the German research network (DFN) as an ISP.

Collaboration has involved investigation and evaluation of the usage of Mobile IP as the basis for supporting mobile communication. In these cooperations FhG Fokus has provided technical support, products, prototyping and consulting as well as research in innovative areas such as AAA and QoS.

Based on the expected results of 6NET, such collaborations are expected to be intensified in the area of security and provide thereby a missing cornerstone that would enable those ISPs and operators to support not only for mobile but also for secure communication. The knowledge gained and components realized in 6NET will build the basis for joint projects between FhG Fokus and 3G network operators in which FhG provides consulting, research and prototyping.

2.2.27.2.2 Research Projects

FhG Fokus is currently engineering a proprietary [UMTS testbed and development environment](#) which is a division of their 3Gb test lab, specializing in network technologies such as Bluetooth, WLAN 802.11a and 802.11b, fixed Internet, GSM, GPRS, UMTS FDD and TDD, Satellite IP and DVB-T. One main purpose is to create and implement a seamless all-IP based communications infrastructure for the development of mobile services and applications. The FhG Fokus UMTS testbed is designed as one of the Berlin UMTS cells of T-Mobile Deutschland. For increased capacity, it may be linked with other cells, thus providing the testbed user with a fully seamless infrastructure. The work dedicated to this item as well as the experience gained in this context build the cornerstone for supporting further work on transparent mobility enabling technology for UMTS and IPv6 based wireless LAN and fixed networks.

The [IPv6 Showcase](#) is an IPv6 pilot trial of Deutsche Telekom (T-Systems), which provides high quality nationwide IPv6 network access to companies and other interested parties such as universities and research organizations. Additionally, IPv6 services and applications, and access to the other national and international IPv6 networks, will be made available.

Some of the main research subjects of FhG Fokus in the area of mobile communication are directed towards providing all-IP VPNs based on Mobile IP. 6NET provides some of the major building blocks for supporting such a service namely security and Mobile IP components. The work to be done in 6NET as well as the expected experience will present a basis for this work.

The results will be presented in conferences and used as input for standardisation groups.

In 2002, FhG has:

- built a 6NET Web site as part of the presentation of the FhG Fokus institute on the Web (see www.fokus.gmd.de/research/cc/mobis/projects/6net/). It is intended to extend this Internet presence to allow for basic access / test of IPv6 services (reachability and connectivity tests, FhG Fokus IPv6 testbed status, Mobile IPv6, IPv6/IPv4 telephony)
- participated in the DFN-Betriebstagung (12-13 Nov 2002) where we presented FhG Fokus' contribution to the 6NET project: "Mobile IPv6 und SIPv6 in 6NET". The slides are available at: www.dfn.de/dfn/dfn-bt/vortraege.

2.2.28. Computer Technology Institute (Assistant Contractor to GRnet)

The Research Academic Computer Technology Institute (CTI) is a research institute supervised by the Greek Ministry of Education & Religious Affairs. CTI collaborates with public and private constitutions, universities and educational constitutions of the country. Moreover, it can set up branches in Greece and abroad, receive loans and furnish postgraduate and postdoctoral scholarships.

In the context of 6NET, CTI disseminates 6NET results by publishing papers in International Journals and Conferences. In addition CTI has a close relationship with the University of Patras and

the Greek School Network, and as result CTI disseminates the 6NET results within the Greek academic community, which will benefit from the new capabilities of IPv6. Moreover CTI, through its participation to the 6NET project, is supporting one PhD postgraduate student and one MSc postgraduate student, who conduct research in IPv6. In addition CTI provides first-line support both to end users and business users (for example Greek ISPs) in the area of IPv6 real time applications and QoS.

2.2.29. DTU (Assistant Contractor to NORDUnet)

2.2.30. INRIA (Assistant Contractor to RENATER)

2.2.31. UNIVERSITÉ LOUIS PASTEUR (Assistant Contractor to RENATER)

In the context of the 6NET project, the Université Louis Pasteur (Strasbourg, France) is represented by members of the Networks and Protocols Team of the LSIIT laboratory (UMR 7005 CNRS-ULP). The Centre Réseau et Communication (CRC - Networking and Telecom Center) which is the operator of the academic metropolitan network OSIRIS is also involved in the project. In particular, the OSIRIS network already offers a native IPv6 Internet connection to interested faculties, departments and laboratories on the university campus. Through the university participation in 6NET, there is a strong intention to promote the adoption of IPv6 within the OSIRIS network.

In parallel, the university has already a number of activities around IPv6. The computer science department proposes a teaching module at Master level, which includes IPv6, Mobile IPv6 and BGP4+, and a graduate course including IPv6 in its PhD program. A wireless IPv6 infrastructure is currently being deployed in partnership with France Telecom in order to evaluate the benefit of wireless technologies and IPv6, and also to gain knowledge in such a deployment. The university is also willing to extend its partnerships with local companies to promote the use, evaluation and adoption of IPv6.

Finally, the Networks and Protocols Team conducts a number of research projects around IPv6 with students at both PhD and Master levels. Results from these projects are made available through journal papers, conferences and workshop. The team has also already proposed a draft document (draft-jelger-mssmsv6-00.txt) to the IETF standardisation body. This draft proposes a number of mechanisms that support the construction of multicast source rooted trees (SSM) when the source is an IPv6 mobile node. The 6NET network will eventually permit to test and validate these mechanisms.

2.2.32. PSNC

PSNC has a wide experience of the deployment of new multicast protocols such as PIM, MSDP and SSM on a large scale, and co-operates with a local radio broadcast station to offers high quality multicast services to end users. It also has experience in the development of advanced applications (network monitoring and management (SNMP IPv4 <-> IPv6), archiving, distributed computing, web services, security tools). They will build an open source IPv6 enabled application for multicast media streaming transmission, called *MCast6*.

2.2.33. CESNET

CESNET addresses the performance and configuration weaknesses of PC-based IPv6 router implementations, by developing a hardware accelerator for IPv6 routing and related functions in the form of a PCI board using programmable gate arrays (FPGA). They also provide the project with a comprehensive public repository of IPv6 open source software, and operate an on-line version

control system (CVS or similar) for most software development, documentation and configuration activities.

2.2.34. HUNGARnet

2.2.34.1 Means of Dissemination

2.2.34.1.1 Web Site

The Hungarian 6NET Web site (<http://6net.iif.hu>) contains all the information about HUNGARnet 6NET activities and network tools. The Web site is available in IPv4 and will be available in IPv6 by the end of January 2003, when the new server will be operational.

2.2.34.1.2 Tutorials

HUNGARNET and ISZT organized an IPv6 tutorial for ISPs on 2nd December, 2002: "IPv6 basics for ISPs". This was presented by Janos Mohacsi at CoHIP (Council of Hungarian Internet Providers) in Budapest.

2.2.34.1.3 Press

NIIF/HUNGARnet wrote a press release about HUNGARnet's participation in 6NET. This was distributed in the NIIF newsletter and posted to more than 700 HUNGARnet member institutions (see: <http://www.niif.hu/index.php?headline=ures&text=hirlevel.html&nomenu=1>).

3. Conclusion

As seen by this version of the Dissemination and Use Plan, the plans of the 6NET partners to promote the project and exploit the availability of this large-scale wide area test facilities for the testing, validation and demonstration of applications, services and features associated specifically with the new IPv6 technology are becoming ever more concrete. These experiments will build upon the infrastructure provided by the dedicated resources of the GÉANT network.

The scientific and technical prospects for the project are excellent, with exploitation routes directly into the development departments of major industrial companies, and key people and organisations in the standards arenas. The synergy with GÉANT optimises the EC economic investment in this network, and the results will be widely disseminated, giving high visibility to the partners and the EC alike.