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Abstract:

The deliverable defines the approach followed by the 6QM consortium towards dissemination of project results into target communities, and strategies for the wide application of project results in the European research community.

The QoS measurement technology developed with in the 6QM project will provide key components to support the uptake and transition towards IPv6 technologies in Europe and worldwide.

Keywords:

Dissemination of Project Results, IPv6, Measurement Infrastructure, Measurement Methods, QoS Measurement.

Revision History

The following table describes the main changes done in the document since created.

Revision	Date	Description	Author (Organization)
v1.0	14/11/2002	First Version Proposal using Project Template	Rudolf Roth (FOKUS)
v1.1	28/11/2002	Some Supplements to chapters	Rudolf Roth (FOKUS) Lidia Yamamoto (HEL)
v1.2	02/12/2002	Text rearrangement and new inputs	Jordi Palet (Consulintel)
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v2.1	11/12/2002	Update FTRD dissemination part	Emile Stephan (FTR&D)
v2.2	16/12/2002	Minor changes and PSC Review	Jordi Palet (Consulintel)

Executive Summary

This document describes the approach undertaken in the project 6QM to the dissemination of project results into the target communities, and lists activities for creating broad public visibility to project results. The Dissemination Plan is detailing the opportunities planned to be taken by the 6QM consortium, and each partner's plan to exploit project results.

The project consortium anticipates that wider application of our results will provide key functionality to support for a fast transition towards IPv6 infrastructures. Given the impact and relevance of the issues addressed by the 6QM project, the consortium considers the task of dissemination as highly important.

In order to ensure that all information reaches its intended audience, the project has planned for a comprehensive communication strategy that addresses the particular information needs of each of its target customer groups. The project will produce material and documentation tailored to their specific information requirements. This input material is forwarded in the appropriate information channels and to industrial fora to ensure broadest diffusion.

In addition to producing information content and making it accessible through the project website, 6QM adopts an pro-active role in disseminating its outcomes by participating in the organization of events and through presentations at conference, workshops and coordination meetings where project results will be discussed with a wider audience.

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1. INTRODUCTION

6QM develops strategically important functional components that help in leveraging a fast deployment and migration to IPv6 based infrastructures. In order to achieve a broadest reception of project outcomes, it is of paramount importance to carefully plan for activities that guarantee a fast and focused circulation of results into relevant fora and communities. The document specifies activities performed by the 6QM consortium for insuring that project results reach its target communities. High emphasis is put on forming synergies and cooperation with other IST activities and an integration into the broad integrated initiatives for IPv6 technologies funded by the European Commission.

6QM will create a comprehensive approach towards the measurement of QoS parameters in IPv6 based network infrastructures. For this purpose it will analyze the specific requirements of the problem space and derive a proposal for a consistent approach. The work performed will include the design of the measurement architecture, a prototypical realization of the system and a demonstration of the technology in real-world scenarios and realistic settings.

6QM lies at the intersection of three core research areas. It interlinks research that is performed in the area of IPv6 based infrastructures, network measurement technologies and QoS services. Given its particular position the project acts as an information exchange that lends itself towards interdisciplinary cooperation and synergies.

This document outlines the strategy taken by the project consortium to disseminate the results of the IST project 6QM. It is organized as follows:

Section 2 identifies the particular nature of the project research work and its expected results. It places them in wider context in order to derive suitable means and a communication strategy for target communities. In section 3, we will identify a set of groups, which should be targeted by project dissemination efforts, and detail their specific information needs. Section 4 describes IST project cluster activities of relevance for 6QM and characterizes potential co-operation and liaison partner projects. Section 5 presents industrial fora working on 6QM related topics, which have been identified as main dialogue partners for the usage of project results. Section 6 presents an overview on active groups of international standardization bodies working on issues addressed by 6QM, where it is expected that 6QM can contribute substantial input. Section 7 identifies high profile conferences and workshops that provide the appropriate means for the fast diffusion of 6QM results to the research community. Section 8 will show the different means that are used for dissemination towards specific groups and specifies the documentation material produced in the project to help in furthering and advancing a successful deployment of 6QM based measurement systems. Section 9 specifies the detailed dissemination and use plan per project partner explaining the use of project results within their own business strategies. Section 10 lists dissemination activities already done to-date by the project consortium.

2. DISSEMINATION STRATEGY FOR 6QM

The deployment of a Europe-wide IPv6 networking infrastructure supporting co-operative Research and Development across Europe belongs to the key strategic objectives of the Fifth Framework Programme of the EC. At the Barcelona Council in March 2002, Europe's leaders awarded priority status to the development of IPv6. This was followed in June by a call on Member States from the Telecommunications Council to take further steps towards the deployment of IPv6. A cluster of projects developing IPv6 related technologies has been set up with in the IST programme.

For the transition process towards native IPv6 networks to gain momentum, it is necessary to bring together a critical mass of networking infrastructure and to demonstrate the efficiency and maturity of the supporting technology required for the operation of the next generation networks. Project results from 6QM will constitute valuable contributions for the realization of such an advanced infrastructure that helps to put Europe in a position to play a leading role in defining the next generation of networking and application technologies.

The 6QM project specifies a QoS measurement architecture suitable for IPv6 networks that allows the validation of network performance and quality of service expected by the client. It generates guidelines for the usage of such systems and analyses IPv6 QoS measurement concepts in different scenarios. The IPv6 QoS measurement system is implemented as a prototype and tested in real IPv6 network environment.

Given the relevance of the issues addressed in the project, a comprehensive approach must be adopted for:

- Guaranteeing visibility of project achievements.
- Establishment of synergistic cooperation with other projects and working groups.
- Accomplishing wide dissemination to industry and scientific community.
- Ensuring successful exploitation of the research results by project partners.

The strategy for creating maximum awareness will comprise the following tasks:

- Identification of main target groups of project results.
- Production of documentation and material for target groups tailored to their specific information requirements.
- Identification of distribution channels, multipliers and key events for dissemination opportunities.

In addition to producing information content and making it accessible through the project website, 6QM will adopt an active role in disseminating its outcomes by co-organizing workshop events and through participation in other events where project results will be presented and discussed with a wider audience. The dissemination plan, in this report, list opportunities that will undertook by the project consortium to reach its target communities.

3. TARGET AUDIENCES

The activities and results produced by 6QM are of interests to various communities. Target groups for the dissemination of 6QM results are identified. Depending on their relation to the work carried out by 6QM and their particular information interests, tailored communication strategies are being developed and there is a planning for means of interaction between these groups and the 6QM consortium to ensure that each group will be reached appropriately.

The major dissemination groups comprise:

- Experimenters and researchers from other IPv6 projects performing experimentation of QoS sensitive application over IPv6 infrastructures.
- Network Engineers operating IPv6 enabled networks, including:
    - GEANT and the European national and regional research networks.
    - Large Campus Networks and networking research institutes.
    - Commercial operators of fixed and mobile networks, ISPs.
- Managerial and policy decision boards of network operators.
- Vendors and implementers of networking equipment and software, tools for monitoring and measurement.

In the starting phase of the project special emphasis of dissemination activities will lie on the setting up of liaisons with other research groups and projects to plan for common experimentation activities. For this activity we can foresee two levels of cooperation. For a small group of select projects, it is planned to establish a close cooperation that includes a joint planning of experimentation on a shared networking test-bed. After successful demonstration of the measurement system, at least suitable parts of the system will be offered to other groups who volunteer to act as beta-testers for the 6QM system. Such cooperation serve the mutual benefit as it can help them in their experimentation and allows the 6QM consortium to receive feedback on the usability of the 6QM approach.

The next groups to be addressed for liaisons are network engineers and operational staff from various networking infrastructures. On one hand it is necessary to receive input on requirements for QoS measurements derived from their operational tasks but also to discuss with them the approach developed within 6QM. In this field we regard research networks and operators of large university networks as early adopters of new emerging technologies, where we expect a higher willingness to engage in experimentation of new approaches. However also commercial operators will be addressed and we anticipate especially in the area of mobile 3G networks a pressing need for 6QM related technologies. For these tasks they need education, training and technical reference material; they require a supporting environment and tools for troubleshooting and monitoring.

The dialogue with network operators will not be restricted to exchanges between technical experts. In order to create a better awareness for the problem field addressed by 6QM, special documentation and information material will be produced that discusses the 6QM approach in a wider context and highlighting issues such as potential implications on business practices and the interoperation between operators. The managerial and policy decision boards of network operators have to decide on investments and allocation of capital and human resources in their network, they make choices on the introduction of new technologies and services within their own domain and they have to find consensus among the interconnected networks, to come to a

common understanding and establish common practices. This decision process must be based on firm technical evidence and there is a need for thorough validation and clear assessment of potential risks. The recommendations derived from the experience gained in 6QM can help them to make informed decisions on their own policy towards IPv6 QoS measurement.

Vendors and implementers of networking software, router equipment and tools for monitoring and measurement, have commercial interests in 6QM results. In particular we see here the need for standardization, definition of common interfaces and agreement on data formats and protocols. Various components from different vendors have to interoperate to allow for the configuration of measurement equipment, result collection and analysis and export across domain boundaries.

4. POTENTIAL COOPERATION WITH PROJECTS AND CLUSTERING

Within the IST Programme, projects are encouraged to work together, to pool and to collectively build on their individual results whenever it makes sense to do so. Given the specific topics addressed by 6QM there are three natural clustering groups of projects that fall into the scope of 6QM.

Foremost, there are the coordinated activities of IPv6 related projects. These projects provide the closest cooperation partners. Especially they provide the opportunity to develop common testing scenarios, where 6QM is deployed with the cooperation project test-bed to demonstrate the feasibility of the 6QM approach and provide validation data of their experiments of IPv6 based applications.

Besides there is a natural cooperation with other projects operating in the field of QoS services and working on the development of monitoring and measurement technology. Even in cases where there is no specific commitment towards IPv6 networks it is expected to exist enough overlap to warrant for exchange of information and ideas and for the coordination of approaches.

The following section lists potential cooperation partners of other on-going IST projects. In some cases there are already established informal links between projects through common partner involvement that guarantees a flow of information between those activities. For those projects that there will be closer cooperation and common experimentation a memorandum of understanding will be established at later stages of the project lifetime to formalize the cooperation.

Besides the currently running projects 6QM will have the opportunity to engage in cooperations with newly starting activities within the 6th Framework. The 6QM consortium will closely monitor those developments and will set up links to relevant projects and Network of Excellences as soon as those new instruments will have been implemented and become operational.

4.1 IPv6 Cluster Activities

At the Barcelona Council in March 2002, Europe's leaders awarded priority status to the development of IPv6. This was followed in June by a call on Member States from the Telecommunications Council to take further steps towards the deployment of IPv6.

The European Commission Information Society Technologies Programme is funding a number of projects with a focus on IPv6 research and development activities. A large set of projects is addressing different technical aspects related to IPv6 (e.g. IPv4 to IPv6 transition, Quality of Service, etc.). It includes IPv6 Projects that have a particular emphasis on IPv6, with the main goal being the research and development related to the protocol itself and projects than can be called IPv6 Related Projects, which are employing IPv6 as part of their broader goals.

4.1.1 IPv6 Cluster and Supporting Projects

An IPv6 cluster has been formed involving all IPv6-related IST projects. In addition, three special projects were started in 2002, as accompanying measures to the research and development projects.

The 6LINK project was designed in order to support the IPv6 Cluster activities, via consensus building, dissemination on consensus agreements and exploitation of the consensus.

Eurov6 (the European IPv6 Showcase) has as principal objective to show the usage of IPv6 products and services and their impact to anyone, at anytime, by the means of fixed and nomadic showrooms.

IPv6 TF-SC's (IPv6 Task Force Steering Committee) main goals are to discover and fill gaps, provide strategic guidance with the assistance of a number of industry and academic players, to quickly propose measures to the appropriate bodies, to involve the European Commission and to verify sustained activities and implementation of proposed measures, towards the global deployment of IPv6.

Both Eurov6 and the IPv6 TF-SC include special liaison with similar international initiatives, in order to raise political and industrial awareness related to IPv6 on a global scale.

The IPv6 Cluster has issued the booklet 'IPv6 Research and Development in Europe' that provides information and references to 31 projects organized in the IPv6 cluster. 6QM is actively participating among the various activities at the level of an IPv6 cluster, especially considering that several 6QM partners are also part of 6LINK.

4.1.2 6NET & Euro6IX

Two large very scale experimentation platforms are investigating the real deployment of IPv6. 6NET and Euro6IX, started in January 2002, are building dedicated, native, IPv6 networks, involving National Research and Education Networks, telcos and ISPs, in a complementary approach, and considering other aspects like applications and Internet Exchanges.

6NET is a three-year European project aims to help European research and industry play a leading role in defining and developing the next generation of networking technologies. The project builds a native IPv6-based network with both static and mobile components in order to gain experience of IPv6 deployment and migration from existing IPv4-based networks. This will be used to extensively test a variety of new IPv6 services and applications, as well as interoperability with legacy applications.

Euro6IX project will research, design and deploy a native pan-European IPv6 network, called the Euro6IX test-bed. It will include the most advanced services obtainable from present technology and will follow the architecture of the current Internet (based on IPv4). It will consider all the levels needed for the worldwide deployment of the next generation Internet.

Several partners of 6QM participate either in 6NET or Euro6IX projects, and we expect a number of collaboration activities carried out between all these projects. In addition, 6QM will use these networks as backbone to connect several 6QM trials and to interconnect to other IPv6 networks or projects.

4.1.3 IPv6 Projects

Starting in January 2000, 6INIT was one of the first attempts to validate the introduction of IPv6 technology in Europe.

GCAP studied multicast and QoS based on IPv6 and DiffServ in relation to active networks technology.

The goal of the WINE project was to build fully IPv6-based globally optimized wireless Internet environments with QoS awareness.

In December 2000, LONG was initiated with the aims to foresee and solve problems related to the design, configuration and deployment of IPv6, especially when new services and applications are involved.

6WINIT continues the work done in 6INIT, but with an emphasis on wireless access and IP mobility, combining IPv6, GPRS, and 3GPP/UMTS.

The SATIP6 project started in March 2002 and examines the technical issues facing satellite broadband access in the coming years, including adaptation of DVB-RCS for IP and IPv6 introduction.

OverDRiVE is aimed at UMTS enhancements and the coordination of existing radio networks into a hybrid network to ensure spectrum efficient provision of mobile multimedia services, based on the IPv6 architecture.

6POWER started in July 2002 with the main goal of contributing to ensure affordable broadband access and the deployment of IPv6 in Europe, using Power Line Technology, and advanced network services such as QoS and multicast.

6HOP studies how multi-hop heterogeneous wireless IPv6 networks can support mobility of users, packet routing and adaptation to varying link conditions.

4.1.4 Other IPv6 Related Projects

DRiVE, started in April 2000, is aiming at enabling spectrum-efficient high-quality wireless IP in a heterogeneous multi-radio environment to deliver in-vehicle multimedia services, including the design of an IPv6-based mobile infrastructure that ensures the inter-working of different radio systems.

HARMONICS proposes a common dynamically reconfigurable fibre infrastructure, deploying flexible wavelength routing integrated with flexible time slot allocation in a new Medium Access Control protocol.

ANDROID is an Active Networks project, started in June 2000, whose aim is to design a means of managing active services through the use of policies. Several IPv6 application layer software modules are being developed.

The overall aim of the CRUMPET project is to implement, validate, and trial tourism related value-added services for nomadic users (across mobile and fixed networks).

NGNi's prime mission is to establish an appropriate infrastructure to operate the first European open environment for research organizations and industry to investigate a broad range of topics and issues covering NGN evolution, and create opportunities for strategic discussions on a global scale.

NGN-LAB establishes a platform for the development of advanced Internet technologies, Moby Dick, started on January 2001, develops, implements, and evaluates an IPv6-based mobility-enabled network architecture with Authentication, Authorization, Accounting and Charging (AAAC) services and support for Quality of Service (QoS), in order to continue the evolution of the 3rd generation mobile and wireless infrastructures towards the Internet.

TORRENT is building a test-bed for multi-service residential access networks that will allow the project to demonstrate the benefit of intelligent control, both for the customer and for the network operators and service providers, with applications based on IPv6.

MIND takes as starting point the concept of an IP core, accessed by a variety of technologies. Research is conducted in the areas of services and applications, the access network architecture and the air interface. The project investigates new business models for "systems beyond 3G", mapping the value chain into the functional entities.

@HOM, started on September 2001, is dedicated to the promotion of broadband home networks and the proof of concept of open, end-to-end and seamless network architecture, with the objective to provide citizens with the emerging IP-based broadband services. Will include an IPv6 test-bed demonstrator.

The FUTURE HOME project will create a solid, secure, user friendly home networking concept with open, wireless networking specifications and will introduce usage of IPv6 and Mobile IP protocols in the wireless home network

WirelessCabin project is developing wireless access technologies for aircraft cabins.

xMOTION will specify and test requirements emerging from the nature of safety and security providing organizations operating in varying degrees of emergency (in particular communication and information needs).

SEEREN, started in October 2002, is aiming at easing the 'digital divide' that still separates most of the South Eastern European countries from the developed world, expanding GÉANT reach.

MESCAL will start in November 2002, and aims to propose and validate scalable, incremental solutions that enable the flexible deployment and delivery of inter-domain Quality of Service (QoS) across the Internet, applicable for both, IPv4 and IPv6.

4.2 QoS Project Cluster Activities

There are a number of IST projects addressing QoS aspects. The three projects AQUILA, CADENUS and TEQUILA acted here as sort of focal point for activities related to IP QoS and Premium IP Service, and their common workshops helped to create a forum for information exchange between IST projects working in this area.

4.2.1 AQUILA

AQUILA is specifying, implementing and evaluating an enhanced architecture for dynamic end-to-end QoS guarantees over IP networks that addresses both, intra- and inter-domain aspects. The main innovation of the architecture is the addition of a new layer on top of the DiffServ network, referred to as the Resource Control Layer (RCL) providing a QoS middleware for the intelligent management of network resources, acting as a distributed Bandwidth Broker in the DiffServ environment while offering scalable and dynamic end-to-end support for QoS including the end-user-hosts in the middleware.

4.2.2 CADENUS

The objective of CADENUS is to define an integrated solution for the creation, configuration, and provisioning of end user services with QoS guarantees in Premium IP networks. The project

defined a logical architecture that partitions the functionalities in a few major packages: an Access Mediator, a Service Mediator, and a Resource Mediator. The current release of the CADENUS framework supports 2 major functional areas, namely service negotiation/ trading and service configuration. CADENUS promotes a Multiple-Layer, Policy-Based approach, with particular attention to the policies repositories used at each layer; and automatic configuration at the network and device level.

4.2.3 TEQUILA

TEQUILA (Traffic Engineering for Quality of service in the Internet at Large) has as primary goal an integrated architecture and associated techniques for end-to-end QoS delivery in a DiffServ-capable IP network. The project deals with both service and resource management aspects and their inter-relationship. Multi-Protocol Label Switching and IP-based techniques for traffic engineering are investigated. TEQUILA specifies a formal definition of a Service Level Specification (SLS) template, enabling the unambiguous definition of a value-added IP connectivity service. The architecture distinguishes between customer (SLS) aware components and resource (QoS class) aware components, and introduces a two-level approach for operational service management, i.e. service subscription and service invocation.

4.2.4 COST263: Quality of future Internet Services

COST 263 has as objectives to coordinate from a European perspective concerted actions among participating organizations and research groups being active in the field of the Quality of Internet Services; to establish and maintain the technical programme in the area of QoIS, aiming at research, technical and engineering improvements of the quality of existing and emerging Internet services; and to enable coordinated contributions of European participants to the Internet-related standards making organizations, mainly IETF.

COST 263 is organizing the yearly workshop series of QofIS – Quality of future Internet Services.

4.3 Monitoring and Measurement Cluster Activities

The IST MoMe Project cluster coordinates activities between projects active in the area of monitoring and measurement. Currently participating projects comprise CADENUS (see QoS cluster), INTERMON, AQUILA (see QoS cluster), NGNI, ATRIUM. Through partners' involvement in this cluster, 6QM will be represented in future coordination activities between those projects.

4.3.1 INTERMON

INTERMON will develop and demonstrate a scalable inter-domain QoS architecture with integrated monitoring, topological and geographical structure mapping, modeling, simulation, optimization and visual data mining components using common distributed QoS database with intelligent agents for management of component's interworking and automated processing of different kind of inter-domain QoS information (inter-domain QoS, traffic, resource, events).

The focus is to offer to Internet service providers (ISP), QoS enabled end system developers and application users, an integrated inter-domain QoS analysis architecture for the purpose of operative control, planning and optimization, e.g. monitoring and modeling information for long-term trends and short experiments on inter-domain QoS and traffic behavior of application classes.

4.3.2 NGNI

The main objective of this initiative is to encourage the interested groups of NGN activities around the world for harmonized and smoother transition to the next generation networks to provide seamless services with high security, quality and performance in creating the future information society.

Activities related to 6QM topics include the Traffic Measurement & Monitoring Roadmap and QoS Roadmap.

4.3.3 ATRIUM

ATRIUM (IST-1999-20675 - A Test-bed of Terabit IP Routers running MPLS over DWDM) will provide the research community with an advanced terabit router (ATR) test-bed. Its objective is to design, assess and experiment with a set of unified traffic management algorithms and protocols necessary to operate successfully such an ATR in an MPLS- and DiffServ-capable AS (Autonomous System). It aims to prototype and assess a generic set of traffic engineering tools and protocols necessary to allow such an ATR to operate as a border router interconnected with other ASs with similar capabilities.

4.3.4 SCAMPI

SCAMPI is developing a scaleable monitoring platform for the Internet. It aims to promote the use of monitoring tools for improving services and technology. The project will develop a network adapter, initially at 10 Gbps speeds, tailored to the needs of monitoring tools. This includes development of an open and extensible monitoring architecture to support a secure and programmable-shared monitoring infrastructure. It will also investigate the technical challenges of developing monitoring systems for 100 Gbps speeds and beyond.

4.4 Networks for Research

4.4.1 GÉANT and TF-NGN

GÉANT is the pan-European backbone interconnecting 28 NRENs (national and regional research and education networks) in Europe and providing connectivity to other research networks worldwide. In December 2001, the GÉANT network became operational offering core network capacity at 2.5-10 Gbit/s.

GÉANT activities include an associated research program exploring technologies viewed as strategically important for the NRENs and GÉANT and investigate their suitability for future implementation in research and education networks in Europe. These activities are performed by TF-NGN the Task Force for Next Generation Networking that is jointly managed by TERENA and DANTE.

The GÉANT technology roadmap for 2003 includes among other topics on-going research in the area of QoS services and IPv6 support over GÉANT, a newly started activity explores monitoring and measurement infrastructure for the research networks.

Through previous involvement of 6QM partners in preceding research projects there already exist close links into this community. Given the overlapping interests of the research topics addressed by the TF-NGN working group and the project objectives of 6QM participation in TF-

NGN meeting will be used for mutual information exchange and potentially planning for common experimentations with partner NRENs working in the 6QM relevant research areas.

4.5 Summary

A number of projects within the IST framework can be identified, with which there exist an overlap of common interests and where we see a potential for mutual synergies, such that some form of cooperation and information exchange should be established. It is however obvious that, resources for close direct cooperation with other project consortia are limited on both sides, therefore a well-balanced approach into this community must be undertaken.

It is also clear, that a number of projects listed above are already in their final stages, such that there is little chance for direct cooperation on a project-to-project basis. However, in several cases, it is expected that there will derive some form of up-take of target research topics, either in form of a new project in the next framework or within the new instruments of Integrated Projects and Network of Excellence. Hence, those project names should be considered as placeholders for future activities that are expected to be set-up during the next year and 6QM will engage in cooperation activities to their respective follow-ups.

But in any case, the main mechanism for dissemination and mutual information exchange on the wider scale will be performed within the framework of larger project clusters, which are the appropriate forum for such activities.

For the more direct cooperation, the 6QM consortium has clear priorities. Highest goal is the coordination of common experiments. The requirement is that in the partner project there exist an accessible IPv6 infrastructure and applications with QoS requirements and there must be possibilities for 6QM researches to deploy measurement components.

The 6QM consortium is confident to establish such links during the next project phase and expects to realize cooperation especially through projects with common partner involvement. Progress and results of this activity will be released in the "*Report on Liaison"* deliverable detailing the specific liaison activities that are established in the project, which is due to February 2003.

5. OTHER RESEARCH GROUPS AND INDUSTRIAL FORA

5.1 IPv6 Forum

A world-wide consortium of leading Internet vendors, Research & Education Networks are shaping the IPv6 FORUM, with a clear mission to promote IPv6 by dramatically improving the market and user awareness of IPv6, creating a quality and secure Next Generation Internet and allowing world-wide equitable access to knowledge and technology, embracing a moral responsibility to the world.

The IPv6 Forum is organizing and participating in many events worldwide. IPv6 Forum sponsored events include the IPv6 Conference this year in France and Global IPv6 Summits all over the world, which provide an introduction to IPv6 to professionals specially in fields like: Internet Service Providers, e-commerce, Telco's, Utilities, Defense, Security, Finance, Public Administration, Education, and in general any kind of Telecomm Professional.

6QM will work very closely with the IPv6 Forum for awareness creation among the actors responsible for developing next generation networks.

5.2 IPv6 Task Force

The European Commission established the IPv6 Task Force in April 2001. The mandate of the Task Force was to map out a strategy for achieving the validation of the technical case for IPv6. This was achieved by a global and collective consensus calling on experts from the technical community, from equipment manufacturers, ISPs, telecom operators and research and education sector, including members from ETSI, Eurescom, IETF, ISOC, IPv6 Forum, ITU. The results of this consensus have been summarized in recommendation documents published in the IPv6 Task Force web page.

The European Commission has called for the renewal of the mandate of the IPv6 Task Force as a platform for debate on critical issues concerning the deployment of IPv6. The mandate includes ensuring a working liaison with standards and Internet governance bodies, provisioning of a regularly updated review and plan of action (the European IPv6 Roadmap) on the development and future perspectives of IPv6 to co-ordinate European efforts, and establishing collaboration arrangements and working relationships with similar initiatives launched in other world regions.

5.3 IPv6 Promotion Council

The IPv6 Promotion council is a Japanese initiative involving about fifty corporate members at the moment. For furthering widespread and upgrade of IPv6, accompanied it is planed to expand the number of membership and administration board. It was formed in response to the e-Japan Priority Policy Program established in March 2001, which has the target to realize an Internet environment equipped with IPv6 by 2005.

Aims of the Council include showing international leadership within the field of Internet development, to develop human resources for an advanced information and telecommunications network society and to create and support new business related to hardware, software and its service associated with networks and terminals.

On 19 Sept 2002 the European Commission initiated IPv6 (Internet protocol version 6) task force and the IPv6 promotion council of Japan announced to have approved a cooperation agreement to foster promotion and deployment and garner support for the new generation IPv6. The 6QM project with its consortium of European and Japanese partners offers the unique opportunity to demonstrate such cooperation in practice.

5.4 Global Grid Forum

The Global Grid Forum (GGF) is a community-initiated forum of individual researchers and practitioners working on distributed computing, or "grid" technologies. 6QM related topics are especially addressed in Area 4 ‘Grid Performance & Information Services’. The Network Measurements Working Group (NMWG) in area 4 identifies and characterizes metrics useful to grid applications and middleware, and develops standards to ensure the compatibility of metrics across measurement systems and applications.

The NMWG focuses on metrics of interest to grid applications and works in collaboration with, other standards groups such as the IETF IPPM WG and the Internet2 End-to-end initiative. The NMWG will determine which of the metrics defined by such groups are relevant to Grid applications, and pursue standardization of metrics of shared interest to multiple communities.

5.5 3GPP

The 3rd Generation Partnership Project is a collaboration agreement that brings together a number of telecommunications standards bodies. The current Organizational Partners are ARIB, CWTS, ETSI, T1, TTA, and TTC. The scope of 3GPP is to produce globally applicable Technical Specifications and Technical Reports for a 3rd Generation Mobile System. QoS issues are especially addressed in WG 2 (Architecture).

6. STANDARDIZATION ACTIVITIES

The work of 6QM is much dependent to standardization activities. There are a number of aspects and tasks that may profit from or even demand mutual agreement by industry players on common standards. This pertains to such diverse goals as e.g. to achieve compatibility between measurement systems, harmonize different measurement approaches and allow for measurements spanning across multiple domains, guarantee comparability of different measurement results, etc.

The interaction of the 6QM consortium with standardization organizations and industrial fora will be in a two-way communication. For the design of the 6QM system there will be selected common industrial standards with regard to measurement metrics, data formats and protocols for results presentation, collection and exchange. However 6QM will feedback the experiences made in the project and will come up with proposals for adaptations and supplements to existing standards where appropriate, and moreover, 6QM will actively participate and trigger new standardization activities in those areas where common approaches are still lacking or insufficiently covered.

Consortium members are already contributors to various standardization fora like IETF, ETSI and ITU-T. Those established channels will be used and exploited for presenting and pushing for 6QM derived solutions. In this way 6QM proposals will find broad reception in these fora and a wider uptake by the community at large. Dissemination activities with regard to standardization includes the production of input documents derived from project deliverables and other project documentation, participation in respective working group meetings and contribution, commenting and supplementing of standardization working drafts.

6.1 IETF Working Groups

6QM project partners are highly active in the IETF standardization forum. Members from the 6QM companies are regular participants in the IETF meetings, and several individuals working in 6QM directly contribute to IETF work as authors of working group drafts.

With respect to the scope of 6QM, the activities of the following working groups will be of particular interest:

6.1.1 IPPM Working Group

The IPPM WG develops a set of standard metrics that can be applied to the quality, performance, and reliability of Internet data delivery services. These metrics are designed such that network operators, end users, or independent testing groups can perform them. The metrics should provide unbiased quantitative measures of performance.

6.1.2 IPFIX Working Group

The working group is working on standards for IP devices such as routers and measurement elements to export flow information to external systems such as mediation, accounting/billing, and network management systems. An IP flow information export system includes a data model, which represents the flow information, and a transport protocol. An "exporter," which is typically an IP router or IP traffic measurement device, will employ the IP flow information

export system to report information about "IP flows". The reported flow information will include both attributes derived from the IP packet headers and attributes often known only to the exporter such as ingress and egress ports, IP (sub)net mask, autonomous system numbers and perhaps sub-IP-layer information.

6.1.3 PSAMP Working Group

The Packet Sampling working group is chartered to define a standard set of capabilities for network elements to sample subsets of packets by statistical and other methods. The capabilities should be simple enough that they can be implemented ubiquitously at maximal line rate. They should be rich enough to support a range of existing and emerging measurement-based applications, and other IETF working groups where appropriate.

The WG will focus be on the specification of a set of selection operations by which packets are sampled, the information that is to be made available for reporting on sampled packets; protocols by which information on sampled packets is reported as well as protocols by which packet selection and reporting is configured.

6.1.4 Traffic Engineering Working Group

Internet Traffic Engineering is concerned with the performance optimization of traffic handling in operational networks. Traffic Engineering applies business goals, technology and scientific principles to the measurement, modeling, characterization, and control of internet traffic, and the application of such knowledge and techniques to achieve specific service and performance objectives, including the reliable and expeditious movement of traffic, the efficient utilization of network resources, and the planning of network capacity.

The primary focus of the Internet Traffic Engineering Working Group (TE) is the measurement and control aspects of intra-domain Internet traffic engineering. This includes provisioning, measurement and control of intra-domain routing, and measurement and control aspects of intra-domain network resource allocation. Techniques already in use or in advanced development for traffic engineering include overlay models, MPLS based approaches, constraint-based routing, and traffic engineering methodologies in DiffServ environments. The TE describes these and documents how various techniques fit together and identifies scenarios in which they are useful. The working group may also consider the problems of traffic engineering across autonomous systems boundaries.

6.1.5 CCAMP Working Group

The CCAMP (Common Control and Measurement Plane) working group coordinates the work within the IETF defining a common control plane and a separate common measurement plane for ISP and SP core tunneling technologies. CCAMP WG tasks include, among others, the definition of signaling protocols and measurement protocols such that they support multiple physical path and tunnel technologies. Signaling and measurement protocols should be independent of each other to allow applications other than signaling protocol to make use of the measurement protocol. The group will develop and define a set of protocol-independent metrics and parameters for describing properties of links and paths that can be carried in protocols.

6.1.6 IPv6 Working Group

This working group focuses on completing the remaining work items for the IPv6 protocol standardization and providing a home for IPv6 work that spans multiple IETF working groups.

There are several work items which may be expected to potentially impact on 6QM and where results from 6QM may contribute, e.g. flow label standardization, special extension headers, multi-homing, mobile wireless networks, etc.

6.1.7 IRTF Internet Measurement Research Group

The Internet Measurement Research Group (IMRG) is a working group in the Internet Research Task Force, whose mission statement is "*to promote research of importance to the evolution of the future Internet"*. The goal of the IMRG group is to provide a forum for discussion of Internet measurement research issues, to assess new measurement techniques, and to increase interactions between operators, developers of measurement tools and techniques, and researchers who analyze and model Internet dynamics. The scope includes active techniques, passive monitoring, end-point probing, in-network methods, network layer, transport layer, application layer, etc.

6.2 ITU-T Study Groups

Within ITU-T it is especially 13 SG (Study Group) that is in charge of topics addressed by 6QM. The work of 6QM is of high interest to Question 6 "Performance of IP-Based Networks and The Emerging Global Information Infrastructure". The charter of this activity states:

> "As critical communications services increase their reliance on IP networking, the user-perceived performance of IP networks is becoming increasingly important. When several IP network providers work together to provide end-to-end communications, each provider needs to understand its fair allocation of the end-to-end performance objectives. Those allocations must be both adequate for the service being offered and feasible based on the available networking technologies.
>
> A framework is needed to guide the development of performance Recommendations for new network capabilities, transmission facilities, and services/applications, including those supported by the emerging global information infrastructure, and to relate performance Recommendations focused on different protocol and service layers."

It can be expected that 6QM results can contribute specifically to the following questions listed under **Items for study**:

- How will QoS commitments of IP networks be verified?
- What additional parameters and statistics should be added to Recommendation Y.1540 so that users can fully understand important performance attributes of IP networks?
- What Recommendations are required to describe the throughput performance of IP "connections" and the relationship of throughput to availability?
- How should the generic measurement points, reference events, communication functions, performance outcomes, and performance parameters defined in Recommendations I.350 be supplemented to address new network capabilities?
- How should the general structure of performance Recommendations summarized in Recommendation I.351/Y.801/Y.1540 be revised to reflect these innovations?
- How should performance Recommendations address communications built on heterogeneous networking technologies?

6.3 ETSI and Partnership Projects

ETSI Technical Bodies with IP related Work Items refers to several ETSI Technical Committees foremost this is SPAN (Services & Protocols for Advanced Networks) which addresses ISDN/IP impact on SS7, DSS1 over IP, Charging over IP, V5.2 Internet access, Convergence IP/Telecommunications, IP over DTM and Cable. An ETSI Partnership Project with many work items related to the all IP core network is 3GPP.

ETSI's Plugtests™ Service organizes the IPv6 (Internet Protocol Version 6) interoperability testing event which provides a commercially secure environment in which engineers can meet together to share experiences, to check their implementations with others and to ensure interoperability of their products and prototypes.

7. INTERNATIONAL CONFERENCES AND WORKSHOPS

A major means for dissemination of project results to the research community will be through presentations at international conferences and workshops devoted to 6QM related topics.

The 6QM participants will produce material to be presented at conferences and workshop. In general, we see here four major categories for contributions to be derived and adopted from the project deliverables:

- Broader tutorials, guidelines and recommendation presenting an overview on issues in the 6QM scope and putting them in context to general trends in next generation networking.
- Analysis of the specific 6QM problem area, characterization of the particular challenges posed and identification of newly arising opportunities.
- Presentation of the selected 6QM approach for QoS measurement in IPv6 based networking environments, discussion of the design decisions, presentation of features and capabilities and potential for future enhancements.
- Reports on measurement results achieved with the 6QM system.

The 6QM consortium will take steps to place 6QM research papers at high profile conferences and workshops in the field. Main events of interests comprise:

- Specialized events for IP measurement approaches including PAM workshops (passive and active workshop), the International Conference on Measurement and Modeling of Computer Systems organized by the ACM SIGMETRICS group.
- Specialized events for IP QoS related research including QofIS (QofIS - Quality of future Internet Services), IWQoS (International Workshop on Quality of Service).
- Dissemination events devoted to IPv6 and Next Generation Networking.
- Major events for European Research Networking like Terena Networking Conference.
- IST yearly conference event as Europe's main event on IT and communications research.
- High profile international scientific conferences with a broader scope including conferences such as ACM SIGCOMM, IEEE Infocom or Globecom.

In addition, 6QM partners are actively involved in the organization of events for the scientific and industrial community. Such events may scope on the national or international level and offer opportunities to create awareness for 6QM activities. Recent events include:

- Traffic Measurement & Monitoring Roadmap and QoS Roadmap (MoMe Workshop Berlin 13 June 2002).
- QoS Measurement and Monitoring Workshop (Associated Symposium to 8th TF-NGN Meeting, Berlin, 3 July 2002).
- 6th Symposium Hitachi – Eurecom – Motorola (Mobile Communication for Everyone, Sophia Antipolis, 28 November 2002)
- Joint FOKUS DFN Workshop on QoS Measurement (Meeting Day for German QoS projects, Berlin, planned for early January 2003).
- Madrid Global IPv6 Summit (IPv6 Forum events organized by Consulintel in Madrid).

8. 6QM WEBSITE AND PROJECT INFORMATION MATERIAL

The project has established a web site for on-line information exchange that is the official home of the project on the World-Wide Web (http://www.ist-6qm.org). All public information will be made available through this site. It forms the general data repository for all project related information and in addition will act as a central reference point and information exchange with further links to general IPv6 QoS Measurement related documentation.

In particular the project website will give access to:

- Project overview and contact points.
- General information explaining to a wider public project scope, context, potential impact and application of results offering downloadable leaflets, brochures, etc.
- Project news announcements and project-related press releases.
- Technical information in form of:
    - Public project deliverables, derived hyperlinked web versions.
    - Articles, papers and presentations.
    - Documentation to software tools developed in the project.
    - Experiment descriptions and measurement results.
- Links to other relevant projects and initiatives worldwide.

The web will have both IPv6 and IPv4 capability, so that the native IPv6 connectivity can be demonstrated across several IPv6 networks.

The portal will also hold the private workspace for the 6QM project partners for on-line information management with both administrative and technical management, contributions deliveries and discussion groups including a repository for all project deliverables.

9. UPDATED PARTNERS EXPLOITATION AND USE PLAN

9.1 HEL Exploitation Plan

One of Hitachi Europe's target market areas is that of network services, specifically related to management of IPv6 network infrastructure. Currently, the existing technology inhibits us from providing IPv6-based premium services. We view IPv6 QoS Measurement technology as an opportunity to leverage new services that will allow us to couple our IPv6 router products with meaningful services that can de deployed, tested and demonstrated. Accordingly, we need a deep understanding of the requirements, and technology with which we can experiment on an operational IPv6 network.

Establishing QoS measurement technology is a mandatory step to develop a management system for IPv6 networks, the results of this project will then represent the first milestone to initiate profitable and competitive services business in Europe.

As a leader, Hitachi Europe will create a strong community among major IPv6 actors both in Europe and Japan, and will then contribute to strengthen European leadership in this essential technology for the future of IT society. Hence we believe that this project is a facilitator for achieving, Hitachi's goal of becoming the most trusted services and systems provider.

For Hitachi Europe, 6QM is also an excellent opportunity to participate in a European project and get in touch with other European partners. Since our research units are still young, it is very important for us to build a network of contacts for future collaboration possibilities. Already now, the 6QM project has provided us contacts with many partners for potential future projects such as in the FP6 context.

We see 6QM as a first step towards broader collaboration in Europe in the area of next generation networks. These networks of the future must provide Quality of Service, reliability, and must be easy to manage. 6QM will offer measuring tools that allow accurate network performance monitoring. This enables pro-active management and can be used as a tool to improve network management features and to facilitate the task of the network manager.

6QM is also the place where high-end solutions for QoS measurement for the next telecommunication infrastructure will be developed. This is a very good opportunity to bridge the gap from R&D and business.

Businesses around IPv6 are today starting in Japan and of course such a business cannot raise its momentum without a proper way to manage the supporting infrastructures.

As we believe that IPv6 will be the next generation communication protocol, it is a strong asset for us to be part of the action that will setup the basics of the management of this infrastructure.

9.2 HIT Exploitation Plan

Hitachi, Ltd. has strongly focused on the IPv6 network solution. Hitachi has already developed and shipped IPv6 and v4 capable gigabit router, GR2000, for carrier-class large-scale IP routers in a worldwide market. GR2000 supports QoS guaranteed IP packet forwarding capability that enable telecommunication operators to provide the premium services beyond the best effort

services. Moreover, Hitachi also developed and shipped IPv6 network topology management in Japan market. This product manages the configuration of IPv6 nodes and routers.

This project will accelerate above activity, especially IPv6 network management solution from Hitachi. The researchers joining this project will acquire many skills and experiences for IPv6 QoS measurement technology. Through this project performed by the co-operation of major European operators and institutes, he will able to propose the sophisticated IPv6 management tools to the product development division of Hitachi after this project. Hitachi will have a plan to develop IPv6-based QoS measurement tools/systems

9.3 FT RD Exploitation Plan

As a global operator, France Telecom is very interested by any new technology, tools, equipment which improve the performance of the networks and services, lower the costs of management, generate new revenues and permit a penetration of new services with guaranteed SLA according to the contracts with the clients.

The 6QM project is very important for us regarding the impact of the standardization of the QoS Measurement and its integration in IPv6 networks & services. FTR&D is interested in 6QM project results to consolidate and increase its expertise in the field of the QoS measurement and management and to play a proactive role in the specification of the future advanced IPv6 services with differentiated QoS that will be deployed and supported by France Telecom Business Units, as it is expected by our clients and by the market of New Generation Internet IPv6-based.

The lack of international framework for inter-domain measurement deployment across measurement system, blocks the deployment of large measurement systems. The 6QM project represents for us an opportunity to define and experiment a framework for the measurement inter administrative areas. FT is active in this area at the IETF.

The management of the migration of IPv4 networks to IPv6 networks, the coexistence of IPv4 and IPv6 networks need efficient systems of measurement for the troubleshooting and the control of the QoS. The 6QM project is very important for us because we consider it as the kick-off for the industrialization of IPv6 probes, the definition of a trajectory of interoperability for the different components of an IPv6 system of measure, and the study of the issues regarding the interoperability across IPv4 and IPv6.

The 6QM project is a real opportunity to contribute to the standardization of the different IPv6 measurement topics, especially in the consolidation of the standards produced by ITU, IETF and 3GPP.

FT has invested heavily in QoS research, both internally, and in the context of other European projects. We remain committed to this effort in the evolution of IPv4->IPv6. As such, we intend to benefit from the studies done in the context of the 6QM project to further our expertise on QoS measurement, and ensure our ability to meet quality expectations in our future IP service offerings.

9.4 CONSULINTEL Exploitation Plan

6QM will help maintain Consulintel’s leverage on the Spanish market with IPv6 networks, consultancy, system integration, and training, as has been recognized during last 3 years.

Now, participating in a project with global interest, the results will allow Consulintel to enter in new large scale business as a system provider for carriers, operators, ISPs and others, opening new business expectative related to QoS and related management.

Consulintel will highly support 6QM and concentrate a strong investment, reinforcing the growth of the company and its research, development, and marketing opportunities, increasing the experience and the number of full time dedicated employees.

Consulintel plan is to increase the number of IPv6 related innovative and advanced services, offering and applications, creating a more secure new Internet that would offer security warranties and real mobility support.

9.5 FOKUS Exploitation Plan

The research group from FOKUS participating in 6QM has long standing expertise in the development and operation of hardware and software based IP measurement technologies. FOKUS is developing prototype measurement solutions and is an active participant in standardization bodies working on QoS measurement.

In addition, they are operating the FOKUS UMTS Testlab, a test and development platform for entry-level access to UMTS and integrated mobile services. This testbed equipped with all the technical components of a commercial UMTS network serves as a trial platform for development projects where service components can be adapted to UMTS and 3Gb Wireless All-IP scenarios. The solutions developed in 6QM will be installed in this experimental environment and will bring add-value to the testbed.

Throughout participation in various national and international research projects FOKUS has been observing a high demand for QoS measurement support. Those activities with diverse partners comprise a.o. cooperations with European Telcos in the context of EURESCOM research initiatives, other IST projects together with partners from European NRNs (national research networks) and the trans-European backbone GEANT, and participation in working groups such as TF-NGN. There is a need for sophisticated measurement solutions that are capable to handle the new features provided with IPv6 (including the Multicast and IPsec features of IPv6).

FOKUS will actively bring 6QM research results and measurement technologies to these communities. FOKUS will collect their particular requirements and will further push the exploitation of the solutions developed by 6QM in this area. FOKUS will promote the deployment of the measurement architecture in research networks and the research community. With this the measurement solution can be tested in the future environment and highly valuable feedback from expert users can be gathered. Tools will find usage in co-operations for field trials and application experiments. The flexibility of the 6QM approach will be demonstrated for both NRN networks and the commercial environment. With its 6QM toolset FOKUS can bring added value to other IPv6 related projects and activities, and thus can contribute to a successful transition to this new networking technology.

Interoperable co-operation of different QoS measurement tools depend on standardized solutions. FOKUS will contribute 6QM project results in order to bring forward the development of a standardized measurement solution. Major target groups for 6QM results will be the IETF working groups related to QoS measurement, such as ipfix (IP Flow Information Export) psamp (Packet Sampling) or ippm (IP Performance Metrics) and activities related to AAA (Authentication, Authorization and Accounting) and IRTF Internet Measurement Working

Group. 6QM results will contribute here especially to efforts for measurement data collection and measurement configuration.

10. DISSEMINATION ACTIVITIES SO FAR

Date	Location	Topic	Participants
09/05/2002	Beijing	**6QM Presentation** China IPv6 Forum	Jordi Palet (Consulintel)
16/05/2002	Madrid	**6QM Presentation** Spanish IPv6 Task Force Kick-off	Jordi Palet (Consulintel)
21/05/2002	Yaroslavl	**6QM Presentation** Russia IPv6 Forum	Jordi Palet (Consulintel)
13/06/2002	Berlin	**Traffic Measurement & Monitoring Roadmap and QoS Roadmap, MoMe Workshop** 6QM Project Announcement	Rudolf Roth (FOKUS)
19/06/2002	Washington	**6QM Presentation** US IPv6 Forum / INET2002	Jordi Palet (Consulintel)
27/06/2002	Madrid	**Conecta SP 2002** IPv6 Presentation for Public Admin.	Jordi Palet (Consulintel)
02/07/2002	Brussels	**6QM Presentation** Japan IPv6 Promotion Council	Jordi Palet (Consulintel)
03/07/2002	Berlin	**FOKUS/T-NOVA QoS Measurement Workshop (TF-NGN add-on event)** 6QM Project Announcement	Rudolf Roth (FOKUS)
10/07/2002	Seoul	**6QM Presentation** Korea IPv6 Forum	Jordi Palet (Consulintel)
19/07/2002	Yokohama	**6QM Presentation** Hitachi Labs	Jordi Palet (Consulintel)
23/07/2002	Valencia	**6QM Presentation** Campus TI	Jordi Palet (Consulintel)
24/07/2002	Brussels	**6QM Presentation** IPv6 Cluster meeting	Jordi Palet (Consulintel)
02/08/2002	Gran Canaria	**6QM Presentation** FICIT 2002 event	Jordi Palet (Consulintel)
05/08/2002	Valencia	**6QM Presentation** Campus Party Event (two presentations)	Jordi Palet (Consulintel)
17/09/2002	CA (US)	**6QM Presentation** UCI/UCLA	Jordi Palet (Consulintel)
04/11/2002	Copenhagen	**IST2002 FTR&D** Demo:IPv6 probes and and IPPM proxy agent	Emile Stephan (FTR&D) Yann Adam (FTR&D)

04/11/2002	Copenhagen	**IST2002 and IPv6 Cluster meeting**	Jordi Palet (Consulintel) Alvaro Vives (Consulintel) Tayeb Ben Meriem (FTR&D) Lidia Yamamoto (HEL)
17/11/2002	Atlanta	**IETF IPPM WG** Presentation of spatial metrics definition for coupling active and passive measures	Emile Stephan (FTR&D)
28/11/2002	Nice	**Hitachi-Eurecom-Motorola Symposium (28-29 November 2002** IPv6 Cluster booklet distributed, and 6QM project introduced	Stephane Amarger (HEL) Jordi Palet (Consulintel) Lidia Yamamoto (HEL)

11. SUMMARY AND CONCLUSIONS

This document described the opportunities planned to be taken by the 6QM consortium to disseminate the achievements from the project. The general outline described in the Technical Annex has been detailed by identifying specific projects, groups and fora that should be targeted in the dissemination effort, describing adequate means for reaching them and potentials for cooperation.

Each year summary reports will be provided for an actualization of the exploitation plans and a documentation of the dissemination results listing the achievements accomplished during the previous period.

12. REFERENCES

12.1 Related Cluster Activities and IST Projects

12.1.1 IPv6 Project Cluster

IST KA4 Mobile & Satellite IPv6 RELATED PROJECTS
http://www.cordis.lu/ist/ka4/mobile/proclu/p/iprelatedproj.htm

Research Networking in Europe - Striving for global leadership
Brochure, Sept 2002

IPv6 Cluster
http://www.ist-ipv6.org/

IPv6 Cluster Booklet: IPv6 Research and Development in Europe
http://www.ist-ipv6.org/documents/IPv6_Research_and_Development_in_Europe.zip

6LINK
http://www.6link.org/

Eurov6
http://www.eurov6.org/

IPv6 TF-SC
http://www.ipv6tf-sc.org/

6NET
http://www.6net.org/

Euro6IX: European IPv6 Internet Exchanges Backbone
http://www.euro6ix.org/

GÉANT IPv6 Test Programme: GTPv6
http://www.ipv6.ac.uk/gtpv6/

Global Communication Architecture & Protocols
for new QoS services over IPv6 Networks
http://www.laas.fr/GCAP/

LONG - Laboratories Over Next Generation Networks
http://long.ccaba.upc.es/

WINE - Wireless Internet Networks
http://www.vtt.fi/ele/projects/wine/

IPv6 Wireless Internet IniTiative
http://www.6winit.org/

SATIP6 - Satellite Broadband Multimedia System for IPv6
http://satip6.tilab.com

Spectrum Efficient Uni- and Multicast Services
over Dynamic Multi-Radio Networks in Vehicular Environments
http://www.ist-drive.org

6POWER: IPv6, QoS & Power Line Integration
http://www.6power.org

6HOP, Protocols for Heterogeneous Multi-Hop Wireless
http://dbs.cordis.lu/fep-cgi/srchidadb?ACTION=D&CALLER=PROJ_IST&QF_EP_RPG=IST-2001-37385

DRiVE Dynamic Radio for IP-Services in Vehicular Environments
http://www.ist-drive.org

HARMONICS Hybrid Access Reconfigurable Multi-wavelength Optical Networks
for IP-based Communication Services
http://www.ist-harmonics.net

ANDROID Active Networks Distributed Open Infrastructure Development
http://www.cs.ucl.ac.uk/research/android

CRUMPET Creation of User Friendly Mobile Services Personalised for Tourism
http://www.ist-crumpet.org

NGNi Next Generation Networks Initiative
http://www.ngni.org

NGN-LAB Next Generation Networks Laboratories
http://www.ngn-lab.org

Moby Dick - Mobility and Differentiated Services in a Future IP Network
http://www-int.berkom.de/~mobydick/

MIND: Mobile IP based Network Developments
http://www.ist-mind.org/

TORRENT Technology for a Realistic End User Access Network Test-bed
http://www.elec.qmul.ac.uk/torrent

WirelessCabin Development and Demonstrator of Wireless Access for Multimedia Services in Aircraft Cabins
http://www.wirelesscabin.com

xMOTION eMobile Test-bed for Interoperabilily of Networks in eLogistics
http://www.ist-xmotion.org

SEEREN South Eastern European Research and Education Networking
http://www.seeren.org

MESCAL Management of End-to-end Quality of Service Across the Internet at Large
http://www.ist-mescal.org

12.1.2 QoS Clustering Activites

AQUILA - Adaptive Resource Control for QoS Using an IP-based Layered Architecture
http://www.ist-aquila.org/

CADENUS - Creation and Deployment of End-UserServices in Premium IP Networks
http://www.cadenus.org/

IST TEQUILA
Traffic Engineering for Quality of Service in the Internet, at Large Scale
http://www.ist-tequila.org/

COST263: Quality of future Internet Services
http://www.fokus.gmd.de/research/cc/glone/projects/cost263/

12.1.3 Monitoring and Measurement Cluster

IST MoMe - Cluster of European Project aimed at Monitoring and Measurement
http://www.ist-mome.org/

MoMe Workshop Berlin 13.th Juni 2002 Summary
http://www.ist-mome.org/docs/mome_workshop_rep_v1.doc

Intermon - Advanced architecture for INTER-domain
quality of service MONitoring, modelling and visualisation
http://www.ist-intermon.org/

ATRIUM IST-1999-20675
A Test-bed of Terabit IP Routers running MPLS over DWDM
http://world.alcatel.be/atrium/index.htm

NGN Initiative - Next Generation Networks
http://www.ngni.org/about.htm

SCAMPI
http://www.ist-scampi.org/

12.1.4 European Research Networking

GEANT
http://www.dante.net/geant/

GÉANT IPv6 project (or GÉANT Test Programme, GTPv6)
http://www.ipv6.ac.uk/gtpv6/workplan.html

TF-NGN -- The GÉANT Technical Programme
The GÉANT Technical Programme and TF-NGN
http://www.dante.net/tf-ngn/

12.2 IETF Standardization

IP Performance Metrics (ippm) Charter
http://ietf.org/html.charters/ippm-charter.html

IP Flow Information Export (ipfix)
http://ietf.org/html.charters/ipfix-charter.html

Packet Sampling (psamp)
http://ietf.org/html.charters/psamp-charter.html

Internet Traffic Engineering (tewg)
http://ietf.org/html.charters/tewg-charter.html

Common Control and Measurement Plane (ccamp)
http://ietf.org/html.charters/ccamp-charter.html

IRTF Internet Measurement Research Group
http://www.irtf.org/charters/imrg.html

12.3 ITU-T Standardization

ITU-T Study Groups
http://www.itu.int/ITU-T/studygroups/index.html

ITU-T Study Group 12
End-to-end transmission performance of networks and terminals
Lead Study Group on Quality of Service and performance
http://www.itu.int/ITU-T/studygroups/com12/index.asp

ITU-T Study Group 13
Multi-protocol and IP-based networks and their internetworking
Lead Study Group for IP related matters, B-ISDN, Global Information Infrastructure and satellite matters
http://www.itu.int/ITU-T/studygroups/com13/index.asp

Question F/16 - Quality of Service (QoS) and End-to-End Performance in Multimedia Systems
http://www.itu.int/ITU-T/studygroups/com16/sg16-qf.html

12.4 ETSI Standardization

ETSI Technical Bodies with IP related Work Items
http://www.etsi.org/technicalfocus/home.htm

ETSI Collaborative Portal - SPAN - Services and Protocols for Advanced Networks
http://portal.etsi.org/portal_common/home.asp?tbkey1=SPAN

ETSI Workshop on QoS in Next Generation Networks
http://www.etsi.org/frameset/home.htm?/qosworkshop/home.htm

12.5 Industry Fora

IPv6 Forum
http://www.ipv6forum.org/

IPv6 Task Force
http://www.ipv6tf.org/

IPv6 Promotion Council (English Home Page)
http://www.v6pc.jp/en/index.html

Global Grid Forum
http://www.gridforum.org/

Grid Performance & Information Services
http://www-didc.lbl.gov/GridPerf/

Network Measurements Working Group
http://www-didc.lbl.gov/NMWG/

The 3rd Generation Partnership Project (3GPP)
http://www.3gpp.org

3GPP IETF Dependencies and Priorities
http://www.3gpp.org/TB/Other/IETF.htm

12.6 Conferences

12.6.1 Measurement

PAM2003 - Passive and Active Measurement Workshop
http://www.pam2003.org/

ACM SIGMETRICS
http://www.sigmetrics.org/

ACM SIGMETRICS 2003
the International Conference on Measurement and Modeling of Computer Systems
http://www.crhc.uiuc.edu/sigm2003/

Internet Measurement Workshop
http://www.icir.org/vern/imw-2002/

12.6.2 IPv6 Conferences

IPv6 conference
Paris, 28 - 30 Nov. 2002
http://www.renater.fr/IPv6-2002/Programme.htm

Global IPv6 Summit Events
http://www.ipv6forum.org/navbar/events/global.htm

12.6.3 QoS Conferences

IWQoS 2003 in Monterey see 10th IWQoS 2002
http://www.cs.virginia.edu/~iwqos/

QofIS2003, Stockholm-Kista, Sweden
QofIS - Quality of future Internet Services
http://www.fokus.gmd.de/research/cc/glone/projects/cost263/workshops.html

12.6.4 Research Networking Conferences

TERENA Networking Conference TNC 2003
http://www.terena.nl/conferences/tnc2003/

IST Annual Conference
http://www.cordis.lu/ist/past_events.htm#annual

12.6.5 General Scope Conferences

ACM SIGCOMM
Special Interest Group on Data Communications
http://www.acm.org/sigcomm/

Computer Performance Modeling, Measurement and Evaluation
http://perf2002.uniroma2.it/

GLOBECOM 2003
http://www.globecom2003.com/

Next Generation Networks and Internet Symposium
http://www.globecom2003.com/NeXt%20Gen.pdf

IEEE INFOCOM - The Conference on Computer Communications
http://www.ieee-infocom.org/
http://www.comsoc.org/confs/infocom/index.html

IEEE INTERNATIONAL CONFERENCE ON COMMUNICATION
http://www.icc2003.com

12.6.6 Partner Organized Events

6th Symposium Hitachi – Eurecom – Motorola: Mobile Communication for Everyone
http://www.eurecom.fr/Symposium2002/

Madrid 2003 Global IPv6 Summit
http://www.ipv6-es.com